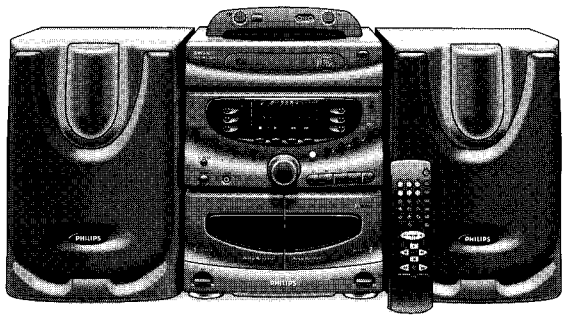
Mini System

FW630

/21/22/34/41

Service
Service
Service



Service Manual

COMPACT disc DIGITAL AUDIO

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CLASS 1 LASER PRODUCT

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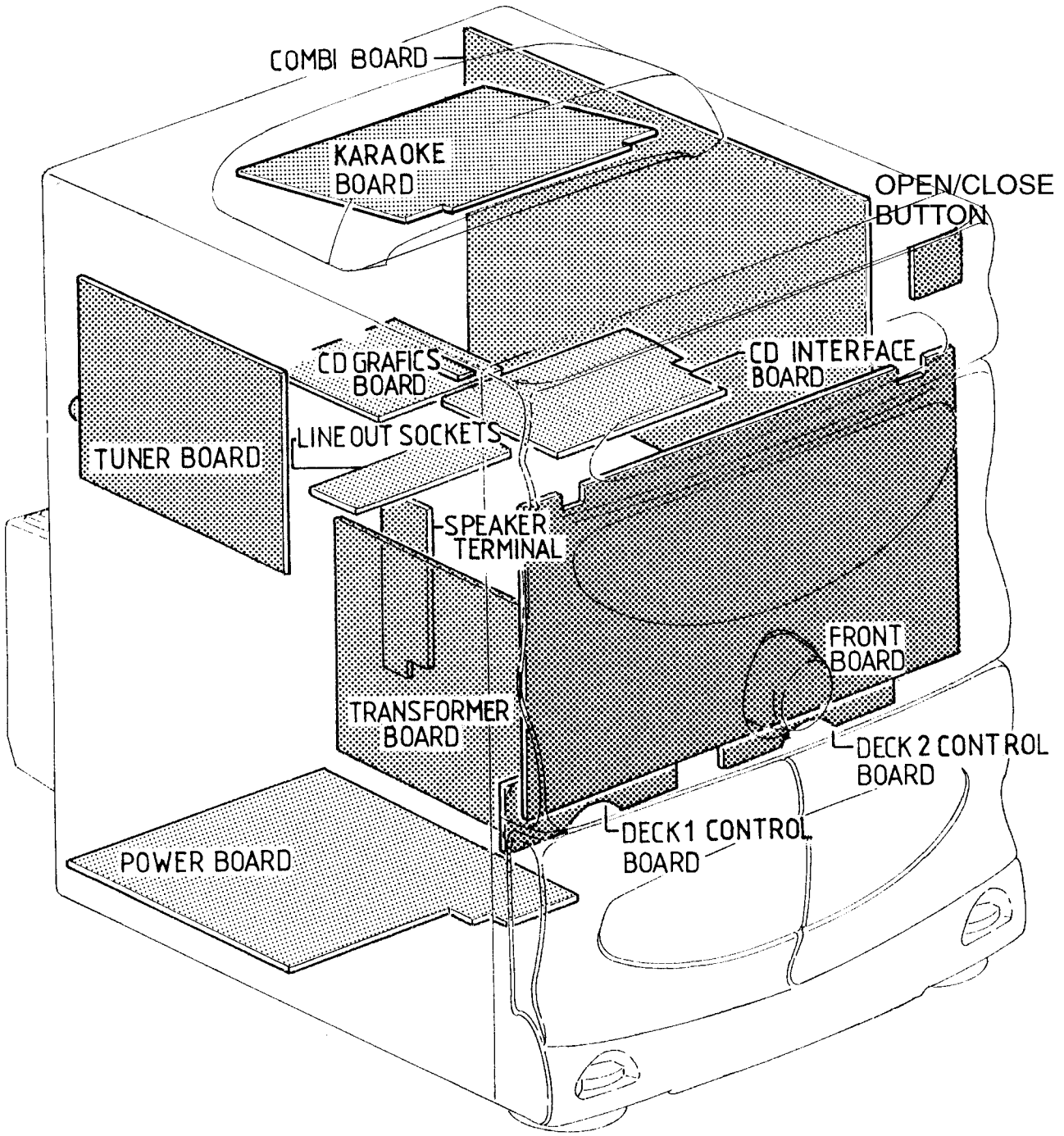
PHILIPS

LOCATION OF PRINTED CIRCUIT BOARDS



CD GRAPHICS BOARD not on all versions
KARAOKE BOARD not on all versions

TECHNICAL SPECIFICATION

General:

Mains voltage	: 230V / 50Hz for /22 and /34
	: 110-127V / 220-240V switchable for /21 and /41
Power consumption	: ≤150W at maximum output power
	: ≤3W in power off mode

Amplifier:

Output power	: 2 x 40W at 6Ω D=10%
Music power	: 2 x 70W at 6Ω
Headphone	: 3,5mm stereo jack 2,5V EMF
Power stage protection	: Shortcircuit, AC, DC, Temperature
Frequency response	: 63 Hz - 20kHz (-3dB) Limit
Input sensitivity	
AUX/LINE	: 500mV
Microphone	: 2,5mV

Equalizer:

60Hz	: ± 6dB
1kHz	: ± 6dB
12kHz	: ±6 dB

Tuner:

FM

Tuning range	: 87,5 - 108MHz
Grid	: 50kHz
Aerial input	: 75Ω Coax
	: 300Ω Click fit for /37
IF	: 10,7MHz ± 25kHz
Sensitivity Mono 26dB S/N	: ≤ 1,7µV
Sensitivity Stereo 46dB S/N	: ≤ 45µV
Sensitivity Search tuning	: ≤ 7µV
Distortion at RF=1mV, Δf=75kHz	: ≤ 7% (2% typ.)
Channel separation	: ≥ 26dB (30dB typ.)
Immage rejection ratio	: ≥ 30dB (70dB typ.)
3 dB limiting point	: ≤ 2µV (1,5µV typ.)

MW

Tuning range	: 522 - 1611kHz
	: 530 - 1710kHz for /37
Grid	: 9kHz
	: 10kHz for /37
Aerial input	: Ferrite antenna
IF	: 450kHz ± 1kHz
Sensitivity	: ≤ 2mV/m
Distortion at RF=100mV, m=80%	: ≤ 5% (3% typ.)
Immage rejection ratio	: ≥ 27dB (30dB typ.)

LW (not for 2 band versions)

Tuning range	: 153 - 279kHz
Grid	: 3kHz
Aerial input	: Ferrite antenna
IF	: 450kHz ± 1kHz
Sensitivity	: ≤ 5 mV/m
Distortion at RF=100mV, m=80%	: ≤ 5% (3% typ.)
Immage rejection ratio	: ≥ 40dB (43dB typ.)

CD unit:

Have to be measured direct on internal connector 1300

Frequency response	: 20 - 20.000Hz ±2dB
Output level	: 2V ±3dB
Signal/noise ratio	: 90dB
Distortion	: < 1% at 1kHz
Channel difference	: < 2dB at 1kHz
Channel crosstalk	: 50dB max.
De emphasis	: 0 or 15/50 µs
Laser	
Output power	: ≤ 500µW
Wave length	: 780nm ± 20nm

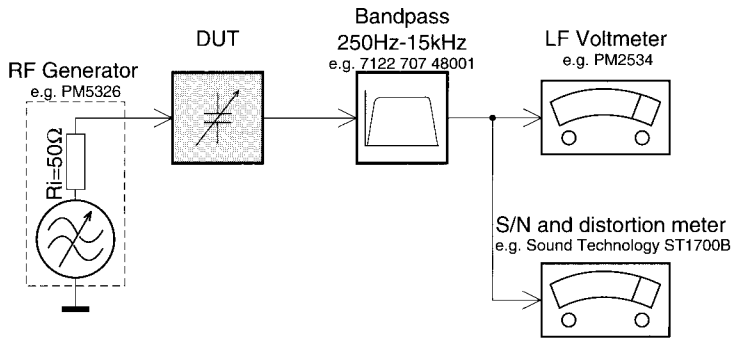
Recorder part:

Tape speed	: 4,76cm/s ±2%
Wow & Flutter	: ≤ 0,4%
Winding speed	: ≤ 130s for C60 cassette
Erase / Bias system	: AC 80kHz ± 5kHz
RIF-shift	: service solution on request
Distortion at 200 nWb/m	: ≤ 3%
Channel difference at PB	: ≤ 3dB
Channel difference overall	: ≤ 3dB
Channel separation	: ≥ 18dB at 1kHz
Track separation	: ≥ 55dB at 1kHz
ALC attack time	: ≤ 15ms
ALC recovery time	: ≥ 50s
Frequency response	: 60Hz - 14kHz within 8dB
Signal to Hiss ratio[1)]	: typ 52dB with Fe
	: typ 54dB with CrO_2
Signal to Noise ratio[2)]	: typ 47dB with Fe
	: typ 47dB with CrO_2
Erase attenuation[3)]	: ≥ 62dB

[1)] at 250 nW/m A-weighted
[2)] at 250 nW/m FF-weighted
[3)] use a 1kHz passfilter to minimize the wide band noise component.

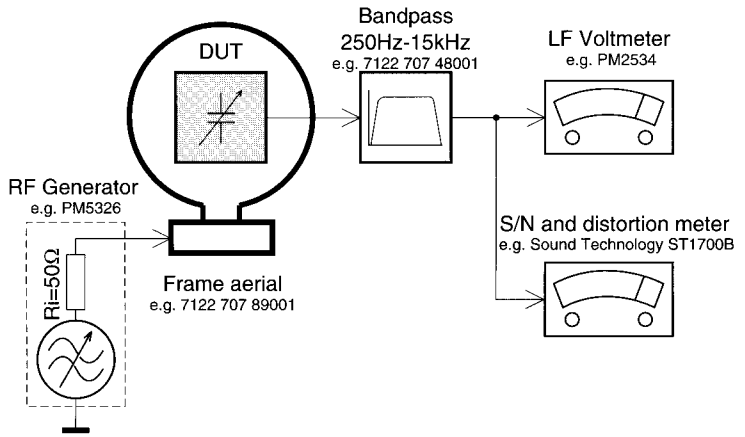
MEASUREMENT SETUP

Tuner FM



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

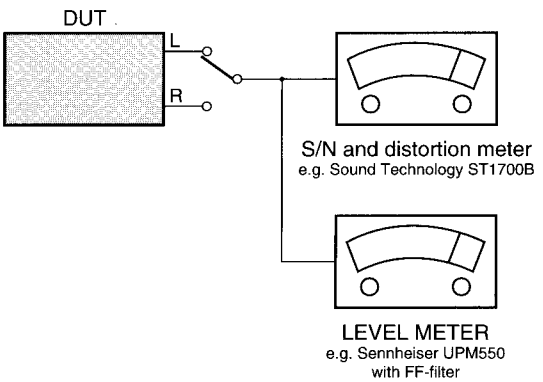
Tuner AM (MW,LW)



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

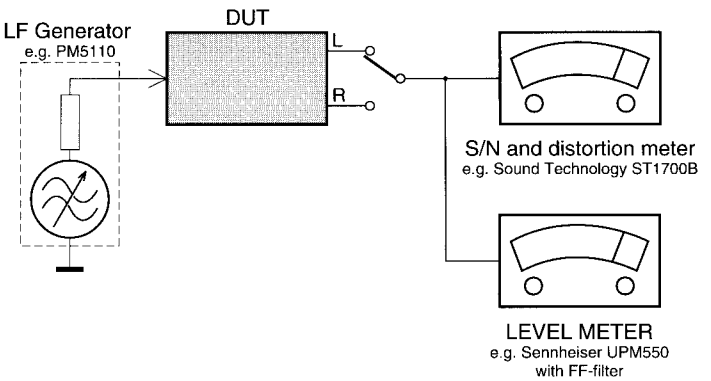
CD

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



RECORDER

Use Universal Test Cassette **CrO_2** SBC419 4822 397 30069
or Universal Test Cassette **Fe** SBC420 4822 397 30071



RC5 SYSTEM/COMMAND CODES

Remote control key	System Code	Command Code
Standby	17, 18, 20	12
Stand by pressed longer than 1sec	00, 04, 05	12
Tuner	17	63
Tuning up	17	30
Tuning down	17	31
Preset up	17	32
Preset down	17	33
Preset 10 key	17	00-09
CD	20	63
CD Play	20	53
CD Stop	20	54
CD Pause	20	48
Preset 10 key	20	00-09
CD Next	20	32
CD Previous	20	33
CD Search forward	20	52
CD Search backward	20	50
CD Disc	20	30
Tape1	18	44
Tape2	18	46
Side	18	47
Tape Play	18	53
Tape Stop	18	54
Tape Wind	18	52
Tape Rewind	18	50
Tape Pause	18	48
Incredible Sound	16	64
DBB	16	70
DSC	16	79
Volume up	16	16
Volume down	16	17
Vocal Fader [1)]	16	67
Key control up[1)]	16	68
Key control down[1)]	16	69
Multi media	04	63

[1)] For sets with KARAOKE only

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Programming track numbers

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Thank you for selecting this Philips system

This state-of-the-art mini stereo system offers you the latest technology, high quality sound and an extreme user-friendly operation thanks to its large display which contains advanced interactive user interface.

Supplied accessories

- 2 loudspeaker boxes, type LSB 650
- 2 loudspeaker cables
- Remote control
- Two batteries (AAA cells) for the remote control
- AC mains lead
- AM/MW frame aerial
- FM wire antenna 75 Ohms

Demo mode

The system has a demo mode, showing various features offered by the system.

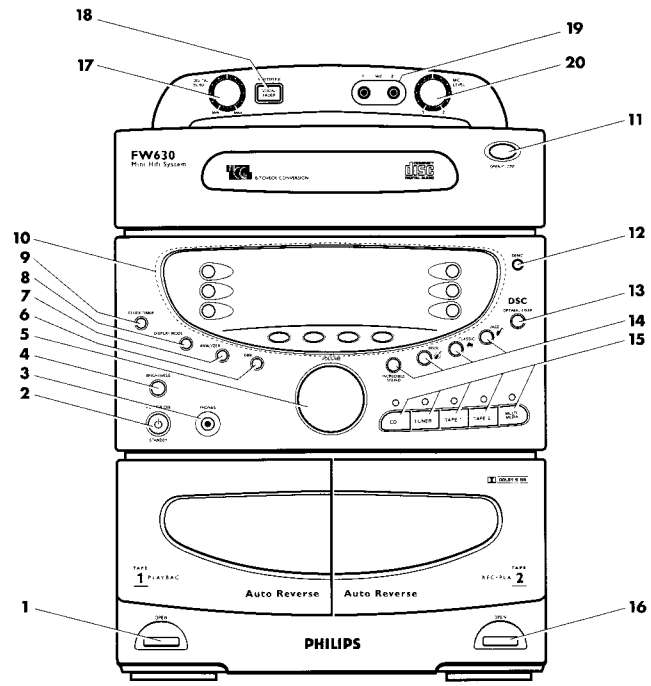
1 To switch on the demonstration mode, press DEMO.
→ The display demonstration starts with the message: "WELCOME TO THE AUDIO WORLD".

2 To leave the demonstration mode, press DEMO or POWER ON/STANDBY.

Environmental information

All unnecessary packaging material has been omitted. We have done our utmost to make the packaging easily separable into three mono-materials:
- cardboard (box)
- expandable polystyrene (buffer)
- polyethylene (bags, protective foam sheet)

Note: 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, exhausted batteries and old equipment.

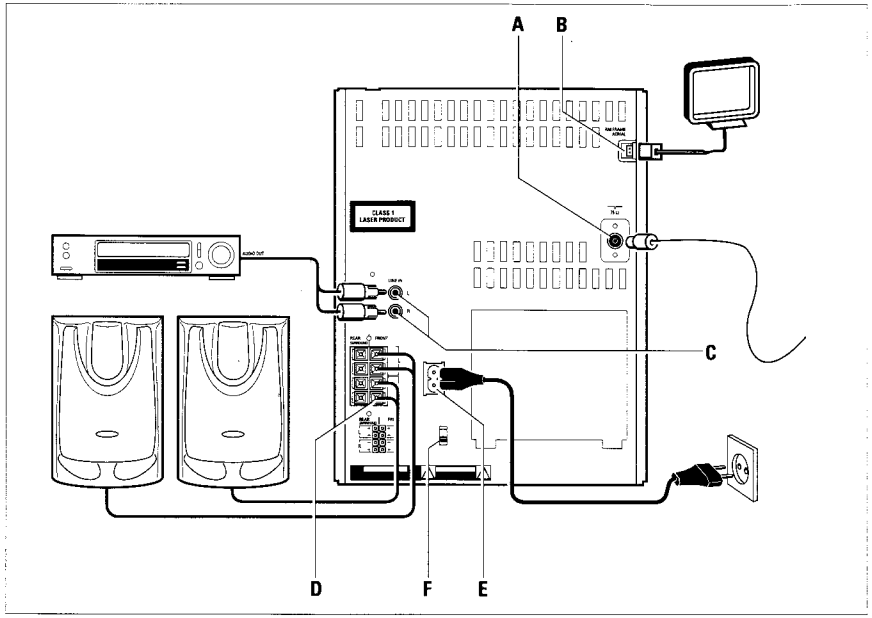


Top and front panel

1 **OPEN** .....to open the cassette compartment of deck 1
2 **POWER ON/STANDBY** – to switch the set on and off
3 **PHONES** .....3.5 mm headphones socket
Inserting the plug will disconnect the speakers.
4 **BRIGHTNESS** ....to adjust the intensity of the display illumination
5 **VOLUME** .....to adjust the volume level
6 **DBB**.....**D**ynamic **B**ass **B**oost: to increase the bass level
7 **ANALYZER** .....to switch the spectrum analyzer on and off
8 **DISPLAY MODE** to change the type of display information for the selected source
9 **CLOCK-TIMER**....to select the clock/timer function
10 **System display and buttons**
11 **OPEN-CLOSE** ....to open and close the CD tray
12 **DEMO** .....to switch on and off the demonstration mode
13 **OPTIMAL-USER** **Digital sound control/setting button** to select the desired equalizer setting: OPTIMAL→USER 1→USER 2→OPTIMAL→...
14 **Digital sound control buttons:**
INCREDIBLE SOUND - ROCK - CLASSIC - JAZZ to adjust the sound to your individual taste
15 **Sound source selection buttons**
CD.....to select the CD player
TUNER.....to select the tuner
TAPE 1 .....to select the left tape deck
TAPE 2.....to select the right tape deck
MULTIMEDIA ....to select the multimedia mode (external sources, e.g. TV sound)
16 **OPEN** .....to open the cassette compartment of deck 2

Karaoke controls:
17 **DIGITAL ECHO** ...to adjust the echo level for the microphone signals
18 **VOCAL FADER** ...to scroll between the different options to fade out the vocal of the original song
19 **MIC** two 3.5 mm microphone sockets
20 **MIC LEVEL**.....to adjust the mixing level of the microphone signal

English

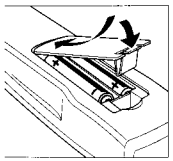


Before you start ...

- After unpacking the system, remove all protective material.
- ***Before connecting the system to the mains***, check if the mains voltage as shown on the type plate corresponds to your local mains voltage. If it does not, consult your dealer or service organisation.
  If your set is equipped with a voltage selector, set this selector to the local mains voltage.
  The typeplate is located at the rear of the system.
- Place the system on a hard surface.
- Do not cover the vents and make sure that you leave sufficient room around the unit for ventilation.

Remote control:

- Open the battery compartment and insert the batteries supplied (type R03, UM-4 or AAA) as indicated.
- Remove the batteries if exhausted or if they will not be used again for a long period.



Connections

A **75 Ω** – Socket for a FM antenna, 75 Ohms.
Connect the supplied antenna wire with this socket. Find a position for best reception.
For good FM stereo reception, use an FM outdoor antenna or a connection to your house distribution system.

B **AM FRAME AERIAL** – Connector for the supplied AM frame antenna. Connect the plug of the AM frame antenna to this socket and position the frame antenna for optimum reception. Do not place the frame antenna too close to the units, the wires or the boxes, as this may cause unwanted noise.

C **LINE IN** – Input sockets (Left/Right) for connecting other sound sources (e.g. VCR, TV audio output etc.).

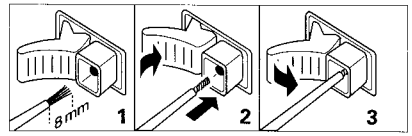
D **REAR/FRONT** – Terminals for four loudspeakers (see SPEAKER CONNECTIONS). Impedance of supplied loudspeakers is 6 ohms, if other front speakers are used, they should have at least 6 ohms.

E **MAINS** – Mains socket. After all other connections have been made, connect the mains lead to the MAINS socket and the wall socket.

F **220-240V/110-127V** – Set this voltage selector to the local mains voltage. If the selector must be reset, disconnect the mains lead first.

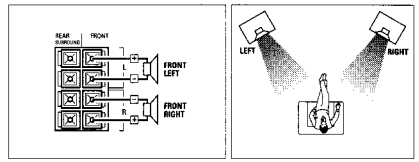
Speaker connections

You can connect the 2 supplied LSB 650 speakers or you can create a 4-speaker system for surround sound using two extra speakers having an impedance of at least 8 ohms, e.g. special surround-sound speakers, type PHILIPS SBC BS010.



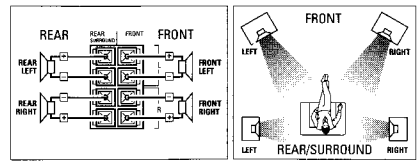
2-speaker system

- Connect the black or non-marked wires to the black terminals and the red or marked wires to the red terminals.



4-speaker system

- ***Front speakers LSB 650 (6Ω):*** Connect the black or non-marked wires to the black FRONT terminals and the red or marked wires to the red FRONT terminals.
- ***Surround speakers, e.g. SBC BS010 (8Ω):*** Connect the black or non-marked wires to the black REAR terminals and the red or marked wires to the red REAR terminals.



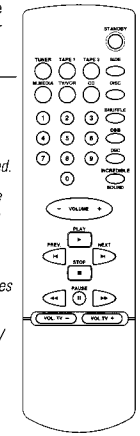
Positioning of the speakers

- You will find the best speaker position by experimenting.
  Placing the speakers on the floor will increase the bass response.
  Placing the speakers behind curtains, furniture etc. will reduce treble response and the stereo effect.
  You will obtain the ideal position when the two front speakers and the listening position build an equilateral triangle and the speakers are at ear-height.

English

Remote control functions

- Always first select the desired sound source and then press the required function key (for example CD + PLAY ▶ or TAPE + PLAY ▶.



Notes:

- The remote control remains tuned to the selected sound source until another sound source button on the remote control is pressed.

- The corresponding LED indicator above the sound source buttons on the system flashes when its source is operated by the remote control.

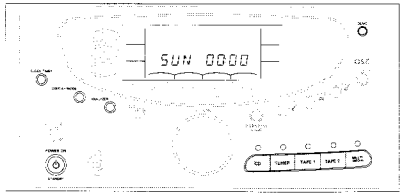
- You can only control TV/VCR if this unit uses the RC-5 remote control system.

- Pressing TV/VCR will first switch on the TV set and after 1 sec the whole audio set. If TV/VCR is selected, the STANDBY button will first switch the TV set to standby and after 1 sec. the whole set.

- Pressing TV/VCR for more than 1 sec will select the external source that is connected via the LINE IN sockets.

STANDBY .....to switch the system to the standby mode
TUNER - TAPE 1 - TAPE 2 - M.MEDIA - TV/VCR - CD sound source selection buttons
SIDE.....***TAPE 1 or 2:*** to select the front or back side of the tape (FRONT/BACK)
DISC .....***CD:*** to select a CD (1-7) - *not applicable to all versions*
SHUFFLE.....***CD:*** to switch on/off the shuffle feature
DBB.....to increase the bass level
DSC.....to select the desired sound setting:
ROCK→CLASSIC→JAZZ→OPTIMAL→
USER 1→USER 2→ROCK→...
INCREDIBLE SOUND – to switch on/off this sound feature
Digits 0-9.....(numbers consisting of two figures must be keyed in within 2 seconds)
CD: to key in a track number
TUNER: to key in a preset number
TV: to key in a TV station
VOLUME – +.....to adjust the volume level of the audio system
PLAY ▶.....***CD, TAPE 1 or 2, VCR:*** to start playback
◀ PREV./NEXT ▶|....***TUNER:*** to select a radio preset station
CD: to select the beginning of the current/ previous or a subsequent track
TV: to select a TV preset station
STOP ■.....***CD, TAPE 1 or 2, VCR:*** to stop playback
◀◀ ▶▶.....***TUNER:*** to tune to a radio station
CD: to search a particular passage
TAPE 1 or 2, VCR: to wind the tape
PAUSE II.....***CD, TAPE 1 or 2, VCR:*** to interrupt playback
VOL TV – +.....***TV:*** to adjust the volume

Switching on and off/standby



- ***To switch on the unit***, press POWER ON/STANDBY on the unit or any sound source button on the unit or on the remote control.
  → The display illumination comes up with full intensity. The selected sound source is indicated on the display and the belonging LED indicator above the sound source button lights up.

- ***To switch off the unit***, press POWER ON/STANDBY on the unit or on the remote control.
  → The system is in standby mode. The display illumination is half dimmed and the display shows the day and time.

- ***To switch off the power supply***, remove the mains plug from the wall socket.

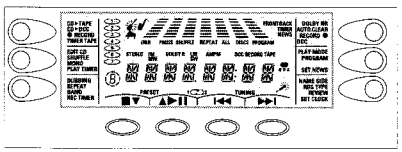
Notes:
- You can also switch on the set by pressing DISPLAY MODE, ANALYZER, CLOCK·TIMER or DEMO.
- The clock memory will be maintained for only ten minutes after the power supply is switched off.

Adjusting the display illumination

- You can change the intensity of the display illumination by pressing BRIGHTNESS.
  → When the system is switched on, the illumination switches from FULL INTENSITY→HALF INTENSITY→OFF→FULL ...
  → In standby mode, the illumination switches from HALF INTENSITY→OFF→HALF ... When the display is off, the power consumption is reduced to about 1 Watt.

Note: When switching on the system, the display always comes on with full intensity.

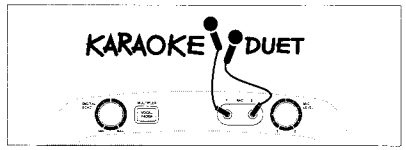
System display and buttons



When you select a sound source or the clock/timer mode, the functions available for the chosen source or the clock/timer mode light up in the display. Using the 10 buttons around the display field, you can select the desired function. These functions are explained in the appropriate chapters in detail.

KARAOKE – microphone mixing

Using a microphone you can mix your voice with any sound source:



1 To prevent acoustic feedback e.g. a loud howling sound, set the control MIC LEVEL to the minimum before you plug in the microphone.
2 Connect either 1 or 2 suitable microphones to the MIC sockets.
3 Select the desired sound source CD, TUNER, TAPE 1, TAPE 2 or MULTIMEDIA and start its playback.

- You can mix a digital echo with the signal of the microphones. Use the control DIGITAL ECHO to adjust the echo level for the desired effect. DIGITAL ECHO does not function in TUNER mode.

- Adjust the mixing ratio with the MIC LEVEL control.

- You can fade out the vocal on a ***CD or a tape*** in 4 different ways: Press VOCAL FADER several times until the desired option is displayed:

- VOCAL FADER: reduces/fades out the vocal of the original song.

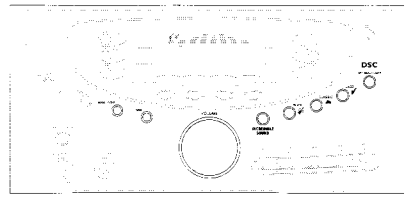
- AUTO VOCAL FADER: reduces/fades out the vocal of the original song only for the time you use the microphone. The vocal is faded in again as soon as you stop singing. When (AUTO) VOCAL FADER is activated, this symbol (flashes) lights up in the display.

- MULTIPLEX (*for special KARAOKE CDs only!*): suppresses the right channel (= vocal) of the KARAOKE CD. The music is audible on both channels.

- AUTO MULTIPLEX (*for special KARAOKE CDs only!*): suppresses the right channel (= vocal) only for the time you use the microphone. The music is audible on both channels. The vocal is faded in again as soon as you stop singing. When (AUTO) MULTIPLEX is activated, this symbol (flashes) lights up in the display.

- OFF: The VOCAL FADER feature is switched off.

Notes:
- It is also possible to record the mixed signal. However, mixing is not possible in DUBBING mode (copying one tape to another).
- If you don't want to record via the microphone, unplug the microphone to avoid accidental mixing with the recording source.
- Due to the recording technique of some CDs it is unfortunately possible that the feature (AUTO) VOCAL FADER does not work.
- We do not recommend to use MULTIPLEX or AUTO MULTIPLEX with a conventional AUDIO CD. The music information would not be transmitted completely and you would only receive mono sound.



ANALYZER – Spectrum Analyzer

The graph bars in the centre of the display show the sound levels. The spectrum analyzer shows continuously the frequency distribution of the current sound.

- By pressing the ANALYZER button, the spectrum analyzer bars are either hidden or shown.
  → The display shows either ANALYZER OFF or ANALYZER ON.

Note: When switching on the system, the spectrum analyzer is always switched on.

DBB – Dynamic Bass Boost

- The bass response can be enhanced in 3 steps: every time you press the DBB button, the bass is enhanced even stronger or the DBB feature is switched off.
  → The display shows the selected DBB level:
  DBB 1→DBB 2→DBB 3→DBB OFF→DBB 1→...

ROCK / CLASSIC / JAZZ

- Press ROCK, CLASSIC or JAZZ (or DSC on the remote control) to enhance the type of music you are listening to.
  → In the display the corresponding icon lights up. A realistic atmosphere for the selected style of music is created.

INCREDIBLE SOUND

- Additionally to all other sound settings, you can activate the incredible sound feature by pressing INCREDIBLE SOUND.
  → This creates a phenomenal surround sound effect even if the speakers are positioned close to the system. The sound becomes "incredibly" spatial.

The button lights up when the incredible sound feature is switched on.

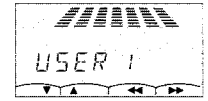
Switchable "OPTIMAL·USER" sound presets

- By repeatedly pressing OPTIMAL·USER, the display shows the different equalizer settings:
  OPTIMAL→USER 1→USER 2→OPTIMAL→...

OPTIMAL: This equalizer setting is specially tuned to the acoustics of the supplied LSB 650 speakers.
USER 1 / USER 2: Here you have the possibility to set your individual sound or to listen to your own equalizer setting.

USER 1 / USER 2
Setting the equalizer

1 Press OPTIMAL·USER several times until the display shows USER 1 or USER 2.
  → The display function buttons light up and flash for 7 sec.



2 Use the display buttons ▼ ▲ and ◀◀ ▶▶ to adjust
  -bass (left two bars),
  -middle tones (middle three bars) and
  -treble (right two bars).
  → The graph bars change according to your settings.
  → If no button is pressed for 90 seconds, the sound setting mode is left automatically and the last changes are stored in the memory.

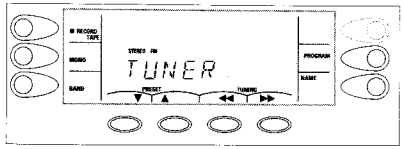
3 You can also leave the sound setting mode by pressing OPTIMAL·USER again.
  → The new sound setting is stored.

Note: From the moment the buttons ▼ ▲ and ◀◀ ▶▶ light up, you have got 7 sec to start adjusting the sound. If non of these buttons are pressed within 7 sec, the sound setting mode is left again.

English

Tuning to radio stations

1 Press TUNER on the unit or on the remote control.
→ First TUNER appears on the display and after a few seconds it will show the current frequency or the station name if available. The available display button functions light up:



2 Select the desired waveband by repeatedly pressing BAND.

3 Hold down TUNING ◀◀ or ▶▶ (◀◀ or ▶▶ on the remote control) until you approach the required frequency.
→ As long as the button is pressed, the digits on the display change according to the frequency.
→ As soon as you release the button, SEARCH appears on the display and the tuner searches the next station of sufficient strength. If the frequency has already been stored, the preset number is also displayed.

4 Press MONO to switch over to mono reception if there is interference noise caused by poor FM stereo reception.
→ Briefly MONO is displayed and the icon STEREO disappears.
→ When you switch back to stereo reception, the display will briefly show STEREO.

5 Repeat this procedure until you find the desired station.

Note: If you briefly press TUNING ◀◀ or ▶▶ (◀◀ or ▶▶ on the remote control), the frequency changes step by step.

Programming radio stations (preset stations)

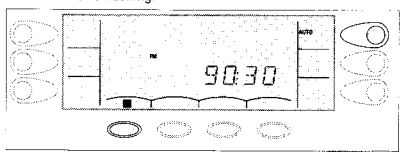
Automatic programming
30 radio stations can be stored automatically in the memory. This function will clear the old preset numbers. If less than 30 radio stations are found, the remaining preset numbers will not be changed.

1 Press TUNER on the unit or on the remote control.

2 Press PROGRAM to enter the programming mode.

3 Select the waveband by repeatedly pressing BAND.

4 Press AUTO to start the automatic programming.
→ The available display button functions light up and AUTO starts flashing:



→ The tuner automatically tunes to stations in the selected waveband. If less than 30 stations of sufficient strength are found, the tuner will stop.
→ The last newly stored preset number is automatically tuned in.

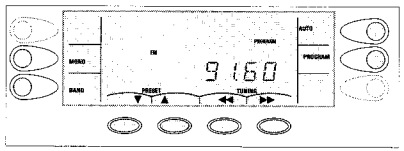
• To stop the automatic programming, press AUTO or ■.

Note: If you want to maintain some old presets, for example preset 1-9, select preset 10 ***before starting automatic programming:*** *now only the presets 10 up to 30 will be programmed.*

Manual programming
You can store up till 30 radio stations in the memory.

1 Press TUNER on the unit or on the remote control.

2 Press PROGRAM to enter the programming mode.
→ The available display button functions light up and PROGRAM starts flashing:



3 Select the waveband by repeatedly pressing BAND.

4 Tune to the station to be programmed with TUNING ◀◀ or ▶▶ (or ◀◀ or ▶▶ on the remote control), as described earlier.

5 If desired, switch over to FM mono reception by pressing MONO.

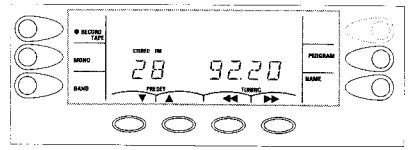
6 Press PRESET ▲ or ▼ to allocate a number from 1 to 30 to the preset station (on the remote control use the buttons |◀ or ▶| or 0-9).

7 Press PROGRAM to confirm the setting.
→ The frequency, preset number and stereo setting are now entered in the memory.

Note: When you store a new frequency, the radio station name belonging to the old frequency is also cleared.

English

Selecting a preset station



• Press PRESET ▲ or ▼ until the desired preset number appears on the display (on the remote control use the buttons |◀ or ▶| or 0-9).

RECORD TAPE ●

1 As soon as you press RECORD TAPE ●, the current sound will be recorded on TAPE 2, provided a tape suitable for recording is loaded.

2 To stop recording, press ■ (or STOP ■ on the remote control).

Switchable tuning grid *(not on all versions)*

In North and South America the frequency step between adjacent channels in the AM band is 10 kHz. In the rest of the world this step is 9 kHz. Usually the frequency step has been preset in the factory for your area.

In some versions the frequency step can be changed:

• Select AM by repeatedly pressing BAND.

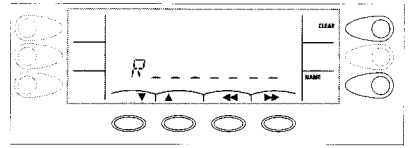
• Keep the sound source button TUNER pressed for more than ***5 sec***.
→ The display shows either GRID 10 or GRID 9.

Programming a radio station name

You can assign a name of 8 characters to the preset stations.

1 First select the preset station by pressing PRESET ▲ or ▼ (on the remote control use the buttons |◀ or ▶| or 0-9).

2 Press NAME to enter the name programming mode.
→ The available display button functions light up and NAME starts flashing. A cursor flashes at the leftmost position.



→ If a name is already assigned to the chosen preset station, this name will then be displayed.

3 Move the cursor to the left or right by pressing ◀◀ or ▶▶ (◀◀ or ▶▶ on the remote control).

4 Select the desired character (A–Z, 0–9) by pressing ▲ or ▼ (on the remote control use the buttons |◀ or ▶|).

5 If your station name is correct, press NAME to store the name in the memory.

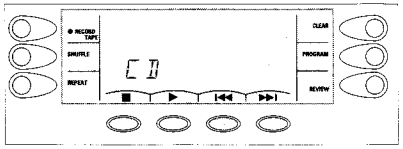
• You can erase a station name by pressing CLEAR.

• The display normally shows the radio station name if available. By repeatedly pressing DISPLAY MODE you can change the type of display information:
→ The display shows in turn: STATION NAME→FREQUENCY→STATION NAME...

Note: If the name programming mode is selected for more than 90 seconds without pressing ▲ ▼ or ◀◀ ▶▶, the last name will be recalled and the name programming mode will be left without storing any changes.

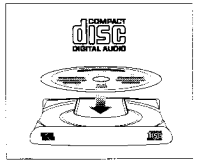
Playing a CD

1 Press CD on the unit or on the remote control.
→ Briefly CD appears on the display. If there is no CD in the selected CD tray, the display will then show NO DISC.
The available display button functions light up:

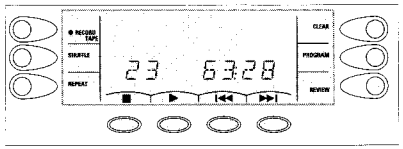


2 Press OPEN·CLOSE on the unit to open the CD tray.
→ The display shows OPEN.

3 Insert a CD, printed side up. Use only Digital Audio CDs.
8 cm CDs can be played as well.



4 Close the tray by pressing OPEN·CLOSE.
→ The display shows READING and then the total number of tracks and the total playing time.



5 Press ▶ (or PLAY ▶ on the remote control) to start playback of the entire CD.
→ Playback starts with the first track.
The display shows the current track number and its elapsed playing time.
→ When all tracks have been played, the CD player stops.
The total number of tracks and the total playing time appear on the display.

6 To stop CD play, press ■ (or STOP ■ on the remote control).

- You can interrupt CD play by pressing ⏸ (or PAUSE ⏸ on the remote control).
Continue CD play by pressing ▶ (or PLAY ▶ on the remote control).

Notes:
- You can also start CD play by selecting a track with the buttons 0-9 on the remote control.
- The tray will also close if you press ▶ or SHUFFLE or gently push against the CD tray.
- CD play also stops if you press OPEN·CLOSE or select another sound source.
- The system will switch off automatically, if no button is pressed for more than 15 minutes after CD play has finished.

Changing the display time indication

- During play, the display normally shows the elapsed playing time of the track currently played. You can change the type of the time information, by repeatedly pressing DISPLAY MODE on the unit.
→ The display shows in turn: REMAINING TIME OF CURRENT TRACK→ REMAINING TIME OF CD→ELAPSED TIME OF CURRENT TRACK→...

Selecting another track

- Briefly press ⏮ or ⏭ once/several times to skip to the beginning of the current/previous or subsequent track (on the remote control use the buttons |◀ or ▶| or 0-9).
→ The display shows the selected track number.
→ During play: CD play continues automatically with the selected track.
→ In the stop position: press ▶ to start CD play.

Searching for a passage during CD play

1 Hold down ⏮ or ⏭ (or ◀◀ or ▶▶ on the remote control) to find a particular passage in the forward or backward direction.
→ The volume is automatically reduced to a low level.

2 Release the button when you have reached the desired passage.

Note: In the shuffle mode and when playing a program, searching is only possible within the playing track.

Selecting another source during CD play

- You can select another sound source during CD play. If you select the CD source again, the CD player will return to the original mode: PLAY, SHUFFLE, REPEAT or PROGRAM.
→ CD play will resume at the position where it was interrupted.

Note: CD play cannot be resumed if the unit has been switched to standby in the meantime.

RECORD TAPE ●

1 As soon as you press RECORD TAPE ●, the current CD-sound will be recorded on TAPE 2, provided a tape suitable for recording is loaded.

2 To stop recording and CD play, press ■ (or STOP ■ on the remote control). If you only want to stop recording, press TAPE 2 first, and then press ■.

REPEAT – repeating a track or the entire CD

1 Press REPEAT on the unit several times until the desired option is displayed:

REPEAT: The current track is played repeatedly.
REPEAT ALL: The entire CD (or program) is played repeatedly.

→ During play: The selected repeating mode is automatically executed.
→ In the stop position: press ▶ to start CD play.

2 To return to normal CD play, press REPEAT until all related indications (REPEAT ALL) disappear from the display.

SHUFFLE – playing in random order

1 Press SHUFFLE on the unit or on the remote control before or during playback.
→ The display shows **SHUFFLE**; all the tracks will now be played in a random order.

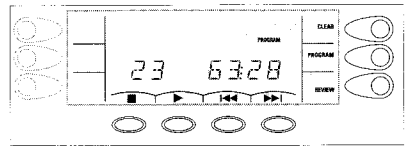
2 To return to normal CD play, press SHUFFLE on the unit (or on the remote control).

Note: You can combine some of the REPEAT and SHUFFLE features at the same time and for example repeatedly play the entire CD or program in random order (SHUFFLE REPEAT ALL).

Programming track numbers

You may select a number of tracks and store these in the memory in the desired sequence. You may store any track more than once. At most, 20 tracks can be stored in the memory. The display will show the message PROGRAM FULL, if you exceed the maximum of 20 tracks.

1 Press PROGRAM to enter the CD programming mode.
→ The available display button functions light up and PROGRAM starts flashing:



2 Select the desired track by pressing with ⏮ or ⏭ (or |◀ or ▶| or 0-9 on the remote control).

3 As soon as the desired track is displayed, press PROGRAM to store the track.
→ The display shows the total number of stored tracks, followed by the just stored track number. PROG behind the track number indicates, this track number is stored.

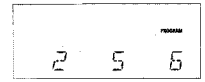
4 Select and store in this way all desired tracks.

5 Quit the CD programming mode by pressing ■ (or STOP ■ on the remote control) or
immediately start playback of the program by pressing ▶ or SHUFFLE (or PLAY ▶ or SHUFFLE on the remote control).

Note:
You can also program a sequence of tracks while playing a CD.

Reviewing your settings

- You can review your settings by pressing REVIEW.
→ The display shows in bundles of three all stored track numbers. During CD play only the tracks that still have to be played are shown on the display.



Note: If you press REVIEW when no program is available, the message NO PROGRAM will appear on the display.

Clearing the entire program (in the stop position)

- Press CLEAR to clear the program.
→ On the display PROGRAM CLEARED briefly lights up and the flag PROGRAM disappears.

Note: The program will also be cleared if you interrupt the power supply or open the CD tray.

Clearing a track from a program

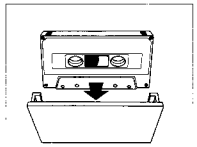
1 Press PROGRAM to enter the CD programming mode.

2 Select the track to be cleared by pressing ⏮ or ⏭ (⏮ or ⏭ on the remote control).

3 As soon as the number you wish to clear is displayed, press CLEAR.
→ The cleared track number and CLEAR appear briefly.

English

Inserting a tape

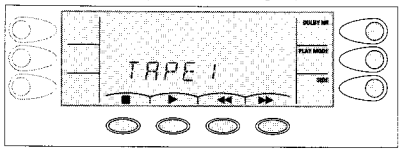


1 Press OPEN to open the cassette compartment.

2 Insert the tape with the open side down.
→ The display shows 000.
→ The deck detects the presence of a tape in the cassette compartment and automatically selects the tape type (NORMAL or CrO_2).

Playing a tape

1 Press TAPE 1 or TAPE 2 on the unit or on the remote control.
→ Briefly TAPE 1 or TAPE 2 appears on the display.
The available display button functions light up:

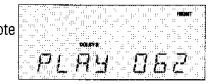


2 Insert a recorded tape with the open side down.

3 Select the tape side by pressing SIDE on the unit (or on the remote control) several times until the desired indicator lights up:
→ FRONT: the visible side will be played.
BACK: the invisible backside will be played.
→ The tape counter is set to 000.

4 If desired, switch on the Dolby NR system by pressing DOLBY NR.

5 Press ▶ (or PLAY ▶ on the remote control) to start playback.
→ The display shows the tape counter.



6 Press ■ (or STOP ■ on the remote control) if you want to stop playback before the end of the tape.

Notes:
- You can set the tape counter to 000 by pressing SIDE twice.

- If no button is pressed for more than 15 minutes after playback has finished, the system automatically switches off.

Fast winding

During playback

1 Hold down ◀◀ or ▶▶ (or ◀◀ or ▶▶ on the remote control) to find a particular passage in the forward or backward direction.
→ The volume is automatically reduced to a low level.

2 Release the button when you have reached the desired passage.

In the stop position

1 Briefly press ◀◀ or ▶▶ (or ◀◀ or ▶▶ on the remote control).

2 Stop winding by pressing ■ (or STOP ■ on the remote control).

Play mode

- You can select the playback mode by pressing PLAY MODE several times until the desired indicator lights up:

  to play (record) one side. At the end of the first side the recorder stops.

  to play (record) both sides once. At the end of the first side, the tape direction is reversed and the recorder stops at the end of the second side.

  for non-stop playback. The deck reverses the tape direction (up to ten times) whenever reaching the end of the tape side. To stop, press ■.

  1 2 for non-stop playback on both decks: The deck reverses the tape direction (up to ten times on each deck) when reaching the end of the tape side. Playback of both tape sides rotates between deck 1 and deck 2. To stop, press ■.

Note: For a recording only the play modes and are available.

Dolby B Noise Reduction System

The Dolby B NR System is manufactured under license from Dolby Laboratories Licensing Corporation. The word Dolby and the ⧈ symbol are trademarks of Dolby Laboratories Licensing Corporation.

- Switch the Dolby B NR on and off with the DOLBY NR button.

Notes:
- A tape recorded with the Dolby B NR system should also be played in the Dolby B NR mode. If you forget to operate the DOLBY NR button, the treble may be reproduced too strongly or too faintly.

- Dolby NR button has no influence during dubbing (copying from TAPE 1 to TAPE 2). An original tape recorded with Dolby B NR automatically produces a copy with Dolby B NR.

English

General information on recording

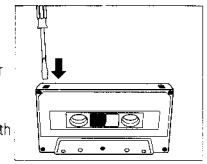
– Recording is permissible insofar as copyright or other rights of third parties are not infringed.

– At the very beginning and end of the tape, no recording will take place during the 7 seconds when the leader tape passes the recorder heads.

– When a recording is active, most functions are disabled. RECORDING ACTIVE will appear on the display when a wrong button is pressed.

– In general, the recording level is set automatically. The recording is not affected by the controls VOLUME, DBB, INCREDIBLE SOUND, ROCK, CLASSIC, JAZZ and OPTIMAL-USER.

Protecting tapes against accidental erasure

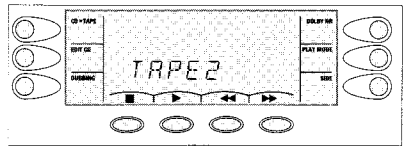


- Keep the tape side to be safeguarded in front of you and break out the left tab. Now, recording on this side is no longer possible.
- To render this safeguard ineffective, cover the aperture with a piece of adhesive tape.

Recording from a CD

1 Insert a CD and, if desired, program track numbers.

2 Press TAPE 2 on the unit or on the remote control.
→ The available display button functions light up:



3 Insert a blank tape into TAPE 2.

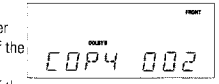
4 Select the tape side by pressing SIDE: FRONT or BACK.

5 Select the play mode by pressing PLAY MODE until the desired indicator lights up: or .

6 If desired, switch on the Dolby NR system by pressing DOLBY NR.

7 If you want to make a "EDIT CD recording", follow from here the instructions for EDIT CD.

8 Start the recording by pressing CD ▶TAPE.
→ The display shows COPY.
With a delay of 7 sec (leader tape of the tape), playing of the CD or program starts automatically. At the end of the first side, recording stops somewhere within the running track.



→ When is selected, the tape direction is reversed and recording continues with the beginning of the incompletely recorded track.
→ Recording will stop when it's finished according to the chosen play mode or when the CD player reaches the end of the CD or the program.

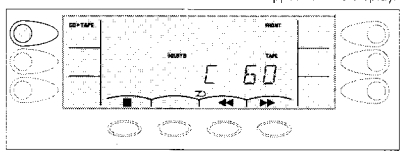
- Press ■ (or STOP ■ on the remote control) to stop the recording at an earlier stage.

EDIT CD – automatic CD track selection by specifying the tape length

To prevent that at the end of the tape the recording is interrupted somewhere within a track, you can use the EDIT CD feature. However, it can only be used for CDs with a maximum of 30 tracks.

The unit automatically selects the total number of tracks that will fit onto each tape side.
The original order of tracks will not be changed.

1 Press EDIT CD.
→ SELECT TAPE LENGTH and C60 appear on the display.



2 Press ◀◀ or ▶▶ until the desired tape length appears on the display (on the remote control use the buttons ⏮ or ⏭).
→ The display shows in turn:
C60→C90→C 100→C 120→C30→C45→C60→...

3 Start the recording by pressing CD ▶TAPE.
→ With a delay of 7 sec (leader tape of the tape), playing of the CD or program starts automatically.
→ Recording will stop when it's finished according to the chosen play mode or when the CD player reaches the end of the CD or the program.

- Press ■ (or STOP ■ on the remote control) to stop the recording at an earlier stage.

- You can change the type of the CD time information, by repeatedly pressing DISPLAY MODE on the unit:
→ The display shows in turn: REMAINING TIME OF CURRENT TRACK→ REMAINING TIME OF CURRENT TAPE SIDE→ELAPSED TIME OF CURRENT TRACK→...

CLOCK / TIMER

English

Dubbing tapes (copying from TAPE 1 to TAPE 2)

1 Insert a recorded tape into deck 1 and a blank tape into deck 2.

2 Press TAPE 1 and prepare the deck for the recording:
- Select the tape side by pressing SIDE: FRONT or BACK.
- Select the play mode by pressing PLAY MODE until the desired indicator lights up: ⇉ or ⇉.

3 Press TAPE 2 and select the tape side by pressing SIDE: FRONT or BACK.

4 Press DUBBING and thereafter select the dubbing speed by pressing ◀◀ or ▶▶.
→ The display shows NORMAL (normal speed) or FAST (high speed). During high-speed dubbing, the sound is reduced to a low volume.

5 Start recording by pressing DUBBING.
→ Both decks start running and either NORM ⊐⊐⊐ (normal speed dubbing) or FAST ⊐⊐⊐ (fast speed dubbing) appears.
→ Recording will stop when one or both sides of the tape are full (depending on the chosen play mode).

- Press ■ (or STOP ■ on the remote control) to stop the recording at an earlier stage.

Notes:
- PRESS STOP FIRST will light up if you press SIDE: you cannot reverse the playback direction during dubbing.

- During dubbing you can listen to any other sound source.

RECORD TAPE ●

1 As soon as you press RECORD TAPE ●, the current sound (CD, TUNER, TAPE 1 or MULTIMEDIA) will be recorded on TAPE 2.

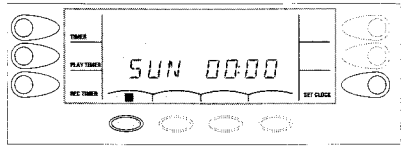
Erase an old tape by recording a silence:
Select CD without starting CD play and press RECORD TAPE ●.

2 To stop recording, press ■.

General

The display shows the weekday and the time. The clock display will flash and has to be set
- when you first plug the unit into the mains, or
- if the power supply was interrupted for longer than 10 minutes.

- Press CLOCK-TIMER to enter the clock/timer mode.
→ The clock/timer display with its available display button functions appears:



- To leave the timer display, press ■, CLOCK-TIMER, POWER ON/STANDBY or any sound source selection button.

Notes:
- The clock and the timer cannot be set with the remote control.

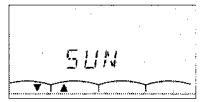
- If no button is pressed for more than 90 seconds, the clock setting mode is left automatically without storing the last changes.

Setting the clock

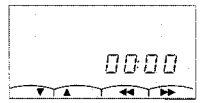
1 Press CLOCK-TIMER to enter the clock/timer mode.
→ The clock/timer display as shown above appears.

2 Press SET CLOCK to enter the clock setting mode.
→ The function indicator SET CLOCK starts flashing.

3 Select the day by pressing ▲ or ▼ until the correct day is indicated.



4 Confirm the day by pressing SET CLOCK.
→ The hour and the minute digits appear.



5 Adjust the hours by using ▲▼ and the minutes by using ◀◀ ▶▶.
→ When pressing the buttons briefly, the digits will change step-by-step. By pressing longer, the running speed will increase after a few seconds.

6 Press SET CLOCK to store the setting and to leave the clock setting mode.
→ The clock starts running.

Setting the timer for a radio recording

1 Insert a tape into TAPE 2.

2 Press CLOCK-TIMER to enter the clock/timer mode.
→ The clock/timer display appears.

3 Press REC TIMER to enter the timer setting mode.
→ The function indicator REC TIMER starts flashing and a radio preset appears.

4 Press ▲ or ▼ until the desired preset station is indicated.

5 Confirm the preset station by pressing REC TIMER.
→ The message ON and the time appear.
The ***recording start time*** must be entered.

6 Adjust the hours and the minutes by using ▲▼ and ◀◀ ▶▶.

7 Confirm the start time by pressing REC TIMER.
→ The message OFF and the time appear.
The ***recording stop time*** must be entered.

8 Adjust the hours and the minutes by using ▲▼ and ◀◀ ▶▶.

9 Press REC TIMER to confirm the settings and to leave the timer setting mode.
→ The timer is activated and TIMER lights up on the display.

Setting the timer for playback

1 Press CLOCK-TIMER to enter the clock/timer mode.
→ The clock/timer display appears.

2 Press PLAY TIMER to enter the timer setting mode.
→ The function indicator PLAY TIMER starts flashing and the last selected timer sound source appears.

3 Press ▲ or ▼ until the desired sound source is indicated.

4 Confirm your selection by pressing PLAY TIMER.
→ If you have selected TUNER, press ▲ or ▼ to select the desired preset station.
→ If you have selected CD, insert a CD.
→ If you have selected TAPE, insert a tape into the cassette compartment.

5 Confirm your selection by pressing PLAY TIMER.
→ The message ON and the time appear.
The ***start time*** must be entered.

6 Adjust the hours and the minutes by using ▲▼ and ◀◀ ▶▶.

7 Press PLAY TIMER to confirm the settings and to leave the timer setting mode.
→ The timer is activated and TIMER lights up on the display.

At the preset start time ...

→ The power is turned on or, if another sound source is selected, the set switches to the preset source.
The preset source comes on automatically.

→ 15 minutes after playback of the CD or the tape has finished, the system switches to standby.
If the timer is activated with the TUNER mode, the sound remains on until you switch off the system.

Notes:
- If the set was activated from standby mode and no button is pressed for more than 40 minutes, the power is turned off again.

- If there is the same start time for REC TIMER and PLAY TIMER, the REC TIMER will be activated.

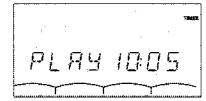
- If you are recording at the time the timer is activated, the timer function will be cancelled.

Reactivating/deactivating the timer

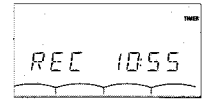
1 Press CLOCK-TIMER to enter the clock/timer mode.
→ The clock/timer display appears.

2 To switch off or to reactivate a timer function, press TIMER several times until the required indication appears:

→ PLAY (playback) and the programmed start time for activating the PLAY TIMER.

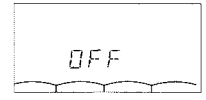


→ REC (recording) and the programmed start time for activating the REC TIMER.



→ BOTH ON - both PLAY TIMER and REC TIMER are activated.

→ OFF for switching the timer off.



English

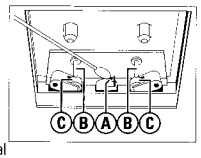
English

General maintenance

- Do not expose the set, CDs or tapes to humidity or rain, sand or to excessive heat caused by heating equipment or direct sunlight.
- The mechanical parts of the set contain self-lubricating bearings and must not be oiled or lubricated!

- You can clean the set with a soft, slightly dampened chamois leather. Do not use any cleaning agents as they may have a corrosive effect.

TAPE decks



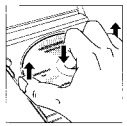
To ensure a good recording and playback quality, clean the head Ⓐ, the capstans Ⓑ and the rubber pressure rollers Ⓒ after approx. 50 hours of operation.

- Use a cotton bud slightly moistened with alcohol or a special head cleaning fluid.

Note: Cleaning of the heads Ⓐ can also be done by playing a cleaning tape through once.

CD player and CD handling

- The lens may cloud over when the set is suddenly moved from cold to warm surroundings. Playing a CD is then not possible. Leave the set in a warm environment until the moisture evaporates.



- To take the CD out of its box easily, press the centre spindle while lifting the CD.
- Always pick up the CD by the edge and put it back in its box after use.

- To clean the CD, wipe in a straight line from the centre towards the edge using a soft, lint-free cloth. A cleaning agent may damage the CD!
- Never write on a CD or attach any sticker to it.

Technical data *(subject to modification)*

AMPLIFIER

Output power:	2x 45 W RMS/6 Ω/THD 10%
Power bandwidth:	40 - 20000 Hz
Frequency response:	40 - 20000 Hz
Signal-to-noise ratio:	≥ 67 dBA (IEC)
Impedance Loudspeakers:	≥ 6 Ω
Impedance headphones:	32 Ω - 1000 Ω (3 Vemk - 150 Ω)

TUNER

FM wave range:	87.5 - 108 MHz
MW wave range: Grid 9:	531 - 1602 kHz
Grid 10:	530 - 1700 kHz
Sensitivity at 75 Ω: mono, 26 dB signal-to-noise ratio:	2.8 µV
stereo, 46 dB, signal-to-noise ratio:	61.4 µV
Selectivity:	≥ 28 dB
Total harmonic distortion:	≤ 5%
Frequency response:	63 - 12500 Hz (± 3 dB)
Signal-to-noise ratio:	≥ 50 dBA

CD PLAYER

Frequency range:	20 - 20000 Hz
Signal-to-noise ratio:	90 dBA
Channel separation	60 dBA
Total harmonic distortion:	≥ 75 dB
Conversion:	Continuous Calibration 4x oversampling

TAPE DECKS

Frequency response: - CrO2 tape (type II):	60-14000 Hz (8 dB)
- Normal tape (type I):	60-14000 Hz (8 dB)
Signal-to-noise ratio (without Dolby NR):	
- CrO2 tape (type II)	
- Normal tape (type I):	47 dB
Signal-to-noise ratio (with Dolby NR):	
- CrO2 tape (type II)	
- Normal tape (type I):	55 dB
Wow and flutter:	≤ 0.4% DIN

SPEAKERS

System	3-way double bass reflex
Impedance	6 Ohms
Bass speaker	5 1/4 inch woofer
Mid/treble speaker:	2 1/2 inch tweeter
Upper treble	piezo tweeter
Dimensions (wxhxd):	210 x 310 x 251 mm

General

Dimensions (wxhxd):	240 x 310 x 335 mm
Weight (with/without speakers):	approx. 14/7 kg

English

- If a fault occurs, first check the points listed below before taking the set for repair.
- If you are unable to remedy a problem by following these hints, consult your dealer or service centre.

WARNING:

Under no circumstances should you try to repair the set yourself, as this will invalidate the guarantee.

PROBLEM	POSSIBLE CAUSE	REMEDY
No power	Mains lead is not securely connected.	Connect the mains lead properly.
No or poor sound	VOLUME is not turned up.	Turn up the VOLUME.
	Speakers are wrongly or not connected.	Check the speaker connections.
	Unsuited speakers are used.	Use recommended speakers.
	Badly matching equalizer setting for the given type of music	Choose a matching equalizer setting for the given type of music
	Headphones are connected.	Disconnect the headphones.
Reversed left and right sound	Speakers are wrongly connected.	Connect the speaker cables correctly.
System does not react to operation of any button	Electrostatic discharge.	Disconnect the set from power supply and reconnect it after a few seconds.
Poor radio reception	FM antenna is not connected.	Connect the FM antenna.
	Interference caused by the vicinity of electrical equipment like TVs, video recorders, computers, etc.	Keep the set away from electrical equipment.
The CD skips tracks	CD is damaged or dirty.	Replace or clean the CD.
Poor tape sound quality	Dust and dirt on the heads, capstan or pressure roller.	Clean the heads, capstan and pressure roller, see maintenance.
Remote control does not work	The distance to the system is too large.	Reduce the distance.
	Wrong sound source is selected.	Select the sound source before pressing the functional button.
	Batteries are incorrectly inserted.	Insert the batteries correctly.
	Batteries are exhausted.	Replace the batteries.

DISPLAY INDICATION	POSSIBLE CAUSE	REMEDY
NO DISC **or** CANNOT READ	CD is badly scratched or dirty.	Replace or clean the CD, see maintenance.
	No CD inserted.	Insert a CD.
	CD inserted upside down.	Insert a CD with label upwards.
	Laser lens is steamed up.	Wait until the lens has acclimatized.
WRONG TRACK	The selected track number does not exist on this CD or is not included in this program	Select a correct track number
NO TAPE	No tape inserted.	Insert a tape.
TAPE PROTECTED	Tape is protected against recording.	Replace the tape or undo the protection
RECORDING ACTIVE	A recording is active.	Stop the recording or wait until it is finished.
EDIT NOT POSSIBLE	The EDIT CD feature can only be used for CDs with a maximum of 30 tracks	Use another CD with less than 30 tracks or create a program with less than 30 tracks

Warnings & Safety

(GB) 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 wrist wrap with resistance. Keep components and tools at this potential.

(F) ATTENTION
Tous les IC et beaucoup d´autres semi-conducteurs sont sensibles aux décharges statiques (ESD). Leur longévite pourrait être considérablement écourtée par le fait qu´aucune précaution nést prise à leur manipulation.
Lors de réparations, s´assurer de bien être relié au même potentiel que la masse de l´appareil et enfileer le bracelet serti 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

(D) WARNUNG
Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.
Sorgen Sie dafür, daß sie im Reparaturfall über ein Puls-armband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

(NL) WAARSCHUWING
Alle IC´s en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen vermindern. 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.

(I) AVVERTIMENTO
Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione. Durante le riparationi occorre quindi essere collegato allo stesso potenziale che quello della massa delápparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

SAFETY

(GB)
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 ⚠

(D)
Bei jeder Reparatur sind die geltenden Sicherheitsvor-schriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Original-ersatzteile zu verwenden.
Sicherheitsbauteile sind durch das Symbol ⚠ markiert.

(S) **Varning !**
Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

(F)
"Pour votre sécurite, ces documents doivent être utilisés par des spécialistes agrées, seuls habilités à réparer votre appareil en panne".

(I)
Le norme di sicurezza estigono che l´apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambiago identici a quelli specificati.
Componenty di sicurezza sono marcati con ⚠

(F)
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 ⚠

(DK) **Advarsel !**
Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

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

(FIN) **Varoitus !**
Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen !

SERVICE HINTS

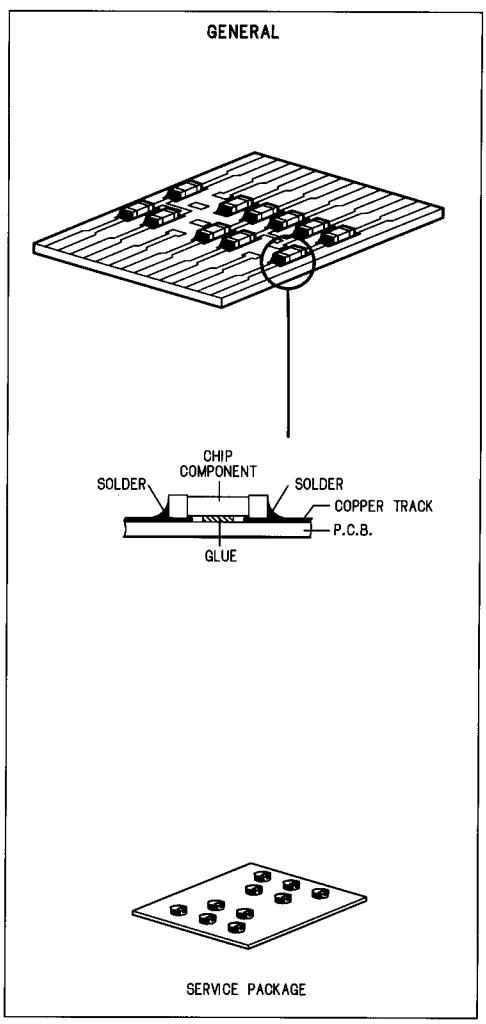
Service Tools

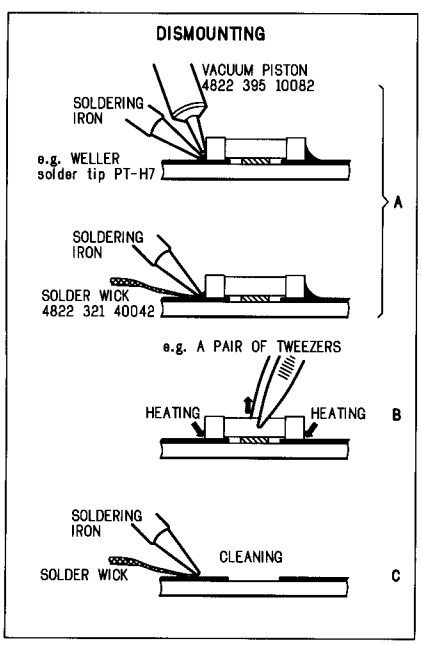
TORX screwdriver set SBC 163 ..... 4822 295 50145

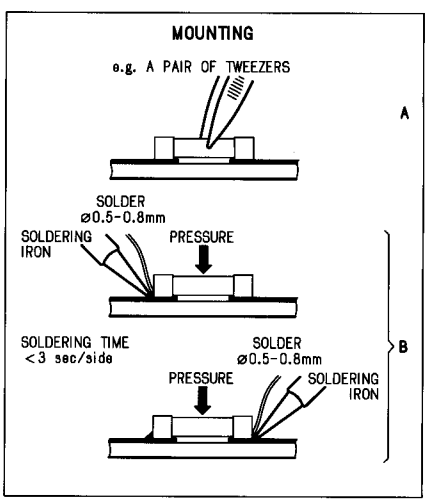
Audio signal disc SBC 429 ..... 4822 397 30184
Test disc 5 (disc without errors) +
Test disc 5A (disc with dropout errors, black spots and fingerprints)
SBC 426/426A 4822 397 30096
Burn in test disc (65 min. 1kHz signal at -30dB level without "pause") 4822 397 30155

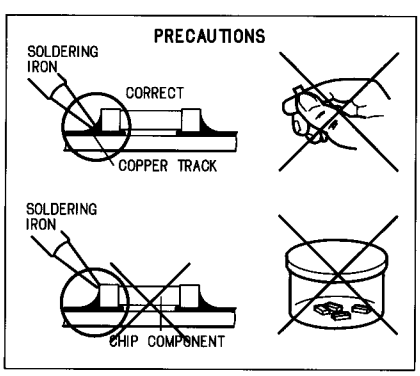
Universal test cassette Fe SBC 420 ..... 4822 397 30071
Universal test cassette CrO2 SBC 419 ..... 4822 397 30069

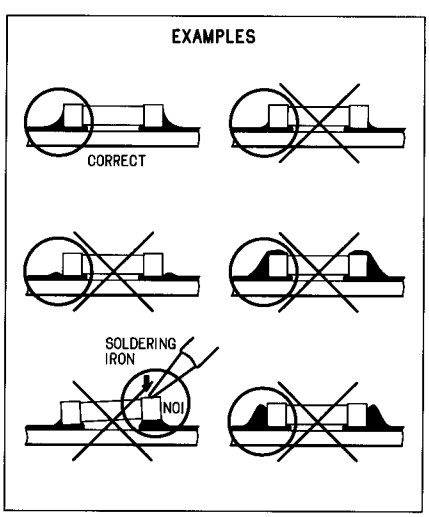
Handling Chip Components











DISMANTLING INSTRUCTIONS

Dismantling of Cassette flap

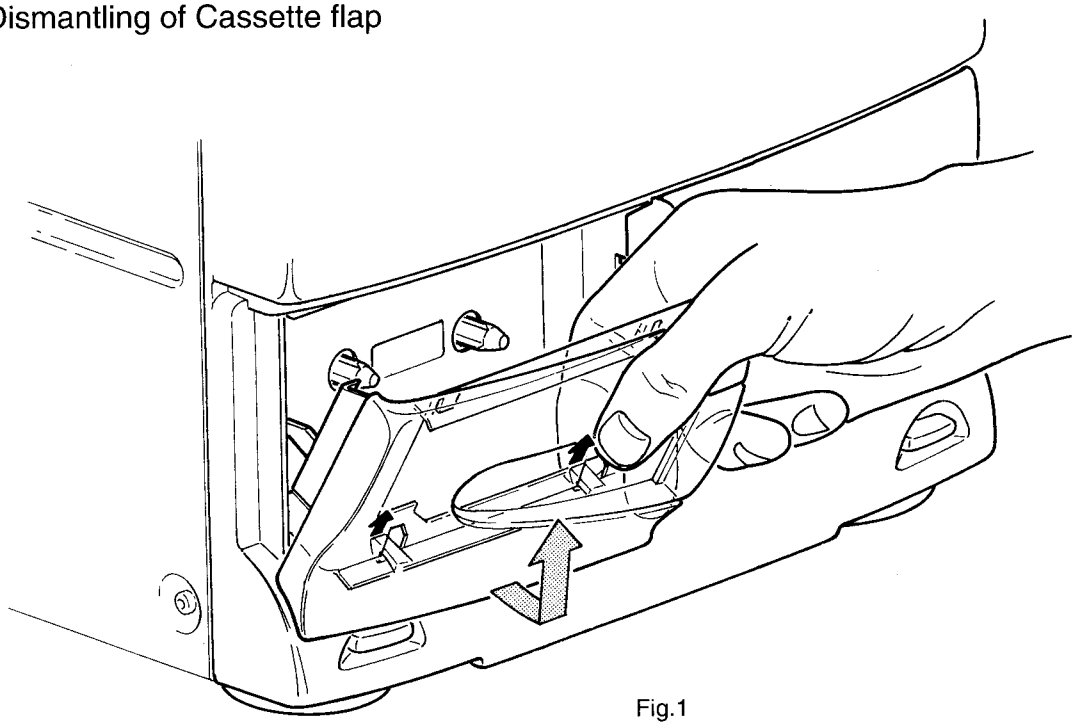


Fig.1

Dismantling the Karaoke Top (not on all Versions)

1) Release the two snaps on back sode
2) Lift the back side ov the cover first

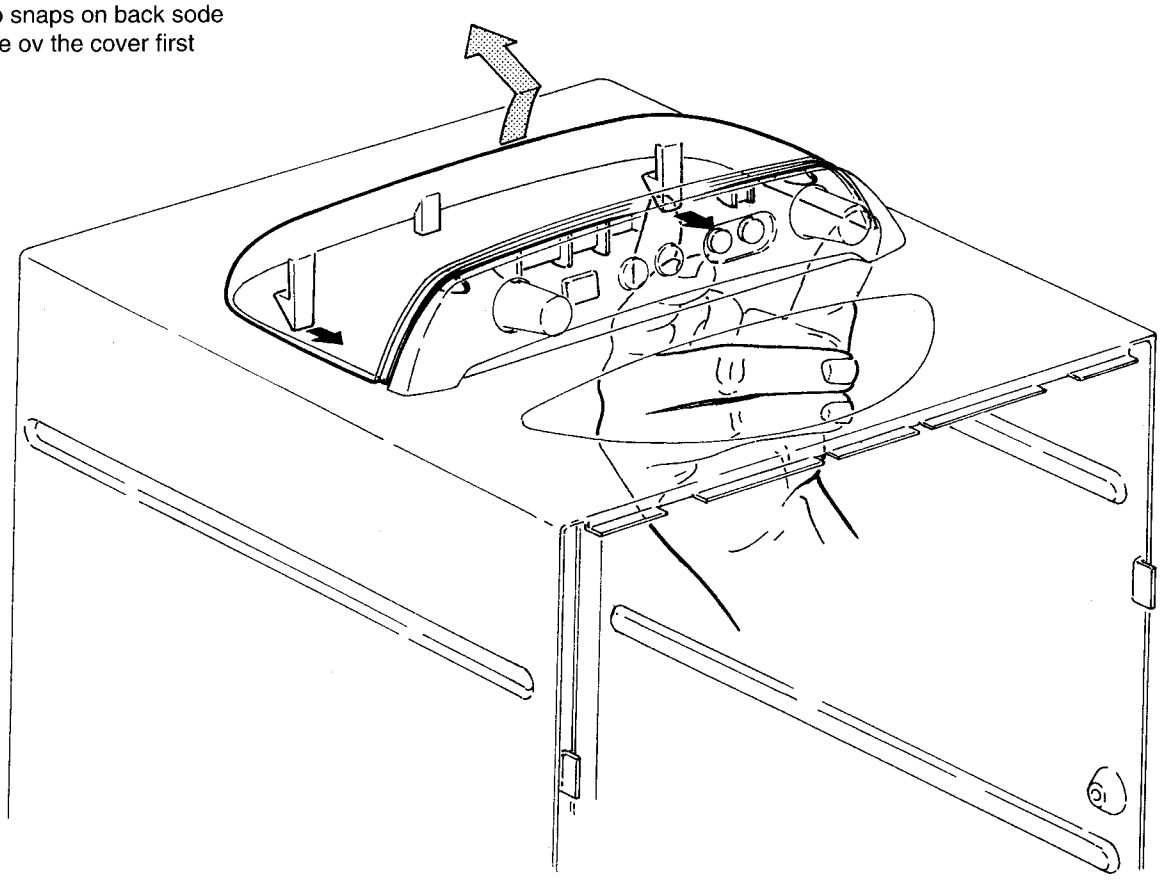
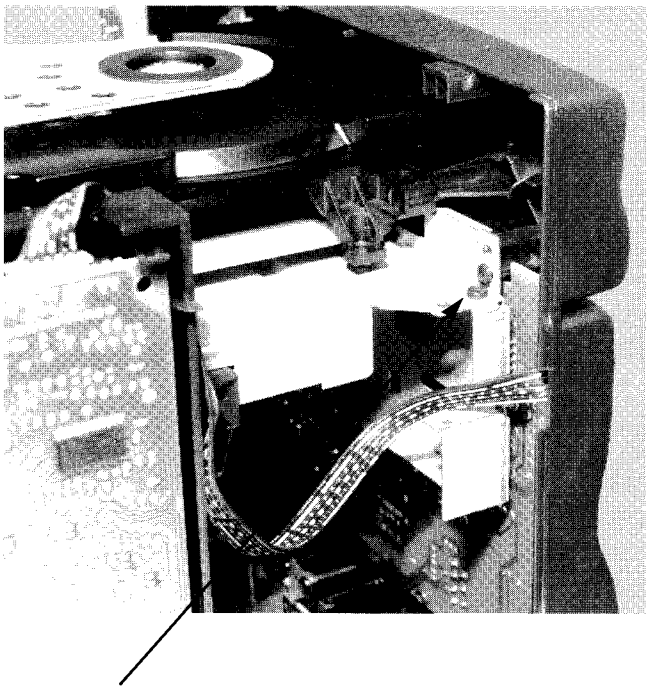


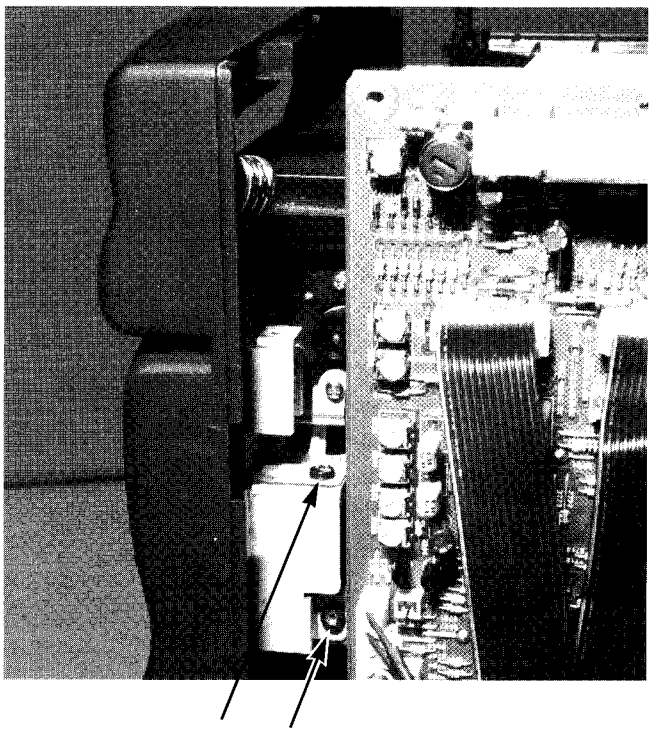
Fig.2

Dismantling of Front

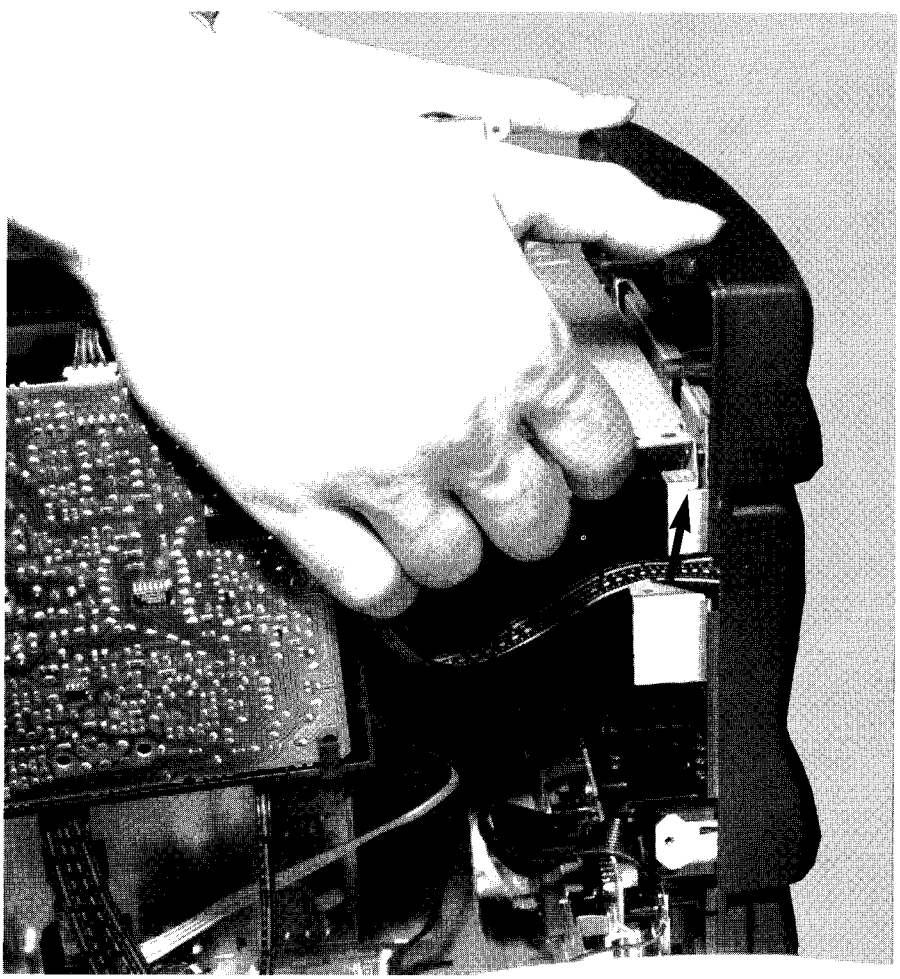
1) Remove top cover.
2) Loosen 3x screw on bottom.



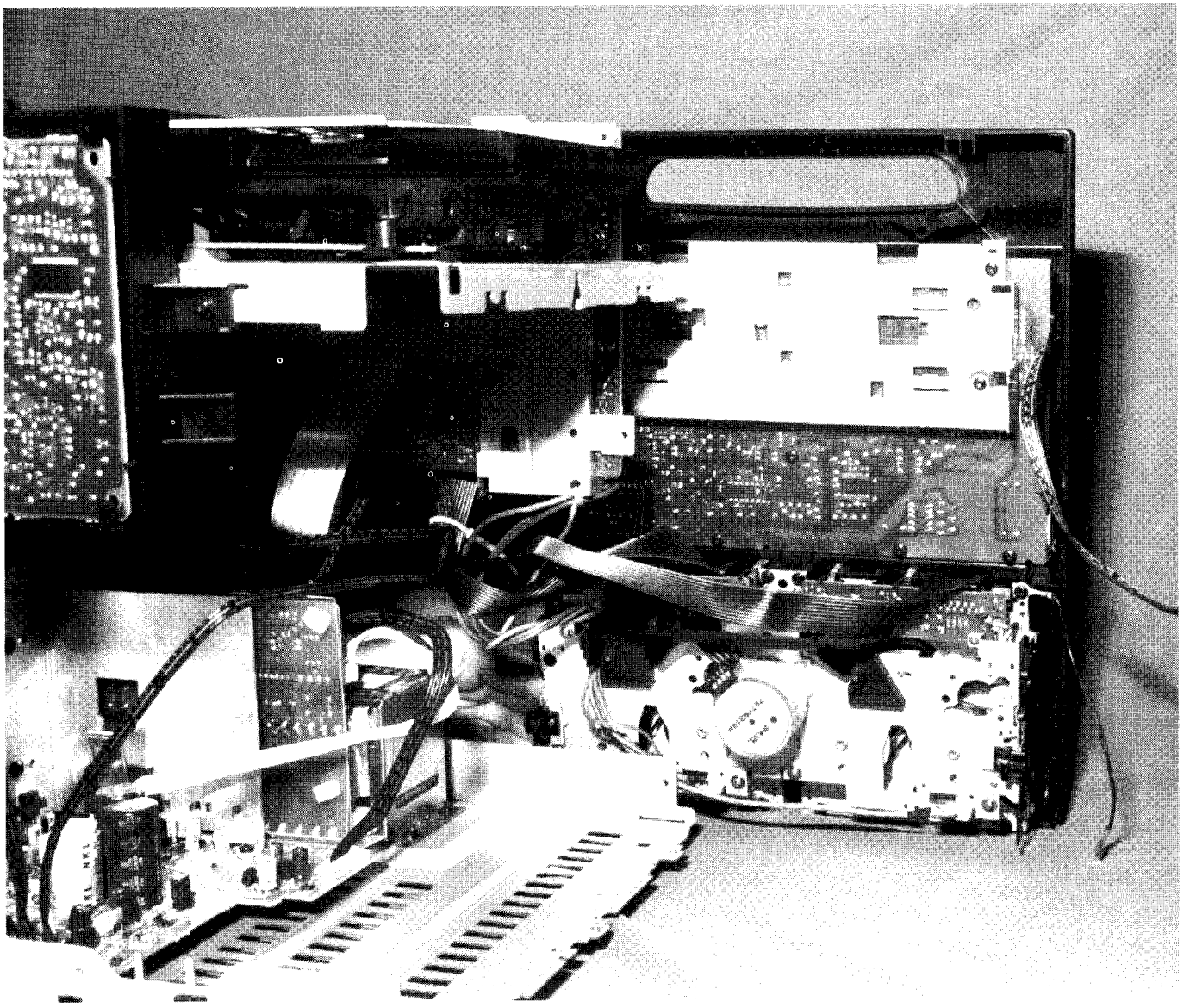
3) Loosen screw on metal bracket



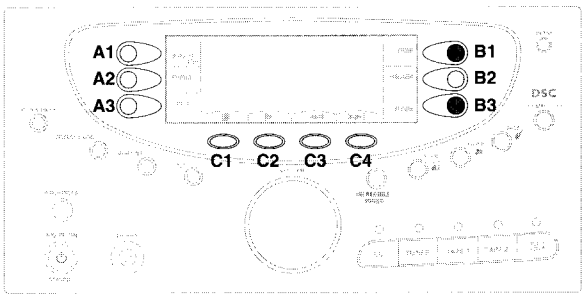
3) Loosen 2x screw on metal bracket
4) Lift the CD Module to release the metal bracket as shown in picture below.



5) Turn the front sidewards as shown below.



SERVICE TEST PROGRAM



To start service test program hold B1 & B3 depressed while plugging in the mains cord

Display shows set version and number of ROM version "Sx yy zz" 1) (Main menu)

1) S stands for Service Testprogram
S1 stands for sets with CD
S2 stands for sets with CD Changer and RDS
S3 stands for sets with CD Changer without RDS

yy stands for software version number of µP on Front Board
(counted from 99 downwards)

zz stands for software version number of µP on Combi Board
(counted from 99 downwards)

DISPLAY TEST

DISPLAY Button pressed? N / Y

Display shows Fig. 1
additional all LEDs for Source and Incredible Sound are blinking

DISPLAY Button pressed? N / Y

Display shows Fig. 2

DISPLAY Button pressed? N / Y

Display shows Fig. 3

DISPLAY Button pressed? N / Y

Display shows Fig. 4

DISPLAY Button pressed? Y / N

TUNER TEST

TUNER Button pressed? N / Y

Display shows Version of Tuner for 2s

Service frequencies are copied to the RAM (see Table1)

Tuner is normal working except for:

PROGRAM and AUTOPROGRAM

Power off? N / Y

Service Mode left

QUARTZ TEST

TIMER Button pressed? N / Y

Display shows 32K Output at pin4 of 7401=2048Hz

TIMER Button pressed? N / Y

Display shows 8M Output at pin4 of 7401=1953,125Hz

TIMER Button pressed? N / Y

TAPE TEST

TAPE1 Button pressed? N / Y

Choose Test by pressing Rewind or Forward buttons

REWIND

FORWARD

STEP	Display shows	ACTION
0	TAPE1	Select T
1	COIL	Solenoi activate
2	PLAY	Normal
3	FAST	Fast Pla (High sp
4	PLAY	Normal
5	FAST	Fast Pla (High sp
6	REC	Record
7	FAST	High sp
8		Leave T

PRESET	Europe "EUR"	East Europe "EAS"	USA "USA"	Oversea "OSE"	Korea "KOR"
1	108MHz	108MHz	108MHz	108MHz	180MHz
2	87,5MHz	65,81MHz	87,5MHz	87,5MHz	87,5MHz
3	1602kHz	1602kHz	1700kHz	1602kHz	1602kHz
4	531kHz	531kHz	530kHz	531kHz	531kHz
5	279kHz	279kHz	-	-	-
6	153kHz	153kHz	-	-	-
7	98MHz	98MHz	98MHz	98MHz	98MHz
8	558kHz	558kHz	560kHz	558kHz	558kHz
9	1494kHz	1494kHz	1500kHz	1494kHz	1500kHz

Table 1

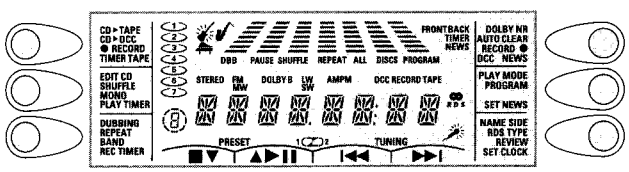


Fig.1

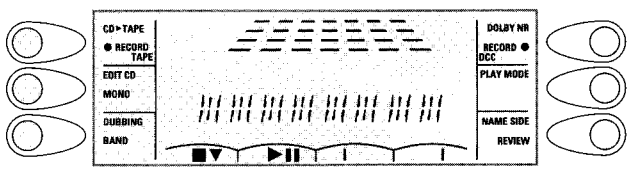
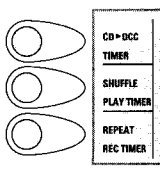


Fig.2



Service Testprogram
sets with CD
sets with CD Changer and RDS
sets with CD Changer without RDS

software version number of µP on Front Board
n 99 downwards)

software version number of µP on Combi Board
n 99 downwards)

TAPE TEST

TAPE1 Button pressed? — N / Y

STEP	Display shows	ACTION
0	TAPE1	Select Tape1 as sound source
1	COIL	Solenoids of both decks activated for 3 seconds
2	PLAY	Normal Play mode for Deck1
3	FAST	Fast Play mode for Deck1 (High speed)
4	PLAY	Normal Play mode for Deck2
5	FAST	Fast Play mode for Deck2 (High speed)
6	REC	Record mode for Deck2
7	FAST	High speed dubbing
8		Leave Tape Test

Choose Test by pressing Rewind or Forward buttons

REWIND ⏮

FORWARD ⏭

CD TEST

CD Button pressed? — N / Y

FOR CD TEST see Chapter 3-6

CD PLAY TEST

STAND BY Button pressed? — N / Y

CD is in normal PLAY Mode.

In case of failures error codes according table 4 (chapter 3-6) will de displayed.

The CD PLAY Test is intended to be used for continuously playing a disc in order to detect intermittend or not reproducible failures. The error code indicates where the failure can be found.

Various other Tests

TEST	***Activated with***	***ACTION***
EEPROM TEST	CLASSIC	A testpattern will be sent to the EEPROM. Size of the eeprom (1K or 4K) is displayed if the pattern is read back correctly. Otherwise ERR will be displayed.
EEPROM CLEAR	JAZZ	Load default data. Display shows NEW for 1 second. ***Caution! All presets from the customer are lost!!***
KEY TEST	OPTIMAL USER	Key numbers according table 5 are shown on the display. (see Chapter 3-6)
TEMPERATURE TEST	ROCK	Temperature of the mains transformer is displayed for 2 seconds. At 115° Celsius the µP reduces the output power → DBB off, volume down. ***Values lower than 66° C are meaningless!***
LEAVE SERVICE TESTPROGRAM	disconnect mains	

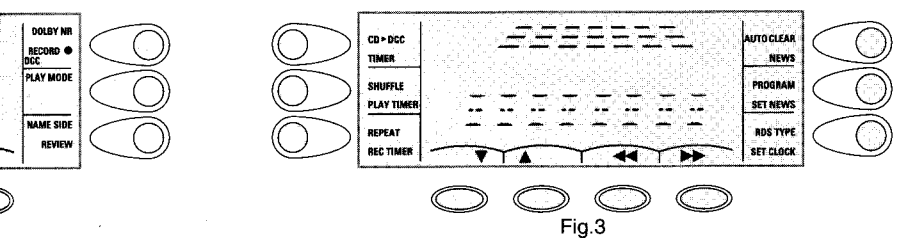


Fig.3

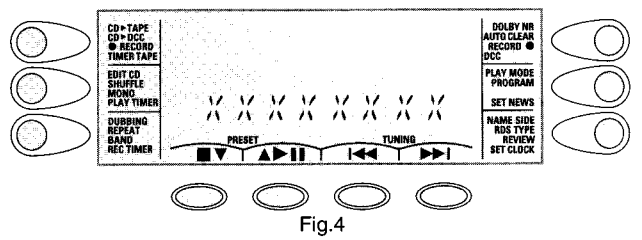


Fig.4

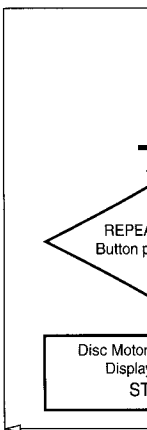
Error number	Error description	Error type
1002	Focus Error. Triggered when the focus could not be found within a certain time when starting up the CD or when the focus is lost for a certain time during playing the CD.	F
1007	Subcode Error. No subcode could have been read, even not after retrying 10 times to restart the PLL and jumping 10 tracks. When this happens the servo is stopped and restarted (as if the user would have pressed stop and then play immediately) to recover.	W
1008	Out of lead-in during reading TOC Triggered when during reading the TOC the lead-in (track no. 0) is left. This can be caused by a misaligned inner-switch or by a disc with a mispositioned lead-in.	W
1010	Radial error Triggered when the radial servo is not on track for a certain time during playing the CD.	F
1011	Sledge error Generated when the inner-switch did not open within a certain time when the pick up is moved from the inner position outside.	W
1012	Fatal sledge error Generated when the inner-switch did not close within a certain time when the pick up is moved inside. Inner-switch or sledge motor problems.	F
1013	Turntable motor error. Generated when the CD did not reach 75% of speed during startup within a certain time. Discmotor problem.	F
1020	PLL lock error. When the PLL did not lock after 10 retries then this warning message is generated and the servo is stopped and restarted (as if the user would have pressed stop and then play immediately) to recover.	W
1079	Tray open position not reached within a certain time.	W

Error type W = Warning, F = Fatal Error

Table 3

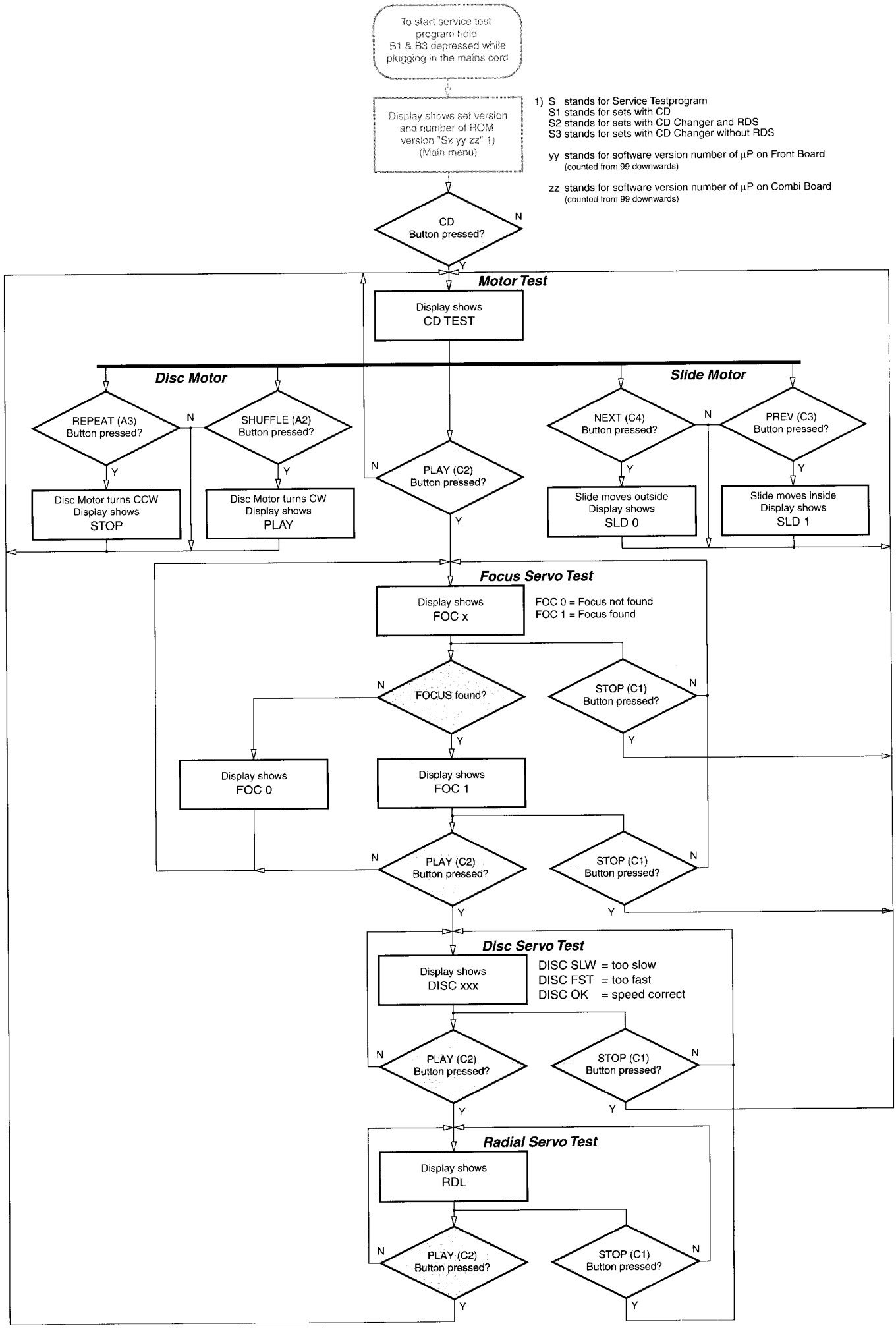
Key activated	Display shows	Key activated	Display shows	Key activated	Display shows
CD open/close	8	C4	19	Power / Stand by	30
Demo	9	Timer/Clock	20	CD	31
A1	10	Display	21	TUNER	32
A2	11	Analyzer	22	TAPE 1	33
A3	12	DBB	23	TAPE 2	34
B1	13	Pop / Incredible Stereo	24	MULTI MEDIA	35
B2	14	Rock	25	Vocal Cancel	36
B3	15	Classic	26	Key Control down	37
C1	16	Jazz	27	Key control up	38
C2	17	Optimal User	leave Test	any RC5 Key	RC
C3	18	Brightness	29		

Table 4

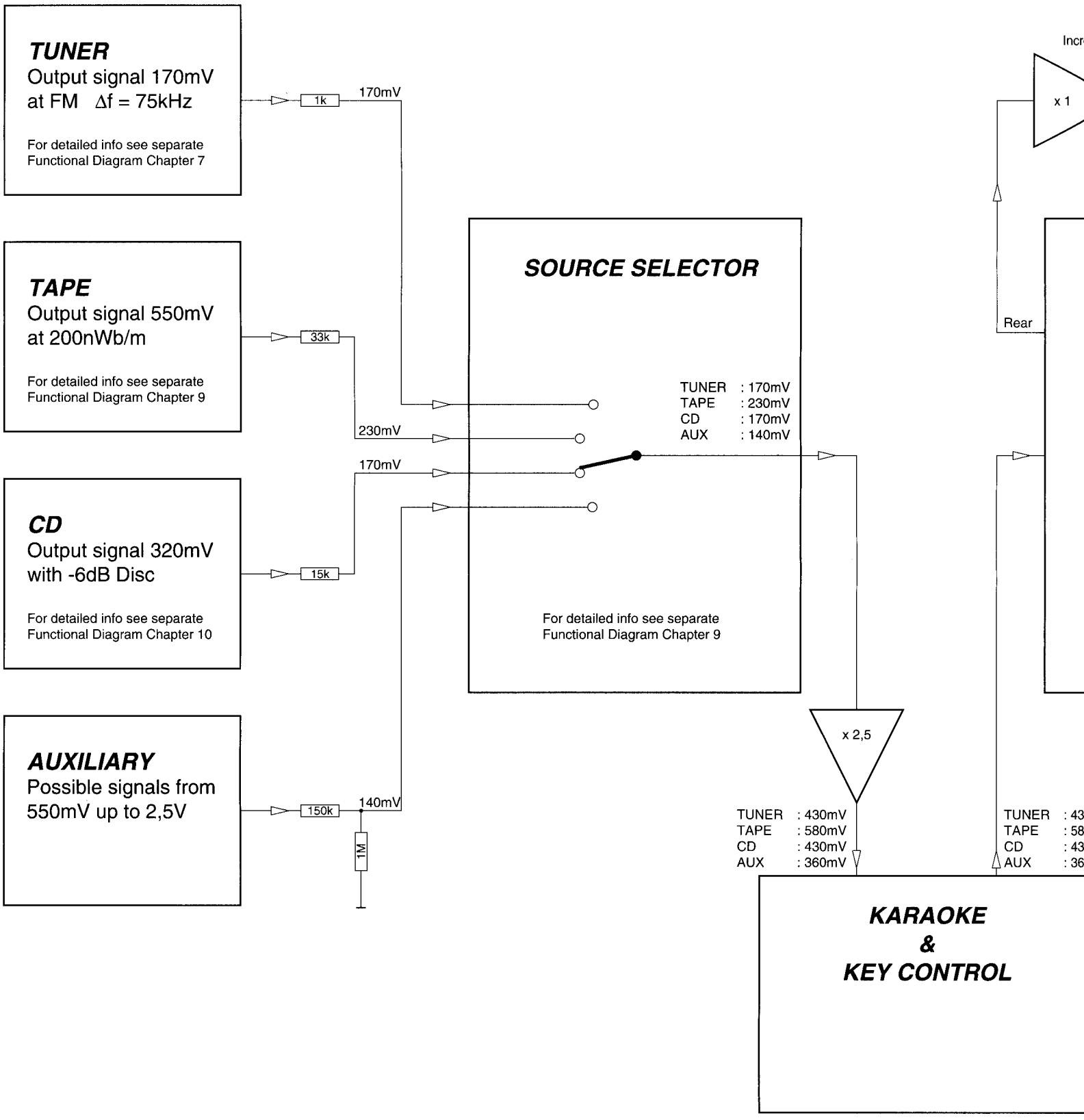


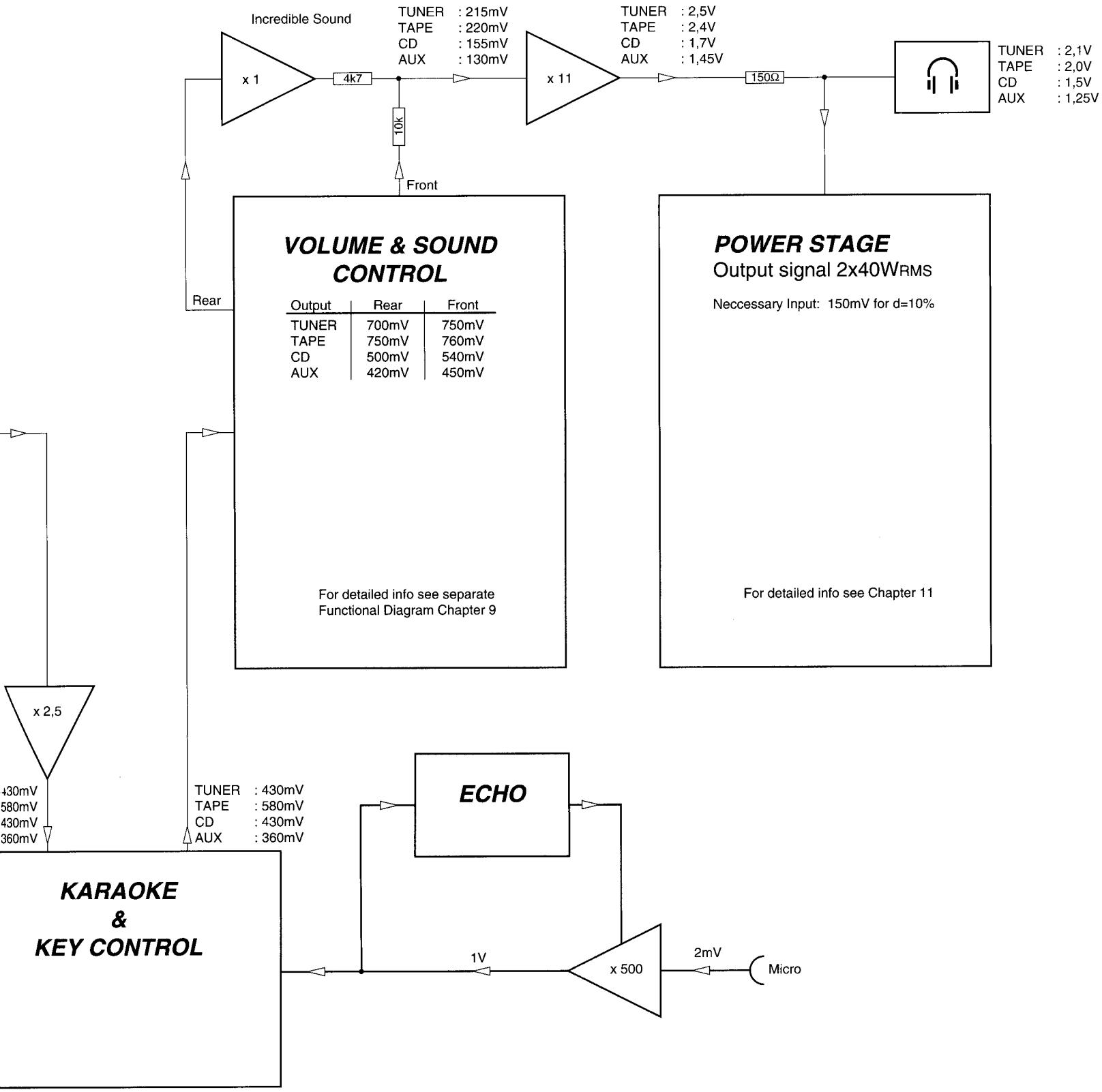
	Error type
	F
	W
	W
	F
	W
	F
	F
	W
	W

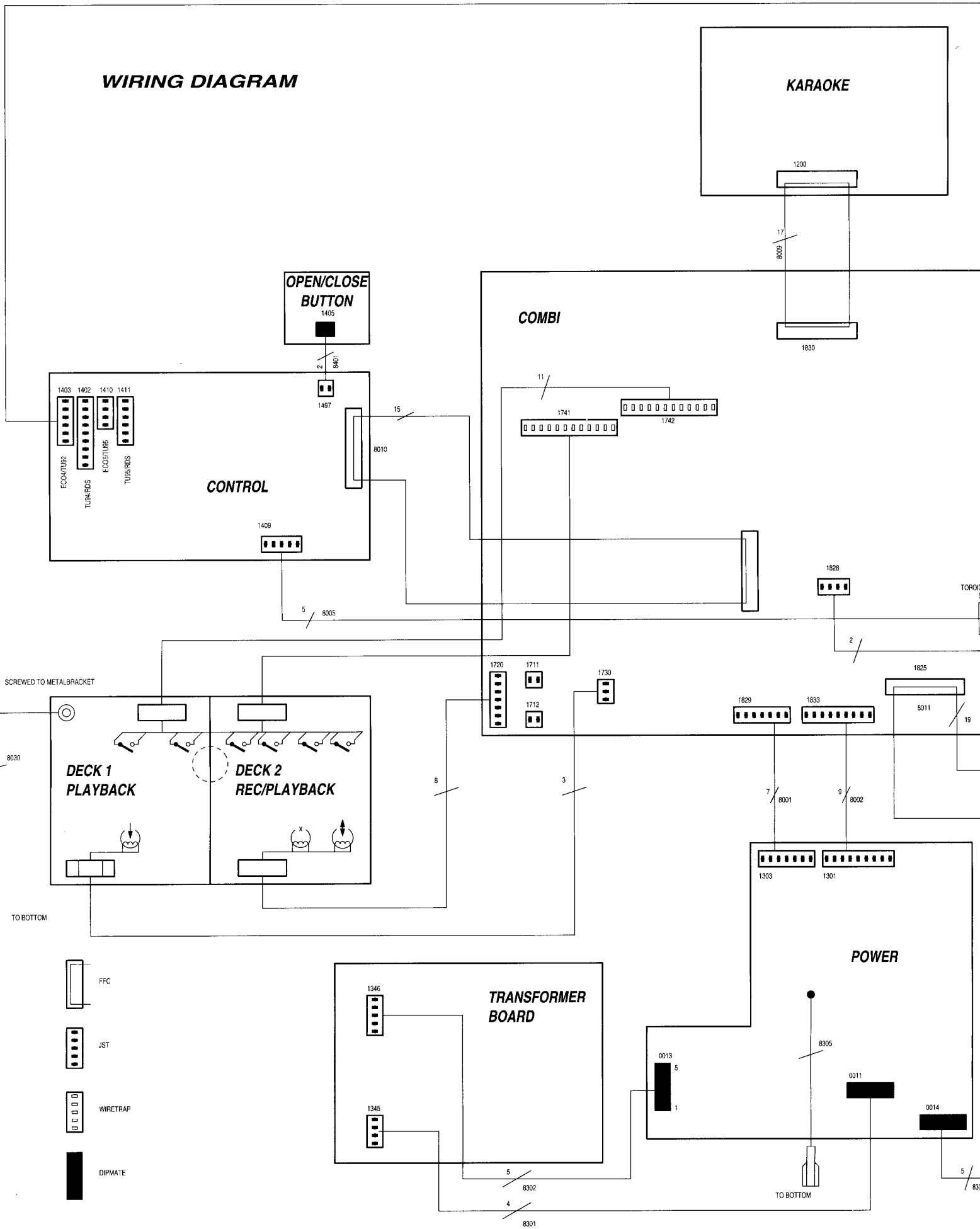
Display shows
30
31
32
33
34
35
36
37
38
RC

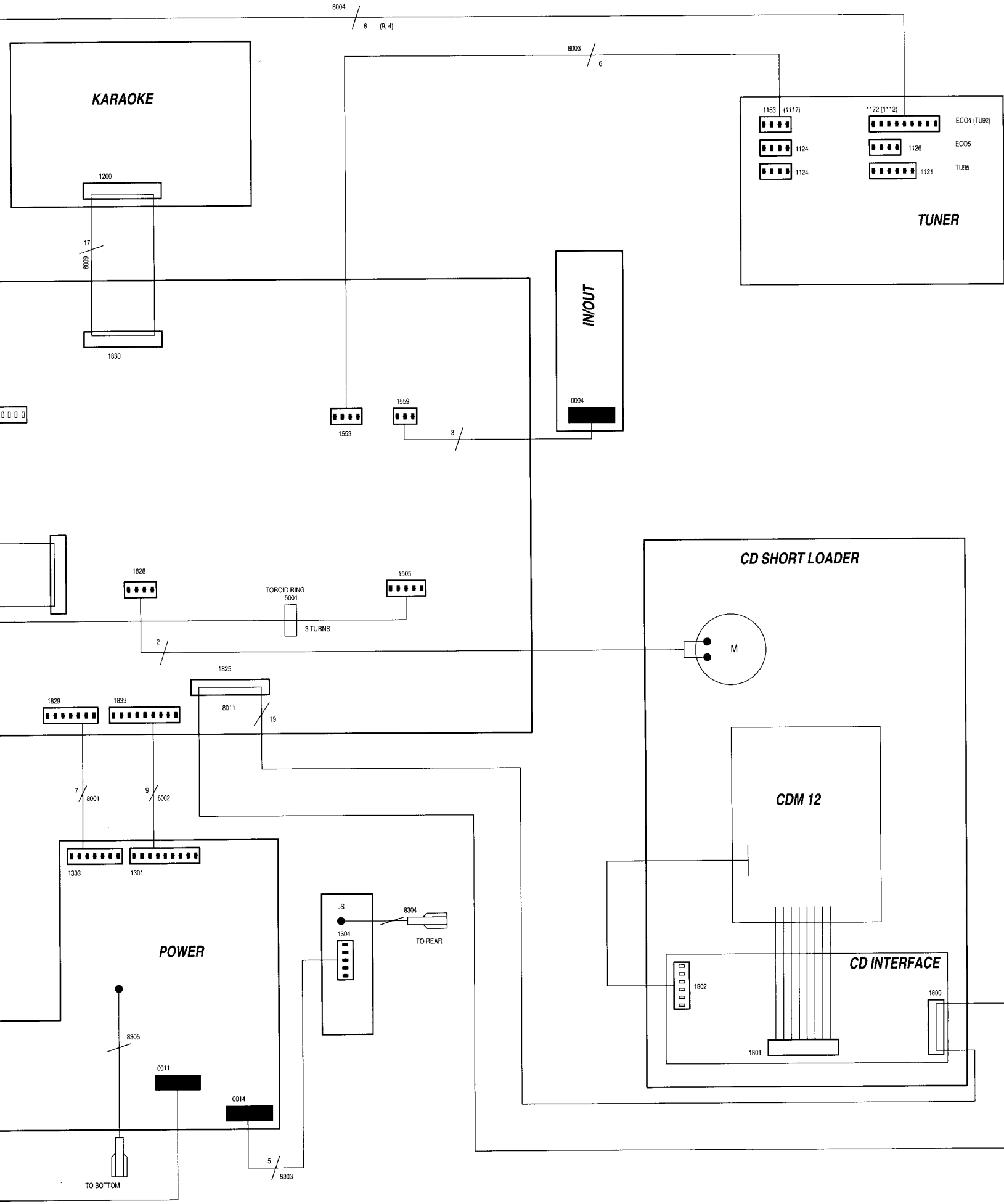


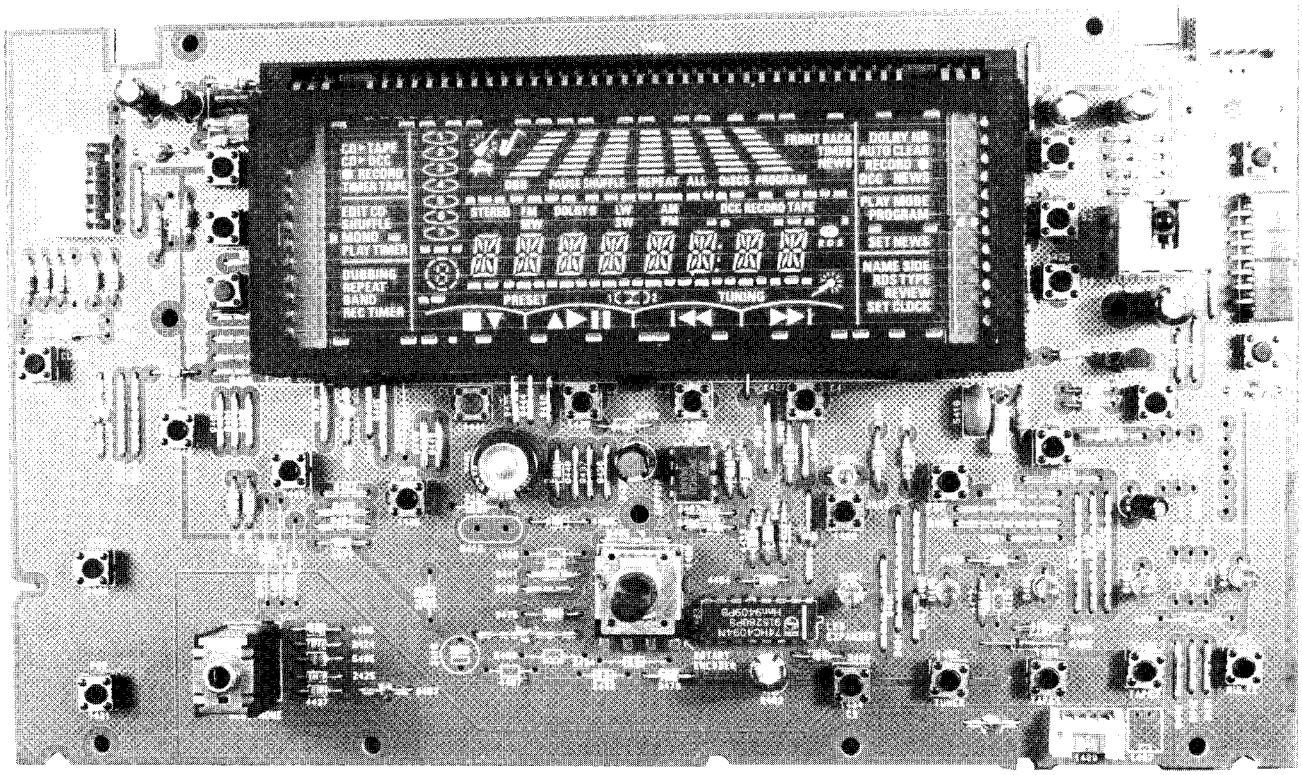
BLOCK DIAGRAM SET




Incredible Sound
TUNER : 215mV
TAPE : 220mV
CD : 155mV
AUX : 130mV
x 1
4k7
10K
x 11
TUNER : 2,5V
TAPE : 2,4V
CD : 1,7V
AUX : 1,45V
150Ω
TUNER : 2,1V
TAPE : 2,0V
CD : 1,5V
AUX : 1,25V
Front
Rear
VOLUME & SOUND CONTROL
Output | Rear | Front
TUNER | 700mV | 750mV
TAPE | 750mV | 760mV
CD | 500mV | 540mV
AUX | 420mV | 450mV
For detailed info see separate Functional Diagram Chapter 9
POWER STAGE
Output signal 2x40WRMS
Neccessary Input: 150mV for d=10%
For detailed info see Chapter 11
x 2,5
430mV
580mV
430mV
360mV
TUNER : 430mV
TAPE : 580mV
CD : 430mV
AUX : 360mV
ECHO
KARAOKE & KEY CONTROL
1V
x 500
2mV
Micro


WIRING DIAGRAM
KARAOKE
1200
17
8009
1830
OPEN/CLOSE
BUTTON
1405
2
8401
1497
COMBI
11
1741
1742
1403
1402
1410
1411
ECO4/TU92
TU94/RDS
ECO5/TU95
TU95/RDS
CONTROL
15
8010
1409
5
8005
1828
TOROID
2
1720
1711
1712
1730
1825
8011
19
1829
1833
SCREWED TO METALBRACKET
8030
DECK 1
PLAYBACK
DECK 2
REC/PLAYBACK
8
3
7
8001
9
8002
1303
1301
TO BOTTOM
POWER
FFC
JST
WIRETRAP
DIPMATE
TRANSFORMER
BOARD
1346
1345
0013
5
1
8305
0011
0014
5
8302
4
8301
TO BOTTOM


8004
6 (9, 4)
8003
6
KARAOKE
1200
17
8009
1830
1153 (1117)
1172 (1112)
ECO4 (TU92)
1124
1126
ECO5
1124
1121
TU95
TUNER
IN/OUT
0004
1559
1553
3
1828
1505
TOROID RING
5001
3 TURNS
2
CD SHORT LOADER
M
1825
8011
19
1829
1833
7
8001
9
8002
CDM 12
1303
1301
POWER
LS
8304
TO REAR
1304
CD INTERFACE
1802
1800
1801
8305
0011
0014
TO BOTTOM
5
8303



CONTROL BOARD

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Circuit diagram 6-2
Component layout copperside view 6-3
CDC-keys 6-4
Partslist 6-4

A

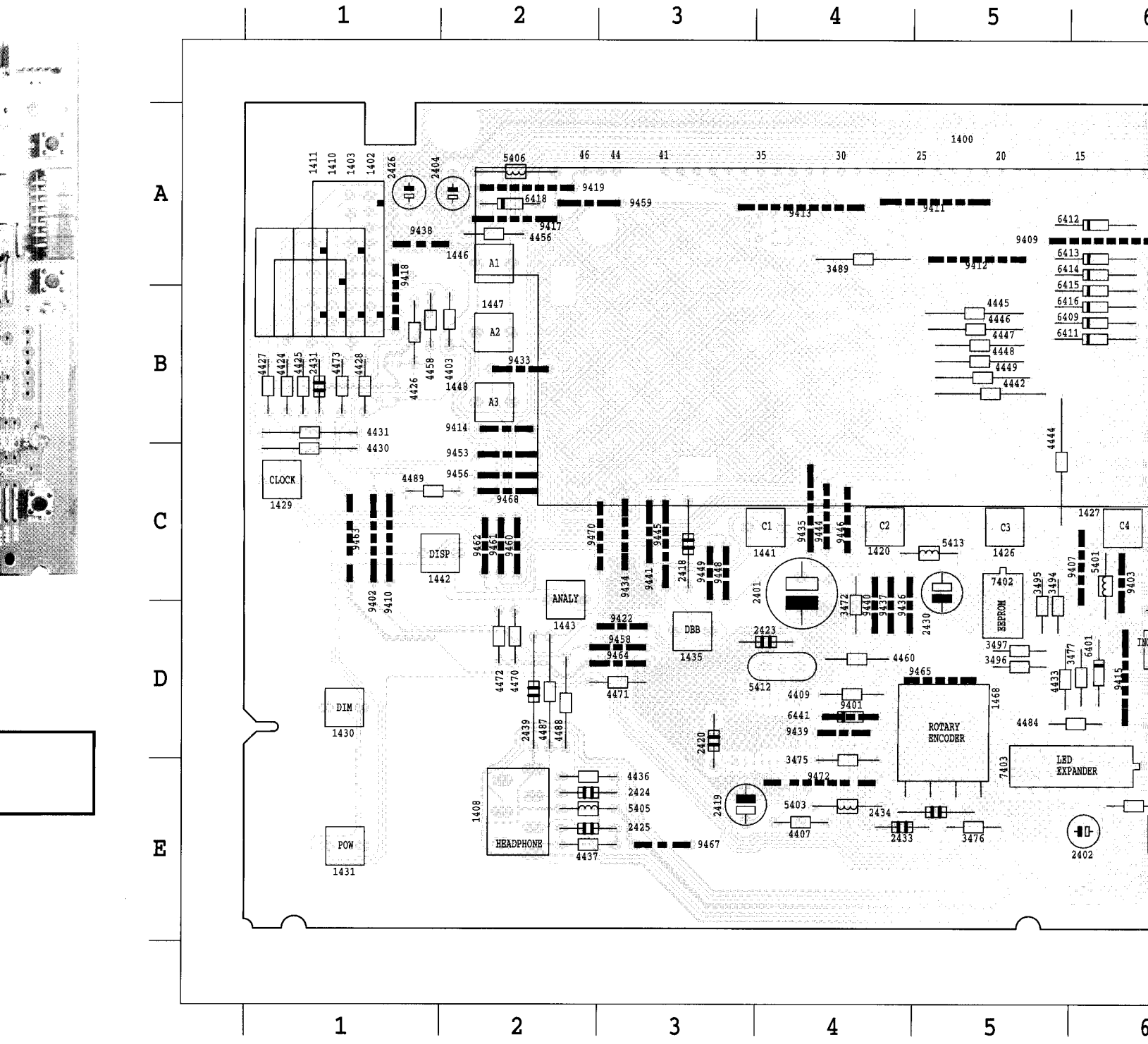
B

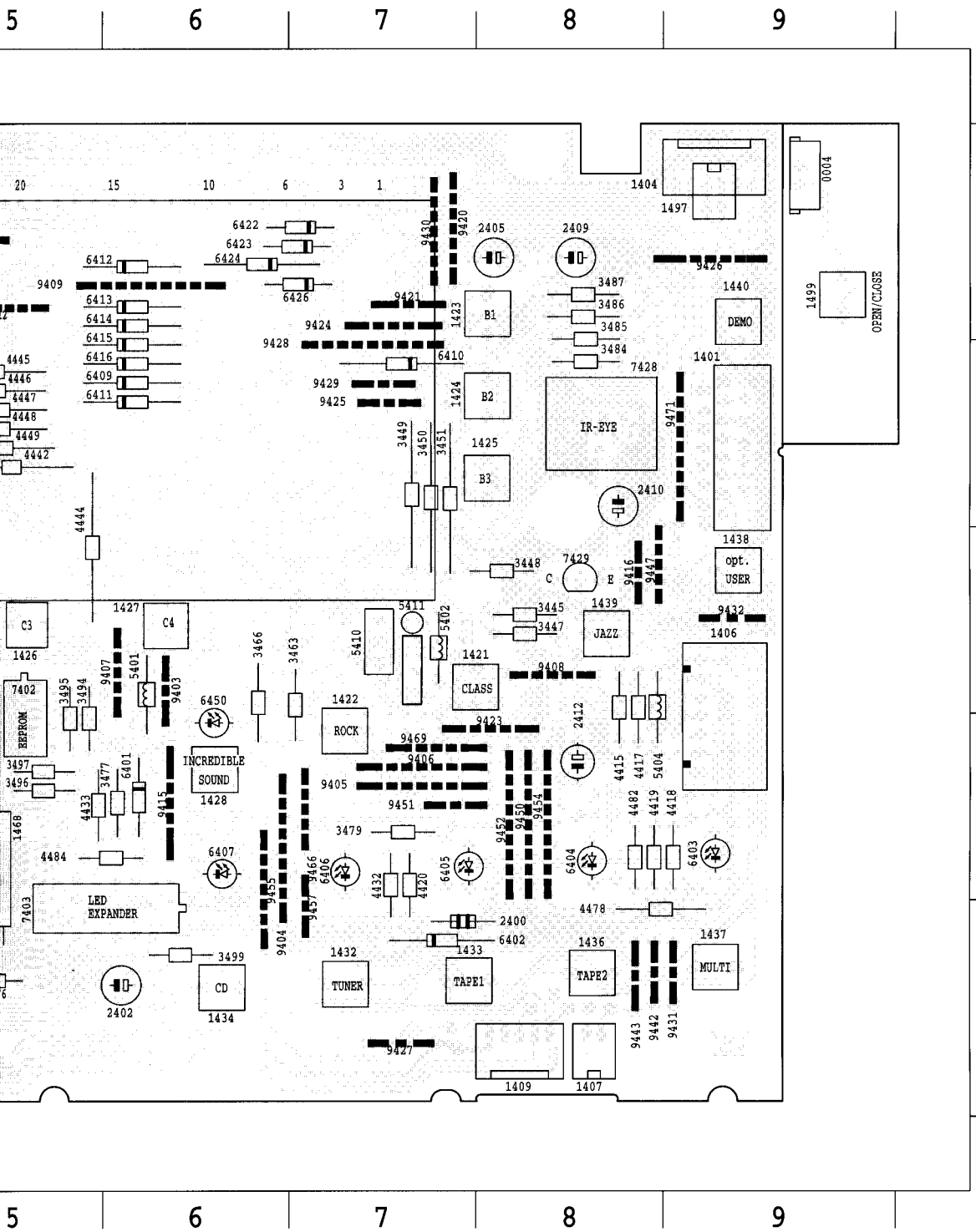
C

D

E

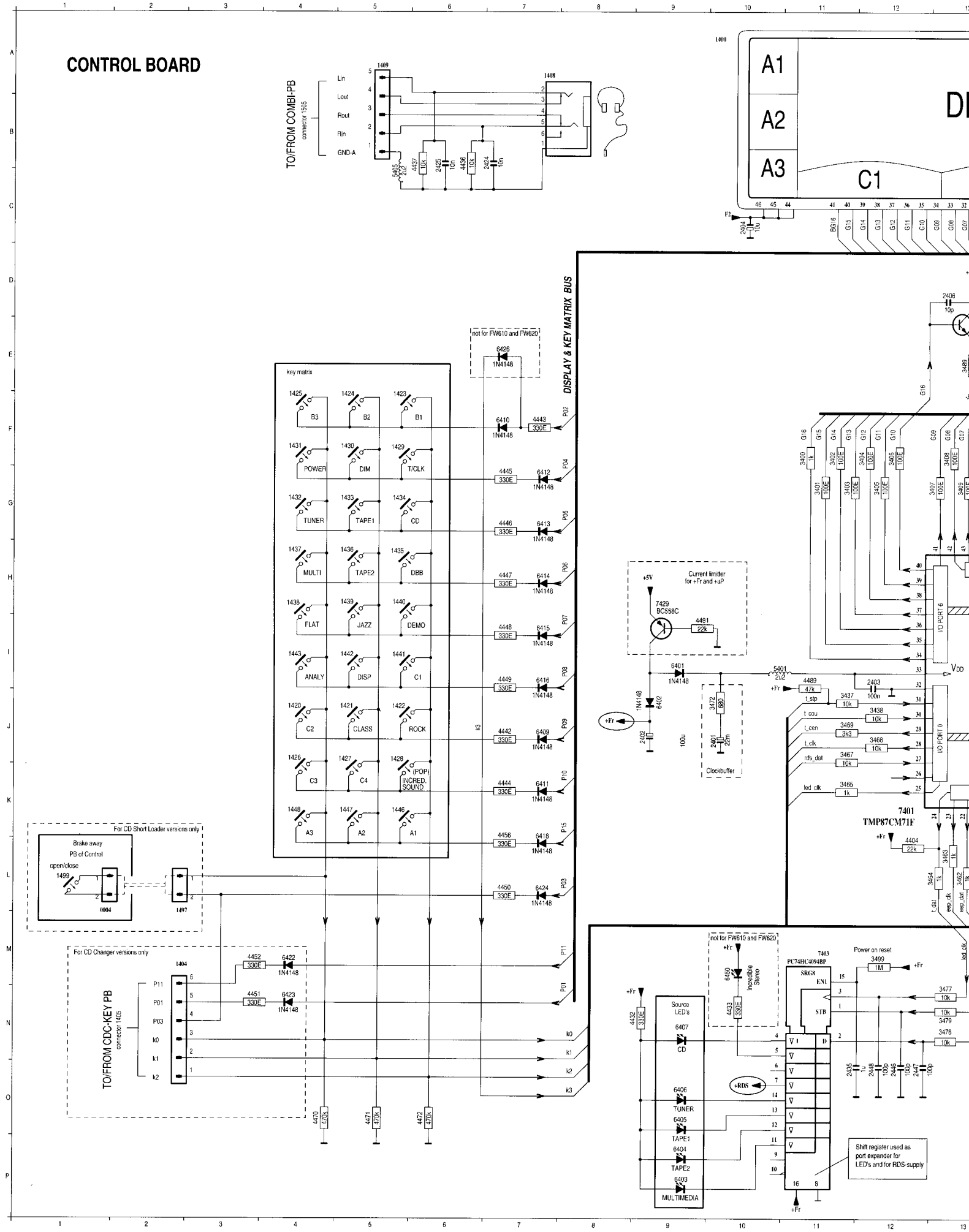
COMPONENT LAYOUT COMPONENTSIDE VIEW

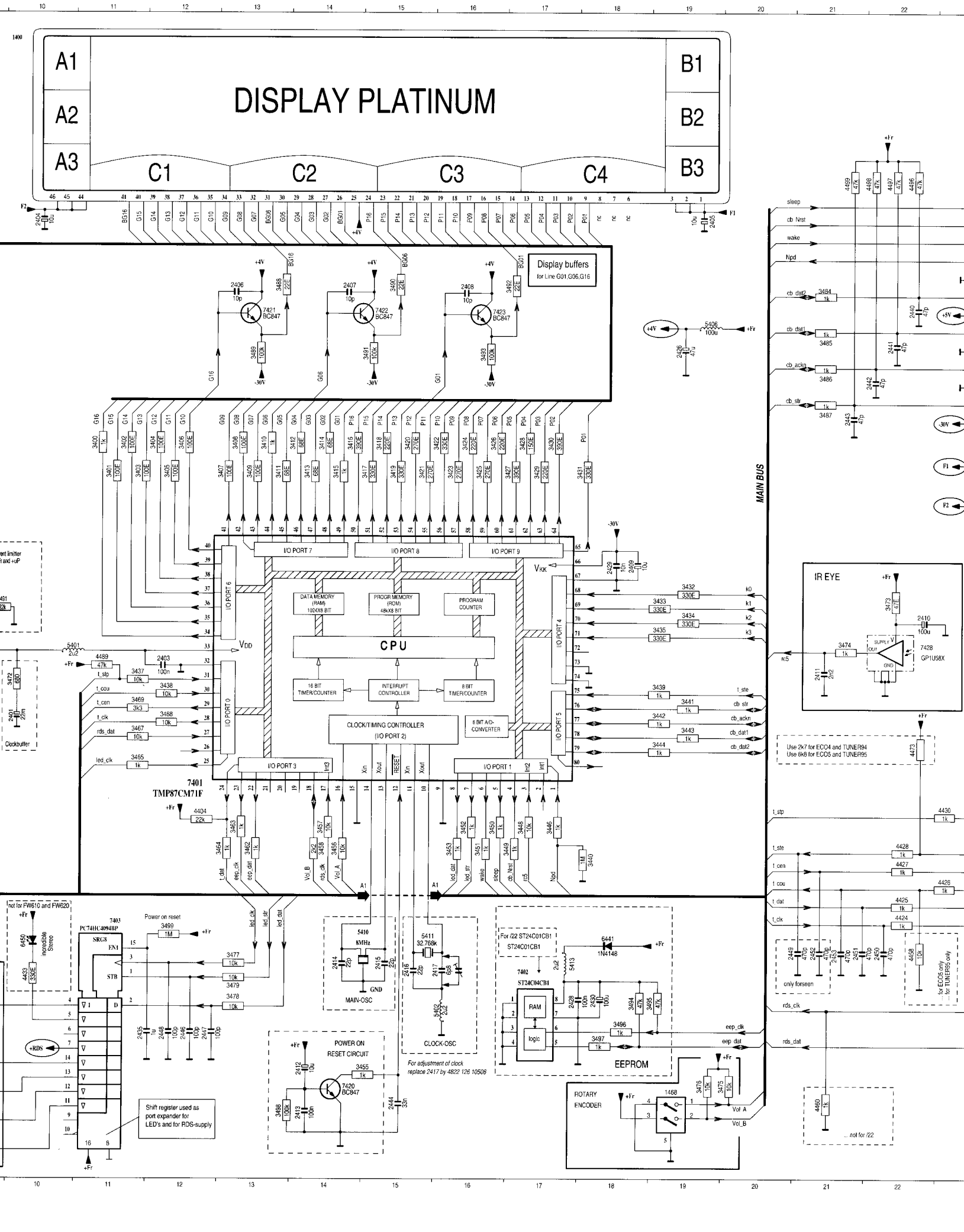


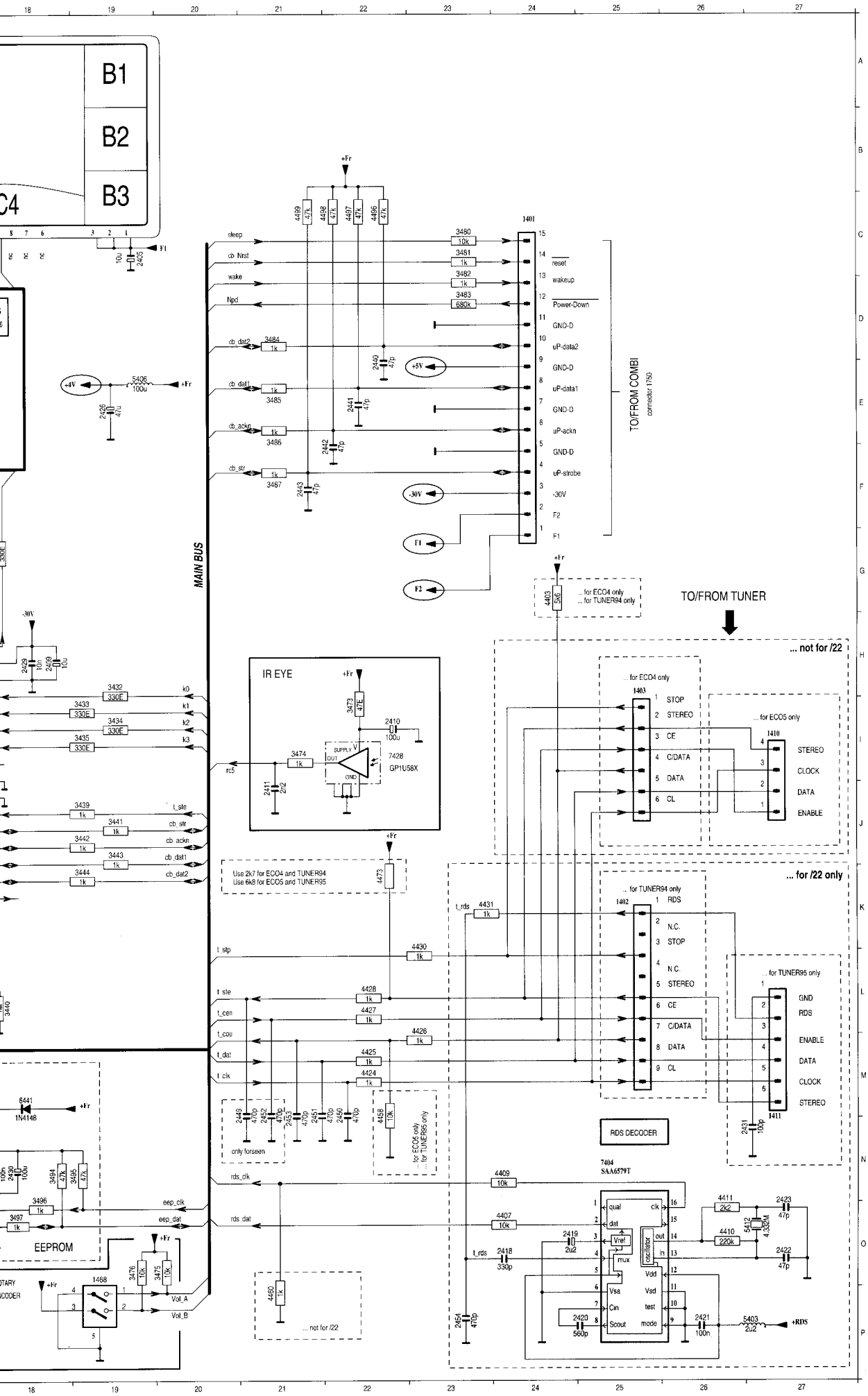


0004 A 9	3448 C 8	5405 E 2	9433 B 2
1400 A 5	3449 B 7	5406 A 2	9434 C 3
1401 B 9	3450 B 7	5410 C 7	9435 C 4
1402 A 1	3451 B 7	5411 C 7	9436 D 4
1403 A 1	3463 C 7	5412 D 4	9437 D 4
1404 A 9	3466 C 6	5413 C 5	9438 A 1
1406 D 9	3472 D 4	6401 D 6	9439 D 4
1407 E 8	3475 E 4	6402 E 7	9440 D 4
1408 E 2	3476 E 5	6403 D 9	9441 C 3
1409 E 8	3477 D 6	6404 D 8	9442 E 8
1410 B 1	3479 D 7	6405 D 7	9443 E 8
1411 A 1	3484 B 8	6406 D 7	9444 C 4
1420 C 4	3485 A 8	6407 D 6	9445 C 3
1421 C 7	3486 A 8	6409 B 6	9446 C 4
1422 D 7	3487 A 8	6410 B 7	9447 C 8
1423 A 8	3489 A 4	6411 B 6	9448 C 3
1424 B 8	3494 D 5	6412 A 6	9449 C 3
1425 B 8	3495 D 5	6413 A 6	9450 D 8
1426 C 5	3496 D 5	6414 A 6	9451 D 7
1427 C 6	3497 D 5	6415 B 6	9452 D 8
1428 D 6	3499 E 6	6416 B 6	9453 C 2
1429 C 1	4403 B 2	6418 A 2	9454 D 8
1430 D 1	4407 E 4	6422 A 7	9455 D 6
1431 E 1	4409 D 4	6423 A 7	9456 C 2
1432 E 7	4415 C 8	6424 A 6	9457 E 7
1433 E 7	4417 C 8	6426 A 7	9458 D 3
1434 E 6	4418 D 9	6441 D 4	9459 A 2
1435 D 3	4419 D 8	6450 D 6	9460 C 2
1436 E 8	4420 D 7	7402 D 5	9461 C 2
1437 E 9	4424 B 1	7403 E 6	9462 C 2
1438 C 9	4425 B 1	7428 B 8	9463 C 1
1439 C 8	4426 B 1	7429 C 8	9464 D 3
1440 A 9	4427 B 1	9401 D 4	9465 D 5
1441 C 4	4428 B 1	9402 C 1	9466 D 7
1442 C 2	4430 C 1	9403 C 6	9467 E 3
1443 C 2	4431 B 1	9404 D 6	9468 C 2
1446 A 2	4432 D 7	9405 D 7	9469 D 7
1447 B 2	4433 D 5	9406 D 7	9470 C 3
1448 B 2	4436 E 2	9407 C 6	9471 B 9
1468 E 5	4437 E 2	9408 C 8	9472 E 4
1497 A 9	4442 B 5	9409 A 6	
1499 A 9	4444 C 5	9410 C 1	
2400 E 7	4445 B 5	9411 A 5	
2401 C 4	4446 B 5	9412 A 5	
2402 E 6	4447 B 5	9413 A 4	
2404 A 2	4448 B 5	9414 B 2	
2405 A 8	4449 B 5	9415 D 6	
2409 A 8	4456 A 2	9416 C 8	
2410 B 8	4458 B 1	9417 A 2	
2412 D 8	4460 D 4	9418 B 1	
2418 C 3	4470 D 2	9419 A 2	
2419 E 3	4471 D 3	9420 A 7	
2420 D 3	4472 D 2	9421 A 7	
2423 D 4	4473 B 1	9422 D 3	
2424 E 2	4478 E 8	9423 D 8	
2425 E 2	4482 D 8	9424 A 7	
2426 A 1	4484 D 6	9425 B 7	
2430 C 5	4487 D 2	9426 A 9	
2431 B 1	4488 D 2	9427 E 7	
2433 E 4	4489 C 1	9428 B 7	
2434 E 5	5401 C 6	9429 B 7	
2439 D 2	5402 C 7	9430 A 7	
3445 C 8	5403 E 4	9431 E 9	
3447 C 8	5404 C 8	9432 C 9	

CONTROL BOARD




DISPLAY PLATINUM
A1
A2
A3
B1
B2
B3
C1
C2
C3
C4
Display buffers
for Line G01,G06,G16
7401
TMP87CM71F
CPU
I/O PORT 7
I/O PORT 8
I/O PORT 9
I/O PORT 6
I/O PORT 4
I/O PORT 5
I/O PORT 0
I/O PORT 3
I/O PORT 1
DATA MEMORY (RAM) 1024X8 BIT
PROGR MEMORY (ROM) 48KX8 BIT
PROGRAM COUNTER
16 BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
6 BIT A/D-CONVERTER
MAIN BUS
IR EYE
GP1U58X
EEPROM
ST24C04CB1
For /22 ST24C01CB1
ST24C01CB1
ROTARY ENCODER
POWER ON RESET CIRCUIT
MAIN-OSC
CLOCK-OSC
5410 8MHz
5411 32.768k
7403 PC74HC4094BP
Shift register used as port expander for LED's and for RDS-supply
For adjustment of clock replace 2417 by 4822 126 10508
Use 2k7 for ECO4 and TUNER94
Use 6k8 for ECO5 and TUNER95
not for FW610 and FW620
Incredible Stereo
Power on reset
only forseen
... for ECO5 only
... for TUNER95 only
... not for /22
sleep
cb Nrst
wake
Npd
cb dat2
cb dat1
cb ackn
cb str
t_ste
t_cen
t_cou
t_dat
t_clk
t_stp
rds_clk
rds_dat
eep_clk
eep dat
Vol A
Vol_B
led_clk
led_dat
led_str
+RDS
Clockbuffer



0004 L 1	1400 A10	1401 C24
1402 K25	1403 H25	1404 M 3
1408 A 7	1409 A 5	1410 I27
1411 N27	1420 J 4	1421 J 5
1422 J 5	1423 F 5	1424 F 5
1425 F 4	1426 J 4	1427 J 5
1428 J 5	1429 F 5	1430 F 5
1431 F 4	1432 G 4	1433 G 5
1434 G 5	1435 H 5	1436 H 5
1437 H 4	1438 H 4	1439 H 5
1440 H 5	1441 I 5	1442 I 5
1443 I 4	1446 K 5	1447 K 5
1448 K 4	1468 O19	1497 L 3
1499 L 1	2401 J10	2402 J 9
2403 I12	2404 C10	2405 C19
2406 D13	2407 D14	2408 D16
2409 H18	2410 I22	2411 J21
2412 O14	2413 P14	2414 N14
2415 N15	2416 N15	2417 N16
2418 O24	2419 O24	2420 P25
2421 P26	2422 O27	2423 O27
2424 B 6	2425 B 6	2426 E19
2428 N17	2429 H18	2430 N18
2431 N27	2435 O11	2440 E22
2441 E22	2442 F22	2443 F21
2444 P15	2445 N16	2446 O12
2447 O12	2448 O12	2449 M21
2450 M22	2451 M21	2452 M21
2453 M21	2454 P23	3400 F11
3401 G11	3402 F11	3403 G11
3404 F12	3405 G12	3406 F12
3407 G13	3408 F13	3409 G13
3410 F13	3411 G13	3412 F14
3413 G14	3414 F14	3415 G14
3416 F14	3417 G15	3418 F15
3419 G15	3420 F15	3421 G15
3422 F16	3423 G16	3424 F16
3425 G16	3426 F16	3427 G17
3428 F17	3429 G17	3430 F17
3431 G18	3432 H19	3433 I19
3434 I19	3435 I19	3437 J11
3438 J12	3439 J19	3440 L18
3441 J19	3442 J19	3443 J19
3444 K19	3445 L18	3446 L17
3449 L17	3450 L16	3451 L16
3452 L16	3453 L16	3455 O15
3456 L14	3457 L14	3458 L14
3462 L13	3463 L13	3464 L13
3465 K11	3467 J11	3468 J12
3469 J11	3472 J10	3473 I22
3474 I21	3475 O20	3476 O19
3477 N13	3478 N13	3479 N13
3480 C23	3481 C23	3482 C23
3483 D23	3484 D21	3485 E21
3486 E21	3487 F21	3488 D13
3489 E13	3490 D15	3491 E14
3492 D17	3493 E16	3494 N18
3495 N19	3496 N18	3497 O18
3498 P13	3499 M12	4403 G24
4404 L12	4407 O24	4409 N24
4410 O26	4411 N26	4424 M22
4425 M22	4426 L23	4427 L22
4428 L22	4430 K23	4431 K23
4432 N 9	4433 N10	4436 B 6
4437 B 6	4442 J 7	4443 F 7
4444 K 7	4445 G 7	4446 G 7
4447 H 7	4448 I 7	4449 I 7
4450 L 7	4451 N 3	4452 M 3
4456 K 7	4458 M22	4460 P21
4470 O 4	4471 O 5	4472 O 6
4473 K22	4489 I11	4491 I 9
4496 C22	4497 C22	4498 C22
4499 C21	5401 I10	5402 N16
5403 P27	5405 B 5	5406 E19
5410 M15	5411 M15	5412 O27
5413 N17	6401 I 9	6402 J 9
6403 P 9	6404 P 9	6405 O 9
6406 O 9	6407 N 9	6409 J 7
6410 F 7	6411 K 7	6412 G 7
6413 G 7	6414 H 7	6415 I 7
6416 I 7	6418 L 7	6422 M 4
6423 N 4	6424 L 7	6426 E 7
6441 M18	6450 M10	7401 K12
7402 N17	7403 M11	7404 N25
7420 O14	7421 D13	7422 D14
7423 D16	7428 I22	7429 H 9
9401 M18		

COMPONENT LAYOUT COPPERSIDE VIEW

2403 C 6
2406 A 4
2407 A 4
2408 A 5
2411 B 8
2413 D 7
2414 C 7
2415 C 7
2416 C 7
2417 C 7
2421 E 4
2422 D 3
2428 C 5
2429 B 7
2435 E 6
2436 C 9
2437 D 9
2438 D 9
2440 B 8
2441 A 8
2442 A 8
2443 A 8
2444 C 7
2446 D 6
2447 D 6
2448 D 5
2449 B 1
2450 C 1
2451 B 1
2452 B 1
2453 B 1
2454 B 1
3400 C 6
3401 C 6
3402 C 5
3403 C 6
3404 C 5
3405 C 5
3406 C 6
3407 C 6
3408 C 6
3409 B 6
3410 B 6
3411 B 6
3412 B 6
3413 B 6
3414 B 6
3415 B 6
3416 B 6
3417 B 6
3418 B 6
3419 B 6
3420 B 6
3421 B 6
3422 B 6
3423 B 6
3424 B 6
3425 B 6
3426 B 6
3427 B 6
3428 B 6
3429 B 7
3430 A 6
3431 A 7

ELECTRICAL PARTSLIST CONTROL BOARD

MISCELLANEOUS

1400	4822 130 91488	DISPLAY
1408	4822 267 31919	PHONE SOCKET
1420	4822 276 13114	TACT SWITCH
1421	4822 276 13114	TACT SWITCH
1422	4822 276 13114	TACT SWITCH
1423	4822 276 13114	TACT SWITCH
1424	4822 276 13114	TACT SWITCH
1425	4822 276 13114	TACT SWITCH
1426	4822 276 13114	TACT SWITCH
1427	4822 276 13114	TACT SWITCH
1428	4822 276 13114	TACT SWITCH
1429	4822 276 13114	TACT SWITCH
1430	4822 276 13114	TACT SWITCH
1431	4822 276 13114	TACT SWITCH
1432	4822 276 13114	TACT SWITCH
1433	4822 276 13114	TACT SWITCH
1434	4822 276 13114	TACT SWITCH
1435	4822 276 13114	TACT SWITCH
1436	4822 276 13114	TACT SWITCH
1437	4822 276 13114	TACT SWITCH
1438	4822 276 13114	TACT SWITCH
1439	4822 276 13114	TACT SWITCH
1440	4822 276 13114	TACT SWITCH
1441	4822 276 13114	TACT SWITCH
1442	4822 276 13114	TACT SWITCH
1443	4822 276 13114	TACT SWITCH
1446	4822 276 13114	TACT SWITCH
1447	4822 276 13114	TACT SWITCH
1448	4822 276 13114	TACT SWITCH
1468	4822 101 21261	ROTARY ENCODER
1499	4822 276 13114	TACT SWITCH

DIODES

6401	4822 130 30621	1N4148
6402	4822 130 30621	1N4148
6403	4822 130 82978	LED LTL-16KPE
6404	4822 130 82978	LED LTL-16KPE
6405	4822 130 82978	LED LTL-16KPE
6406	4822 130 82978	LED LTL-16KPE
6407	4822 130 82978	LED LTL-16KPE
6409	4822 130 30621	1N4148
6410	4822 130 30621	1N4148
6411	4822 130 30621	1N4148
6412	4822 130 30621	1N4148
6413	4822 130 30621	1N4148
6414	4822 130 30621	1N4148
6415	4822 130 30621	1N4148
6416	4822 130 30621	1N4148
6418	4822 130 30621	1N4148
6422	4822 130 30621	1N4148
6423	4822 130 30621	1N4148
6424	4822 130 30621	1N4148
6426	4822 130 30621	1N4148
6441	4822 130 30621	1N4148
6450	4822 130 83363	LED LTL-16KGE

TRANSISTORS

7420	5322 130 42755	BC847C
7421	5322 130 42755	BC847C
7422	5322 130 42755	BC847C
7423	5322 130 42755	BC847C
7429	5322 130 60068	BC558C

INTEGRATED CIRCUITS

7401	4822 209 90995	TMP87CP71F-65SV83021
7402	4822 209 32709	ST24C04CB1 not for /22
7402	4822 209 31508	ST24C01CB1 only for /22
7403	5322 209 11532	PC74HC4094P
7404	4822 209 31981	SAA6579T/V1
7428	4822 214 52009	GP1U58XP

COILS

5401	4822 157 62552	2,2µH
5402	4822 157 62552	2,2µH
5403	4822 157 62552	2,2µH
5405	4822 157 62552	2,2µH
5406	4822 157 52333	100µH 10%
5410	5322 242 73697	CER.RES. 8MHz
5411	4822 242 70938	XTAL 32,768kHz
5412	4822 242 72195	XTAL 4,332MHz
5413	4822 157 62552	2,2µH

RESISTORS

3449	4822 050 11002	1k	5%	0,2W
3450	4822 050 11002	1k	5%	0,2W
3451	4822 050 11002	1k	5%	0,2W
3463	4822 050 11002	1k	5%	0,2W
3472	4822 116 52228	680R	5%	0,5W
3475	4822 116 83864	10k	5%	0,5W
3476	4822 116 83864	10k	5%	0,5W
3477	4822 116 83864	10k	5%	0,5W
3479	4822 116 83864	10k	5%	0,5W
3484	4822 050 11002	1k	5%	0,2W
3485	4822 050 11002	1k	5%	0,2W
3486	4822 050 11002	1k	5%	0,2W
3487	4822 050 11002	1k	5%	0,2W
3489	4822 116 52234	100k	5%	0,5W
3494	4822 116 52284	47k	5%	0,5W
3495	4822 116 52284	47k	5%	0,5W
3496	4822 050 11002	1k	5%	0,2W
3497	4822 050 11002	1k	5%	0,2W
3499	4822 116 52235	1M	5%	0,5W
4403	4822 116 52289	5k6	5%	0,16W
4407	4822 116 83864	10k	5%	0,5W
4409	4822 116 83864	10k	5%	0,5W
4424	4822 050 11002	1k	5%	0,2W
4425	4822 050 11002	1k	5%	0,2W
4426	4822 050 11002	1k	5%	0,2W
4427	4822 050 11002	1k	5%	0,2W
4428	4822 050 11002	1k	5%	0,2W
4430	4822 050 11002	1k	5%	0,2W
4431	4822 050 11002	1k	5%	0,2W
4432	4822 116 52219	330R	5%	0,5W
4433	4822 116 52219	330R	5%	0,5W
4436	4822 116 83864	10k	5%	0,5W
4437	4822 116 83864	10k	5%	0,5W
4442	4822 116 52219	330R	5%	0,5W
4444	4822 116 52219	330R	5%	0,5W

ELECTRICAL PA

RESISTORS

4445	4822 116
4446	4822 116
4447	4822 116
4448	4822 116
4449	4822 116
4456	4822 116
4458	4822 116
4460	4822 050
4470	4822 116
4471	4822 116
4472	4822 116
4473	4822 116
4473	4822 116
4489	4822 116

CHIP RESISTORS

3400	4822 051
3401	4822 051
3402	4822 051
3403	4822 051
3404	4822 051
3405	4822 051
3406	4822 051
3407	4822 051
3408	4822 051
3409	4822 051
3410	4822 051
3411	4822 051
3412	4822 051
3413	4822 051
3414	4822 051
3415	4822 051
3416	4822 051
3417	4822 051
3418	4822 051
3419	4822 051
3420	4822 051
3421	4822 051
3422	4822 051
3423	4822 051
3424	4822 051
3425	4822 051
3426	4822 051
3427	4822 051
3428	4822 051
3429	4822 051
3430	4822 051
3431	4822 051
3432	4822 051
3433	4822 051
3434	4822 051
3435	4822 051
3437	4822 051
3438	4822 051
3439	4822 051
3440	4822 051
3441	4822 051
3442	4822 051
3443	4822 051
3444	4822 051
3446	4822 051

ELECTRICAL PARTSLIST CONTROL BOARD

RESISTORS

4445	4822 116 52219	330R	5%	0,5W	
4446	4822 116 52219	330R	5%	0,5W	
4447	4822 116 52219	330R	5%	0,5W	
4448	4822 116 52219	330R	5%	0,5W	
4449	4822 116 52219	330R	5%	0,5W	
4456	4822 116 52219	330R	5%	0,5W	
4458	4822 116 83864	10k	5%	0,5W	
4460	4822 050 11002	1k	5%	0,2W	
4470	4822 116 52285	470k	5%	0,16W	
4471	4822 116 52285	470k	5%	0,16W	
4472	4822 116 52285	470k	5%	0,16W	
4473	4822 116 52263	2k7	5%	0,5W	for ECO4,Tuner94
4473	4822 116 52296	6k8	5%	0,5W	for ECO5,Tuner95
4489	4822 116 52284	47k	5%	0,5W	

CHIP RESISTORS

3400	4822 051 10102	1k	2%	0,25W
3401	4822 051 20101	100R	5%	0,1W
3402	4822 051 20101	100R	5%	0,1W
3403	4822 051 20101	100R	5%	0,1W
3404	4822 051 20101	100R	5%	0,1W
3405	4822 051 20101	100R	5%	0,1W
3406	4822 051 20101	100R	5%	0,1W
3407	4822 051 20101	100R	5%	0,1W
3408	4822 051 20101	100R	5%	0,1W
3409	4822 051 20101	100R	5%	0,1W
3410	4822 051 10102	1k	2%	0,25W
3411	4822 051 20689	68R	5%	0,1W
3412	4822 051 20689	68R	5%	0,1W
3413	4822 051 20689	68R	5%	0,1W
3414	4822 051 20689	68R	5%	0,1W
3415	4822 051 10102	1k	2%	0,25W
3416	4822 051 20391	390R	5%	0,1W
3417	4822 051 20331	330R	5%	0,1W
3418	4822 051 20221	220R	5%	0,1W
3419	4822 051 20331	330R	5%	0,1W
3420	4822 051 20271	270R	5%	0,1W
3421	4822 051 20271	270R	5%	0,1W
3422	4822 051 20331	330R	5%	0,1W
3423	4822 051 20271	270R	5%	0,1W
3424	4822 051 20221	220R	5%	0,1W
3425	4822 051 20271	270R	5%	0,1W
3426	4822 051 20221	220R	5%	0,1W
3427	4822 051 20391	390R	5%	0,1W
3428	4822 051 20151	150R	5%	0,1W
3429	4822 051 20221	220R	5%	0,1W
3430	4822 051 20391	390R	5%	0,1W
3431	4822 051 20331	330R	5%	0,1W
3432	4822 051 20331	330R	5%	0,1W
3433	4822 051 20331	330R	5%	0,1W
3434	4822 051 20331	330R	5%	0,1W
3435	4822 051 20331	330R	5%	0,1W
3437	4822 051 20103	10k	5%	0,1W
3438	4822 051 20103	10k	5%	0,1W
3439	4822 051 10102	1k	2%	0,25W
3440	4822 051 20105	1M	5%	0,1W
3441	4822 051 10102	1k	2%	0,25W
3442	4822 051 10102	1k	2%	0,25W
3443	4822 051 10102	1k	2%	0,25W
3444	4822 051 10102	1k	2%	0,25W
3446	4822 051 10102	1k	2%	0,25W

CHIP RESISTORS

3452	4822 051 10102	1k	2%	0,25W
3453	4822 051 10102	1k	2%	0,25W
3455	4822 051 10102	1k	2%	0,25W
3456	4822 051 20103	10k	5%	0,1W
3457	4822 051 20103	10k	5%	0,1W
3458	4822 051 20222	2k2	5%	0,1W
3462	4822 051 10102	1k	2%	0,25W
3464	4822 051 10102	1k	2%	0,25W
3465	4822 051 10102	1k	2%	0,25W
3467	4822 051 20103	10k	5%	0,1W
3468	4822 051 20103	10k	5%	0,1W
3469	4822 051 20332	3k3	5%	0,1W
3473	4822 051 20479	47R	5%	0,1W
3474	4822 051 10102	1k	2%	0,25W
3478	4822 051 20103	10k	5%	0,1W
3480	4822 051 20103	10k	5%	0,1W
3481	4822 051 10102	1k	2%	0,25W
3482	4822 051 10102	1k	2%	0,25W
3483	4822 051 20684	680k	5%	0,1W
3488	4822 051 20229	22R	5%	0,1W
3490	4822 051 20229	22R	5%	0,1W
3491	4822 051 20104	100k	5%	0,1W
3492	4822 051 20229	22R	5%	0,1W
3493	4822 051 20104	100k	5%	0,1W
3498	4822 051 20104	100k	5%	0,1W
4404	4822 051 20223	22k	5%	0,1W
4410	4822 051 20224	220k	5%	0,1W
4411	4822 051 20222	2k2	5%	0,1W
4443	4822 051 20331	330R	5%	0,1W
4450	4822 051 20331	330R	5%	0,1W
4451	4822 051 20331	330R	5%	0,1W
4452	4822 051 20331	330R	5%	0,1W
4461	4822 051 10008	CHIP JUMPER 1206		
4462	4822 051 10008	CHIP JUMPER 1206		
4463	4822 051 10008	CHIP JUMPER 1206		
4467	4822 051 10008	CHIP JUMPER 1206		
4491	4822 051 20223	22k	5%	0,1W
4496	4822 051 20473	47k	5%	0,1W
4497	4822 051 20473	47k	5%	0,1W
4498	4822 051 20473	47k	5%	0,1W
4499	4822 051 20473	47k	5%	0,1W

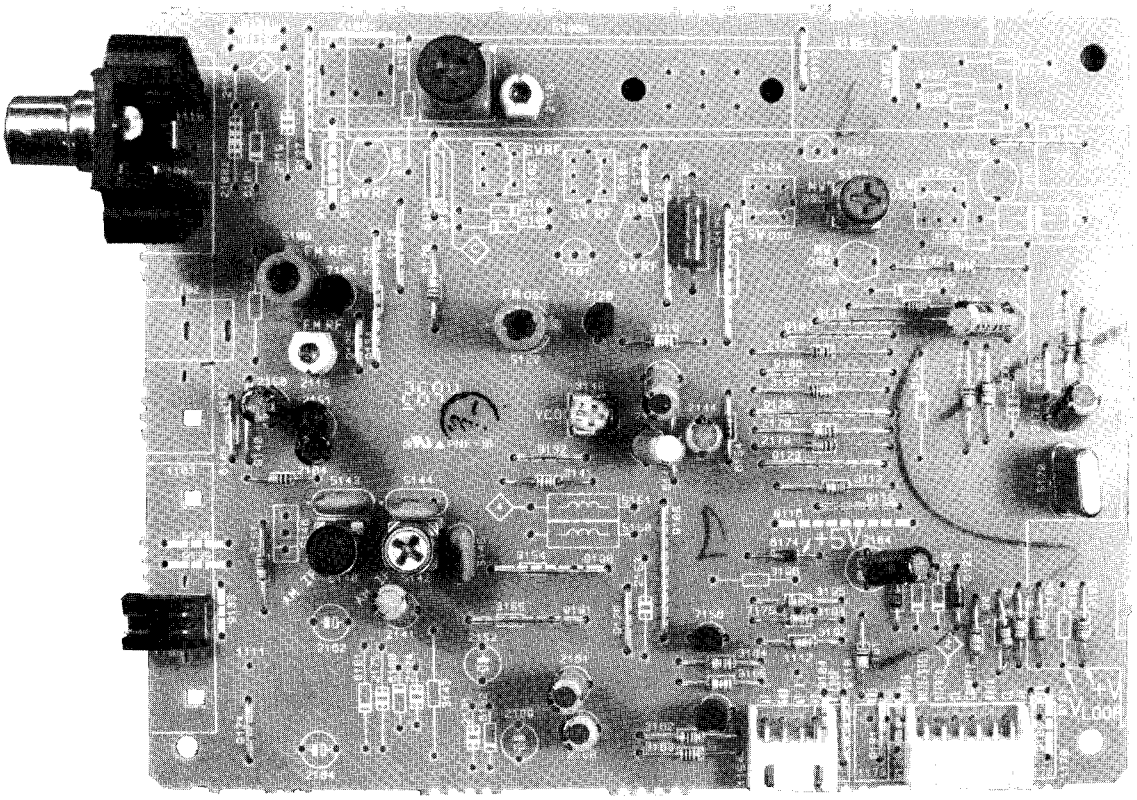
CAPACITORS

2401	4822 124 80818	22mF	20%	5,5V
2402	4822 124 41584	100µF	20%	10V
2404	4822 124 41579	10µF	20%	50V
2405	4822 124 41579	10µF	20%	50V
2409	4822 124 41579	10µF	20%	50V
2410	4822 124 41584	100µF	20%	10V
2412	4822 124 22403	10µF	20%	16V
2418	4822 126 12787	330pF	10%	50V
2419	4822 124 41576	2,2µF	20%	50V
2420	4822 122 10459	560pF	10%	50V
2423	4822 122 33848	47pF	5%	50V
2424	4822 121 51387	10nF	20%	16V
2425	4822 121 51387	10nF	20%	16V
2426	4822 124 40433	47µF	20%	25V
2430	4822 124 42234	100µF	20%	6,3V
2431	4822 122 33195	100pF	10%	50V
2403	4822 122 33496	100nF	10%	63V
2406	5322 122 32448	10pF	5%	50V

ELECTRICAL PARTSLIST CONTROL BOARD

CHIP CAPACITORS

2407	5322 122 32448	10pF	5%	50V
2408	5322 122 32448	10pF	5%	50V
2411	4822 122 33175	2,2nF	20%	50V
2413	4822 122 33496	100nF	10%	63V
2414	5322 122 32658	22pF	5%	50V
2415	5322 122 32658	22pF	5%	50V
2416	5322 122 32658	22pF	5%	50V
2417	5322 122 32269	6,8pF	5%	50V
2421	4822 122 33496	100nF	10%	63V
2422	5322 122 32452	47pF	5%	50V
2428	4822 122 33496	100nF	10%	63V
2429	4822 122 33177	10nF	20%	50V
2435	4822 126 11692	1µF	20%	16V
2440	5322 122 32452	47pF	5%	50V
2441	5322 122 32452	47pF	5%	50V
2442	5322 122 32452	47pF	5%	50V
2443	5322 122 32452	47pF	5%	50V
2444	4822 122 33342	33nF	10%	63V
2446	5322 122 32531	100pF	5%	50V
2447	5322 122 32531	100pF	5%	50V
2448	5322 122 32531	100pF	5%	50V
2449	5322 122 34099	470pF	10%	63V
2450	5322 122 34099	470pF	10%	63V
2451	5322 122 34099	470pF	10%	63V
2452	5322 122 34099	470pF	10%	63V
2453	5322 122 34099	470pF	10%	63V
2454	5322 122 34099	470pF	10%	63V



TUNER BOARD ECO4VA

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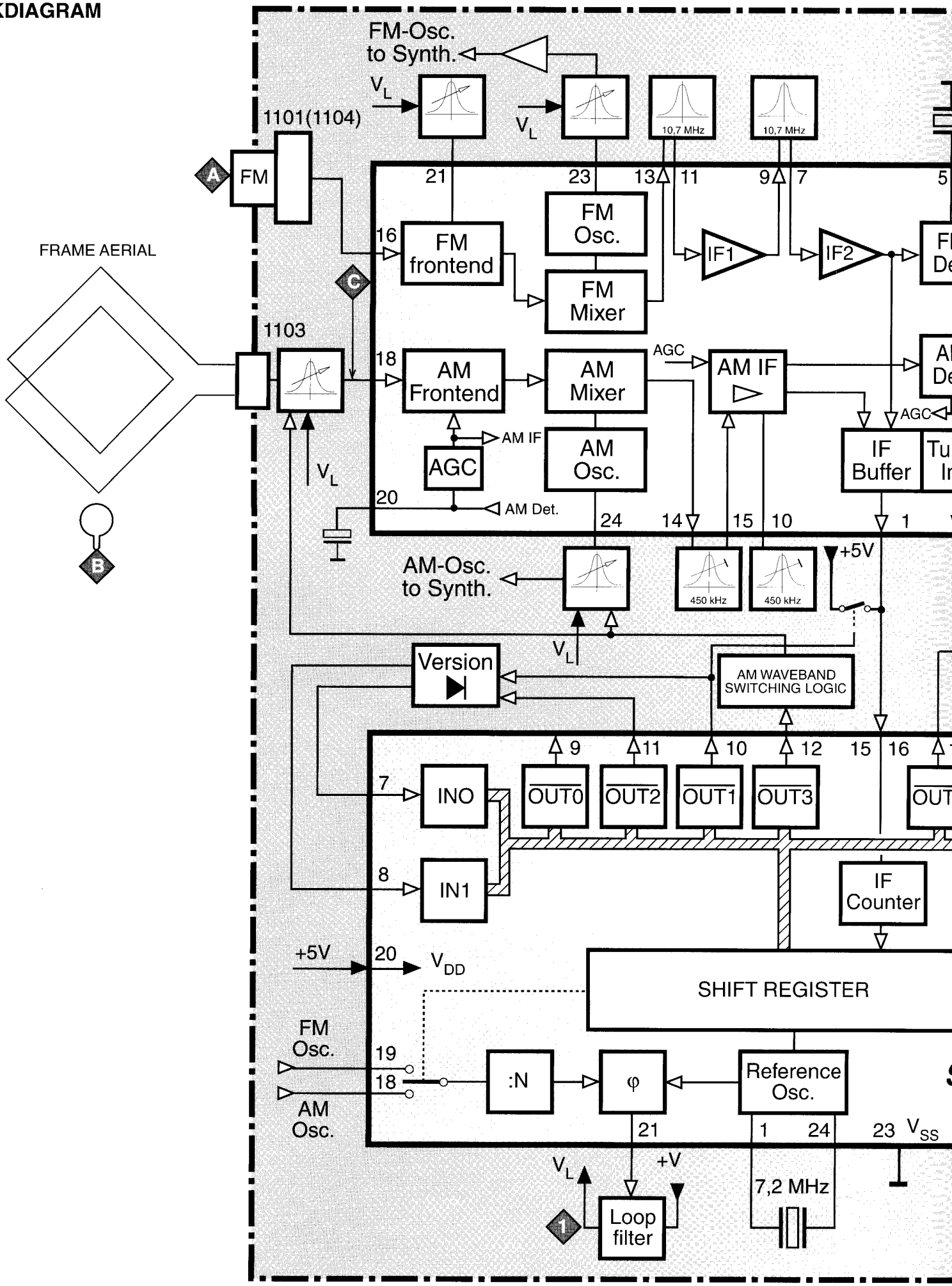
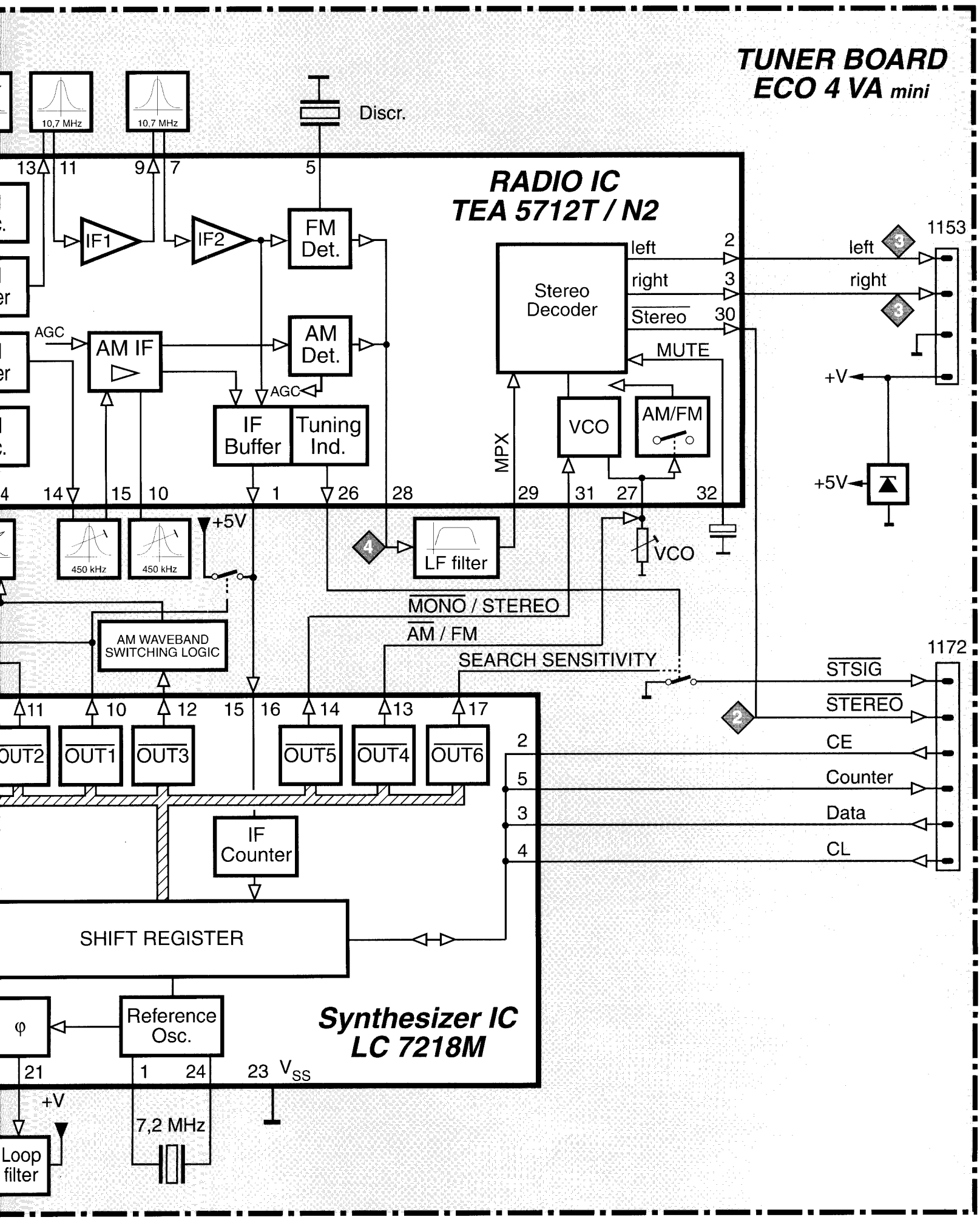
BLOCKDIAGRAM




TUNER BOARD
ECO 4 VA mini
RADIO IC
TEA 5712T / N2
Synthesizer IC
LC 7218M
10,7 MHz
10,7 MHz
Discr.
IF1
IF2
FM Det.
AM IF
AM Det.
AGC
IF Buffer
Tuning Ind.
Stereo Decoder
left
right
Stereo
MUTE
MPX
VCO
AM/FM
+V
+5V
LF filter
VCO
450 kHz
450 kHz
MONO / STEREO
AM / FM
SEARCH SENSITIVITY
AM WAVEBAND SWITCHING LOGIC
STSIG
STEREO
CE
Counter
Data
CL
1153
1172
IF Counter
SHIFT REGISTER
Reference Osc.
φ
7,2 MHz
Loop filter
OUT1
OUT2
OUT3
OUT4
OUT5
OUT6

TUNER ADJUSTMENT TABLE (**ECO4VA** FM/MW- and FM/MW/LW - versions with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM			108MHz	5120		8V ±0.2V
87.5 - 108MHz			87.5MHz	check		4.1V ±0.5V
FM East Europe			108MHz	5120		8V ±0.2V
65.81 - 108MHz			65.81MHz	check		0.8V ±0.4V
MW 2-band version			1710kHz	5123	1	9V ±0.1V
530 - 1710kHz			530kHz	check		1V ±0.4V
LW			279kHz	5122		8V ±0.2V
153 - 279kHz			153kHz	check		1V ±0.4V
MW 3-band version			1611kHz	5123		8V ±0.1V
522 - 1611kHz			522kHz	check		1V ±0.4V
FM RF						
FM	108MHz	A mod=1kHz Δf=22.5kHz	108MHz	2115	3	MAX
87.5 - 108MHz	87.5MHz		87.5MHz	5109		
FM East Europe	108MHz		108MHz	2115		
65.81 - 108MHz	65.81MHz		65.81MHz	5109		
VCO						
FM	98MHz, 1mV continuous wave	A	98MHz	3148	2	152kHz ±1kHz
AM IF						
MW	540kHz Δf=10kHz as low as possible	100nF C 50R	540kHz	5142 5140	4	symmetrical and max. height
AM RF [1)]						
LW	198kHz	B mod=1kHz 30% AM	198kHz	5108	4	MAX
MW 3-band version	1494kHz		1494kHz	2113		MAX
522 - 1611kHz	549kHz		549kHz	5107		
MW 2-band version	1500kHz		1500kHz	2113		
530 - 1710kHz	550kHz		550kHz	5107		

ECO4VA mini.ai 290595

Use service test program. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

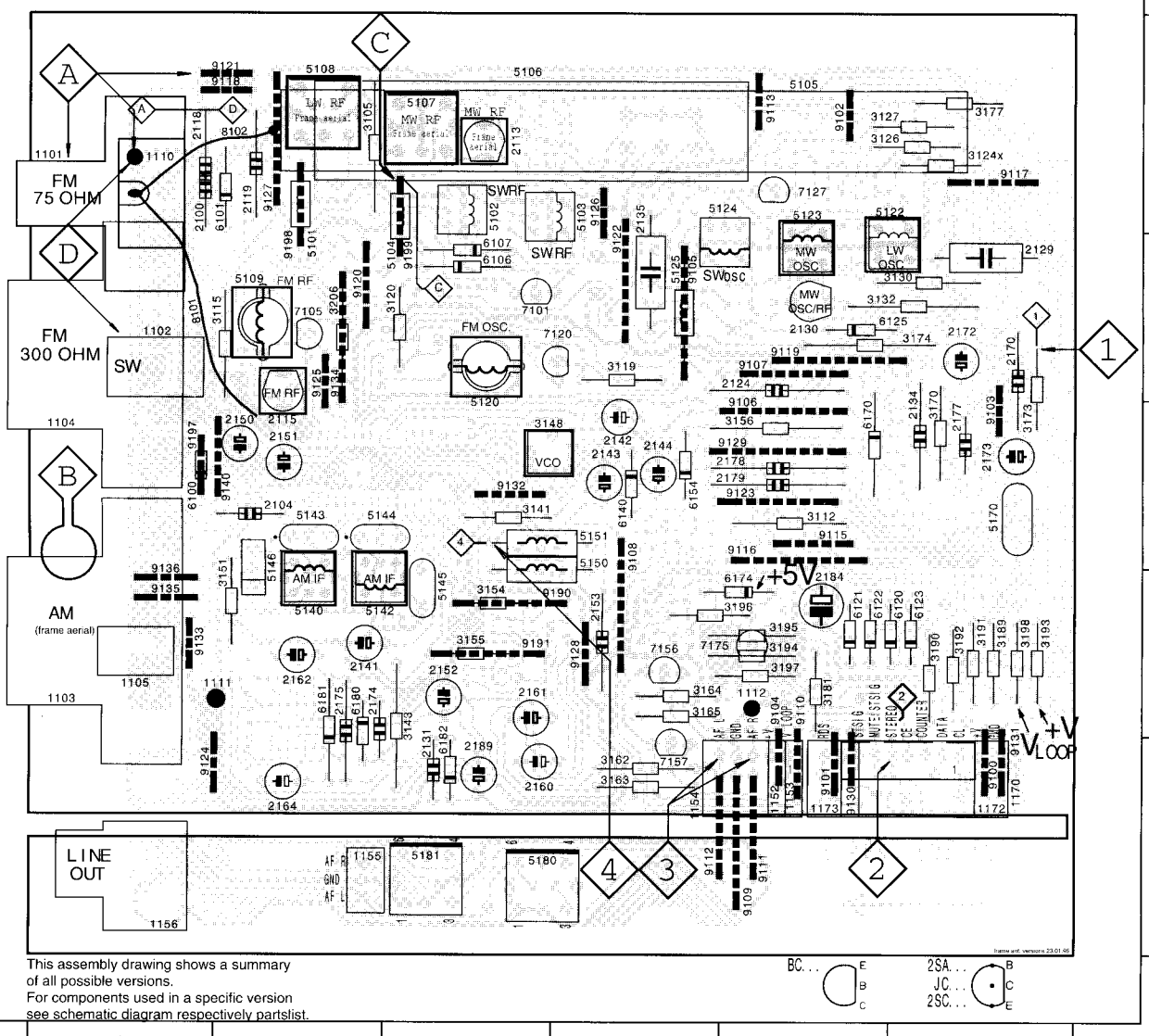
[1)] For AM RF adjustments the original frame antenna 4822 158 60622 has to be used !

↕ Repeat

1101 A 1 1173 E 5 2142 C 4 2175 D 2 3127 A 6 3173 B 6 5101 A 2 5142 D 2 6121 D 5 7156 D 4 9110 E 5 9126 A 4 9198 A 2
1102 B 1 2100 A 1 2143 C 4 2177 C 6 3130 B 6 3174 B 5 5102 A 3 5143 C 2 6122 D 5 7157 E 4 9111 E 5 9127 A 2 9199 A 3
1103 D 1 2104 C 2 2144 C 4 2178 C 5 3132 B 6 3177 A 6 5103 A 3 5144 C 2 6123 D 6 7175 D 5 9112 E 4 9128 D 4
1104 B 1 2106 B 4 2150 C 2 2179 C 5 3141 C 3 3181 D 5 5104 A 3 5145 D 3 6125 B 5 8101 B 1 9113 A 5 9129 C 5
1105 D 1 2113 A 3 2151 C 2 2184 D 5 3143 D 3 3189 D 6 5105 A 4 5146 D 2 6140 C 4 8102 A 1 9115 C 5 9130 E 5
1110 A 1 2115 B 2 2152 D 3 2189 E 3 3148 C 3 3190 D 6 5106 A 4 5150 D 3 6154 C 4 9100 E 6 9116 C 5 9131 E 6
1111 D 2 2118 A 1 2153 D 4 2190 A 2 3151 D 2 3191 D 6 5107 A 3 5151 C 3 6170 C 5 9101 E 5 9117 A 6 9132 C 3
1112 D 5 2119 A 2 2160 E 3 2191 A 6 3154 D 3 3192 D 6 5108 A 2 5170 C 6 6174 D 5 9102 A 5 9118 A 2 9133 D 1
1152 E 5 2124 B 5 2161 D 3 3105 A 2 3155 D 3 3193 D 6 5109 B 2 5180 E 3 6180 D 2 9103 C 6 9119 B 5 9134 B 2
1153 E 5 2129 B 6 2162 D 2 3112 C 5 3156 C 5 3194 D 5 5120 B 3 5181 E 3 6181 D 2 9104 E 5 9120 B 2 9135 D 1
1154 E 4 2130 B 5 2164 E 2 3115 B 2 3162 E 4 3195 D 5 5122 B 6 6100 C 1 6182 E 3 9105 B 4 9121 A 2 9136 D 1
1155 E 2 2131 E 3 2170 B 6 3119 B 4 3163 E 4 3196 D 4 5123 B 5 6101 A 2 7101 B 3 9106 C 5 9122 B 4 9140 C 2
1156 E 1 2134 C 6 2172 B 6 3120 B 3 3164 D 4 3197 D 5 5124 B 5 6106 B 3 7105 B 2 9107 B 5 9123 C 5 9190 D 3
1170 E 6 2135 B 4 2173 C 6 3124 A 6 3165 D 4 3198 D 6 5125 B 4 6107 B 3 7120 B 4 9108 D 4 9124 E 1 9191 D 3
1172 E 6 2141 D 2 2174 D 2 3126 A 6 3170 C 6 3206 B 2 5140 D 2 6120 D 6 7127 A 5 9109 E 5 9125 B 2 9197 C 1

o for AM-version only
x for LW-version only
y for USA version only
z not for all versions

ECO4 VA TUNER BOARD / component side view



This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

BC... E B C
2SA... JC... 2SC... B C E

198 A 2
199 A 3

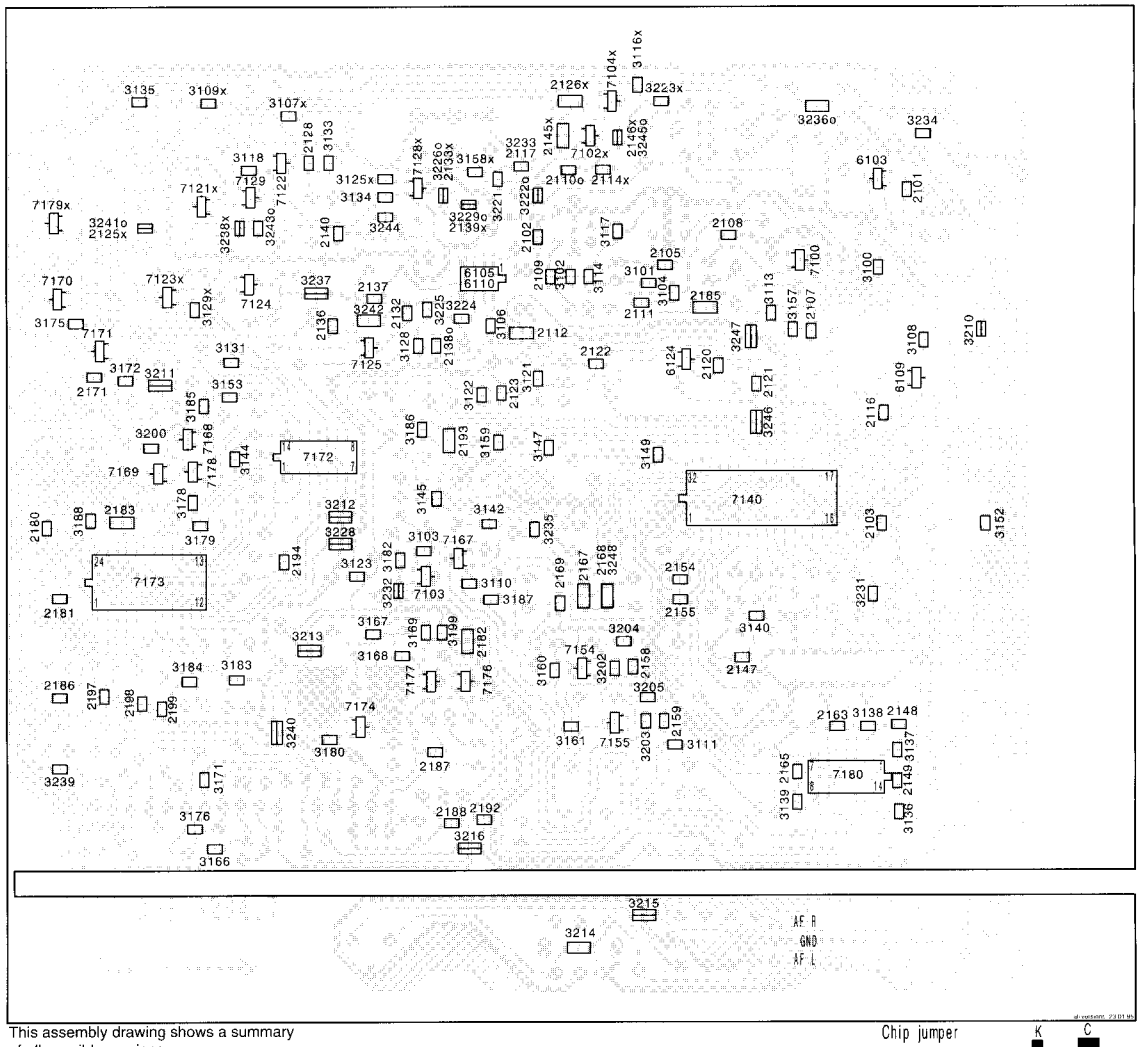
o for AM-version only
x for LW-version only
y for USA version only
z not for all versions

2101 A 2	2122 B 3	2148 D 2	2183 C 6	3104 B 3	3125x A 5	3147 C 4	3175 B 6	3203 D 3	3226o A 4	3243o A 5	7121x A 6	7172 C 5	
2102 A 4	2123 B 4	2149 D 2	2185 B 3	3106 B 4	3128 B 4	3149 C 3	3176 E 6	3204 D 3	3228 C 5	3244 A 5	7122 A 5	7173 C 6	
2103 C 2	2125x A 6	2154 C 3	2186 D 6	3107x A 5	3129x B 6	3152 C 1	3178 C 6	3205 D 3	3229o A 4	3245o A 3	7123x B 6	7174 D 5	
2105 B 3	2126x A 3	2155 C 3	2187 D 4	3108 B 2	3131 B 5	3153 B 5	3179 C 6	3210 B 1	3231 C 2	3246 B 2	7124 B 5	7176 D 4	
2107 B 2	2128 A 5	2158 D 3	2188 E 4	3109x A 5	3133 A 5	3157 B 2	3180 D 5	3211 B 6	3232 C 4	3247 B 3	7125 B 5	7177 D 4	
2108 A 3	2132 B 4	2159 D 3	2192 E 4	3110 C 4	3134 A 5	3158x A 4	3182 C 4	3212 C 5	3233 A 4	3248 C 3	7128x A 4	7178 C 6	
2109 B 4	2133x A 4	2163 D 2	2193 C 4	3111 D 3	3135 A 6	3159 C 4	3183 D 5	3213 D 5	3234 A 2	6103 A 2	7129 A 5	7179x A 6	
2110o A 4	2136 B 5	2165 E 2	2194 C 5	3113 B 2	3136 E 2	3160 D 4	3184 D 6	3214 E 3	3235 C 4	6105 B 4	7140 C 2	7180 D 2	
2111 B 3	2137 B 5	2167 C 3	2197 D 6	3114 B 3	3137 D 2	3161 D 3	3185 B 6	3215 E 3	3236o A 2	6109 B 2	7154 D 3		
2112 B 4	2138o B 4	2168 C 3	2198 D 6	3116x A 3	3138 D 2	3166 E 5	3186 C 4	3216 E 4	3237 B 5	6110 B 4	7155 D 3		
2114x A 3	2139x A 4	2169 C 4	2199 D 6	3117 A 3	3139 D 2	3167 D 5	3187 C 4	3221 A 4	3238x A 5	6124 B 3	7167 C 4		
2116 B 2	2140 A 5	2171 B 6	3100 B 2	3118 A 5	3140 D 2	3168 D 4	3188 C 6	3222o A 4	3239 D 6	7100 B 2	7168 C 6		
2117 A 4	2145x A 4	2180 C 6	3101 B 3	3121 B 4	3142 C 4	3169 D 4	3199 D 4	3223x A 3	3240 D 5	7102x A 3	7169 C 6		
2120 B 3	2146x A 3	2181 C 6	3102 B 3	3122 B 4	3144 C 5	3171 D 6	3200 C 6	3224 B 4	3241o A 6	7103 C 4	7170 B 6		
2121 B 2	2147 D 3	2182 D 4	3103 C 4	3123 C 5	3145 C 4	3172 B 6	3202 D 3	3225 B 4	3242 B 5	7104x A 3	7171 B 6		

o for AM-version only
x for LW-version only
y for USA version only
z not for all versions

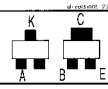
6 5 4 3 2 1

ECO4 VA TUNER BOARD / copper side view



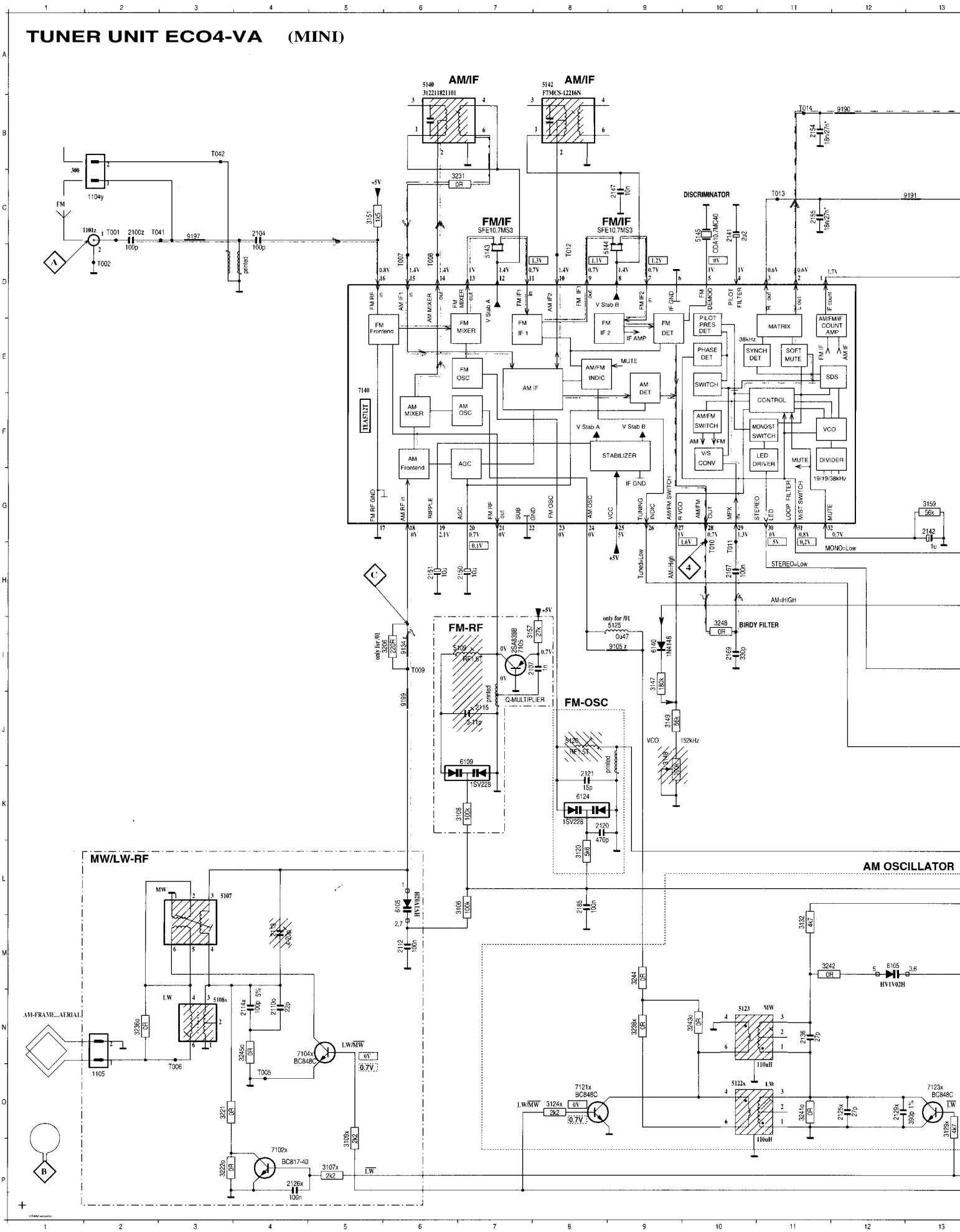
This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

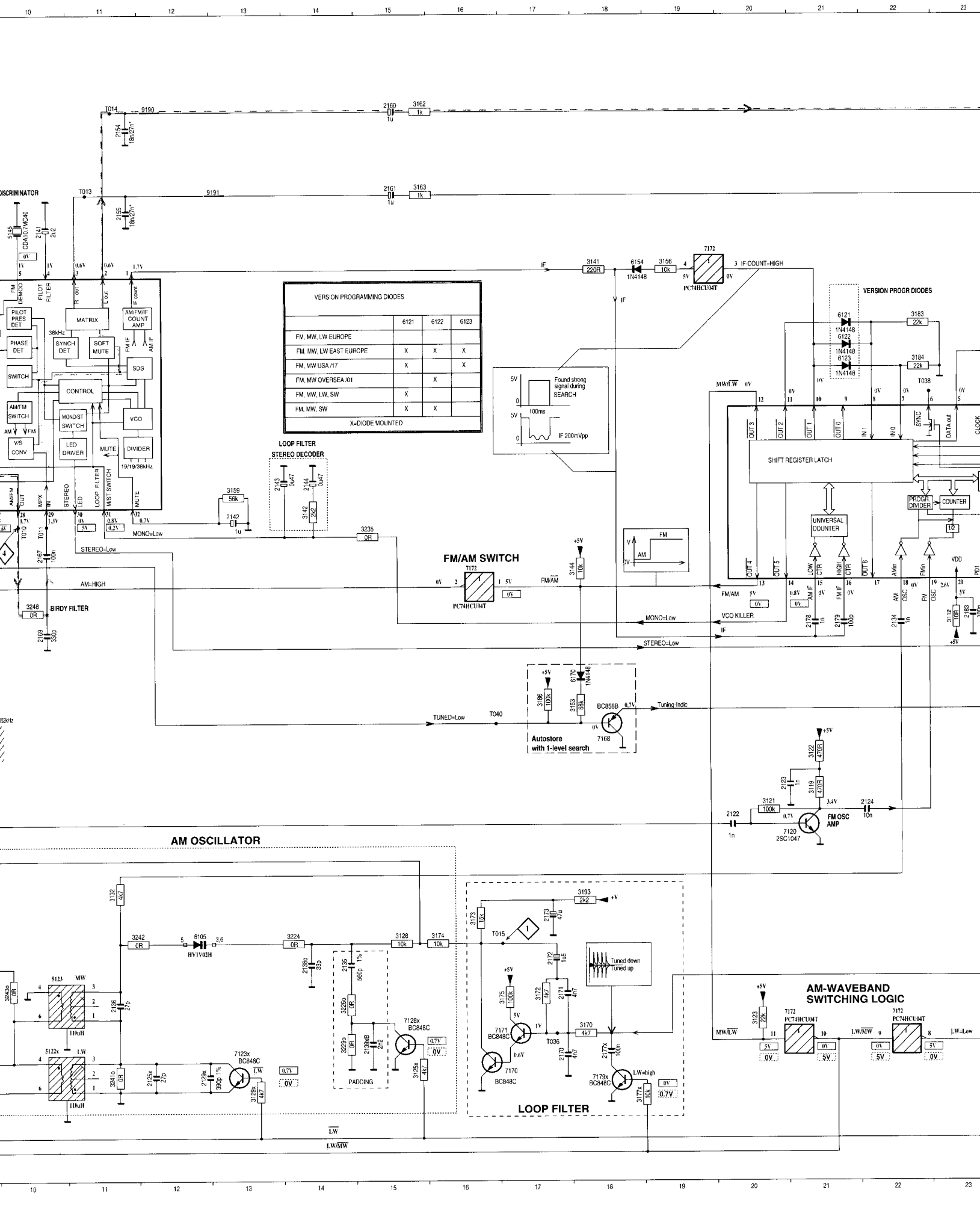
Chip jumper
(not in schematic diagram)

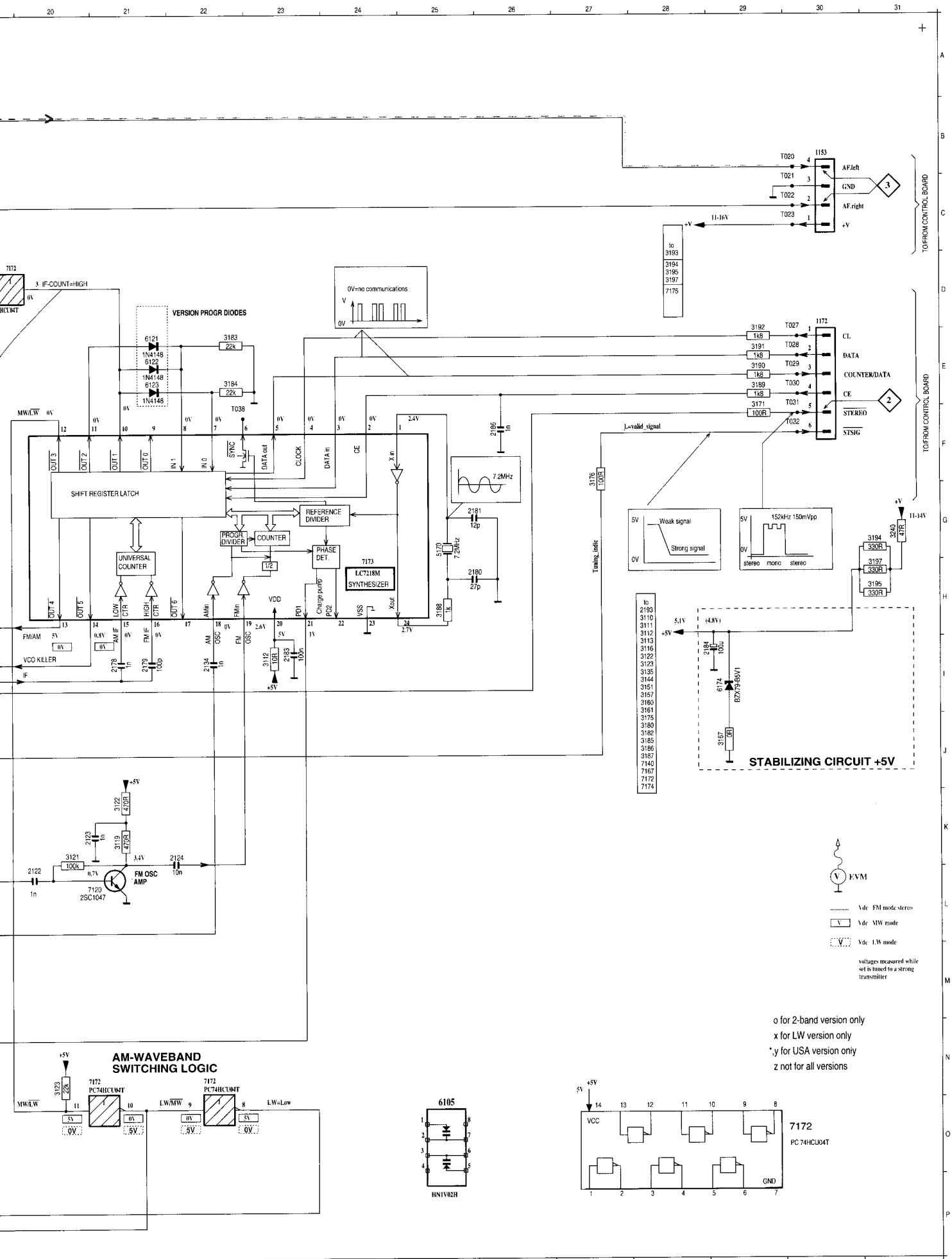


6 5 4 3 2 1

TUNER UNIT ECO4-VA (MINI)




VERSION PROGRAMMING DIODES
6121
6122
6123
FM, MW, LW EUROPE
FM, MW, LW EAST EUROPE
FM, MW USA /17
FM, MW OVERSEA /01
FM, MW, LW, SW
FM, MW, SW
X=DIODE MOUNTED
VERSION PROGR DIODES
Found strong signal during SEARCH
100ms
IF 200mVpp
LOOP FILTER
STEREO DECODER
FM/AM SWITCH
PC74HCU04T
SHIFT REGISTER LATCH
UNIVERSAL COUNTER
PROGR DIVIDER
COUNTER
MONO=Low
STEREO=Low
TUNED=Low
VCO KILLER
BIRDY FILTER
Autostore with 1-level search
Tuning-Indic
FM OSC AMP
AM OSCILLATOR
PADDING
LOOP FILTER
AM-WAVEBAND SWITCHING LOGIC
Tuned down
Tuned up
LW=high
LW=Low


TO/FROM CONTROL BOARD
AF.left
GND
AF.right
+V
11-16V
CL
DATA
COUNTER/DATA
CE
STEREO
STSIG
VERSION PROGR DIODES
0V=no communications
IF-COUNT=HIGH
SHIFT REGISTER LATCH
REFERENCE DIVIDER
PROGR. DIVIDER
COUNTER
PHASE DET.
UNIVERSAL COUNTER
LC7218M SYNTHESIZER
7.2MHz
Tuning_Indic
Weak signal
Strong signal
152kHz 150mVpp
stereo mono stereo
STABILIZING CIRCUIT +5V
FM OSC AMP
AM-WAVEBAND SWITCHING LOGIC
MW/LW
LW=Low
VCO KILLER
FM/AM
IF
EVM
Vdc FM mode stereo
Vdc MW mode
Vdc LW mode
voltages measured while set is tuned to a strong transmitter
o for 2-band version only
x for LW version only
*,y for USA version only
z not for all versions
PC74HCU04T
BN1V02H

ELECTRICAL PARTSLIST TUNER ECO4VA BOARD

MISCELLANEOUS

1101	4822 267 10283	SOCKET COAX IEC 75R
1105	4822 265 31184	JST CONNECTOR 2 POLE

DIODES

6105	4822 130 83075	HN1V02H
6109	4822 130 82833	1SV228
6122	4822 130 30621	1N4148
6124	4822 130 82833	1SV228
6140	4822 130 30621	1N4148
6154	4822 130 30621	1N4148
6170	4822 130 30621	1N4148
6174	4822 130 34233	BZX79-B5V1

TRANSISTORS

7105	4822 130 60093	2SA838B
7120	4822 130 60163	2SC1047
7168	5322 130 41983	BC858B(CHIP)
7170	5322 130 42136	BC848C(CHIP)
7171	5322 130 42136	BC848C(CHIP)

INTEGRATED CIRCUITS

7140	4822 209 32701	TEA5712T/N2 (RF IC)
7172	5322 209 11517	PC74HCU04T
7173	4822 209 31998	LC7218M SYNTHESIZER

COILS

5107	4822 157 63835	ANT. COIL MW 2-BAND
5109	4822 156 30947	RF COIL 1,5 TURNS
5120	4822 156 30947	RF COIL 1,5 TURNS
5123	4822 157 60517	110µH 8%
5125	4822 157 61898	0,47µH
5140	4822 158 60511	AM-IF FILTER 450kHz
5142	4822 157 70302	AM-IF FILTER 450kHz
5143	4822 242 70665	CER. FILTER 10,7MHZ
5144	4822 242 70665	CER. FILTER 10,7MHZ
5145	4822 242 81362	CER. DISCRIMINATOR
5170	4822 242 72976	CER.RESONATOR 7,2MHz

RESISTORS

3112	4822 116 52176	10R	5%	0,5W
3119	4822 116 52224	470R	5%	0,5W
3120	4822 116 52289	5k6	5%	0,16W
3132	4822 116 52283	4k7	5%	0,5W
3141	4822 116 52215	220R	5%	0,16W
3148	4822 100 11163	TRIMPOT.100k lin.		
3151	4822 116 52243	1k5	5%	0,16W
3156	4822 116 83864	10k	5%	0,5W
3162	4822 050 11002	1k	5%	0,2W
3163	4822 050 11002	1k	5%	0,2W
3170	4822 116 52283	4k7	5%	0,5W
3173	4822 116 52244	15k	5%	0,5W
3174	4822 116 83864	10k	5%	0,5W
3189	4822 116 52249	1k8	5%	0,16W
3190	4822 116 52249	1k8	5%	0,16W
3191	4822 116 52249	1k8	5%	0,16W
3192	4822 116 52249	1k8	5%	0,16W
3193	4822 116 52256	2k2	5%	0,16W
3194	4822 116 52219	330R	5%	0,5W
3195	4822 116 52219	330R	5%	0,5W

RESISTORS

3197	4822 116 52219	330R	5%	0,5W
3206	4822 116 52215	220R	5%	0,16W

CHIP RESISTORS

3106	4822 051 20104	100k	5%	0,1W
3108	4822 051 20104	100k	5%	0,1W
3121	4822 051 20104	100k	5%	0,1W
3122	4822 051 20471	470R	5%	0,1W
3123	4822 051 20223	22k	5%	0,1W
3128	4822 117 10833	10k	1%	0,1W
3142	4822 051 20222	2k2	5%	0,1W
3144	4822 117 10833	10k	1%	0,1W
3147	4822 051 20184	180k	5%	0,1W
3149	4822 051 20563	56k	5%	0,1W
3153	4822 051 20683	68k	5%	0,1W
3157	4822 051 20273	27k	5%	0,1W
3159	4822 051 20563	56k	5%	0,1W
3167	4822 051 20008	CHIP JUMPER 0805		
3171	4822 051 20101	100R	5%	0,1W
3172	4822 051 20472	4k7	5%	0,1W
3175	4822 051 20104	100k	5%	0,1W
3176	4822 051 20101	100R	5%	0,1W
3183	4822 051 20223	22k	5%	0,1W
3184	4822 051 20223	22k	5%	0,1W
3186	4822 051 20104	100k	5%	0,1W
3188	4822 051 10102	1k	2%	0,25W
3210	4822 051 20008	CHIP JUMPER 0805		
3211	4822 051 10008	CHIP JUMPER1206		
3212	4822 051 10008	CHIP JUMPER1206		
3213	4822 051 10008	CHIP JUMPER1206		
3221	4822 051 20008	CHIP JUMPER 0805		
3222	4822 051 20008	CHIP JUMPER 0805		
3224	4822 051 20008	CHIP JUMPER 0805		
3226	4822 051 20008	CHIP JUMPER 0805		
3228	4822 051 10008	CHIP JUMPER1206		
3229	4822 051 20008	CHIP JUMPER 0805		
3231	4822 051 20008	CHIP JUMPER 0805		
3235	4822 051 20008	CHIP JUMPER 0805		
3236	4822 051 10008	CHIP JUMPER1206		
3237	4822 051 10008	CHIP JUMPER1206		
3240	4822 051 10479	47R		
3241	4822 051 20008	CHIP JUMPER 0805		
3242	4822 051 10008	CHIP JUMPER1206		
3243	4822 051 20008	CHIP JUMPER 0805		
3244	4822 051 20008	CHIP JUMPER 0805		
3246	4822 051 10008	CHIP JUMPER1206		
3247	4822 051 10008	CHIP JUMPER1206		
3248	4822 051 10008	CHIP JUMPER1206		

CAPACITORS

2100	4822 122 33195	100pF	10%	50V
2104	4822 122 33195	100pF	10%	50V
2113	4822 125 50355	4,2-20pF VARIABLE		
2115	4822 125 60101	10pF VARIABLE		
2124	4822 121 51387	10nF	20%	16V
2134	4822 122 33197	1nF	10%	50V
2135	4822 121 70245	560pF	1%	160V
2141	4822 124 40244	2,2µF	20%	63V
2142	4822 124 40242	1µF	20%	63V
2143	4822 124 40239	0,47µF	20%	63V

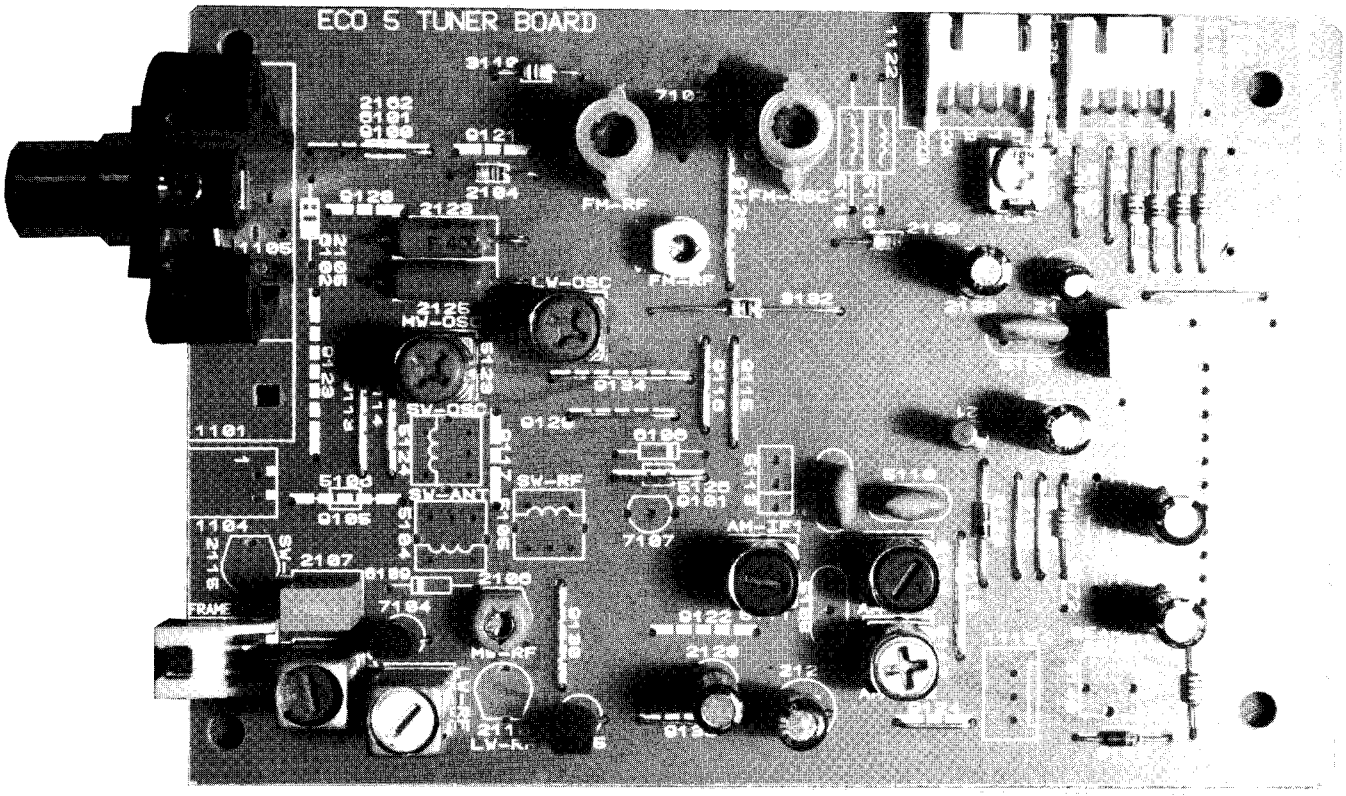
ELECTRICAL PARTSLIST TUNER ECO4VA BOARD

CAPACITORS

2144	4822 124 40239	0,47µF	20%	63V
2150	4822 124 40248	10µF	20%	63V
2151	4822 124 40248	10µF	20%	63V
2160	4822 124 40242	1µF	20%	63V
2161	4822 124 40242	1µF	20%	63V
2170	4822 126 11714	4,7nF	20%	
2172	4822 124 41631	1,5µF	20%	50V
2173	4822 124 40433	47µF	20%	25V
2178	4822 122 33197	1nF	10%	50V
2179	4822 122 33195	100pF	10%	50V
2184	4822 124 41584	100µF	20%	10V

CHIP CAPACITORS

2107	5322 122 34123	1nF	10%	50V
2112	4822 122 33496	100nF	10%	63V
2120	5322 122 32268	470pF	10%	50V
2121	5322 122 32481	15pF	5%	50V
2122	5322 122 34123	1nF	10%	50V
2123	5322 122 34123	1nF	10%	50V
2136	5322 122 31946	27pF	5%	50V
2138	5322 122 32659	33pF	5%	50V
2147	4822 122 33177	10nF	20%	50V
2154	4822 122 33893	18nF	10%	63V
2155	4822 122 33893	18nF	10%	63V
2167	4822 122 33496	100nF	10%	63V
2169	5322 122 31863	330pF	5%	50V
2171	5322 126 10223	4,7nF	10%	63V
2180	5322 122 31946	27pF	5%	50V
2181	4822 122 32139	12pF	5%	63V
2183	4822 122 33496	100nF	10%	63V
2185	4822 122 33496	100nF	10%	63V
2186	5322 122 34123	1nF	10%	50V



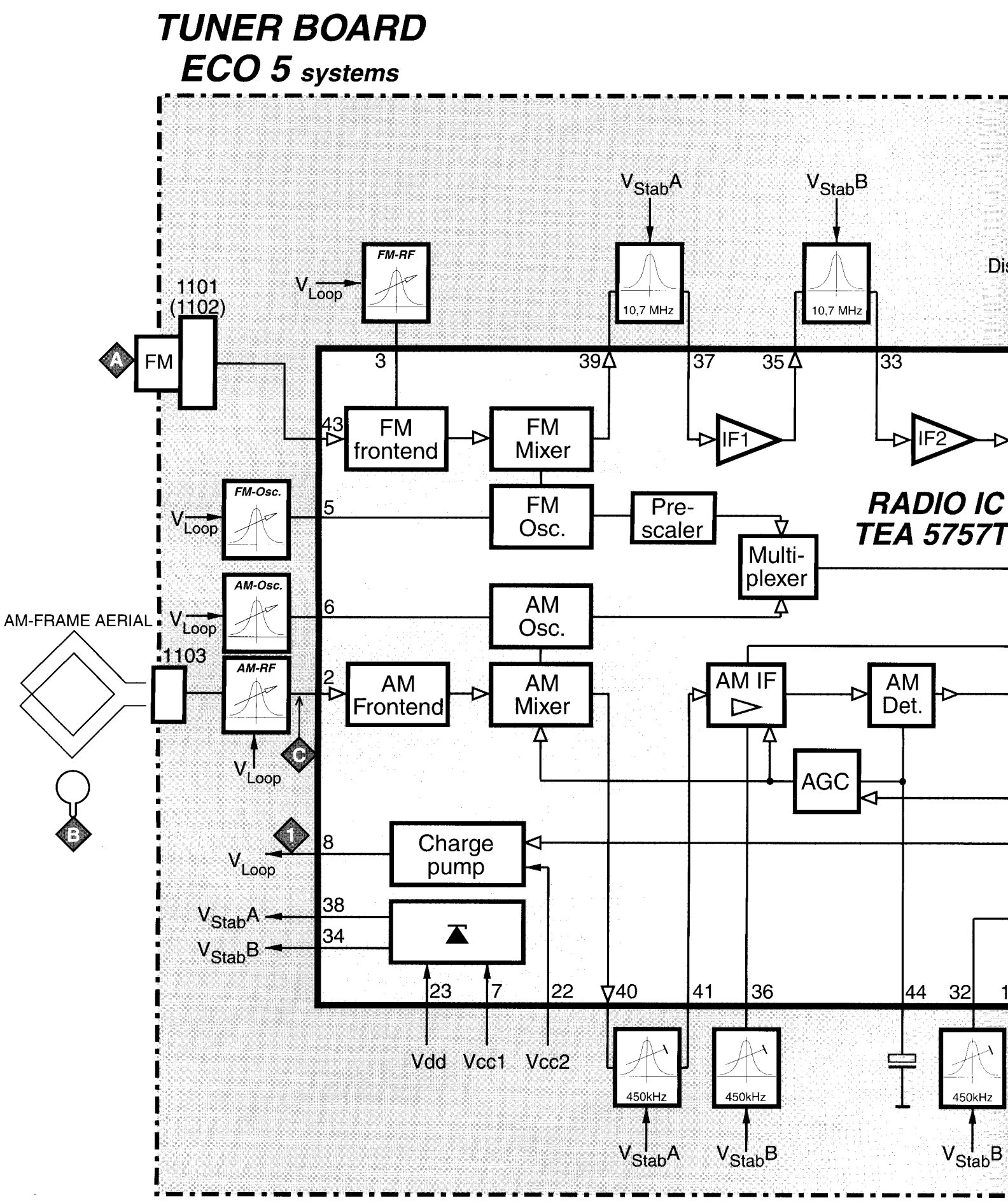
AM-FRAME

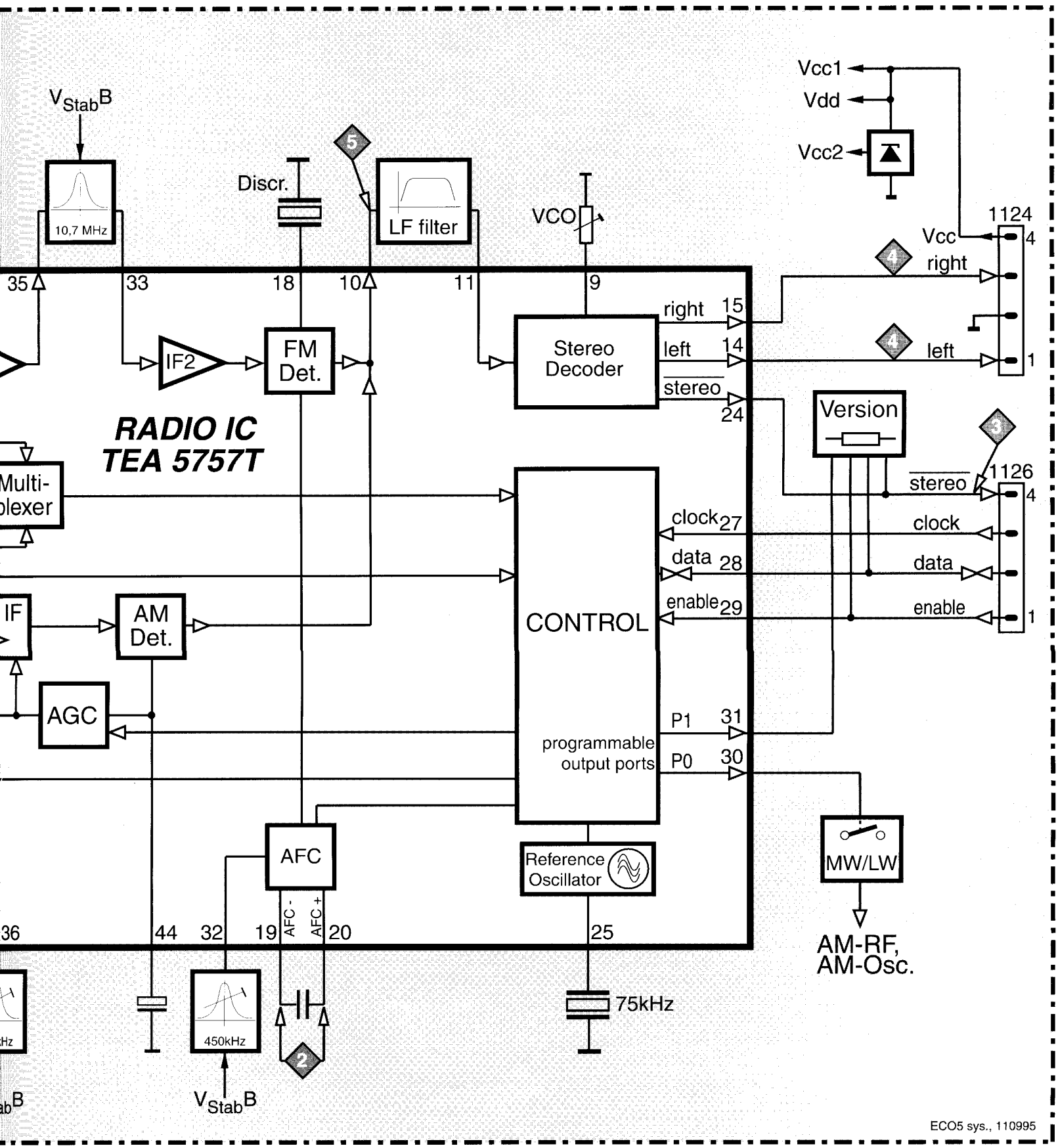
TUNER BOARD ECO5

TABLE OF CONTENTS

Blockdiagram 7B-1
Adjustmant table 7B-2
Component layout 7B-2
Circuit diagram 7B-3
Partslist 7B-4

BLOCKDIAGRAM




RADIO IC
TEA 5757T
VStabB
10,7 MHz
Discr.
LF filter
VCO
Vcc1
Vdd
Vcc2
1124
Vcc
right
left
35
33
18
10
11
9
IF2
FM Det.
Stereo Decoder
right 15
left 14
stereo 24
Version
1126
stereo
clock 27
data 28
enable 29
clock
data
enable
Multi-plexer
IF
AM Det.
AGC
CONTROL
programmable output ports
P1 31
P0 30
AFC
Reference Oscillator
MW/LW
AM-RF, AM-Osc.
AFC -
AFC +
36
44
32
19
20
25
450kHz
75kHz
VStabB
ECO5 sys., 110995

TUNER ADJUSTMENT TABLE (ECO5 FM/MW- and FM/MW/LW - versions with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz			108MHz	5130	1	8V ±0.2V
			87.5MHz	check		4.3V ±0.5V
MW FM/AM-version, 10kHz grid 530 - 1700kHz			1700kHz	5123		8V ±0.2V
			530kHz	check		1.1V ±0.4V
LW 153 - 279kHz			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
MW FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz			1602kHz	5123		8V ±0.2V
			531kHz	check		1.1V ±0.4V
FM RF						
FM 87.5 - 108MHz	108MHz	A mod=1kHz Δf=±22.5kHz	108MHz	2155	4	MAX
	87.5MHz		87.5MHz	5131		
VCO						
FM	98MHz, 1mV continuous wave	A	98MHz	3142	3	152kHz ±1kHz [1]
AM IF						
MW	450kHz connect pin 26 of IC 7101 (AM Osc.) with short wire to ground (pin 4)	C Δf=±15kHz V_{RF} = 3mV	IC 7101 36 100nF 220R	5111	4	max. f_o symmetric
			IC 7101 40 100nF 220R see remark [2]	5112		
AM AFC **MW**		C continuous wave V_{RF} = 10mV		5114	2	0 ± 2 mV DC
AM RF [3]						
MW [4] FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1494kHz	B Δf = ±30kHz V_{RF} as low as possible	1494kHz	2106	4	max. f_o symmetric
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz		1500kHz	2106		
	560kHz		560kHz	5102		

ECO5, 020995

Use service test program. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

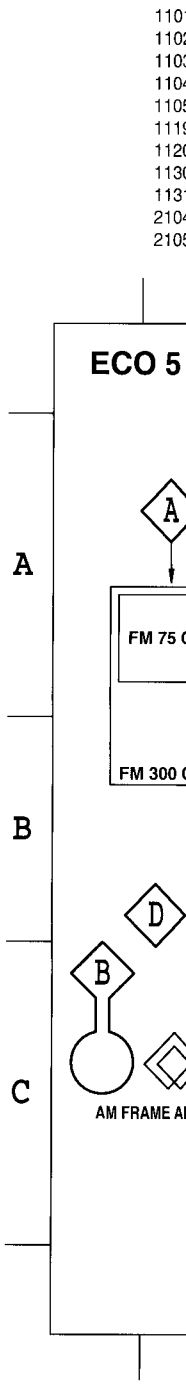
[1] If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

[2] RC network serves for damping the IF-filter while adjusting the other one.

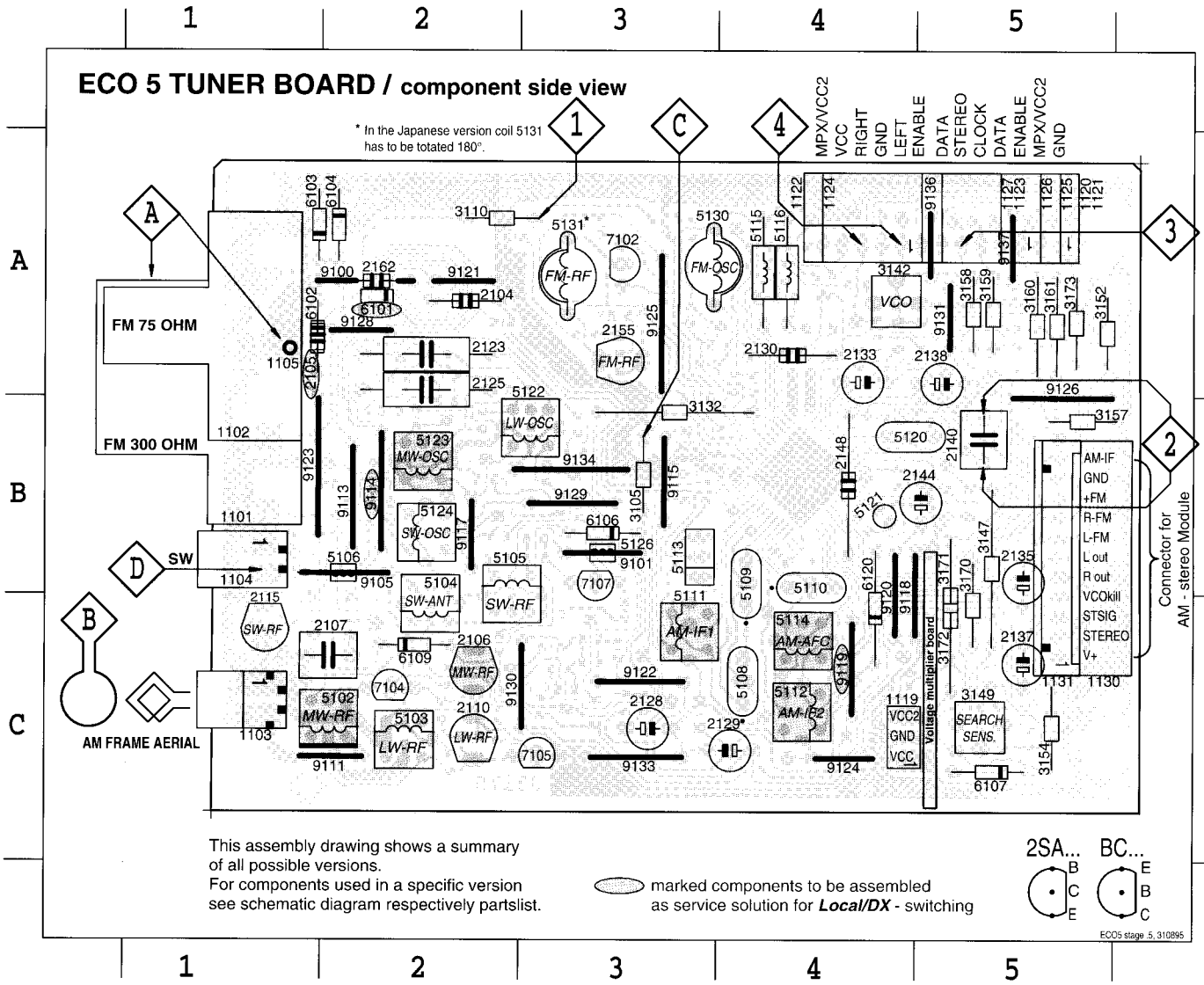
[3] For AM RF adjustments the original frame antenna has to be used !

[4] MW has to be aligned before LW.

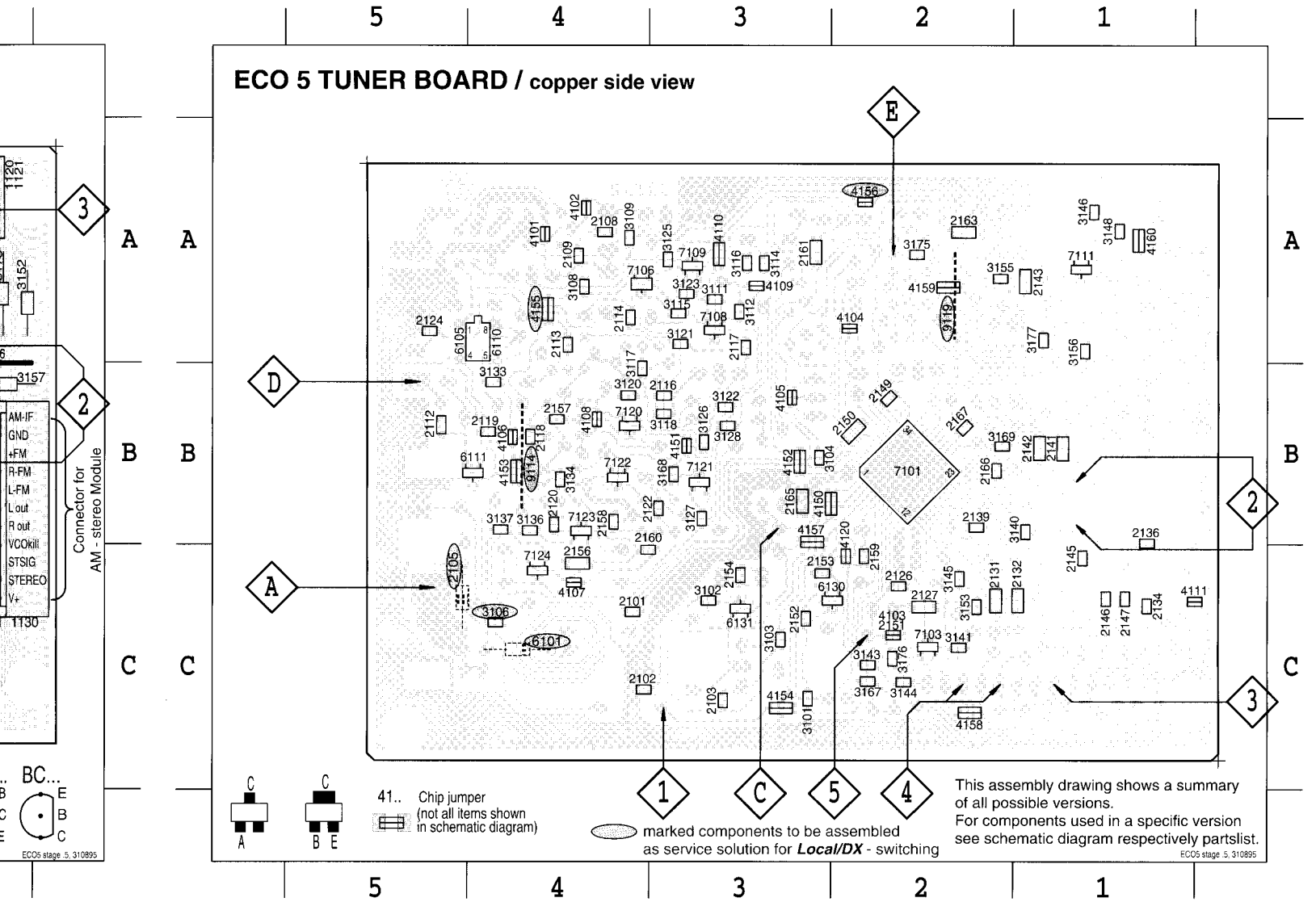
↕ Repeat



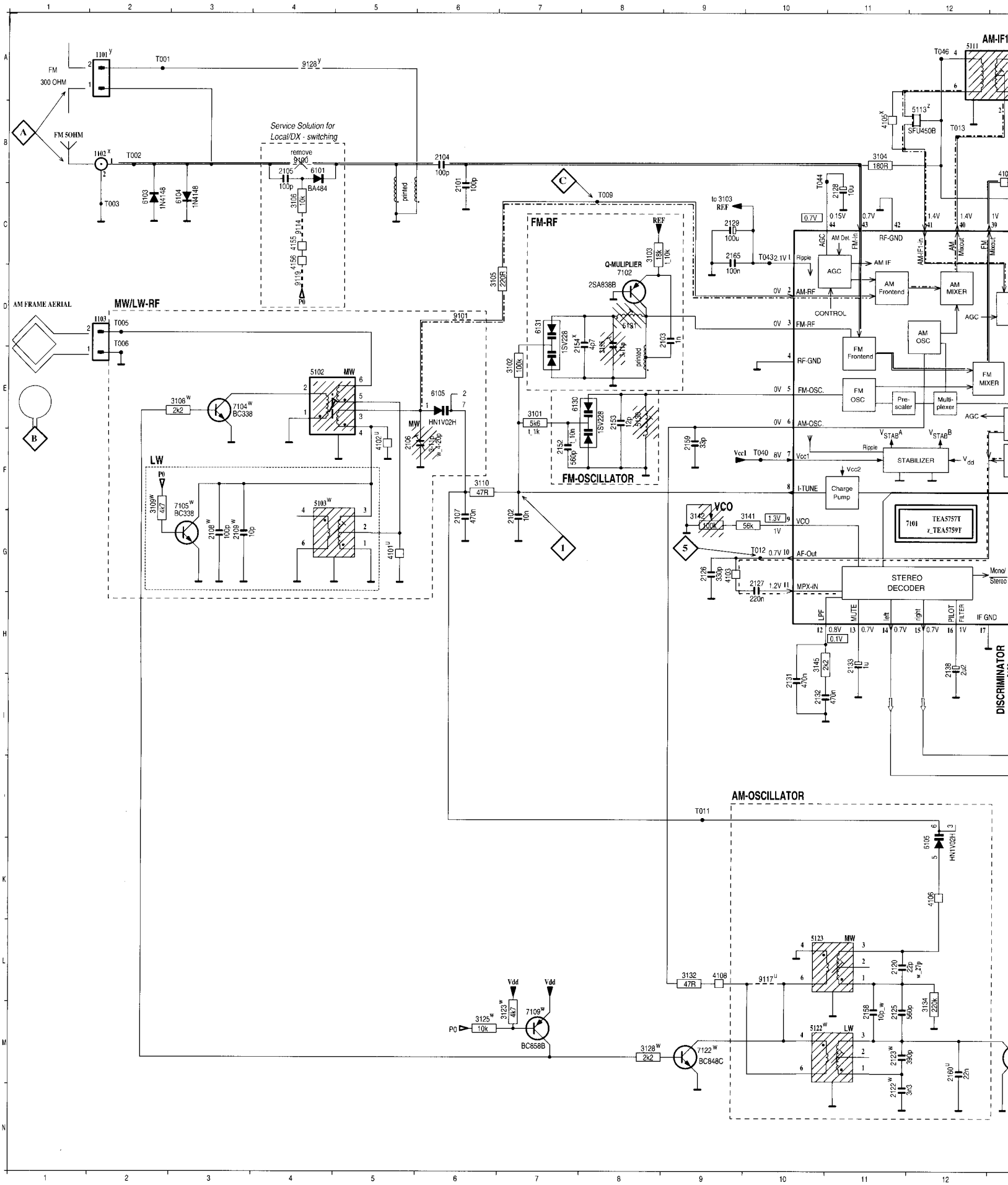
1101 A1	2106 C2	2137 C5	3147 B5	3172 C5	5112 C4	5130 A3	7104 C2	9118 B4	9130 C3	2101 C4
1102 A1	2107 C2	2138 A5	3149 C5	3173 A5	5113 B3	5131 A3	7105 C3	9119 C4	9131 A5	2102 C4
1103 C1	2110 C2	2140 B5	3152 A5	5102 C2	5114 C4	6101 A2	7107 B3	9120 B4	9133 C3	2103 C3
1104 B1	2115 C1	2144 B5	3154 C5	5103 C2	5115 A4	6102 A1	9100 A2	9121 A2	9134 B3	2108 A4
1105 A1	2123 A2	2148 B4	3157 B5	5104 C2	5116 A4	6103 A1	9101 B3	9122 C3	9136 A5	2109 A4
1119 C5	2125 A2	2155 A3	3158 A5	5105 B2	5120 B4	6104 A2	9105 B2	9123 B1	9137 A5	2112 B5
1120 A5	2128 C3	2162 A2	3159 A5	5106 B2	5121 B4	6106 B3	9111 C2	9124 C4		2113 A4
1130 B5	2129 C4	3105 B3	3160 A5	5108 C4	5122 B3	6107 C5	9113 B2	9125 A3		2114 A4
1131 B5	2130 A4	3110 A2	3161 A5	5109 B4	5123 B2	6109 C2	9114 B2	9126 B5		2116 B3
2104 A2	2133 A4	3132 B3	3170 C5	5110 B4	5124 B2	6120 C4	9115 B3	9128 A2		2117 A3
2105 A1	2135 B5	3142 A4	3171 C5	5111 C3	5126 B3	7102 A3	9117 B2	9129 B3		2118 B4

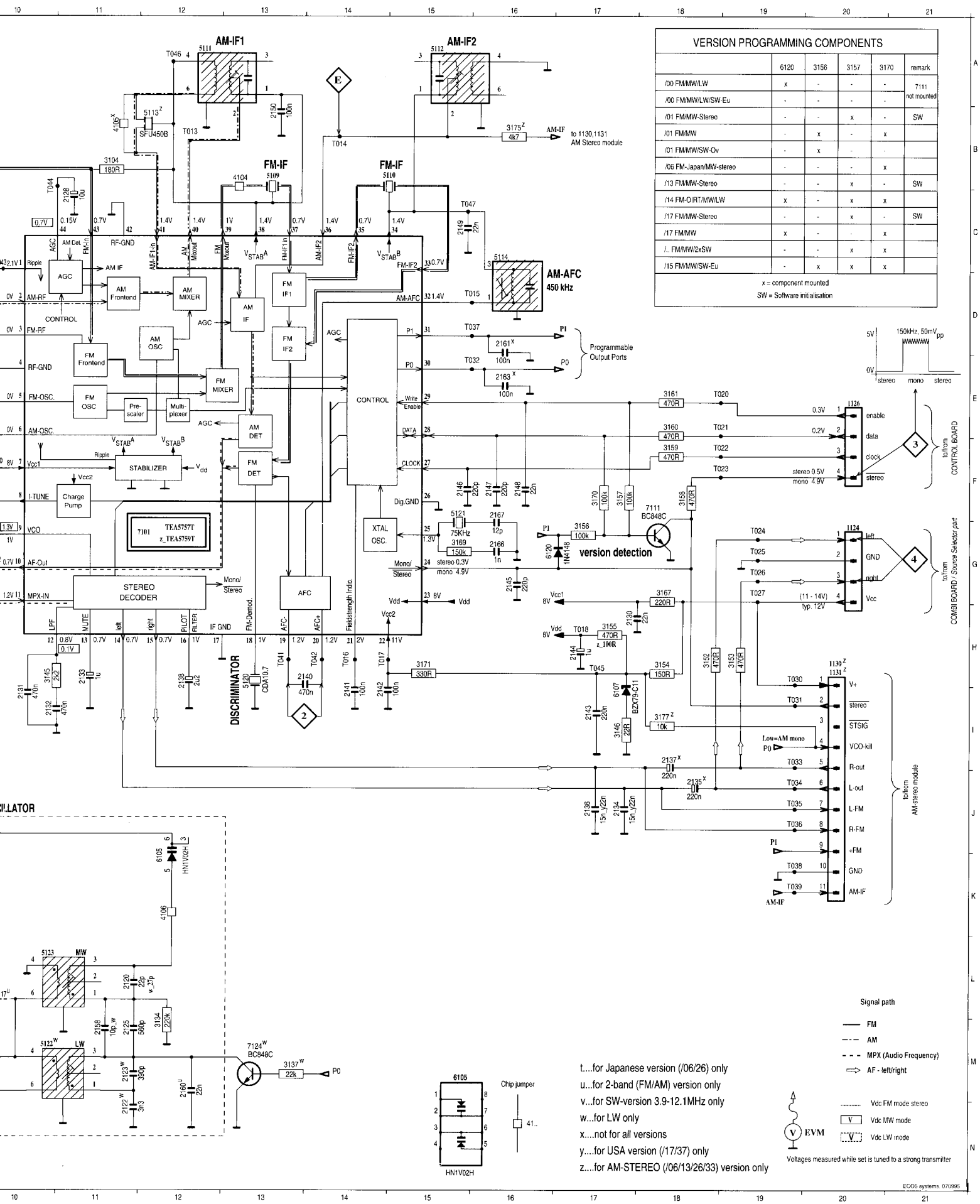


0 C3	2101 C4	2119 B4	2141 B1	2154 C3	3101 C3	3116 A3	3133 B4	3153 C2	4103 C2	4151 B3	6110 A4	7121 B3
1 A5	2102 C4	2120 B4	2142 B1	2156 C4	3102 C3	3117 B4	3134 B4	3155 A2	4104 A2	4152 B3	6111 B4	7122 B4
3 C3	2103 C3	2122 B3	2143 A1	2157 B4	3103 C3	3118 B3	3136 B4	3156 A1	4105 B3	4153 B4	6130 C2	7123 B4
4 B3	2108 A4	2124 A5	2145 C1	2158 B4	3104 B3	3120 B4	3137 B4	3167 C2	4106 B4	4154 C3	6131 C3	7124 C4
6 A5	2109 A4	2126 C2	2146 C1	2159 C2	3106 C4	3121 A3	3140 B1	3168 B3	4107 C4	4155 A4	7101 B2	
7 A5	2112 B5	2127 C2	2147 C1	2160 C4	3108 A4	3122 B3	3141 C2	3169 B2	4108 B4	4156 A2	7103 C2	
	2113 A4	2131 C2	2149 B2	2161 A3	3109 A4	3123 A3	3143 C2	3175 A2	4109 A3	4157 B3	7106 A4	
	2114 A4	2132 C1	2150 B2	2163 A2	3111 A3	3125 A3	3144 C2	3176 C2	4110 A3	4158 C2	7108 A3	
	2116 B3	2134 C1	2151 C2	2165 B3	3112 A3	3126 B3	3145 C2	3177 A1	4111 C1	4159 A2	7109 A3	
	2117 A3	2136 B1	2152 C3	2166 B2	3114 A3	3127 B3	3146 A1	4101 A4	4120 C2	4160 A1	7111 A1	
	2118 B4	2139 B2	2153 C3	2167 B2	3115 A3	3128 B3	3148 A1	4102 A4	4150 B2	6105 A4	7120 B4	



TUNER BOARD ECO5 / Systems




AM-IF1
AM-IF2
FM-IF
FM-IF
AM-AFC
450 kHz
E
T014
AM-IF
to 1130,1131
AM Stereo module
VERSION PROGRAMMING COMPONENTS
/00 FM/MW/LW
/00 FM/MW/LW/SW-Eu
/01 FM/MW-Stereo
/01 FM/MW
/01 FM/MW/SW-Ov
/06 FM-Japan/MW-stereo
/13 FM/MW-Stereo
/14 FM-OIRT/MW/LW
/17 FM/MW-Stereo
/17 FM/MW
/.. FM/MW/2xSW
/15 FM/MW/SW-Eu
7111 not mounted
SW
x = component mounted
SW = Software initialisation
AGC
AM Frontend
AM MIXER
AM IF
FM IF1
FM IF2
AM OSC
FM Frontend
FM MIXER
FM OSC
Pre-scaler
Multi-plexer
AM DET
FM DET
STABILIZER
Charge Pump
CONTROL
XTAL OSC.
STEREO DECODER
AFC
DISCRIMINATOR
7101 TEA5757T z_TEA5759T
Programmable Output Ports
version detection
BC848C
1N4148
BZX79-C11
CDA10.7
HN1V02H
Low=AM mono
enable
data
clock
stereo
left
GND
right
Vcc
V+
stereo
STSIG
VCO-kill
R-out
L-out
L-FM
R-FM
+FM
GND
AM-IF
to/from CONTROL BOARD
to/from COMBI BOARD / Source Selector part
to/from AM-stereo module
150kHz, 50mVpp
stereo
mono
stereo
Signal path
FM
AM
MPX (Audio Frequency)
AF - left/right
Vdc FM mode stereo
Vdc MW mode
Vdc LW mode
EVM
Voltages measured while set is tuned to a strong transmitter
Chip jumper
t....for Japanese version (/06/26) only
u...for 2-band (FM/AM) version only
v...for SW-version 3.9-12.1MHz only
w...for LW only
x....not for all versions
y....for USA version (/17/37) only
z....for AM-STEREO (/06/13/26/33) version only
ECOS systems. 070995

ELECTRICAL PARTSLIST TUNER ECO5 BOARD

MISCELLANEOUS

1101	4822 267 31505	SOCKET 2P CLICKFIT

DIODES

6103	4822 130 30621	1N4148
6104	4822 130 30621	1N4148
6105	4822 130 83075	HN1V02H
6107	4822 130 34488	BZX79-C11
6120	4822 130 30621	1N4148
6130	4822 130 82833	1SV228
6131	4822 130 82833	1SV228

TRANSISTORS

7102	4822 130 60093	2SA838B
7111	5322 130 42136	BC848C(CHIP)

INTEGRATED CIRCUITS

7101	4822 209 90924	TEA5757H/V1,RADIO IC

COILS

5102	4822 157 71634	RF-COIL MW
5109	4822 242 70665	CER. FILTER 10,7MHZ
5110	4822 242 70665	CER. FILTER 10,7MHZ
5111	4822 158 60511	AM-IF FILTER 450kHz
5112	4822 157 70302	AM-IF FILTER 450kHz
5114	4822 157 71637	AM-AFC FILTER 450KHZ
5120	4822 242 82065	CER. DISCRIMINATOR
5121	4822 242 81021	QUARTZ 75kHz
5123	4822 157 60517	110µH 8%
5130	4822 156 30947	RF COIL 1,5 TURNS
5131	4822 156 30947	RF COIL 1,5 TURNS

RESISTORS

3105	4822 116 52215	220R	5%	0,16W
3110	4822 116 52195	47R	5%	0,5W
3132	4822 116 52195	47R	5%	0,5W
3142	4822 100 11163	TRIMPOT.100k lin.		
3152	4822 116 52224	470R	5%	0,5W
3154	4822 116 52211	150R	5%	0,5W
3158	4822 116 52224	470R	5%	0,5W
3159	4822 116 52224	470R	5%	0,5W
3160	4822 116 52224	470R	5%	0,5W
3161	4822 116 52224	470R	5%	0,5W
3170	4822 116 52234	100k	5%	0,5W
3171	4822 116 52219	330R	5%	0,5W

CHIP RESISTORS

3101	4822 051 20562	5k6	5%	0,1W
3102	4822 051 20104	100k	5%	0,1W
3103	4822 051 20183	18k	5%	0,1W
3104	4822 051 20181	180R	5%	0,1W
3134	4822 051 20224	220k	5%	0,1W
3140	4822 051 20008	CHIP JUMPER 0805		
3141	4822 051 20563	56k	5%	0,1W
3145	4822 051 20222	2k2	5%	0,1W
3146	4822 051 20229	22R	5%	0,1W
3153	4822 051 20471	470R	5%	0,1W
3155	4822 051 20471	470R	5%	0,1W
3167	4822 051 20221	220R	5%	0,1W

CHIP RESISTORS

3169	4822 051 20154	150k	5%	0,1W
4101	4822 051 20008	CHIP JUMPER 0805		
4102	4822 051 20008	CHIP JUMPER 0805		
4103	4822 051 20008	CHIP JUMPER 0805		
4104	4822 051 20008	CHIP JUMPER 0805		
4105	4822 051 20008	CHIP JUMPER 0805		
4106	4822 051 20008	CHIP JUMPER 0805		
4108	4822 051 20008	CHIP JUMPER 0805		
4111	4822 051 20008	CHIP JUMPER 0805		
4120	4822 051 20008	CHIP JUMPER 0805		
4150	4822 051 10008	CHIP JUMPER1206		
4152	4822 051 10008	CHIP JUMPER1206		
4153	4822 051 10008	CHIP JUMPER1206		
4154	4822 051 10008	CHIP JUMPER1206		
4157	4822 051 10008	CHIP JUMPER1206		
4158	4822 051 10008	CHIP JUMPER1206		
4159	4822 051 10008	CHIP JUMPER1206		

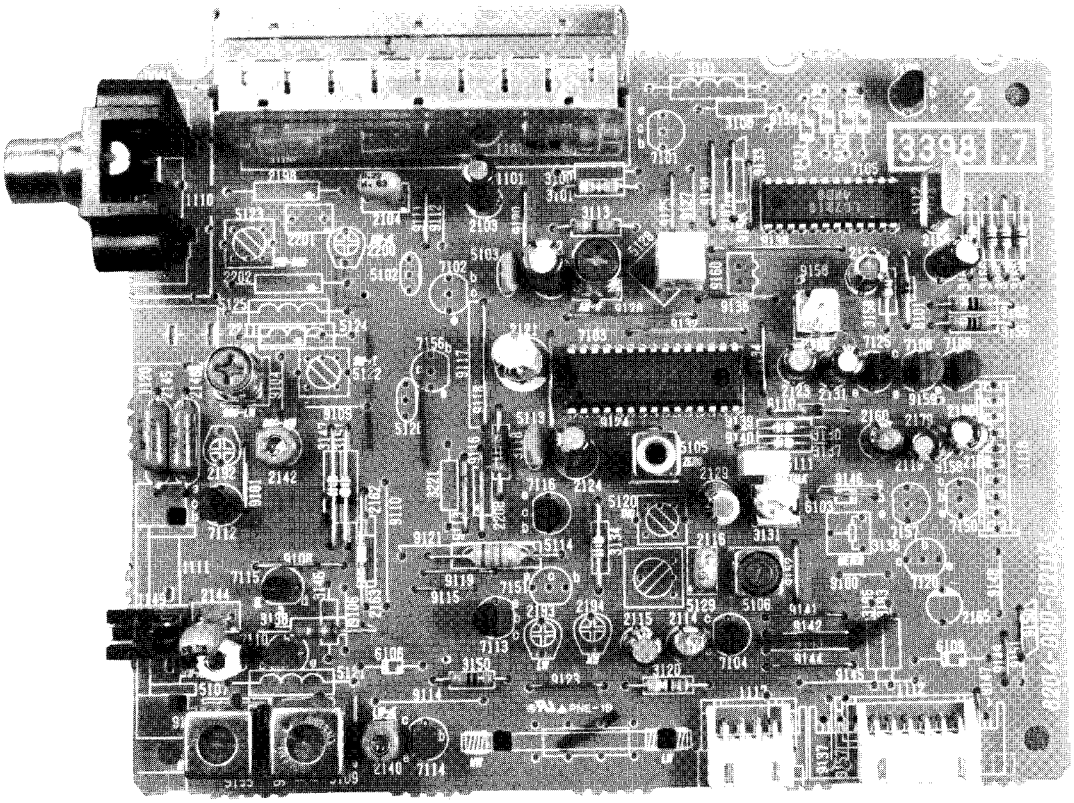
CAPACITORS

2104	4822 122 33195	100pF	10%	50V
2106	4822 125 60101	10pF	VARIABLE	
2107	4822 121 51252	470nF	5%	63V
2125	4822 121 51381	560pF	1%	400V
2128	4822 124 41579	10µF	20%	50V
2129	4822 124 41584	100µF	20%	10V
2130	4822 126 11585	22nF+80/-20%		50V
2133	4822 124 40242	1µF	20%	63V
2135	4822 124 40746	0,22µF	20%	63V
2137	4822 124 40746	0,22µF	20%	63V
2138	4822 124 41576	2,2µF	20%	50V
2140	4822 121 51252	470nF	5%	63V
2144	4822 124 40242	1µF	20%	63V
2148	4822 126 11585	22nF+80/-20%		50V
2155	4822 125 60101	10pF	VARIABLE	

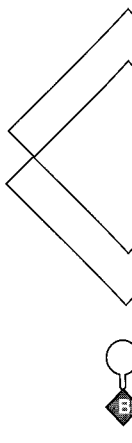
CHIP CAPACITORS

2101	5322 122 32531	100pF	5%	50V
2102	4822 122 33177	10nF	20%	50V
2103	5322 122 34123	1nF	10%	50V
2120	5322 122 32658	22pF	5%	50V
2126	5322 122 31863	330pF	5%	50V
2127	4822 122 32927	220nF	10%	63V
2131	4822 122 33325	470nF	20%	50V
2132	4822 122 33325	470nF	20%	50V
2134	5322 122 32654	22nF	10%	63V
2136	5322 122 32654	22nF	10%	63V
2141	4822 122 31947	100nF	20%	50V
2142	4822 122 31947	100nF	20%	50V
2143	4822 122 32927	220nF	10%	63V
2145	4822 122 33575	220pF	5%	50V
2146	4822 122 33575	220pF	5%	50V
2147	4822 122 33575	220pF	5%	50V
2149	5322 122 32654	22nF	10%	63V
2150	4822 122 31947	100nF	20%	50V
2152	5322 116 80853	560pF	5%	63V
2153	4822 122 32139	12pF	5%	63V
2159	5322 122 32659	33pF	5%	50V
2160	5322 122 32654	22nF	10%	63V
2165	4822 122 31947	100nF	20%	50V
2166	5322 122 34123	1nF	10%	50V

BLOCKD



AM FRAM



TUNER 94 BOARD

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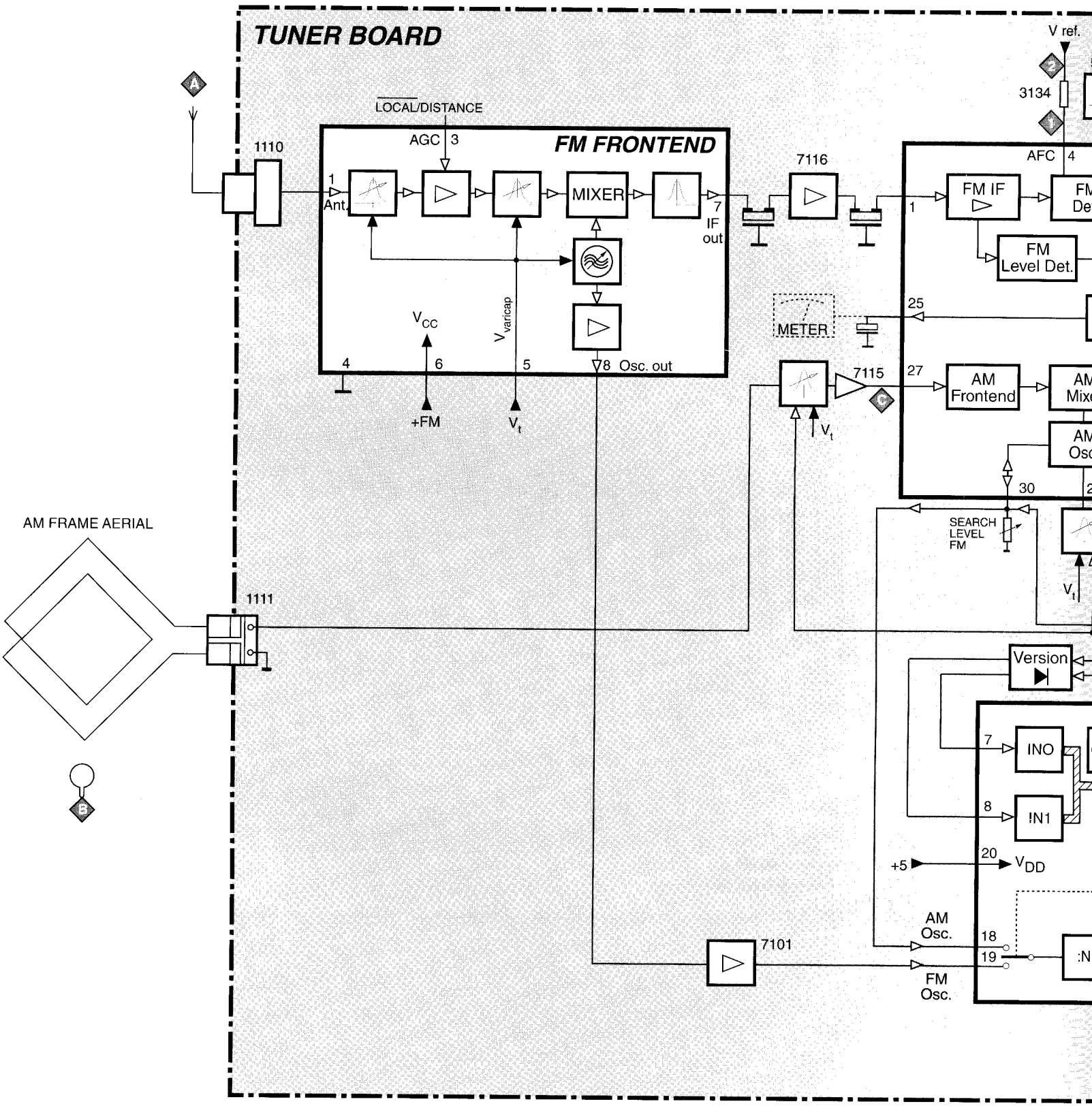
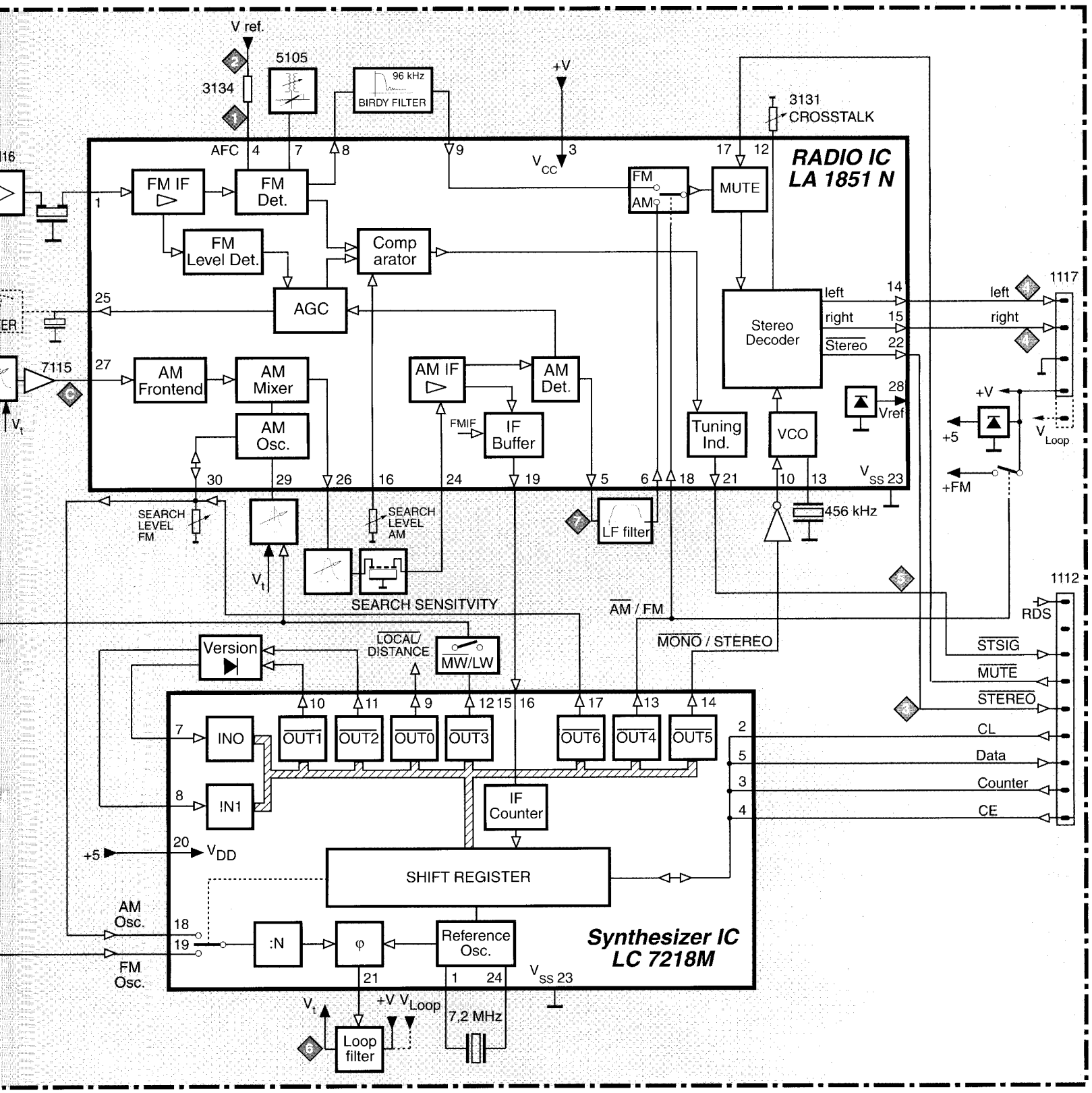
BLOCKDIAGRAM




V ref.
5105
3134
96 kHz
BIRDY FILTER
+V
3131
CROSSTALK
AFC
4
7
8
9
V_{CC}
3
17
12
RADIO IC
LA 1851 N
FM IF
FM Det.
FM
AM
MUTE
FM Level Det.
Comp arator
AGC
25
Stereo Decoder
left
14
right
15
Stereo
22
1117
7115
27
AM Frontend
AM Mixer
AM IF
AM Det.
AM Osc.
FMIF
IF Buffer
Tuning Ind.
VCO
28
Vref
+5
+FM
V_{Loop}
V_t
30
29
26
16
24
19
5
6
18
21
10
13
V_{SS} 23
456 kHz
SEARCH LEVEL FM
SEARCH LEVEL AM
LF filter
SEARCH SENSITVITY
1112
RDS
AM / FM
MONO / STEREO
Version
LOCAL/ DISTANCE
MW/LW
STSIG
MUTE
STEREO
10
11
9
12
15
16
17
13
14
7
INO
OUT1
OUT2
OUT0
OUT3
OUT6
OUT4
OUT5
2
CL
5
Data
3
Counter
4
CE
8
!N1
IF Counter
20
V_{DD}
SHIFT REGISTER
AM Osc.
FM Osc.
18
19
:N
φ
Reference Osc.
Synthesizer IC
LC 7218M
21
1
24
7,2 MHz
Loop filter

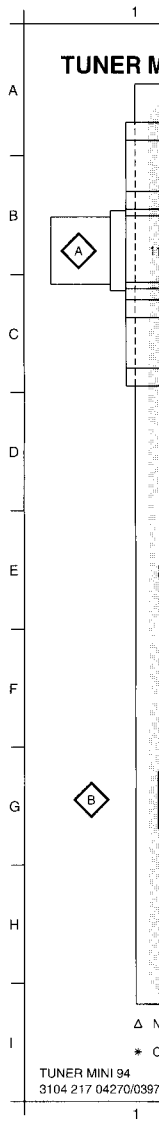
ADJUSTMENT TABLE

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (50kHz grid)			108MHz	check	6	7...9V
			87.5MHz	check		1.3...2V
LW 153 - 279kHz (3kHz grid)			279kHz	5108		8.5V ±0.1V
			153kHz	check		0.7...1.5V
MW 522 - 1611kHz (9kHz grid)			1611kHz	2142		8V ±0.1V
			522kHz	check		0.7...1.7V
FM IF						
FM	98MHz 1mV mod=1kHz Δf=75kHz	A	98MHz	5105	1 2	0V ±20mV
STEREO CROSSTALK						
FM	98MHz 1mV 90% L + 9% pilot	A	98MHz	check	3	low < 1V
				3131	4	right channel min.
SEARCH SENSITIVITY						
FM	98MHz 12µV mod=1kHz Δf=75kHz	A		3125	5	switches just from high to low
AM IF						
MW	1494kHz Δf=10kHz as low as possible	100nF 50R C		5104	7	symmetrical and max. height
AM RF						
LW	155kHz mod=1kHz, 30% AM 270kHz	B*	155kHz	5109	7	MAX
			270kHz	2140		
MW	558kHz mod=1kHz, 30% AM 1494kHz		558kHz	5107		MAX
			1494kHz	2141		

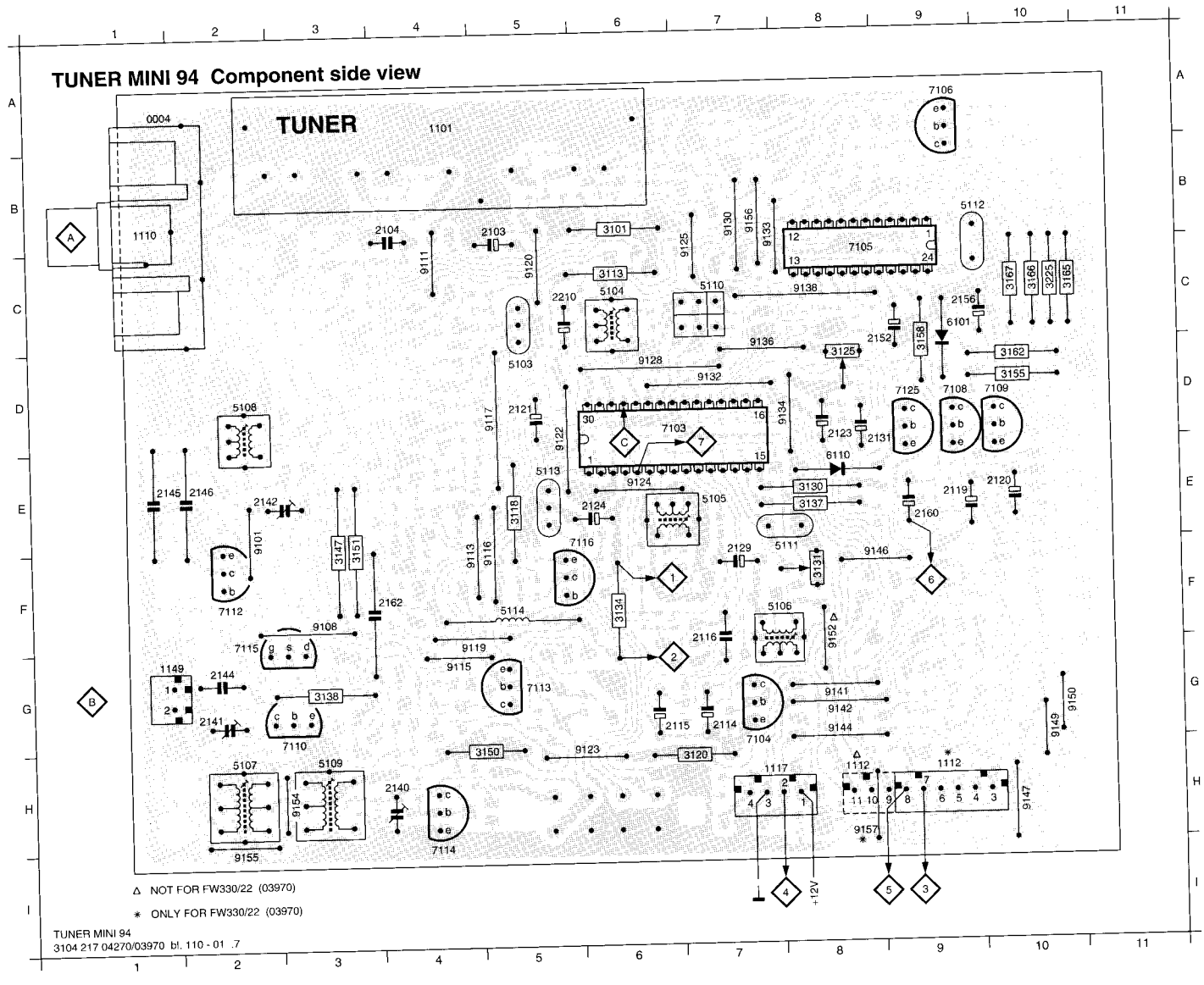
* Signal supplied via frame antenna

↕ Repeat

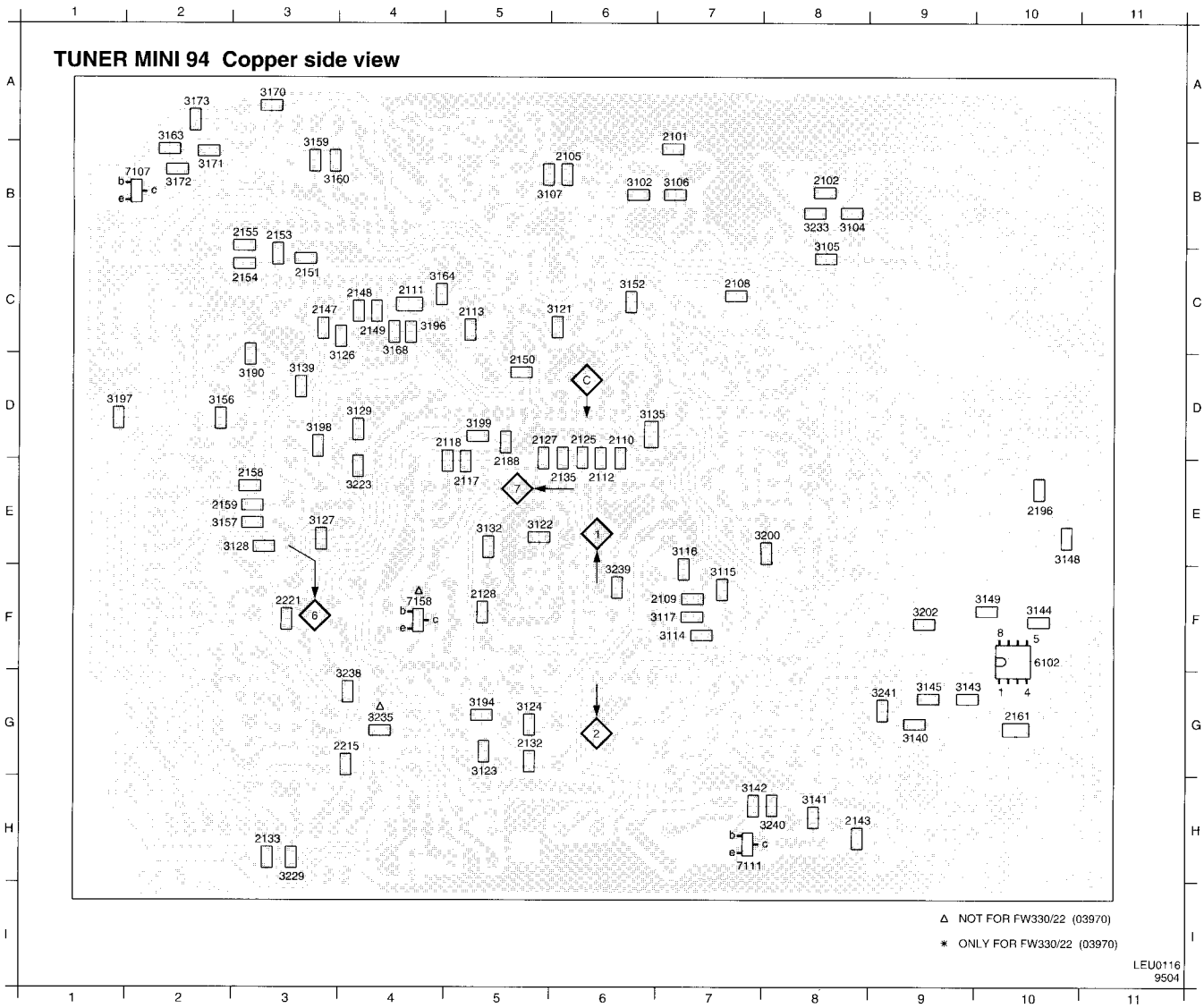
0004	A1	21
1101	A4	21
1110	B1	21
1112	H8	21
1112	H9	21
1117	H7	21
1149	G1	21
2103	B5	21
2104	B4	21
2114	G7	21

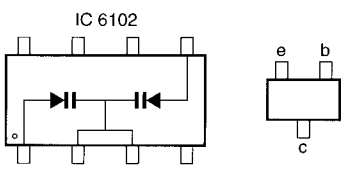


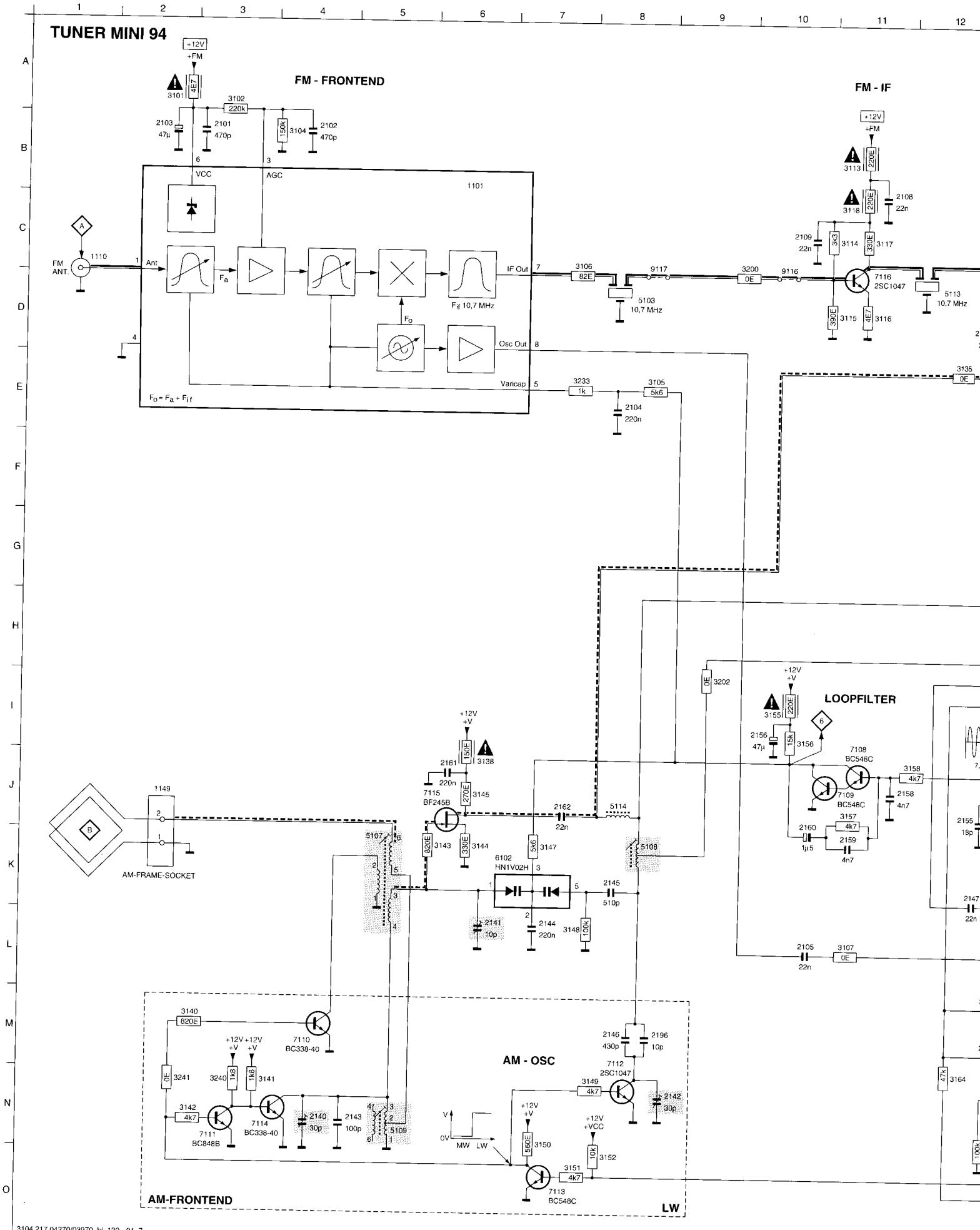
0004	A1	2115	G6	2141	G2	3101	B6	3147	F3	5103	D5	5113	E5	7110	G3	9113	F4	9128	D6	2101	A7	2
1101	A4	2116	F7	2142	E2	3113	C6	3150	H4	5104	C6	5114	F5	7112	F2	9115	G4	9130	B7	2102	B8	2
1110	B1	2119	E9	2144	G2	3118	E5	3151	F3	5105	E7	6101	C9	7113	G5	9116	F5	9132	D7	2105	B6	2
1112	H8	2120	E10	2145	E1	3120	H7	3155	D10	5106	F7	6110	E8	7114	I4	9117	D5	9133	C7	2108	C7	2
1112	H9	2121	D5	2146	E2	3125	D8	3158	D9	5107	H2	7103	D6	7115	F2	9119	G4	9134	D8	2109	F6	2
1117	H7	2123	D8	2152	D8	3130	E8	3162	D10	5108	D2	7104	H7	7116	F5	9120	C5	9136	D7	2110	D6	2
1149	G1	2124	E6	2156	C9	3131	F8	3165	C10	5109	H3	7105	C8	7125	D9	9122	E5	9138	C8	2111	C4	2
2103	B5	2129	F7	2160	E9	3134	F6	3166	C10	5110	C7	7106	A9	9101	F2	9123	H5	9141	G8	2112	E6	2
2104	B4	2131	E8	2162	F3	3137	E8	3167	C10	5111	F7	7108	D9	9108	F3	9124	E6	9142	G8	2113	C5	2
2114	G7	2140	H4	2210	C5	3138	G3	3225	C10	5112	B9	7109	D10	9111	C4	9125	C7	9144	G8	2117	E5	2

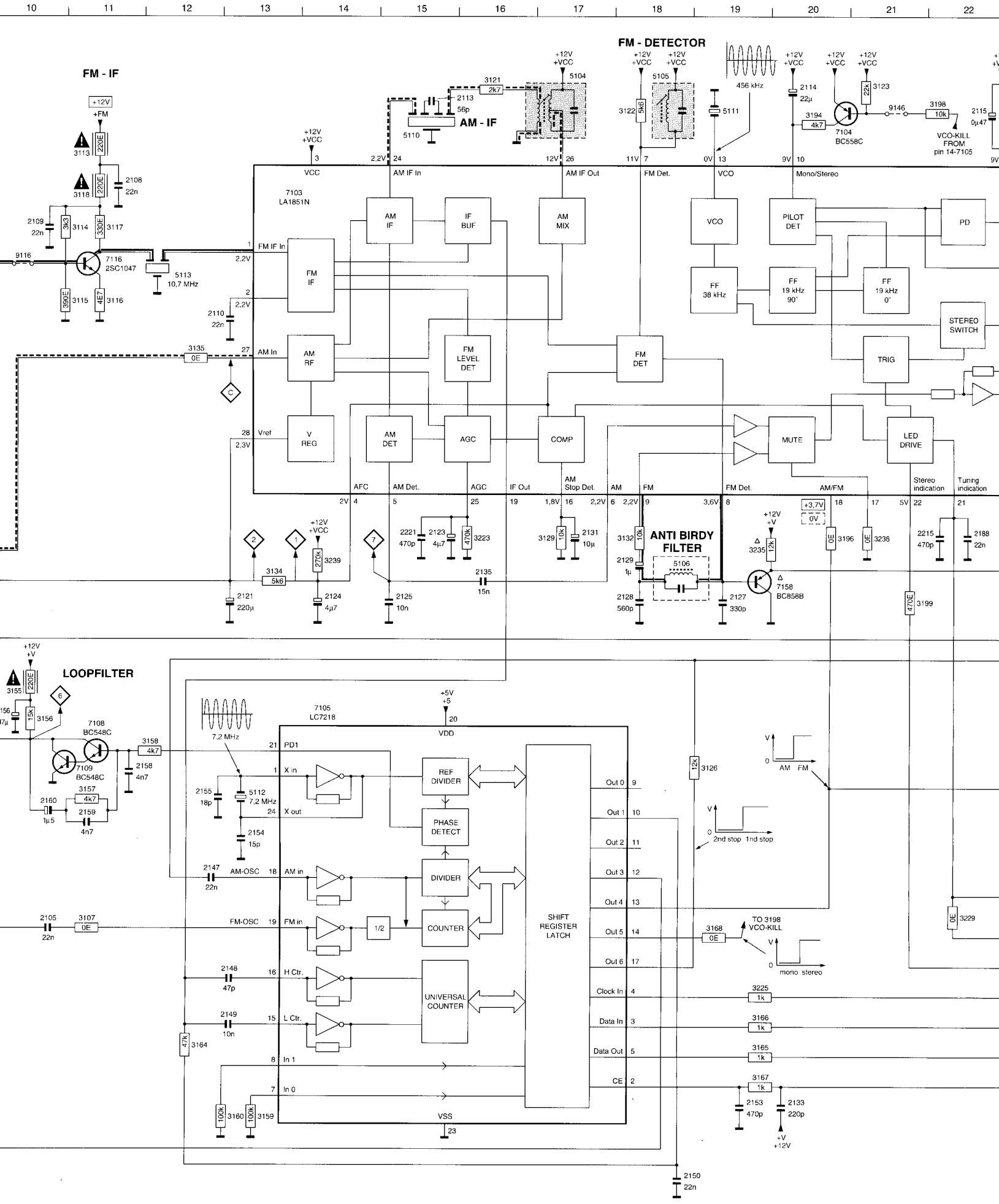


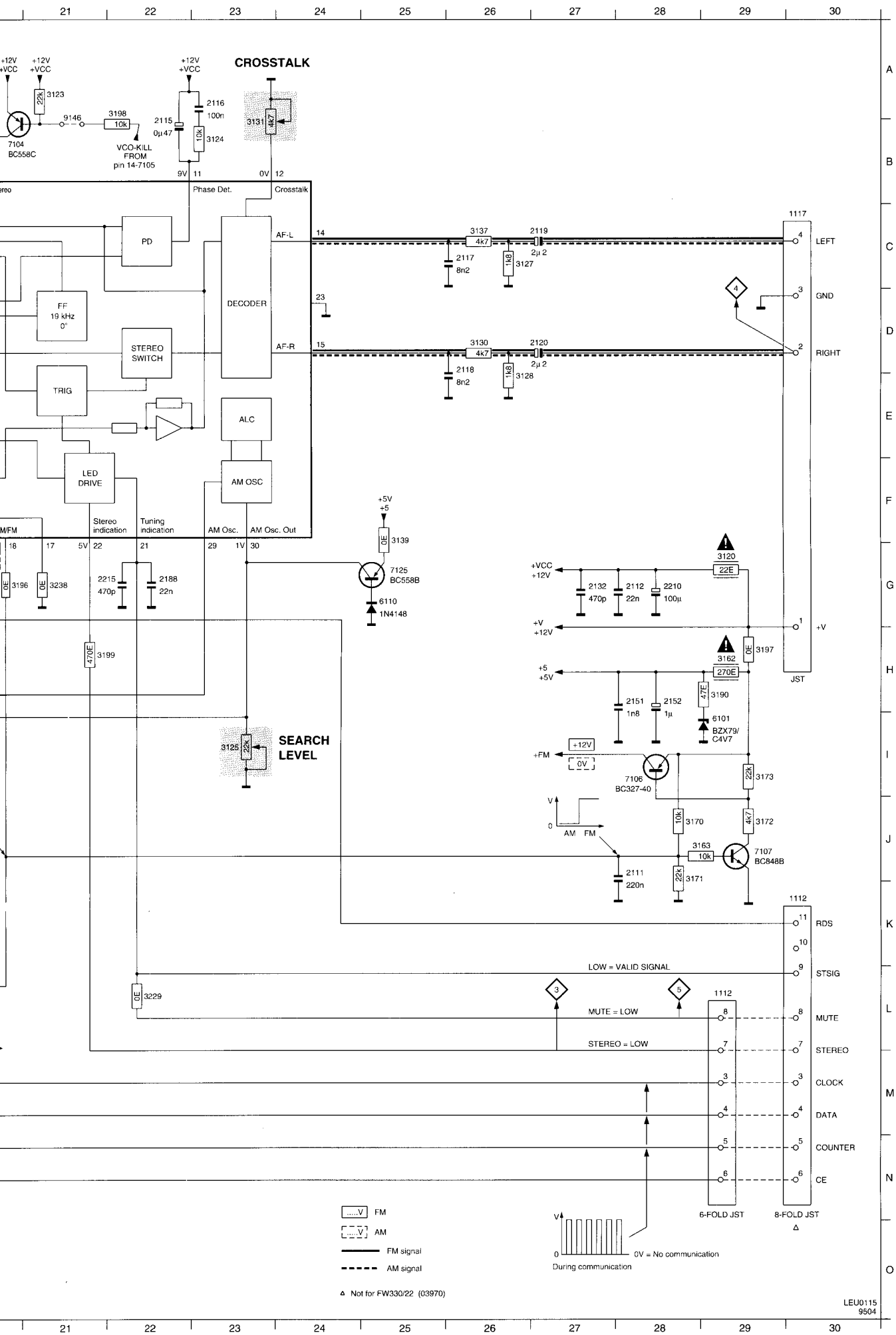
F4	9128	D6	2101	A7	2118	D4	2149	C4	2196	E10	3116	E7	3132	E5	3149	F10	3171	B2	3202	F9	7107	B1
G4	9130	B7	2102	B8	2125	D6	2150	D5	2215	G3	3117	F6	3135	D6	3152	C6	3172	B2	3223	E4	7111	H7
F5	9132	D7	2105	B6	2127	D5	2151	C3	2221	F3	3121	C5	3139	D3	3156	D2	3173	A2	3229	H3	7158	F4
D5	9133	C7	2108	C7	2128	F5	2153	B3	3102	B6	3122	E5	3140	G9	3157	E2	3190	D3	3233	B8		
G4	9134	D8	2109	F6	2132	G5	2154	C2	3104	B8	3123	H5	3141	H8	3159	B3	3194	G5	3235	G4		
C5	9136	D7	2110	D6	2133	H3	2155	B2	3105	C8	3124	G5	3142	H7	3160	B3	3196	C4	3238	G3		
E5	9138	C8	2111	C4	2135	E5	2158	E3	3106	B7	3126	D3	3143	G9	3163	A2	3197	D1	3239	F6		
H5	9141	G8	2112	E6	2143	H8	2159	E2	3107	B5	3127	E3	3144	F10	3164	C4	3198	D3	3240	H7		
E6	9142	G8	2113	C5	2147	C3	2161	G10	3114	F7	3128	E2	3145	G9	3168	D4	3199	D5	3241	G9		
C7	9144	G8	2117	E5	2148	C4	2188	E5	3115	F7	3129	D4	3148	E10	3170	A3	3200	E7	6102	F10		






TUNER MINI 94
FM - FRONTEND
FM - IF
LOOPFILTER
AM - OSC
AM-FRONTEND
LW
AM-FRAME-SOCKET
1101
1110
FM ANT
Ant
Fa
IF Out
Fif 10,7 MHz
Fo
Osc Out
Varicap
Fo = Fa + Fif
VCC
AGC
+12V
+FM
+V
+VCC
3101 4E7
3102 220k
2103 47µ
2101 470p
150k 3104
2102 470p
3106 82E
9117
5103 10,7 MHz
3200 0E
9116
7116 2SC1047
3113 220E
3118 220E
2108 22n
2109 22n
3k3 3114
330E 3117
390E 3115
4E7 3116
5113 10,7 MHz
3135 0E
3233 1k
3105 5k6
2104 220n
3202 0E
3155 220E
2156 47µ
15k 3156
7108 BC548C
7109 BC548C
3158 4k7
2158 4n7
3157 4k7
2160 1µ5
2159 4n7
2155 18p
2147 22n
2105 22n
3107 0E
1149
2161 220n
7115 BF245B
150E 3138
270E 3145
2162 22n
5114
820E 3143
330E 3144
5K6 3147
5107
5108
6102 HN1V02H
2145 510p
2141 10p
2144 220n
3148 100k
3140 820E
7110 BC338-40
3241 0E
3240 1k8
3141 1k8
3142 4k7
7111 BC848B
7114 BC338-40
2140 30p
2143 100p
5109
2146 430p
2196 10p
7112 2SC1047
3149 4k7
2142 30p
MW LW
560E 3150
3151 4k7
10k 3152
7113 BC548C
47k 3164
100k
3104 217 04270/03970 bl. 130 - 01.7


FM - IF
FM - DETECTOR
AM - IF
LOOPFILTER
ANTI BIRDY FILTER
7103 LA1851N
7105 LC7218
7116 2SC1047
7104 BC558C
7107 BC548C
7108 BC548C
7109 BC548C
7158 BC858B
5113 10,7 MHz
5110
5112 7,2 MHz
7,2 MHz
456 kHz
VCC
AM IF In
AM IF Out
FM Det.
VCO
Mono/Stereo
FM IF In
AM In
Vref
AFC
AM Det.
AGC
IF Out
AM Stop Det.
AM
FM
FM Det.
AM/FM
Stereo indication
Tuning indication
AM IF
IF BUF
AM MIX
VCO
PILOT DET
PD
FM IF
FF 38 kHz
FF 19 kHz 90°
FF 19 kHz 0°
STEREO SWITCH
AM RF
FM LEVEL DET
FM DET
TRIG
V REG
AM DET
AGC
COMP
MUTE
LED DRIVE
VDD
VSS
PD1
X in
X out
AM-OSC
AM in
FM-OSC
FM in
H Ctr.
L Ctr.
In 1
In 0
REF DIVIDER
PHASE DETECT
DIVIDER
COUNTER
1/2
UNIVERSAL COUNTER
SHIFT REGISTER LATCH
Out 0
Out 1
Out 2
Out 3
Out 4
Out 5
Out 6
Clock In
Data In
Data Out
CE
2nd stop
1nd stop
mono
stereo
TO 3198 VCO-KILL
VCO-KILL FROM pin 14-7105



1101	B6	3196	G20
1110	C1	3197	H29
1112	L29	3198	A22
1112	K30	3199	H21
1117	C30	3200	C9
1149	J2	3202	I9
2101	B3	3223	G16
2102	B4	3225	M19
2103	B2	3229	L22
2104	E8	3233	E7
2105	L10	3235	G19
2108	B11	3238	G21
2109	C10	3239	G14
2110	D12	3240	N3
2111	J28	3241	N2
2112	G28	5103	D8
2113	A15	5104	A17
2114	A20	5105	A18
2115	B22	5106	G18
2116	A23	5107	K5
2117	C26	5108	K8
2118	D26	5109	N5
2119	C26	5110	B15
2120	D26	5111	B19
2121	H13	5112	J13
2123	G15	5113	D12
2124	H14	5114	J8
2125	H15	6101	I29
2127	H19	6102	K6
2128	H18	6110	G25
2129	G18	7103	C13
2131	G17	7104	B20
2132	G27	7105	I14
2133	N20	7106	I28
2135	G16	7107	J29
2140	N4	7108	I11
2141	L6	7109	J11
2142	N9	7110	M4
2143	N5	7111	N3
2144	L7	7112	M8
2145	K8	7113	O7
2146	M8	7114	N3
2147	K12	7115	J5
2148	M12	7116	C11
2149	M12	7125	G25
2150	O18	7158	H20
2151	H28	9116	C10
2152	H28	9117	C8
2153	N19	9146	B21
2154	K13		
2155	J12		
2156	I10		
2158	J11		
2159	K11		
2160	J10		
2161	J6		
2162	J7		
2188	G22		
2196	M8		
2210	G28		
2215	G21		
2221	G15		
3101	A2		
3102	A3		
3104	B4		
3105	E8		
3106	C7		
3107	L11		
3113	B11		
3114	C11		
3115	D11		
3116	D11		
3117	C11		
3118	C11		
3120	G29		
3121	A16		
3122	B18		
3123	A21		
3124	B23		
3125	I23		
3126	J19		
3127	C26		
3128	E26		
3129	G17		
3130	D26		
3131	B23		
3132	G18		
3134	G13		
3135	E12		
3137	C26		
3138	J6		
3139	G25		
3140	M2		
3141	N3		
3142	N2		
3143	K6		
3144	K6		
3145	J6		
3147	K7		
3148	L7		
3149	N7		
3150	N7		
3151	O7		
3152	O8		
3155	I10		
3156	I10		
3157	J11		
3158	J11		
3159	N13		
3160	N13		
3162	H29		
3163	J28		
3164	N12		
3165	N19		
3166	M19		
3167	N19		
3168	L19		
3170	J28		
3171	K28		
3172	J29		
3173	I29		
3190	H29		
3194	B20		

ELECTRICAL PARTSLIST TUNER 94 BOARD

MISCELLANEOUS

1101	4822 210 10492	FRONTEND ASSY /02/08
1110	4822 267 10283	SOCKET COAX IEC 75R

DIODES

6101	4822 130 34174	BZX79-B4V7
6102	4822 130 83075	HN1V02H
6110	4822 130 30621	1N4148

TRANSISTORS

7104	5322 130 60068	BC558C
7106	4822 130 41327	BC327-40
7107	5322 130 41982	BC848 (CHIP)
7108	4822 130 44196	BC548C
7109	4822 130 44196	BC548C
7110	5322 130 44779	BC338-40
7111	5322 130 41982	BC848 (CHIP)
7112	4822 130 60163	2SC1047
7113	4822 130 44196	BC548C
7114	5322 130 44779	BC338-40
7115	4822 130 41024	BF245B
7116	4822 130 60163	2SC1047
7125	4822 130 44197	BC558B
7158	5322 130 41983	BC858B(CHIP)

INTEGRATED CIRCUITS

7103	4822 209 31001	LA1851N
7105	4822 209 30178	LC7218

COILS

5103	4822 242 81249	CER. FILTER 10,7MHz
5104	4822 157 63029	AM IF COIL
5105	4822 157 63904	Q-DETECION COIL
5106	4822 157 71661	ANTI-BIRDY FILTER
5107	4822 157 71094	ANT. COIL MW, 3-BAND
5108	4822 157 63912	OSC.COIL AM 3-BAND
5109	4822 157 71093	ANT. COIL LW
5110	4822 242 71878	CERAM.FILTER 450kHz
5111	4822 242 81248	CERAM. RES. 19kHz
5112	4822 242 72976	CER.RESONATOR 7,2MHz
5113	4822 242 81249	CER. FILTER 10,7MHz
5114	4822 157 51503	560µH

RESISTORS

3101	4822 052 10478	4R7	5%	NFR
3113	4822 053 10221	220R	5%	1W
3118	4822 050 22201	220R	2%	0,25W
3120	4822 052 10229	22R	5%	0,33W
3125	4822 100 11213	22k	30%	POT.
3130	4822 116 52283	4k7	5%	0,5W
3131	4822 100 11319	4k7		trimpot.
3134	4822 116 52289	5k6	5%	0,16W
3137	4822 116 52283	4k7	5%	0,5W
3138	4822 116 83922	150R	5%	1W
3147	4822 116 52289	5k6	5%	0,16W
3150	4822 050 25601	560R	1%	0,6W
3151	4822 116 52283	4k7	5%	0,5W
3155	4822 050 22201	220R	2%	0,25W
3158	4822 116 52283	4k7	5%	0,5W

RESISTORS

3162	4822 050 22701	270R	1%	0,6W
3165	4822 050 11002	1k	5%	0,2W
3166	4822 050 11002	1k	5%	0,2W
3167	4822 050 11002	1k	5%	0,2W
3225	4822 050 11002	1k	5%	0,2W

CHIP RESISTORS

3102	4822 051 20224	220k	5%	0,1W
3104	4822 051 20154	150k	5%	0,1W
3105	4822 051 20562	5k6	5%	0,1W
3106	4822 051 20829	82R	5%	0,1W
3107	4822 051 20008	CHIP JUMPER 0805		
3114	4822 051 20332	3k3	5%	0,1W
3115	4822 051 20391	390R	5%	0,1W
3116	4822 051 20478	4R7	5%	0,1W
3117	4822 051 20331	330R	5%	0,1W
3121	4822 051 20272	2k7	5%	0,1W
3122	4822 051 20562	5k6	5%	0,1W
3123	4822 051 20223	22k	5%	0,1W
3124	4822 117 10833	10k	1%	0,1W
3126	4822 051 20123	12k	2%	0,1W
3127	4822 051 20182	1k8	5%	0,1W
3128	4822 051 20182	1k8	5%	0,1W
3129	4822 117 10833	10k	1%	0,1W
3132	4822 117 10833	10k	1%	0,1W
3133	4822 051 20008	CHIP JUMPER 0805		
3135	4822 051 10008	CHIP JUMPER1206		
3139	4822 051 20008	CHIP JUMPER 0805		
3140	4822 051 20821	820R	5%	0,1W
3141	4822 051 20182	1k8	5%	0,1W
3142	4822 051 20472	4k7	5%	0,1W
3143	4822 051 20821	820R	5%	0,1W
3144	4822 051 20331	330R	5%	0,1W
3145	4822 051 20271	270R	5%	0,1W
3148	4822 051 20104	100k	5%	0,1W
3149	4822 051 20472	4k7	5%	0,1W
3152	4822 117 10833	10k	1%	0,1W
3156	4822 051 20153	15k	5%	0,1W
3157	4822 051 20472	4k7	5%	0,1W
3159	4822 051 20104	100k	5%	0,1W
3160	4822 051 20104	100k	5%	0,1W
3163	4822 117 10833	10k	1%	0,1W
3164	4822 051 10473	47k	2%	0,25W
3164	4822 051 20473	47k	5%	0,1W
3168	4822 051 20008	CHIP JUMPER 0805		
3170	4822 117 10833	10k	1%	0,1W
3171	4822 051 20223	22k	5%	0,1W
3172	4822 051 20472	4k7	5%	0,1W
3173	4822 051 20223	22k	5%	0,1W
3190	4822 051 20479	47R	5%	0,1W
3194	4822 051 20472	4k7	5%	0,1W
3196	4822 051 20008	CHIP JUMPER 0805		
3197	4822 051 20008	CHIP JUMPER 0805		
3198	4822 117 10833	10k	1%	0,1W
3199	4822 051 20471	470R	5%	0,1W
3200	4822 051 20008	CHIP JUMPER 0805		
3202	4822 051 20008	CHIP JUMPER 0805		
3223	4822 051 20474	470k	5%	0,1W
3229	4822 051 20008	CHIP JUMPER 0805		
3233	4822 051 10102	1k	2%	0,25W
3235	4822 051 20123	12k	2%	0,1W

ELECTRICAL

CHIP RESIST

3236	4822 0
3238	4822 0
3239	4822 0
3240	4822 0
3241	4822 0

CAPACITORS

2103	4822 1
2104	4822 1
2114	5322 1
2115	4822 1
2116	5322 1
2119	4822 1
2120	4822 1
2121	4822 1
2123	4822 1
2124	4822 1
2129	4822 1
2131	4822 1
2140	4822 1
2141	4822 1
2142	4822 1
2144	4822 1
2145	4822 1
2146	4822 1
2152	4822 1
2156	4822 1
2160	4822 1
2162	4822 1
2210	4822 1

CHIP CAPACI

2101	5322 1
2102	5322 1
2105	5322 1
2108	5322 1
2109	5322 1
2110	5322 1
2111	4822 1
2112	5322 1
2113	5322 1
2117	4822 1
2118	4822 1
2125	4822 1
2126	4822 1
2127	5322 1
2128	5322 1
2132	5322 1
2133	5322 1
2135	4822 1
2143	5322 1
2147	5322 1
2148	5322 1
2149	4822 1
2150	5322 1
2151	5322 1
2151	4822 1
2153	5322 1
2154	5322 1
2155	5322 1
2158	5322 1
2159	5322 1

ELECTRICAL PARTSLIST TUNER 94 BOARD

CHIP RESISTORS

3236	4822 051 20008	CHIP JUMPER 0805		
3238	4822 051 20008	CHIP JUMPER 0805		
3239	4822 051 20274	270k	5%	0,1W
3240	4822 051 20182	1k8	5%	0,1W
3241	4822 051 20008	CHIP JUMPER 0805		

CAPACITORS

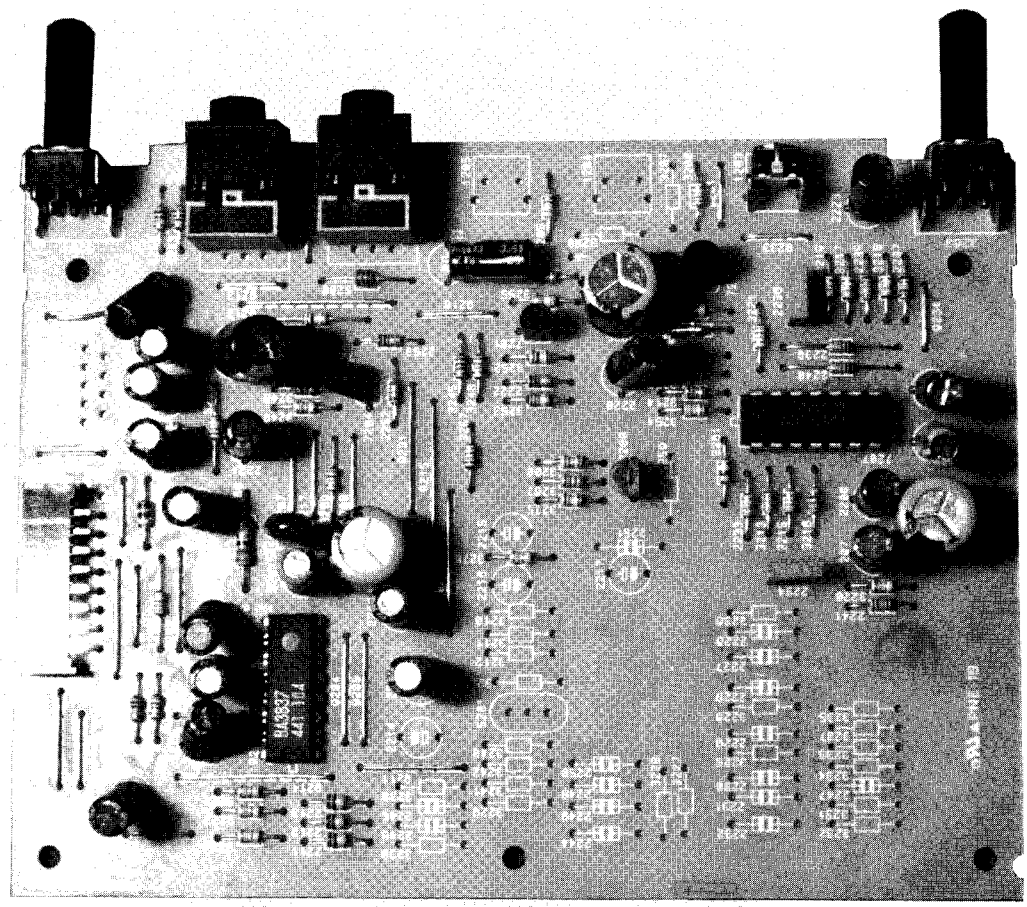
2103	4822 124 40433	47µF	20%	25V
2104	4822 121 42408	220nF	5%	63V
2114	5322 124 41431	22µF	20%	25V
2115	4822 124 40239	0,47µF	20%	63V
2116	5322 121 42386	100nF	5%	63V
2119	4822 124 40244	2,2µF	20%	63V
2120	4822 124 40244	2,2µF	20%	63V
2121	4822 124 40196	220µF	20%	16V
2123	4822 124 40246	4,7µF	20%	63V
2124	4822 124 40246	4,7µF	20%	63V
2129	4822 124 40242	1µF	20%	63V
2131	4822 124 40248	10µF	20%	63V
2140	4822 125 60102	30pF		VARIABLE
2141	4822 125 60101	10pF		VARIABLE
2142	4822 125 60102	30pF		VARIABLE
2144	4822 121 42408	220nF	5%	63V
2145	4822 121 51263	510pF	1%	400V
2146	4822 121 70082	430pF	1%	400V
2152	4822 124 40242	1µF	20%	63V
2156	4822 124 40433	47µF	20%	25V
2160	4822 124 41631	1,5µF	20%	50V
2162	4822 126 11585	22nF	+80/-20%	50V
2210	4822 124 41643	100µF	20%	16V

CHIP CAPACITORS

2101	5322 122 34099	470pF	10%	63V
2102	5322 122 32268	470pF	10%	50V
2105	5322 122 32654	22nF	10%	63V
2108	5322 122 32654	22nF	10%	63V
2109	5322 122 32654	22nF	10%	63V
2110	5322 122 32654	22nF	10%	63V
2111	4822 122 32927	220nF	10%	63V
2112	5322 122 32654	22nF	10%	63V
2113	5322 122 32661	56pF	5%	50V
2117	4822 122 33336	8,2nF	10%	50V
2118	4822 122 33336	8,2nF	10%	50V
2125	4822 122 33177	10nF	20%	50V
2126	4822 122 31782	15nF	10%	50V
2127	5322 122 31863	330pF	5%	50V
2128	5322 116 80853	560pF	5%	63V
2132	5322 122 32268	470pF	10%	50V
2133	5322 126 10794	220pF	10%	
2135	4822 122 33128	15nF	10%	63V
2143	5322 122 32531	100pF	5%	50V
2147	5322 122 32654	22nF	10%	63V
2148	5322 122 32452	47pF	5%	50V
2149	4822 122 33177	10nF	20%	50V
2150	5322 122 32654	22nF	10%	63V
2151	5322 122 34099	470pF	10%	63V
2151	4822 122 33219	1,8nF	10%	50V
2153	5322 122 34099	470pF	10%	63V
2154	5322 122 32481	15pF	5%	50V
2155	5322 122 32965	18pF	5%	50V
2158	5322 126 10223	4,7nF	10%	63V
2159	5322 126 10223	4,7nF	10%	63V

CHIP CAPACITORS

2161	4822 122 32927	220nF	10%	63V
2188	5322 122 32654	22nF	10%	63V
2196	5322 122 32448	10pF	5%	50V
2215	5322 122 32268	470pF	10%	50V
2216	5322 122 32268	470pF	10%	50V
2221	5322 122 32268	470pF	10%	50V



KARAOKE BOARD

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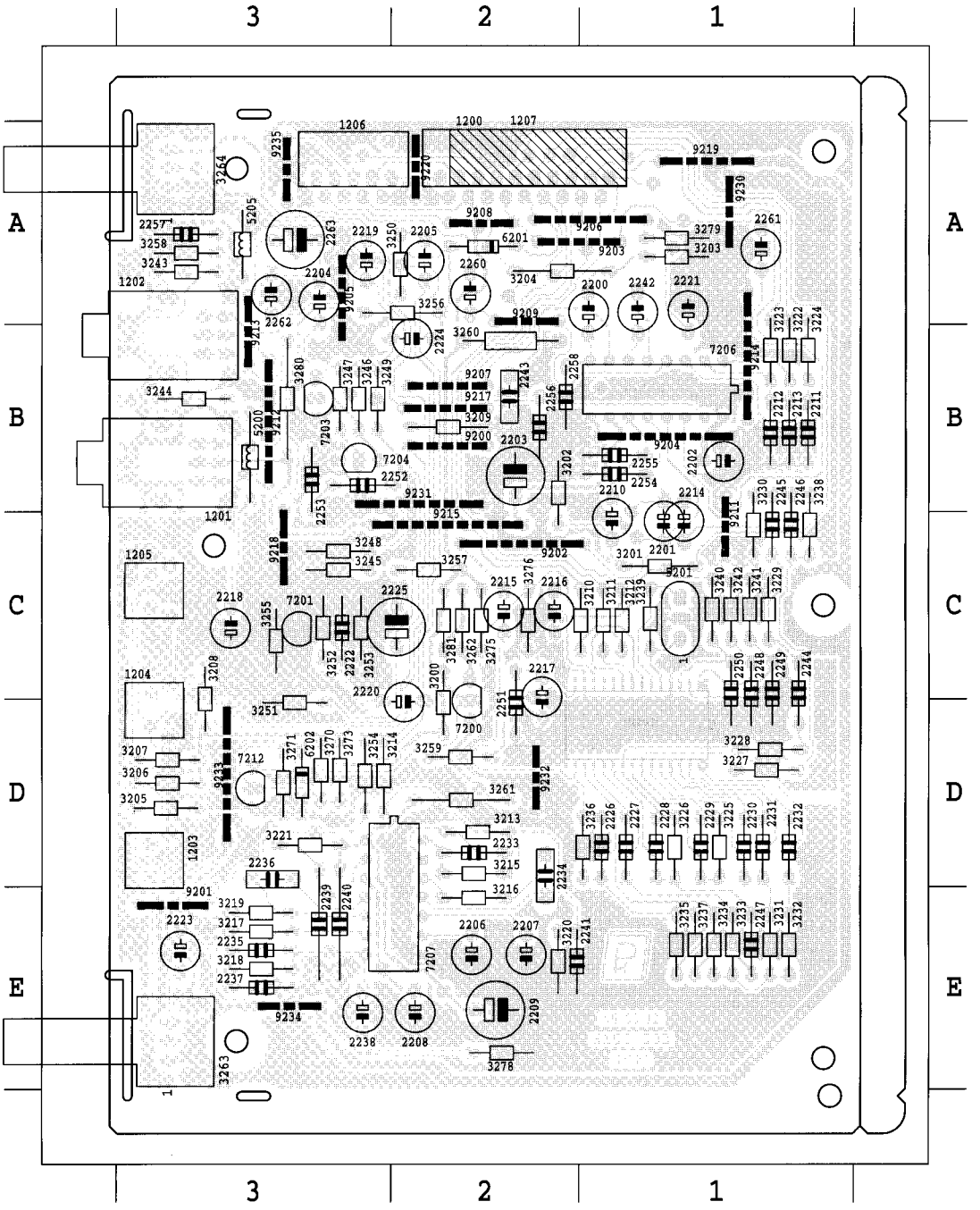
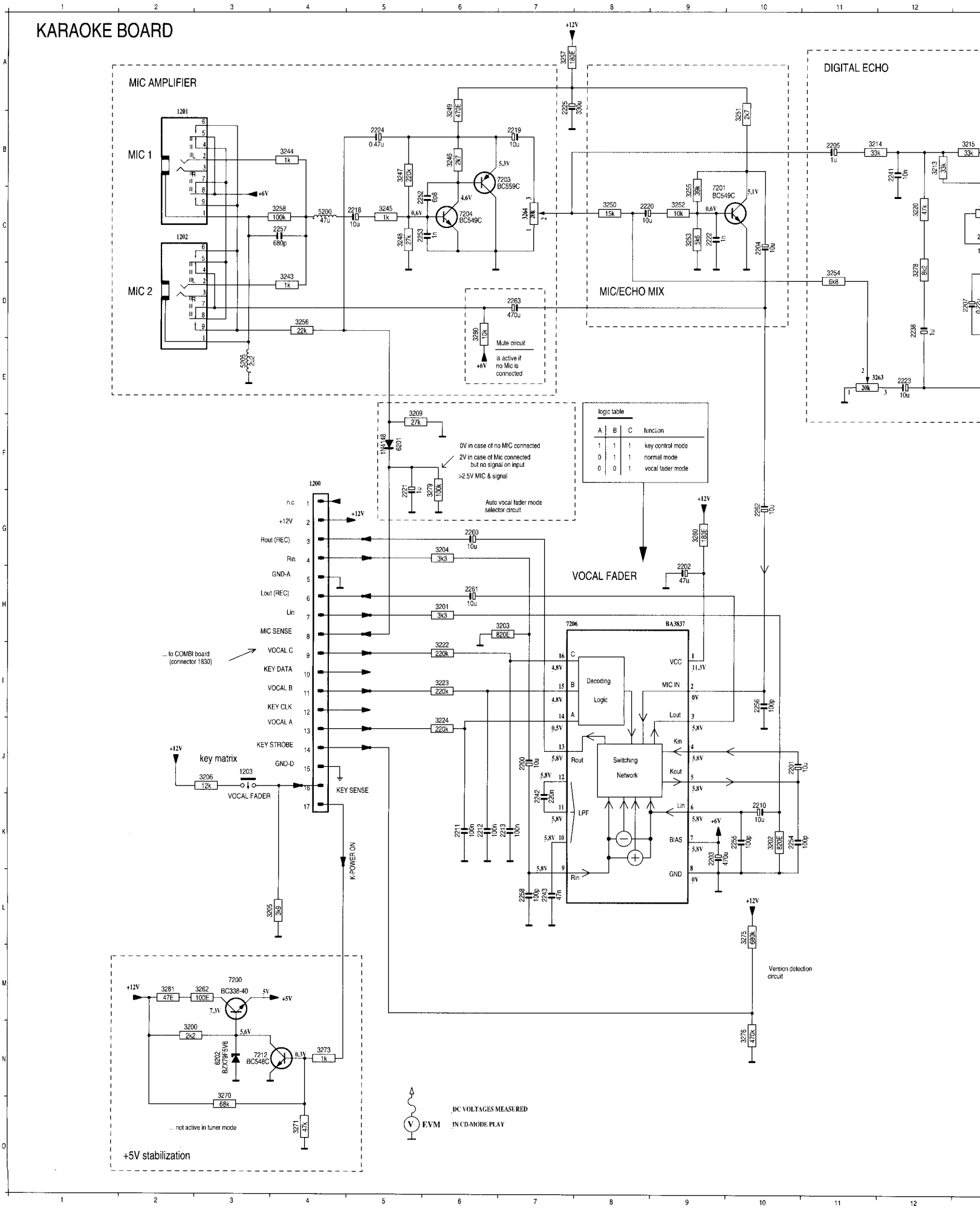
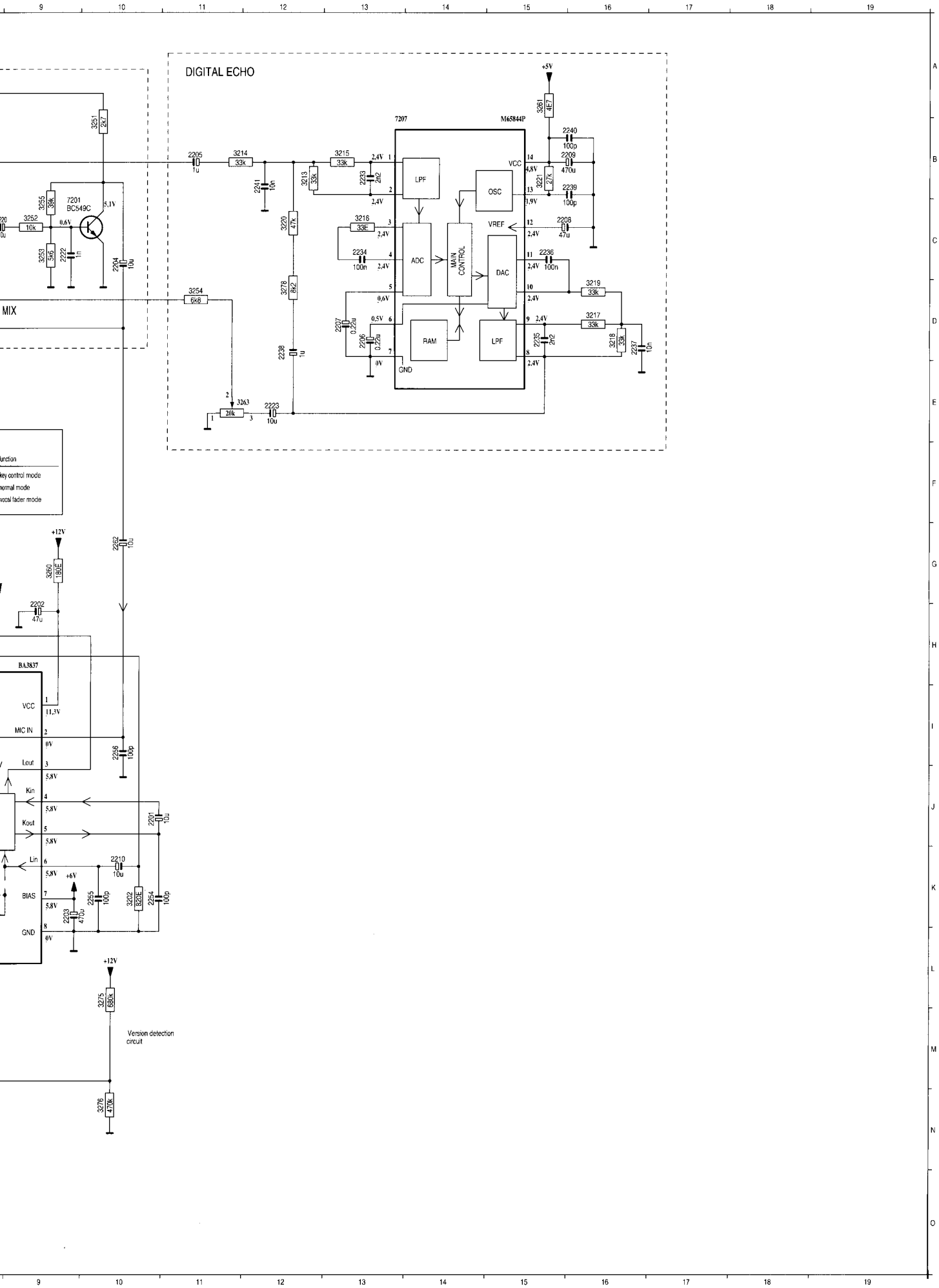
COMPONENT LAYOUT COPPERSIDE VIEW

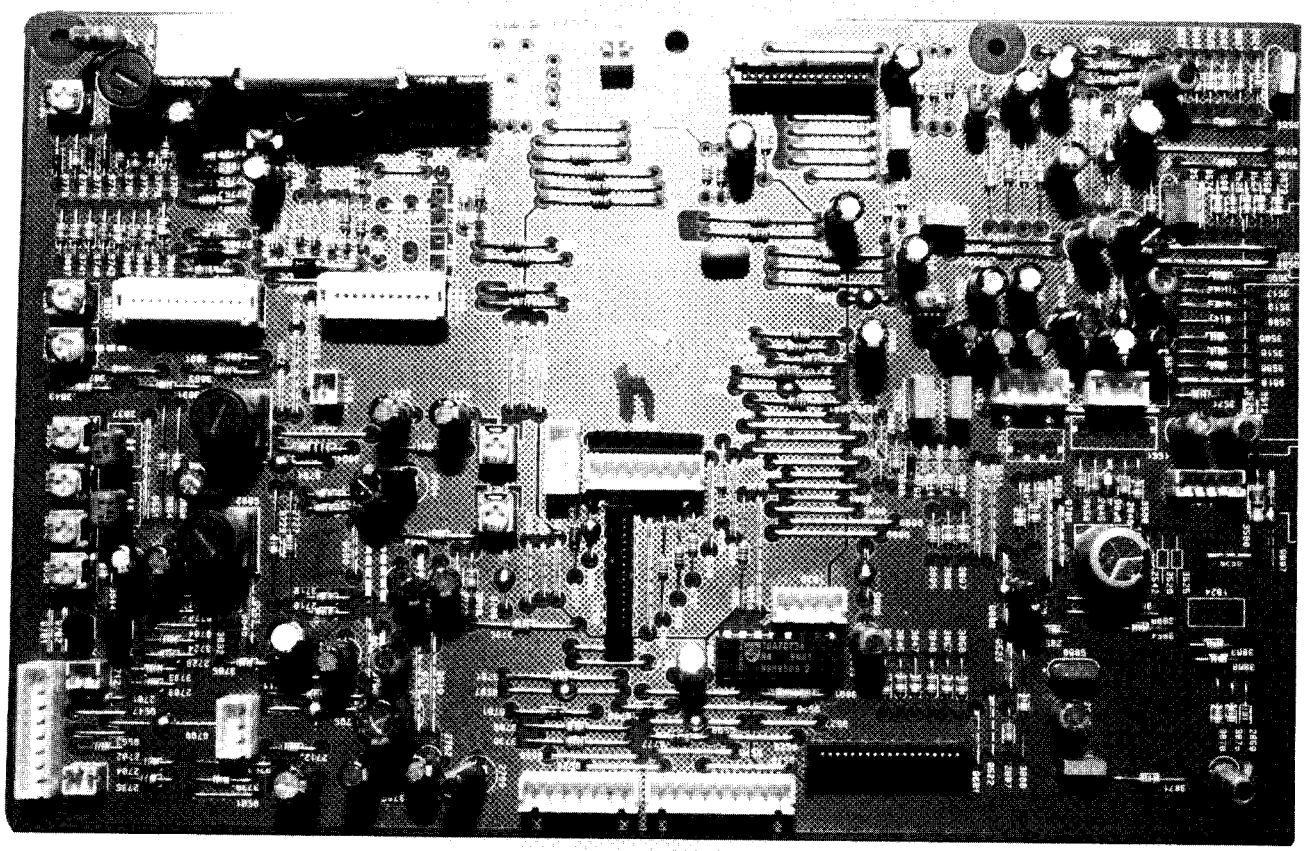


3254 D 3	2258 B 2	1204 D 3
3255 C 3	2260 A 2	1205 C 3
3256 A 2	2261 A 1	1206 A 3
3257 C 2	2262 A 3	1207 A 2
3258 A 3	2263 A 3	2200 A 1
3259 D 2	3200 D 2	2201 C 1
3260 B 2	3201 C 1	2202 B 1
3261 D 2	3202 B 2	2203 B 2
3262 C 2	3203 A 1	2204 A 3
3263 E 3	3204 A 2	2205 A 2
3264 A 3	3205 D 3	2206 E 2
3270 D 3	3206 D 3	2207 E 2
3271 D 3	3207 D 3	2208 E 2
3273 D 3	3208 D 3	2209 E 2
3275 C 2	3209 B 2	2210 C 1
3276 C 2	3210 C 1	2211 B 1
3278 E 2	3211 C 1	2212 B 1
3279 A 1	3212 C 1	2213 B 1
3280 B 3	3213 D 2	2214 C 1
3281 C 2	3214 D 3	2215 C 2
5200 B 3	3215 D 2	2216 C 2
5201 C 1	3216 E 2	2217 C 2
5205 A 3	3217 E 3	2218 C 3
6201 A 2	3218 E 3	2219 A 3
6202 D 3	3219 E 3	2220 D 2
7200 D 2	3220 E 2	2221 A 1
7201 C 3	3221 D 3	2222 C 3
7203 B 3	3222 B 1	2223 E 3
7204 B 3	3223 B 1	2224 B 2
	3224 B 1	2225 C 2
7206 B 1	3225 D 1	2226 D 1
7207 E 2	3226 D 1	2227 D 1
7212 D 3	3227 D 1	2228 D 1
9200 B 2	3228 D 1	2229 D 1
9201 E 3	3229 C 1	2230 D 1
9202 C 2	3230 C 1	2231 D 1
9203 A 1	3231 E 1	2232 D 1
9204 B 1	3232 E 1	2233 D 2
9205 A 3	3233 E 1	2234 D 2
9206 A 1	3234 E 1	2235 E 3
9207 B 2	3235 E 1	2236 D 3
9208 A 2	3236 D 1	2237 E 3
9209 A 2	3237 E 1	2238 E 3
9211 C 1	3238 C 1	2239 E 3
9212 B 3	3239 C 1	2240 E 3
9213 B 3	3240 C 1	2241 E 2
9214 B 1	3241 C 1	2242 A 1
9215 C 2	3242 C 1	2243 B 2
9217 B 2	3243 A 3	2244 C 1
9218 C 3	3244 B 3	2245 C 1
9219 A 1	3245 C 3	2246 C 1
9220 A 2	3246 B 3	2247 E 1
9230 A 1	3247 B 3	2248 C 1
9231 B 2	3248 C 3	2249 C 1
9232 D 2	3249 B 3	2250 C 1
9233 D 3	3250 A 2	2251 D 2
9234 E 3	3251 D 3	2252 B 3
9235 A 3	3252 C 3	2253 B 3
T313 A 1	3253 C 3	2254 B 1
2255 B 1	1201 B 3	
2256 B 2	1202 B 3	
2257 A 3	1203 D 3	


KARAOKE BOARD
MIC AMPLIFIER
MIC 1
MIC 2
MIC/ECHO MIX
DIGITAL ECHO
Mute circuit
is active if no Mic is connected
0V in case of no MIC connected
2V in case of Mic connected but no signal on input
>2.5V MIC & signal
Auto vocal fader mode selector circuit
logic table
A B C function
1 1 1 key control mode
0 1 1 normal mode
0 0 1 vocal fader mode
VOCAL FADER
... to COMBI board (connector 1830)
key matrix
VOCAL FADER
KEY SENSE
K-POWER ON
Decoding Logic
Switching Network
LPF
BIAS
Version detection circuit
... not active in tuner mode
+5V stabilization
DC VOLTAGES MEASURED
IN CD-MODE PLAY
EVM



1200 F 4
1201 B 2
1202 C 2
1203 J 3
2200 J 7
2201 J10
2202 H 9
2203 K 9
2204 C10
2205 B11
2206 D13
2207 D13
2208 C15
2209 B16
2210 K10
2211 K 6
2212 K 6
2213 K 7
2218 C 5
2219 B 7
2220 C 8
2221 F 5
2222 C 9
2223 E12
2224 B 5
2225 A 7
2233 B13
2234 C13
2235 D15
2236 C15
2237 D16
2238 D12
2239 B16
2240 B16
2241 B12
2242 K 7
2243 L 7
2252 C 6
2253 C 6
2254 K10
2255 K10
2256 I10
2257 C 4
2258 L 7
2260 G 6
2261 H 6
2262 G10
2263 D 7
3200 N 2
3201 H 6
3202 K10
3203 H 7
3204 G 6
3205 L 4
3206 J 3
3209 F 5
3213 B12
3214 B11
3215 B13
3216 C13
3217 D16
3218 D16
3219 D16
3220 C12
3221 B15
3222 I 6
3223 I 6
3224 J 6
3243 D 4
3244 B 4
3245 C 5
3246 B 6
3247 B 5
3248 C 5
3249 A 6
3250 C 8
3251 B10
3252 C 9
3253 C 9
3254 D11
3255 C 9
3256 D 4
3257 A 7
3258 C 4
3260 G 9
3261 A15
3262 M 3
3263 E12
3264 C 7
3270 O 3
3271 O 4
3273 N 4
3275 L10
3276 N10
3278 D12
3279 F 6
3280 D 6
3281 M 2
5200 C 4
5205 E 3
6201 F 5
6202 N 3
7200 M 3
7201 C 9
7203 B 6
7204 C 6
7206 H 8
7207 B13
7212 N 4



COMBI BOARD

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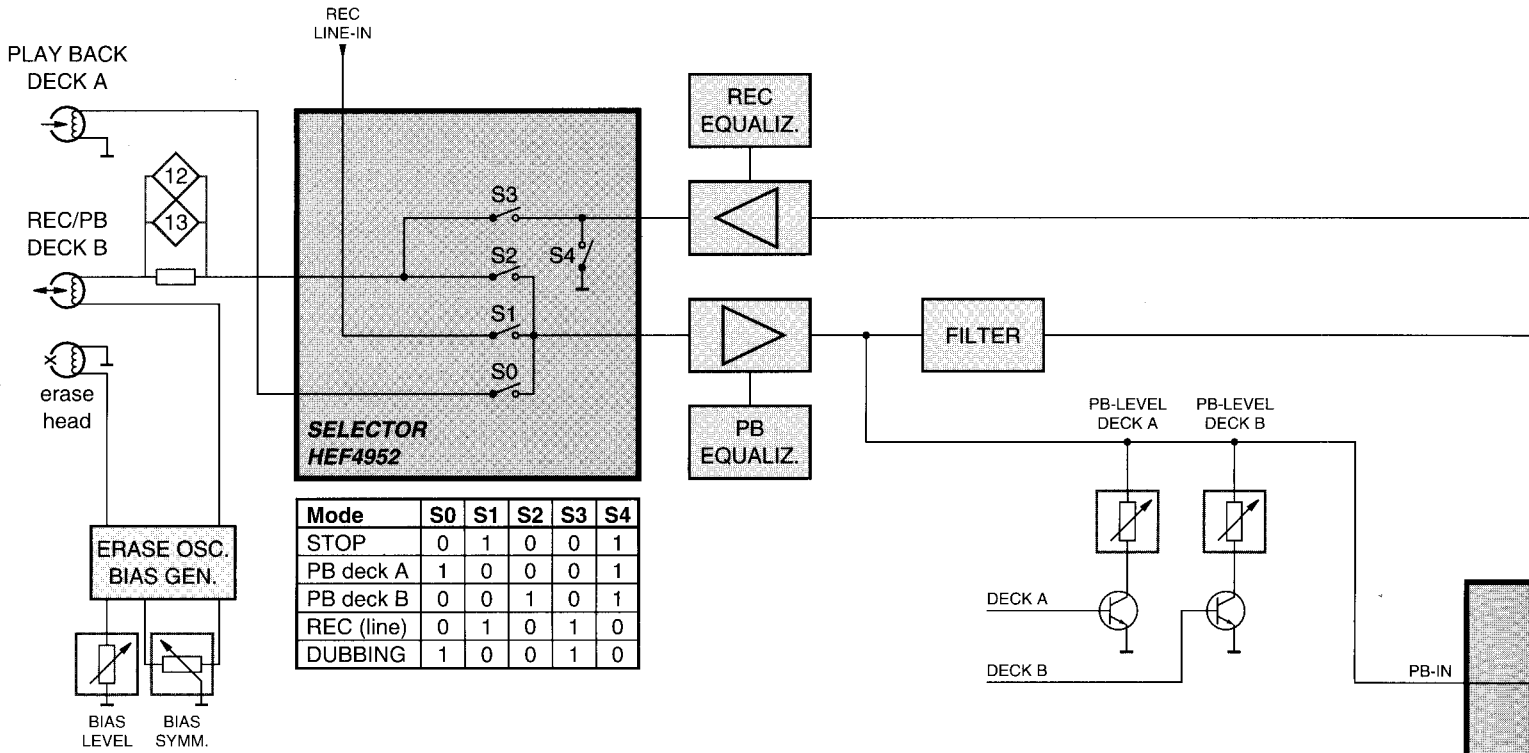
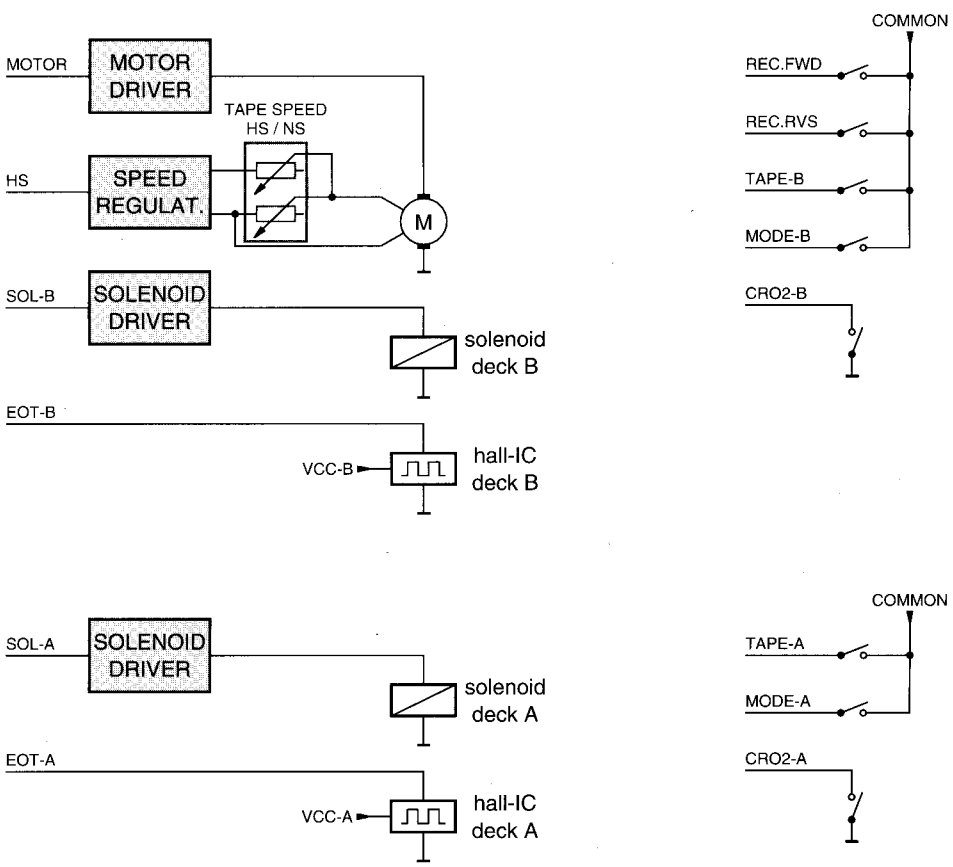
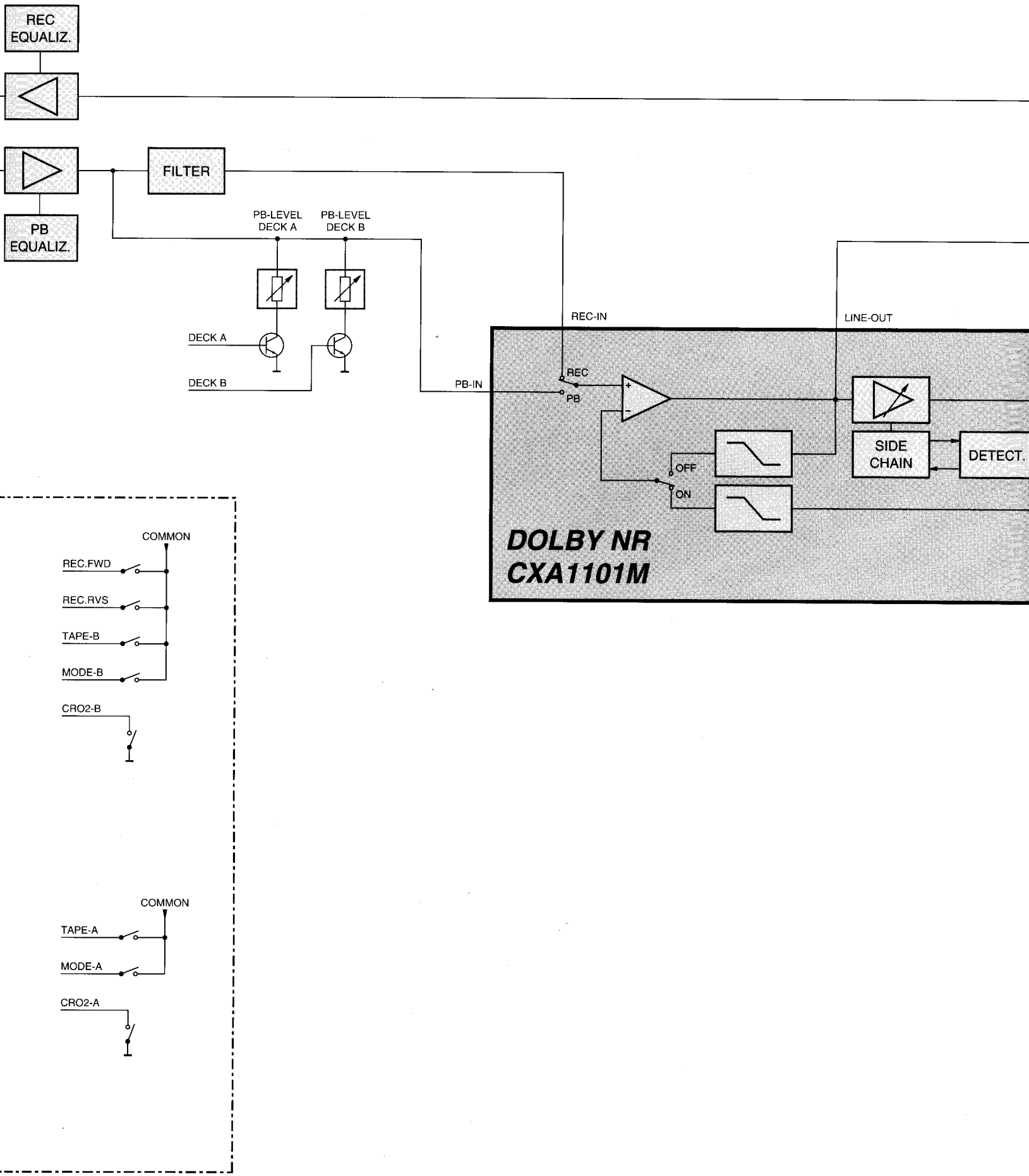
FUNCTIONAL DIAGRAM TAPE PART

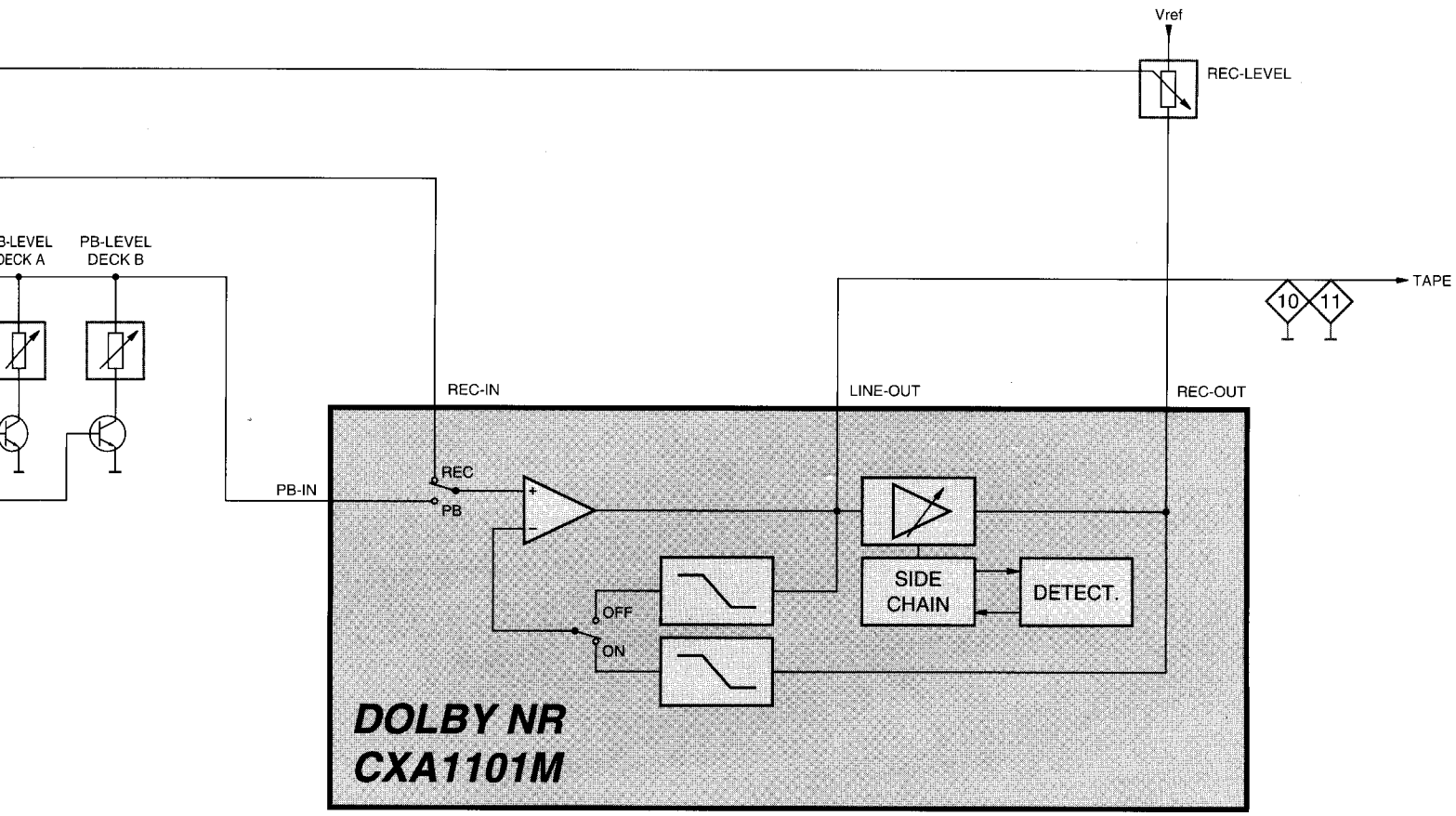


Mode	S0	S1	S2	S3	S4
STOP	0	1	0	0	1
PB deck A	1	0	0	0	1
PB deck B	0	0	1	0	1
REC (line)	0	1	0	1	0
DUBBING	1	0	0	1	0

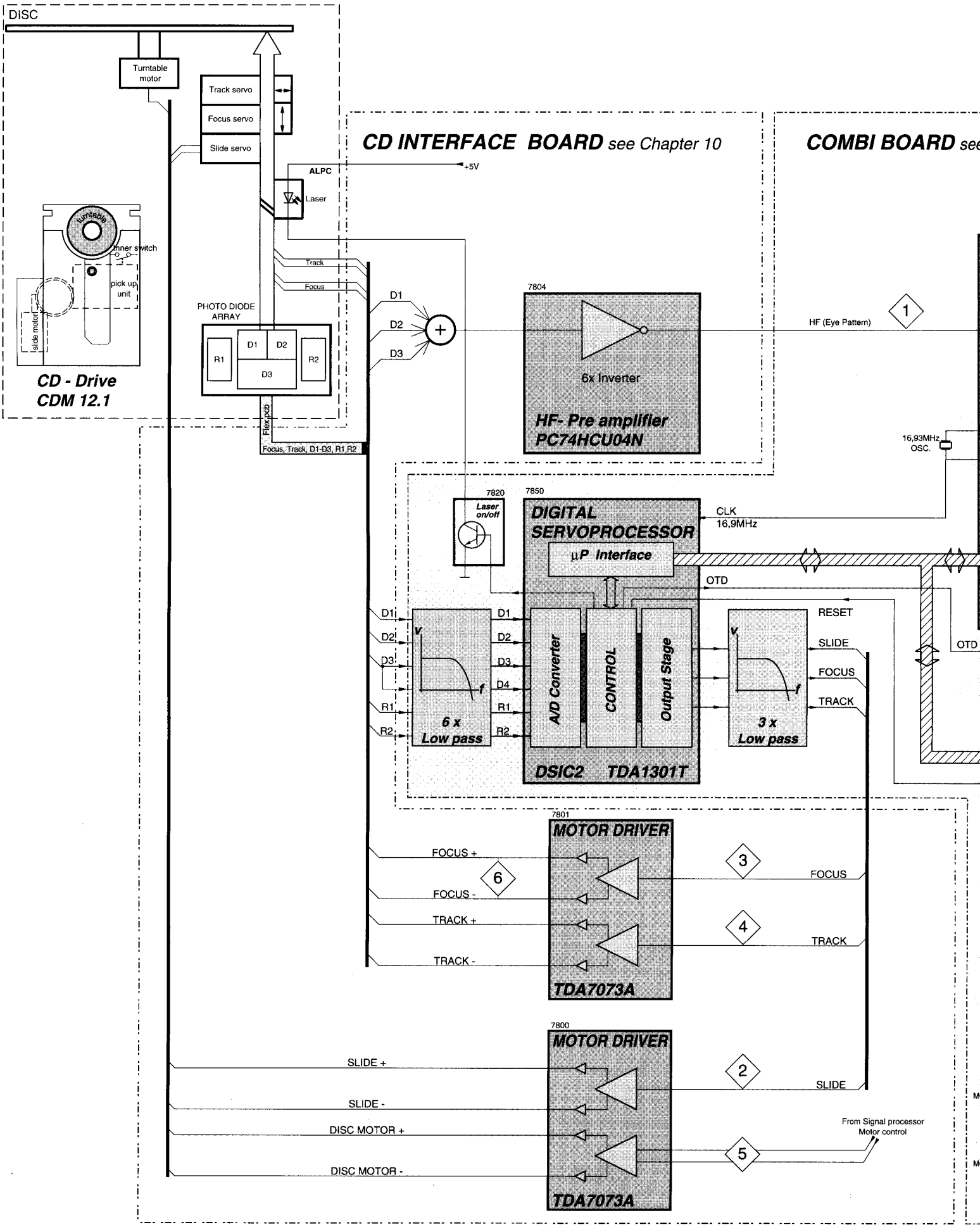


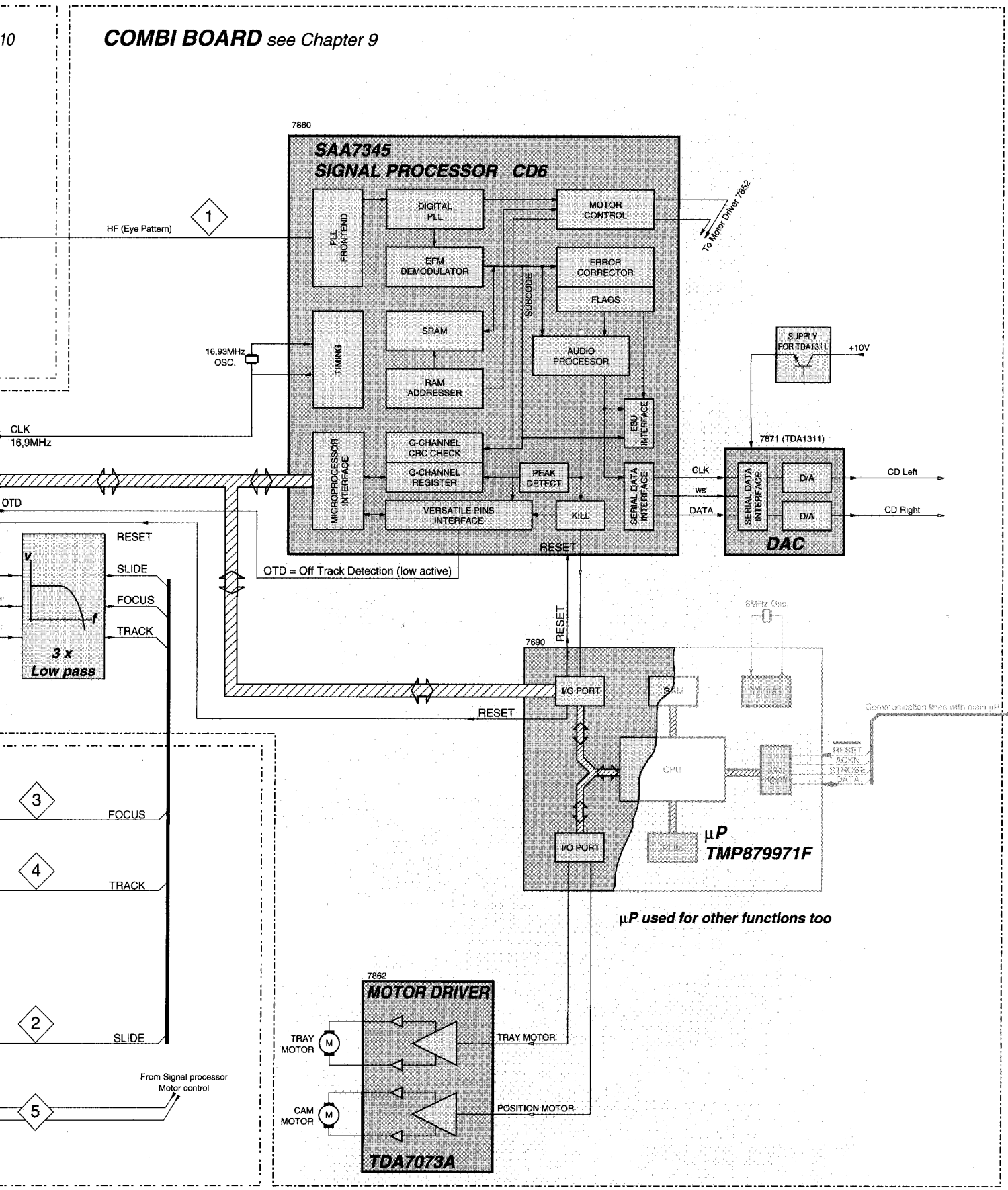
COMBI BOARD *Tape logic / µP part*


REC EQUALIZ.
PB EQUALIZ.
FILTER
PB-LEVEL DECK A
PB-LEVEL DECK B
DECK A
DECK B
PB-IN
REC-IN
LINE-OUT
REC
PB
OFF
ON
SIDE CHAIN
DETECT.
DOLBY NR
CXA1101M
COMMON
REC.FWD
REC.RVS
TAPE-B
MODE-B
CRO2-B
COMMON
TAPE-A
MODE-A
CRO2-A

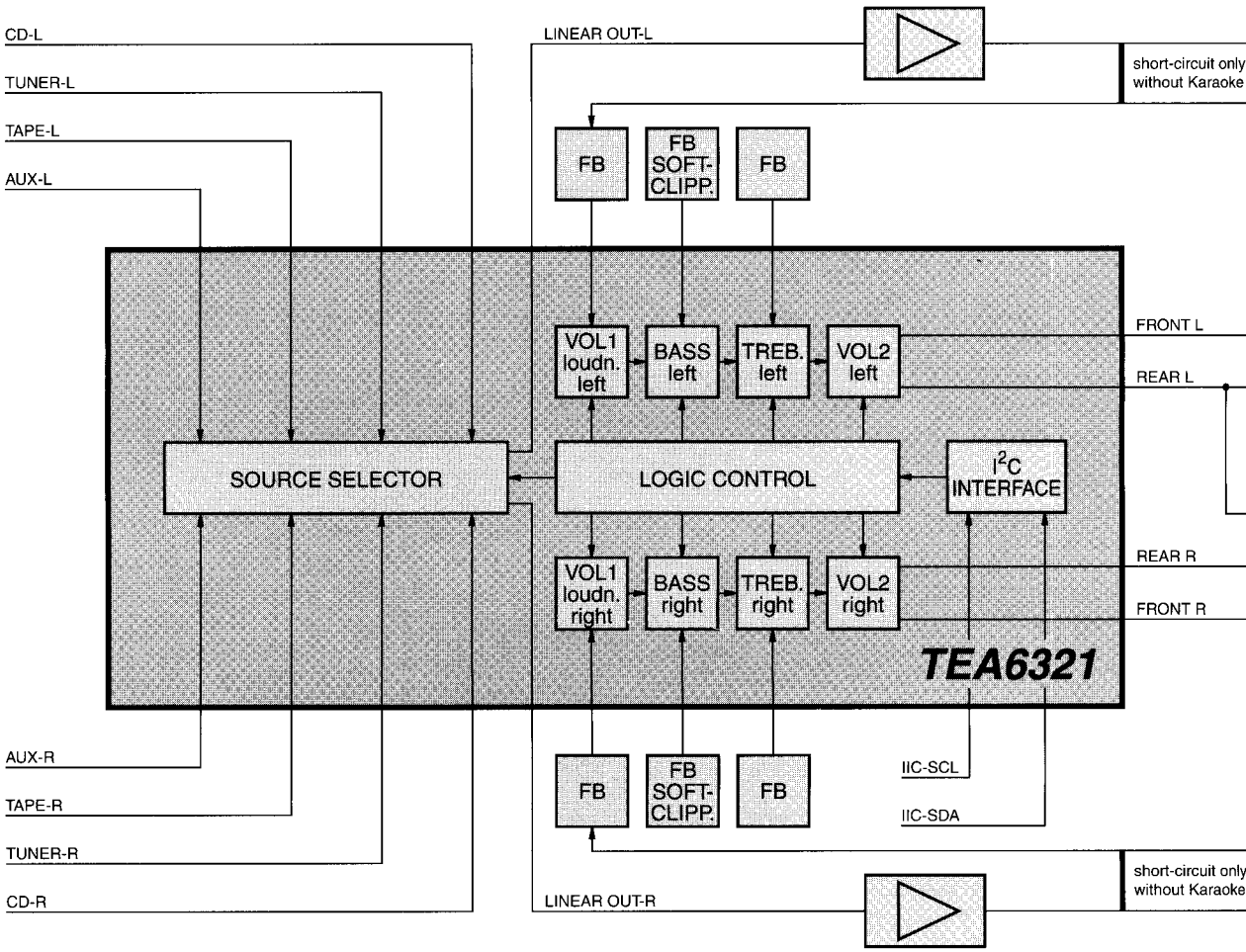

Vref
REC-LEVEL
B-LEVEL
DECK A
PB-LEVEL
DECK B
TAPE
10
11
REC-IN
LINE-OUT
REC-OUT
REC
PB
PB-IN
OFF
ON
SIDE
CHAIN
DETECT.
DOLBY NR
CXA1101M

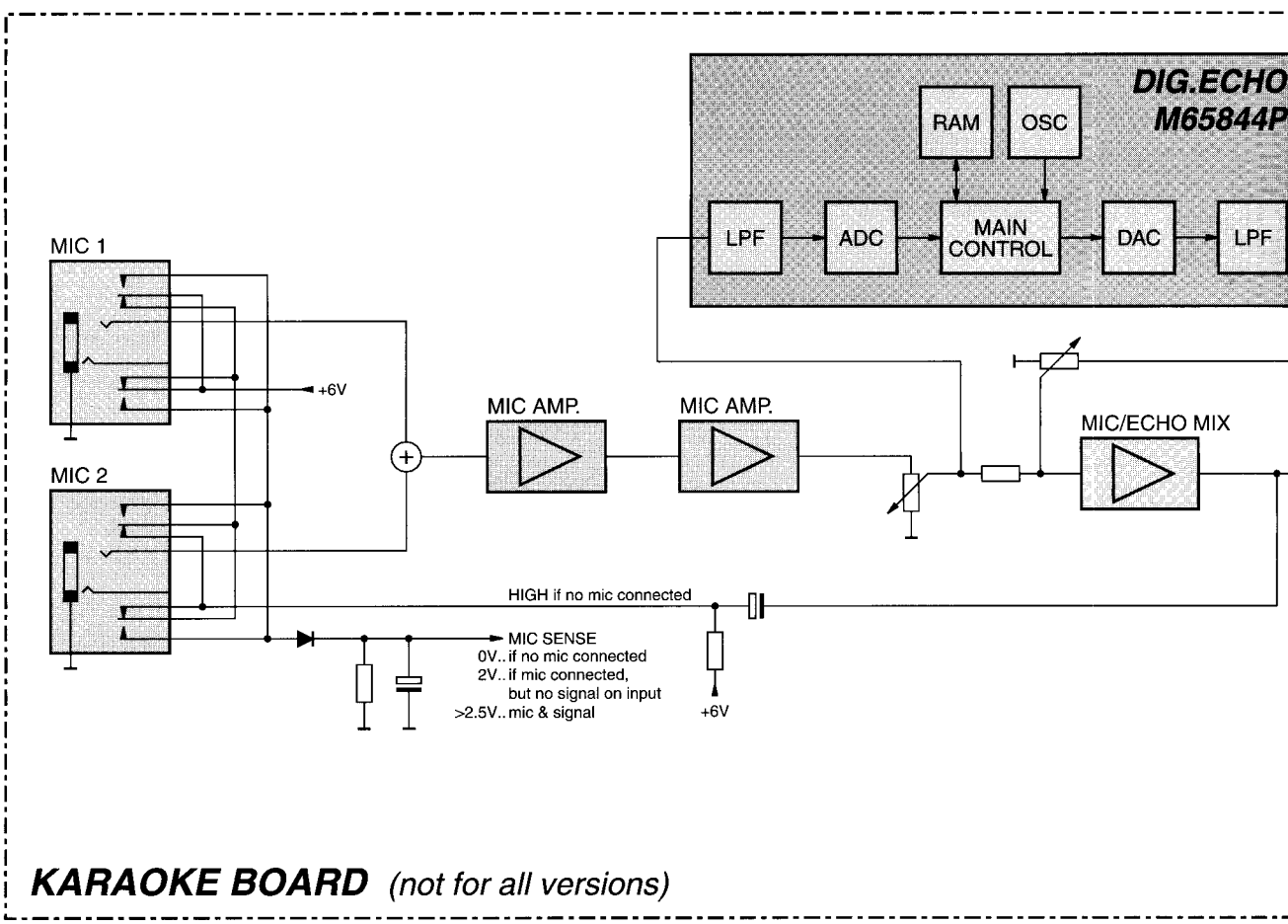
FUNCTIONAL DIAGRAM CD-PART



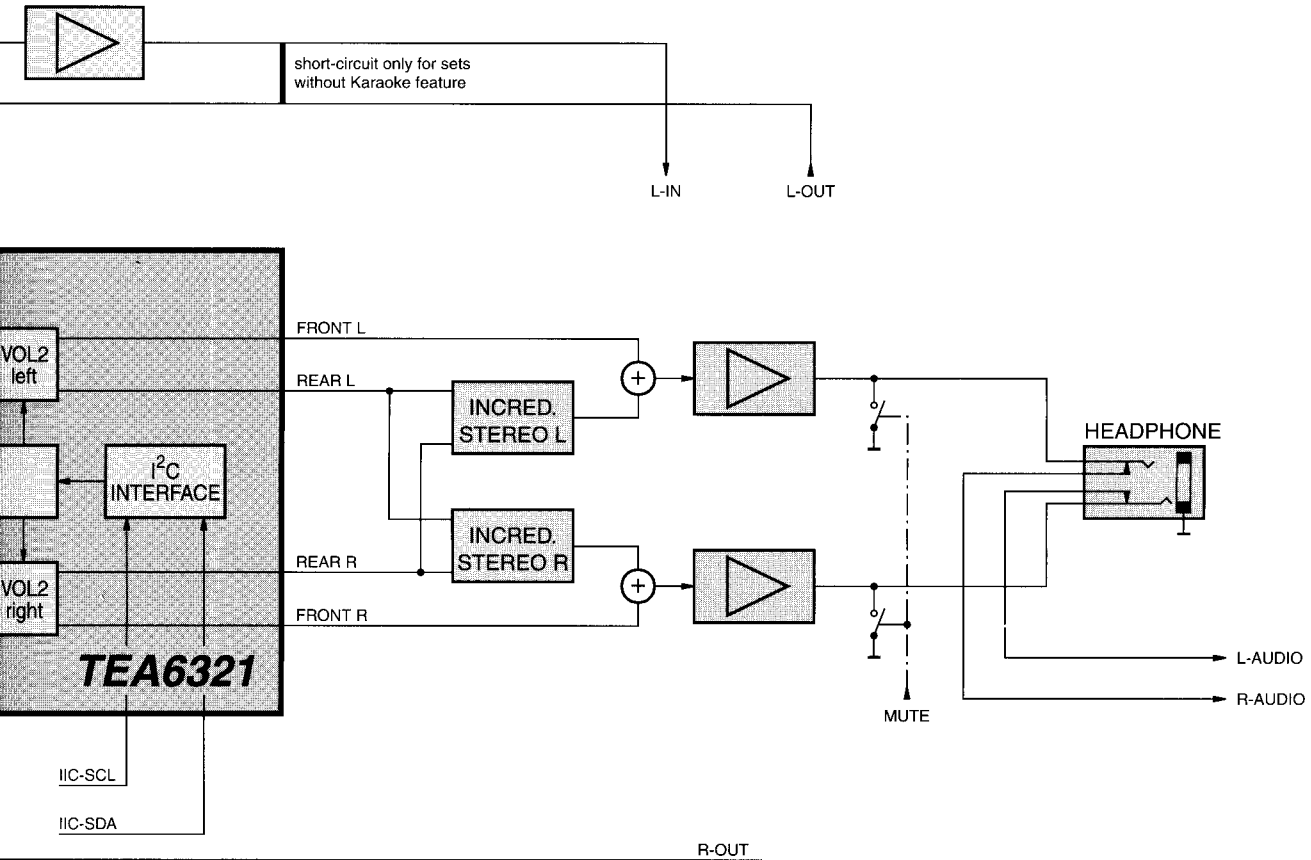

COMBI BOARD see Chapter 9
7660
SAA7345
SIGNAL PROCESSOR CD6
PLL FRONTEND
DIGITAL PLL
MOTOR CONTROL
To Motor Driver 7862
EFM DEMODULATOR
ERROR CORRECTOR
FLAGS
SUBCODE
SRAM
AUDIO PROCESSOR
TIMING
16,93MHz OSC.
RAM ADDRESSER
EBU INTERFACE
SUPPLY FOR TDA1311
+10V
7871 (TDA1311)
CLK 16,9MHz
MICROPROCESSOR INTERFACE
Q-CHANNEL CRC CHECK
Q-CHANNEL REGISTER
PEAK DETECT
SERIAL DATA INTERFACE
CLK
WS
DATA
D/A
CD Left
CD Right
DAC
OTD
VERSATILE PINS INTERFACE
KILL
RESET
OTD = Off Track Detection (low active)
HF (Eye Pattern)
1
RESET
SLIDE
FOCUS
TRACK
3 x Low pass
7690
I/O PORT
RAM
CPU
µP TMP879971F
µP used for other functions too
Communication lines with main µP
3
FOCUS
4
TRACK
2
SLIDE
From Signal processor Motor control
5
7862
MOTOR DRIVER
TRAY MOTOR
CAM MOTOR
POSITION MOTOR
TDA7073A

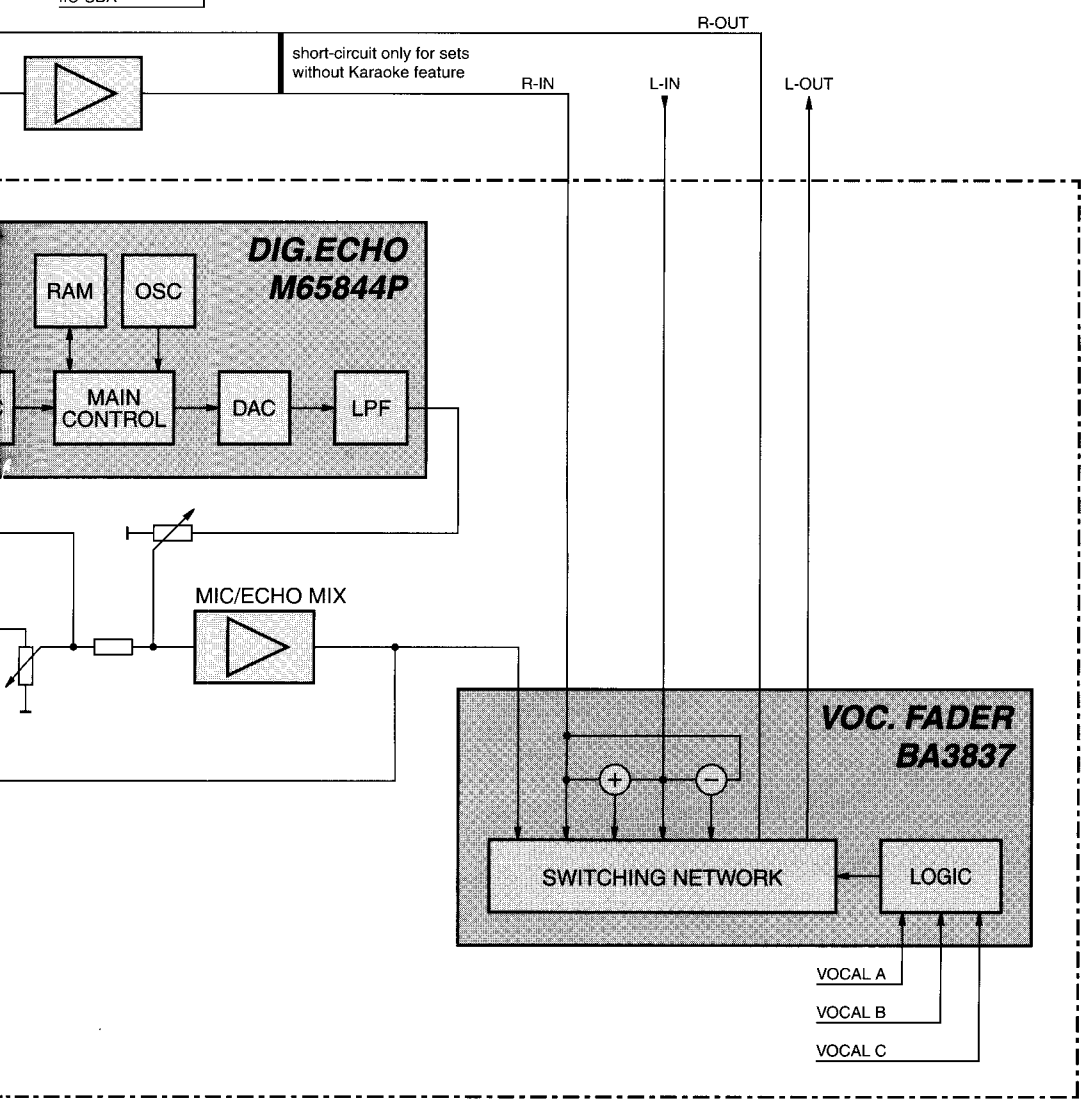
FUNCTIONAL DIAGRAM AF-PART





KARAOKE BOARD *(not for all versions)*


short-circuit only for sets
without Karaoke feature
L-IN
L-OUT
VOL2
left
VOL2
right
I²C
INTERFACE
TEA6321
FRONT L
REAR L
INCRED.
STEREO L
INCRED.
STEREO R
REAR R
FRONT R
HEADPHONE
L-AUDIO
R-AUDIO
MUTE
IIC-SCL
IIC-SDA


R-OUT
short-circuit only for sets
without Karaoke feature
R-IN
L-IN
L-OUT
DIG.ECHO
M65844P
RAM
OSC
MAIN
CONTROL
DAC
LPF
MIC/ECHO MIX
VOC. FADER
BA3837
SWITCHING NETWORK
LOGIC
VOCAL A
VOCAL B
VOCAL C

General

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST with	ADJUST to
ADJUST MOTOR SPEED						
HIGH SPEED	SBC420 (4822 397 30071) 3150Hz	DUBBING	10 LEFT or 11 RIGHT	frequency counter	3682	5670Hz ±0.5%
NORMAL SPEED		PLAY			3684	3150Hz ±0.5%
CHECK WOW & FLUTTER (DECK1 AND DECK2)						
WOW & FLUTTER	SBC420 (4822 397 30071) 3150Hz	PLAY	10 LEFT or 11 RIGHT	W&F-meter	check only	≤0.35% unwtd.
ADJUST AZIMUTH (DECK1 AND DECK2)						
NORM. DIRECTION	SBC420 (4822 397 30071) 10kHz	PLAY FWD	10 LEFT & 11 RIGHT	mV-meter	left hand screw	max. output level & left=right
REV. DIRECTION		PLAY REV			right hand screw	

Playback

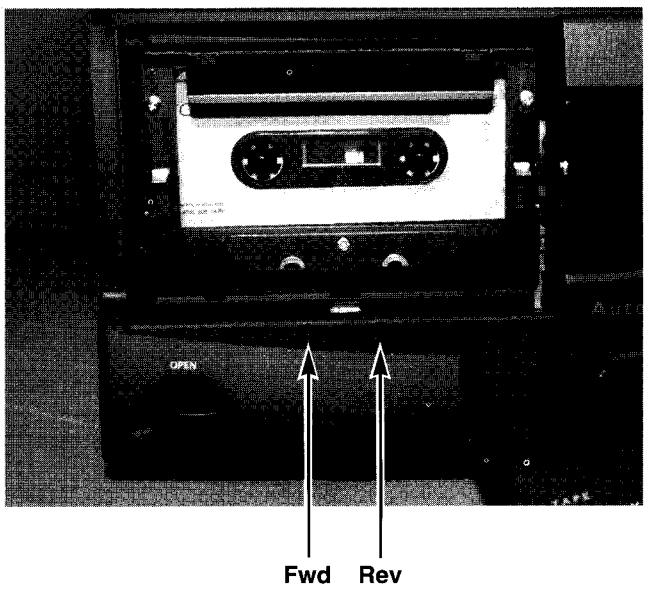
	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST with	ADJUST to
ADJUST PLAYBACK LEVEL						
DECK1	DOLBY REF. (4822 397 30071) 200nWb/m	PLAY	10 LEFT & 11 RIGHT	mV-meter	3635(L), 3636(R)	535mV ±0.5dB
DECK2					3641(L), 3642(R)	
CHECK PLAYBACK FREQUENCY RESPONSE (DECK1 AND DECK2)						
PB FREQU. RESP.	SBC420 (4822 397 30071)	PLAY	10 LEFT & 11 RIGHT	mV-meter	check only	limits see fig.1

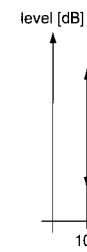
Record

PRE-ADJUST
CrO_2
FERRO
CHECK OVE
37mV at AUX 100Hz,250Hz 10kHz,12.5kH
100mV at AU 1kHz
Remark: If high If disto
ADJUST REC
AUX-IN
[1] Remark: Use
RECORD LE
Remark: If mea

AZIMUTH ALIGNMENT

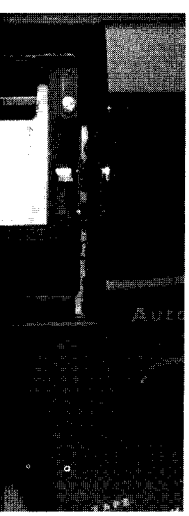
Remove ornamental part of cassette door.
For alignment use a small cross slot screwdriver.





Record

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST with	ADJUST to
PRE-ADJUST BIAS AND BIAS-SYMMETRY						
CrO_2	CrO_2	RECORD	12 & 13 (LEFT / RIGHT)	mV-meter	3773 & 3785	110mV & left=right
FERRO	FERRO	RECORD			check only	71mV ±0.5dB
CHECK OVERALL FREQUENCY RESPONSE AND DISTORTION						
37mV at AUX-IN, 100Hz,250Hz,1kHz, 10kHz,12.5kHz	CrO_2	RECORD				
	RECORDED CASSETTE	PLAY	10 & 11 (LEFT / RIGHT)	mV-meter	check only	limits see fig.2
100mV at AUX-IN, 1kHz	CrO_2	RECORD				
	RECORDED CASSETTE	PLAY	10 & 11 (LEFT / RIGHT)	THD-meter	check only	≤3%
Remark: If high frequencies are not within limits, decrease bias and remeasure. If distortion is too high increase bias and remeasure.						
ADJUST RECORD LEVEL						
AUX-IN	CrO_2	RECORD	10 & 11 (LEFT / RIGHT)	mV-meter	LF-generator	330Hz 170mV
	CrO_2	RECORD	12 & 13 (LEFT / RIGHT)	mV-meter	3655 & 3556	5mV [1]
[1] Remark: Use low pass filter to attenuate the bias component, or short-circuit base of 7783 to ground.						
RECORD LEVEL						
	RECORDED CASSETTE	PLAY	10 & 11 (LEFT / RIGHT)	mV-meter	check only	330Hz 170mV ±0.5dB
Remark: If measured value is out of limit, re-adjust record level and remeasure.						



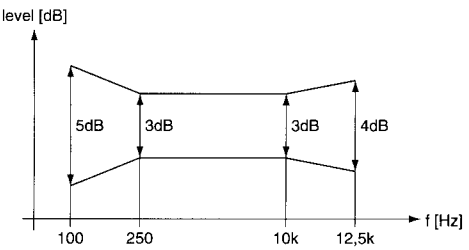


fig.1

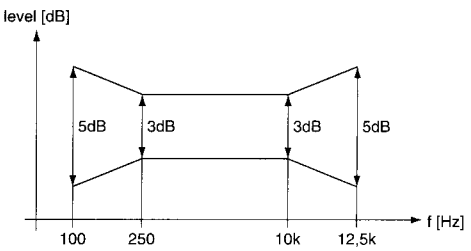
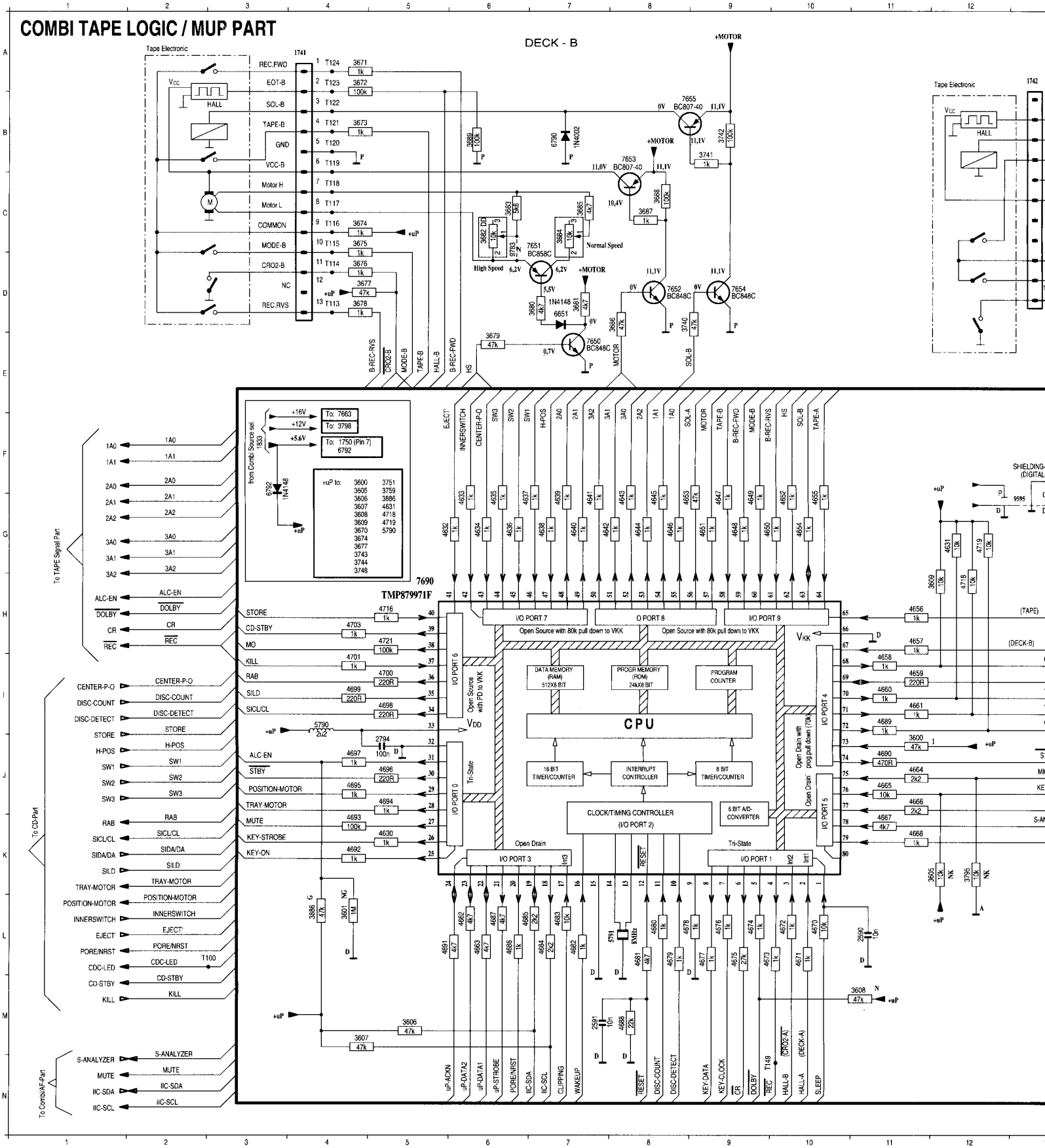
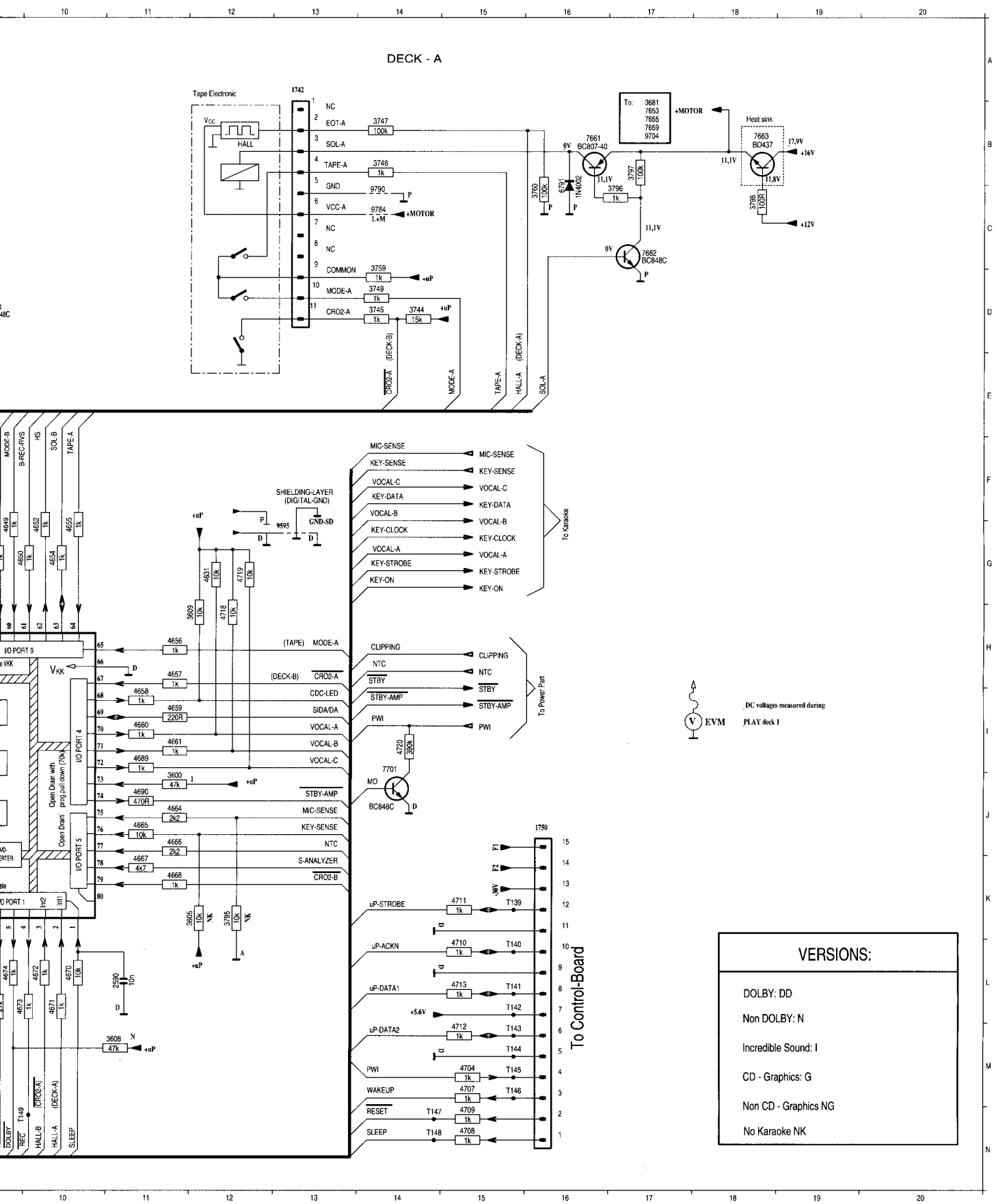


fig.2

COMBI TAPE LOGIC / MUP PART



DECK - A



VERSIONS:

DOLBY: DD

Non DOLBY: N

Incredible Sound: I

CD - Graphics: G

Non CD - Graphics NG

No Karaoke NK

1741 A 4
1742 A13
1750 J16
2590 L11
2591 M 7
2794 J 5
3600 J11
3601 L 4
3605 K12
3606 M 5
3607 M 4
3608 M11
3609 H12
3671 A 4
3672 A 4
3673 B 4
3674 C 4
3675 C 4
3676 D 4
3677 D 4
3678 D 4
3679 E 6
3680 D 7
3681 D 7
3682 C 6
3683 C 6
3684 C 7
3685 C 7
3686 D 8
3687 C 8
3688 C 8
3689 B 6
3740 D 8
3741 B 9
3742 B 9
3744 D14
3745 D14
3746 B14
3747 B14
3749 D14
3759 D14
3760 C16
3795 K12
3796 C17
3797 B17
3798 C18
3886 L 4
4630 K 5
4631 G12
4632 G 5
4633 G 6
4634 G 6
4635 G 6
4636 G 6
4637 G 6
4638 G 7
4639 G 7
4640 G 7
4641 G 7
4642 G 7
4643 G 8
4644 G 8
4645 G 8
4646 G 8
4647 G 9
4648 G 9
4649 G 9
4650 G 9
4651 G 9
4652 G10
4653 G 8
4654 G10
4655 G10
4656 H11
4657 H11
4658 I11
4659 I11
4660 I11
4661 I11
4662 L 6
4663 L 6
4664 J11
4665 J11
4666 J11
4667 K11
4668 K11
4670 L10
4671 L10
4672 L10
4673 L 9
4674 L 9
4675 L 9
4676 L 9
4677 L 9
4678 L 8
4679 L 8
4680 L 8
4681 L 8
4682 L 7
4683 L 7
4684 L 7
4685 L 6
4686 L 6
4687 L 6
4688 M 8
4689 I11
4690 J11
4691 L 5
4692 K 4
4693 K 4
4694 J 5
4695 J 4
4696 J 5
4697 J 4
4698 I 5
4699 I 4
4700 I 5
4701 I 4
4703 H 4
4704 M15
4707 M15
4708 N15
4709 N15
4710 L15
4711 K15
4712 M15
4713 L15
4716 H 5
4718 H12
4719 G12
4720 I14
4721 H 5
5790 I 4
5791 L 8
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6792 F 3
7650 E 7
7651 C 7
7652 D 8
7653 B 8
7654 D 9
7655 B 8
7661 B16
7662 C17
7663 B18
7690 H 5
7701 I14
9595 G13
9783 C 6
9784 C14
9790 C14
T100 L 3
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T114 D 4
T115 C 4
T116 C 4
T117 C 4
T118 C 4
T119 B 4
T120 B 4
T121 B 4
T122 B 4
T123 A 4
T124 A 4
T139 K15
T140 L15
T141 L15
T142 L15
T143 M15
T144 M15
T145 M15
T146 M15
T147 N14
T148 N14
T149 N 9

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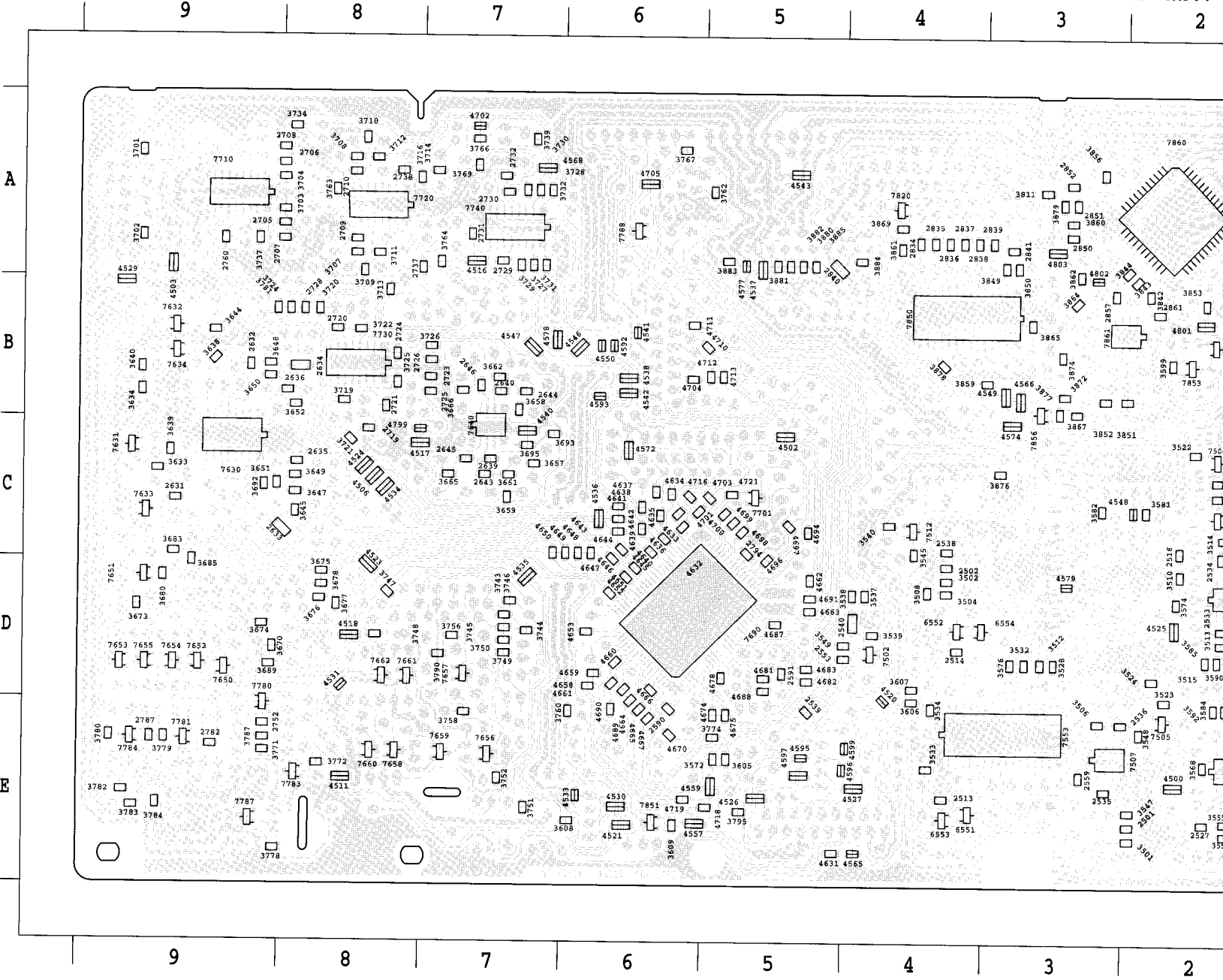

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7505 E 2	7690 D 6	T007 A 4	T034 C 5	T063 A 5	T094 E 1	T132 D 8	T172 B 7
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7507 E 3	7710 A 9	T009 A 3	T036 C 5	T065 E 5	T096 C 1	T134 D 8	T174 B 9
7508 C 1	7720 A 8	T010 A 4	T037 C 5	T066 E 3	T097 D 1	T135 E 8	T175 C 8
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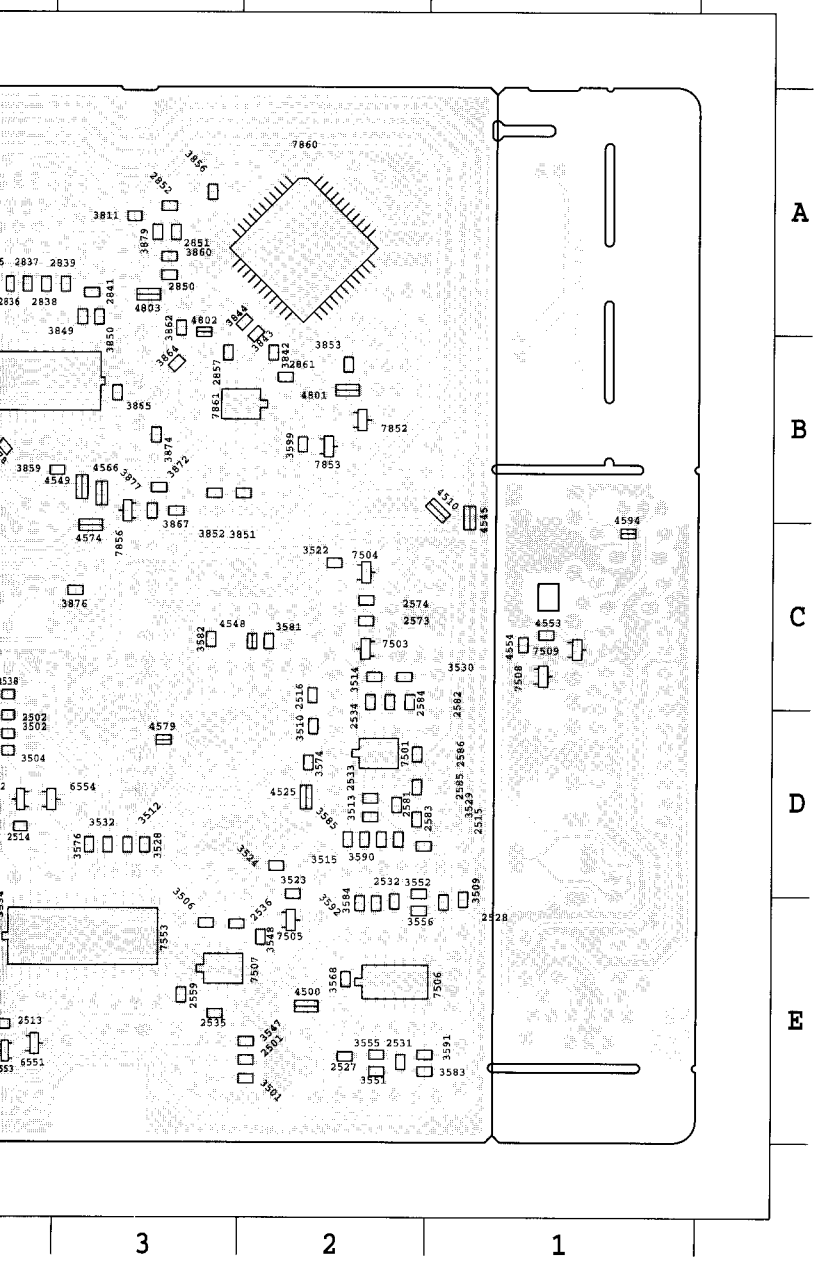

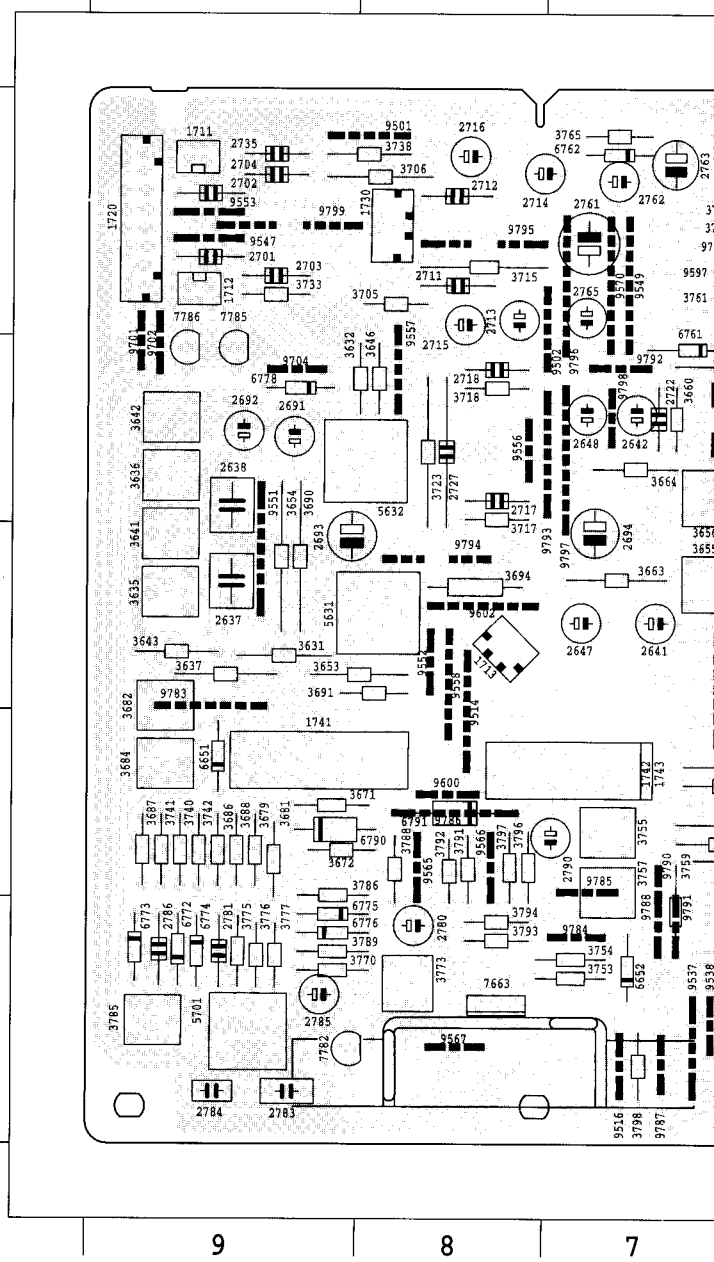

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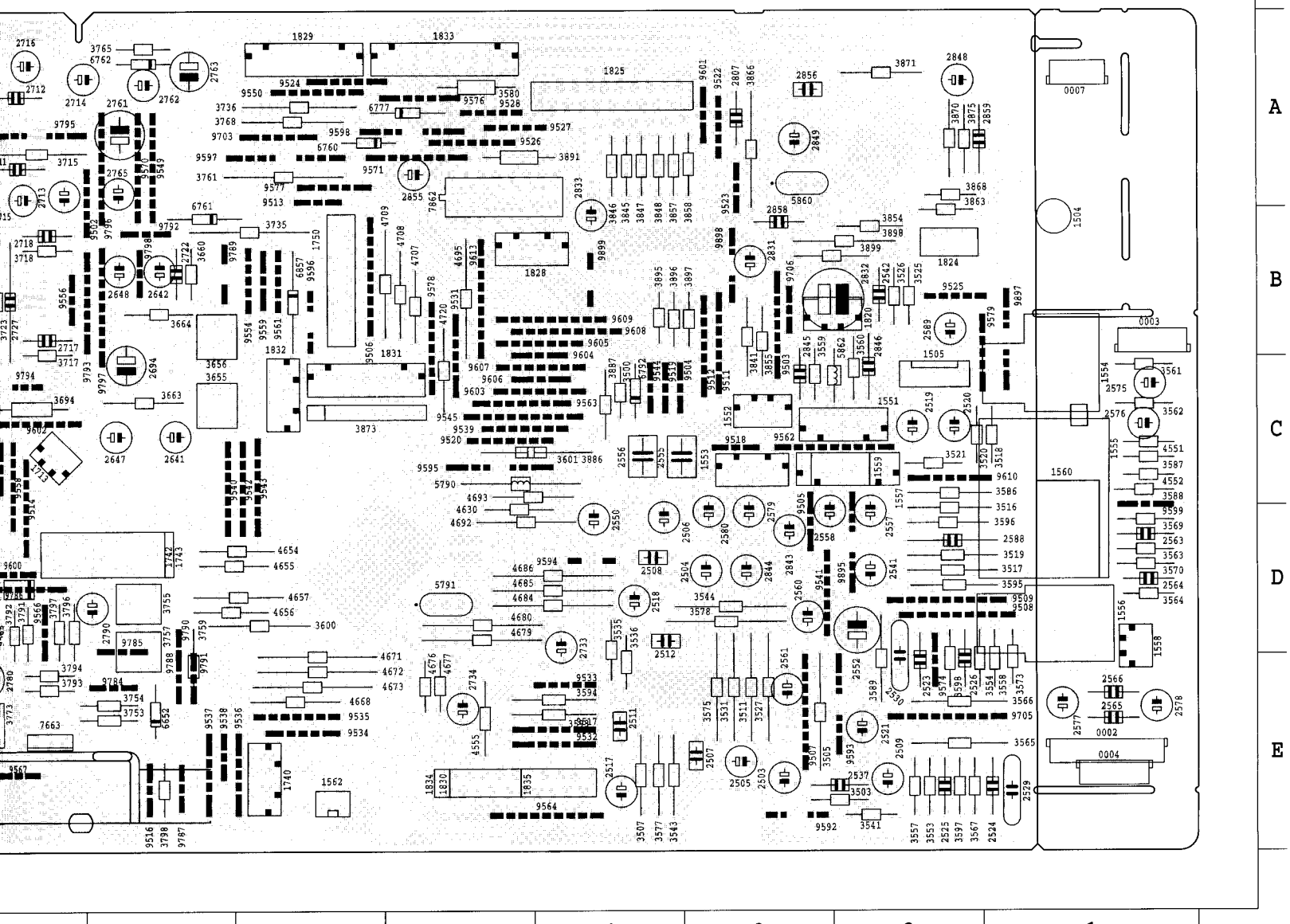

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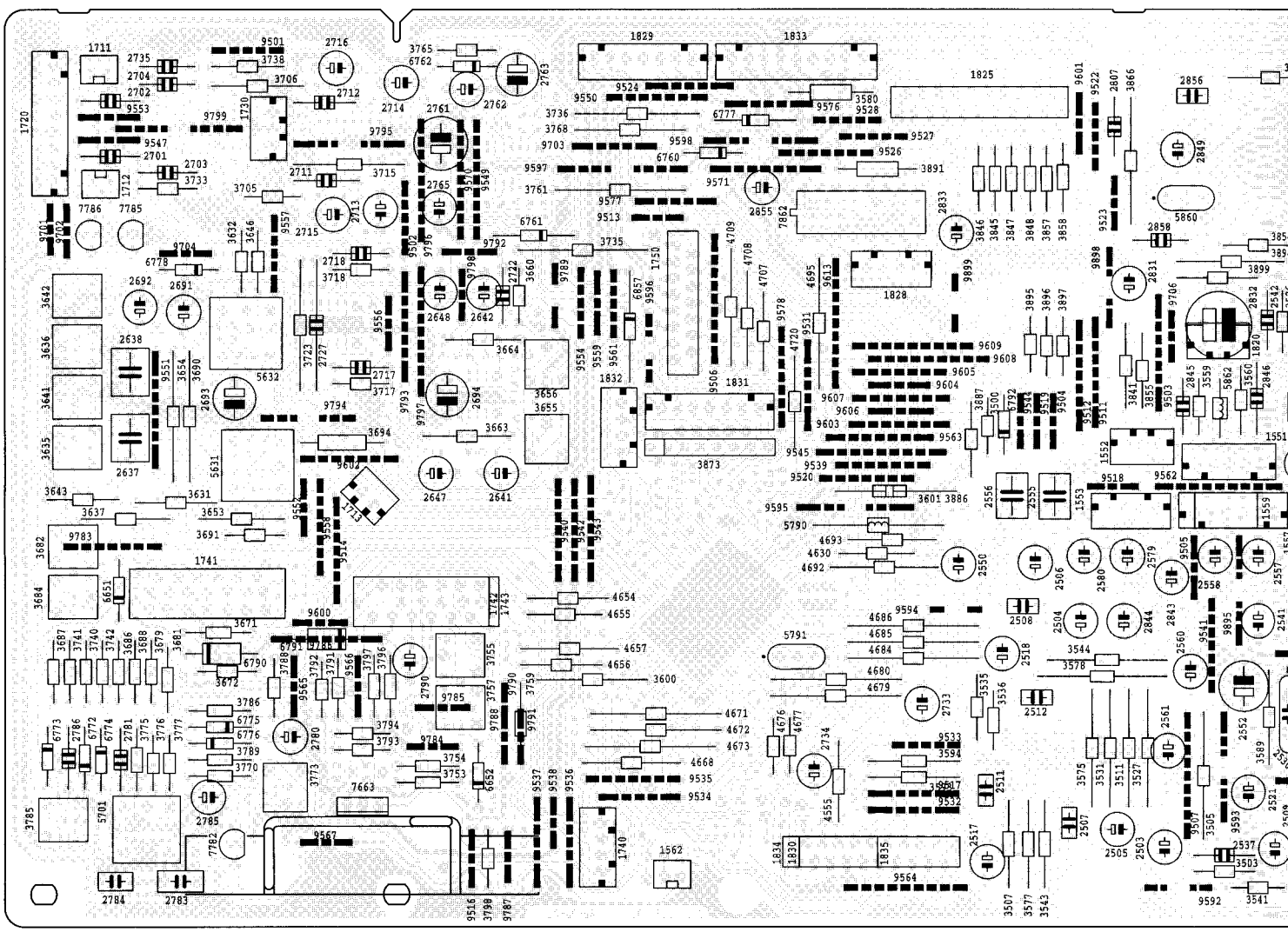

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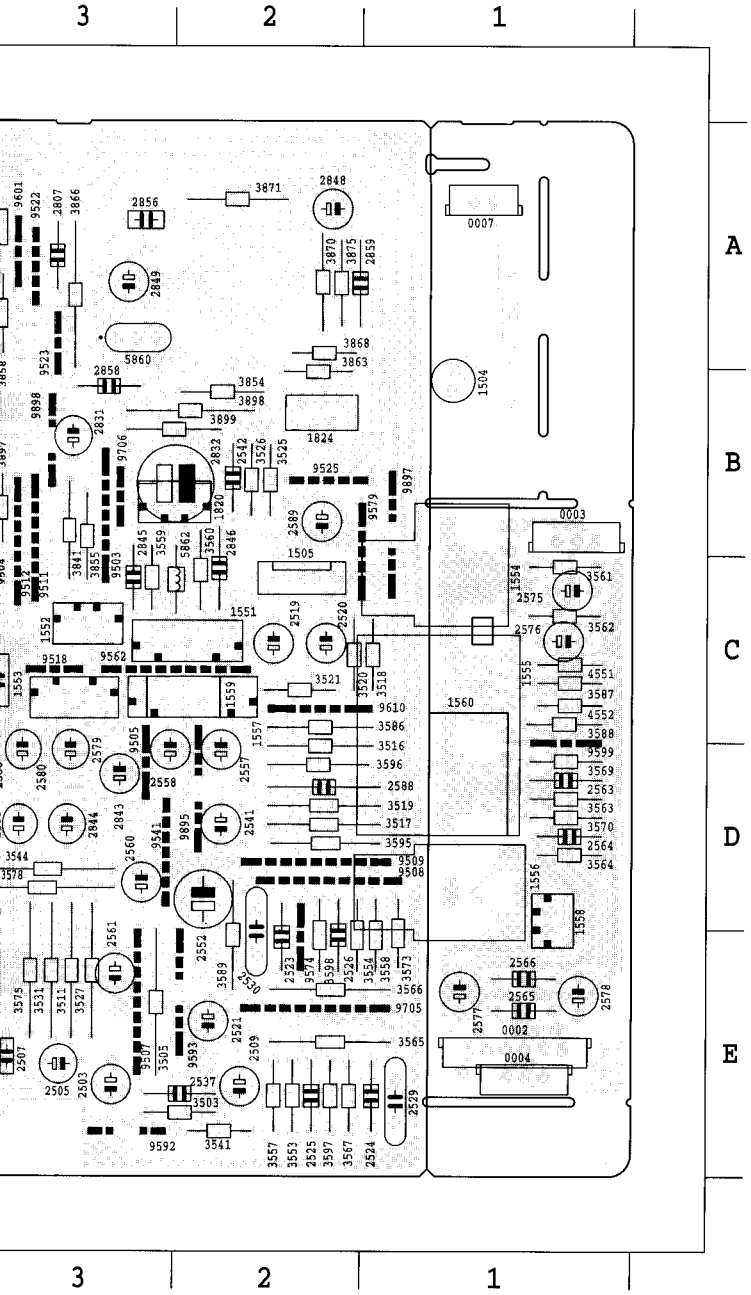

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706 E 4 3674 D 9 3720 B 8 3762 A 5 3859 B 3 4516 A 7 4548 C 2 4633 C 6 4663 D 5 4703 C 5 7506 E 2 7701 C 5 T008 A 4 T035 C 5 T064 E 5 T095 C 1 T133 E 7 T173 C 9
707 D 4 3675 D 8 3721 C 8 3763 A 8 3860 A 3 4517 C 8 4549 B 3 4634 C 6 4664 D 6 4704 B 6 7507 E 3 7710 A 9 T009 A 3 T036 C 5 T065 E 5 T096 C 1 T134 D 8 T174 B 9
708 E 6 3676 D 8 3722 B 8 3764 A 7 3861 A 4 4518 D 8 4550 B 6 4635 C 6 4665 E 6 4705 A 6 7508 C 1 7720 A 8 T010 A 4 T037 C 5 T066 E 3 T097 D 1 T135 E 8 T175 C 8
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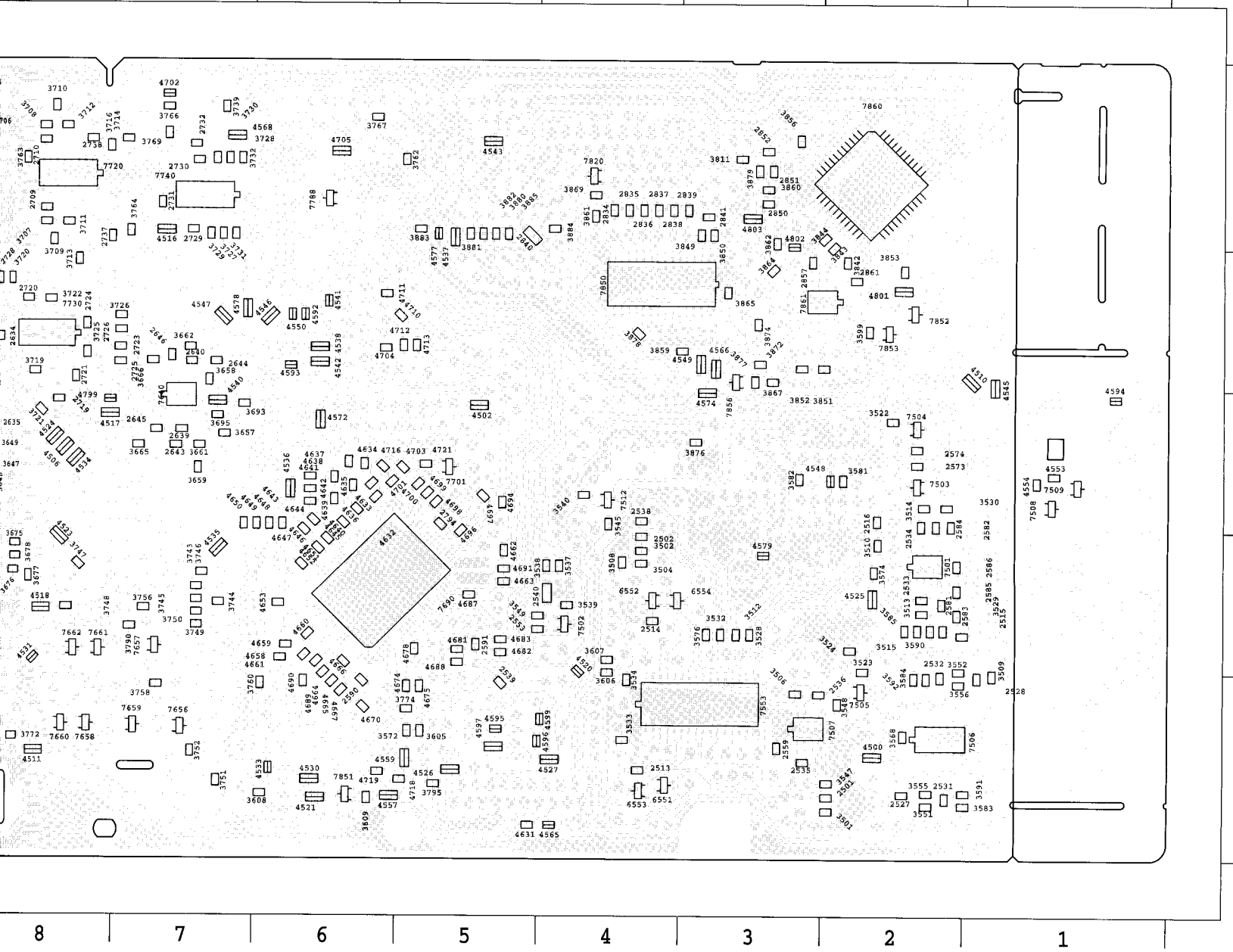
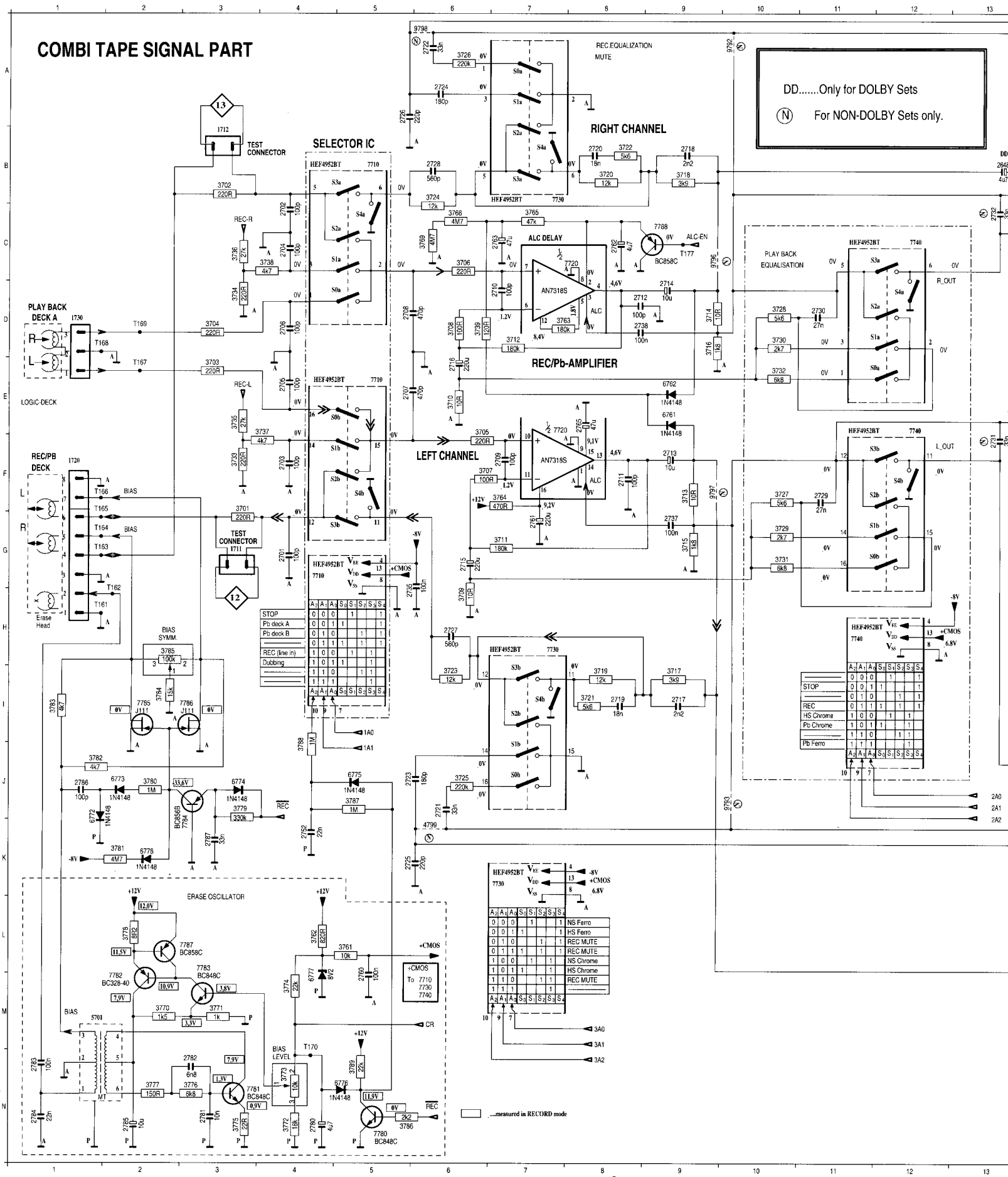
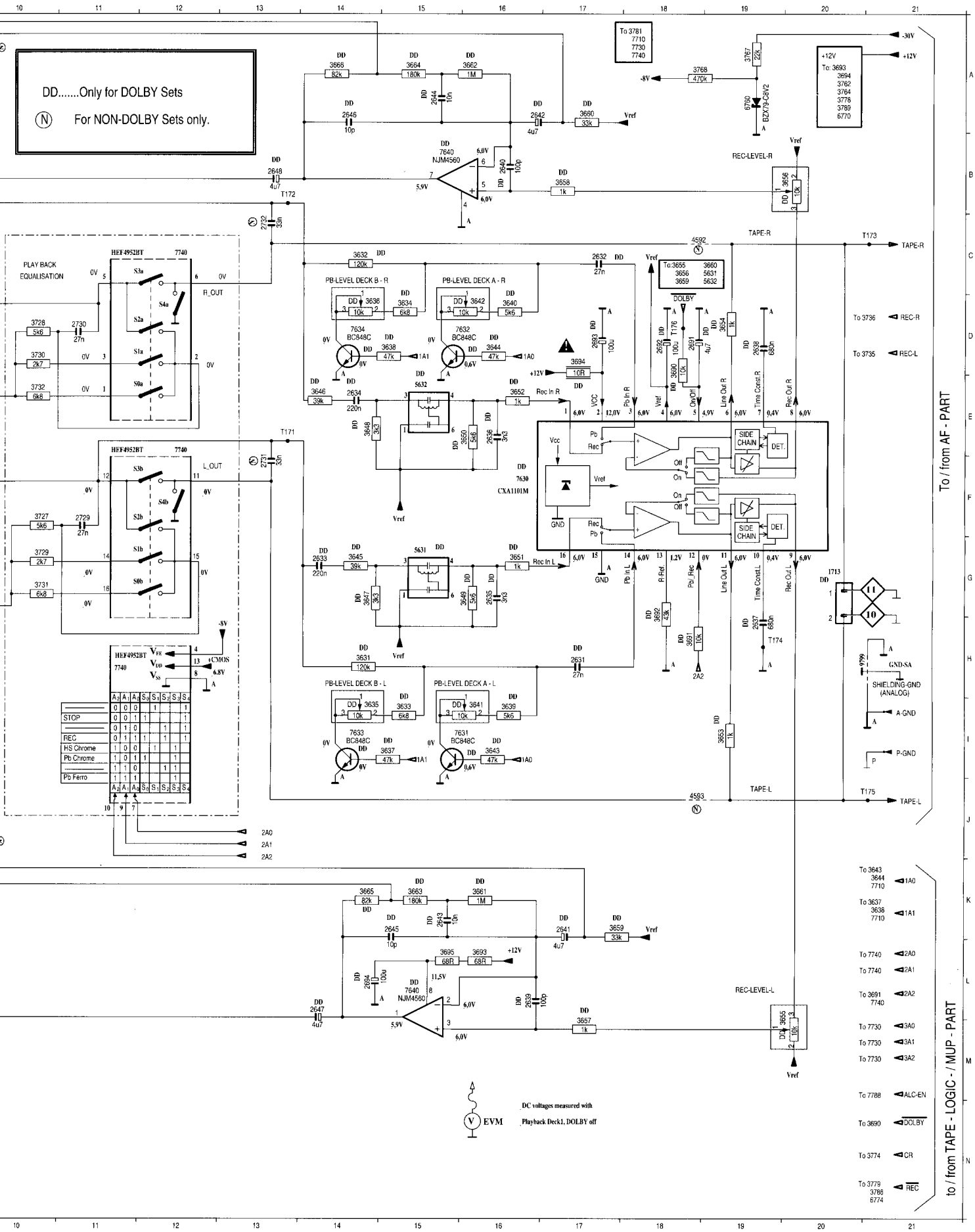
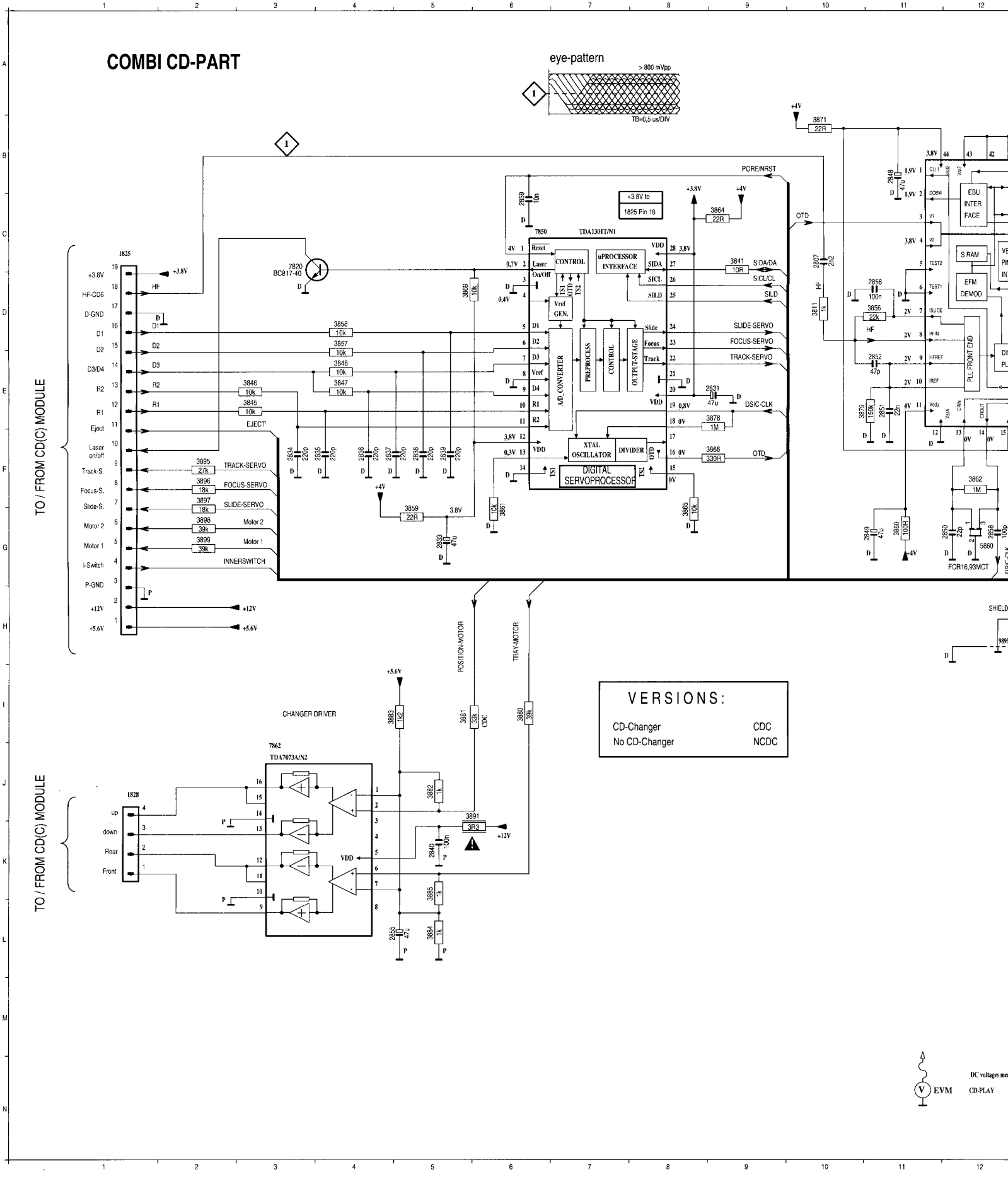
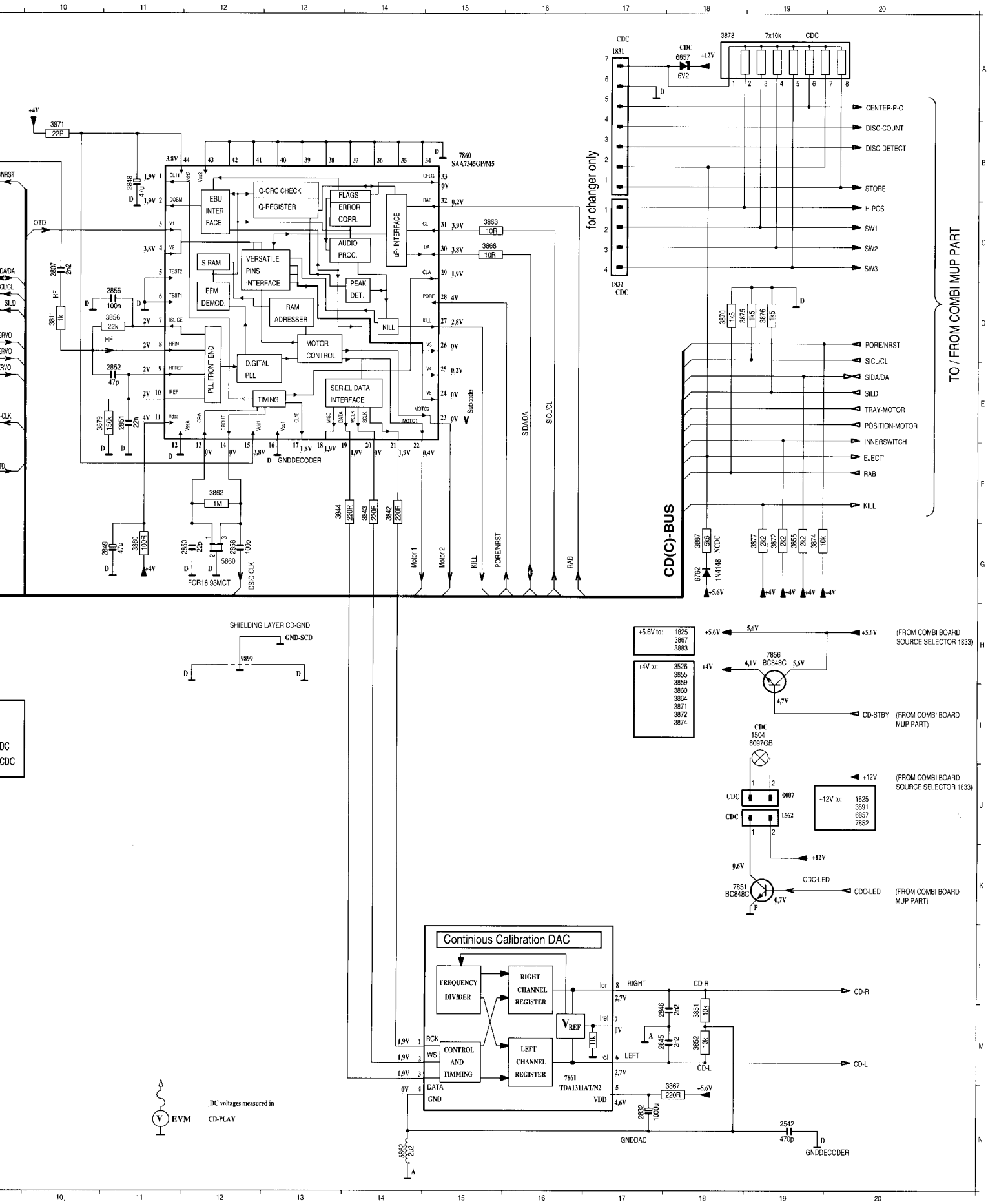



COMBI TAPE SIGNAL PART
DD.....Only for DOLBY Sets
(N) For NON-DOLBY Sets only.
RIGHT CHANNEL
LEFT CHANNEL
REC/Pb-AMPLIFIER
SELECTOR IC
TEST CONNECTOR
ALC DELAY
AN7318S
HEF4952BT
PLAY BACK DECK A
REC/PB DECK
LOGIC-DECK
PLAY BACK EQUALISATION
REC.EQUALIZATION MUTE
BIAS SYMM.
ERASE OSCILLATOR
BIAS LEVEL
R_OUT
L_OUT
STOP
Pb deck A
Pb deck B
REC (line in)
Dubbing
REC
HS Chrome
Pb Chrome
Pb Ferro
NS Ferro
HS Ferro
REC MUTE
NS Chrome
To 7710 7730 7740
....measured in RECORD mode


DD.....Only for DOLBY Sets
(N) For NON-DOLBY Sets only.
PLAY BACK EQUALISATION
HEF4952BT
7740
R_OUT
L_OUT
PB-LEVEL DECK B - R
PB-LEVEL DECK A - R
PB-LEVEL DECK B - L
PB-LEVEL DECK A - L
7634 BC848C
7632 BC848C
7633 BC848C
7631 BC848C
7640 NJM4560
7630 CXA1101M
REC-LEVEL-R
REC-LEVEL-L
TAPE-R
TAPE-L
T171
T172
T173
T174
T175
DOLBY
SIDE CHAIN
DET.
GND-SA
SHIELDING-GND (ANALOG)
A-GND
P-GND
EVM
DC voltages measured with
Playback Deck1, DOLBY off
To / from AF - PART
to / from TAPE - LOGIC - / MUP - PART


COMBI CD-PART
eye-pattern
> 800 mVpp
TB=0,5 us/DIV
TO / FROM CD(C) MODULE
TO / FROM CD(C) MODULE
1825
1828
7850
TDA1301T/N1
7862
TDA7073A/N2
7820
BC817-40
DIGITAL SERVOPROCESSOR
A/D CONVERTER
PREPROCESS
CONTROL
OUTPUT STAGE
uPROCESSOR INTERFACE
XTAL OSCILLATOR
DIVIDER
CHANGER DRIVER
POSITION-MOTOR
TRAY-MOTOR
EBU INTER FACE
S RAM
EFM DEMOD
PLL FRONT END
FCR16,93MCT
TRACK-SERVO
FOCUS-SERVO
SLIDE-SERVO
Motor 2
Motor 1
INNERSWITCH
SLIDE-SERVO
FOCUS-SERVO
TRACK-SERVO
DSIC-CLK
SIDA/DA
SICL/CL
SILD
OTD
PORE/MRST
+3.8V to 1825 Pin 18
VERSIONS:
CD-Changer CDC
No CD-Changer NCDC
EVM
CD-PLAY


SAA7345GP/M5
Q-CRC CHECK
Q-REGISTER
FLAGS
ERROR
CORR.
EBU
INTER
FACE
AUDIO
PROC.
µP-INTERFACE
VERSATILE
PINS
INTERFACE
S RAM
EFM
DEMOD.
RAM
ADRESSER
PEAK
DET.
KILL
MOTOR
CONTROL
DIGITAL
PLL
PLL FRONT END
TIMING
SERIEL DATA
INTERFACE
GNDDECODER
FCR16,93MCT
DSIC-CLK
SIDA/DA
SICL/CL
Subcode
Motor 1
Motor 2
KILL
PORE/NRST
RAB
for changer only
CENTER-P-O
DISC-COUNT
DISC-DETECT
STORE
H-POS
SW1
SW2
SW3
PORE/NRST
SICL/CL
SIDA/DA
SILD
TRAY-MOTOR
POSITION-MOTOR
INNERSWITCH
EJECT
RAB
KILL
CD(C)-BUS
TO / FROM COMBI MUP PART
SHIELDING LAYER CD-GND
GND-SCD
+5.6V to: 1825 3867 3883
+4V to: 3526 3855 3859 3860 3864 3871 3872 3874
(FROM COMBI BOARD SOURCE SELECTOR 1833)
CD-STBY (FROM COMBI BOARD MUP PART)
+12V to: 1825 3891 6857 7852
CDC-LED (FROM COMBI BOARD MUP PART)
Continious Calibration DAC
FREQUENCY DIVIDER
RIGHT CHANNEL REGISTER
LEFT CHANNEL REGISTER
CONTROL AND TIMMING
BCK
WS
DATA
GND
RIGHT
LEFT
CD-R
CD-L
VDD
7861
TDA1311AT/N2
GNDDAC
GNDDECODER
DC voltages measured in
CD-PLAY
EVM

2501 E 2	2586 D 2	2729 A 7	3504 D 4	3551 E 2	3639 C 9	3685 D 9	3729 A 7	3774 E 5	3869 A 4	4525 D 2	4559 E 5	4640 C 6	4674 E 5	4716 C 5	7631 C 9	7783 E 8	T015
2502 D 4	2631 C 9	2730 A 7	3506 E 3	3552 D 2	3640 B 9	3689 D 9	3730 A 7	3778 E 9	3872 B 3	4526 E 5	4561 E 5	4641 C 6	4675 E 5	4718 E 5	7632 B 9	7784 E 9	T016
2513 E 4	2632 B 9	2731 A 7	3508 D 4	3555 E 2	3644 B 9	3692 C 9	3731 A 7	3779 E 9	3874 B 3	4527 E 4	4565 E 4	4642 C 6	4678 D 5	4719 E 5	7633 C 9	7787 E 9	T018
2514 D 4	2633 C 8	2732 A 7	3509 E 1	3556 E 2	3645 C 8	3693 C 7	3732 A 7	3780 E 9	3876 C 3	4529 B 9	4566 B 3	4643 C 6	4681 D 5	4721 C 5	7634 B 9	7788 A 6	T019
2515 D 2	2634 B 8	2737 A 8	3510 D 2	3568 E 2	3647 C 8	3695 C 7	3734 A 8	3782 E 9	3877 B 3	4530 E 6	4568 A 7	4644 C 6	4682 D 5	4723 C 8	7640 C 7	7820 A 4	T020
2516 C 2	2635 C 8	2738 A 8	3512 D 3	3572 E 6	3648 B 9	3701 A 9	3737 A 9	3783 E 9	3878 B 4	4531 D 8	4572 C 6	4645 C 6	4683 D 5	4724 B 8	7650 D 9	7850 B 4	T021
2527 E 2	2636 B 8	2752 E 9	3513 D 2	3574 D 2	3649 C 8	3702 A 9	3743 D 7	3784 E 9	3879 A 3	4533 E 6	4574 C 3	4646 D 6	4687 D 5	4799 C 8	7651 D 9	7851 E 6	T022
2528 E 1	2639 C 7	2760 A 8	3514 C 2	3576 D 3	3650 B 9	3703 A 8	3744 D 7	3787 E 9	3880 A 5	4534 C 8	4577 A 5	4647 D 6	4688 D 5	4801 B 2	7652 D 9	7852 B 2	T023
2531 E 2	2640 B 7	2782 E 9	3515 D 2	3581 C 2	3651 C 9	3704 A 8	3745 D 7	3790 D 7	3881 A 5	4535 D 7	4578 B 7	4648 C 6	4689 D 6	4802 A 3	7653 D 9	7853 B 2	T024
2532 E 2	2643 C 7	2787 E 9	3522 C 2	3582 C 3	3652 B 8	3707 A 8	3746 D 7	3811 A 3	3882 A 5	4536 C 6	4579 D 3	4649 C 6	4690 E 6	4803 A 3	7654 D 9	7856 B 3	T025
2533 D 2	2644 B 7	2794 C 5	3523 D 2	3583 E 1	3657 C 7	3708 A 8	3747 D 8	3842 B 2	3883 A 5	4537 A 5	4592 A 6	4650 C 7	4691 D 5	6551 E 4	7655 D 9	7860 A 2	T026
2534 C 2	2645 C 7	2834 A 4	3524 D 2	3584 E 2	3658 B 7	3709 A 8	3748 D 8	3843 B 2	3884 A 4	4538 B 6	4593 B 6	4651 C 6	4694 C 5	6552 D 4	7656 E 7	7861 B 3	T027
2535 E 3	2646 B 7	2835 A 4	3528 D 3	3585 D 2	3659 C 7	3710 A 8	3749 D 7	3844 A 2	3885 A 5	4540 C 7	4594 C 1	4652 D 6	4696 D 5	6553 E 4	7657 D 7	T001 A 4	T028
2536 E 3	2705 A 8	2836 A 4	3529 D 2	3590 D 2	3661 C 7	3711 A 8	3750 D 7	3849 A 3	4500 E 2	4541 B 6	4595 E 5	4653 D 6	4697 C 5	6554 D 4	7658 E 8	T002 A 3	T029
2538 C 4	2706 A 8	2837 A 4	3530 C 2	3591 E 1	3662 B 7	3712 A 8	3751 E 7	3850 A 3	4502 C 5	4542 B 6	4596 E 4	4658 D 6	4698 C 5	7501 D 2	7659 E 7	T003 A 3	T030
2539 E 5	2707 A 8	2838 A 4	3532 D 3	3592 E 2	3665 C 7	3713 A 8	3752 E 7	3851 B 2	4503 A 9	4543 A 5	4597 E 5	4659 D 6	4699 C 5	7502 D 4	7660 E 8	T004 A 4	T031
2540 D 4	2708 A 8	2839 A 3	3533 E 4	3599 B 2	3666 B 7	3714 A 7	3756 D 7	3852 B 3	4506 C 8	4545 B 1	4599 E 4	4660 D 6	4700 C 5	7503 C 2	7661 D 8	T005 A 3	T032
2553 D 5	2709 A 8	2840 A 5	3534 E 4	3600 E 6	3670 D 9	3716 A 8	3758 E 7	3853 B 2	4510 B 1	4546 B 6	4631 E 5	4661 E 6	4701 C 5	7504 C 2	7662 D 8	T006 A 4	T033
2559 E 3	2710 A 8	2841 A 3	3537 D 4	3605 E 5	3673 D 9	3719 B 8	3760 E 6	3856 A 3	4511 E 8	4547 B 7	4632 C 6	4662 D 5	4702 A 7	7505 E 2	7690 D 6	T007 A 4	T034
2573 C 2	2719 C 8	2850 A 3	3538 D 4	3606 E 4	3674 D 9	3720 B 8	3762 A 5	3859 B 3	4516 A 7	4548 C 2	4633 C 6	4663 D 5	4703 C 5	7506 E 2	7701 C 5	T008 A 4	T035
2574 C 2	2720 B 8	2851 A 3	3539 D 4	3607 D 4	3675 D 8	3721 C 8	3763 A 8	3860 A 3	4517 C 8	4549 B 3	4634 C 6	4664 D 6	4704 B 6	7507 E 3	7710 A 9	T009 A 3	T036
2581 D 2	2721 B 8	2852 A 3	3540 C 4	3608 E 6	3676 D 8	3722 B 8	3764 A 7	3861 A 4	4518 D 8	4550 B 6	4635 C 6	4665 E 6	4705 A 6	7508 C 1	7720 A 8	T010 A 4	T037
2582 C 2	2723 B 7	2857 B 3	3545 C 4	3609 E 6	3677 D 8	3725 B 8	3767 A 6	3862 A 3	4520 D 4	4553 C 1	4636 C 6	4666 D 6	4710 B 5	7509 C 1	7730 B 8	T011 A 4	T038
2583 D 2	2724 B 8	2861 B 2	3547 E 2	3633 C 9	3678 D 8	3726 B 7	3769 A 7	3864 B 3	4521 E 6	4554 C 1	4637 C 6	4667 E 6	4711 B 6	7512 C 4	7740 A 7	T012 A 4	T039
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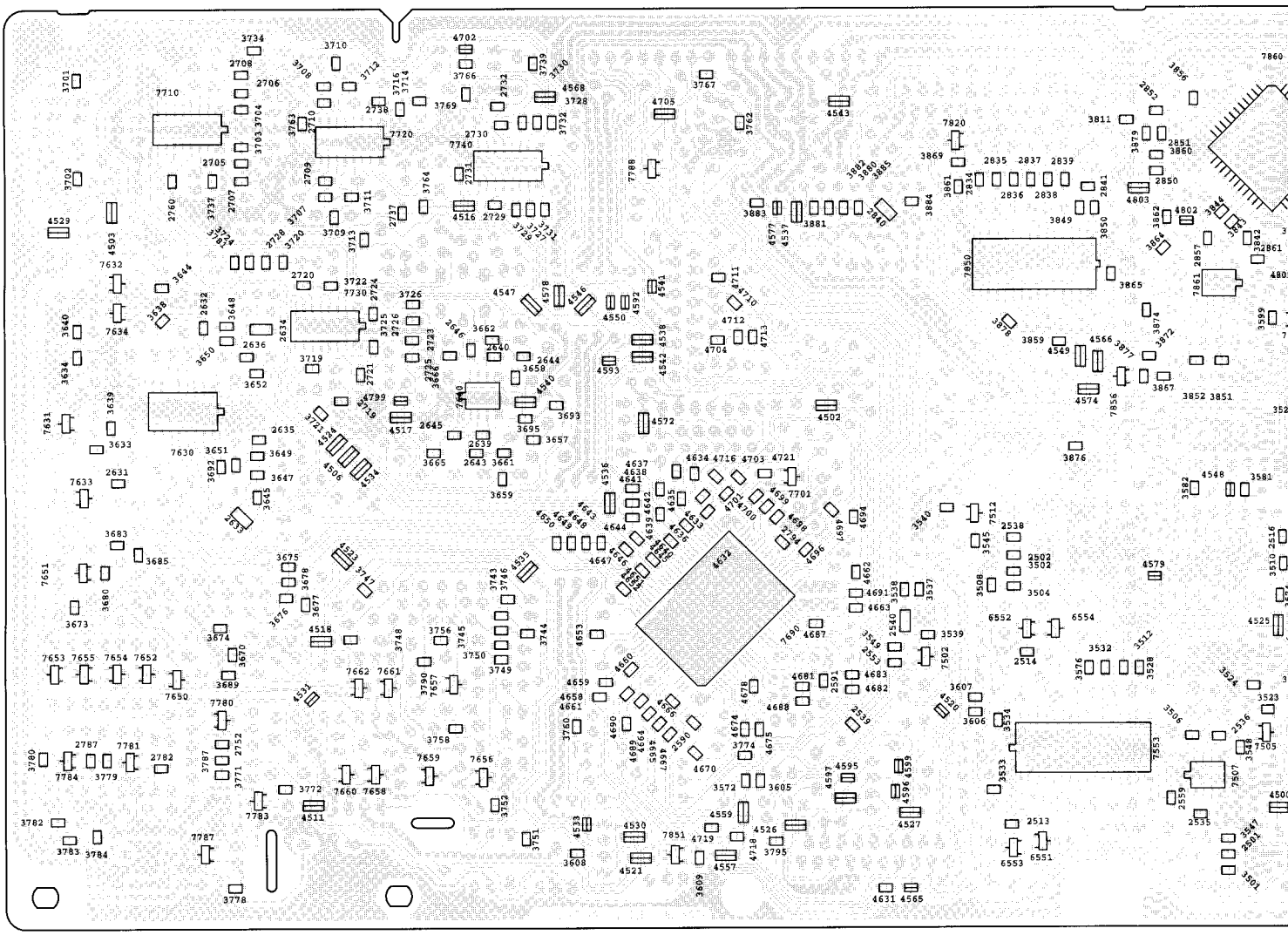

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D 4	7660 E 8	T004 A 4	T031 C 6	T059 A 5	T091 E 6	T129 E 7	T169 A 8
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C 4	7740 A 7	T012 A 4	T039 C 6	T068 E 5	T099 E 1	T140 B 6	T177 B 5
B 3	7780 E 9	T013 A 4	T040 C 6	T072 D 2	T100 E 6	T141 B 6	
C 9	7781 E 9	T014 B 3	T041 C 6	T073 B 2	T113 D 8	T142 A 5	

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9798 B 7	9702 B 9	9593 E 2	9556 B 8	9533 E 4	9509 D 2	6776 E 9	4692 D 5
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	9788 E 7	9603 C 4	9567 E 8	9543 C 6	9520 C 5	7786 B 9	5790 C 5
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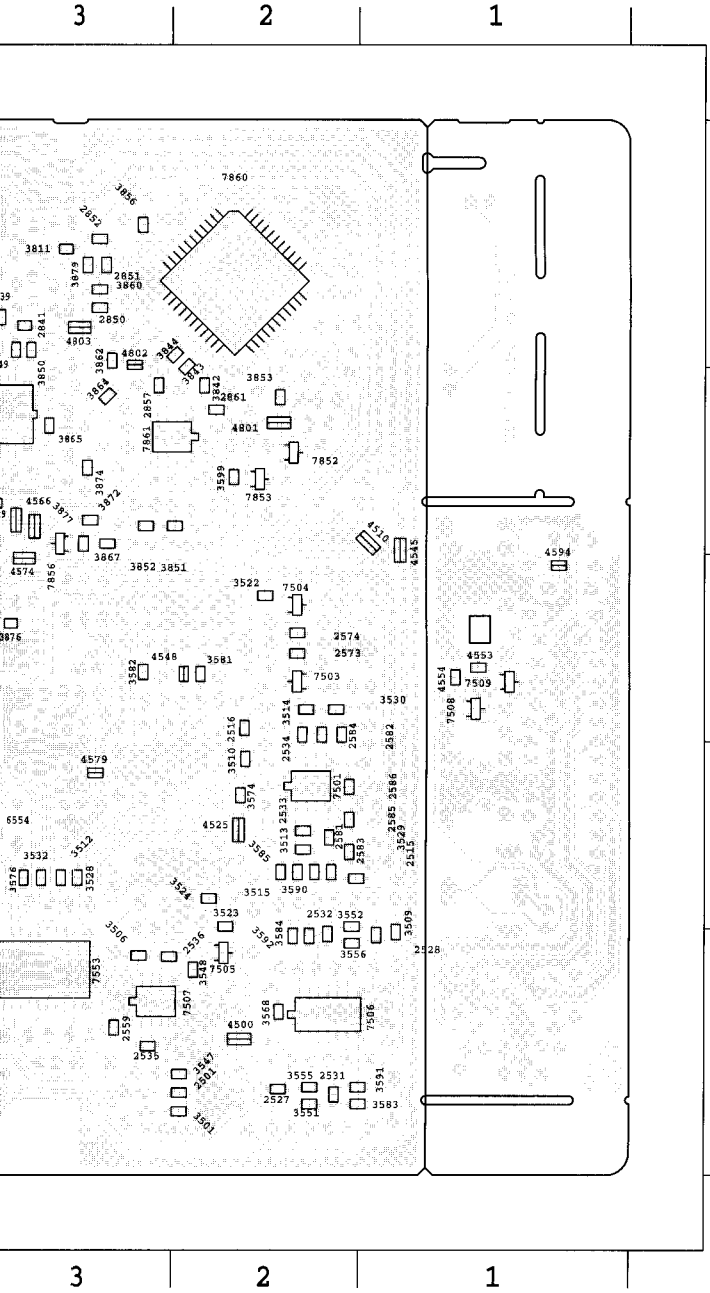

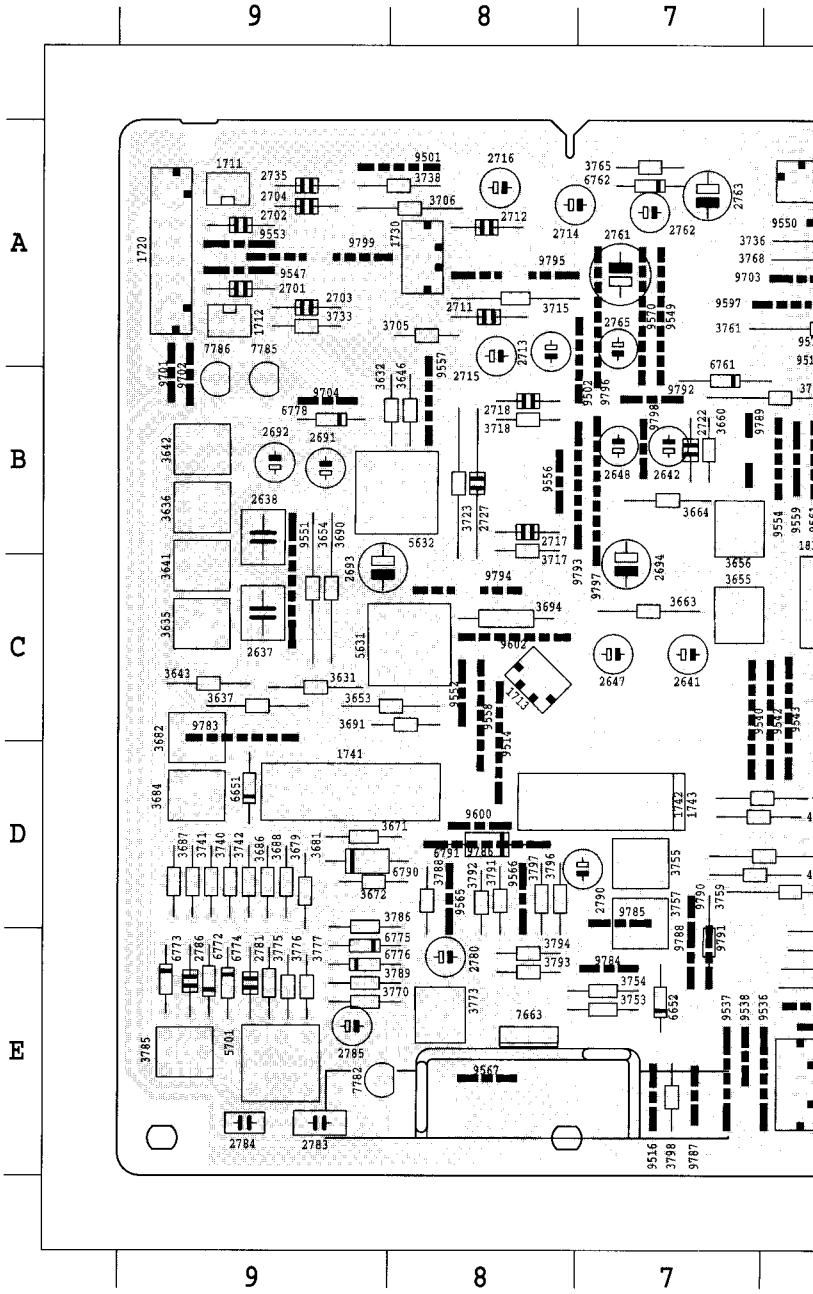

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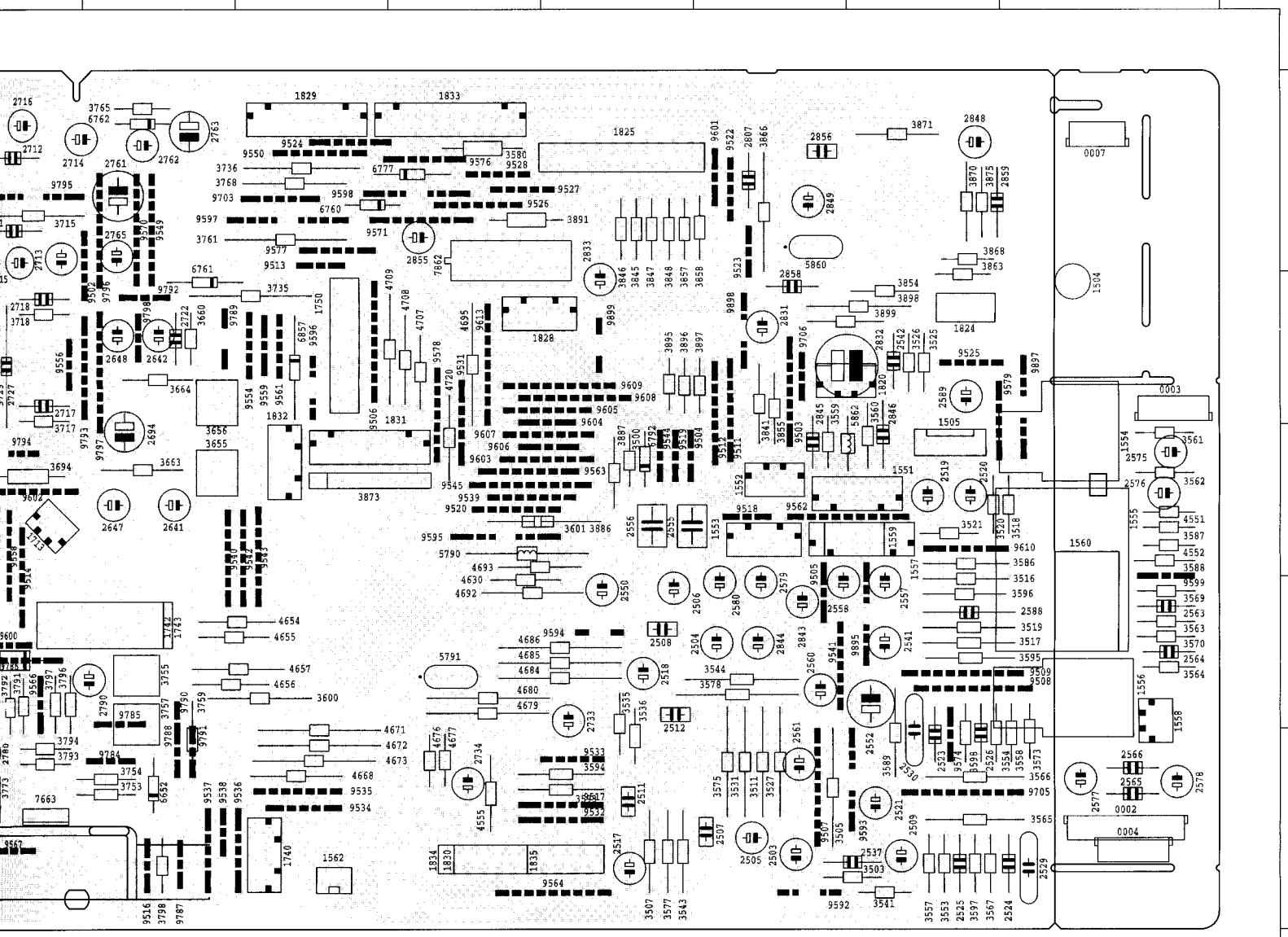

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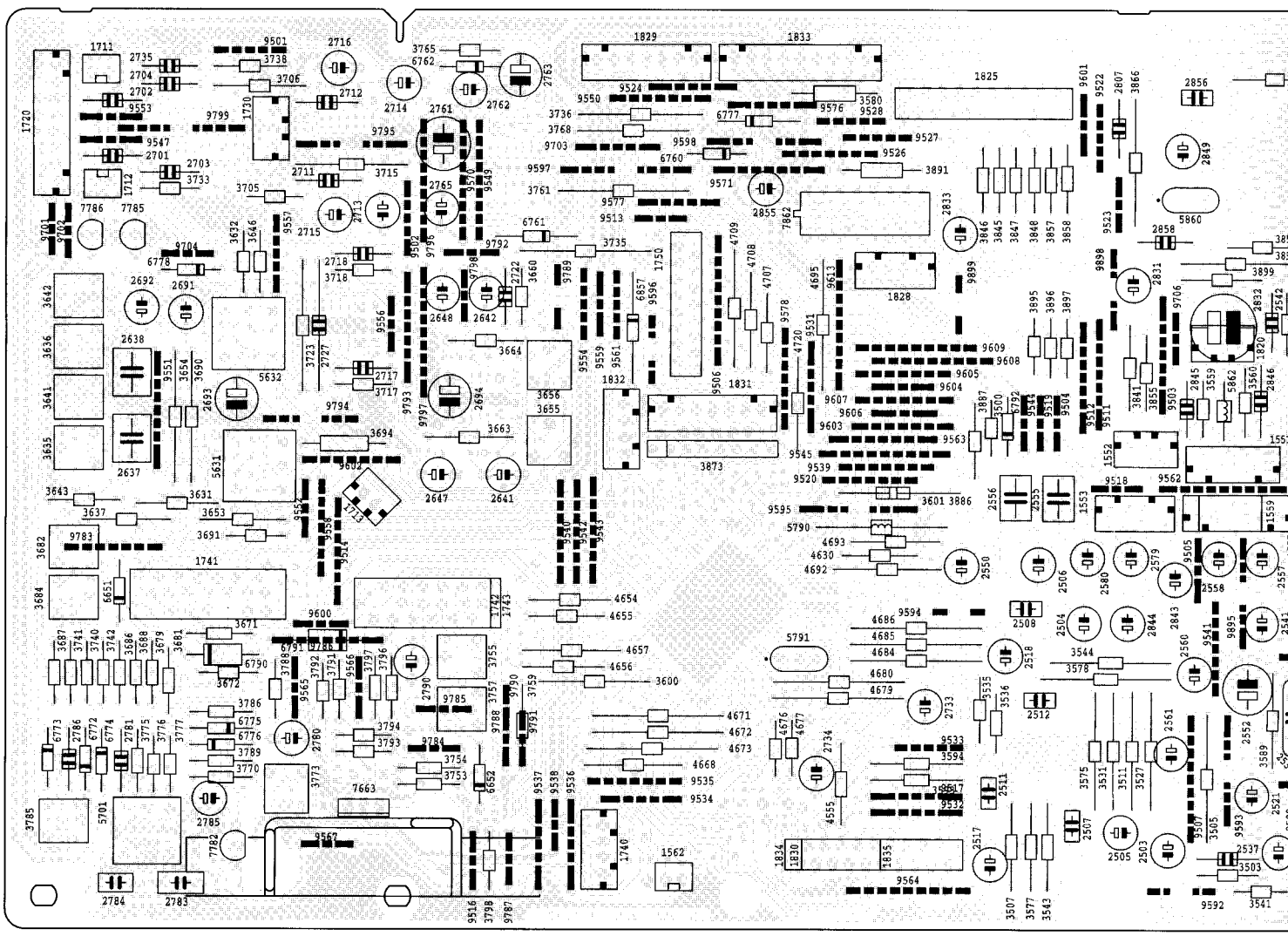

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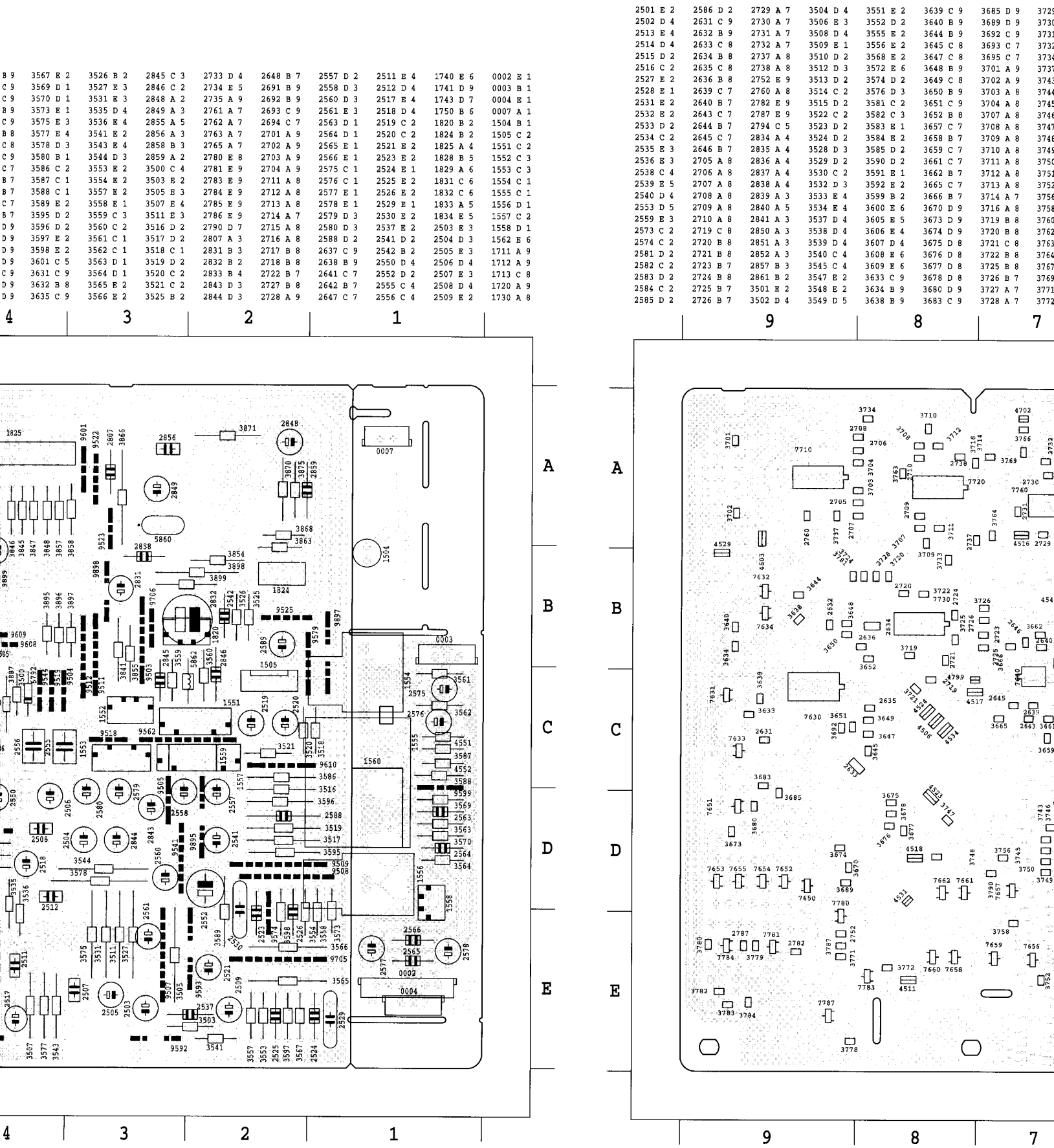
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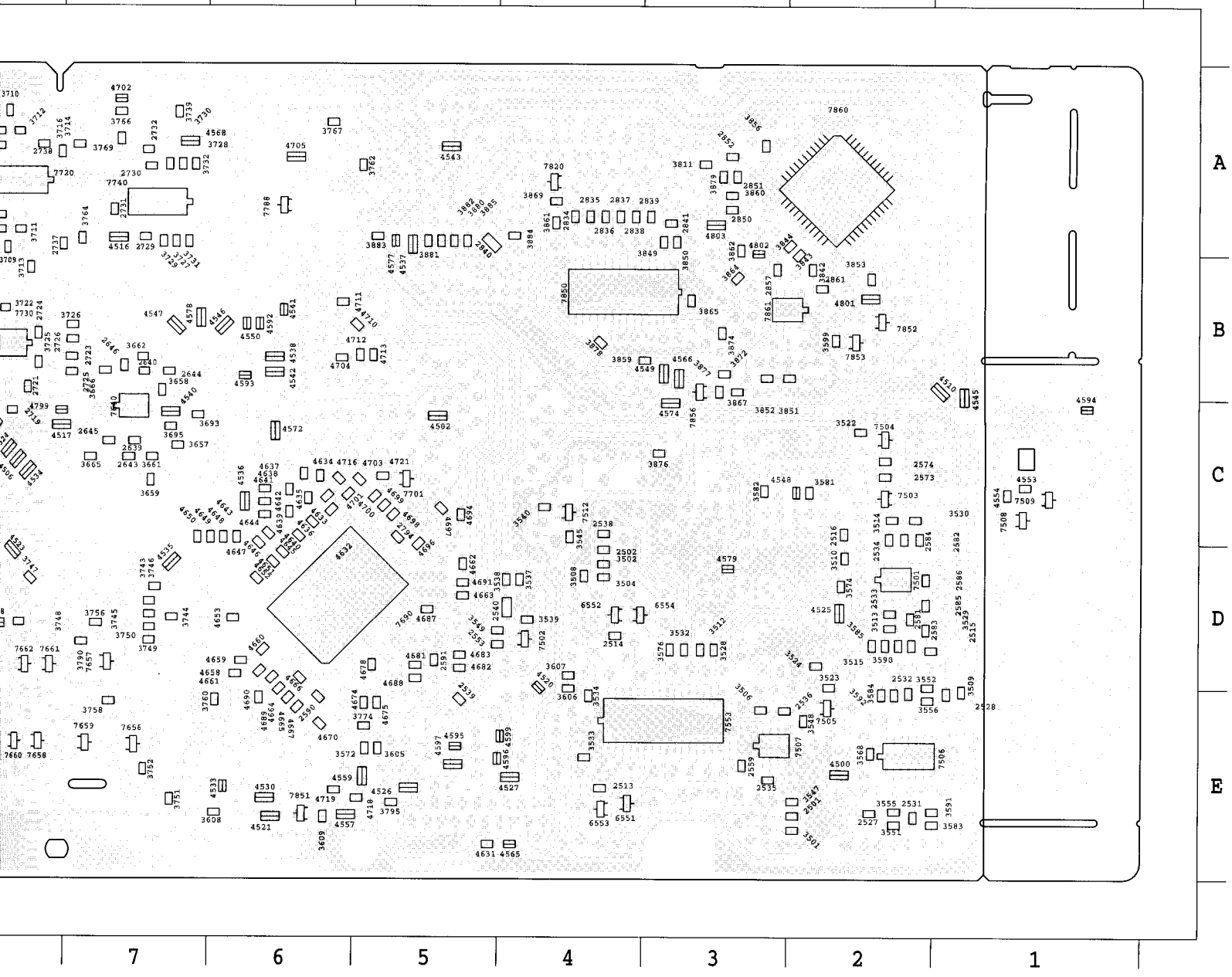

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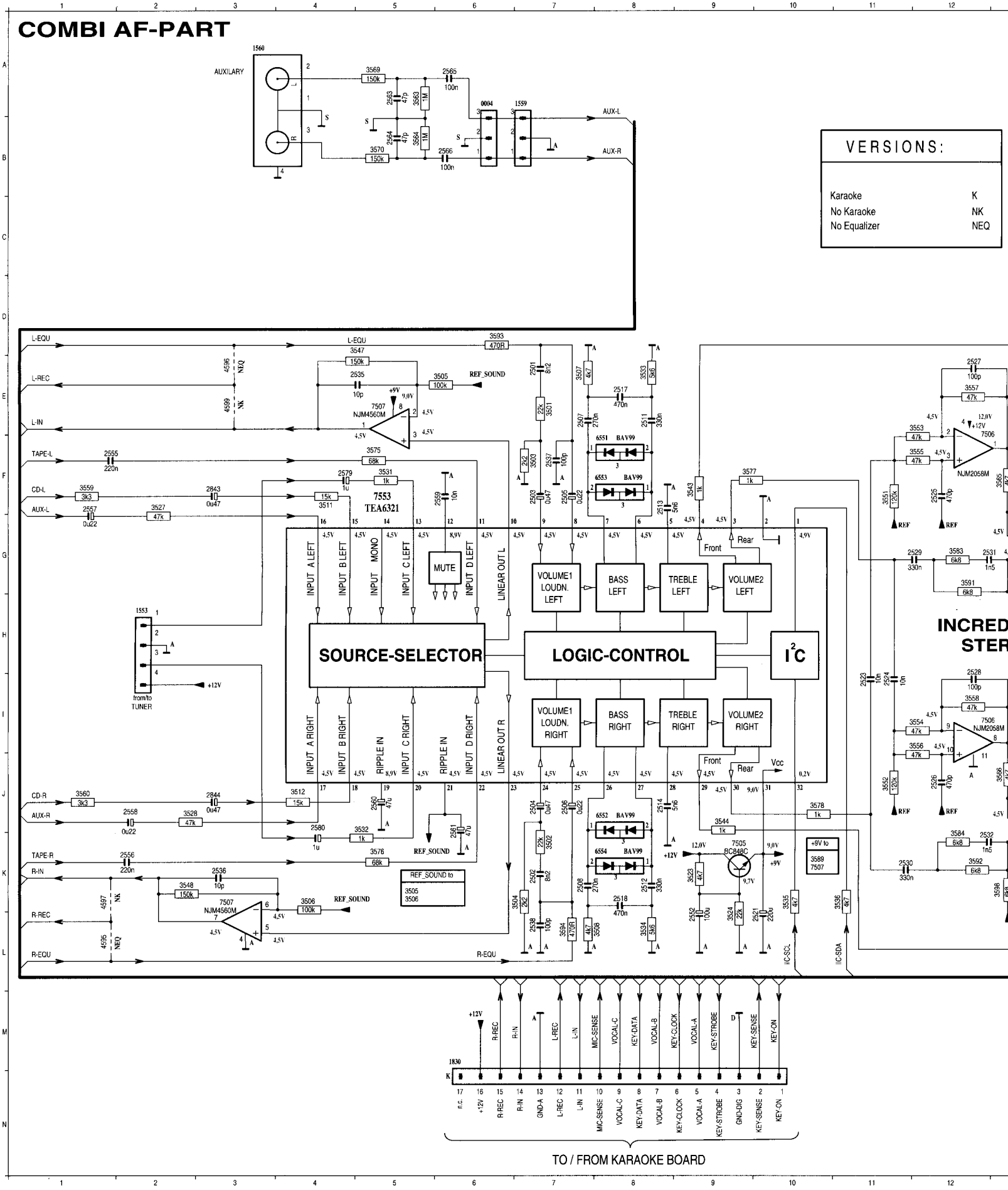

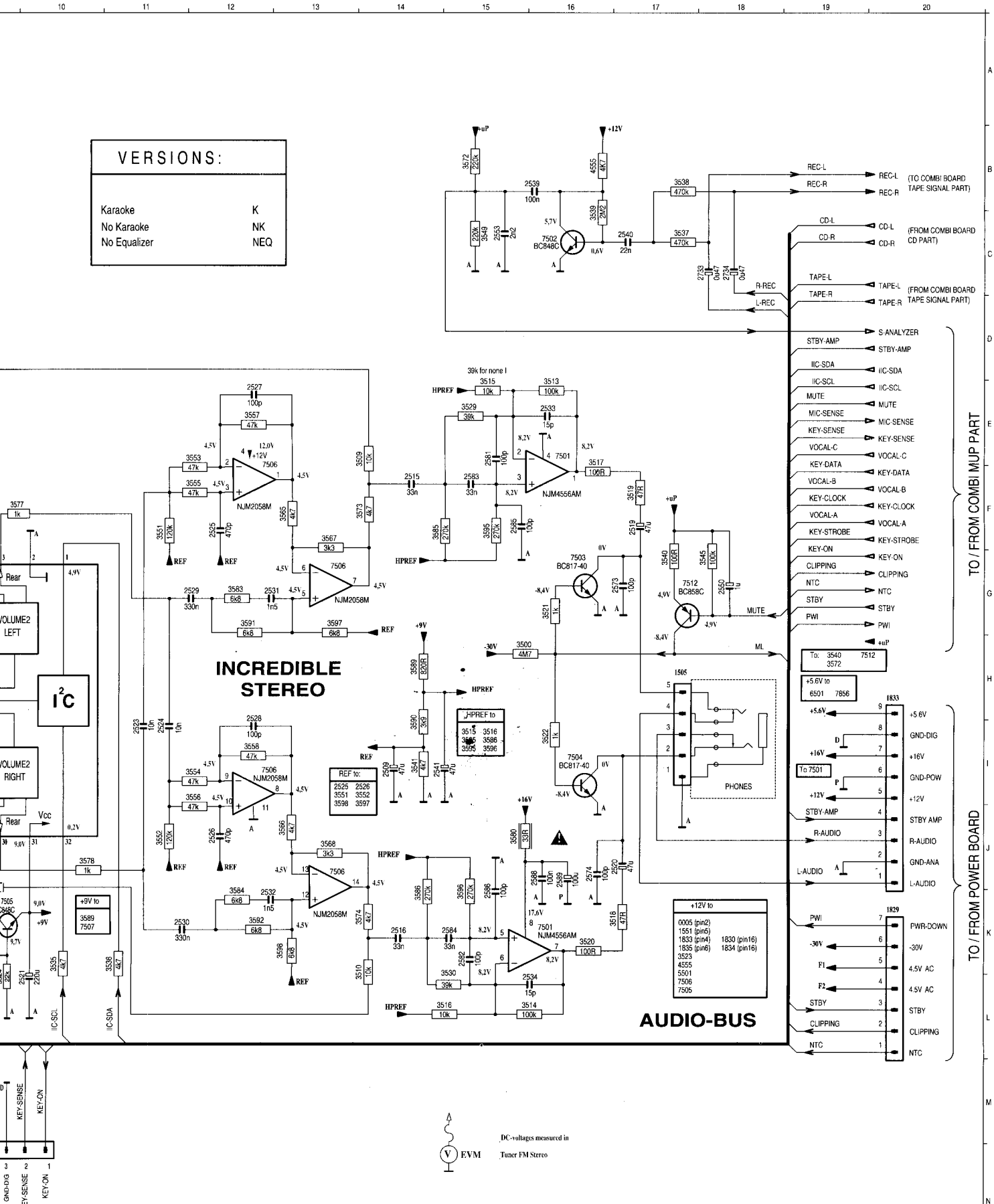

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7631	5322 130 42136	BC848C(CHIP)
7632	5322 130 42136	BC848C(CHIP)
7633	5322 130 42136	BC848C(CHIP)
7634	5322 130 42136	BC848C(CHIP)
7640	5322 130 42136	BC848C(CHIP)
7650	5322 130 42136	BC848C(CHIP)
7651	4822 130 42513	BC858C
7652	5322 130 42136	BC848C(CHIP)
7653	5322 130 60123	BC807-40 (CHIP)
7654	5322 130 42136	BC848C(CHIP)
7655	5322 130 60123	BC807-40 (CHIP)
7661	5322 130 60123	BC807-40 (CHIP)
7662	5322 130 42136	BC848C(CHIP)
7663	4822 130 40982	BD433
7001	4822 130 40982	BD433
7690	4822 130 40982	BD433
7701	5322 130 42136	BC848C(CHIP)
7780	5322 130 42136	BC848C(CHIP)
7781	5322 130 42136	BC848C(CHIP)
7782	4822 130 41715	BC328-40
7783	5322 130 42136	BC848C(CHIP)
7784	4822 130 60373	BC856B
7785	4822 130 63494	J111
7786	4822 130 63494	J111
7787	4822 130 42513	BC858C
7788	4822 130 42513	BC858C
7820	4822 130 42615	BC817-40(CHIP)
7851	5322 130 42136	BC848C(CHIP)
7856	5322 130 42136	BC848C(CHIP)

INTEGRATED CIRCUITS

7501	4822 209 31378	NJM4556M
7553	4822 209 33652	TEA6321T/V1
7630	4822 209 90406	CXA1101M
7710	4822 209 32919	HEF4952BT
7720	4822 209 32918	AN7318S
7730	4822 209 32919	HEF4952BT
7740	4822 209 32919	HEF4952BT
7850	4822 209 31064	TDA1301T/N1
7860	4822 209 90618	SAA7345GP/S5
7861	4822 209 90618	SAA7345GP/S5
7862	4822 209 32852	TDA7073A/N2

COILS

5631	4822 156 21725	MPX FILTER
5632	4822 156 21725	MPX FILTER
5701	4822 156 20946	OSC.COIL 100kHz
5790	4822 156 21721	COIL 2,2µH
5791	5322 242 73697	CERAM.RES. 8MHz
5860	4822 242 81865	CER.RES. 16.93MHz
5862	4822 156 21721	COIL 2,2µH
6551	4822 156 21721	COIL 2,2µH
6552	4822 156 21721	COIL 2,2µH
6553	4822 156 21721	COIL 2,2µH
6554	4822 156 21721	COIL 2,2µH

RESISTORS

3500	4822 111 30893	4M7	5%	0,2W
3503	4822 116 52256	2k2	5%	0,16W
3505	4822 116 52234	100k	5%	0,5W
3507	4822 116 52283	4k7	5%	0,5W
3511	4822 116 52244	15k	5%	0,5W
3516	4822 116 83864	10k	5%	0,5W
3517	4822 116 52175	100R	5%	0,5W
3518	4822 116 52195	47R	5%	0,5W
3519	4822 116 52195	47R	5%	0,5W
3520	4822 116 52175	100R	5%	0,5W
3521	4822 050 11002	1k	5%	0,2W
3527	4822 116 52284	47k	5%	0,5W
3531	4822 050 11002	1k	5%	0,2W
3535	4822 116 52283	4k7	5%	0,5W
3536	4822 116 52283	4k7	5%	0,5W
3541	4822 116 52283	4k7	5%	0,5W
3543	4822 050 11002	1k	5%	0,2W
3544	4822 050 11002	1k	5%	0,2W
3553	4822 116 52284	47k	5%	0,5W
3554	4822 116 52284	47k	5%	0,5W
3557	4822 116 52284	47k	5%	0,5W
3558	4822 116 52284	47k	5%	0,5W
3559	4822 116 52269	3k3	5%	0,5W
3560	4822 116 52269	3k3	5%	0,5W
3563	4822 116 52235	1M	5%	0,5W
3564	4822 116 52235	1M	5%	0,5W
3565	4822 116 52283	4k7	5%	0,5W
3566	4822 116 52283	4k7	5%	0,5W
3567	4822 116 52269	3k3	5%	0,5W
3569	4822 116 52245	150k	5%	0,16W
3570	4822 116 52245	150k	5%	0,16W
3573	4822 116 52283	4k7	5%	0,5W
3575	4822 116 52297	68k	5%	0,5W
3577	4822 050 11002	1k	5%	0,2W
3578	4822 050 11002	1k	5%	0,2W

RESISTORS

3580	4822 052
3586	4822 116
3589	4822 116
3593	4822 116
3594	4822 116
3595	4822 116
3596	4822 116
3597	4822 116
3598	4822 116
3600	4822 116
3601	4822 116
3631	4822 116
3632	4822 116
3635	4822 100
3636	4822 100
3637	4822 116
3641	4822 100
3642	4822 100
3643	4822 116
3646	4822 116
3653	4822 050
3654	4822 050
3655	4822 100
3656	4822 100
3660	4822 116
3663	4822 116
3664	4822 116
3671	4822 050
3672	4822 116
3679	4822 116
3681	4822 116
3682	4822 100
3684	4822 100
3686	4822 116
3687	4822 050
3688	4822 116
3690	4822 116
3691	4822 116
3694	4822 052
3705	4822 116
3706	4822 116
3715	4822 116
3717	4822 116
3718	4822 116
3723	4822 116
3733	4822 116
3735	4822 116
3736	4822 116
3738	4822 116
3740	4822 116
3741	4822 050
3742	4822 116
3759	4822 050
3761	4822 116
3765	4822 116
3770	4822 116
3773	4822 100
3775	4822 116
3776	4822 116
3777	4822 116

ELECTRICAL PARTSLIST COMBI BOARD

RESISTORS

3580	4822 052 10339	33R	5%	NFR
3586	4822 116 83878	270k	5%	0,5W
3589	4822 116 52231	820R	5%	0,5W
3593	4822 116 52224	470R	5%	0,5W
3594	4822 116 52224	470R	5%	0,5W
3595	4822 116 83878	270k	5%	0,5W
3596	4822 116 83878	270k	5%	0,5W
3597	4822 116 52296	6k8	5%	0,5W
3598	4822 116 52296	6k8	5%	0,5W
3600	4822 116 52284	47k	5%	0,5W
3601	4822 116 52235	1M	5%	0,5W
3631	4822 116 52239	120k	5%	0,5W
3632	4822 116 52239	120k	5%	0,5W
3635	4822 100 20166	10k		TRIMPOT.
3636	4822 100 20166	10k		TRIMPOT.
3637	4822 116 52284	47k	5%	0,5W
3641	4822 100 20166	10k		TRIMPOT.
3642	4822 100 20166	10k		TRIMPOT.
3643	4822 116 52284	47k	5%	0,5W
3646	4822 116 83882	39k	5%	0,5W
3653	4822 050 11002	1k	5%	0,2W
3654	4822 050 11002	1k	5%	0,2W
3655	4822 100 20166	10k		TRIMPOT.
3656	4822 100 20166	10k		TRIMPOT.
3660	4822 116 52271	33k	5%	0,16W
3663	4822 116 52252	180k	5%	0,5W
3664	4822 116 52252	180k	5%	0,5W
3671	4822 050 11002	1k	5%	0,2W
3672	4822 116 52234	100k	5%	0,5W
3679	4822 116 52284	47k	5%	0,5W
3681	4822 116 52283	4k7	5%	0,5W
3682	4822 100 20166	10k		TRIMPOT.
3684	4822 100 20166	10k		TRIMPOT.
3686	4822 116 52284	47k	5%	0,5W
3687	4822 050 11002	1k	5%	0,2W
3688	4822 116 52234	100k	5%	0,5W
3690	4822 116 83864	10k	5%	0,5W
3691	4822 116 83864	10k	5%	0,5W
3694	4822 052 10109	10R	5%	0,33W
3705	4822 116 52215	220R	5%	0,16W
3706	4822 116 52215	220R	5%	0,16W
3715	4822 116 52249	1k8	5%	0,16W
3717	4822 116 52276	3k9	5%	0,5W
3718	4822 116 52276	3k9	5%	0,5W
3723	4822 116 52238	12k	5%	0,5W
3733	4822 116 52215	220R	5%	0,16W
3735	4822 116 52264	27k	5%	0,5W
3736	4822 116 52264	27k	5%	0,5W
3738	4822 116 52283	4k7	5%	0,5W
3740	4822 116 52284	47k	5%	0,5W
3741	4822 050 11002	1k	5%	0,2W
3742	4822 116 52234	100k	5%	0,5W
3759	4822 050 11002	1k	5%	0,2W
3761	4822 116 83864	10k	5%	0,5W
3765	4822 116 52284	47k	5%	0,5W
3770	4822 116 52243	1k5	5%	0,16W
3773	4822 100 20166	10k		TRIMPOT.
3775	4822 116 52186	22R	5%	0,5W
3776	4822 116 52296	6k8	5%	0,5W
3777	4822 116 52211	150R	5%	0,5W

RESISTORS

3778	4822 116 52211	150R	5%	0,5W
3785	4822 100 11163	TRIMPOT.		100klin.
3786	4822 116 52256	2k2	5%	0,16W
3788	4822 116 52235	1M	5%	0,5W
3789	4822 116 52257	22k	5%	0,5W
3796	4822 050 11002	1k	5%	0,2W
3797	4822 116 52234	100k	5%	0,5W
3798	4822 116 52175	100R	5%	0,5W
3841	4822 116 52176	10R	5%	0,5W
3845	4822 116 83864	10k	5%	0,5W
3846	4822 116 83864	10k	5%	0,5W
3847	4822 116 83864	10k	5%	0,5W
3848	4822 116 83864	10k	5%	0,5W
3854	4822 116 52215	220R	5%	0,16W
3855	4822 116 52256	2k2	5%	0,16W
3857	4822 116 83864	10k	5%	0,5W
3858	4822 116 83864	10k	5%	0,5W
3863	4822 116 52176	10R	5%	0,5W
3866	4822 116 52219	330R	5%	0,5W
3868	4822 116 52176	10R	5%	0,5W
3870	4822 116 52243	1k5	5%	0,16W
3871	4822 116 52186	22R	5%	0,5W
3875	4822 116 52243	1k5	5%	0,16W
3891	4822 052 10338	3R3		NFR25
3895	4822 116 52264	27k	5%	0,5W
3896	4822 116 52251	18k	5%	0,5W
3897	4822 116 52251	18k	5%	0,5W
3898	4822 116 83882	39k	5%	0,5W
3899	4822 116 83882	39k	5%	0,5W
4555	4822 116 52283	4k7	5%	0,5W
4630	4822 050 11002	1k	5%	0,2W
4654	4822 050 11002	1k	5%	0,2W
4655	4822 050 11002	1k	5%	0,2W
4656	4822 050 11002	1k	5%	0,2W
4657	4822 050 11002	1k	5%	0,2W
4668	4822 050 11002	1k	5%	0,2W
4671	4822 050 11002	1k	5%	0,2W
4672	4822 050 11002	1k	5%	0,2W
4673	4822 050 11002	1k	5%	0,2W
4676	4822 050 11002	1k	5%	0,2W
4677	4822 050 11002	1k	5%	0,2W
4679	4822 050 11002	1k	5%	0,2W
4680	4822 050 11002	1k	5%	0,2W
4684	4822 116 52256	2k2	5%	0,16W
4685	4822 116 52256	2k2	5%	0,16W
4686	4822 050 11002	1k	5%	0,2W
4692	4822 050 11002	1k	5%	0,2W
4693	4822 116 52234	100k	5%	0,5W
4695	4822 050 11002	1k	5%	0,2W
4707	4822 050 11002	1k	5%	0,2W
4708	4822 050 11002	1k	5%	0,2W
4709	4822 050 11002	1k	5%	0,2W
4720	4822 116 52278	390k	5%	0,5W

CHIP RESISTORS

3501	4822 051 20223	22k	5%	0,1W
3502	4822 051 20223	22k	5%	0,1W
3504	4822 051 20222	2k2	5%	0,1W
3506	4822 051 20104	100k	5%	0,1W
3508	4822 051 20472	4k7	5%	0,1W

CHIP RESISTORS

3509	4822 051 20103	10k	5%	0,1W
3510	4822 051 20103	10k	5%	0,1W
3512	4822 051 20153	15k	5%	0,1W
3513	4822 051 20104	100k	5%	0,1W
3514	4822 051 20104	100k	5%	0,1W
3515	4822 051 20103	10k	5%	0,1W
3522	4822 051 10102	1k	2%	0,25W
3523	4822 051 20472	4k7	5%	0,1W
3524	4822 051 20223	22k	5%	0,1W
3528	4822 051 20473	47k	5%	0,1W
3529	4822 051 20393	39k	5%	0,1W
3530	4822 051 20393	39k	5%	0,1W
3532	4822 051 10102	1k	2%	0,25W
3533	4822 051 20562	5k6	5%	0,1W
3534	4822 051 20562	5k6	5%	0,1W
3537	4822 051 20474	470k	5%	0,1W
3538	4822 051 20474	470k	5%	0,1W
3539	4822 051 20225	2M2	5%	0,1W
3540	4822 051 20101	100R	5%	0,1W
3545	4822 051 20104	100k	5%	0,1W
3547	4822 051 20154	150k	5%	0,1W
3548	4822 051 20154	150k	5%	0,1W
3549	4822 051 20224	220k	5%	0,1W
3551	4822 051 20124	120k	5%	0,1W
3552	4822 051 20124	120k	5%	0,1W
3555	4822 051 20473	47k	5%	0,1W
3556	4822 051 20473	47k	5%	0,1W
3568	4822 051 20332	3k3	5%	0,1W
3572	4822 051 20224	220k	5%	0,1W
3574	4822 051 20472	4k7	5%	0,1W
3576	4822 051 20683	68k	5%	0,1W
3583	4822 051 20682	6k8	5%	0,1W
3584	4822 051 20682	6k8	5%	0,1W
3585	4822 051 20274	270k	5%	0,1W
3590	4822 051 20392	3k9	5%	0,1W
3591	4822 051 20682	6k8	5%	0,1W
3592	4822 051 20682	6k8	5%	0,1W
3605	4822 051 20103	10k	5%	0,1W
3606	4822 051 20473	47k	5%	0,1W
3607	4822 051 20473	47k	5%	0,1W
3633	4822 051 20682	6k8	5%	0,1W
3634	4822 051 20682	6k8	5%	0,1W
3638	4822 051 20473	47k	5%	0,1W
3639	4822 051 20562	5k6	5%	0,1W
3640	4822 051 20562	5k6	5%	0,1W
3644	4822 051 20473	47k	5%	0,1W
3645	4822 051 20393	39k	5%	0,1W
3647	4822 051 20332	3k3	5%	0,1W
3648	4822 051 20332	3k3	5%	0,1W
3649	4822 051 20562	5k6	5%	0,1W
3650	4822 051 20562	5k6	5%	0,1W
3651	4822 051 10102	1k	2%	0,25W
3652	4822 051 10102	1k	2%	0,25W
3657	4822 051 10102	1k	2%	0,25W
3658	4822 051 10102	1k	2%	0,25W
3659	4822 051 20333	33k	5%	0,1W
3661	4822 051 20105	1M	5%	0,1W
3662	4822 051 20105	1M	5%	0,1W
3665	4822 117 11149	82k	1%	0,1W

CHIP RESISTORS

3666	4822 117 11149	82k	1%	0,1W
3673	4822 051 10102	1k	2%	0,25W
3674	4822 051 10102	1k	2%	0,25W
3675	4822 051 10102	1k	2%	0,25W
3676	4822 051 10102	1k	2%	0,25W
3677	4822 051 20473	47k	5%	0,1W
3678	4822 051 10102	1k	2%	0,25W
3680	4822 051 20472	4k7	5%	0,1W
3683	4822 051 20562	5k6	5%	0,1W
3685	4822 051 20472	4k7	5%	0,1W
3689	4822 051 20104	100k	5%	0,1W
3692	4822 117 11746	43k	1%	0,1W
3693	4822 051 20689	68R	5%	0,1W
3695	4822 051 20689	68R	5%	0,1W
3701	4822 051 20221	220R	5%	0,1W
3702	4822 051 20221	220R	5%	0,1W
3703	4822 051 20221	220R	5%	0,1W
3704	4822 051 20221	220R	5%	0,1W
3707	4822 051 20101	100R	5%	0,1W
3708	4822 051 20101	100R	5%	0,1W
3709	4822 051 20109	10R	5%	0,1W
3710	4822 051 20109	10R	5%	0,1W
3711	4822 051 20184	180k	5%	0,1W
3712	4822 051 20184	180k	5%	0,1W
3713	4822 051 20109	10R	5%	0,1W
3714	4822 051 20109	10R	5%	0,1W
3716	4822 051 20182	1k8	5%	0,1W
3719	4822 051 20123	12k	2%	0,1W
3720	4822 051 20123	12k	2%	0,1W
3721	4822 051 20562	5k6	5%	0,1W
3722	4822 051 20562	5k6	5%	0,1W
3724	4822 051 20123	12k	2%	0,1W
3725	4822 051 20224	220k	5%	0,1W
3726	4822 051 20224	220k	5%	0,1W
3727	4822 051 20562	5k6	5%	0,1W
3728	4822 051 20562	5k6	5%	0,1W
3729	4822 051 20272	2k7	5%	0,1W
3730	4822 051 20272	2k7	5%	0,1W
3731	4822 051 20682	6k8	5%	0,1W
3732	4822 051 20682	6k8	5%	0,1W
3734	4822 051 20221	220R	5%	0,1W
3737	4822 051 20472	4k7	5%	0,1W
3739	4822 051 20121	120R	5%	0,1W
3744	4822 051 20153	15k	5%	0,1W
3745	4822 051 10102	1k	2%	0,25W
3746	4822 051 10102	1k	2%	0,25W
3747	4822 051 20104	100k	5%	0,1W
3749	4822 051 10102	1k	2%	0,25W
3760	4822 051 20104	100k	5%	0,1W
3762	4822 051 20821	820R	5%	0,1W
3763	4822 051 20184	180k	5%	0,1W
3764	4822 051 20471	470R	5%	0,1W
3766	4822 051 20475	4M7	5%	0,1W
3767	4822 051 20223	22k	5%	0,1W
3769	4822 051 20475	4M7	5%	0,1W
3771	4822 051 10102	1k	2%	0,25W
3772	4822 051 20183	18k	5%	0,1W
3774	4822 051 20223	22k	5%	0,1W
3779	4822 051 20334	330k	5%	0,1W
3780	4822 051 20105	1M	5%	0,1W

CHIP RESISTO

3781	4822 05
3782	4822 05
3783	4822 05
3784	4822 05
3787	4822 05
3795	4822 05
3811	4822 05
3842	4822 05
3843	4822 05
3844	4822 05
3851	4822 05
3852	4822 05
3856	4822 05
3859	4822 05
3860	4822 05
3861	4822 05
3862	4822 05
3864	4822 05
3865	4822 05
3867	4822 05
3869	4822 05
3872	4822 05
3874	4822 05
3876	4822 1
3877	4822 05
3878	4822 05
3879	4822 05
3880	4822 05
3882	4822 05
3883	4822 05
3884	4822 05
3885	4822 05
3887	4822 05
4500	4822 05
4502	4822 05
4503	4822 05
4506	4822 05
4510	4822 05
4511	4822 05
4516	4822 05
4517	4822 05
4518	4822 05
4520	4822 05
4521	4822 05
4523	4822 05
4524	4822 05
4525	4822 05
4526	4822 05
4527	4822 05
4529	4822 05
4530	4822 05
4531	4822 05
4533	4822 05
4534	4822 05
4535	4822 05
4536	4822 05
4537	4822 05
4538	4822 05
4540	4822 05
4541	4822 05

CHIP RESISTORS

0,1W	3781	4822 051 20475	4M7	5%	0,1W
0,25W	3782	4822 051 20472	4k7	5%	0,1W
0,25W	3783	4822 051 20472	4k7	5%	0,1W
0,25W	3784	4822 051 20153	15k	5%	0,1W
0,25W	3787	4822 051 20105	1M	5%	0,1W
0,1W	3795	4822 051 20103	10k	5%	0,1W
0,25W	3811	4822 051 10102	1k	2%	0,25W
0,1W	3842	4822 051 20221	220R	5%	0,1W
0,1W	3843	4822 051 20221	220R	5%	0,1W
0,1W	3844	4822 051 20221	220R	5%	0,1W
0,1W	3851	4822 051 20103	10k	5%	0,1W
0,1W	3852	4822 051 20103	10k	5%	0,1W
0,1W	3856	4822 051 20223	22k	5%	0,1W
0,1W	3859	4822 051 20229	22R	5%	0,1W
0,1W	3860	4822 051 20101	100R	5%	0,1W
0,1W	3861	4822 051 20103	10k	5%	0,1W
0,1W	3862	4822 051 20105	1M	5%	0,1W
0,1W	3864	4822 051 20229	22R	5%	0,1W
0,1W	3865	4822 051 20103	10k	5%	0,1W
0,1W	3867	4822 051 20221	220R	5%	0,1W
0,1W	3869	4822 051 20103	10k	5%	0,1W
0,1W	3872	4822 051 20222	2k2	5%	0,1W
0,1W	3874	4822 051 20103	10k	5%	0,1W
0,1W	3876	4822 117 11139	1k5	5%	0,1W
0,1W	3877	4822 051 20222	2k2	5%	0,1W
0,1W	3878	4822 051 20105	1M	5%	0,1W
0,1W	3879	4822 051 20154	150k	5%	0,1W
0,1W	3880	4822 051 20393	39k	5%	0,1W
0,1W	3882	4822 051 10102	1k	2%	0,25W
0,1W					
	3883	4822 051 20122	1,2k	5%	0,1W
0,1W	3884	4822 051 10102	1k	2%	0,25W
0,1W	3885	4822 051 10102	1k	2%	0,25W
0,1W	3887	4822 051 20333	33k	5%	0,1W
0,1W	4500	4822 051 10008	CHIP JUMPER1206		
0,1W	4502	4822 051 10008	CHIP JUMPER1206		
0,1W	4503	4822 051 10008	CHIP JUMPER1206		
0,1W	4506	4822 051 10008	CHIP JUMPER1206		
0,1W	4510	4822 051 10008	CHIP JUMPER1206		
0,1W	4511	4822 051 10008	CHIP JUMPER1206		
0,1W	4516	4822 051 10008	CHIP JUMPER1206		
0,1W	4517	4822 051 10008	CHIP JUMPER1206		
0,1W	4518	4822 051 10008	CHIP JUMPER1206		
0,1W	4520	4822 051 20008	CHIP JUMPER 0805		
0,1W	4521	4822 051 10008	CHIP JUMPER1206		
0,25W	4523	4822 051 10008	CHIP JUMPER1206		
0,25W	4524	4822 051 10008	CHIP JUMPER1206		
0,1W	4525	4822 051 10008	CHIP JUMPER1206		
0,25W	4526	4822 051 10008	CHIP JUMPER1206		
0,1W	4527	4822 051 10008	CHIP JUMPER1206		
0,1W	4529	4822 051 10008	CHIP JUMPER1206		
0,1W	4530	4822 051 10008	CHIP JUMPER1206		
0,1W	4531	4822 051 20008	CHIP JUMPER 0805		
0,1W	4533	4822 051 20008	CHIP JUMPER 0805		
0,1W	4534	4822 051 10008	CHIP JUMPER1206		
0,1W	4535	4822 051 10008	CHIP JUMPER1206		
0,25W	4536	4822 051 10008	CHIP JUMPER1206		
0,1W	4537	4822 051 10008	CHIP JUMPER1206		
0,1W	4538	4822 051 10008	CHIP JUMPER1206		
0,1W	4540	4822 051 10008	CHIP JUMPER1206		
0,1W	4541	4822 051 20008	CHIP JUMPER 0805		

CHIP RESISTORS

4542	4822 051 10008	CHIP JUMPER1206			
4543	4822 051 10008	CHIP JUMPER1206			
4545	4822 051 10008	CHIP JUMPER1206			
4546	4822 051 10008	CHIP JUMPER1206			
4547	4822 051 10008	CHIP JUMPER1206			
4548	4822 051 20008	CHIP JUMPER 0805			
4549	4822 051 10008	CHIP JUMPER1206			
4550	4822 051 20008	CHIP JUMPER 0805			
4557	4822 051 10008	CHIP JUMPER1206			
4559	4822 051 10008	CHIP JUMPER1206			
4565	4822 051 20008	CHIP JUMPER 0805			
4566	4822 051 10008	CHIP JUMPER1206			
4568	4822 051 10008	CHIP JUMPER1206			
4572	4822 051 10008	CHIP JUMPER1206			
4574	4822 051 10008	CHIP JUMPER1206			
4577	4822 051 20008	CHIP JUMPER 0805			
4578	4822 051 10008	CHIP JUMPER1206			
4579	4822 051 20008	CHIP JUMPER 0805			
4595	4822 051 20008	CHIP JUMPER 0805			
4596	4822 051 20008	CHIP JUMPER 0805			
4597	4822 051 10008	CHIP JUMPER1206			
4599	4822 051 20008	CHIP JUMPER 0805			
4631	4822 051 20103	10k	5%	0,1W	
4632	4822 051 10102	1k	2%	0,25W	
4633	4822 051 10102	1k	2%	0,25W	
4634	4822 051 10102	1k	2%	0,25W	
4635	4822 051 10102	1k	2%	0,25W	
4636	4822 051 10102	1k	2%	0,25W	
4637	4822 051 10102	1k	2%	0,25W	
4638	4822 051 10102	1k	2%	0,25W	
4639	4822 051 10102	1k	2%	0,25W	
4640	4822 051 10102	1k	2%	0,25W	
4641	4822 051 10102	1k	2%	0,25W	
4642	4822 051 10102	1k	2%	0,25W	
4643	4822 051 10102	1k	2%	0,25W	
4644	4822 051 10102	1k	2%	0,25W	
4645	4822 051 10102	1k	2%	0,25W	
4646	4822 051 10102	1k	2%	0,25W	
4647	4822 051 10102	1k	2%	0,25W	
4648	4822 051 10102	1k	2%	0,25W	
4649	4822 051 10102	1k	2%	0,25W	
4650	4822 051 10102	1k	2%	0,25W	
4651	4822 051 10102	1k	2%	0,25W	
4652	4822 051 10102	1k	2%	0,25W	
4653	4822 051 20473	47k	5%	0,1W	
4658	4822 051 10102	1k	2%	0,25W	
4659	4822 051 20221	220R	5%	0,1W	
4660	4822 051 10102	1k	2%	0,25W	
4661	4822 051 10102	1k	2%	0,25W	
4662	4822 051 20472	4k7	5%	0,1W	
4663	4822 051 20472	4k7	5%	0,1W	
4664	4822 051 20222	2k2	5%	0,1W	
4665	4822 051 20103	10k	5%	0,1W	
4666	4822 051 20222	2k2	5%	0,1W	
4667	4822 051 20472	4k7	5%	0,1W	
4670	4822 051 20103	10k	5%	0,1W	
4674	4822 051 10102	1k	2%	0,25W	
4675	4822 051 20273	27k	5%	0,1W	
4678	4822 051 10102	1k	2%	0,25W	
4681	4822 051 20472	4k7	5%	0,1W	

ELECTRICAL PARTSLIST COMBI BOARD

CHIP RESISTORS

4682	4822 051 10102	1k	2%	0,25W
4683	4822 051 20103	10k	5%	0,1W
4687	4822 051 20472	4k7	5%	0,1W
4688	4822 051 20223	22k	5%	0,1W
4689	4822 051 10102	1k	2%	0,25W
4690	4822 051 20471	470R	5%	0,1W
4691	4822 051 20472	4k7	5%	0,1W
4694	4822 051 10102	1k	2%	0,25W
4696	4822 051 20221	220R	5%	0,1W
4697	4822 051 10102	1k	2%	0,25W
4698	4822 051 20221	220R	5%	0,1W
4699	4822 051 20221	220R	5%	0,1W
4700	4822 051 20221	220R	5%	0,1W
4701	4822 051 10102	1k	2%	0,25W
4702	4822 051 20008	CHIP JUMPER 0805		
4703	4822 051 10102	1k	2%	0,25W
4704	4822 051 10102	1k	2%	0,25W
4705	4822 051 10008	CHIP JUMPER1206		
4710	4822 051 10102	1k	2%	0,25W
4711	4822 051 10102	1k	2%	0,25W
4712	4822 051 10102	1k	2%	0,25W
4713	4822 051 10102	1k	2%	0,25W
4716	4822 051 10102	1k	2%	0,25W
4718	4822 051 20103	10k	5%	0,1W
4719	4822 051 20103	10k	5%	0,1W
4721	4822 051 20104	100k	5%	0,1W
4801	4822 051 10008	CHIP JUMPER1206		
4802	4822 051 20008	CHIP JUMPER 0805		
4803	4822 051 10008	CHIP JUMPER 1206		
7690	4822 051 20008	CHIP JUMPER 0805		

CAPACITORS

2503	4822 124 41407	0,47µF	20%	63V
2504	4822 124 41407	0,47µF	20%	63V
2505	4822 124 40746	0,22µF	20%	63V
2506	4822 124 40746	0,22µF	20%	63V
2507	4822 121 41738	270nF	5%	63V
2508	4822 121 41738	270nF	5%	63V
2509	4822 124 40433	47µF	20%	25V
2511	5322 121 42661	330nF	5%	63V
2512	5322 121 42661	330nF	5%	63V
2517	4822 121 51252	470nF	5%	63V
2518	4822 121 51252	470nF	5%	63V
2519	4822 124 40433	47µF	20%	25V
2520	4822 124 40433	47µF	20%	25V
2521	4822 124 40196	220µF	20%	16V
2523	4822 121 51387	10nF	20%	16V
2524	4822 121 51387	10nF	20%	16V
2525	4822 122 33519	470pF	10%	50V
2526	4822 122 33519	470pF	10%	50V
2529	5322 121 42661	330nF	5%	63V
2530	5322 121 42661	330nF	5%	63V
2537	4822 122 33195	100pF	10%	50V
2541	4822 124 40433	47µF	20%	25V
2542	4822 122 33519	470pF	10%	50V
2550	4822 124 40242	1µF	20%	63V
2552	4822 124 41525	100µF	20%	25V

CAPACITORS

2555	4822 121 42408	220nF	5%	63V
2556	4822 121 42408	220nF	5%	63V
2557	4822 124 40746	0,22µF	20%	63V
2558	4822 124 40746	0,22µF	20%	63V
2560	4822 124 40433	47µF	20%	25V
2561	4822 124 40433	47µF	20%	25V
2563	4822 122 33848	47pF	5%	50V
2564	4822 122 33848	47pF	5%	50V
2565	4822 126 12882	100nF+80/-20%		50V
2566	4822 126 12882	100nF+80/-20%		50V
2579	4822 124 40242	1µF	20%	63V
2580	4822 124 40242	1µF	20%	63V
2588	4822 126 12882	100nF+80/-20%		50V
2589	4822 124 41525	100µF	20%	25V
2637	5322 121 42498	680nF	5%	63V
2638	5322 121 42498	680nF	5%	63V
2641	4822 124 40246	4,7µF	20%	63V
2642	4822 124 40246	4,7µF	20%	63V
2647	4822 124 40246	4,7µF	20%	63V
2648	4822 124 40246	4,7µF	20%	63V
2691	4822 124 40246	4,7µF	20%	63V
2692	4822 124 41584	100µF	20%	10V
2693	4822 124 41525	100µF	20%	25V
2694	4822 124 41525	100µF	20%	25V
2701	4822 122 33195	100pF	10%	50V
2702	4822 122 33195	100pF	10%	50V
2703	4822 122 33195	100pF	10%	50V
2704	4822 122 33195	100pF	10%	50V
2711	4822 122 33195	100pF	10%	50V
2712	4822 122 33195	100pF	10%	50V
2713	4822 124 41579	10µF	20%	50V
2714	4822 124 41579	10µF	20%	50V
2715	4822 124 40196	220µF	20%	16V
2716	4822 124 40196	220µF	20%	16V
2717	4822 126 12339	2,2nF	10%	16V
2718	4822 126 12339	2,2nF	10%	16V
2722	4822 126 13174	33nF	20%	16V
2727	4822 122 10459	560pF	10%	50V
2733	4822 124 41407	0,47µF	20%	63V
2734	4822 124 41407	0,47µF	20%	63V
2735	4822 126 12882	100nF+80/-20%		50V
2761	4822 124 22263	220µF	20%	25V
2762	4822 124 40246	4,7µF	20%	63V
2763	4822 124 40433	47µF	20%	25V
2765	4822 124 40433	47µF	20%	25V
2780	4822 124 40246	4,7µF	20%	63V
2781	4822 121 51387	10nF	20%	16V
2783	5322 121 42386	100nF	5%	63V
2784	4822 121 41934	22nF	10%	100V
2785	4822 124 41579	10µF	20%	50V
2786	4822 122 33195	100pF	10%	50V
2807	4822 126 12339	2,2nF	10%	16V
2831	4822 124 40433	47µF	20%	25V
2832	4822 124 40184	1000µF	20%	10V
2833	4822 124 40433	47µF	20%	25V
2843	4822 124 41407	0,47µF	20%	63V
2844	4822 124 41407	0,47µF	20%	63V
2845	4822 126 12339	2,2nF	10%	16V
2846	4822 126 12339	2,2nF	10%	16V
2848	4822 124 40433	47µF	20%	25V

CAPACITORS

2849	4822 124 4
2855	4822 124 4
2856	5322 121 4
2858	4822 122 3
2859	4822 121 5

CHIP CAPACITOR

2501	4822 122 3
2502	4822 122 3
2513	4822 122 3
2514	4822 122 3
2515	4822 122 3
2516	4822 122 3
2527	5322 122 3
2528	5322 122 3
2531	5322 122 3
2532	5322 122 3
2533	5322 122 3
2534	5322 122 3
2535	5322 122 3
2536	5322 122 3
2538	5322 122 3
2539	4822 126
2540	4822 122
2553	4822 122
2559	4822 122
2573	5322 122
2574	5322 122
2581	5322 122
2582	5322 122
2583	4822 122
2584	4822 122
2585	5322 122
2586	5322 122
2590	4822 122
2591	4822 122
2631	4822 122
2632	4822 122
2633	4822 126
2634	4822 126
2635	4822 122
2636	4822 122
2639	5322 122
2640	5322 122
2643	4822 122
2644	4822 122
2645	5322 122
2646	5322 122
2705	5322 122
2706	5322 122
2707	5322 122
2708	5322 122
2709	5322 122
2710	5322 122
2719	4822 122
2720	4822 122
2721	4822 122
2723	4822 126
2724	4822 126
2725	4822 122
2726	4822 122
2728	4822 122

CAPACITORS

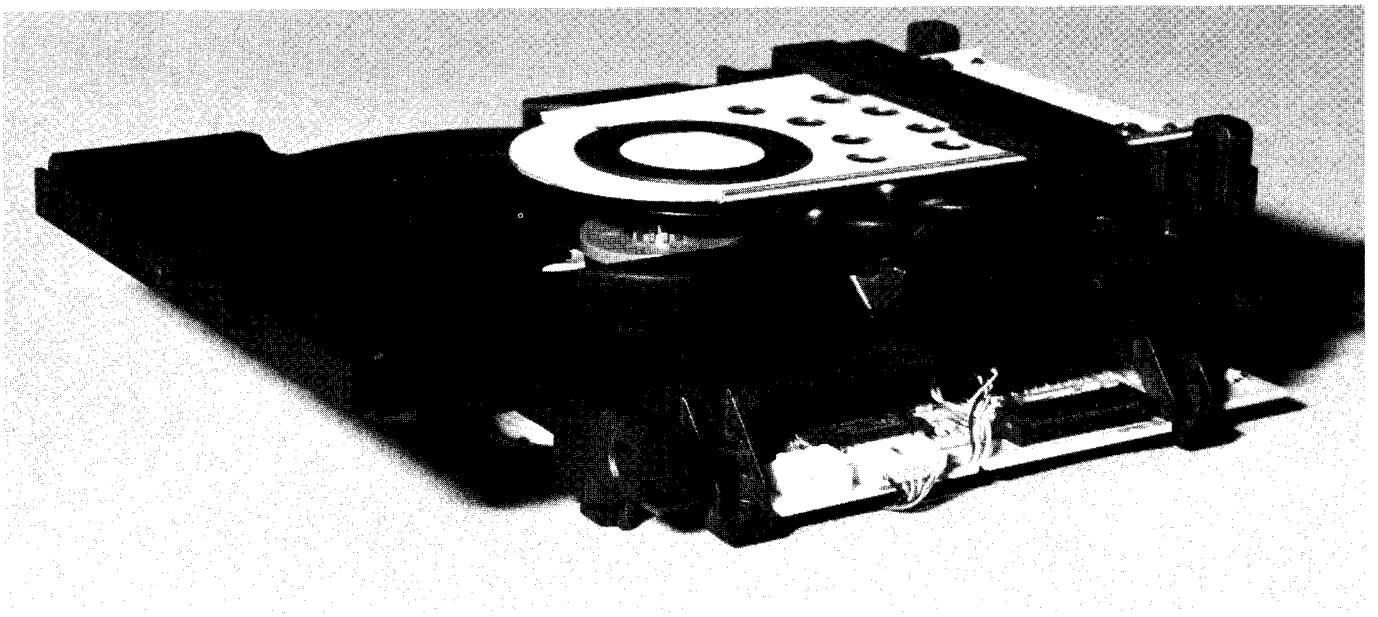
2849	4822 124 40433	47µF	20%	25V	
2855	4822 124 40433	47µF	20%	25V	
2856	5322 121 42386	100nF	5%	63V	
2858	4822 122 33195	100pF	10%	50V	
2859	4822 121 51387	10nF	20%	16V	

CHIP CAPACITORS

2501	4822 122 33336	8,2nF	10%	50V
2502	4822 122 33336	8,2nF	10%	50V
2513	4822 122 32646	5,6nF	10%	50V
2514	4822 122 32646	5,6nF	10%	50V
2515	4822 122 33342	33nF	10%	63V
2516	4822 122 33342	33nF	10%	63V
2527	5322 122 32531	100pF	5%	50V
2528	5322 122 32531	100pF	5%	50V
2531	5322 122 31865	1,5nF	10%	63V
2532	5322 122 31865	1,5nF	10%	63V
2533	5322 122 32481	15pF	5%	50V
2534	5322 122 32481	15pF	5%	50V
2535	5322 122 32448	10pF	5%	50V
2536	5322 122 32448	10pF	5%	50V
2538	5322 122 32531	100pF	5%	50V
2539	4822 126 10002	100nF	20%	50V
2540	4822 122 31797	22nF	10%	63V
2553	4822 122 33175	2,2nF	20%	50V
2559	4822 122 33177	10nF	20%	50V
2573	5322 122 32531	100pF	5%	50V
2574	5322 122 32531	100pF	5%	50V
2581	5322 122 32531	100pF	5%	50V
2582	5322 122 32531	100pF	5%	50V
2583	4822 122 33342	33nF	10%	63V
2584	4822 122 33342	33nF	10%	63V
2585	5322 122 32531	100pF	5%	50V
2586	5322 122 32531	100pF	5%	50V
2590	4822 122 33177	10nF	20%	50V
2591	4822 122 33177	10nF	20%	50V
2631	4822 122 32541	27nF	10%	63V
2632	4822 122 32541	27nF	10%	63V
2633	4822 126 13057	220nF	10%	25V
2634	4822 126 13057	220nF	10%	25V
2635	4822 122 33891	3,3nF	10%	63V
2636	4822 122 33891	3,3nF	10%	63V
2639	5322 122 32531	100pF	5%	50V
2640	5322 122 32531	100pF	5%	50V
2643	4822 122 33177	10nF	20%	50V
2644	4822 122 33177	10nF	20%	50V
2645	5322 122 32448	10pF	5%	50V
2646	5322 122 32448	10pF	5%	50V
2705	5322 122 32531	100pF	5%	50V
2706	5322 122 32531	100pF	5%	50V
2707	5322 122 34099	470pF	10%	63V
2708	5322 122 34099	470pF	10%	63V
2709	5322 122 32531	100pF	5%	50V
2710	5322 122 32531	100pF	5%	50V
2719	4822 122 33893	18nF	10%	63V
2720	4822 122 33893	18nF	10%	63V
2721	4822 122 33342	33nF	10%	63V
2723	4822 126 10326	180pF	5%	
2724	4822 126 10326	180pF	5%	
2725	4822 122 33575	220pF	5%	50V
2726	4822 122 33575	220pF	5%	50V
2728	4822 122 33173	560pF	10%	63V

CHIP CAPACITORS

2729	4822 122 32541	27nF	10%	63V
2730	4822 122 32541	27nF	10%	63V
2737	4822 126 10002	100nF	20%	50V
2738	4822 126 10002	100nF	20%	50V
2752	5322 122 32654	22nF	10%	63V
2760	4822 126 10002	100nF	20%	50V
2782	5322 122 31866	6,8nF	10%	63V
2787	4822 122 33342	33nF	10%	63V
2794	4822 126 10002	100nF	20%	50V
2834	5322 126 10794	220pF	10%	
2835	5322 126 10794	220pF	10%	
2836	5322 126 10794	220pF	10%	
2837	5322 126 10794	220pF	10%	
2838	5322 126 10794	220pF	10%	
2839	5322 126 10794	220pF	10%	
2840	4822 122 33496	100nF	10%	63V
2850	5322 122 32658	22pF	5%	50V
2851	5322 122 32654	22nF	10%	63V
2852	5322 122 32452	47pF	5%	50V



CD SHORT LOADER UNIT

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Dismantling hints CD Short Loader

Dismantling the tray

a) Press open/close button to open the tray. If the tray doesn´t work, use a small screwdriver as shown in Fig.1 point 1 to move the tray outside. After the first centimetre it is possible to pull the tray out by hand.

b) Release two snaps and remove tray.

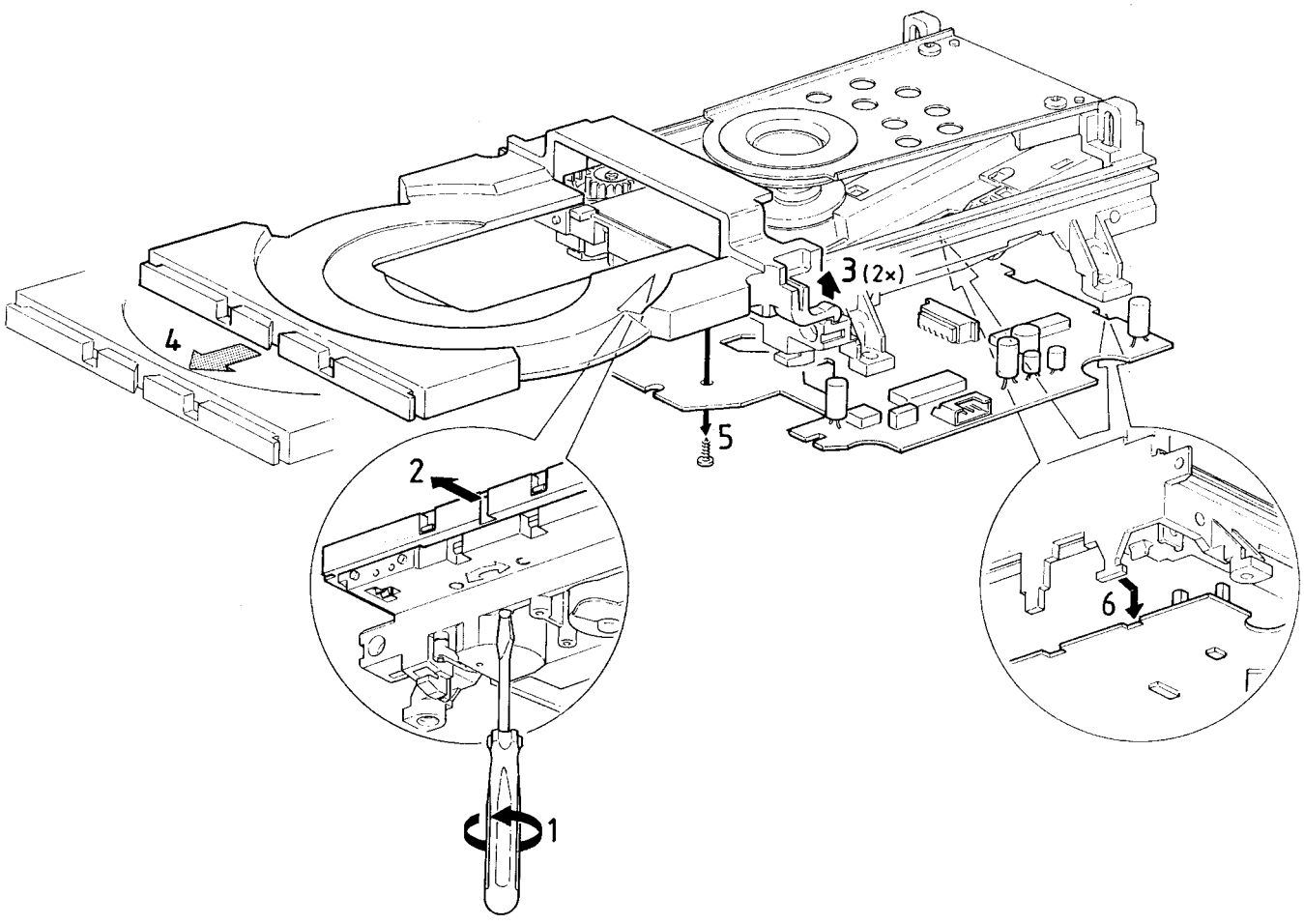


Fig. 1

Assembly of gear

a) Use a pin (e.g. a paperclip) to align the cam wheel (a) withthe gear wheel (b). See Fig. 2.

b) Fix the wheels with the small plastic whashers.

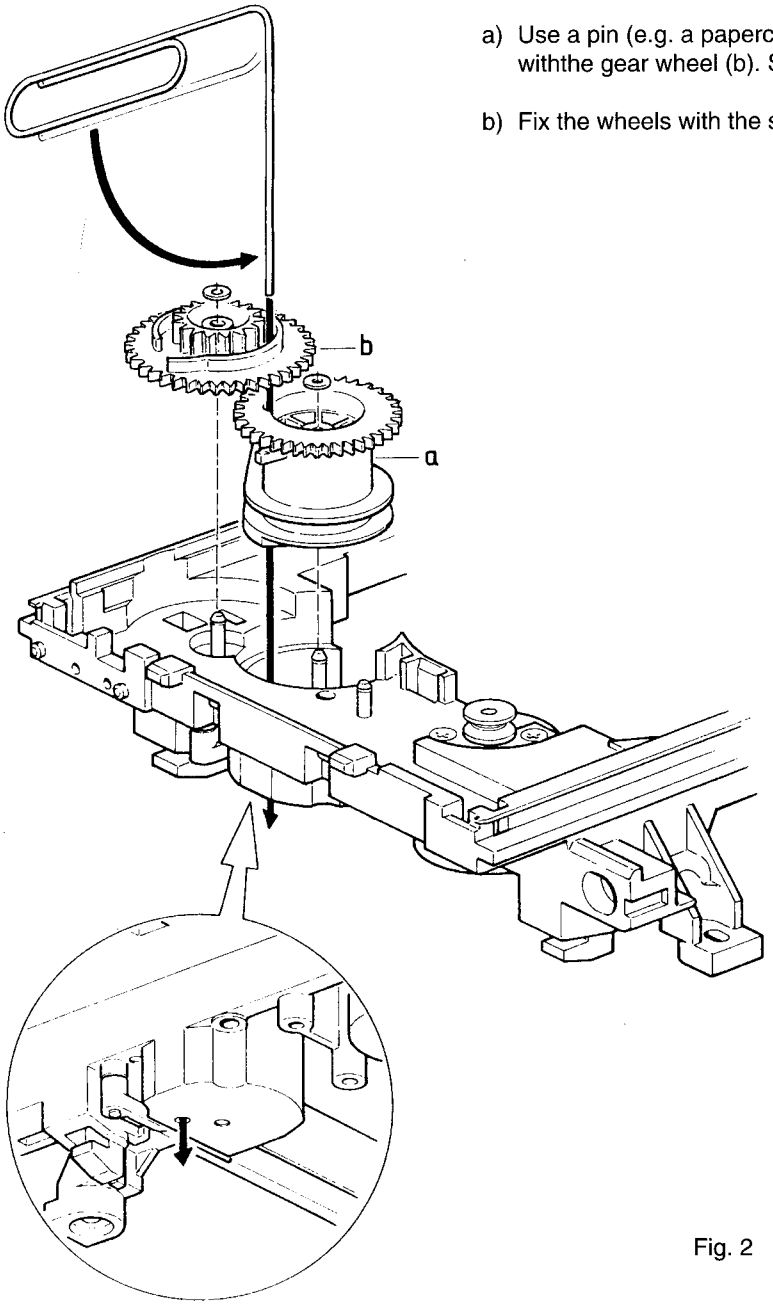


Fig. 2

c) Mount idle wheel 2 (c) and idle wheel 1 (d) in any position. See Fig. 3.

d) Fix the idle wheel 1 (d) with the small plastic whasher.

e) Mount the driving belt.

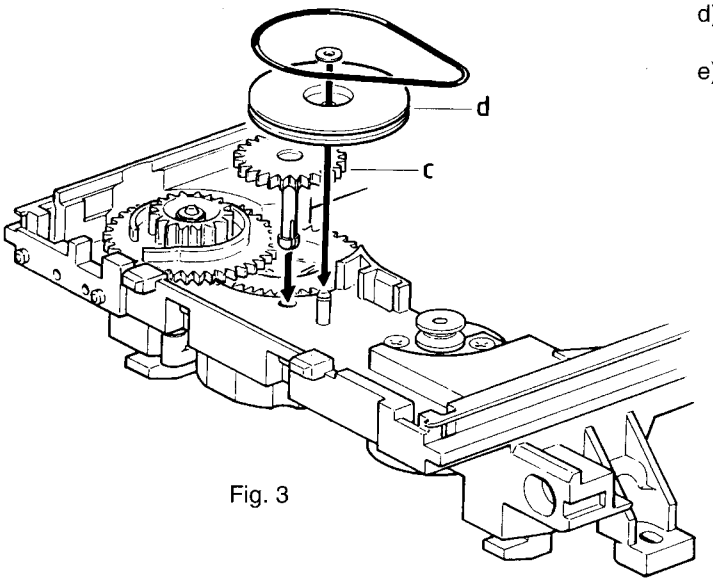


Fig. 3

f) Mount the pinion guiding assy and the cover as shown in Fig. 4.

g) Turn the gear wheel (b) counter clockwise to endposition.

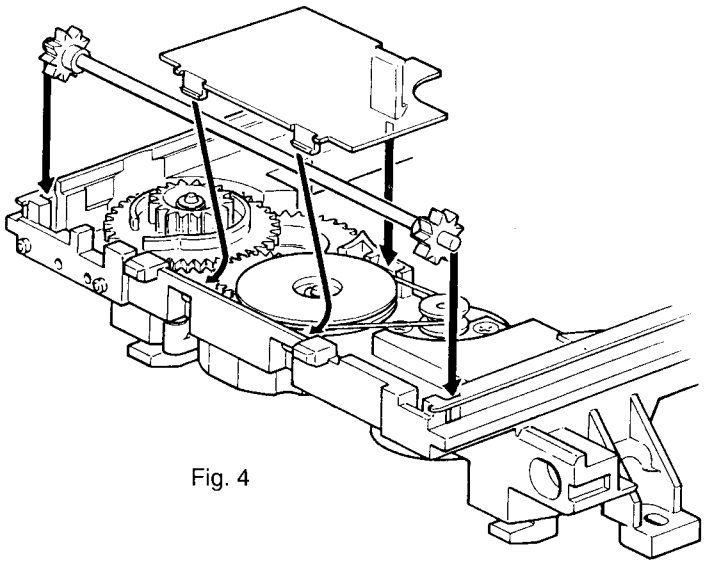


Fig. 4

h) Mount the CD Mechanism as shown in Fig. 5.

i) Mount the tray (Align the tray to the chassis and push it inside).

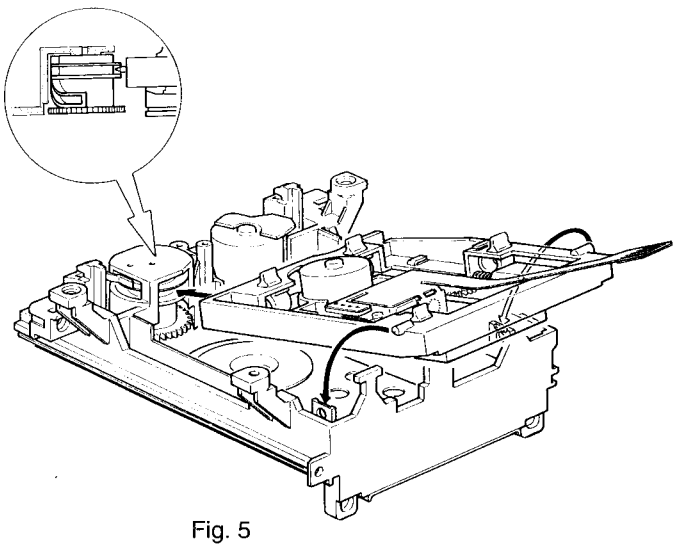


Fig. 5

Check if tray mechanism works correctly!

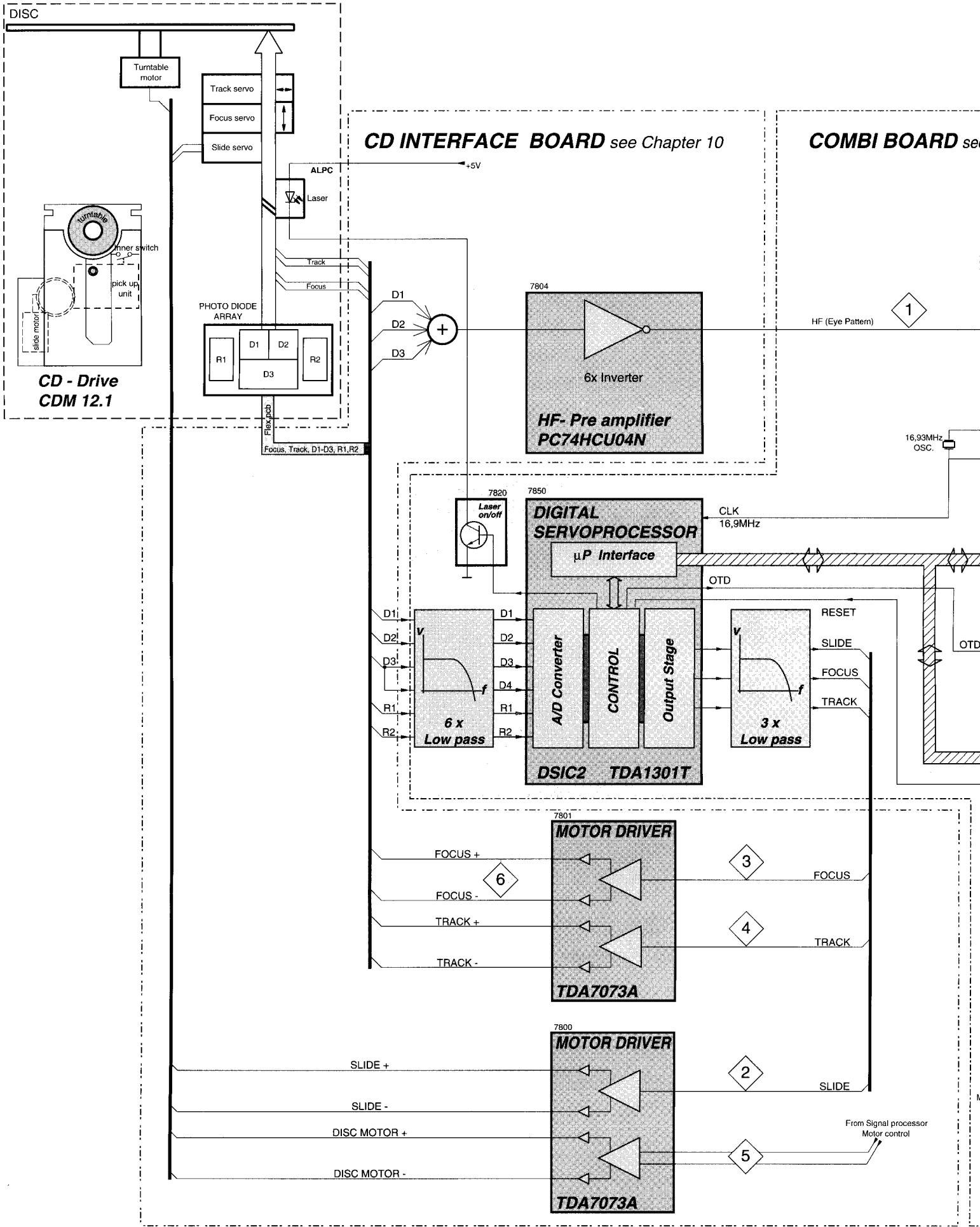
1) Turn the gear wheel (b) clockwise to its endposition (Use a small screwdriver as shown in Fig. 1 point 1).

   The tray has to move to inner position first and then the CD mechanism has to move to its upper position.

2) Turn the gear wheel (b) counter clockwise to its endposition.

   The CD Mechanism has to move to its lower position first and then the tray has to move outside.

FUNCTIONAL DIAGRAM *CD Short Loader Module*



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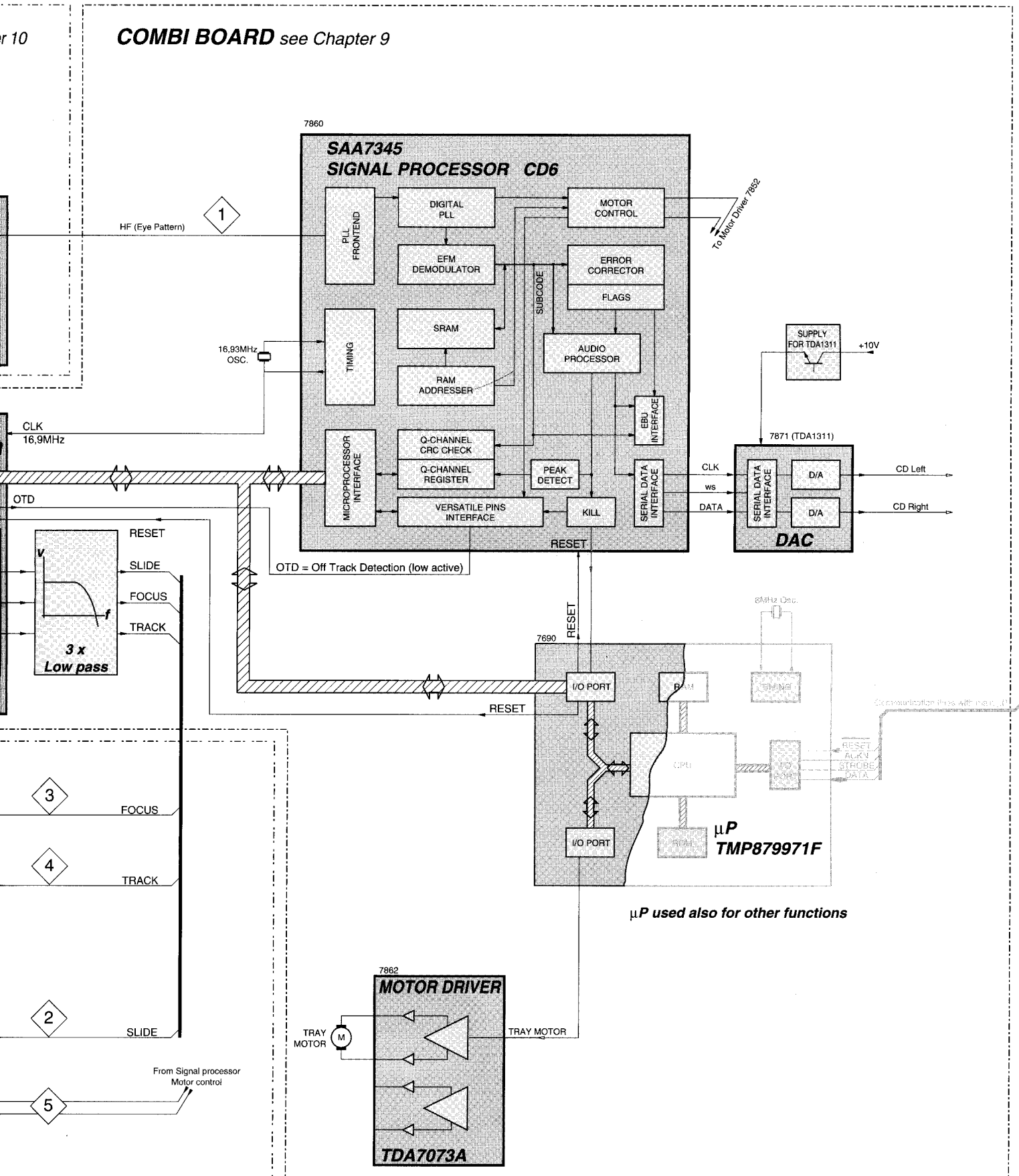
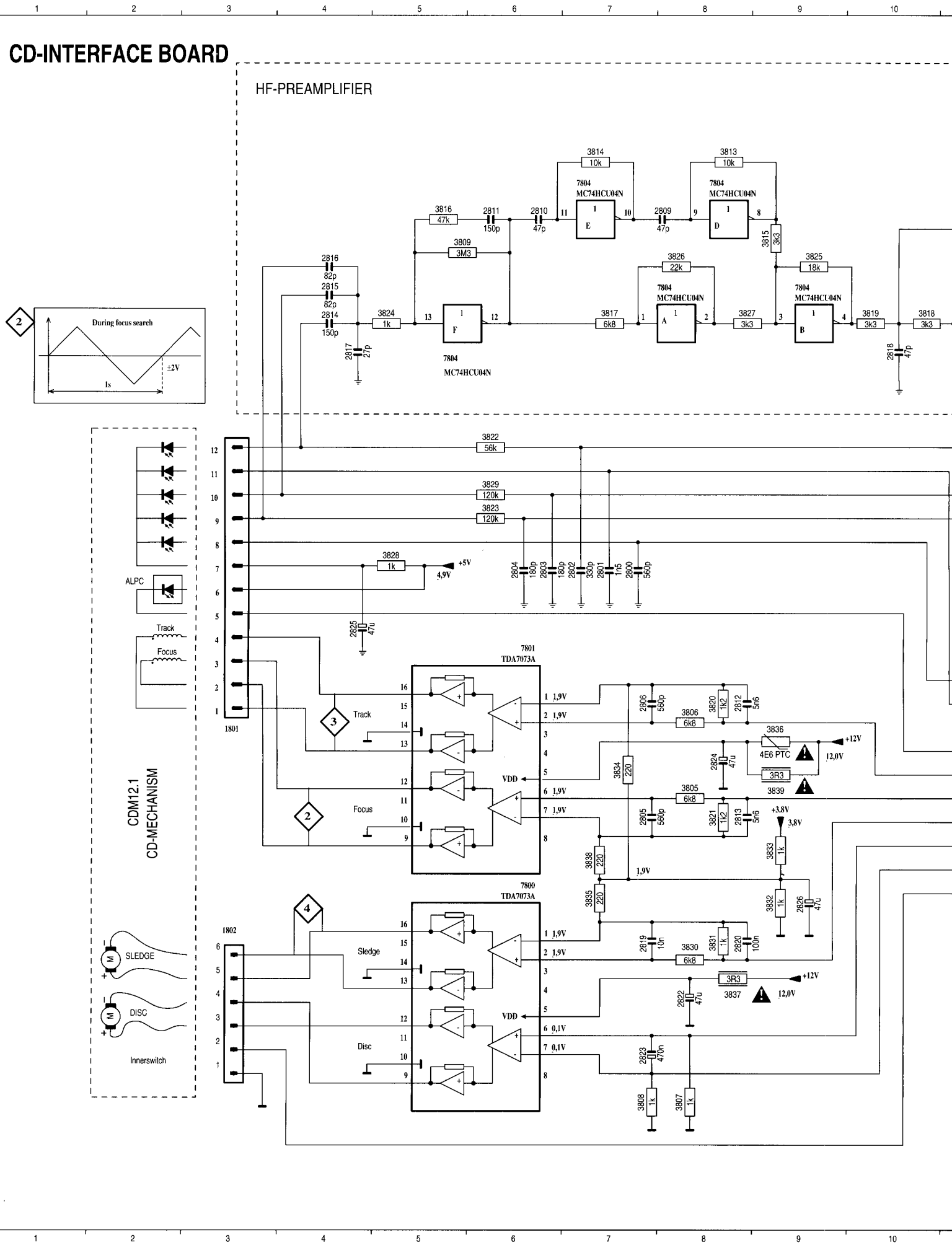
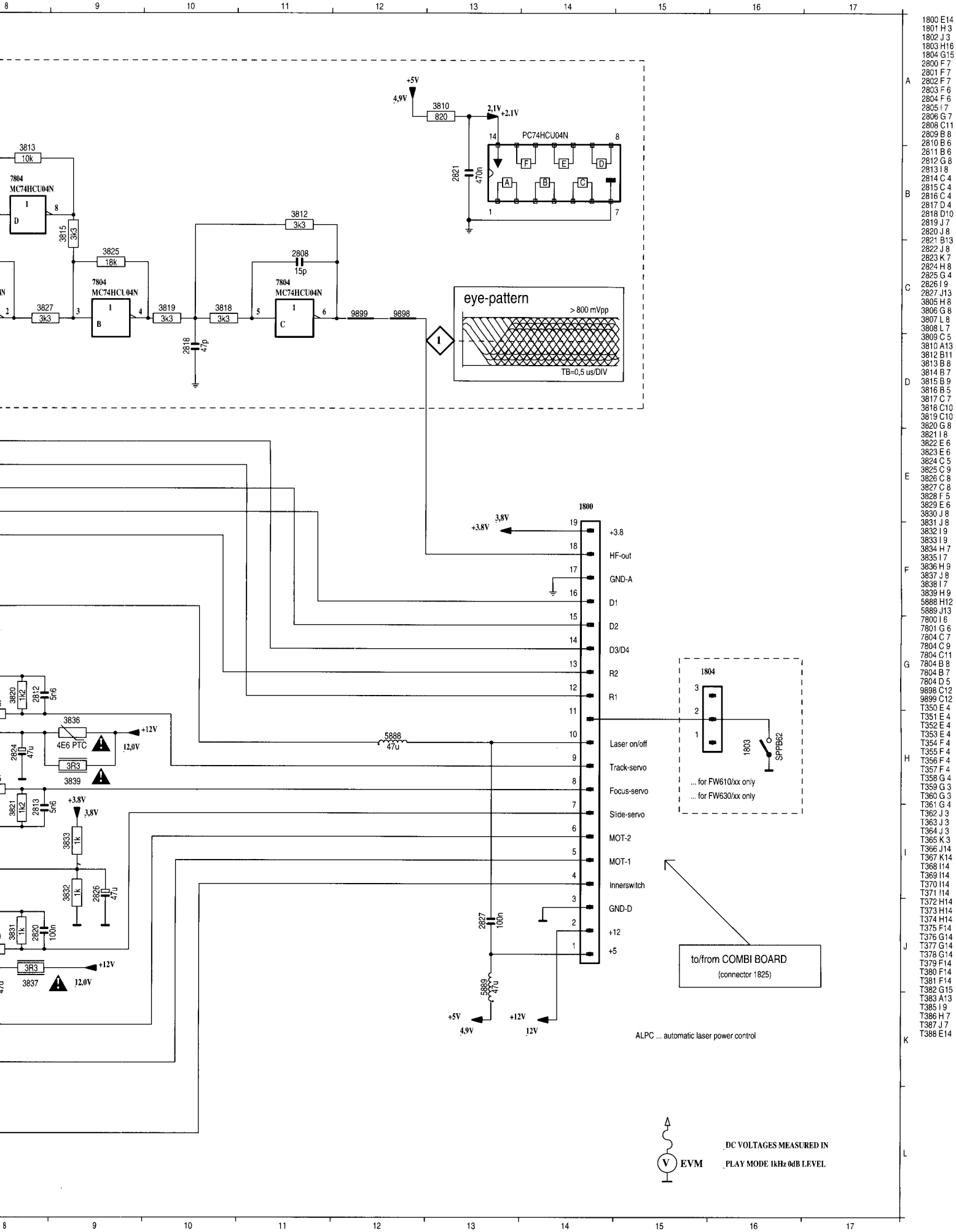

COMBI BOARD see Chapter 9
7860
SAA7345
SIGNAL PROCESSOR CD6
PLL FRONTEND
DIGITAL PLL
MOTOR CONTROL
To Motor Driver 7852
EFM DEMODULATOR
ERROR CORRECTOR
FLAGS
SUBCODE
SRAM
AUDIO PROCESSOR
TIMING
16,93MHz OSC.
RAM ADDRESSER
EBU INTERFACE
MICROPROCESSOR INTERFACE
Q-CHANNEL CRC CHECK
Q-CHANNEL REGISTER
PEAK DETECT
SERIAL DATA INTERFACE
VERSATILE PINS INTERFACE
KILL
RESET
HF (Eye Pattern)
1
CLK
16,9MHz
OTD
OTD = Off Track Detection (low active)
SUPPLY FOR TDA1311
+10V
7871 (TDA1311)
CLK
ws
DATA
SERIAL DATA INTERFACE
D/A
D/A
CD Left
CD Right
DAC
RESET
SLIDE
FOCUS
TRACK
3 x
Low pass
7690
I/O PORT
RESET
8MHz Osc.
RAM
TIMING
CPU
I/O PORT
ROM
µP
TMP879971F
µP used also for other functions
3
FOCUS
4
TRACK
2
SLIDE
5
From Signal processor
Motor control
7862
MOTOR DRIVER
TRAY MOTOR
M
TRAY MOTOR
TDA7073A

CD-INTERFACE BOARD



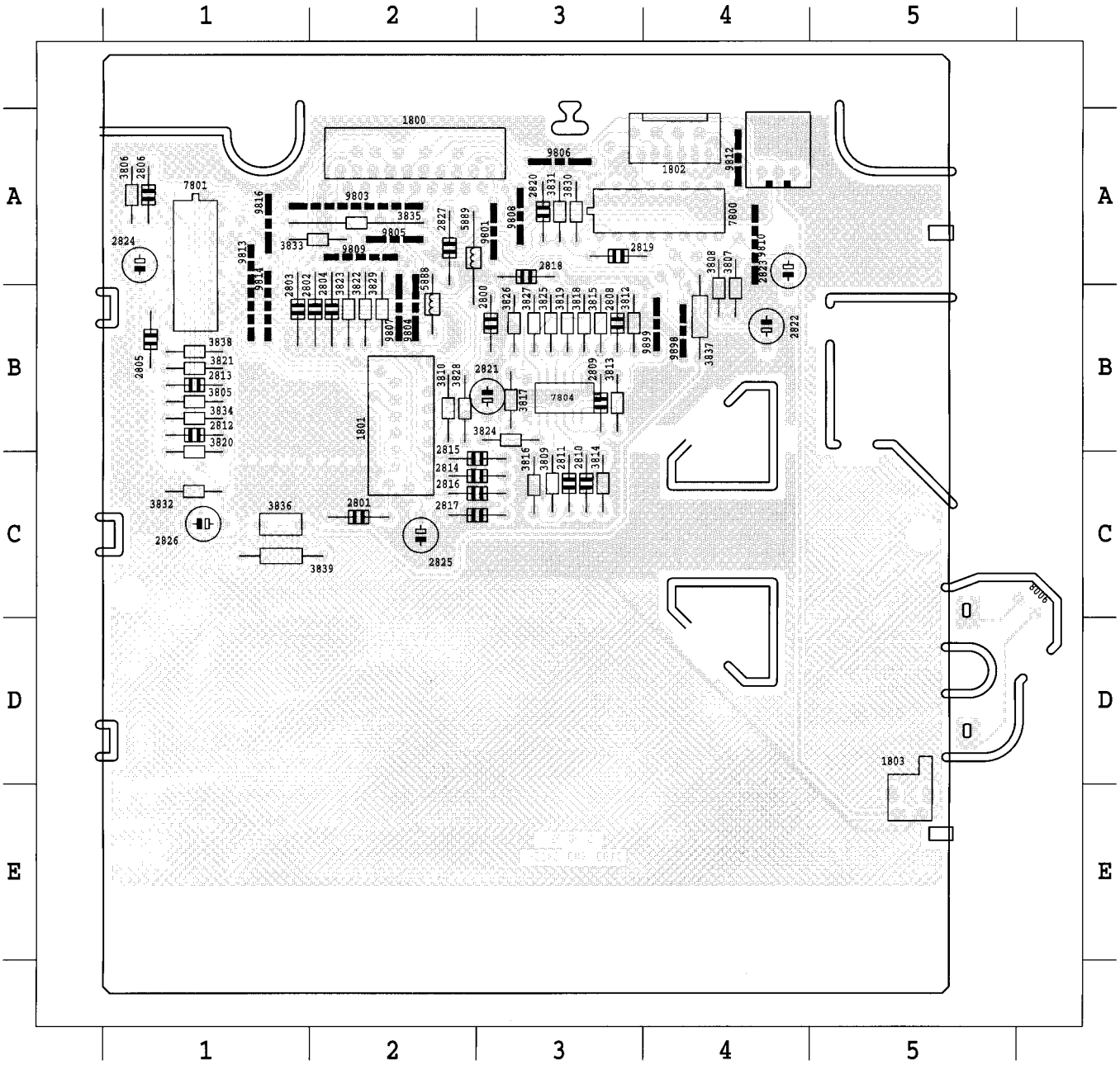


1800 E14
1801 H 3
1802 J 3
1803 H16
1804 G15
2800 F 7
2801 F 7
2802 F 7
2803 F 6
2804 F 6
2805 I 7
2806 G 7
2808 C11
2809 B 8
2810 B 6
2811 B 6
2812 G 8
2813 I 8
2814 C 4
2815 C 4
2816 C 4
2817 D 4
2818 D10
2819 J 7
2820 J 8
2821 B13
2822 J 8
2823 K 7
2824 H 8
2825 G 4
2826 I 9
2827 J13
3805 H 8
3806 G 8
3807 L 8
3808 L 7
3809 C 5
3810 A13
3812 B11
3813 B 8
3814 B 7
3815 B 9
3816 B 5
3817 C 7
3818 C10
3819 C10
3820 G 8
3821 I 8
3822 E 6
3823 E 6
3824 C 5
3825 C 9
3826 C 8
3827 C 8
3828 F 5
3829 E 6
3830 J 8
3831 J 8
3832 I 9
3833 I 9
3834 H 7
3835 I 7
3836 H 9
3837 J 8
3838 I 7
3839 H 9
5888 H12
5889 J13
7800 I 6
7801 G 6
7804 C 7
7804 C 9
7804 C11
7804 B 8
7804 B 7
7804 D 5
9898 C12
9899 C12
T350 E 4
T351 E 4
T352 E 4
T353 E 4
T354 F 4
T355 F 4
T356 F 4
T357 F 4
T358 G 4
T359 G 3
T360 G 3
T361 G 4
T362 J 3
T363 J 3
T364 J 3
T365 K 3
T366 J14
T367 K14
T368 I14
T369 I14
T370 I14
T371 I14
T372 H14
T373 H14
T374 H14
T375 F14
T376 G14
T377 G14
T378 G14
T379 F14
T380 F14
T381 F14
T382 G15
T383 A13
T385 I 9
T386 H 7
T387 J 7
T388 E14

1800 A 2	2805 B 1	2816 C 3	2826 C 1	3814 C 3	3824 B 3	3834 B 1	7804 B 3	9812 A 4	1800 A 2
1801 B 2	2806 A 1	2817 C 3	2827 A 2	3815 B 3	3825 B 3	3835 A 2	9801 A 3	9813 B 1	1801 B 2
1802 A 4	2808 B 3	2818 A 3	3805 B 1	3816 C 3	3826 B 3	3836 C 1	9803 A 2	9814 B 1	1802 A 4
1803 E 5	2809 B 3	2819 A 3	3806 A 1	3817 B 3	3827 B 3	3837 B 4	9804 B 2	9816 A 1	1803 E 5
1804 A 4	2810 C 3	2820 A 3	3807 B 4	3818 B 3	3828 B 2	3838 B 1	9805 A 2	9898 B 4	1804 A 4
2800 B 3	2811 C 3	2821 B 3	3808 B 4	3819 B 3	3829 B 2	3839 C 1	9806 A 3	9899 B 4	2800 B 3
2801 C 2	2812 B 1	2822 B 4	3809 C 3	3820 C 1	3830 A 3	5888 B 2	9807 B 2		2801 C 2
2802 B 2	2813 B 1	2823 A 4	3810 B 2	3821 B 1	3831 A 3	5889 A 2	9808 A 3		2802 B 2
2803 B 1	2814 C 3	2824 A 1	3812 B 3	3822 B 2	3832 C 1	7800 A 4	9809 A 2		2803 B 1
2804 B 2	2815 C 3	2825 C 2	3813 B 3	3823 B 2	3833 A 2	7801 A 1	9810 A 4		2804 B 2

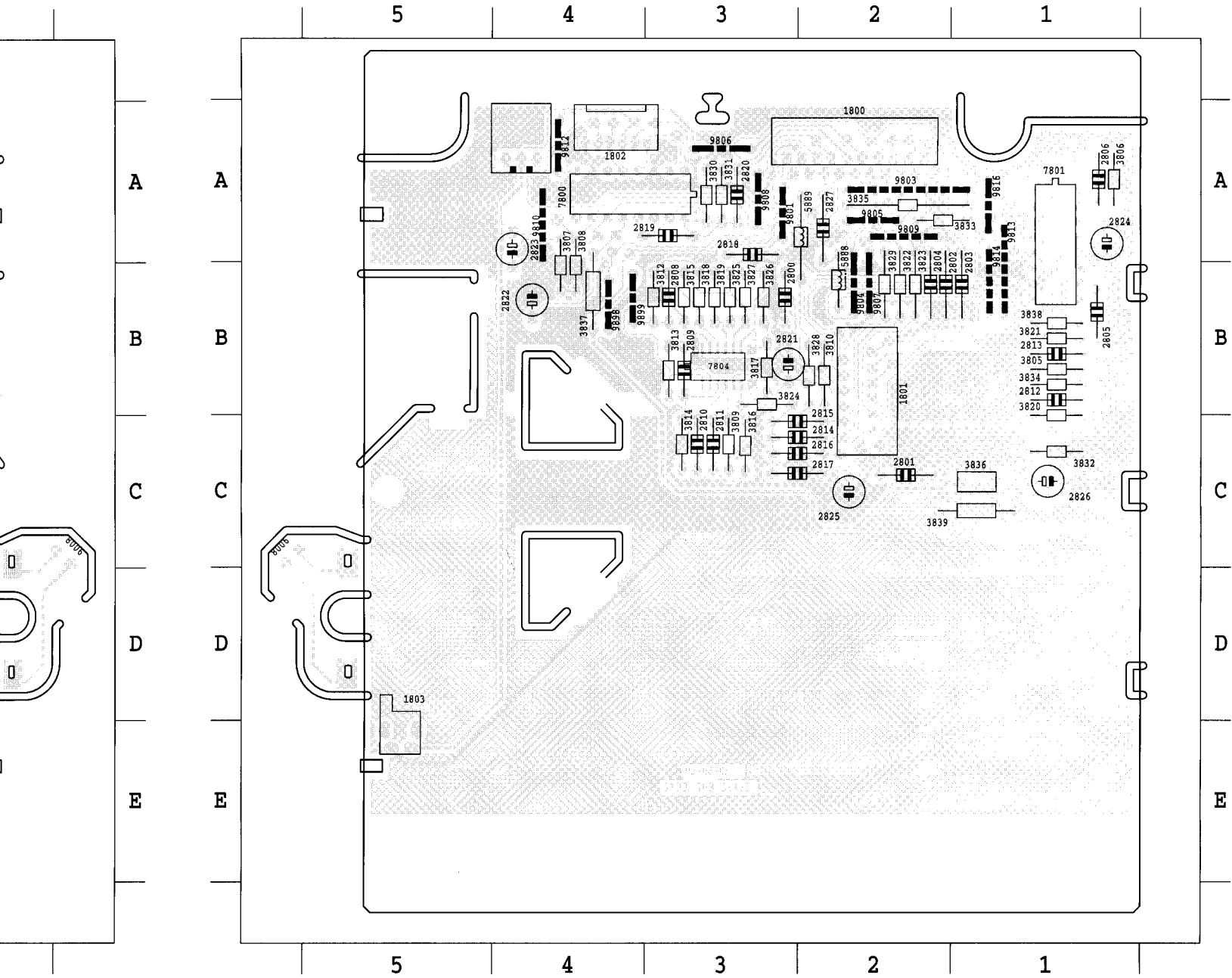
Componentside view

Coppe

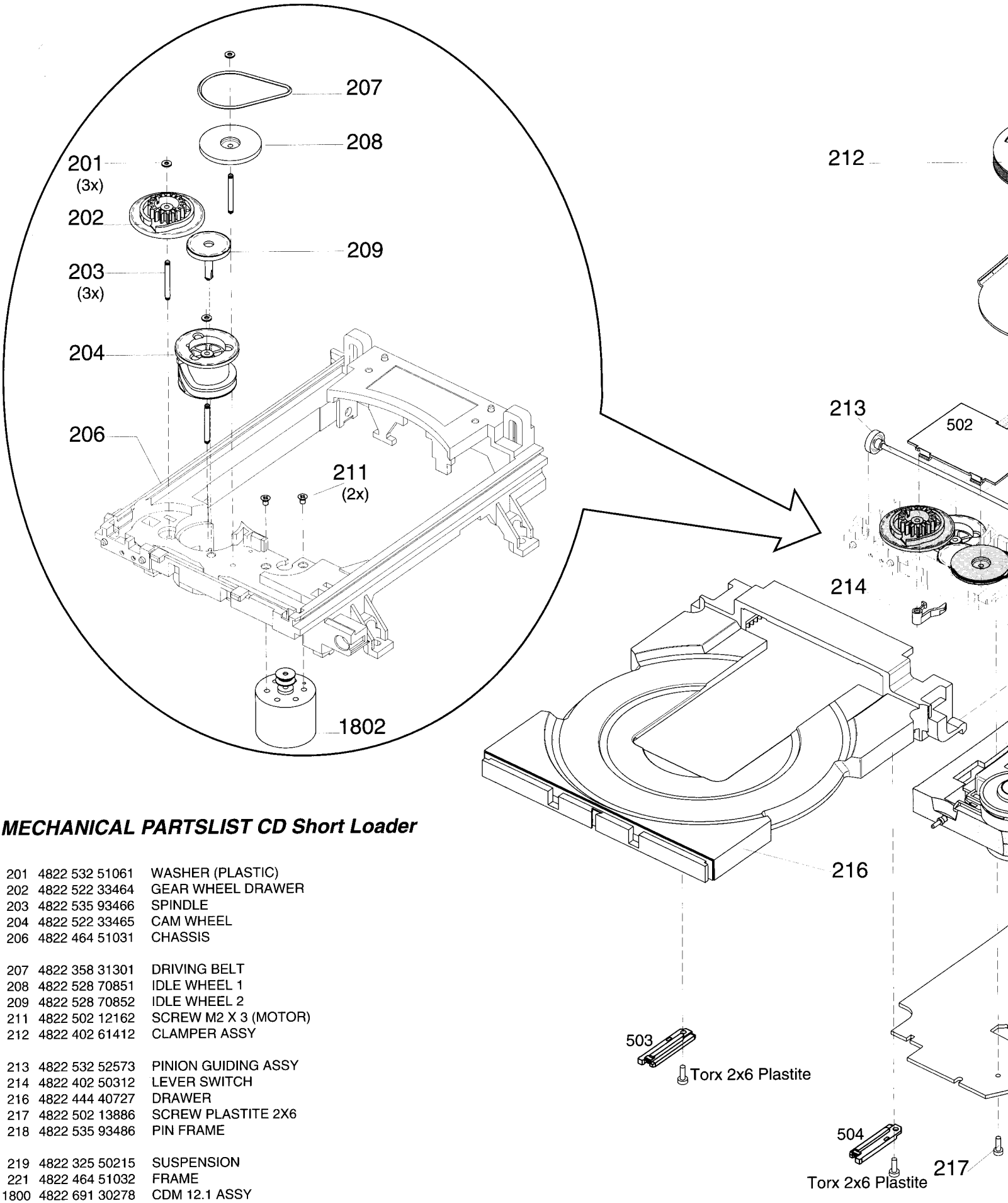


04 B 3	9812 A 4	1800 A 2	2805 B 1	2816 C 3	2826 C 1	3814 C 3	3824 B 3	3834 B 1	7804 B 3	9812 A 4
01 A 3	9813 B 1	1801 B 2	2806 A 1	2817 C 3	2827 A 2	3815 B 3	3825 B 3	3835 A 2	9801 A 3	9813 B 1
03 A 2	9814 B 1	1802 A 4	2808 B 3	2818 A 3	3805 B 1	3816 C 3	3826 B 3	3836 C 1	9803 A 2	9814 B 1
04 B 2	9816 A 1	1803 E 5	2809 B 3	2819 A 3	3806 A 1	3817 B 3	3827 B 3	3837 B 4	9804 B 2	9816 A 1
05 A 2	9898 B 4	1804 A 4	2810 C 3	2820 A 3	3807 B 4	3818 B 3	3828 B 2	3838 B 1	9805 A 2	9898 B 4
06 A 3	9899 B 4	2800 B 3	2811 C 3	2821 B 3	3808 B 4	3819 B 3	3829 B 2	3839 C 1	9806 A 3	9899 B 4
07 B 2		2801 C 2	2812 B 1	2822 B 4	3809 C 3	3820 C 1	3830 A 3	5888 B 2	9807 B 2	
08 A 3		2802 B 2	2813 B 1	2823 A 4	3810 B 2	3821 B 1	3831 A 3	5889 A 2	9808 A 3	
09 A 2		2803 B 1	2814 C 3	2824 A 1	3812 B 3	3822 B 2	3832 C 1	7800 A 4	9809 A 2	
10 A 4		2804 B 2	2815 C 3	2825 C 2	3813 B 3	3823 B 2	3833 A 2	7801 A 1	9810 A 4	

Copperside view



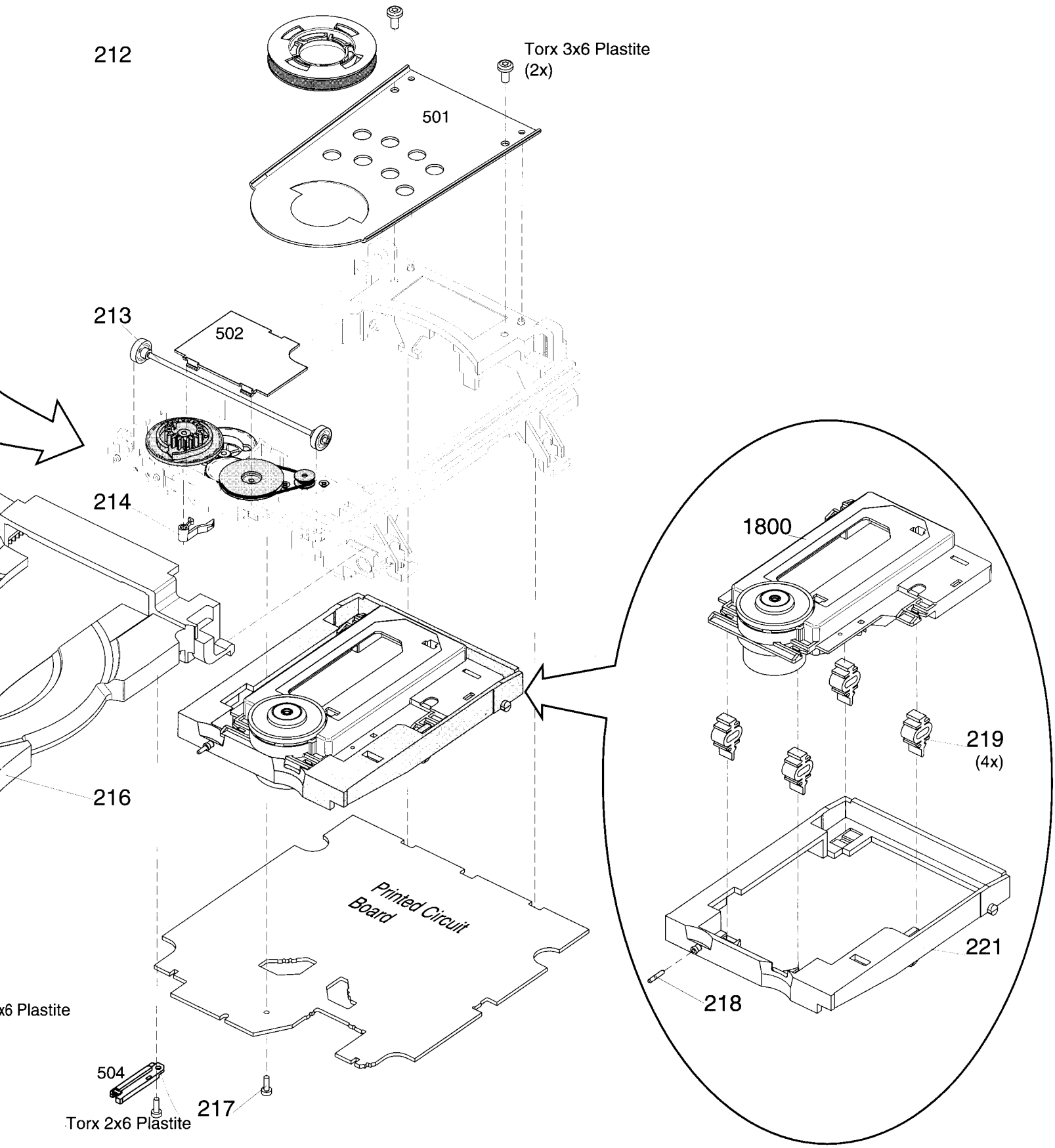
Exploded view CD Short Loade



MECHANICAL PARTSLIST CD Short Loader

201	4822 532 51061	WASHER (PLASTIC)
202	4822 522 33464	GEAR WHEEL DRAWER
203	4822 535 93466	SPINDLE
204	4822 522 33465	CAM WHEEL
206	4822 464 51031	CHASSIS
207	4822 358 31301	DRIVING BELT
208	4822 528 70851	IDLE WHEEL 1
209	4822 528 70852	IDLE WHEEL 2
211	4822 502 12162	SCREW M2 X 3 (MOTOR)
212	4822 402 61412	CLAMPER ASSY
213	4822 532 52573	PINION GUIDING ASSY
214	4822 402 50312	LEVER SWITCH
216	4822 444 40727	DRAWER
217	4822 502 13886	SCREW PLASTITE 2X6
218	4822 535 93486	PIN FRAME
219	4822 325 50215	SUSPENSION
221	4822 464 51032	FRAME
1800	4822 691 30278	CDM 12.1 ASSY
1802	4822 361 21708	MOTOR ASSY
	4822 502 30735	SCREW 3 X 6 PLASTITE

oded view CD Short Loader



ELECTRICAL PARTSLIST CD INTERFACE BOARD

MISCELLANEOUS

1800	4822 267 60412	FLEX PRINT CONNECTOR
1803	4822 276 13503	SWITCH

INTEGRATED CIRCUITS

7800	4822 209 32852	TDA7073A/N2
7801	4822 209 32852	TDA7073A/N2
7804	5322 209 11517	PC74HCU04T

COILS

5888	4822 157 53906	47µH	10%
5889	4822 157 53906	47µH	10%

RESISTORS

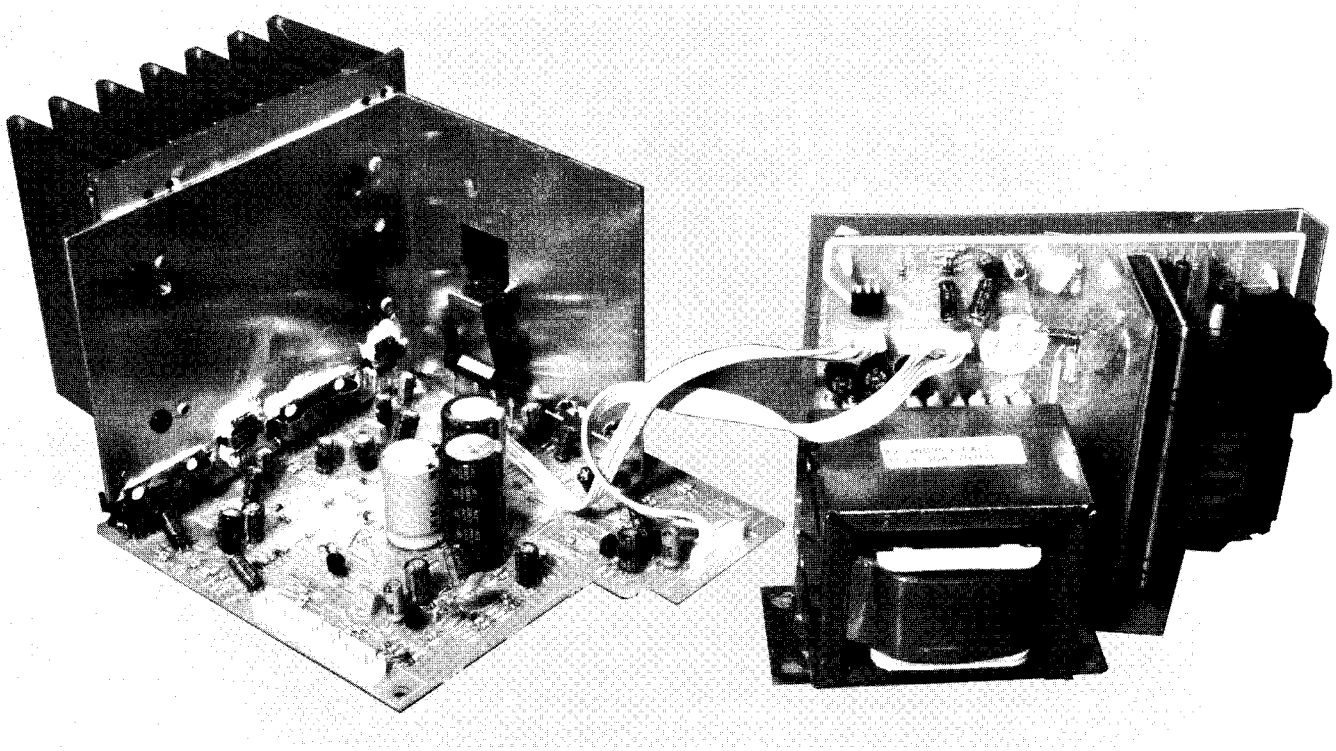
3805	4822 116 52296	6k8	5%	0,5W
3806	4822 116 52296	6k8	5%	0,5W
3807	4822 050 11002	1k	5%	0,2W
3808	4822 050 11002	1k	5%	0,2W
3809	4822 111 50499	3M3	5%	0,2W
3810	4822 116 52231	820R	5%	0,5W
3812	4822 116 52269	3k3	5%	0,5W
3813	4822 116 83864	10k	5%	0,5W
3814	4822 116 83864	10k	5%	0,5W
3815	4822 116 52269	3k3	5%	0,5W
3816	4822 116 52284	47k	5%	0,5W
3817	4822 116 52296	6k8	5%	0,5W
3818	4822 116 52269	3k3	5%	0,5W
3819	4822 116 52269	3k3	5%	0,5W
3820	4822 116 52207	1k2	5%	0,5W
3821	4822 116 52207	1k2	5%	0,5W
3822	4822 116 52291	56k	5%	0,5W
3823	4822 116 52239	120k	5%	0,5W
3824	4822 050 11002	1k	5%	0,2W
3825	4822 116 52251	18k	5%	0,5W
3826	4822 116 52257	22k	5%	0,5W
3827	4822 116 52269	3k3	5%	0,5W
3828	4822 050 11002	1k	5%	0,2W
3829	4822 116 52239	120k	5%	0,5W
3830	4822 116 52296	6k8	5%	0,5W
3831	4822 050 11002	1k	5%	0,2W
3832	4822 050 11002	1k	5%	0,2W
3833	4822 050 11002	1k	5%	0,2W
3834	4822 116 52215	220R	5%	0,16W
3835	4822 116 52215	220R	5%	0,16W
3836	4822 116 40227	PTC	4R6	
3837	4822 052 10338	3R3		NFR25
3838	4822 116 52215	220R	5%	0,16W

CAPACITORS

2800	4822 122 10459	560pF	10%	50V
2801	4822 126 12878	1,5nF	10%	16V
2802	4822 126 12787	330pF	10%	50V
2803	4822 126 10053	180pF	10%	50V
2804	4822 126 10053	180pF	10%	50V
2805	4822 122 10459	560pF	10%	50V
2806	4822 122 10459	560pF	10%	50V
2808	4822 122 10462	15pF	5%	50V
2809	4822 122 33848	47pF	5%	50V

CAPACITORS

2810	4822 122 33848	47pF	5%	50V
2811	4822 122 33849	150pF	10%	50V
2812	4822 126 13098	5,6nF	20%	16V
2813	4822 126 13098	5,6nF	20%	16V
2814	4822 122 33849	150pF	10%	50V
2815	4822 122 10319	82pF	5%	50V
2816	4822 122 10319	82pF	5%	50V
2817	4822 122 33192	27pF	5%	50V
2818	4822 122 33848	47pF	5%	50V
2819	4822 121 51387	10nF	20%	16V
2820	4822 126 12882	100nF	20%	50V
2821	4822 124 41407	0,47µF	20%	63V
2822	4822 124 40433	47µF	20%	25V
2823	4822 124 40999	0,47µF	20%	50V
2824	4822 124 40433	47µF	20%	25V
2825	4822 124 40433	47µF	20%	25V
2826	4822 124 40433	47µF	20%	25V
2827	4822 126 12882	100nF	20%	50V



POWER BOARD

TABLE OF CONTENTS

Circuit description 11-1
Component layout 11-2
Circuit diagram Supply part 11-3
Component layout 11-4
Circuit diagram Power stage 11-5
Partslist 11-6

CIRCUIT

The mains tra
voltage. The
7351. To be a
rectified by a
control of the

In Power on r
optocoupler 7
optocoupler is
Stabilisation a
and the elcap
transistor 736
the stabilized
connected via
voltage +16V
voltage +16V
+16V the tran
also the MOS
both semicon

To provide su
measures are
resistor 3341
the secondary
The RC netw
DC gain rema

Transients co
To safeguard
3357 and the
thyristor 7352
To avoid a to
thyristor 7376
6386 senses
of excessive

CIRCUIT DESCRIPTION

The mains transformer 1008 is fed with a preregulated voltage. The preregulation is done by a power MOSFET 7351. To be able to handle AC, the voltage for the FET is rectified by a diode bridge 6351, 6352, 6353 and 6354. The control of the MOSFET is depending of the mode of the set.

In Power on mode the MOSFET is controled by the optocoupler 7353 via resistor 3345. The supply for the optocoupler is created via resistor 3343 and the diode 6344. Stabilisation and filtering is done by the zenerdiode 6345 and the elcap 2343. The optocoupler is activated by the transistor 7369. The emitter of this transistor is connected to the stabilized voltage +5,6V via resistor 3386. The base is connected via zenerdiode 6384 and resistor 3383 to the voltage +16V. This enables the transistor to compare the voltage +16V with the voltage +5,6V. In case of a too low +16V the transistor conducts and makes via the optocoupler also the MOSFET conducting. In case of a too high +16V both semiconductors become nonconducting.

To provide sufficient stability in the whole control loop, some measures are taken. On the primary side a feed back via resistor 3341 and diode 6341 reduces the overall gain. On the secondary side the resistor 3386 works in similar way. The RC network 2379/3379 reduces the AC gain while the DC gain remains unaffected.

Transients could cause too high current peaks in the FET. To safeguard the FET, the current is sensed by the resistor 3357 and the transistor 7342. In case of overcurrent the thyristor 7352 fires and bypass the FET.
To avoid a too high supply in case of fault condition the thyristor 7376 is used as a crowbar device. The zenerdiode 6386 senses the voltage +24V and fires the thyristor in case of excessive voltage. The fuses will be blown.

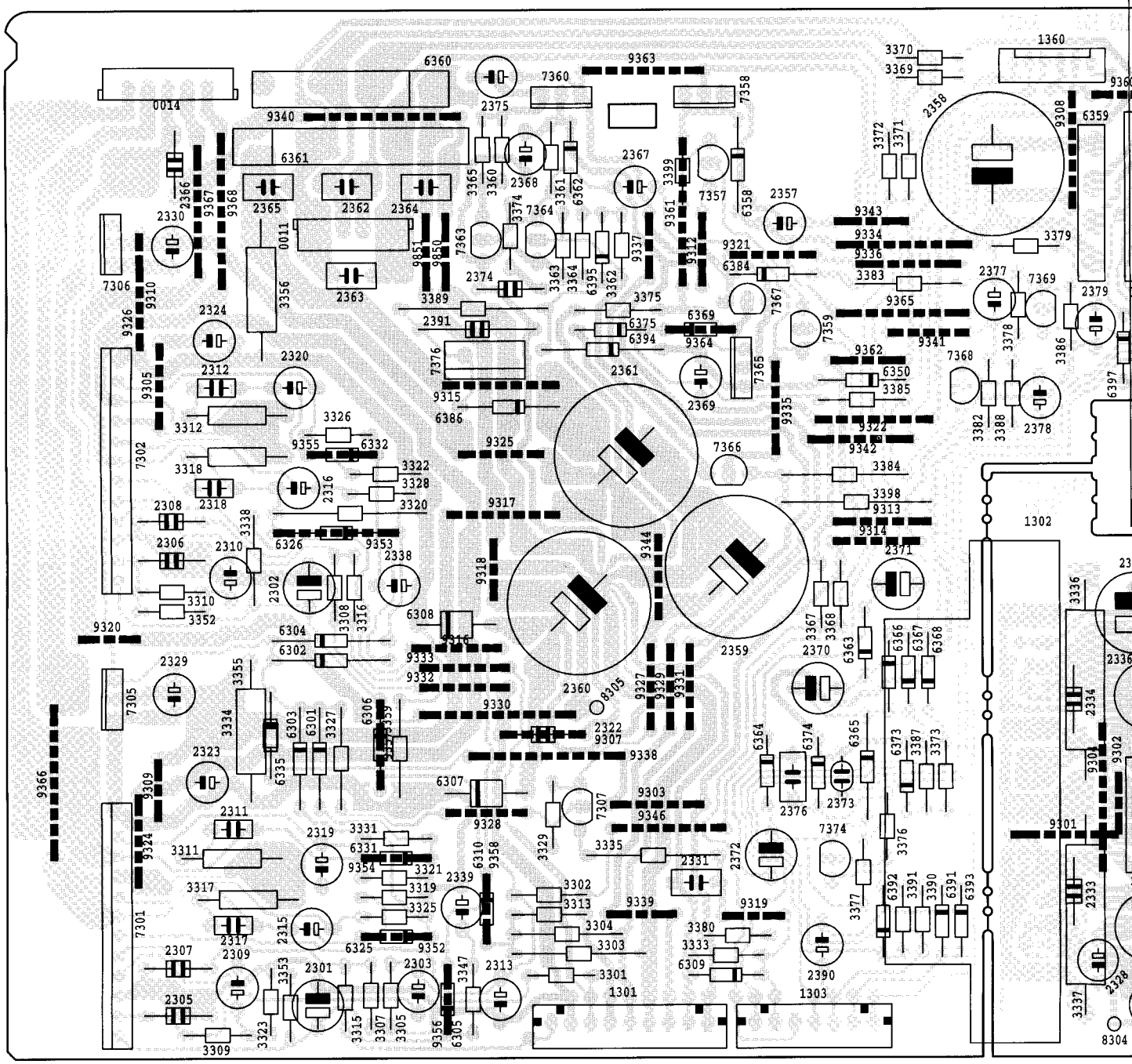
In the ECO mode (Stand by and display off) it is only necessary to supply the microprocessor and the infrared eye. This can be done with a drastically reduced voltage on the transformer. To activate that mode, the line STBY is switched by the microprocessor to ground. This makes the transistor 7366 conducting. As a consequence the +12V stabilisation, realized by transistors 7360, 7363 and 7364, is switched off. Additional the transistor 7368 is conducting and switches transistor 7369 off. The control loop via the optocoupler is now cut off. The control is working only with components connected to the primary side of the transformer. Via the diode 6344 still a stabilized voltage of 12V is created. The voltage at the anode of the diode 6344 is during one half cycle about +12V and during the other half cycle below zero depending on the voltage across the transformer.

Integration by resistor 3349 and capacitor 2344 results a triangle voltage, fed via diode 6342 to the gate of the FET. The positive peak happens at the zero crossing of the mains, switching on the FET for a short time. The average DC level is depending on the transformer voltage. Increasing transformer voltage shifts the DC level to negative. This is reducing the conduction time of the FET.

0011 A 2	1357 A 8	2312 B 1	2330 B 1	2358 A 5	2372 E 4	3305 E 2	3321 E 2	3338 C 1	3356 B 1	3371 A 5	3386 B 5	6306 D 2
0013 A 6	1358 A 8	2313 E 3	2331 E 4	2359 C 4	2373 D 4	3307 E 2	3322 C 2	3339 C 8	3357 C 9	3372 A 5	3387 D 5	6307 D 2
0014 A 1	1359 B 8	2315 E 2	2333 E 5	2360 C 3	2374 B 3	3308 C 2	3323 E 1	3341 C 9	3358 B 9	3373 D 5	3388 B 5	6308 C 2
1008 B 7	1360 A 5	2316 C 2	2334 D 5	2361 C 3	2375 A 3	3309 E 1	3325 E 2	3343 C 8	3359 D 2	3374 A 3	3389 B 2	6309 E 4
1301 E 3	2301 E 2	2317 E 1	2335 C 6	2362 A 2	2376 D 4	3310 C 1	3326 B 2	3345 C 9	3360 A 3	3375 B 3	3390 E 5	6310 E 2
1302 D 5	2302 C 2	2318 C 1	2336 D 6	2363 B 2	2377 B 5	3311 E 1	3327 D 2	3346 B 9	3361 A 3	3376 D 5	3391 E 5	6325 E 2
1303 E 4	2303 E 2	2319 E 2	2337 E 6	2364 A 2	2378 B 5	3312 B 1	3328 C 2	3347 E 2	3362 B 3	3377 E 4	3398 C 4	6326 C 2
1304 D 6	2305 E 1	2320 B 2	2338 C 2	2365 A 1	2379 B 6	3313 E 3	3329 D 3	3349 A 9	3363 B 3	3378 B 5	3399 A 4	6331 E 2
1345 A 9	2306 C 1	2322 D 3	2339 E 2	2366 A 1	2390 E 4	3315 E 2	3331 E 2	3350 A 9	3364 B 3	3379 B 5	5350 D 8	6332 C 2
1346 B 9	2307 E 1	2323 D 1	2343 B 9	2367 A 3	2391 B 2	3316 C 2	3333 E 4	3351 A 9	3365 A 2	3380 E 4	6301 D 2	6335 D 1
1350 E 9	2308 C 1	2324 B 1	2344 B 9	2368 A 3	3301 E 3	3317 E 1	3334 D 1	3352 C 1	3367 C 4	3382 B 5	6302 D 2	6340 A 9
1352 E 9	2309 E 1	2327 E 6	2345 B 9	2369 B 4	3302 E 3	3318 C 1	3335 E 3	3353 E 1	3368 C 4	3383 B 5	6303 D 2	6341 A 9
1355 E 7	2310 C 1	2328 E 6	2351 E 9	2370 D 4	3303 E 3	3319 E 2	3336 D 6	3354 B 9	3369 A 5	3384 C 4	6304 D 2	6342 A 9
1356 A 8	2311 E 1	2329 D 1	2357 A 4	2371 C 5	3304 E 3	3320 C 2	3337 E 6	3355 D 1	3370 A 5	3385 B 4	6305 E 2	6343 A 9

1 2 3 4 5

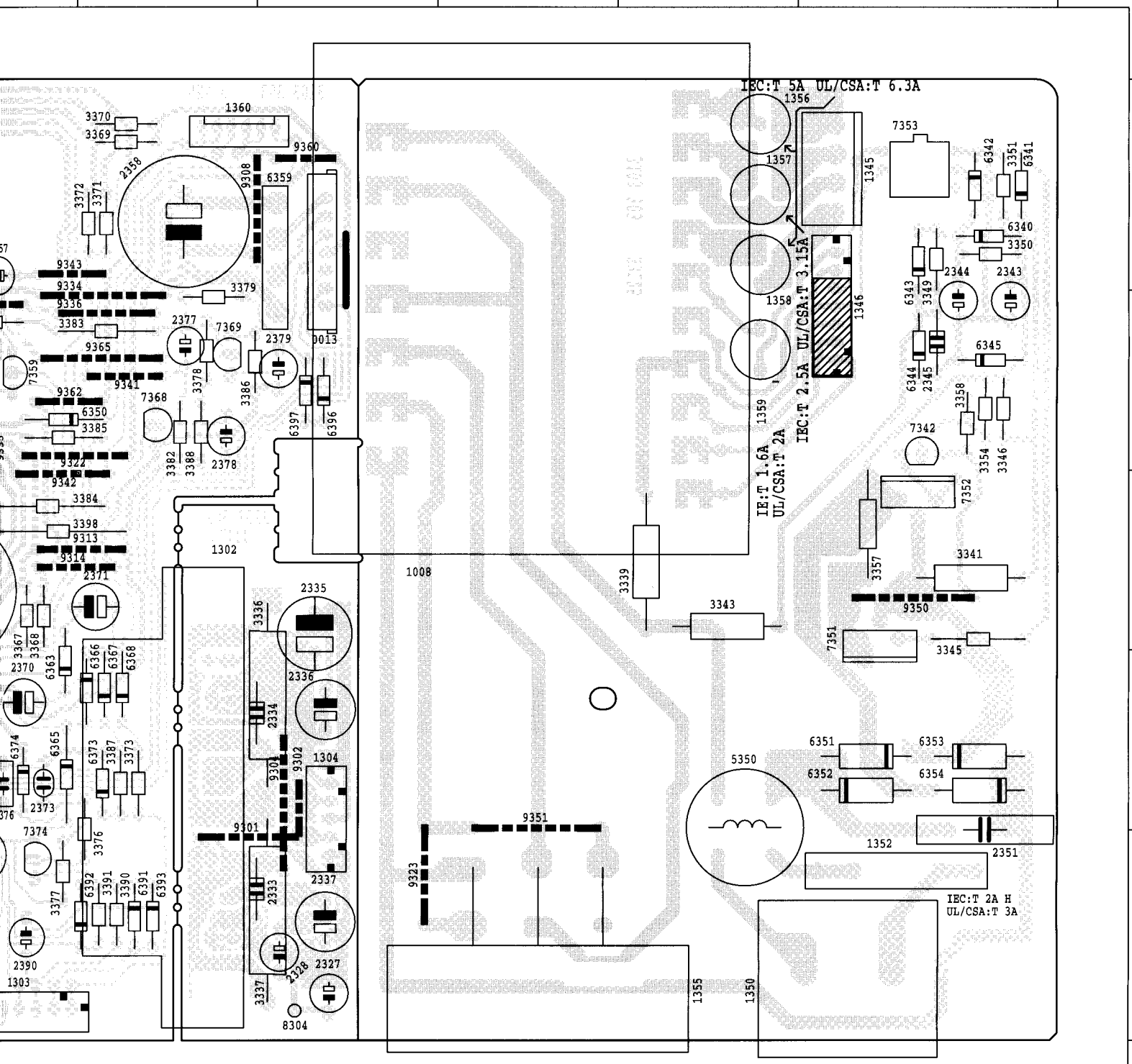
COMPONENT SIDE VIEW

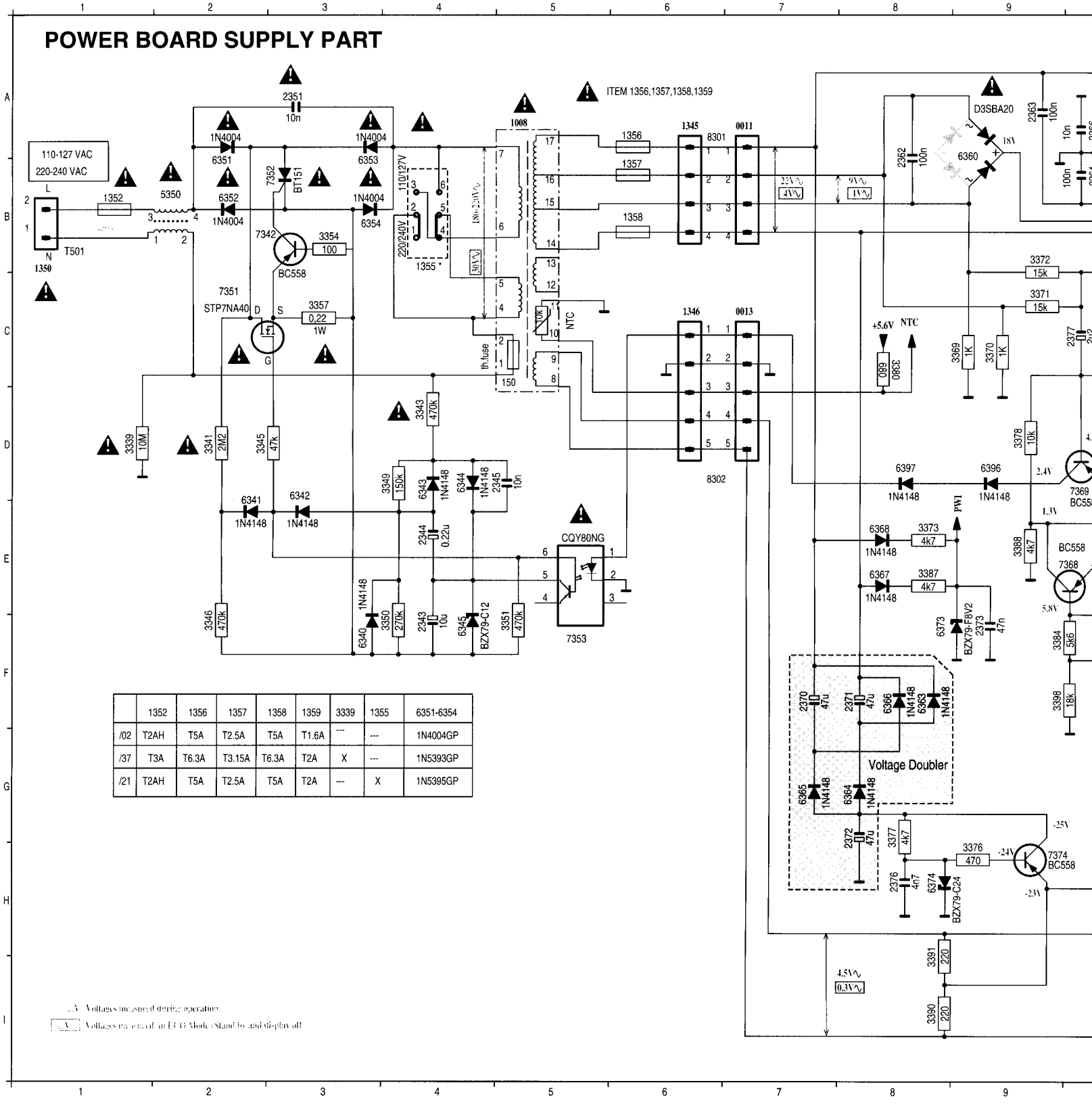


A B C D E

1 2 3 4 5

56 B 1	3371 A 5	3386 B 5	6306 D 2	6344 B 9	6365 D 4	6395 B 3	7359 B 4	9302 D 6	9318 C 3	9332 D 2	9350 C 9	9365 B 5
57 C 9	3372 A 5	3387 D 5	6307 D 2	6345 B 9	6366 D 5	6396 B 6	7360 A 3	9303 D 3	9319 E 4	9333 D 2	9351 D 7	9366 D 1
58 B 9	3373 D 5	3388 B 5	6308 C 2	6350 B 4	6367 D 5	6397 B 6	7363 B 2	9304 D 6	9320 D 1	9334 B 5	9352 E 2	9367 A 1
59 D 2	3374 A 3	3389 B 2	6309 E 4	6351 D 9	6368 D 5	7301 E 1	7364 B 3	9305 B 1	9321 B 4	9335 B 4	9353 C 2	9368 A 1
60 A 3	3375 B 3	3390 E 5	6310 E 2	6352 D 9	6369 B 4	7302 C 1	7365 B 4	9307 D 3	9322 B 4	9336 B 5	9354 E 2	9850 B 2
61 A 3	3376 D 5	3391 E 5	6325 E 2	6353 D 9	6373 D 5	7305 D 1	7366 C 4	9308 A 5	9323 E 6	9337 B 3	9355 C 2	9851 B 2
62 B 3	3377 E 4	3398 C 4	6326 C 2	6354 D 9	6374 D 4	7306 B 1	7367 B 4	9309 D 1	9324 E 1	9338 D 3	9356 E 2	
63 B 3	3378 B 5	3399 A 4	6331 E 2	6358 A 4	6375 B 3	7307 D 3	7368 B 5	9310 B 1	9325 C 3	9339 E 3	9357 D 2	
64 B 3	3379 B 5	5350 D 8	6332 C 2	6359 A 6	6384 B 4	7342 B 9	7369 B 5	9312 B 4	9326 B 1	9340 A 2	9358 E 2	
65 A 2	3380 E 4	6301 D 2	6335 D 1	6360 A 2	6386 B 3	7351 C 9	7374 E 4	9313 C 5	9327 D 3	9341 B 5	9360 A 6	
67 C 4	3382 B 5	6302 D 2	6340 A 9	6361 A 2	6391 E 5	7352 C 9	7376 B 2	9314 C 4	9328 D 2	9342 C 4	9361 A 4	
68 C 4	3383 B 5	6303 D 2	6341 A 9	6362 A 3	6392 E 5	7353 A 9	8304 E 6	9315 B 3	9329 D 3	9343 A 4	9362 B 4	
69 A 5	3384 C 4	6304 D 2	6342 A 9	6363 D 4	6393 E 5	7357 A 4	8305 D 3	9316 D 2	9330 D 3	9344 C 3	9363 A 3	
70 A 5	3385 B 4	6305 E 2	6343 A 9	6364 D 4	6394 B 3	7358 A 4	9301 E 5	9317 C 3	9331 D 4	9346 E 3	9364 B 4	

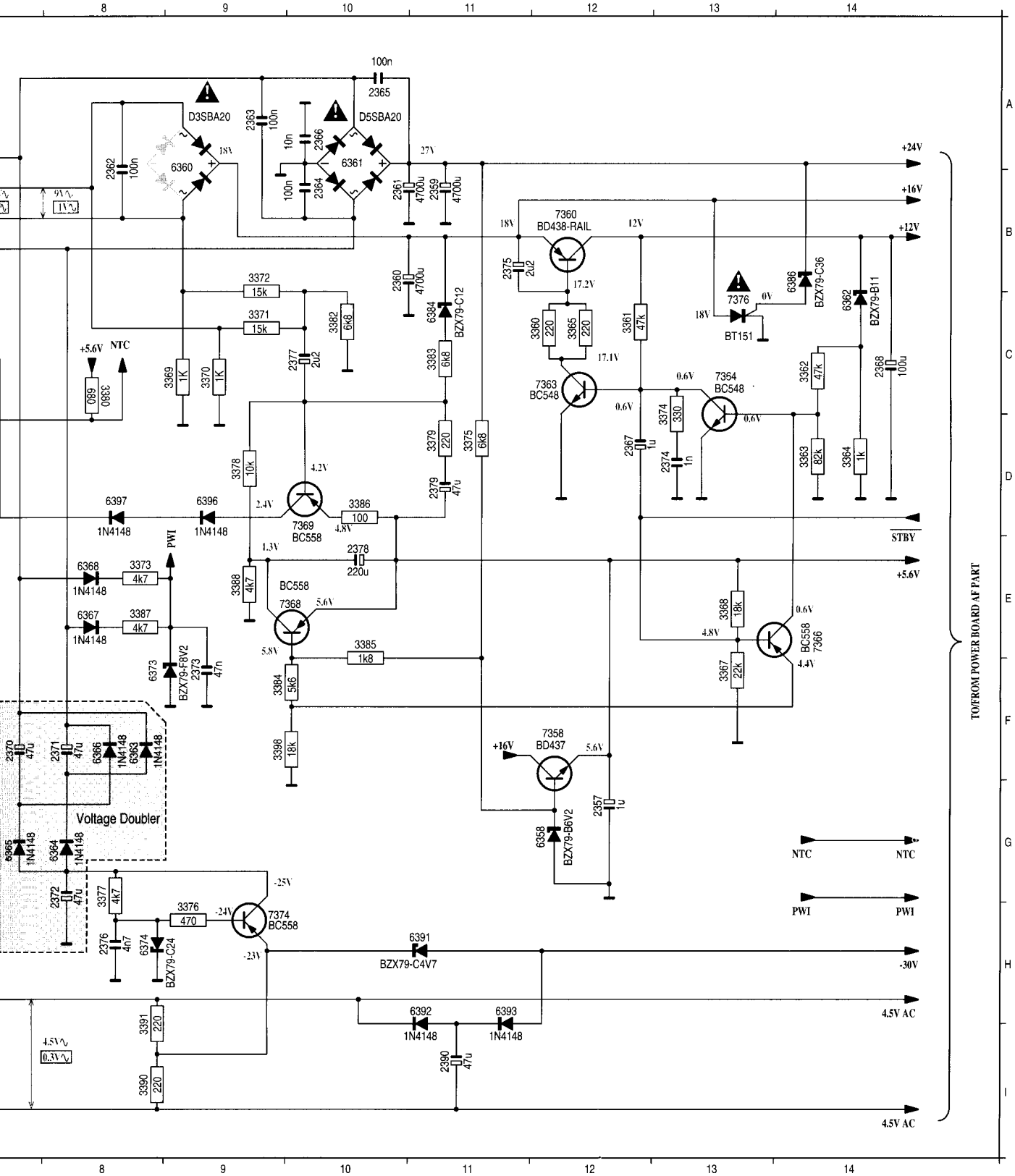




	1352	1356	1357	1358	1359	3339	1355	6351-6354
/02	T2AH	T5A	T2.5A	T5A	T1.6A	---	---	1N4004GP
/37	T3A	T6.3A	T3.15A	T6.3A	T2A	X	---	1N5393GP
/21	T2AH	T5A	T2.5A	T5A	T2A	---	X	1N5395GP

...V Voltages measured during operation

...V Voltages measured in LCD Mode (Stand-by and display off)

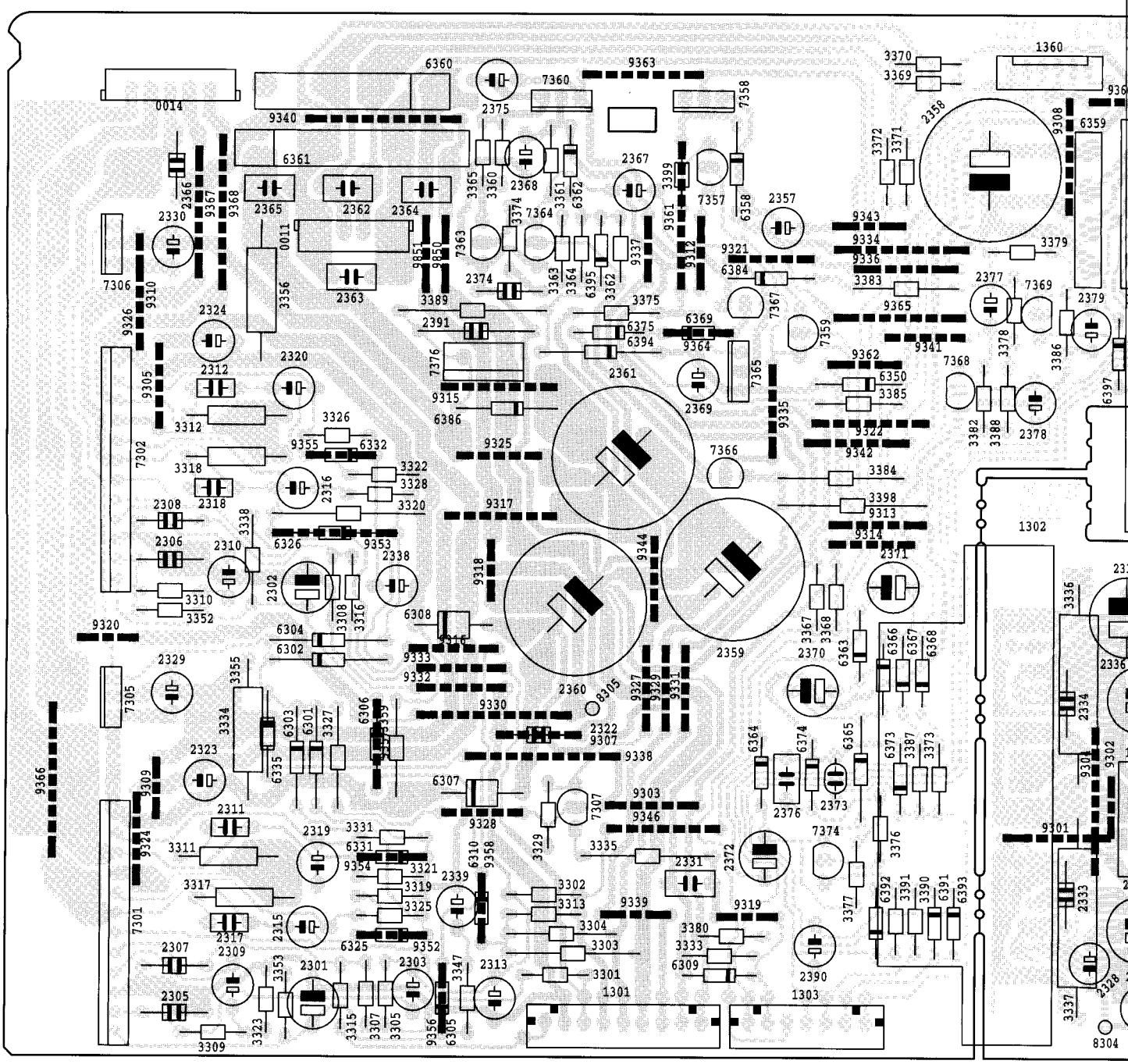


0011 A 7
0013 B 7
1008 A 5
1345 A 6
1346 B 6
1350 B 1
1352 B 1
1355 B 4
1356 A 6
1357 B 6
1358 B 6
2343 F 4
2344 E 4
2345 D 5
2351 A 3
2357 G12
2359 B11
2360 B10
2361 B10
2362 A 8
2363 A 9
2364 B10
2365 A10
2366 A10
2367 D12
2368 C14
2370 F 7
2371 F 8
2372 G 8
2373 F 9
2374 D13
2375 B11
2376 H 8
2377 C10
2378 E10
2379 D11
2390 I11
3339 D 1
3341 D 2
3343 D 4
3345 D 2
3346 F 2
3349 D 4
3350 F 4
3351 F 5
3354 B 3
3357 C 3
3358 C 3
3360 C12
3361 C12
3362 C14
3363 D14
3364 D14
3365 C12
3367 F13
3368 E13
3369 C 9
3370 C 9
3371 C 9
3372 B 9
3373 E 8
3374 C13
3375 D11
3376 H 9
3377 G 8
3378 D 9
3379 D11
3380 C 8
3382 C10
3383 C11
3384 F 9
3385 E10
3386 D10
3387 E 8
3388 E 9
3390 I 8
3391 H 8
3398 F 9
5350 B 2
6340 F 3
6341 E 2
6342 D 3
6343 D 4
6344 D 4
6345 F 4
6351 B 2
6352 B 2
6353 B 3
6354 B 3
6358 G12
6360 A 9
6361 A10
6362 C14
6363 F 8
6364 G 8
6365 G 7
6366 F 8
6367 E 8
6368 E 8
6373 F 8
6374 H 8
6384 C11
6386 B14
6391 H11
6392 H11
6393 H11
6396 D 9
6397 D 8
7342 B 3
7351 C 2
7352 B 3
7353 F 5
7358 F12
7360 B12
7363 C12
7364 C13
7366 E14
7368 E 9
7369 D10
7374 H 9
7376 C13
9363 F11
9365 G12

0011 A 2	1357 A 8	2312 B 1	2330 B 1	2358 A 5	2372 E 4	3305 E 2	3321 E 2	3338 C 1	3356 B 1	3371 A 5	3386 B 5	6306 D 2
0013 A 6	1358 A 8	2313 E 3	2331 E 4	2359 C 4	2373 D 4	3307 E 2	3322 C 2	3339 C 8	3357 C 9	3372 A 5	3387 D 5	6307 D 2
0014 A 1	1359 B 8	2315 E 2	2333 E 5	2360 C 3	2374 B 3	3308 C 2	3323 E 1	3341 C 9	3358 B 9	3373 D 5	3388 B 5	6308 C 2
1008 B 7	1360 A 5	2316 C 2	2334 D 5	2361 C 3	2375 A 3	3309 E 1	3325 E 2	3343 C 8	3359 D 2	3374 A 3	3389 B 2	6309 E 4
1301 E 3	2301 E 2	2317 E 1	2335 C 6	2362 A 2	2376 D 4	3310 C 1	3326 B 2	3345 C 9	3360 A 3	3375 B 3	3390 E 5	6310 E 2
1302 D 5	2302 C 2	2318 C 1	2336 D 6	2363 B 2	2377 B 5	3311 E 1	3327 D 2	3346 B 9	3361 A 3	3376 D 5	3391 E 5	6325 E 2
1303 E 4	2303 E 2	2319 E 2	2337 E 6	2364 A 2	2378 B 5	3312 B 1	3328 C 2	3347 E 2	3362 B 3	3377 E 4	3398 C 4	6326 C 2
1304 D 6	2305 E 1	2320 B 2	2338 C 2	2365 A 1	2379 B 6	3313 E 3	3329 D 3	3349 A 9	3363 B 3	3378 B 5	3399 A 4	6331 E 2
1345 A 9	2306 C 1	2322 D 3	2339 E 2	2366 A 1	2390 E 4	3315 E 2	3331 E 2	3350 A 9	3364 B 3	3379 B 5	5350 D 8	6332 C 2
1346 B 9	2307 E 1	2323 D 1	2343 B 9	2367 A 3	2391 B 2	3316 C 2	3333 E 4	3351 A 9	3365 A 2	3380 E 4	6301 D 2	6335 D 1
1350 E 9	2308 C 1	2324 B 1	2344 B 9	2368 A 3	3301 E 3	3317 E 1	3334 D 1	3352 C 1	3367 C 4	3382 B 5	6302 D 2	6340 A 9
1352 E 9	2309 E 1	2327 E 6	2345 B 9	2369 B 4	3302 E 3	3318 C 1	3335 E 3	3353 E 1	3368 C 4	3383 B 5	6303 D 2	6341 A 9
1355 E 7	2310 C 1	2328 E 6	2351 E 9	2370 D 4	3303 E 3	3319 E 2	3336 D 6	3354 B 9	3369 A 5	3384 C 4	6304 D 2	6342 A 9
1356 A 8	2311 E 1	2329 D 1	2357 A 4	2371 C 5	3304 E 3	3320 C 2	3337 E 6	3355 D 1	3370 A 5	3385 B 4	6305 E 2	6343 A 9

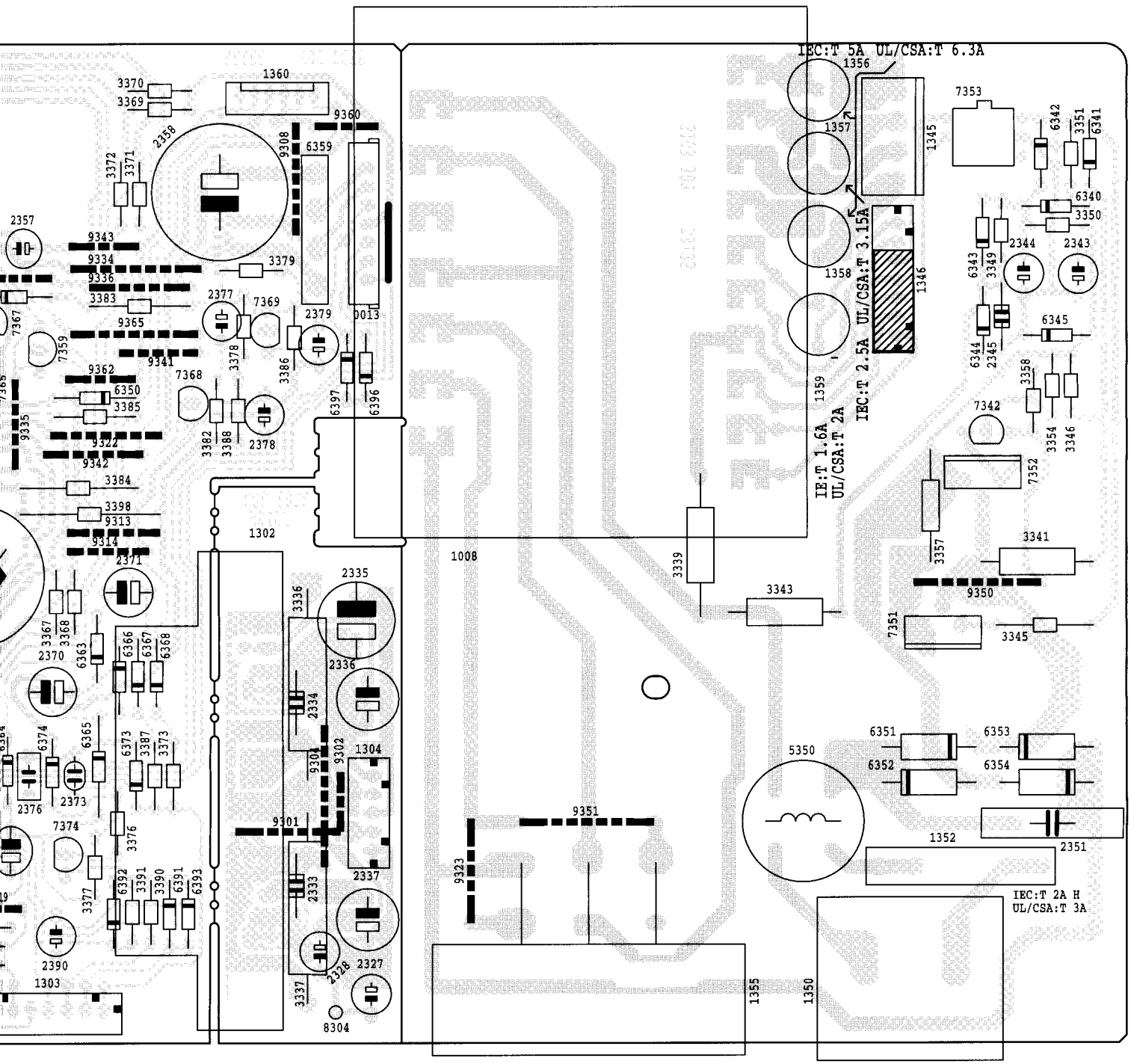
1 2 3 4 5

COMPONENT SIDE VIEW



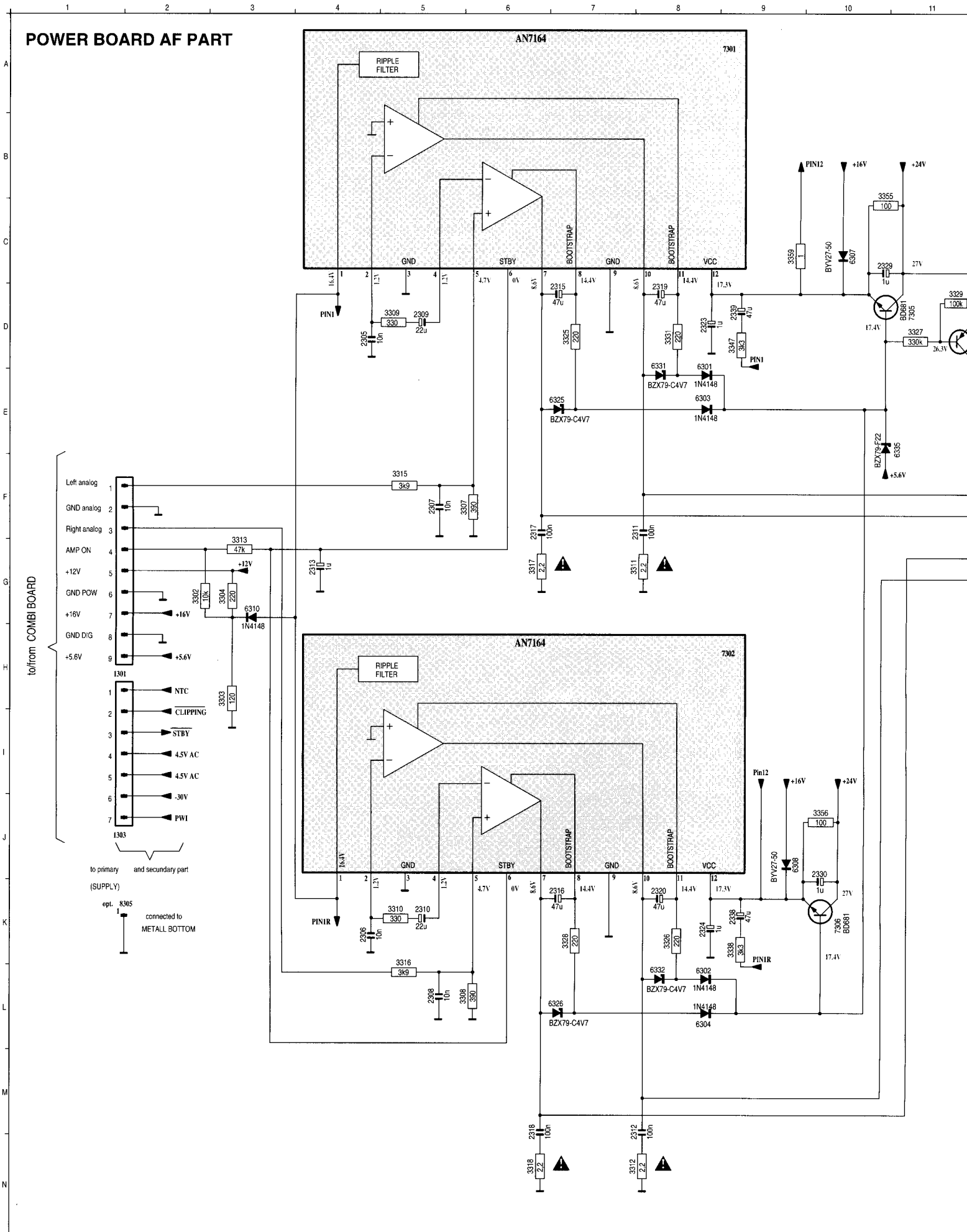
3356 B 1	3371 A 5	3386 B 5	6306 D 2	6344 B 9	6365 D 4	6395 B 3	7359 B 4	9302 D 6	9318 C 3	9332 D 2	9350 C 9	9365 B 5
3357 C 9	3372 A 5	3387 D 5	6307 D 2	6345 B 9	6366 D 5	6396 B 6	7360 A 3	9303 D 3	9319 E 4	9333 D 2	9351 D 7	9366 D 1
3358 B 9	3373 D 5	3388 B 5	6308 C 2	6350 B 4	6367 D 5	6397 B 6	7363 B 2	9304 D 6	9320 D 1	9334 B 5	9352 E 2	9367 A 1
3359 D 2	3374 A 3	3389 B 2	6309 E 4	6351 D 9	6368 D 5	7301 E 1	7364 B 3	9305 B 1	9321 B 4	9335 B 4	9353 C 2	9368 A 1
3360 A 3	3375 B 3	3390 E 5	6310 E 2	6352 D 9	6369 B 4	7302 C 1	7365 B 4	9307 D 3	9322 B 4	9336 B 5	9354 E 2	9850 B 2
3361 A 3	3376 D 5	3391 E 5	6325 E 2	6353 D 9	6373 D 5	7305 D 1	7366 C 4	9308 A 5	9323 E 6	9337 B 3	9355 C 2	9851 B 2
3362 B 3	3377 E 4	3398 C 4	6326 C 2	6354 D 9	6374 D 4	7306 B 1	7367 B 4	9309 D 1	9324 E 1	9338 D 3	9356 E 2	
3363 B 3	3378 B 5	3399 A 4	6331 E 2	6358 A 4	6375 B 3	7307 D 3	7368 B 5	9310 B 1	9325 C 3	9339 E 3	9357 D 2	
3364 B 3	3379 B 5	5350 D 8	6332 C 2	6359 A 6	6384 B 4	7342 B 9	7369 B 5	9312 B 4	9326 B 1	9340 A 2	9358 E 2	
3365 A 2	3380 E 4	6301 D 2	6335 D 1	6360 A 2	6386 B 3	7351 C 9	7374 E 4	9313 C 5	9327 D 3	9341 B 5	9360 A 6	
3367 C 4	3382 B 5	6302 D 2	6340 A 9	6361 A 2	6391 E 5	7352 C 9	7376 B 2	9314 C 4	9328 D 2	9342 C 4	9361 A 4	
3368 C 4	3383 B 5	6303 D 2	6341 A 9	6362 A 3	6392 E 5	7353 A 9	8304 E 6	9315 B 3	9329 D 3	9343 A 4	9362 B 4	
3369 A 5	3384 C 4	6304 D 2	6342 A 9	6363 D 4	6393 E 5	7357 A 4	8305 D 3	9316 D 2	9330 D 3	9344 C 3	9363 A 3	
3370 A 5	3385 B 4	6305 E 2	6343 A 9	6364 D 4	6394 B 3	7358 A 4	9301 E 5	9317 C 3	9331 D 4	9346 E 3	9364 B 4	

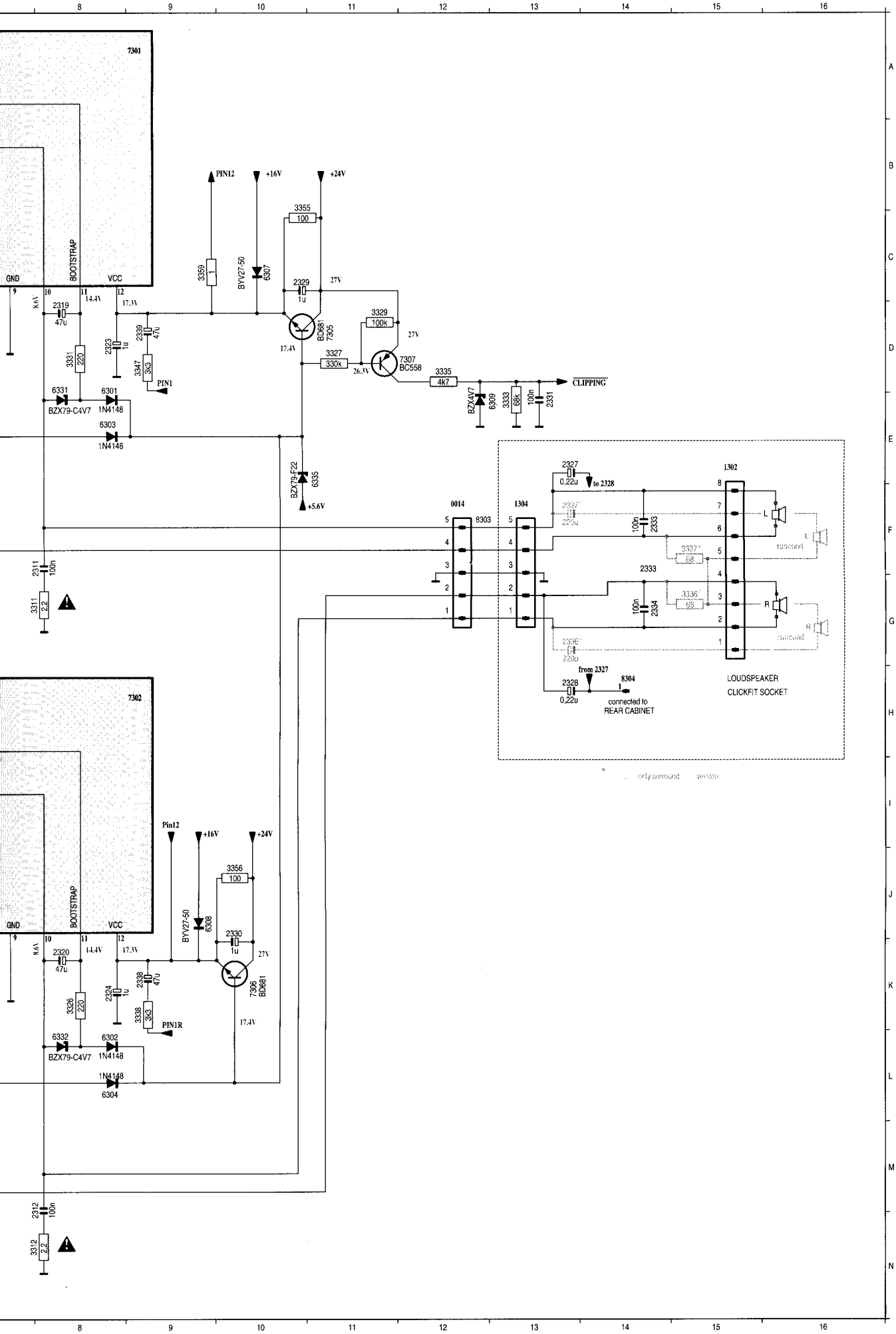
4 5 6 7 8 9



4 5 6 7 8 9

POWER BOARD AF PART



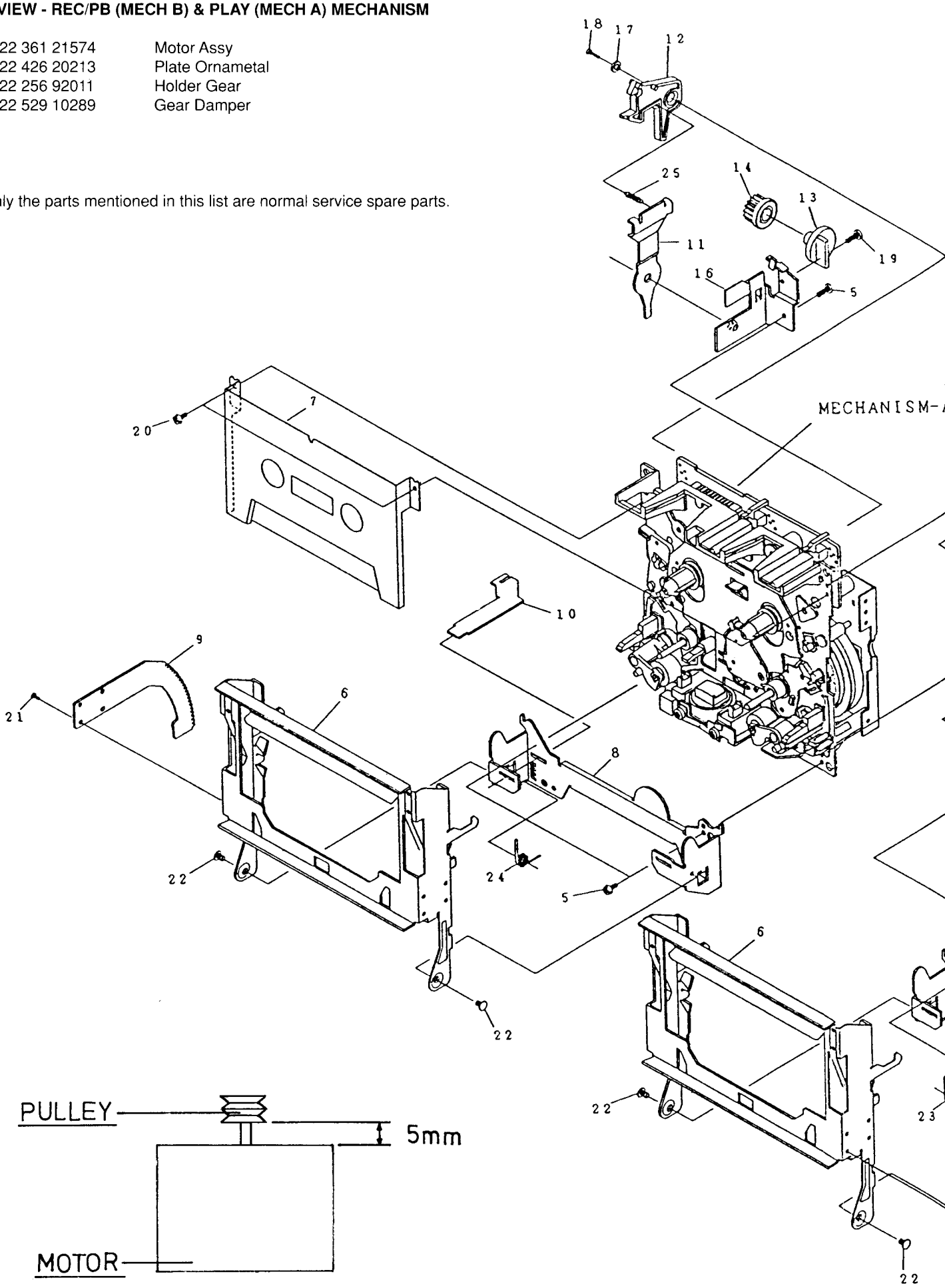


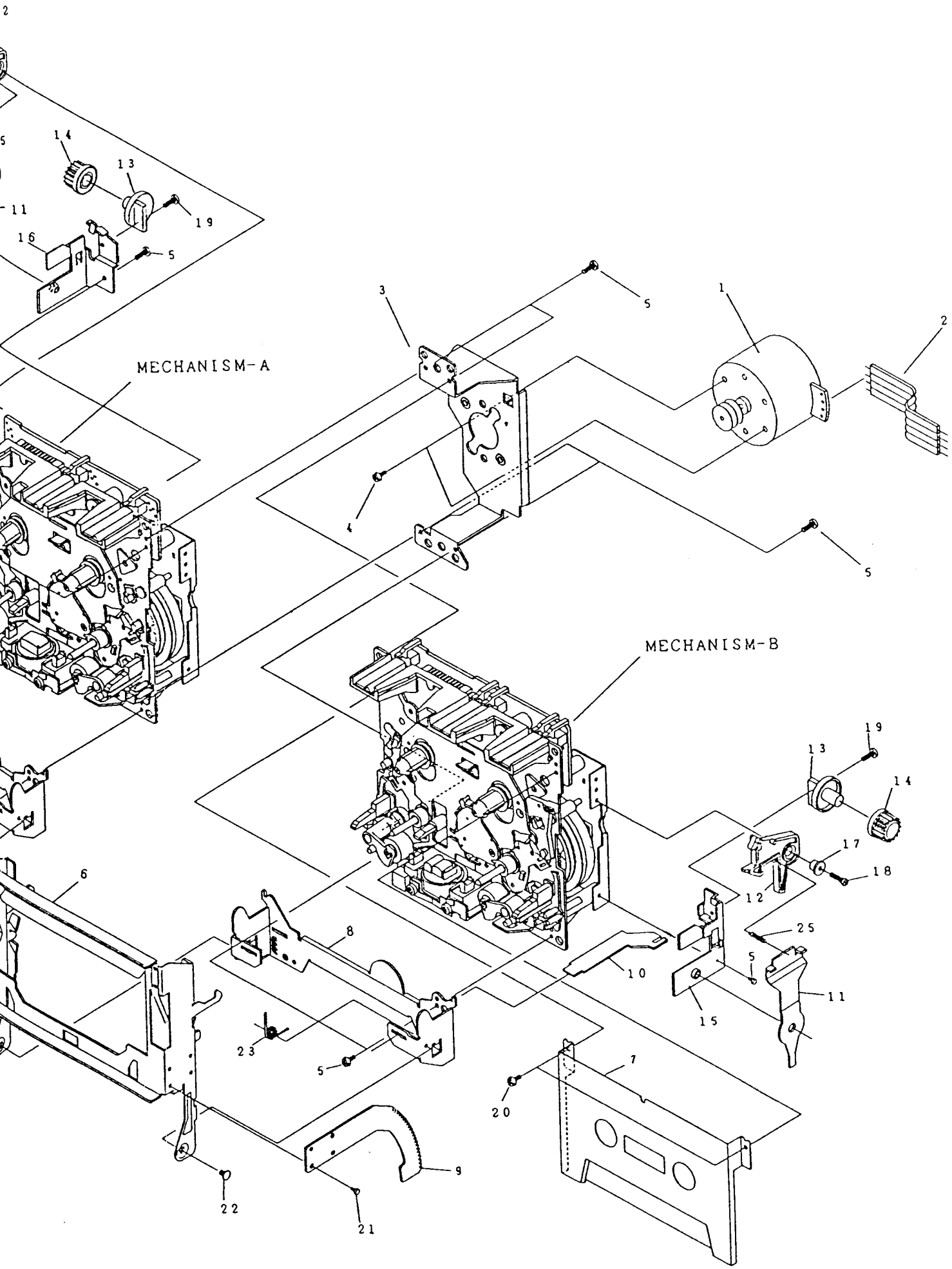
0014 F12
1301 H 1
1302 E15
1303 J 1
1304 F13
2303 D 4
2305 D 5
2306 K 5
2307 F 5
2308 L 5
2309 D 5
2310 K 5
2311 F 8
2312 M 8
2313 G 4
2315 D 7
2316 K 7
2317 F 6
2318 M 6
2319 D 8
2320 K 8
2323 D 8
2324 K 8
2327 E13
2328 H13
2329 C10
2330 J10
2331 E13
2333 E14
2334 G14
2335 H15
2336 G13
2337 F13
2338 K 9
2339 D 9
3301 D 4
3302 G 2
3303 H 3
3304 G 3
3305 E 4
3307 F 6
3308 L 6
3309 D 5
3310 K 5
3311 G 8
3312 N 8
3313 G 3
3315 F 5
3316 L 5
3317 G 6
3318 N 6
3323 E 5
3325 D 7
3326 K 8
3327 D11
3328 K 7
3329 D11
3331 D 8
3333 E13
3335 D12
3336 G15
3337 F15
3338 K 9
3347 D 9
3352 K 4
3355 B10
3356 J10
3359 C 9
6301 E 8
6302 L 8
6303 E 8
6304 L 8
6305 D 2
6306 K 4
6307 C10
6308 J 9
6309 E12
6325 E 7
6326 L 7
6331 D 8
6332 L 8
6335 E11
7301 A 9
7302 G 8
7305 D11
7306 K10
7307 D12
8304 H14
8305 K 1

EXPLODED VIEW - REC/PB (MECH B) & PLAY (MECH A) MECHANISM

1	4822 361 21574	Motor Assy
7	4822 426 20213	Plate Ornametal
13	4822 256 92011	Holder Gear
14	4822 529 10289	Gear Damper

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

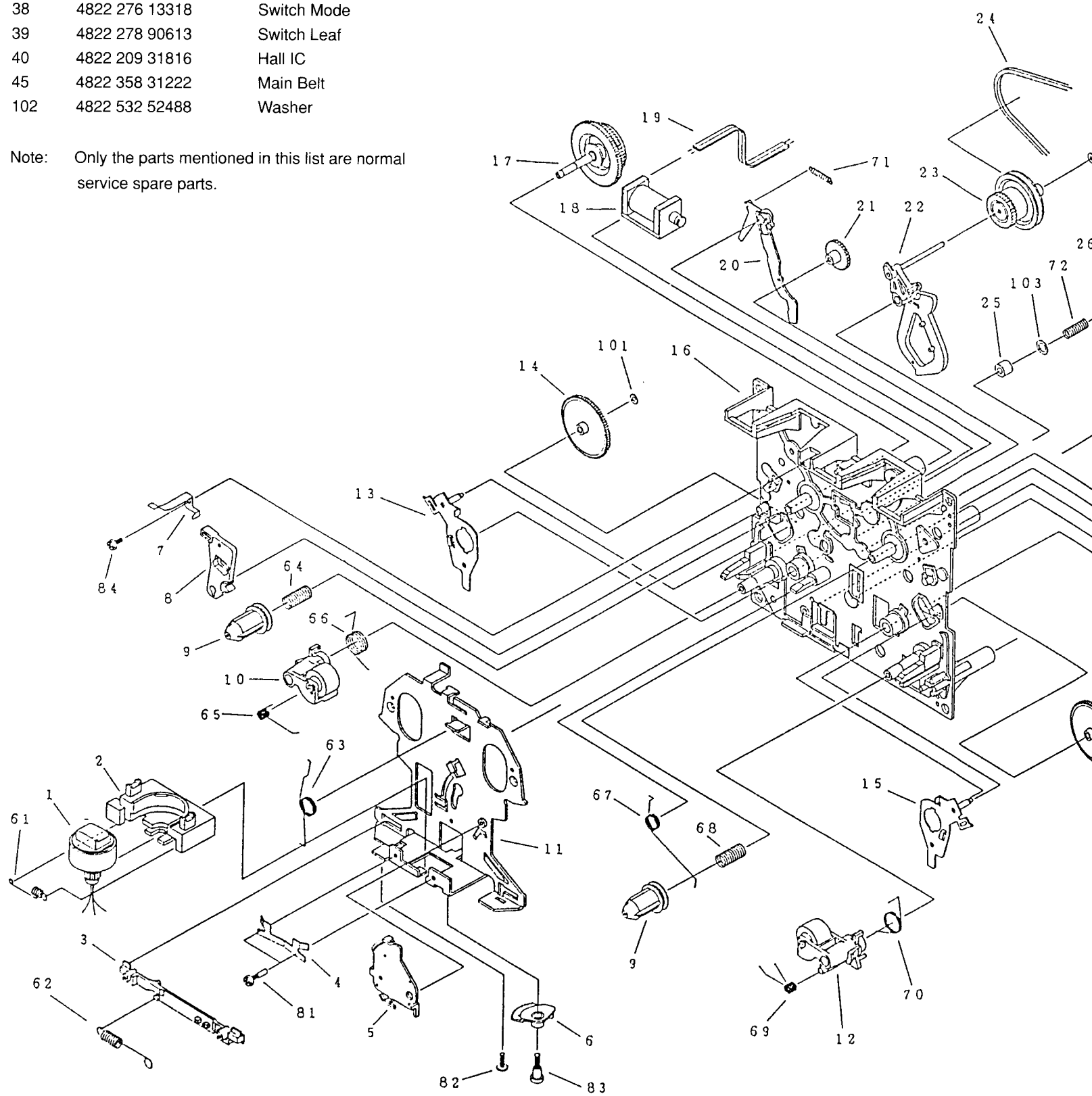


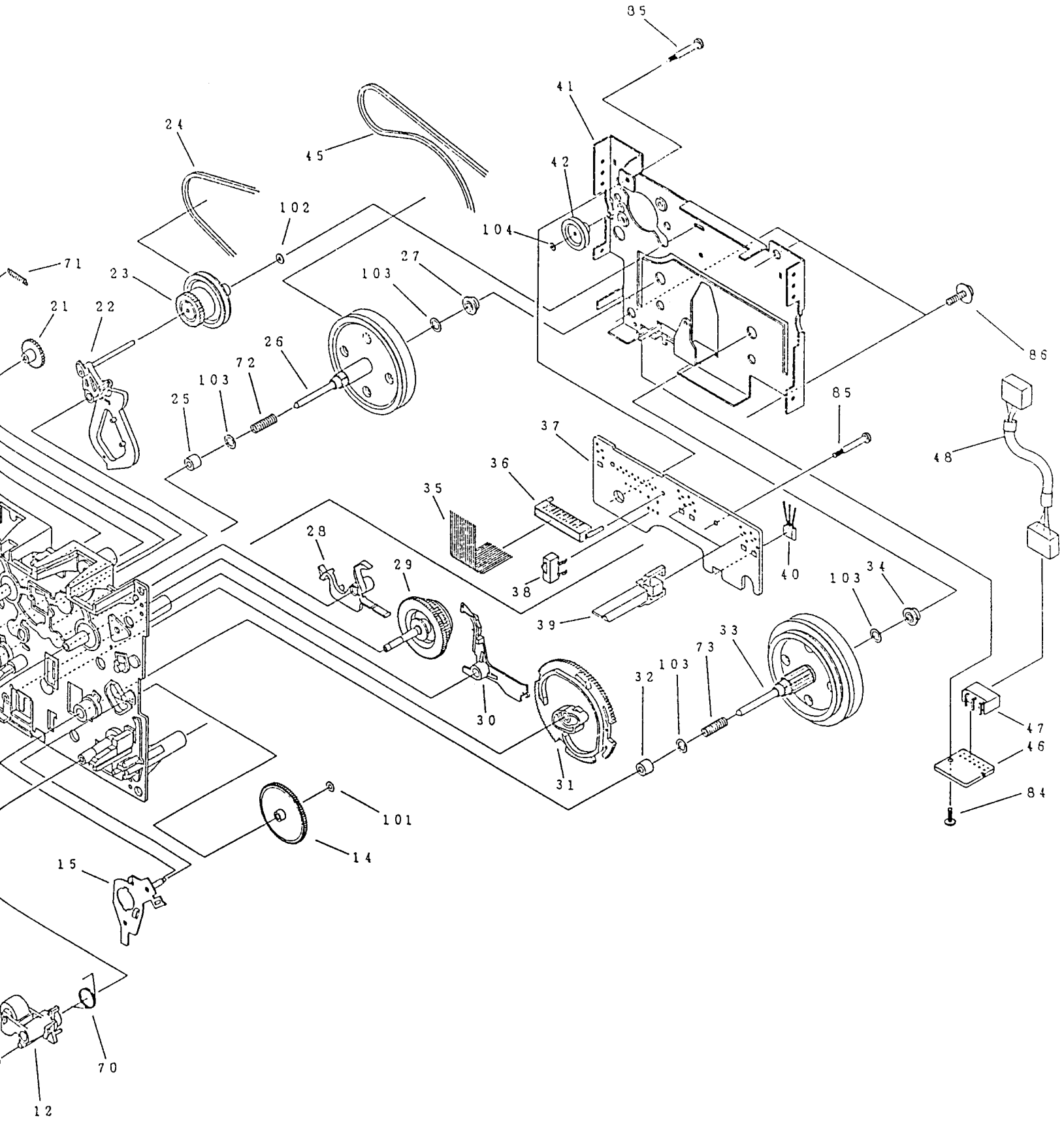

MECHANISM-A
MECHANISM-B
14
13
19
16
5
3
1
2
4
6
8
10
25
11
15
23
7
20
9
22
21
17
18
12

EXPLODED VIEW - PLAY (MECH A) MECHANISM

1	4822 249 30189	Play Head Assy
10	4822 403 70729	Pinch Arm Assy L
12	4822 403 70731	Pinch Arm Assy R
18	4822 157 70155	Solenoid
24	4822 358 31219	Belt FR
38	4822 276 13318	Switch Mode
39	4822 278 90613	Switch Leaf
40	4822 209 31816	Hall IC
45	4822 358 31222	Main Belt
102	4822 532 52488	Washer

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




85
41
24
45
42
102
104
71
27
23
103
21
22
86
26
72
103
25
85
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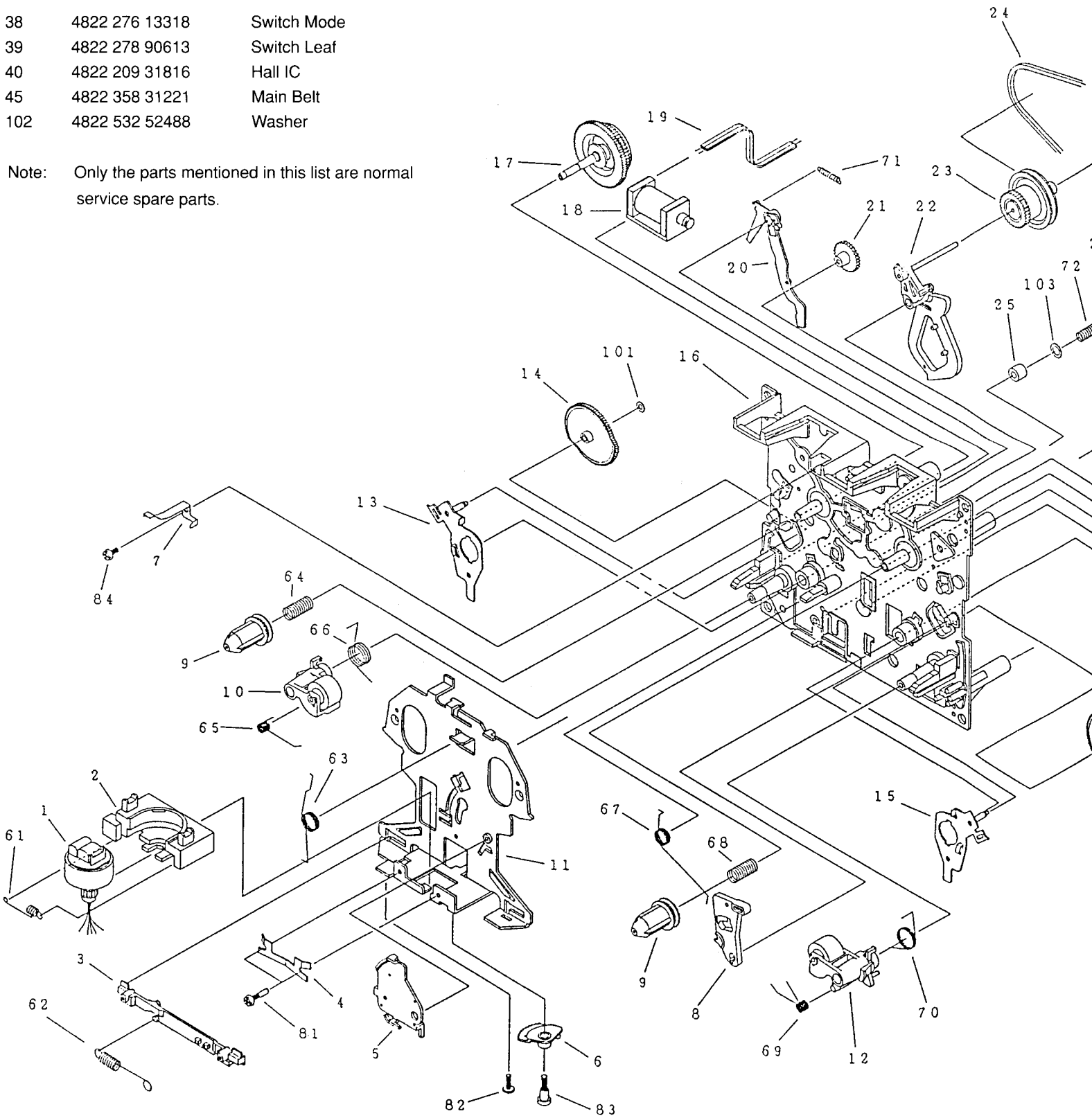
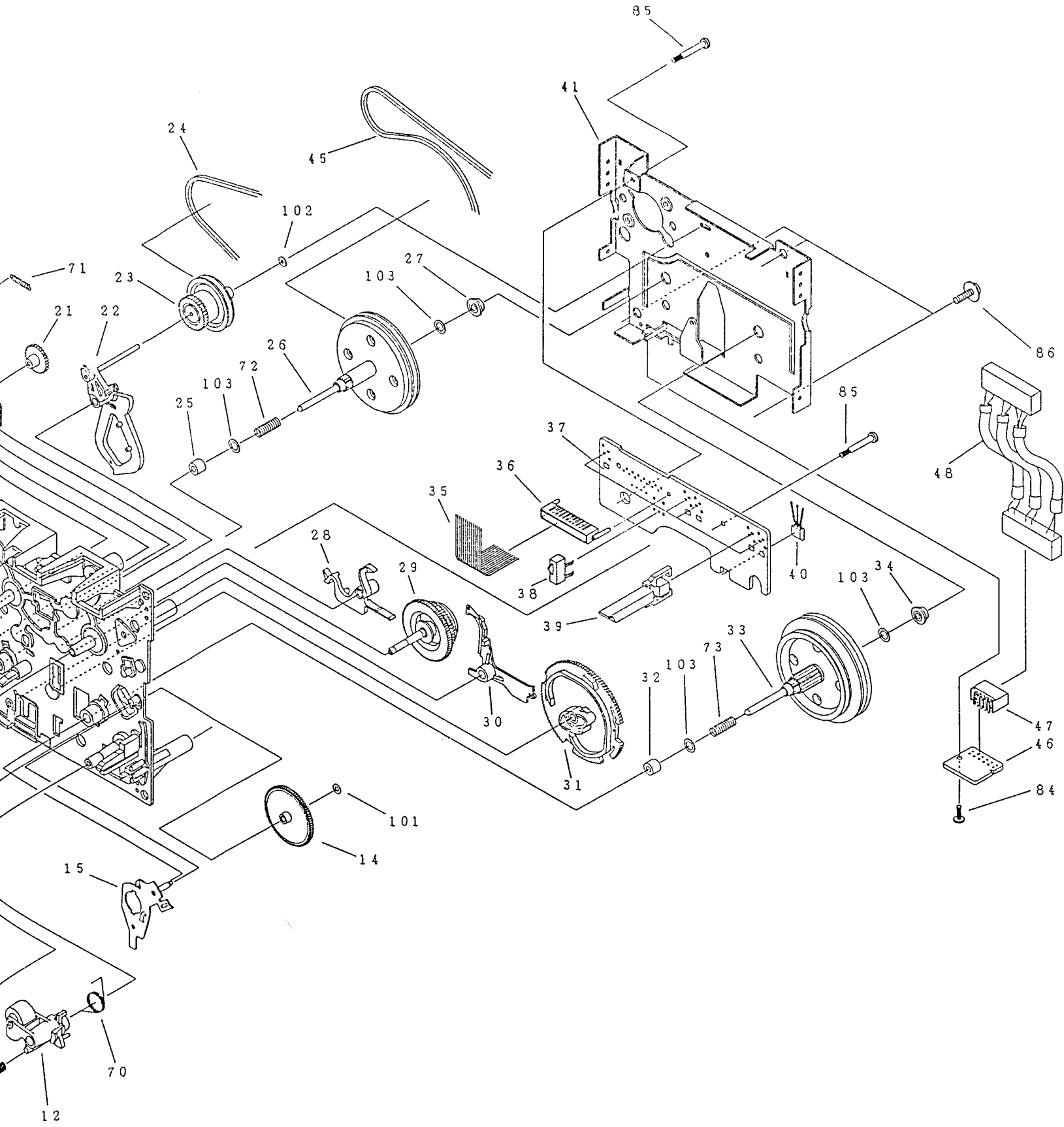
48
36
35
28
40
29
38
103
34
39
33
73
32
103
30
47
46
31
84
101
14
15
70
12

EXPLODED VIEW - REC/PB (MECH B) MECHANISM

1	4822 249 10472	Rec/Play Head Assy
10	4822 403 70729	Pinch Arm Assy L
12	4822 403 70731	Pinch Arm Assy R
18	4822 157 70155	Solenoid
24	4822 358 31219	Belt FR
38	4822 276 13318	Switch Mode
39	4822 278 90613	Switch Leaf
40	4822 209 31816	Hall IC
45	4822 358 31221	Main Belt
102	4822 532 52488	Washer

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




85
41
24
45
102
71
23
27
103
21
22
86
26
72
103
25
85
37
36
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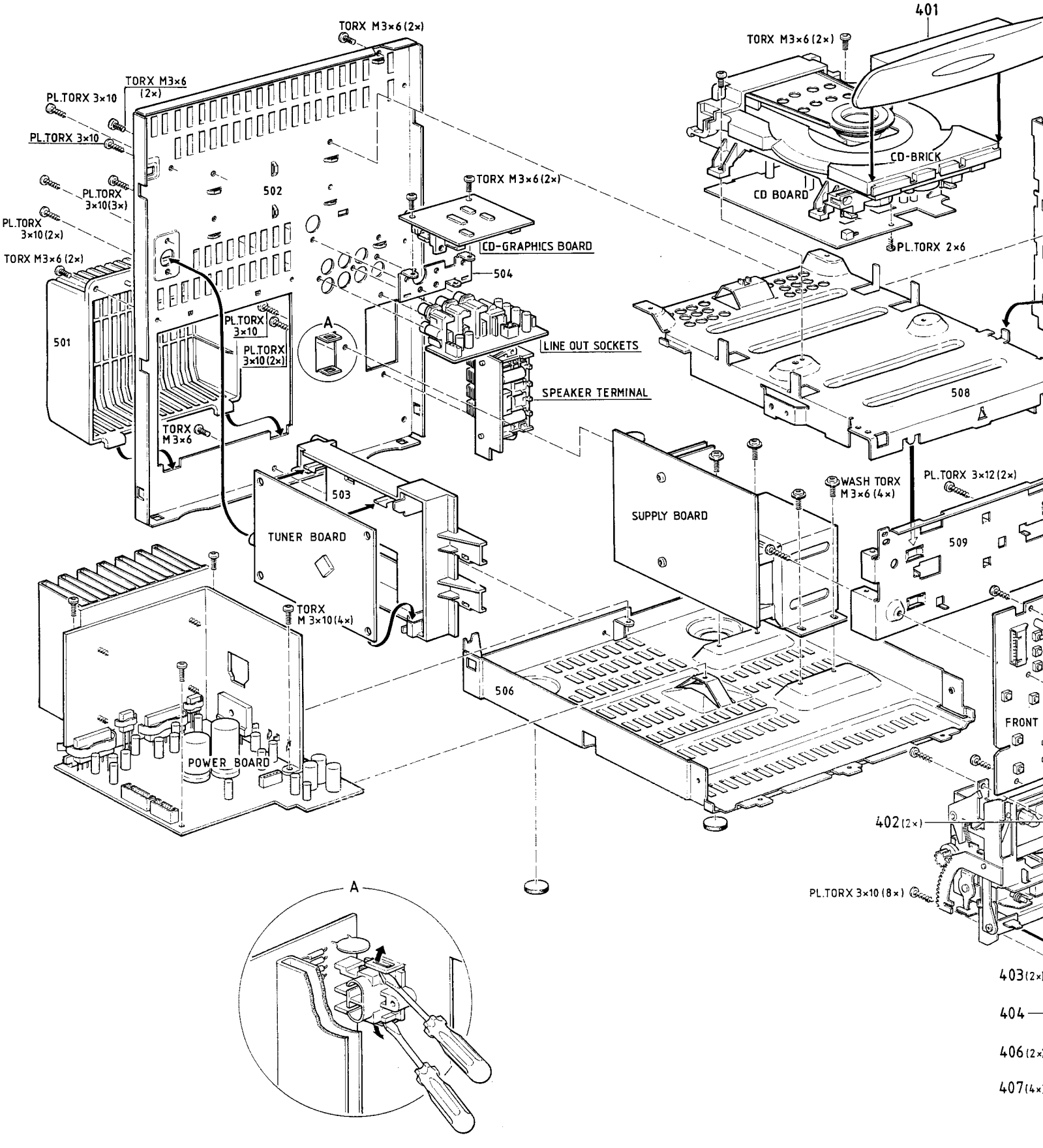
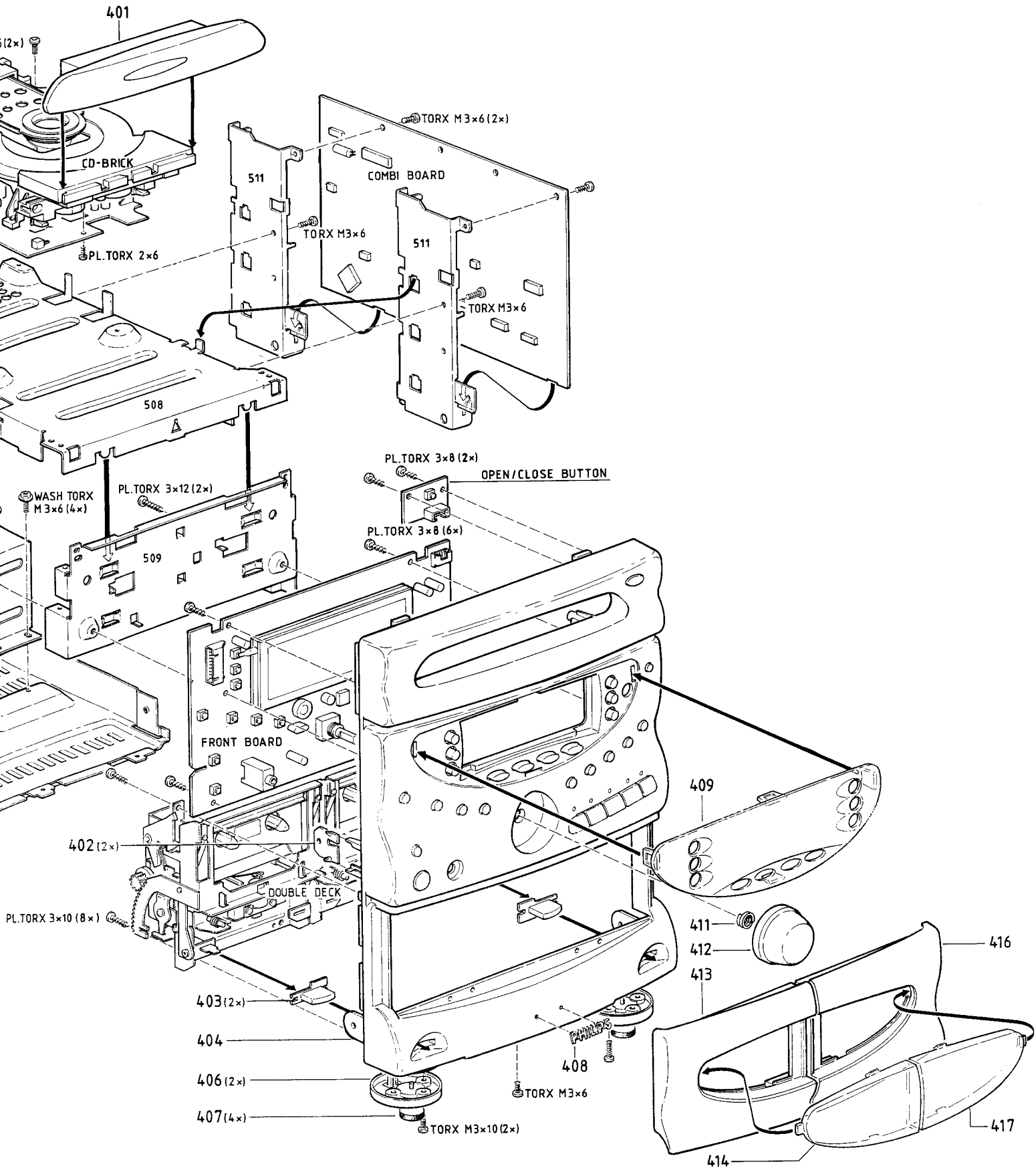
48
28
29
40
103
34
38
39
33
73
103
32
30
47
46
31
84
101
14
15
70
12

EXPLODED VIEW OF SET I




401
(2×)
CD-BRICK
PL.TORX 2×6
511
TORX M3×6 (2×)
COMBI BOARD
TORX M3×6
511
TORX M3×6
508
PL.TORX 3×8 (2×)
OPEN/CLOSE BUTTON
WASH TORX M3×6 (4×)
PL.TORX 3×12 (2×)
PL.TORX 3×8 (6×)
509
FRONT BOARD
409
402 (2×)
DOUBLE DECK
PL.TORX 3×10 (8×)
411
412
413
416
403 (2×)
404
406 (2×)
407 (4×)
408
TORX M3×6
TORX M3×10 (2×)
417
414

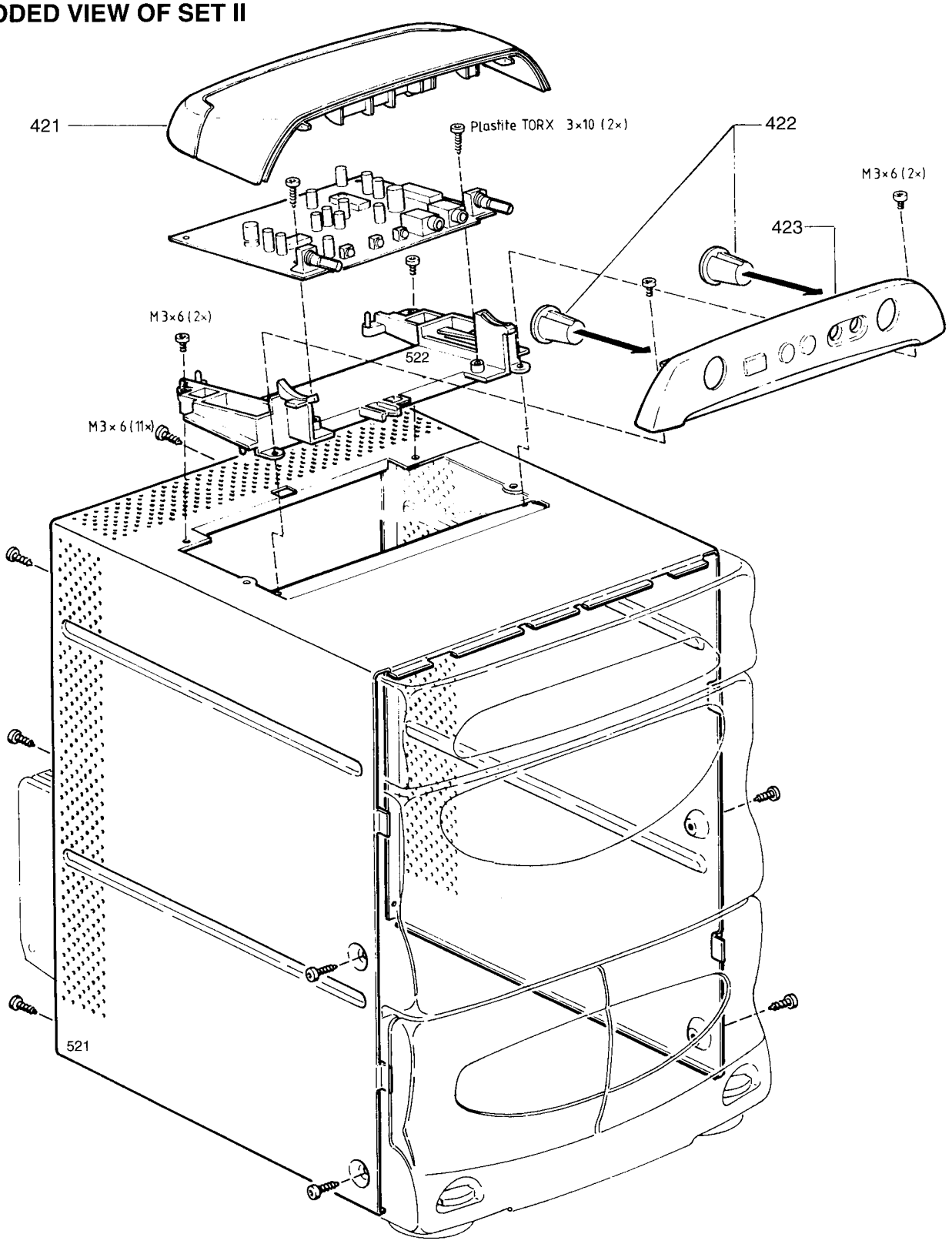
MECHANICAL PARTS

401	4822 444 40844	FRONT CD-TRAY
403	4822 410 63807	EJECT BUTTON
404	4822 425 20209	FRONT PRINTED for sets without RDS
404	4822 425 20212	FRONT PRINTED for sets with RDS only
406	4822 462 42211	FOOT ORNAMENTAL PART
407	4822 462 40683	FOOT RUBBER
408	4822 459 11086	WORDMARK PHILIPS
409	4822 450 62477	WINDOW DISPLAY
411	4822 492 51374	SPRING KNOB CLAMP
412	4822 413 51508	KNOB VOLUME
413	4822 443 64506	CASSETTE DOOR LEFT
414	4822 450 62478	CASSETTE WINDOW LEFT
416	4822 443 64507	CASSETTE DOOR RIGHT
417	4822 450 62479	CASSETTE WINDOW RIGHT
421	4822 444 40836	COVER KARAOKE
422	4822 413 41916	KNOB KARAOKE
	4822 492 51374	SPRING KNOB CLAMP
501	4822 444 40835	COVER HEATSINK
423	4822 426 51832	FRONT KARAOKE

MISCELLANEOUS

5001	4822 157 40202	TOROID RING 23x14x7
8030	4822 321 63183	CABLE WITH CAPACITOR
	4822 445 10443	LOUDSPEAKER BOX
	4822 218 21342	IRT RC8601/01
	4822 303 50063	FM AERIAL
	4822 303 50082	AM FRAME AERIAL
	4822 321 10249	MAINS CORD EUROPE

EXPLODED VIEW OF SET II



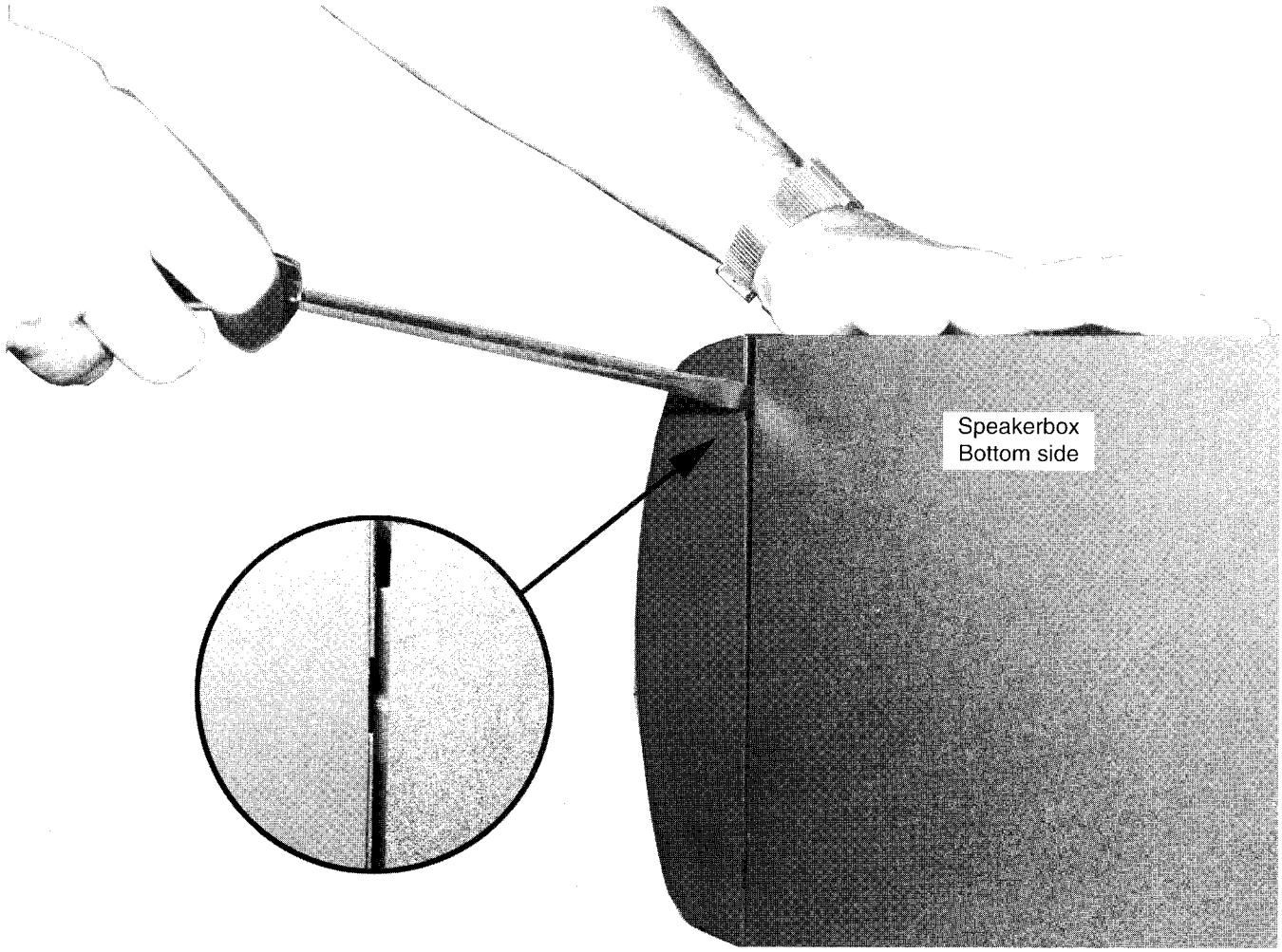
MECHANICAL PARTS

421	4822 444 40836	COVER KARAOKE
422	4822 413 41916	KNOB KARAOKE
	4822 492 51374	SPRING KNOB CLAMP
501	4822 444 40835	COVER HEATSINK
423	4822 426 51832	FRONT KARAOKE

MISCELLANEOUS

5001	4822 157 40202	TOROID RING 23x14x7
8030	4822 321 63183	CABLE WITH CAPACITOR
	4822 445 10443	LOUDSPEAKER BOX
	4822 218 21342	IRT RC8601/01
	4822 303 50063	FM AERIAL
	4822 303 50082	AM FRAME AERIAL
	4822 321 10249	MAINS CORD EUROPE

Dismantling of Speakerbox



Spareparts