

Service
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PRODUCT FAMILY TARGET FM TUNER

Service Manual



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PHILIPS

TECHNICAL SPECIFICATION

General

Dimensions (WxHxD) : 128x30x139.5mm
Weight without batteries : 220g

Laser

Output power : <5mW (3mW typ.)
Wavelength : 780nm

Shock resistance

+X/-X direction : $\geq 2.5g$
+Y/-Y direction : $\geq 2.5g$
+Z/-Z direction : $\geq 2.0g$

Power supply modes

SUPPLY MODE	Voltage range	
	CD	Tuner
DC-in socket	2.9 - 6.0V	
Primary batteries 2 x LR6	1.9 - 3.0V	1.9 - 3.0V
Rechargeable batteries AY3362	1.9 - 3.0V	1.9 - 3.0V

Battery lifetime

BATTERY TYPE	CD MODE PSM IN	CD MODE ESP=ON	TUNER MODE
Primary batteries 2 x LR6	$\geq 15h$ (20h typ.)	$\geq 10h$ (12h typ.)	$\geq 40h$ (50h typ.)
Rechargeable batteries AY3362	$\geq 7h$ (12h typ.)	$\geq 7h$ (8h typ.)	$\geq 25h$ (30h typ.)

Battery level detection – CD mode

DETECTION LEVEL	Primary batteries	Rechargeable batteries
Battery empty	1.8V +100/-50mV	1.8V +100/-50mV
Battery weak 1	battery empty level + 0.75V $\pm 100mV$	battery empty level + 0.7V $\pm 100mV$
Battery weak 2	battery empty level + 0.45V $\pm 100mV$	battery empty level + 0.5V $\pm 100mV$
Battery weak 3	battery empty level + 0.25V $\pm 100mV$	battery empty level + 0.3V $\pm 100mV$

Battery level detection – Tuner mode

DETECTION LEVEL	Primary batteries	Rechargeable batteries
Battery empty	2.0V +100/-50mV	2.0V +100/-50mV
Battery weak 1	battery empty level + 0.7V $\pm 100mV$	battery empty level + 0.5V $\pm 100mV$
Battery weak 2	battery empty level + 0.45V $\pm 100mV$	battery empty level + 0.35V $\pm 100mV$
Battery weak 3	battery empty level + 0.2V $\pm 100mV$	battery empty level + 0.2V $\pm 100mV$

Current consumption

OPERATION MODE	DC-IN SUPPLY (4.5V)		BATT. SUPPLY (2.25V)	
	PSM	ESP	PSM	ESP
CD Play mode	100mA typ.	120mA typ.	120mA typ.	150mA typ.
CD Jump mode	300mA typ.	300mA typ.	300mA typ.	400mA typ.
CHARGE mode	250mA typ.		n/a	
TUNER mode	60mA typ.		60mA typ.	
Stand-by (excl. recharge)	60mA typ.		350 μ A typ.	

Charge section (not on all versions)

Charge current : 250mA $\pm 50mA$
Max. charge time (μP controlled) : 7h
Temperature protection : 50°C $\pm 5^\circ C$

Tuner (not on all versions)

	FM
Tuning range	87.5-108MHz
Stereo -46dB S/N	$\leq 51.5dBf$ (48dBf typ.)
Sensitivity 26dB S/N, m=30%	$\leq 25dBf$ (35dBf typ.)
Channel separation 1mV $\Delta f=40kHz$	$> 26dBf$ (33dBf typ.)
Distortion	$\leq 7%$ (4% typ.) rf=1mV, $\Delta f=75kHz$
Stereo sw on point	45dBf (40dBf typ.)

Headphone out (CD)

Output power (THD=10%)
/17 version only : 8mW (+1/-3dB)
all other versions : 5mW (+1/-3dB)
Frequency response (1mW) : 100Hz-20kHz within 6dB
S/N ratio (unwght) : $\geq 76dB$ (80dB typ.)
S/N ratio (A-wght) : $\geq 78dB$ (82dB typ.)
THD+N (1kHz, 1mW) : $\leq 1%$ (0.2% typ.)
Crosstalk(1kHz,w/o load) : $\leq -24dB$ (-44dB typ.)
Channel unbalance (-40dB) : $\leq 5dB$
Volume attenuation (1kHz) : $> 60dB$ (70dB typ.)
Residual noise : $\leq 40nW$

Headphone out (Tuner)

Output power
/17 version only : 6.5mW (+1/-1dB)
all other versions : 3.3mW (+1/-1dB)
Crosstalk(1kHz) : $\leq -20dB$ (-35dB typ.)
THD+N (1kHz, 1mW) : $\leq 7%$ (2% typ.)
Residual noise : $\leq 40nW$

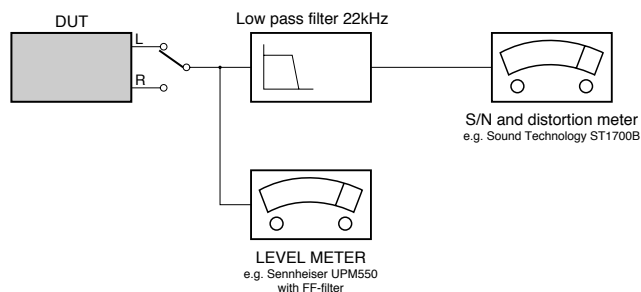
Dynamic Bass Boost DBB

DBB STAGE	Frequency response		
	63Hz	1kHz	10kHz
DBB	+7dB \pm 2dB		0dB \pm 2dB

Measurement setup CD

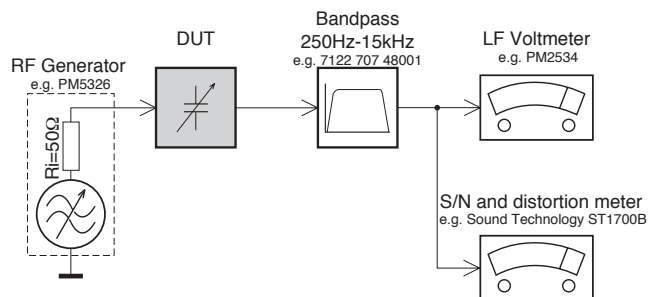
Use Audio Signal disc SBC429

4822 397 30184



Measurement setup FM

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



FEATURES

FEATURES OF CD-PORTABLE PRODUCT FAMILY FM TUNER	AZT3202/00c		AZT3202/05Z		AZT3202/10		AZT3202/01		AZT3202/17		AZT3202/07	
CD-RW COMPATIBILITY	●	●			●	●			●	●		
ELECTRONIC SKIP PROTECTION	45s	45s			45s	45s			45s	45s		
ESP DRAM SIZE [Mbit]	16	16			16	16			16	16		
HOLD / RESUME FUNCTION	●/●	●/●			●/●	●/●			●/●	●/●		
DBB STAGES	1	1			1	1			1	1		
ACOUSTIC FEEDBACK	●	●			●	●			●	●		
PROGRAM MEMORY	30	30			30	30			30	30		
RECHARGE NiCd / NiMH	●/●	●/●			●/●	●/●			--/--	--/--		
BELT-CLIP	●	●			●	●			●	●		
CORD REMOTE CONTROL	--	--			--	--			--	--		
LINE / OPT. DIGITAL OUTPUT	--/--	--/--			--/--	--/--			--/--	--/--		

ACCESSORIES

ACCESSORIES FOR CD-PORTABLE PRODUCT FAMILY FM TUNER		AZT3202														
		/00c	/05Z	/10	/01	/17	/07									
AY3170/00 AC/DC Adaptor	4822 219 10617	X														
AY3170/02 AC/DC Adaptor	4822 219 10676				X											
AY3170/05 AC/DC Adaptor	4822 219 10672		X													
AY3170/10 AC/DC Adaptor	4822 219 10681			X												
AY3170/17 AC/DC Adaptor	4822 219 10616							O	O							
AY3362/00 Rechargeable Batt. NiMH	3103 308 84120	X	X	X	X											
AY3464 HiFi Cord (3.5mm L-plug→cinch)	4822 320 11881	O	O	O	O			O	O							
AY3501/00 Car Adaptor Cassette	4822 397 10059	O	O	O	O			O	O							
AY3545/00 Car DC/DC Converter	4822 219 10033	O	O	O	O											
AY3545/17 Car DC/DC Converter	3140 118 32970							O	O							
HE205/77 Headphone	9082 100 00615	X	X	X	X											
HE205/77s Headphone (S-plug)	9082 100 00616															
HL351/77 Headphone	9082 100 00639															
HS383/77s Headphone (S-plug)	9082 100 01821							X	X							
BELT-CLIP	3103 304 70250	X	X	X	X			X	X							

X...supplied with the set, O...optional available

CONNECTIONS AND CONTROLS

1 OPEN

2

3 CD

4

5 HOLD OFF

6 PLAY

7 VOLUME

!!!

1

2

3

4

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English

CONTROLS / POWER SUPPLY

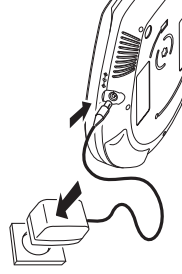
POWER SUPPLY / GENERAL INFORMATION

CONTROLS (see figure 1)

- 1 OPEN ►opens the CD lid
- 2 DBB.....switches the bass enhancement on and off. This button also switches acoustic feedback (the beep) on/off when it is pressed for more than 2 seconds
- 3 MODEselects the different playing possibilities: **shuffle**, **shuffle repeat all**, **repeat**, **repeat all** and **5 2 4 7**
- 4 PROG.....programs CD tracks and radio stations, reviews the program
- 5 PRESET ▲, ▼selects a preset tuner station (down, up)
- 6 FM.....selects the radio on or off.
- 7display
- 8 ►||, ■ - switches the player on, starts or pauses CD play
- stops CD play, clears a program or switches the player off
- 9 TUNING ◀◀, ▶▶
TUNER : - (down,up) tunes to radio station;
CD : - skips and searches CD tracks forwards or backwards.
- 10 RESUMEstores the last position of a CD track played
HOLD.....locks all buttons
OFFswitches RESUME and HOLD off
- 11 LINE OUT/Ĥ.....3.5 mm headphone jack and LINE OUT jack to connect the player to another audio input of an additional appliance.
- 12 VOL ◀.....adjusts the volume
- 13 4.5V DC.....jack for external power supply
- 14belt clip holder
- 15type plate

Mains adapter (supplied or optionally available)

Use only the AYT 3170 adapter (4.5 V / 300 mA direct current, positive pole to the center pin). Any other product may damage the player.



- 1 Make sure the local voltage corresponds to the power adapter's voltage.
- 2 Connect the power adapter to the 4.5V DC jack of the player and to the wall outlet.

Note: Always disconnect the adapter when you are not using it.

Environmental information

- All redundant packing material has been omitted. We have done our utmost to make the packaging easily separable into two materials: cardboard (box) and polyethylene (bags, protective foam sheet).
- Your set consists of materials which can be recycled if disassembled by a specialized company. Please observe the local regulations regarding the disposal of packing materials, dead batteries and old equipment.

INSTRUCTION FOR USE

Batteries (supplied or optionally available)

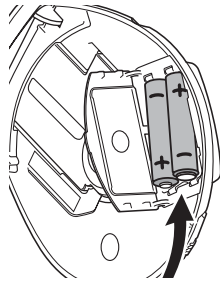
You can use the following batteries with this CD-player:

- normal batteries type **LR6, UM3** or **AA** (preferably Philips), or
- alkaline batteries type **LR6, UM3** or **AA** (preferably Philips).

*Notes: – Old and new or different types of batteries should not be combined.
– Remove batteries if they are empty or if the player is not going to be used for a long time.*

Inserting batteries

- 1 Push OPEN ► to open the CD lid.
- 2 Open the battery compartment and insert either 2 normal or alkaline batteries.



Battery indication

The approximate power level of your batteries is shown in the display.

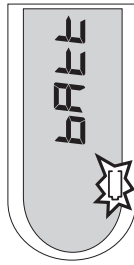


Battery full

Battery two-thirds full

Battery one-third full

Battery dead or empty. When the batteries are dead or empty, the symbol  flashes, **bA7z z** is displayed, and the beep tone sounds repeatedly.



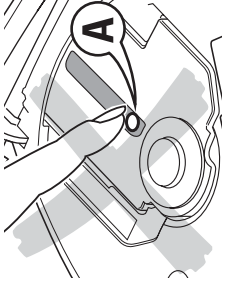
Average playing time of batteries under normal conditions

Battery type	ESP on	Power Save
Normal	5 hours	6 hours
Alkaline	16 hours	20 hours

Batteries contain chemical substances, so they should be disposed of properly.

CD player and CD handling

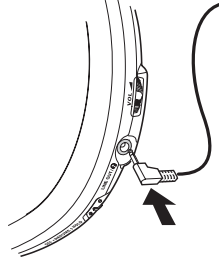
- Do not touch the lens (A) of the CD player.
- Do not expose the unit, batteries or CDs to humidity, rain, sand or excessive heat (caused by heating equipment or direct sunlight).
- You can clean the CD player with a soft, slightly dampened, lint-free cloth. Do not use any cleaning agents as they may have a corrosive effect.
- To clean the CD, wipe it in a straight line from the center toward the edge using a soft, lint-free cloth. A cleaning agent may damage the disc! Never write on a CD or attach a sticker to it.
- The lens may cloud over when the unit is moved suddenly from cold to warm surroundings. Playing a CD is not possible then. Leave the CD player in a warm environment until the moisture has evaporated.
- Active mobile phones in the vicinity of the CD player may cause malfunctions.
- Avoid dropping the unit as this may cause damage.



Headphones HS383

- Connect the supplied headphones to the LINE OUT/ jack of the player.

Note: LINE OUT can also be used for connecting this set to your HiFi system. To adjust the sound and volume, use the controls on the connected audio equipment and on the CD player.



IMPORTANT!

Hearing safety: Do not play your headphones at a high volume. Hearing experts advise that continuous use at high volume can permanently damage your hearing.

Traffic safety: Do not use headphones while driving a vehicle. It may create a hazard and it is illegal in many countries. Even if your headphones are an open-air type designed to let you hear outside sounds, do not turn up the volume so high that you cannot hear what is going on around you.

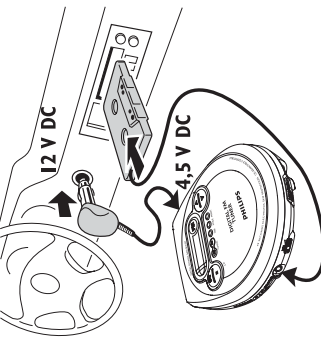
INSTRUCTION FOR USE

GENERAL INFORMATION / CD PLAY

CD PLAY / FEATURES

In-car use (connections supplied or optionally available)

Only use the AY 3545 (4822 219 10033) or AY 3548 (3140 118 71890) car voltage converter (4.5 V DC, positive pole to the center pin) and the AY 3501 cassette car adapter. Any other product may damage the set.



1 Put the set on a horizontal, vibration-free and stable surface. Make sure it is in a safe place, where the set is neither a danger nor an obstacle to the driver and the passengers.

2 Plug the voltage converter into the cigarette lighter jack (**only for 12 V car battery, negative grounding**), then connect the wired end with 4.5V DC input jack on the set.

3 If necessary, clean the cigarette lighter jack to obtain a good electrical contact.

4 Turn down the volume and connect the cassette adapter plug to LINE OUT/⚡ on the set.

5 Carefully insert the cassette adapter into the car radio's cassette compartment.

6 Make sure the cord does not hinder your driving.

7 Decrease the volume on the set if necessary. Start playback on the set and adjust the sound with the car radio controls.


- **Always remove the voltage converter from the cigarette lighter jack when the set is not in use.**

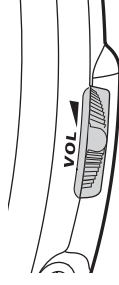
Note: If your car radio has a LINE IN jack, it is better to use it for the car radio connection instead of the cassette adapter. Connect the signal lead to this LINE IN jack and to LINE OUT/⚡ on the set.



Playback information

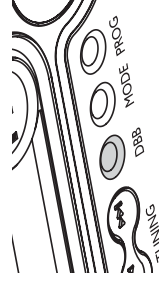
- If a CD-Recordable (CD-R) or a CD-Rewritable (CD-RW) is not recorded properly, **FF** or **FL** is displayed, indicating that the CD has not been finalized. In that case, use FINALIZE on your CD recorder to complete the recording.
- When playing a CD-Rewritable (CD-RW), please note that it takes 3–15 seconds after pressing **▶** **II** for sound reproduction to start.
- Playback will stop if you open the CD lid.
- While the CD is read, **1 - :** flashes in the display.

Volume and bass**Volume adjustment**

- Adjust the volume by using VOL .

**Bass adjustment**

- Press DBB to switch the bass enhancement on or off   is shown if the bass enhancement is activated.



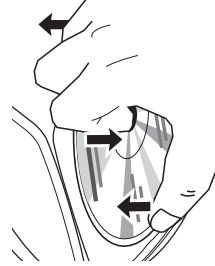
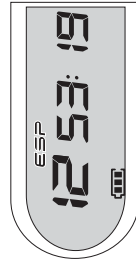
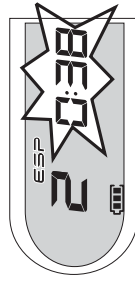
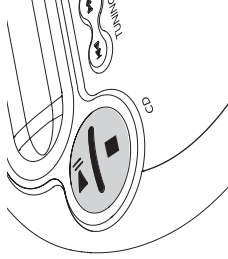
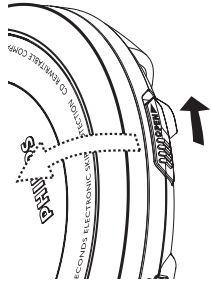
INSTRUCTION FOR USE

Playing a CD

This CD-player can play all kinds of **Audio Discs** such as CD-Recordables and CD-Rewritables. Do not try to play a CD-ROM, CDi, VCD, DVD or computer CD.

- 1 Push the OPEN ► slider to open the player.
- 2 Insert an audio CD, printed side up, by pressing the CD onto the hub.
- 3 Close the player by pressing the lid down.
- 4 Press ►► to switch the player on and start playback.
 - The current track number and elapsed playing time are displayed.
- You can pause playback by pressing ►►.
- The time at which playback was paused starts flashing.
- You can continue playback by pressing ►► again.
- 5 Press ■ to stop playback.
 - The total number of tracks and the total playing time of the CD are displayed.
- 6 Press ■ again to switch the player off.
- To remove the CD, hold it by its edge and press the hub gently while lifting the CD.

Note: If there is no activity, the set will automatically switch off after a while to save energy.



Selecting a track and searching

Selecting a track during playback

- Briefly press ◀◀ or ▶▶ once or several times to skip to the current, previous or next track.
 - Playback continues with the selected track, and the track's number is displayed.

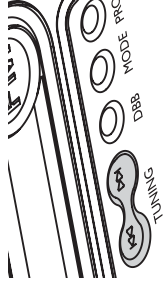
Selecting a track when playback is stopped

- 1 Briefly press ◀◀ or ▶▶ once or several times to select the desired track. The track number is displayed.
- 2 Press ►► to start CD play.
 - Playback starts with the selected track.

Searching for a passage during playback

- 1 Keep ◀◀ or ▶▶ pressed to find a particular passage in a backward or forward direction.
 - Searching starts while playback continues at low volume. After 2 seconds the search speeds up.
- 2 Release the button when you reach the desired passage.
 - Playback continues from this position.

Notes: – If the player is in SCAN mode (see MODE chapter), searching is not possible.



FEATURES

Programming track numbers

You can store up to 30 tracks to play in a program. A single track may be stored more than once in the program.

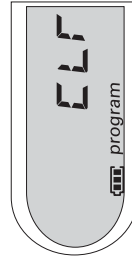
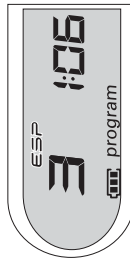
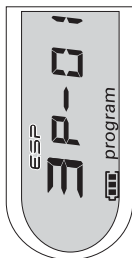
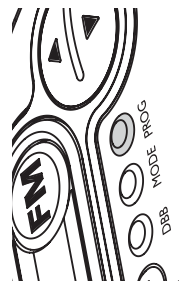
- 1 While playback is stopped, select a track with **◀◀** or **▶▶**.
- 2 Press **PROG** to store the track.
 - **program** lights up; the track number programmed and **F** with the total number of stored tracks are displayed.
- 3 Select and store all desired tracks in this way.
- 4 Press **▶▶** to start playback of your selected tracks.
 - **program** is shown and playback starts.
- You can review the program by pressing **PROG** for more than 2 seconds.
 - The display shows all the stored tracks in sequence.

Notes: – If you press **PROG** and there is no track selected, **SEL** is displayed.
 – If you try to store more than 30 tracks, **F L L L** is displayed.

Clearing the program

- While playback is stopped, press **■** to clear program.
 - **L L F** is displayed once, **program** goes off, and the program is cleared.

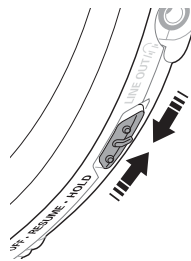
Note: The program will also be cleared if the power supply is interrupted, or if the CD-player lid is opened, or if the set switches off automatically.



FEATURES

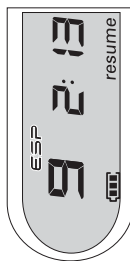
RESUME and HOLD

You can interrupt playback and continue (even after an extended period of time) from the position where playback stopped (**RESUME**) and you can lock all buttons of the set so that no action will be executed (**HOLD**). Use the **RESUME-HOLD-OFF** slider for these functions.



RESUME – continuing from where you have stopped

- 1 Switch the slider to **RESUME** during playback to activate **RESUME**.
 - **resume** is shown.
- 2 Press **■** whenever you want to stop playback.
- 3 Press **▶▶** whenever you want to resume playback.
 - **resume** is shown and playback continues from where you have stopped.
- To deactivate **RESUME**, switch the slider to **OFF**.
 - **resume** goes off.



HOLD – locking all buttons

You can lock the buttons of the set by switching the slider to **HOLD**. Now, when a key is pressed, no action will be executed. This is of use, for example, when transporting the player in a bag. With **HOLD** activated, you can avoid accidental activation of other functions.

- 1 Switch the slider to **HOLD** to activate **HOLD**.
 - All buttons are locked. **H L L L** is shown when you press any button. If the set is switched off, **hold** will be shown only when **▶▶** or **FM** is pressed.
- 2 To deactivate **HOLD**, switch the slider to **OFF**.

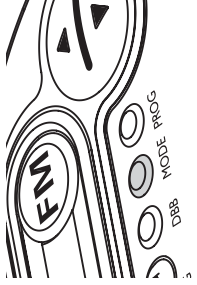
Note: If you deactivate **HOLD** by switching the slider to **RESUME**, you will be activating the **RESUME** function.

INSTRUCTION FOR USE

Selecting different playing possibilities **MODE**

It is possible to play tracks in random order, to repeat a single track or the entire CD, and to play the first few seconds of each track.

- 1 Press **MODE** during playback as often as required in order to activate one of the following 'modes'. The active mode is shown in the display.
 - **shuffle** : All tracks of the CD are played in random order until all of them have been played once.
 - **shuffle repeat all** : All tracks of the CD are played repeatedly in random order.
 - **repeat** : The current track is played repeatedly.
 - **repeat all** : The entire CD is played repeatedly.
 - **SKIP** : The first 10 seconds of each of the remaining tracks are played in sequence.
- 2 Playback starts in the chosen mode after 2 seconds.
 - To return to normal playback, press **MODE** repeatedly until the display shows no active modes.



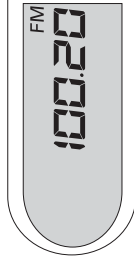
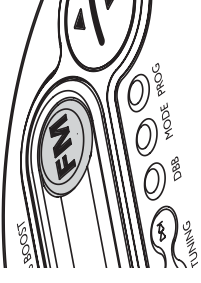
Radio Play

You can tune to any FM station automatically or manually.

- 1 Press **FM** to switch the radio on.

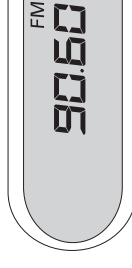
Tuning to radio stations automatically

- 1 Keep **◀◀** or **▶▶** pressed for at least 2 seconds.
 - The radio tunes to a station with sufficient strength and radio play starts. The current waveband and frequency are displayed.
- 2 Repeat searching until you find the desired radio station.



Tuning to radio stations manually

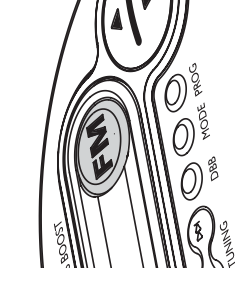
- 1 Keep **◀◀** or **▶▶** pressed.
- 2 Release **◀◀** or **▶▶**, then briefly press **◀◀** or **▶▶** again when you are close to the desired frequency.
- 3 Briefly press **◀◀** or **▶▶** repeatedly until you reach the desired frequency.
 - Radio play starts. The current waveband and frequency are displayed.
 - To switch from radio play to CD play, press **▶▶▶**.
 - Press **FM** or **■** to switch the radio off.



ESP / Power Save Mode

With a conventional portable CD-player you might have experienced that the music stopped e.g. when you were jogging. The **ELECTRONIC SKIP PROTECTION** prevents loss of sound caused by light vibrations and shocks. Continuous playback is ensured. However ESP does not prevent playback interruptions during vigorous running. It also does not protect the unit against any damage caused by dropping! On this set ESP is default on. It is possible to set ESP off and enter the Power Save mode. The Power Save mode helps to extend battery lifetime for longer playback.

- Press **MODE** for more than 2 seconds.
 - **ESP** disappears, power save mode is now activated.
- Press **MODE** again for more than 2 seconds.
 - **ESP** is displayed once

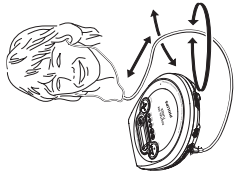


INSTRUCTION FOR USE

FEATURES / TROUBLESHOOTING

Antennas

The headphone wire is used as an FM antenna. If necessary, move it for optimum reception.



Storing radio stations

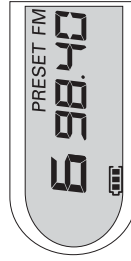
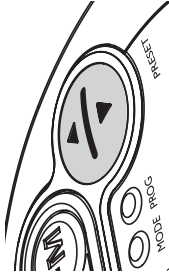
You can store up to 30 radio stations (1-30).

- 1 Tune to a desired radio station and press PROG.
- 2 Press PRESET▲, ▼ repeatedly if necessary to select the number that should be assigned to this radio station.
- 3 Press PROG while PRESET is blinking to confirm the storage.
 - PRESET, the waveband, the frequency and the preset number of the stored station are displayed.
- 4 Store all desired stations this way.

Note: Already stored stations can be recognized by the indicator PRESET and the preset number.

Tuning to a stored radio station

- 1 Press FM to switch the radio ON.
- 2 Press PRESET▲, ▼ once or more to find your preset station.
 - Radio play starts. **program**, the waveband, the frequency and the preset number of the stored station are displayed.



Troubleshooting

WARNING: Under no circumstances should you try to repair the set yourself as this will invalidate the warranty. If a fault occurs, first check the points listed, before taking the unit for repair. If you are unable to solve a problem by following these hints, consult your dealer or service center.

The CD player has no power, or playback does not start

- Check that your batteries are not dead or empty, that they are inserted correctly, that the contact pins are clean.
- Your adapter connection may be loose. Connect it securely.
- For in-car use, check that the car ignition is on. Also check player's batteries.

The indication **CD** is displayed

- Check that the CD is clean and correctly inserted (label-side upward).
- If your lens has steamed up, wait a few minutes for this to clear.

The indication **CD-RW** is displayed

- CD-RW (CD-R) was not recorded properly. Use FINALIZE on your CD-recorder.

The indication **HOLD** is on and/or there is no reaction to controls

- If HOLD is activated, then deactivate it.
- Electrostatic discharge. Disconnect power or remove batteries for a few seconds.

The CD skips tracks

- The CD is damaged or dirty. Replace or clean the CD.
- RESUME, SHUFFLE or PROGRAM is active. Switch off whichever is on.

No sound or bad sound quality.

- PAUSE might be active. Press **II**.
- Loose, wrong or dirty connections. Check and clean connections.
- Volume might not be appropriately adjusted. Adjust the volume.
- Strong magnetic fields. Check player's position and connections. Also keep away from active mobile phones.
- For in-car use, check that the cassette adapter is inserted correctly, that the car cassette player's playback direction is correct (press autoreverse to change), and that the cigarette lighter jack is clean. Allow time for temperature change.

SAFETY & WARNINGS

Ⓒ WARNING

All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.

When repairing, make sure that you are connected with the same potential as the mass of the set via a wristband with resistance. Keep components and tools at this potential.

Ⓕ ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD). Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.

Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfilez le bracelet sert d'une résistance de sécurité.

Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

ESD



Ⓓ WARNING

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD). Unvorsichtige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.

Sorgen Sie dafür, daß Sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.

Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

Ⓖ WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).

Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.

Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

Ⓘ AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).

La loro longevità potrebbe essere fortemente ridotta in caso di non osservazione della più grande cauzione alla loro manipolazione. Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa del apparecchio tramite un braccialetto a resistenza.

Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

Ⓒ AVAILABLE ESD PROTECTION EQUIPMENT :

anti-static table mat	large 1200x650x1.25mm	4822 466 10953
	small 600x650x1.25mm	4822 466 10958
anti-static wristband		4822 395 10223
connection box (3 press stud connections, 1MΩ)		4822 320 11307
extendible cable (2m, 2MΩ, to connect wristband to connection box)		4822 320 11305
connecting cable (3m, 2MΩ, to connect table mat to connection box)		4822 320 11306
earth cable (1MΩ, to connect any product to mat or to connection box)		4822 320 11308
KIT ESD3 (combining all 6 prior products - small table mat)		4822 310 10671
wristband tester		4822 344 13999

Ⓒ

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

Safety components are marked by the symbol

Ⓕ

Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.

Les composants de sécurité sont marqués

SAFETY



Ⓓ

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Originalersatzteile zu verwenden.

Sicherheitsbauteile sind durch das Symbol markiert.

Ⓖ

Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast. De Veiligheidsonderdelen zijn aangeduid met het symbool

Ⓘ

Le norme di sicurezza estigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati.

Componenti di sicurezza sono marcati con

Ⓒ

DANGER: Invisible laser radiation when open. AVOID DIRECT EXPOSURE TO BEAM.



Ⓔ Warning !

Osynlig laserstråling når apparaten är öppnad och spårén är urkopplad. Betrakta ej strålen.

ⒹK Advarsel !

Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling.

Ⓕ Varoitus !

Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen !

Ⓒ

After servicing and before returning the set to customer perform a leakage current measurement test from all exposed metal parts to earth ground, to assure no shock hazard exists.

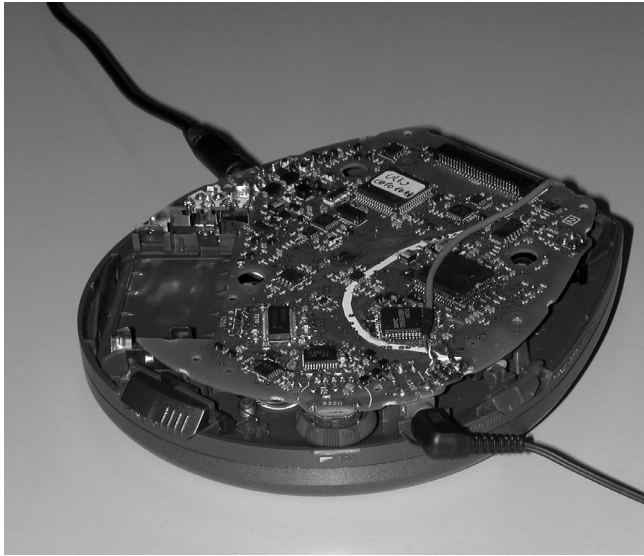
The leakage current must not exceed 0.5mA.

Ⓕ

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

SERVICE HINTS

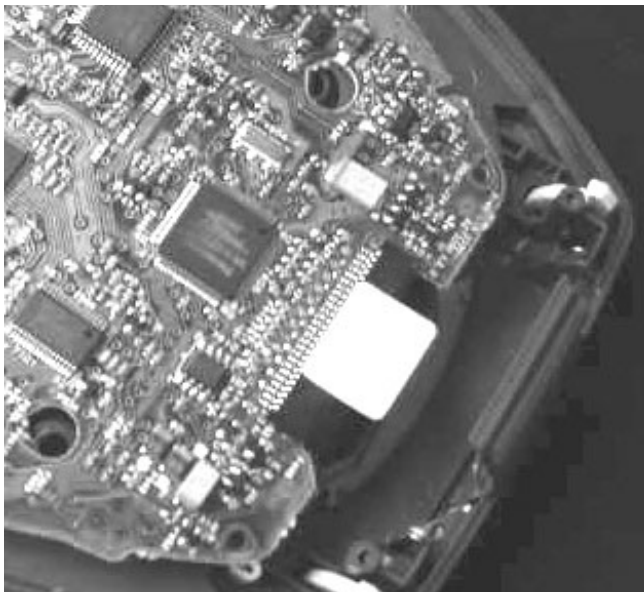
REPAIR POSITION COPPERSIDE



To get access to the copperside of the printed board assembly proceed as follows:

- 1.Remove the bottom screws(6x)
- 2.Lift the bottom -cabinet
- 3.Supply the unit via external DC-socket
- 4.Take care that the door switch is closed during measurements

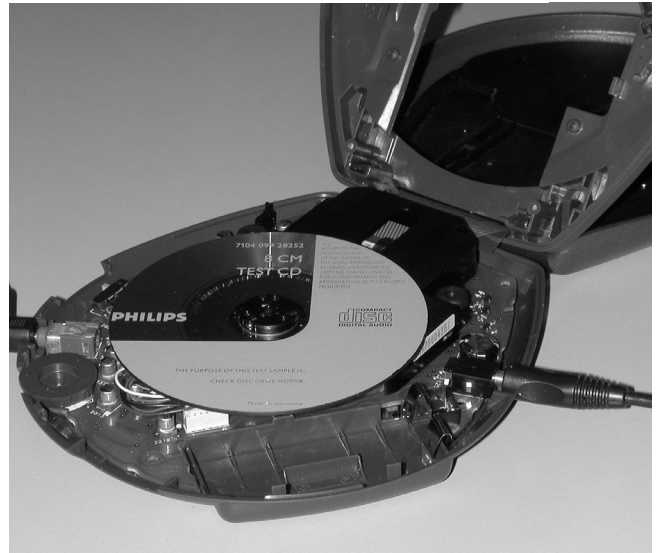
DISMANTLING THE CD-DOOR



To dismantle the CD-door proceed as follows:

- 1.Dismantle bottom and printed board/drive assembly
- 2.Disconnect the sticker
(flex-foil connector on the membrane keyboard)
- 3.Disconnect membrane keyboard
(flex-foil connector on copperside of printed board)

REPAIR POSITION COMPONENTSIDE



To get access to the componentside of the printed board assembly proceed as followed:

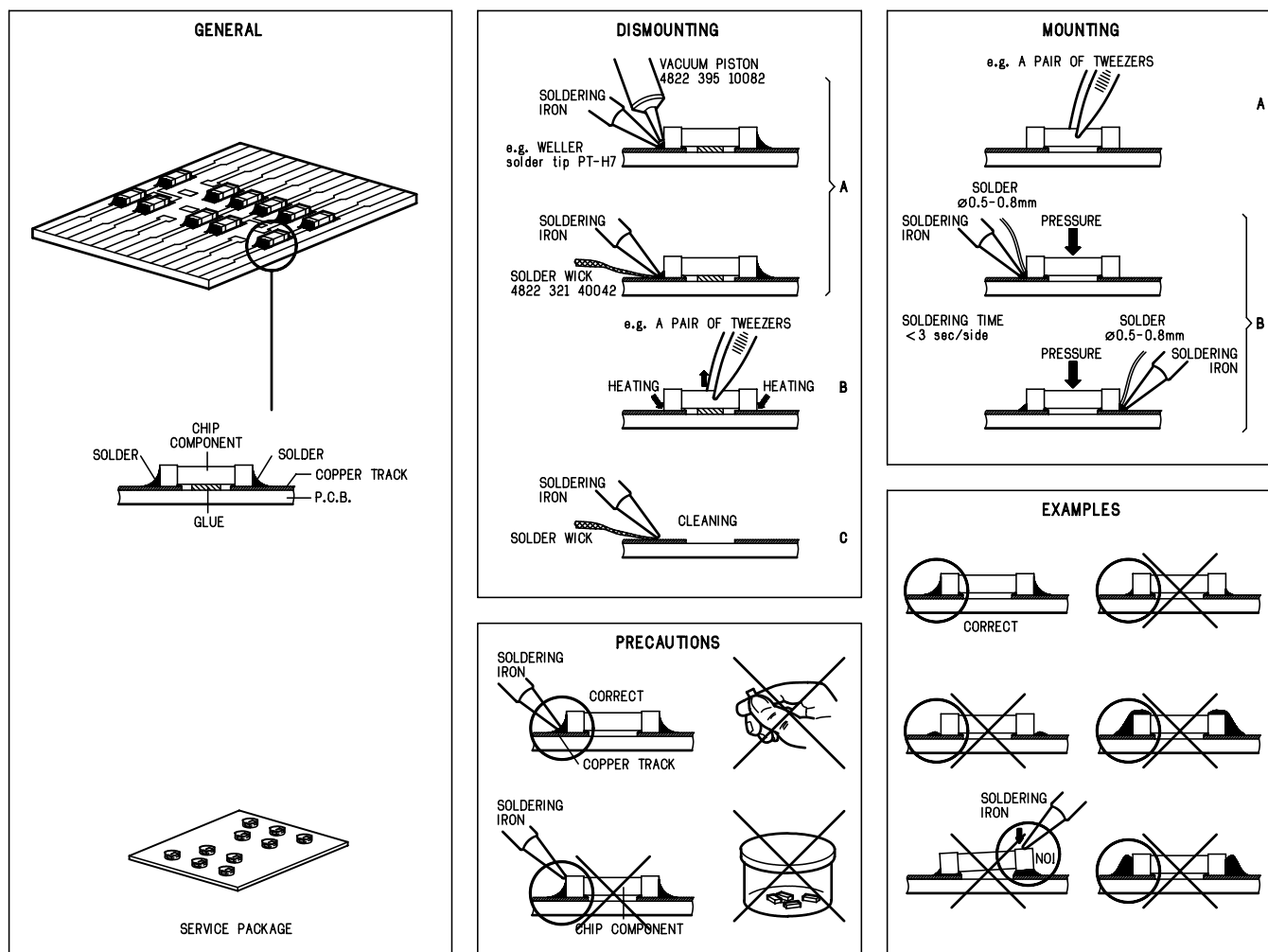
- 1.Remove the bottom screws(6x)
- 2.Open the CD-door
- 3.Lift the top-cabinet and put it backwards on the table
- 4.Supply the unit via the external DC-socket
- 5.Take care that the door switch is closed during measurements



- 4.Bend the CD-door leftwards downwards as indicated in the picture above

Remark:Do not use screwdrivers or tools.
Sharp edges could damage hinge or cabinet part.

HANDLING CHIP COMPONENTS



SERVICE TOOLS

Audio signal disc SBC429

4822 397 30184

Playability test disc SBC444

4822 397 30245

Test disc 5 (disc without errors) + **Test disc 5A** (disc with dropout errors
black spots and fingerprints) **SBC426/ SBC426A**

4822 397 30096

ESD PROTECTION EQUIPMENT

Anti-static table mat large 1200x650x1.25mm
small 600x650x1.25mm

4822 466 10953
4822 466 10958

Anti-static wristband

4822 395 10223

Connection box (3press stud connections, 1MΩ)

4822 320 11307

Extendible cable (2m, 2MΩ, to connect wristband to connection box)

4822 320 11305

Connecting cable (3m, 2MΩ, to connect table mat to connection box)

4822 320 11306

Earth cable (1MΩ, to connect any product to mat or to connection box)

4822 320 11308

KIT ESD3 (combining all 6 prior products - small table mat)

4822 310 10671

Wristband tester

4822 344 13999

PIN DESCRIPTION OF INTEGRATED CIRCUITS

MN662786SB – SIGNAL PROCESSING IC

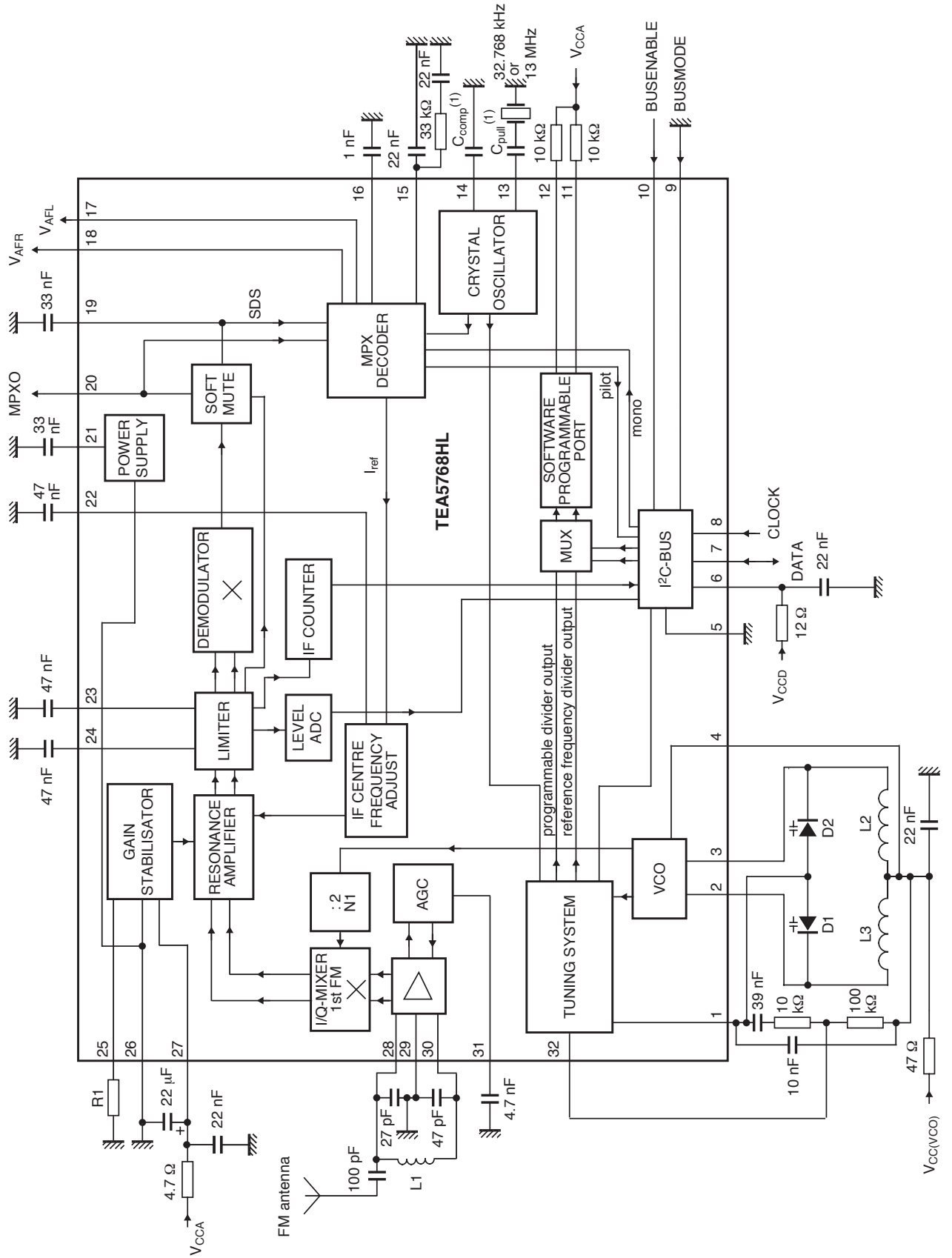
Pin	Name	I/O	Description
1	DRVDD	I	Power supply for DRAM interface (Pin 2 to 19, and 80)
2	D0	I/O	DRAM data I/O signal 0
3	D1	I/O	DRAM data I/O signal 1
4	NWE	O	DRAM write enable signal
5	NRAS	O	DRAM RAS control signal
6	D2	I/O	DRAM data I/O signal 2
7	D3	I/O	DRAM data I/O signal 3
8	NCAS0	O	DRAM CAS control signal 0
9	NCAS1	O	DRAM CAS control signal 1
10	A8	O	DRAM address signal 8
11	A7	O	DRAM address signal 7
12	A6	O	DRAM address signal 6
13	A5	O	DRAM address signal 5
14	A4	O	DRAM address signal 4
15	A9	O	DRAM address signal 9
16	A0	O	DRAM address signal 0
17	A1	O	DRAM address signal 1
18	A2	O	DRAM address signal 2
19	A3	O	DRAM address signal 3
20	DVSS2	I	Ground for digital circuits
21	DVDD2	I	Power supply for digital circuits
22	SPOUT	O	Spindle motor drive signal output (Absolute value output)
23	TRVP	O	Traverse drive output (+side output)
24	TRVM	O	Traverse drive output (-side output)
25	TRP	O	Traverse drive output (+side output)
26	TRM	O	Traverse drive output (-side output)
27	FOP	O	Focus drive output (+side output)
28	FOM	O	Focus drive output (-side output)
29	IOVDD1	I	I/O power supply
30	TBAL	O	Tracking balance adjustment output
31	FBAL	O	Focus balance adjustment output
32	FE	I	Focus error signal input (Analog input)
33	TE	I	Tracking error signal input (Analog input)
34	RFENV	I	RF envelope signal input (Analog input)
35	OFT	I	Off-track signal input H: Off track
36	NRFDET	I	RF detection signal input L: Detect
37	BDO	I	Dropout signal input H: Dropout
38	LDON	O	Laser ON signal output H: ON
39	ARF	I	RF signal input
40	IREF	I	Reference current input
41	ADPVCC	I	A/D converter reference voltage input (Analog input)
42	DSLFL	O	DSL loop filter
43	DRFL	I	DSL bias
44	PLLFL	O	PLL loop filter
45	VCOFL	O	Jitter-free VCO loop filter
46	AVDD2	I	Power supply for analog circuits (For DSL, PLL, VCOFL, A/D converter, and D/A converter)
47	AVSS2	I	Ground for analog circuits (For DSL, PLL, VCOFL, A/D converter, and D/A converter)
48	OUTL	O	L-ch audio output
49	AVSS1	I	Ground for analog circuit (For audio output stage)
50	OUTR	O	R-ch audio output
51	AVDD1	I	Power supply for analog circuits (For audio output stage)
52	FSEL	I	Noise filter for microcontroller interface ON/OFF selection input L:ON H:OFF
53	TMOD1	I	Test input pin Normal:
54	TMOD2	I	Test input pin Normal: L
55	*FLAG	O	Flag signal output
56	*IPFLAG	O	Interpolation flag signal output H: Interpolation
57	*EXT0	I/O	Expansion I/O port 0
58	*EXT1	I/O	Expansion I/O port 1
59	IOVDD2	I	I/O power supply
60	TX	O	Digital audio interface signal output
61	MCLK	I	Microcontroller command clock signal input (Latches the data at a rising edge)
62	MDATA	I	Microcontroller command data signal input
63	MLD	I	Microcontroller command load signal input L: Load
64	*BLKCK	O	Subcode block clock signal output f=75 Hz (Normal-speed playback)
65	PWMSEL	I/O	PWM output mode selection input L: Direct H: 3-state
66	SMCK	O	4.236-MHz/8.4672-MHz clock signal output
67	DMUTE	I/O	Muting input H: Mute
68	STAT	O	Status signal output
69	NRST	I	Reset input L: Reset

<i>Pin</i>	<i>Name</i>	<i>I/O</i>	<i>Description</i>
70	*SPPOL	O	Spindle motor drive signal output (Polarity output)
71	PMCK	O	88.2-KHz clock signal output
72	*NCLDCK	O	Frame sync signal output f=7.35kHz (Normal-speed playback)
73	*SUBC	O	Subcode serial output
74	*SBCK	I	Subcode serial output clock input
75	NTEST	I	Test input pin Normal: H
76	X2	O	Crystal oscillator output pin f=16.9344 MHz
77	X1	I	Crystal oscillator input pin f=16.9344 MHz
78	DVSS1	I	Ground for digital circuits
79	DVDD1	I	Power supply for digital circuits
80	*EXT2	I	Expansion I/O part 2

AN8789FB– SILICON MONOLITHIC BIPOLAR IC

<i>Pin</i>	<i>Name</i>	<i>Description</i>
1	VSEN	Empty detection input
2	PVCC1	Power supply
3	RESET	Reset output
4	DED	Dead time input
5	OUT	CD/DC converter output
6	FB	Error amplifier output
7	IN	Error amplifier input
8	SPRO	Short-circuit protection input
9	CT	Triangular wave oscillation
10	AREF	1/2 AVDD output
11	CRIP	Ripple rejection capacitor
12	SVCC	Power supply
13	N.C.	Not connected
14	AVDD	Ripple filter output
15	DRVDD	Power supply
16	VREF	1/2 VDCC input
17	INFO	Driver input
18	INTR	Driver input
19	LDON	Driver ON/OFF control
20	INSP	Driver input
21	PC	Driver IN/OFF control
22	INTV	Driver input
23	TRVSTOP	Driver ON/OFF control
24	TR-	Driver output
25	TR+	Driver output
26	FO-	Driver output
27	FO+	Driver output
28	PGND	Ground
29	SP+	Driver output
30	SP-	Driver output
31	TV+	Driver output
32	TV-	Driver output
33	ICONT	Charge current setting
34	MRST	Muting reset output
35	EMP	Empty detection output
36	Vc	Driver supply voltage
37	TB	PWM circuit output
38	CLK	External sync input
39	START	Start oscillation starting input
40	POWER	Power ON/OFF
41	PVCC2	Power supply
42	IOUT	Charging and battery detection
43	SGND	Ground
44	PWMG	PWM loop gain control

TEA5768HL - LOWPOWER FM STEREO RADIO BLOCK DIAGRAM

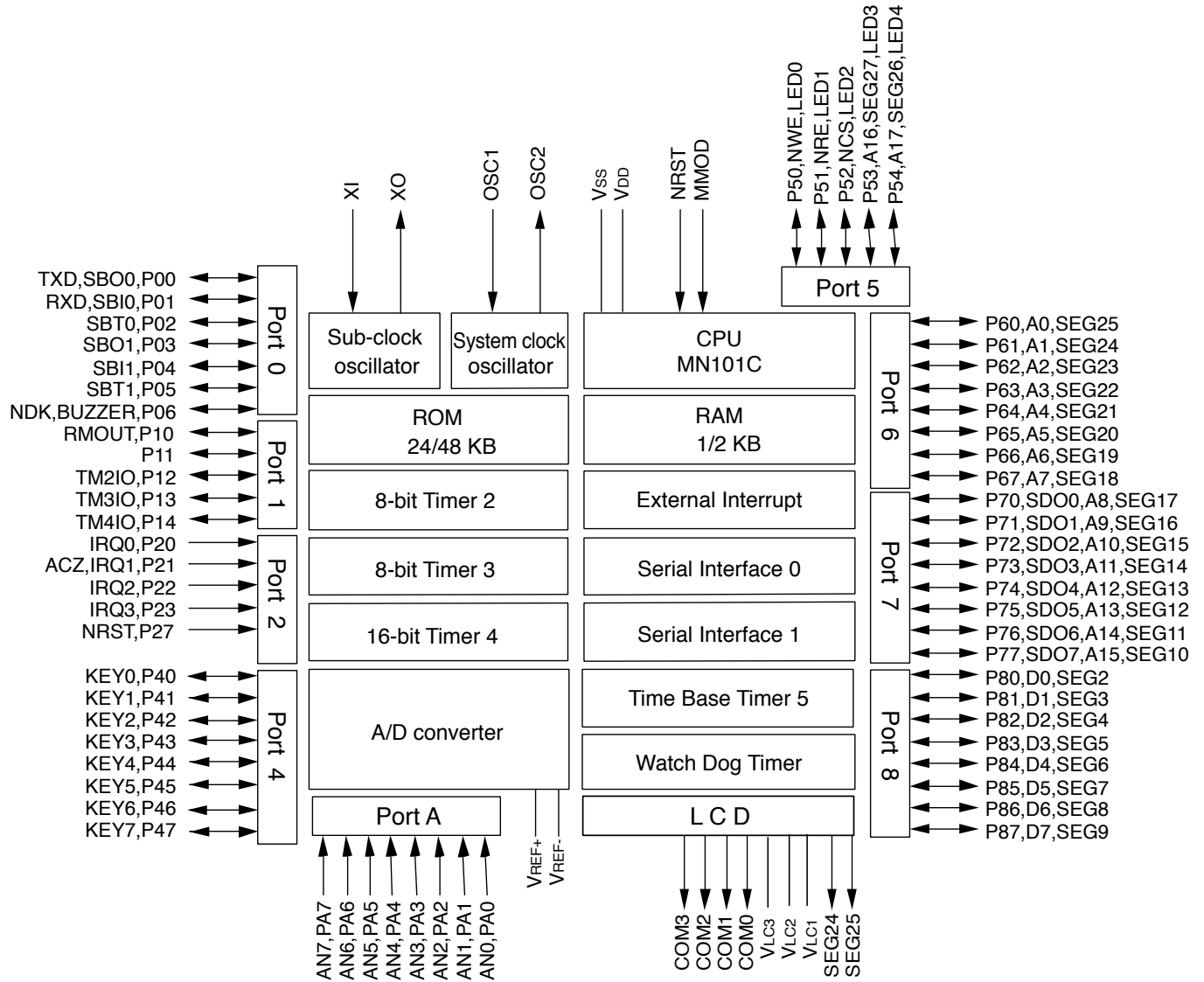


(1) C_{comp} and C_{pull} data depends on crystal specification.

PIN DESCRIPTION OF TEA5768HL

SYMBOL	PIN	DESCRIPTION
CPOUT	1	charge pump output of synthesizer PLL
VCOTANK1	2	voltage controlled oscillator tuned circuit output 1
VCOTANK2	3	voltage controlled oscillator tuned circuit output 2
V _{CC(VCO)}	4	voltage controlled oscillator supply voltage
DGND	5	digital ground
V _{CCD}	6	digital supply voltage
DATA	7	bus data line input/output
CLOCK	8	bus-clock line input
BUSMODE	9	bus mode select input
BUSENABLE	10	bus enable input
SWPORT1	11	software programmable port 1
SWPORT2	12	software programmable port 2
XTAL1	13	crystal oscillator input 1
XTAL2	14	crystal oscillator input 2
PHASEFIL	15	phase detector loop filter
PILFIL	16	pilot detector low-pass filter
V _{AFL}	17	left audio frequency output voltage
V _{AFR}	18	right audio frequency output voltage
TMUTE	19	time constant for soft mute
MPXO	20	FM demodulator MPX signal output
V _{ref}	21	reference voltage
TIFC	22	time constant for IF centre adjust
LIMDEC1	23	decoupling IF limiter 1
LIMDEC2	24	decoupling IF limiter 2
I _{gain}	25	gain control current for IF filter
AGND	26	analog ground
V _{CCA}	27	analog supply voltage
RFI1	28	RF input 1
RFGND	29	RF ground
RFI2	30	RF input 2
TAGC	31	time constant RF AGC
LOOPSW	32	switch output of synthesizer PLL loop filter

MN101C39C-399 - MICROCOMPUTER BLOCK DIAGRAM



PIN DESCRIPTION OF MN101C39C-399

Pin Specification (1/2)

Pins	Special Functions	I/O	Direction Control	Pin Control	Functions Description
P00	SBO0 TXD	in/out	P0DIR0	P0PLU0	SBO0 : Serial Interface 0 transmission data output TXD : UART transmission data output
P01	SBI0 RXD	in/out	P0DIR1	P0PLU1	SBI0 : Serial Interface 0 reception data input RXD : UART reception data input
P02	SBT0	in/out	P0DIR2	P0PLU2	SBT0 : Serial Interface 0 clock I/O
P03	SBO1	in/out	P0DIR3	P0PLU3	SBO1 : Serial Interface 1 transmission data output
P04	SBI1	in/out	P0DIR4	P0PLU4	SBI1 : Serial Interface 1 reception data input
P05	SBT1	in/out	P0DIR5	P0PLU5	SBT1 : Serial Interface 1 clock I/O
P06	NDK BUZZER	in/out	P0DIR6	P0PLU6	NDK : Data acknowledgement signal BUZZER : Buzzer output
P10	RMOUT	in/out	P1DIR0	P1PLU0	RMOUT : Remote control carrier output
P11		in/out	P1DIR1	P1PLU1	
P12	TM2IO	in/out	P1DIR2	P1PLU2	TM2IO : Timer 2 I/O
P13	TM3IO	in/out	P1DIR3	P1PLU3	TM3IO : Timer 3 I/O
P14	TM4IO	in/out	P1DIR4	P1PLU4	TM4IO : Timer 4 I/O
P20	IRQ0	in	-	P2PLU0	IRQ0 : External interrupt 0
P21	IRQ1 ACZ	in	-	P2PLU1	IRQ1 : External interrupt 1 ACZ : Zero-cross input
P22	IRQ2	in	-	P2PLU2	IRQ2 : External interrupt 2
P23	IRQ3	in	-	P2PLU3	IRQ3 : External interrupt 3
P27	NRST	in	-	-	NRST : Reset
P40	KEY 0	in/out	P4DIR0	P4PLU0	KEY0 : KEY interrupt input 0
P41	KEY 1	in/out	P4DIR1	P4PLU1	KEY1 : KEY interrupt input 1
P42	KEY 2	in/out	P4DIR2	P4PLU2	KEY2 : KEY interrupt input 2
P43	KEY 3	in/out	P4DIR3	P4PLU3	KEY3 : KEY interrupt input 3
P44	KEY 4	in/out	P4DIR4	P4PLU4	KEY4 : KEY interrupt input 4
P45	KEY 5	in/out	P4DIR5	P4PLU5	KEY5 : KEY interrupt input 5
P46	KEY 6	in/out	P4DIR6	P4PLU6	KEY6 : KEY interrupt input 6
P47	KEY 7	in/out	P4DIR7	P4PLU7	KEY7 : KEY interrupt input 7
P50	NWE LED0	in/out	P5DIR0	P5PLU0	NWE : Write enable signal LED0 : LED driving pin 0
P51	NRE LED1	in/out	P5DIR1	P5PLU1	NRE : Read enable signal LED1 : LED driving pin 1
P52	NCS LED2	in/out	P5DIR2	P5PLU2	NCS : Chip select signal LED2 : LED driving pin 2
P53	A16 LED3	in/out	P5DIR3	P5PLU3	A16 : Address output (bp16) LED3 : LED driving pin 3
P54	SEG27 LED4	in/out	P5DIR4	P5PLU4	SEG27 : LCD segment output 27 LED : LED driving pin 4
	SEG26				SEG26 : LCD segment output 26
P60	A0 SEG25	in/out	P6DIR0	P6PLU0	A0 : Address output (bp0) SEG25 : LCD segment output 25
P61	A1 SEG24	in/out	P6DIR1	P6PLU1	A1 : Address output (bp1) SEG24 : LCD segment output 24
P62	A2 SEG23	in/out	P6DIR2	P6PLU2	A2 : Address output (bp2) SEG23 : LCD segment output 23
P63	A3 SEG22	in/out	P6DIR3	P6PLU3	A3 : Address output (bp3) SEG22 : LCD segment output 22
P64	A4 SEG21	in/out	P6DIR4	P6PLU4	A4 : Address output (bp4) SEG21 : LCD segment output 21
P65	A5 SEG20	in/out	P6DIR5	P6PLU5	A5 : Address output (bp5) SEG20 : LCD segment output 20
P66	A6 SEG19	in/out	P6DIR6	P6PLU6	A6 : Address output (bp6) SEG19 : LCD segment output 19
P67	A7 SEG18	in/out	P6DIR7	P6PLU7	A7 : Address output (bp7) SEG18 : LCD segment output 18

Pin Specification (2/2)

Pins	Special Functions	I/O	Direction Control	Pin Control	Functions Description
P70	A8 SEG17 SDO0	in/out	P7DIR0	P7PLUD0	A8 : Address output (bp8) SEG17 : LCD segment output 17 SDO0 : Synchronous output 0
P71	A9 SEG16 SDO1	in/out	P7DIR1	P7PLUD1	A9 : Address output (bp9) SEG16 : LCD segment output 16 SDO1 : Synchronous output 1
P72	A10 SEG15 SDO2	in/out	P7DIR2	P7PLUD2	A10 : Address output (bp10) SEG15 : LCD segment output 15 SDO2 : Synchronous output 2
P73	A11 SEG14 SDO3	in/out	P7DIR3	P7PLUD3	A11 : Address output (bp11) SEG14 : LCD segment output 14 SDO3 : Synchronous output 3
P74	A12 SEG13 SDO4	in/out	P7DIR4	P7PLUD4	A12 : Address output (bp12) SEG13 : LCD segment output 13 SDO4 : Synchronous output 4
P75	A13 SEG12 SDO5	in/out	P7DIR5	P7PLUD5	A13 : Address output (bp13) SEG12 : LCD segment output 12 SDO5 : Synchronous output 5
P76	A14 SEG11 SDO6	in/out	P7DIR6	P7PLUD6	A14 : Address output (bp14) SEG11 : LCD segment output 11 SDO6 : Synchronous output 6
P77	A15 SEG10 SDO7	in/out	P7DIR7	P7PLUD7	A15 : Address output (bp15) SEG10 : LCD segment output 10 SDO7 : Synchronous output 7
P80	D0 SEG2	in/out	P8DIR0	P8PLU0	D0 : Data I/O (bp0) SEG2 : LCD segment output 2
P81	D1 SEG3	in/out	P8DIR1	P8PLU1	D1 : Data I/O (bp1) SEG3 : LCD segment output 3
P82	D2 SEG4	in/out	P8DIR2	P8PLU2	D2 : Data I/O (bp2) SEG4 : LCD segment output 4
P83	D3 SEG5	in/out	P8DIR3	P8PLU3	D3 : Data I/O (bp3) SEG5 : LCD segment output 5
P84	D4 SEG6	in/out	P8DIR4	P8PLU4	D4 : Data I/O (bp4) SEG6 : LCD segment output 6
P85	D5 SEG7	in/out	P8DIR5	P8PLU5	D5 : Data I/O (bp5) SEG7 : LCD segment output 7
P86	D6 SEG8	in/out	P8DIR6	P8PLU6	D6 : Data I/O (bp6) SEG8 : LCD segment output 8
P87	D7 SEG9	in/out	P8DIR7	P8PLU7	D7 : Data I/O (bp7) SEG9 : LCD segment output 9
PA0	AN0	in	-	PAPLUD0	AN0 : Analog 0 input
PA1	AN1	in	-	PAPLUD1	AN1 : Analog 1 input
PA2	AN2	in	-	PAPLUD2	AN2 : Analog 2 input
PA3	AN3	in	-	PAPLUD3	AN3 : Analog 3 input
PA4	AN4	in	-	PAPLUD4	AN4 : Analog 4 input
PA5	AN5	in	-	PAPLUD5	AN5 : Analog 5 input
PA6	AN6	in	-	PAPLUD6	AN6 : Analog 6 input
PA7	AN7	in	-	PAPLUD7	AN7 : Analog 7 input
SEG0	SEG0	out	-	-	SEG0 : LCD segment output 0
SEG1	SEG1	out	-	-	SEG1 : LCD segment output 1
COM0	COM0	out	-	-	COM0 : LCD common output 0
COM1	COM1	out	-	-	COM1 : LCD common output 1
COM2	COM2	out	-	-	COM2 : LCD common output 2
COM3	COM3	out	-	-	COM3 : LCD common output 3

START-UP PROCEDURE -CHART

Start-up procedure for external DC supply,
no accu inserted, hold-switch in off pos.,
ESA on, resume-mode off, CD-door closed.



SERVICE TEST PROGRAM

1. PRELIMINARY SETUP

- To enter the service test program disconnect the AC/DC adaptor and remove batteries, open the CD-door and hold the buttons "PLAY" & "PREV" depressed while turning power on (i.e. connecting the AC/DC adaptor).
- The display shows the software version of the built-in μP (i.e. "5-25"). Versions are counted from "00" onwards; that means the higher the number the newer the software.
- The program is now in the main menu – various tests can be entered by pressing the corresponding buttons (see flow chart on next page or detailed description of available tests below).
- To exit the service test program press the "STOP" button or disconnect the set from the power source.

2. DISPLAY TEST

Purpose: Check functionality of display and display driver.

- To enter the display test start the service test program and press the "NEXT" button.
- The display shows test pattern1. All segments are activated for finding open circuits (see flow chart on next page).
- To jump to the next pattern press the "NEXT" button.
- The display shows test pattern2. All alternate pins (2, 4, ...) are activated for finding short circuits (see flow chart on next page).
- To jump back to test pattern1 press the "NEXT" button, to exit the display test and return to the main menu press the "STOP" button.

3. KEY TEST

Purpose: Check operation of keys and cord remote control.

- To enter the key test start the service test program and press the "MODE" button.
- The display shows " - - ".
- Hold key depressed and check corresponding key code on the display. Key codes can be found in table1 (see flow chart on next page).
- To exit the key test and return to the main menu press the "STOP" button.

4. PLAYBACK TEST WITH ERROR ANALYSIS

Purpose: Analyze errors that occur during playback and search for intermittent failures.

- To enter the playback test start the service test program and press the "BASS" button.
- To start the error analysis press the "PLAY" button. Note that the playback test can only be entered if the CD-door is closed.
- The set will read the TOC and start playback.

As long as the playback is free of errors the display shows track and time information like in normal play-mode. In case of errors corresponding error codes will be displayed. The meaning of these error codes can be found in table2 (see flow chart on next page).

Note: Errors can either be "fatal" or "non fatal". Fatal errors always stop the playback, non fatal errors only cause a short interruption of the music. Fatal errors are displayed as long as the set is connected to the power source, non fatal errors are displayed until a new error occurs or a button is pressed.

- To stop the playback test disconnect the set from the power source.

5. SERVO TEST

Purpose: Check door switch, inner switch of CD-drive, movement of slide and acceleration of discmotor.

- To enter the servo test start the service test program and press the "PLAY" button.
- The display shows "L d xy".
"x" indicates state of door switch;
"y" indicates state of inner switch.
x,y = "0" means switch is closed; "1" means switch is open.
- To move slide outside hold the "NEXT" button depressed.
- To move slide inside hold the "PREV" button depressed.
- To accelerate the discmotor clockwise hold the "MODE" button depressed.
- To accelerate the discmotor counter-clockwise hold the "PROG" button depressed.
- To enter the focus test press the "PLAY" button, to exit the servo test and return to the main menu press the "STOP" button.

6. FOCUS TEST

Purpose: Check movement of lens and operation of focus servo for CDDA and CDRW discs.

Since the CDRW reflects much less light than an ordinary CDDA, the gain of the HF-amplifier stage and the sensitivity of the ADC inside the Decoder&Digital Servo IC "CD10" must be adapted accordingly. The gain is switched via the CDRW input of the HF-preamplifier. The ADC-sensitivity is set via software parameters (sent from μP to "CD10"). In total, there are 4 sensitivity modes available: 1 for CDDA and 3 for CDRW. The modes are listed in table3 (see next page). In normal play-mode, the correct focus sensitivity is chosen automatically during start-up (see "Start-up procedure" on previous page). In the service test program, the sensitivity can be chosen manually in order to allow individual measurements in several modes.

- The focus servo loop is switched on and the set starts searching the focus ("focus ramping"). As soon as the focus has been found the focus servo loop is closed and the state of the focus is monitored continuously.
- If the focus is OK the display shows " F x", else " - F x".
"x" indicates the sensitivity mode. Details can be found in table3 (see flow chart on next page).
- To toggle between sensitivity modes press the "BASS" button.
- To move slide outside hold the "NEXT" button depressed.
- To move slide inside hold the "PREV" button depressed.
- To accelerate the discmotor clockwise hold the "MODE" button depressed.
- To accelerate the discmotor counter-clockwise hold the "PROG" button depressed.
- In case the focus is OK the discmotor test can be entered by pressing the "PLAY" button, to exit the focus test and return to the main menu press the "STOP" button.

7. DISCMOTOR TEST

Purpose: Check speed regulation of discmotor.

- The speed regulation is switched on and the discmotor starts rotating. If the speed reaches 75% of the nom. speed the display shows " d", else " - d".
- In parallel also the state of the focus is monitored continuously (display " F x" or " - F x").
- In case the disc speed is OK and the focus is OK the radial test can be entered by pressing the "PLAY" button, to exit the discmotor test and return to the main menu press the "STOP" button.

8. RADIAL TEST

Purpose: Check if radial loop locks and an audio signal is audible at the headphone output.

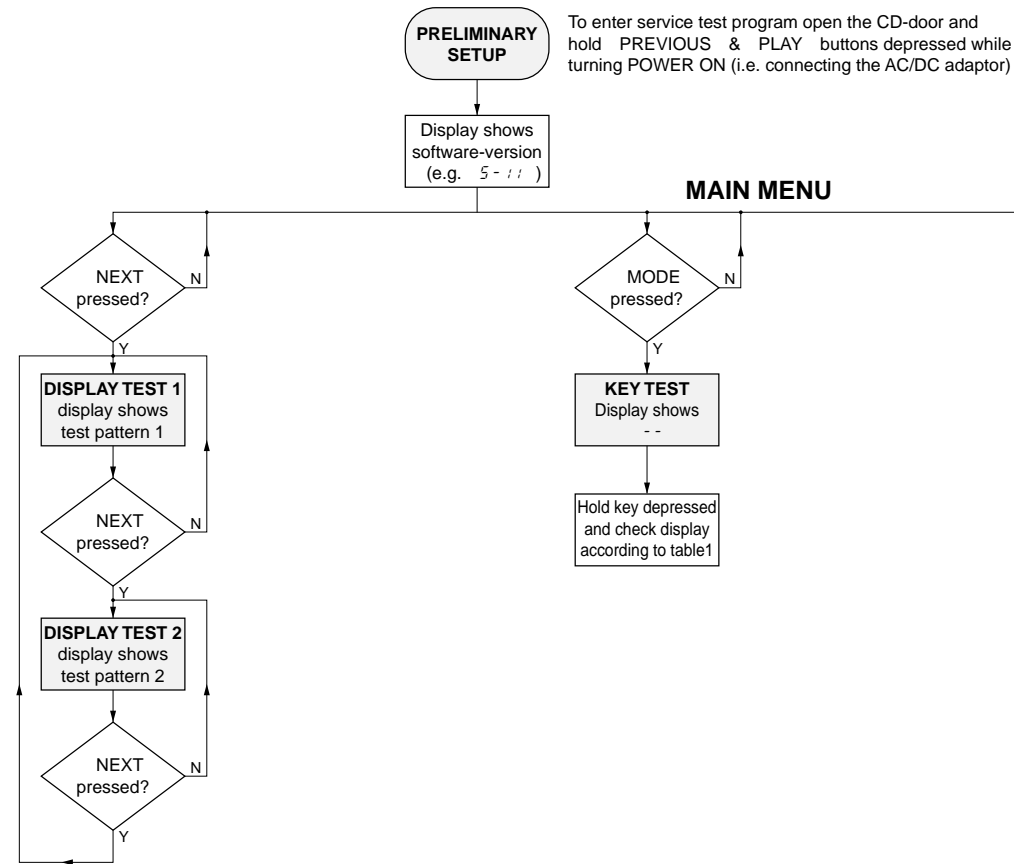
- The radial servo loop is switched on, mute is released and the audio signal is audible. If the system is on track the display shows " r", else " - r".
- In parallel also the disc speed (display " d" or " - d") and the state of the focus (display " F x" or " - F x") are monitored continuously.
Note: In case of radial errors the audio output is muted and muting is not released automatically when the systems recovers from the error. " - r" remains on the display.
To open mute again press the "NEXT" or "PREV" button.
- To jump 16 tracks outside press the "NEXT" button.
- To jump 16 tracks inside press the "PREV" button.
- To exit the radial test and return to the main menu press the "STOP" button, to exit the service test program disconnect the set from the power source.

Important remark:

In radial test mode data to the DRAM is written at 1.2 times the nominal speed, and read from the DRAM at nominal speed. Because writing is done faster than reading the DRAM gets full after a certain time.

In normal play mode the system would now wait until the DRAM is partly emptied again, jump backwards and resume filling at the last written position. However, in radial test mode the jumps would disturb measurements on the radial servo loop. Therefore this function has been disabled and filling restarts immediately from the current position of the pick-up unit. As a result "jumps" are audible during playback.

SERVICE TEST PROGRAM - FLOW CHART



test pattern 1 (all segments activated)



test pattern 2 (alternate segments activated)



table1 — key test

KEY	DISPLAY
DBB	!
PROGRAM	2
MODE	3
PLAY	5
NEXT	5
PREVIOUS	7
ESP	8

Press "STOP" on the CD-player to exit the key test.

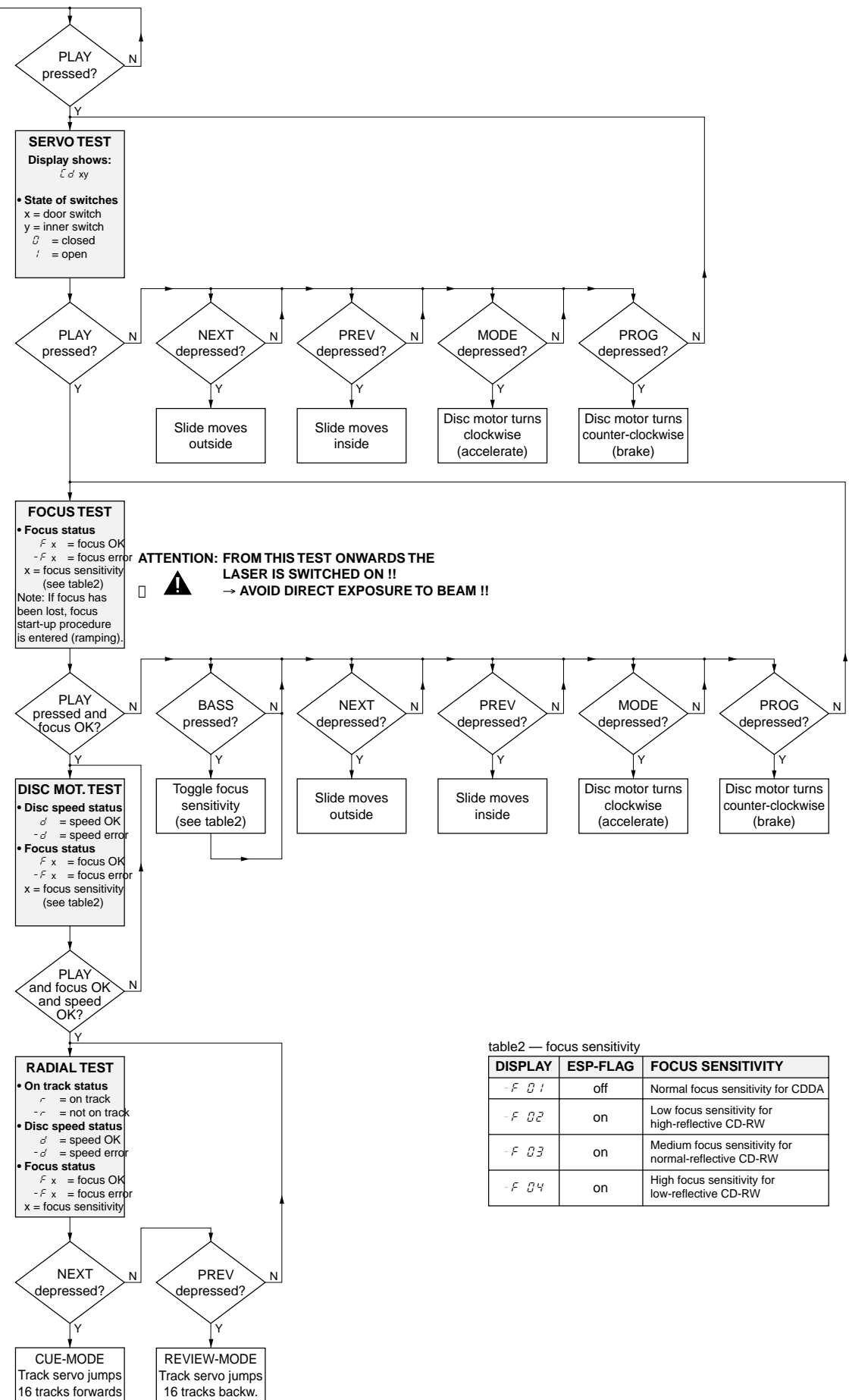
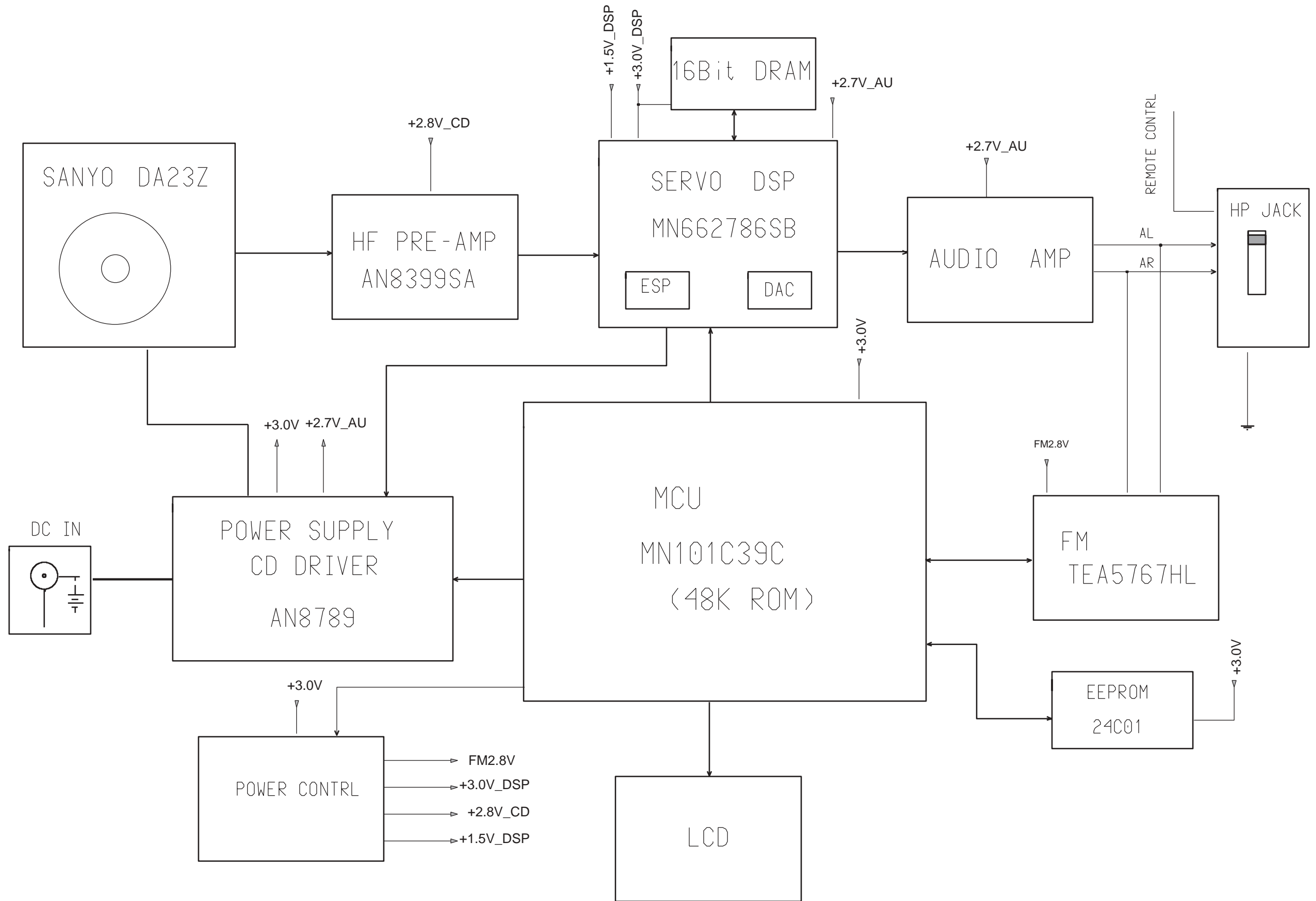


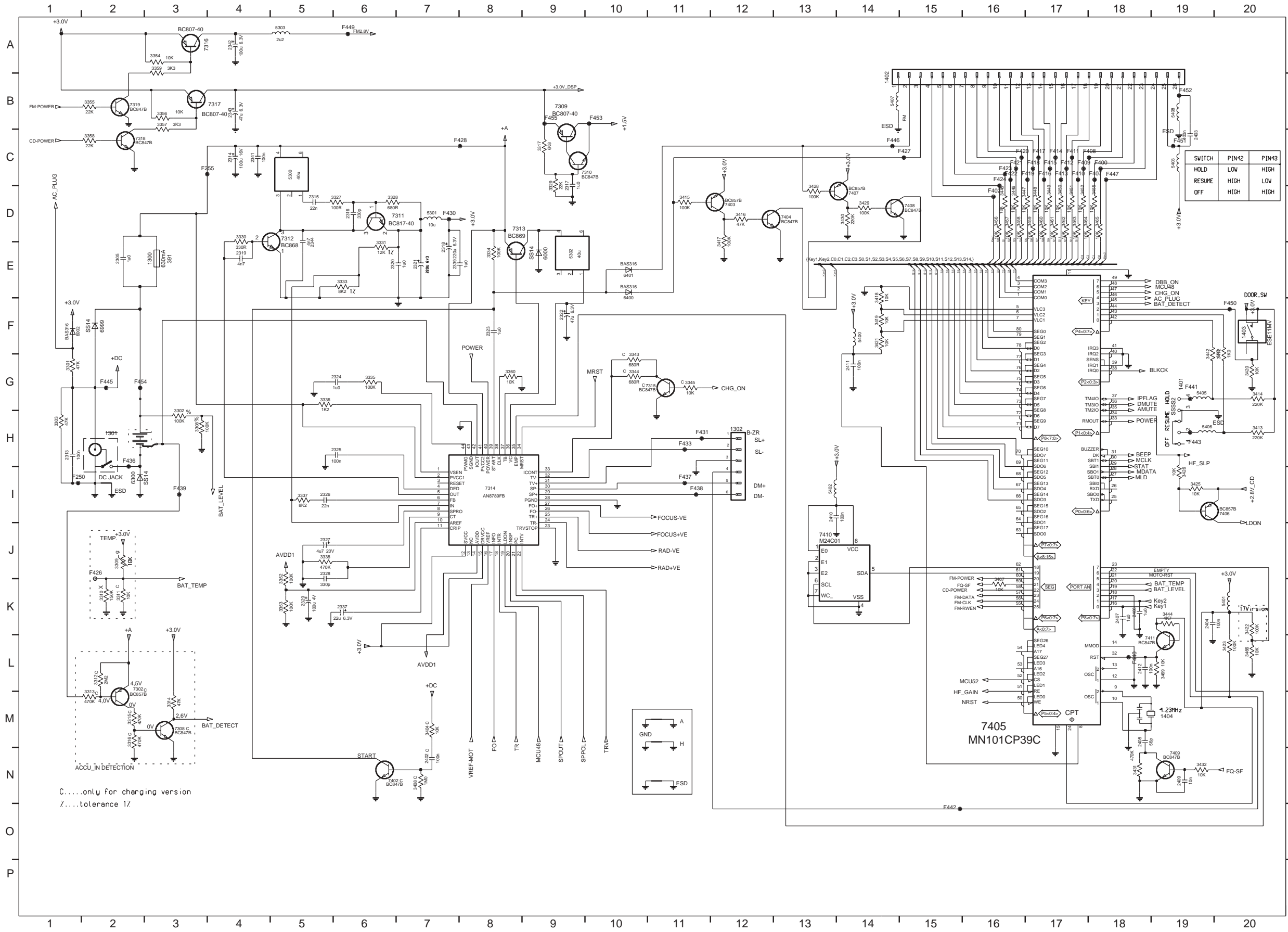
table2 — focus sensitivity

DISPLAY	ESP-FLAG	FOCUS SENSITIVITY
-F 01	off	Normal focus sensitivity for CDDA
-F 02	on	Low focus sensitivity for high-reflective CD-RW
-F 03	on	Medium focus sensitivity for normal-reflective CD-RW
-F 04	on	High focus sensitivity for low-reflective CD-RW

BLOCKDIAGRAM



COMBI BOARD - CIRCUIT DIAGRAM CONTROL / SUPPLY PART

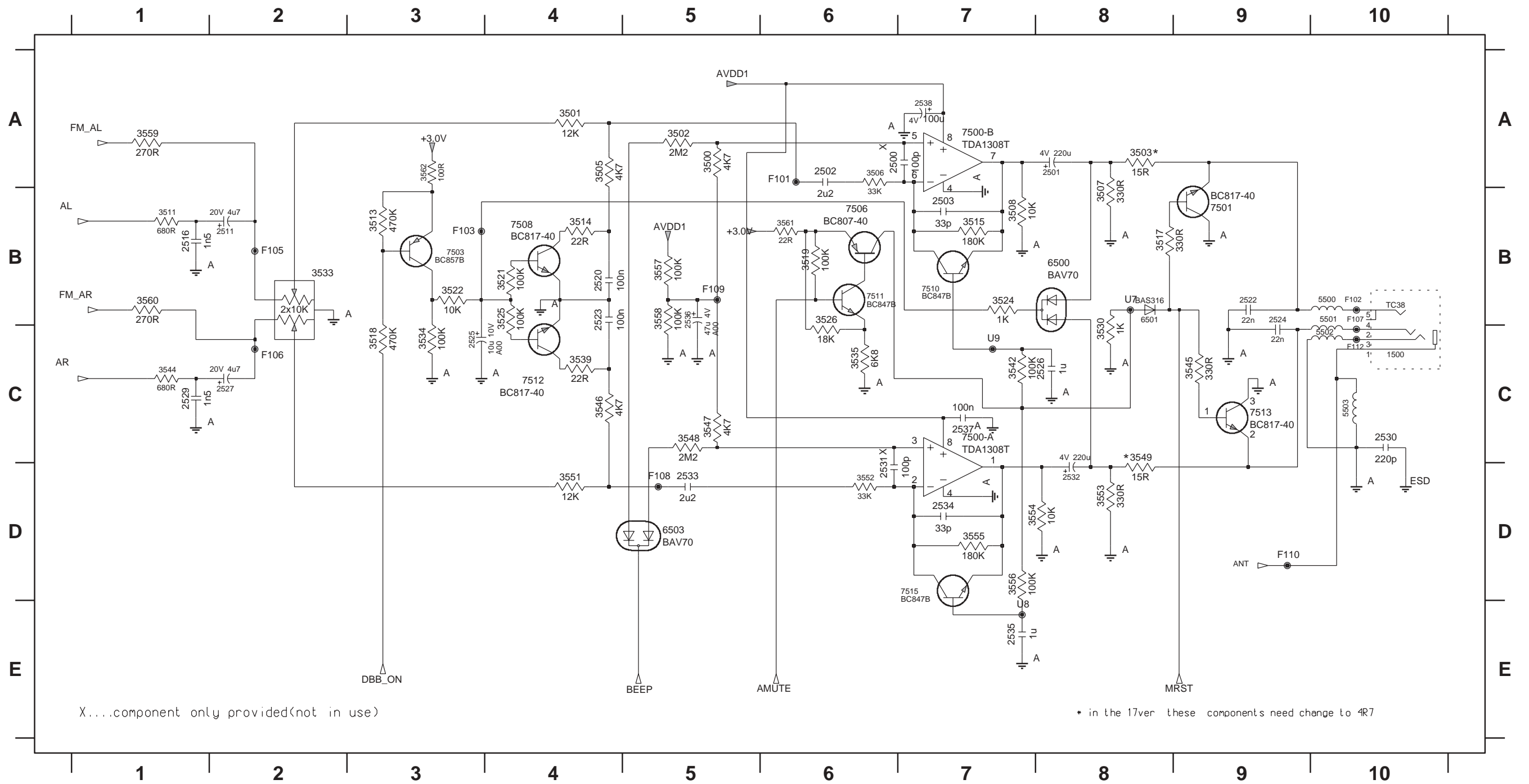


C.....only for charging version
 /.....tolerance 1%

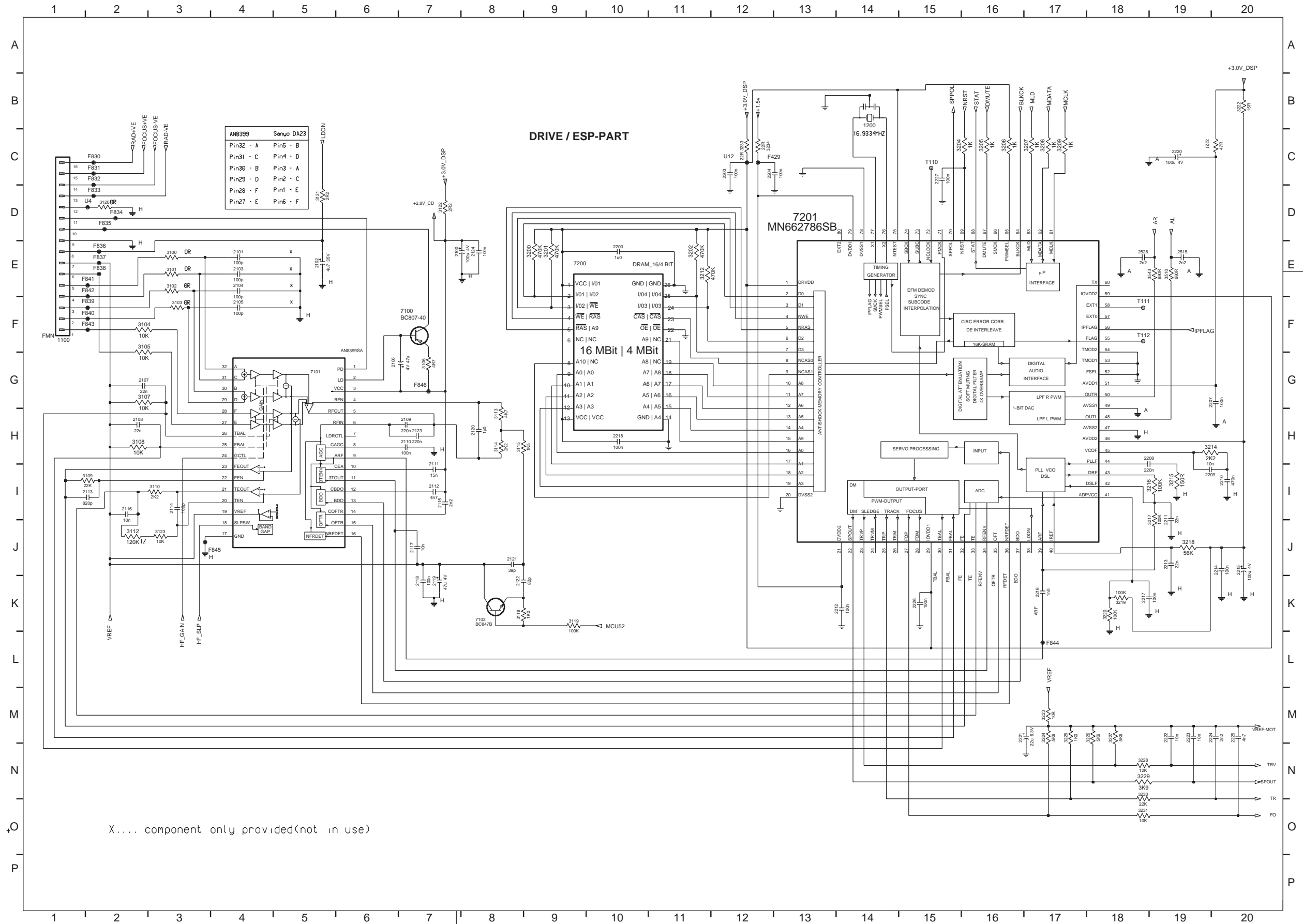
- 1300 D3
- 1301 F2
- 1302 F1B
- 1401 F16
- 1402 B12
- 1403 E17
- 1404 J16
- 2305 D2
- 2313 F2
- 2314 C4
- 2315 C5
- 2316 C5
- 2317 C8
- 2318 D7
- 2319 D4
- 2320 D6
- 2321 D6
- 2322 E8
- 2323 E7
- 2324 E5
- 2325 F5
- 2326 G5
- 2327 G5
- 2328 H5
- 2329 H5
- 2337 H5
- 2339 D7
- 2341 C4
- 2342 A4
- 2343 B5
- 2344 D5
- 2402 J6
- 2403 B16
- 2404 H16
- 2406 H15
- 2407 H15
- 2408 J15
- 2409 J16
- 2410 D11
- 2411 E12
- 2412 H15
- 3301 E2
- 3302 F3
- 3303 F2
- 3308 F3
- 3309 H2
- 3310 H2
- 3311 H2
- 3312 I2
- 3313 I2
- 3314 I3
- 3315 I3
- 3316 J3
- 3317 B8
- 3318 H5
- 3328 C6
- 3329 C8
- 3330 D4
- 3331 D6
- 3333 D5
- 3334 D7
- 3335 E6
- 3336 F5
- 3337 G5
- 3338 H5
- 3343 E9
- 3344 E9
- 3345 E10
- 3352 H4
- 3353 H4
- 3355 A3
- 3356 B3
- 3357 B3
- 3358 B2
- 3359 A3
- 3360 E7
- 3404 J6
- 3408 K6
- 3412 E16
- 3413 F17
- 3414 F17
- 3415 D10
- 3416 C10
- 3417 D10
- 3418 D12
- 3419 E12
- 3420 E7
- 3421 E12
- 3422 H7
- 3423 H6
- 3425 D16
- 3426 G11
- 3428 C11
- 3429 C12
- 3430 C12
- 3431 J15
- 3432 J16
- 3442 E16
- 3444 H16
- 3445 C14
- 3446 C14
- 3447 C14
- 3448 C14
- 3449 C14
- 3450 C14
- 3451 C14
- 3452 C15
- 3455 C15
- 3456 C14
- 3457 C14
- 3458 C14
- 3459 C14
- 3460 C14
- 3461 C14
- 3462 C14
- 3463 C15
- 3464 C15
- 3465 C15
- 3466 H7
- 3467 H14
- 3469 H16
- 5300 C5
- 5301 C6
- 5302 D8
- 5303 A4
- 5400 E12
- 5401 H16
- 5402 G11
- 5403 C16
- 5405 F16
- 5406 F16
- 5407 B12
- 5408 B16
- 6000 D8
- 6002 E2
- 6300 G3
- 6400 D9
- 6401 D9
- 6999 E2
- 7302 I3
- 7308 J3
- 7309 B8
- 7310 C8
- 7311 C8
- 7312 D4
- 7313 D8
- 7314 G7
- 7315 E9
- 7316 A3
- 7317 B4
- 7318 B3
- 7319 B2
- 7402 K6
- 7403 C10
- 7404 C11
- 7405 H14
- 7406 G16
- 7407 C12
- 7408 C12
- 7409 J16
- 7410 G11
- 7411 H6
- 7412 G2
- 7413 H6
- 7414 H6
- 7415 H6
- 7416 H6
- 7417 H6
- 7418 H6
- 7419 H6
- 7420 H6
- 7421 H6
- 7422 H6
- 7423 H6
- 7424 H6
- 7425 H6
- 7426 H6
- 7427 H6
- 7428 H6
- 7429 H6
- 7430 H6
- 7431 H6
- 7432 H6
- 7433 H6
- 7434 H6
- 7435 H6
- 7436 H6
- 7437 H6
- 7438 H6
- 7439 H6
- 7440 H6
- 7441 H6
- 7442 H6
- 7443 H6
- 7444 H6
- 7445 H6
- 7446 H6
- 7447 H6
- 7448 H6
- 7449 H6
- 7450 H6
- 7451 H6
- 7452 H6
- 7453 H6
- 7454 H6
- 7455 H6
- 7456 H6
- 7457 H6
- 7458 H6
- 7459 H6
- 7460 H6
- 7461 H6
- 7462 H6
- 7463 H6
- 7464 H6
- 7465 H6
- 7466 H6
- 7467 H6
- 7468 H6
- 7469 H6
- 7470 H6
- 7471 H6
- 7472 H6
- 7473 H6
- 7474 H6
- 7475 H6
- 7476 H6
- 7477 H6
- 7478 H6
- 7479 H6
- 7480 H6
- 7481 H6
- 7482 H6
- 7483 H6
- 7484 H6
- 7485 H6
- 7486 H6
- 7487 H6
- 7488 H6
- 7489 H6
- 7490 H6
- 7491 H6
- 7492 H6
- 7493 H6
- 7494 H6
- 7495 H6
- 7496 H6
- 7497 H6
- 7498 H6
- 7499 H6
- 7500 H6
- 7501 H6
- 7502 H6
- 7503 H6
- 7504 H6
- 7505 H6
- 7506 H6
- 7507 H6
- 7508 H6
- 7509 H6
- 7510 H6
- 7511 C8

COMBI BOARD - CIRCUIT DIAGRAM
AUDIO PART

U7 B8	2502 A6	2523 B4	2530 C10	2536 B5	3503 A8	3513 B3	3520 B10	3530 C8	3544 C1	3551 D4	3557 B5	5500 B10	6502 C9	7506 B6	7515 D7	F106 C2
U8 E7	2503 B7	2524 B9	2531 D6	2537 C7	3505 A4	3514 B4	3521 B4	3533 B2	3545 C9	3552 D6	3558 B5	5501 B10	6503 D5	7508 B4	F101 A6	F107 C9
U9 C7	2511 B2	2525 C3	2532 D8	2538 A7	3506 A6	3515 B7	3522 B3	3534 C3	3546 C4	3553 D8	3559 A1	5502 C10	7500-A C7	7510 B7	F102 B9	F108 D5
1500 C10	2516 B1	2526 C8	2533 D5	3500 A5	3507 B8	3517 B8	3524 B7	3535 C6	3547 C5	3554 D7	3560 B1	5503 C10	7500-B A7	7511 B6	F103 B3	F109 B5
2500 A6	2520 B4	2527 C2	2534 D7	3501 A4	3508 B7	3518 C3	3525 B4	3539 C4	3548 C5	3555 D7	3561 B6	6500 B8	7501 B9	7512 C4	F104 B10	F110 D9
2501 A8	2522 B9	2529 C1	2535 E7	3502 A5	3511 B1	3519 B6	3526 B6	3542 C7	3549 C8	3556 D7	3562 A3	6501 B8	7503 B3	7513 C9	F105 B2	

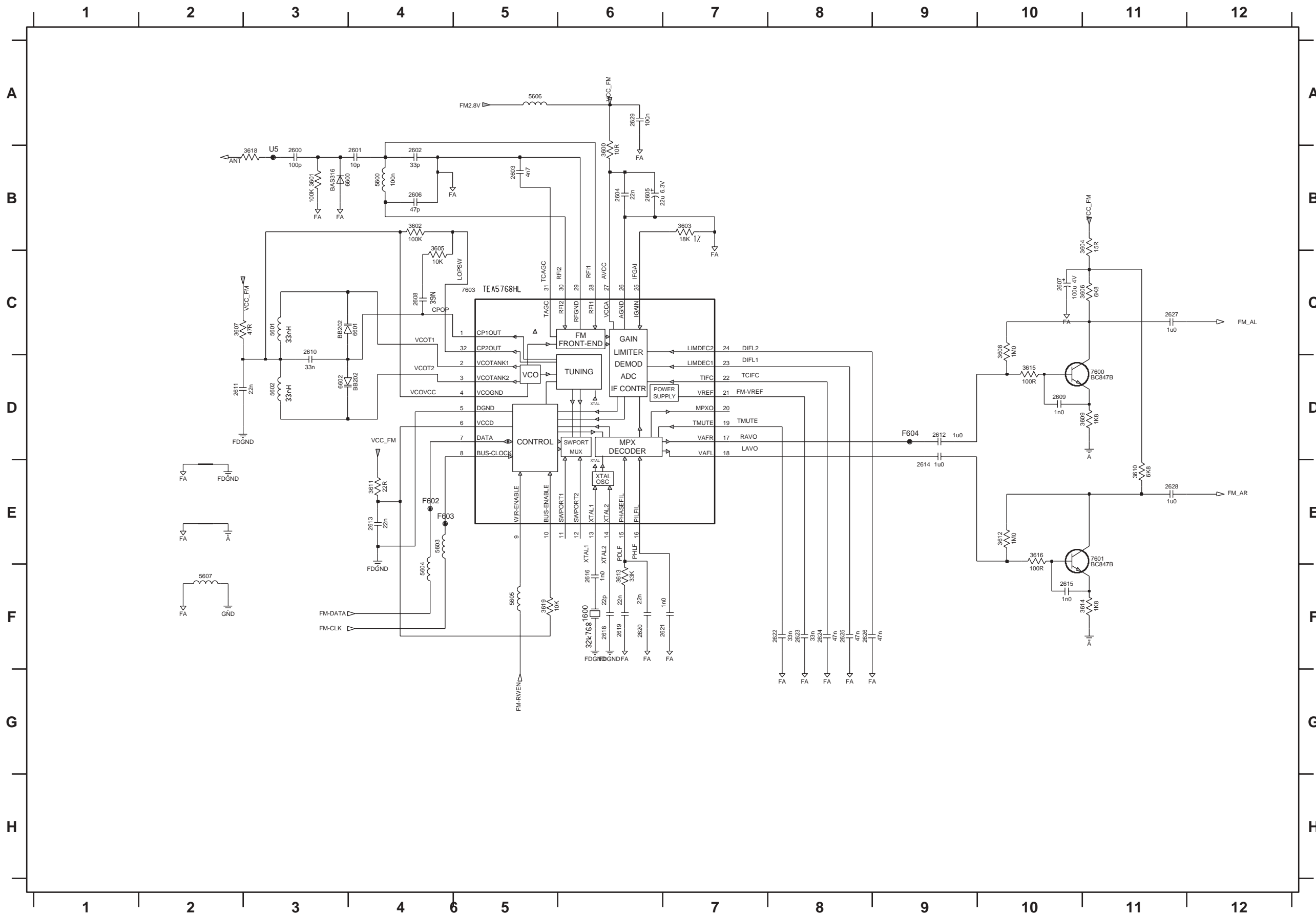


COMBI BAORD - CIRCUIT DIAGRAM DRIVE / ESP PART



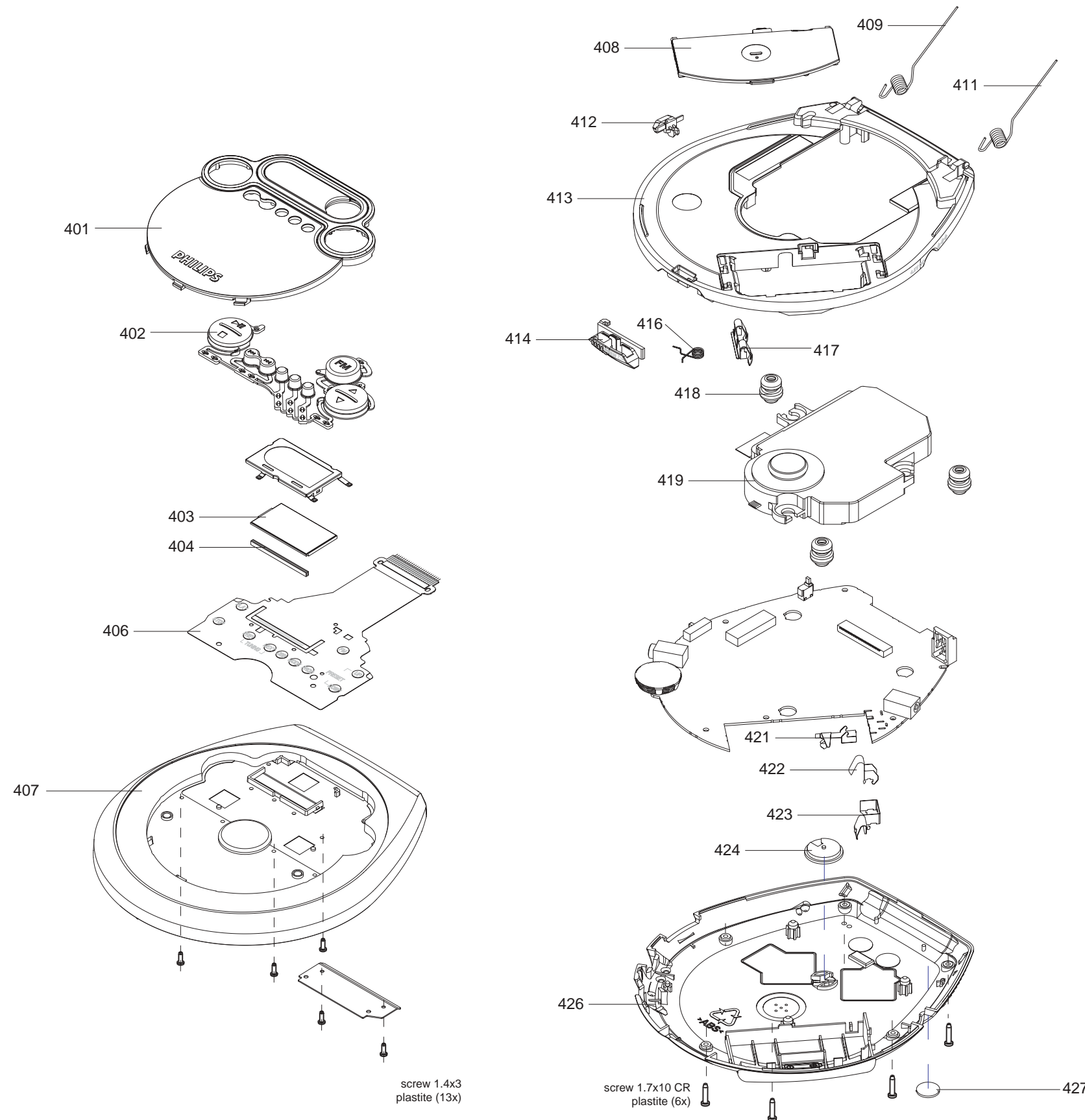
- U4 C2
- 1100 E2
- 1200 B12
- 2100 D7
- 2101 D4
- 2102 D5
- 2103 D4
- 2104 D4
- 2105 D4
- 2106 E5
- 2107 E3
- 2108 F3
- 2109 F6
- 2110 F6
- 2111 G6
- 2112 G6
- 2113 G2
- 2114 G3
- 2115 G6
- 2116 G2
- 2117 H6
- 2118 H6
- 2119 H6
- 2120 F7
- 2121 H7
- 2122 H7
- 2123 F6
- 2124 D7
- 2200 D9
- 2203 C10
- 2204 C11
- 2207 F16
- 2208 F15
- 2209 G16
- 2210 G16
- 2211 G16
- 2212 H12
- 2213 H16
- 2214 H16
- 2215 H17
- 2216 H4
- 2217 H15
- 2218 F9
- 2220 C16
- 2221 J14
- 2222 J16
- 2223 J16
- 2224 J16
- 2225 J17
- 2226 H13
- 2227 C13
- 2515 D16
- 2528 D15
- 3100 D3
- 3109 G3
- 3102 D3
- 3103 D3
- 3104 E3
- 3105 E3
- 3106 E6
- 3107 F3
- 3108 F3
- 3109 G3
- 3110 G3
- 3112 G2
- 3113 F7
- 3114 F7
- 3115 F7
- 3116 H7
- 3119 B8
- 3120 C2
- 3121 C5
- 3122 C6
- 3123 G3
- 3200 D8
- 3201 D6
- 3202 D10
- 3204 B13
- 3205 B13
- 3206 B14
- 3207 B14
- 3208 B14
- 3209 B14
- 3212 D10
- 3214 F16
- 3215 G16
- 3216 G16
- 3217 G16
- 3218 H16
- 3219 H15
- 3220 H15
- 3221 B16
- 3222 B17
- 3223 J14
- 3224 J14
- 3225 J14
- 3226 J15
- 3227 J15
- 3228 J15
- 3229 K15
- 3230 K15
- 3231 K15
- 3233 B10
- 3234 B11
- 3510 D16
- 3543 D16
- 7100 E6
- 7101 E5
- 7103 I7
- 7200 D8
- 7201 C11
- F429 C11
- F830 C2
- F831 C2
- F832 C2
- F833 C2
- F834 C2
- F835 C2
- F836 D2
- F837 D2
- F838 D2
- F839 D2
- F840 E2
- F841 D2
- F842 D2
- F843 E2
- F844 I4
- F845 H4
- F846 F6
- T110 C13
- T111 D15
- T112 E15

COMBI BOARD - CIRCUIT DIAGRAM FM PART



- U5 B3
- 1600 F6
- 2600 B3
- 2601 B4
- 2602 B4
- 2603 B5
- 2604 B6
- 2605 B6
- 2606 B4
- 2607 C10
- 2608 C4
- 2609 D10
- 2610 C3
- 2611 D2
- 2612 D9
- 2613 E4
- 2614 E9
- 2615 F10
- 2616 F6
- 2618 F6
- 2619 F6
- 2620 F6
- 2621 F7
- 2622 F8
- 2623 F8
- 2624 F8
- 2625 F8
- 2626 F8
- 2627 C11
- 2628 E11
- 2629 A6
- 3600 B6
- 3601 B3
- 3602 B4
- 3603 B7
- 3604 B11
- 3605 B4
- 3606 C11
- 3607 C2
- 3608 C10
- 3609 D11
- 3610 E11
- 3611 E4
- 3612 E10
- 3613 F6
- 3614 F11
- 3615 D10
- 3616 E10
- 3618 B3
- 3619 F5
- 5600 B4
- 5601 C3
- 5602 D3
- 5603 E4
- 5604 F4
- 5605 F5
- 5606 A5
- 5607 F2
- 6600 B3
- 6601 C4
- 6602 D3
- 7600 D11
- 7601 E11
- 7603 C5
- F602 E4
- F603 E4
- F604 D9

EXPLODED VIEW DIAGRAM - CABINET



MECHANICAL PARTSLIST - CABINET

401	3140 117 67491	CONTROL PANEL ASSY
402	3140 117 67591	KNOB SET-ASSY
403	3140 110 51931	LCD PANEL - DOT MATRIX
404	3140 114 49871	ZEBRASTRIP
406	3140 113 33311	MEMBRANE-KEYBOARD
407	3140 117 67471	CD-DOOR ASSY
408	3103 304 70320	DOOR-BATTERY-2
409	3140 111 01371	CD-DOOR-SPRING-LEFT
411	3140 111 01381	CD-DOOR-SPRING-RIGHT
412	3103 304 69570	SLIDER-RESUME
413	3103 307 99711	CABINET - ASSY - 2
414	3103 304 69580	SLIDER-OPEN
416	3103 301 06500	SPRING-SLIDER-OPEN-2
417	3103 301 45180	SPRING-BATTERY-SHORT-2
418	3103 304 69590	SUSPENSION
419	3103 309 05480	CD DA23ZPH
421	3103 301 45430	SPRING-BATTERY-CHARGE
422	3103 301 45410	SPRING-BATTERY-MINUS
423	3103 301 45420	SPRING-BATTERY-PLUS
424	3103 304 69540	COVER-BOTTOM
426	3103 307 99620	BOTTOM-ASSY-1
427	4822 462 41819	RUBBER
	3103 304 69602	FOIL-ADHESIVE-FLEXFOIL

Note: Only these parts mentioned in the list are normal service parts.

ELECTRICAL PARTSLIST - COMBI BOARD

- MISCELLANEOUS -

1100	4822 267 11027	CONNECTOR 16P
1300	2422 086 10946	FUSE 630mA 65V
1301	2422 026 05086	CONNECTOR 1P
1302	2422 025 12272	SOCKET FFC 6P V
1401	4822 277 21705	SWITCH
1402	4822 267 10694	SOCKET FFC 26P H
1403	2422 129 16818	SWITCH 1P 5V
1500	2422 026 05204	SOCKET PHONE 1P
1600	4822 242 10971	CRYSTAL

- CAPACITORS -

2100	4822 124 12108	100µF 20% 4V
2102	2020 021 91729	4,7µF 20% 35V
2106	4822 124 81058	47µF 20% 4V
2107	2238 916 15641	22nF 10% 25V
2108	2238 916 15641	22nF 10% 25V
2109	4822 126 13879	220nF +80-20% 16V
2110	2238 586 59812	100nF +80-20% Y5V 50V
2111	3198 017 31530	15nF X7R 50V
2112	4822 126 13193	4,7nF 10% X7R 63V
2113	3198 016 38210	820pF NP0 25V
2114	2020 552 94427	100pF 5% NP0 50V
2115	4822 126 14238	2,2nF X7R 50V
2116	5322 126 11583	10nF 10% X7R 50V
2117	5322 126 11583	10nF 10% X7R 50V
2118	2238 586 59812	100nF +80-20% Y5V 50V
2119	4822 124 81058	47µF 20% 4V
2120	3198 016 31080	1pF NP0 50V
2121	2020 552 93645	39pF 5% NP0 50V
2122	4822 126 14226	82pF 5% NP0 50V
2123	4822 126 13879	220nF +80-20% 16V
2124	2238 586 59812	100nF +80-20% Y5V 50V
2200	3198 017 41050	1µF Y5V 10V
2203	2238 586 59812	100nF +80-20% Y5V 50V
2204	2238 586 59812	100nF +80-20% Y5V 50V
2207	2238 586 59812	100nF +80-20% Y5V 50V
2208	4822 126 13879	220nF +80-20% 16V
2209	5322 126 11583	10nF 10% X7R 50V
2210	3198 017 44740	470nF Y5V 10V
2211	2238 916 15641	22nF 10% X7R 25V
2212	2238 586 59812	100nF +80-20% Y5V 50V
2213	2238 916 15641	22nF 10% X7R 25V
2214	2238 586 59812	100nF +80-20% Y5V 50V
2215	3198 032 15190	100µF 20%
2216	5322 126 11578	1nF 10% X7R 50V
2217	2238 586 59812	100nF +80-20% Y5V 50V

- CAPACITORS -

2218	2238 586 59812	100nF +80-20% Y5V 50V
2220	3198 032 15190	100µF 20% 4V
2221	4822 124 11946	22µF 20% 16V
2222	5322 126 11583	10nF 10% X7R 50V
2223	5322 126 11583	10nF 10% X7R 50V
2224	4822 126 14238	2,2nF X7R 50V
2225	4822 126 13193	4,7nF 10% X7R 63V
2226	2238 586 59812	100nF +80-20% Y5V 50V
2227	2238 586 59812	100nF +80-20% Y5V 50V
2305	3198 017 41050	1µF Y5V 10V
2313	2238 586 59812	100nF +80-20% Y5V 50V
2314	4822 124 12095	100µF 20% 16V
2315	3198 017 42230	22nF Y5V 50V
2316	4822 126 14241	330pF NP0 50V
2317	3198 017 41050	1µF Y5V 10V
2318	3198 032 28210	220µF 20% 6,3V
2319	4822 126 13193	4,7nF 10% X7R 63V
2320	3198 017 41050	1µF Y5V 10V
2321	3198 032 28210	220µF 20% 6,3V
2322	2022 009 00656	47µF 20% 6,3V
2323	3198 017 41050	1µF Y5V 10V
2324	3198 017 41050	1µF Y5V 10V
2325	2238 586 59812	100nF +80-20% Y5V 50V
2326	3198 017 42230	22nF Y5V 50V
2327	3198 032 54110	4,7µF 20% 20V
2328	4822 126 14241	330pF NP0 50V
2329	3198 032 15190	100µF 20% 4V
2337	4822 124 11946	22µF 20% 16V
2339	3198 017 41050	1µF Y5V 10V
2341	2238 586 59812	100nF +80-20% Y5V 50V
2342	3198 032 27190	100µF 20% 6,3V
2343	2022 009 00656	47µF 20% 6,3V
2344	4822 126 13193	4,7nF 10% X7R 63V
2402	2238 586 59812	100nF +80-20% Y5V 50V
2403	2238 586 59812	100nF +80-20% Y5V 50V
2404	2238 586 59812	100nF +80-20% Y5V 50V
2406	3198 017 41050	1µF Y5V 10V
2407	3198 017 41050	1µF Y5V 10V
2408	4822 126 14225	56pF 5% NP0 50V
2409	5322 126 11583	10nF 10% X7R 50V
2410	2238 586 59812	100nF +80-20% Y5V 50V
2411	2238 586 59812	100nF +80-20% Y5V 50V
2501	4822 124 81059	220µF 20% 4V
2502	4822 126 14491	2,2µF 10V 0805
2503	2222 867 15339	33pF 5% NP0 50V
2511	3198 032 54110	4,7µF 20% 20V
2515	4822 126 14238	2,2nF X7R 50V
2516	4822 126 14247	1,5nF X7R 50V
2520	2238 586 59812	100nF +80-20% Y5V 50V
2522	3198 017 42230	22nF Y5V 50V

ELECTRICAL PARTSLIST - COMBI BOARD

- CAPACITORS -

2523	2238 586 59812	100nF +80-20% Y5V 50V
2524	3198 017 42230	22nF Y5V 50V
2525	2020 004 90283	10µF 20% F93 10V
2526	3198 017 41050	1µF Y5V 10V
2527	3198 032 54110	4,7µF 20% 20V
2528	4822 126 14238	2,2nF X7R 50V
2529	4822 126 14247	1,5nF X7R 50V
2530	4822 126 13883	220pF 5% 50V
2532	4822 124 81059	220µF 20% 4V
2533	4822 126 14491	2,2µF 10V
2534	2222 867 15339	33pF NP0 50V
2535	3198 017 41050	1µF Y5V 10V
2536	4822 124 81058	47µF 20% 4V
2537	2238 586 59812	100nF +80-20% Y5V 50V
2538	4822 124 12108	100µF 20% 4V
2600	2020 552 94427	100pF 5% NP0 50V
2601	4822 122 33741	10pF 10% NP0 50V
2602	2222 867 15339	33pF 5% NP0 50V
2603	4822 126 13193	4,7nF 10% X7R 63V
2604	2238 916 15641	22nF 10% X7R 25V
2605	4822 124 11946	22µF 20% 16V
2606	4822 126 11785	47pF 5% NP0 50V
2607	3198 032 15190	100µF 20%
2608	2238 786 15644	39nF 10% X7R 16V
2609	5322 126 11578	1nF 10% X7R 50V
2610	5322 126 11583	10nF 10% X7R 50V
2611	2238 916 15641	X7R 25V 22nF 10%
2612	3198 017 41050	1µF Y5V 10V
2613	2238 916 15641	22nF 10%X7R 25V
2614	3198 017 41050	1µF Y5V 10V
2615	5322 126 11578	1nF 10% X7R 50V
2616	3198 016 31020	1nF NP0 25V
2618	4822 122 33761	22pF 5% NP0 50V
2619	2238 916 15641	22nF 10% X7R 25V
2620	2238 916 15641	22nF 10% X7R 25V
2621	3198 016 31020	1nF NP0 25V
2622	4822 126 14549	33nF 16V X7R
2623	4822 126 14549	33nF 16V X7R
2624	3198 017 34730	47nF X7R 16V
2625	3198 017 34730	47nF X7R 16V
2626	3198 017 34730	47nF X7R 16V
2627	3198 017 41050	1µF Y5V 10V
2628	3198 017 41050	1µF Y5V 10V
2629	2238 586 59812	100nF +80-20% Y5V 50V

- RESISTORS -

3100	4822 051 30008	0R JUMPER
3101	4822 051 30008	0R JUMPER
3102	4822 051 30008	0R JUMPER
3103	4822 051 30008	0R JUMPER
3104	4822 051 30103	10K 5% 0,062W
3105	4822 051 30103	10K 5% 0,062W
3106	4822 117 13608	4,7R 5% 0,0016W
3107	4822 051 30103	10K 5% 0,062W
3108	4822 051 30103	10K 5% 0,062W
3109	4822 051 30223	22K 5% 0,062W
3110	4822 051 30222	2,2K 5% 0,062W
3112	2322 704 61204	120K 1%
3113	4822 051 30472	4,7K 5% 0,062W
3114	4822 051 30222	2,2K 5% 0,062W
3115	4822 051 30152	1,5K 5% 0,062W
3118	4822 051 30102	1K 5% 0,062W
3119	4822 117 13632	100K 1% 0,62W
3120	4822 051 30008	0R JUMPER
3121	4822 117 13613	2,2R 5%
3122	4822 117 13613	2,2R 5%
3123	4822 051 30103	10K 5% 0,062W
3200	4822 051 30474	470K 5% 0,062W
3201	4822 051 30474	470K 5% 0,062W
3202	4822 051 30474	470K 5% 0,062W
3204	4822 051 30102	1K 5% 0,062W
3205	4822 051 30102	1K 5% 0,062W
3206	4822 051 30102	1K 5% 0,062W
3207	4822 051 30102	1K 5% 0,062W
3208	4822 051 30102	1K 5% 0,062W
3209	4822 051 30102	1K 5% 0,062W
3212	4822 051 30474	470K 5% 0,062W
3214	4822 051 30222	2,2K 5% 0,062W
3215	4822 051 30151	150R 5% 0,062W
3216	4822 117 13632	100K 1% 0,62W
3217	4822 117 13632	100K 1% 0,62W
3218	4822 051 30563	56K 5% 0,062W
3219	4822 117 13632	100K 1% 0,62W
3220	4822 117 13632	100K 1% 0,62W
3221	4822 051 30479	47R 5% 0,062W
3222	4822 117 12971	15R 5% 0,62W
3223	4822 051 30109	10R 5% 0,062W
3224	4822 051 30562	5,6K 5% 0,063W
3225	4822 051 30102	1K 5% 0,062W
3226	4822 051 30562	5,6K 5% 0,063W
3227	4822 051 30562	5,6K 5% 0,063W
3228	4822 051 30123	12K 5% 0,062W
3229	4822 051 30392	3,9K 5% 0,063W
3230	4822 051 30223	22K 5% 0,062W
3231	4822 051 30103	10K 5% 0,062W
3233	4822 117 12139	22R 5% 0,062W

ELECTRICAL PARTSLIST - COMBI BOARD**- RESISTORS -**

3234	4822 117 12139	22R 5% 0,062W
3301	4822 117 12925	47K 1% 0,063W
3302	4822 117 13632	100K 1% 0,62W
3303	4822 117 12925	47K 1% 0,063W
3308	4822 117 13632	100K 1% 0,62W
3309	2322 615 33103	10K 5% 0,125W
3310	4822 051 30154	150K 5% 0,062W
3311	4822 051 30103	10K 5% 0,062W
3312	3198 021 32250	2,2M 5%
3313	4822 051 30474	470K 5% 0,062W
3314	4822 117 12925	47K 1% 0,063W
3315	4822 051 30474	470K 5% 0,062W
3316	4822 051 30474	470K 5% 0,062W
3317	4822 051 30682	6,8K 5% 0,062W
3327	4822 051 30101	100R 5% 0,062W
3328	4822 051 30681	680R 5% 0,062W
3329	4822 051 30223	22K 5% 0,062W
3330	4822 051 30331	330R 5% 0,062W
3331	5322 117 13028	12K 1% 0,063W
3333	5322 117 13056	8,2K 1% 0,063W
3334	4822 117 13632	100K 1% 0,62W
3335	4822 117 13632	100K 1% 0,62W
3336	4822 117 11817	1,2K 1% 1/16W
3337	4822 117 12902	8,2K 1% 0,063W
3338	4822 051 30474	470K 5% 0,062W
3343	4822 051 30681	680R 5% 0,062W
3344	4822 051 30681	680R 5% 0,062W
3345	4822 051 30103	10K 5% 0,062W
3352	4822 117 13632	100K 1% 0,62W
3353	4822 117 13632	100K 1% 0,62W
3354	4822 051 30103	10K 5% 0,062W
3355	4822 051 30223	22K 5% 0,062W
3356	4822 051 30103	10K 5% 0,062W
3357	4822 051 30332	3,3K 5% 0,062W
3358	4822 051 30223	22K 5% 0,062W
3359	4822 051 30332	3,3K 5% 0,062W
3360	4822 051 30103	10K 5% 0,062W
3404	4822 051 30103	10K 5% 0,062W
3408	4822 051 30105	1M 5% 0,062W
3412	4822 051 30102	1M 5% 0,062W
3413	4822 117 12891	220K 1%
3414	4822 117 12891	220K 1%
3415	4822 117 13632	100K 1% 0,62W
3416	4822 117 12925	47K 1% 0,063W
3417	4822 117 13632	100K 1% 0,62W
3418	4822 051 30103	10K 5% 0,062W
3419	4822 051 30103	10K 5% 0,062W
3420	4822 051 30103	10K 5% 0,062W
3421	4822 051 30103	10K 5% 0,062W
3423	4822 117 13632	100K 1% 0,62W

- RESISTORS -

3425	4822 051 30103	10K 5% 0,062W
3426	4822 051 30103	10K 5% 0,062W
3428	4822 117 13632	100K 1% 0,62W
3429	4822 117 13632	100K 1% 0,62W
3430	4822 117 12891	220K 1%
3431	4822 051 30474	470K 5% 0,062W
3432	4822 051 30103	10K 5% 0,062W
3442	4822 051 30102	1K 5% 0,062W
3444	4822 051 30472	4,7K 5% 0,062W
3445	4822 051 30103	10K 5% 0,062W
3446	4822 051 30103	10K 5% 0,062W
3447	4822 051 30103	10K 5% 0,062W
3448	4822 051 30103	10K 5% 0,062W
3449	4822 051 30103	10K 5% 0,062W
3450	4822 051 30103	10K 5% 0,062W
3451	4822 051 30103	10K 5% 0,062W
3452	4822 051 30103	10K 5% 0,062W
3455	4822 051 30103	10K 5% 0,062W
3456	4822 051 30103	10K 5% 0,062W
3457	4822 051 30103	10K 5% 0,062W
3458	4822 051 30103	10K 5% 0,062W
3459	4822 051 30103	10K 5% 0,062W
3460	4822 051 30103	10K 5% 0,062W
3461	4822 051 30103	10K 5% 0,062W
3462	4822 051 30103	10K 5% 0,062W
3463	4822 051 30103	10K 5% 0,062W
3464	4822 051 30103	10K 5% 0,062W
3465	4822 051 30103	10K 5% 0,062W
3466	4822 051 30103	10K 5% 0,062W
3467	4822 051 30103	10K 5% 0,062W
3468	4822 051 30103	10K 5% 0,062W
3469	4822 051 30103	10K 5% 0,062W
3500	4822 051 30472	4,7K 5% 0,062W
3501	4822 051 30123	12K 5% 0,062W
3502	3198 021 32250	2,2M 5%
3503	4822 117 12971	15R 5% 0,62W
3505	4822 051 30472	4,7K 5% 0,062W
3506	4822 051 20333	33K 5% 0,1W
3507	4822 051 30331	330R 5% 0,062W
3508	4822 051 30103	10K 5% 0,062W
3510	4822 051 30681	680R 5% 0,062W
3511	4822 051 30681	680R 5% 0,062W
3513	4822 051 30474	470K 5% 0,062W
3514	4822 117 12139	22R 5% 0,062W
3515	2322 702 60184	180K 5%
3517	4822 051 30331	330R 5% 0,062W
3518	4822 051 30474	470K 5% 0,062W
3519	4822 117 13632	100K 1% 0,62W
3521	4822 117 13632	100K 1% 0,62W
3522	4822 051 30103	10K 5% 0,062W

ELECTRICAL PARTSLIST - COMBI BOARD**- RESISTORS -**

3524	4822 051 30102	1K 5% 0,062W
3525	4822 117 13632	100K 1% 0,62W
3526	4822 051 30183	18K 5% 0,062W
3530	4822 051 30102	1K 5% 0,062W
3533	2122 400 00001	10K X2 H F-1001G
3534	4822 117 13632	100K 1% 0,62W
3535	4822 051 30682	6,8K 5% 0,062W
3539	4822 117 12139	22R 5% 0,062W
3542	4822 117 13632	100K 1% 0,62W
3543	4822 051 30681	680R 5% 0,062W
3544	4822 051 30681	680R 5% 0,062W
3545	4822 051 30331	330R 5% 0,062W
3546	4822 051 30472	4,7K 5% 0,062W
3547	4822 051 30472	4,7K 5% 0,062W
3548	3198 021 32250	2,2M 5%
3549	4822 117 12971	15R 5% 0,62W
3551	4822 051 30123	12K 5% 0,062W
3552	4822 051 20333	33K 5% 0,1W
3553	4822 051 30331	330R 5% 0,062W
3554	4822 051 30103	10K 5% 0,062W
3555	2322 702 60184	180K 5%
3556	4822 117 13632	100K 1% 0,62W
3557	4822 117 13632	100K 1% 0,62W
3558	4822 117 13632	100K 1% 0,62W
3559	4822 051 30271	270R 5% 0,062W
3560	4822 051 30271	270R 5% 0,062W
3561	4822 117 12139	22R 5% 0,062W
3562	4822 051 30101	100R 5% 0,062W
3600	4822 051 30109	10R 5% 0,062W
3601	4822 117 13632	100K 1% 0,62W
3602	4822 117 13632	100K 1% 0,62W
3603	5322 117 13032	18K 1% 0,063W
3604	4822 117 12971	15R 5% 0,62W
3605	4822 051 30103	10K 5% 0,062W
3606	4822 051 30682	6,8K 5% 0,062W
3607	4822 051 30479	47R 5% 0,062W
3608	4822 051 30105	1M 5% 0,062W
3609	4822 117 12903	1,8K 1% 0,063W
3610	4822 051 30682	6,8K 5% 0,062W
3611	4822 117 12139	22R 5% 0,062W
3612	4822 051 30105	1M 5% 0,062W
3613	4822 051 30333	33K 5% 0,062W
3614	4822 117 12903	1,8K 1% 0,063W
3615	4822 051 30101	100R 5% 0,062W
3616	4822 051 30101	100R 5% 0,062W
3618	4822 051 30008	0R JUMPER
3619	4822 051 30103	10K 5% 0,062W

- COILS & FILTERS -

1200	4822 242 81865	CST16,93MXW0C3-TF01
1404	4822 242 10845	CSTCC4,23MG002-TC
5300	2422 536 00346	IND VAR 5MM 5HP 40µH
5301	4822 157 51462	10µH 10% 4X9,8MM
5302	2422 536 00346	IND VAR 5MM 5HP 40µH
5303	3198 018 52280	FXDIND SM 2,2µH 10%
5400	3198 018 90050	FXDIND 100MHZ 1K
5401	2422 549 43062	IND FXD SM 100MHZ 600R
5402	2422 549 43062	IND FXD SM 100MHZ 600R
5403	2422 549 43062	IND FXD SM 100MHZ 600R
5405	2422 549 43062	IND FXD SM 100MHZ 600R
5406	2422 549 43062	IND FXD SM 100MHZ 600R
5407	2422 549 43062	IND FXD SM 100MHZ 600R
5408	2422 549 43062	IND FXD SM 100MHZ 600R
5500	3198 018 35670	FXDIND SM 0,56µH 10%
5501	3198 018 35670	FXDIND SM 0,56µH 10%
5502	3198 018 35670	FXDIND SM 0,56µH 10%
5503	3198 018 35670	FXDIND SM 0,56µH 10%
5600	2422 536 00471	IND FXD SM 0,1µH 2%
5601	2422 536 00469	IND FXD SM 33nF 2%
5602	2422 536 00469	IND FXD SM 33nF 2%
5603	2422 549 43062	IND FXD SM 100MHZ 600R
5604	2422 549 43062	IND FXD SM 100MHZ 600R
5605	2422 549 43062	IND FXD SM 100MHZ 600R
5606	2422 549 43062	IND FXD SM 100MHZ 600R
5607	2422 549 43062	IND FXD SM 100MHZ 600R

- DIODES -

6000	9322 128 70685	REC SM SS14
6002	4822 130 11397	BAS316
6300	9322 128 70685	REC SM SS14
6400	4822 130 11397	BAS316
6401	4822 130 11397	BAS316
6500	5322 130 34331	BAV70
6501	4822 130 11397	BAS316
6503	5322 130 34331	BAV70
6600	4822 130 11397	BAS316
6601	9340 569 20135	VAR SM BB202
6602	9340 569 20135	VAR SM BB202
6999	9322 128 70685	REC SM SS14

- IC & TRANSISTORS -

7100	5322 130 60123	BC807-40
7101	9322 182 66671	AN8399SA
7103	5322 130 60159	BC846B
7200	9322 175 89668	MSM51V17405F-60SJ
7201	9322 182 62671	MN662786SB

ELECTRICAL PARTSLIST - COMBI BOARD**- IC & TRANSISTORS -**

7302	4822 130 60373	BC856B
7308	5322 130 60159	BC846B
7309	5322 130 60123	BC807-40
7310	5322 130 60159	BC846B
7311	4822 130 42615	BC817-40
7312	5322 130 61569	BC868
7313	4822 130 60142	BC869
7314	9322 186 71671	AN8789FB
7315	5322 130 60159	BC846B
7316	5322 130 60123	BC807-40
7317	5322 130 60123	BC807-40
7318	5322 130 60159	BC846B
7319	5322 130 60159	BC846B
7402	5322 130 60159	BC846B
7403	4822 130 60373	BC856B
7404	5322 130 60159	BC846B
7405	3140 110 51981	MN101C39C
7406	4822 130 60373	BC856B
7407	4822 130 60373	BC856B
7408	5322 130 60159	BC846B
7409	5322 130 60159	BC846B
7410	9965 000 04931	M24C01-WMN6
7411	5322 130 60159	BC846B
7500	4822 209 33165	TDA1308T/N1
7501	4822 130 42615	BC817-40
7503	4822 130 60373	BC856B
7506	5322 130 60123	BC807-40
7508	4822 130 42615	BC817-40
7510	5322 130 60159	BC846B
7511	5322 130 60159	BC846B
7512	4822 130 42615	BC817-40
7513	4822 130 42615	BC817-40
7515	5322 130 60159	BC846B
7600	5322 130 60159	BC846B
7601	5322 130 60159	BC846B
7603	9352 707 25118	TEA5768HL/V1

Note: Only these parts mentioned in the list are normal service parts.