

TA-F590ES/F690ES

SERVICE MANUAL

AEP Model
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)
	8 ohms, 20 Hz – 20 kHz Scandinavian countries, Switzerland, Spain and Portugal	80 W + 80 W (THD 0.004%) (DIN: 90 W + 90 W)	85 W + 85 W (THD 0.004%) (DIN: 95 W + 95 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®

Amplifier Section

Items	Conditions		Data	
			TA-F590ES	TA-F690ES
Residual noise	network A, 8 ohms		less than 100 μ V	less than 100 μ V
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 $_{-3}^{+0}$ dB	2 Hz – 200 kHz $_{-3}^{+0}$ dB
Input sensitivity	PHONO	MC	0.17 mV, 100 ohms	0.17 mV, 100 ohms
		MM	2.5 mV, 50 kilohms	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)	77 (0.5 mV)
		MM	95 (5.0 mV)	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	—		$-\infty$ dB	$-\infty$ 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
 UK model : 240V AC, 50Hz
 AEP, Germany models : 220 – 230V AC, 50/60Hz

Power requirements

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)

Weight

TA-F590ES: Approx. 12 kg (26 lbs 8 oz)
 TA-F690ES: Approx. 12.5 kg (27 lbs 8 oz)

Accessories supplied

Remote Commander RM-S703 (1) (TA-F690ES)
 RM-S702 (1) (TA-F590ES)
 Sony batteries SUM-3 (NS) (2)

Design and specifications are subject to change without notice.

Note

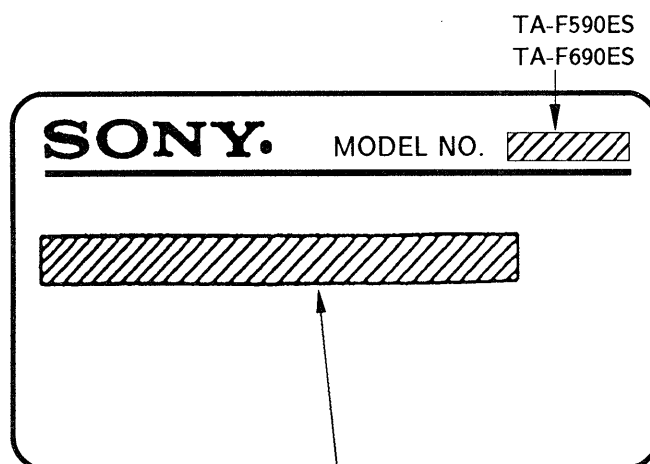
This appliance conforms with EEC directive 87/308/EEC regarding interference suppression.

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31		

MODEL IDENTIFICATION

- Model Number Label -



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

Germany Model : AC 230V ~ 50/60Hz

UK Model : AC 240V ~ 50/60Hz

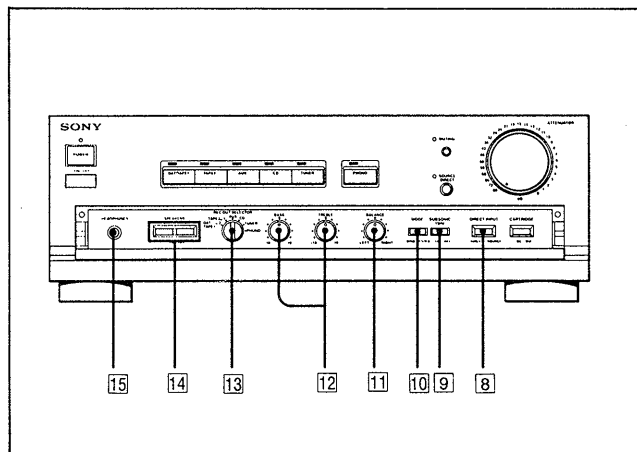
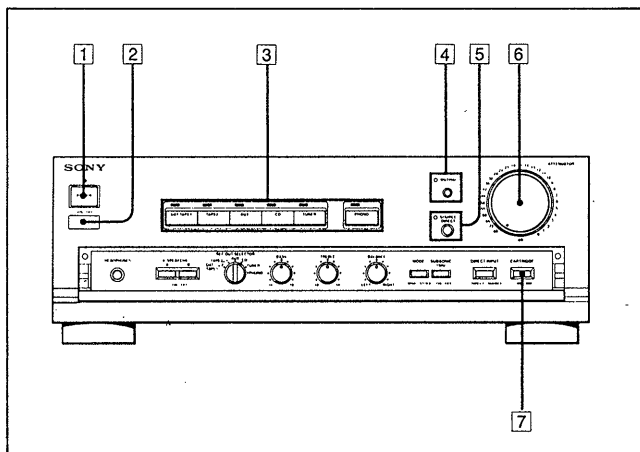
SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK $\triangle$ OR DOTTED LINE WITH MARK $\triangle$ 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.

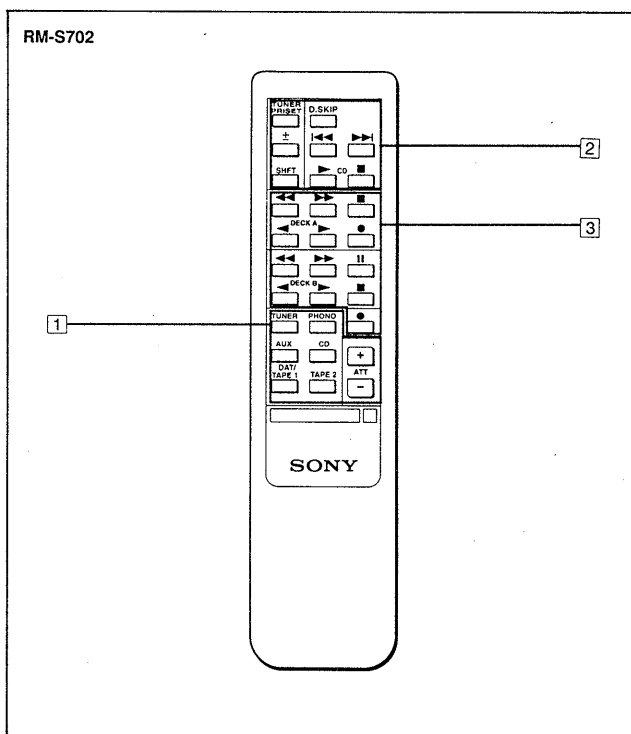
For headphones listening only: Set both to OFF ($\square$).

TA-F690ES only

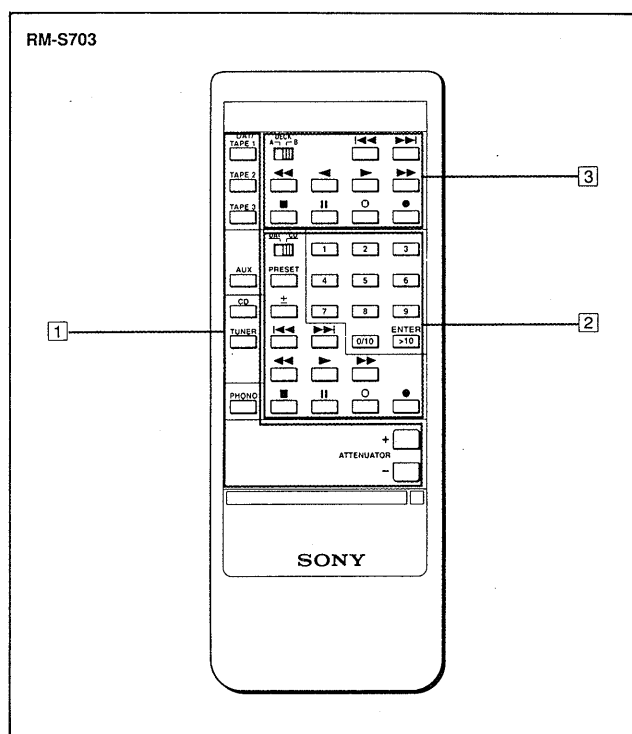
To use power amplifier or active speaker system connected to the PRE OUT jacks, depress B/PRE OUT.

15 HEADPHONES jack

Accepts headphones with the stereo phone plug.



RM-S702



RM-S703

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)
I<|||>I: 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.
I<|||>I: 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.
I<|||>I: 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.

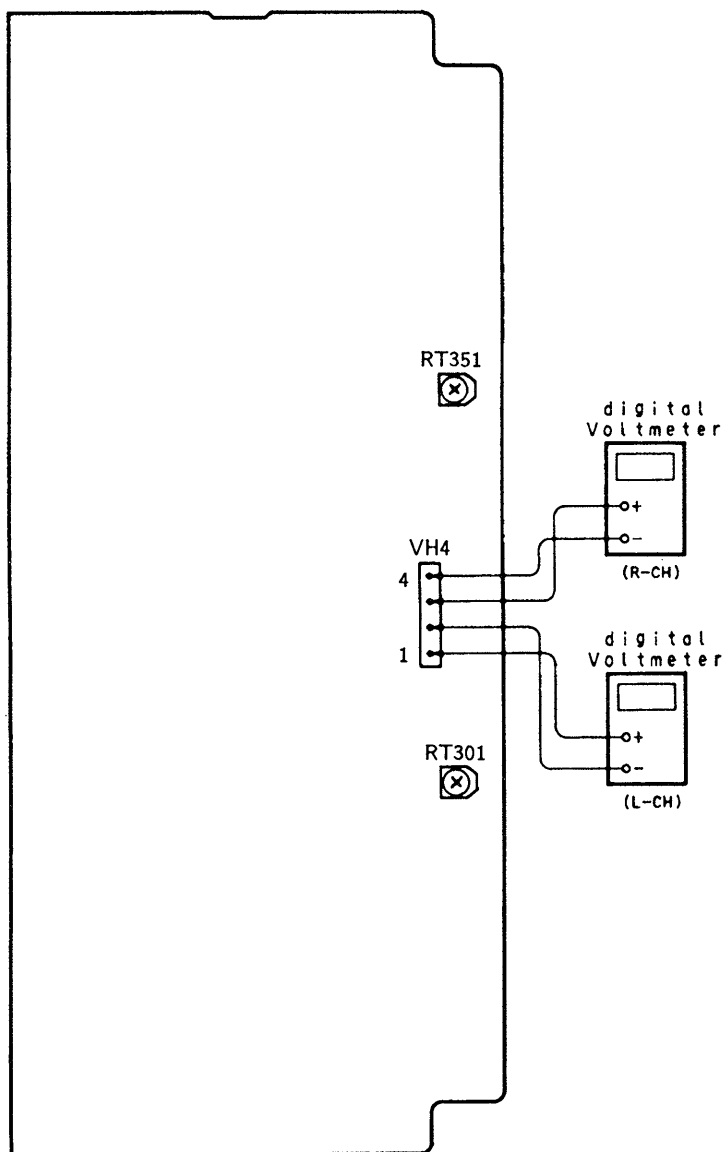
Procedure :

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 —



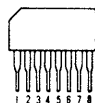
SECTION 3 DIAGRAMS

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

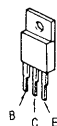
Pin No.	Pin Name	I / O	Description
1	5V CHECK	I	Power supply (+5V) check.
2	S/D ON/OFF	I	+5V power supply.
3	PROTECT	I	Ground.
4	X OUT	O	Connected oscillator circuit.
5	X IN	I	Connected oscillator circuit.
6	CE	I	Signal input for a return to normal position.
7	<u>RESET</u>	I	Reset signal input. ("L" : RESET)
8	VDD	I	+5 Volts power supply.
9	CNTR	I	Ground.
10	AC DET	I	Ground.
11	C	I	Connected 0.01 μ F 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	<u>BRAKE RELEASE</u>	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

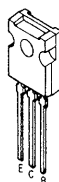
BA6208
μPC1237HA



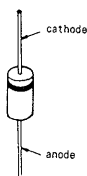
2SA985A-QP
2SC2275A-P



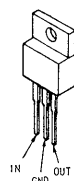
2SC3423-0



IN4148M



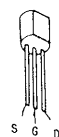
TA7805S



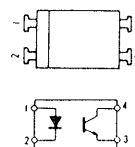
2SA988-PAFAEA
2SA1371-E
2SC2545-E



2SK246-GR2



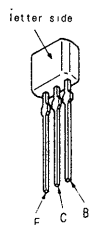
PC817



DTA114ES
DTC124ES
2SC2603-EF



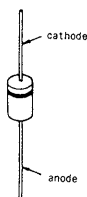
2SA1175-FEK



2SK1530-Y
2SJ201-Y



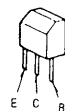
30DF2



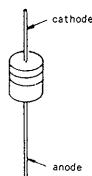
2SA733-QP
2SC945-P



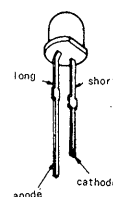
2SC1941-LK
2SD774-34



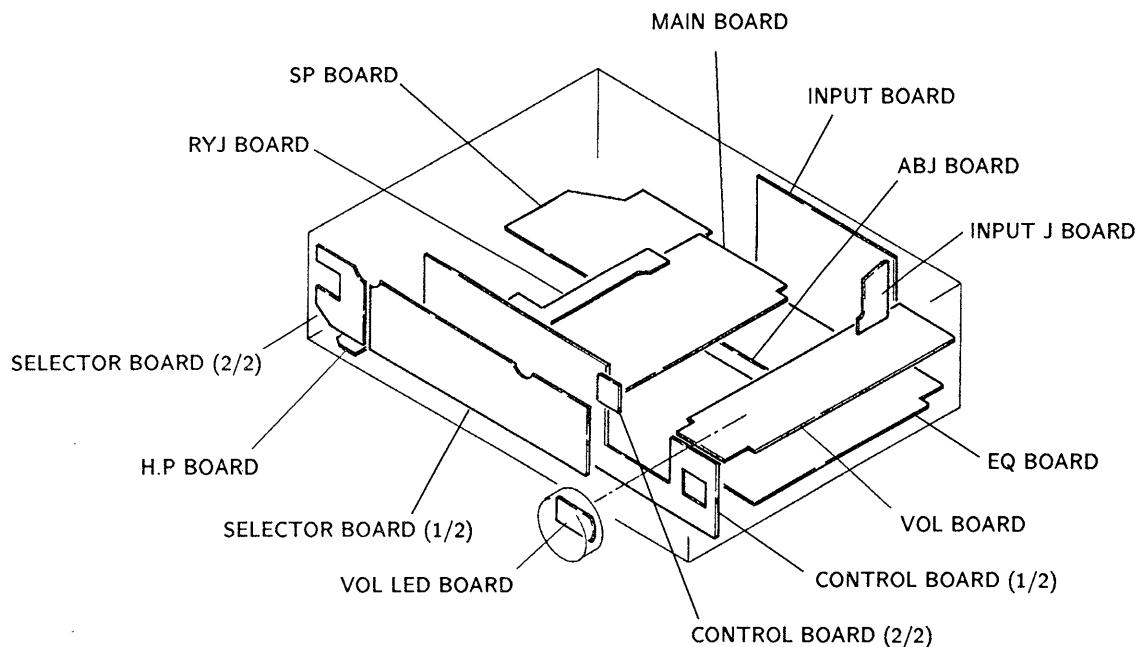
HZS6C3L
HZS16-2L
μZL-7M1
11ES2



SEL1516W
SEL2510C-D
SEL2810A

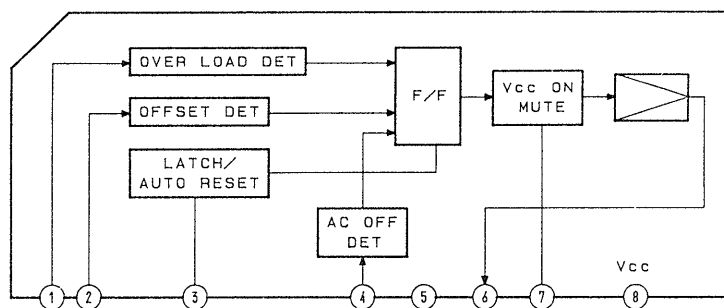


3-3. CIRCUIT BOARDS LOCATION

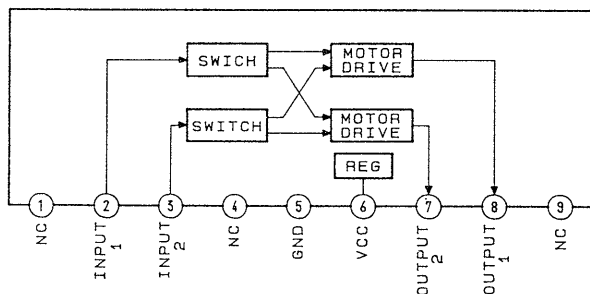


3-4. IC BLOCK DIAGRAMS

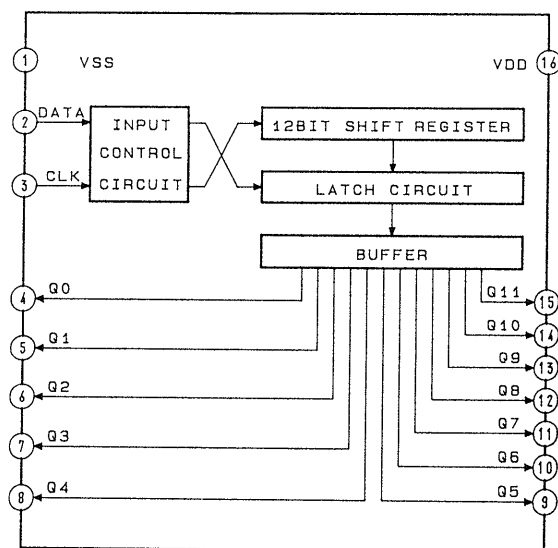
IC501 UPC1237HA



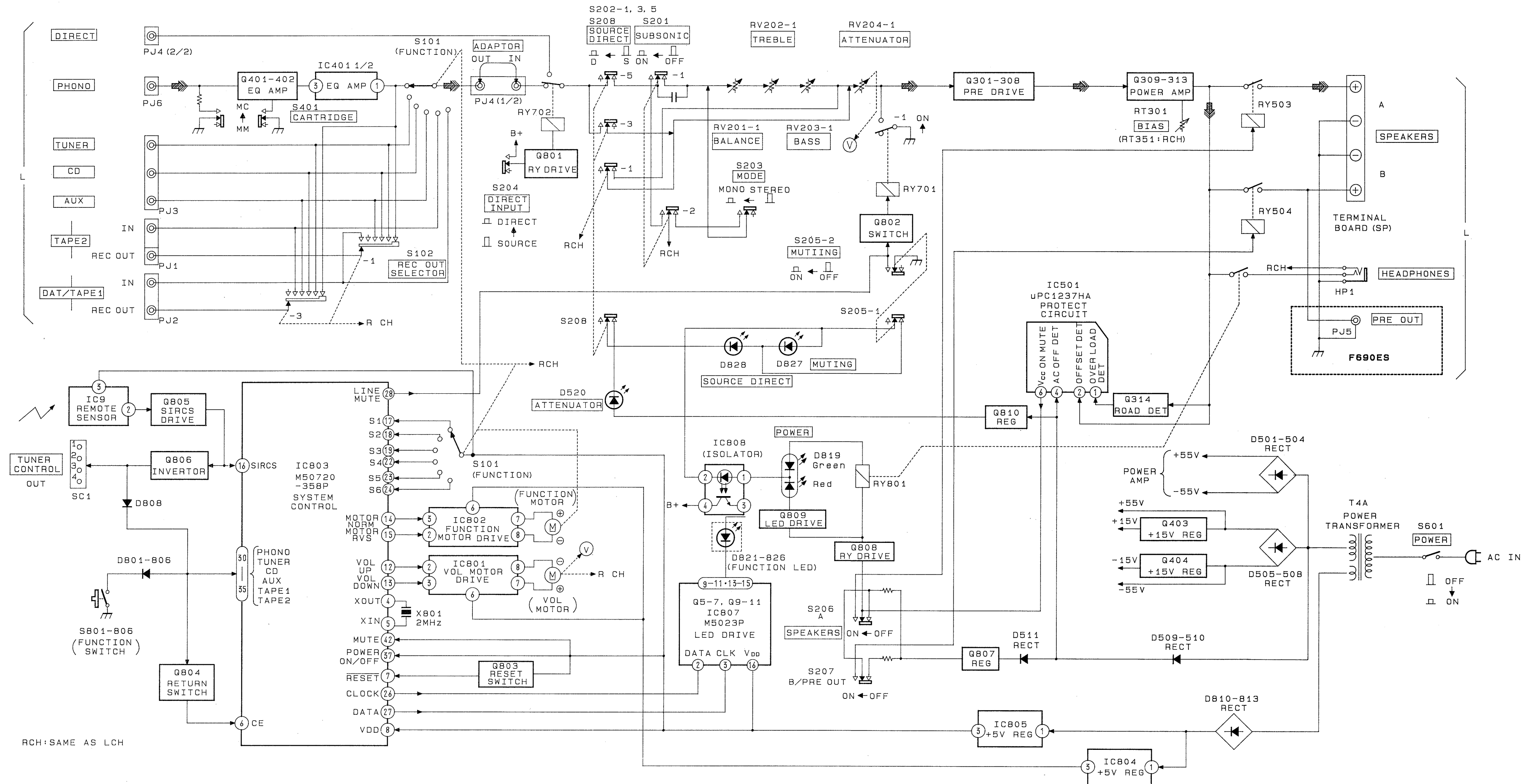
IC801, 802 BA6208



IC807 M50253P

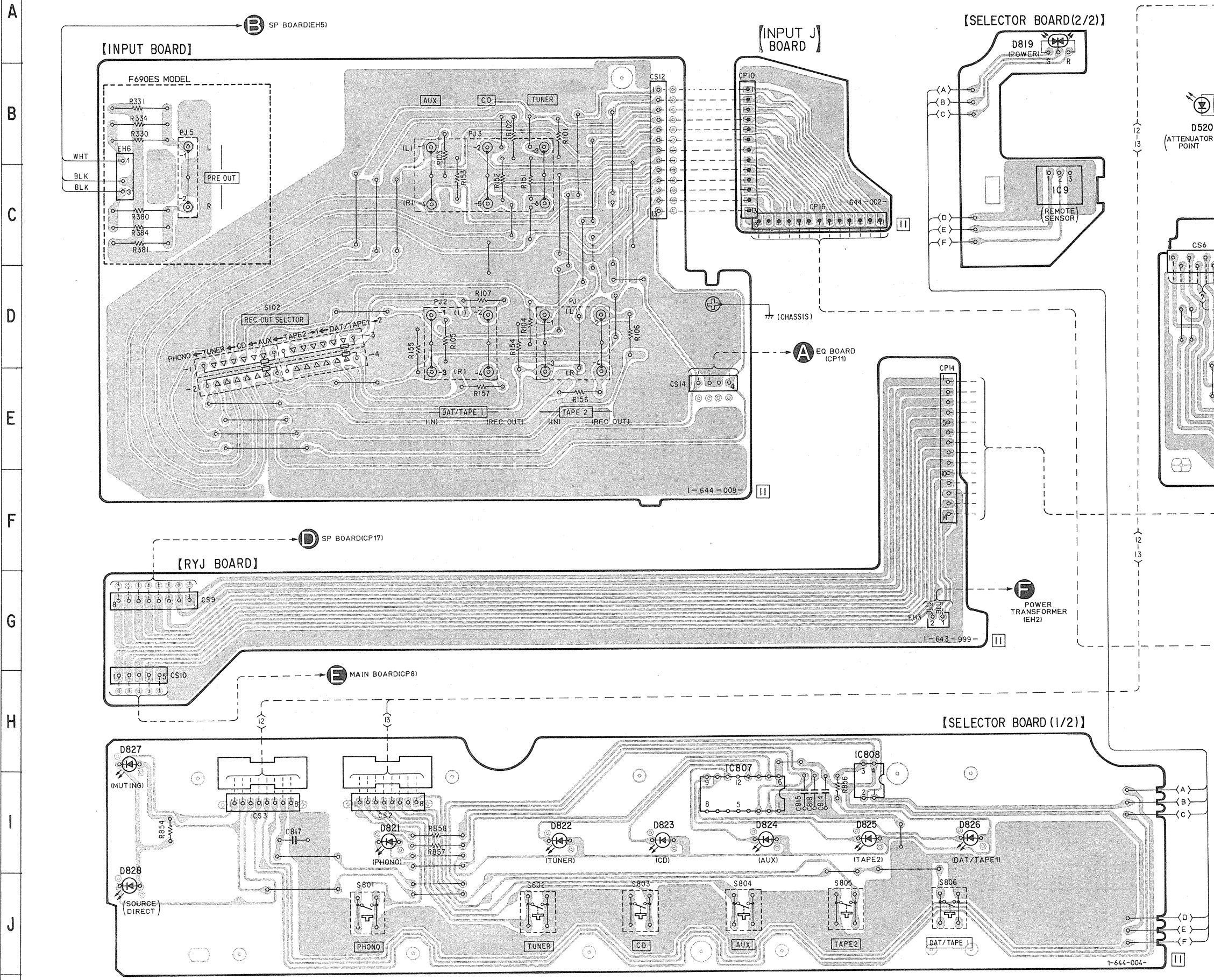


3-5. BLOCK DIAGRAM



RCH: SAME AS LCH

3-6. PRINTED WIRING BOARDS (CONTROL, INPUT, SELECTOR, VOL SECTION) • See page 8 for Semiconductor Lead Layouts.

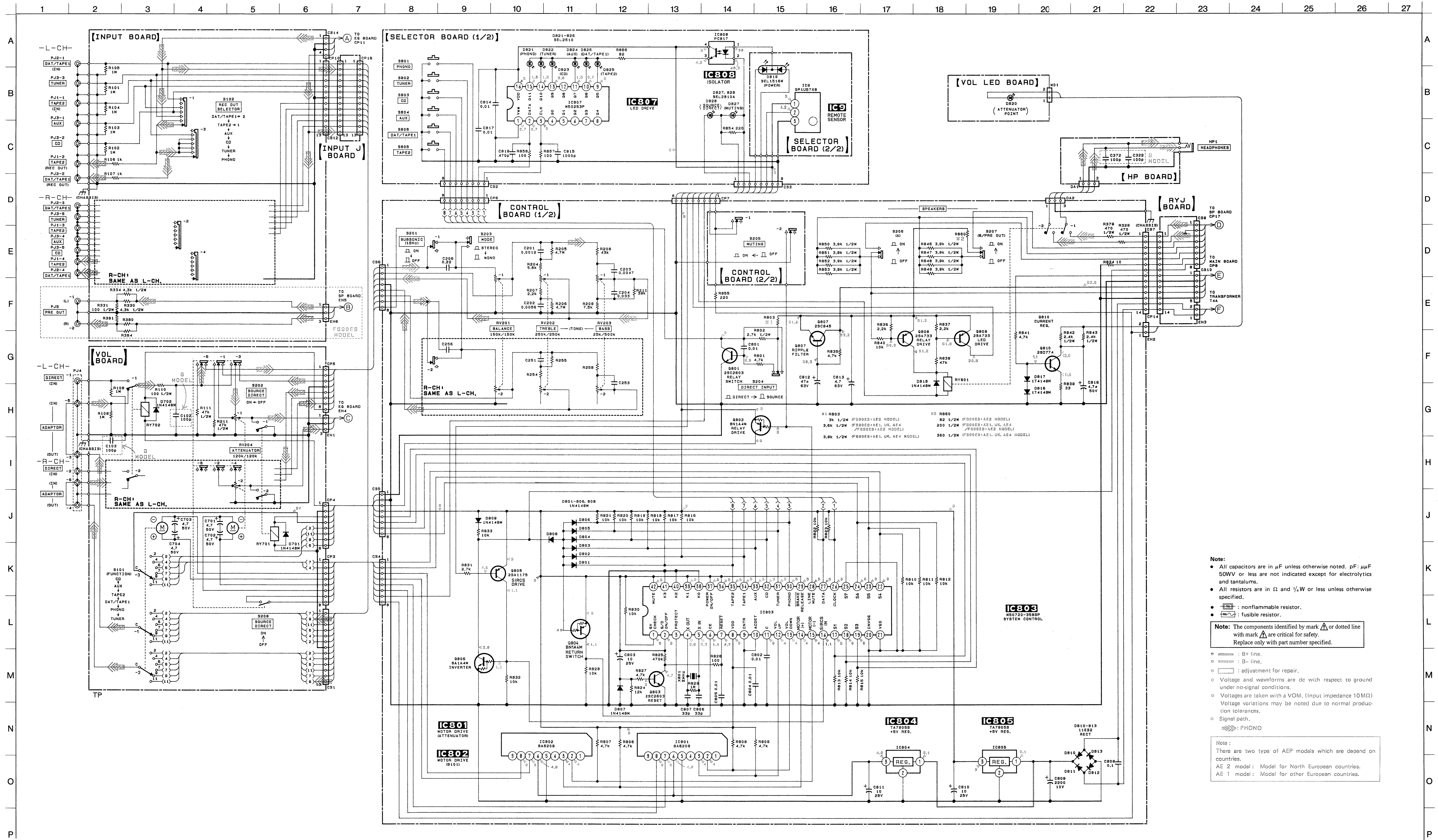


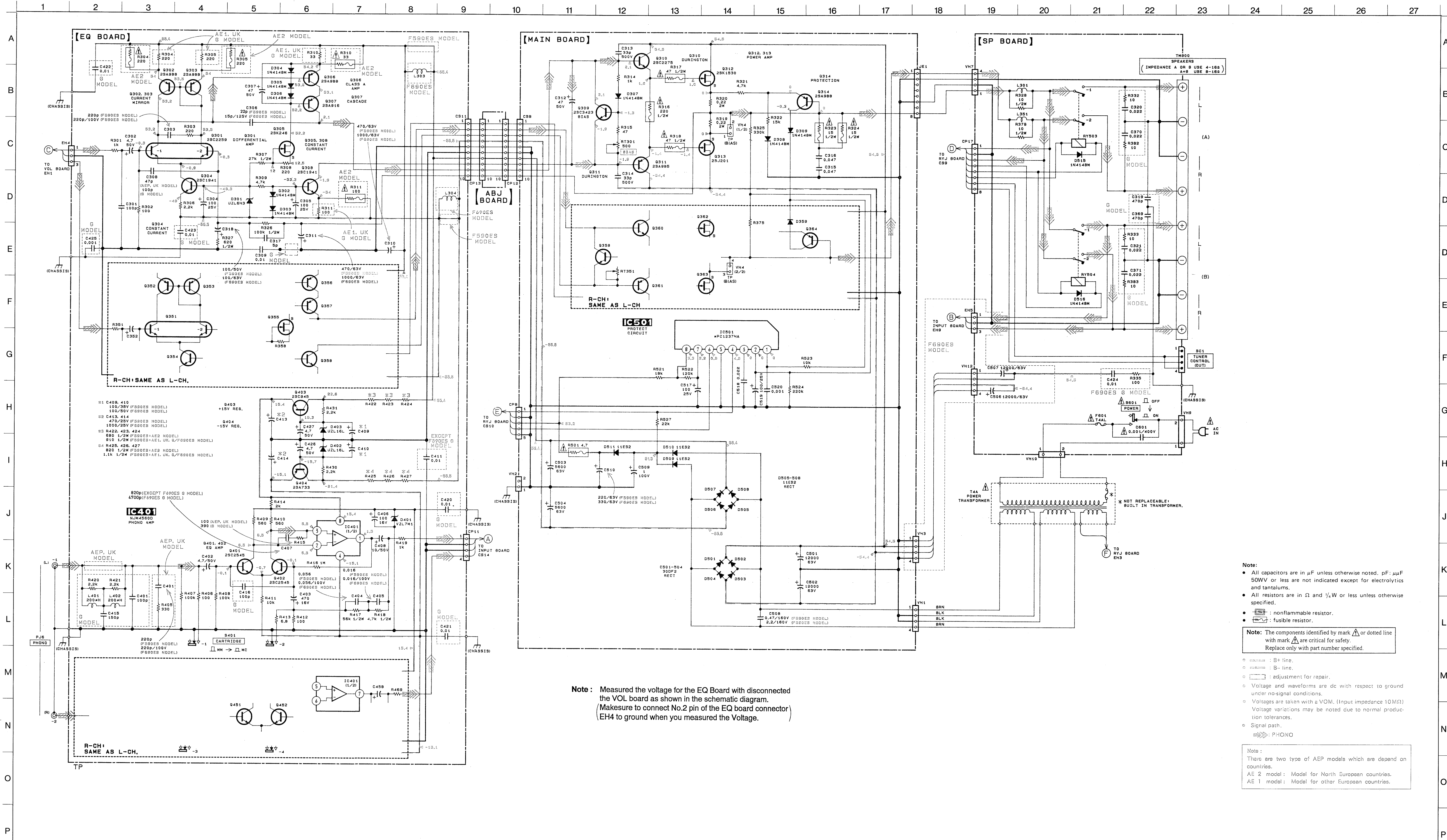
• Semiconductor Location

Ref. No.	Location
D520	B-12
D701	H-15
D702	H-21
D801	B-19
D802	B-19
D803	B-19
D804	B-19
D805	B-19
D806	B-19
D807	C-20
D808	C-22
D809	B-22
D810	D-22
D811	D-22
D812	D-22
D813	D-22
D816	C-24
D817	C-24
D818	B-24
D819	A-11
D821	I-4
D822	I-6
D823	I-7
D824	I-8
D825	I-9
D826	I-10
D827	H-2
D828	J-2
IC9	C-11
IC801	B-17
IC802	C-17
IC803	B-21
IC804	B-23
IC805	B-23
IC807	I-8
IC808	I-9
Q801	E-14
Q802	C-17
Q803	C-21
Q804	C-21
Q805	B-22
Q806	C-22
Q807	B-23
Q808	B-23
Q809	B-24
Q810	C-24

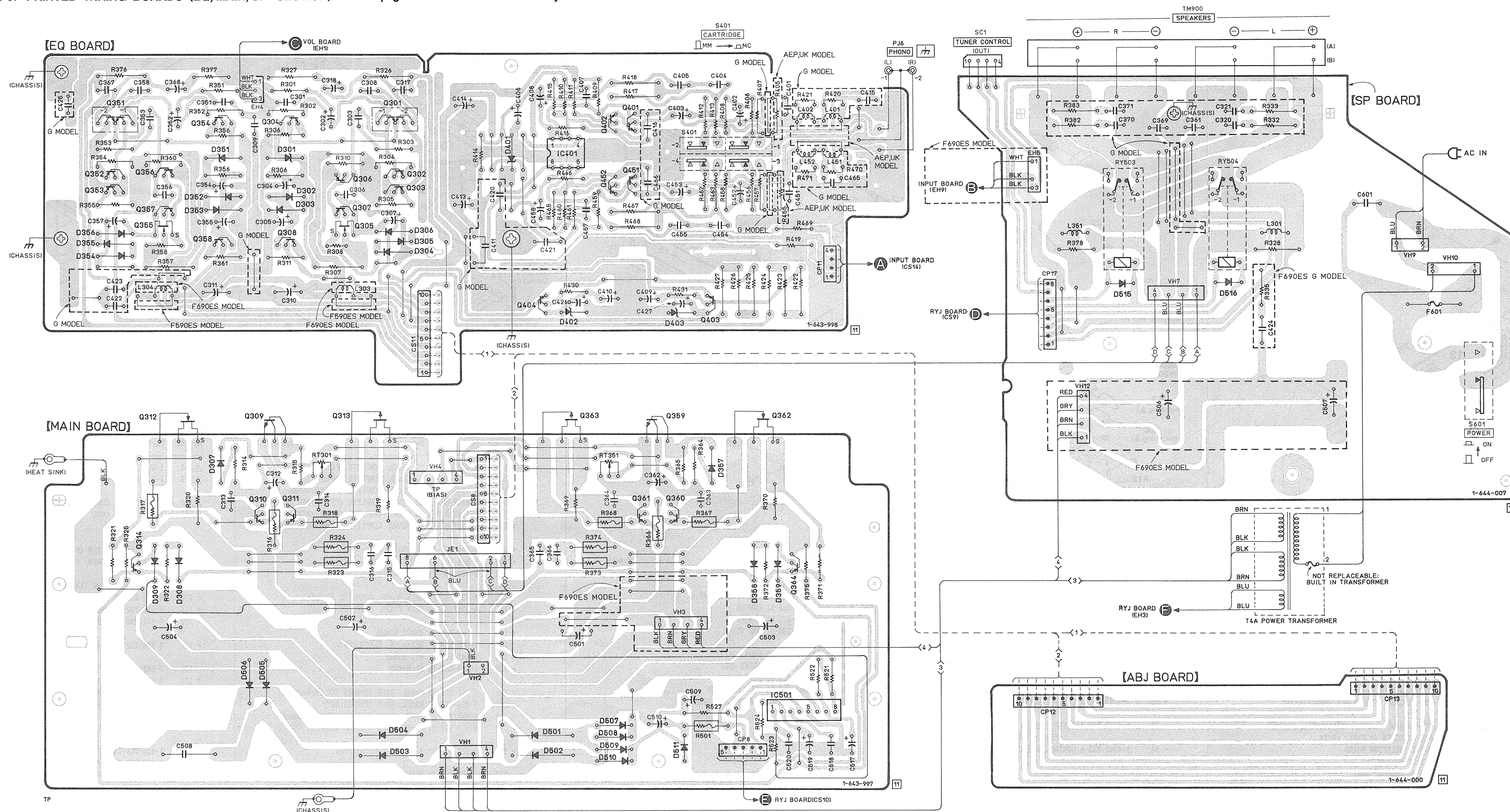
Note:
• : parts extracted from the component side.
• : Pattern on the side which is seen.

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.





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		
D303	C-4	Q301	B-5
D304	D-5	Q302	C-5
D305	C-5	Q303	C-5
D306	C-5	Q304	B-4
D307	F-3	Q305	C-5
D308	G-3	Q306	C-5
D309	G-2	Q307	C-5
D351	C-3	Q308	D-4
D352	C-3	Q309	F-4
D353	C-3	Q310	G-4
D354	D-2	Q311	G-4
D355	D-2	Q312	F-3
D356	C-2	Q313	F-5
D357	F-9	Q314	G-2
D358	G-9	Q351	B-2
D359	G10	Q352	C-2
D401	C-7	Q353	C-2
D402	D-7	Q354	B-3
D403	D-8	Q355	C-3
D501	I-7	Q356	C-3
D502	I-7	Q357	C-3
D503	I-5	Q358	D-3
D504	I-5	Q359	F-8
D505	I-4	Q360	G-8
D506	I-4	Q361	G-8
D507	I-8	Q362	F-9
D508	I-8	Q363	F-7
D509	I-8	Q364	G-10
D510	I-8	Q401	B-8
D511	I-9	Q402	B-8
D515	D-14	Q403	D-9
D516	D-16	Q404	D-7
		Q451	C-8
IC401	B-7	Q452	C-8

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.

SECTION 4

EXPLODED VIEWS

NOTE:

- -XX,-X mean standardized parts, so they may have some difference from the original one.

- Color indication of Appearance Parts.

Example:

KNOB,BALANCE (WHITE) ... (RED)

↑
Parts
Color

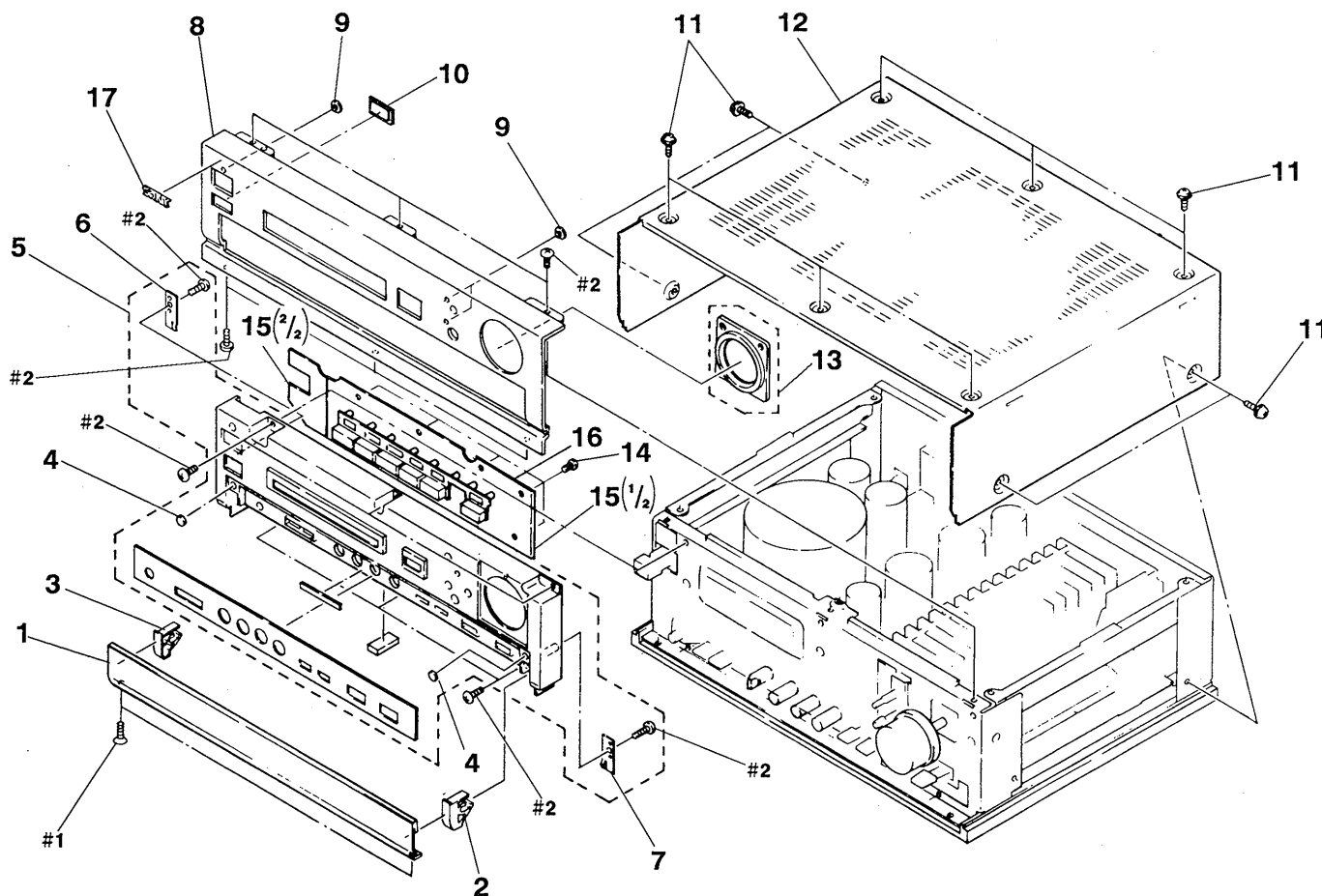
↑
Cabinet's
Color

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

- The mechanical parts with no reference number in the exploded views are not supplied.

- Hardware (# mark) list is given in the last of this parts list.

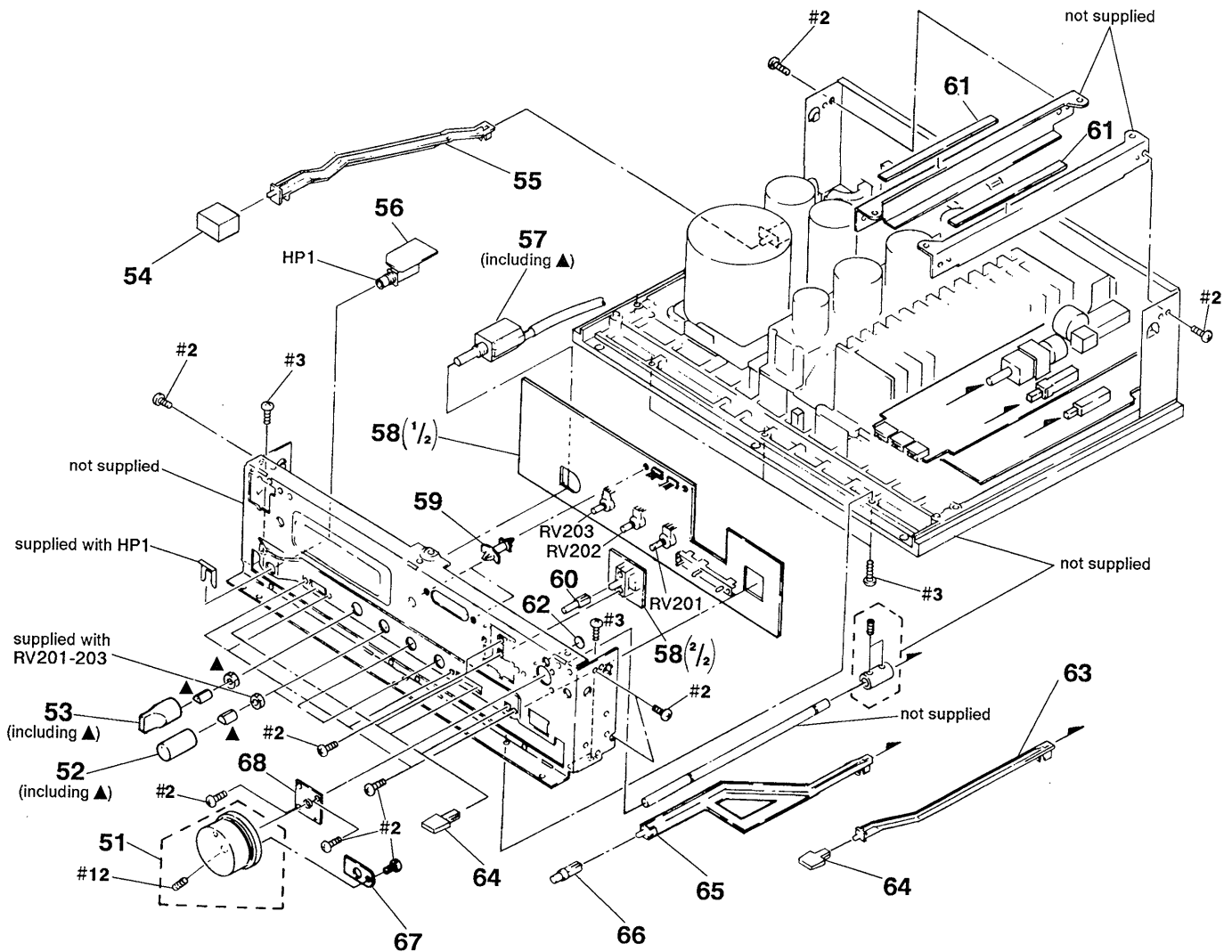
The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.

4-1. FRONT PANEL SECTION

Ref. No.	Part No.	Description	Remark
1	4-952-067-01	LID	
2	4-942-226-01	ARM (R)	
3	4-942-225-01	ARM (L)	
4	4-879-274-01	SPACER	
5	X-4942-633-1	PANEL (BASE) ASSY (F590ES)	
5	X-4942-634-1	PANEL (BASE) ASSY (F690ES)	
* 6	4-942-233-01	SPRING (L), PLATE	
* 7	4-942-234-01	SPRING (R), PLATE	
8	4-951-899-01	PANEL, FRONT (F590ES:AEP, AE2, Germany)	
8	4-951-899-11	PANEL, FRONT (F690ES:AEP, AE2, Germany)	
8	4-951-899-21	PANEL, FRONT (F590ES:UK)	
8	4-951-899-31	PANEL, FRONT (F690ES:UK)	

Ref. No.	Part No.	Description	Remark
9	4-931-646-01	LENS, LED	
10	4-952-206-01	WINDOW, REMOTE CONTROL	
11	3-704-366-01	SCREW (CASE) (M3X8)	
* 12	4-946-347-01	CASE (F590ES:AEP, UK, Germany/F690ES:AEP, UK, Germany)	
* 12	4-946-347-11	CASE (F590ES:AE2/F690ES:AE2)	
13	4-946-324-01	RING (LARGE), ORNAMENTAL (F690ES)	
14	4-951-620-01	SCREW (2.6X8), +BVTP	
* 15	1-644-004-11	SELECTOR BOARD	
16	4-951-921-01	BUTTON (F)	
17	4-908-848-01	EMBLEM, SONY	

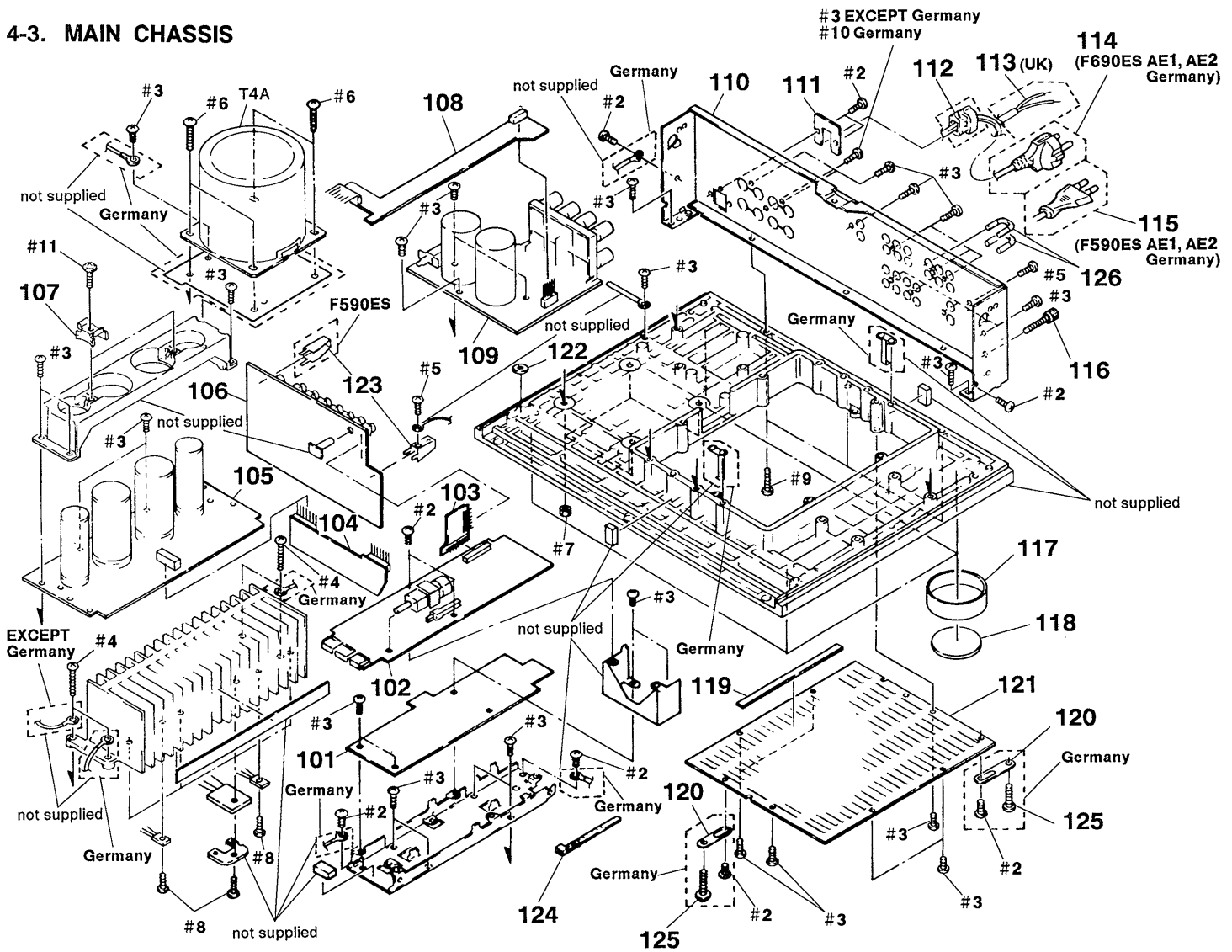
4-2. SUB CHASSIS



Ref. No.	Part No.	Description	Remark
51	X-4942-635-1	KNOB (DIA. 52) ASSY (F590ES)	
51	X-4942-636-1	KNOB (DIA. 48) ASSY (F690ES)	
52	4-952-955-01	KNOB (DIA. 13)	
53	4-952-954-01	KNOB (DIA. 13)	
54	4-942-032-01	KNOB (POWER)	
55	4-946-340-01	ROD (P)	
* 56	1-644-006-11	H. P BOARD	
57	1-692-138-11	SWITCH, ROTARY (REMOTE TYPE) (FUNCTION)	
* 58	A-4347-830-A	CONTROL BOARD, COMPLETE (F690ES: AEP, UK, Germany)	
* 58	A-4347-846-A	CONTROL BOARD, COMPLETE (F590ES: AEP, UK, Germany/F690ES: AE2)	
* 58	A-4347-853-A	CONTROL BOARD, COMPLETE (F590ES: AE2)	

Ref. No.	Part No.	Description	Remark
* 59	3-350-846-51	HOLDER, PCB	
60	4-931-641-01	BUTTON (DIA. 4)	
* 61	4-916-782-21	DAMPER	
* 62	4-908-892-01	SPACER	
63	4-946-338-01	ROD (C)	
64	4-942-228-01	KNOB (3X13)	
65	4-951-922-01	JOINT (SD)	
66	4-931-926-01	BUTTON (B)	
* 67	1-644-005-11	VOL. LED BOARD	
68	4-946-335-01	BRACKET (BEARING)	

4-3. MAIN CHASSIS



Ref. No.	Part No.	Description	Remark
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* 101	A-4347-829-A	EQ BOARD, COMPLETE (F690ES: AEP, UK)	
* 101	A-4347-834-A	EQ BOARD, COMPLETE (F690ES: AE2)	
* 101	A-4347-836-A	EQ BOARD, COMPLETE (F690ES: Germany)	
* 101	A-4347-841-A	EQ BOARD, COMPLETE (F590ES: AEP, UK)	
* 101	A-4347-850-A	EQ BOARD, COMPLETE (F590ES: AE2)	
* 101	A-4347-855-A	EQ BOARD, COMPLETE (F590ES: Germany)	

* 102	1-644-001-11	VOL BOARD	
* 103	1-644-002-11	INPUT J BOARD	
* 104	1-644-000-11	ABJ BOARD	

* 105	A-4347-828-A	MAIN BOARD, COMPLETE (F690ES)	
* 105	A-4347-840-A	MAIN BOARD, COMPLETE (F590ES)	

* 106	1-644-008-11	INPUT BOARD	
* 107	4-946-329-01	RETAINER, ELECT CAP	
* 108	1-643-999-11	RYJ BOARD	
* 109	1-644-007-11	SP BOARD	

* 110	4-951-917-01	PANEL, BACK (F590ES: AEP, UK, Germany)	
* 110	4-951-917-11	PANEL, BACK (F590ES: AE2)	
* 110	4-951-917-21	PANEL, BACK (F690ES: AEP, UK, Germany)	
* 110	4-951-917-31	PANEL, BACK (F690ES: AE2)	

* 111	4-923-873-01	BRACKET, CORD STOPPER	
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112	2-352-626-01	BUSHING, CORD (F690ES)	
* 112	3-703-244-00	BUSHING (2104), CORD (F590ES)	

Ref. No.	Part No.	Description	Remark
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△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)

116	3-706-165-00	SCREW (F590ES)	
* 116	4-941-033-01	SCREW, FIXED, FEEDER (F690ES)	
117	4-923-882-02	RING (LARGE-16), ORNAMENTAL, FOOT	
* 118	4-923-850-01	FOOT (DIA. 46)	
* 119	4-916-782-21	DAMPER	
* 120	4-941-988-01	BRACKET (GROUND)	
		(F590ES: Germany/F690ES: Germany)	
* 121	4-916-732-01	BOARD, BOTTOM	

122	3-942-525-01	BLIND (1), KNOB	
* 123	4-946-336-01	BRACKET (GROUND)	
124	3-655-653-21	BAND (TAITON), BINDING	
125	4-921-437-01	SCREW (M3X20), TAPPING	
		(F590ES: Germany/F690ES: 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)	

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.
- **SEMICONDUCTORS**
In each case, u : 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
AE4: Germany model

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
*	1-644-000-11	ABJ BOARD *****		C812	1-126-062-11	ELECT 47uF 20% 63V	
		< COMPOSITION CIRCUIT BLOCK >		C813	1-126-058-11	ELECT 4.7uF 20% 63V	
* CP12	1-568-202-11	PIN, CONNECTOR (PC BOARD) 10P		C816	1-126-163-11	ELECT 4.7uF 20% 50V	
* CP13	1-568-202-11	PIN, CONNECTOR (PC BOARD) 10P				< COMPOSITION CIRCUIT BLOCK >	
*****				CP6	1-695-015-11	PIN, CONNECTOR (PC BOARD) 8P	
				CP7	1-695-015-11	PIN, CONNECTOR (PC BOARD) 8P	
						< CONNECTOR >	
*	A-4347-830-A	CONTROL BOARD, COMPLETE (F690ES: AEP, UK, Germany)		CS4	1-568-319-11	SOCKET, CONNECTOR 8P	
*	A-4347-846-A	CONTROL BOARD, COMPLETE (F590ES: AEP, UK, Germany/F690ES: AE2)		CS5	1-568-319-11	SOCKET, CONNECTOR 8P	
*	A-4347-853-A	CONTROL BOARD, COMPLETE (F590ES: AE2) *****		CS6	1-568-319-11	SOCKET, CONNECTOR 8P	
		< CAPACITOR >		CS7	1-568-117-11	SOCKET, CONNECTOR 14P	
C201	1-130-472-00	MYLAR 0.0012uF 5% 50V				< DIODE >	
C202	1-130-480-00	MYLAR 0.0056uF 5% 50V		D801	8-719-987-63	DIODE 1N4148M	
C203	1-130-479-00	MYLAR 0.0047uF 5% 50V		D802	8-719-987-63	DIODE 1N4148M	
C204	1-136-159-00	FILM 0.033uF 5% 50V		D803	8-719-987-63	DIODE 1N4148M	
C206	1-136-169-00	FILM 0.22uF 5% 50V		D804	8-719-987-63	DIODE 1N4148M	
				D805	8-719-987-63	DIODE 1N4148M	
C251	1-130-472-00	MYLAR 0.0012uF 5% 50V		D806	8-719-987-63	DIODE 1N4148M	
C252	1-130-480-00	MYLAR 0.0056uF 5% 50V		D807	8-719-987-63	DIODE 1N4148M	
C253	1-130-479-00	MYLAR 0.0047uF 5% 50V		D808	8-719-987-63	DIODE 1N4148M	
C254	1-136-159-00	FILM 0.033uF 5% 50V		D809	8-719-987-63	DIODE 1N4148M	
C256	1-136-169-00	FILM 0.22uF 5% 50V		D810	8-719-200-82	DIODE 11ES2	
				D811	8-719-200-82	DIODE 11ES2	
C801	1-130-483-00	MYLAR 0.01uF 5% 50V				< DIODE >	
C802	1-161-379-00	CERAMIC 0.01uF 20% 25V		D812	8-719-200-82	DIODE 11ES2	
C803	1-126-059-11	ELECT 10uF 20% 25V		D813	8-719-200-82	DIODE 11ES2	
C804	1-161-379-00	CERAMIC 0.01uF 20% 25V		D816	8-719-987-63	DIODE 1N4148M	
C805	1-161-379-00	CERAMIC 0.01uF 20% 25V		D817	8-719-987-63	DIODE 1N4148M	
				D818	8-719-987-63	DIODE 1N4148M	
C806	1-162-211-31	CERAMIC 33PF 5% 50V				< CONNECTOR >	
C807	1-162-211-31	CERAMIC 33PF 5% 50V		* EH2	1-564-517-11	PLUG, CONNECTOR 2P	
C808	1-136-165-00	FILM 0.1uF 5% 50V					
C809	1-124-999-81	ELECT 2200uF 20% 10V					
C810	1-126-059-11	ELECT 10uF 20% 25V					
C811	1-126-059-11	ELECT 10uF 20% 25V					

CONTROL

Ref.No.	Part No.	Description	Remark
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< IC >

IC801	8-759-962-08	IC BA6208	
IC802	8-759-962-08	IC BA6208	
IC803	8-759-082-11	IC M50720-358SP (SYSTEM CONTROLLER)	
IC804	8-759-234-64	IC TA7805S	
IC805	8-759-234-64	IC TA7805S	

< TRANSISTOR >

Q801	8-729-620-05	TRANSISTOR 2SC2603-EF	
Q802	8-729-900-61	TRANSISTOR DTA114ES	
Q803	8-729-620-05	TRANSISTOR 2SC2603-EF	
Q804	8-729-900-61	TRANSISTOR DTA114ES	
Q805	8-729-119-77	TRANSISTOR 2SA1175-FEK	
Q806	8-729-900-36	TRANSISTOR DTC124ES	
Q807	8-729-194-57	TRANSISTOR 2SC945-P	
Q808	8-729-141-03	TRANSISTOR 2SA733-QP	
Q809	8-729-141-03	TRANSISTOR 2SA733-QP	
Q810	8-729-140-96	TRANSISTOR 2SD774-34	

< RESISTOR >

R204	1-247-722-11	CARBON 5.6K 5%	1/4W
R205	1-259-502-11	CARBON 4.7M 5%	1/4W
R206	1-259-502-11	CARBON 4.7M 5%	1/4W
R207	1-247-717-11	CARBON 2.2K 5%	1/4W
R208	1-259-467-11	CARBON 43K 5%	1/4W
R209	1-247-152-00	CARBON 7.5K 5%	1/4W
R210	1-249-590-11	CARBON 39K 5%	1/4W
R254	1-247-722-11	CARBON 5.6K 5%	1/4W
R255	1-259-502-11	CARBON 4.7M 5%	1/4W
R256	1-259-502-11	CARBON 4.7M 5%	1/4W
R257	1-247-717-11	CARBON 2.2K 5%	1/4W
R258	1-259-467-11	CARBON 43K 5%	1/4W
R259	1-247-152-00	CARBON 7.5K 5%	1/4W
R260	1-249-590-11	CARBON 39K 5%	1/4W
R329	1-247-747-11	CARBON 470 5%	1/2W
R379	1-247-747-11	CARBON 470 5%	1/2W
R801	1-249-425-11	CARBON 4.7K 5%	1/4W
R802	1-247-757-11	CARBON 2.7K 5%	1/2W
R803	1-247-251-00	CARBON 3K 5%	1/2W (F590ES:AE2)
R803	1-247-253-00	CARBON 3.6K 5%	1/2W (F590ES:AEP, UK, Germany/F690ES:AE2)
R803	1-247-759-11	CARBON 3.9K 5%	1/2W (F690ES:AEP, UK, Germany)
R806	1-249-425-11	CARBON 4.7K 5%	1/4W
R807	1-249-425-11	CARBON 4.7K 5%	1/4W
R808	1-249-425-11	CARBON 4.7K 5%	1/4W
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
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R811	1-249-429-11	CARBON 10K 5%	1/4W
R812	1-249-429-11	CARBON 10K 5%	1/4W
R813	1-249-429-11	CARBON 10K 5%	1/4W
R814	1-249-429-11	CARBON 10K 5%	1/4W
R815	1-249-429-11	CARBON 10K 5%	1/4W

R816	1-249-429-11	CARBON 10K 5%	1/4W
R817	1-249-429-11	CARBON 10K 5%	1/4W
R818	1-249-429-11	CARBON 10K 5%	1/4W
R819	1-249-429-11	CARBON 10K 5%	1/4W
R820	1-249-429-11	CARBON 10K 5%	1/4W

R821	1-249-429-11	CARBON 10K 5%	1/4W
R822	1-249-429-11	CARBON 10K 5%	1/4W
R823	1-249-429-11	CARBON 10K 5%	1/4W
R824	1-249-430-11	CARBON 12K 5%	1/4W
R825	1-247-895-00	CARBON 470K 5%	1/4W

R826	1-249-405-11	CARBON 100 5%	1/4W
R827	1-249-425-11	CARBON 4.7K 5%	1/4W
R828	1-249-429-11	CARBON 10K 5%	1/4W
R829	1-247-903-00	CARBON 1M 5%	1/4W
R830	1-249-429-11	CARBON 10K 5%	1/4W

R831	1-249-421-11	CARBON 2.2K 5%	1/4W
R832	1-249-429-11	CARBON 10K 5%	1/4W
R833	1-249-429-11	CARBON 10K 5%	1/4W
R834	1-249-393-11	CARBON 10 5%	1/4W
R835	1-249-425-11	CARBON 4.7K 5%	1/4W

R836	1-249-421-11	CARBON 2.2K 5%	1/4W
R837	1-249-421-11	CARBON 2.2K 5%	1/4W
R838	1-249-437-11	CARBON 47K 5%	1/4W
R839	1-249-399-11	CARBON 33 5%	1/4W
R840	1-249-429-11	CARBON 10K 5%	1/4W

R841	1-249-425-11	CARBON 4.7K 5%	1/4W
R842	1-247-249-00	CARBON 2.4K 5%	1/2W
R843	1-247-249-00	CARBON 2.4K 5%	1/2W
R846	1-247-759-11	CARBON 3.9K 5%	1/2W
R847	1-247-759-11	CARBON 3.9K 5%	1/2W

R848	1-247-759-11	CARBON 3.9K 5%	1/2W
R849	1-247-759-11	CARBON 3.9K 5%	1/2W
R850	1-247-759-11	CARBON 3.9K 5%	1/2W
R851	1-247-759-11	CARBON 3.9K 5%	1/2W

R852	1-247-759-11	CARBON 3.9K 5%	1/2W
R853	1-247-759-11	CARBON 3.9K 5%	1/2W
R855	1-249-409-11	CARBON 220 5%	1/4W

R860	1-247-223-00	CARBON 200 5%	1/2W (F590ES:AEP, UK, Germany/F690ES:AE2)
R860	1-247-229-00	CARBON 360 5%	1/2W (F690ES:AEP, UK, Germany)
R860	1-247-738-11	CARBON 82 5%	1/2W (F590ES:AE2)

CONTROL

EQ

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 >			
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 (F690ES:AEP, UK)	
*	A-4347-850-A	EQ BOARD, COMPLETE (F690ES:AE2)	
*	A-4347-855-A	EQ BOARD, COMPLETE (F690ES:Germany)	

< CAPACITOR >			
C301	1-104-278-11	POLYSTYRENE 100PF 5% 50V (F690ES)	
C301	1-110-335-11	MYLAR 100PF 5% 50V (F690ES)	
C302	1-123-369-00	ELECT 4.7uF 20% 50V	
C303	1-110-339-11	MYLAR 220PF 5% 50V (F690ES)	
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 (F690ES)	
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 (F690ES: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 (F690ES: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	

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/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/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

Ref. No.	Part No.	Description	Remark
R420	1-249-421-11	CARBON 2.2K 5% 1/4W (F590ES:Germany/F690ES:Germany)	
R421	1-249-421-11	CARBON 2.2K 5% 1/4W (F590ES:Germany/F690ES:Germany)	
R422	1-247-239-00	CARBON 910 5% 1/2W (F590ES:AEP, UK, Germany, F690ES)	
R422	1-247-750-11	CARBON 680 5% 1/2W (F590ES:AE2)	
R423	1-247-239-00	CARBON 910 5% 1/2W (F590ES:AEP, UK, Germany, F690ES)	
R423	1-247-750-11	CARBON 680 5% 1/2W (F590ES:AE2)	
R424	1-247-239-00	CARBON 910 5% 1/2W (F590ES:AEP, UK, Germany, F690ES)	
R424	1-247-750-11	CARBON 680 5% 1/2W (F590ES:AE2)	
R425	1-244-874-11	CARBON 1.1K 5% 1/2W (F590ES:AEP, UK, Germany, F690ES)	
R425	1-247-751-11	CARBON 820 5% 1/2W (F590ES:AE2)	
R426	1-244-874-11	CARBON 1.1K 5% 1/2W (F590ES:AEP, UK, Germany, F690ES)	
R426	1-247-751-11	CARBON 820 5% 1/2W (F590ES:AE2)	
R427	1-244-874-11	CARBON 1.1K 5% 1/2W (F590ES:AEP, UK, Germany, F690ES)	
R427	1-247-751-11	CARBON 820 5% 1/2W (F590ES:AE2)	
R430	1-249-421-11	CARBON 2.2K 5% 1/4W	
R431	1-249-421-11	CARBON 2.2K 5% 1/4W	
R455	1-247-706-11	CARBON 330 5% 1/4W (F590ES:AEP, AE2, UK/F690ES:AEP, AE2, UK)	
R456	1-247-700-11	CARBON 100 5% 1/4W	
R457	1-249-469-11	CARBON 100K 5% 1/4W	
R458	1-249-469-11	CARBON 100K 5% 1/4W	
R459	1-247-710-11	CARBON 560 5% 1/4W	
R460	1-247-710-11	CARBON 560 5% 1/4W	
R461	1-247-725-11	CARBON 10K 5% 1/4W	
R462	1-247-700-11	CARBON 100 5% 1/4W	
R463	1-260-661-11	CARBON 6.8 5% 1/4W	
R465	1-247-700-11	CARBON 100 5% 1/4W (F590ES:AEP, AE2, UK/F690ES:AEP, AE2, UK)	
R465	1-249-542-11	CARBON 390 5% 1/4W (F590ES:Germany/F690ES:Germany)	
R466	1-246-545-00	CARBON 1.0M 5% 1/4W	
R467	1-249-844-11	CARBON 56K 1% 1/2W	
R468	1-249-818-11	CARBON 4.7K 1% 1/2W	
R469	1-247-713-11	CARBON 1K 5% 1/4W	
R470	1-249-421-11	CARBON 2.2K 5% 1/4W (F590ES:Germany/F690ES:Germany)	
R471	1-249-421-11	CARBON 2.2K 5% 1/4W (F590ES:Germany/F690ES:Germany)	

Ref. No.	Part No.	Description	Remark
		< SWITCH >	
S401	1-571-111-11	SWITCH, PUSH (1 KEY) (CARTRIDGE)	

*	1-644-006-11	H P BOARD *****	
		< CAPACITOR >	
C322	1-162-282-31	CERAMIC 100PF 10% 50V (F590ES:Germany/F690ES:Germany)	
C372	1-162-282-31	CERAMIC 100PF 10% 50V (F590ES:Germany/F690ES:Germany)	
		< JACK >	
HP1	1-507-796-71	JACK (HEADPHONES)	

*	1-644-008-11	INPUT BOARD *****	
		< CONNECTOR >	
* CS12	1-509-931-11	SOCKET, CONNECTOR	
CS14	1-562-087-00	SOCKET, CONNECTOR 4P	
		< PLUG >	
EH6	1-691-765-11	PLUG (MICRO CONNECTOR) 3P (F690ES)	
		< JACK >	
* PJ1	1-573-142-21	JACK, PIN 4P (TAPE 2) (F590ES)	
* PJ1	1-573-142-41	JACK, PIN 4P (TAPE 2) (F690ES)	
* PJ2	1-573-142-21	JACK, PIN 4P (DAT/TAPE 1) (F590ES)	
* PJ2	1-573-142-41	JACK, PIN 4P (DAT/TAPE 1) (F690ES)	
PJ3	1-568-978-21	JACK 6P (TUNER/CD/AUX)	
PJ5	1-573-141-11	JACK 2P (PRE OUT) (F690ES)	
		< RESISTOR >	
R101	1-246-545-00	CARBON 1.0M 5% 1/4W	
R102	1-246-545-00	CARBON 1.0M 5% 1/4W	
R103	1-246-545-00	CARBON 1.0M 5% 1/4W	
R104	1-246-545-00	CARBON 1.0M 5% 1/4W	
R105	1-246-545-00	CARBON 1.0M 5% 1/4W	
R106	1-247-713-11	CARBON 1K 5% 1/4W	
R107	1-247-713-11	CARBON 1K 5% 1/4W	
R151	1-246-545-00	CARBON 1.0M 5% 1/4W	
R152	1-246-545-00	CARBON 1.0M 5% 1/4W	
R153	1-246-545-00	CARBON 1.0M 5% 1/4W	

INPUT

INPUT J

MAIN

Ref. No.	Part No.	Description	Remark		
R154	1-246-545-00	CARBON	1.0M	5%	1/4W
R155	1-246-545-00	CARBON	1.0M	5%	1/4W
R156	1-247-713-11	CARBON	1K	5%	1/4W
R157	1-247-713-11	CARBON	1K	5%	1/4W
R330	1-247-255-00	CARBON	4.3K	5%	1/2W (F690ES)
R331	1-247-739-11	CARBON	100	5%	1/2W (F690ES)
R334	1-247-255-00	CARBON	4.3K	5%	1/2W (F690ES)
R380	1-247-255-00	CARBON	4.3K	5%	1/2W (F690ES)
R381	1-247-739-11	CARBON	100	5%	1/2W (F690ES)
R384	1-247-255-00	CARBON	4.3K	5%	1/2W (F690ES)

< SWITCH >

S102 1-571-115-11 SWITCH, SLIDE (REC OUT SELECTOR)

* 1-644-002-11 INPUT J BOARD

< CONPOSITION CIRCUIT BLOCK >

* CP10 1-569-418-11 PIN, CONNECTOR 13P
* CP16 1-508-745-00 CONNECTOR PIN

* A-4347-828-A MAIN BOARD, COMPLETE (F690ES)
* A-4347-840-A MAIN BOARD, COMPLETE (F590ES)

< CAPACITOR >

C312	1-126-051-11	ELECT	47uF	20%	50V
C313	1-102-233-00	CERAMIC	33PF	10%	500V (F590ES)
C314	1-102-233-00	CERAMIC	33PF	10%	500V (F590ES)
C314	1-107-159-00	MICA	33PF	5%	500V (F690ES)
C315	1-136-161-00	FILM	0.047uF	5%	50V
C316	1-136-161-00	FILM	0.047uF	5%	50V
C317	1-107-026-00	MICA	5.1PF		500V (F690ES)
C362	1-126-051-11	ELECT	47uF	20%	50V
C363	1-102-233-00	CERAMIC	33PF	10%	500V (F590ES)
C363	1-107-159-00	MICA	33PF	5%	500V (F690ES)
C364	1-102-233-00	CERAMIC	33PF	10%	500V (F590ES)
C364	1-107-159-00	MICA	33PF	5%	500V (F690ES)

C365	1-136-161-00	FILM	0.047uF	5%	50V
C366	1-136-161-00	FILM	0.047uF	5%	50V
C501	1-125-695-11	ELECT	12000uF	20%	63V
C502	1-125-695-11	ELECT	12000uF	20%	63V
C503	1-125-694-11	ELECT	5600uF	20%	63V
C504	1-125-694-11	ELECT	5600uF	20%	63V

C508	1-136-880-11	FILM	2.2uF	10%	160V (F690ES)
C508	1-136-962-11	FILM	0.47uF	10%	160V (F590ES)
C509	1-126-069-11	ELECT	1uF	20%	100V
C510	1-126-064-11	ELECT	220uF	20%	63V (F590ES)
C510	1-126-065-81	ELECT	330uF	20%	63V (F690ES)
C517	1-126-023-11	ELECT	100uF	20%	25V
C518	1-130-487-00	MYLAR	0.022uF	5%	50V
C519	1-126-023-11	ELECT	100uF	20%	25V
C520	1-130-471-00	MYLAR	0.001uF	5%	50V

< CONPOSITION CIRCUIT BLOCK >

* CP8 1-560-531-00 PIN, CONNECTOR 5P

< CONNECTOR >

* CS8 1-562-334-00 SOCKET, CONNECTOR 10P

< DIODE >

D307	8-719-987-63	DIODE	1N4148M
D308	8-719-987-63	DIODE	1N4148M
D309	8-719-987-63	DIODE	1N4148M
D357	8-719-987-63	DIODE	1N4148M
D358	8-719-987-63	DIODE	1N4148M
D359	8-719-987-63	DIODE	1N4148M
D501	8-719-230-02	DIODE	30DF2
D502	8-719-230-02	DIODE	30DF2
D503	8-719-230-02	DIODE	30DF2
D504	8-719-230-02	DIODE	30DF2

D505	8-719-200-82	DIODE	11ES2
D506	8-719-200-82	DIODE	11ES2
D507	8-719-200-82	DIODE	11ES2
D508	8-719-200-82	DIODE	11ES2
D509	8-719-200-82	DIODE	11ES2

D510	8-719-200-82	DIODE	11ES2
D511	8-719-200-82	DIODE	11ES2

< IC >

IC501 8-759-111-68 IC uPC1237HA

< TRANSISTOR >

Q309	8-729-203-45	TRANSISTOR	2SC3423-0
Q310	8-729-107-53	TRANSISTOR	2SC2275A
Q311	8-729-141-10	TRANSISTOR	2SA985A-QP
Q312	8-729-015-30	TRANSISTOR	2SK1530-Y
Q313	8-729-015-31	TRANSISTOR	2SJ201-Y
Q314	8-729-140-82	TRANSISTOR	2SA988-PAFAEA
Q315	8-729-015-30	TRANSISTOR	2SK1530-Y
Q359	8-729-203-45	TRANSISTOR	2SC3423-0

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	8-729-140-8z	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	

		< COMPOSITION CIRCUIT BLOCK >	

* CP14	1-565-647-11	PIN, CONNECTOR 14P
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< CONNECTOR >

* CS9	1-562-573-11	SOCKET, CONNECTOR 8P
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* EH3	1-564-505-11	PLUG, CONNECTOR 2P
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*	1-644-004-11	SELECTOR BOARD	
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< 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.

SELECTOR

SP

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)	

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 $\triangle$ or dotted line with mark $\triangle$ 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.

