

TA-F590ES/F690ES

SERVICE MANUAL

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AEP Model

www.freeservicemanuals.info UK Model



Photo : TA-F690ES

SPECIFICATIONS

Amplifier Section

Items	Conditions	Data	
		TA-F590ES	TA-F690ES
Continuous RMS power output (both channels driven simultaneously)	4 ohms, 20 Hz - 20 kHz Countries other than Scandinavian countries, Switzerland, Spain and Portugal	110 W + 110 W (THD 0.01%) (DIN: 130 W + 130 W)	125 W + 125 W (THD 0.01%) (DIN: 145 W + 145 W)
	6 ohms, 20 Hz - 20 kHz Scandinavian countries, Switzerland, Spain and Portugal	90 W + 90 W (THD 0.006%) (DIN: 105 W + 105 W)	100 W + 100 W (THD 0.006%) ; (DIN: 110 W + 110 W)
	8 ohms, 20 Hz - 20 kHz Countries other than Scandinavian countries, Switzerland, Spain and Portugal	85 W + 85 W (THD 0.004%) (DIN: 95 W + 95 W)	95 W + 95 W (THD 0.004%) (DIN: 105 W + 105 W)
		Scandinavian countries, Switzerland, Spain and Portugal	80 W + 80 W (THD 0.004%) (DIN: 90 W + 90 W)
Power band width (IHF)	8 ohms, THD 0.02%	10 Hz - 100 kHz at 45 W	10 Hz - 100 kHz at 45 W
Dynamic headroom ('78 IHF)	4 ohms	2 dB	2 dB
	8 ohms	1.2 dB	1.2 dB
Total harmonic distortion	8 ohms, at 10 watt output	0.005%	0.005%
Intermodulation (IM) distortion 60 Hz : 7 kHz = 4 : 1	4 ohms, at rated output	0.008%	0.008%
	6 ohms, at rated output	0.006%	0.006%
	8 ohms, at rated output	0.004%	0.004%
Damping factor	8 ohms, at 1 kHz	100	100

- continued on next page -

INTEGRATED STEREO AMPLIFIER
SONY®



TA-F590ES/F690ES

Amplifier Section

Items	Conditions	Data	
		TA-F590ES	TA-F690ES
Residual noise	network A, 8 ohms	less than 100 μV	less than 100 μV
Frequency response	PHONO MM	RIAA equalization curve ± 0.2 dB	RIAA equalization curve ± 0.2 dB
	TUNER, CD, TAPE 1 2, DIRECT IN	2 Hz - 200 kHz $+0_{-3}$ dB	2 Hz - 200 kHz $+0_{-3}$ dB
Input sensitivity	PHONO	MC	0.17 mV, 100 ohms
		MM	2.5 mV, 50 kilohms
	TUNER, CD, DIRECT IN, TAPE 1 2, ADAPTOR, AUX	150 mV, 50 kilohms	150 mV, 50 kilohms
S/N (network) (78 IHF)	PHONO	MC	77 (0.5 mV)
		MM	95 (5.0 mV)
	TUNER, CD, DIRECT IN, TAPE 1 2, ADAPTOR, AUX	105 (150 mV)	105 (150 mV)
Output voltage impedance	REC OUT 1 2, ADAPTOR	150 mV, 1 kilohm	150 mV, 1 kilohm
	HEADPHONES	25 milliwatts (at 8 ohms) Accepts low and high impedance headphones.	25 milliwatts (at 8 ohms) Accepts low and high impedance headphones.
Tone controls	BASS, at 100 Hz	± 7 dB	± 7 dB
	TREBLE, at 10 kHz	± 6 dB	± 6 dB
Subsonic filter	—	6 dB / octave attenuation below 15 Hz	6 dB/octave attenuation below 15 Hz
Muting	—	-∞ dB	-∞ dB

General

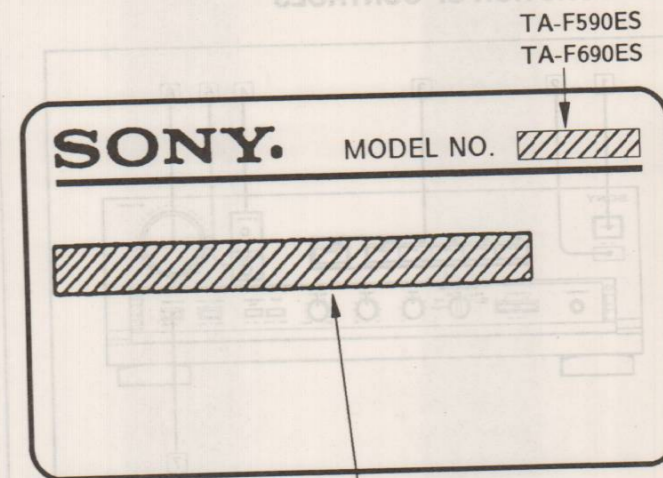
System	Preamplifier section: Low-noise high gain NAB type equalizer amplifier, passive type direct tone control Power amplifier section: Pure-complementary SEPP power amplifier, MOS FET power transistor for final stage	Weight	TA-F590ES: Approx. 12 kg (26 lbs 8 oz) TA-F690ES: Approx. 12.5 kg (27 lbs 8 oz)
Power requirements	UK model: 240V AC, 50Hz AEP, Germany models: 220 - 230V AC, 50/60Hz	Accessories supplied	Remote Commander RM-S703 (1) (TA-F690ES) RM-S702 (1) (TA-F590ES) Sony batteries SUM-3 (NS) (2)
Dimensions	TA-F590ES: Approx. 430 x 150 x 375 mm (w/h/d) (17 x 5 7/8 x 14 3/4 inches) TA-F690ES: Approx. 430 x 150 x 375 mm (w/h/d) (17 x 5 7/8 x 14 3/4 inches)	Design and specifications are subject to change without notice.	
		Note	This appliance conforms with EEC directive 87/308/EEC regarding interference suppression.

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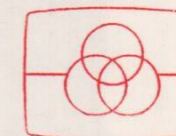
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MODEL IDENTIFICATION

- Model Number Label -



AEP Model : AC 220 - 230V ~ 50/60Hz
Germany Model : AC 230V ~ 50/60Hz
UK Model : AC 240V ~ 50/60Hz



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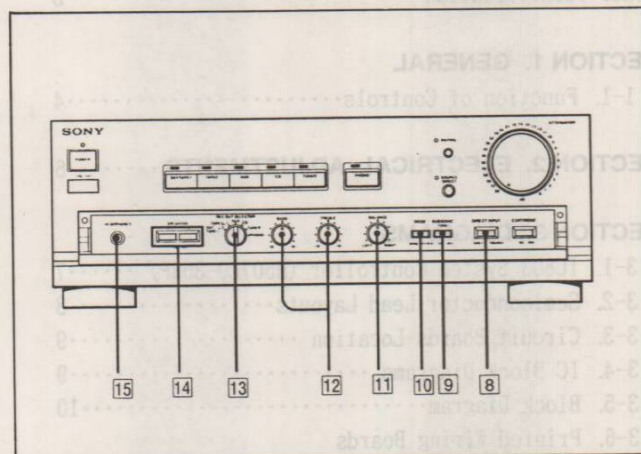
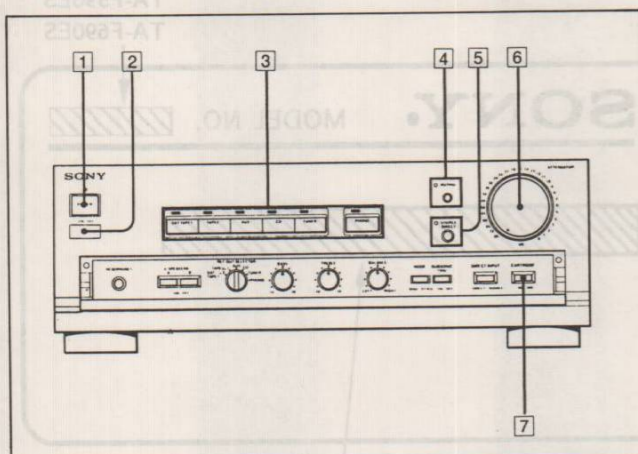
SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK Δ OR DOTTED LINE WITH MARK Δ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SECTION 1 GENERAL

This section is extracted from instruction manual

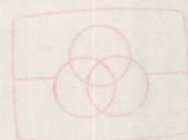
1-1. FUNCTION OF CONTROLS



Front panel

1 POWER switch and indicator

Turns the power on and off. After the power is turned on, the standby indicator lights red as the built-in muting circuit activates. When the amplifier is ready to operate, the indicator lights green. If the unit detects shorting in the speaker output circuits or in the DC component inputs, the indicator lights red. In this case, disconnect the power source and check the connected components and speaker systems.



2 Remote control sensor

3 INPUT SELECTOR
Selects the desired program source for listening.

4 MUTING button and indicator
Mutes the sound. Generally, keep the button released (OFF).

5 SOURCE DIRECT button and indicator
Deactivated the circuits of the TONE control, SUBSONIC filter button, BALANCE control and MODE selector without regard to the setting of the switches. The indicator lights red.

6 ATTENUATOR control
Adjusts the sound level. To increase the sound level, turn the control clockwise. To decrease the level, turn the control counterclockwise.

Caution
Turn down the sound level before switching on the unit. This prevents damage to speakers.

7 CARTRIDGE selector
Selects a position according to your cartridge.
MM: For moving-magnet type cartridges
MC: For moving-coil type cartridges

8 DIRECT INPUT selector
Selects the program source connected to the DIRECT IN jacks or the other input jacks.
DIRECT: For listening to a program source connected to the DIRECT IN jacks.
SOURCE: For listening to a program source connected to the other input jacks or the ADAPTOR jacks, such as a graphic equalizer.

9 SUBSONIC filter button
Reduces the noise components of less than 15 Hz which cause modulation noise.

10 MODE selector
STEREO: For listening to a stereo program.
MONO: For listening to a monaural program.

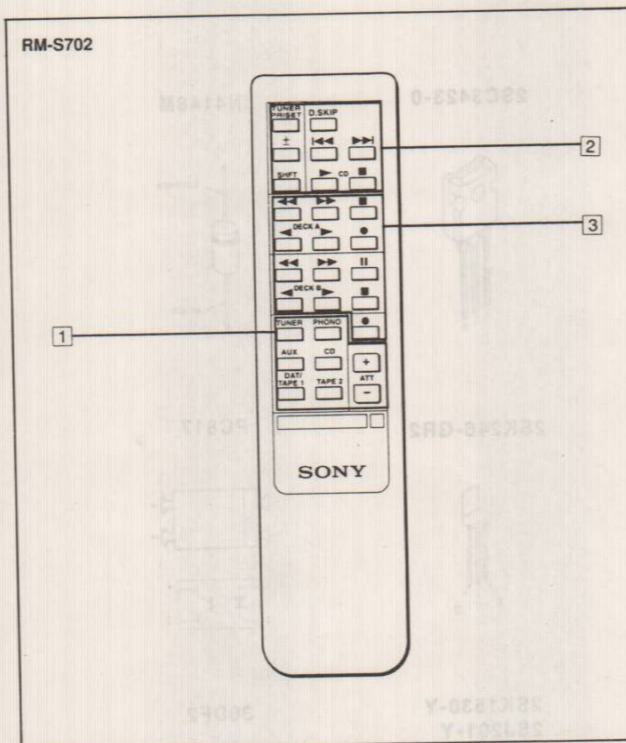
11 BALANCE control
Adjusts the sound level of the left and right speakers.

12 BASS and TREBLE TONE controls
Adjusts the tone quality. To increase bass or treble sound, turn the control clockwise. To decrease them, turn the control counterclockwise.

13 REC OUT SELECTOR
Selects the program source for the REC OUT jacks.

14 SPEAKERS buttons
Select speaker system A or B, or both. To drive speaker system A: Depress A button. To drive speaker system B: Depress B button. To drive speaker system A and B: Depress A and B. For headphones listening only: Set both to OFF (□).
TA-F690ES only
To use power amplifier or active speaker system connected to the PRE OUT jacks, depress B/PRE OUT.

15 HEADPHONES jack
Accepts headphones with the stereo phone plug.

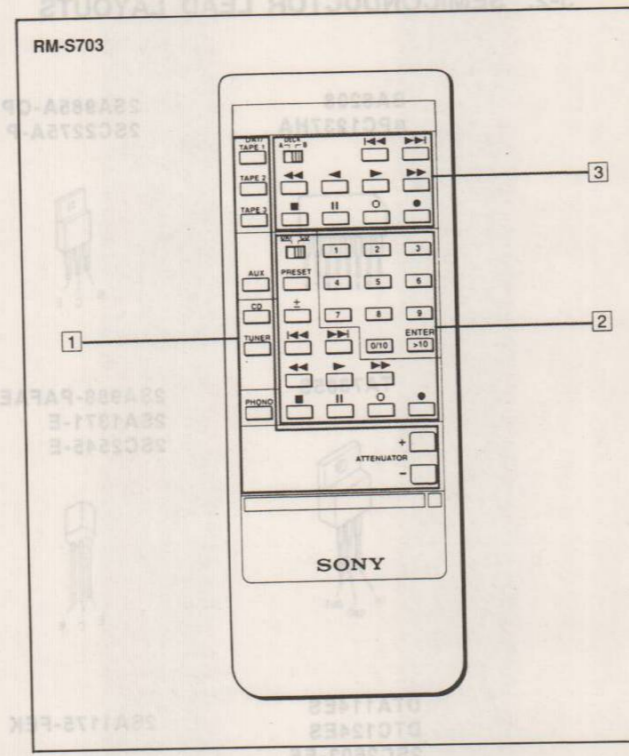


Remote Commander RM-S702 (for TA-F590ES)

1 Amplifier control section
Input selectors: Select an input source for the amplifier.
ATT. +/- buttons: Control the volume of the amplifier.

2 Tuner/CD player control section
PRESET +/- buttons: Select a preset tuner channel. (for the tuner only)
SHIFT: Select the preset memory page A, B, or C. (for the tuner only)
D.SKIP: Move to the disc tray next to the current one. (for the CD player only)
▶▶▶▶▶: Locate a desired selection
▶: Play
■: Stop

3 Tape deck control section
DECK A,B
◀◀◀◀◀: Fast winding
▶▶▶▶▶: Play
■: Stop
●: Recording
DECK B only
||: Pause



Remote Commander RM-S703 (for TA-F690ES)

1 Amplifier control section
Input selectors: Select an input source for the amplifier.
ATTENUATOR +/- buttons: Control the volume of the amplifier.

2 Tuner/DAT deck/CD player control section
DAT/CD selector: Select DAT deck or CD player.
◀◀◀▶▶▶▶▶: Locate a desired selection
▶▶▶▶▶: Manual search
▶: Play
■: Stop
||: Pause
○: Record muting
●: Recording
PRESET +/- buttons: Select a preset tuner channel. (for the tuner only)
Program number (1 to 0/10, and >10) button: Select a program or track number. (for the DAT deck and CD player)
ENTER buttons: Program your selection number. (for the DAT deck only)

3 Tape deck control section
DECK A/B selector: Select deck A or B.
◀◀◀▶▶▶▶▶: Locate a desired selection.
▶▶▶▶▶: Play
◀◀◀◀◀: Fast winding
■: Stop
||: Pause
○: Record muting
●: Recording

Note
The TAPE 3 button on the remote commander does not control this amplifier, as it doesn't have TAPE 3 input plugs.

SECTION 2 ELECTRICAL ADJUSTMENTS

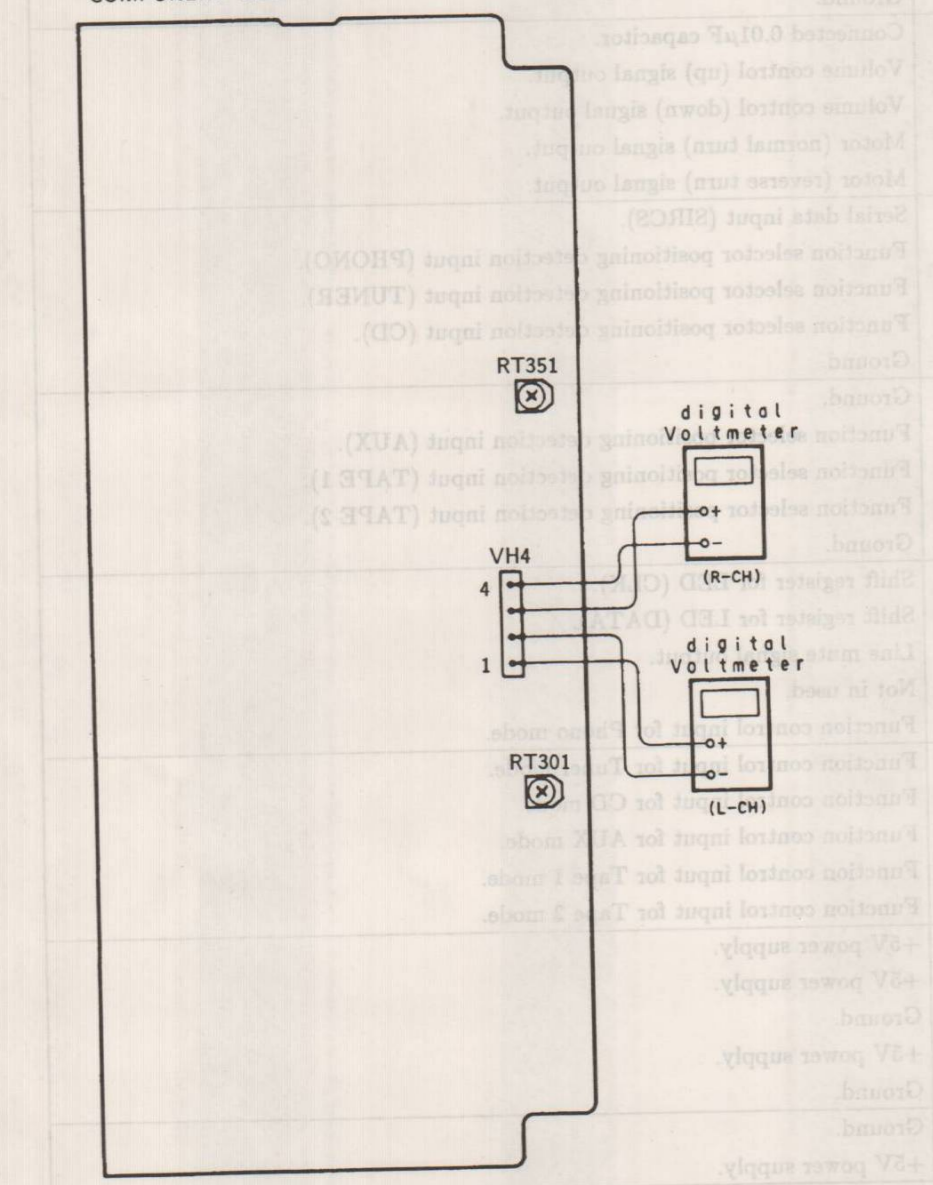
Bias Adjustment

Note: Adjustment the idling after tuning the unit on for about 10 minutes, giving it time to warm up.

Procedure :

1. Connect the digital voltmeter to VH4 on main board as follows.
2. Adjust RT301(L-CH) and RT351(R-CH) so that the digital voltmeter on signal reads 24mV at VH4.

Adjustment Location :
[MAIN BOARD]
— COMPONENT SIDE —

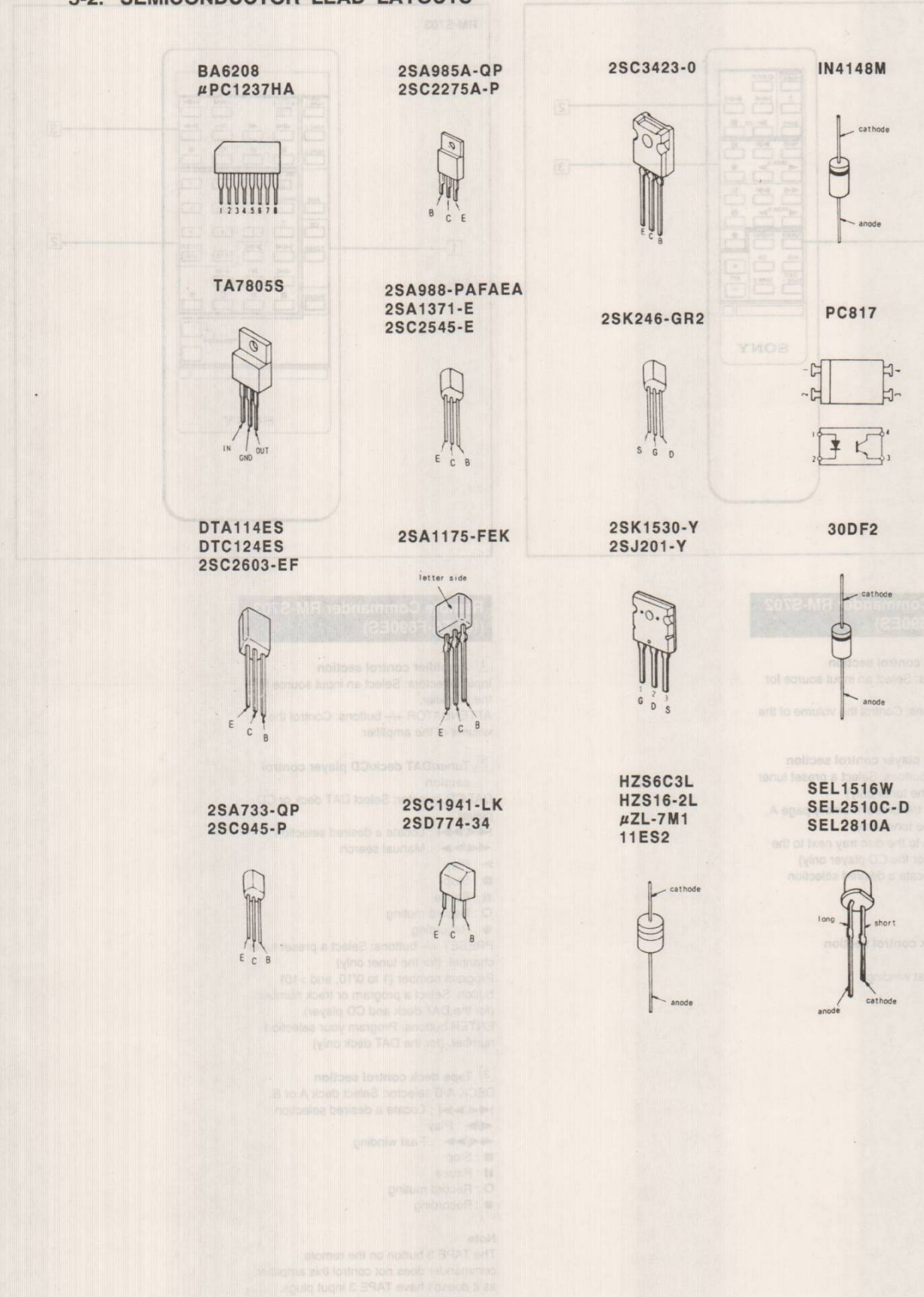


SECTION 3 DIAGRAMS

3-1. IC803 SYSTEM CONTROLLER (M 50720-358SP)

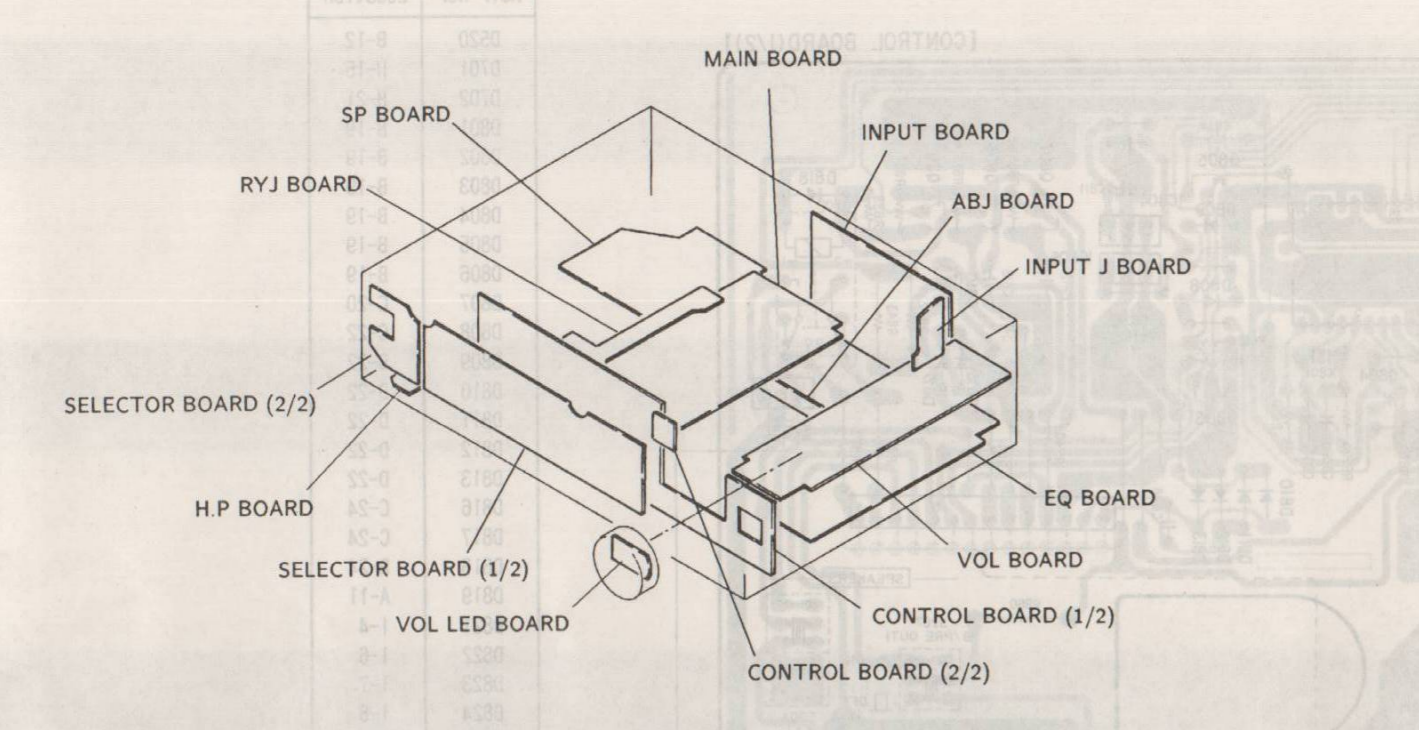
Pin No.	Pin Name	I/O	Description
1	5V CHECK	I	Power supply (+5V) check.
2	S/D ON/OFF	I	+5V power supply.
3	PROTECT	I	Ground.
4	X OUT	O	Connected oscillator circuit.
5	X IN	I	Connected oscillator circuit.
6	CE	I	Signal input for a return to normal position.
7	RESET	I	Reset signal input. ("L" : RESET)
8	VDD	I	+5 Volts power supply.
9	CNTR	I	Ground.
10	AC DET	I	Ground.
11	C	I	Connected 0.01μF capacitor.
12	VOL UP	O	Volume control (up) signal output.
13	VOL DOWN	O	Volume control (down) signal output.
14	MOTOR NORM	O	Motor (normal turn) signal output.
15	MOTOR RVS	O	Motor (reverse turn) signal output.
16	SIRCS IN	I	Serial data input (SIRCS).
17	S1	I	Function selector positioning detection input (PHONO).
18	S2	I	Function selector positioning detection input (TUNER).
19	S3	I	Function selector positioning detection input (CD).
20	CNVSS	-	Ground.
21	VSS	-	Ground.
22	S4	I	Function selector positioning detection input (AUX).
23	S5	I	Function selector positioning detection input (TAPE 1).
24	S6	I	Function selector positioning detection input (TAPE 2).
25	S7	I	Ground.
26	CLOCK	O	Shift register for LED (CLK).
27	DATA	O	Shift register for LED (DATA).
28	LINE MUTE	O	Line mute signal output.
29	BRAKE RELEASE	O	Not in used.
30	PHONO	I	Function control input for Phono mode.
31	TUNER	I	Function control input for Tuner mode.
32	CD	I	Function control input for CD mode.
33	AUX	I	Function control input for AUX mode.
34	TAPE1	I	Function control input for Tape 1 mode.
35	TAPE2	I	Function control input for Tape 2 mode.
36	-	-	+5V power supply.
37	POWER ON/OFF	I	+5V power supply.
38	K0	I	Ground.
39	K1	I	+5V power supply.
40	K2	I	Ground.
41	K3	I	Ground.
42	MUTE	I	+5V power supply.

3-2. SEMICONDUCTOR LEAD LAYOUTS

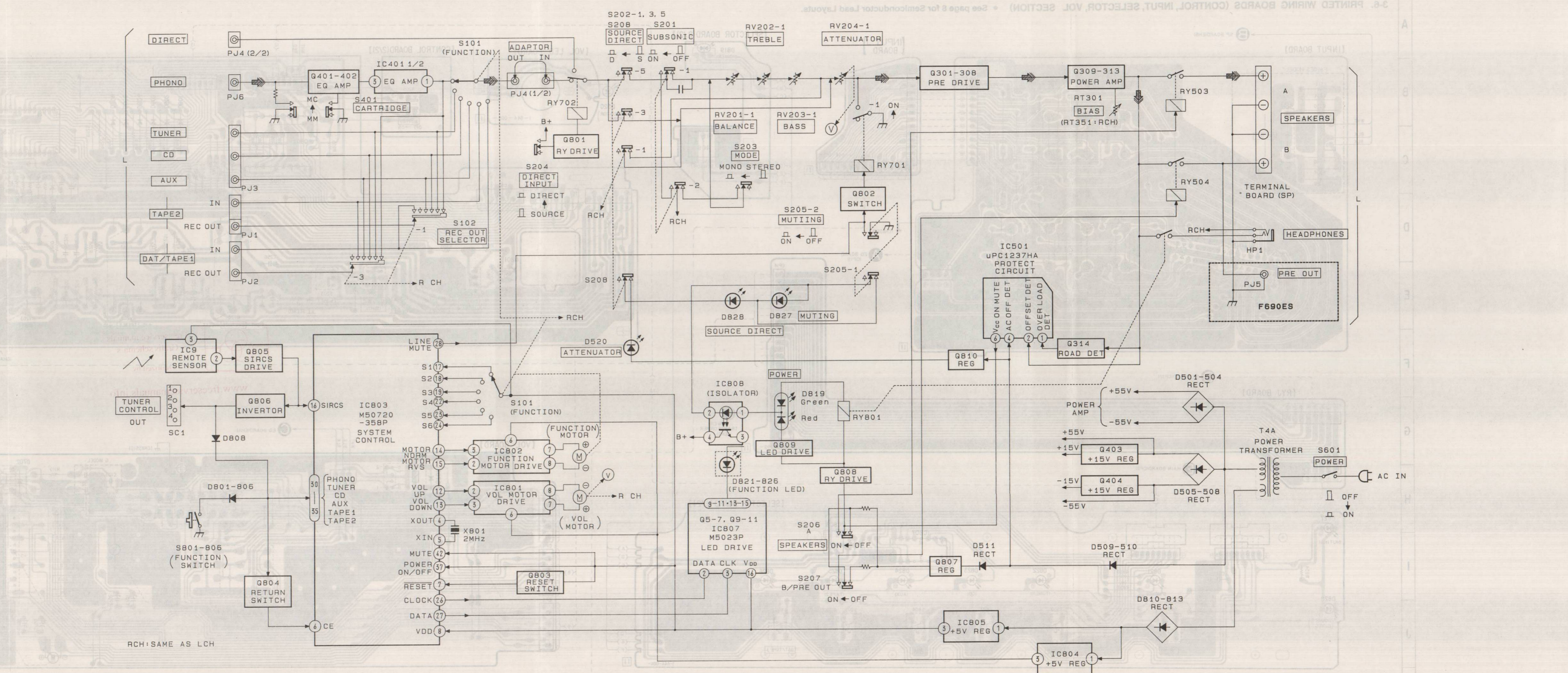
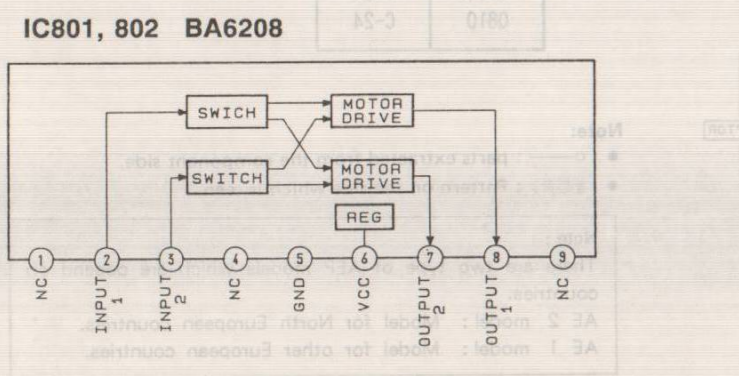
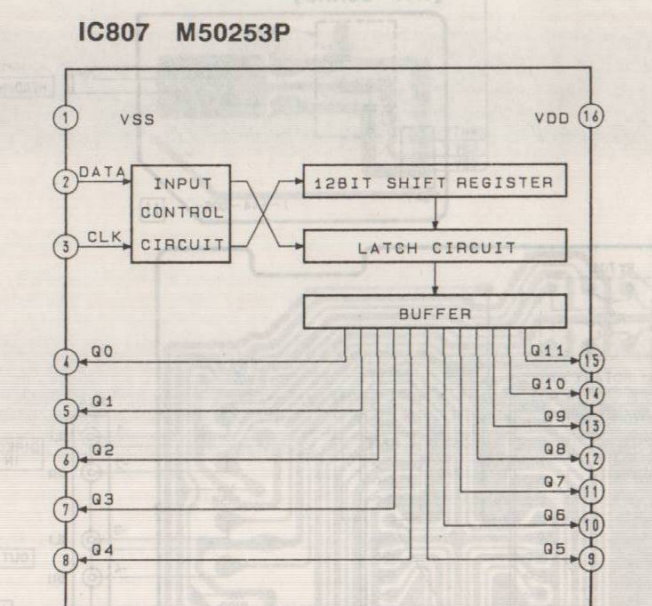
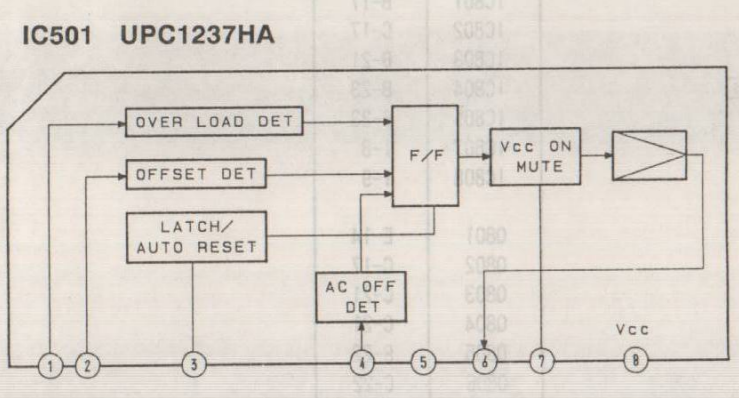


3-5. BLOCK DIAGRAM

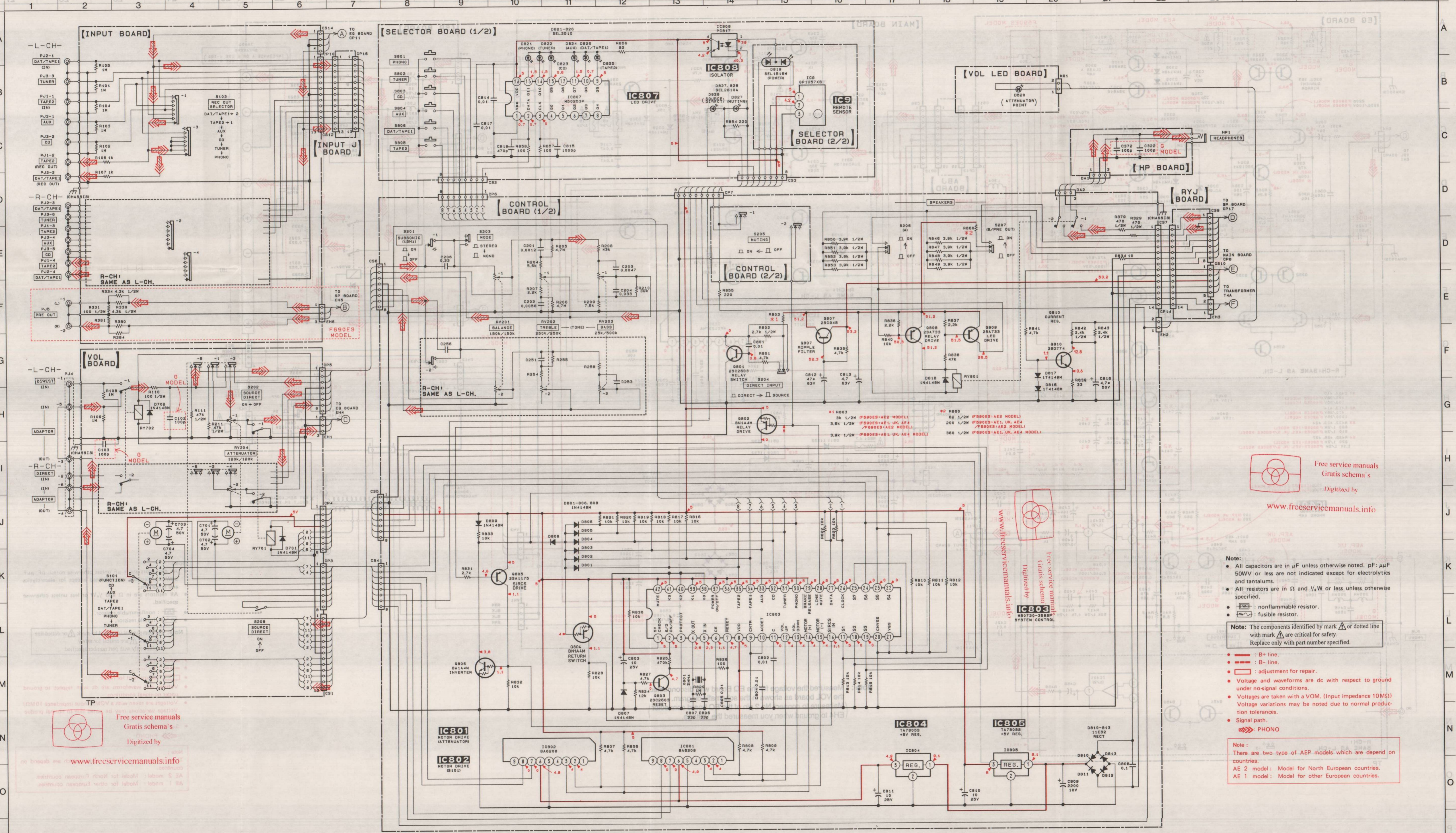
3-3. CIRCUIT BOARDS LOCATION



3-4. IC BLOCK DIAGRAMS



3-7. SCHEMATIC DIAGRAM (CONTROL, INPUT, SELECTOR, VOL. SECTION) • See page 9 for IC Block Diagrams.



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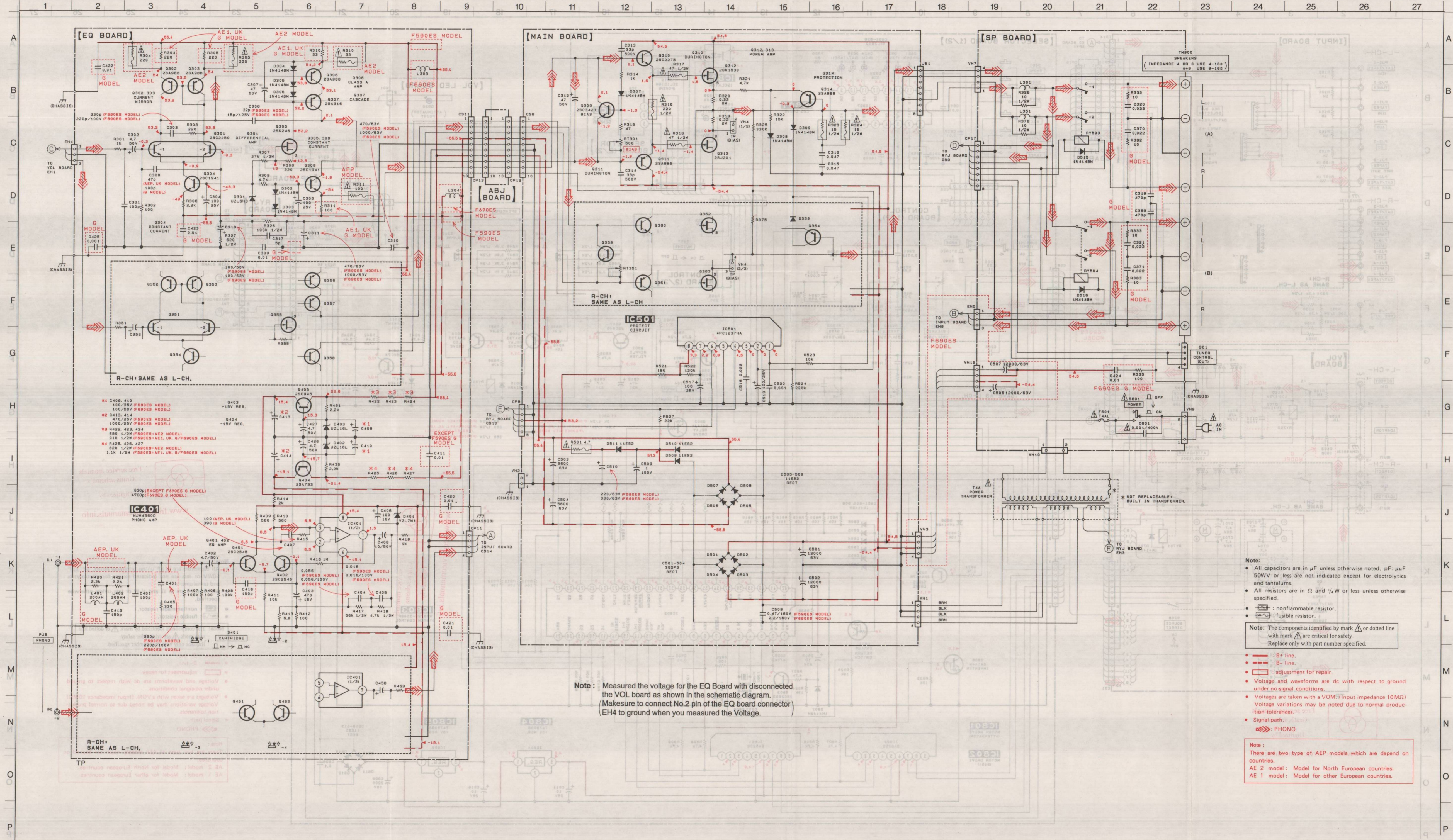
Note:
• All capacitors are in μF unless otherwise noted. $\text{pF} = \mu\text{F} \times 10^{-6}$ or 10^{-12} for electrolytics and tantalums.
• All resistors are in Ω and $\frac{1}{4}\text{W}$ or less unless otherwise specified.
• \square : nonflammable resistor.
• \square : fusible resistor.
Note: The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

• —: B+ line.
• - - -: B- line.
• \square : adjustment for repair.
• Voltage and waveforms are dc with respect to ground under no-signal conditions.
• Voltages are taken with a VOM. (Input impedance 10M Ω) Voltage variations may be noted due to normal production tolerances.
• Signal path.
• \Rightarrow : PHONO

Note:
There are two type of AEP models which are depend on countries.
AE 2 model : Model for North European countries.
AE 1 model : Model for other European countries.

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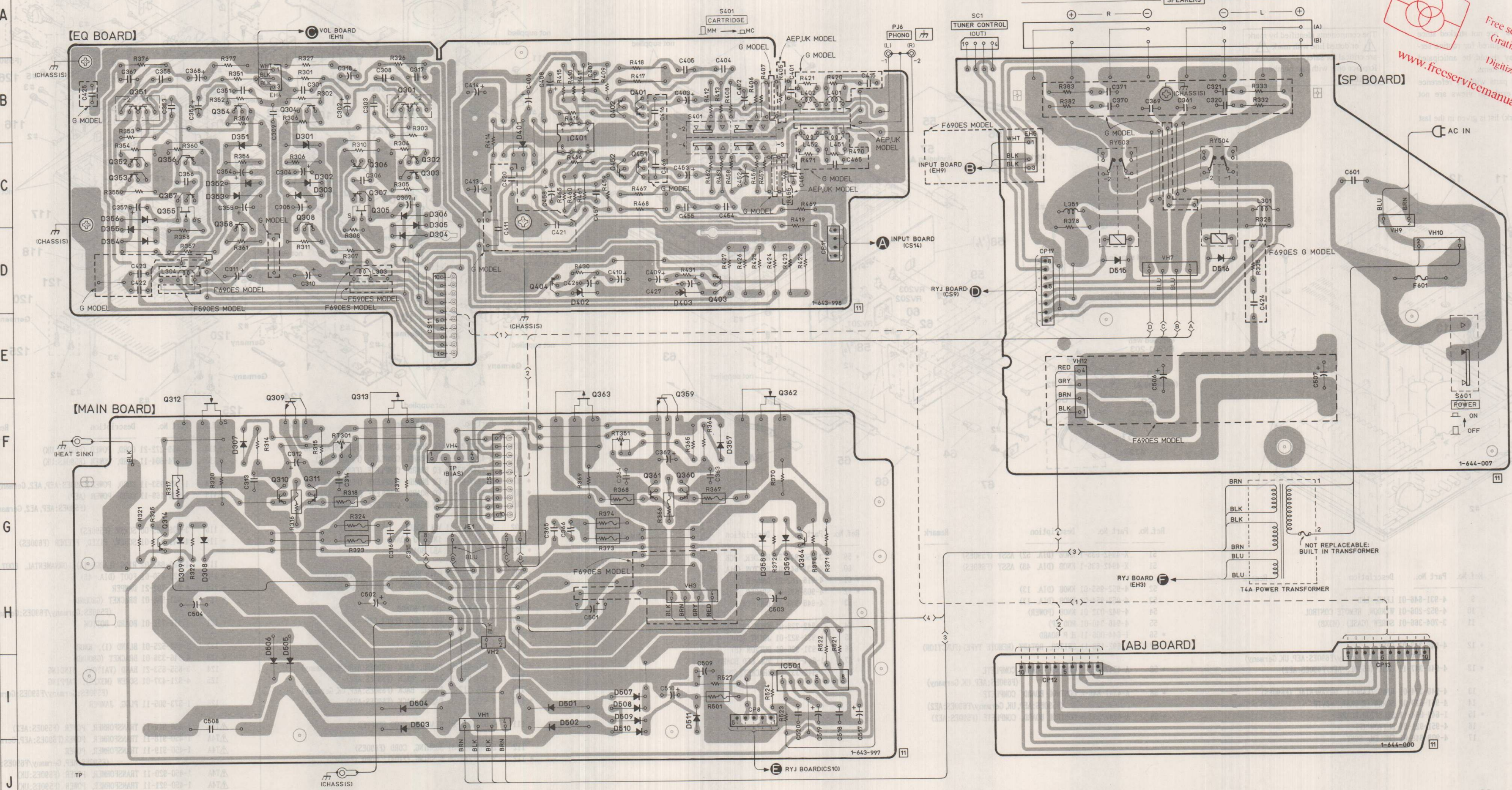
- *1 C409, 410 100/25V (F990ES MODEL)
- *2 C413, 414 100/25V (F990ES MODEL)
- *3 R422, 423, 424 880 1/2W (F990ES/AE2 MODEL)
- *4 R425, 428, 427 820 1/2W (F990ES/AE1 MODEL)

Note: Measured the voltage for the EQ Board with disconnected the VOL board as shown in the schematic diagram. (Make sure to connect No.2 pin of the EQ board connector EH4 to ground when you measured the Voltage.)

- Note:
- All capacitors are in μF unless otherwise noted. pF: μF 50WV or less are not indicated except for electrolytics and tantalums.
 - All resistors are in Ω and $1/4\text{W}$ or less unless otherwise specified.
 - : nonflammable resistor.
 - : fusible resistor.
- Note: The components identified by mark or dotted line with mark are critical for safety. Replace only with part number specified.

- : B+ line.
 - : B- line.
 - : adjustment for repair.
 - Voltage and waveforms are dc with respect to ground under no-signal conditions.
 - Voltages are taken with a VOM: (Input impedance 10M Ω) Voltage variations may be noted due to normal production tolerances.
 - Signal path:
- Note: There are two type of AEP models which are depend on countries.
 AE 2 model: Model for North European countries.
 AE 1 model: Model for other European countries.

3-9. PRINTED WIRING BOARDS (EQ, MAIN, SP SECTION) • See page 8 for Semiconductor Lead Layouts.



• Semiconductor Location

Ref. No.	Location	Ref. No.	Location
D301	C-4	IC501	I-10
D302	C-4	Q301	B-5
D303	C-4	Q302	C-5
D304	D-5	Q303	C-5
D305	C-5	Q304	B-4
D306	C-5	Q305	C-5
D307	F-3	Q306	C-5
D308	G-3	Q307	C-5
D309	G-2	Q308	D-4
D351	C-3	Q309	F-4
D352	C-3	Q310	G-4
D353	C-3	Q311	G-4
D354	D-2	Q312	F-3
D355	D-2	Q313	F-5
D356	C-2	Q314	G-2
D357	F-9	Q351	B-2
D358	G-9	Q352	C-2
D359	G10	Q353	C-2
D401	C-7	Q354	B-3
D402	D-7	Q355	C-3
D403	D-8	Q356	C-3
D501	I-7	Q357	C-3
D502	I-7	Q358	D-3
D503	I-5	Q359	F-8
D504	I-5	Q360	G-8
D505	I-4	Q361	G-8
D506	I-4	Q362	F-9
D507	I-8	Q363	F-7
D508	I-8	Q364	G-10
D509	I-8	Q401	B-8
D510	I-8	Q402	B-8
D515	D-14	Q403	D-9
D516	D-16	Q404	D-7
		Q451	C-8
		Q452	C-8

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Note:
 ● —: parts extracted from the component side.
 ● —: Pattern on the side which is seen.

Note:
 There are two type of AEP models which are depend on countries.
 AE 2 model: Model for North European countries.
 AE 1 model: Model for other European countries.

ABJ

CONTROL

SECTION 5

ELECTRICAL PARTS LIST



NOTE:

- Due to standardization, replacements in the parts list may be different from the part specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
All resistors are in ohms
METAL : Metal-film resistor
METAL OXIDE : Metal Oxide-film resistor
F : nonflammable

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

SEMICONDUCTORSIn each case, μ : μ , for example :uA... : μ A..., uPA... : μ PA...uPB... : μ PB..., uPC... : μ PC...uPD... : μ PD...**CAPACITORS**uF : μ F**COILS**uH : μ H

When indicating parts by reference number, please include the board name.

The components identified by mark  or dotted line with mark  are critical for safety.
Replace only with part number specified.

- Abbreviation
AE2: North European model
AE1: Germany model

Ref. No.	Part No.	Description	Remark
*	1-644-000-11	ABJ BOARD *****	
< COMPOSITION CIRCUIT BLOCK >			
* CP12	1-568-202-11	PIN, CONNECTOR (PC BOARD) 10P	
* CP13	1-568-202-11	PIN, CONNECTOR (PC BOARD) 10P	

*	A-4347-830-A	CONTROL BOARD, COMPLETE (F690ES: AEP, UK, Germany)	
*	A-4347-846-A	CONTROL BOARD, COMPLETE (F590ES: AEP, UK, Germany/F690ES: AE2)	
*	A-4347-853-A	CONTROL BOARD, COMPLETE (F590ES: AE2) *****	
< CAPACITOR >			
C201	1-130-472-00	MYLAR 0.0012 μ F 5% 50V	
C202	1-130-480-00	MYLAR 0.0056 μ F 5% 50V	
C203	1-130-479-00	MYLAR 0.0047 μ F 5% 50V	
C204	1-136-159-00	FILM 0.033 μ F 5% 50V	
C206	1-136-169-00	FILM 0.22 μ F 5% 50V	
C251	1-130-472-00	MYLAR 0.0012 μ F 5% 50V	
C252	1-130-480-00	MYLAR 0.0056 μ F 5% 50V	
C253	1-130-479-00	MYLAR 0.0047 μ F 5% 50V	
C254	1-136-159-00	FILM 0.033 μ F 5% 50V	
C256	1-136-169-00	FILM 0.22 μ F 5% 50V	
C801	1-130-483-00	MYLAR 0.01 μ F 5% 50V	
C802	1-161-379-00	CERAMIC 0.01 μ F 20% 25V	
C803	1-126-059-11	ELECT 10 μ F 20% 25V	
C804	1-161-379-00	CERAMIC 0.01 μ F 20% 25V	
C805	1-161-379-00	CERAMIC 0.01 μ F 20% 25V	
C806	1-162-211-31	CERAMIC 33PF 5% 50V	
C807	1-162-211-31	CERAMIC 33PF 5% 50V	
C808	1-136-165-00	FILM 0.1 μ F 5% 50V	
C809	1-124-999-81	ELECT 2200 μ F 20% 10V	
C810	1-126-059-11	ELECT 10 μ F 20% 25V	
C811	1-126-059-11	ELECT 10 μ F 20% 25V	

Ref. No.	Part No.	Description	Remark
C812	1-126-062-11	ELECT 47 μ F 20% 63V	
C813	1-126-058-11	ELECT 4.7 μ F 20% 63V	
C816	1-126-163-11	ELECT 4.7 μ F 20% 50V	
< COMPOSITION CIRCUIT BLOCK >			
CP6	1-695-015-11	PIN, CONNECTOR (PC BOARD) 8P	
CP7	1-695-015-11	PIN, CONNECTOR (PC BOARD) 8P	
< CONNECTOR >			
CS4	1-568-319-11	SOCKET, CONNECTOR 8P	
CS5	1-568-319-11	SOCKET, CONNECTOR 8P	
CS6	1-568-319-11	SOCKET, CONNECTOR 8P	
CS7	1-568-117-11	SOCKET, CONNECTOR 14P	
< DIODE >			
D801	8-719-987-63	DIODE 1N4148M	
D802	8-719-987-63	DIODE 1N4148M	
D803	8-719-987-63	DIODE 1N4148M	
D804	8-719-987-63	DIODE 1N4148M	
D805	8-719-987-63	DIODE 1N4148M	
D806	8-719-987-63	DIODE 1N4148M	
D807	8-719-987-63	DIODE 1N4148M	
D808	8-719-987-63	DIODE 1N4148M	
D809	8-719-987-63	DIODE 1N4148M	
D810	8-719-200-82	DIODE 11ES2	
D811	8-719-200-82	DIODE 11ES2	
D812	8-719-200-82	DIODE 11ES2	
D813	8-719-200-82	DIODE 11ES2	
D816	8-719-987-63	DIODE 1N4148M	
D817	8-719-987-63	DIODE 1N4148M	
D818	8-719-987-63	DIODE 1N4148M	
< CONNECTOR >			
* EH2	1-564-517-11	PLUG, CONNECTOR 2P	

CONTROL

LAB

CONTROL EQ

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
< IC >							
IC801	8-759-962-08	IC BA6208		R811	1-249-429-11	CARBON	10K 5% 1/4W
IC802	8-759-962-08	IC BA6208		R812	1-249-429-11	CARBON	10K 5% 1/4W
IC803	8-759-082-11	IC M50720-358SP (SYSTEM CONTROLLER)		R813	1-249-429-11	CARBON	10K 5% 1/4W
IC804	8-759-234-64	IC TA7805S		R814	1-249-429-11	CARBON	10K 5% 1/4W
IC805	8-759-234-64	IC TA7805S		R815	1-249-429-11	CARBON	10K 5% 1/4W
< TRANSISTOR >							
Q801	8-729-620-05	TRANSISTOR 2SC2603-EF		R816	1-249-429-11	CARBON	10K 5% 1/4W
Q802	8-729-900-61	TRANSISTOR DTA114ES		R817	1-249-429-11	CARBON	10K 5% 1/4W
Q803	8-729-620-05	TRANSISTOR 2SC2603-EF		R818	1-249-429-11	CARBON	10K 5% 1/4W
Q804	8-729-900-61	TRANSISTOR DTA114ES		R819	1-249-429-11	CARBON	10K 5% 1/4W
Q805	8-729-119-77	TRANSISTOR 2SA1175-FEK		R820	1-249-429-11	CARBON	10K 5% 1/4W
Q806	8-729-900-36	TRANSISTOR DTC124ES		R821	1-249-429-11	CARBON	10K 5% 1/4W
Q807	8-729-194-57	TRANSISTOR 2SC945-P		R822	1-249-429-11	CARBON	10K 5% 1/4W
Q808	8-729-141-03	TRANSISTOR 2SA733-QP		R823	1-249-429-11	CARBON	10K 5% 1/4W
Q809	8-729-141-03	TRANSISTOR 2SA733-QP		R824	1-249-430-11	CARBON	12K 5% 1/4W
Q810	8-729-140-96	TRANSISTOR 2SD774-34		R825	1-247-895-00	CARBON	470K 5% 1/4W
< RESISTOR >							
R204	1-247-722-11	CARBON	5.6K 5% 1/4W	R831	1-249-421-11	CARBON	2.2K 5% 1/4W
R205	1-259-502-11	CARBON	4.7M 5% 1/4W	R832	1-249-429-11	CARBON	10K 5% 1/4W
R206	1-259-502-11	CARBON	4.7M 5% 1/4W	R833	1-249-429-11	CARBON	10K 5% 1/4W
R207	1-247-717-11	CARBON	2.2K 5% 1/4W	R834	1-249-393-11	CARBON	10 5% 1/4W
R208	1-259-467-11	CARBON	43K 5% 1/4W	R835	1-249-425-11	CARBON	4.7K 5% 1/4W
R209	1-247-152-00	CARBON	7.5K 5% 1/4W	R836	1-249-421-11	CARBON	2.2K 5% 1/4W
R210	1-249-590-11	CARBON	39K 5% 1/4W	R837	1-249-421-11	CARBON	2.2K 5% 1/4W
R254	1-247-722-11	CARBON	5.6K 5% 1/4W	R838	1-249-437-11	CARBON	47K 5% 1/4W
R255	1-259-502-11	CARBON	4.7M 5% 1/4W	R839	1-249-399-11	CARBON	33 5% 1/4W
R256	1-259-502-11	CARBON	4.7M 5% 1/4W	R840	1-249-429-11	CARBON	10K 5% 1/4W
R257	1-247-717-11	CARBON	2.2K 5% 1/4W	R841	1-249-425-11	CARBON	4.7K 5% 1/4W
R258	1-259-467-11	CARBON	43K 5% 1/4W	R842	1-247-249-00	CARBON	2.4K 5% 1/2W
R259	1-247-152-00	CARBON	7.5K 5% 1/4W	R843	1-247-249-00	CARBON	2.4K 5% 1/2W
R260	1-249-590-11	CARBON	39K 5% 1/4W	R846	1-247-759-11	CARBON	3.9K 5% 1/2W
R329	1-247-747-11	CARBON	470 5% 1/2W	R847	1-247-759-11	CARBON	3.9K 5% 1/2W
R379	1-247-747-11	CARBON	470 5% 1/2W	R848	1-247-759-11	CARBON	3.9K 5% 1/2W
R801	1-249-425-11	CARBON	4.7K 5% 1/4W	R849	1-247-759-11	CARBON	3.9K 5% 1/2W
R802	1-247-757-11	CARBON	2.7K 5% 1/2W	R850	1-247-759-11	CARBON	3.9K 5% 1/2W
R803	1-247-251-00	CARBON	3K 5% 1/2W (F590ES:AE2)	R851	1-247-759-11	CARBON	3.9K 5% 1/2W
R803	1-247-253-00	CARBON	3.6K 5% 1/2W (F590ES:AEP, UK, Germany/F690ES:AE2)	R852	1-247-759-11	CARBON	3.9K 5% 1/2W
R803	1-247-759-11	CARBON	3.9K 5% 1/2W (F690ES:AEP, UK, Germany)	R853	1-247-759-11	CARBON	3.9K 5% 1/2W
R803	1-247-759-11	CARBON	3.9K 5% 1/2W (F690ES:AEP, UK, Germany)	R855	1-249-409-11	CARBON	220 5% 1/4W
R806	1-249-425-11	CARBON	4.7K 5% 1/4W (F590ES:AEP, UK, Germany/F690ES:AE2)	R860	1-247-223-00	CARBON	200 5% 1/2W (F590ES:AEP, UK, Germany/F690ES:AE2)
R807	1-249-425-11	CARBON	4.7K 5% 1/4W	R860	1-247-229-00	CARBON	360 5% 1/2W (F690ES:AEP, UK, Germany)
R808	1-249-425-11	CARBON	4.7K 5% 1/4W	R860	1-247-738-11	CARBON	82 5% 1/2W (F590ES:AE2)
R809	1-249-425-11	CARBON	4.7K 5% 1/4W				
R810	1-249-429-11	CARBON	10K 5% 1/4W				

Ref. No.	Part No.	Description	Remark
< VARIABLE RESISTOR >			
RV201	1-238-448-31	RES. VAR. CARBON 150K/150K (BALANCE)	
RV202	1-238-446-31	RES. VAR. CARBON 250K/250K (TREBLE)	
RV203	1-238-447-31	RES. VAR. CARBON 25K/500K (BASS)	
< RELAY >			
< CONECTOR >			
RY801	1-515-787-11	RELAY (HP)	
< SWITCH >			
S201	1-692-141-11	SWITCH, PUSH (3 KEY) (SUBSONIC (15HZ))	
S203	1-692-141-11	SWITCH, PUSH (3 KEY) (MODE)	
S204	1-692-141-11	SWITCH, PUSH (3 KEY) (DIRECT INPUT)	
S205	1-572-740-11	SWITCH, PUSH (1 KEY) (MUTING)	
S206	1-572-739-11	SWITCH, PUSH (2 KEY) (SPEAKERS, A)	
S207	1-572-739-11	SWITCH, PUSH (2 KEY) (SPEAKERS, B/PRE OUT)	
< VIBRATOR >			
X801	1-567-254-11	OSCILLATOR, CERAMIC (2MHz)	

*	A-4347-829-A	EQ BOARD, COMPLETE (F690ES:AEP, UK)	
*	A-4347-834-A	EQ BOARD, COMPLETE (F690ES:AE2)	
*	A-4347-836-A	EQ BOARD, COMPLETE (F690ES:Germany)	
*	A-4347-841-A	EQ BOARD, COMPLETE (F590ES:AEP, UK)	
*	A-4347-850-A	EQ BOARD, COMPLETE (F590ES:AE2)	
*	A-4347-855-A	EQ BOARD, COMPLETE (F590ES:Germany)	

< CAPACITOR >			
C301	1-104-278-11	POLYSTYRENE 100PF 5% 50V (F690ES)	
C301	1-110-335-11	MYLAR 100PF 5% 50V (F590ES)	
C302	1-123-369-00	ELECT 4.7uF 20% 50V	
C303	1-110-339-11	MYLAR 220PF 5% 50V (F590ES)	
C303	1-136-810-11	FILM 220PF 5% 100V (F690ES)	
C304	1-124-122-11	ELECT 100uF 20% 50V	
C305	1-124-122-11	ELECT 100uF 20% 50V	
C306	1-102-959-91	CERAMIC 22PF 5% 50V (F590ES)	
C306	1-104-327-11	STYROL 22PF 10% 125V (F690ES)	
C307	1-124-910-11	ELECT 47uF 20% 50V	
C308	1-101-880-00	CERAMIC 47PF 5% 50V (F590ES:AEP, AE2, UK)	
C308	1-104-274-11	POLYSTYRENE 47PF 10% 50V (F690ES:AEP, AE2, UK)	
C308	1-104-278-11	POLYSTYRENE 100PF 5% 50V (F690ES:Germany)	
C308	1-110-335-11	MYLAR 100PF 5% 50V (F590ES:Germany)	

Ref. No.	Part No.	Description	Remark
C309	1-130-483-00	MYLAR 0.01uF 5% 50V	
C310	1-124-922-11	ELECT 1000uF 20% 63V (F690ES)	
C310	1-126-066-11	ELECT 470uF 20% 63V (F590ES)	
C311	1-124-922-11	ELECT 1000uF 20% 63V (F690ES)	
C311	1-126-066-11	ELECT 470uF 20% 63V (F590ES)	
C313	1-107-159-00	MICA 33PF 5% 500V (F690ES)	
C317	1-102-942-00	CERAMIC 5.0PF +-0.5PF 50V (F590ES)	
C318	1-124-130-00	ELECT 100uF 20% 63V (F690ES)	
C318	1-126-052-11	ELECT 100uF 20% 50V (F590ES)	
C351	1-104-278-11	POLYSTYRENE 100PF 5% 50V (F690ES)	
C351	1-110-335-11	MYLAR 100PF 5% 50V (F590ES)	
C352	1-123-369-00	ELECT 4.7uF 20% 50V	
C353	1-110-339-11	MYLAR 220PF 5% 50V (F590ES)	
C353	1-136-810-11	FILM 220PF 5% 100V (F690ES)	
C354	1-124-122-11	ELECT 100uF 20% 50V	
C355	1-124-122-11	ELECT 100uF 20% 50V	
C356	1-102-959-91	CERAMIC 22PF 5% 50V (F590ES)	
C356	1-104-327-11	STYROL 22PF 10% 125V (F690ES)	
C357	1-124-910-11	ELECT 47uF 20% 50V	
C358	1-104-278-11	POLYSTYRENE 100PF 5% 50V (F690ES:Germany)	
C358	1-110-335-11	MYLAR 100PF 5% 50V (F590ES:Germany)	
C358	1-101-880-00	CERAMIC 47PF 5% 50V (F590ES:AEP, AE2, UK)	
C358	1-104-274-11	POLYSTYRENE 47PF 10% 50V (F690ES:AEP, AE2, UK)	
C367	1-102-942-00	CERAMIC 5.0PF +-0.5PF 50V (F590ES)	
C367	1-107-026-00	MICA 5.1PF 500V (F690ES)	
C368	1-124-130-00	ELECT 100uF 20% 63V (F690ES)	
C368	1-126-052-11	ELECT 100uF 20% 50V (F590ES)	
C401	1-104-278-11	POLYSTYRENE 100PF 5% 50V (F690ES:Germany)	
C401	1-110-335-11	MYLAR 100PF 5% 50V (F590ES:Germany)	
C401	1-110-339-11	MYLAR 220PF 5% 50V (F590ES:AEP, AE2, UK)	
C401	1-136-810-11	FILM 220PF 5% 100V (F690ES:AEP, AE2, UK)	
C402	1-123-369-00	ELECT 4.7uF 20% 50V	
C403	1-126-103-11	ELECT 470uF 20% 16V	
C404	1-130-341-00	FILM 0.056uF 2% 100V (F690ES)	
C404	1-136-162-00	FILM 0.056uF 5% 50V (F590ES)	
C405	1-130-971-00	FILM 0.016uF 2% 100V (F690ES)	
C405	1-137-471-11	FILM 0.016uF 5% 50V (F590ES)	
C406	1-124-122-11	ELECT 100uF 20% 50V	
C407	1-130-479-00	FILM 4700PF 5% 50V	
C408	1-126-059-11	ELECT 10uF 20% 50V	

EQ

CONTROL

INPUT H.P. EQ

Ref. No.	Part No.	Description	Remark
C409	1-124-122-11	ELECT 100uF 20% 50V (F590ES)	
C409	1-126-052-11	ELECT 100uF 20% 50V (F690ES)	
C410	1-124-122-11	ELECT 100uF 20% 50V (F590ES)	
C410	1-126-052-11	ELECT 100uF 20% 50V (F690ES)	
C411	1-161-379-00	CERAMIC 0.01uF 20% 25V (F690ES:Germany)	
C413	1-124-557-11	ELECT 1000uF 20% 25V (F690ES)	
C413	1-124-913-11	ELECT 470uF 20% 50V (F590ES)	
C414	1-124-913-11	ELECT 470uF 20% 50V (F590ES)	
C414	1-124-557-11	ELECT 1000uF 20% 25V (F690ES)	
C415	1-104-282-11	POLYSTYRENE 150PF 5% 50V (F690ES:Germany)	
C415	1-101-361-00	CERAMIC 150PF 5% 50V (F590ES:Germany)	
C416	1-162-282-31	CERAMIC 100PF 10% 50V (F590ES:Germany/F690ES:Germany)	
C420	1-161-379-00	CERAMIC 0.01uF 20% 25V (F590ES:Germany/F690ES:Germany)	
C421	1-161-379-00	CERAMIC 0.01uF 20% 25V (F590ES:Germany/F690ES:Germany)	
C422	1-106-367-00	MYLAR 0.01uF 5% 200V (F590ES:Germany/F690ES:Germany)	
C423	1-106-367-00	MYLAR 0.01uF 5% 200V (F590ES:Germany/F690ES:Germany)	
C425	1-162-294-31	CERAMIC 0.001uF 10% 50V (F590ES:Germany/F690ES:Germany)	
C426	1-123-369-00	ELECT 4.7uF 20% 50V	
C427	1-123-369-00	ELECT 4.7uF 20% 50V	
C451	1-104-278-11	POLYSTYRENE 100PF 5% 50V (F690ES:Germany)	
C451	1-110-335-11	MYLAR 100PF 5% 50V (F590ES:Germany)	
C451	1-110-339-11	MYLAR 220PF 5% 50V (F590ES:AEP, AE2, UK)	
C451	1-136-810-11	FILM 220PF 5% 100V (F690ES:AEP, AE2, UK)	
C452	1-123-369-00	ELECT 4.7uF 20% 50V	
C453	1-126-103-11	ELECT 470uF 20% 16V	
C454	1-130-341-00	FILM 0.056uF 2% 100V (F690ES)	
C454	1-136-162-00	FILM 0.056uF 5% 50V (F590ES)	
C455	1-130-971-00	FILM 0.016uF 2% 100V (F690ES)	
C455	1-137-471-11	FILM 0.016uF 5% 50V (F590ES)	
C457	1-130-479-00	FILM 4700PF 5% 50V	
C458	1-126-059-11	ELECT 10uF 20% 50V	
C465	1-101-361-00	CERAMIC 150PF 5% 50V (F590ES:Germany)	
C465	1-104-282-11	POLYSTYRENE 150PF 5% 50V (F690ES:Germany)	

Ref. No.	Part No.	Description	Remark
C466	1-162-282-31	CERAMIC 100PF 10% 50V (F590ES:Germany/F690ES:Germany)	
< COMPOSITION CIRCUIT BLOCK >			
CP11	1-560-941-00	PIN, CONNECTOR 4P	
< CONNECTOR >			
* CS11	1-562-334-00	SOCKET, CONNECTOR 10P	
< DIODE >			
D301	8-719-933-41	DIODE HZS6C3L	
D302	8-719-987-63	DIODE 1N4148M	
D303	8-719-987-63	DIODE 1N4148M	
D304	8-719-987-63	DIODE 1N4148M	
D305	8-719-987-63	DIODE 1N4148M	
D306	8-719-987-63	DIODE 1N4148M	
D351	8-719-933-41	DIODE HZS6C3L	
D352	8-719-987-63	DIODE 1N4148M	
D353	8-719-987-63	DIODE 1N4148M	
D354	8-719-987-63	DIODE 1N4148M	
D355	8-719-987-63	DIODE 1N4148M	
D356	8-719-987-63	DIODE 1N4148M	
D401	8-719-000-84	DIODE UZL-7M1	
D402	8-719-933-88	DIODE HZS16-2L	
D403	8-719-933-88	DIODE HZS16-2L	
< CONNECTOR >			
* EH4	1-564-506-11	PLUG, CONNECTOR 3P	
< IC >			
IC401	8-759-745-61	IC NJM4560D-D	
< COIL >			
* L303	1-428-203-11	COIL, AIR-CORE (F690ES)	
* L304	1-428-203-11	COIL, AIR-CORE (F690ES)	
L401	1-424-397-11	COIL, CHOKE 200uH (F590ES:Germany/F690ES:Germany)	
L402	1-424-397-11	COIL, CHOKE 200uH (F590ES:Germany/F690ES:Germany)	
L451	1-424-397-11	COIL, CHOKE 200uH (F590ES:Germany/F690ES:Germany)	
L452	1-424-397-11	COIL, CHOKE 200uH (F590ES:Germany/F690ES:Germany)	
< JACK >			
PJ6	1-580-054-11	JACK, PIN 2P (PHONO)	

Ref. No.	Part No.	Description	Remark
< TRANSISTOR >			
Q301	8-729-620-17	TRANSISTOR 2SC2259-FG	
Q302	8-729-140-82	TRANSISTOR 2SA988-PAFAEA	
Q303	8-729-140-82	TRANSISTOR 2SA988-PAFAEA	
Q304	8-729-142-01	TRANSISTOR 2SC1941-LK	
Q305	8-729-201-56	TRANSISTOR 2SK246-GR2	
Q306	8-729-140-82	TRANSISTOR 2SA988-PAFAEA	
Q307	8-729-803-76	TRANSISTOR 2SA1371-E	
Q308	8-729-142-01	TRANSISTOR 2SC1941-LK	
Q351	8-729-620-17	TRANSISTOR 2SC2259-FG	
Q352	8-729-140-82	TRANSISTOR 2SA988-PAFAEA	
Q353	8-729-140-82	TRANSISTOR 2SA988-PAFAEA	
Q354	8-729-142-01	TRANSISTOR 2SC1941-LK	
Q355	8-729-201-56	TRANSISTOR 2SK246-GR2	
Q356	8-729-140-82	TRANSISTOR 2SA988-PAFAEA	
Q357	8-729-803-76	TRANSISTOR 2SA1371-E	
Q358	8-729-142-01	TRANSISTOR 2SC1941-LK	
Q401	8-729-354-52	TRANSISTOR 2SC2545-E	
Q402	8-729-354-52	TRANSISTOR 2SC2545-E	
Q403	8-729-194-57	TRANSISTOR 2SC945-P	
Q404	8-729-141-03	TRANSISTOR 2SA733-QP	
Q451	8-729-354-52	TRANSISTOR 2SC2545-E	
Q452	8-729-354-52	TRANSISTOR 2SC2545-E	
< RESISTOR >			
R301	1-247-713-11	CARBON 1K 5% 1/4W	
R302	1-249-469-11	CARBON 100K 5% 1/4W	
R303	1-247-704-11	CARBON 220 5% 1/4W	
△R304	1-212-889-00	FUSIBLE 220 5% 1/4W F (F590ES:AE2/F690ES:AE2)	
R304	1-247-704-11	CARBON 220 5% 1/4W (F590ES:AEP, UK, Germany/F690ES:AEP, UK, Germany)	
△R305	1-212-889-00	FUSIBLE 220 5% 1/4W F (F590ES:AE2/F690ES:AE2)	
R305	1-247-704-11	CARBON 220 5% 1/4W (F590ES:AEP, UK, Germany/F690ES:AEP, UK, Germany)	
R306	1-247-717-11	CARBON 2.2K 5% 1/4W	
R307	1-249-490-11	CARBON 27K 5% 1/2W	
R308	1-247-704-11	CARBON 220 5% 1/4W	
R309	1-247-721-11	CARBON 4.7K 5% 1/4W	
△R310	1-212-869-00	FUSIBLE 33 5% 1/4W F (F590ES:AE2/F690ES:AE2)	
R310	1-249-887-91	CARBON 33 1% 1/4W (F590ES:AEP, UK, Germany/F690ES:AEP, UK, Germany)	
△R311	1-212-881-11	FUSIBLE 100 5% 1/4W F (F590ES:AE2/F690ES:AE2)	
R311	1-247-700-11	CARBON 100 5% 1/4W (F590ES:AEP, UK, Germany/F690ES:AEP, UK, Germany)	

Ref. No.	Part No.	Description	Remark
R326	1-249-721-11	CARBON 100K 5% 1/2W	
R327	1-249-668-11	CARBON 620 5% 1/2W	
R351	1-247-713-11	CARBON 1K 5% 1/4W	
R352	1-249-469-11	CARBON 100K 5% 1/4W	
R353	1-247-704-11	CARBON 220 5% 1/4W	
△R354	1-212-889-00	FUSIBLE 220 5% 1/4W F (F590ES:AE2/F690ES:AE2)	
R354	1-247-704-11	CARBON 220 5% 1/4W (F590ES:AEP, UK, Germany/F690ES:AEP, UK, Germany)	
△R355	1-212-889-00	FUSIBLE 220 5% 1/4W F (F590ES:AE2/F690ES:AE2)	
R355	1-247-704-11	CARBON 220 5% 1/4W (F590ES:AEP, UK, Germany/F690ES:AEP, UK, Germany)	
R356	1-247-717-11	CARBON 2.2K 5% 1/4W	
R357	1-249-490-11	CARBON 27K 5% 1/2W	
R358	1-247-704-11	CARBON 220 5% 1/4W	
R359	1-247-721-11	CARBON 4.7K 5% 1/4W	
△R360	1-212-869-00	FUSIBLE 33 5% 1/4W F (F590ES:AE2/F690ES:AE2)	
R360	1-249-887-91	CARBON 33 1% 1/4W (F590ES:AEP, UK, Germany/F690ES:AEP, UK, Germany)	
△R361	1-212-881-11	FUSIBLE 100 5% 1/4W F (F590ES:AE2/F690ES:AE2)	
R361	1-247-700-11	CARBON 100 5% 1/4W (F590ES:AEP, UK, Germany/F690ES:AEP, UK, Germany)	
R376	1-249-721-11	CARBON 100K 5% 1/2W	
R377	1-249-668-11	CARBON 620 5% 1/2W	
R405	1-247-706-11	CARBON 330 5% 1/4W (F590ES:AEP, AE2, UK, Germany/F690ES:AEP, AE2, UK)	
R406	1-247-700-11	CARBON 100 5% 1/4W	
R407	1-249-469-11	CARBON 100K 5% 1/4W	
R408	1-249-469-11	CARBON 100K 5% 1/4W	
R409	1-247-710-11	CARBON 560 5% 1/4W	
R410	1-247-710-11	CARBON 560 5% 1/4W	
R411	1-247-725-11	CARBON 10K 5% 1/4W	
R412	1-247-700-11	CARBON 100 5% 1/4W	
R413	1-260-661-11	CARBON 6.8 5% 1/4W	
R414	1-247-138-00	CARBON 2K 5% 1/4W	
R415	1-247-700-11	CARBON 100 5% 1/4W (F590ES:AEP, AE2, UK, Germany/F690ES:AEP, AE2, UK)	
R415	1-249-542-11	CARBON 390 5% 1/4W (F590ES:Germany/F690ES:Germany)	
R416	1-246-545-00	CARBON 1.0M 5% 1/4W	
R417	1-249-844-11	CARBON 56K 1% 1/2W	
R418	1-249-818-11	CARBON 4.7K 1% 1/2W	
R419	1-247-713-11	CARBON 1K 5% 1/4W	

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

EQ H.P INPUT

INPUT INPUT J MAIN

Table with columns: Ref.No., Part No., Description, Remark. Rows include carbon resistors (R420-R471), ceramic capacitors (C322, C372), and various boards (S401, HP1, CS12, CS14).

Table with columns: Ref.No., Part No., Description, Remark. Rows include a switch (S401), an H.P. board (1-644-006-11), a ceramic capacitor (C322), a ceramic capacitor (C372), a jack (HP1), an input board (1-644-008-11), a socket (CS12), a socket (CS14), a plug (EH6), and resistors (R101-R153).

Table with columns: Ref.No., Part No., Description, Remark. Rows include carbon resistors (R154-R384), an input J board (1-644-002-11), a switch (S102), a pin connector (CP10), a connector pin (CP16), main boards (A-4347-828-A, A-4347-840-A), a capacitor (C312), ceramic capacitors (C313, C314), mica capacitors (C314, C315, C316, C317), an elect (C362), ceramic capacitors (C363, C364, C364), mica capacitors (C364, C364), film capacitors (C365, C366), and elects (C501, C502, C503, C504).

Table with columns: Ref.No., Part No., Description, Remark. Rows include film capacitors (C508, C509), elects (C510, C517, C518, C519, C520), a pin connector (CP8), a socket (CS8), diodes (D307-D358, D359-D504, D505-D511), an IC (IC501), and transistors (Q309-Q359).

Note: The components identified by mark Δ or dotted line with mark are critical for safety. Replace only with part number specified.

Note: The components identified by mark Δ or dotted line with mark are critical for safety. Replace only with part number specified.

MAIN RYJ SELECTOR

Ref. No.	Part No.	Description	Remark
Q360	8-729-107-53	TRANSISTOR 2SC2275A	
Q361	8-729-141-10	TRANSISTOR 2SA985A-QP	
Q362	8-729-015-30	TRANSISTOR 2SK1530-Y	
Q363	8-729-015-31	TRANSISTOR 2SJ201-Y	
Q364	8-729-140-82	TRANSISTOR 2SA988-PAFAEA	
< RESISTOR >			
R314	1-247-713-11	CARBON 1K 5% 1/4W	
R315	1-247-696-11	CARBON 47 5% 1/4W	
△R316	1-212-990-00	FUSIBLE 220 5% 1/2W F	
△R317	1-212-974-00	FUSIBLE 47 5% 1/2W F	
△R318	1-212-974-00	FUSIBLE 47 5% 1/2W F	
R319	1-217-151-00	RES. METAL PLATE 0.22	
R320	1-217-151-00	RES. METAL PLATE 0.22	
R321	1-247-721-11	CARBON 4.7K 5% 1/4W	
R322	1-249-460-11	CARBON 15K 5% 1/4W	
△R323	1-212-962-00	FUSIBLE 15 5% 1/2W F	
△R324	1-212-962-00	FUSIBLE 15 5% 1/2W F	
R325	1-247-891-00	CARBON 330K 5% 1/4W	
R364	1-247-713-11	CARBON 1K 5% 1/4W	
R365	1-247-696-11	CARBON 47 5% 1/4W	
△R366	1-212-990-00	FUSIBLE 220 5% 1/2W F	
△R367	1-212-974-00	FUSIBLE 47 5% 1/2W F	
△R368	1-212-974-00	FUSIBLE 47 5% 1/2W F	
R369	1-217-151-00	RES. METAL PLATE 0.22	
R370	1-217-151-00	RES. METAL PLATE 0.22	
R371	1-247-721-11	CARBON 4.7K 5% 1/4W	
R372	1-249-460-11	CARBON 15K 5% 1/4W	
△R373	1-212-962-00	FUSIBLE 15 5% 1/2W F	
△R374	1-212-962-00	FUSIBLE 15 5% 1/2W F	
R375	1-247-891-00	CARBON 330K 5% 1/4W	
△R501	1-212-849-00	FUSIBLE 4.7 5% 1/4W F	
R521	1-249-461-11	CARBON 18K 5% 1/4W	
R522	1-247-881-00	CARBON 120K 5% 1/4W	
R523	1-247-725-11	CARBON 10K 5% 1/4W	
R524	1-247-887-00	CARBON 220K 5% 1/4W	
R527	1-249-462-11	CARBON 22K 5% 1/4W	
< VARIABLE RESISTOR >			
RT301	1-237-455-11	RES. ADJ. CARBON 500 (L CH) BIAS	
RT351	1-237-455-11	RES. ADJ. CARBON 500 (R CH) BIAS	
< CONNECTOR >			
* VH1	1-564-241-00	PIN, CONNECTOR (B4P-VH) 4P	
VH2	1-564-320-00	PIN, CONNECTOR (B2P-VH) 2P	
* VH3	1-564-241-00	PIN, CONNECTOR (B4P-VH) 4P (F690ES)	
* VH4	1-564-241-00	PIN, CONNECTOR (B4P-VH) 4P	

Ref. No.	Part No.	Description	Remark
* 1-643-999-11	RYJ BOARD		

< CONPOSITION CIRCUIT BLOCK >			
* CP14	1-565-647-11	PIN, CONNECTOR 14P	
< CONNECTOR >			
* CS9	1-562-573-11	SOCKET, CONNECTOR 8P	
* EH3	1-564-505-11	PLUG, CONNECTOR 2P	

* 1-644-004-11	SELECTOR BOARD		

< CAPACITOR >			
C814	1-161-379-00	CERAMIC 0.01uF 20% 25V	
C815	1-162-294-31	CERAMIC 0.001uF 10% 50V	
C817	1-161-379-00	CERAMIC 0.01uF 20% 25V	
C818	1-162-290-31	CERAMIC 470PF 10% 50V	
< CONNECTOR >			
CS2	1-695-014-11	SOCKET, CONNECTOR 8P	
CS3	1-695-014-11	SOCKET, CONNECTOR 8P	
< DIODE >			
D819	8-719-313-40	LED SEL1516W (POWER)	
D821	8-719-303-02	DIODE SEL2510C-D (PHONO)	
D822	8-719-303-02	DIODE SEL2510C-D (TUNER)	
D823	8-719-303-02	DIODE SEL2510C-D (CD)	
D824	8-719-303-02	DIODE SEL2510C-D (AUX)	
D825	8-719-303-02	DIODE SEL2510C-D (TAPE 2)	
D826	8-719-303-02	DIODE SEL2510C-D (DAT/TAPE 1)	
D827	8-719-301-49	LED SEL2810A (MUTING)	
D828	8-719-301-49	LED SEL2810A (SOURCE DIRECT)	
< IC >			
IC9	8-749-923-43	IC GP1U57XB (REMOTE SENSOR)	
IC807	8-759-635-31	IC M50253P	
IC808	8-719-902-56	DIODE PC817 (PHOTO COUPLER)	
< RESISTOR >			
R854	1-249-409-11	CARBON 220 5% 1/4W	
R856	1-249-404-00	CARBON 82 5% 1/4W	
R857	1-249-405-11	CARBON 100 5% 1/4W	
R858	1-249-405-11	CARBON 100 5% 1/4W	

Note: The components identified by mark **△** or dotted line with mark **△** are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
< SWITCH >			
S801	1-554-303-21	SWITCH, TACTILE (PHONO)	
S802	1-554-303-21	SWITCH, TACTILE (TUNER)	
S803	1-554-303-21	SWITCH, TACTILE (CD)	
S804	1-554-303-21	SWITCH, TACTILE (AUX)	
S805	1-554-303-21	SWITCH, TACTILE (TAPE 2)	
S806	1-554-303-21	SWITCH, TACTILE (DAT/TAPE 1)	

* 1-644-007-11	SP BOARD		

1-533-183-11	HOLDER, FUSE		
< CAPACITOR >			
C319	1-162-290-31	CERAMIC 470PF 10% 50V (F590ES:Germany/F690ES:Germany)	
C320	1-136-157-11	FILM 0.022uF 5% 50V (F590ES:Germany/F690ES:Germany)	
C321	1-136-157-11	FILM 0.022uF 5% 50V (F590ES:Germany/F690ES:Germany)	
C369	1-162-290-31	CERAMIC 470PF 10% 50V (F590ES:Germany/F690ES:Germany)	
C370	1-136-157-11	FILM 0.022uF 5% 50V (F590ES:Germany/F690ES:Germany)	
C371	1-136-157-11	FILM 0.022uF 5% 50V (F590ES:Germany/F690ES:Germany)	
C424	1-161-379-00	CERAMIC 0.01uF 20% 25V (F690ES:Germany)	
C506	1-125-695-11	ELECT 12000uF 20% 63V (F690ES)	
C507	1-125-695-11	ELECT 12000uF 20% 63V (F690ES)	
C601	1-161-741-00	CERAMIC 0.001uF 10% 400V	
< LEAD PIN >			
CL2	4-352-844-01	PIN, LEAD, COATING	
< CONPOSITION CIRCUIT BLOCK >			
* CP17	1-566-878-11	PIN, CONNECTOR (PC BOARD) 8P	
< DIODE >			
D515	8-719-987-63	DIODE 1N4148M	
D516	8-719-987-63	DIODE 1N4148M	
< PLUG >			
EH5	1-691-765-11	PLUG (MICRO CONNECTOR) 3P (F690ES)	
< FUSE >			
△F601	1-532-350-11	FUSE TIME LAG 4A 250V (T4AL)	

△F601 1-532-350-11 FUSE TIME LAG 4A 250V (T4AL)

SELECTOR SP

Ref. No.	Part No.	Description	Remark
< COIL >			
* L301	1-422-009-13	COIL, AIR-CORE	
* L351	1-422-009-13	COIL, AIR-CORE	
< RESISTOR >			
R328	1-247-727-11	CARBON 10 5% 1/2W	
R332	1-247-727-11	CARBON 10 5% 1/2W (F590ES:Germany/F690ES:Germany)	
R333	1-247-727-11	CARBON 10 5% 1/2W (F590ES:Germany/F690ES:Germany)	
R335	1-247-700-11	CARBON 100 5% 1/4W (F690ES:Germany)	
R378	1-247-727-11	CARBON 10 5% 1/2W	
R382	1-247-727-11	CARBON 10 5% 1/2W (F590ES:Germany/F690ES:Germany)	
R383	1-247-727-11	CARBON 10 5% 1/2W (F590ES:Germany/F690ES:Germany)	
< RELAY >			
RY503	1-515-676-11	RELAY (SP L)	
RY504	1-515-676-11	RELAY (SP R)	
< SWITCH >			
S601	1-554-920-11	SWITCH, PUSH (AC POWER) (1 KEY)	
< CONNECTOR >			
SC1	1-566-213-11	PIN, CONNECTOR 4P (TUNER CONTROL OUT)	
< TERMINAL >			
TM900	1-537-227-11	TERMINAL BOARD (SP) (F590ES:AE2/F690ES:AE2)	
TM900	1-537-228-11	TERMINAL BOARD (SP) (F590ES:Germany/F690ES:Germany)	
TM900	1-537-235-11	TERMINAL BOARD (SP) (F590ES:AEP,UK/F690ES:AEP,UK)	
< CONNECTOR >			
* VH7	1-564-241-00	PIN, CONNECTOR (B4P-VH) 4P	
* VH9	1-564-321-00	PIN, CONNECTOR 2P	
* VH10	1-565-792-11	PIN, CONNECTOR 2P	
* VH12	1-564-241-00	PIN, CONNECTOR (B4P-VH) 4P (F690ES)	

Note: The components identified by mark **△** or dotted line with mark **△** are critical for safety. Replace only with part number specified.

VOL VOL LED

Ref. No.	Part No.	Description	Remark
*	1-644-001-11	VOL BOARD ***** < CAPACITOR >	
C102	1-104-278-11	POLYSTYRENE 100PF 5% 50V (F690ES:Germany)	
C102	1-110-335-11	MYLAR 100PF 5% 50V (F590ES:Germany)	
C103	1-104-278-11	POLYSTYRENE 100PF 5% 50V (F690ES:Germany)	
C103	1-110-335-11	MYLAR 100PF 5% 50V (F590ES:Germany)	
C152	1-104-278-11	POLYSTYRENE 100PF 5% 50V (F690ES:Germany)	
C152	1-110-335-11	MYLAR 100PF 5% 50V (F590ES:Germany)	
C701	1-126-163-11	ELECT 4.7uF 20% 50V	
C702	1-126-163-11	ELECT 4.7uF 20% 50V	
C703	1-126-163-11	ELECT 4.7uF 20% 50V	
C704	1-126-163-11	ELECT 4.7uF 20% 50V	
		< LEAD PIN >	
CL1	4-352-844-01	PIN, LEAD, COATING < COMPOSITION CIRCUIT BLOCK >	
* CP3	1-568-320-11	PLUG, CONNECTOR 8P	
* CP4	1-568-320-11	PLUG, CONNECTOR 8P	
* CP5	1-568-320-11	PLUG, CONNECTOR 8P < CONNECTOR BOARD >	
* CS1	1-565-489-11	CONNECTOR, BOARD TO BOARD 13P < DIODE >	
D701	8-719-987-63	DIODE 1N4148M	
D702	8-719-987-63	DIODE 1N4148M < CONNECTOR >	
* EH1	1-564-506-11	PLUG, CONNECTOR 3P < JACK >	
PJ4	1-566-883-31	JACK, PIN 6P (DIRECT/ADAPTOR) (F690ES)	
* PJ4	1-566-883-51	JACK, PIN 6P (DIRECT/ADAPTOR) (F590ES) < RESISTOR >	
R108	1-246-545-00	CARBON 1.0M 5% 1/4W	
R109	1-246-545-00	CARBON 1.0M 5% 1/4W	
R110	1-249-778-91	CARBON 100 1% 1/2W	
R111	1-249-842-91	CARBON 47K 1% 1/2W	
R158	1-246-545-00	CARBON 1.0M 5% 1/4W	

Ref. No.	Part No.	Description	Remark
R159	1-246-545-00	CARBON 1.0M 5% 1/4W	
R160	1-249-778-91	CARBON 100 1% 1/2W	
R161	1-249-842-91	CARBON 47K 1% 1/2W	
R211	1-249-842-91	CARBON 47K 1% 1/2W	
R261	1-249-842-91	CARBON 47K 1% 1/2W	
		< VARIABLE RESISTOR >	
RV204	1-241-908-11	RES, VAR, CARBON 120K/120K (WITH MOTOR) (ATTENUATOR)	
		< RELAY >	
RY701	1-515-622-11	RELAY (MUTING)	
RY702	1-515-804-11	RELAY (DIRECT/ADAPTOR)	
		< SWITCH >	
S101	1-692-142-11	SWITCH, ROTARY (WITH MOTOR) (FUNCTION)	
S202	1-692-140-11	SWITCH, PUSH (1 KEY) (SOURCE DIRECT)	
S208	1-572-126-11	SWITCH, PUSH (1 KEY) (SOURCE DIRECT)	

*	1-644-005-11	VOL LED BOARD ***** < DIODE >	
D520	8-719-303-02	DIODE SEL2510C-D (ATTENUATOR)	

		MISCELLANEOUS *****	
57	1-692-138-11	SWITCH, ROTARY (REMOTE TYPE) (FUNCTION)	
△113	1-559-272-21	CORD, POWER (F690ES:UK)	
△113	1-574-804-11	CORD, POWER (F590ES:UK)	
△114	1-575-953-11	CORD, POWER (F690ES:AEP, AE2, Germany)	
△115	1-696-169-11	CORD, POWER (AEP) (F590ES:AEP, AE2, Germany)	
126	1-573-905-11	PLUG, JAMPER	
△T4A	1-450-916-11	TRANSFORMER, POWER (F590ES:AE2)	
△T4A	1-450-918-11	TRANSFORMER, POWER (F690ES:AEP, Germany)	
△T4A	1-450-919-11	TRANSFORMER, POWER (F590ES:AEP, Germany/F690ES:AE2)	
△T4A	1-450-920-11	TRANSFORMER, POWER (F690ES:UK)	
△T4A	1-450-921-11	TRANSFORMER, POWER (F590ES:UK)	

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
		ACCESSORIES & PACKING MATERIALS *****	
		1-465-801-11 REMOTE COMMANDER (RM-S703) (F690ES)	
		1-693-108-11 REMOTE COMMANDER (RM-S702) (F590ES)	
		2-181-754-01 COVER, BATTERY (F590ES)	
		3-755-257-11 MANUAL, INSTRUCTION (ENGLISH/FRENCH/ SPANISH/PORTUGUESE) (F590ES:AEP, AE2, UK/F690ES:AEP, AE2, UK)	
		3-755-257-41 MANUAL, INSTRUCTION (GERMAN/DUTCH/ SWEDISH/ITALIAN) (F590ES:AEP, AE2, Germany/F690ES:AEP, AE2, Germany)	
*		4-927-854-01 CUSHION	
*		4-951-280-01 INDIVIDUAL CARTON (F690ES)	
*		4-951-281-01 INDIVIDUAL CARTON (F590ES)	

		HARDWARE LIST *****	
#1	7-685-234-19	SCREW +KTP 2.6X8 TYPE2NON-SLIT	
#2	7-682-547-09	SCREW +BVTT 3X6 (S)	
#3	7-685-647-79	SCREW +BVTP 3X10 TYPE2 N-S	
#4	7-685-650-79	SCREW +BVTP 3X16 TYPE2 SLIT	
#5	7-682-548-09	SCREW (3X8)	
#6	7-682-565-09	SCREW +B 4X16	
#7	7-684-024-04	N 4, TYPE 2	
#8	7-685-649-79	SCREW +BVTP 3X14 TYPE2 IT-3	
#9	7-685-876-09	SCREW +BVTT 3X16 (S)	
#10	7-621-849-00	SCREW, TAPPING (F590ES:Germany/F690ES:Germany)	
#11	7-685-648-79	SCREW +BVTP 3X12 TYPE2 N-S	
#12	7-683-255-58	SET SCREW 5X6 HEXAGON SOCKET	

Note:
There are two type of AEP models which are depend on countries.
AE 2 model : Model for North European countries.
AEP model : Model for other European countries.

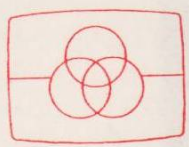


Part No.	Description	Remark
ACCESSORIES & PACKING MATERIALS		
1-692-501-11	REMOTE COMMANDER (FR 220V) (FR092)	
1-692-106-11	REMOTE COMMANDER (FR 220V) (FR022)	
1-101-124-01	COVER, BATTERY (FR092)	
1-352-227-11	MANUAL, INSTRUCTION (ENGLISH/FRENCH/SPANISH/PORTUGUESE)	
1-352-227-11	MANUAL, INSTRUCTION (GERMAN/DUTCH/ITALIAN)	
1-352-227-11	MANUAL, INSTRUCTION (FRENCH/GERMAN)	
4-929-804-01	CUSHION	*
4-921-236-01	INDIVIDUAL CARTON (FR092)	*
4-921-237-01	INDIVIDUAL CARTON (FR022)	*

HARDWARE LIST		

1-692-524-10	SCREW +RTP 2.6X8 TYPE308-311	81
1-692-517-00	SCREW +RTP 2.6X8 (2)	82
1-692-502-00	SCREW +RTP 2.6X8 TYPE 4-2	83
1-692-503-00	SCREW +RTP 2.6X8 TYPE 2-1	84
1-692-516-00	SCREW (2X8)	85
1-692-505-00	SCREW +R 2X18	86
1-692-514-04	N.A. TYPE 2	87
1-692-508-00	SCREW +RTP 2.6X8 TYPE 11-3	88
1-692-518-00	SCREW +RTP 2.6X8 (2)	89
1-321-814-00	SCREW, TAPPING	910
1-692-504-00	SCREW +RTP 2.6X8 TYPE 4-2	911
1-692-505-02	SCREW 2.6X HEXAGON SOCKET	912

Note:
There are two types of AEP models which are depend on countries.
AE 2 model: Model for North European countries.
AEP model: Model for other European countries.



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