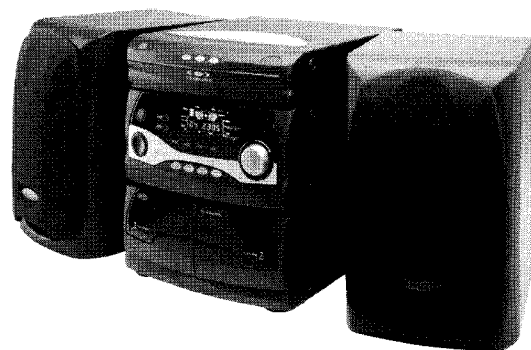


Service
Service
Service



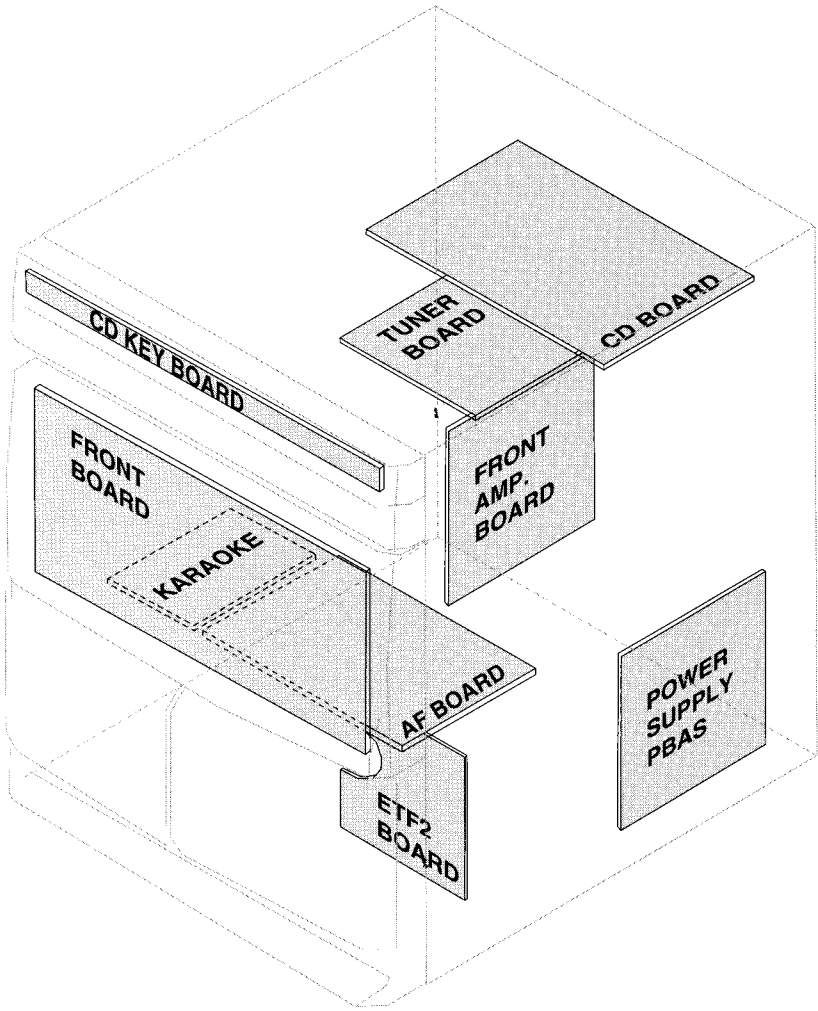
Service Manual

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LOCATION OF PRINTED CIRCUIT BOARD



VERSION VARIATIONS:

Features & Board in used:	Versions:	/21 /21M	/22 /22S	/25	/26	/30	/33	/34	/37
Dolby B			x	x				x	
RDS			x	x					
Karaoke Feature		x					x		
Digital Output									
Tuner board - ECO5 Sys		x					x	x	
Tuner board - Tuner 95			x	x					
Tape pc board - ND/DD/FR		x					x		
Tape pc board - DB/DD/FR			x	x				x	

Note: /..M = Version without "MADE IN" indication
/..S = Version with Grey/Silver colour

SPECIFICATIONS

GENERAL:

Mains voltage	: 100V for /26 110-127V/220-240V Switchable for /21 120V for /37 220V for /33 220-230V for /22/34 230V for /25 230-240V for /30
Mains frequency	: 50/60Hz
Power consumption	: < 12W at standby, clock on : < 3W power off for /22 : < 80W at 1/8 rated power out
Mains Breakdown Buffer	: No
Clock accuracy	: < 4 seconds per day
Dimension centre unit	: 265 x 310 x 363mm

TUNER:

FM	
Tuning range	: 87.5-108MHz 65.81-74MHz for /34
Grid	: 50kHz (& 30kHz for /34)
IF frequency	: 10.7MHz $\pm$ 25kHz
Aerial input	: 75ohm coaxial 300ohm click fit for /37
Sensitivity at 26dB S/N	: < 7 μ V
Selectivity at 600kHz bandwidth	: > 50dB
Image rejection	: > 25dB [> 75dB]
Distortion at RF=1mV, dev. 75kHz	: < 3% [< 2%]
-3dB Limiting point	: < 7 μ V
Crosstalk at RF=1mV, dev. 40kHz	: > 18dB [> 26dB]

MW

Tuning range	: 531-1602kHz 530-1710kHz for /21/37
Grid	: 9kHz 10kHz for /21/37
IF frequency	: 450kHz $\pm$ 1kHz
Aerial input	: Frame aerial
Sensitivity at 26dB S/N	: < 4.0mV/M
Selectivity at 18kHz bandwidth	: > 18dB
IF rejection	: > 45dB
Image rejection	: > 28dB
Distortion at RF=50mV, m=80%	: < 5% [< 7%]

LW

Tuning range	: 153-279kHz
Grid	: 3kHz
IF frequency	: 450kHz $\pm$ 1kHz
Aerial input	: Frame aerial
Sensitivity at 26dB S/N	: [< 7.0mV/M]
Selectivity at 18kHz bandwidth	: [> 24dB]
IF rejection	: [> 26dB]
Image rejection	: [> 35dB]
Distortion at RF=50mV, m=80%	: [< 7%]

AMPLIFIER:

Output power (D=10%)	L & R : 2 x 45W at 6 ohm
Frequency response within -3dB	: 40Hz-15kHz
Dynamic Bass Boost: DBB1, DBB2, DBB3, DBB Off ¹⁾	
Digital Sound Control: Classic, Rock, POP, Optimal, Jazz ¹⁾	
Incredible Surround: IS3, IS2, IS1, IS Off ¹⁾	
Headphone output at 32 ohm	: 16.5mW
Input sensitivity	Aux/Line-in : 350mV $\pm$ 2dB at 47kohm Mic : 2.5mV $\pm$ 2dB at 10kohm
Output sensitivity	Line-out : 350mV $\pm$ 2dB at 2.2kohm Sub-woofer (max. vol.) : 500mV $\pm$ 2dB at 2.2kohm

CASSETTE RECORDER:

Number of track	: 2 x 2 stereo
Tape speed	: 4.76 cm/sec $\pm$ 2% 1.8 x 4.76 cm/sec
Wow and flutter	: < 0.6% DIN
Fast-wind time C60	: 130 sec
Bias system	: 75kHz $\pm$ 5kHz
Rec/Pb frequency response within 8dB	: 80Hz - 12.5kHz
Signal to noise ratio	: > 44dB
Dolby NR Factor	: > 8.5dB

COMPACT DISC:

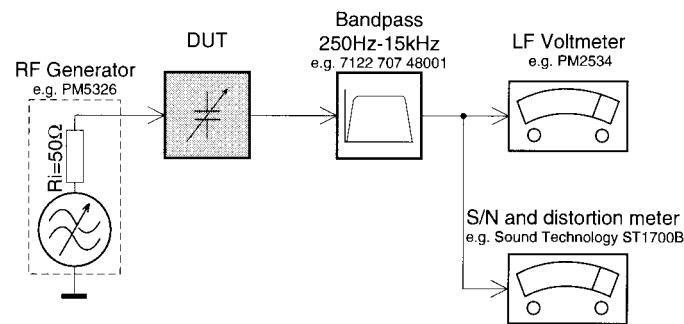
Measurement done at output conn. of the CDC module.	
Frequency response within $\pm$ 3dB	: 20Hz - 20kHz
Output level (in Vrms)	: 550mV $\pm$ 2dB unloaded
Signal/Noise ratio (A-weighted)	: > 80dBA
Distortion at 1kHz	: < 0.5%
Channel difference at 1kHz	: < 1dB
Channel crosstalk at 1kHz	: > 45dB
De-emphasis	: 0 or 15/50 mS (Switched by subcode on the disc)

[....] Values indicated are for "Tuner 95 Board" only

¹⁾ Frequency response in each setting is software controlled.

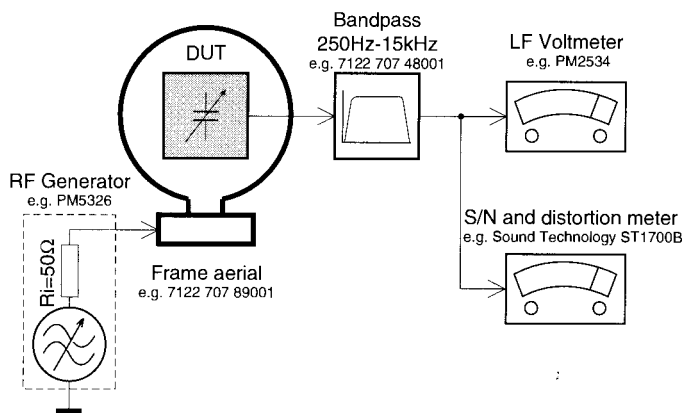
MEASUREMENT SETUP

Tuner FM



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

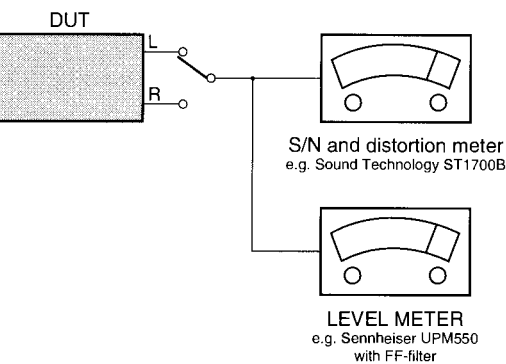
Tuner AM (MW,LW)



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

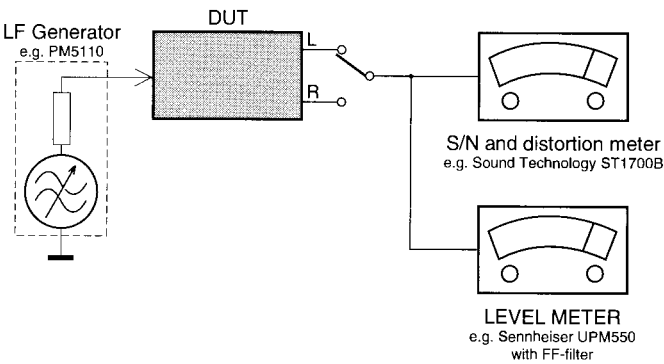
CD

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



Recorder

Use Universal Test Cassette **CrO2** SBC419 4822 397 30069
or Universal Test Cassette **Fe** SBC420 4822 397 30071



SERVICE AIDS

Service Tools:

Universal Torx driver holder	4822 395 91019
Torx bit T10 150mm	4822 395 50456
Torx driver set T6 - T20	4822 395 50145
Torx driver T10 extended	4822 395 50423

Cassette:

SBC419 Test cassette CrO2	4822 397 30069
SBC420 Test cassette Fe	4822 397 30071
MTT150 Dolby level 200nWb/M	4822 397 30271

Compact Disc:

SBC426/426A Test disc 5 + 5A	4822 397 30096
SBC442 Audio Burn-in Test disc 1kHz	4822 397 30155
SBC429 Audio Signals disc	4822 397 30184
Dolby Pro-logic Test Disc	4822 395 10216

ESD Equipment:

Anti-static table mat - large 1200x650x1.25mm ...	4822 466 10953
Anti-static table mat - small 600x650x1.25mm	4822 466 10958
Anti-static wristband	4822 395 10223
Connector box (1M Ω)	4822 320 11307
Extension cable	
(to connect wristband to conn. box)	4822 320 11305
Connecting cable	
(to connect table mat to conn. box)	4822 320 11306
Earth cable (to connect product to mat or box)	4822 320 11308
Complete kit ESD3	
(combining all above products)	4822 320 10671
Wristband tester	4822 344 13999

HANDLING CHIP COMPONENTS

GENERAL

SCALE 1:1

CHIP COMPONENT

SOLDER

COPPER TRACK

P.C.B.

GLUE

SERVICE PACKAGE

DISMOUNTING

VACUUM PISTON 4822 395 10082

SOLDERING IRON e.g. WELDER SOLDER TIP PT-H7

OR

SOLDERING IRON

SOLDER WICK 4822 321 40042

e.g. A PAIR OF TWEEZERS

HEATING

HEATING

SOLDERING IRON

SOLDER WICK

CLEANING

MOUNTING

e.g. A PAIR OF TWEEZERS

SOLDER $\varnothing 0.5 - 0.8 \text{ mm}$

SOLDERING IRON

PRESSURE

SOLDERING TIME < 3 sec./side

SOLDER $\varnothing 0.5 - 0.8 \text{ mm}$

PRESSURE

SOLDERING IRON

PRECAUTIONS

SOLDERING IRON

RIGHT

COPPER TRACK

SOLDERING IRON

CHIP COMPONENT

EXAMPLES

RIGHT

NO!

27 012C12

(GB) WARNING

All ICs and many other semi-conductors 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 also at this potential.

ESD**(NL) WAARSCHUWING**

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

Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.

Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.

Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(F) ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).

Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.

Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler 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.

(D) WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).

Unvorsichtige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.

Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes.

Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

(I) AVVERTIMENTO

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

La loro longevità potrebbe essere fortemente ridotta in caso di non osservazione della più grande cauzione alla loro manipolazione.

Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.

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

(GB)

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

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

(NL)

Veiligheidsbepalingen vereisen, dat het apparaat bij reparatie in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.

(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.

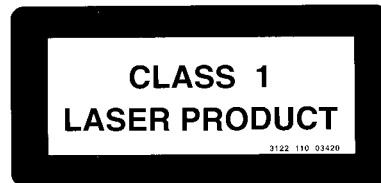
(D)

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Geräts darf nicht verändert werden; für Reparaturen sind Original-Ersatzteile zu verwenden.

(I)

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

"After servicing and before returning set to customer perform a leakage current measurement test from all exposed metal parts to earth ground to assure no shock hazard exist. The leakage current must not exceed 0.5mA."

**(GB) Warning !**

Invisible laser radiation when open.
Avoid direct exposure to beam.

(S) Varning !

Osynlig laserstrålning när apparaten är öppnad och spårren är urkopplad. Betrakta ej strålen.

(SF) Varoitus !

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

(DK) Advarsel !

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

General Information/Safety Information

Preparations

English

General Information

- The typeplate is located at the rear of the set.
 - Recording is permissible if copyright or other rights of third parties are not infringed.
- All unnecessary packaging material has been omitted. We have done our utmost to make the packaging easy to separate into three mono-materials:
 - cardboard (box)
 - expandable polystyrene (buffer)
 - polythene (bags, protective foam sheet).
 Please observe the local regulations regarding the disposal of these packaging materials.
 - Your set consists of materials which can be recycled and reused if disassembled by a specialized company. Please follow local regulations on recycling your old set.
 - Do not dispose exhausted batteries with your household waste. Dispose batteries according to local regulations.
 - Note: Switching off the standby mode overnight (remove the AC power cord from the wall socket) will save energy.

Safety Information

- Before operating the system, check that the operating voltage indicated on the typeplate (or the voltage indication beside the voltage selector) of your system is identical with the voltage of your local power supply. If not, please consult your dealer. The type plate is located at the rear of your system.
- When the system is switched on, do not move it around.
- Place the system on a solid base (e.g. a cabinet).
- Place the system in a location with adequate ventilation to prevent internal heat build-up in your system.
- Do not expose the system to excessive moisture, rain, sand or heat sources.
- Under no circumstances should you repair the unit yourself, as this will invalidate the warranty!
- If the system is brought directly from a cold to a warm location, or is placed in a very damp room, moisture may condense on the lens of the CD unit inside the system. Should this occur, the CD player will not operate normally. Leave the power on for about one hour with no disc in the unit until normal playback is possible.
- Electrostatic discharge may cause unexpected problems. See whether these problems disappear if you unplug the AC power cord and plug it in again after a few seconds.
- To disconnect the system from the power supply completely, remove the AC power plug from the wall socket.**

Accessories (Supplied)

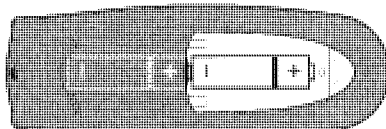
- Remote control transmitter
- Batteries (2 x AAA size) for remote control transmitter
- AM loop antenna
- FM antenna wire
- AC power cord

Accessories (Recommended)

- Philips FB 201 active subwoofer.
- Philips FB 202W wireless active subwoofer

Inserting the batteries into the Remote Control

- Insert the batteries (Type R03 or AAA) into the remote control transmitter as shown in the battery compartment.

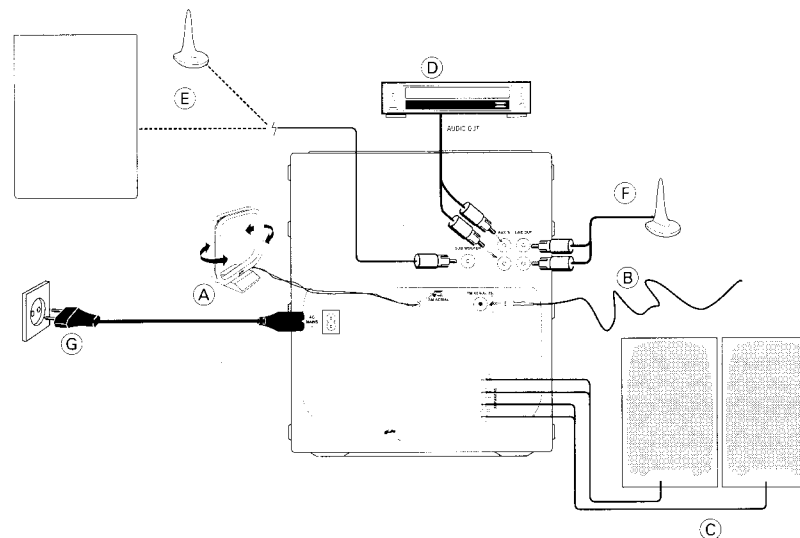


- To avoid damage from possible battery leakage, remove exhausted batteries or batteries that will not be used for a long time. For replacement use type R03 or AAA batteries.

Preparations

English

Rear Connection



A AM Antenna Connection

Connect the supplied loop antenna to the AM AERIAL terminal. Adjust the position of the AM loop antenna for the best reception.

B FM Wire Antenna Connection

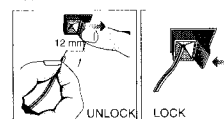
Connect the supplied FM wire antenna to the FM 75 Ω terminal. Adjust the position of the FM antenna for the best reception.

Outdoor Antenna

For better FM stereo reception connect an outdoor FM antenna to the FM AERIAL 75 Ω terminal using a 75 Ω coaxial wire.

C Speaker Connections

- Connect the right speaker to terminal **R**, with the red wire to **+** and the black wire to **-**.
- Connect the left speaker to terminal **L**, with the red wire to **+** and the black wire to **-**.
- Clip the stripped portion of the speaker wire as shown.



D Connecting other equipment to your system

You can connect TV, Laser Disc player, VCR or DVD (Digital Video Disc) audio left and right outputs to the AUX IN terminal at the rear of the system.

E Subwoofer Out (optional)

See page 6, under Subwoofer Out.

F Line Out (ready)

See page 6, under Line Out for remote speakers

G Power Supply

After all other connections have been made, connect the AC power socket to the set and the AC power plug to the wall outlet.

Preparations

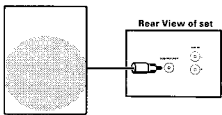
Demo Mode

Remote Controls

English

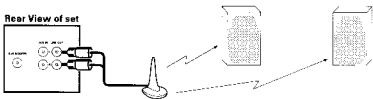
English

Subwoofer Out (optional)



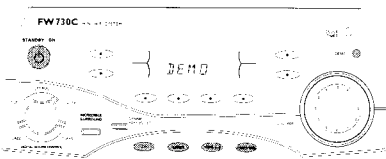
You can connect either an external active subwoofer (recommended Philips FB 201) or an external wireless active subwoofer (recommended Philips FB 202W) to the SUBWOOFER OUT socket. For the wireless system it uses a radio frequency transmitter. The subwoofer is dedicated to reproducing just the low bass effect (e.g. explosions, the rumble of the spaceships, etc.). Be sure to follow the instructions supplied with the subwoofer unit.

Line Out for remote active speakers (Ready)



There is a possibility of locating additional front active speakers away from the system (e.g. in another room). It reduces the inconvenience of running long speaker wires across rooms. You can place as many remote speakers as you like provided that they operate at the same radio frequency. Connect the wireless radio frequency transmitter to the LINE OUT sockets. Place the active speakers at your preferred location. Be sure to follow the instructions supplied with the active speakers.

Demo mode



The system has a demonstration mode that shows the various features offered by the system. Whenever the system is switched on from the wall socket, the demonstration mode will start automatically.

To stop demonstration mode

- Press **DEMO**, **STANDBY - ON**, **CD**, **TUNER**, **TAPE 1-2**, **VIDEO/DVD**, **CD OPEN•CLOSE** or **3 CD DIRECT PLAY** button on the system (or **CD**, **TUNER**, **TAPE 1**, **TAPE 2**, **AUX**, **TV** or **VCR** on remote control) to stop the demonstration mode.

To switch on demonstration mode

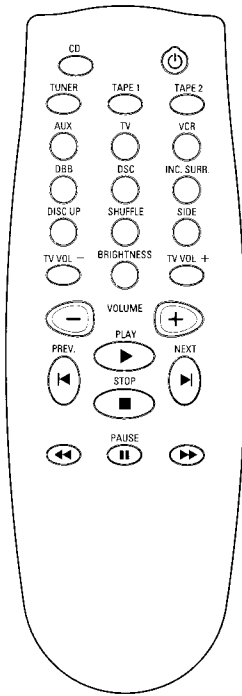
- Press **DEMO**.
 - The display will show "DEMO", then a demonstration of the various features will follow.

Remote Control Functions

- First select the source you wish to control by pressing one of the source select keys on the remote control (e.g. **TUNER**, **TAPE 1**, **TAPE 2**, **CD**, **AUX**, **TV** or **VCR**).
- Then select the desired function (**PLAY**, **NEXT**, etc.).

Notes:

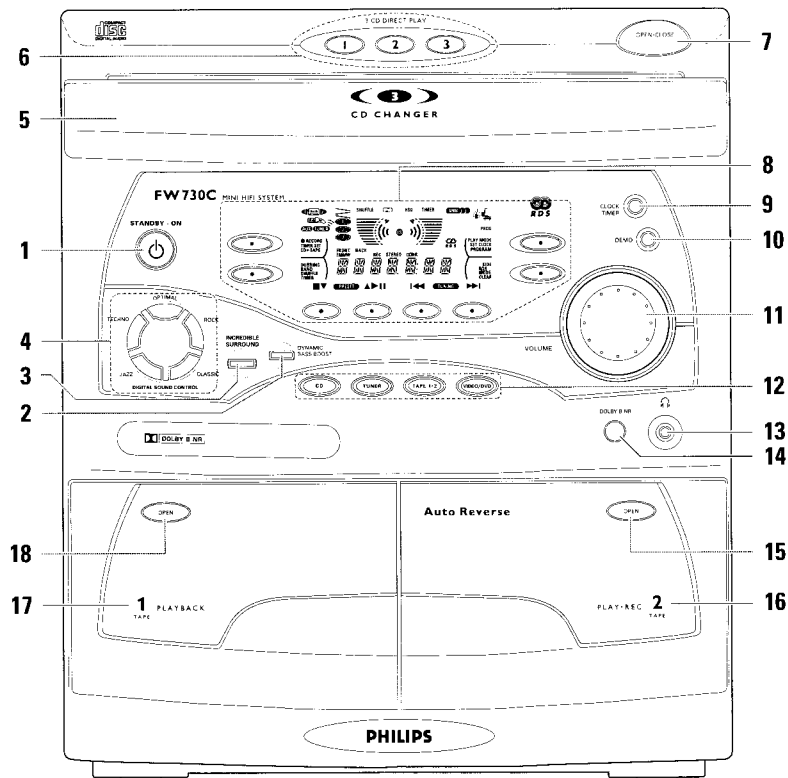
- Whenever a remote control button is pressed, the source icon on the display will flicker. This indicates the remote control signal is received by the set.
- For TV/VCR operation, the TV or VCR must use the RC-5 code remote control system.



- CD** to switch the unit to standby mode.
- TUNER** to select CD mode.
- TAPE 1** to select TUNER mode.
- TAPE 2** to select TAPE DECK 1.
- AUX** to select TAPE DECK 2.
- TV** to select VIDEO/DVD or external mode.
- VCR** to select TV mode.
- DBB** to select VCR mode.
- DSC** to switch on or off dynamic bass boost.
- INC. SURR.** to select digital sound control: JAZZ, CLASSIC, ROCK, TECHNO or OPTIMAL.
- DISC UP** to switch on or off the surround sound effect.
- SHUFFLE** to select the next disc tray for playback.
- SIDE** to play CD tracks at random.
- BRIGHTNESS** to select the direction of play for TAPE DECK 2.
- TV VOLUME +/-** to select the brightness level of the display screen.
- VOLUME +/-** to adjust the TV (RC 5 code) volume.
- PLAY** to adjust the volume.
- STOP** to start playback in CD, TAPE or VCR mode.
- PREV./NEXT** to stop playback in CD, TAPE or VCR mode.
- PAUSE** for TUNER to select a lower/higher tuner preset station.
- PAUSE** for CD to select previous/next CD track.
- PAUSE** for TV/VCR to select previous/next channel.
- PAUSE** to interrupt play in CD, TAPE or VCR mode.
- PAUSE** for TUNER to select a lower/higher frequency.
- PAUSE** for CD to search a particular passage.
- PAUSE** for TAPE to fast rewind/forward the cassette.

Controls

Front View



Controls

Front View

- 1 **STANDBY - ON**
 - to switch the set on or to standby mode.
- 2 **DYNAMIC BASS BOOST (DBB)**
 - to switch on bass boost to enhance bass response or to switch off bass boost.
- 3 **INCREDIBLE SURROUND**
 - to switch on or off the surround sound effect.
- 4 **DIGITAL SOUND CONTROL (DSC)**
 - to select the desired sound effect : JAZZ, TECHNO, OPTIMAL, ROCK or CLASSIC.
- 5 **CD CAROUSEL TRAY**
- 6 **3 CD DIRECT PLAY**
 - to select play for each CD in the tray.
- 7 **OPEN-CLOSE**
 - to open or close the CD carousel tray.
- 8 **MAGIC MENU USER INTERFACE AND DISPLAY**
 - to select the respective control functions : Tuner, CD, Tape or Video/DVD.
- 9 **CLOCK-TIMER**
 - to set clock or timer.
- 10 **DEMO**
 - to display the various features offered by the system.
- 11 **VOLUME**
 - to adjust the volume level.
- 12 **SOURCE SELECTION**
 - to select the following:
 - CD** : to switch to CD mode.
 - TUNER** : to switch to Tuner mode.
 - TAPE 1-2** : to switch to Tape 1 or 2 mode.
 - VIDEO/DVD** : to switch to external sources (e.g. DVD, TV, Laser Disc or VCR sound).
- 13 **HEADPHONES**
 - to connect headphones (3.5 mm) jack.
- 14 **DOLBY NR**
 - to switch on or off the Dolby B NR mode.
- 15 **OPEN**
 - to open TAPE DECK 2 cassette compartment.
- 16 **TAPE DECK 2**
- 17 **TAPE DECK 1**
- 18 **OPEN**
 - to open TAPE DECK 1 cassette compartment.

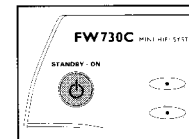
Operating the System

Important:

Before you begin operating the system, complete the preparation procedures.

Switching the system ON

- Press **STANDBY-ON**, **CD**, **TUNER**, **TAPE 1-2** or **VIDEO/DVD** (or **CD**, **TUNER**, **TAPE 1**, **TAPE 2** or **AUX** on the remote control).



You can also switch on the system by pressing the **OPEN-CLOSE** or any one of the **3 CD DIRECT PLAY** buttons.

Switching the system to standby mode

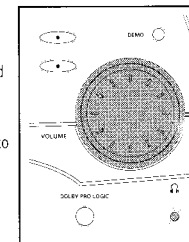
- Press **STANDBY-ON** again (or **⏻** on the remote control).

Volume Adjustment

Rotate **VOLUME** right or left (or press **VOLUME +** or **-** on the remote control) to increase or decrease the sound level.

For Personal Listening

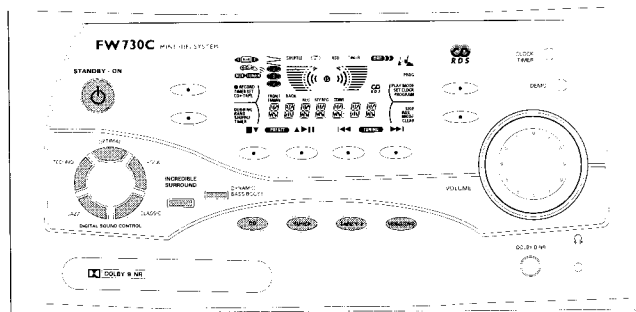
Connect the headphones jack to the **⏻** socket (3.5 mm) at the front of the set. The speakers will be muted.



Operating the System

Tuner

English



Selecting the Sound Source

- Press the respective source selection: **CD, TUNER, TAPE 1-2** or **VIDEO/DVD** (or **CD, TUNER, TAPE 1, TAPE 2** or **AUX** on the remote control).
→ The display indicates the selected sound source.

Note:

For external source, ensure that you had connected the audio left and right outputs of the external equipment (TV, VCR, Laser Disc player or DVD) to the AUX IN sockets.

Digital Sound Control (DSC)

The DSC feature creates a realistic atmosphere for the style of music you select using the latest digital sound technology.

- To enjoy a special sound effect, press **JAZZ** (J), **TECHNO** (T), **CLASSIC** (C), **ROCK** (R) or **OPTIMAL**.
- You can also press **DSC** on the remote control to select the respective sound setting.

Dynamic Bass Boost (DBB)

There are 3 settings for the DBB mode to enhance the bass response. You can press DBB on the set or remote control.

- Press **DBB** briefly to select the various level of bass boost.
→ The DBB button lights up.
→ The display message "BASS 1, 2 or 3" will scroll across the display.
→ The display will be as follows:



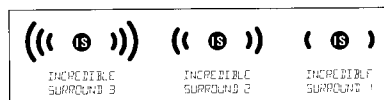
To switch off DBB

- Press **DBB** briefly until the DBB button light is switched off and "BASS OFF" scroll across the display.

Incredible Surround

There are 3 settings for the Incredible Surround sound mode to create a phenomenal surround sound effect. You can press Incredible Surround on the set or remote control.

- Press **INCREDIBLE SURROUND** to select the various level of surround sound.
→ The INCREDIBLE SURROUND button lights up.
→ The display message "INCREDIBLE SURROUND 3, 2 or 1" will scroll across the display.
→ The display will be as follows:

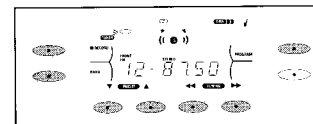


To switch off Incredible Surround

- Press **INCREDIBLE SURROUND** until the INCREDIBLE SURROUND button light is switched off and "INCREDIBLE SURROUND OFF" scroll across the display.

Tuning to radio stations

- Press **TUNER** on the unit or on the remote control to select TUNER mode.
→ 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:



- Press **BAND** to select the desired waveband: FM, MW or LW (not for all versions).
- Press **TUNING** (left or right arrow) for more than one second and release.
→ The display will show "SEARCH" until a station with sufficient signal strength is found.
- Repeat this procedure until the desired station is reached.
- To tune to a weak station, briefly press **TUNING** (left or right arrow) until the display shows the right frequency and/or when the best reception has been obtained.

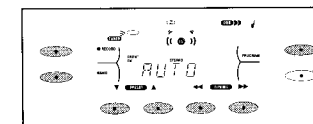
Note:

If you briefly press **TUNING** (left or right arrow) on the remote control, the frequency changes step by step.

Storing Preset Stations

You can store up to 20 stations in the memory. When a preset station is selected, the preset number appears next to the frequency on the display.

Automatic programming



- Press **TUNER** on the unit or on the remote control.
- Press **PROGRAM** for more than 1 second.
→ **PROGRAM** flashes and "AUTO" is displayed.
→ Every available station will be stored automatically. The frequency and preset number will be displayed briefly.
→ It will stop searching when all the available stations are stored or the memory for 20 preset stations is used.
→ The set will remain tuned to the last stored preset number.
- You can cancel the automatic programming by pressing **PROGRAM** or **■**.

Note:

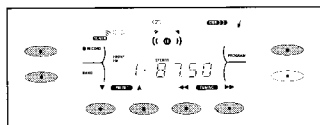
If you want to reserve a section of preset numbers, for example preset number 1 to 9, select preset 10 before starting automatic programming: now only the preset numbers 10 to 20 will be programmed.

English

Tuner

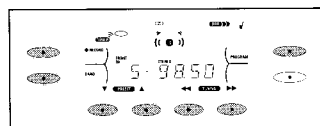
Manual programming

- 1 Press **TUNER** on the unit or on the remote control.
- 2 Press **PROGRAM** for less than 1 second.
→ **PROGRAM** flashes on the display.



- 3 Press **BAND** to select the desired waveband: FM, MW or LW (not for all versions).
 - 4 Press **TUNING** ◀ or ▶ to tune to the desired frequency.
 - 5 Press **PRESET** ▼ or ▲ (or **PREV** ◀ / **NEXT** ▶) on the remote control to select a preset number.
 - 6 Press **PROGRAM** again.
→ **PROGRAM** stop flashing, and the station is stored.
- Repeat the above procedure to store other preset stations.

Tuning to Preset Stations



- Press **PRESET** ▼ or ▲ (or **PREV** ◀ / **NEXT** ▶) on the remote control to select the desired preset number.
→ The preset number, frequency and waveband appear on the display.

Record Tape

- 1 As soon as you press **RECORD**, the current sound will be recorded on **TAPE DECK 2**, provided a cassette suitable for recording is loaded.
- 2 To stop recording, press **STOP** ■ on the remote control.

Receiving RDS radio station

(not for all versions)

RDS (Radio Data System) is a broadcasting service that allows FM stations to send additional information along with the regular FM radio signal. This additional information can contain:

- **STATION NAME**: The station name is displayed.
- **FREQUENCY**: The frequency of the station is displayed.
- **PROGRAM TYPE**: The following program types exist and can be received by your tuner: News, Affairs, Info, Sport, Educate, Drama, Culture, Science, Varied, Pop M, Rock M, M.O.R. (middle of the road music), Light M, Classics, Other M, No type.
- **RADIO TEXT (RT)**: text messages appear in the display.

When you have tuned to a RDS station, the RDS logo (RDS) and the station name will appear on the display:

- The display normally shows the radio station name if available.
- By repeatedly pressing **RDS MODE** you can change the type of display information:
→ The display shows in turn:
STATION NAME → FREQUENCY → PROGRAM
TYPE → RADIO TEXT → STATION NAME ...

Note:

When you press the **RDS MODE** button and the display shows "NO RDS", it indicates that either the tuned station is not transmitting RDS signal or it is a non RDS station.

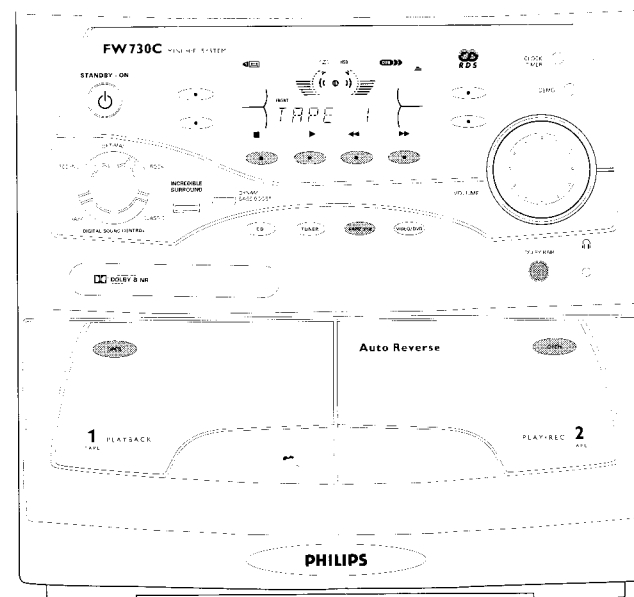
RDS Clock

Some RDS station may be transmitting a real time clock at an interval of every minute.

Setting the time with RDS clock:

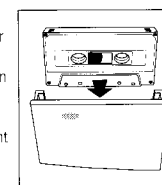
- 1 Press **CLOCK+TIMER**.
- 2 Press **SET CLOCK**.
→ "00:00" starts flashing
- 3 Press **RDS MODE** button.
→ The message "SEARCH RDS CLOCK" will continue scroll across the display.
→ If the station does not transmit RDS time within 90 seconds, the message "NO RDS CLOCK" appears.
→ When the RDS clock is read, the message "READ RDS SET CLOCK" appears. The current clock time is displayed for 2 seconds and will be stored automatically.

Cassette Decks



Loading a cassette

- Press **OPEN**
- The cassette compartment door opens.
- Load the cassette with the open side downward and the full spool to the left.
- Close the cassette compartment door.
→ The deck automatically selects the cassette type (NORMAL or CHROME (CRO)).



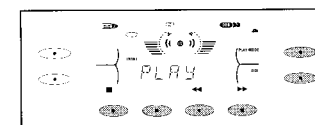
Tape Playback

- 1 Press **TAPE 1-2** (or **TAPE 1** / **TAPE 2** on the remote control) to select either **TAPE 1** or **TAPE 2** mode.



- 2 Load the cassette into the desired **cassette deck**.

- 3 Press **PLAY** ▶ (or **PLAY** ▶ on the remote control) to start playback.



- 3a (For Tape Deck 2 only)

Press **SIDE** (or **SIDE** on the remote control) to change the direction of the play mode.
→ The **FRONT** or **BACK** flag appears in the display, depending on the side selected.

- 3b (For Tape Deck 2 only)

Press **PLAY MODE** to select the different type of play mode (see continuous playback).

- 4 Press **STOP** ■ (or **STOP** ■ on the remote control) to end playback.

Note:

When the cassette has stopped playing, the set will switch to the standby mode automatically after 15 minutes if no button is pressed.

Cassette Decks

English

Continuous Playback (only on TAPE DECK 2)

The PLAY MODE enables you to select the different play modes.

- : recording or playback on one side of the cassette in the normal or reverse direction. The cassette stops at the end of one side.
- : recording or playback on both sides of the cassette; first in one direction and then in the reverse direction. The cassette then stops.
- : continuous playback on both sides of the cassette up to a maximum of 5 times per side unless you press .

Winding/Rewinding

At the stop mode

- You can rewind or wind the cassette by pressing or , (or on the remote control) respectively.
→ The cassette will stop automatically at the end of the winding or rewinding.
- Press (or **STOP** on the remote control) to stop winding or rewinding.

During playback

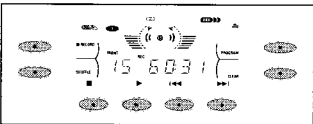
- You can search for a particular passage or beginning of a track by pressing and holding or , (or on the remote control) respectively.
→ During searching, the sound is reduced to a low volume.
→ When you release or , the cassette continues playing.

Note:

During winding or rewinding a cassette, it is possible to select another source mode (e.g. TUNER, CD or VIDEO/DVD mode).

Recording from other sources (only on TAPE DECK 2)

- Press **TAPE 1-2** to select **tape deck 2**.
- Load a blank cassette into **tape deck 2**.
- Press **SIDE** to change to the desired direction of the play mode.
→ The **FRONT** or **BACK** flag appears in the display, depending on the side selected.
- Press **PLAY MODE** to select the play mode (or .
- Press **CD, TUNER** or **VIDEO/DVD**.



- Press **RECORD** to start recording.
→ The **RECORD** flag starts flashing.
- Press to stop recording.

Notes:

- Only or mode is available during recording.
- For CD Synchro-start recording see Compact Disc section.
- During recording, it is not possible to listen to another sound source.

Dubbing cassettes (from TAPE DECK 1 to TAPE DECK 2)

- Press **TAPE 1-2** to select **tape deck 2**.
- Load the prerecorded cassette into **tape deck 1** and a blank cassette into **tape deck 2**.
→ Make sure that both cassettes have their full spools to the left.
- Press **SIDE** to select the **FRONT** side of the cassette in **tape deck 2**.
- Press **DUBBING** and then press or for respective dubbing speed mode.
→ **NORMAL** (normal speed) or **FAST** (high speed) appears on the display.
- Press **DUBBING** again to start recording.
→ The **RECORD** flag starts flashing.
→ **HSD** appears on the display for high speed dubbing.
- Press to stop dubbing.

Notes:

- At the end of side A, flip the cassettes to side B and repeat the procedure.
- Dubbing of cassettes is only possible in the TAPE DECK 2. To ensure good dubbing, use cassettes of the same length.
- During high speed dubbing in Tape mode, the sound is reduced to a low volume.
- You can switch to other sound source while dubbing.

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.

- Press **DOLBY NR** to switch on Dolby B NR.
→ The appears in the display.
- Press **DOLBY NR** again to switch off Dolby B NR.
→ The disappears from the display.

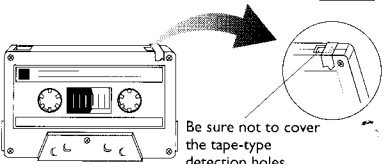
Notes:

- 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 (dubbing from TAPE 1 to TAPE 2). An original tape recorded with Dolby B NR automatically produces a copy with Dolby B NR.

Cassette Decks

General Information

- For recording, use only a cassette of IEC type I (normal cassette) or IEC type II (Chrome). The respective cassette type is selected automatically.
- The tape in the cassette is secured at both ends with a leader tape. At the beginning and end of a cassette, nothing will be recorded for six to seven seconds.
- The recording level is set automatically, regardless of the position of **VOLUME**.
- Check and tighten slack tape with a pencil before use. Slack tape may get jammed or may burst in the mechanism.
- To prevent accidental recording, break out the tab on the left shoulder of the cassette side you want to protect.
- To re-record the cassette, cover each hole with cellophane tape. Do not cover the Chrome tape detection hole when covering the tab opening.



- C-120 tape is extremely thin and may be easily deformed or damaged. It is not recommended for use in this unit.
- Store the cassettes at room temperature and do not put them too close to a magnetic field (for example, transformers, TVs or speakers).

CD Changer

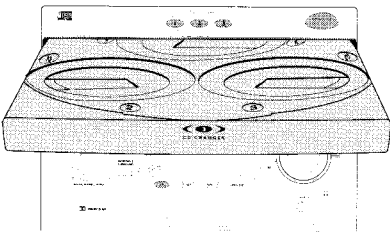
English

Warning!

- This unit is designed for conventional CDs. Do not use any cassettes, disc disc stabilizer rings or CD treatment chemicals, etc., which may damage the CD mechanism.
- Do not load more than one disc into each tray.
- When the CD changer is loaded with CDs, do not turn over or shake the unit as this may jam the changer mechanism.

You can load up to three discs in the CD changer for continuous play without interruption. In addition to the conventional 12-cm disc, 8-cm discs can also be used without an adaptor.

Loading the CD Changer



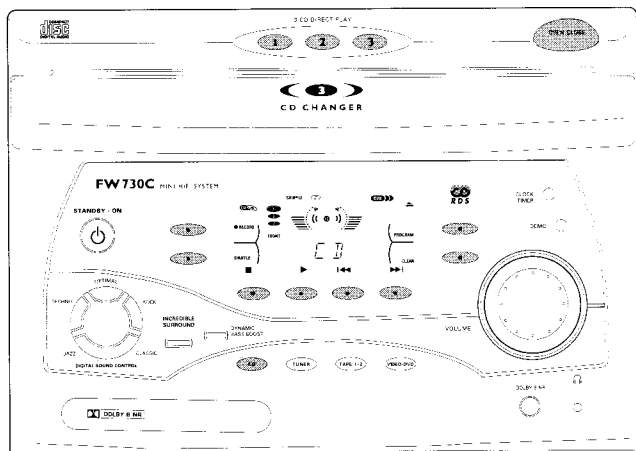
- Press **CD** on the unit or on the remote control to select CD mode.
- Press **OPEN•CLOSE**.
→ The CD compartment slides out.
- Load a CD with the **printed side up** in the right tray.
 - You can load another disc in the left tray.
 - To load the third disc, press the corresponding **3 CD DIRECT PLAY** button of the empty tray.
→ The CD changer carousel will rotate until the empty tray is at the right hand side and is ready for loading.
→ Playback will always start with the outer right disc tray.
- Press **OPEN•CLOSE** to close the CD compartment.
→ The total number of tracks and playing time of the last selected disc appear on the display.

The following display indications will help you to know whether the disc trays are empty or loaded.

- indicates that disc tray 1 is empty.
- indicates that disc tray 2 is loaded with a disc.
- indicates that disc tray 3 is loaded and selected.

CD Changer

English

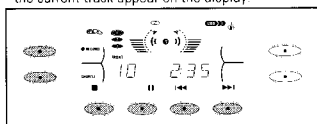


3 CD Direct Play button

- When the button is green, it indicates that there is no disc loaded in the disc tray.
- When the button is red, it indicates that there is a disc loaded in the disc tray.

Playing a CD

- Press **▶** (or **PLAY ▶** on the remote control) to start playback.
 - The disc tray, track number and elapsed playing time of the current track appear on the display.



- To interrupt play, press **||** (or **PAUSE ||** on the remote control).
 - The playing time flashes.
- To resume play, press **▶** again (or **PLAY ▶** on the remote control).
- To stop play, press **■** (or **STOP ■** on the remote control).

Note:

All the available discs will play once, then stop. When the CD has stopped playing, the set will switch to the standby mode after 15 minutes if no button is pressed.

When the CD tray is closed, you can play a CD directly by pressing the **3 CD DIRECT PLAY (1 - 3)** buttons on the set (or **DISC UP** button on the remote control). The CD player will stop at the end of playback of the selected disc.

Selecting a desired track

Selecting a desired track at the stop mode

- Press **◀◀** or **▶▶** (**PREV ◀ / NEXT ▶**) on the remote control) until the desired track appears on the display.
 - The selected track number and elapsed playing time appear on the display.

Selecting a desired track during play mode

- Press **◀◀** or **▶▶** (**PREV ◀** or **NEXT ▶**) on the remote control) until the desired track appears on the display.
 - The selected track number and elapsed playing time appear on the display.
- If you press **◀◀** once it will skip to the beginning of the current track and play the track again.

Searching for a particular passage during play mode

- Press and hold **◀◀** or **▶▶** (**◀◀** or **▶▶**) on the remote control) until the desired passage is located.
 - During the search, the sound is played at a faster than normal rate and at a reduced volume.
- Play returns to normal when **◀◀** or **▶▶** is released.

Shuffle

SHUFFLE – playing all the available discs and their tracks in random order. It can also be used when tracks are programmed.

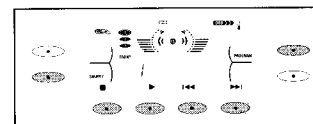
To shuffle all the discs and tracks

- Press SHUFFLE (or SHUFFLE on the remote control).
 - "SHUFFLE" flashes briefly on the display.
 - The SHUFFLE flag, the disc and the track selected at random appear on the display.
- The discs and the tracks will now be played in random order until you press **■**.
- Press SHUFFLE again to resume normal playback.
 - The SHUFFLE flag disappears from the display.

Programming Tracks

Programming tracks of a loaded CD is possible in the stop mode of the CD. The display will indicate the total tracks stored in the program. Up to 40 tracks can be stored in the memory in any order. When 40 tracks are stored and you attempt to store another track, the display will show "PROGRAM1 FULL".

- Load the desired discs in the disc trays.
- Press PROGRAM to start programming.
 - The PROGRAM flag flashes on the display.



- Press the desired disc button to select the disc.
- Press **◀◀** or **▶▶** to select the desired track.
- Press PROGRAM to store the track.
 - Repeat steps 3 to 5 to store other discs and tracks.
- Press **■** once to end programming mode.
 - The total number of tracks programmed and total playing time appear on the display.

Note:

If the total playing time is more than "99:59" or one of the programmed tracks has a number greater than 30, then "----" is displayed instead of the total playing time.

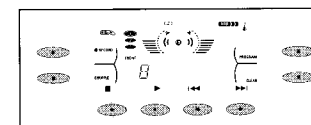
Playing the program

- Press **▶** (or **PLAY ▶** on the remote control) to start program playback.
 - "PROGRAM1 PLAY" appears on the display.
 - The track number and elapsed playing time of the current track will appear on the display.
- Press **■** (or **STOP ■** on the remote control) to stop program playback.

Note:

If you press any of the 3 CD DIRECT PLAY buttons, the set will play the selected disc or track and the stored program will be ignored temporary. The PROGRAM flag will also temporarily disappear from the display and then reappear when the playback for the selected disc ends.

Reviewing the program



Reviewing of the program is only possible in the stop mode.

- Press **◀◀** or **▶▶** repeatedly to review the programmed tracks.

Erasing the program (in the stop position)

- Press CLEAR on the set.
 - "PROGRAM1 CLEAR" appears on the display.

Note:

The program is also erased when the set is disconnected from the power supply. If the CD carousel is opened, the tracks belonging to the outer two trays will be erased and "CLEAR" will scroll on the display once.

Record Tape

- As soon as you press **●** RECORD, the current sound will be recorded on TAPE DECK 2, provided a cassette suitable for recording is loaded.
- To stop recording, press **■** (or **STOP ■** on the remote control).

CD Changer

External Connection

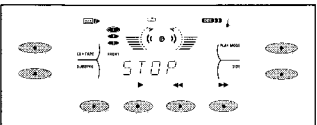
Clock Setting

Timer Setting

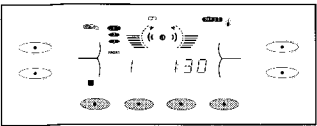
English

CD Synchro Start Audio Recording

- During CD synchro start audio recording,**
- It is not advisable to fast forward/rewind your cassette in TAPE DECK 1.
 - It is not possible to listen to another sound source.
- Press **CD** on the unit or on the remote control to select CD mode.
 - Load a disc into the disc tray.
 - You can program the tracks in the order you want them to be recorded (see Programming Tracks). If not, the tracks are recorded according to the selected disc.
 - Press **TAPE 1-2** (or **TAPE 2** on the remote control) to select **tape deck 2**.

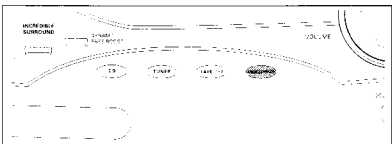


- Load a blank cassette (full spool to the left) into **tape deck 2**.
- Press **SIDE** to select the **FRONT** side of the cassette.
→ The **FRONT** flag appears in the display.
- Press **PLAY MODE** to select the play mode (⏮ or ⏭) for **tape deck 2**.
- Press **CD ▶ TAPE** to start recording.
→ The **RECORD** flag flashes on the display.
→ The CD starts playing after a seven-second delay to prevent recording on the leader tape at the beginning of the cassette.



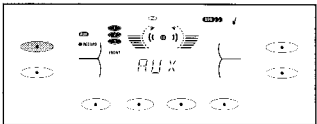
- Press **■** to stop recording.

Selecting External Connection



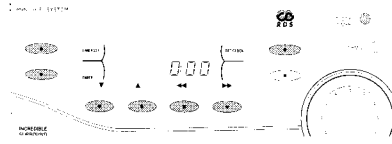
If you have connected the audio out of the external equipment (TV, VCR, Laser Disc player or DVD) to the AUX IN sockets, you can hear the enhanced sound from the system.

- Press **VIDEO/OVD** on the unit (or **AUX** on the remote control) to select external mode.
→ **AUX** appears on the display.
The available display button functions light up:



Record Tape

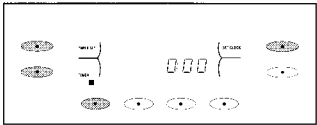
- As soon as you press **RECORD**, the current sound will be recorded on TAPE DECK 2, provided a cassette suitable for recording is loaded.
- To stop recording, press **■** (or **STOP** **■** on the remote control).



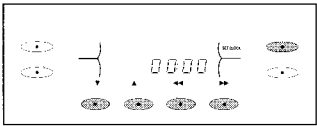
Setting the clock

The clock is in 24-hour mode, e.g. 00:00 or 23:59.

- Press **CLOCK•TIMER**.
→ "00:00" starts flashing.



- Press **SET CLOCK**.
→ "00:00" starts flashing.



- Set the hour with **▼** or **▲**.
- Set the minute with **◀** or **▶**.
- Press **SET CLOCK** again to store the setting.
→ The clock starts running.

Notes:

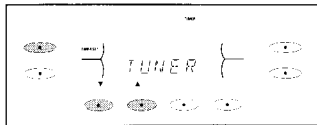
- Before setting the clock, make sure that the system is switched ON.
- When a power interruption occurs, the clock settings are erased.

Setting the Timer

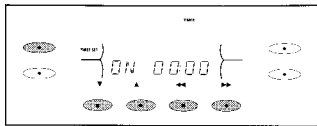
- The system can switch on to CD, TUNER or TAPE 1 mode automatically at a preset time. It can serve as an alarm to wake you up. After half an hour from the preset time, the system will return to the standby mode if no button is pressed.
- Before setting the timer, make sure the clock is set correctly.
- The timer works only once for each setting.
- The volume of the timer will be at the last setting before the set is switched to standby mode.**

Timer Setting

- Press **CLOCK•TIMER**.
- Press **TIMER SET**.
→ The **TIMER** flag flashes.



- Press **▼** or **▲** to select the desired source.
→ The display will switch as follows:
TUNER → TAPE 1 → CD → TUNER ...
- Press **TIMER SET** to confirm your selection.
→ The display will show "ON 00:00" and "00:00" flashes.



- Press **▼** or **▲** to set the hour for the timer to start.
- Press **◀** or **▶** to set the minutes for the timer to start.
- Press **TIMER SET** to store the start time.
→ The **TIMER** is now set.
→ The **TIMER** flag remains lit.

To stop the TIMER

- Press **CLOCK•TIMER**.
- Press **TIMER** on the set.
→ The **TIMER** is now off.

To start the TIMER again

- Press **CLOCK•TIMER**.
- Press **TIMER** on the set.
→ The display will show the last set start time of the **TIMER** and its flag.
→ The **TIMER** flag remains lit.

Notes:

- If the source selected is TUNER, the last tuned frequency will be switched on.
- If the source selected is CD, the first track of the last selected disc will be played. If the CD trays are empty, the TUNER source will be selected instead.
- If the source selected is TAPE 1, when the preset time is reached during high speed dubbing, the TUNER source will be selected instead.

English

Maintenance

English

Maintenance

Cleaning the Cabinet

- Use a soft cloth slightly moistened with a mild detergent solution. Do not use a solution containing alcohol, spirits, ammonia or abrasive.

Cleaning Discs

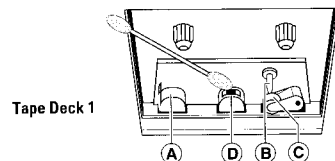
- When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the center out.



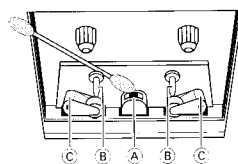
- Do not use solvents such as benzene, thinner, commercially available cleaners, or antistatic spray intended for analog records.

Cleaning the Heads and the Tape Paths

- To ensure good recording and playback quality, clean the heads (A) and (D), the capstan(s) (B), and pressure roller(s) (C) after every 50 hours of tape operation.



Tape Deck 1



Tape Deck 2

- Use a cotton swab slightly moistened with cleaning fluid or alcohol.
- You can also clean the head by playing a cleaning tape through once.

Demagnetizing the heads

- Use a demagnetizing cassette available at your dealer.

Troubleshooting Guide

English

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

- If a fault occurs, check the points listed below before taking the set for repair.
- Should any problems persist after you have made these checks, consult your nearest dealer or service center.

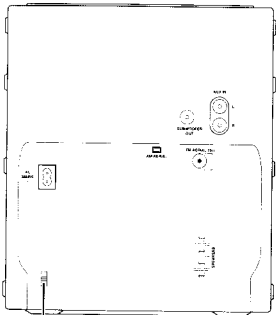
SYMPTOM	POSSIBLE CAUSE	REMEDY
RADIO RECEPTION		
The STEREO indicator flashes.	The signal is too weak.	Adjust the antenna.
Severe hum or noise.	The signal strength is too weak.	Adjust the antenna.
	The TV or VCR is too close to the stereo system.	Separate the stereo system from the TV or VCR.
		Connect an external antenna for better reception.
"NO RDS" is displayed.	Station is not transmitting RDS.	Select another RDS station.
"NO RDS TEXT" is displayed.	RDS text message is not available.	Select another RDS station.
CASSETTE DECK OPERATION		
"CANNOT RECORD" is displayed.	No cassette in the cassette deck.	Insert a blank cassette into the cassette deck.
	The protection tab has been broken.	Put a piece of clear adhesive tape over the opening.
"RECORDING ACTIVE" is displayed.	A recording is active.	Stop the recording or wait until it is finished.
Recording or playback cannot be made or there is a decrease in audio level.	Dirty tape heads.	See section on cassette deck maintenance.
	Magnetic build-up in the record/playback head.	Use demagnetizing cassette.
Excessive wow or flutter, or sound drop-out.	Contamination of the capstans or pressure rollers.	See section on cassette deck maintenance.
CD PLAYER OPERATION		
"NO DISC" is displayed.	The disc is inserted upside down.	Place CD with printed side up.
	Moisture condensation.	Wait until lens has adjusted to normal room temperature.
	There is no disc in the CD tray.	Insert a CD.
	The CD is dirty, badly scratched or warped.	Replace or clean the CD.
GENERAL		
Set not working.	Set does not react when buttons are pressed.	Press STANDBY-ON to switch the unit off, then switch it on again. Or, unplug the AC power plug from the wall outlet, then plug it in again.
No or poor sound.	Volume is not turned up.	Adjust VOLUME.
	The headphones are connected.	Disconnect the headphones.
	Speakers are not connected or are connected wrongly.	Check that the speakers are connected correctly. Make sure that the stripped speaker wire is clamped.
Reversed left and right sound.	Speakers are connected wrongly.	Check the speaker connections and speaker location.
Lack of bass sound or apparently imprecise physical location of musical instruments.	Speakers are connected wrongly.	Check the speaker connection for proper phasing. red/black wires to red/black terminals.
Clock blinking.	There was a power disruption.	Reset the clock.
Remote control has no effect on the set.	The distance to the system is too large.	Reduce the distance.
	Batteries are inserted incorrectly.	Insert the batteries correctly.
	Batteries are exhausted.	Replace the batteries.
	Wrong sound source is selected.	Select the sound source before pressing the function button, (PLAY, PREV/NEXT, etc.).
Timer not working.	Timer not on.	Press TIMER on the set to switch on the timer.
	Dubbing/recording is active.	Stop dubbing/recording.
"PRESS DEMO TO EXIT" is displayed.	Demo mode is switched on.	Press STANDBY-ON or DEMO to switch off the demo.

Additional Features - For other versions

Adjusting the Operating Voltage

(for voltage selector version only)

Before connecting the AC power cord to a wall outlet, make sure that the voltage selector at the rear of the system is set to the local power line voltage. If not, reset the selector before connecting to the wall outlet.



Voltage Selector

Changing the FM/MW tuning grid

(for /21/21M only)

The frequency step can be changed if necessary. In North and South America, the frequency step between adjacent channels in the FM/MW band is 100 kHz/10 kHz. In other parts of the world, it is 50 kHz/9 kHz. The frequency step presetted in the factory is 9 KHz.

For FM Band : change from 50 kHz to 100 kHz or vice versa

For MW Band : change from 9 kHz to 10 kHz or vice versa

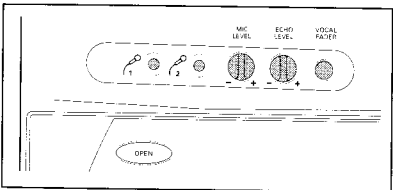
Changing of tuning grid will erase all previously stored preset stations.

While in TUNER mode, press the **TUNER** button for **more than 5 seconds**. Display will shows "GRID 10" or "GRID 9".

Note:

GRID 9 indicates that the tuning grid is in step of 50 kHz in FM band and 9 kHz in MW band. GRID 10 indicates that the tuning grid is in step of 100 kHz in FM band and 10 kHz in MW band.

Karaoke



CONNECTION & CONTROLS

VOCAL FADER

- to fade out the vocal of the original song

ECHO LEVEL

- to adjust the echo level for karaoke or microphone recording.

MIC LEVEL

- to adjust the mixing level for karaoke or microphone recording.

MIC 1 and 2

- to connect microphones (3.5 mm) jack.

Microphone mixing

- 1 Set the **MIC LEVEL** control to the minimum level to prevent acoustic feedback (e.g. a loud howling sound) before you connect the microphone.
- 2 Connect either 1 or 2 microphones to the mic socket.
- 3 Press **CD, TUNER, TAPE 1-2** or **VIDEO/DVD**.
- 4 Play the selected source.
- 5 Adjust the volume with **VOLUME** control.
- 6 Adjust the **MIC LEVEL** control to the mixing level that you want.
- 7 Adjust the **ECHO LEVEL** control to the echo level that you want.
- 8 Press **VOCAL FADER** to suppress the vocals on special recorded Karaoke CDs.
→ When the VOCAL FADER is switched on, the  appears on the display.
- 9 Start singing or talking through the microphone.

Recording the mixed sound

During microphone mixing, you can record the mixed sound on a cassette in Tape Deck 2.

- 1 Load a blank cassette in **tape deck 2**.
- 2 Press  **RECORD**.

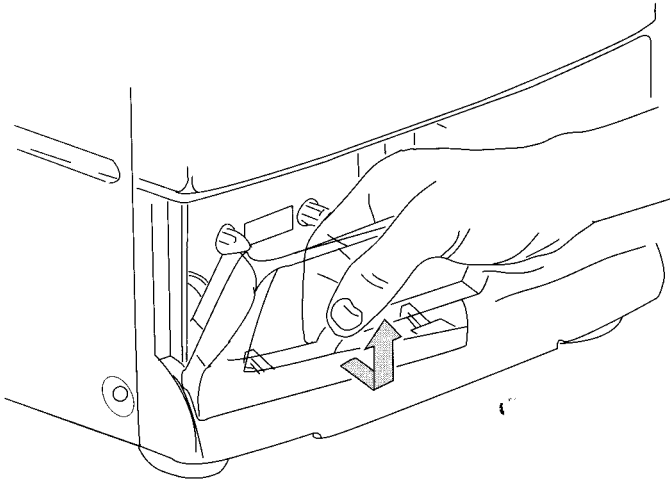
Notes:

1. For maximum VOCAL FADER effect, you are advised to switch off the Incredible Surround.
2. If you do not intend to record via the microphone, unplug the microphone to avoid accidental mixing with other recording source.
3. It is not possible to record the mixed sound through a microphone during cassette Dubbing mode.

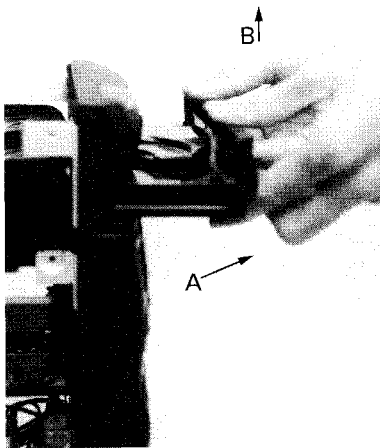
Remarks:

DISMANTLING INSTRUCTIONS

Dismantling of the Cassette Cover



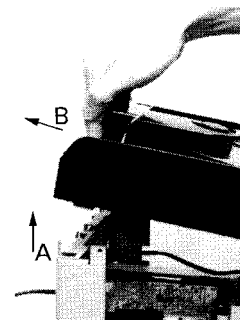
Dismantling of the Front Panel



- 1) Remove the top cover
- 2) Slide the CD tray out
- 3) Remove the CD cover as indicated

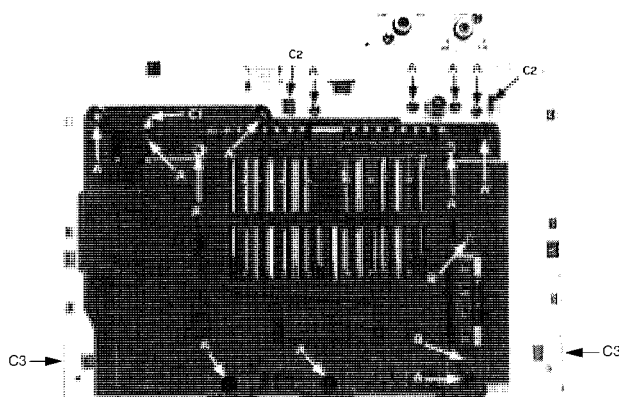


- 4) Loosen 2 screws at the front



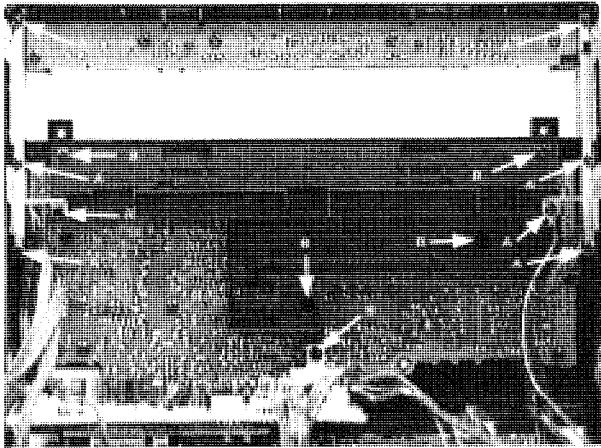
- 5) Remove the CD shield, pos 272 and 2 screws at the rear.
- 6) Lift the CDC Module up and remove as indicated

Dismantling of Power Module / Rear Panel



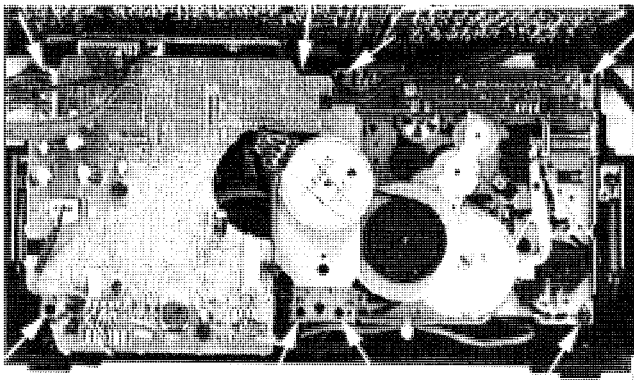
- 1) Remove 13 screws A as indicated.
- 2) Uncatch C1 the bracket, pos 321 to free the Power Module.
- 3) Remove Tuner board assembly by 2 catches C2
- 4) Uncatch 2 catches C3 on both sides of the Rear panel and remove it from the Bottom plate, pos 295.
- 5) Remove the rucksack (Power module) cover by 2 screws B.

Dismantling of Front Board



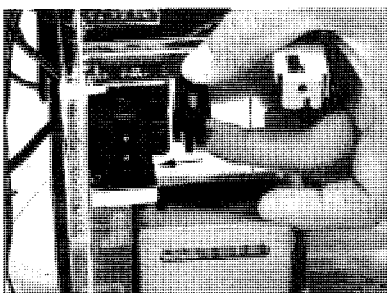
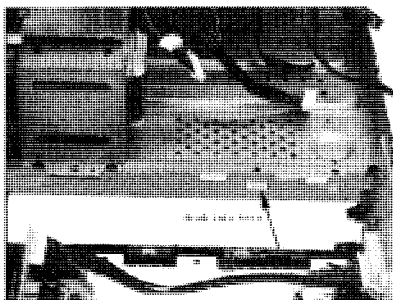
- 1) Remove the left and right bracket, pos 260 & 261 by 8 screws A.
- 2) Remove the Front bracket, pos 247 by 5 screws B.

Dismantling of Tape Deck Module



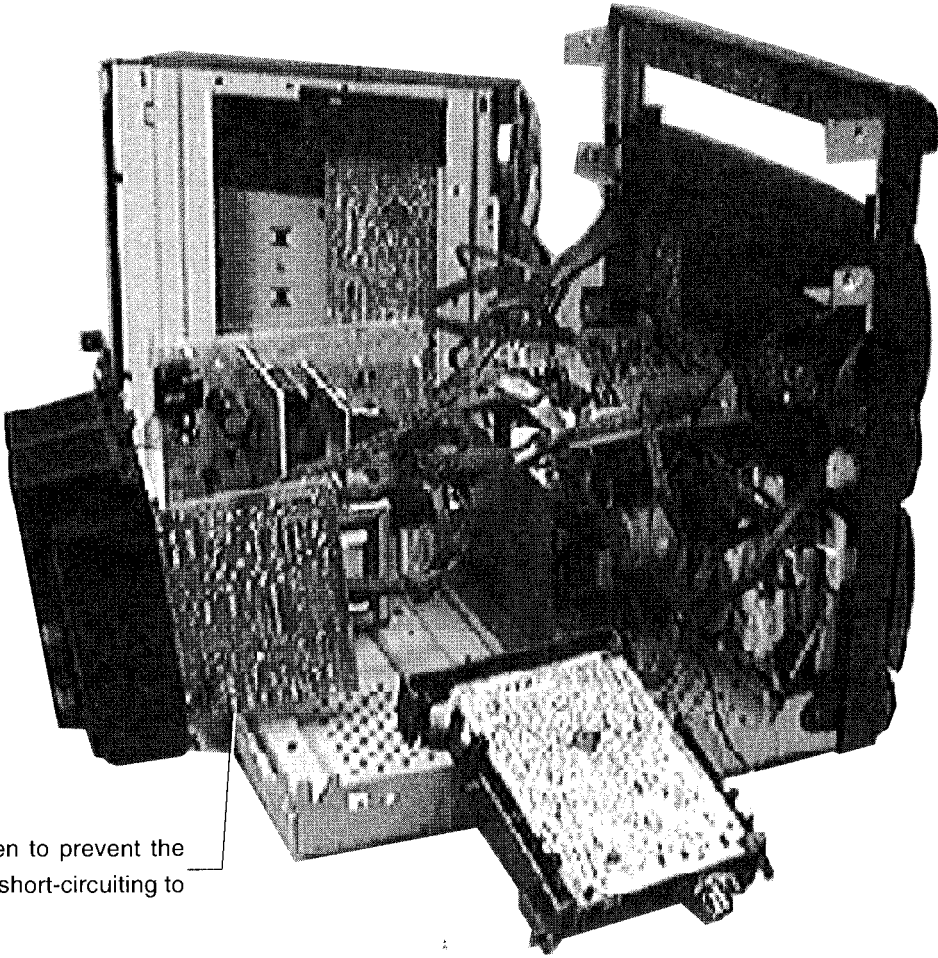
- 1) Remove 1 screw at the bottom of the Front Cabinet to separate the Front cabinet assembly from the Bottom plate assembly.
- 2) Remove 8 screws as indicated to take out the Tape module from the Front Cabinet.

Hints for Power Module & Rear Panel assembly



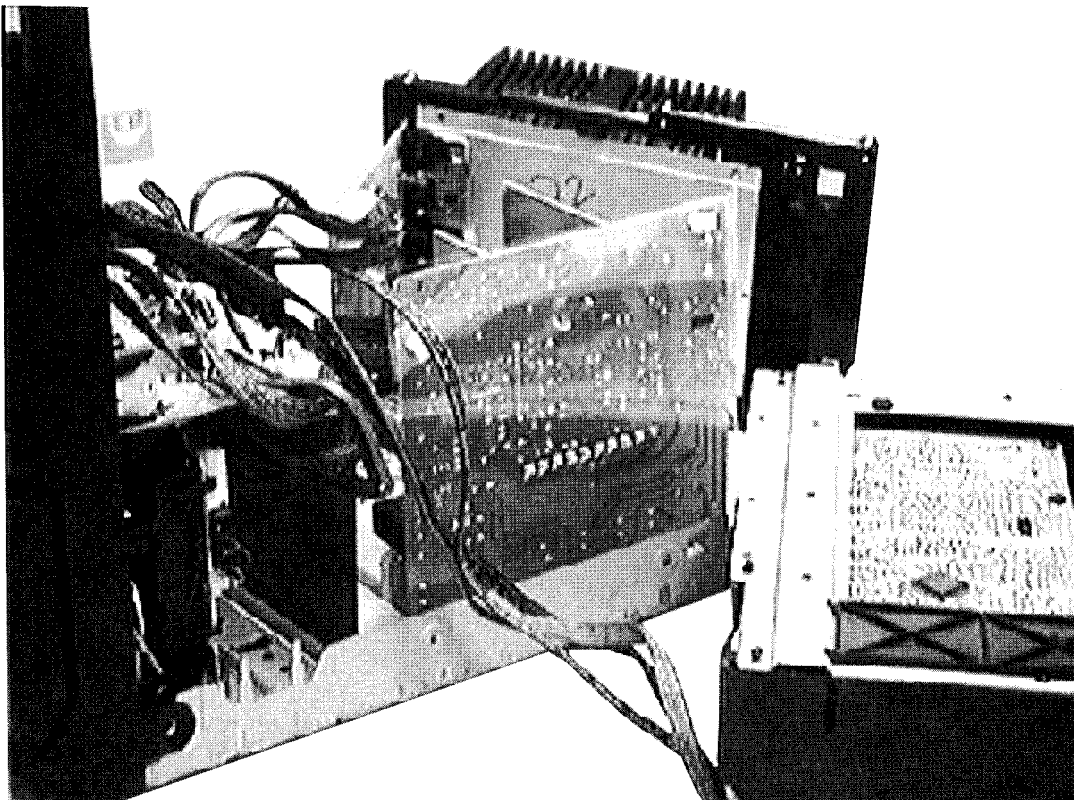
- 1) During re-assembly of the pc Boards into the Rucksack (Power module cover) care should be taken to alignment Loudspeaker sockets into the openings. Do not force bend the leads of the sockets.
- 2) Hooked the Power module onto the Bottom plate, pos 295.
- 3) Place the bracket, pos 321 behind the mains socket and catch it into the Rucksack.
- 4) Assemble the Rear Panel, pos 288 onto the Bottom plate, pos 295 care should be taken not to damage any wires or pc board copper pattern.

Service pos A

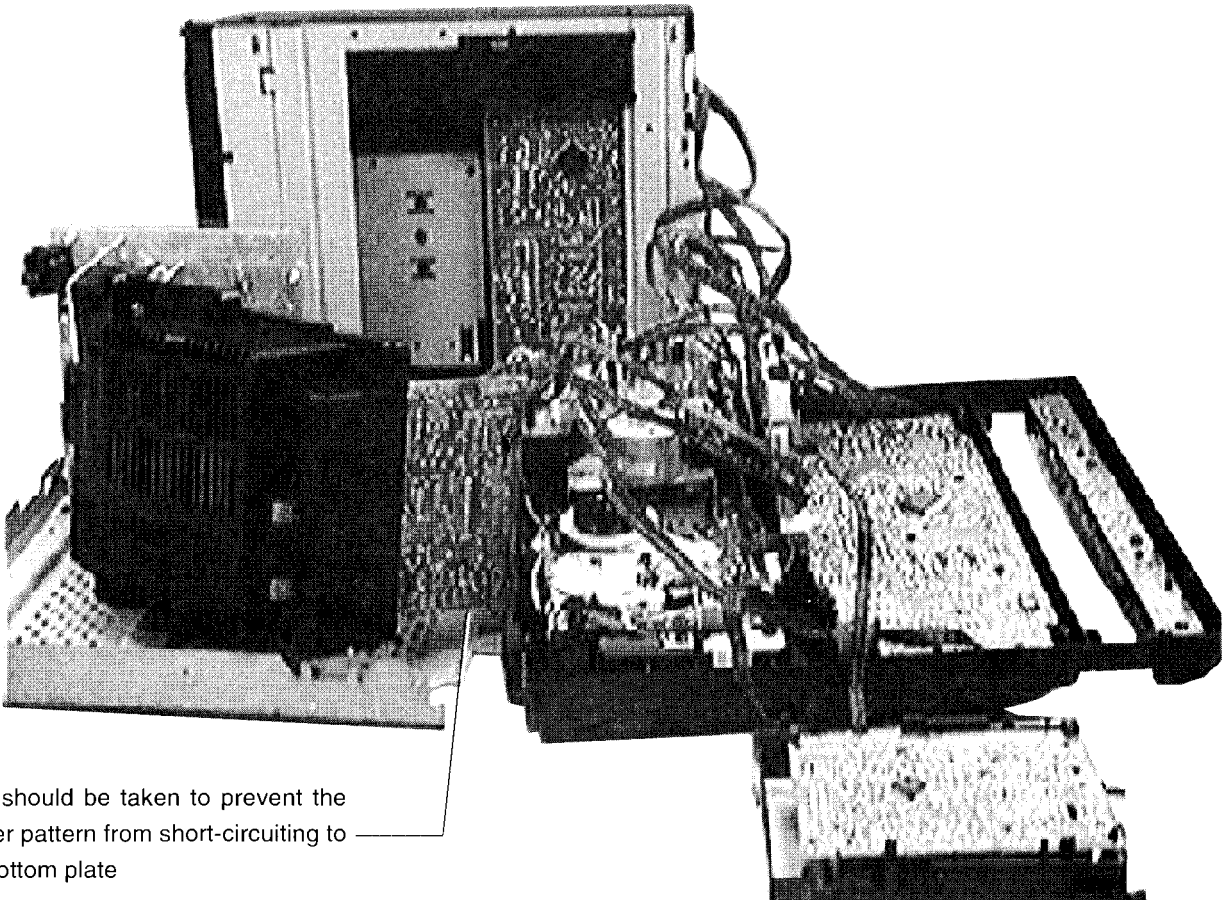


Care should be taken to prevent the copper pattern from short-circuiting to the Bottom plate

Service pos B

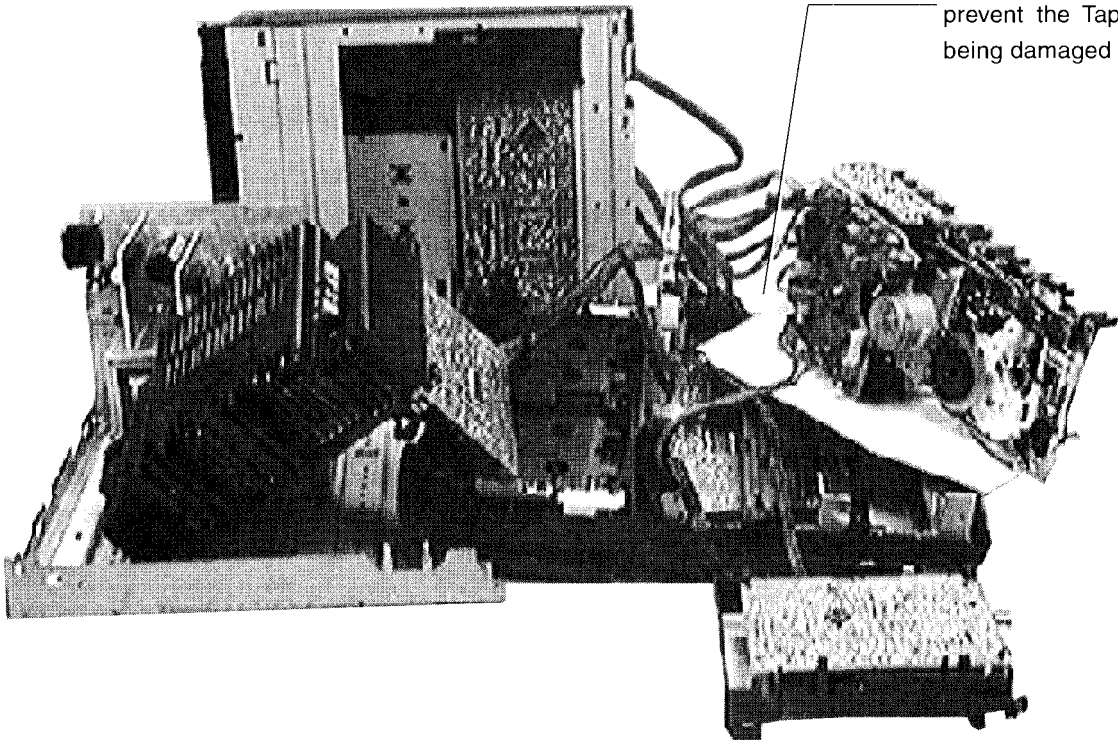


Service pos C



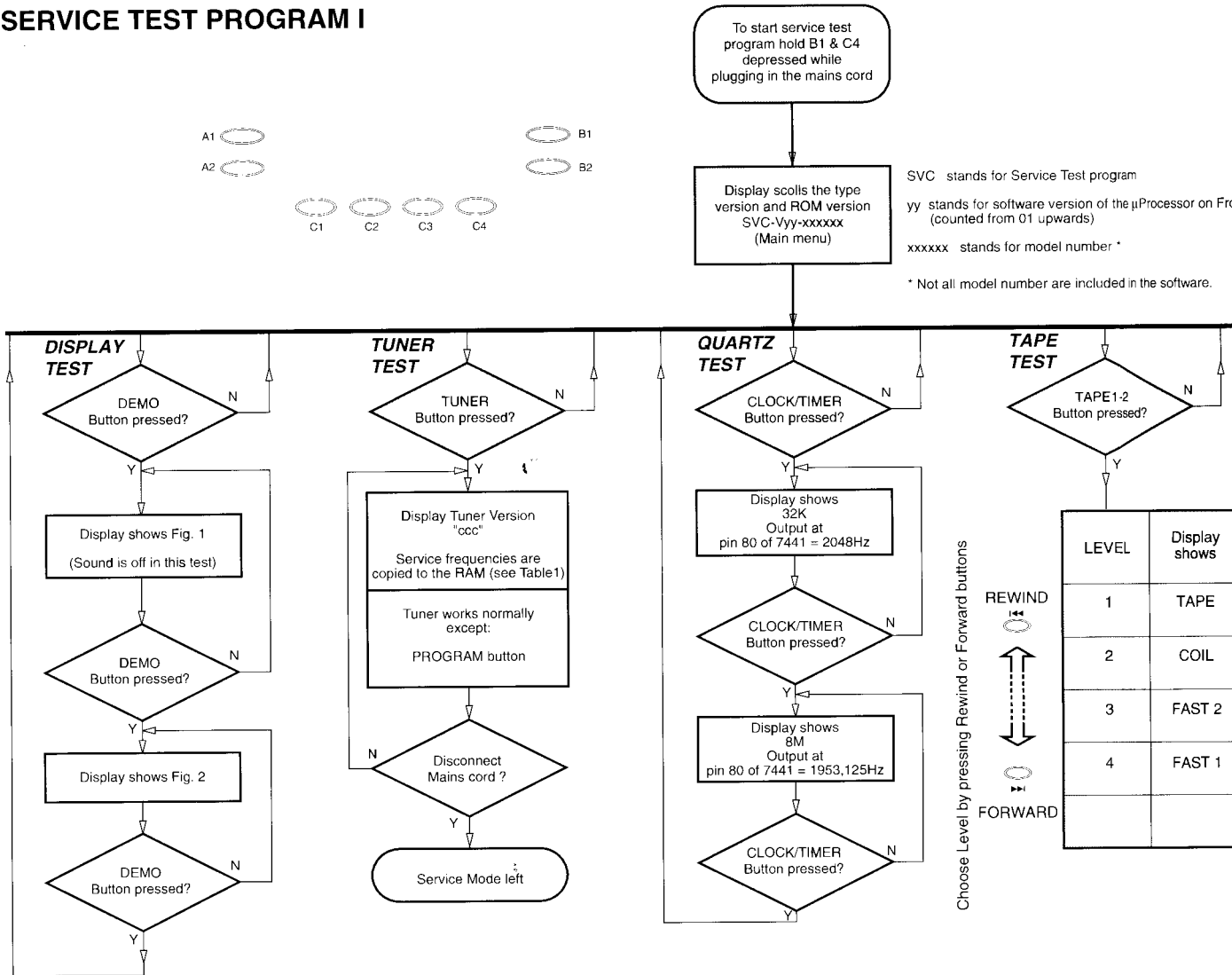
Care should be taken to prevent the copper pattern from short-circuiting to the Bottom plate

Service pos D



Use a plastic sheet or hard paper to prevent the Tape Mechanism from being damaged or shorted.

SERVICE TEST PROGRAM I



PRESET	Europe "EUR"	East Europe "EAS"	USA "USA"	Oversea "OSE"	Korea "KOR"	Japan "JAP"	East Eur. 2-band "EAS"
1	87.5MHz	65.81MHz	87.5MHz	87.5MHz	87.5MHz	76MHz	65.81MHz
2	108MHz	108MHz	108MHz	108MHz	108MHz	CH3 107.75MHz	108MHz
3	531kHz	74MHz	530kHz	531/530kHz	531kHz	90MHz	74MHz
4	1602kHz	87.5MHz	1700kHz	1602/1700kHz	1602kHz	CH1 95.75MHz	87.5MHz
5	558kHz	531kHz	560kHz	558/560kHz	558kHz	CH2 101.75MHz	531kHz
6	1494kHz	1602kHz	1500kHz	1494/1500kHz	1494kHz	531kHz	1602kHz
7	153kHz	558kHz	98MHz	87.5/98MHz	87.5MHz	1602kHz	558kHz
8	279kHz	1494kHz	87.5MHz	87.5MHz	87.5MHz	558kHz	1494kHz
9	198kHz	153kHz	87.5MHz	87.5MHz	87.5MHz	1494kHz	98MHz
10	98MHz	279kHz	87.5MHz	87.5MHz	98MHz	80MHz	70.01MHz
11	87.5MHz	198kHz	87.5MHz	98/87.5MHz	98MHz	76MHz	65.81MHz

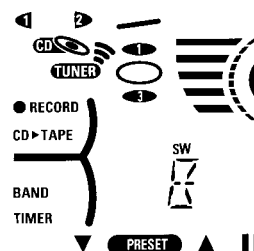
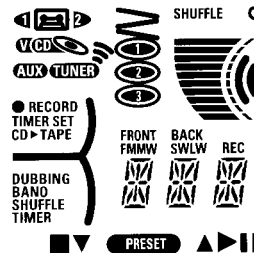
Table 1

East Europe TUNER IF offset correction

- 1) Input a reference frequency 87.5MHz from the generator.
- 2) Proceed to the Tuner Test Mode (Press PROGRAM button)
- 3) The set will self-calibrate automatically and display "OFS-xx" when calibration is successful, otherwise it will display "00E".

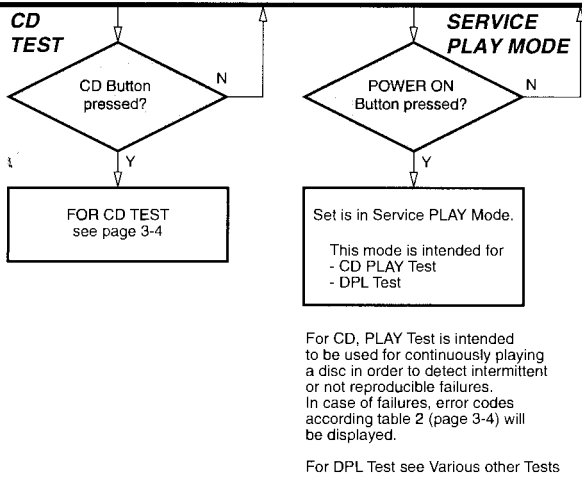
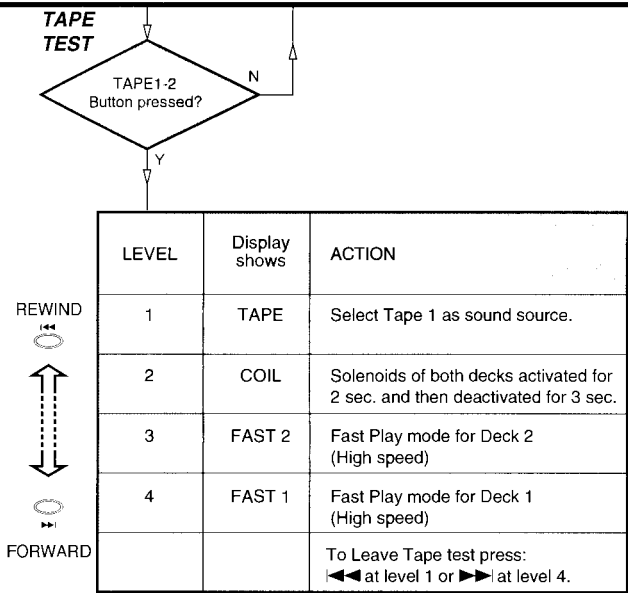
xx : offset value between -3 to +3

Note: This has to be done whenever the Eeprom, Microprocessor or the components in the oscillator circuitry are replaced.



stands for Service Test program
stands for software version of the μ Processor on Front Board
(counted from 01 upwards)
xx stands for model number *
at all model number are included in the software.

Choose Level by pressing Rewind or Forward buttons



Various other Tests

TEST	Activated with	ACTION
EEPROM TEST	Optimal	A test pattern will be sent to the EEPROM. "PASS" is displayed if the uProcessor read back the test pattern correctly, otherwise "ERR" will be displayed.
EEPROM FORMAT	Classic	Load default data. Display shows "NEW" for 1 second. Caution! All presets from the customer will be lost!!
KEY TEST	Aux / Video-DVD	Key numbers according table 3 are shown on the display. (see Chapter 3-4)
FAST CLOCK TEST	Dynamic Bass Boost (DBB)	The clock is switched to fast mode. "FAST" is displayed for 2 sec. Press DBB again to reset the clock to normal. "NORMAL" displayed for 2 sec.
DETECTION TEST	C1	This test is intended to check on the sensor near to the Volume knob. Display shows "OBJ nn" nn < 185 = no object detected nn > 185 = object detected
HVC TEST	B2	This test is intended to check on the hydraulic movement of the Volume knob. level 1: Knob moves out & DBB Led turns on. level 2: Knob moves in & DBB Led turns off. level 3: Exit test, ● Record & ■ flag turns on.
DPL TEST	Dolby Pro-logic	The set enters into Pro-logic install mode. The noise-source switches between Left, Center, Right and Rear speakers. Pro-logic settings cannot be install in this test.
LEAVE SERVICE TESTPROGRAM	Disconnect mains cord	

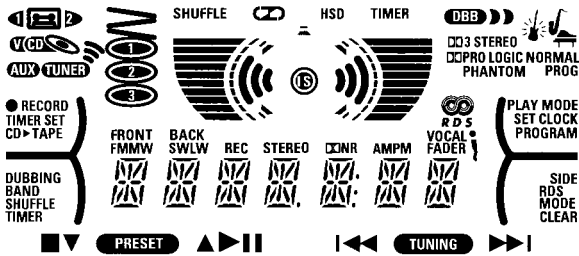


Figure 1

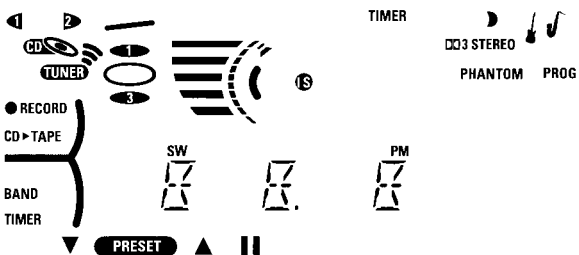


Figure 2

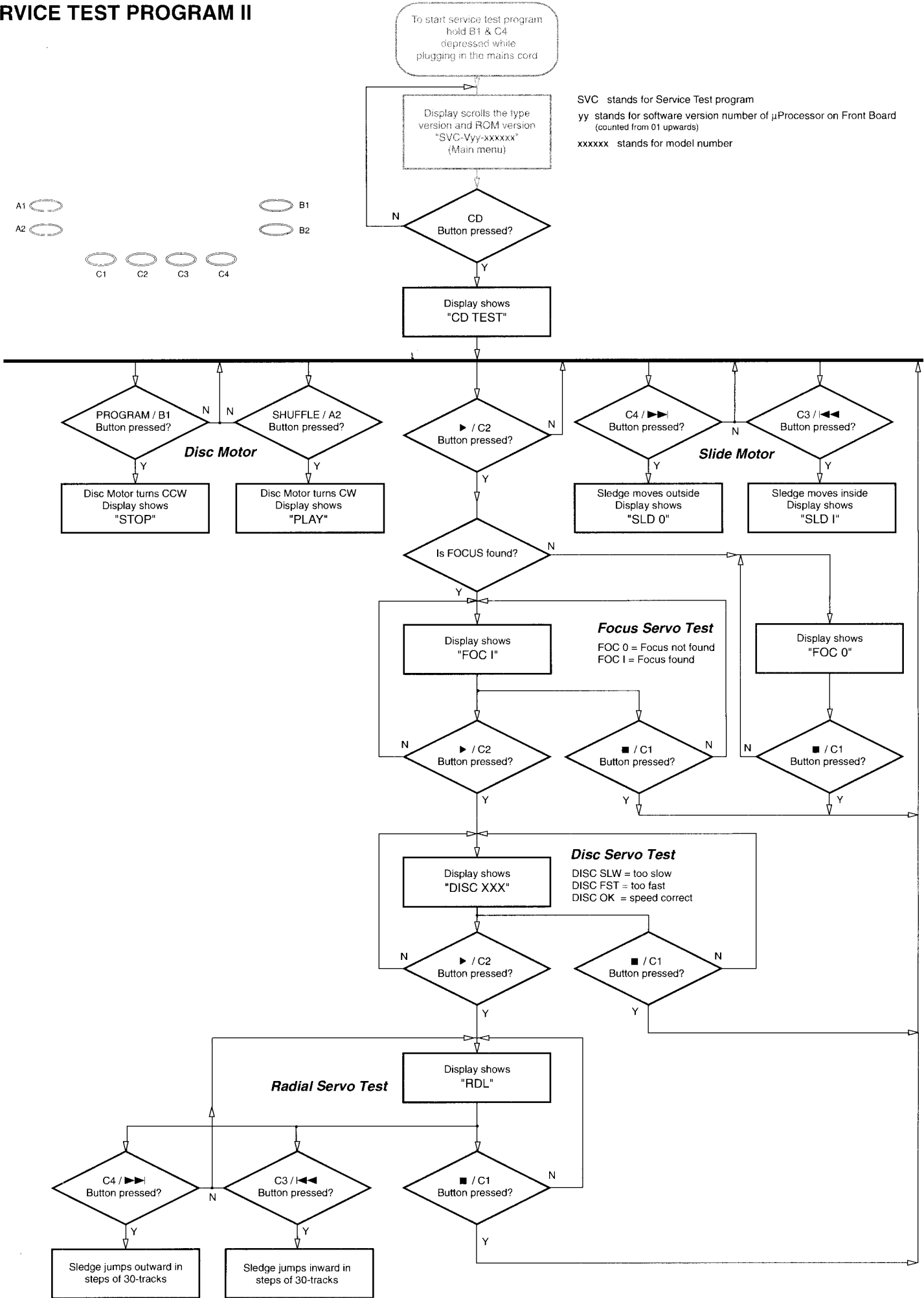
CD Error code	Error Description
E1002	Focus Error Triggered when the focus could not be found within a certain time when starting up the CD or when the focus is lost for a certain time during play.
E1007	Subcode Error (no subcode within time) Triggered when a new subcode was missing for a certain time during play.
E1008	TOC error, out of lead-in area when 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.
E1010	Radial Error Triggered when the radial servo is not on track for a certain time during play.
E1011	Sledge Error Generated when the inner-switch did not open within a certain time when the pick-up is moved from the inner position. Inner-switch or sledge motor problem.
E1012	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 problem.
E1013	Turntable Motor Error Generated when the CD did not reached 75% of speed during startup within a certain time. Discmotor problem.
E1014	Jump-offtrack error (too less grooves within time) Triggered in normal play when the jump destination could not be found within a certain time.
E1020	PLL Error The Phase Lock Loop could not lock within a certain time.
E1070	Carousel CDM-position switch not open within time.
E1071	Carousel position not reached within time.
E1072	Error tray open
E1076	Error disc change
E1077	Error pickup switch close
E1078	Error pickup switch open
E1079	Error tray block

Table 2

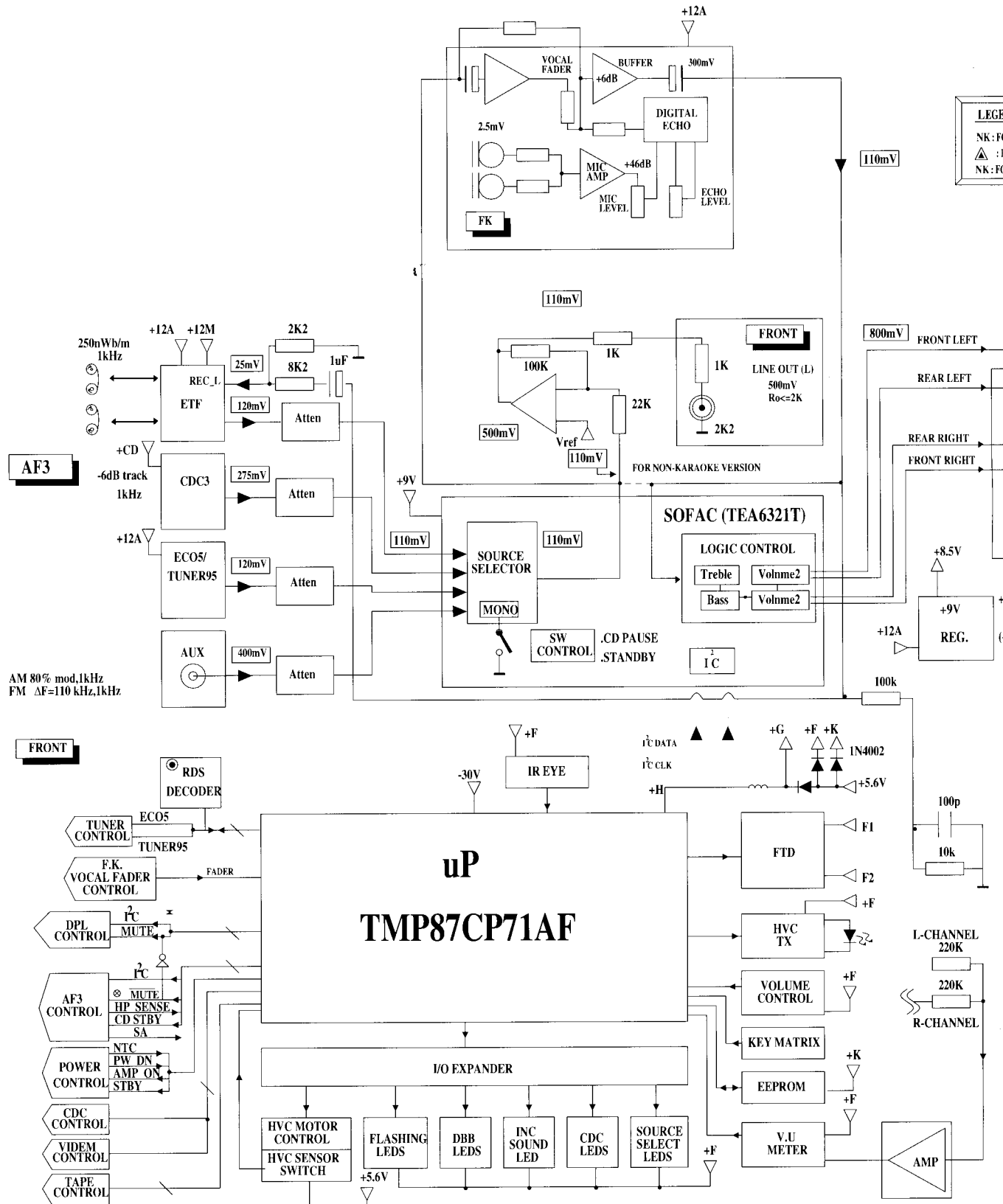
Keys activated	Display shows	Keys activated	Display shows	Keys activated	Display shows
Disc 1	01	Incredible Surround	21	Clock/Timer	14
Disc 2	02	Dynamic Bass Boost	22	Demo	15
Disc 3	03	A1	06	CD	23
Open/Close	04	A2	07	Tuner	24
Standby-On	05	C1	08	Tape 1 - 2	25
Optimal	19	C2	09	Aux / Video - DVD	26
Rock	17	C3	10	Dolby Pro-Logic	27
Classic	16	C4	11	Dolby	28
Jazz	18	B1	12		
POP	20	B2	13	Any Remote control button	RC

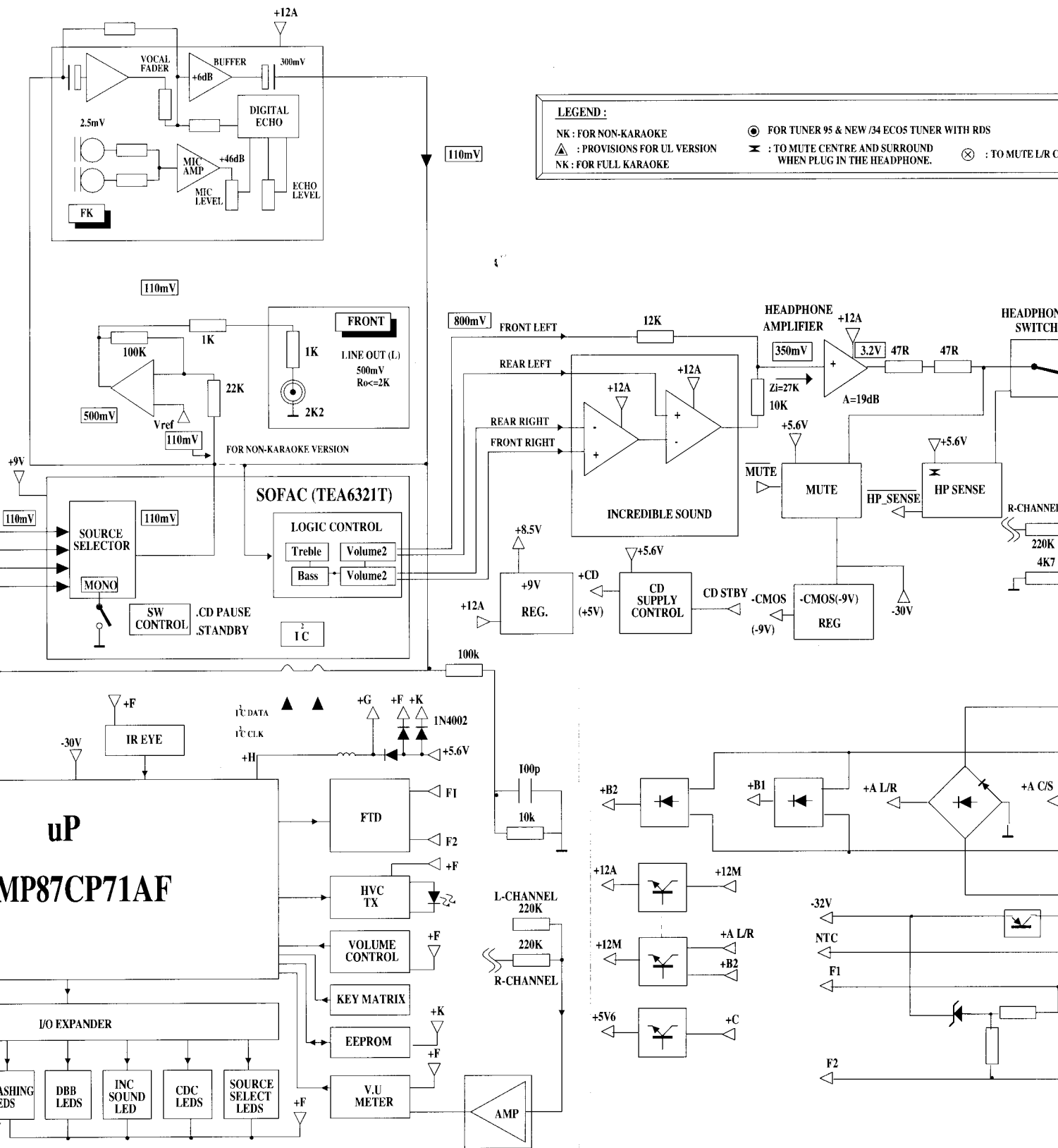
Table 3

SERVICE TEST PROGRAM II



SET BLOCK DIAGRAM





POWER AMPLIFIER

LEGEND :

NK : FOR NON-KARAOKE

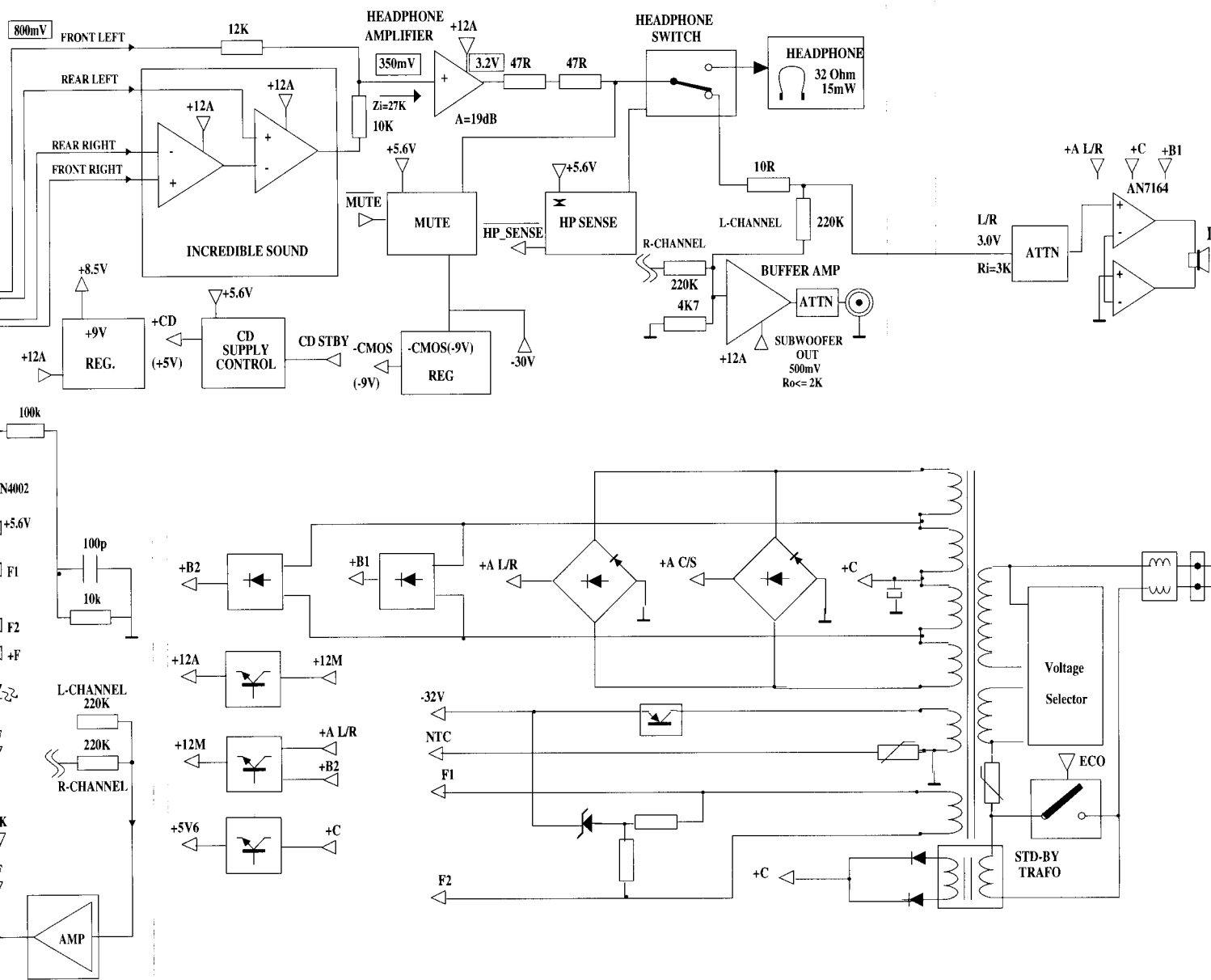
⚠ : PROVISIONS FOR UL VERSION

NK : FOR FULL KARAOKE

⦿ FOR TUNER 95 & NEW /34 ECOS TUNER WITH RDS

✂ : TO MUTE CENTRE AND SURROUND WHEN PLUG IN THE HEADPHONE.

⊗ : TO MUTE L/R CHANNELS

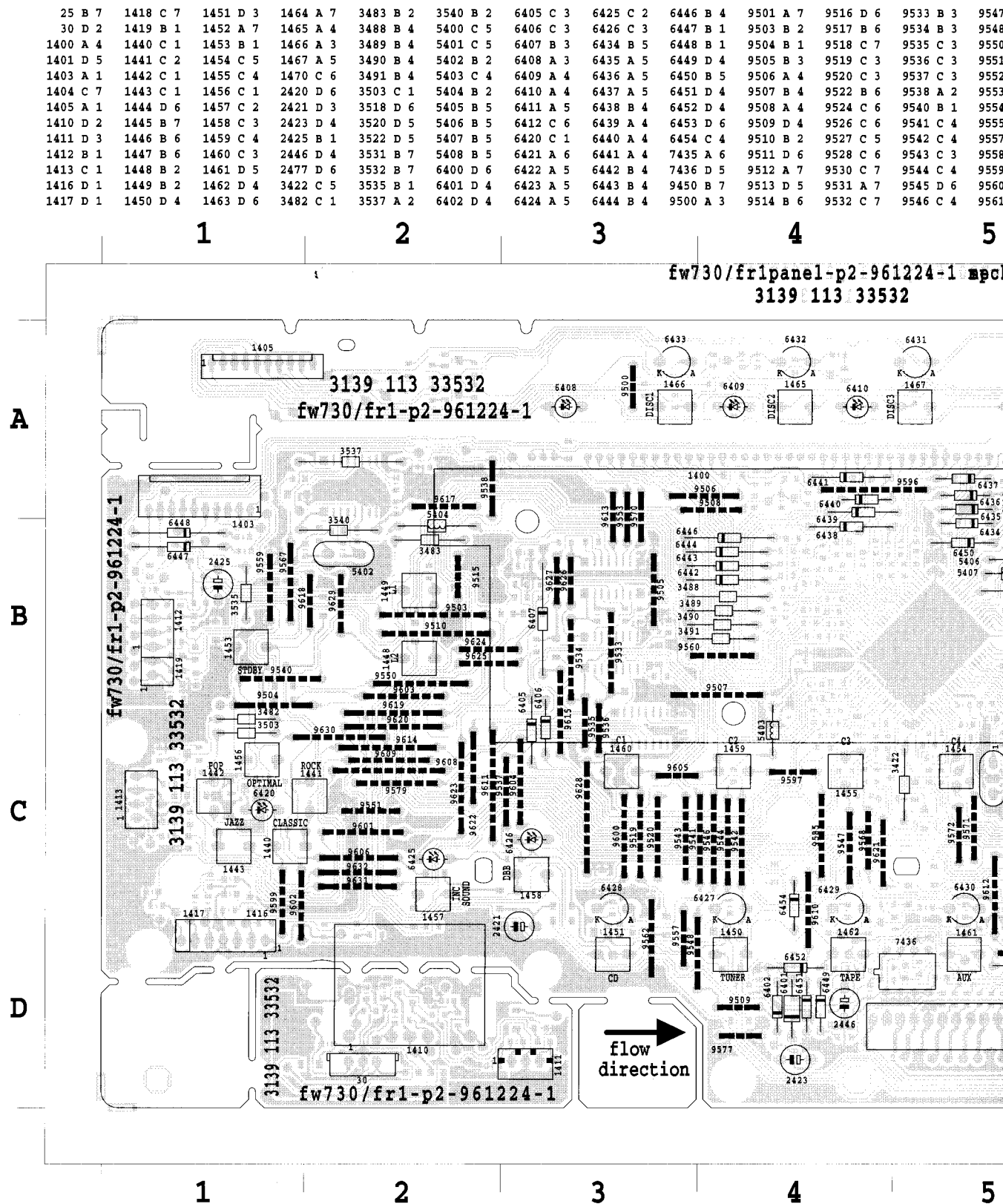


FRONT BOARD

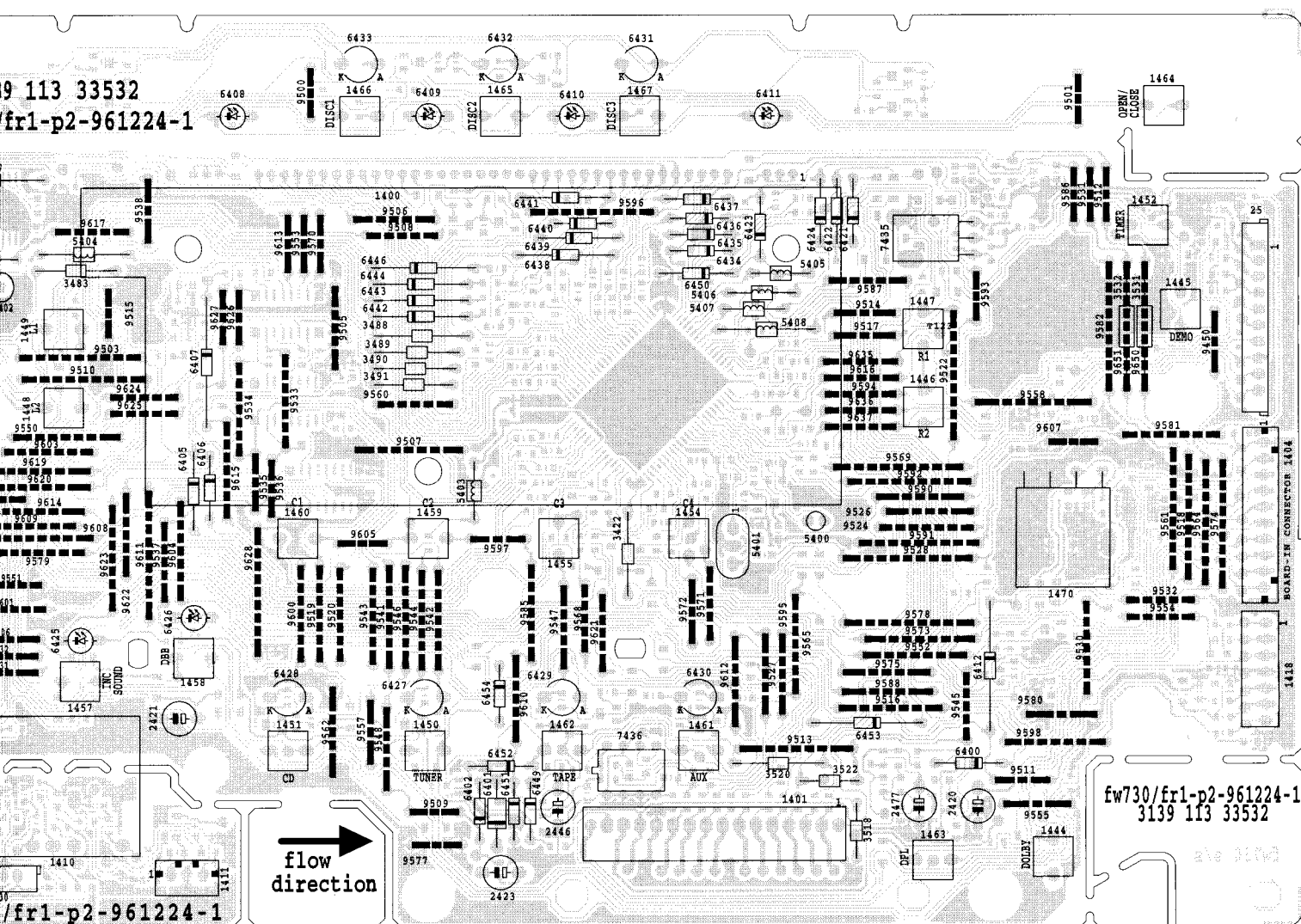
TABLE OF CONTENTS

Component layout	6A-1
Circuit diagram	6A-2
Chip component layout	6A-3
LCD pin connection	6A-3
Electrical parts list	6A-4

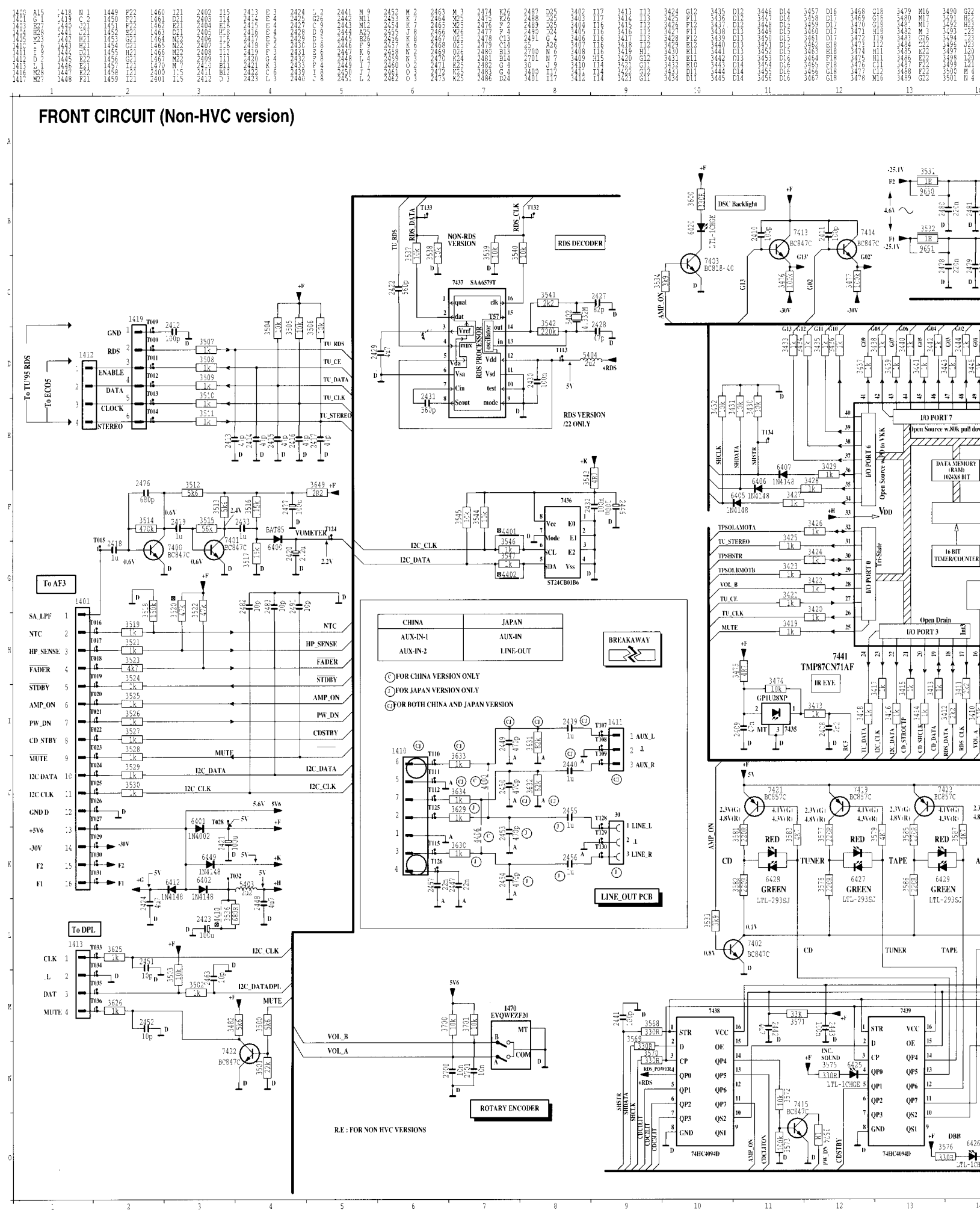
COMPONENT LAYOUT DIAGRAM

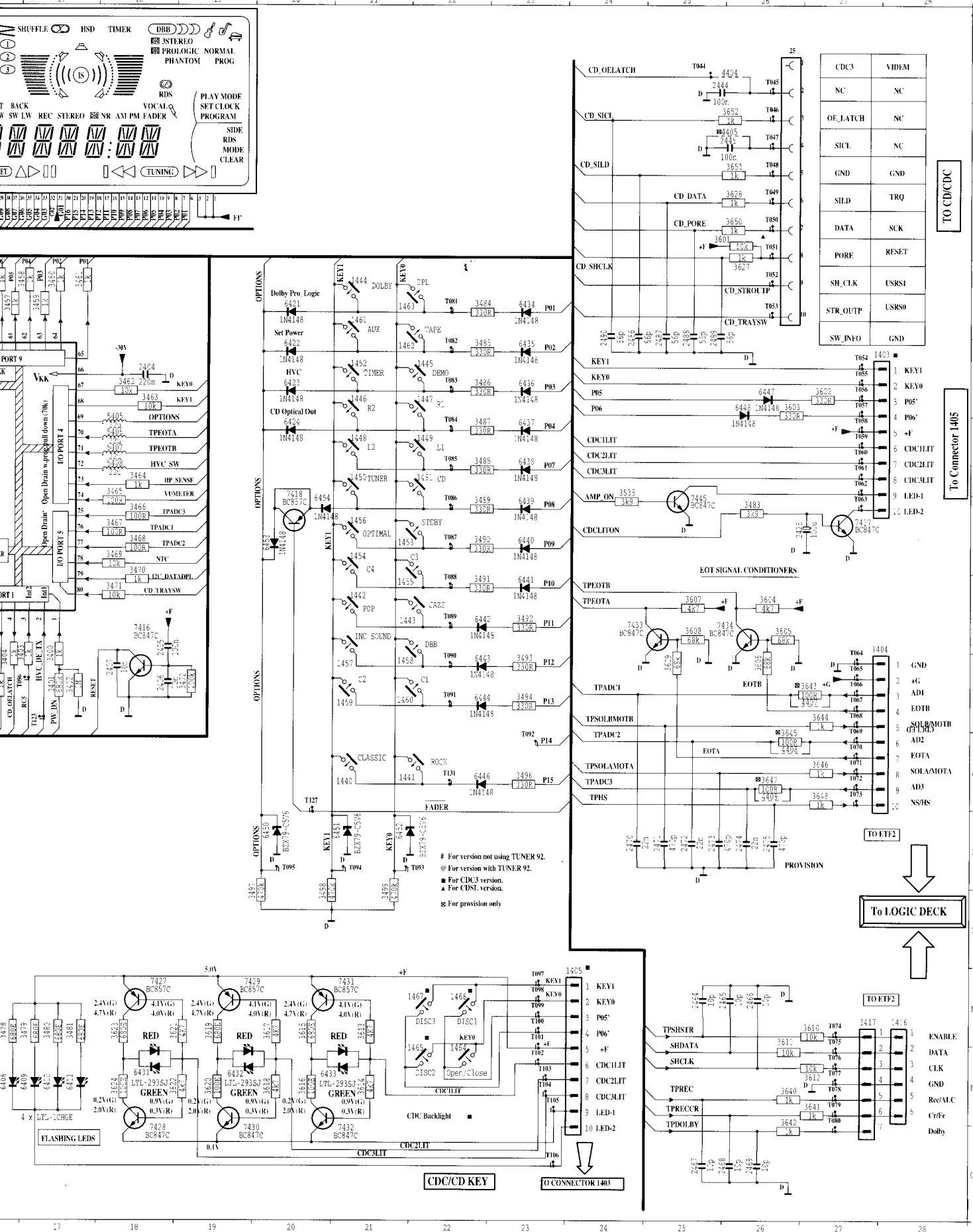


9 113 33532
fr1-p2-961224-1



fw730/fr1-p2-961224-1
3139 113 33532





2400 B 5	2428 B 2	2457 D 2	2481 A 6	3412 C 5	3436 B 4	3459 B 5	3484 A 5	3513 D 6	3544 D 4	3590 C 5	3621 A 6	3644 C 7	4452 A 3	4475
2401 C 5	2429 A 1	2458 C 7	2482 D 5	3413 C 5	3437 B 4	3460 B 5	3485 A 5	3514 D 6	3545 D 4	3591 D 5	3622 A 6	3645 C 7	4453 A 3	4476
2402 B 5	2430 B 2	2459 C 7	2483 D 5	3414 C 5	3438 B 4	3461 B 5	3486 A 5	3515 D 6	3546 D 5	3600 C 1	3623 A 6	3646 C 7	4454 B 3	4477
2403 C 5	2431 A 2	2460 C 7	2486 B 6	3415 C 5	3439 B 4	3462 B 5	3487 A 5	3516 D 6	3547 D 5	3601 A 7	3624 A 6	3647 C 7	4455 B 5	4478
2404 A 6	2432 D 4	2461 C 7	2487 B 6	3416 C 5	3440 B 4	3463 B 5	3492 B 4	3517 D 6	3568 B 3	3602 B 1	3625 C 1	3648 C 7	4456 B 4	4479
2405 C 5	2433 D 6	2462 D 7	2488 B 6	3417 C 5	3441 B 4	3464 B 5	3493 B 4	3519 D 5	3569 B 3	3603 B 1	3626 C 1	3649 D 6	4457 B 5	4482
2406 C 5	2439 D 3	2463 C 1	2489 B 7	3418 C 4	3442 B 4	3465 B 5	3494 B 4	3521 D 5	3570 B 3	3604 C 6	3627 B 6	3650 B 6	4458 C 1	4483
2407 C 5	2440 D 3	2464 D 2	2490 A 7	3419 C 4	3443 B 4	3466 B 5	3496 B 4	3523 D 5	3571 B 3	3605 C 6	3628 B 7	3651 B 7	4459 A 6	4484
2408 A 6	2441 B 3	2465 C 1	2491 D 5	3420 C 4	3444 B 4	3467 B 5	3497 B 5	3524 D 5	3572 B 3	3606 C 7	3629 D 2	3652 B 7	4460 C 6	4485
2409 A 6	2442 B 3	2466 C 1	2700 C 7	3421 C 4	3445 B 4	3468 B 5	3498 D 4	3525 D 5	3573 B 3	3607 C 6	3630 D 2	3700 C 7	4461 D 6	4486
2410 A 4	2443 B 3	2467 C 1	2701 C 6	3423 C 4	3446 B 4	3469 B 5	3499 D 4	3526 D 5	3574 B 3	3608 C 6	3631 D 2	3701 C 7	4462 C 5	4487
2411 A 4	2444 A 7	2468 C 1	3400 B 5	3424 C 4	3447 B 4	3470 B 5	3500 C 1	3527 D 5	3575 C 3	3609 C 7	3632 D 3	4400 D 2	4463 D 4	4488
2412 B 1	2445 B 7	2469 C 1	3401 B 5	3425 C 4	3448 B 4	3471 B 5	3501 C 1	3528 D 5	3576 C 3	3610 D 2	3633 D 2	4401 D 5	4464 B 6	4489
2413 B 1	2447 D 2	2470 C 7	3402 B 5	3426 C 4	3449 B 4	3472 C 5	3502 C 1	3529 D 5	3577 C 4	3611 D 1	3634 D 2	4402 D 5	4465 B 6	4490
2414 B 1	2448 B 4	2471 C 7	3403 B 5	3427 C 4	3450 B 4	3473 A 6	3504 B 1	3530 D 5	3578 D 3	3612 D 1	3635 C 7	4404 A 7	4466 A 6	4491
2415 B 1	2449 D 2	2472 C 7	3404 B 5	3428 C 4	3451 B 4	3474 B 6	3505 B 1	3533 C 4	3579 D 4	3613 A 2	3636 C 7	4405 B 7	4467 C 6	4492
2416 B 1	2450 D 2	2473 C 6	3405 B 5	3429 B 5	3452 B 4	3475 A 6	3506 B 1	3534 C 1	3581 C 3	3614 A 2	3637 D 7	4406 D 2	4468 D 5	4494
2417 B 1	2451 C 1	2474 C 6	3406 B 5	3430 B 3	3453 B 4	3476 A 4	3507 B 1	3536 D 4	3582 D 3	3615 A 2	3638 D 7	4407 C 7	4469 C 6	4495
2418 D 6	2452 C 1	2475 D 6	3407 B 5	3431 B 3	3454 B 4	3477 A 4	3508 B 1	3538 A 2	3583 D 3	3616 A 2	3639 D 7	4408 C 7	4470 D 4	4496
2419 D 6	2453 D 2	2476 D 6	3408 B 5	3432 B 3	3455 B 4	3478 A 3	3509 B 1	3539 A 2	3585 D 4	3617 A 4	3640 C 1	4409 C 7	4471 D 4	4497
2422 A 1	2454 D 2	2478 A 6	3409 C 5	3433 B 4	3456 B 4	3479 A 4	3510 B 1	3541 B 2	3586 D 4	3618 A 4	3641 C 1	4410 D 4	4472 A 3	4498
2424 B 7	2455 D 2	2479 A 6	3410 B 5	3434 B 4	3457 B 5	3480 A 4	3511 B 1	3542 B 2	3587 D 4	3619 A 4	3642 C 1	4450 A 5	4473 D 3	4500
2427 B 2	2456 D 2	2480 A 6	3411 C 5	3435 B 4	3458 B 5	3481 A 5	3512 D 6	3543 D 4	3589 D 5	3620 A 4	3643 C 7	4451 A 4	4474 B 1	4501

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A

B

C

D

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3436 B 4	3459 B 5	3484 A 5	3513 D 6	3544 D 4	3590 C 5	3621 A 6	3644 C 7	4452 A 3	4475 C 2	4502 B 6	4530 B 7	4578 B 6	7417 B 1
3437 B 4	3460 B 5	3485 A 5	3514 D 6	3545 D 4	3591 D 5	3622 A 6	3645 C 7	4453 A 3	4476 C 5	4503 C 4	4532 C 4	4579 C 5	7418 C 5
3438 B 4	3461 B 5	3486 A 5	3515 D 6	3546 D 5	3600 C 1	3623 A 6	3646 C 7	4454 B 3	4477 D 4	4504 C 5	4535 B 7	4580 D 2	7419 D 4
3439 B 4	3462 B 5	3487 A 5	3516 D 6	3547 D 5	3601 A 7	3624 A 6	3647 C 7	4455 B 5	4478 D 4	4506 C 5	4545 B 3	4581 D 2	7421 D 3
3440 B 4	3463 B 5	3492 B 4	3517 D 6	3548 B 3	3602 B 1	3625 C 1	3648 C 7	4456 B 4	4479 B 1	4507 D 6	4554 A 2	4582 C 7	7422 C 1
3441 B 4	3464 B 5	3493 B 4	3519 D 5	3549 B 3	3603 B 1	3626 C 1	3649 D 6	4457 B 5	4482 D 4	4508 B 6	4559 B 1	4583 C 6	7423 D 4
3442 B 4	3465 B 5	3494 B 4	3521 D 5	3570 B 3	3604 C 6	3627 B 6	3650 B 6	4458 C 1	4483 C 3	4509 B 1	4560 C 1	4584 A 7	7425 D 5
3443 B 4	3466 B 5	3496 B 4	3523 D 5	3571 B 3	3605 C 6	3628 B 7	3651 B 7	4459 A 6	4484 B 1	4510 D 5	4562 A 6	4585 C 4	7427 A 6
3444 B 4	3467 B 5	3497 B 5	3524 D 5	3572 B 3	3606 C 7	3629 D 2	3652 B 7	4460 C 6	4485 B 3	4511 B 4	4563 A 5	4586 C 4	7428 A 6
3445 B 4	3468 B 5	3498 D 4	3525 D 5	3573 B 3	3607 C 6	3630 D 2	3700 C 7	4461 D 6	4486 C 1	4512 A 4	4564 A 6	4587 C 4	7429 A 4
3446 B 4	3469 B 5	3499 D 4	3526 D 5	3574 B 3	3608 C 6	3631 D 2	3701 C 7	4462 C 5	4487 B 3	4513 B 1	4565 B 2	4588 C 6	7430 A 4
3447 B 4	3470 B 5	3500 C 1	3527 D 5	3575 C 3	3609 C 7	3632 D 3	4400 D 2	4463 D 4	4488 D 7	4515 D 3	4566 B 2	4589 C 7	7431 A 2
3448 B 4	3471 B 5	3501 C 1	3528 D 5	3576 C 3	3610 D 2	3633 D 2	4401 D 5	4464 B 6	4489 D 4	4516 C 5	4567 D 6	4590 A 6	7432 A 2
3449 B 4	3472 C 5	3502 C 1	3529 D 5	3577 C 4	3611 D 1	3634 D 2	4402 D 5	4465 B 6	4490 D 3	4517 C 4	4568 A 5	4591 D 3	7433 C 6
3450 B 4	3473 A 6	3504 B 1	3530 D 5	3578 D 3	3612 D 1	3635 C 7	4404 A 7	4466 A 6	4491 A 4	4518 C 3	4569 C 2	4597 A 6	7434 C 6
3451 B 4	3474 B 6	3505 B 1	3533 C 4	3579 D 4	3613 A 2	3636 C 7	4405 B 7	4467 C 6	4492 C 7	4521 D 4	4570 D 2	7400 D 6	7437 A 2
3452 B 4	3475 A 6	3506 B 1	3534 C 1	3581 C 3	3614 A 2	3637 D 7	4406 D 2	4468 D 5	4494 C 2	4522 A 6	4571 D 6	7401 D 6	7438 B 3
3453 B 4	3476 A 4	3507 B 1	3535 C 4	3582 D 3	3615 A 2	3638 D 7	4407 C 7	4469 C 6	4495 D 5	4523 C 6	4572 C 2	7402 D 4	7439 B 3
3454 B 4	3477 A 4	3508 B 1	3538 A 2	3583 D 3	3616 A 2	3639 D 7	4408 C 7	4470 D 4	4496 C 5	4524 B 6	4573 B 1	7403 C 1	7440 C 3
3455 B 4	3478 A 3	3509 B 1	3539 A 2	3585 D 4	3617 A 4	3640 C 1	4409 C 7	4471 D 4	4497 B 2	4525 C 6	4574 D 5	7413 A 4	7441 B 5
3456 B 4	3479 A 4	3510 B 1	3541 B 2	3586 D 4	3618 A 4	3641 C 1	4410 D 4	4472 A 3	4498 D 5	4526 C 3	4575 B 2	7414 A 4	7445 B 1
3457 B 5	3480 A 4	3511 B 1	3542 B 2	3587 D 4	3619 A 4	3642 C 1	4450 A 5	4473 D 3	4500 B 6	4527 B 3	4576 B 3	7415 B 3	
3458 B 5	3481 A 5	3512 D 6	3543 D 4	3589 D 5	3620 A 4	3643 C 7	4451 A 4	4474 B 1	4501 A 6	4528 B 3	4577 B 6	7416 C 5	

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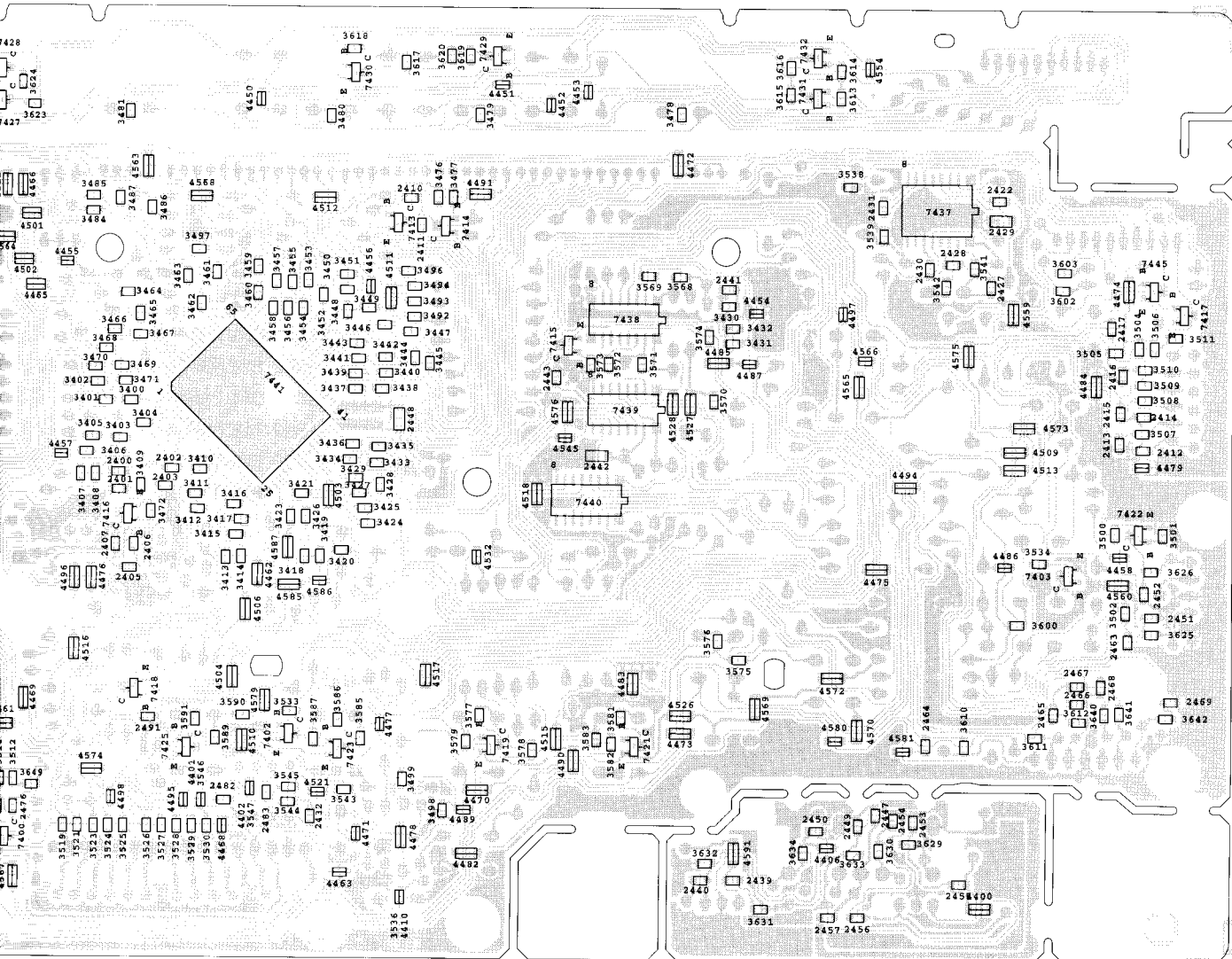
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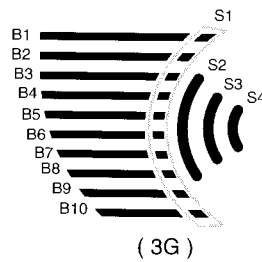
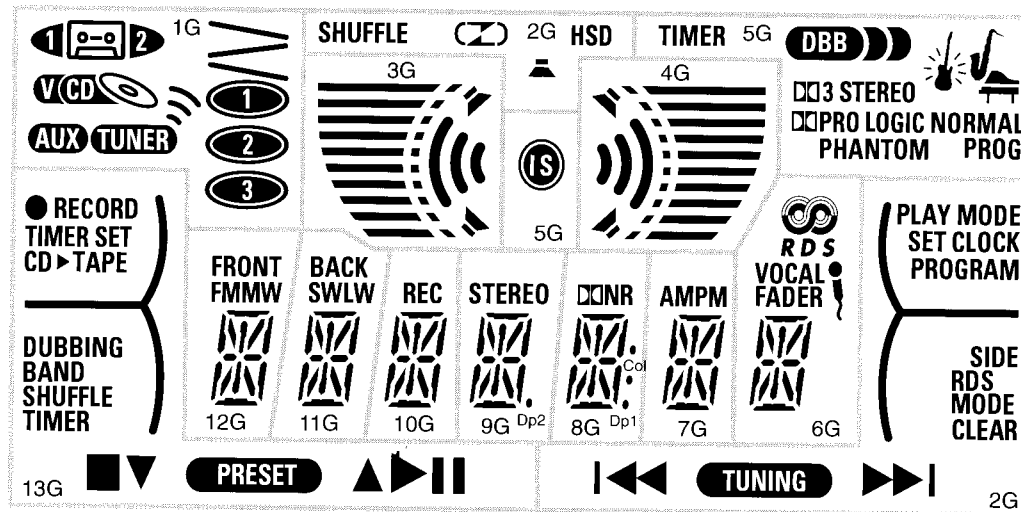
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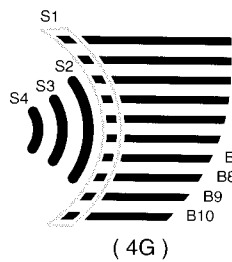
fw730/fr1panel-p2-961224-1 mech
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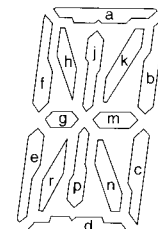
LCD DISPLAY PIN CONNECTIONS



(3G)



(4G)



(6G - 12G)

	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G	13G
P1		SHUFFLE	B1	B1		a	a	a	a	a	a	a	● RECORD
P2		)	B2	B2		b	b	b	b	b	b	b	TIMER SET
P3		C	B3	B3	TIMER	f	f	f	f	f	f	f	CD ▶ TAPE
P4		Z	B4	B4	DBB	h	h	h	h	h	h	h	DUBBING
P5		HSD	B5	B5		k	k	k	k	k	k	k	BAND
P6	AUX		B6	B6		j, p	j, p	j, p	j, p	j, p	j, p	j, p	SHUFFLE
P7	TUNER	PLAY MODE	B7	B7		g	g	g	g	g	g	g	TIMER
P8	/	SET CLOCK	B8	B8		m	m	m	m	m	m	m	
P9	/	PROGRAM	B9	B9		e	e	e	e	e	e	e	PRESET
P10	/	SIDE	B10	B10		c	c	c	c	c	c	c	
P11	1	RDS MODE	S1	S1		n	n	n	n	n	n	n	▼ ▲
P12	2	CLEAR	S4	S4		r	r	r	r	r	r	r	▶
P13	3		S3	S3	PHANTOM	d	d	d	d	d	d	d	
P14	(1)		S2	S2	NORMAL	VOCAL FADER	AM		STEREO	REC	BACK	FRONT	-
P15	(2)	◀ ▶			PROG	RDS	PM	• Dp 1	• Dp 2	-	SW	FM	-
P16	(3)	TUNING			-	-	-	• col	-	-	LW	MW	-

ELECTRICAL PARTS LIST - FRONT BOARD (Non-HVC version)**ELECTRICAL**

2700 4822 1

MISCELLANEOUS

1400	4822 135 00091	FTD Display 13-BT-150GK
1401	4822 267 51238	16Pin Connector
1410	4822 267 31823	4P Cinch Socket /34
1440	4822 276 13114	Tact Switch
1441	4822 276 13114	Tact Switch
1442	4822 276 13114	Tact Switch
1443	4822 276 13114	Tact Switch
1445	4822 276 13114	Tact Switch
1446	4822 276 13114	Tact Switch
1447	4822 276 13114	Tact Switch
1448	4822 276 13114	Tact Switch
1449	4822 276 13114	Tact Switch
1450	4822 276 13114	Tact Switch
1451	4822 276 13114	Tact Switch
1452	4822 276 13114	Tact Switch
1453	4822 276 13114	Tact Switch
1454	4822 276 13114	Tact Switch
1455	4822 276 13114	Tact Switch
1456	4822 276 13114	Tact Switch
1457	4822 276 13114	Tact Switch
1458	4822 276 13114	Tact Switch
1459	4822 276 13114	Tact Switch
1460	4822 276 13114	Tact Switch
1461	4822 276 13114	Tact Switch
1462	4822 276 13114	Tact Switch
1464	4822 276 13114	Tact Switch
1465	4822 276 13114	Tact Switch
1466	4822 276 13114	Tact Switch
1467	4822 276 13114	Tact Switch
1470	4822 101 21261	Rotary Encoder

CAPACITORS

2400	5322 122 32481	15pF 5% 50V
2401	5322 122 32481	15pF 5% 50V
2402	5322 122 32659	33pF 50V
2403	5322 122 32659	33pF 50V
2404	4822 126 13473	220nF 50V
2405	4822 126 13838	100nF +80/-20% 50V
2406	4822 122 33177	10nF 20% 50V
2407	4822 122 33177	10nF 20% 50V
2408	4822 122 33175	2,2nF 20% 50V
2409	4822 122 33797	47nF 20% 50V
2410	5322 122 32531	100pF 5% 50V
2411	5322 122 32531	100pF 5% 50V
2412	5322 122 32531	100pF 5% 50V
2413	5322 122 32452	47pF 5% 63V
2414	5322 122 32452	47pF 5% 63V
2415	5322 122 32452	47pF 5% 63V
2416	5322 122 32452	47pF 5% 63V
2417	5322 122 32452	47pF 5% 63V
2418	4822 126 14043	1μF +80/-20% 16V
2419	4822 126 14043	1μF +80/-20% 16V
2420	4822 124 40244	2,2μF 20% 63V

PCS 90 327

2421	4822 124 41584	100μF 20% 10V
2422	5322 116 80853	560pF 5% 50V
2423	4822 124 42446	100μF 20% 10V
2424	4822 126 14083	4μ7 +80/-20% 10V
2425	4822 124 42446	100μF 20% 10V
2427	4822 122 33515	82pF 50V
2428	5322 122 32452	47pF 5% 63V
2429	4822 126 14083	4μ7 +80/-20% 10V
2430	4822 126 13838	100nF +80/-20% 50V
2431	5322 116 80853	560pF 50V
2432	4822 126 13838	100nF +80/-20% 50V
2433	4822 126 14043	1μF +80/-20% 16V
2439	4822 126 14043	1μF +80/-20% 16V
2440	4822 126 14043	1μF +80/-20% 16V
2441	5322 122 32531	100pF 5% 50V
2442	4822 126 14083	4μ7 +80/-20% 10V
2443	4822 126 13838	100nF +80/-20% 50V
2444	4822 126 13838	100nF +80/-20% 50V
2445	4822 126 13838	100nF +80/-20% 50V
2446	4822 124 42446	100μF 20% 10V
2447	5322 122 32654	22nF 50V
2448	4822 126 14083	4μ7 +80/-20% 10V
2449	5322 122 32268	470pF 50V
2450	5322 122 32268	470pF 50V
2451	5322 122 32448	10pF 5% 50V
2452	5322 122 32448	10pF 5% 50V
2453	5322 122 32268	470pF 50V
2454	5322 122 32268	470pF 50V
2455	4822 126 14043	1μF +80/-20% 16V
2456	4822 126 14043	1μF +80/-20% 16V
2457	5322 122 32654	22nF 50V
2463	5322 122 32448	10pF 5% 50V
2464	5322 122 32448	10pF 5% 50V
2465	5322 122 32448	10pF 5% 50V
2466	5322 122 32448	10pF 5% 50V
2467	5322 122 32448	10pF 5% 50V
2468	5322 122 32448	10pF 5% 50V
2469	5322 122 32448	10pF 5% 50V
2476	4822 122 32535	680pF 10% 63V
2477	4822 124 42446	100μF 20% 10V
2478	4822 126 13473	220nF 50V
2479	4822 126 13473	220nF 50V
2480	4822 126 13473	220nF 50V
2481	4822 126 13473	220nF 50V
2482	5322 122 32448	10pF 5% 50V
2483	5322 122 32448	10pF 5% 50V
2486	5322 122 32661	56pF 5% 50V
2487	5322 122 32661	56pF 5% 50V
2488	5322 122 32661	56pF 5% 50V
2489	5322 122 32661	56pF 5% 50V
2490	5322 122 32661	56pF 5% 50V
2491	5322 122 32448	10pF 5% 50V
2700	4822 122 33177	10nF 50V

RESISTORS

3400	4822 0
3401	4822 0
3402	4822 0
3403	4822 0
3404	4822 0
3405	4822 0
3406	4822 0
3407	4822 0
3408	4822 0
3409	4822 0
3410	4822 1
3411	4822 1
3412	4822 1
3413	4822 0
3414	4822 0
3415	4822 0
3416	4822 0
3417	4822 0
3418	4822 0
3419	4822 0
3420	4822 0
3421	4822 0
3422	4822 0
3423	4822 0
3424	4822 0
3425	4822 0
3426	4822 0
3427	4822 0
3428	4822 0
3429	4822 0
3430	4822 1
3431	4822 1
3432	4822 1
3433	4822 0
3434	4822 0
3435	4822 0
3436	4822 0
3437	4822 0
3438	4822 0
3439	4822 0
3440	4822 0
3441	4822 0
3442	4822 0
3443	4822 0
3444	4822 0
3445	4822 0
3446	4822 0
3447	4822 0
3448	4822 0
3449	4822 0
3450	4822 0
3451	4822 0

ELECTRICAL PARTS LIST - FRONT BOARD (Non-HVC version)

2700 4822 122 33177 10nF 50V

ELECTRICAL PARTS LIST - FRONT BOARD (Non-HVC version)**RESISTORS**

3400	4822 051 10102	1k 2% 0,25W	3452	4822 051 10102	1k 2% 0,25W	3506	4822 051 10102	1k 2% 0,25W
3401	4822 051 20684	680k 5% 0,1W	3453	4822 051 10102	1k 2% 0,25W	3507	4822 051 10102	1k 2% 0,25W
3402	4822 051 20105	1M 5% 0,1W	3454	4822 051 10102	1k 2% 0,25W	3508	4822 051 10102	1k 2% 0,25W
3403	4822 051 10102	1k 2% 0,25W	3455	4822 051 10102	1k 2% 0,25W	3509	4822 051 10102	1k 2% 0,25W
3404	4822 051 10102	1k 2% 0,25W	3456	4822 051 10102	1k 2% 0,25W	3510	4822 051 10102	1k 2% 0,25W
3405	4822 051 10102	1k 2% 0,25W	3457	4822 051 10102	1k 2% 0,25W	3511	4822 051 10102	1k 2% 0,25W
3406	4822 051 10102	1k 2% 0,25W	3458	4822 051 10102	1k 2% 0,25W	3512	4822 051 10102	1k 2% 0,25W
3407	4822 051 10102	1k 2% 0,25W	3459	4822 051 10102	1k 2% 0,25W	3513	4822 051 10102	1k 2% 0,25W
3408	4822 051 10102	1k 2% 0,25W	3460	4822 051 10102	1k 2% 0,25W	3514	4822 051 10102	1k 2% 0,25W
3409	4822 051 10102	1k 2% 0,25W	3461	4822 051 10102	1k 2% 0,25W	3515	4822 051 10102	1k 2% 0,25W
3410	4822 117 10833	10k 1% 0,1W	3462	4822 117 10833	10k 1% 0,1W	3516	4822 117 10833	10k 1% 0,1W
3411	4822 117 11449	2k2 1% 0,1W	3463	4822 117 10833	10k 1% 0,1W	3517	4822 117 10833	10k 1% 0,1W
3412	4822 117 11449	2k2 1% 0,1W	3464	4822 051 10102	1k 2% 0,25W	3518	4822 051 10102	1k 2% 0,25W
3413	4822 051 10102	1k 2% 0,25W	3465	4822 051 20101	100R 5% 0,1W	3519	4822 051 20101	100R 5% 0,1W
3414	4822 051 10102	1k 2% 0,25W	3466	4822 051 20101	100R 5% 0,1W	3521	4822 051 20101	100R 5% 0,1W
3415	4822 051 10102	1k 2% 0,25W	3467	4822 051 20101	100R 5% 0,1W	3522	4822 051 20101	100R 5% 0,1W
3416	4822 051 10102	1k 2% 0,25W	3468	4822 051 20101	100R 5% 0,1W	3523	4822 051 20101	100R 5% 0,1W
3417	4822 051 10102	1k 2% 0,25W	3469	4822 117 10833	10k 1% 0,1W	3524	4822 117 10833	10k 1% 0,1W
3418	4822 051 10102	1k 2% 0,25W	3470	4822 051 10102	1k 2% 0,25W	3525	4822 051 10102	1k 2% 0,25W
3419	4822 051 10102	1k 2% 0,25W	3471	4822 117 10833	10k 1% 0,1W	3526	4822 117 10833	10k 1% 0,1W
3420	4822 051 10102	1k 2% 0,25W	3472	4822 051 20104	100k 5% 0,1W	3527	4822 051 20104	100k 5% 0,1W
3421	4822 051 10102	1k 2% 0,25W	3473	4822 051 10102	1k 2% 0,25W	3528	4822 051 10102	1k 2% 0,25W
3422	4822 050 11002	1k 1% 0,4W	3474	4822 117 10833	10k 1% 0,1W	3529	4822 117 10833	10k 1% 0,1W
3423	4822 051 10102	1k 2% 0,25W	3475	4822 051 20478	4R7 5% 0,1W	3530	4822 051 20478	4R7 5% 0,1W
3424	4822 051 10102	1k 2% 0,25W	3476	4822 051 20104	100k 5% 0,1W	3531	4822 051 20104	100k 5% 0,1W
3425	4822 051 10102	1k 2% 0,25W	3477	4822 051 20104	100k 5% 0,1W	3532	4822 051 20104	100k 5% 0,1W
3426	4822 051 10102	1k 2% 0,25W	3478	4822 051 20681	680R 5% 0,1W	3533	4822 051 20681	680R 5% 0,1W
3427	4822 051 10102	1k 2% 0,25W	3479	4822 051 20681	680R 5% 0,1W	3534	4822 051 20681	680R 5% 0,1W
3428	4822 051 10102	1k 2% 0,25W	3480	4822 051 20681	680R 5% 0,1W	3535	4822 051 20681	680R 5% 0,1W
3429	4822 051 10102	1k 2% 0,25W	3481	4822 051 20681	680R 5% 0,1W	3536	4822 051 20681	680R 5% 0,1W
3430	4822 117 10833	10k 1% 0,1W	3482	4822 116 52289	5k6 5% 0,5W	3537	4822 116 52289	5k6 5% 0,5W
3431	4822 117 10833	10k 1% 0,1W	3483	4822 116 52276	3k9 5% 0,5W	3538	4822 116 52276	3k9 5% 0,5W
3432	4822 117 10833	10k 1% 0,1W	3484	4822 051 20331	330R 5% 0,1W	3539	4822 051 20331	330R 5% 0,1W
3433	4822 051 10102	1k 2% 0,25W	3485	4822 051 20331	330R 5% 0,1W	3540	4822 051 20331	330R 5% 0,1W
3434	4822 051 10102	1k 2% 0,25W	3486	4822 051 20331	330R 5% 0,1W	3541	4822 051 20331	330R 5% 0,1W
3435	4822 051 10102	1k 2% 0,25W	3487	4822 051 20331	330R 5% 0,1W	3542	4822 051 20331	330R 5% 0,1W
3436	4822 051 10102	1k 2% 0,25W	3488	4822 116 52219	330R 5% 0,5W	3543	4822 116 52219	330R 5% 0,5W
3437	4822 051 10102	1k 2% 0,25W	3489	4822 116 52219	330R 5% 0,5W	3544	4822 116 52219	330R 5% 0,5W
3438	4822 051 10102	1k 2% 0,25W	3490	4822 116 52219	330R 5% 0,5W	3545	4822 116 52219	330R 5% 0,5W
3439	4822 051 10102	1k 2% 0,25W	3491	4822 116 52219	330R 5% 0,5W	3546	4822 116 52219	330R 5% 0,5W
3440	4822 051 10102	1k 2% 0,25W	3492	4822 051 20331	330R 5% 0,1W	3547	4822 051 20331	330R 5% 0,1W
3441	4822 051 10102	1k 2% 0,25W	3493	4822 051 20331	330R 5% 0,1W	3548	4822 051 20331	330R 5% 0,1W
3442	4822 051 10102	1k 2% 0,25W	3494	4822 051 20331	330R 5% 0,1W	3549	4822 051 20331	330R 5% 0,1W
3443	4822 051 10102	1k 2% 0,25W	3496	4822 051 20331	330R 5% 0,1W	3550	4822 051 20331	330R 5% 0,1W
3444	4822 051 10102	1k 2% 0,25W	3497	4822 051 20474	470k 5% 0,1W	3551	4822 051 20474	470k 5% 0,1W
3445	4822 051 10102	1k 2% 0,25W	3498	4822 051 20474	470k 5% 0,1W	3552	4822 051 20474	470k 5% 0,1W
3446	4822 051 10102	1k 2% 0,25W	3499	4822 051 20474	470k 5% 0,1W	3553	4822 051 20474	470k 5% 0,1W
3447	4822 051 10102	1k 2% 0,25W	3500	4822 051 20562	5k6 5% 0,1W	3554	4822 051 20562	5k6 5% 0,1W
3448	4822 051 10102	1k 2% 0,25W	3501	4822 051 20223	22k 5% 0,1W	3555	4822 051 20223	22k 5% 0,1W
3449	4822 051 10102	1k 2% 0,25W	3502	4822 051 10102	1k 2% 0,25W	3556	4822 051 10102	1k 2% 0,25W
3450	4822 051 10102	1k 2% 0,25W	3503	4822 116 83864	10k 5% 0,5W	3557	4822 116 83864	10k 5% 0,5W
3451	4822 051 10102	1k 2% 0,25W	3504	4822 117 10833	10k 1% 0,1W	3558	4822 117 10833	10k 1% 0,1W
			3505	4822 117 10833	10k 1% 0,1W	3559	4822 117 10833	10k 1% 0,1W

ELECTRICAL PARTS LIST - FRONT BOARD (Non-HVC version)

3506	4822 117 10833	10k 1% 0,1W	3581	4822 117 11503	220R 1% 0,1W
3507	4822 051 10102	1k 2% 0,25W	3582	4822 117 11503	220R 1% 0,1W
3508	4822 051 10102	1k 2% 0,25W	3583	4822 051 20472	4k7 5% 0,1W
3509	4822 051 10102	1k 2% 0,25W	3585	4822 117 11503	220R 1% 0,1W
3510	4822 051 10102	1k 2% 0,25W	3586	4822 117 11503	220R 1% 0,1W
3511	4822 051 10102	1k 2% 0,25W	3587	4822 051 20472	4k7 5% 0,1W
3512	4822 051 20562	5k6 5% 0,1W	3589	4822 117 11503	220R 1% 0,1W
3513	4822 051 20562	5k6 5% 0,1W	3590	4822 117 11503	220R 1% 0,1W
3514	4822 051 20474	470k 5% 0,1W	3591	4822 051 20472	4k7 5% 0,1W
3515	4822 051 20563	56k 5% 0,1W	3600	4822 051 20331	330R 5% 0,1W
3516	4822 051 20153	15k 1% 0,1W	3602	4822 051 20331	330R 5% 0,1W
3517	4822 051 20153	15k 5% 0,1W	3603	4822 051 20331	330R 5% 0,1W
3518	4822 116 52245	150k 5% 0,5W	3604	4822 051 20472	4k7 5% 0,1W
3519	4822 051 10102	1k 2% 0,25W	3605	4822 051 20683	68k 5% 0,1W
3521	4822 051 10102	1k 2% 0,25W	3606	4822 051 20683	68k 5% 0,1W
3522	4822 116 83884	47k 5% 0,167W	3607	4822 051 20472	4k7 5% 0,1W
3523	4822 051 20472	4k7 5% 0,1W	3608	4822 051 20683	68k 5% 0,1W
3524	4822 051 10102	1k 2% 0,25W	3609	4822 051 20683	68k 5% 0,1W
3525	4822 051 10102	1k 2% 0,25W	3610	4822 117 10833	10k 1% 0,1W
3526	4822 051 10102	1k 2% 0,25W	3611	4822 117 10833	10k 1% 0,1W
3527	4822 051 10102	1k 2% 0,25W	3612	4822 117 10833	10k 1% 0,1W
3528	4822 051 10102	1k 2% 0,25W	3613	4822 051 20472	4k7 5% 0,1W
3529	4822 051 10102	1k 2% 0,25W	3614	4822 051 20472	4k7 5% 0,1W
3530	4822 051 10102	1k 2% 0,25W	3615	4822 051 20681	680R 5% 0,1W
3531	4822 052 10108 Δ	1R 5% 0,33W	3616	4822 051 20101	100R 5% 0,1W
3532	4822 052 10108 Δ	1R 5% 0,33W	3617	4822 051 20472	4k7 5% 0,1W
3533	4822 051 20392	3k9 5% 0,1W	3618	4822 051 20472	4k7 5% 0,1W
3534	4822 051 20392	3k9 5% 0,1W	3619	4822 051 20681	680R 5% 0,1W
3535	4822 116 52276	3k9 5% 0,5W	3620	4822 051 20101	100R 5% 0,1W
3536	4822 051 20681	680R 5% 0,1W	3621	4822 051 20472	4k7 5% 0,1W
3537	4822 116 83864	10k 5% 0,167W	3622	4822 051 20472	4k7 5% 0,1W
3538	4822 117 10833	10k 1% 0,1W	3623	4822 051 20681	680R 5% 0,1W
3539	4822 117 10833	10k 1% 0,1W	3624	4822 051 20101	100R 5% 0,1W
3540	4822 116 83864	10k 5% 0,167W	3625	4822 051 10102	1k 2% 0,25W
3541	4822 117 11449	2k2 5% 0,1W	3626	4822 051 10102	1k 2% 0,25W
3542	4822 051 20224	220k 5% 0,1W	3627	4822 051 10102	1k 2% 0,25W
3543	4822 051 20478	4R7 5% 0,1W	3628	4822 051 10102	1k 2% 0,25W
3544	4822 117 10833	10k 1% 0,1W	3629	4822 051 10102	1k 2% 0,25W
3545	4822 117 10833	10k 1% 0,1W	3630	4822 051 10102	1k 2% 0,25W
3546	4822 051 10102	1k 2% 0,25W	3631	4822 117 11149	82k 5% 0,1W
3547	4822 051 10102	1k 2% 0,25W	3632	4822 117 11149	82k 5% 0,1W
3568	4822 051 20331	330R 5% 0,1W	3633	4822 051 10102	1k 2% 0,25W
3569	4822 051 20331	330R 5% 0,1W	3634	4822 051 10102	1k 2% 0,25W
3570	4822 051 20331	330R 5% 0,1W	3635	4822 051 20101	100R 5% 0,1W
3571	4822 051 20333	33k 5% 0,1W	3636	4822 051 20101	100R 5% 0,1W
3572	4822 117 10833	10k 1% 0,1W	3637	4822 051 20101	100R 5% 0,1W
3573	4822 051 20104	100k 5% 0,1W	3638	4822 051 20101	100R 5% 0,1W
3574	4822 051 20105	1M 5% 0,1W	3639	4822 051 20101	100R 5% 0,1W
3575	4822 051 20331	330R 5% 0,1W	3640	4822 051 10102	1k 2% 0,25W
3576	4822 051 20331	330R 5% 0,1W	3641	4822 051 10102	1k 2% 0,25W
3577	4822 117 11503	220R 1% 0,1W	3642	4822 051 10102	1k 2% 0,25W
3578	4822 117 11503	220R 1% 0,1W	3644	4822 051 10102	1k 2% 0,25W
3579	4822 051 20472	4k7 5% 0,1W			

ELECTRICAL PARTS LIST - FRONT BOARD (Non-HVC version)**RESISTORS**

3646	4822 051 10102	1k 2% 0,25W	4494	4822 051 10008	Chip Jumper 1206
3648	4822 051 10102	1k 2% 0,25W	4495	4822 051 20008	Chip Jumper 0805
3649	4822 051 20228	2R2 5% 0,1W	4496	4822 051 10008	Chip Jumper 1206
3650	4822 051 10102	1k 2% 0,25W	4497	4822 051 20008	Chip Jumper 0805
3651	4822 051 10102	1k 2% 0,25W	4498	4822 051 20008	Chip Jumper 0805
3652	4822 051 10102	1k 2% 0,25W	4500	4822 051 10008	Chip Jumper 1206
3700	4822 117 10833	10k 5% 0,1W	4501	4822 051 10008	Chip Jumper 1206
3701	4822 117 10833	10k 5% 0,1W	4502	4822 051 10008	Chip Jumper 1206
4404	4822 051 20008	Chip Jumper 0805	4503	4822 051 10008	Chip Jumper 1206
4407	4822 051 20008	Chip Jumper 0805	4504	4822 051 10008	Chip Jumper 1206
4408	4822 051 20008	Chip Jumper 0805	4506	4822 051 10008	Chip Jumper 1206
4409	4822 051 20008	Chip Jumper 0805	4507	4822 051 20008	Chip Jumper 0805
4450	4822 051 20008	Chip Jumper 0805	4508	4822 051 10008	Chip Jumper 1206
4451	4822 051 20008	Chip Jumper 0805	4509	4822 051 10008	Chip Jumper 1206
4452	4822 051 20008	Chip Jumper 0805	4510	4822 051 10008	Chip Jumper 1206
4453	4822 051 20008	Chip Jumper 0805	4511	4822 051 10008	Chip Jumper 1206
4454	4822 051 20008	Chip Jumper 0805	4512	4822 051 10008	Chip Jumper 1206
4455	4822 051 20008	Chip Jumper 0805	4513	4822 051 10008	Chip Jumper 1206
4456	4822 051 20008	Chip Jumper 0805	4515	4822 051 10008	Chip Jumper 1206
4457	4822 051 20008	Chip Jumper 0805	4516	4822 051 10008	Chip Jumper 1206
4458	4822 051 20008	Chip Jumper 0805	4517	4822 051 10008	Chip Jumper 1206
4459	4822 051 10008	Chip Jumper 1206	4518	4822 051 10008	Chip Jumper 1206
4460	4822 051 20008	Chip Jumper 0805	4521	4822 051 20008	Chip Jumper 0805
4461	4822 051 10008	Chip Jumper 1206	4522	4822 051 10008	Chip Jumper 1206
4462	4822 051 10008	Chip Jumper 1206	4523	4822 051 10008	Chip Jumper 1206
4463	4822 051 20008	Chip Jumper 0805	4524	4822 051 20008	Chip Jumper 0805
4464	4822 051 10008	Chip Jumper 1206	4525	4822 051 20008	Chip Jumper 0805
4465	4822 051 10008	Chip Jumper 1206	4526	4822 051 10008	Chip Jumper 1206
4466	4822 051 10008	Chip Jumper 1206	4527	4822 051 10008	Chip Jumper 1206
4467	4822 051 10008	Chip Jumper 1206	4528	4822 051 10008	Chip Jumper 1206
4468	4822 051 20008	Chip Jumper 0805	4530	4822 051 10008	Chip Jumper 1206
4469	4822 051 10008	Chip Jumper 1206	4532	4822 051 20008	Chip Jumper 0805
4470	4822 051 10008	Chip Jumper 1206	4535	4822 051 20008	Chip Jumper 0805
4471	4822 051 20008	Chip Jumper 0805	4545	4822 051 20008	Chip Jumper 0805
4472	4822 051 10008	Chip Jumper 1206	4554	4822 051 20008	Chip Jumper 0805
4473	4822 051 10008	Chip Jumper 1206	4559	4822 051 10008	Chip Jumper 1206
4474	4822 051 10008	Chip Jumper 1206	4560	4822 051 10008	Chip Jumper 1206
4475	4822 051 10008	Chip Jumper 1206	4562	4822 051 10008	Chip Jumper 1206
4476	4822 051 10008	Chip Jumper 1206	4563	4822 051 10008	Chip Jumper 1206
4477	4822 051 20008	Chip Jumper 0805	4564	4822 051 10008	Chip Jumper 1206
4478	4822 051 10008	Chip Jumper 1206	4565	4822 051 10008	Chip Jumper 1206
4479	4822 051 20008	Chip Jumper 0805	4566	4822 051 20008	Chip Jumper 0805
4482	4822 051 10008	Chip Jumper 1206	4567	4822 051 10008	Chip Jumper 1206
4483	4822 051 10008	Chip Jumper 1206	4568	4822 051 10008	Chip Jumper 1206
4484	4822 051 10008	Chip Jumper 1206	4569	4822 051 10008	Chip Jumper 1206
4485	4822 051 10008	Chip Jumper 1206	4570	4822 051 10008	Chip Jumper 1206
4486	4822 051 20008	Chip Jumper 0805	4571	4822 051 10008	Chip Jumper 1206
4487	4822 051 20008	Chip Jumper 0805	4572	4822 051 10008	Chip Jumper 1206
4488	4822 051 20008	Chip Jumper 0805	4573	4822 051 10008	Chip Jumper 1206
4489	4822 051 20008	Chip Jumper 0805	4574	4822 051 10008	Chip Jumper 1206
4490	4822 051 10008	Chip Jumper 1206	4575	4822 051 10008	Chip Jumper 1206
4491	4822 051 10008	Chip Jumper 1206	4576	4822 051 10008	Chip Jumper 1206
4492	4822 051 10008	Chip Jumper 1206	4577	4822 051 20008	Chip Jumper 0805

ELECTRICAL PARTS LIST - FRONT BOARD (Non-HVC version)**RESISTORS**

4578	4822 051 10008	Chip Jumper 1206
4579	4822 051 10008	Chip Jumper 1206
4580	4822 051 20008	Chip Jumper 0805
4581	4822 051 20008	Chip Jumper 0805
4582	4822 051 10008	Chip Jumper 1206
4583	4822 051 10008	Chip Jumper 1206
4584	4822 051 20008	Chip Jumper 0805
4585	4822 051 10008	Chip Jumper 1206
4586	4822 051 20008	Chip Jumper 0805
4587	4822 051 10008	Chip Jumper 1206
4588	4822 051 10008	Chip Jumper 1206
4589	4822 051 10008	Chip Jumper 1206
4590	4822 051 20008	Chip Jumper 0805
4591	4822 051 10008	Chip Jumper 1206
4597	4822 051 10008	Chip Jumper 1206

6438	4822 130 30621	1N4148
6439	4822 130 30621	1N4148
6440	4822 130 30621	1N4148
6441	4822 130 30621	1N4148
6442	4822 130 30621	1N4148
6443	4822 130 30621	1N4148
6444	4822 130 30621	1N4148
6446	4822 130 30621	1N4148
6447	4822 130 30621	1N4148
6448	4822 130 30621	1N4148
6449	4822 130 30621	1N4148
6450	4822 130 34173	BZX79-C5V6
6451	4822 130 34173	BZX79-C5V6
6452	4822 130 34173	BZX79-C5V6
6453	4822 130 30621	1N4148
6454	4822 130 30621	1N4148

COILS & FILTERS

5400	4822 242 70938	X'tal Resonator 32,768kHz
5401	4822 242 72066	Ceram Resonator 8MHz
5402	4822 242 72195	X'tal 4,332MHz
5403	4822 156 21721	2,2μH 10%
5404	4822 156 21721	2,2μH 10%
5405	4822 157 52983	22μH 10%
5406	4822 157 52983	22μH 10%
5407	4822 157 52983	22μH 10%
5408	4822 157 52983	22μH 10%

DIODES

6400	4822 130 31983	BAT85
6401	5322 130 30684	1N4002
6402	4822 130 30621	1N4148
6405	4822 130 30621	1N4148
6406	4822 130 30621	1N4148
6407	4822 130 30621	1N4148
6408	4822 130 10791	LTL-1CHGE
6409	4822 130 10791	LTL-1CHGE
6410	4822 130 10791	LTL-1CHGE
6411	4822 130 10791	LTL-1CHGE
6412	4822 130 30621	1N4148
6420	4822 130 10791	LTL-1CHGE
6425	4822 130 10791	LTL-1CHGE
6426	4822 130 10792	LTL-1CHPE
6427	4822 130 10774	LTL-293SJ
6428	4822 130 10774	LTL-293SJ
6429	4822 130 10774	LTL-293SJ
6430	4822 130 10774	LTL-293SJ
6431	4822 130 10774	LTL-293SJ
6432	4822 130 10774	LTL-293SJ
6433	4822 130 10774	LTL-293SJ
6434	4822 130 30621	1N4148
6435	4822 130 30621	1N4148
6436	4822 130 30621	1N4148
6437	4822 130 30621	1N4148

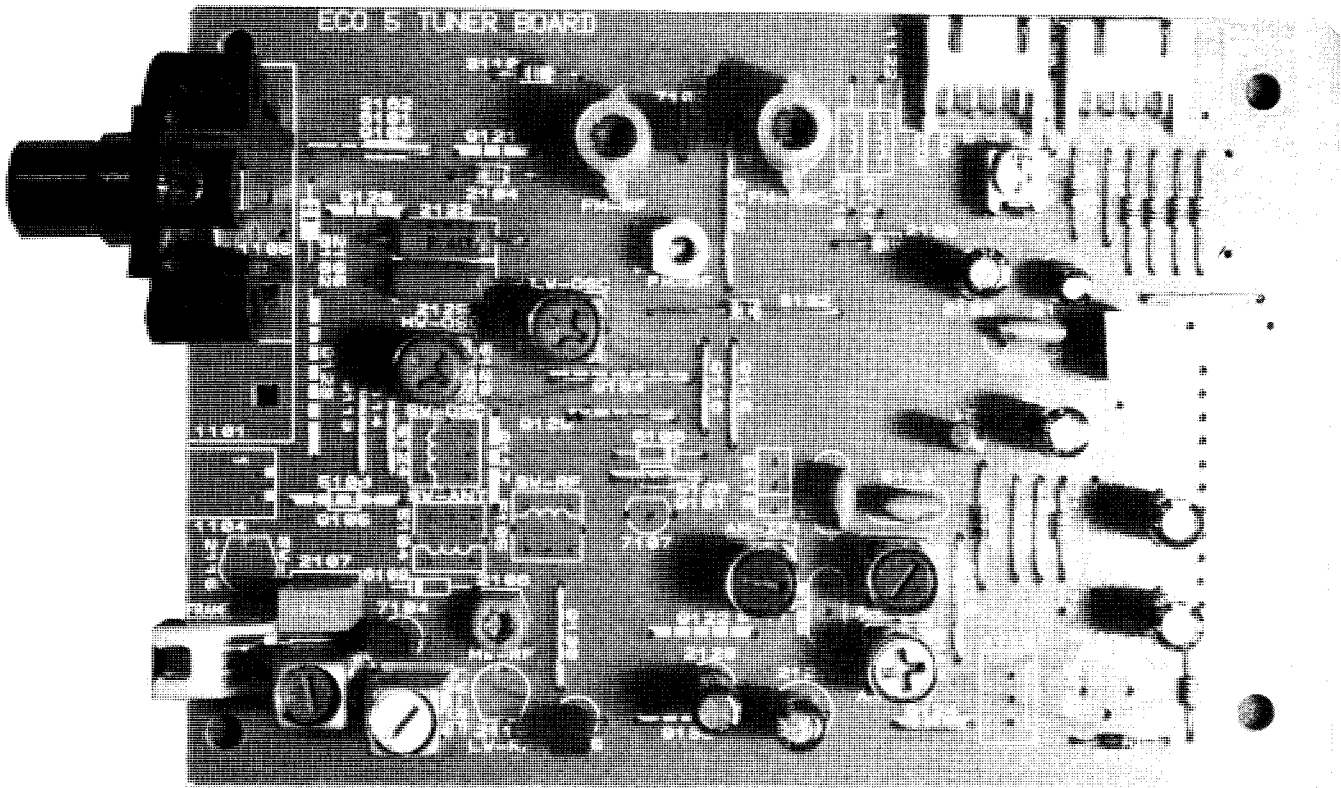
TRANSISTORS & INTEGRATED CIRCUITS

7400	5322 130 42755	BC847C
7401	5322 130 42755	BC847C
7402	5322 130 42755	BC847C
7403	4822 130 42616	BC818-40
7413	5322 130 42755	BC847C
7414	5322 130 42755	BC847C
7415	5322 130 42755	BC847C
7416	5322 130 42755	BC847C
7417	5322 130 42755	BC847C
7418	5322 130 42756	BC857C
7419	5322 130 42756	BC857C
7421	5322 130 42756	BC857C
7422	5322 130 42755	BC847C
7423	5322 130 42756	BC857C
7425	5322 130 42756	BC857C
7427	5322 130 42756	BC857C
7428	5322 130 42755	BC847C
7429	5322 130 42756	BC857C
7430	5322 130 42755	BC847C
7431	5322 130 42756	BC857C
7432	5322 130 42755	BC847C
7433	5322 130 42755	BC847C
7434	5322 130 42755	BC847C
7435	4822 130 10165	GP1U28XP
7436	4822 209 31508	ST24C01B6
7437	4822 209 31981	SAA6579T
7438	4822 209 15449	74HC4094D
7439	4822 209 15449	74HC4094D
7440	4822 209 15449	74HC4094D
7441	4822 209 15475	TMP87CS71AF - 770S51491
7441	4822 209 15476	TMP87CS71AF - 770S51501
7445	5322 130 42755	BC847C

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

TABLE OF

Blockdiagram
Adjustment
Component
Circuit diagram
Partslist



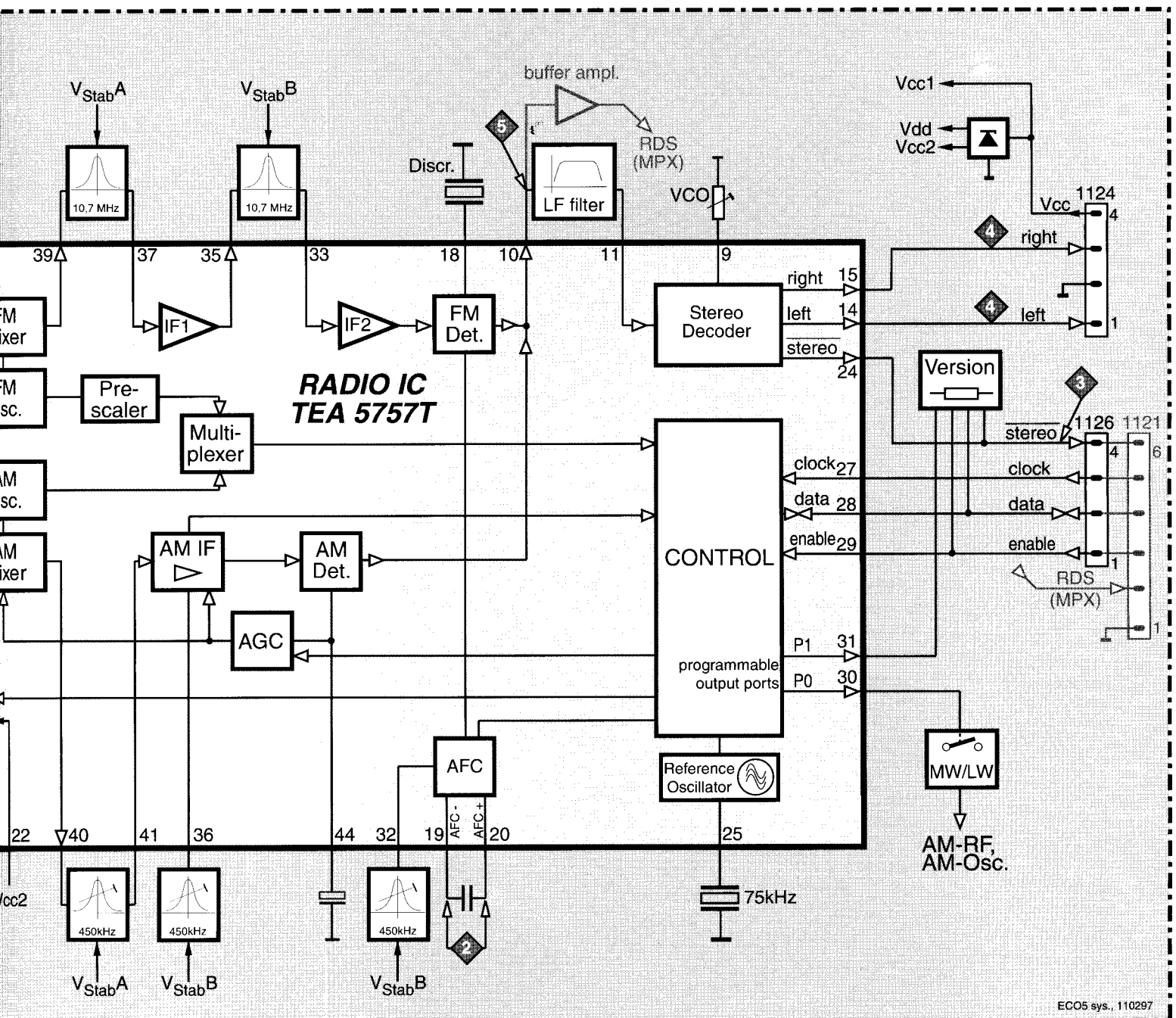
TUNER BOARD EC05

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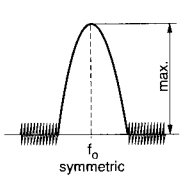
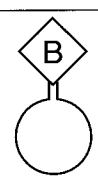
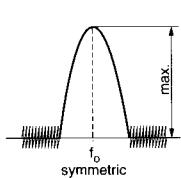
Blockdiagram	7B-1
Adjustmant table	7B-2
Component layout	7B-2
Circuit diagram	7B-3
Partslist	7B-4

The diagram illustrates the internal architecture of the **RADIO IC TEA 5757T**. Key components and connections include:

- Inputs:** FM (1101, 1102) and AM (1103) signals are fed into the FM Frontend and AM Frontend respectively. Reference voltages V_{Loop} , $V_{Stab A}$, and $V_{Stab B}$ are provided to various stages.
- Internal Blocks:**
 - FM Path:** FM Frontend → FM Mixer → FM Osc. → Pre-scaler → Multi-plexer → IF1 → IF2 → FM Det.
 - AM Path:** AM Frontend → AM Mixer → AM Osc. → Multi-plexer → AM IF → AM Det.
 - Control & Power:** Charge pump, AGC (Automatic Gain Control), and AFC (Automatic Frequency Control) blocks.
- Outputs:** The FM detector output is connected to an external **Discr.** (discriminator) and **LF filter** (low-pass filter), which then feeds a **buffer ampli.** (buffer amplifier) and an **RDS (MPX)** output.
- External Components:** Various capacitors and inductors are shown, including a 10.7 MHz filter for the FM IF stage and a 450 kHz filter for the AM IF stage.



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 (65.81 - 74, 87.5 - 108MHz)			108MHz	5130	1	8V ±0.2V
			87.5MHz (65.81MHz)	check		4.3V ±0.5V (1.2V ±0.5V)
MW FM/AM-version, 10kHz grid 530 - 1700kHz			1700kHz	5123		8V ±0.2V
			530kHz	check		1.1V ±0.4V
FM/MW-version, 9kHz grid 531 - 1602kHz			1602kHz	5123		6.9V ±0.2V
			531kHz	check		1.1V ±0.4V
LW 153 - 279kHz			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
MW FM/MW/LW- version, 9kHz grid 531 - 1602kHz			1602kHz	5123		8V ±0.2V
			531kHz	check		1.1V ±0.4V
FM RF						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)	108MHz	A mod=1kHz Δf=±22.5kHz	108MHz	2155	4	MAX
	87.5MHz (65.81MHz)		87.5MHz (65.81MHz)	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 220R 100nF	5111	4	
			IC 7101 40 220R 100nF 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 	1494kHz	2106	4	
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz		1500kHz	2106		
	560kHz	Δf = ±30kHz V _{RF} as low as possible	560kHz	5102		

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

ECO5, 170996

- 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
1102
1103
1104
1105
1119
1120
1130
1131
2104
2105

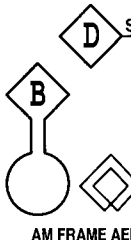
ECO 5 1

A

FM 75 O

FM 300 O

B

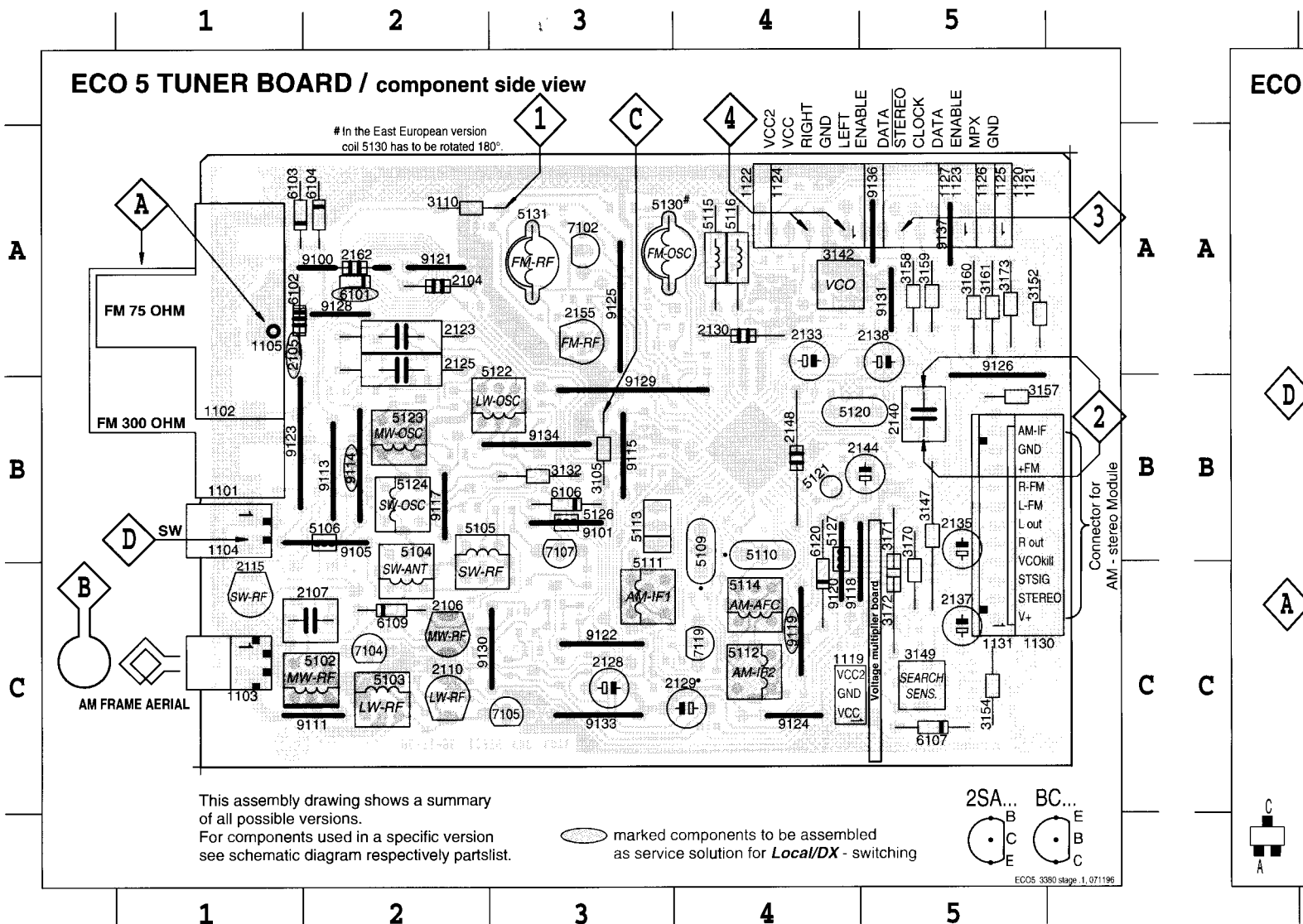


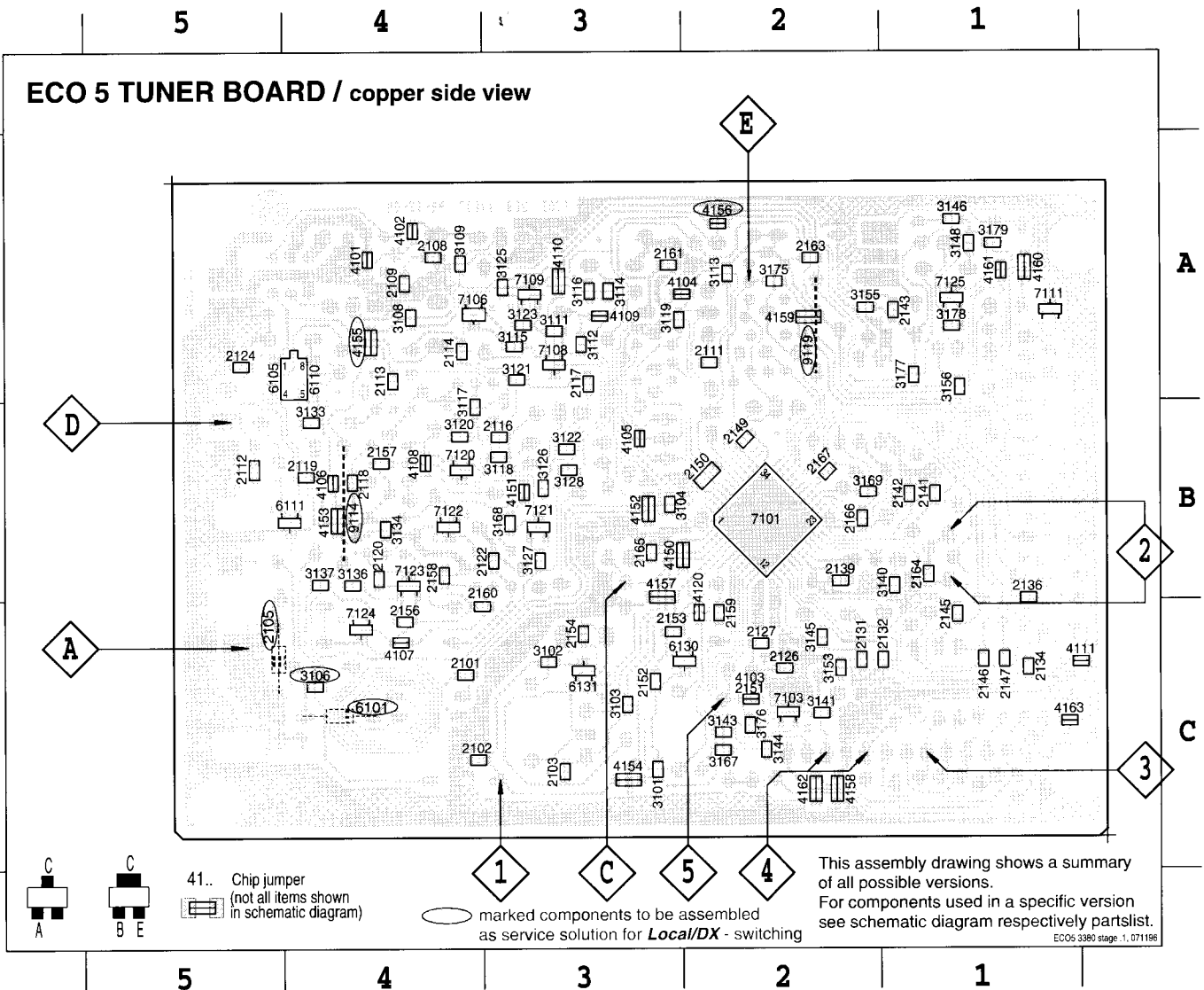
C

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

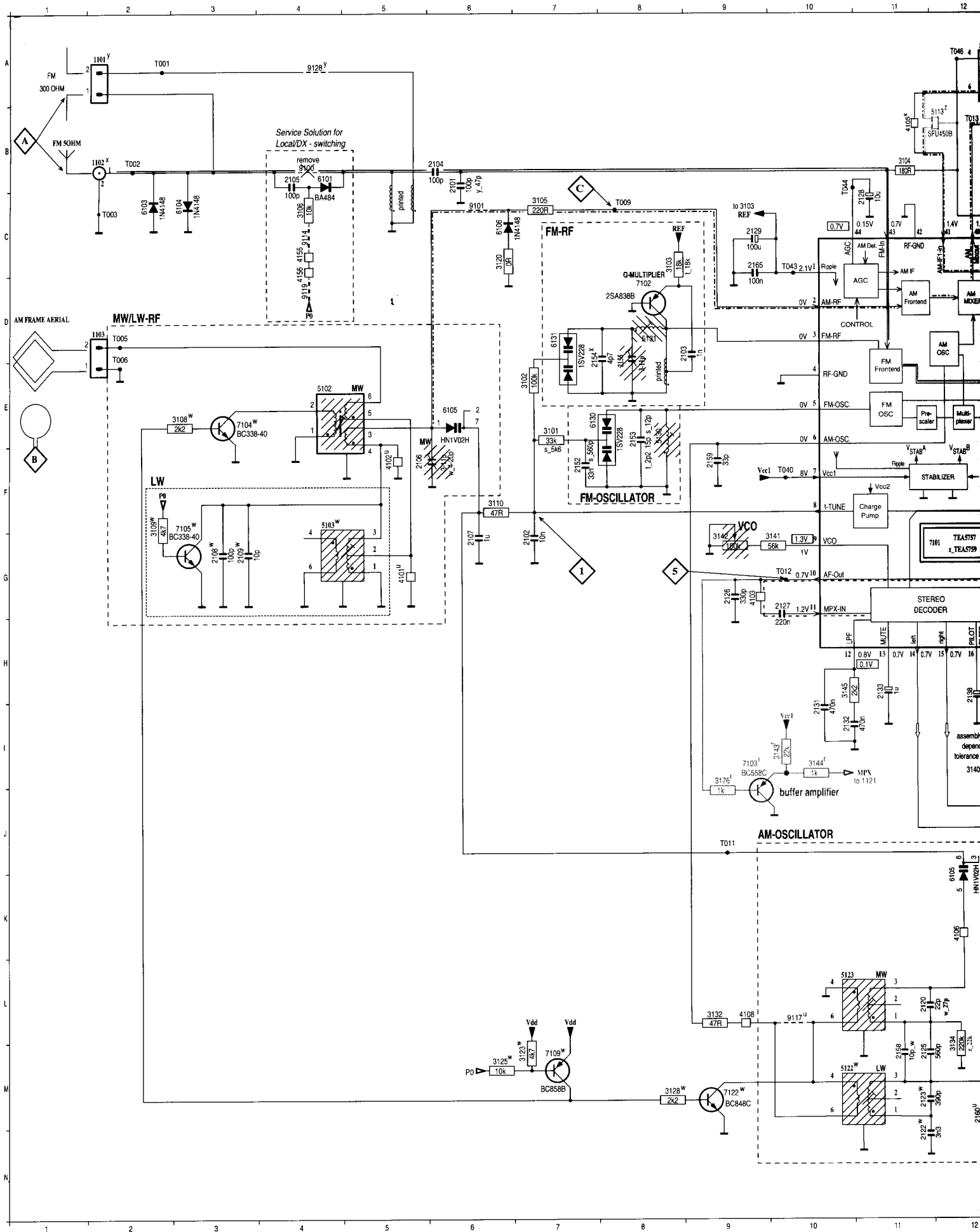
ECO 5 TUNER BOARD / component side view

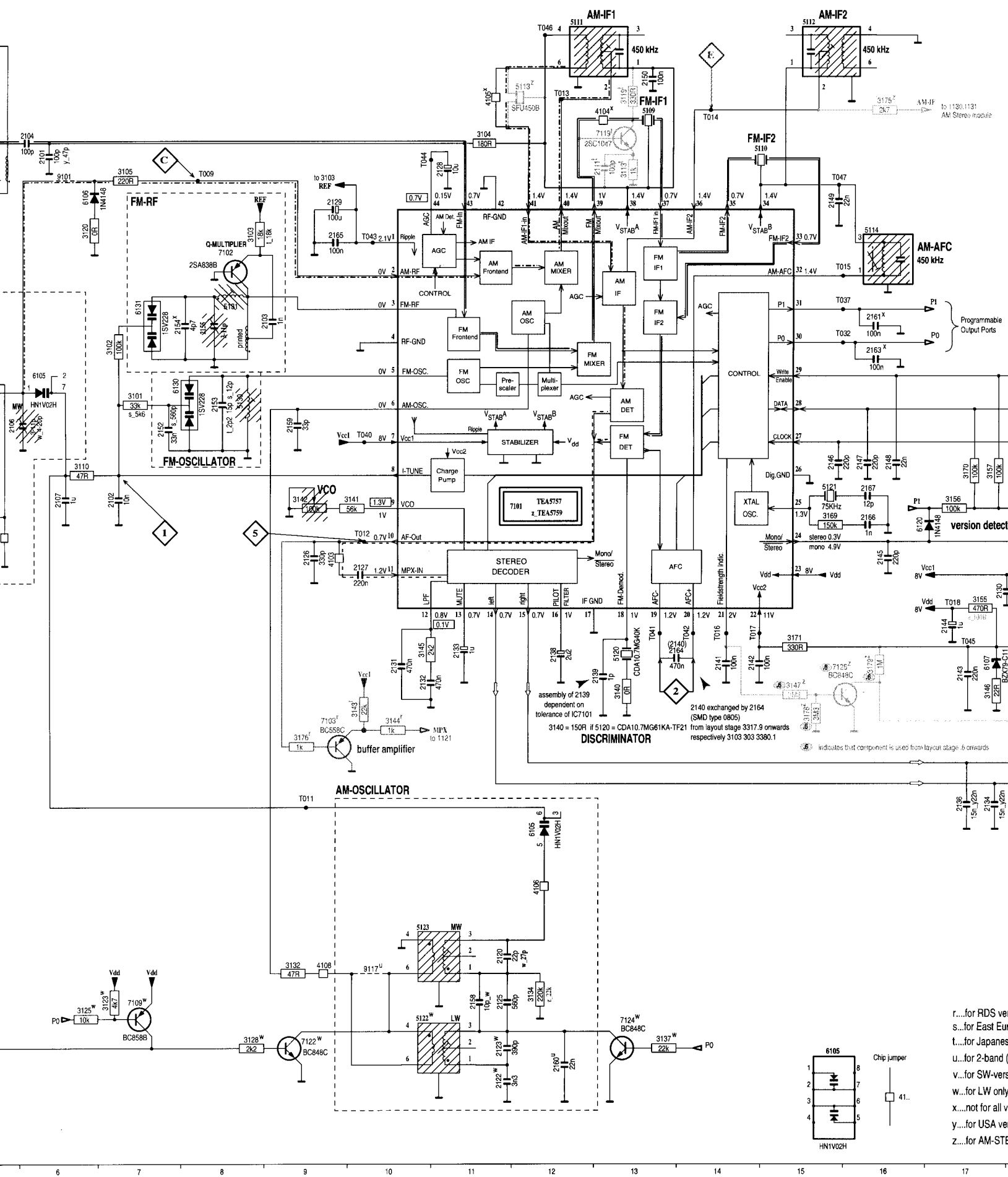
In the East European version
coil 5130 has to be rotated 180°.

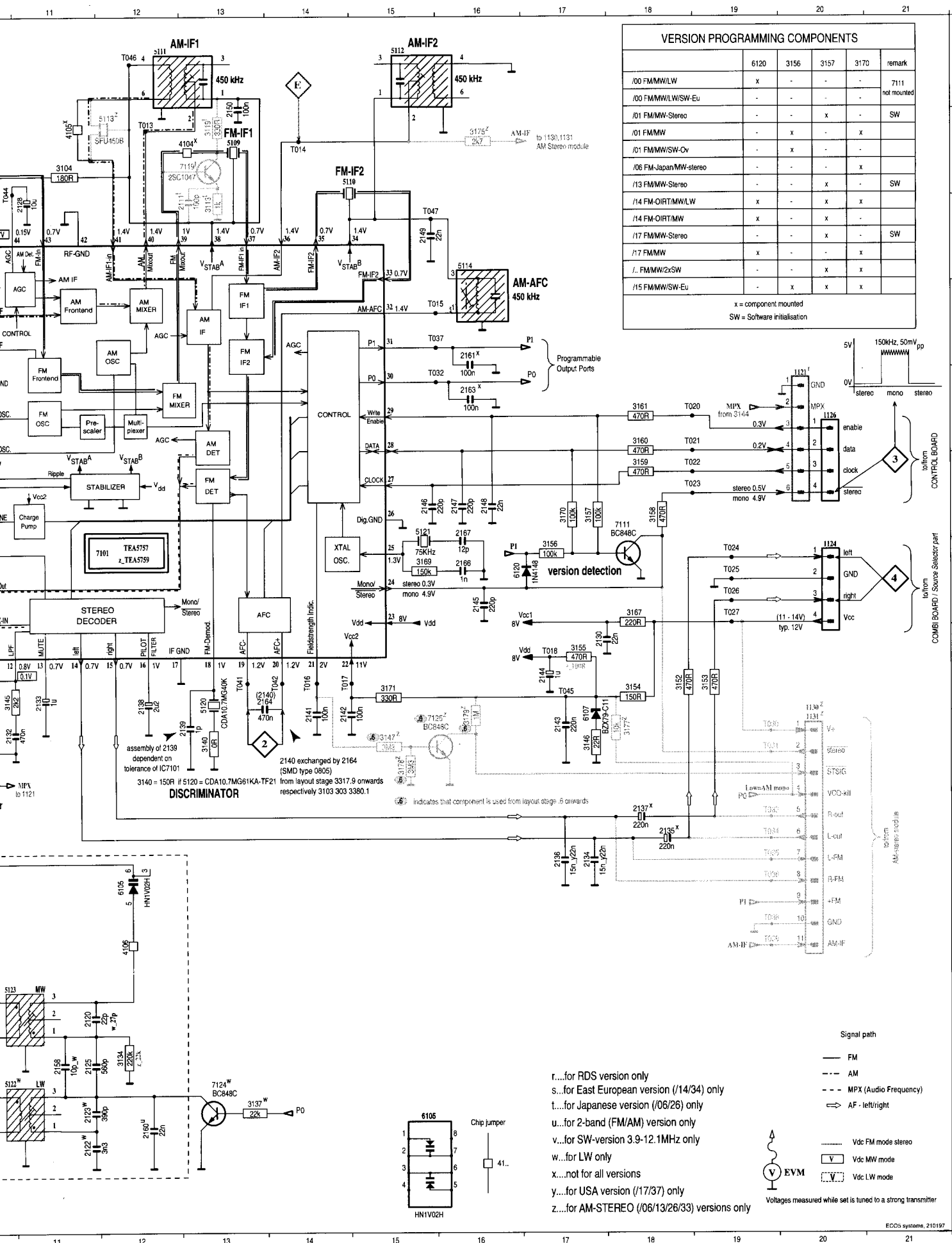




TUNER BOARD ECO5 / Systems







ELECTRICAL PARTSLIST ECO5 TUNER BOARD**MISCELLANEOUS**

1101	4822 267 31505	ANTENNA SOCKET, 300Ω
1102	4822 267 10283	ANTENNA SOCKET, COAX IEC 75Ω

CAPACITORS

2101©	5322 122 32531	100pF	5%	50V	
2102©	4822 122 33177	10nF	20%	50V	
2103©	5322 122 34123	1nF	10%	50V	
2104	4822 122 33195	100pF	10%	50V	
2106	4822 125 60101	3-11pF TRIMCAP.			
2107	4822 121 51319	1μF	20%	50V	
2120©	5322 122 32658	22pF	5%	50V	
2125	4822 121 51381	560pF	1%	400V	
2126©	5322 122 31863	330pF	5%	50V	
2127©	4822 122 32927	220nF	10%	63V	
2127©	4822 126 13473	220nF	20%	50V	
2128	4822 124 41579	10μF	20%	50V	
2129	4822 124 41584	100μF	20%	10V	
2130	4822 126 11585	22nF	20%	50V	
2131©	4822 122 33325	470nF	20%	50V	
2131©	4822 126 13482	470nF	20%	16V	
2132©	4822 122 33325	470nF	20%	50V	
2132©	4822 126 13482	470nF	20%	16V	
2133	4822 124 40242	1μF	20%	63V	
2134©	4822 122 33128	15nF	10%	63V	not for USA
2134©	5322 122 32654	22nF	10%	63V	for USA only
2135	4822 124 40746	0,22μF	20%	63V	
2136©	4822 122 33128	15nF	10%	63V	not for USA
2136©	5322 122 32654	22nF	10%	63V	for USA only
2137	4822 124 40746	0,22μF	20%	63V	
2138	4822 124 41576	2,2μF	20%	50V	
2139©	5322 122 32447	1pF	5%	50V	
2141©	4822 126 10002	100nF	20%	50V	
2142©	4822 126 10002	100nF	20%	50V	
2143©	4822 126 13473	220nF	20%	50V	
2144	4822 124 40242	1μF	20%	63V	
2145©	4822 122 33575	220pF	5%	50V	
2146©	4822 122 33575	220pF	5%	50V	
2147©	4822 122 33575	220pF	5%	50V	
2148	4822 126 11585	22nF	20%	50V	
2149©	5322 122 32654	22nF	10%	63V	
2150©	4822 122 31947	100nF	20%	50V	
2152©	4822 122 33342	33nF	10%	63V	not for East Europe
2152©	5322 116 80853	560pF	5%	63V	for East Europe only
2153©	4822 122 32139	12pF	5%	63V	for East Europe only
2153©	5322 122 32481	15pF	5%	50V	not for East Europe
2155	4822 125 60101	3-11pF TRIMCAP.			
2159©	5322 122 32659	33pF	5%	50V	
2160©	5322 122 32654	22nF	10%	63V	
2164©	4822 126 13482	470nF	20%	16V	
2165©	4822 126 10002	100nF	20%	50V	
2166©	5322 122 34123	1nF	10%	50V	
2167©	4822 122 32139	12pF	5%	63V	

RESISTORS

3101©	4822 051 20333	33kΩ	5%	0,1W	not for East Europe
3101©	4822 051 20562	5,6kΩ	5%	0,1W	for East Europe only
3102©	4822 051 20104	100kΩ	5%	0,1W	
3103©	4822 051 20183	18kΩ	5%	0,1W	
3104©	4822 117 11448	180Ω	10%	0,1W	
3105	4822 116 83872	220Ω	5%	0,5W	
3110	4822 116 52195	47Ω	5%	0,5W	
3120©	4822 051 20008	CHIP JUMPER 0805			

RESISTORS

3132	4822 116 52195	47Ω	5%	0,5W	
3134©	4822 051 20224	220kΩ	5%	0,1W	
3140©	4822 051 20008	CHIP JUMPER 0805			5120=CDA10.7MG40K
3140©	4822 117 10353	150Ω	5%	0,1W	5120=CDA10.7MG61KA
3141©	4822 051 20563	56kΩ	5%	0,1W	
3142	4822 100 11163	100kΩ TRIMPOT. LIN.			
3143©	4822 051 20223	22kΩ	5%	0,1W	for RDS version only
3144©	4822 051 10102	1kΩ	5%	0,1W	for RDS version only
3145©	4822 117 11449	2,2kΩ	1%	0,1W	
3146©	4822 051 20229	22Ω	5%	0,1W	
3152	4822 116 83883	470Ω	5%	0,16W	
3153©	4822 051 20471	470Ω	5%	0,1W	
3154	4822 116 83868	150Ω	5%	0,5W	
3155©	4822 051 20471	470Ω	5%	0,1W	
3156©	4822 051 20104	100kΩ	5%	0,1W	for /21/30/33 only
3157	4822 116 52234	100kΩ	5%	0,5W	for East Europe only
3158	4822 116 83883	470Ω	5%	0,16W	
3159	4822 116 83883	470Ω	5%	0,16W	
3160	4822 116 83883	470Ω	5%	0,16W	
3161	4822 116 83883	470Ω	5%	0,16W	
3167©	4822 117 11503	220Ω	5%	0,1W	
3169©	4822 051 20154	150kΩ	5%	0,1W	
3170	4822 116 52234	100kΩ	5%	0,5W	
3171	4822 116 52219	330Ω	5%	0,5W	
3176©	4822 051 10102	1kΩ	5%	0,1W	for RDS version only
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 JUMPER 1206			
4152©	4822 051 10008	CHIP JUMPER 1206			
4153©	4822 051 10008	CHIP JUMPER 1206			
4154©	4822 051 10008	CHIP JUMPER 1206			
4157©	4822 051 10008	CHIP JUMPER 1206			
4158©	4822 051 10008	CHIP JUMPER 1206			
4159©	4822 051 10008	CHIP JUMPER 1206			
4162©	4822 051 10008	CHIP JUMPER 1206			for RDS version only

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 70302	AM-IF FILTER 450kHz (AM AFC)		
5120	4822 242 10251	CER. DISCRIMINATOR 10.7MG61KA-TF21		
5120	4822 242 82065	CER. DISCRIMINATOR 10.7MG40K		
5121	4822 242 10261	QUARTZ 75kHz		
5123	4822 157 60517	OSC. COIL MW		
5130	4822 156 30947	RF COIL 1,5 TURNS		
5131	4822 156 30947	RF COIL 1,5 TURNS		

ELECTRICAL PARTSLIST ECO5 TUNER BOARD

DIODES

6103	4822 130 30621	1N4148	
6104	4822 130 30621	1N4148	
6105 ©	4822 130 83075	HN1V02H	
6106	4822 130 30621	1N4148	
6107	4822 130 34488	BZX79-C11	
6120	4822 130 30621	1N4148	not for /21/30/33
6130 ©	4822 130 82833	1SV228	
6131 ©	4822 130 82833	1SV228	

TRANSISTORS

7102	4822 130 60093	2SA838B	
7103 ©	4822 130 42513	BC558C	for RDS version only
7111 ©	5322 130 42136	BC848C	

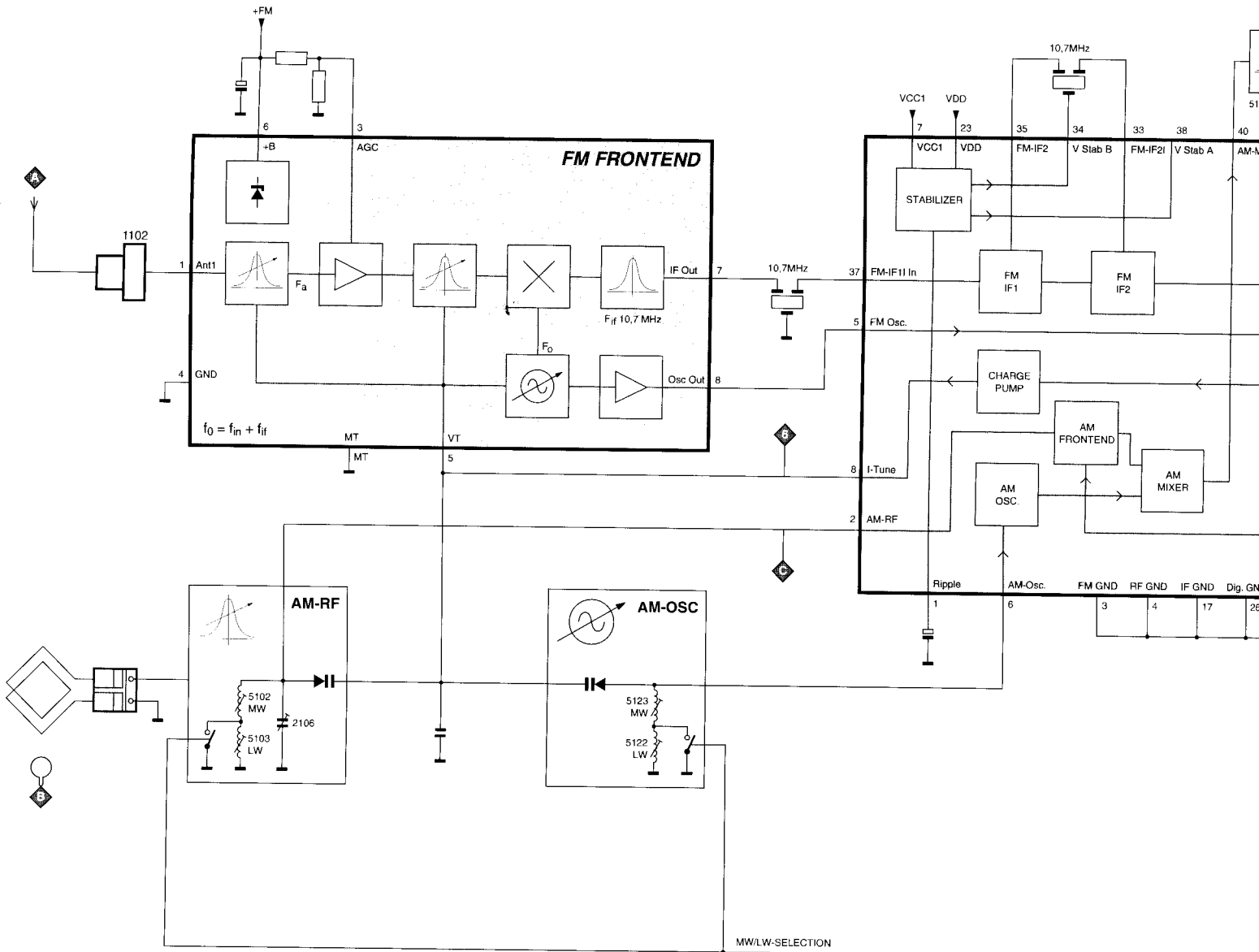
INTEGRATED CIRCUITS

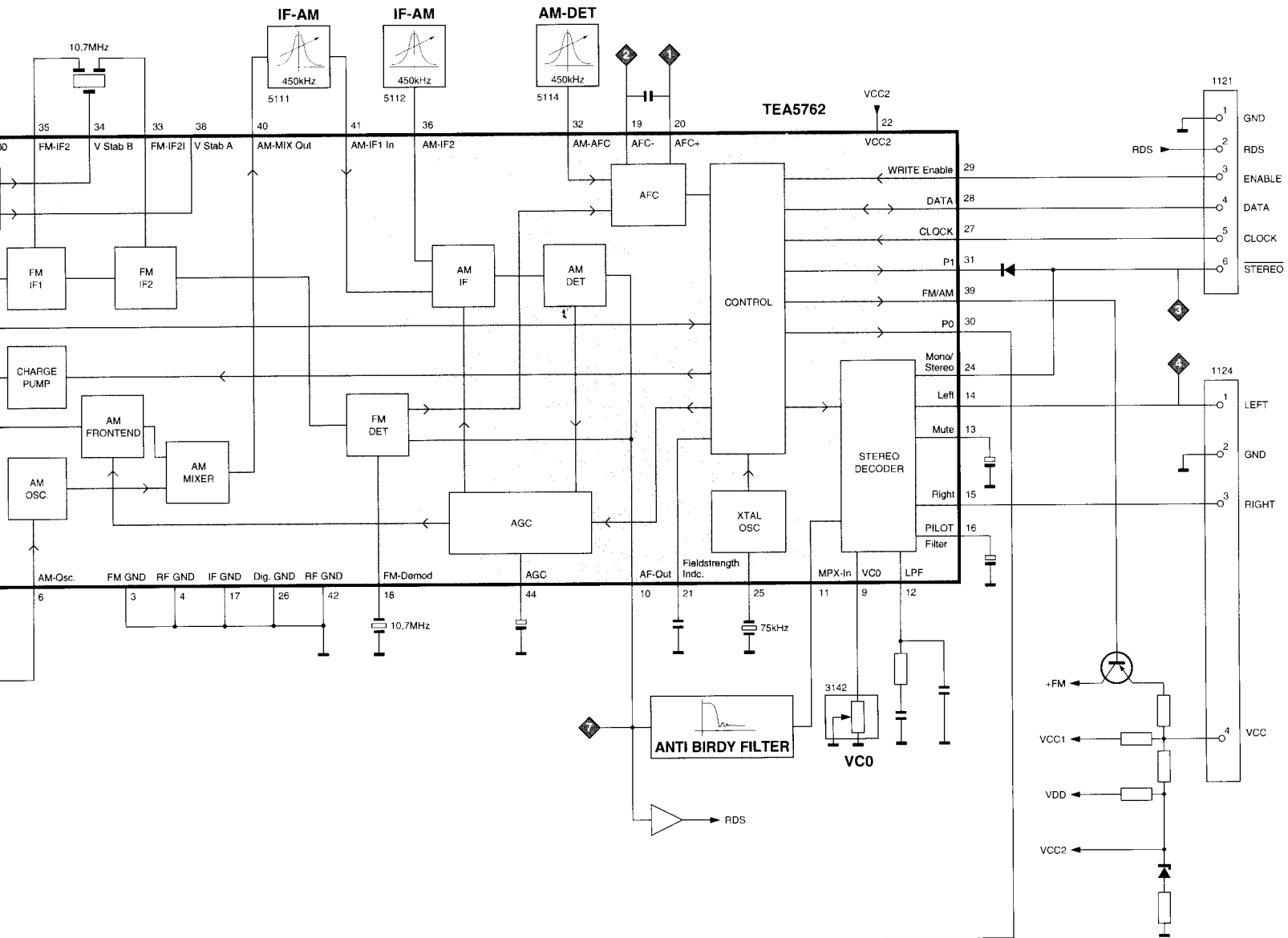
7101 ©	4822 209 90924	TEA5757H/V1, RADIO IC	
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TAB

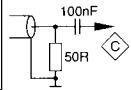
Bloc
Adju
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Circu
Parts

BLOCKDIAGRAM





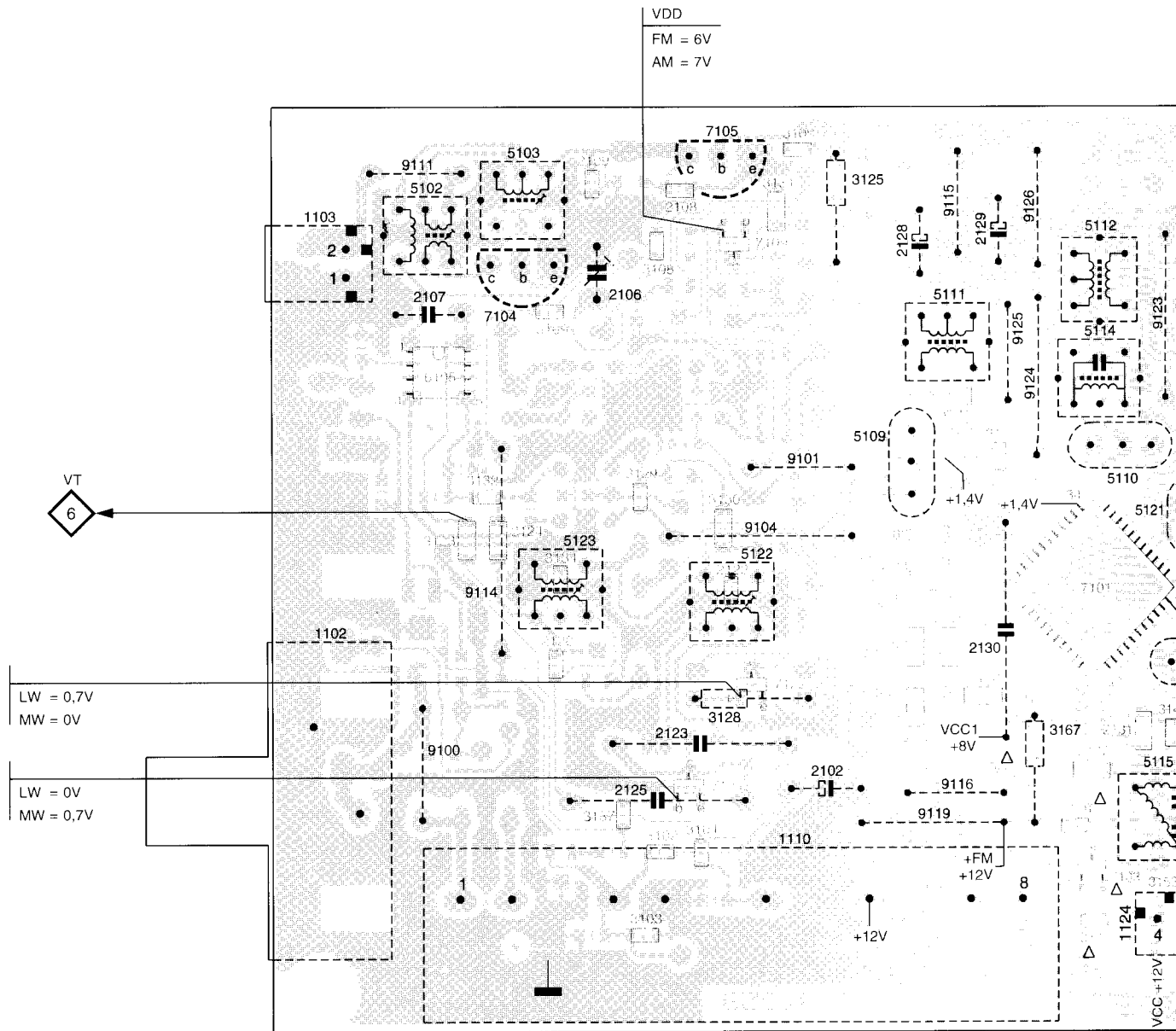
ADJUSTMENT TABLE

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
MW 531 - 1602kHz (9kHz grid)			1602kHz	5123		8.3V ±0.2V
			531kHz	check		1V ±0.4V
LW 153 - 279kHz (3kHz grid)			279kHz	5122		8.3V ±0.2V
			153kHz	check		1V ±0.4V
FM - VCO						
FM	98MHz 1mV continuous wave	A	98MHz	3142	3	152kHz ±1kHz
DISTORTION						
FM	98MHz 1mV 90% L, 9% pilot mod=1kHz	A	98MHz	mixcoil inside tuner 1110	4	min. distortion
AM IF						
MW	450kHz Δf=10kHz as low as possible			5111	7	symmetrical and max. height
				5112		
	450.0kHz continuous wave			C	5114	1 2
AM RF						
MW	588kHz mod=1kHz, 30% AM 1494kHz	B	558kHz	5102	7	MAX
			1494kHz	2106		
LW	198kHz mod=1kHz, 30% AM		198kHz	5103		MAX

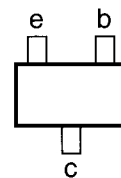
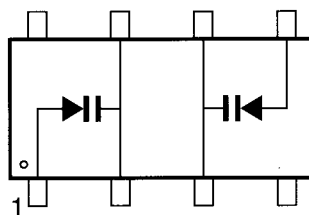
* Signal supplied via frame antenna

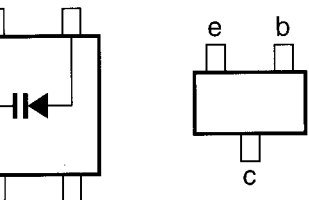
 ↑ Repeat
 ↓

TUNER 95 – Copperside view



IC 6105

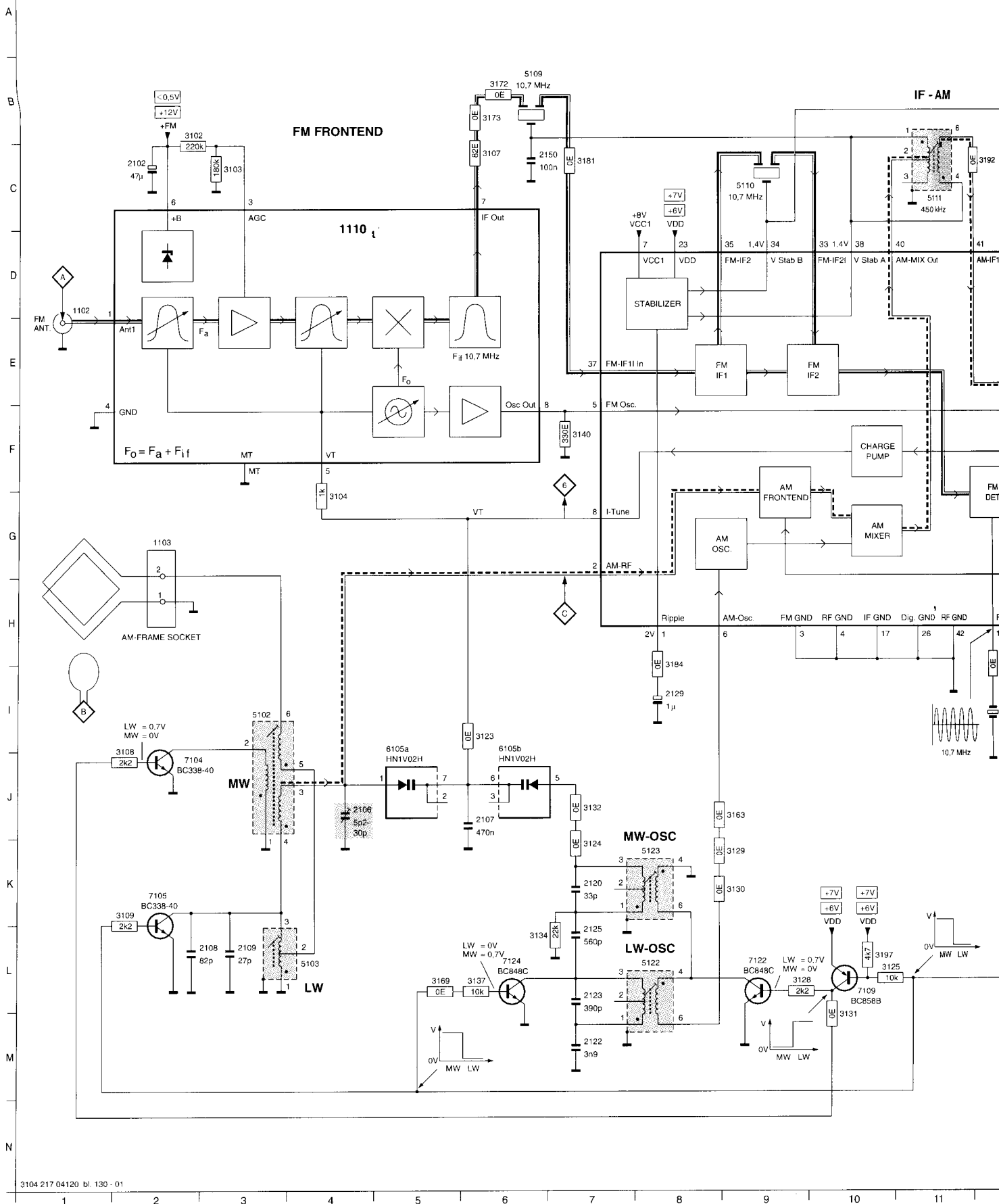




○ only FW610 (04340)

1102	D1	1124	F21	2108	L3	2123	L7	2129	I8	2133	G18	2137	G19	2142	K19	2147	E19	2160	I15	3103	C3	3109	K2	3128	L9	3132	J7	3141	I16	3145	I17	315
1103	G2	2102	C2	2109	L3	2125	L7	2130	J20	2134	G18	2138	H18	2143	K20	2148	E20	2161	I15	3104	G4	3123	I6	3129	K9	3134	L6	3142	I16	3146	L20	315
1110	D4	2106	J4	2120	K7	2127	H16	2131	I17	2135	F19	2140	C14	2144	K20	2150	C6	2162	H20	3107	C6	3124	K7	3130	K9	3137	L6	3143	K17	3150	H19	315
1121	C21	2107	J6	2122	M7	2128	I13	2132	I17	2136	H19	2141	H15	2145	E19	2158	L18	3102	B2	3108	J2	3125	L10	3131	M10	3140	F7	3144	K17	3151	I20	315

TUNER 95





ELECTRICAL PARTSLIST TUNER 95 BOARD**ELECTRICAL PARTSLIST****MISCELLANEOUS**

1102	4822 267 10283	SOCKET COAX IEC 75R
1103	4822 265 31184	JST CONNECTOR 2 POLE
1110	4822 210 10492	FRONTEND ASSY /02/08

DIODES

6105	4822 130 83075	HN1V02H
6107	4822 130 34488	BZX79-C11
6120	4822 130 30621	1N4148

TRANSISTORS

7103	4822 130 42513	BC858C
7104	5322 130 44779	BC338-40
7105	5322 130 44779	BC338-40
7109	5322 130 41983	BC858B
7110	5322 130 41983	BC858B

7122	5322 130 42136	BC848C
7124	5322 130 42136	BC848C

INTEGRATED CIRCUITS

7101	4822 209 90315	TEA5762H/V1
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COILS

5102	4822 157 71634	RF-COIL MW
5103	4822 157 71635	RF-COIL LW
5109	4822 157 71639	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
5115	4822 157 71636	ANTI-BIRDY FILTER
5120	4822 242 82065	CER. DISCRIMINATOR
5121	4822 242 81021	QUARTZ 75kHz

5122	4822 157 60517	RF-COIL AM
5123	4822 157 60517	RF-COIL AM

RESISTORS

3125	4822 116 83864	10k	5%	0,5W
3128	4822 116 52256	2k2	5%	0,16W
3142	4822 100 11163	TRIMPOT. 100K LIN.		
3154	4822 116 52215	220R	5%	0,16W
3155	4822 116 52219	330R	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
3164	4822 052 10478	4R7	5%	NFR

3167	4822 116 52215	220R	5%	0,16W
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CHIP RESISTORS

3102	4822 051 20224	220k	5%	0,1W
3103	4822 051 20184	180k	5%	0,1W
3104	4822 051 10102	1k	2%	0,25W
3107	4822 051 20829	82R	5%	0,1W
3108	4822 051 20222	2k2	5%	0,1W

3109	4822 051 20222	2k2	5%	0,1W
3123	4822 051 10008	CHIP JUMPER 1206		
3124	4822 051 10008	CHIP JUMPER 1206		
3129	4822 051 20008	CHIP JUMPER 0805		
3130	4822 051 10008	CHIP JUMPER 1206		

CHIP RESISTORS

3131	4822 051 10008	CHIP JUMPER 1206		
3132	4822 051 20008	CHIP JUMPER 0805		
3134	4822 051 20223	22k	5%	0,1W
3137	4822 051 20103	10k	5%	0,1W
3140	4822 051 20331	330R	5%	0,1W

3141	4822 051 20563	56k	5%	0,1W
3143	4822 051 20223	22k	5%	0,1W
3144	4822 051 10102	1k	2%	0,25W
3145	4822 051 20222	2k2	5%	0,1W
3146	4822 051 20479	47R	5%	0,1W

3150	4822 051 20472	4k7	5%	0,1W
3151	4822 051 20683	68k	5%	0,1W
3152	4822 051 20471	470R	5%	0,1W
3153	4822 051 20471	470R	5%	0,1W
3162	4822 051 20154	150k	5%	0,1W

3163	4822 051 10008	CHIP JUMPER 1206		
3169	4822 051 20008	CHIP JUMPER 0805		
3172	4822 051 10008	CHIP JUMPER 1206		
3173	4822 051 10008	CHIP JUMPER 1206		
3181	4822 051 10008	CHIP JUMPER 1206		

3183	4822 051 10008	CHIP JUMPER 1206		
3184	4822 051 10008	CHIP JUMPER 1206		
3185	4822 051 10008	CHIP JUMPER 1206		
3186	4822 051 10102	1k	2%	0,25W
3188	4822 051 10008	CHIP JUMPER 1206		

3191	4822 051 20008	CHIP JUMPER 0805		
3192	4822 051 20008	CHIP JUMPER 0805		
3197	4822 051 20472	4k7	5%	0,1W

CAPACITORS

2102	4822 124 40433	47µF	20%	25V
2106	4822 125 60102	30pF		VARIABLE
2107	4822 121 51252	470nF	5%	63V
2123	4822 121 51254	390pF	1%	400V
2125	4822 121 51381	560pF	1%	400V

2128	4822 124 41579	10µF	20%	50V
2129	4822 124 40242	1µF	20%	63V
2130	4822 126 11585	22nF	20%	50V
2133	4822 124 40242	1µF	20%	63V
2138	4822 124 41576	2,2µF	20%	50V

2140	4822 121 51252	470nF	5%	63V
2144	4822 124 40242	1µF	20%	63V
2162	4822 124 41596	22µF	20%	50V

CHIP CAPACITORS

2108	4822 122 33515	82pF	5%	50V
2109	5322 122 31946	27pF	5%	50V
2120	5322 122 32659	33pF	5%	50V
2122	5322 126 10465	3,9nF	10%	63V
2127	4822 122 32927	220nF	10%	63V

2131	4822 122 33325	470nF	20%	50V
2132	4822 122 33325	470nF	20%	50V
2134	4822 122 33128	15nF	10%	63V
2135	4822 122 32927	220nF	10%	63V
2136	4822 122 33128	15nF	10%	63V

2137	4822 122 32927	220nF	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

2147	4822 122 33575	220pF	5%	50V
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2148	4822 122 33575	220pF	5%	50V
2150	4822 122 33575	220pF	5%	50V
2158	4822 122 33575	220pF	5%	50V
2160	4822 122 33575	220pF	5%	50V
2161	5322 122 33575	220pF	5%	50V

ELECTRICAL PARTSLIST TUNER 95 BOARD

CHIP CAPACITORS

2148	4822 122 33575	220pF	5%	50V
2150	4822 122 31947	100nF	20%	50V
2158	4822 122 31947	100nF	20%	50V
2160	4822 122 32139	12pF	5%	63V
2161	5322 122 34123	1nF	10%	50V

Compo
Circuit
Partlist

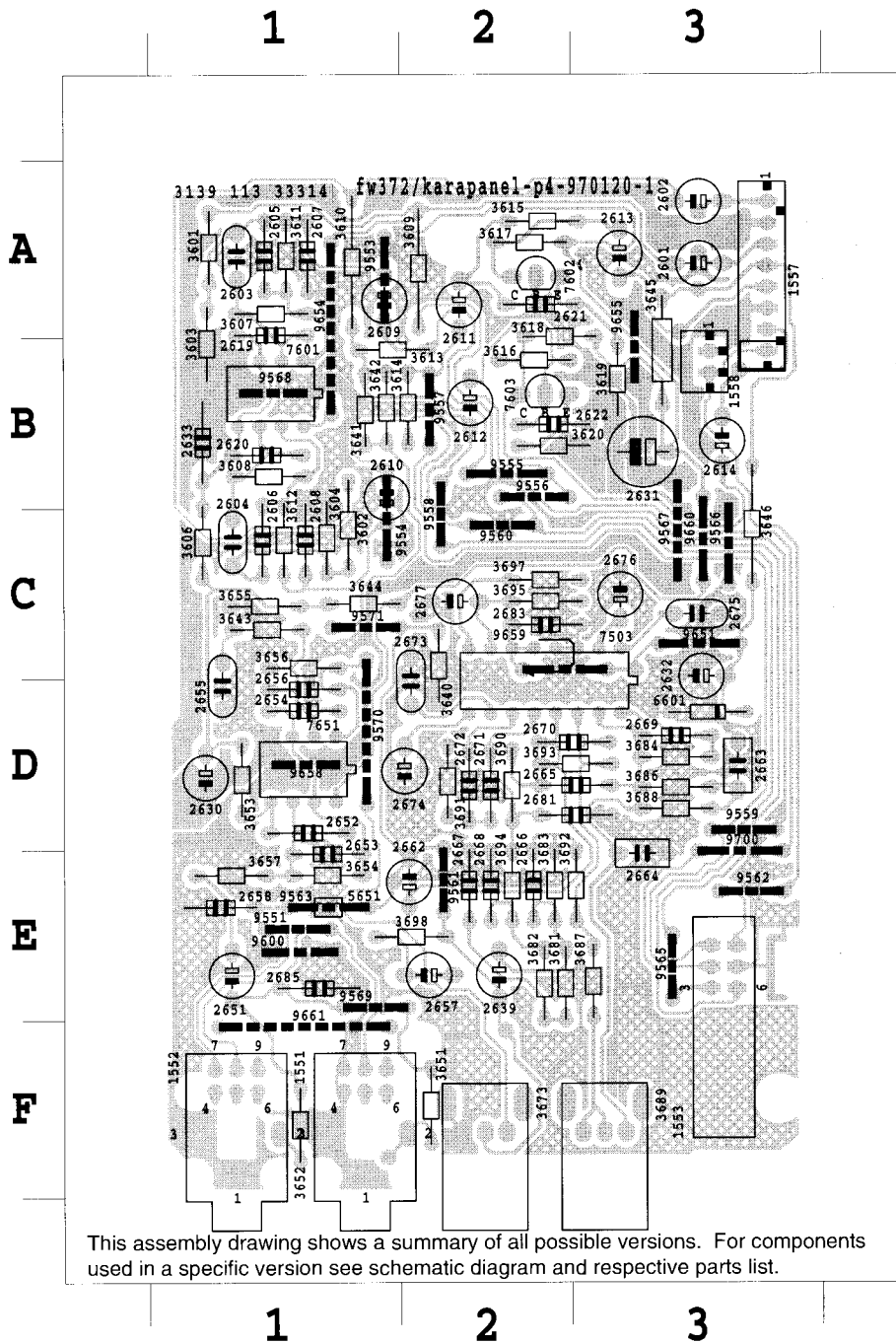
KARAOKE BOARD

Component Layout	8 - 2
Circuit Diagram	8 - 3
Partlist	8 - 4

KARAOKE BOARD

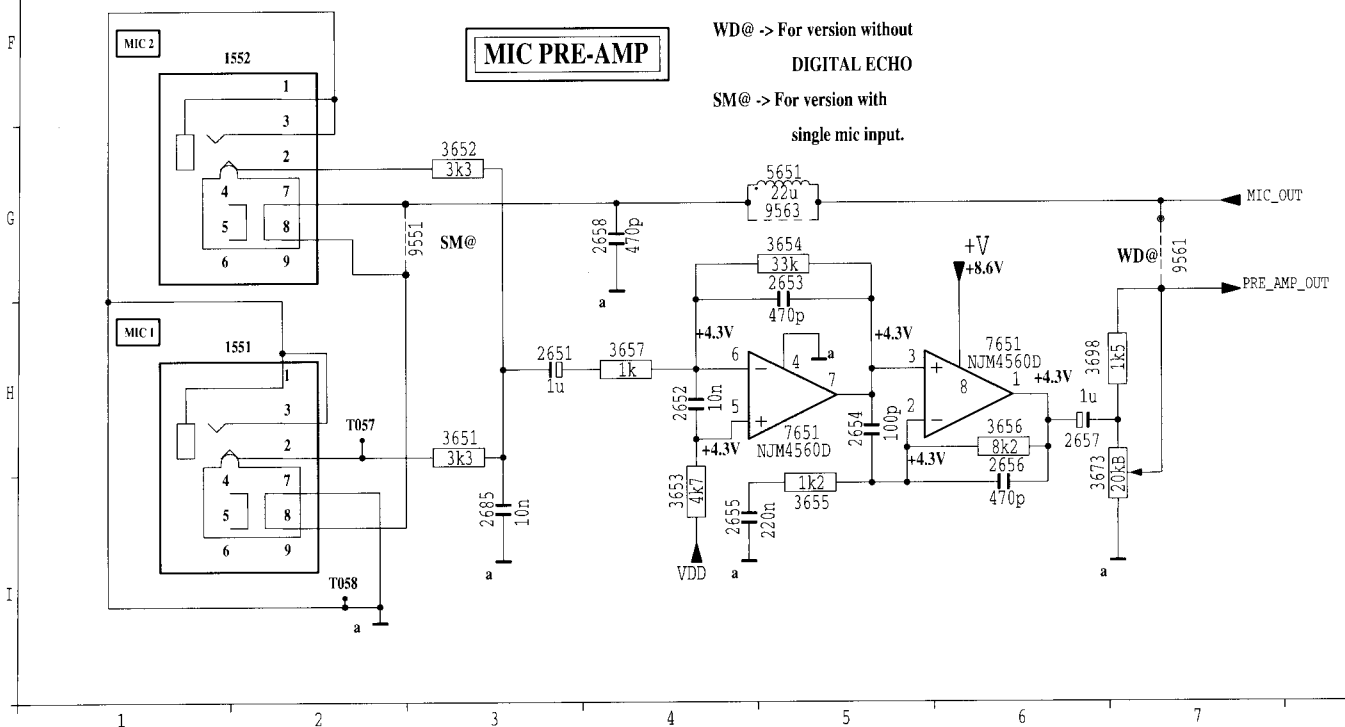
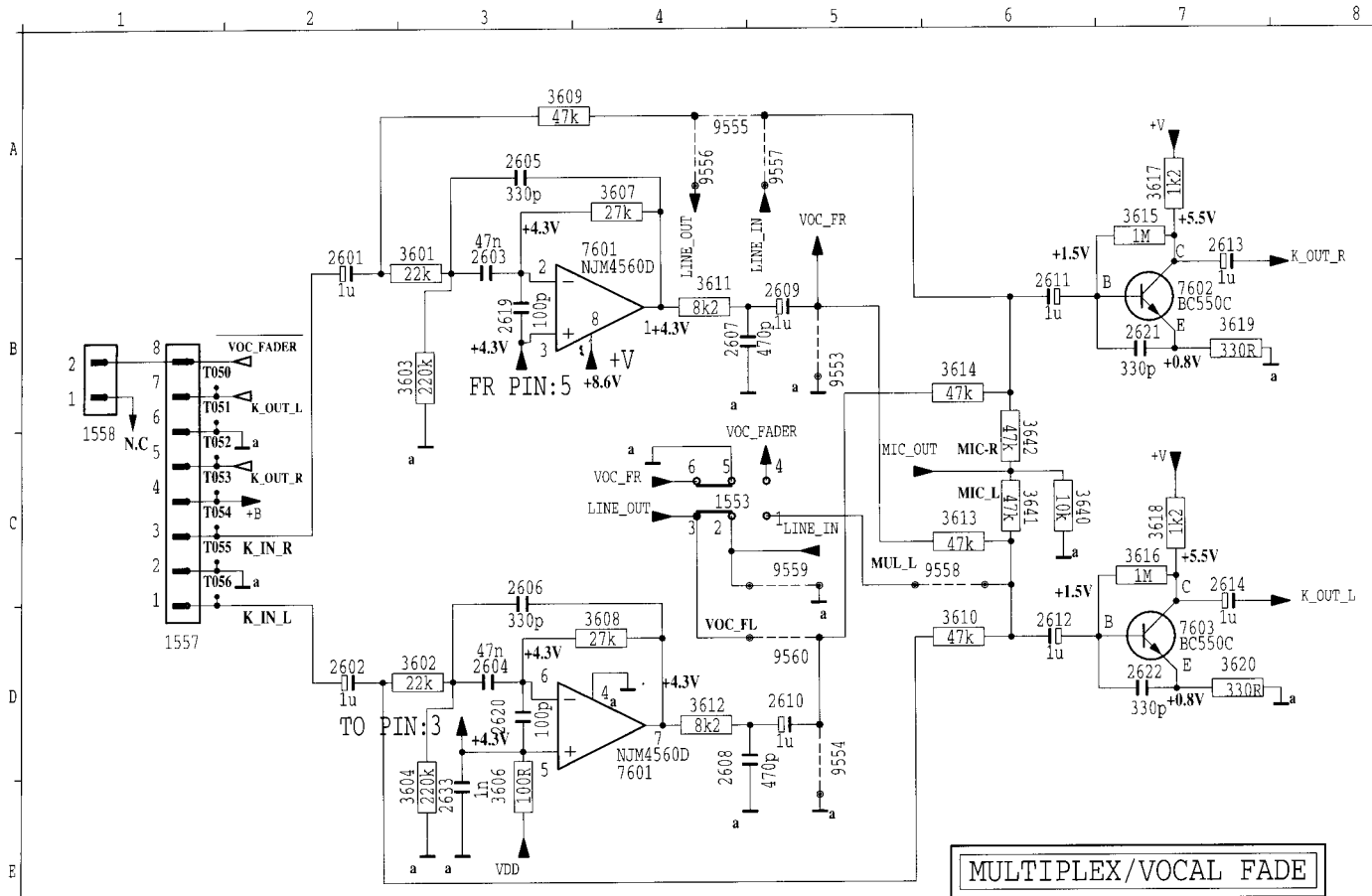
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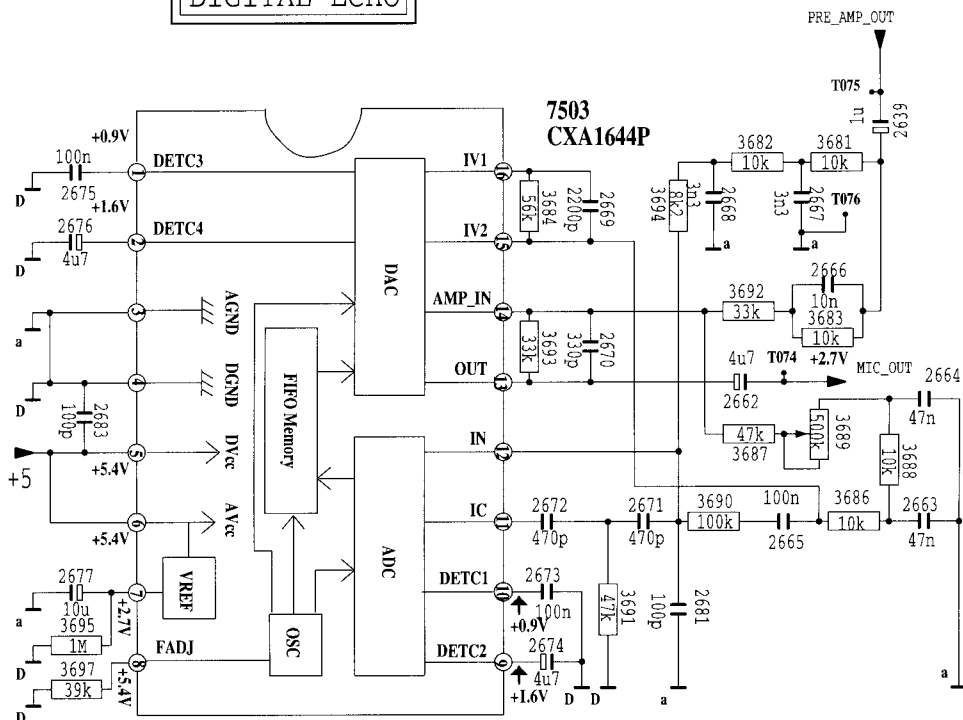
COMPONENT LAYOUT



1551 F 1	2677 C 2	3695 C 2
1552 F 1	2681 D 3	3697 C 2
1553 E 3	2683 C 2	3698 E 2
1557 A 3	2685 E 1	5651 E 1
1558 B 3	3601 A 1	6601 D 3
2601 A 3	3602 C 1	7503 D 2
2602 A 3	3603 B 1	7601 B 1
2603 A 1	3604 C 1	7602 A 2
2604 C 1	3606 C 1	7603 B 2
2605 A 1	3607 A 1	7651 D 1
2606 C 1	3608 B 1	9551 E 1
2607 A 1	3609 A 2	9553 A 1
2608 C 1	3610 A 1	9554 C 1
2609 A 1	3611 A 1	9555 B 2
2610 B 1	3612 C 1	9556 B 2
2611 A 2	3613 B 1	9557 B 2
2612 B 2	3614 B 2	9558 C 2
2613 A 3	3615 A 2	9559 D 3
2614 B 3	3616 B 2	9560 C 2
2619 A 1	3617 A 2	9561 E 2
2620 B 1	3618 B 2	9562 E 3
2621 A 2	3619 B 3	9563 E 1
2622 B 2	3620 B 2	9565 E 3
2630 D 1	3640 C 2	9566 C 3
2631 B 3	3641 B 1	9567 C 3
2632 C 3	3642 B 1	9568 B 1
2633 B 1	3643 C 1	9569 E 1
2639 E 2	3644 C 1	9570 D 1
2651 E 1	3645 B 3	9571 C 1
2652 D 1	3646 C 3	9600 E 1
2653 E 1	3651 F 2	9651 C 3
2654 D 1	3652 F 1	9654 A 1
2655 D 1	3653 D 1	9655 B 3
2656 D 1	3654 E 1	9658 D 1
2657 E 2	3655 C 1	9659 C 2
2658 E 1	3656 C 1	9660 C 3
2662 E 2	3657 E 1	9661 F 1
2663 D 3	3673 F 2	9700 E 3
2664 E 3	3681 E 2	
2665 D 3	3682 E 2	
2666 E 2	3683 E 2	
2667 E 2	3684 D 3	
2668 E 2	3686 D 3	
2669 D 3	3687 E 3	
2670 D 3	3688 D 3	
2671 D 2	3689 F 3	
2672 D 2	3690 D 2	
2673 D 2	3691 D 2	
2674 D 2	3692 E 3	
2675 C 3	3693 D 3	
2676 C 3	3694 E 2	

KARAOKE CIRCUIT





ELECTRICAL PARTS LIST - KARAOKE BOARD**ELECTRICAL PARTS LIST - KARAOKE BOARD****MISCELLANEOUS**

1551	4822 267 40898	Mic Socket
1552	4822 267 40898	Mic Socket
1553	4822 276 12571	Vocal Fader Switch

2681	4822 122 33195	100pF 10% 50V
2683	4822 122 33195	100pF 10% 50V
2685	4822 121 51387	10nF 20% 16V

3695	4822 122 33195	100pF 10% 50V
3697	4822 122 33195	100pF 10% 50V
3698	4822 121 51387	10nF 20% 16V

CAPACITORS

2601	4822 124 40242	1μF 20% 63V
2602	4822 124 40242	1μF 20% 63V
2603	4822 121 43526	47nF 5% 250V
2604	4822 121 43526	47nF 5% 250V
2605	4822 126 12787	330pF 10% 50V
2606	4822 126 12787	330pF 10% 50V
2607	4822 122 33519	470pF 10% 50V
2608	4822 122 33519	470pF 10% 50V
2609	4822 124 40242	1μF 20% 63V
2610	4822 124 40242	1μF 20% 63V
2611	4822 124 40242	1μF 20% 63V
2612	4822 124 40242	1μF 20% 63V
2613	4822 124 40242	1μF 20% 63V
2614	4822 124 40242	1μF 20% 63V
2619	4822 122 33195	100pF 10% 50V
2620	4822 122 33195	100pF 10% 50V
2621	4822 126 12787	330pF 10% 50V
2622	4822 126 12787	330pF 10% 50V
2630	4822 124 41584	100μF 20% 10V
2631	4822 124 80144	220μF 20% 25V
2632	4822 124 41584	100μF 20% 10V
2633	4822 122 33197	1nF 10% 50V
2639	4822 124 40242	1μF 20% 63V
2651	4822 124 40242	1μF 20% 63V
2652	4822 121 51387	10nF 20% 16V
2653	4822 122 33519	470pF 10% 50V
2654	4822 122 33195	100pF 10% 50V
2655	4822 121 42408	220nF 5% 63V
2656	4822 122 33519	470pF 10% 50V
2657	4822 124 40242	1μF 20% 63V
2658	4822 122 33519	470pF 10% 50V
2662	4822 124 40246	4,7μF 20% 63V
2663	4822 121 43526	47nF 5% 250V
2664	4822 121 43526	47nF 5% 250V
2665	4822 126 12882	100nF +80-20% 50V
2666	4822 121 51387	10nF 20% 16V
2667	4822 122 10577	3,3nF 10% 16V
2668	4822 122 10577	3,3nF 10% 16V
2669	4822 126 12339	2,2nF 10%
2670	4822 126 12787	330pF 10% 50V
2671	4822 122 33519	470pF 10% 50V
2672	4822 122 33519	470pF 10% 50V
2673	5322 121 42386	100nF 5% 63V
2674	4822 124 40246	4,7μF 20% 63V
2675	5322 121 42386	100nF 5% 63V
2676	4822 124 40246	4,7μF 20% 63V
2677	4822 124 41579	10μF 20% 50V

RESISTORS

3601	4822 116 52257	22k 5% 0,5W
3602	4822 116 52257	22k 5% 0,5W
3603	4822 116 83874	220k 5% 0,5W
3604	4822 116 83874	220k 5% 0,5W
3606	4822 116 52175	100R 5% 0,5W
3607	4822 116 52264	27k 5% 0,5W
3608	4822 116 52264	27k 5% 0,5W
3609	4822 116 83884	47k 5% 0,5W
3610	4822 116 83884	47k 5% 0,5W
3611	4822 116 52303	8k2 5% 0,5W
3612	4822 116 52303	8k2 5% 0,5W
3613	4822 116 83884	47k 5% 0,5W
3614	4822 116 83884	47k 5% 0,5W
3615	4822 116 52235	1M 5% 0,5W
3616	4822 116 52235	1M 5% 0,5W
3617	4822 116 52207	1k2 5% 0,5W
3618	4822 116 52207	1k2 5% 0,5W
3619	4822 116 52219	330R 5% 0,5W
3620	4822 116 52219	330R 5% 0,5W
3640	4822 116 83864	10k 5% 0,5W
3641	4822 116 83884	47k 5% 0,5W
3642	4822 116 83884	47k 5% 0,5W
3643	4822 116 52289	5k6 5% 0,5W
3644	4822 116 52289	5k6 5% 0,5W
3645	4822 052 10221	220R 5% 0,33W
3646	4822 116 83883	470R 5% 0,5W
3651	4822 116 52269	3k3 5% 0,5W
3652	4822 116 52269	3k3 5% 0,5W
3653	4822 116 52283	4k7 5% 0,5W
3654	4822 116 52271	33k 5% 0,5W
3655	4822 116 52207	1k2 5% 0,5W
3656	4822 116 52303	8k2 5% 0,5W
3657	4822 050 11002	1k 1% 0,4W
3673	4822 101 21204	Rotary Potm 20kA
3681	4822 116 83864	10k 5% 0,5W
3682	4822 116 83864	10k 5% 0,5W
3683	4822 116 83864	10k 5% 0,5W
3684	4822 116 52291	56k 5% 0,5W
3686	4822 116 83864	10k 5% 0,5W
3687	4822 116 83884	47k 5% 0,5W
3688	4822 116 83864	10k 5% 0,5W
3689	4822 101 11326	Rotary Potm 500k
3690	4822 116 52234	100k 5% 0,5W
3691	4822 116 83884	47k 5% 0,5W
3692	4822 116 52271	33k 5% 0,5W
3693	4822 116 52271	33k 5% 0,5W
3694	4822 116 52303	8k2 5% 0,5W

COILS

5651	4822 116 52257	22k 5% 0,5W
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DIODES

6601	4822 116 83874	220k 5% 0,5W
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TRANSISTORS

7503	4822 116 52264	27k 5% 0,5W
------	----------------	-------------

7601	4822 116 83884	47k 5% 0,5W
------	----------------	-------------

7602	4822 116 83884	47k 5% 0,5W
------	----------------	-------------

7603	4822 116 52303	8k2 5% 0,5W
------	----------------	-------------

7651	4822 116 52303	8k2 5% 0,5W
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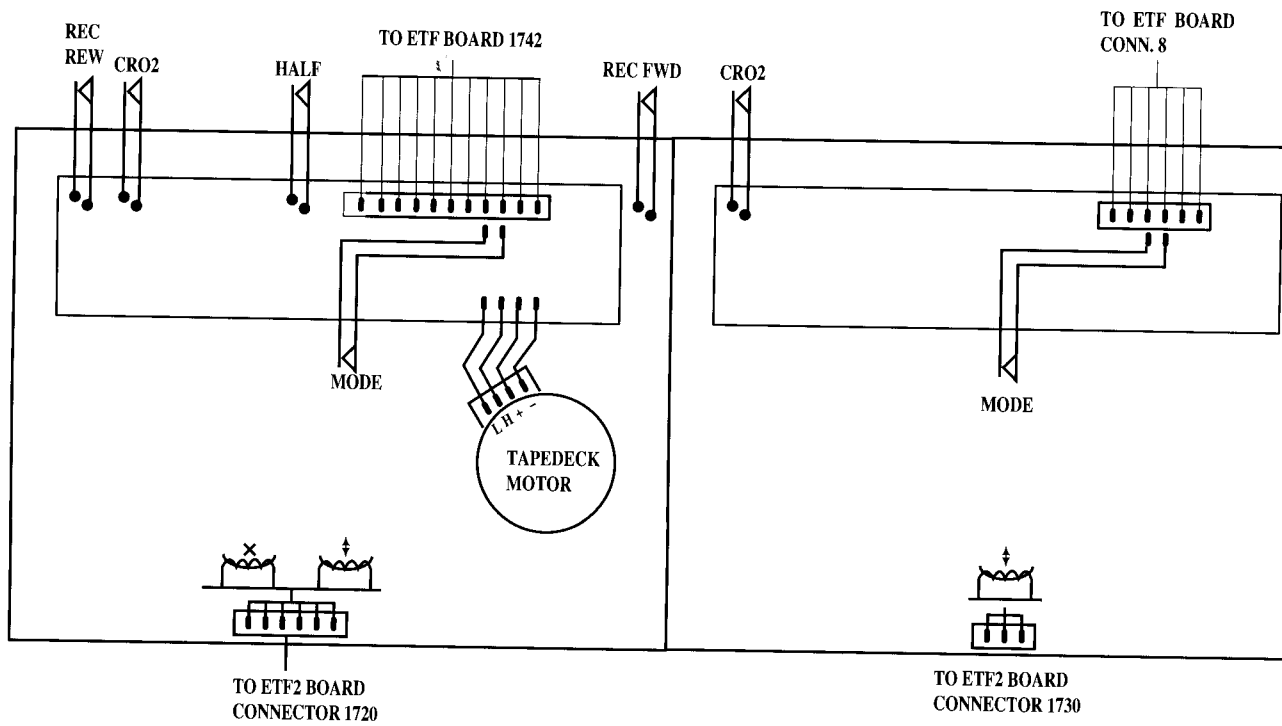
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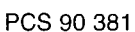
ETF2 TAPE MODULE

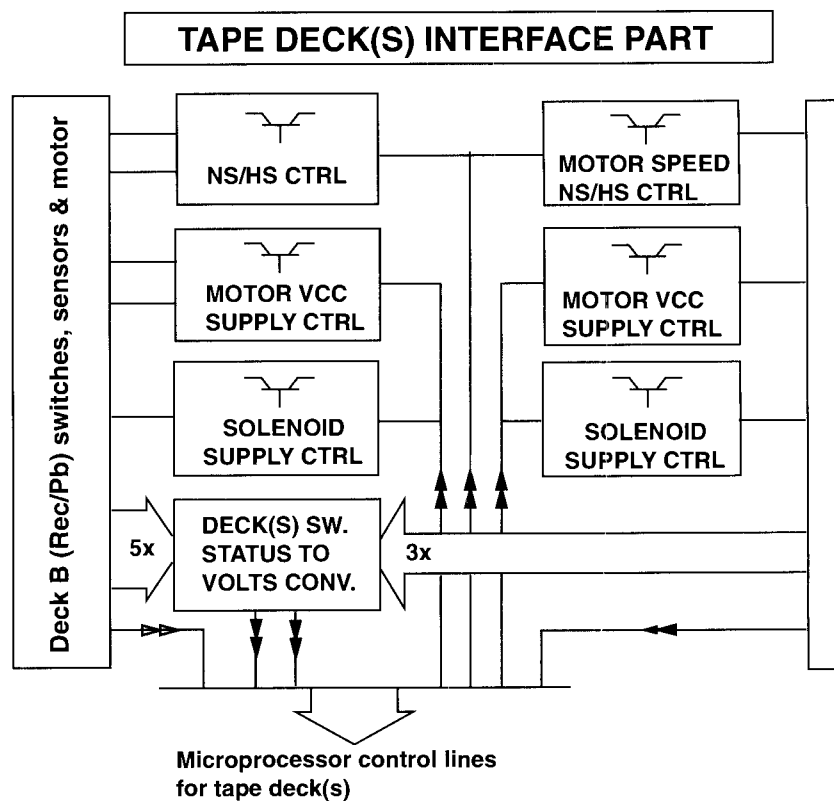
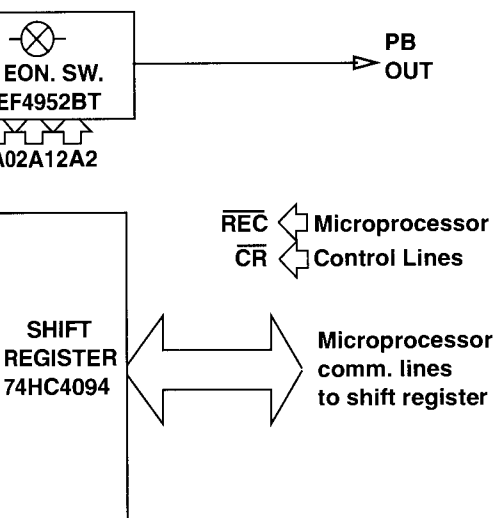
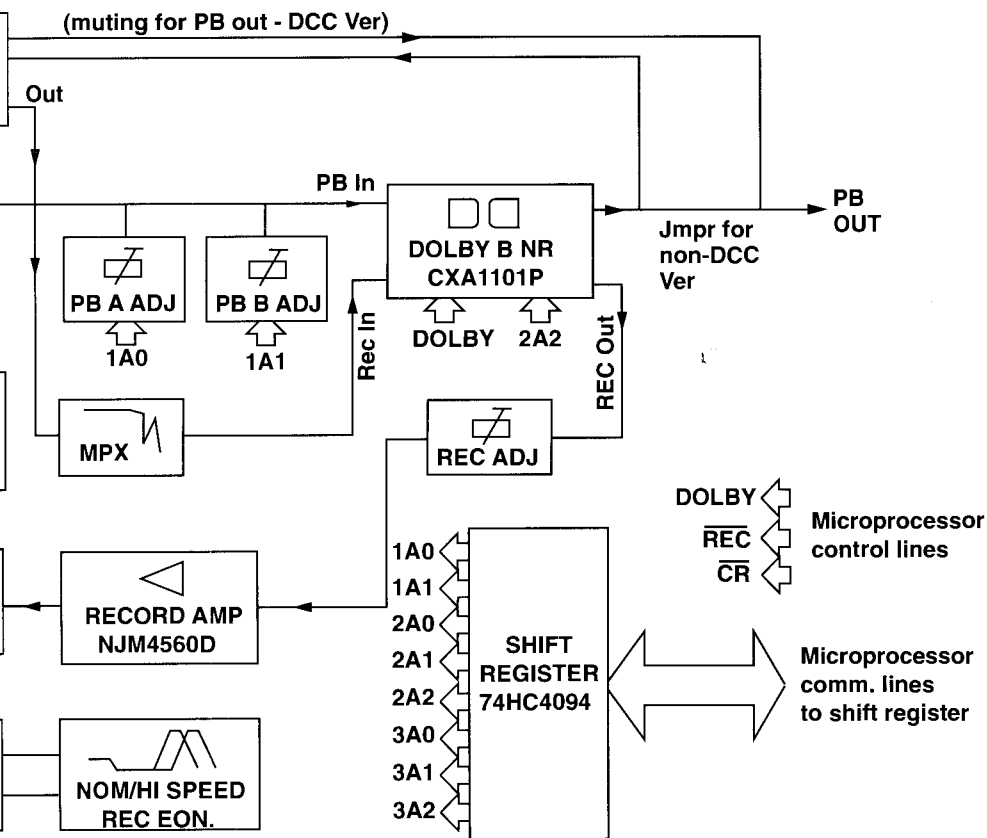
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Tapedeck wiring (Double deck)







GENERAL DESCRIPTION

FEATURES

The ETF-2 is a family of logic controlled, electronically switched tape function modules. Each module comprises a logic controlled tape deck with attached pcb housing the tape pre-amplifier, recording and switching circuitry, and tape deck interface circuitry.

The following features are available as options:

single / double tape-deck applications
 auto-reverse / single way deck options
 single / double motor options for double deck
 IEC I & IEC II tape types auto selection for playback & recording
 Dolby B type Noise Reduction
 line-in recording with pilot suppression
 tape dubbing at normal & high speed (for double deck applications)
 automatic recording level control
 software controlled full auto reverse permutations
 opto-reflector disc for counter pulses & end-of-tape (EOT) auto-stop
 input for DCC deck analog playpack output

NOTATIONS & ABBREVIATIONS USED IN THIS DOCUMENT

Gnd x Ground x
 S/A Sub-assy
 FE Ferro (IEC type I)
 CR Chrome (IEC type II)
 NR Noise Reduction
 PB Playback
 REC Record
 NSD Normal speed dubbing
 HSD High speed dubbing
 DD Double Deck
 SD Single Deck
 SM Single Motor
 DM Double Motor
 ND Non Dolby
 DB Dolby B

PC board variations	ND/SD	ND/DD/FF	DB/DD/FR	DB/DD/FF
12NCs (3139 118 ...)	... 85990	... 88910	... 88750	... 89960
Deck configuration	Single	Double	Double	Double
Motor configuration	Single	Single	Single	Single
Auto Fe/Cr02 selection	Yes	Yes	Yes	Yes
Dolby B	No	No	Yes	Yes
19kHz suppression	No	No	Yes	Yes
High speed dubbing	No	Yes	Yes	Yes
Audio I/P for DCC sets	No	No	No	No

Note: ND - Non Dolby, DB - Dolby B
 SD - Single Deck, DD - Double Deck
 FF - Playback + Rec/Playback
 FR - Playback + Auto-reverse Rec/Playback

Deck A (Pb) switches, sensors (& motor)

CONNECTORS ASSIGNMENTS:CONNECTOR 1701AF SIGNAL & SUPPLY CONNECTIONS

○	1	-CMOS	Negative d.c. supply (-9V) for CMOS ICs
○	2	TAPE-L	Playback output left
○	3	TAPE-R	Playback output right
○	4	+12V	D.C. supply (+12V) for AF electronics
○	5	GND A	AF Ground
○	6	REC-L	Record input left
○	7	REC-R	Record input right

CONNECTOR 1702CONTROL LINES FOR AF ELECTRON (For NON-Dolby versions only)

○	1	STROBE	HEF4094BT shift register Strobe line
○	2	DATA	HEF4094BT shift register Data line
○	3	CLK	HEF4094BT shift register Clock line
○	4	GND P	Control & Oscillator Ground
○	5	REC'	Record on/off control (+5V=Pb; 0V=Rec)
○	6	CRO2'	CrO2 tape recording control (+5V=Fe; 0V=Cr)

CONNECTOR 1705DCC DECK CONNECTORS (For versions with inputs for DCC Analog Playback)

○	1	ACC L	DCC Deck analog playback left
○	2	GND A	AF Ground
○	3	ACC R	DCC Deck analog playback right

CONNECTOR 1706CONTROL LINES FOR AS ELECTRON (For versions with Dolby only)

○	1	STROBE	HEF4094BT shift register Strobe line
○	2	DATA	HEF4094BT shift register Data line
○	3	CLK	HEF4094BT shift register Clock line
○	4	GND P	Control & Oscillator Ground
○	5	REC'	Record on/off control (+5V=Pb; 0V=Rec)
○	6	CRO2'	CrO2 tape recording control (+5V=Fe; 0V=Cr)
○	7	DOLBY'	Dolby NR on/off control (option) (+5V=off; 0V=On)

CONNECTOR 1711BIAS CURRENT SENSO (For Testing purpose only)

○	1	BIAS L+	Bias current test connector - left channel
○	2	BIAS L-	Bias current test connector - left channel
○	3	BIAS R+	Bias current test connector - right channel
○	4	BIAS R-	Bias current test connector - right channel

CONNECTOR 1720DECK B HEADS CONNECTON (JQ top-type)

○	1	B R/P HD L+	R/P Head left channel positive
○	2	B R/P HD L-	R/P Head left channel negative
○	3	B R/P HD R+	R/P Head right channel positive
○	4	B R/P HD R-R?	Head right channel negative
○	5	ERASE HEAD	Erase Head
○	6	GND P	Erase Head ground

CONNECTOR 1730

○	1	A PB HD R+	Pb Head right channel positive
○	2	GND A	Pb Head return ground shield
○	3	A PB HD L+	Pb Head left channel positive

DECK A HEAD CONNECTIONS (For Double Deck versions only)**5.2 TAPE DECK INTERFACES**CONNECTOR 1703

○	1	+MOTOR	D.C. supply (+12V) for tape deck motor & solenoid
○	2	GND P	Motor Ground

MOTOR SUPPLY LINES (PH side-type)CONNECTOR 1704

○	1	GND	Ground for deck sensing switches network (provision)
○	2	+5V	D.C. supply (+5V) for deck status ADC network (referenced to micro-p)
○	3	AD1	Deck B sensing switches output voltage
○	4	EOT B	Deck B EOT/counter pulse
○	5	SOLB/MOTB*	Deck B motor/solenoid control (tri-state; see table below)
○	6	AD2	Deck A sensing switches output voltage

CONTROL LINES FOR TAPE DECK OPERATE (PH side-type)
*(For single Deck versions only)*CONNECTOR 1707

○	1	GND	Ground for deck sensing switches network (provision)
○	2	+5V	D.C. supply (+5V) for deck status ADC network (referenced to micro-p)
○	3	AD1	Deck B sensing switches output voltage
○	4	EOT B	Deck B EOT/counter pulse
○	5	SOLB/MOTB*	Deck B motor/solenoid control (tri-state; see table below)
○	6	AD2	Deck A sensing switches output voltage
○	7	EOT A	Deck A EOT/counter pulse
○	8	SOLA/MOTA*	Deck A motor/solenoid control (tri-state; see table)
○	9	AD3	Deck A sensing switches output voltage
○	10	NS/HS	Normal/high speed toggle (+5V=HS; 0V=NS)

CONTROL LINES FOR TAPE DECK OPERATE (PH side-type)
(For Double Deck versions; only)

* motor/solenoid tristate ctrl lines		
	mot	sol
0V	on	on
Hi-Z	on	off
5V	off	off

CONNECTOR 1741

○	1	GND	Deck/Motor ground
○	2	MODE	Mode switch (head engagement)
○	3	Vcc	Deck/Motor supply
○	4	SOL B	Solenoid supply
○	5	PHOTO B	Photo sensor output (tape movement indication)
○	6	CrO2	Chrome tape detection switch
○	7	HALF	Half switch (cassette present detection, provision only)
○	8	REC FWD	Record tab protection status switch (forward)
○	9	REC RVS	Record tab protection status switch (reverse)

DECK B CONTROL INTERFACE*(For Single Deck versions only)*

CONN

CONN

CONN

SUPPL

+12V

+CMOS

+MOTOR

+5V

CONNECTOR 1742

☐	1	H
☐	2	L
☐	3	GND
☐	4	MODE
☐	5	Vcc
☐	6	SOL B
☐	7	PHOTO B
☐	8	CrO2
☐	9	HALF
☐	10	REC FWD
☐	11	REC RVS

DECK B CONTROL INTERFACE**(For Double Deck versions only)**

H pin for motor
L pin for motor
Deck/Motor ground
Mode switch (head engagement)
Deck/Motor supply
Solenoid supply
Photo sensor output (tape movement indication)
Chrome tape detection switch
Half switch (cassette present detection, provision only)
Record tab protection status switch (forward)
Record tab protection status switch (reverse)

CONNECTOR 1743

☐	1	HALF
☐	2	CrO2
☐	3	PHOTO A
☐	4	SOL A
☐	5	Vcc
☐	6	MODE
☐	7	GND

DECK A CONTROL INTERFACE (XH wire-type on dip-mate item 8)**(For Double Deck/Single Motor versions only)**

Half switch (cassette present detection, provision only)
Chrome tape detection switch
Photo sensor output (tape movement indication)
Solenoid supply
Deck/Motor supply
Mode switch (head engagement)
Deck/Motor ground

CONNECTOR 1744

☐	1	HALF
☐	2	CrO2
☐	3	PHOTO A
☐	4	SOL A
☐	5	Vcc
☐	6	MODE
☐	7	GND

DECK A CONTROL INTERFACE (XH wire-type on dip-mate item 8 & 9)**(For Double Deck/Double Motor versions only)**

Half switch (cassette present detection, provision only)
Chrome tape detection switch
Photo sensor output (tape movement indication)
Solenoid supply
Deck/Motor supply
Mode switch (head engagement)
Deck/Motor ground

☐	1	L	L pin for motor
☐	2	H	H pin for motor

SUPPLY

+12V
+CMOS
+MOTOR
+5V

DESCRIPTION

d.c. supply for AF electronics
d.c. supply for CMOS ICs
d.c. supply for tape deck motor and solenoid
d.c. supply for deck status ADC network

VOLTAGE

+12V
-9V
+12V
+5V

General

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
ADJUST MOTOR SPEED						
HIGH SPEED	SBC420 (4822 397 30071)	DUBBING	10 or 11 LEFT RIGHT	frequency counter	3682	5040Hz±0.5%
NORMAL	3150Hz	PLAY			3684	3150Hz±0.5%
CHECK WOW & FLUTTER (DECK1 AND DECK2)						
WOW FLUTTER	SBC420 (4822 397 30071) 3150Hz	PLAY	10 or 11 LEFT RIGHT	W&F-meter	check only	≤0.6 % unwtd.
ADJUST AZIMUTH (DECK1 AND DECK2)						
NORM. DIRECTION	SBC420 (4822 397 30071)	PLAY FWD	10 or 11 LEFT RIGHT	mV-meter	left hand screw	max. output level & left=right
REV. DIRECTION	10kHz	PLAY REV			right hand screw	

Playback

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
ADJUST DOLBY PLAYBACK LEVEL						
DECK1	DOLBY REF. (4822 397 30271) 200nWb/m	PLAY	10 or 11 LEFT RIGHT	mV-meter	3641(L), 3642(R)	535mV ±0.5dB
DECK2					3635(L), 3636(R)	
CHECK PLAYBACK FREQUENCY RESPONSE (DECK1 AND DECK2)						
PB FREQU. RESP.	SBC420 (4822 397 30071)	PLAY	10 or 11 LEFT RIGHT	mV-meter	mV-meter	limits see fig.1

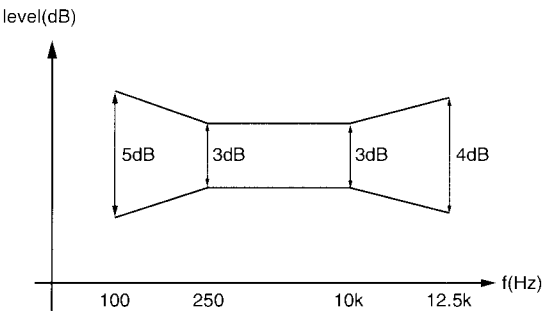


fig. 1

Recording

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST with to	
PRE-ADJUST BIAS AND BIAS-SYMMETRY						
CrO ₂	CrO ₂	RECORD	12 or 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 or 11 LEFT RIGHT	mV-meter	check only	limits see fig.2
100mV at AUX-IN, 1kHz	CrO ₂	RECORD				
	RECORDED CASSETTE	PLAY	10 or 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 DOLBY RECORD LEVEL						
AUX-IN	CrO ₂	RECORD	10 or 11 LEFT RIGHT	mV-meter	LF-generator	330Hz 170mV
	CrO ₂	RECORD	12 or 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 CHECK						
	RECORDED CASSETTE	PLAY	10 or 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.						

Note : The adjustment and check table are for all options/variants. For your exact application , please refer to the Options/Variants Table.

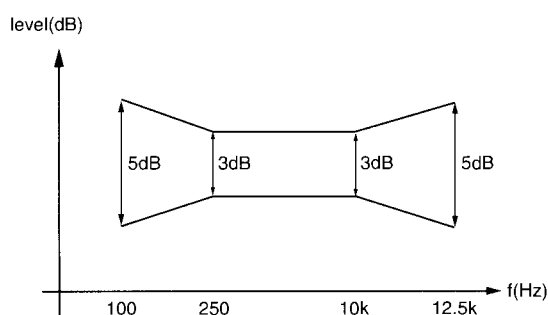
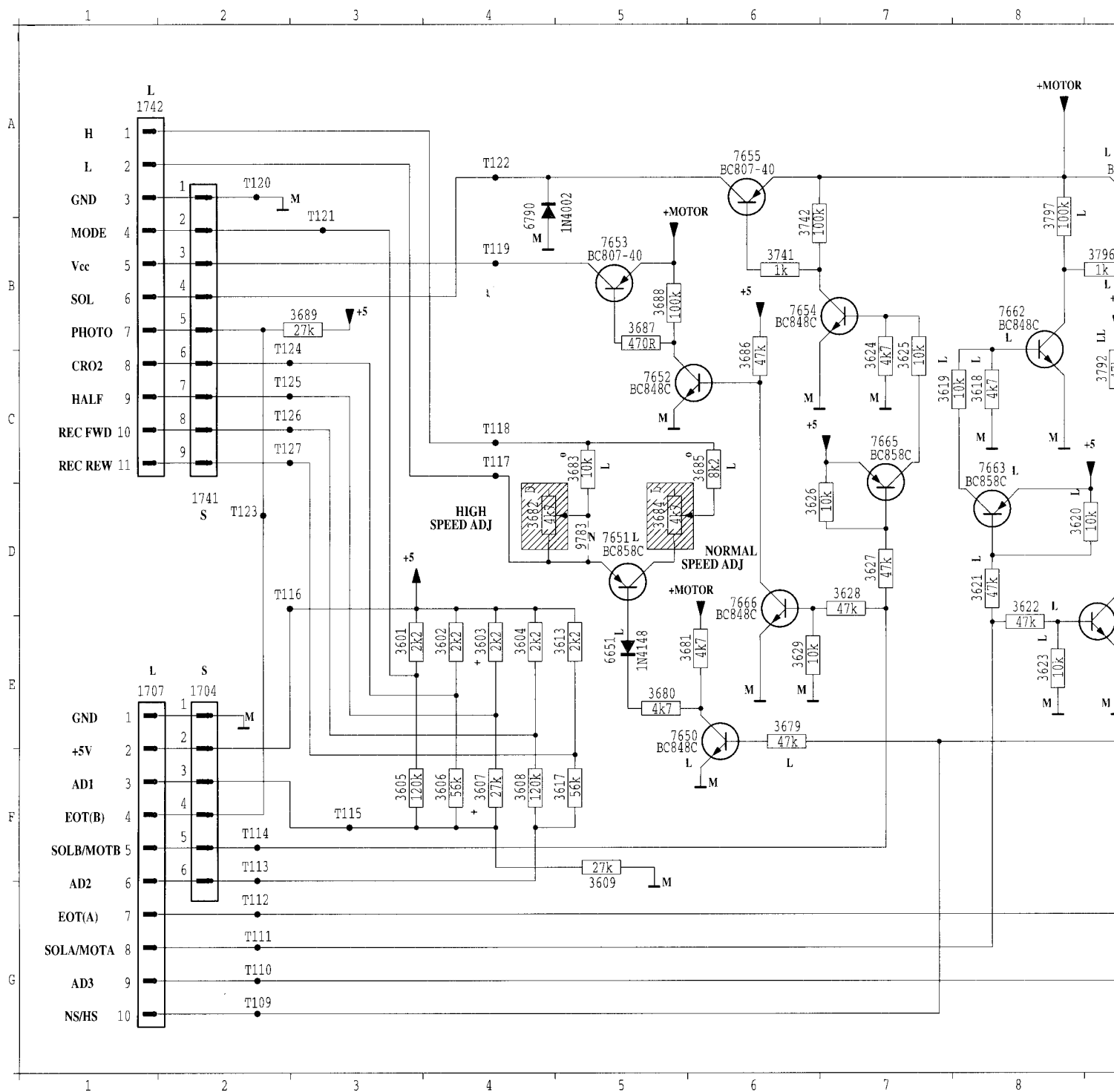


fig. 2

ETF2 CIRCUIT I



- S** Required for sets with Single-Deck only
N Required for sets with Non-Dolby/Double-Deck only
D Required for sets with Dolby/Double-Deck only
L Required for sets with Double-Deck only
M Required for sets with Double-Deck/Single-Motor only
LL Required for sets with Double-Deck/Double-Motor only
+ For provision only

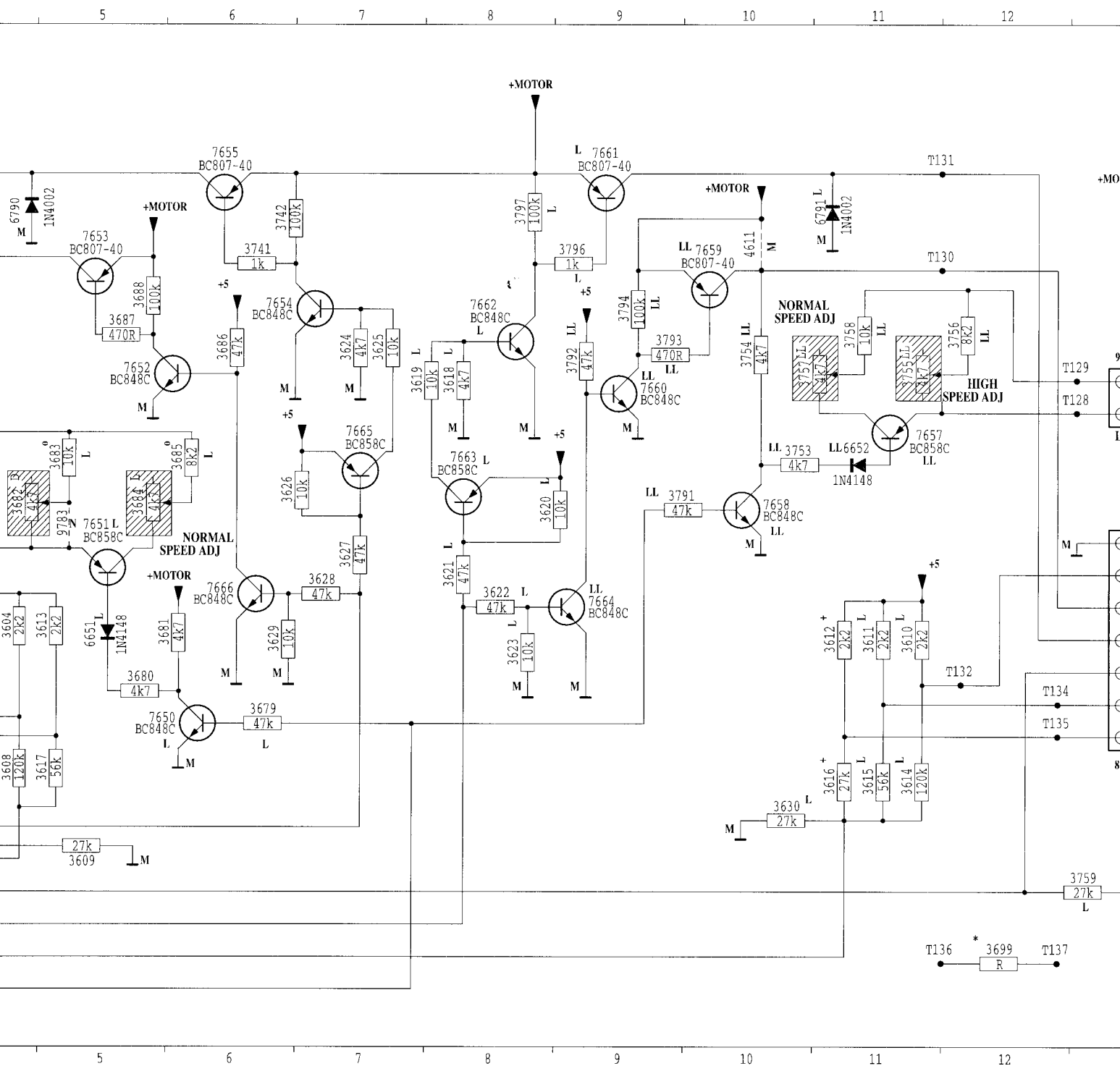
* For Variants detection during PCB testing:

Values for Resistor 3699

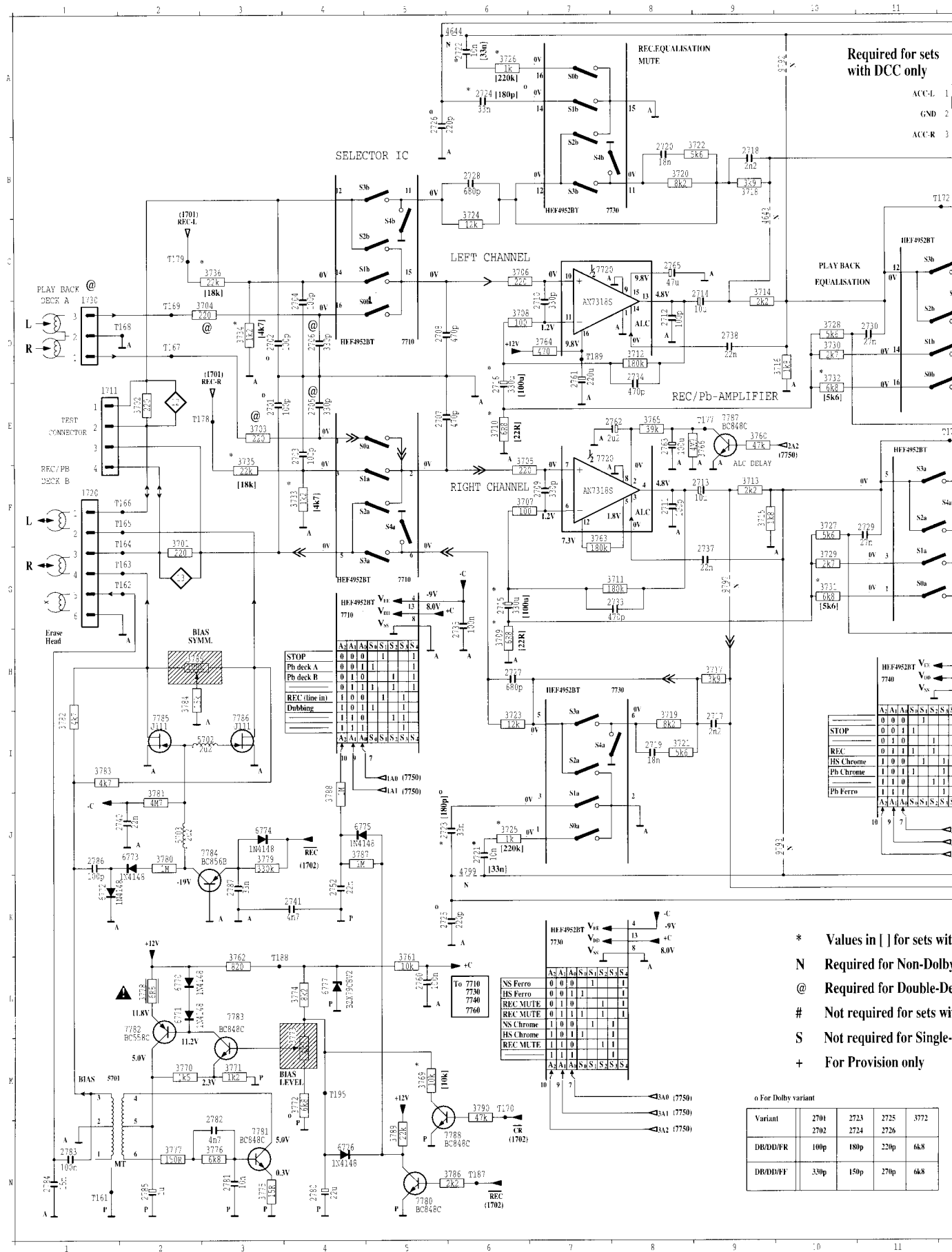
1	ND/SD	1k
2	DB/SD	2k2
3	ND/DD/FR	3k3
4	DB/DD/FR	5k6
5	DB/DD/RR	5k6
6	DB/DD/DM	6k8

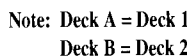
o For Dolby variant,

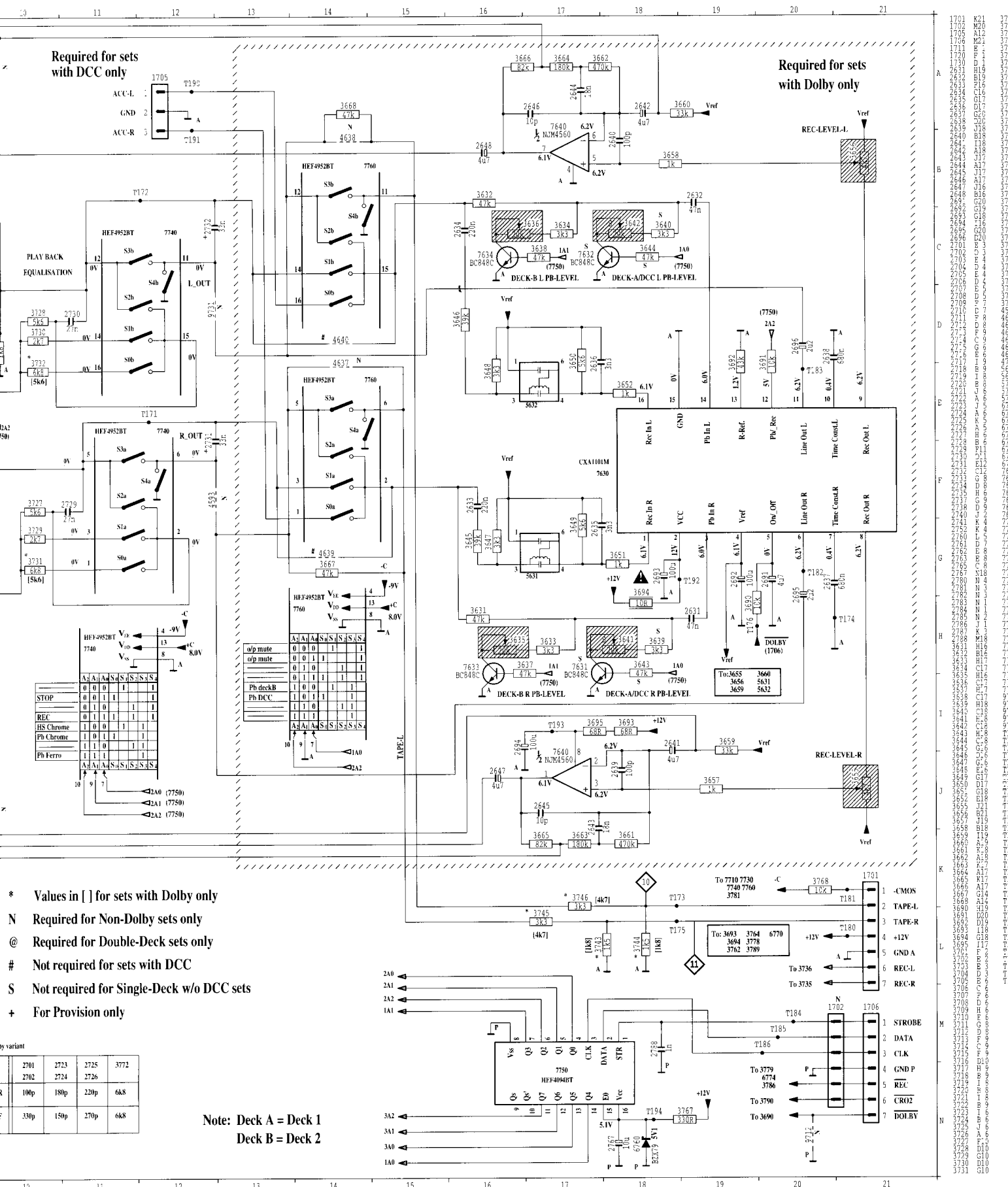
3683	DB/DD/FR	8k2
	DB/DD/FF	6k8
3685	DB/DD/FR	10k



ETF2 CIRCUIT II







1

2

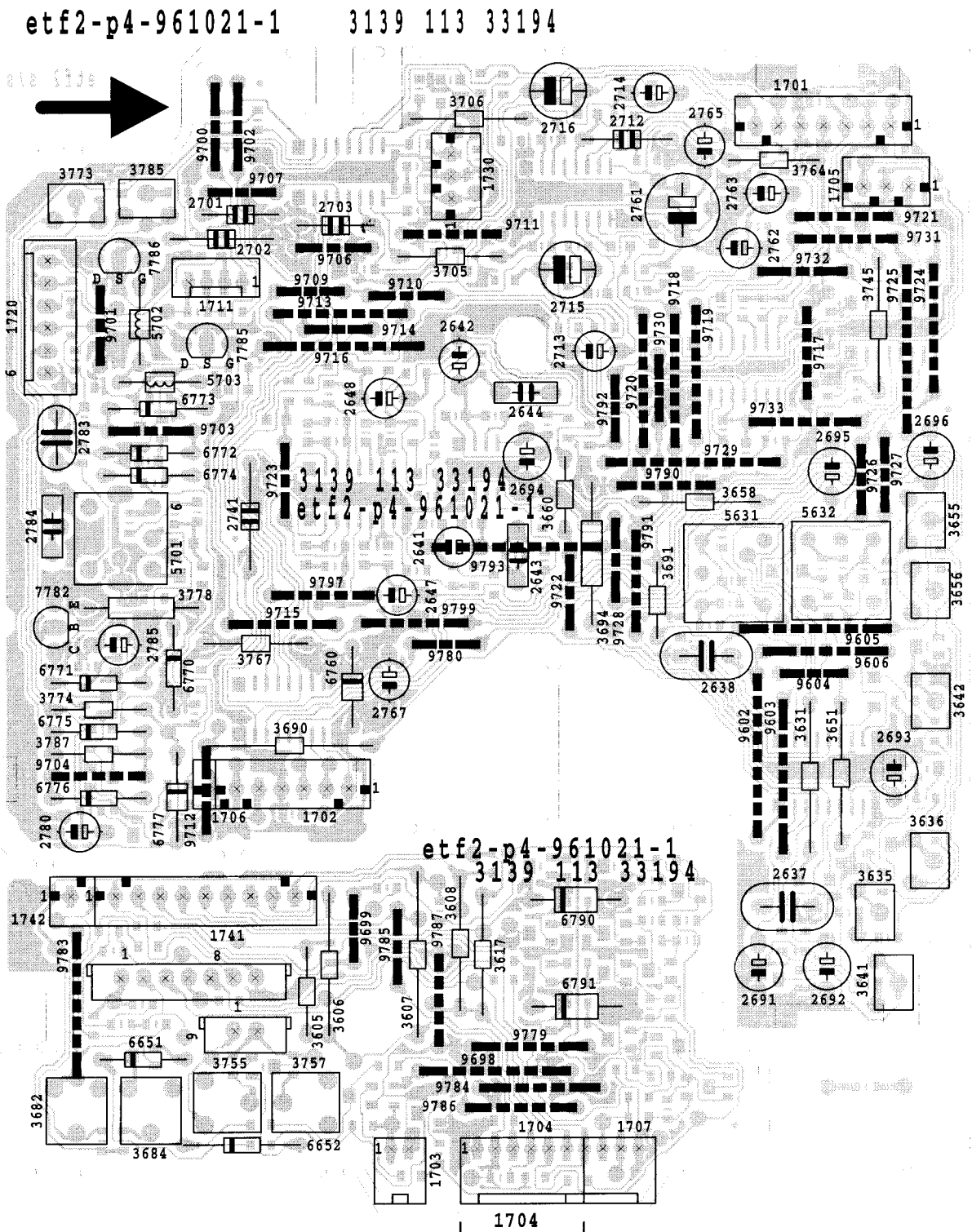
3

A

B

C

D

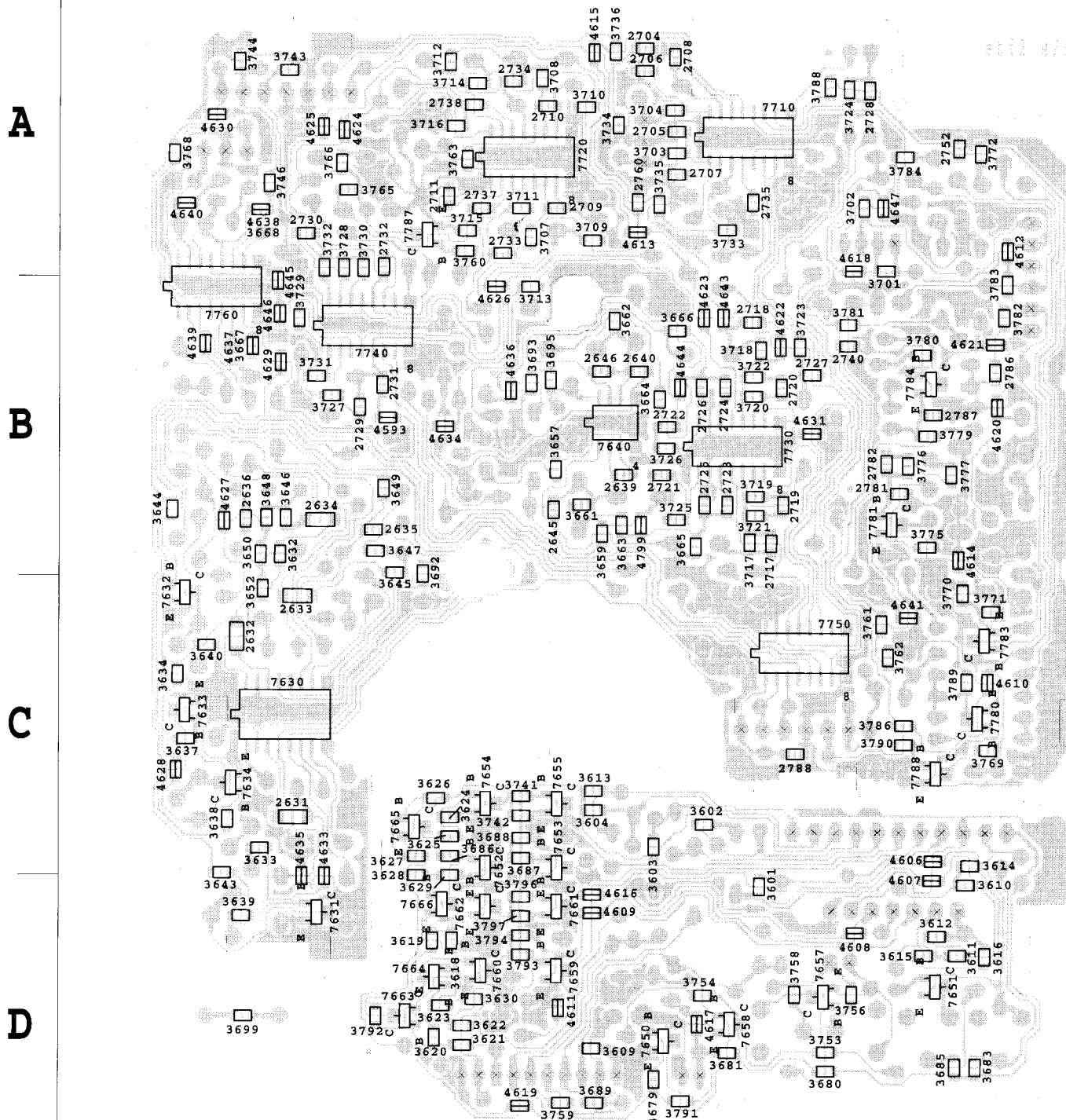


This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

1

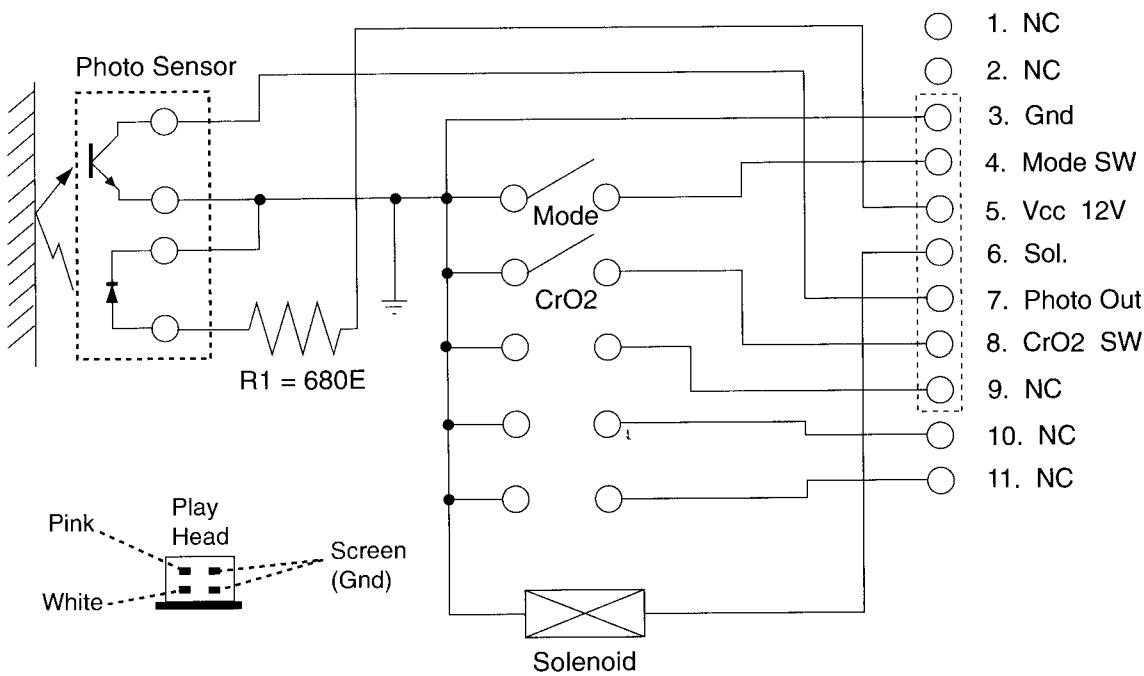
2

3

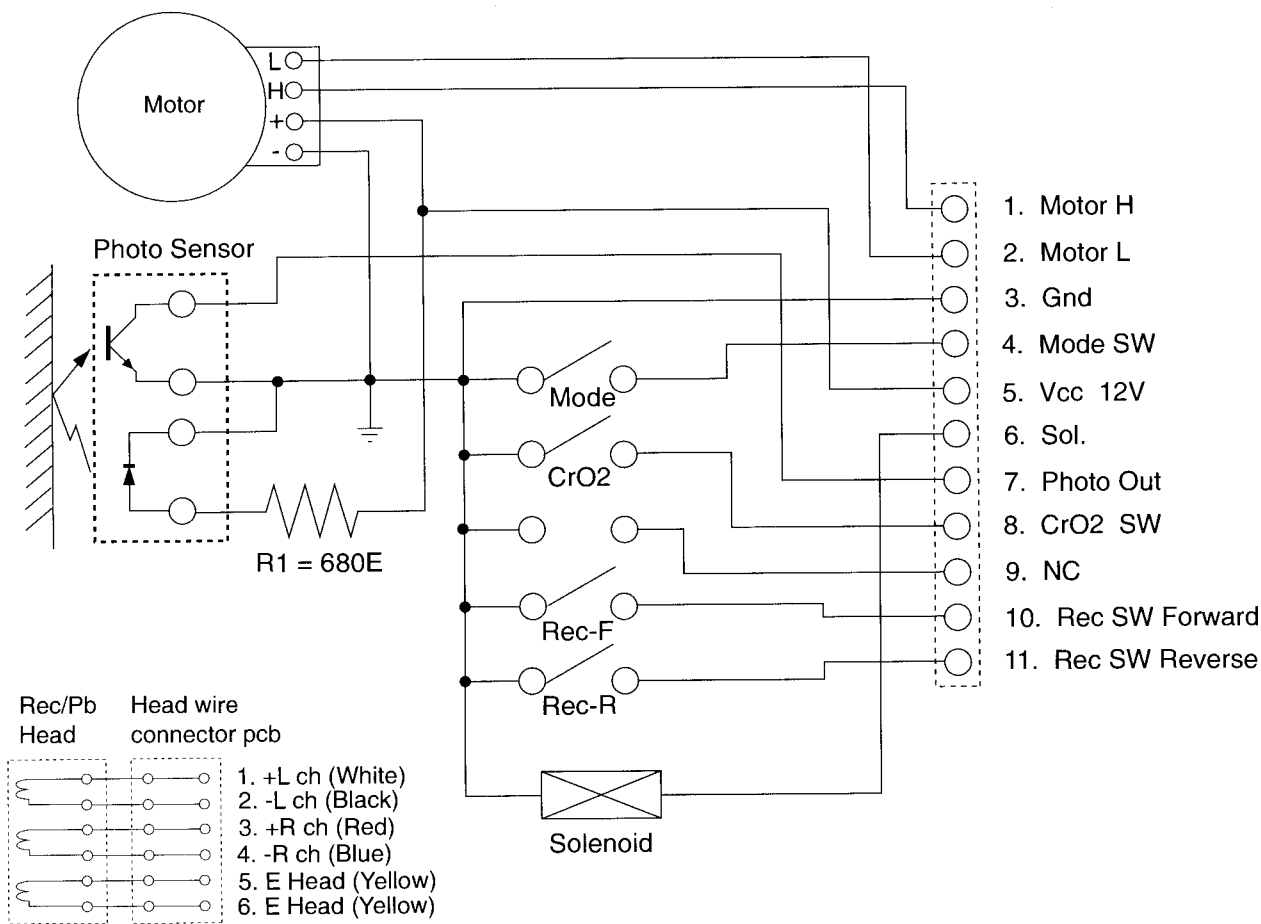


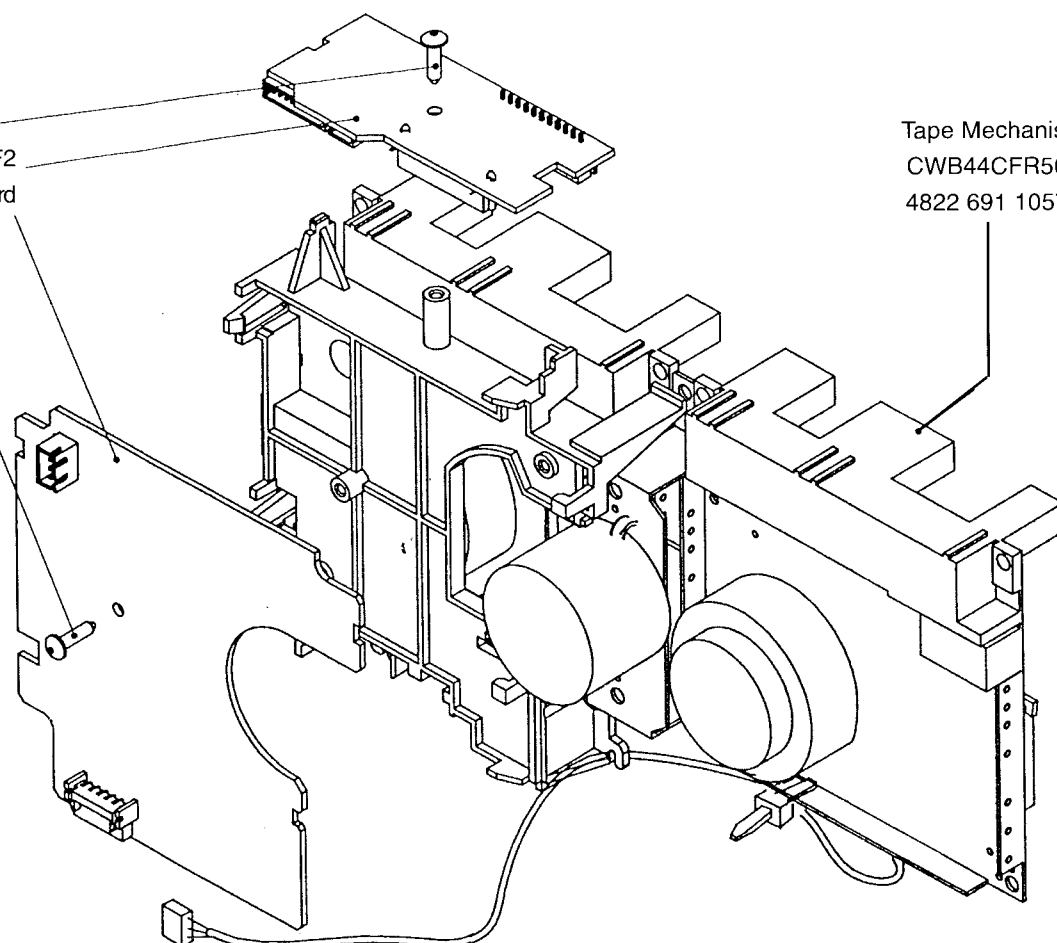
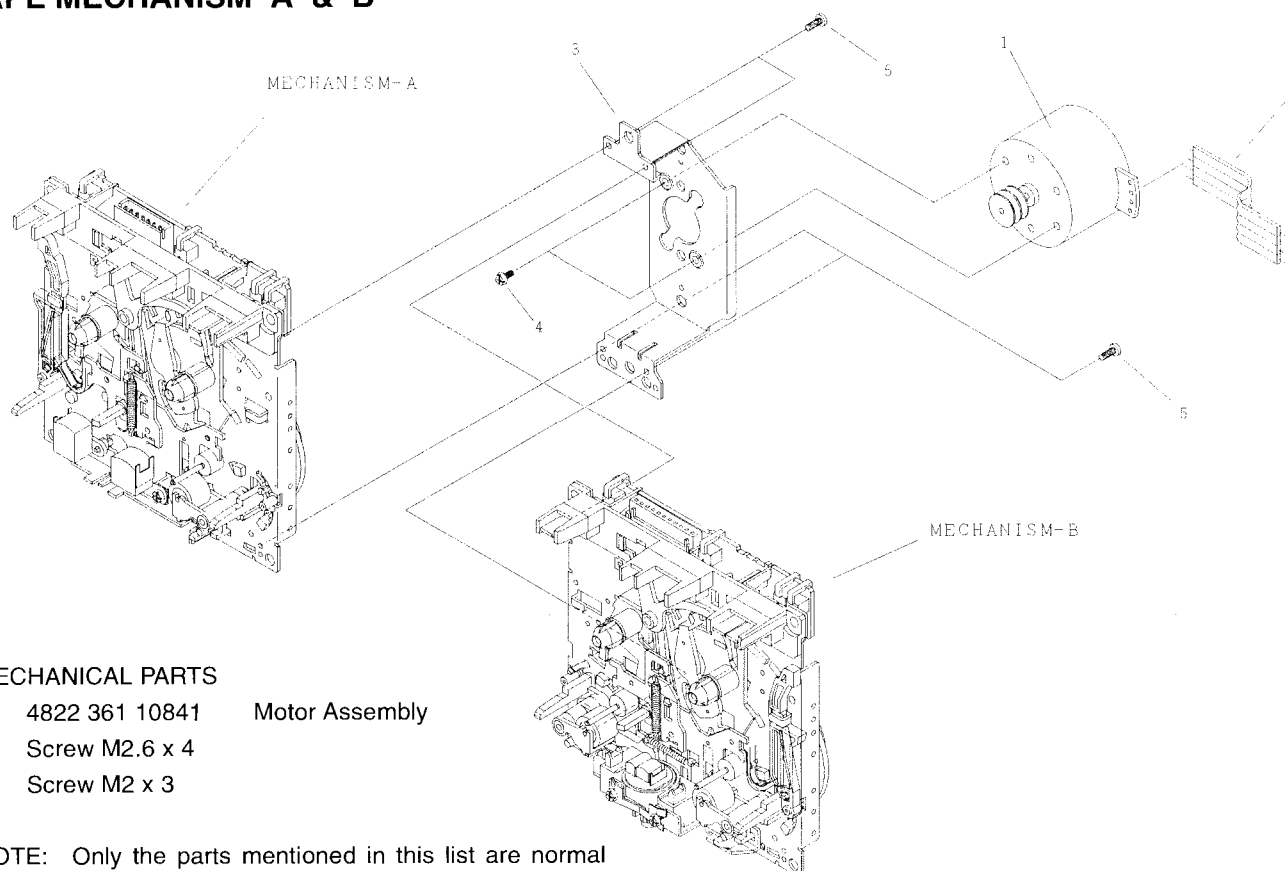
This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

TAPE MECHANISM A ELECTRONICS



TAPE MECHANISM B ELECTRONICS



ETFScrew
D3 x 10ETF2
BoardTape Mechanism
CWB44CFR501
4822 691 10572**TAPE MECHANISM A & B****MECHANICAL PARTS**

- | | | |
|---|----------------|----------------|
| 1 | 4822 361 10841 | Motor Assembly |
| 4 | Screw M2.6 x 4 | |
| 5 | Screw M2 x 3 | |

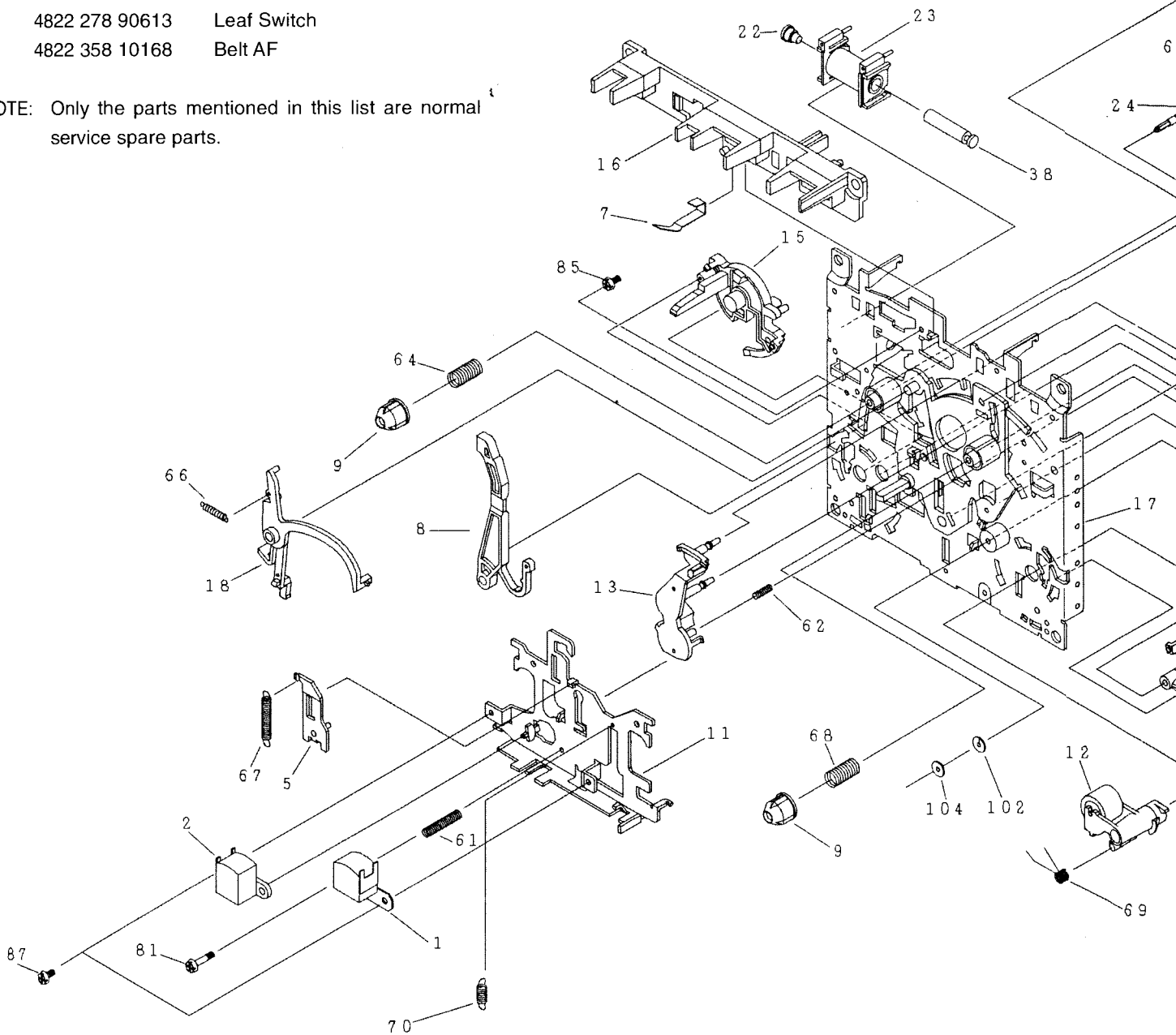
NOTE: Only the parts mentioned in this list are normal service spare parts.

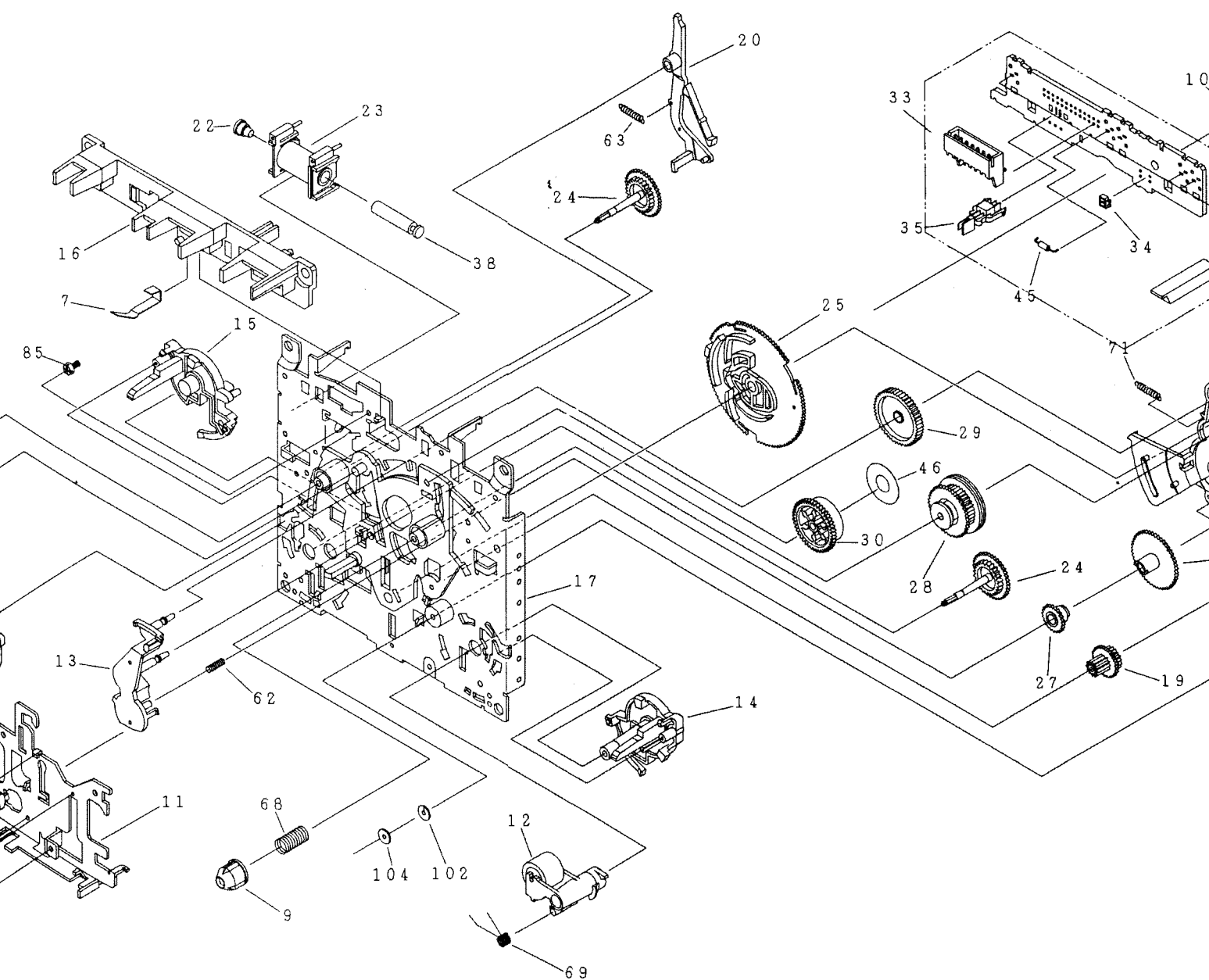
TAPE MECHANISM A

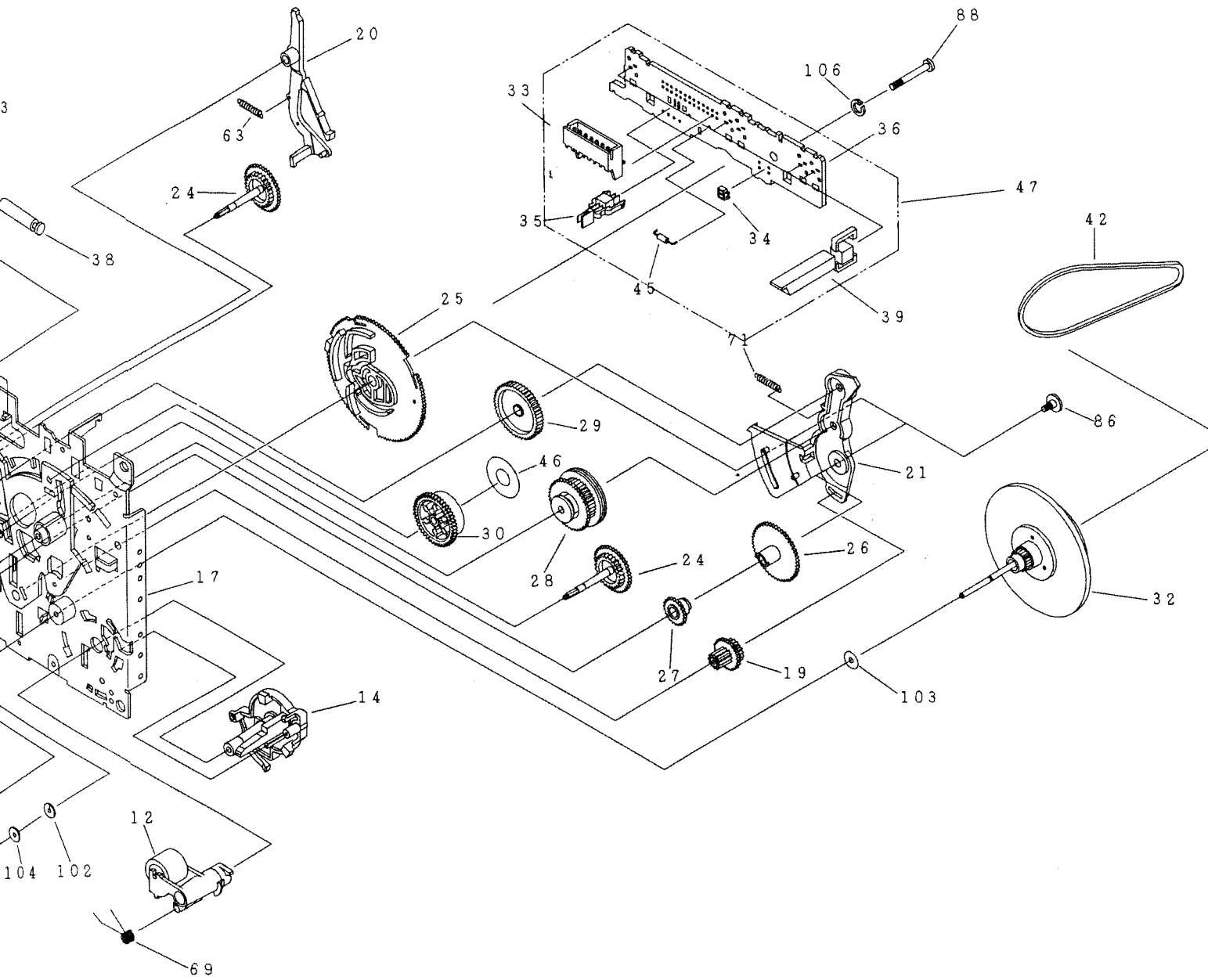
MECHANICAL PARTS

1	4822 249 10397	Play Head
12	4822 528 10974	Assembly, Arm Pinch R
23	4822 281 11069	Coil Assembly
34	4822 130 10205	Photo Sensor
35	4822 277 11531	Mode Switch
39	4822 278 90613	Leaf Switch
42	4822 358 10168	Belt AF

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





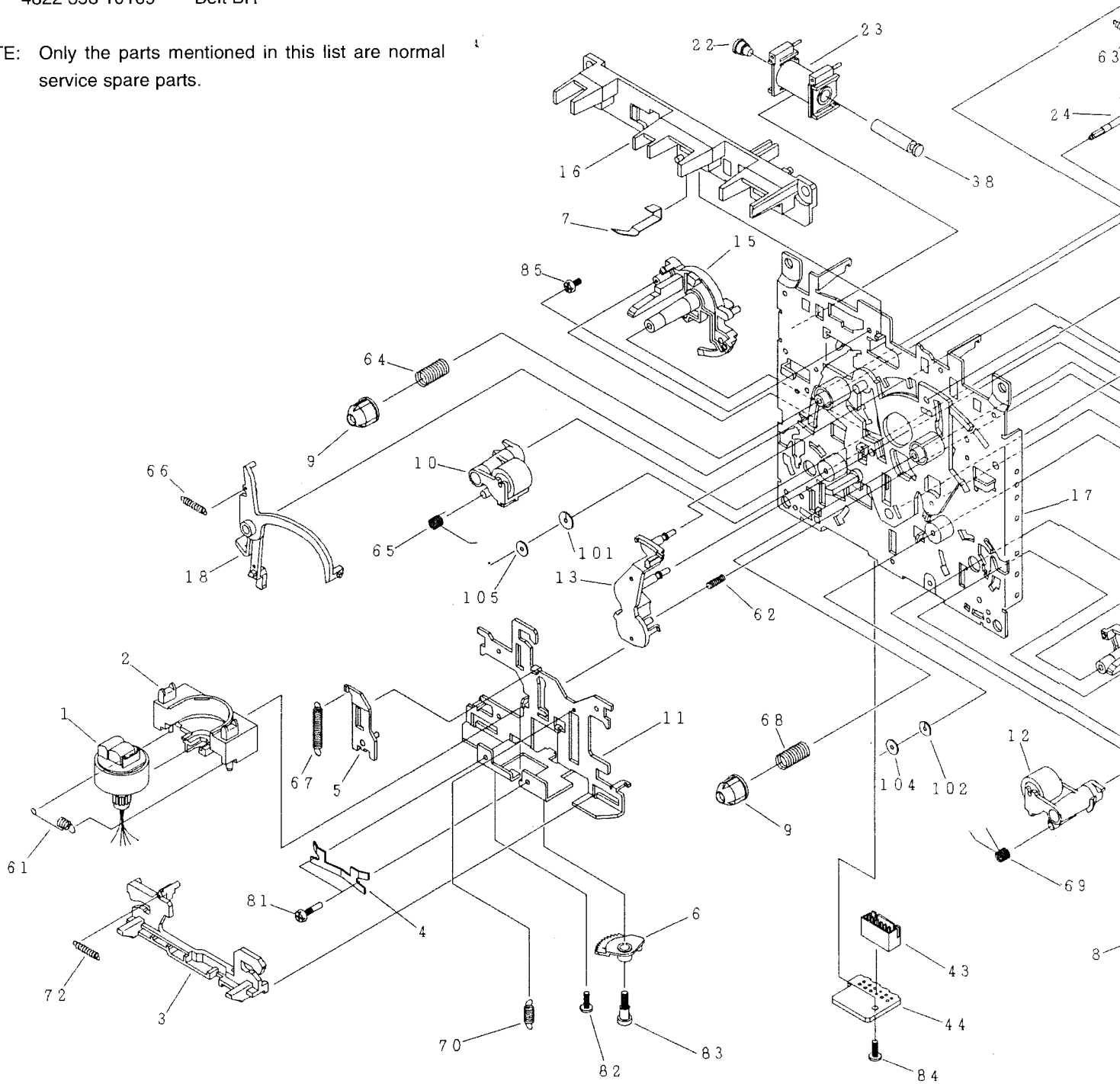


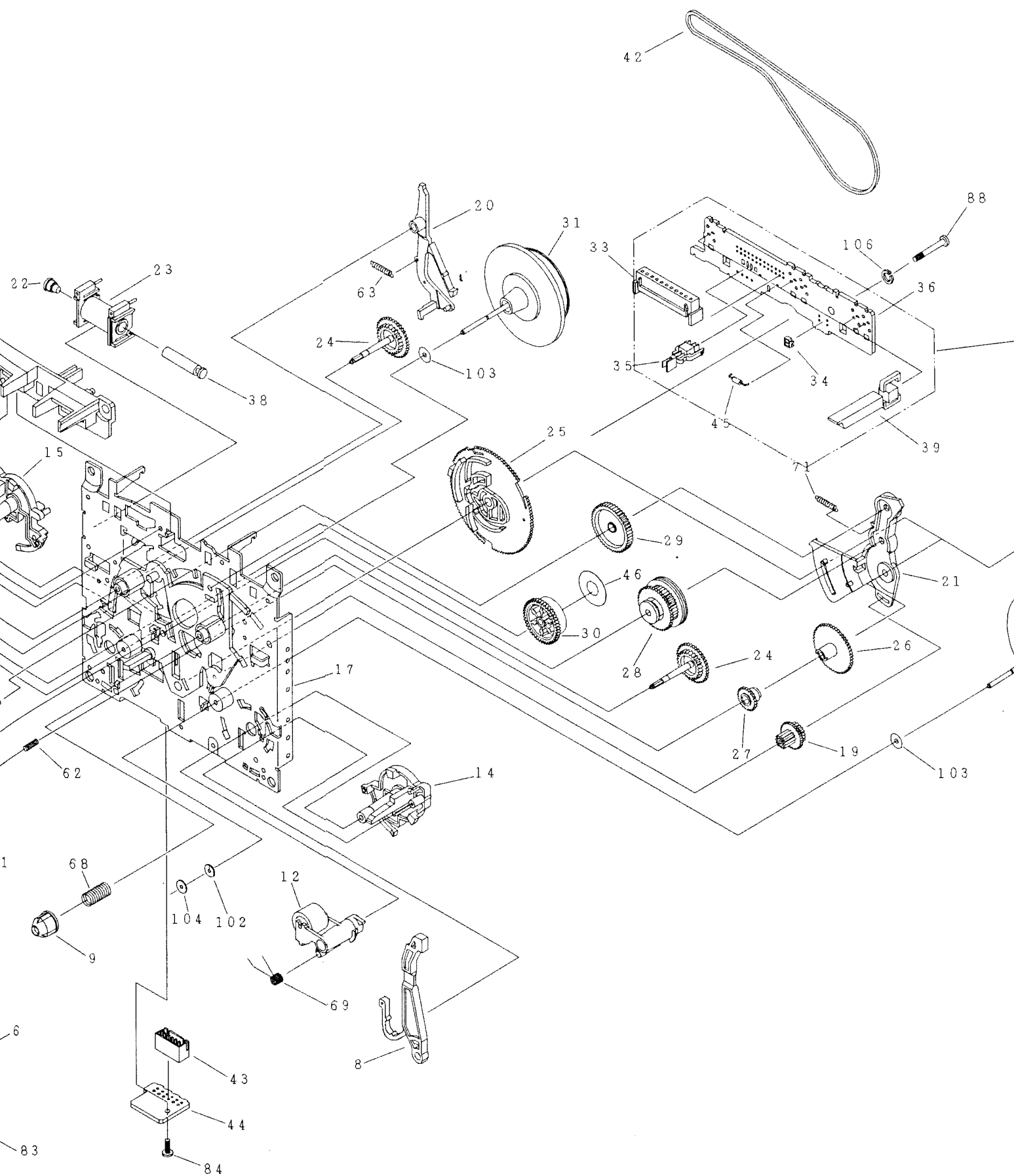
TAPE MECHANISM B

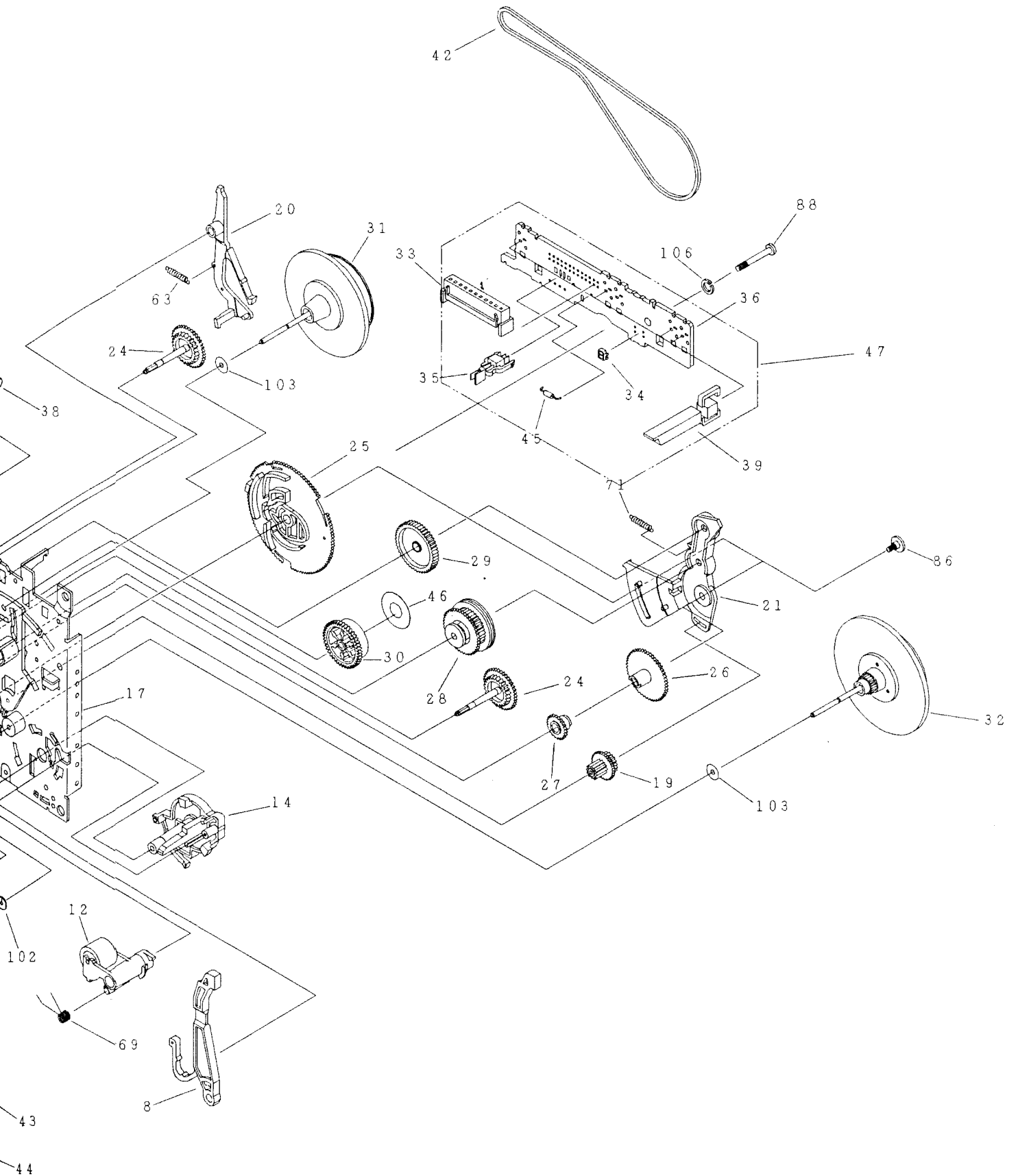
MECHANICAL PARTS

1	4822 249 10526	Rec/Pb Head
10	4822 528 10975	Assembly, Arm Pinch L
12	4822 528 10974	Assembly Arm Pinch R
23	4822 281 11069	Coil Assembly
34	4822 130 10205	Photo Sensor
35	4822 277 11531	Mode Switch
39	4822 278 90613	Leaf Switch
42	4822 358 10169	Belt BR

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







ELECTRICAL PARTS LIST - ETF2 BOARD**CAPACITORS**

2631	4822 122 32542	47nF 10% 63V
2632	4822 122 32542	47nF 10% 63V
2633	4822 122 32927	220nF +80 / -20% 50V
2634	4822 122 32927	220nF +80 / -20% 50V
2635	4822 122 33891	3,3nF 10% 63V
2636	4822 122 33891	3,3nF 10% 63V
2637	5322 121 42498	680nF 5% 63V
2638	5322 121 42498	680nF 5% 63V
2639	5322 122 32531	100pF 5% 50V
2640	5322 122 32531	100pF 5% 50V
2641	4822 124 40246	4,7μF 20% 63V
2642	4822 124 40246	4,7μF 20% 63V
2643	4822 121 43179	18nF 5% 250V
2644	4822 121 43179	18nF 5% 250V
2645	5322 122 32448	10pF 5% 50V
2646	5322 122 32448	10pF 5% 50V
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 81029	100μF 20% 25V
2694	4822 124 81029	100μF 20% 25V
2695	4822 124 41576	2,2μF 20% 50V
2696	4822 124 41576	2,2μF 20% 50V
2701	4822 122 33195	100pF 10% 50V
2702	4822 122 33195	100pF 10% 50V
2703	4822 122 33195	100pF 10% 50V
2704	5322 122 32531	100pF 5% 50V
2705	5322 122 31863	330pF 5% 50V
2706	5322 122 31863	330pF 5% 50V
2707	5322 122 34099	470pF 10% 63V
2708	5322 122 34099	470pF 10% 63V
2709	5322 122 31863	330pF 5% 50V
2710	5322 122 31863	330pF 5% 50V
2711	5322 122 32531	100pF 5% 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 41584	100μF 20% 10V
2715	4822 124 40849	330μF 20% 16V
2716	4822 124 41584	100μF 20% 10V
2716	4822 124 40849	330μF 20% 16V
2717	4822 122 33175	2,2nF 20% 50V
2718	4822 122 33175	2,2nF 20% 50V
2719	4822 122 33893	18nF 10% 63V
2720	4822 122 33893	18nF 10% 63V
2721	4822 122 33342	33nF 10% 63V
2721	4822 122 33177	10nF 20% 50V
2722	4822 122 33342	33nF 10% 63V
2722	4822 122 33177	10nF 20% 50V
2723	4822 126 10326	180pF 5% 63V
2723	4822 122 33342	33nF 10% 63V
2724	4822 126 10326	180pF 5% 63V

2724	4822 122 33342	33nF 10% 63V
2725	5322 126 10794	220pF 5% 63V
2726	5322 126 10794	220pF 5% 63V
2727	4822 122 32535	680pF 10% 63V
2728	4822 122 32535	680pF 10% 63V
2729	4822 122 32541	27nF 10% 63V
2730	4822 122 32541	27nF 10% 63V
2733	5322 122 34099	470pF 10% 63V
2734	5322 122 34099	470pF 10% 63V
2735	4822 126 10002	100nF 20% 25V
2737	5322 122 32654	22nF 10% 63V
2738	5322 122 32654	22nF 10% 63V
2740	5322 122 32654	22nF 10% 63V
2741	4822 126 11714	4,7nF 20%
2752	5322 122 32654	22nF 10% 63V
2760	4822 126 10002	100nF 20% 25V
2761	4822 124 22263	220μF 20% 25V
2762	4822 124 41576	2,2μF 20% 50V
2763	4822 124 41584	100μF 20% 10V
2765	4822 124 40433	47μF 20% 25V
2767	4822 124 41579	10μF 20% 50V
2780	4822 124 41596	22μF 20% 50V
2781	4822 122 33177	10nF 20% 50V
2782	5322 126 10223	4,7nF 10% 63V
2783	5322 121 42386	100nF 5% 63V
2784	4822 121 51305	15nF 10% 50V
2785	4822 124 40242	1μF 20% 63V
2786	5322 122 32531	100pF 5% 50V
2787	4822 122 33342	33nF 10% 63V
2788	5322 122 34123	1nF 10% 50V

RESISTORS

3601	4822 117 11449	2k2 1% 0,1W
3602	4822 117 11449	2k2 1% 0,1W
3604	4822 117 11449	2k2 1% 0,1W
3605	4822 116 52239	120k 5% 0,5W
3606	4822 116 52291	56k 5% 0,5W
3608	4822 116 52239	120k 5% 0,5W
3609	4822 051 20273	27k 5% 0,1W
3610	4822 117 11449	2k2 1% 0,1W
3611	4822 117 11449	2k2 1% 0,1W
3613	4822 117 11449	2k2 1% 0,1W
3614	4822 051 20124	120k 5% 0,1W
3615	4822 051 20563	56k 5% 0,1W
3617	4822 116 52291	56k 5% 0,5W
3618	4822 051 20472	4k7 5% 0,1W
3619	4822 117 10833	10k 1% 0,1W
3620	4822 117 10833	10k 1% 0,1W
3621	4822 051 20473	47k 5% 0,1W
3622	4822 051 20473	47k 5% 0,1W
3623	4822 117 10833	10k 1% 0,1W
3624	4822 051 20472	4k7 5% 0,1W
3625	4822 117 10833	10k 1% 0,1W

ELECTRICAL PARTS LIST - ETF2 BOARD

3626	4822 117 10833	10k 1% 0,1W	3690	4822 116 83864	10k 5% 0,5W
3627	4822 051 20473	47k 5% 0,1W	3691	4822 116 83864	10k 5% 0,5W
3628	4822 051 20473	47k 5% 0,1W	3692	4822 051 20433	43k 5% 0,1W
3629	4822 117 10833	10k 1% 0,1W	3693	4822 051 20689	68R 5% 0,1W
3630	4822 051 20273	27k 5% 0,1W	3694	4822 052 10109	△ 10R 5% 0,33W
3631	4822 116 83884	47k 5% 0,5W	3695	4822 051 20689	68R 5% 0,1W
3632	4822 051 20473	47k 5% 0,1W	3699	4822 051 20562	5k6 5% 0,1W
3633	4822 051 20332	3k3 5% 0,1W	3699	4822 051 20332	3k3 5% 0,1W
3634	4822 051 20332	3k3 5% 0,1W	3701	4822 051 20221	220R 5% 0,1W
3635	4822 100 11771	Trimmer 20k 30% 0,1W	3702	4822 051 20221	220R 5% 0,1W
3636	4822 100 11771	Trimmer 20k 30% 0,1W	3703	4822 051 20221	220R 5% 0,1W
3637	4822 051 20473	47k 5% 0,1W	3704	4822 051 20221	220R 5% 0,1W
3638	4822 051 20473	47k 5% 0,1W	3705	4822 116 83872	220R 5% 0,5W
3639	4822 051 20332	3k3 5% 0,1W	3706	4822 116 83872	220R 5% 0,5W
3640	4822 051 20332	3k3 5% 0,1W	3707	4822 051 20101	100R 5% 0,1W
3641	4822 100 11771	Trimmer 20k 30% 0,1W	3708	4822 051 20101	100R 5% 0,1W
3642	4822 100 11771	Trimmer 20k 30% 0,1W	3709	4822 051 20229	22R 5% 0,1W
3643	4822 051 20473	47k 5% 0,1W	3709	4822 051 20688	6R80 5% 0,1W
3644	4822 051 20473	47k 5% 0,1W	3710	4822 051 20229	22R 5% 0,1W
3645	4822 051 20393	39k 5% 0,1W	3710	4822 051 20688	6R80 5% 0,1W
3646	4822 051 20393	39k 5% 0,1W	3711	4822 051 20184	180k 5% 0,1W
3647	4822 051 20332	3k3 5% 0,1W	3712	4822 051 20184	180k 5% 0,1W
3648	4822 051 20332	3k3 5% 0,1W	3713	4822 117 11449	2k2 1% 0,1W
3649	4822 051 20562	5k6 5% 0,1W	3714	4822 117 11449	2k2 1% 0,1W
3650	4822 051 20562	5k6 5% 0,1W	3715	4822 051 20182	1k8 5% 0,1W
3651	4822 050 11002	1k 1% 0,4W	3716	4822 051 20182	1k8 5% 0,1W
3652	4822 051 10102	1k 2% 0,25W	3717	4822 051 20392	3k9 5% 0,1W
3655	5322 100 11542	Trimmer 4k7 30% 0,1W	3718	4822 051 20392	3k9 5% 0,1W
3656	5322 100 11542	Trimmer 4k7 30% 0,1W	3719	4822 051 20822	8k2 5% 0,1W
3657	4822 051 10102	1k 2% 0,25W	3720	4822 051 20822	8k2 5% 0,1W
3658	4822 050 11002	1k 1% 0,4W	3721	4822 051 20562	5k6 5% 0,1W
3659	4822 051 20333	33k 5% 0,1W	3722	4822 051 20562	5k6 5% 0,1W
3660	4822 116 52271	33k 5% 0,5W	3723	4822 117 11383	12k 1% 0,1W
3661	4822 051 20474	470k 5% 0,1W	3724	4822 117 11383	12k 1% 0,1W
3662	4822 051 20474	470k 5% 0,1W	3725	4822 051 20224	220k 5% 0,1W
3663	4822 051 20184	180k 5% 0,1W	3725	4822 051 10102	1k 2% 0,25W
3664	4822 051 20184	180k 5% 0,1W	3726	4822 051 20224	220k 5% 0,1W
3665	4822 117 11149	82k 1% 0,1W	3726	4822 051 10102	1k 2% 0,25W
3666	4822 117 11149	82k 1% 0,1W	3727	4822 051 20562	5k6 5% 0,1W
3667	4822 051 20473	47k 5% 0,1W	3728	4822 051 20562	5k6 5% 0,1W
3668	4822 051 20473	47k 5% 0,1W	3729	4822 051 20272	2k7 5% 0,1W
3679	4822 051 20473	47k 5% 0,1W	3730	4822 051 20272	2k7 5% 0,1W
3680	4822 051 20472	4k7 5% 0,1W	3731	4822 051 20562	5k6 5% 0,1W
3681	4822 051 20472	4k7 5% 0,1W	3731	4822 051 20682	6k8 5% 0,1W
3682	4822 100 11319	Trimmer 4k7 30% 0,1W	3732	4822 051 20562	5k6 5% 0,1W
3683	4822 051 20822	8k2 5% 0,1W (dolby only)	3732	4822 051 20682	6k8 5% 0,1W
3683	4822 117 10833	10k 1% 0,1W	3733	4822 051 20472	4k7 5% 0,1W
3684	4822 100 11319	Trimmer 4k7 30% 0,1W	3733	4822 051 20122	1k2 5% 0,1W
3685	4822 051 20822	8k2 5% 0,1W	3734	4822 051 20472	4k7 5% 0,1W
3686	4822 051 20473	47k 5% 0,1W	3734	4822 051 20122	1k2 5% 0,1W
3687	4822 051 20471	470R 5% 0,1W	3735	4822 051 20183	18k 5% 0,1W
3688	4822 051 20104	100k 5% 0,1W	3735	4822 051 20223	22k 5% 0,1W
3689	4822 051 20273	27k 5% 0,1W	3736	4822 051 20183	18k 5% 0,1W

ELECTRICAL PARTS LIST - ETF2 BOARD**ELECT****RESISTORS**

3736	4822 051 20223	22k 5% 0,1W
3741	4822 051 10102	1k 2% 0,25W
3742	4822 051 20104	100k 5% 0,1W
3743	4822 051 20182	1k8 5% 0,1W
3743	4822 117 11139	1k5 1% 0,1W
3744	4822 051 20182	1k8 5% 0,1W
3744	4822 117 11139	1k5 1% 0,1W
3745	4822 116 52283	4k7 5% 0,5W
3745	4822 116 52269	3k3 5% 0,5W
3746	4822 051 20472	4k7 5% 0,1W
3746	4822 051 20332	3k3 5% 0,1W
3759	4822 051 20273	27k 5% 0,1W
3760	4822 051 20473	47k 5% 0,1W
3761	4822 117 10833	10k 1% 0,1W
3762	4822 051 20821	820R 5% 0,1W
3763	4822 051 20184	180k 5% 0,1W
3764	4822 116 83883	470R 5% 0,5W
3765	4822 051 20393	39k 5% 0,1W
3766	4822 051 20475	4M7 5% 0,1W
3767	4822 116 52219	330R 5% 0,5W
3768	4822 117 10833	10k 1% 0,1W
3769	4822 117 10833	10k 1% 0,1W
3770	4822 117 11139	1k5 1% 0,1W
3771	4822 051 20122	1k2 5% 0,1W
3772	4822 051 20682	6k8 5% 0,1W
3773	5322 100 11542	Trimmer 4k7 30% 0,1W
3774	4822 116 52303	8k2 5% 0,5W
3775	4822 051 20478	4R7 5% 0,1W
3776	4822 051 20682	6k8 5% 0,1W
3777	4822 117 10353	150R 1% 0,1W
3778	4822 052 10688	△ 6R8 5% 0,33W
3779	4822 051 20334	330k 5% 0,1W
3780	4822 051 20105	1M 5% 0,1W
3781	4822 051 20475	4M7 5% 0,1W
3782	4822 051 20472	4k7 5% 0,1W
3783	4822 051 20472	4k7 5% 0,1W
3784	4822 051 20153	15k 5% 0,1W
3785	5322 100 11539	Trimmer 100k 30% 0,1W
3786	4822 117 11449	2k2 1% 0,1W
3787	4822 116 52235	1M 5% 0,5W
3788	4822 051 20105	1M 5% 0,1W
3789	4822 051 20223	22k 5% 0,1W
3790	4822 051 20473	47k 5% 0,1W
3796	4822 051 10102	1k 2% 0,25W
3797	4822 051 20104	100k 5% 0,1W
4593	4822 051 20008	0R Jumper 0805
4606	4822 051 20008	0R Jumper 0805
4607	4822 051 20008	0R Jumper 0805
4608	4822 051 20008	0R Jumper 0805
4609	4822 051 20008	0R Jumper 0805
4610	4822 051 20008	0R Jumper 0805
4611	4822 051 20008	0R Jumper 0805
4612	4822 051 20008	0R Jumper 0805

4613	4822 051 20008	0R Jumper 0805
4614	4822 051 20008	0R Jumper 0805
4615	4822 051 20008	0R Jumper 0805
4616	4822 051 20008	0R Jumper 0805
4617	4822 051 20008	0R Jumper 0805
4618	4822 051 20008	0R Jumper 0805
4619	4822 051 20008	0R Jumper 0805
4620	4822 051 20008	0R Jumper 0805
4621	4822 051 20008	0R Jumper 0805
4622	4822 051 20008	0R Jumper 0805
4623	4822 051 20008	0R Jumper 0805
4624	4822 051 20008	0R Jumper 0805
4625	4822 051 20008	0R Jumper 0805
4626	4822 051 20008	0R Jumper 0805
4627	4822 051 20008	0R Jumper 0805
4628	4822 051 20008	0R Jumper 0805
4629	4822 051 20008	0R Jumper 0805
4630	4822 051 20008	0R Jumper 0805
4631	4822 051 20008	0R Jumper 0805
4633	4822 051 20008	0R Jumper 0805
4634	4822 051 20008	0R Jumper 0805
4635	4822 051 20008	0R Jumper 0805
4636	4822 051 20008	0R Jumper 0805
4637	4822 051 20008	0R Jumper 0805
4638	4822 051 20008	0R Jumper 0805
4639	4822 051 20008	0R Jumper 0805
4640	4822 051 20008	0R Jumper 0805
4641	4822 051 20008	0R Jumper 0805
4643	4822 051 20008	0R Jumper 0805
4644	4822 051 20008	0R Jumper 0805
4645	4822 051 20008	0R Jumper 0805
4646	4822 051 20008	0R Jumper 0805
4647	4822 051 20008	0R Jumper 0805
4799	4822 051 20008	0R Jumper 0805

6790

6791

TRANS

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COILS & FILTERS

5631	4822 156 21725	MPX Filter LXD-210
5632	4822 156 21725	MPX Filter LXD-210
5701	4822 156 20946	Osc Coil 100kHz
5702	4822 156 21721	Coil 2,2uH 10%
5703	4822 156 21721	Coil 2,2uH 10%

NOTE:

DIODES

6651	4822 130 30621	1N4148
6760	4822 130 34233	BZX79-C5V1
6770	4822 130 30621	1N4148
6771	4822 130 30621	1N4148
6772	4822 130 30621	1N4148
6773	4822 130 30621	1N4148
6774	4822 130 30621	1N4148
6775	4822 130 30621	1N4148
6776	4822 130 30621	1N4148
6777	4822 130 34382	BZX79-C8V2

ELECTRICAL PARTS LIST - ETF2 BOARD

6790	5322 130 30684	1N4002
6791	5322 130 30684	1N4002

TRANSISTORS & INTEGRATED CIRCUITS

7630	4822 209 90406	CXA1101M
7631	5322 130 42136	BC848C
7632	5322 130 42136	BC848C
7633	5322 130 42136	BC848C
7634	5322 130 42136	BC848C
7640	4822 209 83357	NJM4560M
7650	5322 130 42136	BC848C
7651	4822 130 42513	BC858C
7652	5322 130 42136	BC848C
7653	5322 130 60123	BC807-40
7654	5322 130 42136	BC848C
7655	5322 130 60123	BC807-40
7661	5322 130 60123	BC807-40
7662	5322 130 42136	BC848C
7663	4822 130 42513	BC858C
7665	4822 130 42513	BC858C
7666	5322 130 42136	BC848C
7710	4822 209 32919	HEF4952BT
7720	4822 209 32918	AN7318S
7730	4822 209 32919	HEF4952BT
7740	4822 209 32919	HEF4952BT
7750	5322 209 11306	HEF4094BT
7760	4822 209 32919	HEF4952BT
7780	5322 130 42136	BC848C
7781	5322 130 42136	BC848C
7782	5322 130 60068	BC558C
7783	5322 130 42136	BC848C
7784	4822 130 60373	BC856B
7785	4822 130 63494	J111
7786	4822 130 63494	J111
7787	5322 130 42136	BC848C
7788	5322 130 42136	BC848C

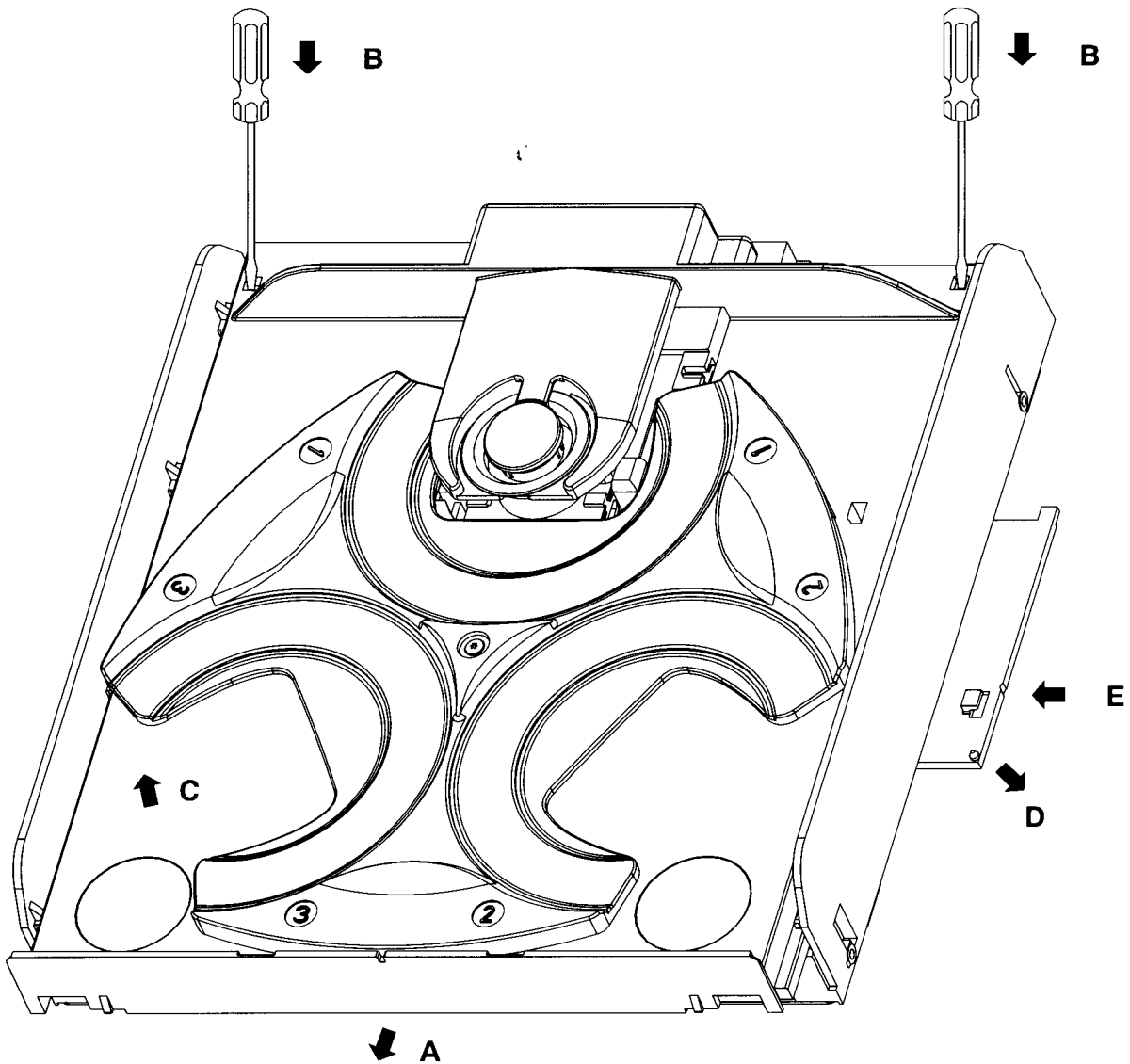
NOTE: Only the parts mentioned in this list are normal service spare parts.

CDC3 MODULE BOARD

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DEMOUNTING HINTS



DEMOUNTING OF DRAWER

- ⇒ A Pull drawer outwards
- ⇒ B Unlock drawer with screwdriver
- ⇒ C Lift drawer to demount from chassis

DEMOUNTING OF FLEX PLATE

- ⇒ D Lift plate to unlock pin from bottom plate
- ⇒ E Move plate inwards to demount from bottom plate

SERVICING HINTS

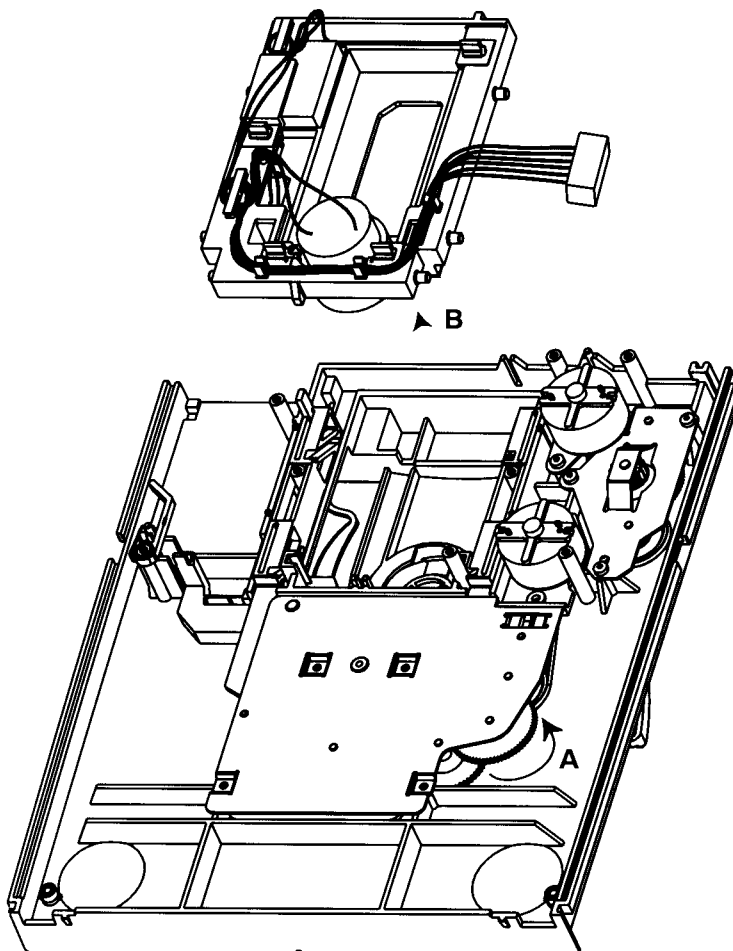
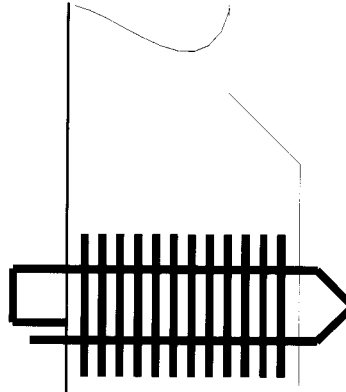
REPLACEMENT OF CDM-12.1

See also exploded view of changer mechanism.

1. Demount flex plate (140).
2. Demount printboard: remove 6 screws and desolder lips of tray motor and carousel motor.
3. Disconnect flexfoil and JST connector of CDM from PCB. Put paperclip on flexfoil to protect CDM against laser damage.
4. Remove 2 screws 107 and 108 and demount CDM lockings 105 and 106.
5. Turn gearwheel 42 of disc-change-mechanism by finger to move CDM-support in upper position (position of carousel between 2 discs during changing). **A**
6. Demount CDM-support 95. **B**

7. Replace CDM 100. The wire tree of JST connector has to be desoldered and resoldered on the new CDM.

CDM flex foil



MOUNTING OF CARROUSEL

1. Turn gearwheel 42 of disc change mechanism by finger until CDM is in play position.
2. Mount carousel 115 so that disc is positioned right on the turntable. Carousel positionnumber doesn't matter.

CD SERVO SERVICE HINTS

CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE CDM-ELECTRONICS WHEN CONNECTION IS MADE TO A NEW CDM MECHANISM. THAT'S WHY, BESIDES THE SAFETY MEASURES LIKE

- SWITCH OFF POWER SUPPLY
- ESD PROTECTION

ADDITIONAL ACTIONS MUST BE TAKEN BY THE REPAIR TECHNICIAN.

The following steps have to be done when replacing the CDM mechanism:

1. Disconnect old CDM flexfoil from printed board
2. Connect paper-clip to CDM flexfoil to short-circuit flexfoil (fig. 1)
3. Short-circuit printed board with brass-sheet (4822 321 11197) plugged into the flexfoil connector (fig. 2)
4. Remove old CDM mechanism
5. Position new CDM mechanism in its studs
6. Remove short-circuit from printed board connector
7. Remove short-circuit from flexfoil of new CDM
8. Connect new flexfoil to print connector (fig. 3)

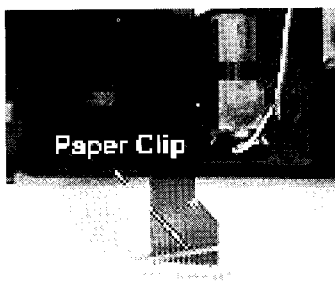


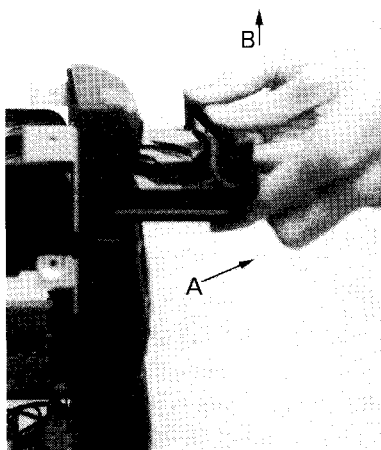
Figure 1



Figure 2



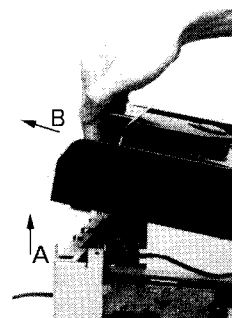
Figure 3

Dismantling Hints for CDC Module

- 1) Remove the CDC Cover as indicated

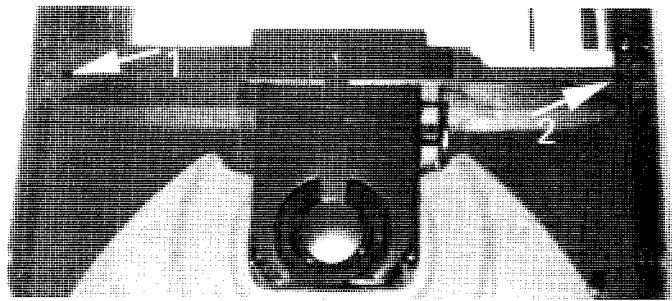
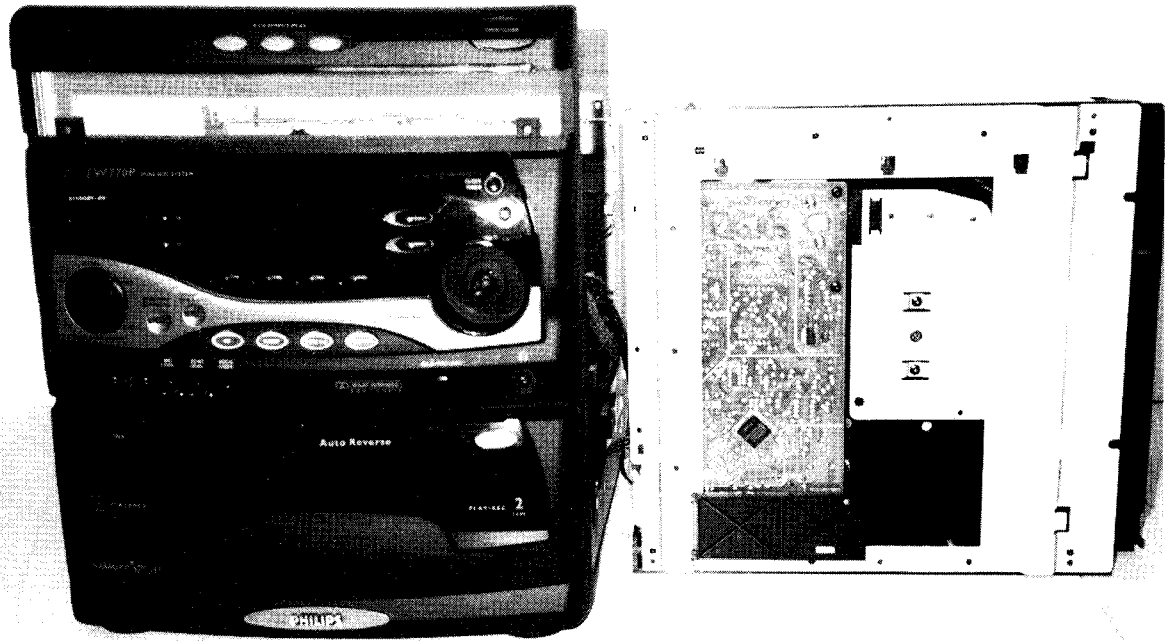


- 2) Remove the 2 hidden screws



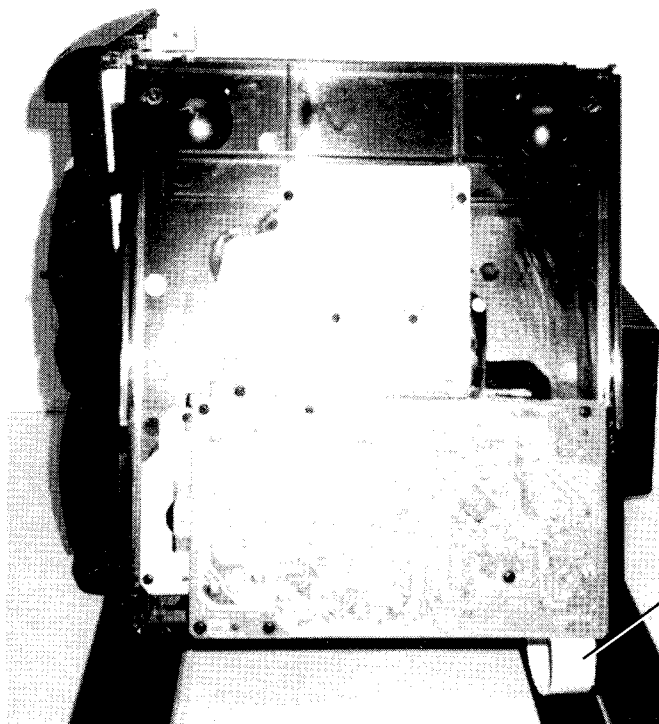
- 3) Remove the back screws, lift-up the Module and pull it out

Service Position A



- 1) Press down the tray catches at position 1 & 2 before pulling the tray out

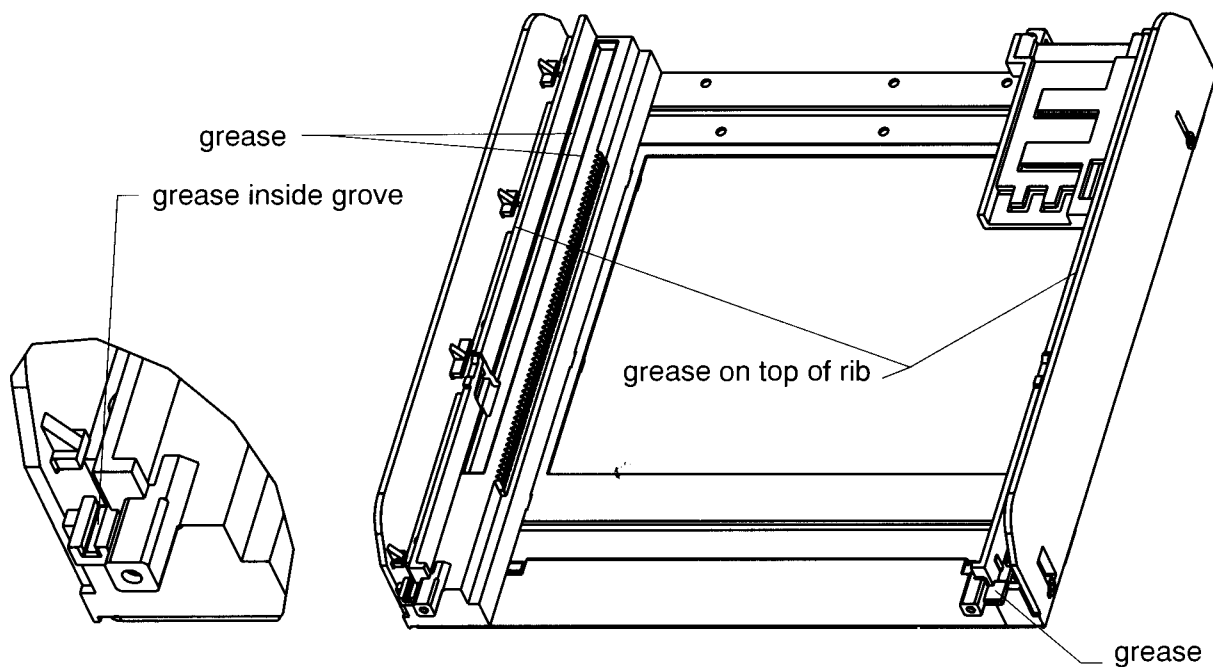
Service Position B



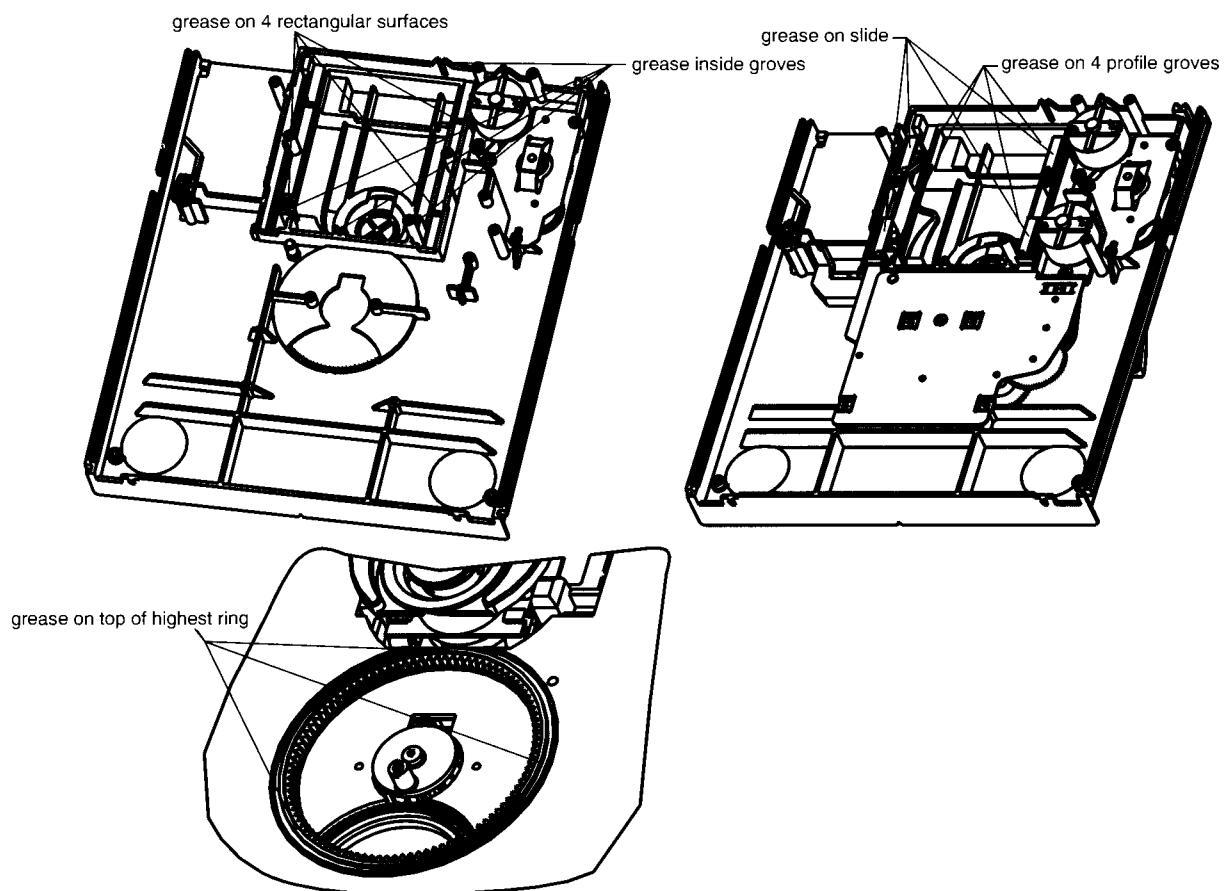
Be careful not to damage
this flex cable

LUBRICATING INSTRUCTIONS

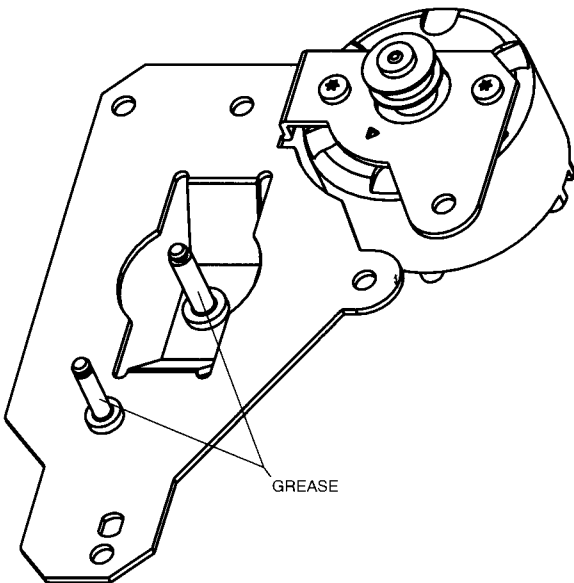
CHASSIS



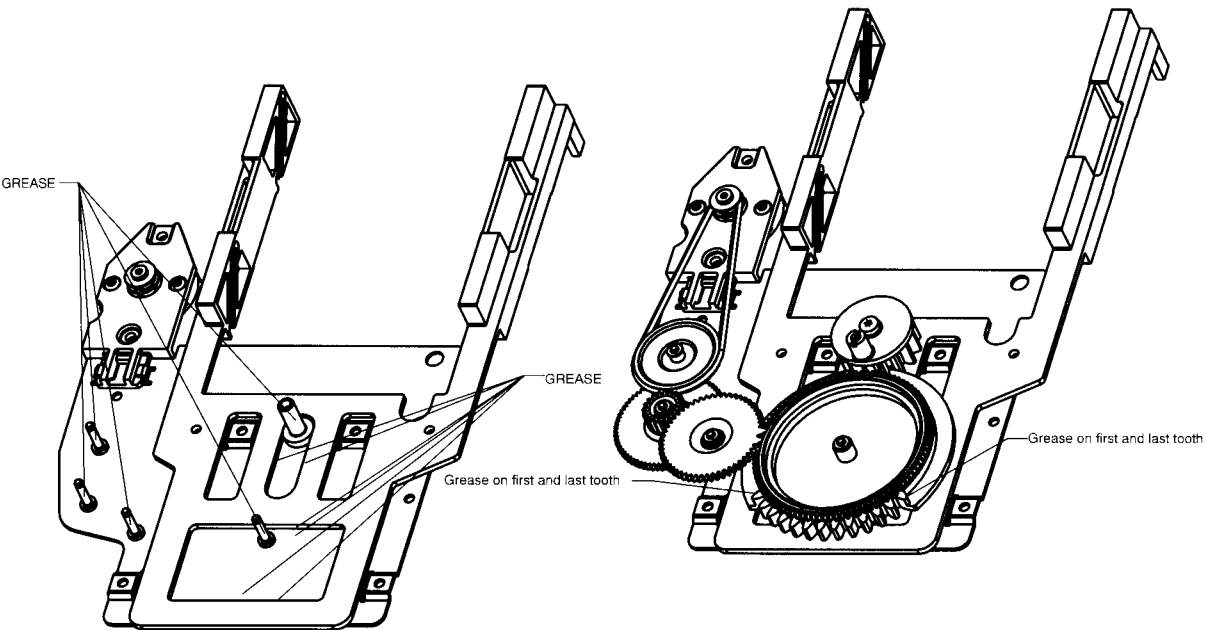
DRAWER



DRAWER MECHANISM

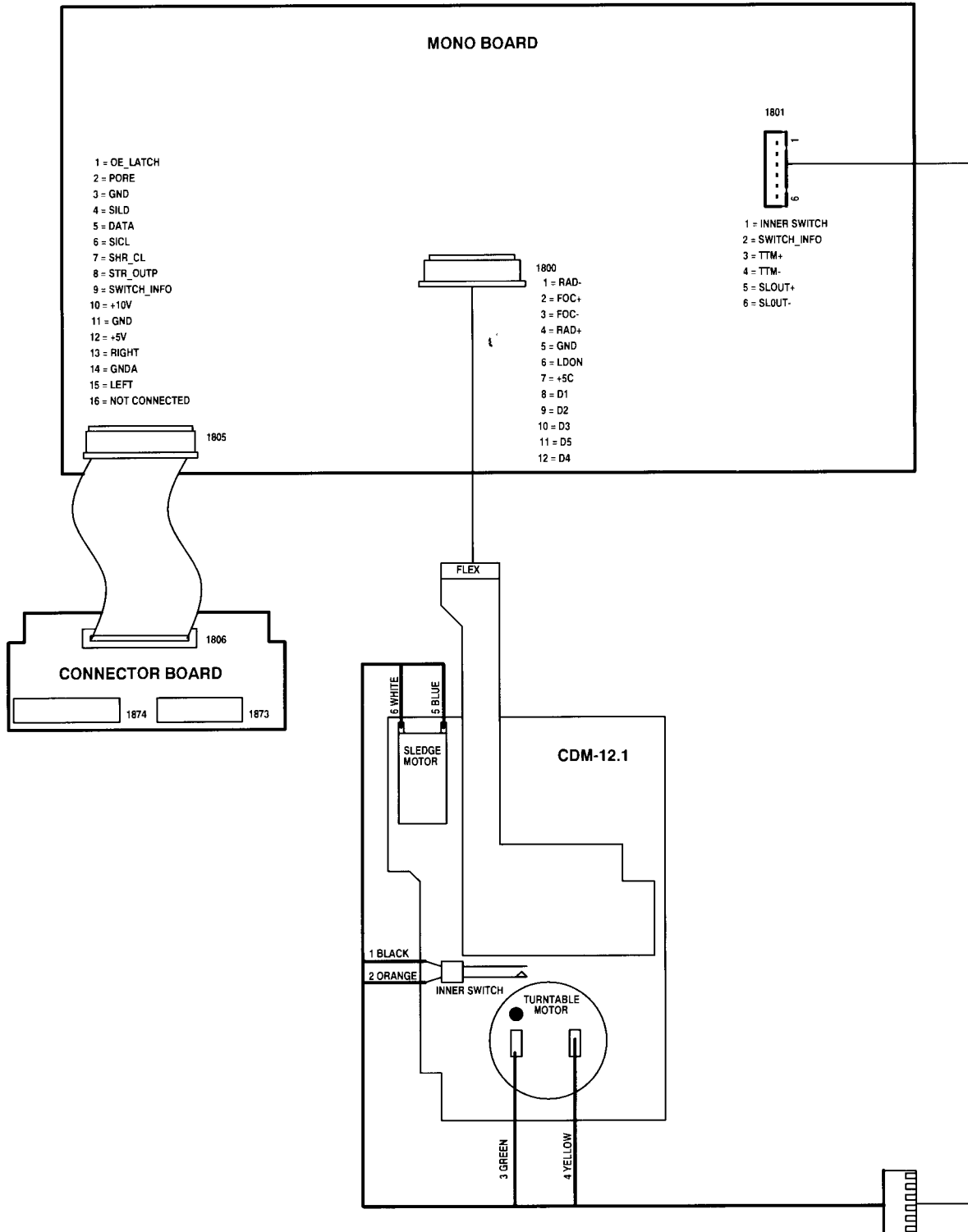


DISC-CHANGE MECHANISM

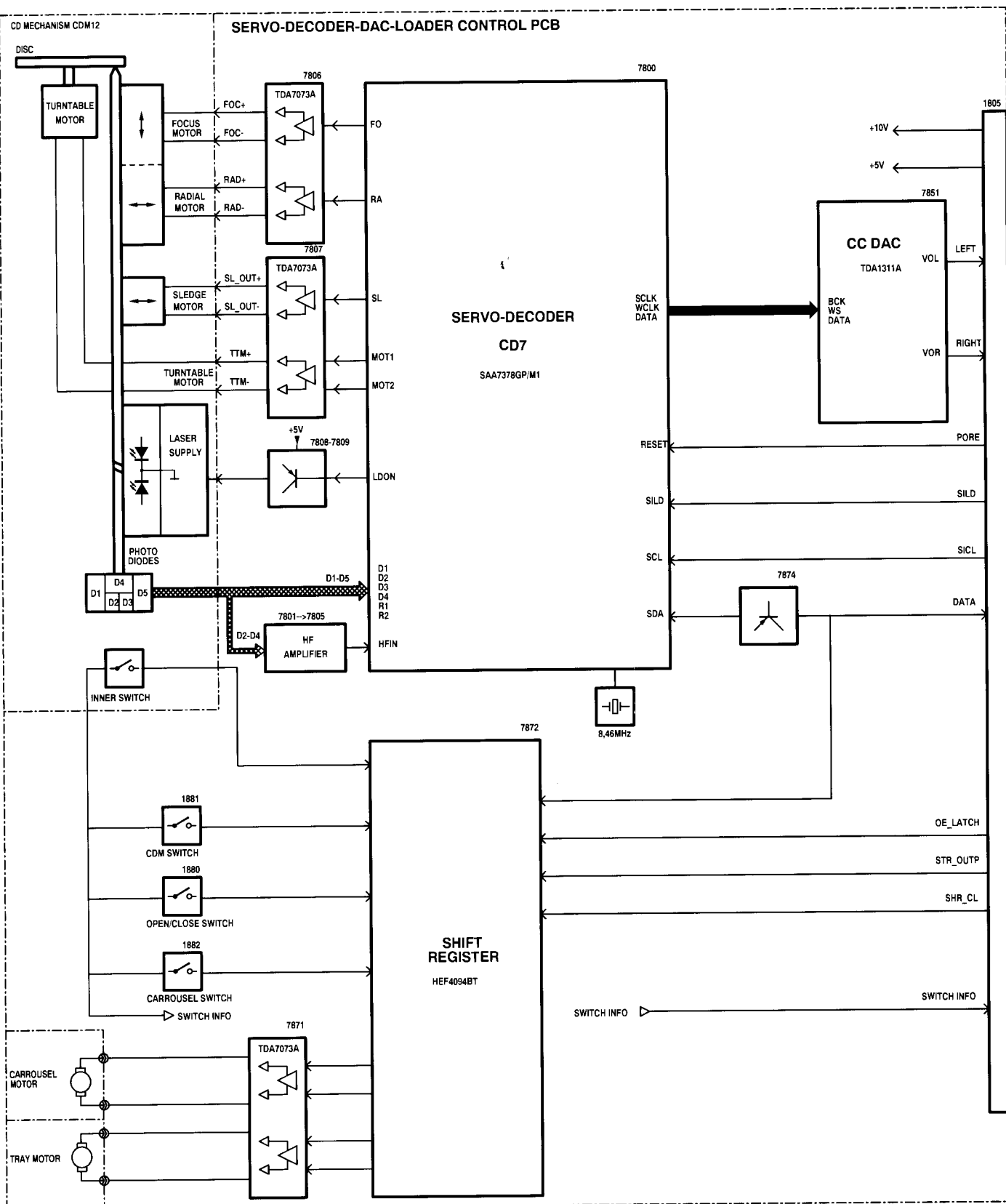


Use only grease **Polylub GLY 801** service codenumber 4822 390 10136

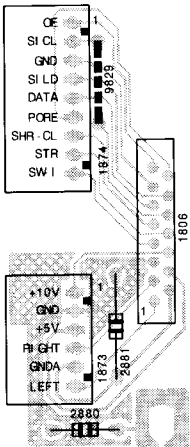
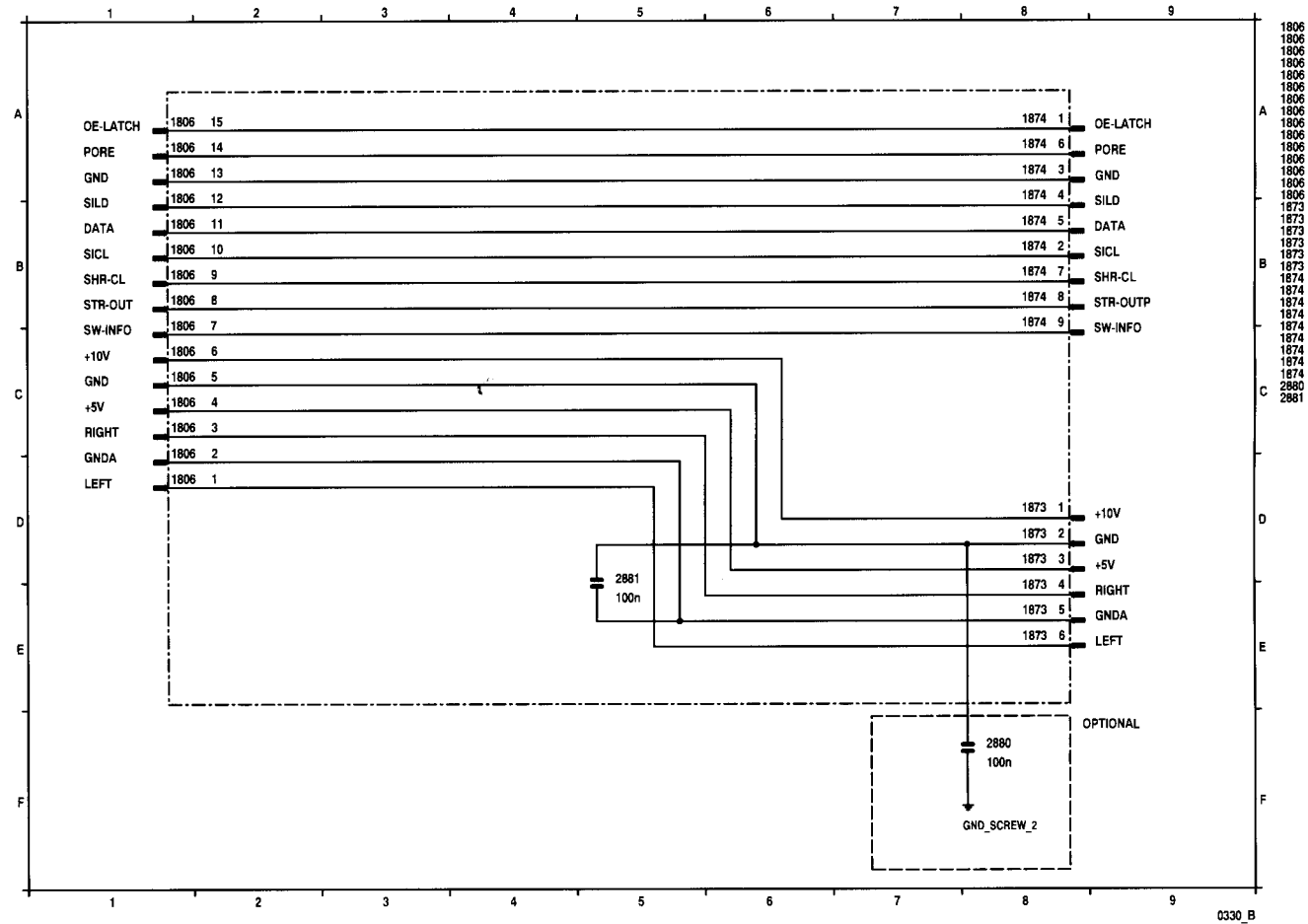
WIRING DIAGRAM



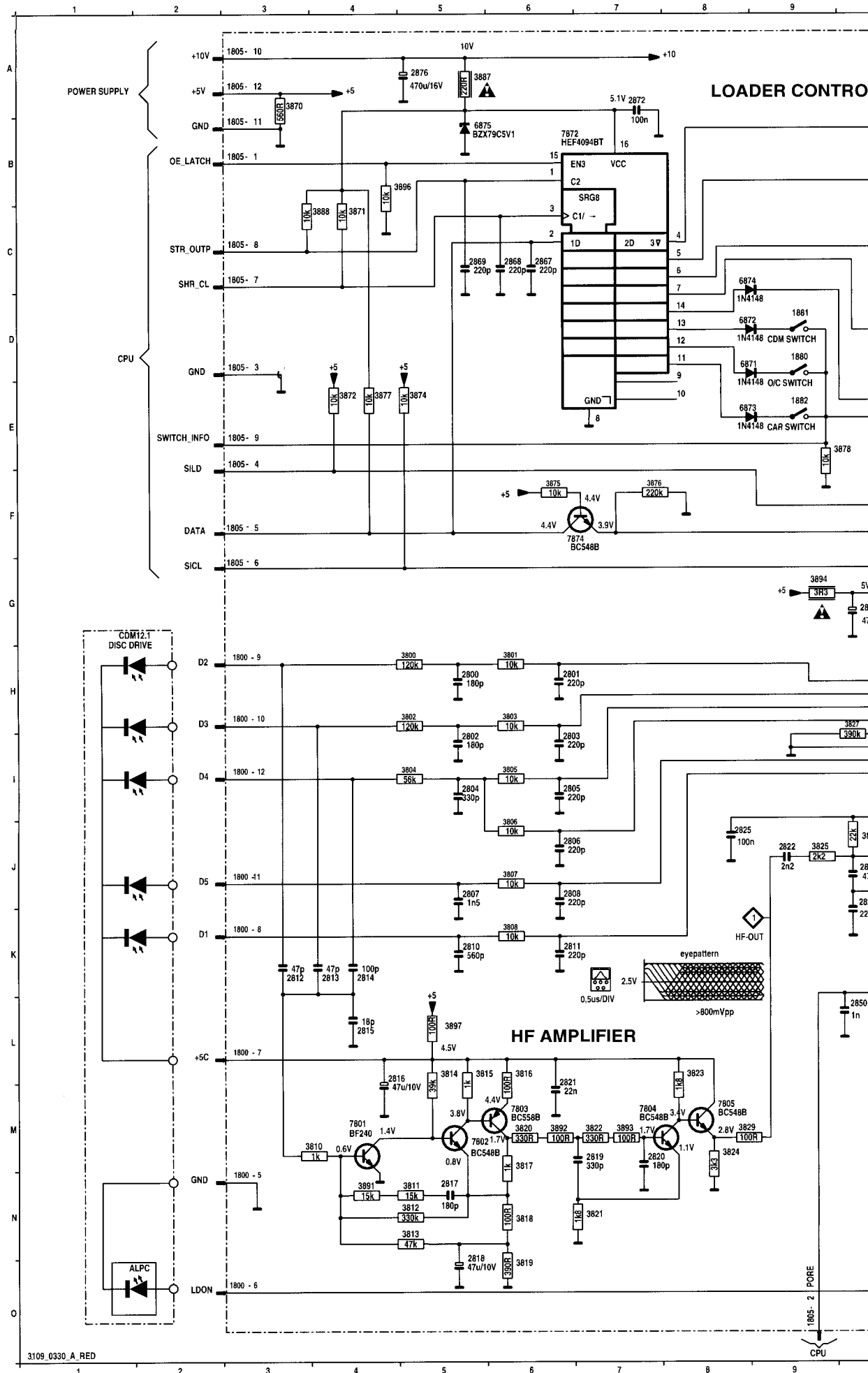
BLOCK DIAGRAM

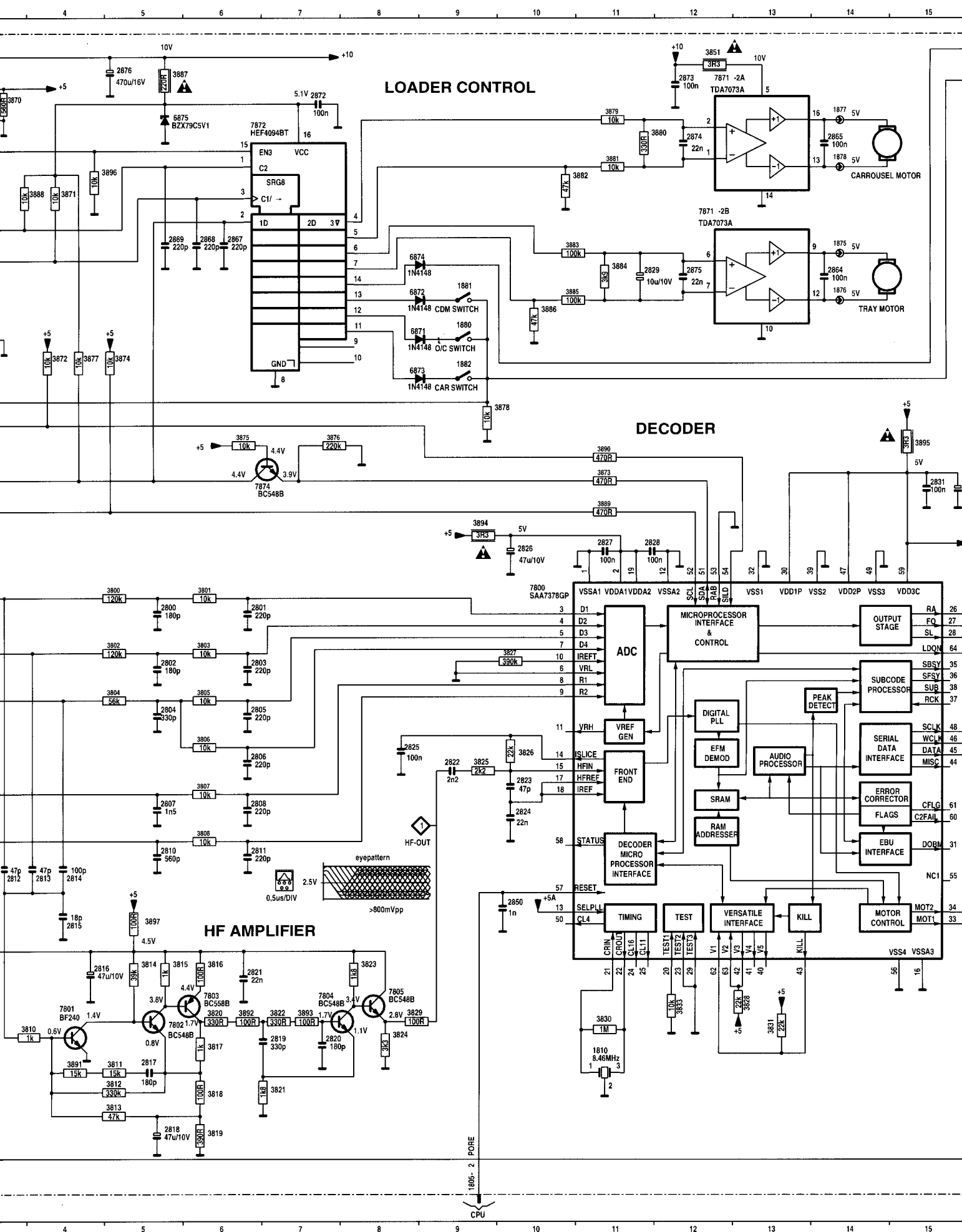


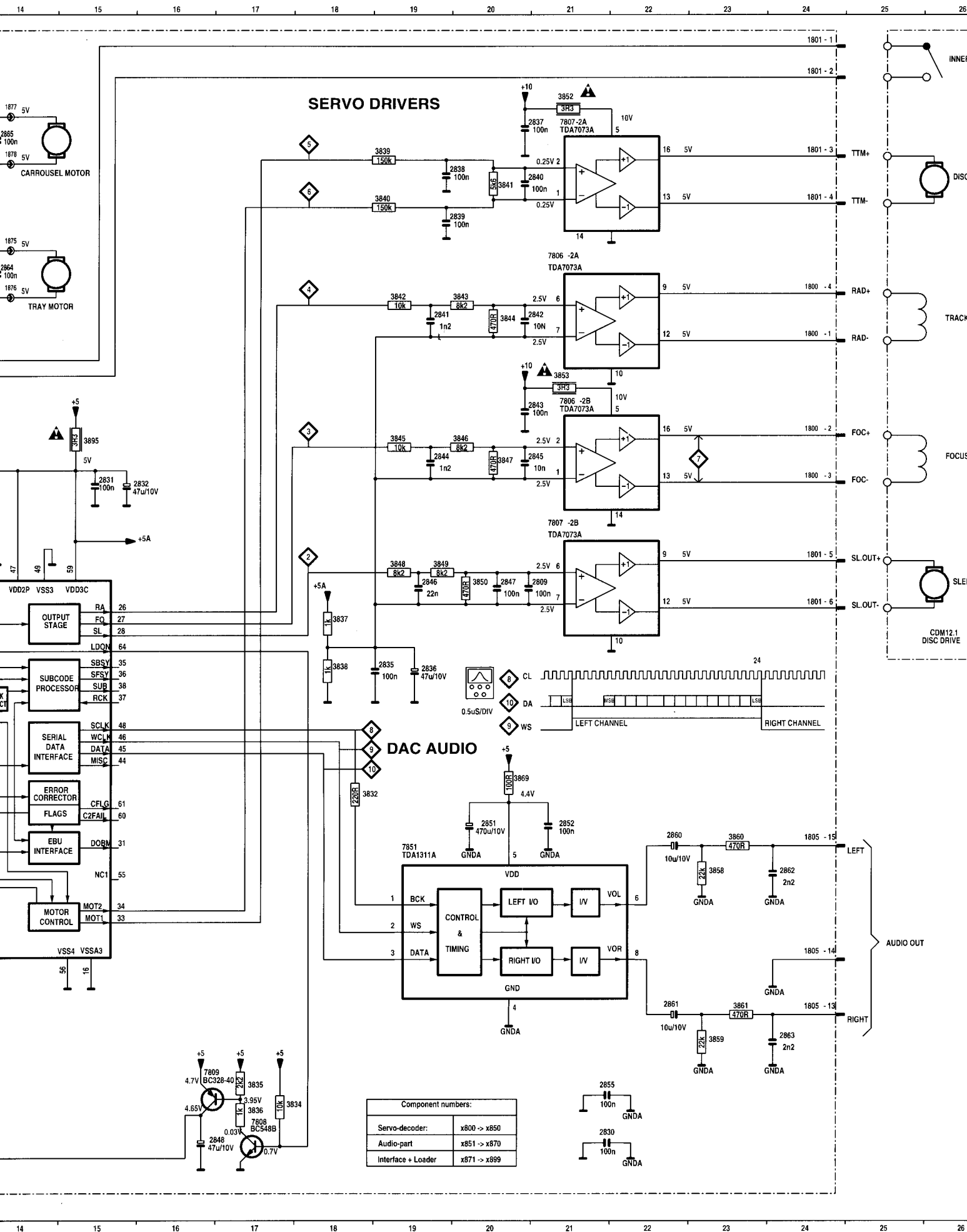
CONNECTOR WIRING AND LAYOUT



CDC-3 CIRCUIT





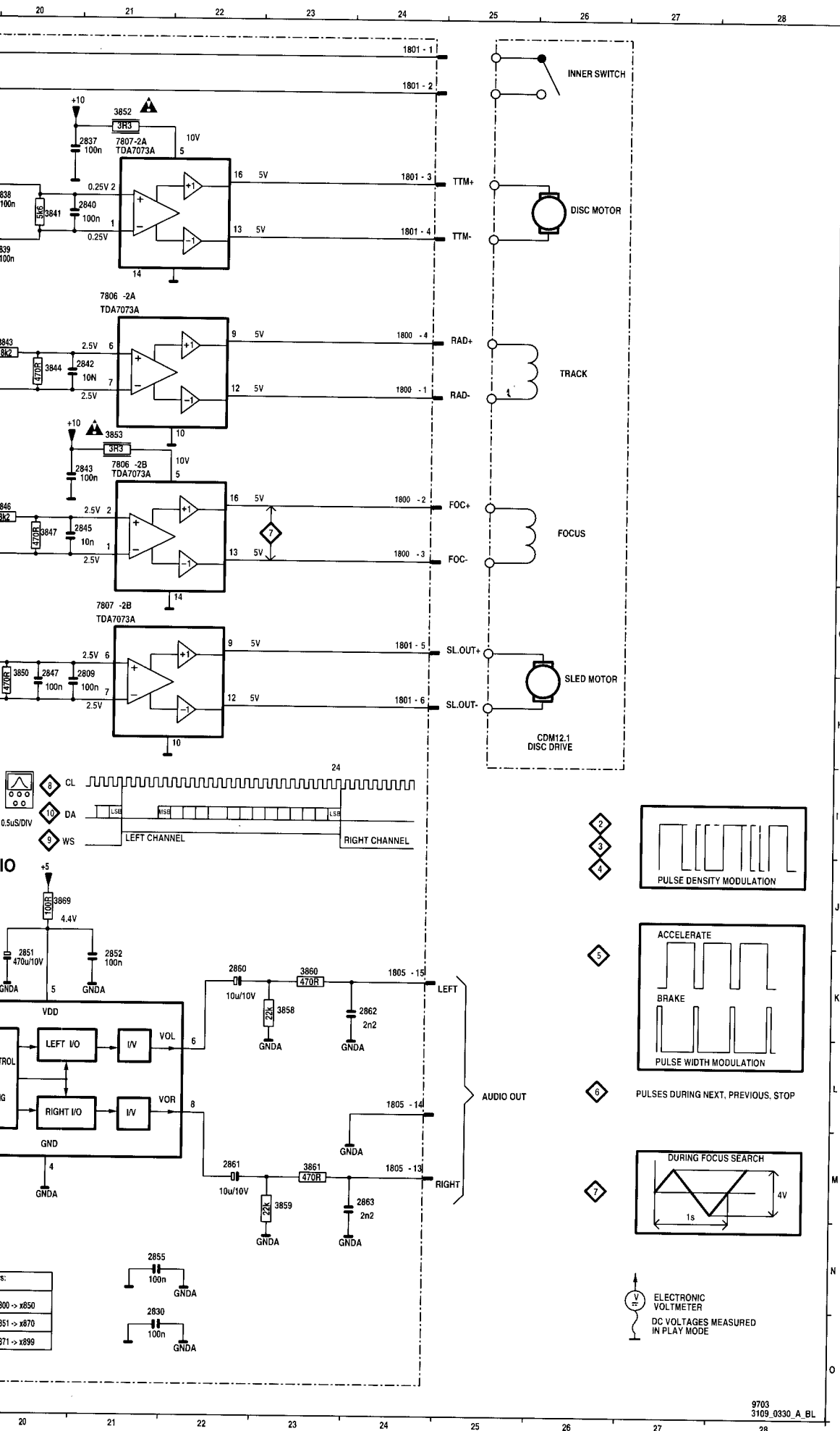


SERVO DRIVERS

DAC AUDIO

AUDIO OUT

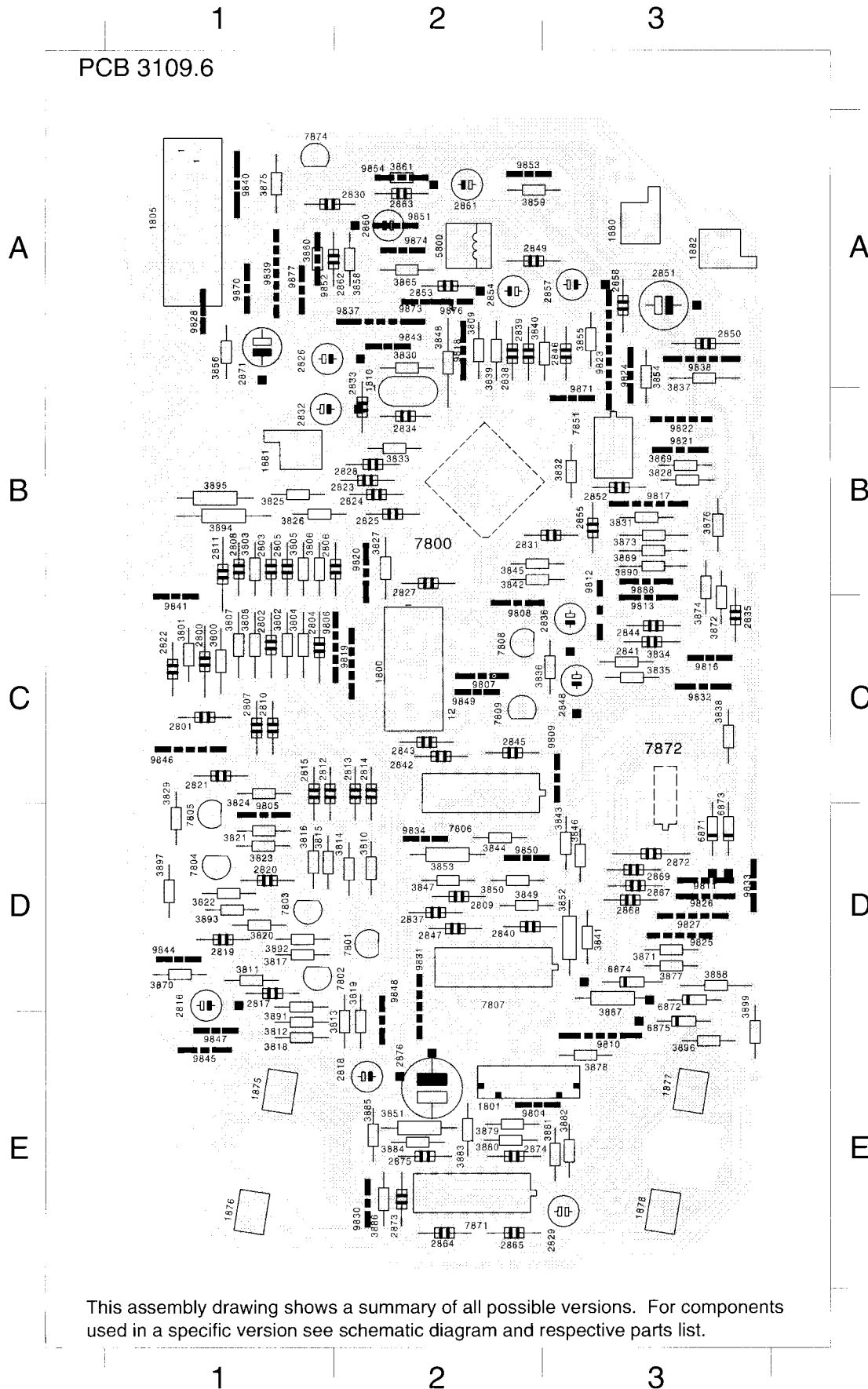
Component numbers:	
Servo-decoder:	x800 -> x850
Audio-part	x851 -> x870
Interface + Loader	x871 -> x899



	1800 D24	3873 F11
	1800 F24	3874 E5
	1800 F24	3875 F6
	1800 G24	3876 F7
	1800 N3	3877 E4
A	1800 O3	3878 E9
	1800 L3	3879 B11
	1800 K3	3880 B11
	1800 H3	3881 B11
	1800 H3	3882 B10
	1800 J3	3883 C10
	1800 K3	3884 C11
	1801 A24	3885 D10
	1801 A24	3886 D10
	1801 A24	3887 A5
	1801 C24	3888 C4
	1801 G24	3889 G11
B	1801 H24	3890 F11
	1805 C3	3891 N4
	1805 D3	3892 M6
	1805 E3	3894 G9
	1805 G3	3895 F5
	1805 G3	3896 B4
	1805 C3	3897 L5
	1805 C3	3871 D9
	1805 A3	3897 D9
C	1805 B3	3873 E9
	1805 A3	3874 E9
	1805 A3	3875 B6
	1805 K24	3890 M10
	1805 L24	7801 M4
	1805 K24	7802 M5
	1805 L24	7803 M6
	1880 D9	7804 M7
	1881 D9	7805 M8
	1882 E9	7806 E21
D	1882 G9	7807 C11
	1881 H6	7807 B21
	2802 J5	7808 N17
	2803 J6	7809 N17
	2805 J5	7810 K5
	2805 J6	7811 A12
	2806 J5	7812 A12
	2806 J6	7813 A12
E	2809 H21	7874 F6
	2810 K5	
	2811 K5	
	2812 K3	
	2813 K4	
	2814 K4	
	2815 L4	
	2816 L4	
	2817 N5	
	2818 O5	
F	2820 H10	
	2821 M6	
	2822 J9	
	2823 J10	
	2824 J10	
	2825 J8	
	2826 G11	
	2827 G11	
	2828 G11	
	2829 D11	
G	2830 Q21	
	2831 F15	
	2832 F16	
	2835 J9	
	2836 J9	
	2837 B20	
	2838 B19	
	2839 C19	
	2840 Z20	
	2841 D19	
	2842 D20	
H	2843 M6	
	2844 F19	
	2845 F20	
	2846 H19	
	2847 D20	
	2848 O16	
	2850 L10	
	2851 K20	
	2852 N17	
	2853 N17	
	2855 N21	
	2860 K22	
	2861 M22	
	2862 K24	
	2863 M24	
	2864 D14	
	2865 D14	
	2867 C6	
	2868 C6	
	2869 C5	
	2870 A7	
	2873 A12	
	2874 B12	
	2875 D12	
	2876 L5	
	3800 H5	
	3801 H6	
	3802 H5	
	3803 H6	
	3804 L5	
	3805 L6	
	3806 L6	
	3807 J6	
	3808 K6	
	3810 M4	
	3811 N5	
	3812 N5	
	3813 N5	
	3814 L5	
	3815 L6	
	3816 L6	
	3817 M6	
	3818 N6	
	3819 O6	
	3820 M6	
	3821 M6	
	3822 M7	
	3823 L8	
	3824 M8	
	3825 J9	
	3826 J9	
	3827 H10	
	3828 M13	
	3829 M8	
	3830 M11	
	3831 M13	
	3832 J12	
	3833 M12	
	3834 N12	
	3835 N17	
	3836 N17	
	3837 H18	
	3838 H8	
	3840 C19	
	3841 D19	
	3842 D19	
	3843 D20	
	3844 D20	
	3845 F16	
	3846 F20	
	3848 G19	
	3849 G19	
	3851 A12	
	3852 A21	
	3853 E21	
	3858 K23	
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	3860 K23	
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	3869 J20	
	3870 A3	
	3871 A4	
	3872 A4	

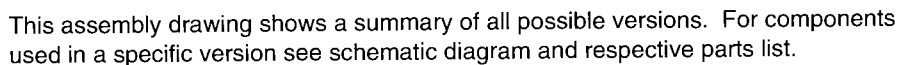
CDC-3 COMPONENT LAYOUT

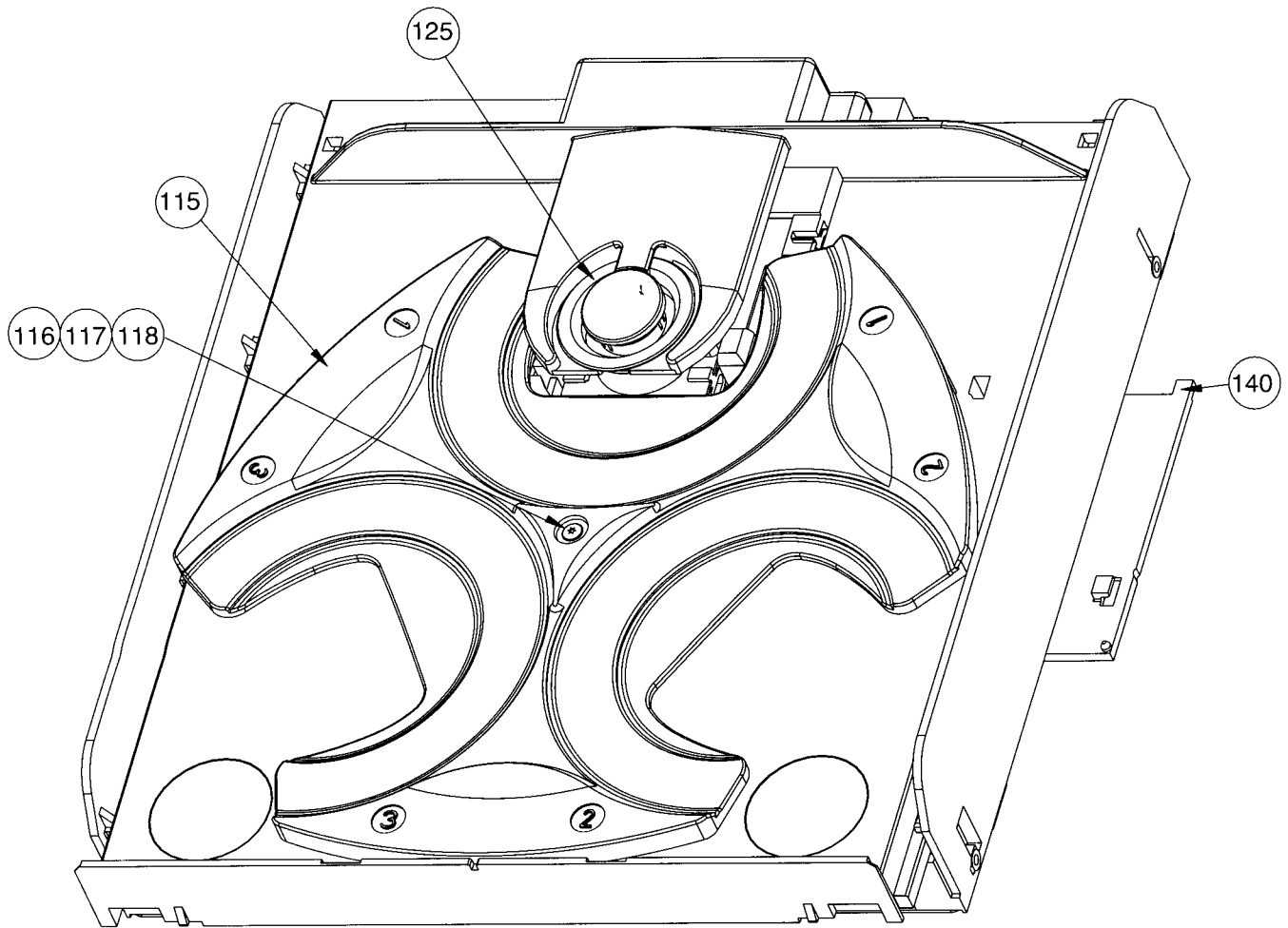
CDC-3



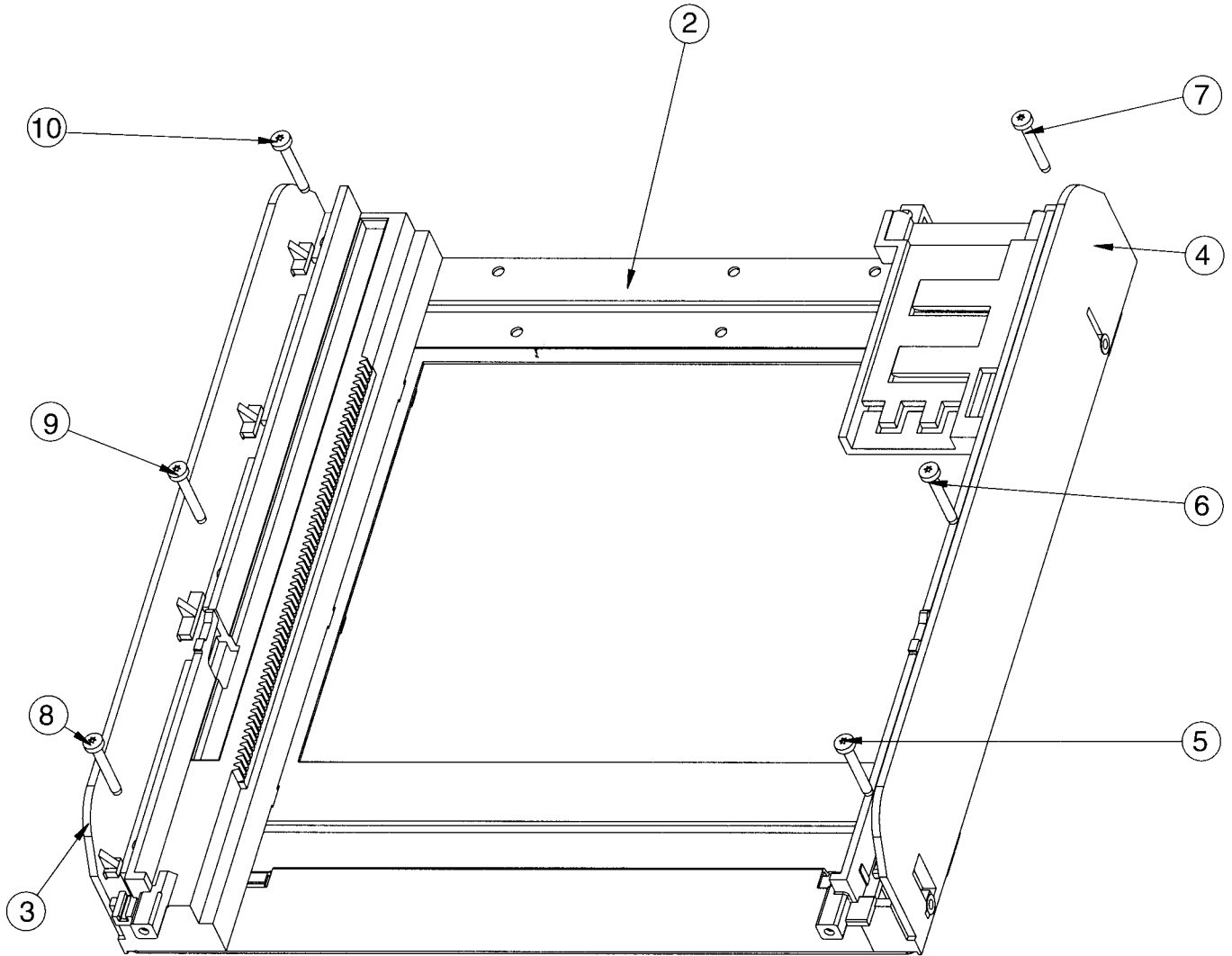
1800 C 2	3807 C 1	7801 D 2
1801 E 2	3808 C 1	7802 D 1
1805 A 1	3809 A 2	7803 D 1
1810 B 2	3810 D 2	7804 D 1
1875 E 1	3811 D 1	7805 D 1
1876 E 1	3812 E 1	7806 C 2
1877 E 3	3813 E 2	7807 D 2
1878 E 3	3814 D 2	7808 C 2
1880 A 3	3815 D 1	7809 C 2
1881 B 1	3816 D 1	7851 B 3
1882 A 3	3817 D 1	7871 E 2
2800 C 1	3818 E 1	7874 A 1
2801 C 1	3819 E 2	9804 E 2
2802 C 1	3820 D 1	9805 D 1
2803 B 1	3821 D 1	9806 C 2
2804 C 1	3822 D 1	9807 C 2
2805 B 1	3823 D 1	9808 C 2
2806 B 2	3824 C 1	9809 C 3
2807 C 1	3825 B 1	9810 E 3
2808 B 1	3826 B 1	9811 D 3
2809 D 2	3827 B 2	9812 C 3
2810 C 1	3828 B 3	9813 C 3
2811 B 1	3829 D 1	9816 C 3
2812 C 1	3830 A 2	9817 B 3
2813 C 2	3831 B 3	9818 A 2
2814 C 2	3832 B 3	9819 C 2
2815 C 1	3833 B 2	9820 B 2
2816 D 1	3834 C 3	9821 B 3
2817 D 1	3835 C 3	9822 B 3
2818 E 2	3836 C 3	9823 A 3
2819 D 1	3837 A 3	9824 A 3
2820 D 1	3838 C 3	9825 D 3
2821 C 1	3839 A 2	9826 D 3
2822 C 1	3840 A 3	9827 D 3
2823 B 2	3841 D 3	9828 A 1
2824 B 2	3842 B 2	9830 E 2
2825 B 2	3843 D 3	9831 D 2
2826 A 1	3844 D 2	9832 C 3
2827 B 2	3845 B 2	9833 D 3
2828 B 2	3846 D 2	9834 D 2
2829 E 3	3847 D 2	9837 A 2
2830 A 1	3848 A 2	9838 A 3
2831 B 3	3849 D 2	9839 A 1
2832 B 1	3850 D 2	9840 A 1
2833 B 2	3851 E 2	9841 C 1
2834 B 2	3852 D 3	9843 A 2
2835 C 3	3853 D 2	9844 D 1
2836 C 3	3854 A 3	9845 E 1
2837 D 2	3855 A 3	9846 C 1
2838 A 2	3856 A 1	9847 E 1
2839 A 2	3858 A 2	9848 E 2
2840 D 2	3859 A 2	9849 C 2
2841 C 3	3860 A 1	9850 D 2
2842 C 2	3861 A 2	9851 A 2
2843 C 2	3865 A 2	9852 A 1
2844 C 3	3869 B 3	9853 A 2
2845 C 2	3870 D 1	9854 A 2
2846 A 3	3871 D 3	9870 A 1
2847 D 2	3872 C 3	9871 B 3
2848 C 3	3873 B 3	9873 A 2
2849 A 2	3874 B 3	9874 A 2
2850 A 3	3875 A 1	9876 A 2
2851 A 3	3876 B 3	9877 A 1
2852 B 3	3877 D 3	9888 B 3
2853 A 2	3878 E 3	
2854 A 2	3879 E 2	
2855 B 3	3880 E 2	
2857 A 3	3881 E 3	
2858 A 3	3882 E 3	
2860 A 2	3883 E 2	
2861 A 2	3884 E 2	
2862 A 1	3885 E 2	
2863 A 2	3886 E 2	
2864 E 2	3887 D 3	
2865 E 2	3888 D 3	
2867 D 3	3889 B 3	
2868 D 3	3890 B 3	
2869 D 3	3891 D 1	
2871 A 1	3892 D 1	
2872 D 3	3893 D 1	
2873 E 2	3894 B 1	
2874 E 2	3895 B 1	
2875 E 2	3896 E 3	
2876 E 2	3897 D 1	
3800 C 1	3899 E 3	
3801 C 1	5800 A 2	
3802 C 1	6871 D 3	
3803 B 1	6872 D 3	
3804 C 1	6873 D 3	
3805 B 1	6874 D 3	
3806 B 1	6875 E 3	

7801 D 2
7802 D 1
7803 D 1
7804 D 1
7805 D 1
7806 C 2
7807 D 2
7808 C 2
7809 C 2
7851 B 3
7871 E 2
7874 A 1
9804 E 2
9805 D 1
9806 C 2
9807 C 2
9808 C 2
9809 C 3
9810 E 3
9811 D 3
9812 C 3
9813 C 3
9816 C 3
9817 B 3
9818 A 2
9819 C 3
9820 B 2
9821 B 3
9822 B 3
9823 A 3
9824 A 3
9825 D 3
9826 D 3
9827 D 3
9828 A 1
9830 E 2
9831 D 2
9832 C 3
9833 D 3
9834 D 2
9837 A 3
9838 A 2
9839 A 1
9840 A 1
9841 C 1
9843 A 2
9844 D 1
9845 E 1
9846 C 1
9847 E 1
9848 E 2
9849 C 2
9850 D 2
9851 A 2
9852 A 1
9853 A 1
9854 A 1
9870 A 1
9871 B 1
9873 A 1
9874 A 1
9876 A 1
9877 A 1
9888 B 1





3	4822 463 11008	Guide Left	45	4822 358 10115	Belt	83
4	4822 463 11009	Guide Right	46	4822 466 10735	Eccentric Gear Wheel	84
21	4822 441 11615	Drawer	50	4822 532 12364	Washer	95
22	4822 402 10088	Tumbler	51	4822 532 12364	Washer	96
35	4822 361 10753	Carrousel Motor	52	4822 532 12364	Washer	97
38	4822 502 12548	Screw M2,6 X 3,5	53	4822 532 12364	Washer	98
39	4822 502 12548	Screw M2,6 X 3,5	70	4822 361 10753	Tray Motor	99
40	4822 463 11011	Slide	73	4822 502 12548	Screw M 2,6 X 3,5	100
41	4822 522 10509	Control Disc	74	4822 502 12548	Screw M 2,6 X 3,5	115
42	4822 522 10492	Gear Wheel	80	4822 528 10937	Pulley	117
43	4822 528 10937	Pulley	81	4822 522 10494	Gear Wheel	120
44	4822 522 10493	Idler Wheel	82	4822 358 10115	Belt	121



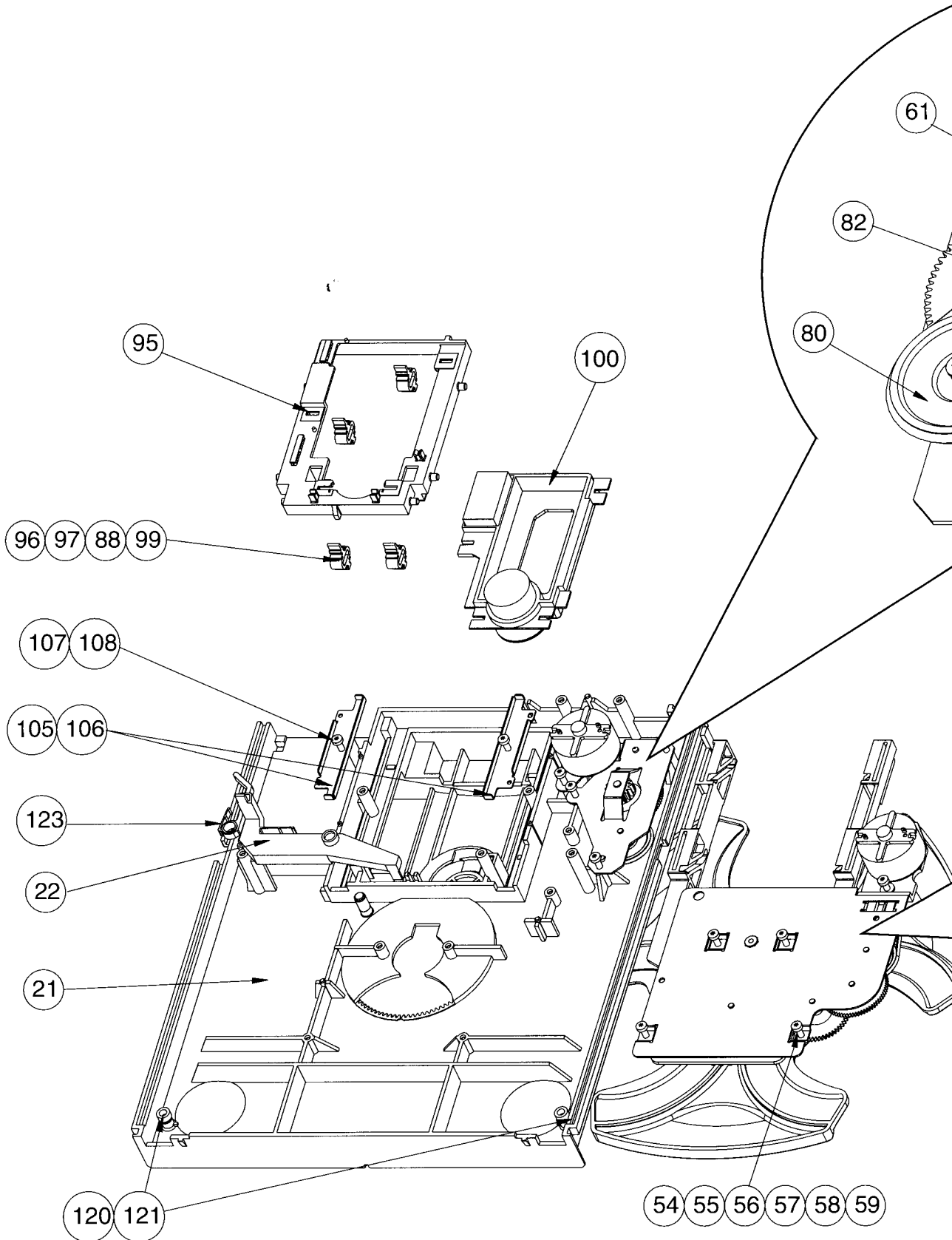
83	4822 532 12364	Washer
84	4822 532 12364	Washer
95	4822 404 10894	CDM Support
96	4822 325 50215	Suspension
97	4822 325 50215	Suspension
98	4822 325 50215	Suspension
99	4822 325 50215	Suspension
100	4822 691 30278	CDM-12.1 Mechanism

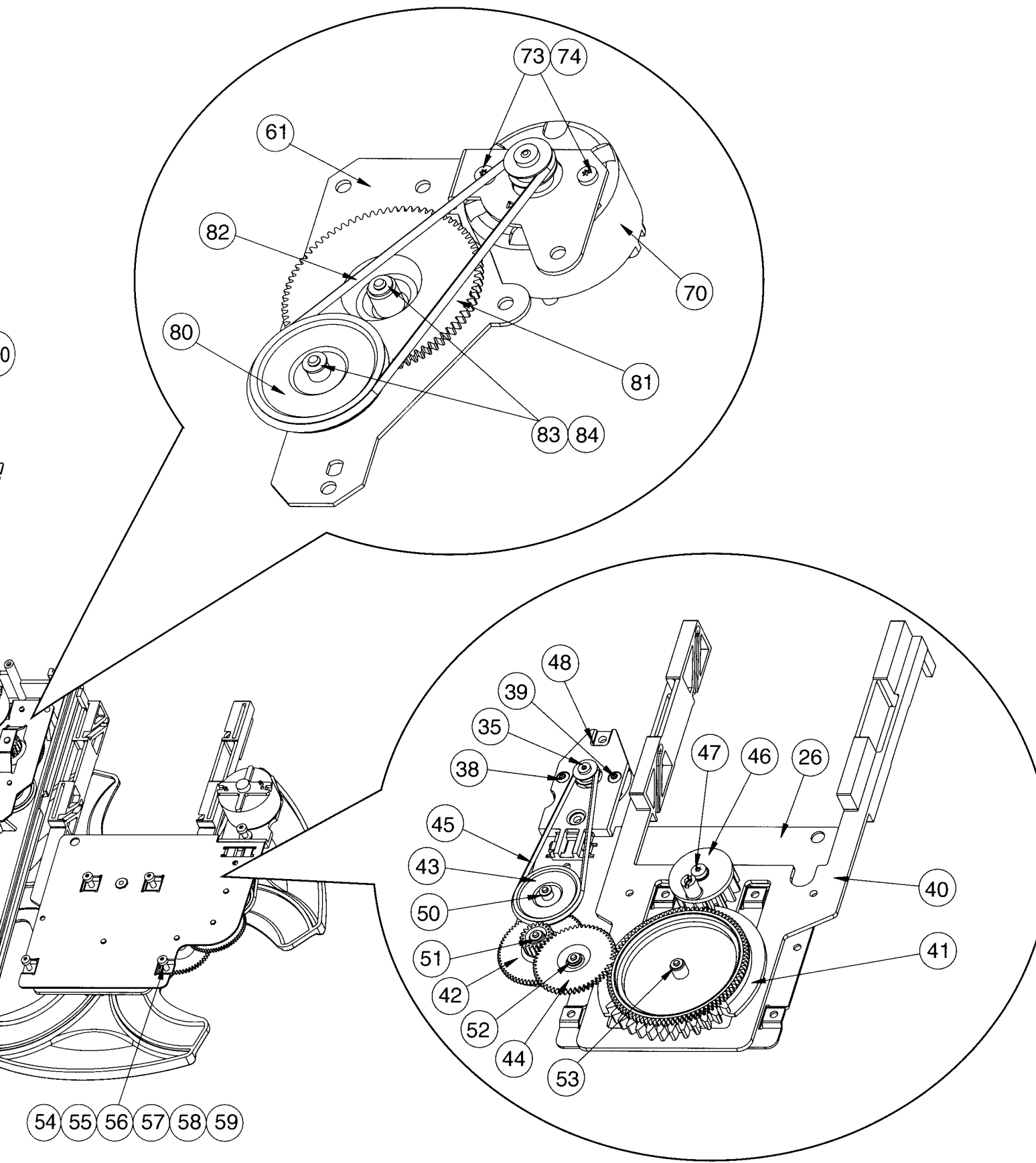
115	4822 466 10736	Carrousel
117	4822 532 12365	Bush
120	4822 532 51756	Damping Grommet
121	4822 532 51756	Damping Grommet

123	4822 402 10085	Switch Bracket
125	4822 532 52386	Clamper
140	4822 466 10734	Flex Cable Protection Plate
	4822 320 11183	Flexfoil 17P
	4822 390 10136	Lub. Grease Poly lub GLY801

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

CDC EXPLODED VIEW II





ELECTRICAL PARTS LIST - CDC BOARD**ELEC****MISCELLANEOUS**

1810	4822 242 73557	Ceram Resonator 8.46MHz
1880	4822 276 13503	Open/Close Switch
1881	4822 276 13503	CDM Position Switch
1882	4822 276 13503	Carrousel Switch
8002	4822 320 11313	Flexfoil 15 Pin

CAPACITORS

2800	4822 126 10053	180pF 10%
2801	4822 122 10466	220pF 10% 50V
2802	4822 126 10053	180pF 10%
2803	4822 122 10466	220pF 10% 50V
2804	4822 126 12787	330pF 10% 50V
2805	4822 122 10466	220pF 10% 50V
2806	4822 122 10466	220pF 10% 50V
2807	4822 126 12878	1,5nF 10% 16V
2808	4822 122 10466	220pF 10% 50V
2809	4822 126 12882	100nF +80 / -20% 50V
2810	4822 122 10459	560pF 10% 50V
2811	4822 122 10466	220pF 10% 50V
2812	4822 122 33848	47pF 5% 50V
2813	4822 122 33848	47pF 5% 50V
2814	4822 122 33195	100pF 10% 50V
2815	4822 126 12573	18pF 5% 50V
2816	4822 124 23624	47μF 20% 16V
2817	4822 126 10053	180pF 10%
2818	4822 124 23624	47μF 20% 16V
2819	4822 126 12787	330pF 10% 50V
2820	4822 126 10053	180pF 10%
2821	4822 126 11585	22nF +80 / -20% 25V
2822	4822 126 12339	2,2nF 10%
2823	4822 122 33848	47pF 5% 50V
2824	4822 126 11585	22nF +80 / -20% 25V
2825	4822 126 12882	100nF +80 / -20% 50V
2826	4822 124 23624	47μF 20% 16V
2827	4822 126 12882	100nF +80 / -20% 50V
2828	4822 126 12882	100nF +80 / -20% 50V
2829	4822 124 80865	10μF 20% 25V
2830	4822 126 12882	100nF +80 / -20% 50V
2831	4822 126 12882	100nF +80 / -20% 50V
2832	4822 124 23624	47μF 20% 16V
2835	4822 126 12882	100nF +80 / -20% 50V
2836	4822 124 23624	47μF 20% 16V
2837	4822 126 12882	100nF +80 / -20% 50V
2838	4822 126 12882	100nF +80 / -20% 50V
2839	4822 126 12882	100nF +80 / -20% 50V
2840	4822 126 12882	100nF +80 / -20% 50V
2841	4822 122 10574	1,2nF 10% 16V
2842	4822 121 51387	10nF 20% 16V
2843	4822 126 12882	100nF +80 / -20% 50V
2844	4822 122 10574	1,2nF 10% 16V
2845	4822 121 51387	10nF 20% 16V
2846	4822 126 11585	22nF +80 / -20% 25V

2847	4822 126 12882	100nF +80 / -20% 50V	3831
2848	4822 124 23624	47μF 20% 16V	3832
2850	4822 122 33197	1nF 10% 50V	3833
2851	4822 124 41997	470μF 10V	3834
2852	4822 126 12882	100nF +80 / -20% 50V	3835
2855	4822 126 12882	100nF +80 / -20% 50V	3836
2860	4822 124 41579	10μF 20% 50V	3837
2861	4822 124 41579	10μF 20% 50V	3838
2862	4822 126 12339	2,2nF 10%	3839
2863	4822 126 12339	2,2nF 10%	3840
2864	4822 126 12882	100nF +80 / -20% 50V	3841
2865	4822 126 12882	100nF +80 / -20% 50V	3842
2867	4822 122 10466	220pF 10% 50V	3843
2868	4822 122 10466	220pF 10% 50V	3844
2869	4822 122 10466	220pF 10% 50V	3845
2872	4822 126 12882	100nF +80 / -20% 50V	3846
2873	4822 126 12882	100nF +80 / -20% 50V	3847
2874	4822 126 11585	22nF +80 / -20% 25V	3848
2875	4822 126 11585	22nF +80 / -20% 25V	3849
2876	4822 124 23794	470μF 20% 16V	3850

RESISTORS

3800	4822 116 52239	120k 5% 0,5W	3853
3801	4822 116 83864	10k 5% 0,5W	3858
3802	4822 116 52239	120k 5% 0,5W	3859
3803	4822 116 83864	10k 5% 0,5W	3860
3804	4822 116 52291	56k 5% 0,5W	3861
3805	4822 116 83864	10k 5% 0,5W	3869
3806	4822 116 83864	10k 5% 0,5W	3870
3807	4822 116 83864	10k 5% 0,5W	3871
3808	4822 116 83864	10k 5% 0,5W	3872
3810	4822 050 11002	1k 1% 0,4W	3873
3811	4822 116 52244	15k 5% 0,5W	3874
3812	4822 116 52272	330k 5% 0,5W	3875
3813	4822 116 83884	47k 5% 0,5W	3876
3814	4822 116 83882	39k 5% 0,5W	3877
3815	4822 050 11002	1k 1% 0,4W	3878
3816	4822 116 52175	100R 5% 0,5W	3879
3817	4822 050 11002	1k 1% 0,4W	3880
3818	4822 116 52175	100R 5% 0,5W	3881
3819	4822 116 52222	390R 5% 0,5W	3882
3820	4822 116 52219	330R 5% 0,5W	3883
3821	4822 116 52249	1k8 5% 0,5W	3884
3822	4822 116 52219	330R 5% 0,5W	3885
3823	4822 116 52249	1k8 5% 0,5W	3886
3824	4822 116 52269	3k3 5% 0,5W	3887
3825	4822 116 52256	2k2 5% 0,5W	3888
3826	4822 116 52257	22k 5% 0,5W	3889
3827	4822 116 52278	390k 5% 0,5W	3890
3828	4822 116 52257	22k 5% 0,5W	3891
3829	4822 116 52175	100R 5% 0,5W	3892
3830	4822 116 52235	1M 5% 0,5W	3893

ELECTRICAL PARTS LIST - CDC BOARD

3831	4822 116 52257	22k 5% 0,5W
3832	4822 116 83872	220R 5% 0,5W
3833	4822 116 83864	10k 5% 0,5W
3834	4822 116 83864	10k 5% 0,5W
3835	4822 116 52256	2k2 5% 0,5W
3836	4822 050 11002	1k 1% 0,4W
3837	4822 050 11002	1k 1% 0,4W
3838	4822 050 11002	1k 1% 0,4W
3839	4822 116 52245	150k 5% 0,5W
3840	4822 116 52245	150k 5% 0,5W
3841	4822 116 52289	5k6 5% 0,5W
3842	4822 116 83864	10k 5% 0,5W
3843	4822 116 52303	8k2 5% 0,5W
3844	4822 116 83883	470R 5% 0,5W
3845	4822 116 83864	10k 5% 0,5W
3846	4822 116 52303	8k2 5% 0,5W
3847	4822 116 83883	470R 5% 0,5W
3848	4822 116 52303	8k2 5% 0,5W
3849	4822 116 52303	8k2 5% 0,5W
3850	4822 116 83883	470R 5% 0,5W
3851	4822 052 10338 Δ	3R3 5% 0,33W
3852	4822 052 10338 Δ	3R3 5% 0,33W
3853	4822 052 10338 Δ	3R3 5% 0,33W
3858	4822 116 52257	22k 5% 0,5W
3859	4822 116 52257	22k 5% 0,5W
3860	4822 116 83883	470R 5% 0,5W
3861	4822 116 83883	470R 5% 0,5W
3869	4822 116 52175	100R 5% 0,5W
3870	4822 116 52226	560R 5% 0,5W
3871	4822 116 83864	10k 5% 0,5W
3872	4822 116 83864	10k 5% 0,5W
3873	4822 116 83883	470R 5% 0,5W
3874	4822 116 83864	10k 5% 0,5W
3875	4822 116 83864	10k 5% 0,5W
3876	4822 116 83874	220k 5% 0,5W
3877	4822 116 83864	10k 5% 0,5W
3878	4822 116 83864	10k 5% 0,5W
3879	4822 116 83864	10k 5% 0,5W
3880	4822 116 52219	330R 5% 0,5W
3881	4822 116 83864	10k 5% 0,5W
3882	4822 116 83884	47k 5% 0,5W
3883	4822 116 52234	100k 5% 0,5W
3884	4822 116 52276	3k9 5% 0,5W
3885	4822 116 52234	100k 5% 0,5W
3886	4822 116 83884	47k 5% 0,5W
3887	4822 052 10221 Δ	220R 5% 0,33W
3888	4822 116 83864	10k 5% 0,5W
3889	4822 116 83883	470R 5% 0,5W
3890	4822 116 83883	470R 5% 0,5W
3891	4822 116 52244	15k 5% 0,5W
3892	4822 116 52175	100R 5% 0,5W
3893	4822 116 52175	100R 5% 0,5W

3894	4822 052 10338 Δ	3R3 5% 0,33W
3895	4822 052 10338 Δ	3R3 5% 0,33W
3896	4822 116 83864	10k 5% 0,5W
3897	4822 116 52175	100R 5% 0,5W

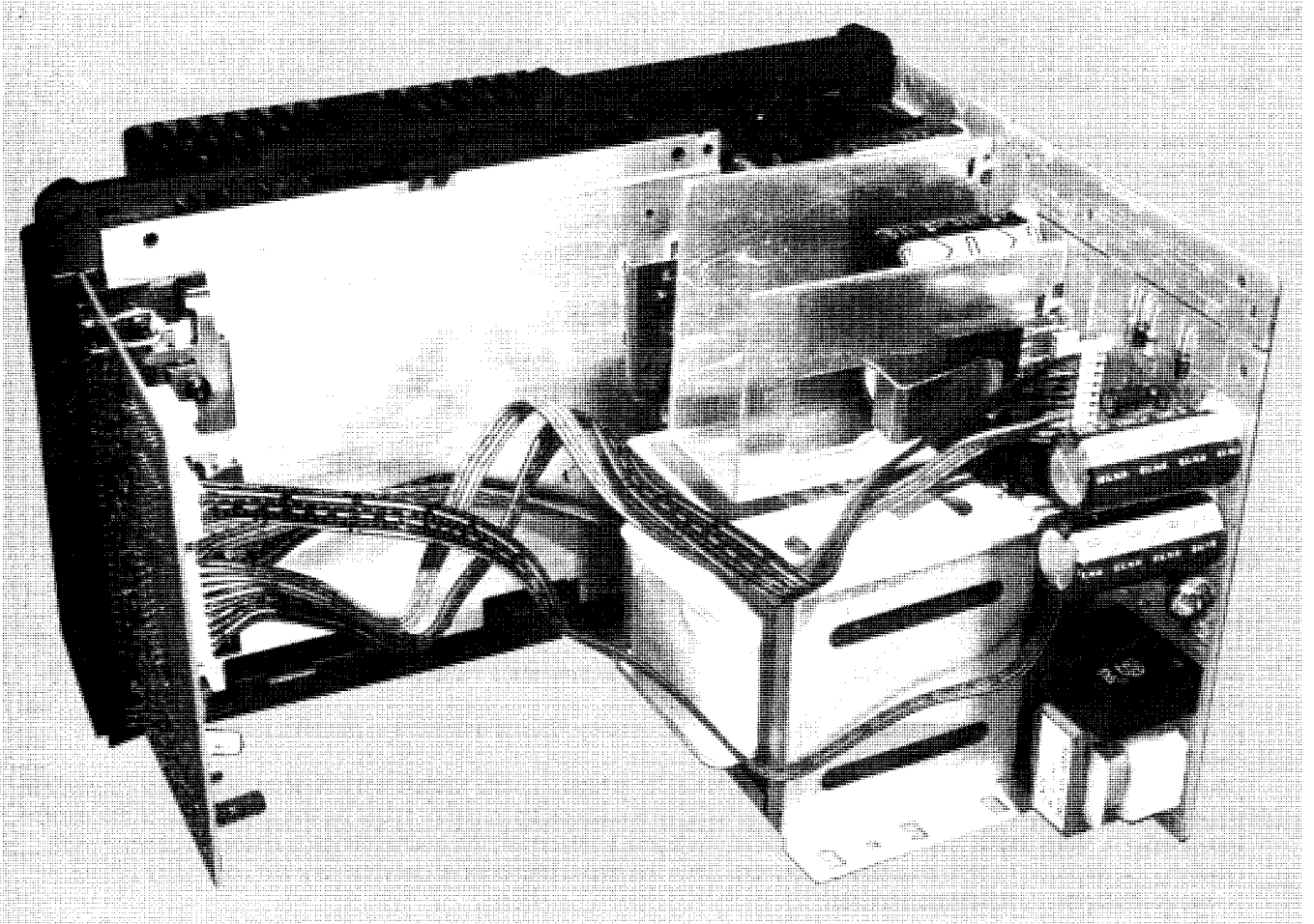
DIODES

6871	4822 130 30621	1N4148
6872	4822 130 30621	1N4148
6873	4822 130 30621	1N4148
6874	4822 130 30621	1N4148
6875	4822 130 34233	BZX79-C5V1

TRANSISTORS & INTEGRATED CIRCUITS

7800	4822 209 12752	SAA7378GP/M1
7801	4822 130 40902	BF240
7802	4822 130 40937	BC548B
7803	4822 130 44197	BC558B
7804	4822 130 40937	BC548B
7805	4822 130 40937	BC548B
7806	4822 209 32852	TDA7073A/N2
7807	4822 209 32852	TDA7073A/N2
7808	4822 130 40937	BC548B
7809	4822 130 41715	BC328-40
7851	4822 209 32421	TDA1311A/N2
7871	4822 209 32852	TDA7073A/N2
7872	5322 209 11306	HEF4094BT
7874	4822 130 40937	BC548B

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



POWER 4 Module

(2 Channel Version)

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CIRCUIT DESCRIPTION FOR POWER4-MODULE

Supply-part

General (pos. numbers refer to circuit diagram chapter 11-7)

The primary circuitry depends on the version:

- Versions with fixed primary voltage: 100VAC for /26
120VAC for /37
220-240VAC for /22/25/30/33/34

Versions /22/25/26/37 use radial type-fuse 1201, versions /30/33/34 use glass tube fuse 1202.

For correct replacement see service printing on printed board respectively version table in circuit diagram or partslist.

- Version with switchable primary voltage: 110-127/220-240VAC for /21
In version /21 voltage selector 1210 is built-in and each primary winding is protected separately (fuses 1201 and 1200).
For correct replacement see service printing on printed board respectively version table in circuit diagram or partslist.
- European versions – “low power standby feature”
For detailed description see below.

Circuit details:

• Low power standby feature

An additional small standby transformer, connected in series to the mains transformer, reduces power consumption in standby-mode.

In case power is switched on, the control line ECO is low → relay 1208 is activated → standby transformer 5211 is shortened and out of work.

When the set is switched off (standby) the control line ECO is high → relay 1208 is not activated → standby transformer 5211 is now connected in series to the primary winding of the mains transformer 1008. As the impedance of the standby transformer is much higher than the impedance of the mains transformer, the mainsvoltage is divided by approx. 85% (standby transformer) to 15% (mains transformer). Thus the mains transformer delivers very low secondary voltage → power consumption is less than 100mW.

Via standby transformer and rectifiers 6209-6212 the supply voltage +C is substituted. The 5,6V regulator is still working and so the microprocessor is kept running.

• DC voltages +A, +B1/+B2, +C

These voltages supply the Super Class G amplifier, described later in this chapter.

The whole power supply is optimized for the special characteristic of this type of amplifier. For that reason several “tricky” details have been applied to ensure optimal efficiency and symmetrical load to the mains transformer.

Generation of +A

Common full wave rectifying with bridge rectifier 6201, using 100% secondary winding of mains transformer (pin 11-15).

Generation of +B1/+B2

The power supply is designed to cover both, 2-channel and 4-channel application.

While for 2-channel application only one supply voltage +B1 is sufficient, 4-channel application requires an additional supply part +B2 which supplies the Center/Surround-amplifiers and the +12V-regulator (current required by 4 amplifiers would overload a single rectifier).

The supply for 2-channel versions consists of one full wave rectifier:

- 2 diodes of bridge rectifier 6201, with 6204/6205 for generation of +B1
- +B2 is connected in parallel with a bridge wire.

The supply for 4-channel versions consists of two separate full wave rectifiers:

- 2 diodes of bridge rectifier 6201, with 6204/6205 (for +B1) and
- 2 diodes of bridge rectifier 6201, with 6202/6203 (for +B2),
using approx. 70% secondary winding of mains transformer (pin 11-14 respectively pin 12-15).

As example for generation of +B2 see picture 1.



Full wave rectifying with 2 diodes of bridge rectifier 6201, using 50% secondary winding of mains transformer (pin 13-15/13-11). See pictures 2 and 3 below.



picture 3

Circuit details (continued):

- **Supply voltages for FTD (Fluorescent Tube Display)**

The FTD requires two supply voltages, delivered by separate windings of the mains transformer:

- 4,5VAC for FTD heating (transformer pin 16/17)
- -30V stabilized by the -30V regulator located on the amplifier part. The supply part delivers -35V unstabilized (transformer pin 9/10), typical value: -35V...-45V.

- **Stabilized +5V6**

Stabilizer 7201 generates the supply voltage +5V6 for the microprocessor. In fault condition the output voltage can rise up to approx. 17V, which would definitely damage the device. Therefore an overvoltage protection for the +5V6 supply is implemented.

Whenever the output of stabilizer rises above 7,5V, the base of 7202 reaches 0,7V (7,5V - voltage drop on 6207), the transistor switches through and short circuits the input voltage. This causes the safety resistor 3204 to blow out and interrupt immediately.

- **Temperature monitoring**

The mains transformer is equipped with a NTC, embedded in the secondary winding (pin 8/9). Via the NTC line the temperature of the mains transformer is continuously monitored by the microprocessor. Further actions depend on the software of the set. Usually the set will be switched to standby mode when the transformer is overheated.

- **Power down (PWDN) monitoring**

In order to enable proper switch off conditions the mains supply is monitored by the microprocessor via the PWDN line.

In case of mains supply interrupts the PWDN line becomes low, while the +5V6 is still stable. This enables the microprocessor to take actions for a safe shut-down (e.g. mute, reset of electronics, release of head support of tape deck).

Amplifier part**+12V-regulator** (*pos. numbers refer to circuit diagram chapter 11-9*)

Is used to supply all motors (+12M) and all analogue circuits (+12A) in the set. +12C is provisional only.

- **Power on/off:**

Switching on/off is done via the STBY-line from the microprocessor. H=ON, L=OFF

If the STBY line is high - transistor 7222 is conductive. Base of 7224 becomes less positive than the emitter. This causes transistor 7224 to switch through and supply the base of 7221. Consequently 7221 switches through too.

Via 3218 transistor 3228 is conductive as soon as B2 is available. Consequently switching transistor 7227 is also switched through.

If the STBY line is switched to low level base current for 7222 is blocked. In turn 7224 and 7221 are blocked. → OFF.

- **Regulation:**

Key components are power-transistor 7221, reference diode 6221 and transistor 7223.

After power is switched on via the STBY line as described above the +12A increases until 7223 becomes conductive via reference diode 6221 → 7223 reduces base current of 7221 → +12A is stable (typical +12,4V).

In normal operating mode 7227 is always switched through as described above.

- **Protections:**

In case of overcurrent (typical 2,5A) 7227 gets out of saturation → 7226 becomes conductive → 7225 becomes conductive via 6225 → 7228 is blocked (no base current anymore) → 7227 is blocked too → no +12V.

Restarting is only possible with power OFF → ON.

In case of overvoltage (more than +15V on emitter of 7221) 7225 is now activated via 6233 → 7228 is blocked (no base current anymore) → 7227 is blocked too → no +12V.

These protections are implemented for saving the set-electronic in any fault-condition.

-30V-regulator

- **Grid supply for the FTD switched by the microprocessor.**

Simple regulation with 6251 as reference. Typical value: -29V. Maximum current: 30mA

Circuit details (continued):

Fan-circuit:

Is a provision for versions with not enough cooling-capacity (e.g. MICRO-sets).

There are three modes: (off, low and high) which are controlled by: - an NTC located on the cooling-plate and
- info-line TURBOFAN from the amplifier-supply.

OFF: If NTC 3250 has high resistance, 7236 is conductive → 7237 is blocked → fan is not running.

LOW: When the NTC becomes hot the resistance decreases. At approx. 60°C 7236 blocks. 7237 becomes conductive → fan starts running. The fan is supplied is approx. 8V because divider 3244/3245 keeps base of 7237 at typ. 9V. 3246 works as a hysteresis resistor. Just when the temperature decreases to about 50°C the fan will be switched off.

HIGH: When the set is driven with very high output-levels, +B or even +A is switched as supply voltage to the power stages. Via 6244 the level of the TURBOFAN-line becomes high. Base of 7237 increases and in turn the emitter. This results in a higher fan-speed. The voltage on the fan can rise up to +12V - depending on the music.

Amplifier:

Attention: In the POWER 4 module the power amplifier IC AN7164 is used as a bridge-amplifier.

Any connection from output to ground will destroy the output stages!

- Via the AMP_ON control line, connected to pins 6 (Stby), the power amplifiers are switched on/off by the μP .
High level (approx. 4,5V): power amplifiers switched on
Low level (approx. 0V): power amplifiers switched off
- Super class G - operation

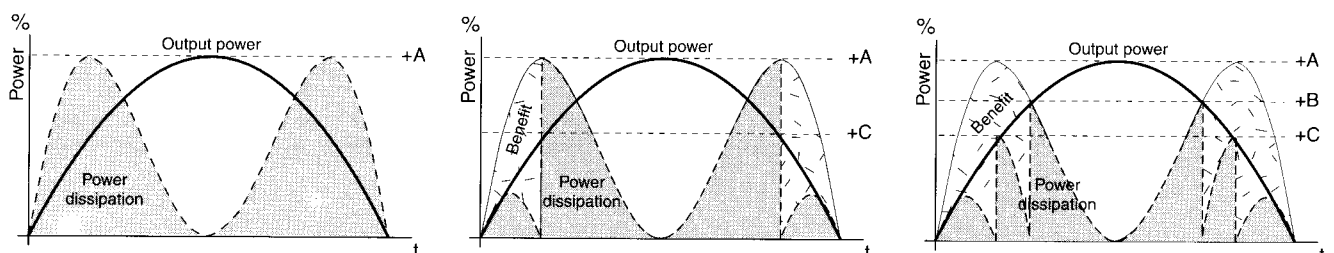
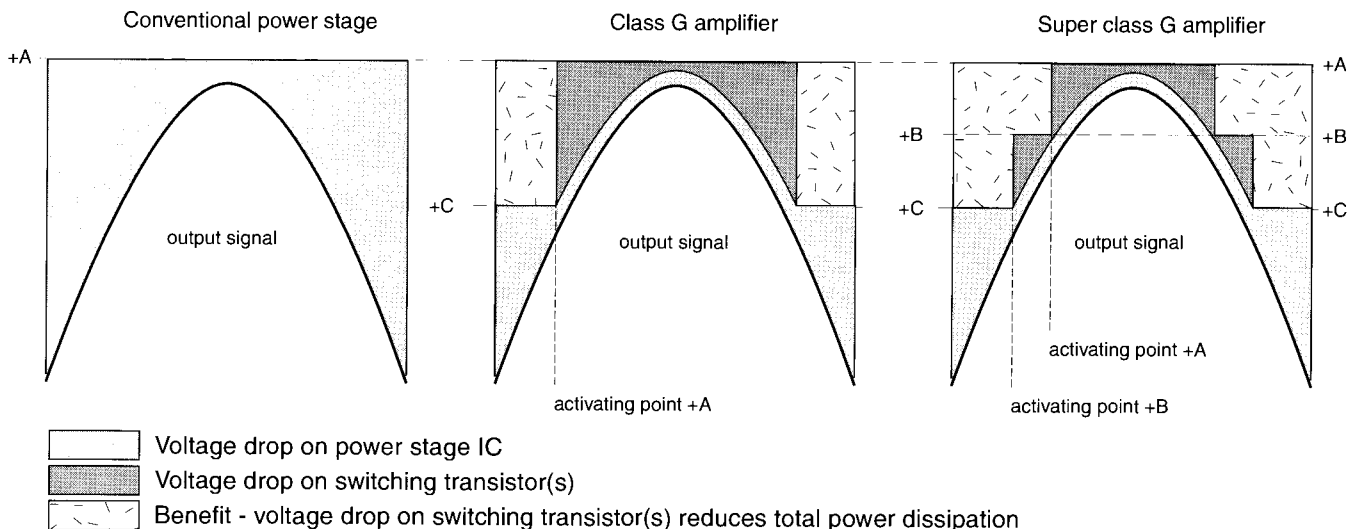
The power amplifiers operate as so-called super class G - amplifiers:

The supply pins 12 (Vcc) are not just connected to one fixed DC-supply as in conventional amplifiers.

Dependent on the output power there are three different DC-voltages supplied to the power amplifiers:

- ⇒ +C (+18V) for low output power
- ⇒ +B (+25V) for medium output power
- ⇒ +A (+36V) for high output power

Principle / benefit of Super Class G



- advantages:
 - best efficiency
 - less power drawn from the mains transformer than by conventional operating amplifiers reduces transformer heating.
 - reduced power dissipation at the amplifier ICs results in
 - less junction temperature and better reliability
 - possibility of higher output power with smaller cooling fin
 - smaller size
- Functional description of the super class G - circuitry used in Power4-module

The DC-level on the amplifier output pins is normally $V_{cc}/2$.

With low signals +C is supplying the amplifiers via decoupling diode 6312. The DC-level on the output pins is therefore approx. 8,6V and approx. 8V on the base of 7315.

When the output signal increases, also DC-level on base of 7315 increases via diodes 6305, 6306, 6307 and 6308. At a certain output power 7315 becomes slightly conductive and enables low base current for 7304 which becomes conductive too and pulls gate of FET 7303 up to a more positive level. Thus FET 7303 begins to switch through and connects the higher DC supply +B1 slowly to the power stages.

This does not end up in a hard switching but in a smooth regulating because V_{cc} is coupled back to the emitter of 7315 via Zener diode 6310. As soon as V_{cc} increases also the level on emitter 7315 is increased by a 3,9V lower level than V_{cc} . When the output power is increased further +B1 would not be high enough to enable undistorted output signal. The more the output level increases the more increases the DC-level on base of 7315 which causes the transistor more and more conducting until the sum of the voltage drop on 3340+E/B 7304+3342 becomes approx. 1,4V. Now the necessary VBE for a darlington-type transistor is obtained, 7305 begins to switch through and connects the again higher DC supply +A slowly to the power stages. 7305 regulates +A, same as described before for +B.

7322 and 7316 switch the ripple capacitor 2355, dependent on the output power.

With low output power the DC-level on base 7322 is approx. 8V. Via Zener diode 6310 and resistor 3333 the emitter is pulled to V_{cc} (+C at low levels). 7322 is switched through and in turn 7316. The ripple capacitor 2325 is connected to ground and functions as in normal amplifiers. Hum is suppressed and good S/N-ratio is guaranteed even during silent music passages.

When the supply voltage has to be switched to a higher level the DC-level of the ripple capacitor has to increase in the same relation, otherwise the reference voltages inside the IC would not fit to the actual V_{cc} . Because of the different delays this relation cannot be obtained and a continuously connected capacitor to the ripple input would cause distortion. For that reason the ripple capacitor 2325 is disconnected as soon as the output power exceeds a certain value. When the output signal increases, also DC-level on base of 7322 increases via diodes 6305, 6306, 6307 and 6308. 7322 blocks and in turn 7316. The ripple capacitor 2325 is disconnected from ground. The circuitry is designed so that 2325 is disconnected just before 7303 begins to switch +B through (see above).

- For Center/Surround-amplifier the function of the Super Class G circuit is similar. Instead of +B1 there +B2 is connected.
- For the /37-versions with two channel-application the so called MATRIX SURROUND is added. The 2 surround-speakers are added in a way, that in case of STEREO a high signal can be measured (up to 10W per speaker at 6 Ohm). In MONO only a few 100mW are available. Result: The widening of the STEREO base is increased without any additional electronic or amplifier.
- In all four channel versions a pre-amplifier out for SURROUND is available to add a wireless speaker system (e.g. FB206,FB208).

0014 E 3	1210 A 5	1361 D 8	2213 D 1	2253 A 9	2314 D 7	2342 C 8	2362 C 12	3202 C 5	3225 B 7	3248 A 7	3307 B 10	3329 C 11	3354 D 11	3375 C
0091 E 12	1211 A 10	1362 D 12	2214 D 4	2301 C 9	2315 B 12	2345 E 8	2364 D 11	3203 C 5	3226 B 7	3250 A 8	3308 B 10	3333 B 9	3355 A 11	3376 C
0225 D 2	1214 D 2	1363 B 12	2215 C 1	2302 C 7	2316 D 12	2346 E 7	2365 B 11	3204 E 2	3227 B 7	3251 A 9	3309 B 10	3335 E 1	3356 C 11	3382 A
0227 A 11	1215 A 10	1390 E 12	2216 D 5	2303 C 10	2317 B 10	2351 B 11	2366 C 11	3211 A 7	3228 B 7	3252 B 10	3310 B 10	3336 E 2	3357 A 11	3383 C
1008 A 4	1218 B 8	1391 E 11	2217 D 5	2304 C 8	2319 C 9	2352 D 11	2374 B 9	3215 B 7	3229 B 6	3253 A 9	3311 D 9	3337 E 2	3358 C 12	3384 A
1200 B 2	1222 A 9	2200 D 5	2221 A 7	2305 C 9	2320 C 8	2353 A 11	2375 C 11	3216 B 6	3230 B 6	3254 A 9	3312 D 9	3338 E 2	3359 C 12	3385 A
1201 C 6	1235 A 8	2202 E 4	2222 A 7	2306 C 7	2323 C 7	2354 C 11	2379 A 12	3217 B 6	3235 A 6	3255 E 2	3313 D 7	3340 D 10	3361 A 12	3389 E
1202 C 6	1303 E 8	2203 D 4	2225 B 6	2307 C 8	2324 C 9	2355 B 11	2381 A 11	3218 C 7	3239 D 2	3256 A 9	3314 D 8	3341 C 10	3362 C 12	3391 E
1203 C 2	1304 E 2	2204 C 1	2226 A 7	2308 C 7	2325 B 9	2356 D 11	2382 C 11	3219 B 6	3242 C 2	3301 C 9	3316 D 9	3342 D 10	3363 B 12	5201 D
1204 C 3	1305 E 10	2205 E 5	2227 C 6	2309 D 9	2329 D 10	2357 B 11	2385 B 12	3220 B 7	3243 A 9	3302 C 8	3317 C 8	3343 C 10	3364 D 12	5202 D
1205 C 5	1351 C 11	2206 C 1	2228 B 7	2310 D 7	2331 E 9	2358 D 11	2386 D 12	3221 B 7	3244 A 8	3303 C 9	3321 A 10	3344 C 8	3366 B 11	5211 A
1207 B 8	1355 D 13	2210 D 3	2235 A 7	2311 D 9	2332 D 6	2359 B 12	2395 E 11	3222 B 7	3245 A 8	3304 C 7	3326 D 7	3351 B 11	3367 A 12	5301 D
1208 B 1	1356 B 13	2211 C 3	2236 A 8	2312 D 7	2335 B 11	2360 D 12	2396 E 12	3223 A 6	3246 A 7	3305 C 10	3327 C 10	3352 D 11	3371 A 11	5302 D
1209 E 6	1360 D 6	2212 D 3	2251 D 2	2313 D 8	2341 C 9	2361 B 12	3201 B 1	3224 A 6	3247 A 8	3306 C 8	3328 B 9	3353 B 11	3372 C 11	5303 D

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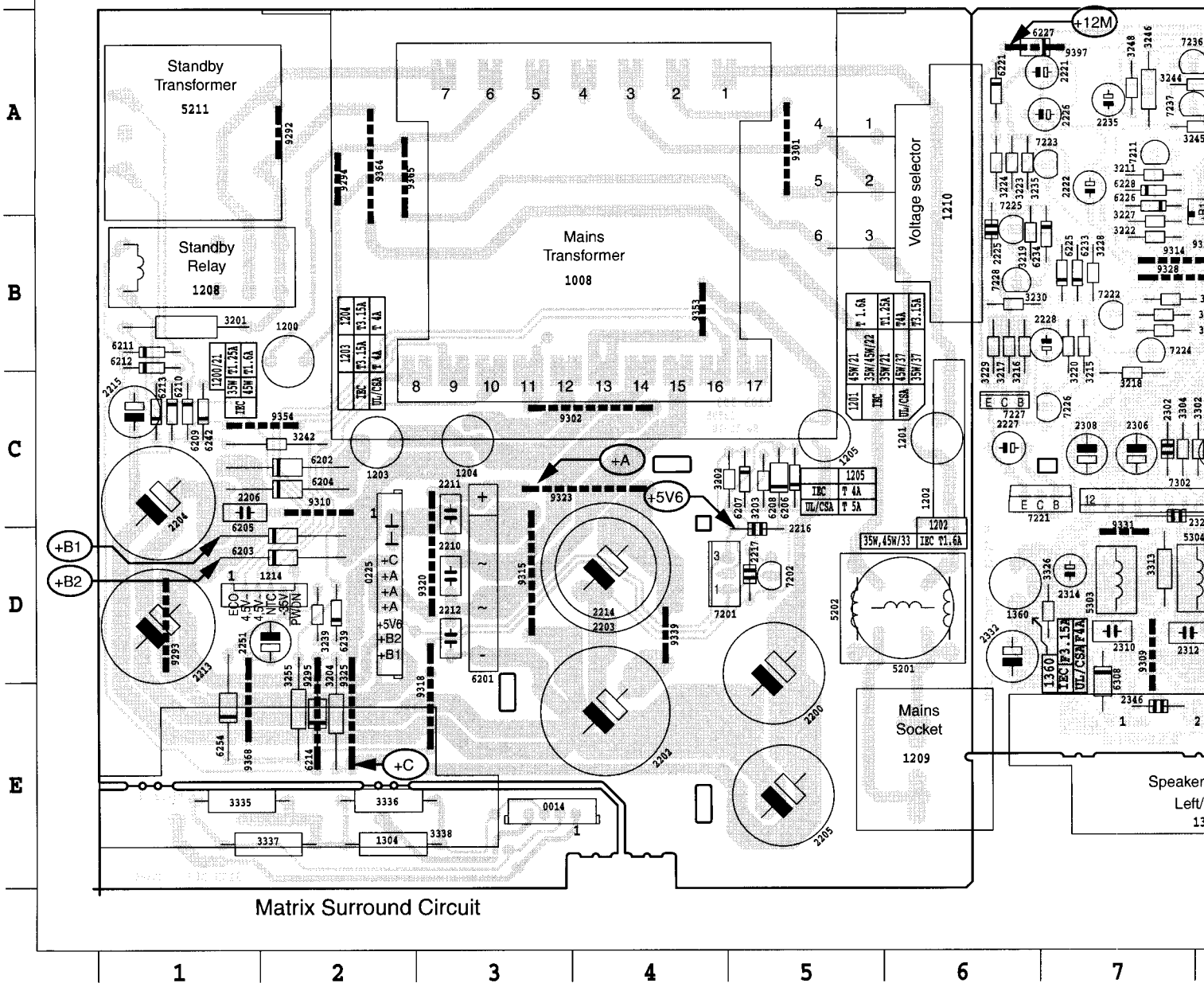
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7

Componentside view

Supply Part

Amplifier



Matrix Surround Circuit

1

2

3

4

5

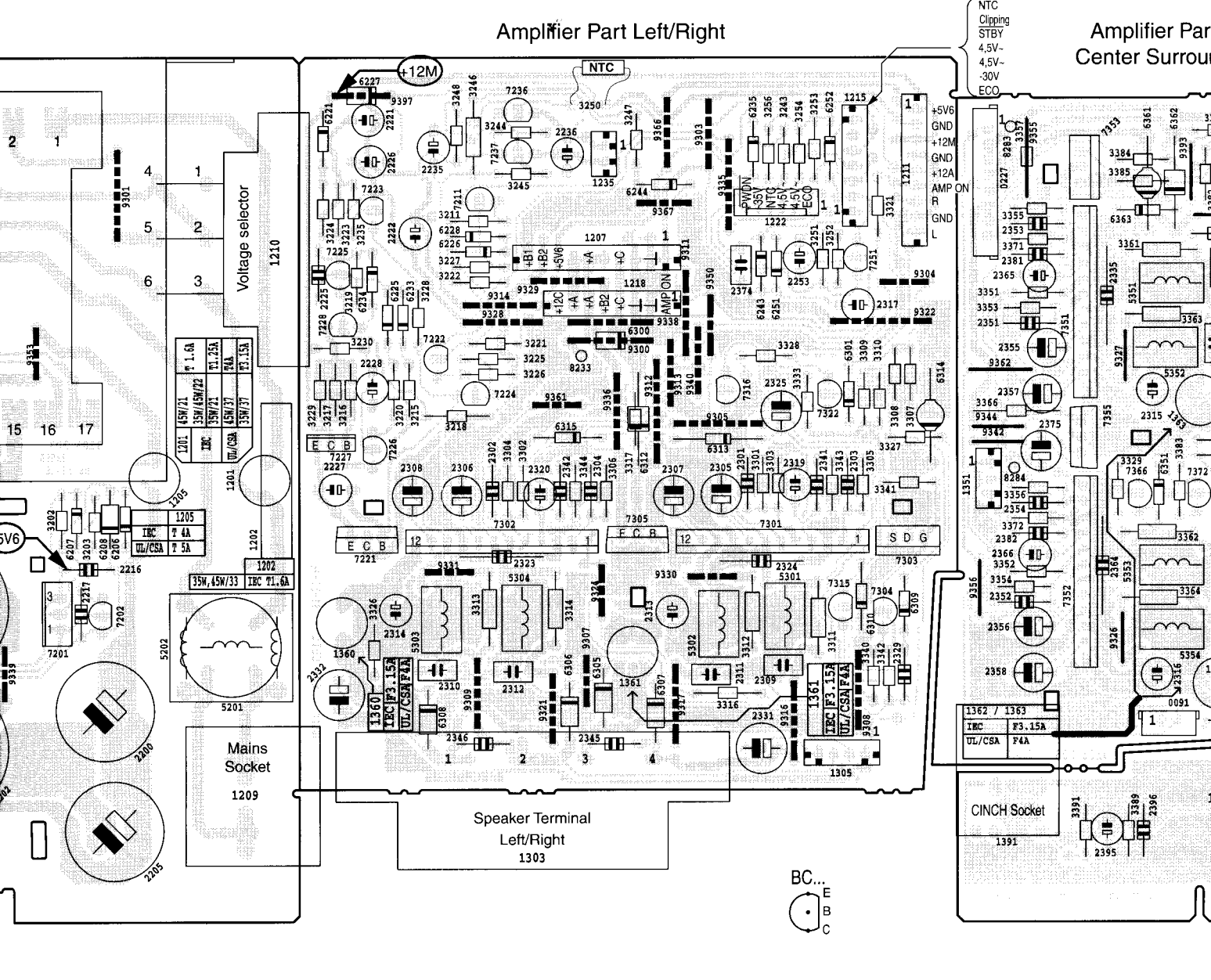
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7

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

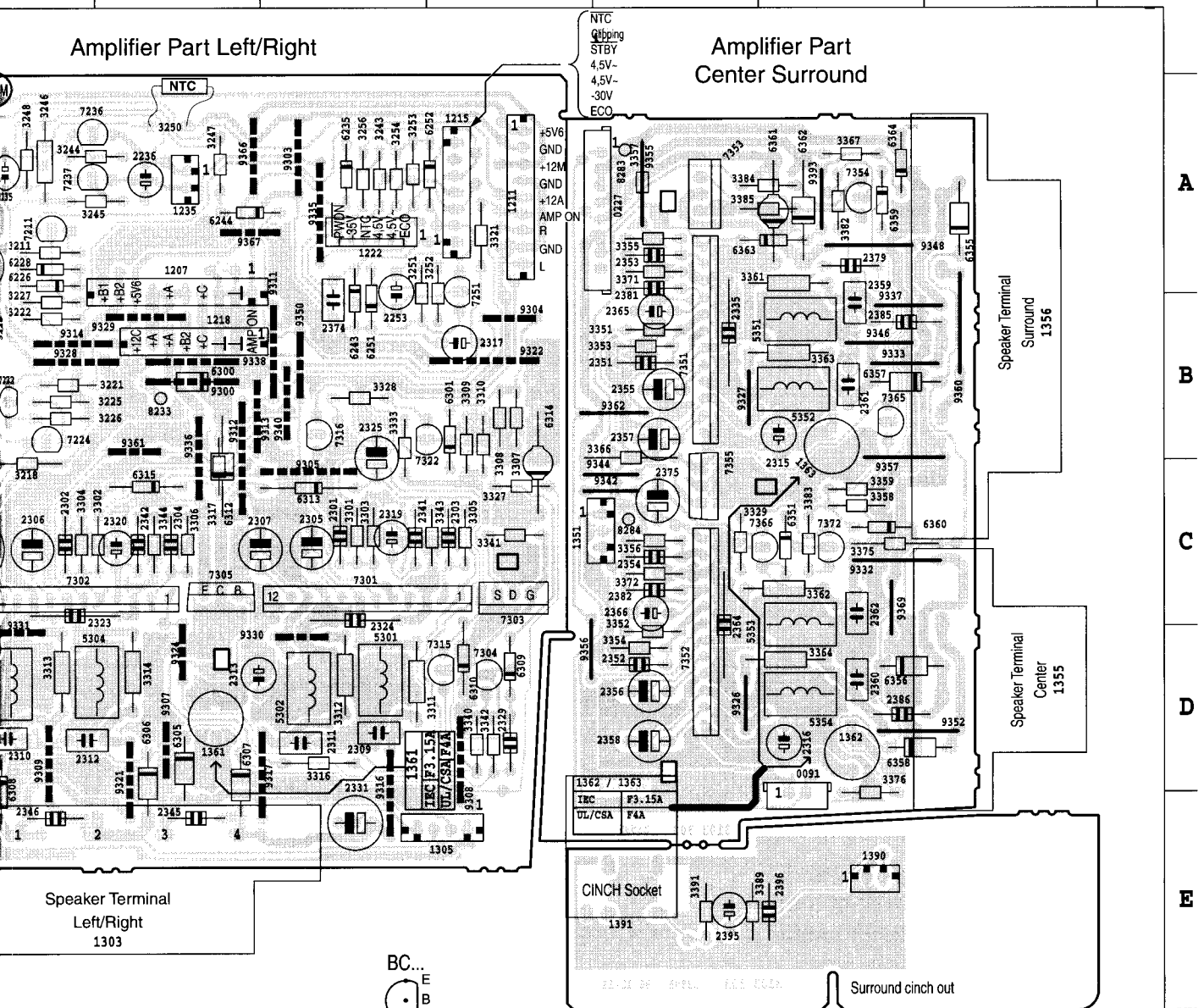
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3203 C 5	3226 B 7	3250 A 8	3308 B 10	3333 B 9	3355 A 11	3376 E 12	5351 B 12	6211 B 1	6243 B 9	6313 C 9	7201 D 4	7301 C 9	7366 C 12	9305 C 9	9307 D 8	9308 D 10	9309 D 7	9310 C 2	9311 B 9	9312 B 8	9313 B 8	9314 B 7	9315 D 3	9316 B 9	9317 D 9	9318 B 3	
3204 E 2	3227 B 7	3251 A 9	3309 B 10	3335 E 1	3356 C 11	3382 A 12	5352 B 12	6212 B 1	6244 A 8	6314 C 10	7202 D 5	7302 C 7	7372 C 12	9307 D 8	9308 D 10	9309 D 7	9310 C 2	9311 B 9	9312 B 8	9313 B 8	9314 B 7	9315 D 3	9316 B 9	9317 D 9	9318 B 3		
3211 A 7	3228 B 7	3252 B 10	3310 B 10	3336 E 2	3357 A 11	3383 C 12	5353 C 12	6213 C 1	6251 B 9	6315 C 8	7211 A 7	7303 C 10	8233 B 8	9308 D 10	9309 D 7	9310 C 2	9311 B 9	9312 B 8	9313 B 8	9314 B 7	9315 D 3	9316 B 9	9317 D 9	9318 B 3			
3215 B 7	3229 B 6	3253 A 9	3311 D 9	3337 E 2	3358 C 12	3384 A 12	5354 D 12	6214 E 2	6252 A 10	6351 C 12	7221 C 7	7304 D 10	8283 A 11	9309 D 7	9310 C 2	9311 B 9	9312 B 8	9313 B 8	9314 B 7	9315 D 3	9316 B 9	9317 D 9	9318 B 3				
3216 B 6	3230 B 6	3254 A 9	3312 D 9	3338 E 2	3359 C 12	3385 A 12	6201 D 3	6221 A 6	6254 E 1	6355 A 13	7222 B 7	7305 C 8	8284 C 11	9310 C 2	9311 B 9	9312 B 8	9313 B 8	9314 B 7	9315 D 3	9316 B 9	9317 D 9	9318 B 3					
3217 B 6	3235 A 6	3255 E 2	3313 D 7	3340 D 10	3361 A 12	3389 E 11	6202 C 2	6225 B 7	6300 B 8	6356 D 12	7223 A 7	7315 D 10	9292 A 2	9311 B 9	9312 B 8	9313 B 8	9314 B 7	9315 D 3	9316 B 9	9317 D 9	9318 B 3						
3218 C 7	3239 D 2	3256 A 9	3314 D 8	3341 C 10	3362 C 12	3391 E 11	6203 D 2	6226 A 7	6301 B 10	6357 B 12	7224 B 7	7316 B 9	9293 D 1	9312 B 8	9313 B 8	9314 B 7	9315 D 3	9316 B 9	9317 D 9	9318 B 3							
3219 B 6	3242 C 2	3301 C 9	3316 D 9	3342 D 10	3363 B 12	5201 D 6	6204 C 2	6227 A 6	6305 D 8	6358 D 12	7225 B 6	7322 B 9	9294 A 2	9313 B 8	9314 B 7	9315 D 3	9316 B 9	9317 D 9	9318 B 3								
3220 B 7	3243 A 9	3302 C 8	3317 C 8	3343 C 10	3364 D 12	5202 D 6	6205 D 2	6228 A 7	6306 D 8	6359 A 12	7226 C 7	7351 B 11	9295 E 2	9314 B 7	9315 D 3	9316 B 9	9317 D 9	9318 B 3									
3221 B 7	3244 A 8	3303 C 9	3321 A 10	3344 C 8	3366 B 11	5211 A 1	6206 C 5	6233 B 7	6307 D 8	6360 C 12	7227 C 6	7352 D 11	9300 B 8	9315 D 3	9316 B 9	9317 D 9	9318 B 3										
3222 B 7	3245 A 8	3304 C 7	3326 D 7	3351 B 11	3367 A 12	5301 D 9	6207 C 5	6234 B 7	6308 E 7	6361 A 12	7228 B 6	7353 A 11	9301 A 5	9316 B 9	9317 D 9	9318 B 3											
3223 A 6	3246 A 7	3305 C 10	3327 C 10	3352 D 11	3371 A 11	5302 D 9	6208 C 5	6235 A 9	6309 D 10	6362 A 12	7236 A 7	7354 A 12	9302 C 4	9317 D 9	9318 B 3												
3224 A 6	3247 A 8	3306 C 8	3328 B 9	3353 B 11	3372 C 11	5303 D 7	6209 C 1	6239 D 2	6310 D 10	6363 A 12	7237 A 7	7355 C 11	9303 A 9	9318 B 3													

5 6 7 8 9 10 11 12



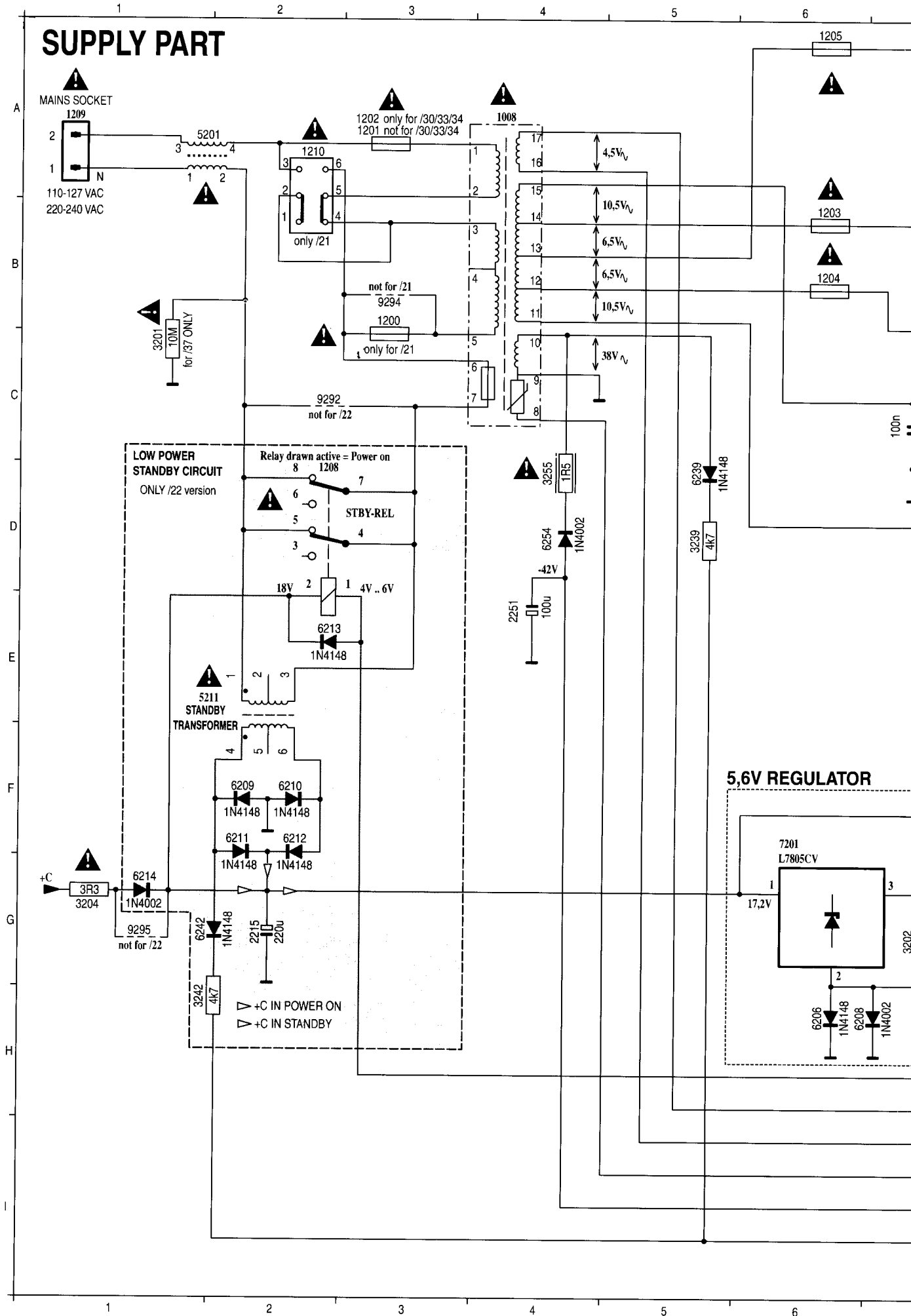
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55 A 11	3376 E 12	5351 B 12	6211 B 1	6243 B 9	6313 C 9	7201 D 4	7301 C 9	7366 C 12	9305 C 9	9321 D 8	9336 B 8	9356 D 10
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57 A 11	3383 C 12	5353 C 12	6213 C 1	6251 B 9	6315 C 8	7211 A 7	7303 C 10	8233 B 8	9308 D 10	9323 C 4	9338 B 8	9360 B 13
58 C 12	3384 A 12	5354 D 12	6214 E 2	6252 A 10	6351 C 12	7221 C 7	7304 D 10	8283 A 11	9309 D 7	9324 D 8	9339 D 4	9361 B 8
59 C 12	3385 A 12	6201 D 3	6221 A 6	6254 E 1	6355 A 13	7222 B 7	7305 C 8	8284 C 11	9310 C 2	9325 E 2	9340 B 9	9362 B 11
60 A 12	3389 E 11	6202 C 2	6225 B 7	6300 B 8	6356 D 12	7223 A 7	7315 D 10	9292 A 2	9311 B 9	9326 D 11	9342 C 11	9364 A 2
62 C 12	3391 E 11	6203 D 2	6226 A 7	6301 B 10	6357 B 12	7224 B 7	7316 B 9	9293 D 1	9312 B 8	9327 B 11	9344 C 11	9365 A 2
63 B 12	5201 D 6	6204 C 2	6227 A 6	6305 D 8	6358 D 12	7225 B 6	7322 B 9	9294 A 2	9313 B 8	9328 B 7	9346 B 12	9366 A 8
64 D 12	5202 D 6	6205 D 2	6228 A 7	6306 D 8	6359 A 12	7226 C 7	7351 B 11	9295 E 2	9314 B 7	9329 B 8	9348 A 12	9367 A 8
66 B 11	5211 A 1	6206 C 5	6233 B 7	6307 D 8	6360 C 12	7227 C 6	7352 D 11	9300 B 8	9315 D 3	9330 D 9	9350 B 9	9368 E 1
67 A 12	5301 D 9	6207 C 5	6234 B 7	6308 E 7	6361 A 12	7228 B 6	7353 A 11	9301 A 5	9316 E 9	9331 D 7	9352 D 12	9369 C 12
71 A 11	5302 D 9	6208 C 5	6235 A 9	6309 D 10	6362 A 12	7236 A 7	7354 A 12	9302 C 4	9317 D 9	9332 C 12	9353 B 4	9393 A 12
72 C 11	5303 D 7	6209 C 1	6239 D 2	6310 D 10	6363 A 12	7237 A 7	7355 C 11	9303 A 9	9318 E 3	9333 B 12	9354 C 2	9397 A 6

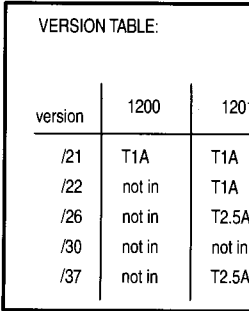
7 8 9 10 11 12 13

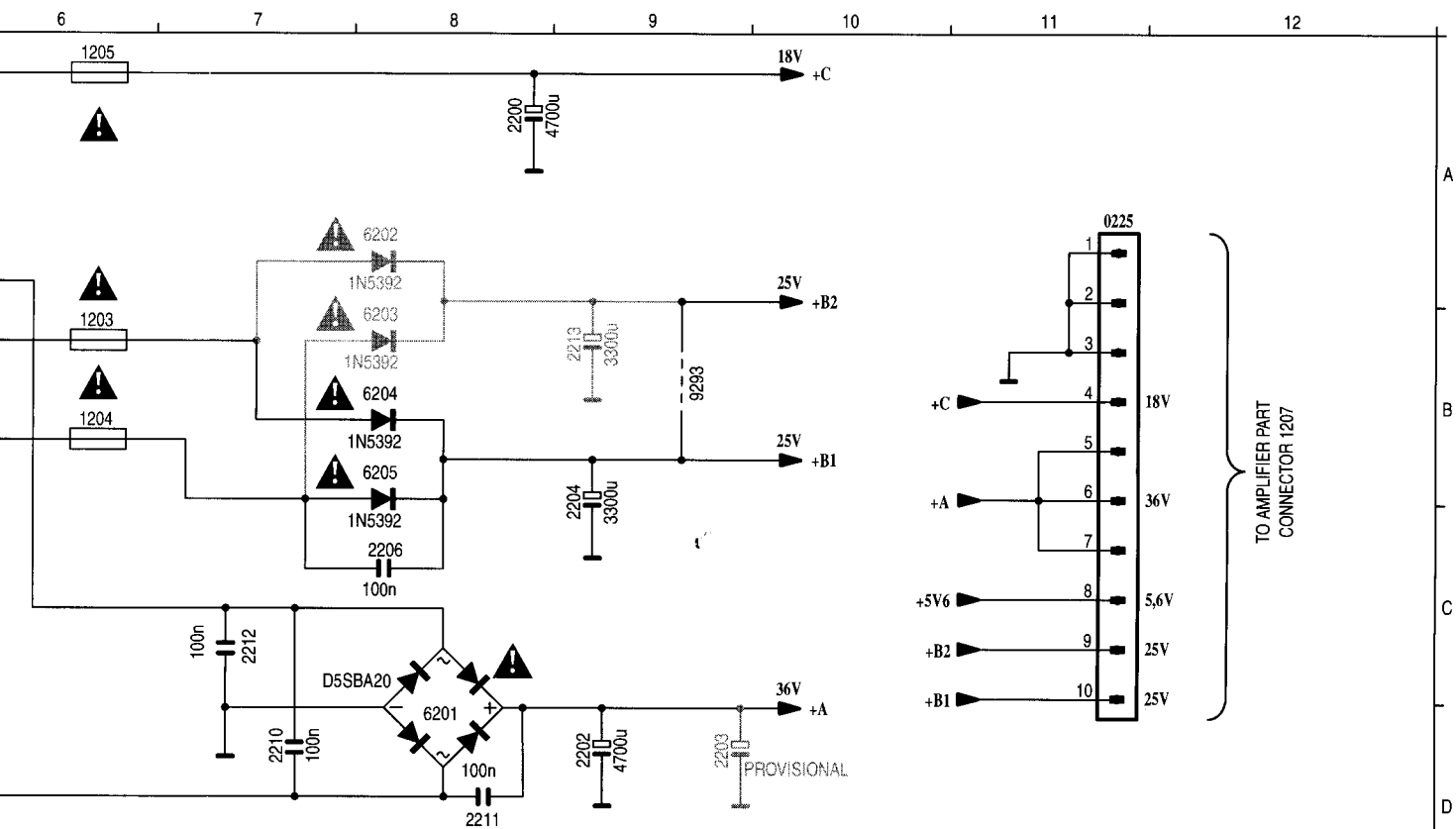


7 8 9 10 11 12 13

SUPPLY PART



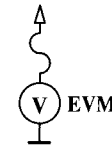
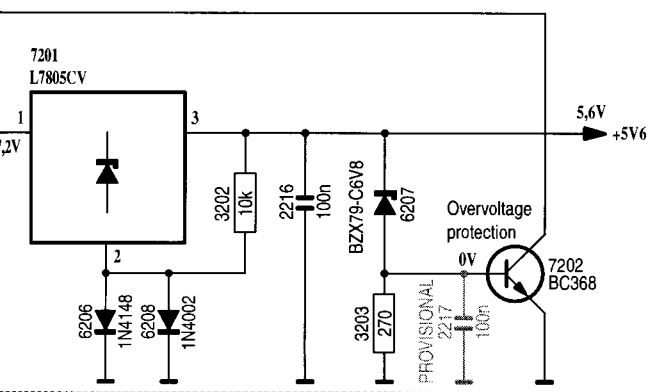




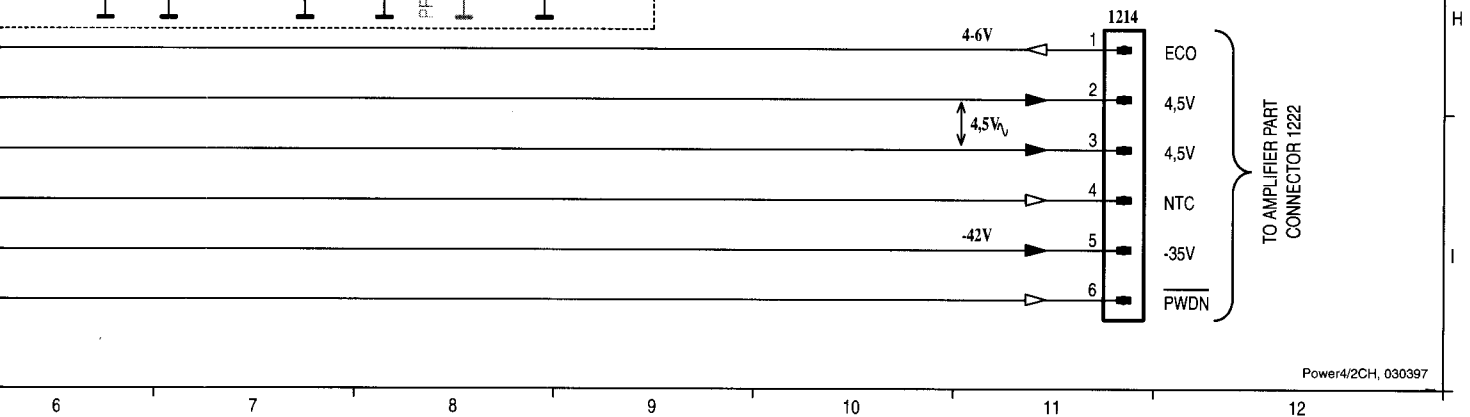
VERSION TABLE:

version	value of item				
	1200	1201	1202 glass fuse	1203 & 1204	1205
/21	T1A	T1A	not in	T2.5A	T2.5A
/22	not in	T1A	not in	T2.5A	T2.5A
/26	not in	T2.5A	not in	T2.5A	T2.5A
/30	not in	not in	T1A	T2.5A	T2.5A
/37	not in	T2.5A	not in	T3.15A	T3.15A

REGULATOR

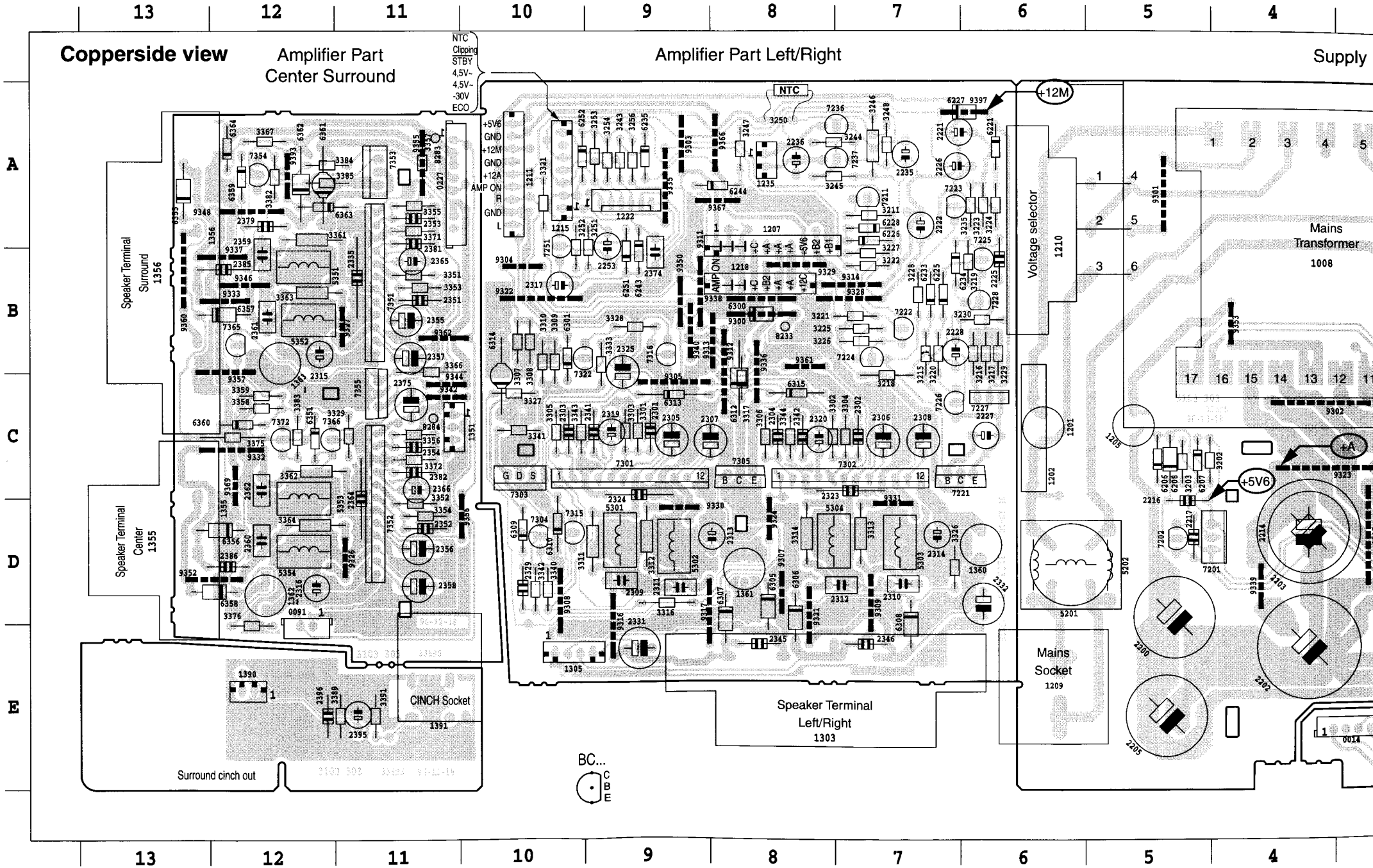


.....V DC-voltages measured with low output power



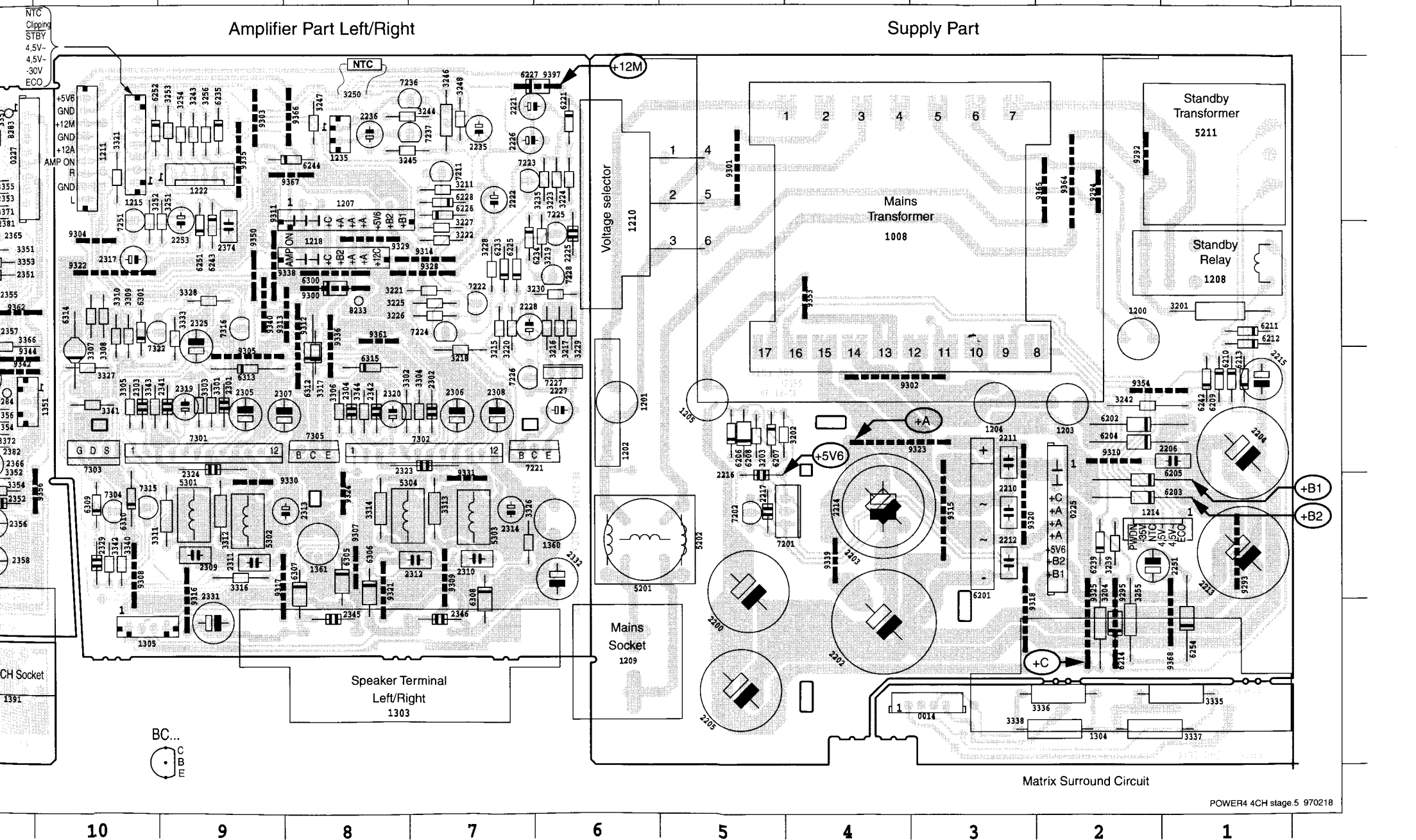
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1008 A
1200 B
1201 A
1202 A
1203 B
1204 B
1205 A
1208 D
1209 B
1210 A
1214 I
2200 A
2202 D
2203 D
2204 B
2206 C
2210 D
2212 C
2213 B
2215 G
2216 G
2217 H
2251 E
3201 C
3202 G
3203 H
3204 G
3239 D
3242 H
3255 D
5201 A
5211 E
6201 C
6202 A
6203 A
6204 B
6205 B
6206 H
6207 G
6208 H
6209 F
6210 F
6211 F
6212 F
6213 E
6214 G
6239 D
6242 G
6254 D
7201 F
7202 G
9292 C
9293 B
9294 B
9295 F

9364 A 2	9342 C 11	9326 D 11	9311 B 9	9292 A 2	7315 D 10	7223 A 7	6356 D 12	6300 B 8	6225 B 7	6202 C 2	3389 E 11	3361 A 12	3340 D 10	3313 D 7	3255 E 2	3235 A 6	3217 B 6	2379 A 12	2354 C 11
9365 A 2	9344 C 11	9327 B 11	9312 B 8	9293 D 1	7316 B 9	7224 B 7	6357 B 12	6301 B 10	6226 A 7	6203 D 2	3391 E 11	3362 C 12	3341 C 10	3314 D 8	3256 A 9	3239 D 2	3218 C 7	2381 A 11	2355 B 11
9366 A 8	9346 B 12	9328 B 7	9313 B 8	9294 A 2	7322 B 9	7225 B 6	6358 D 12	6305 D 8	6227 A 6	6204 C 2	5201 D 6	3363 B 12	3342 D 10	3316 D 9	3301 C 9	3242 C 2	3219 B 6	2382 C 11	2356 D 11
9367 A 8	9348 A 12	9329 B 8	9314 B 7	9295 B 2	7351 B 11	7226 C 7	6359 A 12	6306 D 8	6228 A 7	6205 D 2	5202 D 6	3364 D 12	3343 C 10	3317 C 8	3302 C 8	3243 A 9	3220 B 7	2385 B 12	2357 B 11
9368 B 1	9350 B 9	9330 D 9	9315 D 3	9300 B 8	7352 D 11	7227 C 6	6360 C 12	6307 D 8	6233 B 7	6206 C 5	5211 A 1	3366 B 11	3344 C 8	3321 A 10	3303 C 9	3244 A 8	3221 B 7	2386 D 12	2358 D 11
9369 C 12	9352 D 12	9331 D 7	9316 B 9	9301 A 5	7353 A 11	7228 B 6	6361 A 12	6308 E 7	6234 B 7	6207 C 5	5301 D 9	3367 A 12	3351 B 11	3326 D 7	3304 C 7	3245 A 8	3222 B 7	2395 E 11	2359 B 12
9393 A 12	9353 B 4	9332 C 12	9317 D 9	9302 C 4	7354 A 12	7236 A 7	6362 A 12	6309 D 10	6235 A 9	6208 C 5	5302 D 9	3371 A 11	3352 D 11	3327 C 10	3305 C 10	3246 A 7	3223 A 6	2396 E 12	2360 D 12
9397 A 6	9354 C 2	9333 B 12	9318 B 3	9303 A 9	7355 C 11	7237 A 7	6363 A 12	6310 D 10	6239 D 2	6209 C 1	5303 D 7	3372 C 11	3353 B 11	3328 B 9	3306 C 8	3247 A 8	3224 A 6	3201 B 1	2361 B 12

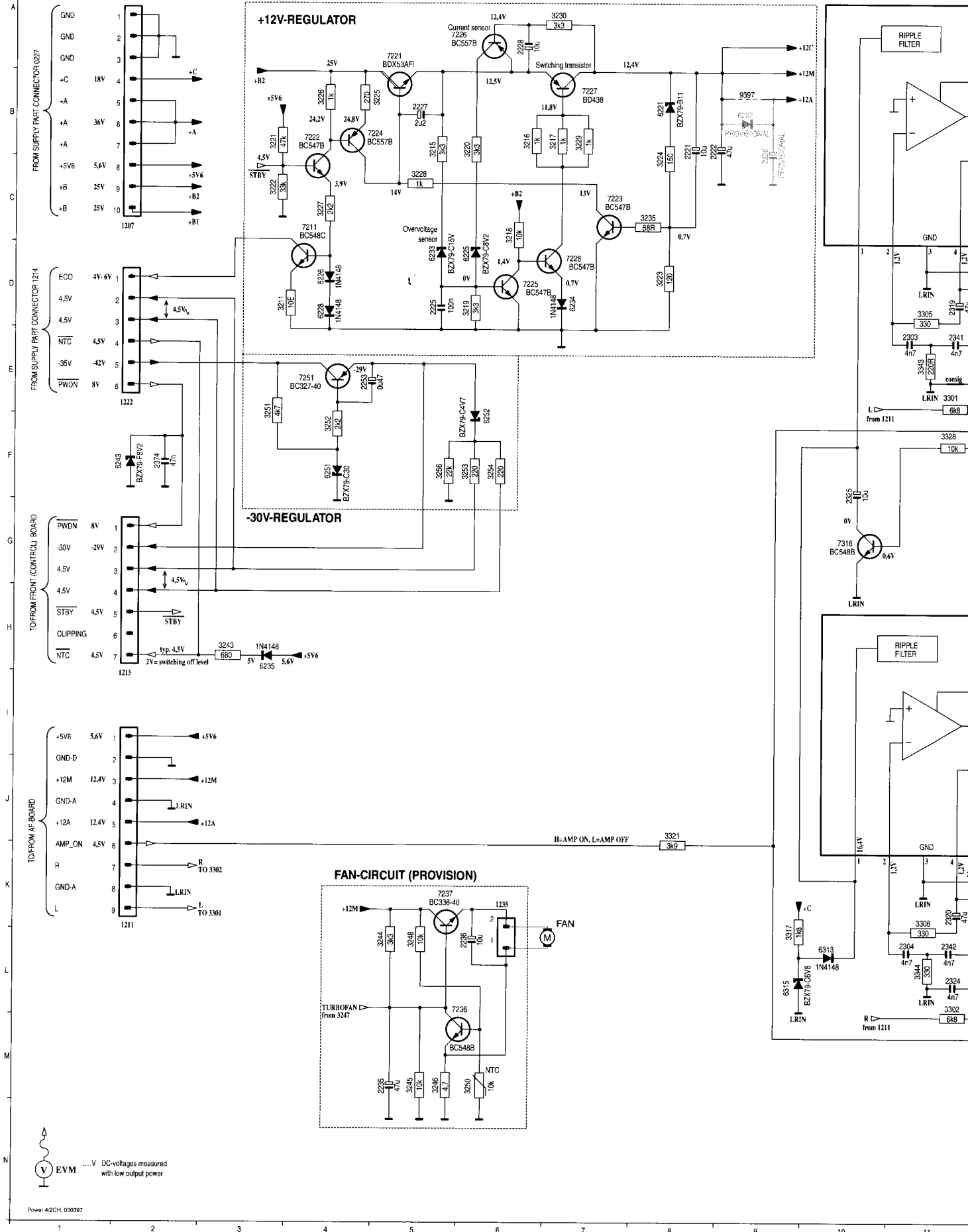


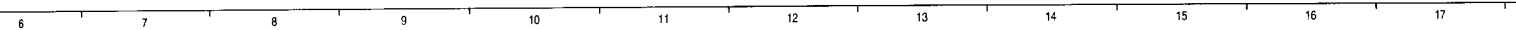
This assembly drawing shows a summary of all possible versions.

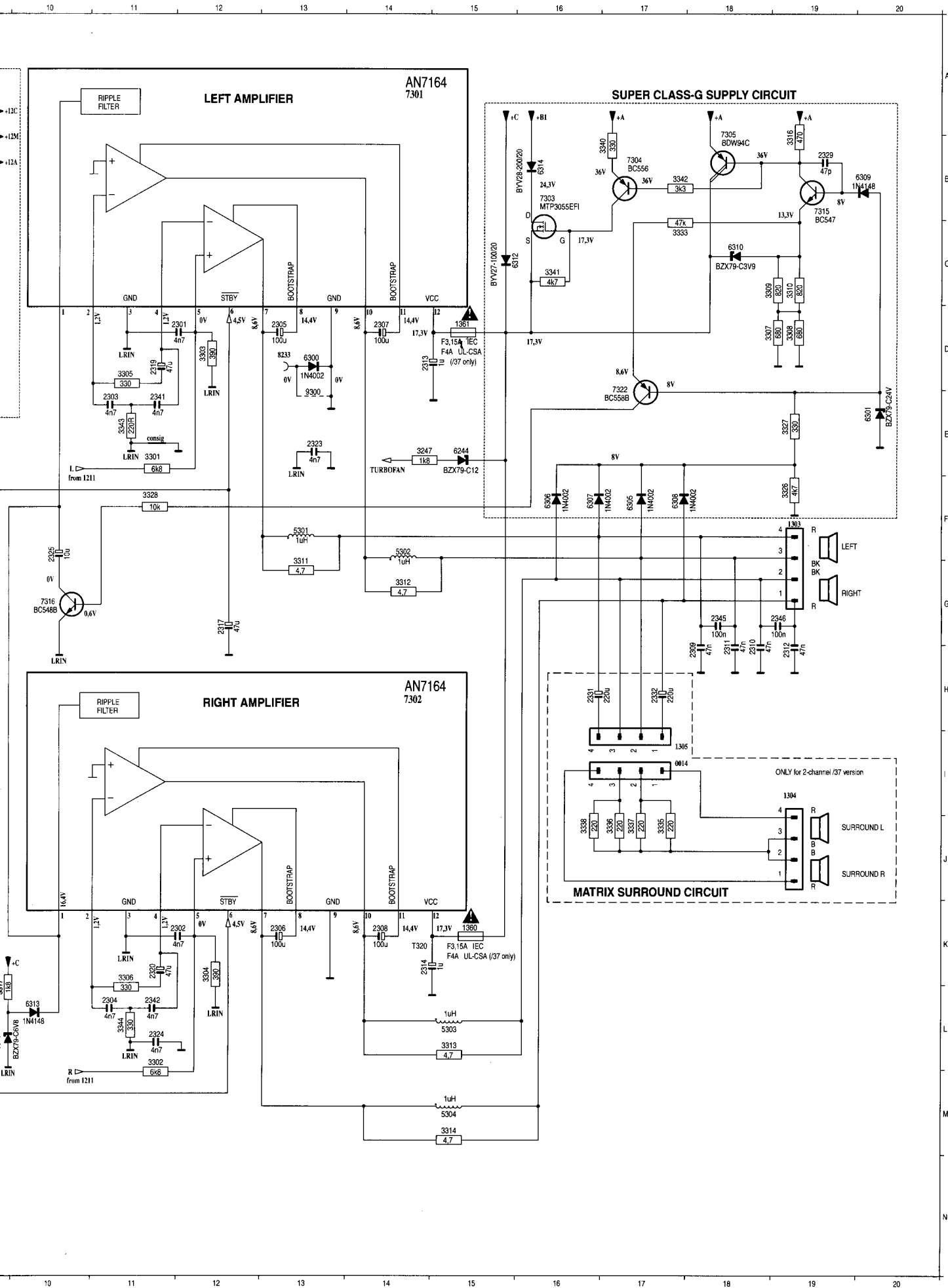
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3316 B 9	7224 B 7	6357 B 12	6301 B 8	6226 A 7	3391 E 11	3362 C 12	3341 C 10	3314 D 8	3255 A 6	3235 A 6	3218 C 7	2381 A 11	2355 B 11	2324 C 9	2307 C 8	2225 B 6	2203 D 4	1303 E 8	1202 C 6
3322 B 9	7225 B 7	6358 D 12	6305 D 8	6227 A 6	6204 C 2	5201 D 6	3363 B 12	3342 D 10	3316 D 9	3301 C 9	3219 B 6	2382 C 11	2356 D 11	2325 B 9	2308 C 7	2226 A 7	2204 C 1	1304 E 10	1203 C 2
3351 B 11	7226 C 6	6359 D 12	6306 D 8	6228 A 7	6205 D 2	5202 D 6	3364 D 12	3343 C 10	3317 C 8	3302 C 8	3243 A 9	2320 B 7	2357 B 11	2329 D 10	2309 D 9	2227 C 6	2205 E 5	1305 E 2	1204 C 3
7227 C 6	7227 C 6	6360 C 12	6307 D 8	6233 B 7	6206 C 5	5211 A 1	3365 B 11	3344 C 8	3321 A 10	3303 C 9	3244 A 8	2321 B 7	2358 D 11	2331 E 9	2310 D 7	2228 B 7	2206 C 1	1351 C 11	1205 C 5
3353 A 11	7228 B 6	6361 A 12	6308 E 7	6234 B 7	6207 C 5	5301 D 9	3366 A 12	3351 B 11	3326 D 7	3304 C 7	3245 A 8	2322 B 7	2359 B 12	2332 D 6	2311 D 9	2235 A 7	2210 D 3	1355 D 13	1207 B 8
3354 A 12	7236 A 7	6362 A 12	6309 D 10	6235 A 9	6208 C 5	5302 D 9	3371 A 11	3352 D 11	3327 C 10	3305 C 10	3246 A 7	2323 A 6	2396 E 12	2360 D 12	2335 B 11	2312 D 7	2236 A 8	2211 C 3	1356 B 13
3355 C 11	7237 A 7	6363 A 12	6310 D 10	6239 D 2	6209 C 1	5303 D 7	3372 C 11	3353 B 11	3328 B 9	3306 C 8	3247 A 8	3224 A 6	3201 B 1	2361 B 12	2341 C 9	2313 D 8	2251 D 2	2212 D 3	1360 D 6
10	9		8		7		6		5		4		3		2		1		



AMPLIFIER PART LEFT/RIGHT

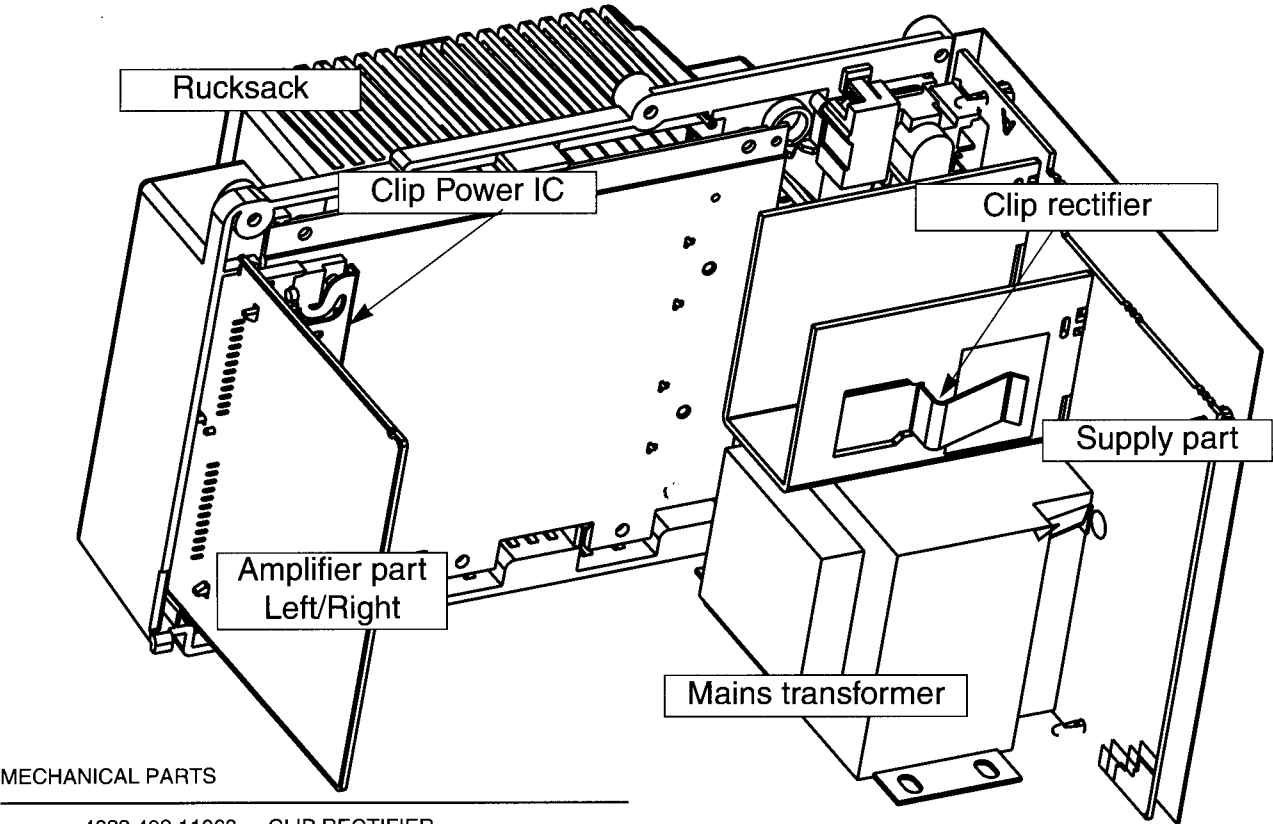






- 0014 H17
- 1207 C 2
- 1211 K 2
- 1215 I 2
- 1222 D 2
- 1233 L 6
- 1303 G19
- 1304 H9
- 1305 H7
- 1360 K15
- 1361 D15
- 2221 B 8
- 2222 B 9
- 2226 B 5
- 2226 B 9
- 2227 B 5
- 2228 A 6
- 2235 N 5
- 2236 L 6
- 2253 E 4
- 2301 D12
- 2302 K12
- 2303 E11
- 2304 L11
- 2305 D13
- 2306 K13
- 2307 D14
- 2308 K14
- 2309 H18
- 2310 H18
- 2311 H18
- 2312 H19
- 2313 D15
- 2314 K15
- 2317 G12
- 2319 D11
- 2320 K11
- 2323 E13
- 2324 L11
- 2329 B19
- 2331 H17
- 2332 H17
- 2341 E11
- 2342 L11
- 2345 G18
- 2346 G19
- 2374 F 2
- 3211 D 3
- 3215 B 5
- 3216 B 6
- 3217 B 7
- 3218 C 6
- 3219 D 6
- 3220 B 6
- 3221 B 3
- 3222 C 3
- 3223 D 8
- 3224 B 8
- 3225 B 4
- 3226 B 4
- 3227 C 4
- 3228 C 5
- 3229 B 7
- 3230 A 7
- 3235 C 8
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- 3244 L 5
- 3245 N 5
- 3246 N 5
- 3247 E14
- 3248 L 5
- 3250 N 6
- 3251 E 3
- 3252 F 5
- 3253 F 5
- 3254 F 6
- 3256 F 5
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- 3302 L11
- 3303 D12
- 3305 D11
- 3306 K11
- 3307 D19
- 3308 D19
- 3309 C19
- 3310 C19
- 3311 G13
- 3312 G14
- 3313 L15
- 3314 M15
- 3316 B19
- 3317 L10
- 3321 J 8
- 3328 F19
- 3327 E19
- 3328 F11
- 3333 C18
- 3335 J17
- 3336 J17
- 3337 J17
- 3338 J16
- 3340 B17
- 3341 C16
- 3342 B18
- 3343 E11
- 3344 L11
- 3381 F13
- 5302 F14
- 5303 L15
- 5304 M15
- 6221 B 8
- 6225 D 6
- 6226 D 4
- 6227 B 9
- 6228 D 4
- 6233 D 5
- 6234 D 7
- 6235 H 3
- 6243 F11
- 6244 E15
- 6251 F 4
- 6252 F 5
- 6300 D13
- 6301 E20
- 6305 F17
- 6306 F16
- 6307 F17
- 6308 F18
- 6309 B20
- 6310 C18
- 6312 C16
- 6315 L10
- 6314 B16
- 6315 L 9
- 7211 C 4
- 7221 A 5
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- 7223 C 7
- 7224 B 4
- 7225 D 6
- 7226 A 5
- 7227 B 7
- 7228 D 7
- 7236 M 6
- 7237 L 5
- 7251 E 3
- 7301 A15
- 7302 H15
- 7303 B16
- 7304 B17
- 7305 B18
- 7315 B19
- 7316 G10
- 7322 E17
- 8233 D13

PARTSLIST POWER4 MODULE



MECHANICAL PARTS

4822 492 11068	CLIP RECTIFIER
4822 492 11395	CLIP POWER-IC
4822 255 40179	CLIP TO220
4822 600 10662	RUCKSACK not for /37
4822 600 10661	RUCKSACK for /37 only

ELECTRICAL PARTSLIST POWER4 MODULE

MISCELLANEOUS

1200	4822 071 51002▲	FUSE T1A	/21 only
1201	4822 071 51002▲	FUSE T1A.....	not for /37
1201	4822 253 50137▲	FUSE T 2,5A UL	/37 only
1202	4822 252 11224▲	FUSE T1A	/30 only
1203	4822 071 52502▲	FUSE T 2,5A.....	not for /37
1203	4822 252 51121▲	FUSE T3,15A UL.....	/37 only
1204	4822 071 52502▲	FUSE T 2,5A.....	not for /37
1204	4822 252 51121▲	FUSE T3,15A UL.....	/37 only
1205	4822 071 52502▲	FUSE T 2,5A.....	not for /37
1205	4822 252 51121▲	FUSE T3,15A UL.....	/37 only
1208	4822 280 80777▲	RELAY	/22 only
1209	4822 265 31015▲	MAINS SOCKET	not for /37
1209	4822 265 31016▲	MAINS SOCKET	/37 only
1210	4822 272 10269▲	VOLTAGE SELECTOR	/21 only
1303	4822 267 31176	SPEAKER TERMINAL left/right	
1304	4822 265 10912	SPEAKER TERMINAL Matrix surround	
1360	4822 252 11225▲	FUSE F3.15A IEC 250V	not for /37
1360	4822 252 11226▲	FUSE F4A UL/CSA 250V	/37 only
1361	4822 252 11225▲	FUSE F3.15A IEC 250V	not for /37
1361	4822 252 11226▲	FUSE F4A UL/CSA 250V	/37 only
5211	4822 146 10756▲	TRANSFORMER STANDBY	/22 only

CAPACITORS

2200	4822 124 80103	4700µF	20%	25V
2202	4822 124 80415	4700µF	20%	50V
2204	4822 124 42367	3300µF	20%	35V
2206	5322 121 42386	100nF	5%	63V
2210	5322 121 42386	100nF	5%	63V

CAPACITORS

2211	5322 121 42386	100nF	5%	63V
2212	5322 121 42386	100nF	5%	63V
2215	4822 124 22263	220µF	20%	25V
2216	4822 126 12882	100nF	20%	50V
2221	4822 124 41579	10µF	20%	50V
2222	4822 124 40433	47µF	20%	25V
2227	4822 124 41576	2,2µF	20%	50V
2228	4822 124 41579	10µF	20%	50V
2251	4822 124 40255	100µF	20%	50V
2253	4822 124 41407	0,47µF	20%	63V
2301	4822 126 11714	4,7nF	20%	
2302	4822 126 11714	4,7nF	20%	
2303	4822 126 11714	4,7nF	20%	
2304	4822 126 11714	4,7nF	20%	
2305	4822 124 81029	100µF	20%	25V
2306	4822 124 81029	100µF	20%	25V
2307	4822 124 81029	100µF	20%	25V
2308	4822 124 81029	100µF	20%	25V
2309	4822 121 43526	47nF	5%	100V
2310	4822 121 43526	47nF	5%	100V
2311	4822 121 43526	47nF	5%	100V
2312	4822 121 43526	47nF	5%	100V
2313	4822 124 40242	1µF	20%	63V
2314	4822 124 40242	1µF	20%	63V
2317	4822 124 40433	47µF	20%	25V

ELECTRICAL PARTSLIST POWER4 MODULE**CAPACITORS**

2319	4822 124 40433	47µF	20%	25V
2320	4822 124 40433	47µF	20%	25V
2323	4822 126 11714	4,7nF	20%	
2324	4822 126 11714	4,7nF	20%	
2325	4822 124 41579	10µF	20%	50V
2329	4822 122 33848	47pF	5%	50V
2331	4822 124 41992	220µF		35V
2332	4822 124 41992	220µF		35V
2341	4822 126 11714	4,7nF	20%	
2342	4822 126 11714	4,7nF	20%	
2345	4822 126 12882	100nF	20%	50V
2346	4822 126 12882	100nF	20%	50V
2374	4822 121 43526	47nF	5%	100V

RESISTORS

3201	4822 053 21106	10MΩ	5%	0,5W
3202	4822 116 83864	10kΩ	5%	0,5W
3203	4822 116 83876	270Ω	5%	0,16W
3204	4822 052 10338▲	3,3Ω		NFR25
3211	4822 116 52176	10Ω	5%	0,5W
3215	4822 116 52269	3,3kΩ	5%	0,5W
3216	4822 050 11002	1kΩ	5%	0,2W
3217	4822 050 11002	1kΩ	5%	0,2W
3218	4822 116 83864	10kΩ	5%	0,5W
3219	4822 116 52269	3,3kΩ	5%	0,5W
3220	4822 116 52269	3,3kΩ	5%	0,5W
3221	4822 116 83884	47kΩ	5%	0,16W
3222	4822 116 52271	33kΩ	5%	0,16W
3223	4822 116 52206	120Ω	5%	0,5W
3224	4822 116 83868	150Ω	5%	0,5W
3225	4822 116 83876	270Ω	5%	0,16W
3226	4822 050 11002	1kΩ	5%	0,2W
3227	4822 116 52256	2,2kΩ	5%	0,16W
3228	4822 050 11002	1kΩ	5%	0,2W
3229	4822 050 11002	1kΩ	5%	0,2W
3230	4822 116 52269	3,3kΩ	5%	0,5W
3235	4822 116 52199	68Ω	5%	0,16W
3239	4822 116 52283	4,7kΩ	5%	0,5W
3242	4822 116 52283	4,7kΩ	5%	0,5W
3243	4822 116 52228	680Ω	5%	0,5W
3251	4822 116 52283	4,7kΩ	5%	0,5W
3252	4822 116 52256	2,2kΩ	5%	0,16W
3253	4822 116 83872	220Ω	5%	0,5W
3254	4822 116 83872	220Ω	5%	0,5W
3255	4822 117 12148	1,5Ω	5%	
3256	4822 116 52257	22kΩ	5%	0,5W
3301	4822 116 83961	6,8kΩ	5%	0,16W
3302	4822 116 83961	6,8kΩ	5%	0,16W
3303	4822 116 52222	390Ω	5%	0,16W
3304	4822 116 52222	390Ω	5%	0,16W
3305	4822 116 52219	330Ω	5%	0,5W
3306	4822 116 52219	330Ω	5%	0,5W
3307	4822 116 52228	680Ω	5%	0,5W
3308	4822 116 52228	680Ω	5%	0,5W
3309	4822 116 52231	820Ω	5%	0,5W
3310	4822 116 52231	820Ω	5%	0,5W
3311	4822 050 24708	4,7Ω	1%	0,6W
3312	4822 050 24708	4,7Ω	1%	0,6W
3313	4822 050 24708	4,7Ω	1%	0,6W
3314	4822 050 24708	4,7Ω	1%	0,6W

RESISTORS

3316	4822 116 83883	470Ω	5%	0,16W
3317	4822 116 52249	1,8kΩ	5%	0,16W
3321	4822 116 52276	3,9kΩ	5%	0,5W
3326	4822 116 52283	4,7kΩ	5%	0,5W
3327	4822 116 52219	330Ω	5%	0,5W
3328	4822 116 83864	10kΩ	5%	0,5W
3333	4822 116 83884	47kΩ	5%	0,16W
3335	4822 053 11221	220Ω	5%	2W
3336	4822 053 11221	220Ω	5%	2W
3337	4822 053 11221	220Ω	5%	2W
3338	4822 053 11221	220Ω	5%	2W
3340	4822 116 52219	330Ω	5%	0,5W
3341	4822 116 52283	4,7kΩ	5%	0,5W
3342	4822 116 52269	3,3kΩ	5%	0,5W
3343	4822 116 83872	220Ω	5%	0,5W
3344	4822 116 83872	220Ω	5%	0,5W

COILS

5201	4822 157 71285	400µH
5301	4822 157 62255	COIL 18,5 TURNS
5302	4822 157 62255	COIL 18,5 TURNS
5303	4822 157 62255	COIL 18,5 TURNS
5304	4822 157 62255	COIL 18,5 TURNS

DIODES

6201	4822 130 82078	D5SBA20
6204	5322 130 80686	1N5392
6205	5322 130 80686	1N5392
6206	4822 130 30621	1N4148
6207	4822 130 34278	BZX79-C6V8
6208	5322 130 30684	1N4002
6209	4822 130 30621	1N4148
6210	4822 130 30621	1N4148
6211	4822 130 30621	1N4148
6212	4822 130 30621	1N4148
6213	4822 130 30621	1N4148
6214	5322 130 30684	1N4002
6221	4822 130 34488	BZX79-C11
6225	4822 130 34382	BZX79-C8V2
6226	4822 130 30621	1N4148
6228	4822 130 30621	1N4148
6233	4822 130 34281	BZX79-C15
6234	4822 130 30621	1N4148
6235	4822 130 30621	1N4148
6239	4822 130 30621	1N4148
6242	4822 130 30621	1N4148
6243	4822 130 34382	BZX79-C8V2
6251	4822 130 34328	BZX79-C30
6252	4822 130 34174	BZX79-B4V7
6254	5322 130 30684	1N4002
6300	5322 130 30684	1N4002
6301	4822 130 34398	BZX79-C24
6305	5322 130 30684	1N4002
6306	5322 130 30684	1N4002
6307	5322 130 30684	1N4002
6308	5322 130 30684	1N4002
6309	4822 130 30621	1N4148
6310	4822 130 31981	BZX79-C3V9
6312	4822 130 10846	BYV27-100/20
6313	4822 130 30621	1N4148
6314	4822 130 80791	BYV28-200/20
6315	4822 130 34278	BZX79-C6V8

ELECTRICAL PARTSLIST POWER4 MODULE

TRANSISTORS

7202	5322 130 44647	BC368
7211	4822 130 44196	BC548C
7221	4822 130 10812	BDX53BFI
7222	4822 130 40959	BC547B
7223	4822 130 40959	BC547B
7224	4822 130 41691	BC556B
7225	4822 130 40959	BC547B
7226	4822 130 41691	BC556B
7227	4822 130 40995	BD438
7228	4822 130 40959	BC547B
7251	4822 130 41327	BC327-40
7303	4822 130 63726	MTP3055EFI
7304	4822 130 41691	BC556B
7305	4822 130 10847	BDW94C
7315	4822 130 40959	BC547B
7316	4822 130 40937	BC548B
7322	4822 130 44197	BC558B

INTEGRATED CIRCUITS

7201	4822 209 80817	L7805CV
7301	4822 209 90411	AN7164
7302	4822 209 90411	AN7164

AF3 BOARD

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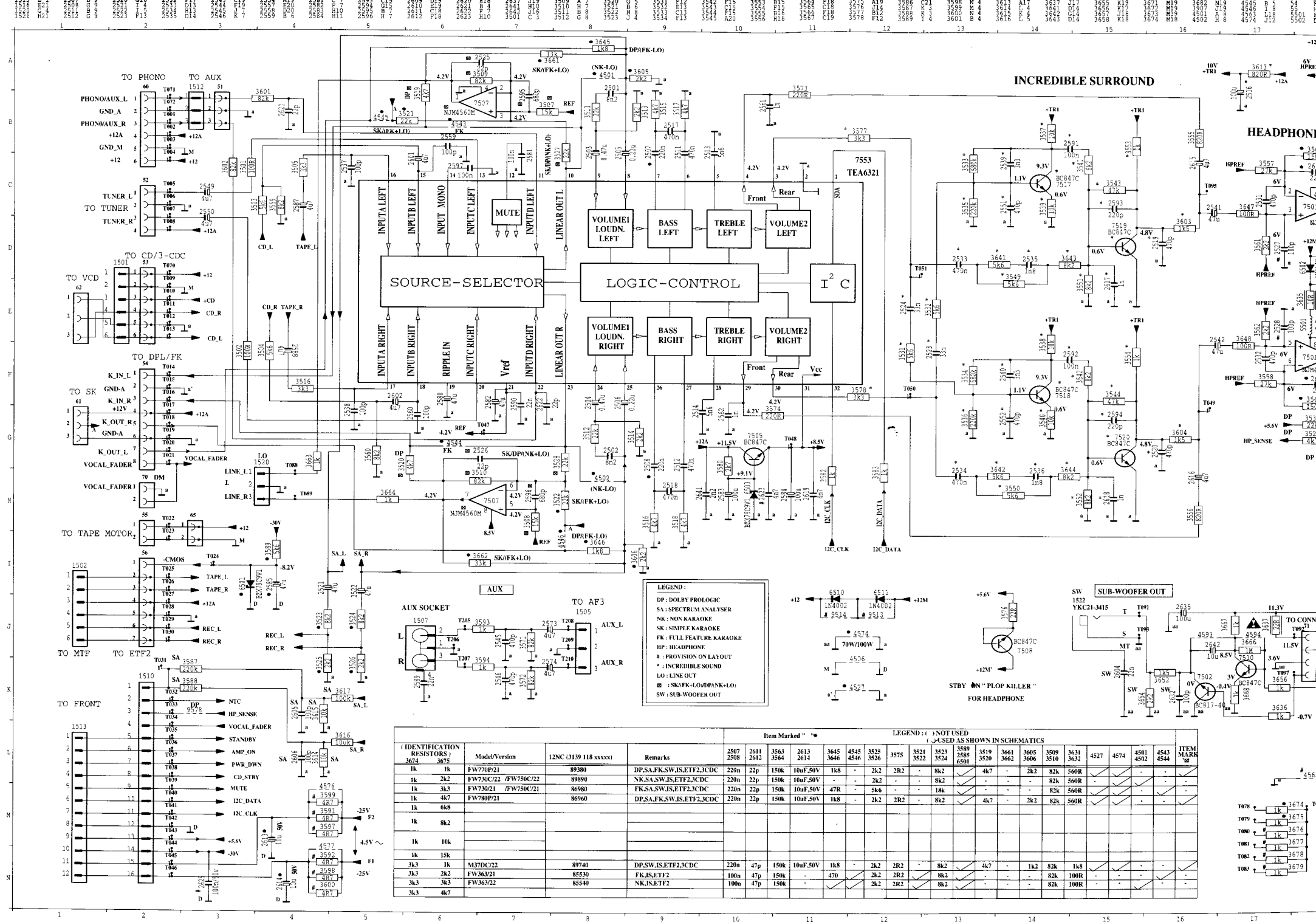
Chip component layout 12-4

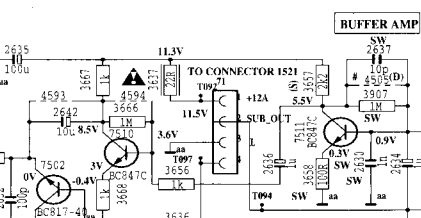
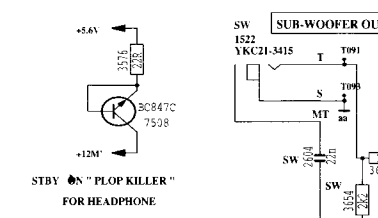
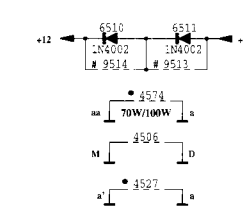
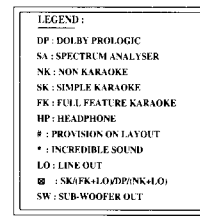
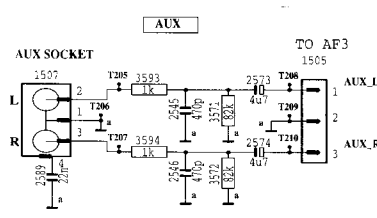
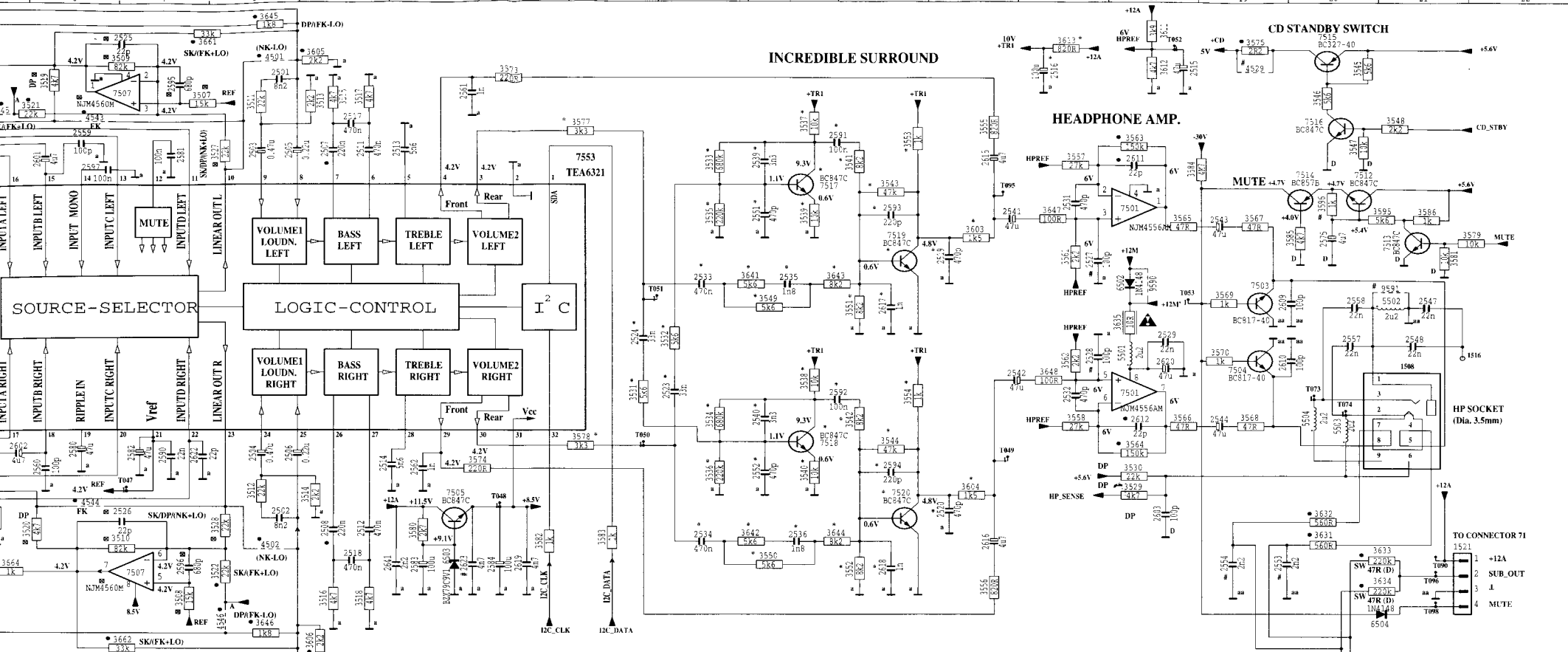
Electrical parts list..... 12-5

BRIEF INTRODUCTION OF AF3 BOARD

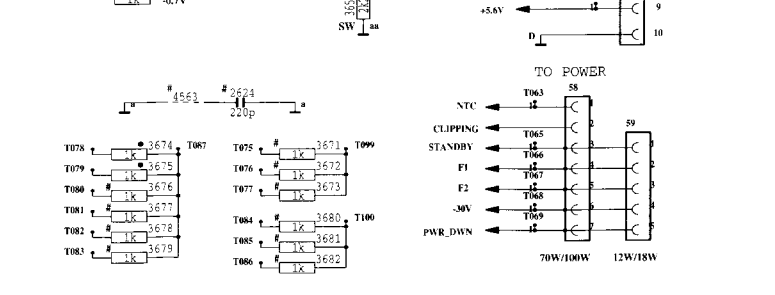
The AF3 Board consists of the following:

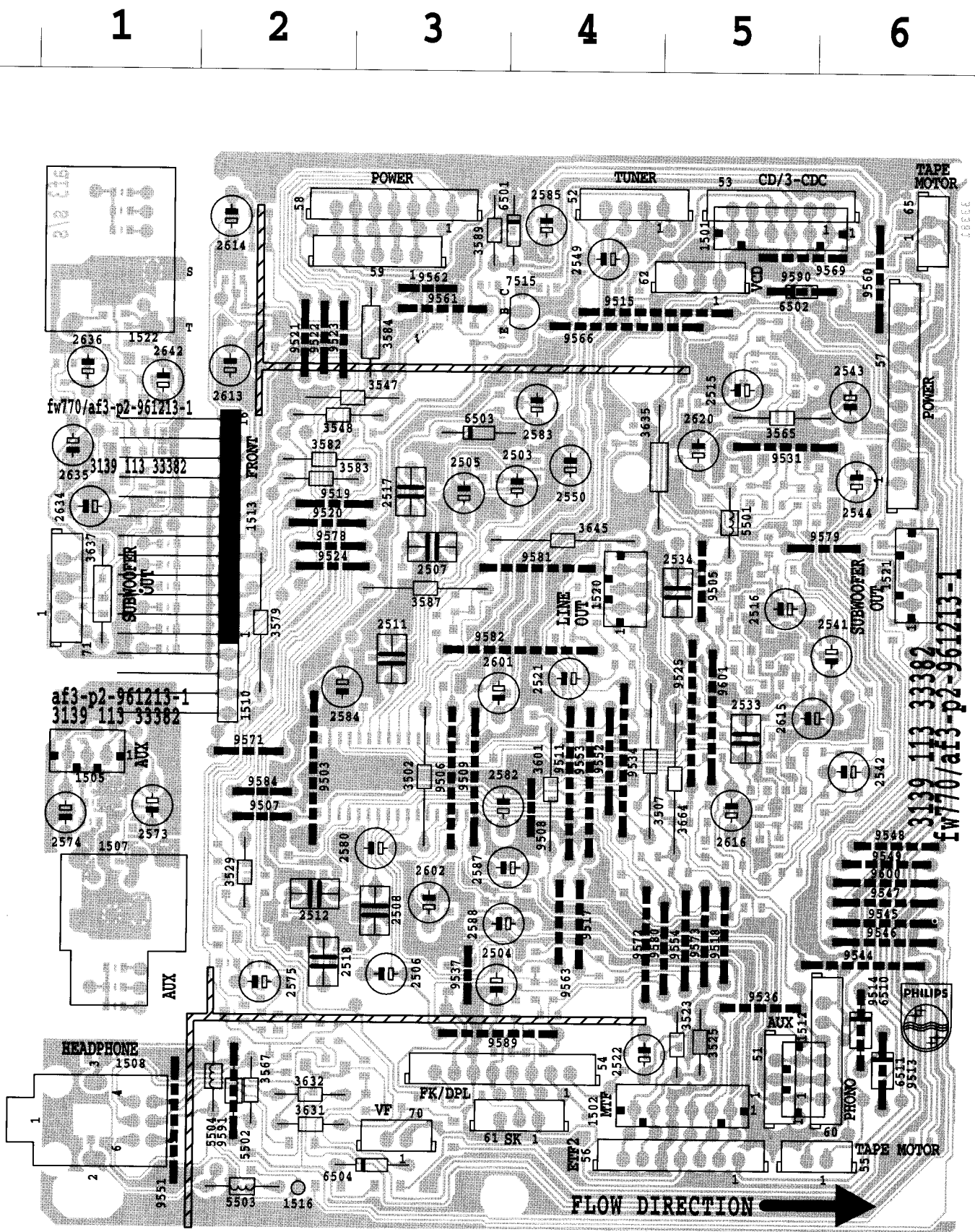
- a. SOFAC IC which includes functions such as source selection, loudness control, dynamic bass control, treble control, front/rear volume control and muting function. Sound features such as DBB, DSC, and IS are controllable via I²C data from the microprocessor.
The SOFAC IC caters for 4 input sources namely Tuner, Tape, CD and AUX.
- b. Karaoke Mic Mixing
NK: Non-Karaoke
SK: Simple Karaoke which caters for mic. mixing with additional mic. amplifier board.
FK: Full Karaoke with vocal fader and echo effect with additional Karaoke Board.
- c. Dolby Pro-Logic interface
It caters for DPL and also DPL with one of the Karaoke functions.
- d. Line out provision
- e. Sub-woofer output with cinch socket for connection to active sub-woofer speaker.
- f. Incredible Surround effect using transistor circuit to create phase shifting and spatial effect.
- g. Headphone amplifier using Op-Amp. NJM4456M
- h. CD Standby control circuit which switches on the supply to CD Servo control IC, HF circuit and the laser light pen in CD mode only.
- i. Headphone Sensing circuit to mute centre and surround channels in DPL application.
- j. Attenuation network is provided at the output of the AF3 Board for interfacing with power board of different output power.

[illegible]

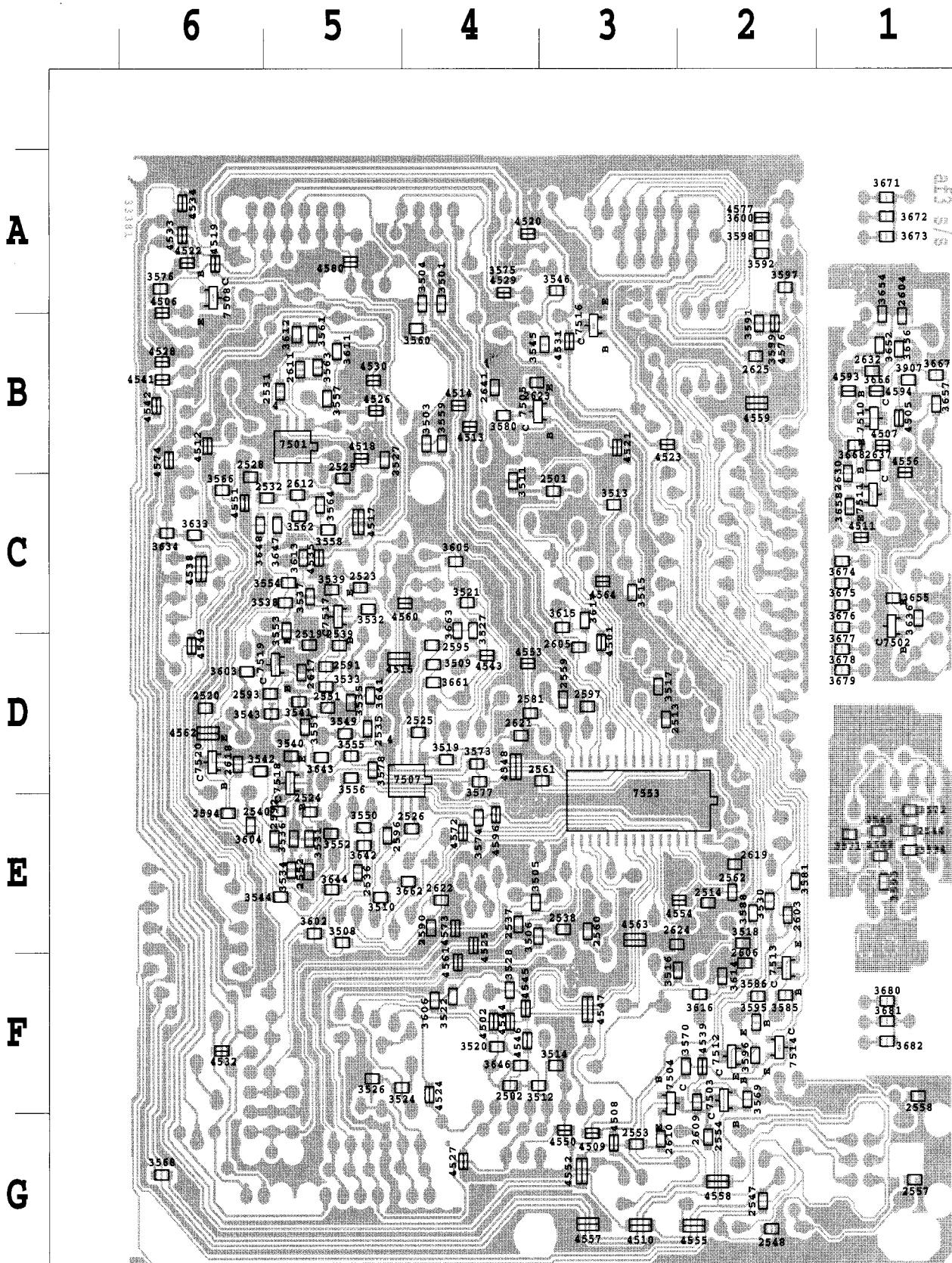


(IDENTIFICATION RESISTORS)		Model/Version		12NC (3139 118 xxxxx)		Remarks		Item Marked " "		LEGEND: () NOT USED		() USED AS SHOWN IN SCHEMATICS		ITEM MARK	
3674	3675														
1k	1k	FW770P/21		89380		DP,SA,FK,SW,IS,ETF2,3CDC	220n	22p	150k	100pF,50V	1k8	-	2k2	2R2	-
1k	2k2	FW730C/22	/FW750C/22	89890		NK,SA,SW,IS,ETF2,3CDC	220n	22p	150k	100pF,50V	-	-	2k2	-	-
1k	3k3	FW730/21	/FW750C/21	86980		FK,SA,SW,IS,ETF2,3CDC	220n	22p	150k	100pF,50V	47R	-	5k6	-	-
1k	4k7	FW780P/21		86960		DP,SA,FK,SW,IS,ETF2,3CDC	220n	22p	150k	100pF,50V	1k8	-	2k2	2R2	-
1k	6k8														
1k	8k2														
1k	10k														
1k	15k														
3k3	1k	M37DC/22		89740		DP,SW,IS,ETF2,3CDC	220n	47p	150k	100pF,50V	1k8	-	2k2	2R2	-
3k3	2k2	FW363/21		85530		FK,IS,ETF2	100n	47p	150k	-	470	-	2k2	2R2	-
3k3	3k3	FW363/22		85540		NK,IS,ETF2	100n	47p	150k	-	-	-	2k2	2R2	-
3k3	4k7														





This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

ELECTRICAL PARTS LIST - AF3 BOARD**MISCELLANEOUS**

1507	4822 265 20553	AUX Socket
1508	4822 267 40898	Headphone Socket
1510	4822 265 41325	16 Pin Connector
1522	4822 267 31729	Sub-woofer Socket

CAPACITORS

2501	4822 122 33336	8,2nF 10% 50V	2557	5322 122 32654	22nF 10% 63V
2502	4822 122 33336	8,2nF 10% 50V	2558	5322 122 32654	22nF 10% 63V
2503	4822 124 41407	0,47μF 20% 63V	2559	5322 122 32531	100pF 5% 50V
2504	4822 124 41407	0,47μF 20% 63V	2560	5322 122 32531	100pF 5% 50V
2505	4822 124 40746	0,22μF 20% 63V	2561	5322 122 34123	1nF 10% 50V
2506	4822 124 40746	0,22μF 20% 63V	2562	5322 122 34123	1nF 10% 50V
2507	4822 121 42408	220nF 5% 63V	2573	4822 124 40246	4,7μF 20% 63V
2508	4822 121 42408	220nF 5% 63V	2574	4822 124 40246	4,7μF 20% 63V
2511	4822 121 51252	470nF 5% 63V	2575	4822 124 40246	4,7μF 20% 63V
2512	4822 121 51252	470nF 5% 63V	2580	4822 124 41751	47μF 20% 50V
2513	4822 122 32646	5,6nF 10% 50V	2581	4822 126 13838	100nF +80/-20% 50V
2514	4822 122 32646	5,6nF 10% 50V	2582	4822 124 41751	47μF 20% 50V
2515	4822 124 40433	47μF 20% 25V	2583	4822 124 81029	100μF 20% 25V
2516	4822 124 81029	100μF 20% 25V	2584	4822 124 81029	100μF 20% 25V
2517	4822 121 51252	470nF 5% 63V	2585	4822 124 41751	47μF 20% 50V
2518	4822 121 51252	470nF 5% 63V	2587	4822 124 40246	4,7μF 20% 63V
2519	5322 122 32268	470pF 10% 50V	2588	4822 124 40246	4,7μF 20% 63V
2520	5322 122 32268	470pF 10% 50V	2589	5322 122 32654	22nF 10% 63V
2521	4822 124 41751	47μF 20% 50V	2590	5322 122 32654	22nF 10% 63V
2522	4822 124 41751	47μF 20% 50V	2591	4822 126 13838	100nF +80/-20% 50V
2523	4822 122 33342	33nF 10% 63V	2592	4822 126 13838	100nF +80/-20% 50V
2524	4822 122 33342	33nF 10% 63V	2593	4822 122 33575	220pF 5% 50V
2525	5322 122 32658	22pF 5% 50V /21/21M	2594	4822 122 33575	220pF 5% 50V
2526	5322 122 32658	22pF 5% 50V /21/21M	2595	4822 122 32535	680pF 10% 63V /21/21M
2529	5322 122 32654	22nF 10% 63V	2596	4822 122 32535	680pF 10% 63V /21/21M
2531	5322 122 32268	470pF 10% 50V	2597	4822 126 13838	100nF +80/-20% 50V
2532	5322 122 32268	470pF 10% 50V	2601	4822 124 40246	4,7μF 20% 63V
2533	4822 121 51252	470nF 5% 63V	2602	4822 124 40246	4,7μF 20% 63V
2534	4822 121 51252	470nF 5% 63V	2603	5322 122 32531	100pF 5% 50V
2535	4822 122 33219	1,8nF 10% 50V	2604	5322 122 32654	22nF 10% 63V
2536	4822 122 33219	1,8nF 10% 50V	2605	5322 122 32531	100pF 5% 50V
2537	5322 122 32531	100pF 5% 50V	2606	5322 122 32531	100pF 5% 50V
2538	5322 122 32531	100pF 5% 50V	2609	5322 122 32531	100pF 5% 50V
2539	4822 122 33891	3,3nF 10% 63V	2610	5322 122 32531	100pF 5% 50V
2540	4822 122 33891	3,3nF 10% 63V	2611	5322 122 32658	22pF 5% 50V
2541	4822 124 41751	47μF 20% 50V	2612	5322 122 32658	22pF 5% 50V
2542	4822 124 41751	47μF 20% 50V	2613	4822 124 41579	10μF 20% 50V
2543	4822 124 41751	47μF 20% 50V	2614	4822 124 41579	10μF 20% 50V
2544	4822 124 41751	47μF 20% 50V	2615	4822 124 40246	4,7μF 20% 63V
2545	5322 122 32268	470pF 10% 50V	2616	4822 124 40246	4,7μF 20% 63V
2546	5322 122 34099	470pF 10% 63V	2617	5322 122 34123	1nF 10% 50V
2547	5322 122 32654	22nF 10% 63V	2618	5322 122 34123	1nF 10% 50V
2549	4822 124 40246	4,7μF 20% 63V	2620	4822 124 40433	47μF 20% 25V
2550	4822 124 40246	4,7μF 20% 63V	2621	5322 122 32658	22pF 5% 50V
2551	5322 122 32268	470pF 10% 50V	2622	5322 122 32658	22pF 5% 50V
2552	5322 122 32268	470pF 10% 50V	2623	5322 126 10223	4,7nF 10% 63V
			2630	5322 122 34123	1nF 10% 50V
			2632	5322 122 32531	100pF 5% 50V
			2634	4822 124 40242	1μF 20% 63V
			2635	4822 124 81029	100μF 20% 25V
			2636	4822 124 40242	1μF 20% 63V
			2637	5322 122 32448	10pF 5% 50V

ELECTRICAL PARTS LIST - AF3 BOARD

2641 4822 122 33175 2,2nF 20% 50V
 2642 4822 124 41579 10μF 20% 50V

RESISTORS

3501	4822 051 20101	100R 5% 0,1W	3549	4822 051 20562	5k6 5% 0,1W
3502	4822 116 52175	100R 5% 0,5W	3550	4822 051 20562	5k6 5% 0,1W
3503	4822 051 20562	5k6 5% 0,1W	3551	4822 051 20822	8k2 5% 0,1W
3504	4822 051 20562	5k6 5% 0,1W	3552	4822 051 20822	8k2 5% 0,1W
3505	4822 051 20332	3k3 5% 0,1W	3553	4822 051 10102	1k 2% 0,25W
3506	4822 051 20332	3k3 5% 0,1W	3554	4822 051 10102	1k 2% 0,25W
3507	4822 116 52244	15k 5% 0,5W /21/21M	3555	4822 051 20821	820R 5% 0,1W
3508	4822 051 20153	15k 5% 0,1W /21/21M	3556	4822 051 20821	820R 5% 0,1W
3509	4822 117 11149	82k 1% 0,1W /21/21M	3557	4822 051 20273	27k 5% 0,1W
3510	4822 117 11149	82k 1% 0,1W /21/21M	3558	4822 051 20273	27k 5% 0,1W
3511	4822 051 20223	22k 5% 0,1W	3559	4822 051 20822	8k2 5% 0,1W
3512	4822 051 20223	22k 5% 0,1W	3560	4822 051 20822	8k2 5% 0,1W
3513	4822 117 11449	2k2 1% 0,1W	3561	4822 117 11449	2k2 1% 0,1W
3514	4822 117 11449	2k2 1% 0,1W	3562	4822 117 11449	2k2 1% 0,1W
3515	4822 051 20472	4k7 5% 0,1W	3563	4822 051 20154	150k 5% 0,1W
3516	4822 051 20472	4k7 5% 0,1W	3564	4822 051 20154	150k 5% 0,1W
3517	4822 051 20472	4k7 5% 0,1W	3565	4822 116 52195	47R 5% 0,5W
3518	4822 051 20472	4k7 5% 0,1W	3566	4822 051 20479	47R 5% 0,1W
3523	4822 116 52303	8k2 5% 0,5W	3567	4822 116 52195	47R 5% 0,5W
3523	4822 116 52251	18k 5% 0,5W /21/21M	3568	4822 051 20479	47R 5% 0,1W
3524	4822 051 20822	8k2 5% 0,1W	3569	4822 051 10102	1k 2% 0,25W
3524	4822 051 20183	18k 5% 0,1W /21/21M	3570	4822 051 10102	1k 2% 0,25W
3525	4822 116 52256	2k2 5% 0,5W	3571	4822 117 11149	82k 1% 0,1W
3525	4822 116 52289	5k6 5% 0,5W /21/21M	3572	4822 117 11149	82k 1% 0,1W
3526	4822 117 11449	2k2 1% 0,1W	3573	4822 117 11503	220R 1% 0,1W
3526	4822 051 20562	5k6 5% 0,1W /21/21M	3574	4822 117 11503	220R 1% 0,1W
3527	4822 051 20223	22k 5% 0,1W /21/21M	3575	4822 051 20228	2R2 5% 0,1W
3528	4822 051 20223	22k 5% 0,1W /21/21M	3577	4822 051 20332	3k3 5% 0,1W
3529	4822 116 52283	4k7 5% 0,5W	3578	4822 051 20332	3k3 5% 0,1W
3530	4822 051 20223	22k 5% 0,1W	3579	4822 116 83864	10k 5% 0,5W
3531	4822 051 20562	5k6 5% 0,1W	3580	4822 051 20272	2k7 5% 0,1W
3532	4822 051 20562	5k6 5% 0,1W	3581	4822 117 10833	10k 1% 0,1W
3533	4822 051 20684	680k 5% 0,1W	3582	4822 050 11002	1k 1% 0,4W
3534	4822 051 20684	680k 5% 0,1W	3583	4822 050 11002	1k 1% 0,4W
3535	4822 051 20224	220k 5% 0,1W	3584	4822 050 24705	4M7 1% 0,6W
3536	4822 051 20224	220k 5% 0,1W	3585	4822 051 20472	4k7 5% 0,1W
3537	4822 117 10833	10k 1% 0,1W	3586	4822 051 10102	1k 2% 0,25W
3538	4822 117 10833	10k 1% 0,1W	3587	4822 116 83874	220k 5% 0,5W
3539	4822 117 10833	10k 1% 0,1W	3588	4822 051 20224	220k 5% 0,1W
3540	4822 117 10833	10k 1% 0,1W	3589	4822 116 52289	5k6 5% 0,5W
3541	4822 051 20822	8k2 5% 0,1W	3593	4822 051 10102	1k 2% 0,25W
3542	4822 051 20822	8k2 5% 0,1W	3594	4822 051 10102	1k 2% 0,25W
3543	4822 051 20473	47k 5% 0,1W	3595	4822 051 20562	5k6 5% 0,1W
3544	4822 051 20473	47k 5% 0,1W	3601	4822 116 52304	82k 5% 0,5W
3545	4822 051 20562	5k6 5% 0,1W	3602	4822 117 11149	82k 1% 0,1W
3546	4822 051 20562	5k6 5% 0,1W	3603	4822 117 11139	1k5 1% 0,1W
3547	4822 116 83864	10k 5% 0,5W	3604	4822 117 11139	1k5 1% 0,1W
3548	4822 116 52256	2k2 5% 0,5W	3611	4822 051 20392	3k9 5% 0,1W
			3612	4822 051 20472	4k7 5% 0,1W
			3613	4822 051 20821	820R 5% 0,1W
			3614	4822 117 10833	10k 1% 0,1W
			3615	4822 117 10833	10k 1% 0,1W

ELECTRICAL PARTS LIST - AF3 BOARD**ELECTRICAL PARTS LIST - AF3 BOARD****RESISTORS**

3616	4822 051 20104	100k 5% 0,1W
3617	4822 051 20104	100k 5% 0,1W
3631	4822 116 52226	560R 5% 0,5W
3632	4822 116 52226	560R 5% 0,5W
3633	4822 051 20224	220k 5% 0,1W
3634	4822 051 20224	220k 5% 0,1W
3635	4822 052 10109	△ 10R 5% 0,33W
3636	4822 051 10102	1k 2% 0,25W
3637	4822 052 10229	△ 22R 5% 0,33W
3641	4822 051 20562	5k6 5% 0,1W
3642	4822 051 20562	5k6 5% 0,1W
3643	4822 051 20822	8k2 5% 0,1W
3644	4822 051 20822	8k2 5% 0,1W
3645	4822 051 20479	47R 5% 0,1W /21/21M
3646	4822 051 20479	47R 5% 0,1W /21/21M
3647	4822 051 20101	100R 5% 0,1W
3648	4822 051 20101	100R 5% 0,1W
3652	4822 117 11139	1k5 1% 0,1W
3654	4822 117 11449	2k2 1% 0,1W
3655	4822 117 11449	2k2 1% 0,1W
3656	4822 051 10102	1k 2% 0,25W
3657	4822 117 11449	2k2 1% 0,1W
3658	4822 051 20101	100R 5% 0,1W
3663	4822 051 10102	1k 2% 0,25W /21/21M
3664	4822 050 11002	1k 1% 0,4W /21/21M
3666	4822 051 20105	1M 5% 0,1W
3667	4822 051 10102	1k 2% 0,25W
3668	4822 051 10102	1k 2% 0,25W
3674	4822 051 10102	1k 2% 0,25W
3675	4822 051 20332	3k3 5% 0,1W /21/21M
3675	4822 117 11449	2k2 1% 0,1W
3907	4822 051 20105	1M 5% 0,1W
4501	4822 051 20008	Chip Jumper 0805
4502	4822 051 20008	Chip Jumper 0805
4506	4822 051 20008	Chip Jumper 0805
4508	4822 051 20008	Chip Jumper 0805
4509	4822 051 20008	Chip Jumper 0805
4510	4822 051 10008	Chip Jumper 1206
4511	4822 051 20008	Chip Jumper 0805
4512	4822 051 20008	Chip Jumper 0805
4513	4822 051 20008	Chip Jumper 0805
4514	4822 051 20008	Chip Jumper 0805
4515	4822 051 10008	Chip Jumper 1206
4517	4822 051 10008	Chip Jumper 1206
4518	4822 051 20008	Chip Jumper 0805
4519	4822 051 20008	Chip Jumper 0805
4520	4822 051 20008	Chip Jumper 0805
4521	4822 051 20008	Chip Jumper 0805
4522	4822 051 20008	Chip Jumper 0805
4523	4822 051 20008	Chip Jumper 0805
4524	4822 051 20008	Chip Jumper 0805
4525	4822 051 20008	Chip Jumper 0805

4526	4822 051 20008	Chip Jumper 0805
4527	4822 051 20008	Chip Jumper 0805 /21/21M
4528	4822 051 20008	Chip Jumper 0805
4530	4822 051 20008	Chip Jumper 0805
4531	4822 051 20008	Chip Jumper 0805
4532	4822 051 20008	Chip Jumper 0805
4533	4822 051 20008	Chip Jumper 0805
4534	4822 051 20008	Chip Jumper 0805
4535	4822 051 20008	Chip Jumper 0805
4538	4822 051 10008	Chip Jumper 1206
4539	4822 051 20008	Chip Jumper 0805
4541	4822 051 20008	Chip Jumper 0805
4542	4822 051 20008	Chip Jumper 0805
4543	4822 051 20008	Chip Jumper 0805 /21/21M
4544	4822 051 20008	Chip Jumper 0805 /21/21M
4547	4822 051 10008	Chip Jumper 1206
4548	4822 051 10008	Chip Jumper 1206
4549	4822 051 20008	Chip Jumper 0805
4550	4822 051 20008	Chip Jumper 0805
4551	4822 051 20008	Chip Jumper 0805
4552	4822 051 10008	Chip Jumper 1206
4553	4822 051 20008	Chip Jumper 0805
4554	4822 051 20008	Chip Jumper 0805
4555	4822 051 10008	Chip Jumper 1206
4556	4822 051 20008	Chip Jumper 0805
4557	4822 051 10008	Chip Jumper 1206
4558	4822 051 10008	Chip Jumper 1206
4559	4822 051 10008	Chip Jumper 1206
4560	4822 051 20008	Chip Jumper 0805 /21/21M
4561	4822 051 20008	Chip Jumper 0805
4562	4822 051 10008	Chip Jumper 1206
4564	4822 051 20008	Chip Jumper 0805
4572	4822 051 20008	Chip Jumper 0805
4573	4822 051 20008	Chip Jumper 0805
4574	4822 051 20008	Chip Jumper 0805
4576	4822 051 20008	Chip Jumper 0805
4577	4822 051 20008	Chip Jumper 0805
4580	4822 051 20008	Chip Jumper 0805
4596	4822 051 20008	Chip Jumper 0805

COILS

5501	4822 156 21721	Inductor 2,2μH 10%
5502	4822 156 21721	Inductor 2,2μH 10%
5503	4822 156 21721	Inductor 2,2μH 10%
5504	4822 156 21721	Inductor 2,2μH 10%

DIODES

6501	4822 130 30862	BZX79-C9V1
6503	4822 130 30862	BZX79-C9V1
6504	4822 130 30621	1N4148
6510	5322 130 30684	1N4002
6511	5322 130 30684	1N4002

TRANSISTORS

7501
7502
7503
7504
7505
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7553

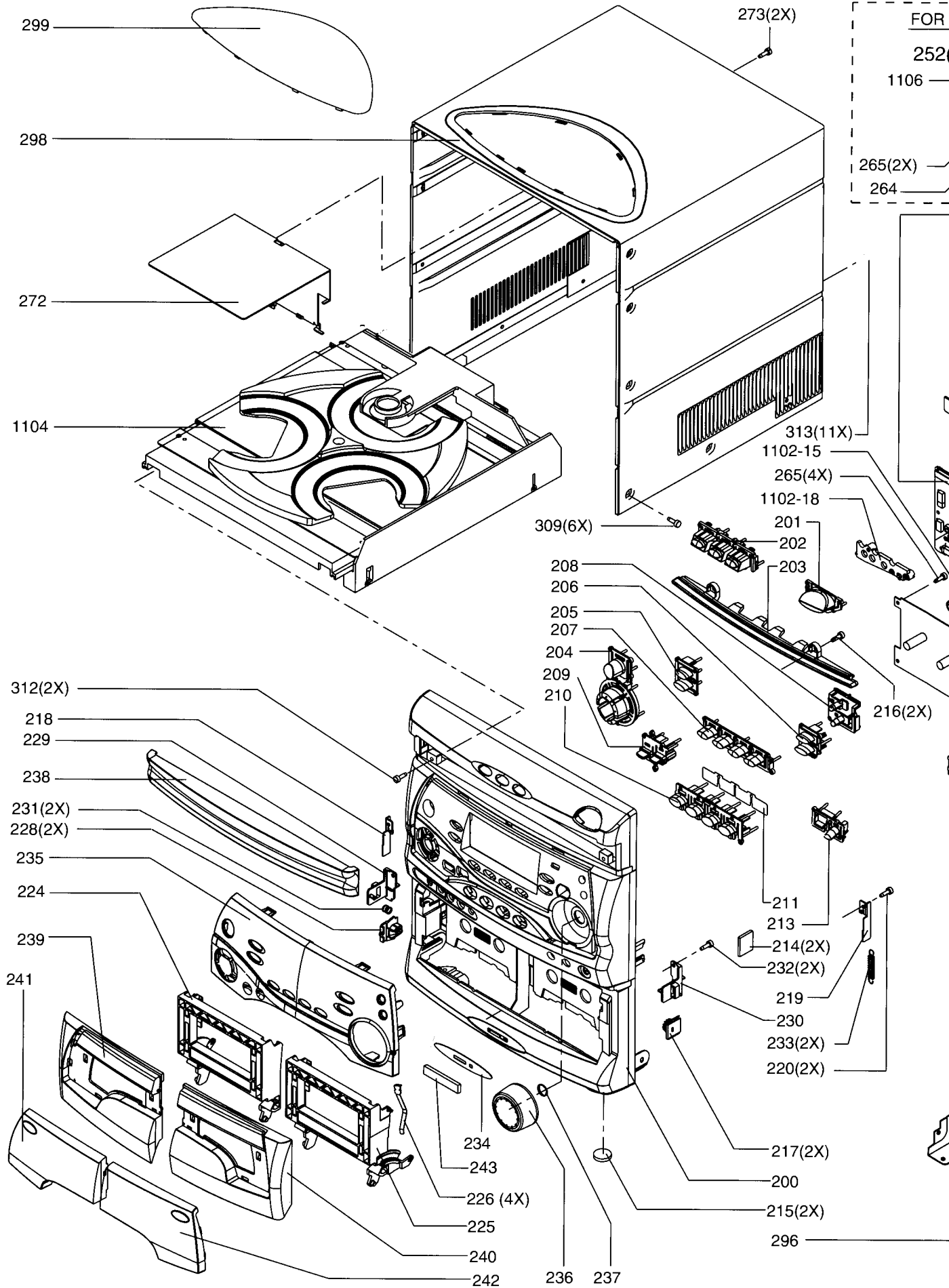
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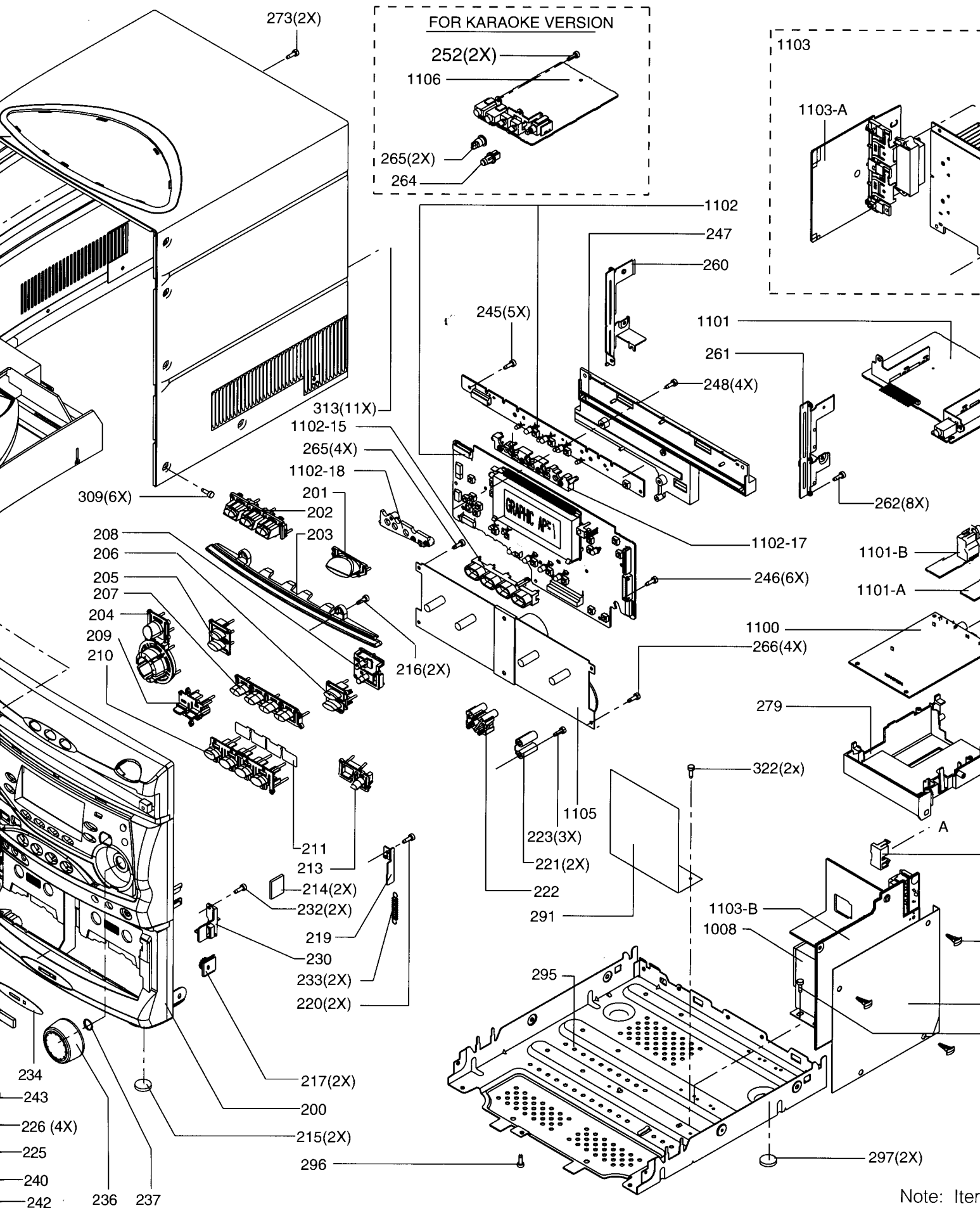
ELECTRICAL PARTS LIST - AF3 BOARD

TRANSISTORS & INTEGRATED CIRCUITS

7501	4822 209 31378	NJM4556AM
7502	4822 130 42615	BC817-40
7503	4822 130 42615	BC817-40
7504	4822 130 42615	BC817-40
7505	5322 130 42755	BC847C
7507	4822 209 83357	NJM4560M /21/21M
7510	5322 130 42755	BC847C
7511	5322 130 42755	BC847C
7512	5322 130 42755	BC847C
7513	5322 130 42755	BC847C
7514	5322 130 60508	BC857B
7515	4822 130 41327	BC327-40
7516	5322 130 42755	BC847C
7517	5322 130 42755	BC847C
7518	5322 130 42755	BC847C
7519	5322 130 42755	BC847C
7520	5322 130 42755	BC847C
7553	4822 209 33652	TEA6321T

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





Note: Iter

2X)

FOR KARAOKE VERSION

252(2X)

1106

265(2X)

264

1103

1103-A

307(2X)

293(3X)

305

310(3X)

1103-201

1103-204

263(2X)

311 (2X)

303

316(2x)

282(2X)

302(2X)

304

313(11X)

102-15

265(4X)

102-18

201

202

203

216(2X)

1101

261

248(4X)

1102-17

246(6X)

1100

266(4X)

279

322(2x)

1103-B

1008

295

297(2X)

299

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298

299

300

301

302

303

304

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306

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MECHANICAL & ACCESSORIES PARTS LIST - MAIN UNIT**SCRI**

200	4822 459 04469	Cabinet Front /22/25/34	320	4822 466 93148	Spacer 5mm	216
200	4822 459 04505	Cabinet Front /21/21M	321	4822 402 10288	Bracket, Mains Socket	220
200	4822 459 04534	Cabinet Front /22S	1008	4822 146 10728 Δ	Mains Transformer	223
201	4822 410 10875	Button Open/Close	1008	4822 146 10755 Δ	Mains Transformer /21/21M	232
201	4822 410 11024	Button Open/Close /22S		4822 445 10599	Loudspeaker Box - Black	245
202	4822 410 10878	Button Set CDC		4822 445 10601	Loudspeaker Box - Silver /22S	246
203	4822 466 11392	Light Guide CDC		4822 303 50063	FM Aerial	248
204	4822 410 11025	Button Set Power/DSC		4822 263 21071	Adaptor Female-Female /25	252
205	4822 410 10881	Button Set Display Left		4822 219 10181	Remote Control RC0781/01	262
206	4822 410 10882	Button Set Display Right		4822 303 50082	AM Frame Aerial	263
207	4822 410 10883	Button Set Display C		4822 321 10249 Δ	Mains Cord IEC	265
208	4822 410 10884	Button Set Clock/Demo		4822 321 10886 Δ	Mains Cord UK /25	266
209	4822 410 10885	Button Set DBB/IS		4822 736 14995	Instruction for use - Europe	273
210	4822 410 10886	Button Set Mode		4822 736 15098	Instruction for use - Overseas	282
213	4822 410 11001	Button Dolby /22/22S/25/34		4822 736 15162	Instruction For Use - E. Europe	284
215	4822 462 40683	Plate (Foot)	NOTE: Only the parts mentioned in this list are normal service spare parts.			293
217	4822 529 10322	Damper Assembly				296
224	4822 443 10487	Door Cassette Left				302
225	4822 443 10488	Door Cassette Right				303
226	4822 492 42787	Spring Cassette				304
228	4822 402 10621	Push-Catch				305
231	4822 492 11344	Spring Compression				307
233	4822 492 11345	Spring Tension				309
235	4822 450 10279	Window Display /22/22S/25				310
235	4822 450 10293	Window Display /21/21M/34				311
236	4822 410 11002	Knob Volume				312
237	4822 492 51374	Ring				313
238	4822 442 00667	Cover Door CDC				316
238	4822 443 10554	Cover Door CDC /22S				322
239	4822 442 00773	Cover Door Cass. Left				
239	4822 442 00845	Cover Door Cass. Left /22S				
240	4822 442 00669	Cover Door Cass. Right				
240	4822 443 10556	Cover Door Cass. Right /22S				
241	4822 450 10228	Window Cassette Left				
242	4822 450 10229	Window Cassette Right				
243	4822 459 11055	Badge, Philips				
250	4822 410 10889	Knob Vocal Cancel /21/21M				
251	4822 410 10533	Knob Karaoke /21/21M				
297	4822 462 40683	Plate (Foot)				
298	4822 426 10069	Cabinet Rear				
298	4822 426 10371	Cabinet Rear /22S				
299	4822 450 10226	Window CDC				
299	4822 450 10291	Window CDC /22S				

SCREW LISTS - MAIN UNIT

216 D3 x 10
220 D3 x 10
223 D3 x 30
232 D3 x 10
245 D3 x 12

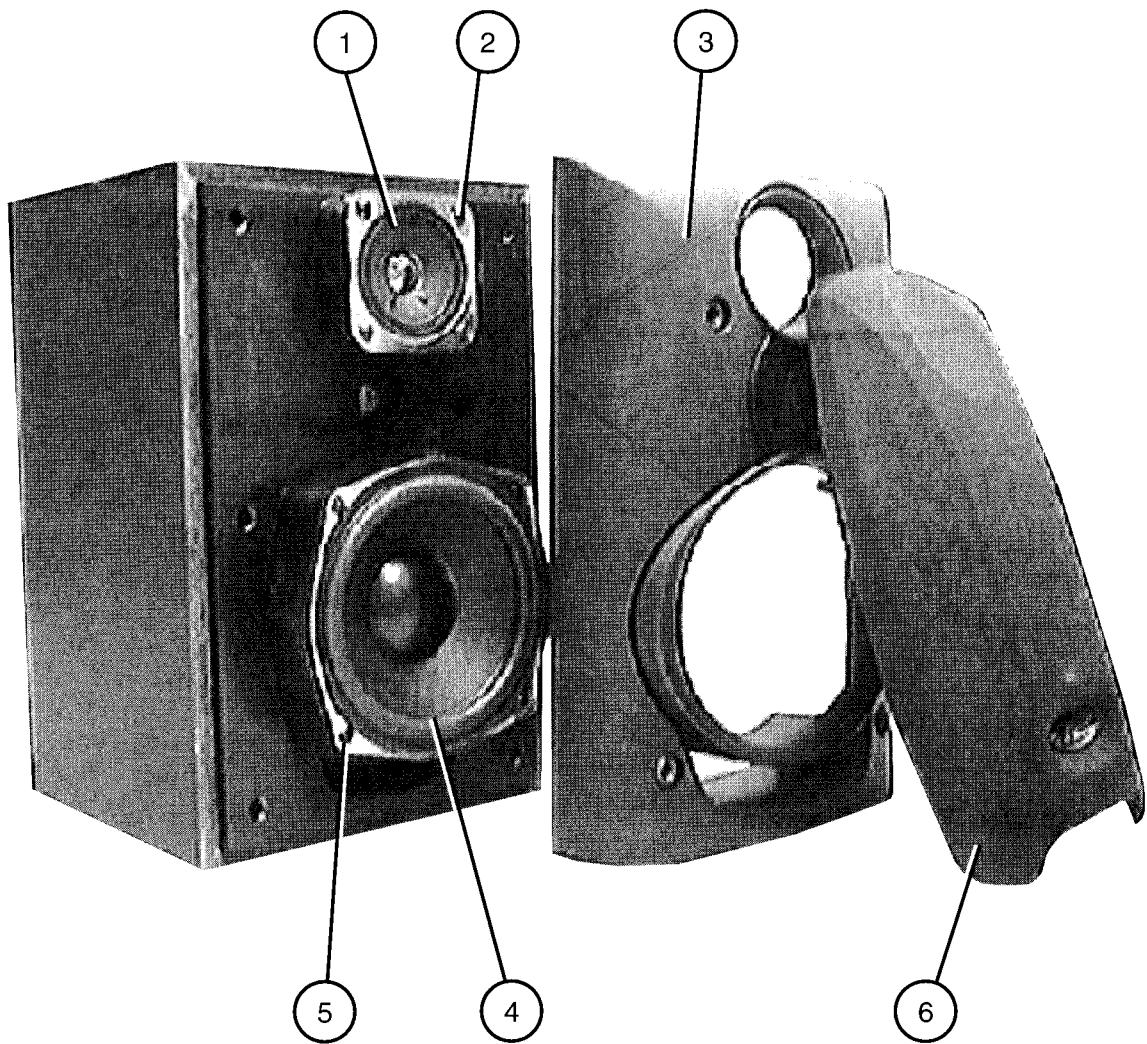
246 D3 x 12
248 D3 x 12
252 D3 x 10
262 D3 x 12
263 D3 x 12

265 D3 x 12
266 D3 x 30
273 M3 x 10
282 D3 x 12
284 M3 x 6

293 M3 x 10
296 M3 x 10
302 D3 x 12
303 D3 x 12
304 D3 x 12

305 D3 x 12
307 D3 x 12
309 M3 x 10
310 M3 x 10
311 D3 x 10

312 D3 x 10
313 M3 x 10
316 M3 x 10
322 M3 x 6



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|---|----------------|------------------------------------|
| 1 | 4822 240 10182 | Tweeter /22S |
| 1 | 4822 240 10218 | Tweeter |
| 2 | - | Screw D3.5 x 14 |
| 3 | 4822 459 04544 | Front Panel Assembly - Silver /22S |
| 3 | 4822 459 04545 | Front Panel Assembly - Black |
| | | |
| 4 | 4822 240 10213 | Woofer /22S |
| 4 | 4822 240 50347 | Woofer |
| 5 | - | Screw D3.5 x 14 |
| 6 | 4822 464 10247 | Cloth Frame Assembly - Silver /22S |
| 6 | 4822 464 10282 | Cloth Frame Assembly |
| | | |
| | 4822 445 10599 | Loudspeaker Box - Black |
| | 4822 445 10601 | Loudspeaker Box - Silver /22S |

Note: Only the parts mentioned are normal service spare parts.

