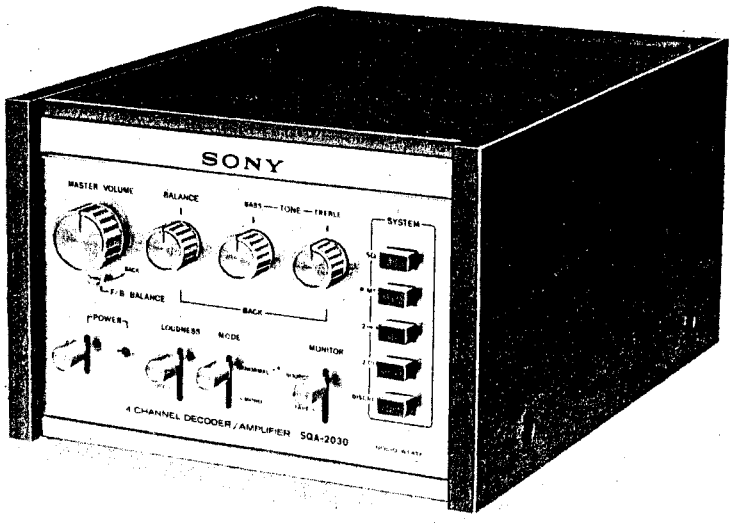
SQA-2030

USA Model
Canada Model
UK Model
AEP Model



Original

SQ DECODER/AMPLIFIER

SPECIFICATIONS

GENERAL

Power Requirements: 110, 127, 220, 240 V ac, 50/60 Hz
(UK, AEP Model)
120 V ac, 60 Hz (USA, Canada Model)

Power Consumption: 170W (UK, AEP Model)
70W (USA Model)
110W (Canada Model)

AC Outlets: One unswitched, 300W

Dimensions: Approx. 226 (w) x 156 (h) x 307 (d) mm
8 7/8 (w) x 6 1/8 (h) x 12 1/8 (d) inches
Including projecting parts and controls

Weight: Approx. 6.9 kg, 15 lb 3 oz (net)
Approx. 8.5 kg, 18 lb 12 oz
(with shipping carton)

POWER AMPLIFIER SECTION (BACK CHANNEL)

Continuous RMS Power Output: (rated output) (Less than 0.8% harmonic distortion)
Both channels driven simultaneously
At 20–20,000 Hz
18 + 18W (8Ω)
According to DIN 45500 (UK Model)
20 + 20W (8Ω)
25 + 25W (4Ω)

Damping Factor: 70 (8Ω)

Harmonic Distortion: Less than 0.8% at rated output

IM Distortion: (60 Hz:7 kHz = 4:1)
Less than 0.8% at rated output
Less than 0.2% at 1W output

Frequency Response: 20–50,000 Hz $\pm^{0}_{3}$ dB
(DISCRETE input, 1W output)

S/N Ratio: 90 dB, DISCRETE input, input level 250 mV, weighting network A

Outputs: Accept 4–16Ω speakers

– continued on next page –

SONY®
SERVICE MANUAL

Original

DECORDER AND PREAMPLIFIER SECTION

Inputs: Measured with specified continuous RMS output into 8Ω load at 1 kHz with the both channels driven simultaneously.

		Sensitivity	Impedance
FRONT PREAMP INPUT	LOW	75 mV (-20 dB)	75 kΩ
	NORMAL	250 mV (-10 dB)	90 kΩ
	HIGH	500 mV (-4 dB)	100 kΩ
2CH TAPE	LOW	250 mV (-10 dB)	50 kΩ
	NORMAL	750 mV (-0.5 dB)	80 kΩ
REC/PB		250 mV (-10 dB)	80 kΩ
DISCRETE		250 mV (-10 dB)	100 kΩ

Outputs:

	Output Level	Impedance
FRONT PREAMP OUTPUT	1 V (max. 5.5 V)	10 kΩ
2CH REC OUT	250 mV	10 kΩ
REC/PB	43 mV	82 kΩ

Harmonic Distortion: Less than 0.2% (input level 250 mV at 2 kHz)

Frequency Response:
SQ, R-MTX, 2→4: 20–20,000 Hz ±3 dB
DISCRETE, 2CH: 20–20,000 Hz $\pm^{0}_{3}$ dB

Signal-to-Noise Ratio: 85 dB (FRONT PREAMP INPUT, input level 250 mV, weighting network A)

SQ Separation: (input signal: 250 mV at 2 kHz)
Lf ↔ Rf 20 dB Rf ↔ Rb 20 dB
Lb ↔ Rb 14 dB Rf ↔ Lb 20 dB
Lf ↔ Lb 20 dB Cf ↔ Cb 18 dB
Lf ↔ Rb 20 dB

Tone Controls: (back channel)
BASS ±10 dB at 100 Hz
TREBLE ±10 dB at 10 kHz

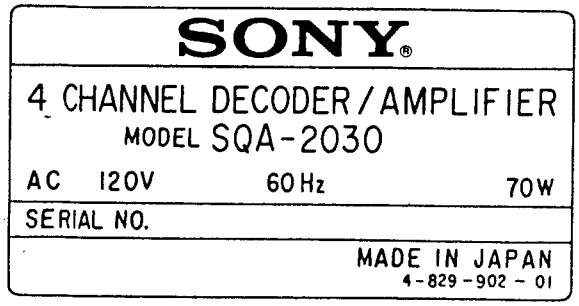
Loudness Control: (front and back channel)
+10 dB at 50 Hz, +4 dB at 10 kHz (att. -30 dB)

SECTION 1
OUTLINE

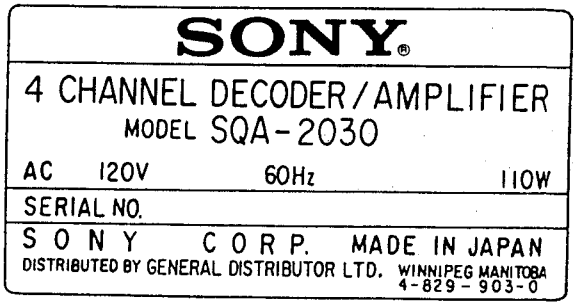
1-1. MODEL IDENTIFICATION

See the specification label.

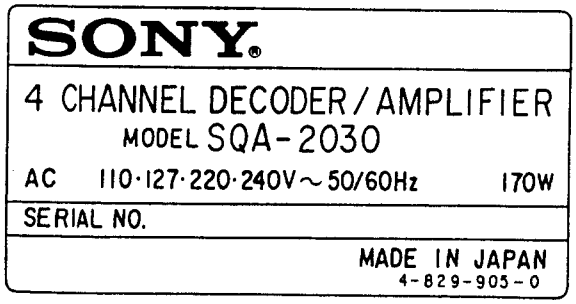
USA Model



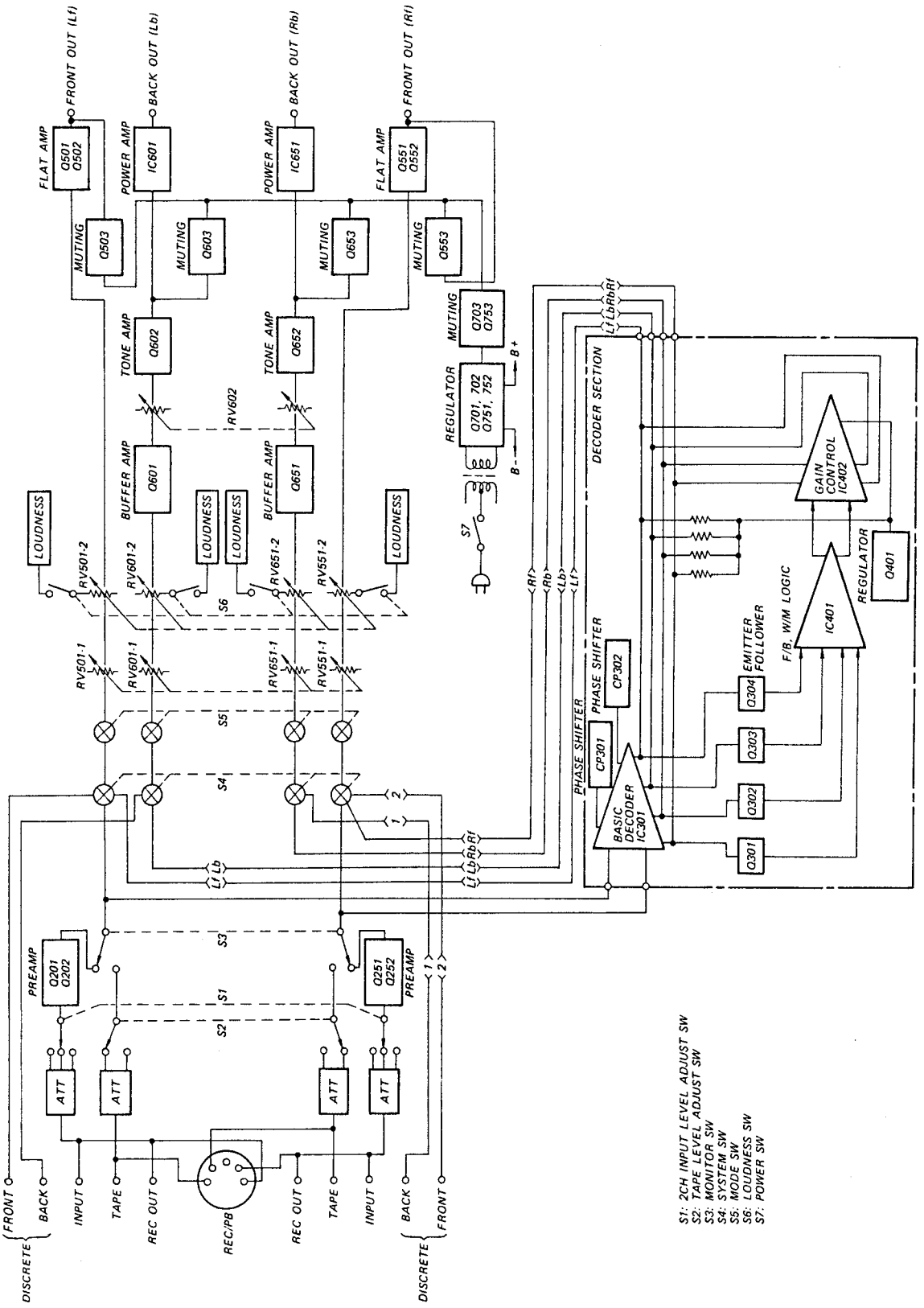
Canada Model



UK, AEP Model



1-2. BLOCK DIAGRAM



SECTION 2
DISASSEMBLY AND REPLACEMENT

Note: All screws are Phillips type (cross recess type) unless otherwise indicated.
(-): slotted head.

2-1. FRONT PANEL REMOVAL

1. Remove the two screws at each side of the set, and separate the wooden cabinet and the shield case from the chassis.
2. Remove the knobs and buttons from the front panel except the SYSTEM pushbuttons. (BALANCE and TONE control knobs are secured by the set screws.)
3. Remove the two screws shown in Fig. 2-1, and the two screws shown in Fig. 2-2.

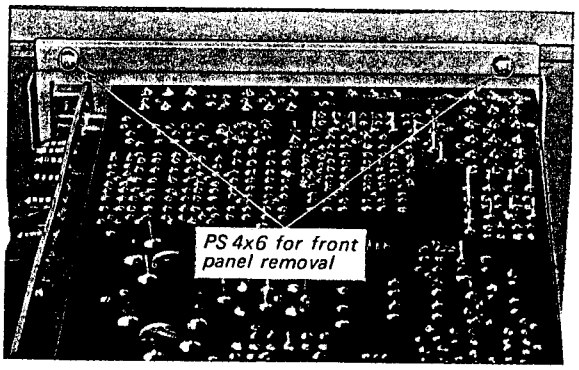


Fig. 2-1. Front panel removal

2-2. FRONT SUBCHASSIS REMOVAL

1. Remove the front panel. (Procedure 2-1)
2. Remove the screw shown in Fig. 2-2, and the eight screws shown in Fig. 2-3 and Fig. 2-4.

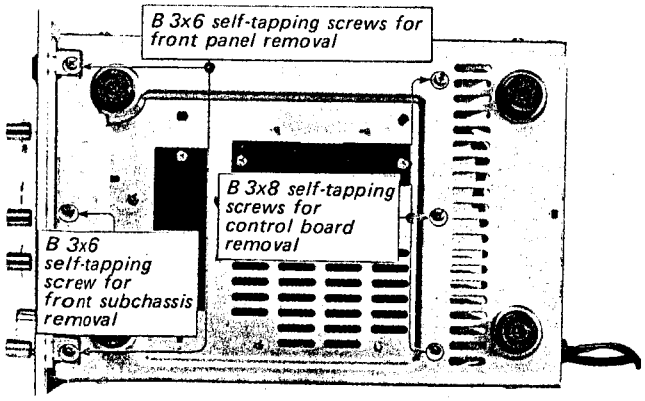


Fig. 2-2. Front subchassis and control board removal

2-3. CIRCUIT BOARD REMOVAL

1. Remove the front subchassis. (Procedure 2-2)
2. To separate the SQ board from the chassis, remove the screw shown in Fig. 2-4.
3. To separate the control board, first, remove the three screws shown in Fig. 2-2. Next, remove the four screws (B 3x12) securing the two power ICs to the heat sink. Then, remove the self-tapping screw (B 3x10) securing the control board to the heat sink with a bracket at the top.

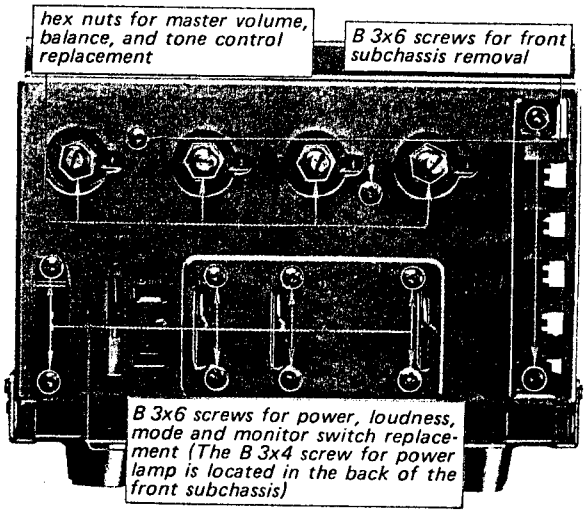


Fig. 2-3. Front subchassis removal, and control and switch replacement

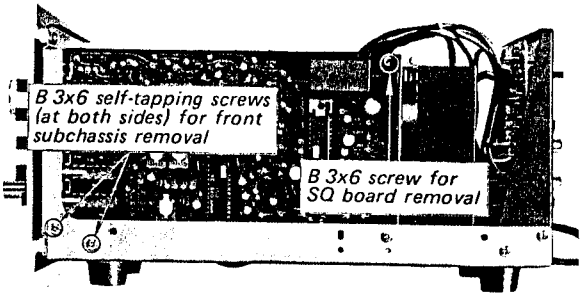


Fig. 2-4. Front subchassis and SQ board removal

2-4. SWITCH, CONTROL, AND POWER LAMP REPLACEMENT

Preparation:

Remove the front subchassis from the chassis. (Procedure 2-2)

POWER, LOUDNESS, MODE, and MONITOR Switch, and POWER Lamp Replacement

1. These switches and the lamp are secured to the front subchassis by screws. Remove these screws, shown in Fig. 2-3, and disconnect the lead wires.
2. Install a new switch (or lamp).

SYSTEM Switch Replacement

1. Remove the SQ circuit board from the chassis. (Procedure 2-3-2)
2. Straighten the claws which hold the switch.
3. Unsolder and free the legs of the defective switch from the circuit board.
4. Install a new switch.

MASTER VOLUME, BALANCE, and TONE Control Replacement

1. Remove the control board from the chassis. (Procedure 2-3-3)
2. Remove the four hex nuts, shown in Fig. 2-3, and the bracket, which braces the controls together, from the shafts of the controls.
3. Unsolder and free the legs of the defective control from the circuit board.
4. Install a new control.

2-5. CHASSIS LAYOUT

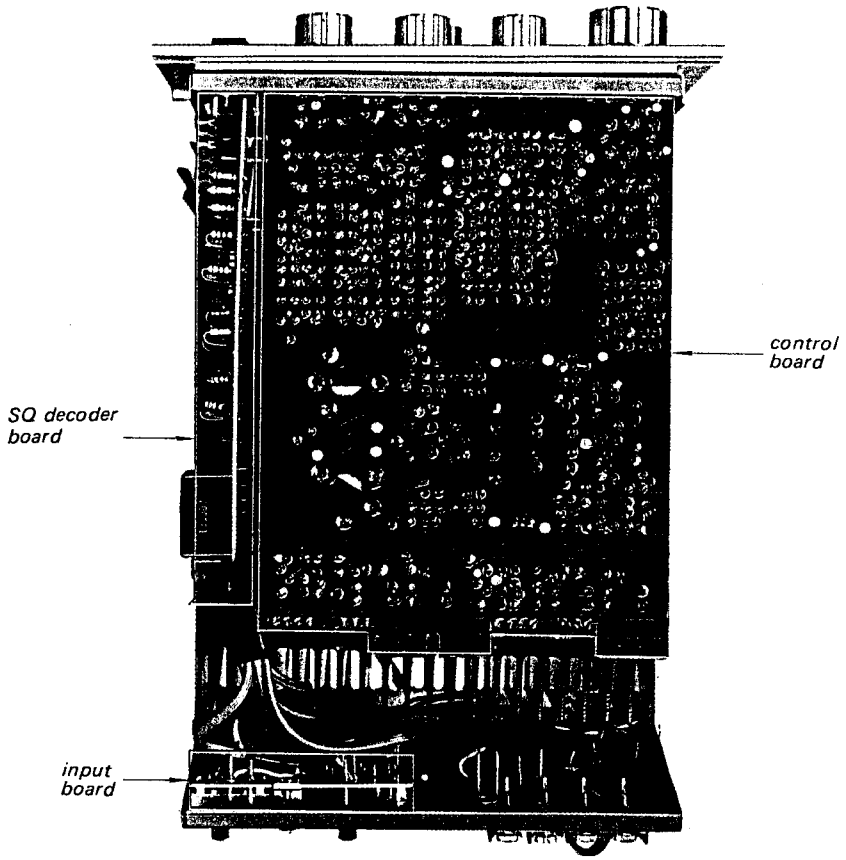


Fig. 2-5. Chassis layout

SECTION 3
CHECKS AND ADJUSTMENTS

Preparation

For the checks and adjustments on SQA-2030, prepare a signal source capable of simulating the various components of an SQ signal. The required signal components and their phase relationship are summarized in Table 3-1.

The required signal modes can be produced by either of the two methods: by using the SONY SQ CHECKER Model 0005, available at each SONY Factory Service Center, or an accurate audio oscillator and the signal mode selector shown in Fig. 3-1. To obtain an accurate result with the latter method, the oscillator must be set to 2 kHz ± 1 %, and the precision components must be used where the schematic diagram (Fig. 3-1) indicates.

Table 3-1. Signal components and their phase relationship of the signal mode selector

output	mode					
	L_F	R_F	C_F	C_B	L_B	R_B
L-CH OUT	1	0	1	1	1	1
R-CH OUT	0	1	1	1	1	1
phase difference between L-CH and R-CH outputs	—	—	0°	180°	90°	-90°

Note: L_F ..... Left front
R_F ..... Right front
C_F ..... Center front
C_B ..... Center back
L_B ..... Left back
R_B ..... Right back

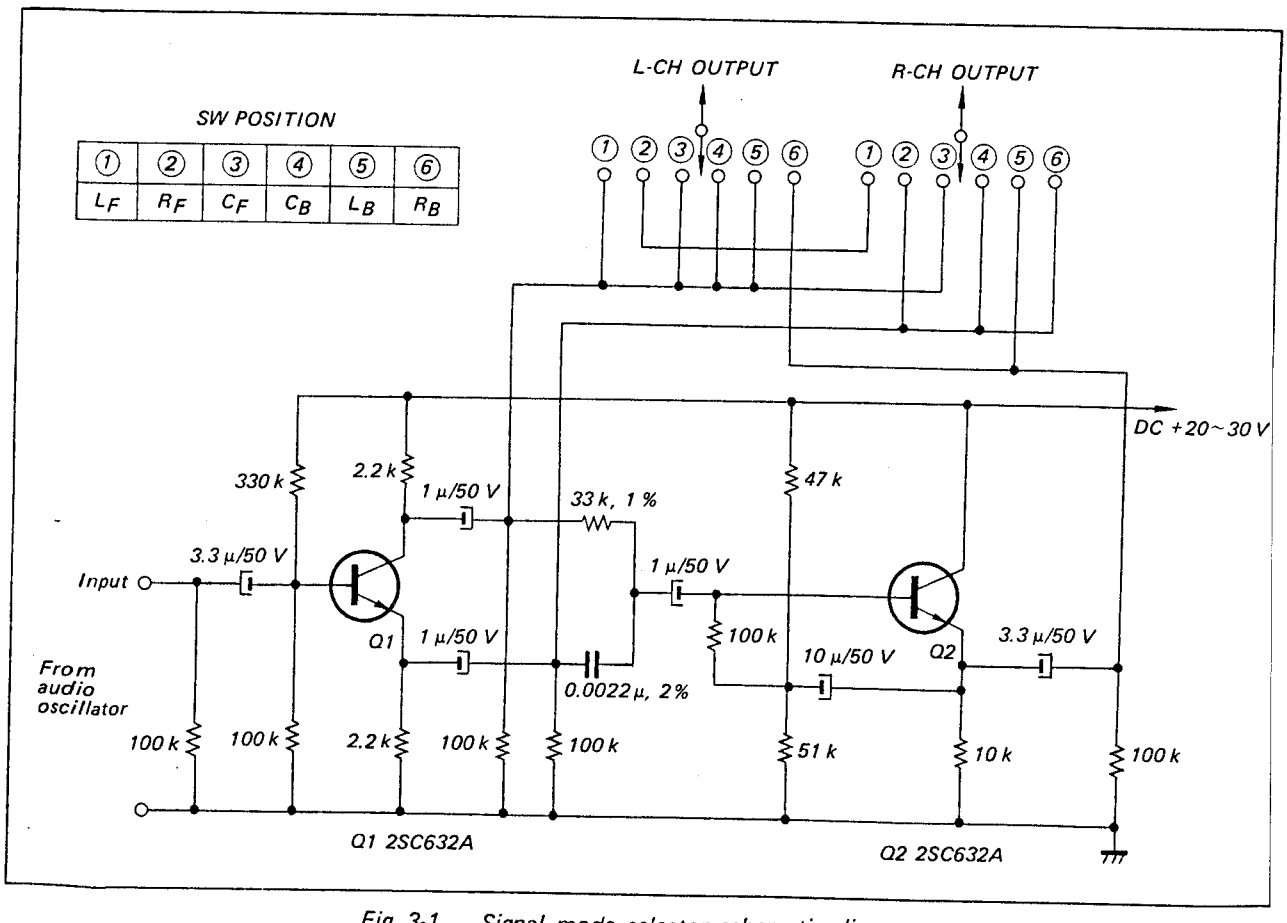


Fig. 3-1. Signal mode selector schematic diagram

Required Test Equipment

1. SQ CHECKER Model 0005 (SONY) or Audio Oscillator and Signal Mode Selector (see Fig. 3-1)
2. Ac VTVM (and Oscilloscope, if available)
3. Audio Oscillator

Control and Switch Settings

Set SQA-2030 controls as below unless otherwise specified.

INPUT LEVEL ADJUST switch ..... NORMAL
TAPE LEVEL ADJUST switch ..... NORMAL
MONITOR switch ..... SOURCE
SYSTEM switch ..... SQ
MODE switch ..... NORMAL
LOUDNESS switch ..... OFF
POWER switch ..... ON
TONE controls ..... center
BALANCE control ..... center
MASTER VOLUME ..... maximum
F/B BALANCE ..... center

Note: Throughout this section, the output terminals of SQA-2030 will be called Lf, Rf, Lb and Rb output terminals. They refer to the following terminals:
Lf: FRONT PREAMP OUTPUT (L) terminal
Rf: FRONT PREAMP OUTPUT (R) terminal
Lb: BACK SPEAKER OUTPUT (L) terminal
Rb: BACK SPEAKER OUTPUT (R) terminal

3-1. DISCRETE OUTPUT LEVEL CHECK

1. Set the SYSTEM switch to DISCRETE.
2. With the equipment connected as shown in Fig. 3-2, feed 1 kHz/-15 dB signal to the each DISCRETE INPUT terminal of SQA-2030.
3. Check the output level at the each output terminal corresponding to the input terminal (*i.e.* when the signal is received at left front input terminal, check the output level at Lf terminal). The result should be within the value given in Table 3-2.

Table 3-2. Discrete output level

input (1 kHz/-15 dB)		output	
DISCRETE INPUT terminals	L_F	L_f	-2.5 ± 1.5 dB
	R_F	R_f	-2.5 ± 1.5 dB
	L_B	L_b	+21 ± 1.5 dB
	R_B	R_b	+21 ± 1.5 dB

3-2. SQ OUTPUT LEVEL CHECK

1. Set the SYSTEM switch to SQ.
2. With the equipment connected as shown in Fig. 3-3, feed 2 kHz/-10 dB signal to the FRONT PREAMP INPUT terminals of SQA-2030.
3. Check the output level at the each output terminals. The result should be within the value given in Table 3-3.

Table 3-3. SQ output level

input signal mode	output	
L_F	L_f	-0.5 ± 1.5 dB
R_F	R_f	-0.5 ± 1.5 dB
L_B	L_b	+22 ± 1.5 dB
R_B	R_b	+22 ± 1.5 dB

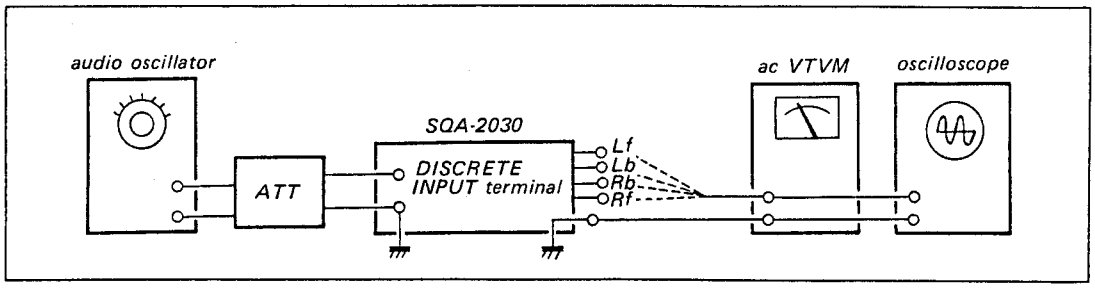


Fig. 3-2. Discrete output level check setup

3-3. SQ SEPARATION CHECK

1. Set the SYSTEM switch to SQ.
2. With the equipment connected as shown in Fig. 3-3, feed 2 kHz/–10 dB signal to FRONT PREAMP INPUT terminals of SQA-2030.
3. Connect the ac VTVM to the left channel of "TO TAPE IN" terminal (Lf), and adjust the attenuator for 0 dB reading on the VTVM.
4. Change the signal mode of the SQ checker or signal mode selector to R_F, L_B, and R_B, and read the output level at the Lf terminal.
5. Set the signal mode to C_F and adjust the attenuator for 0 dB reading on the VTVM.
6. Change the signal mode from C_F to C_B, and read the Lf output level.
7. Check the SQ separation at Rf, Lb, and Rb output terminals in the same way as described in steps (1) to (6). The result should be within the value given in Table 3-4.

Note: When measuring the output level at Rf, Lb, and Rb terminals of SQA-2030, adjust the attenuator so that the VTVM reads 0 dB at R_F, L_B, and R_B input signal modes, respectively, except for C_F and C_B modes. Adjust the attenuator so that the VTVM reads 0 dB at C_F mode when checking the output of Lf and Rf terminals with C_B mode, and at C_B when checking the output of Lb and Rb with C_F mode.

Table 3-4. SQ separation check

input signal mode	SQA-2030 output			
	Lf	Rf	Lb	Rb
L_F	0 dB	–20 ± 3 dB	–20 ± 3 dB	–20 ± 3 dB
R_F	–20 ± 3 dB	0 dB	–20 ± 3 dB	–20 ± 3 dB
L_B	–20 ± 3 dB	–20 ± 3 dB	0 dB	–14 ± 3 dB
R_B	–20 ± 3 dB	–20 ± 3 dB	–14 ± 3 dB	0 dB
C_F	0 dB	0 dB	–18 ± 3 dB	–18 ± 3 dB
C_B	–18 ± 3 dB	–18 ± 3 dB	0 dB	0 dB

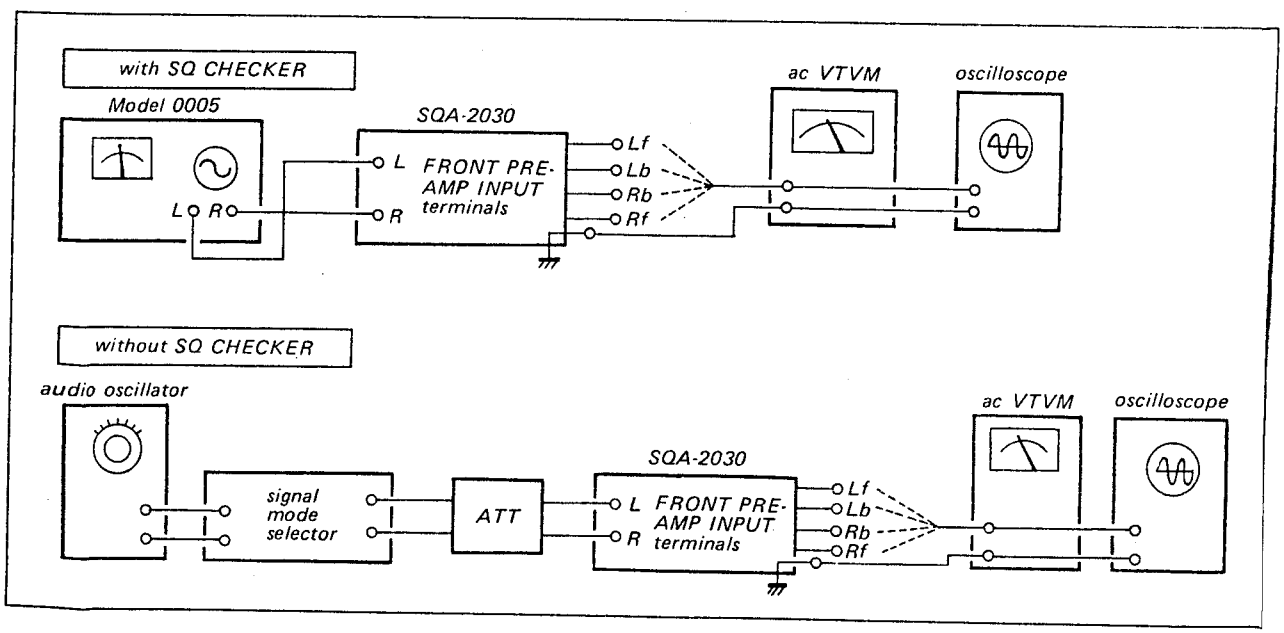


Fig. 3-3. SQ output level and SQ separation checks setup

3-4. SQ CIRCUIT BOARD ADJUSTMENT

1. Set all the SYSTEM switches off.
2. Connect the equipment as shown in Fig. 3-3, and the VTVM to the left channel of "TO TAPE IN" terminal (Lf).
3. Feed 2 kHz/−10 dB signal to FRONT PREAMP INPUT terminal of SQA-2030.
4. Set the signal mode of the SQ checker or the signal mode selector to LF, and confirm that the VTVM reads approximately 0 dB.
5. Adjust the attenuator so that the VTVM reads 0 dB.
6. Adjust RV403 (see Fig. 3-4) so that the output level drops by 3 dB when the two testing points, shown in Fig. 3-4, are shorted.
7. Set the SYSTEM switch to SQ.
8. Set the signal mode to C_F, and adjust the attenuator for 0 dB reading on the VTVM.
9. Adjust RV401 (see Fig. 3-4) so that the VTVM reads −18 dB when the signal mode is shifted to C_B.
10. Connect the VTVM to Lb output terminal.
11. Set the signal mode to C_B and adjust the attenuator for 0 dB reading on the VTVM.
12. Adjust RV402 (see Fig. 3-4) so that the VTVM reads −18 dB when the signal mode is shifted to C_F.

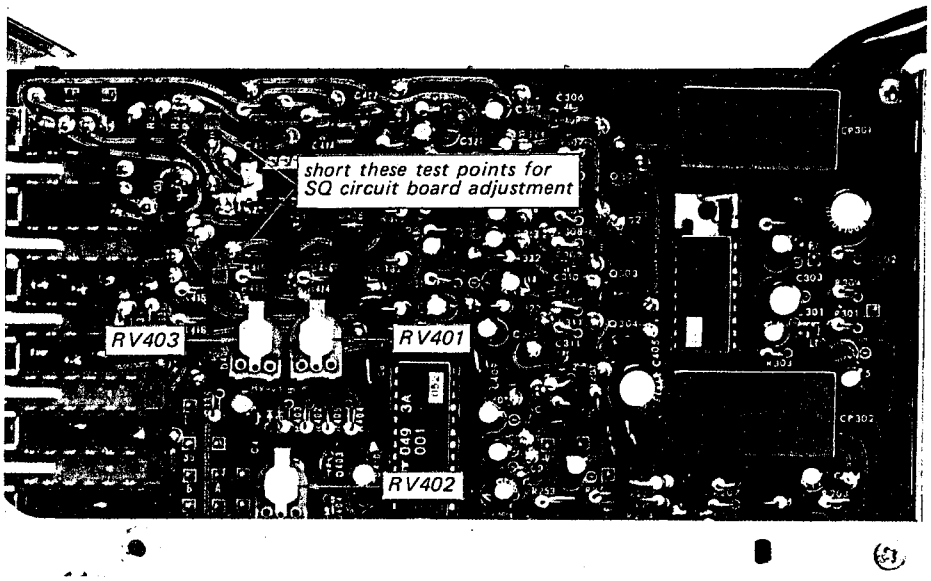
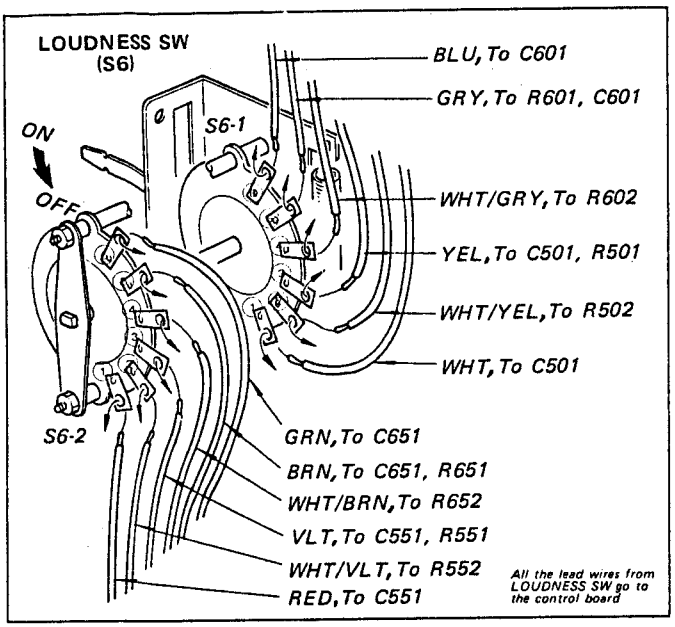


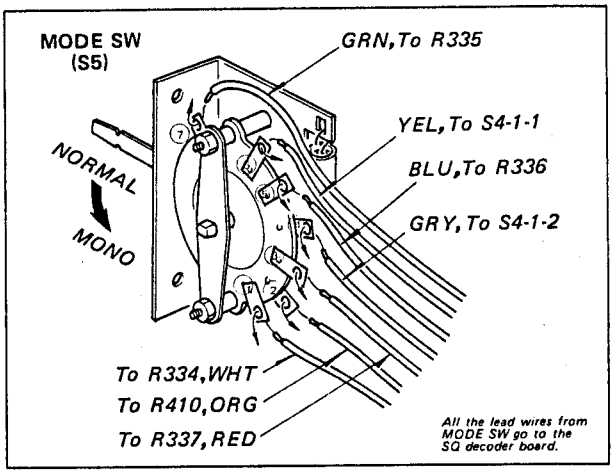
Fig. 3-4. SQ circuit board adjustment

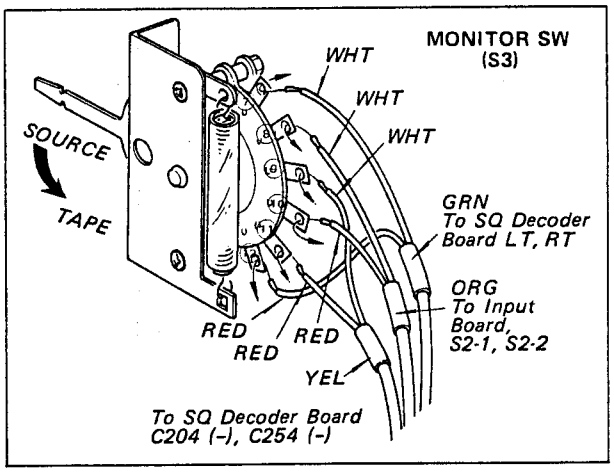
MEMO

SECTION 4
DIAGRAMS

4-1. WIRING DIAGRAM OF SWITCHES

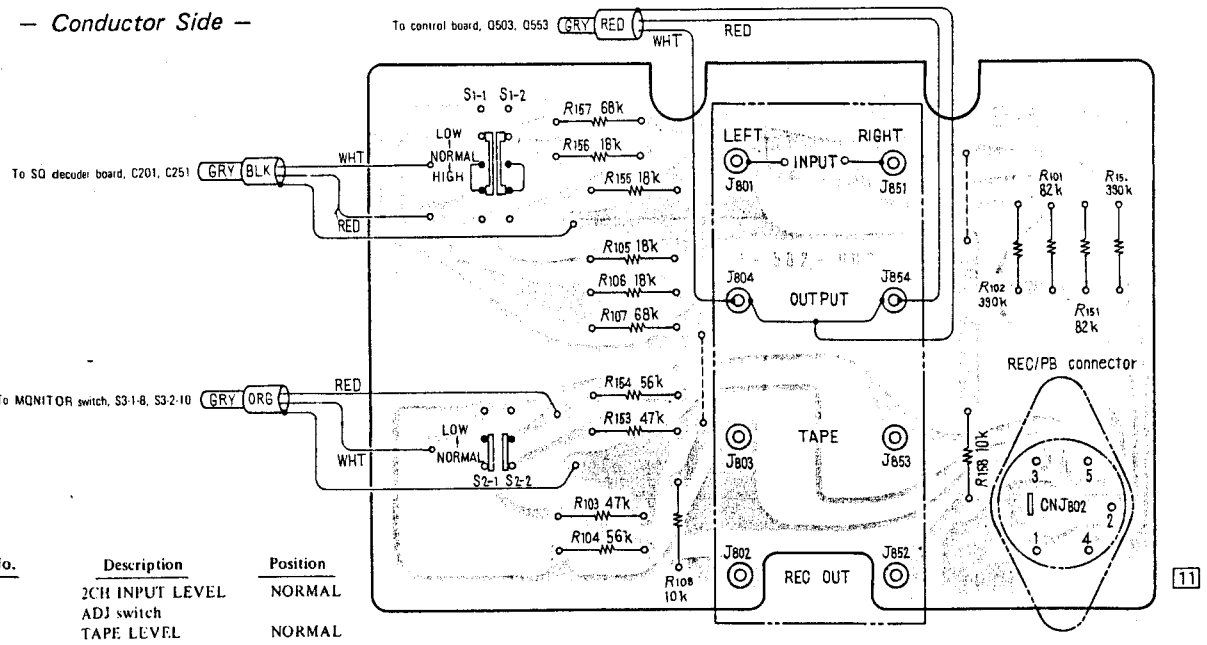






4-2. MOUNTING DIAGRAM – Input Board –

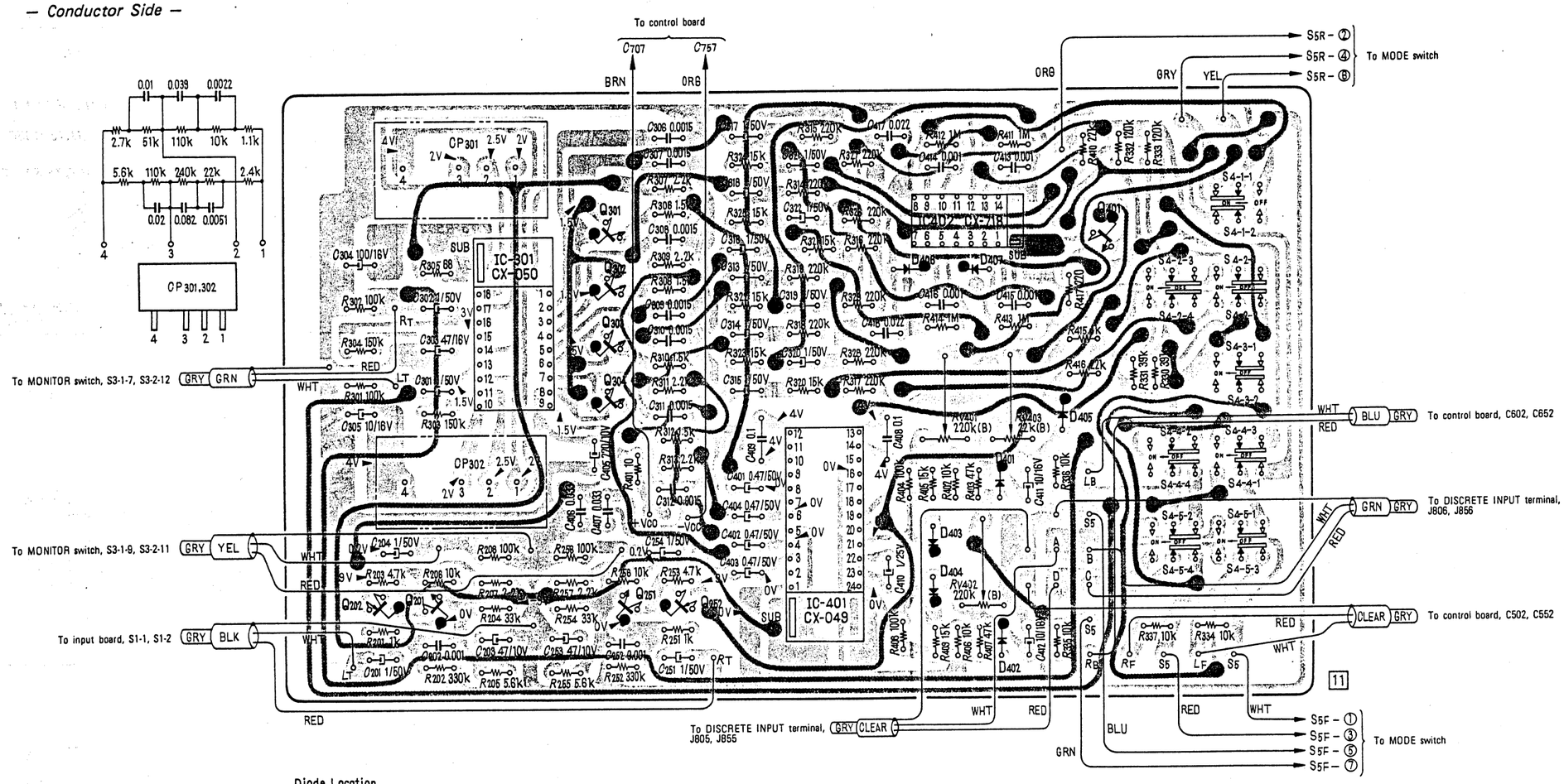
– Conductor Side –



Ref. No.	Description	Position
S1	2CH INPUT LEVEL ADJ switch	NORMAL
S2	TAPE LEVEL ADJ switch	NORMAL

4-3. MOUNTING DIAGRAM — SQ Decoder Board —

— Conductor Side —



Diode Location

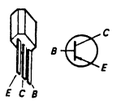
D406 D407
D403 D401 D405
D404 D402

Transistor and IC Location

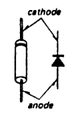
IC402 Q401
Q301
IC301 Q302
Q303
Q304
IC401
Q202 Q201 Q251 Q252

Q201 (Q251)	2SC632A
Q202 (Q252)	2SA677
Q301~Q304	2SC632A
Q401	2SC634A
IC301	CX-050
IC401	CX-049
IC402	CX-718
D401~D404	1S1555
D405~D407	1T243M
RV401, 402	SEPARATION ADJ
RV403	-3 dB POINT ADJ

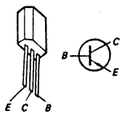
2SA677



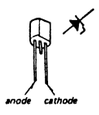
1S1555



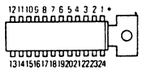
2SC632A
2SC634A



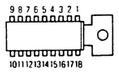
1T243M



CX-049



CX-050



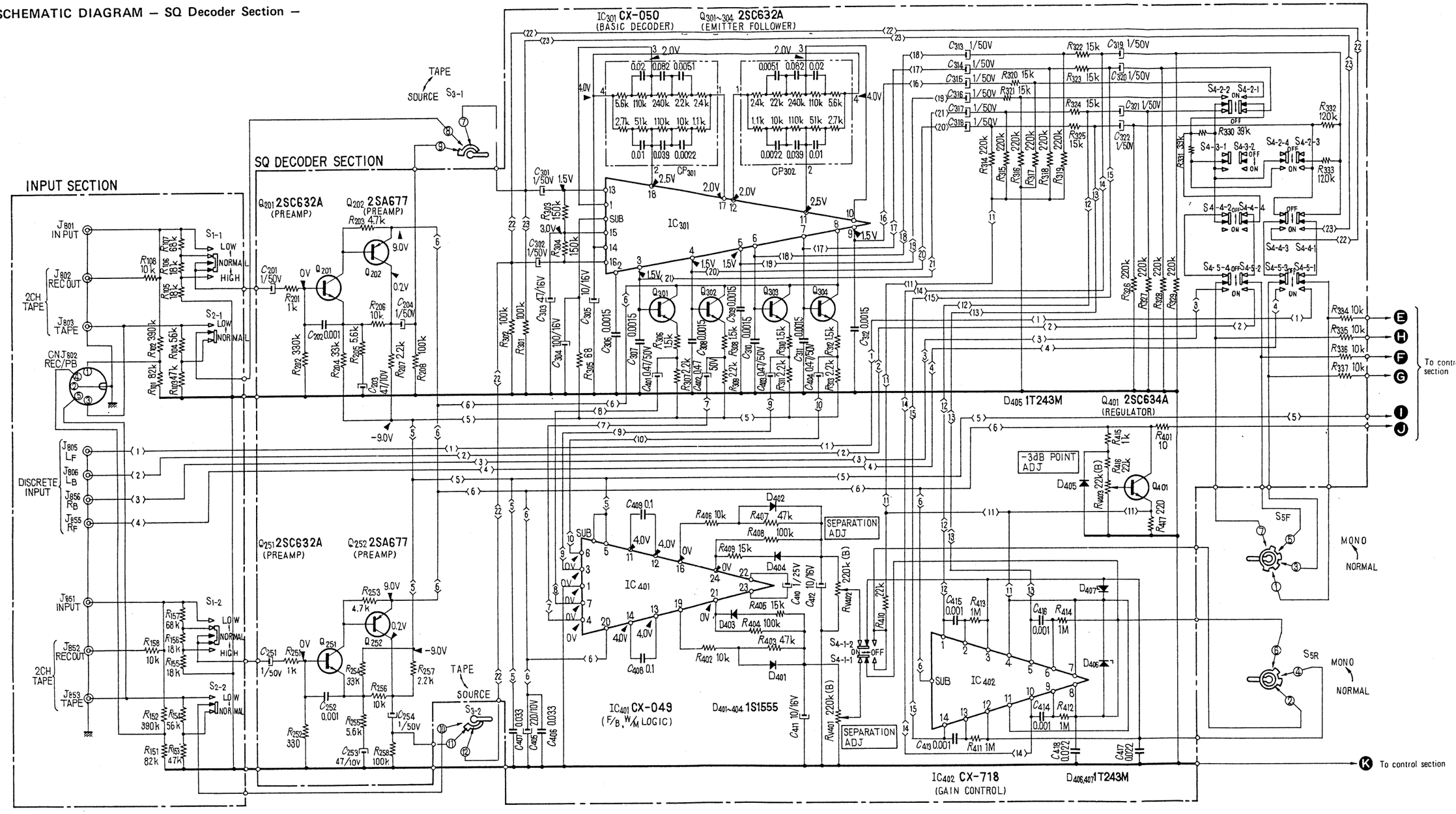
CX-718

Ref. No.	Description	Position
S4	SYSTEM switch	
S4-1	SQ	ON
S4-2	R-MTX	OFF
S4-3	2→4	OFF
S4-4	2CH	OFF
S4-5	DISCRETE	OFF

CAUTION

When handling CX-718, take the following steps:
1) short all the terminals of CX-718
2) avoid a static electricity built-up on your body by keeping your hand on the chassis of the set.

4-4. SCHEMATIC DIAGRAM — SQ Decoder Section —

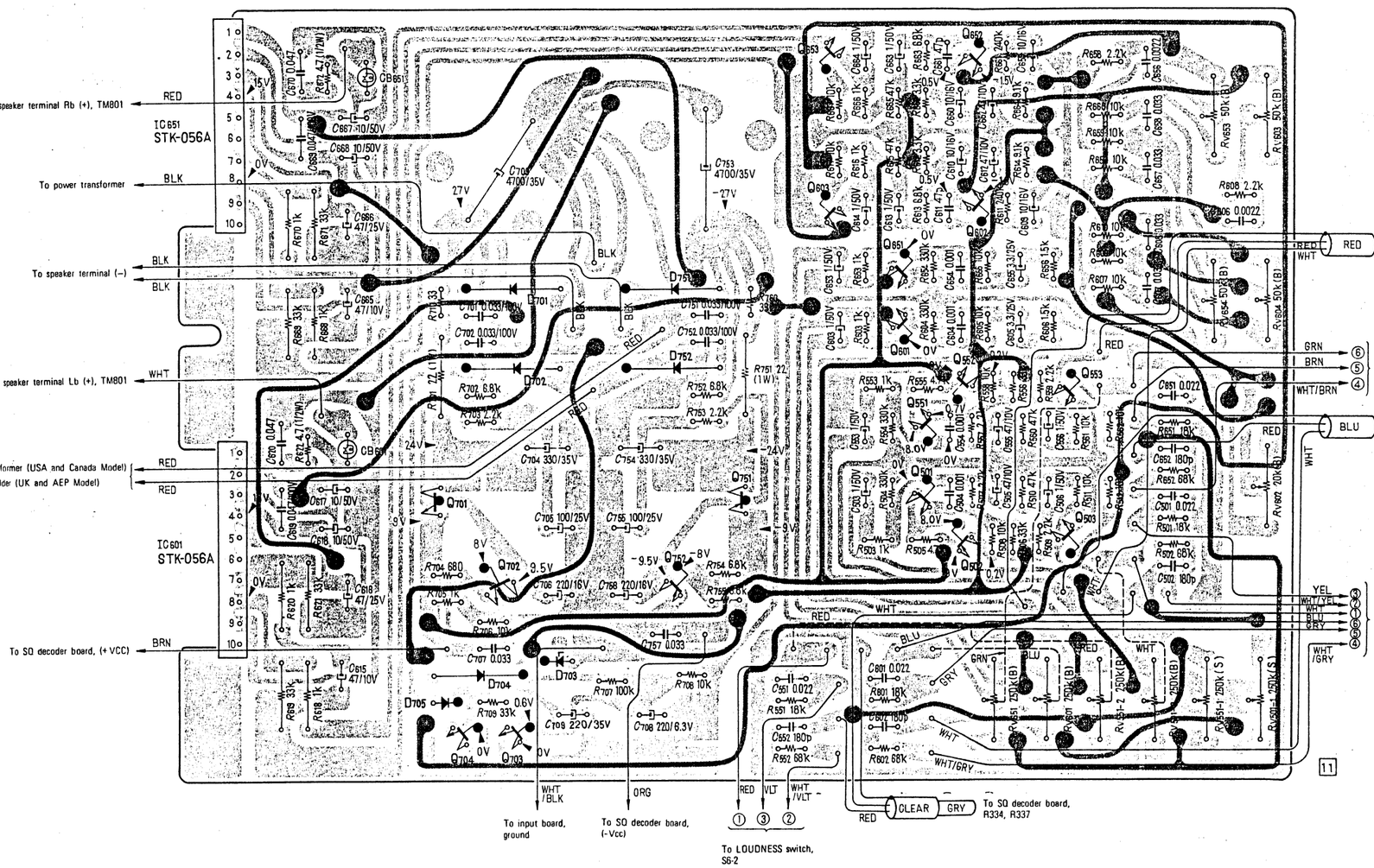


Ref. No.	Description	Position
S1	2CH INPUT LEVEL ADJ SW	NORMAL
S2	TAPE LEVEL ADJ SW	NORMAL
S3	MONITOR SW	SOURCE
S4	SYSTEM SW	
S4-1	SQ	ON
S4-2	R-MTX	OFF
S4-3	2→4	OFF
S4-4	2CH	OFF
S4-5	DISCRETE	OFF
S5	MODE SW	NORMAL

Note:
All resistance values are in ohms. k = 1,000, M = 1,000 k
All capacitance values are in μF except as indicated with p, which means μμF.
All voltages are dc measured with a VOM which has an input impedance of 20 k ohms/volt. No signal in.
Voltage variations may be noted due to normal production tolerances.

4-5. MOUNTING DIAGRAM — Control Board —

— Conductor Side —



Diode Location

D701 D702 D704 D705 D703 D751 D752

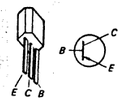
Transistor and IC Location

IC651 Q653 Q603 Q651 Q601 Q652 Q602 Q552 Q551 Q553 Q501 Q502 Q503 Q701 Q702 Q704 Q703 Q752 Q751 IC601

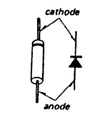
RV501-1 (RV551-1)	F/B BALANCE
RV501-2 (RV551-2) / RV601 (RV651)	MASTER VOLUME
RV602	BALANCE
RV603 (RV653)	TONE (TREBLE)
RV604 (RV654)	TONE (BASS)

Q501 (Q551)	2SC632A
Q502 (Q552)	2SA677
Q503 (Q553)	2SC634A
Q601 (Q651)	2SC632A
Q602 (Q652)	2SC632A
Q603 (Q653)	2SC634A
Q701	2SC1124
Q702	2SC634A
Q703	2SC634A
Q704	2SC634A
Q751	2SA706
Q752	2SA677
IC601 (IC651)	STK-056A
D701 (D751)	UO-5E
D702 (D752)	UO-5E
D703	1T243M
D704	10D-2
D705	1S1555

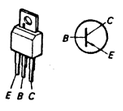
2SA677



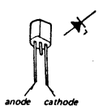
1S1555



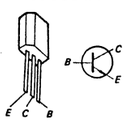
2SA706



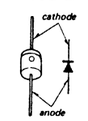
1T243M



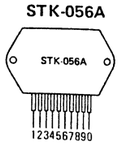
2SC632A
2SC634A



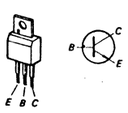
10D-2



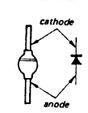
STK-056A



2SC1124



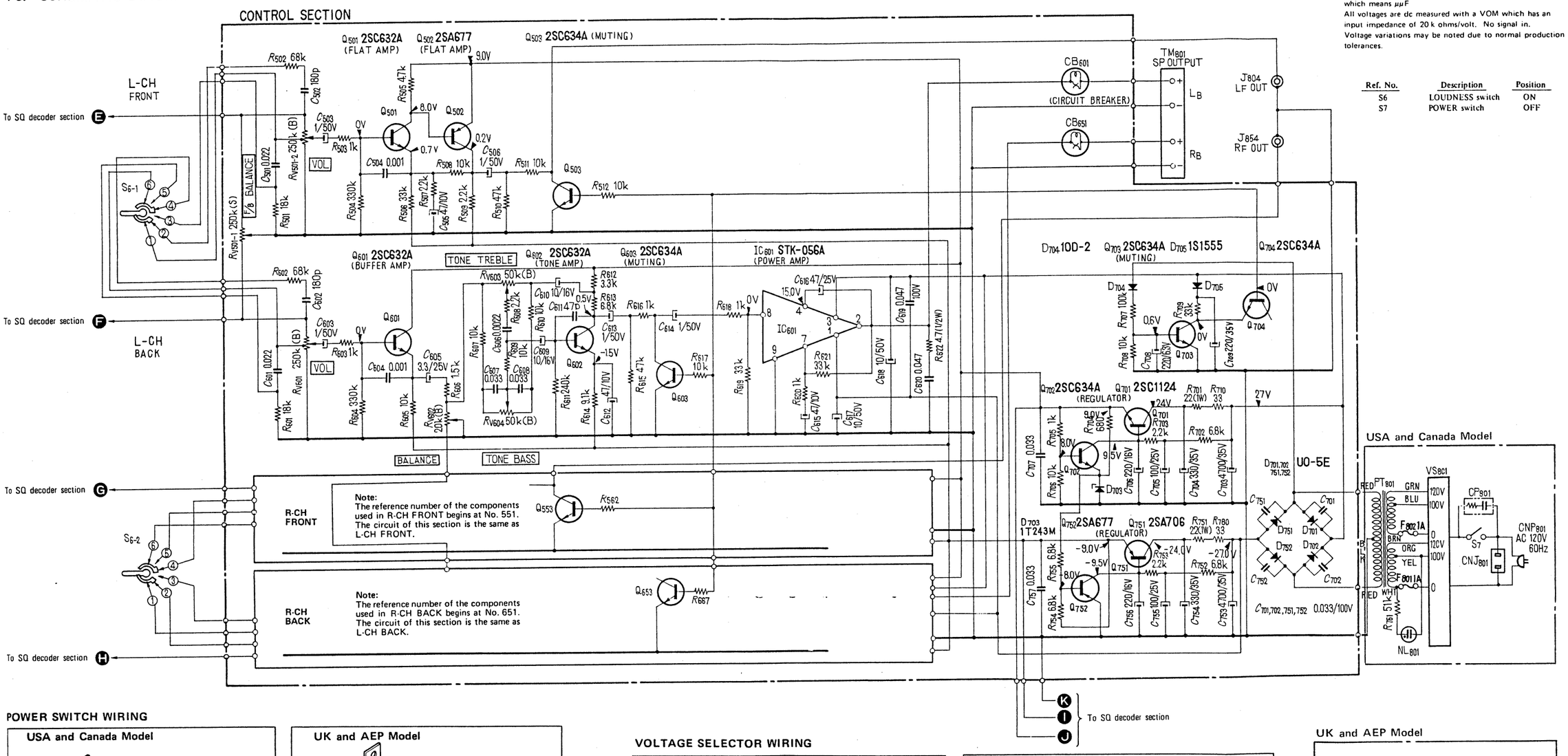
UO-5E



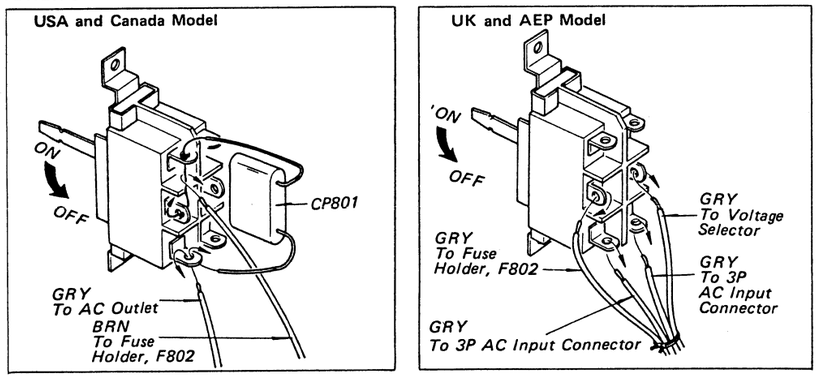
4-6. SCHEMATIC DIAGRAM — Control Section —

Note:
All resistance values are in ohms. k = 1,000, M = 1,000 k
All capacitance values are in μF except as indicated with p, which means μμF
All voltages are dc measured with a VOM which has an input impedance of 20 k ohms/volt. No signal in.
Voltage variations may be noted due to normal production tolerances.

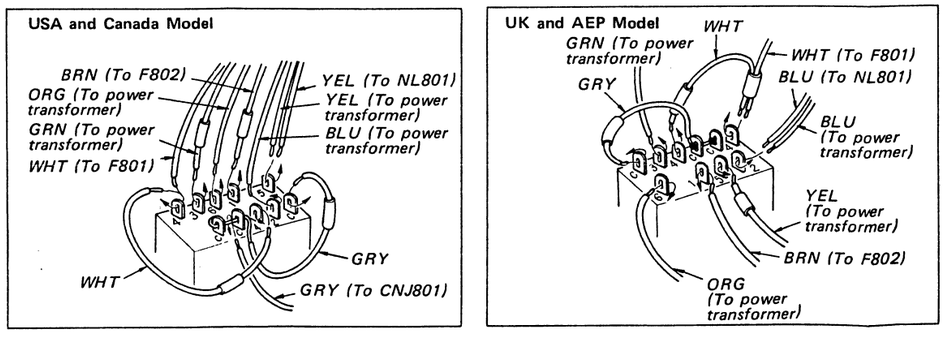
Ref. No.	Description	Position
S6	LOUDNESS switch	ON
S7	POWER switch	OFF

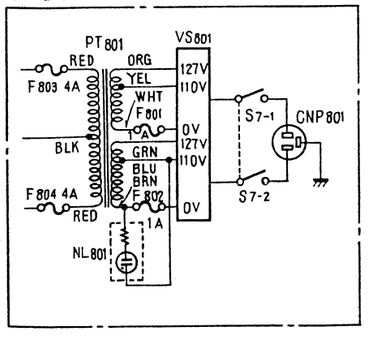


POWER SWITCH WIRING



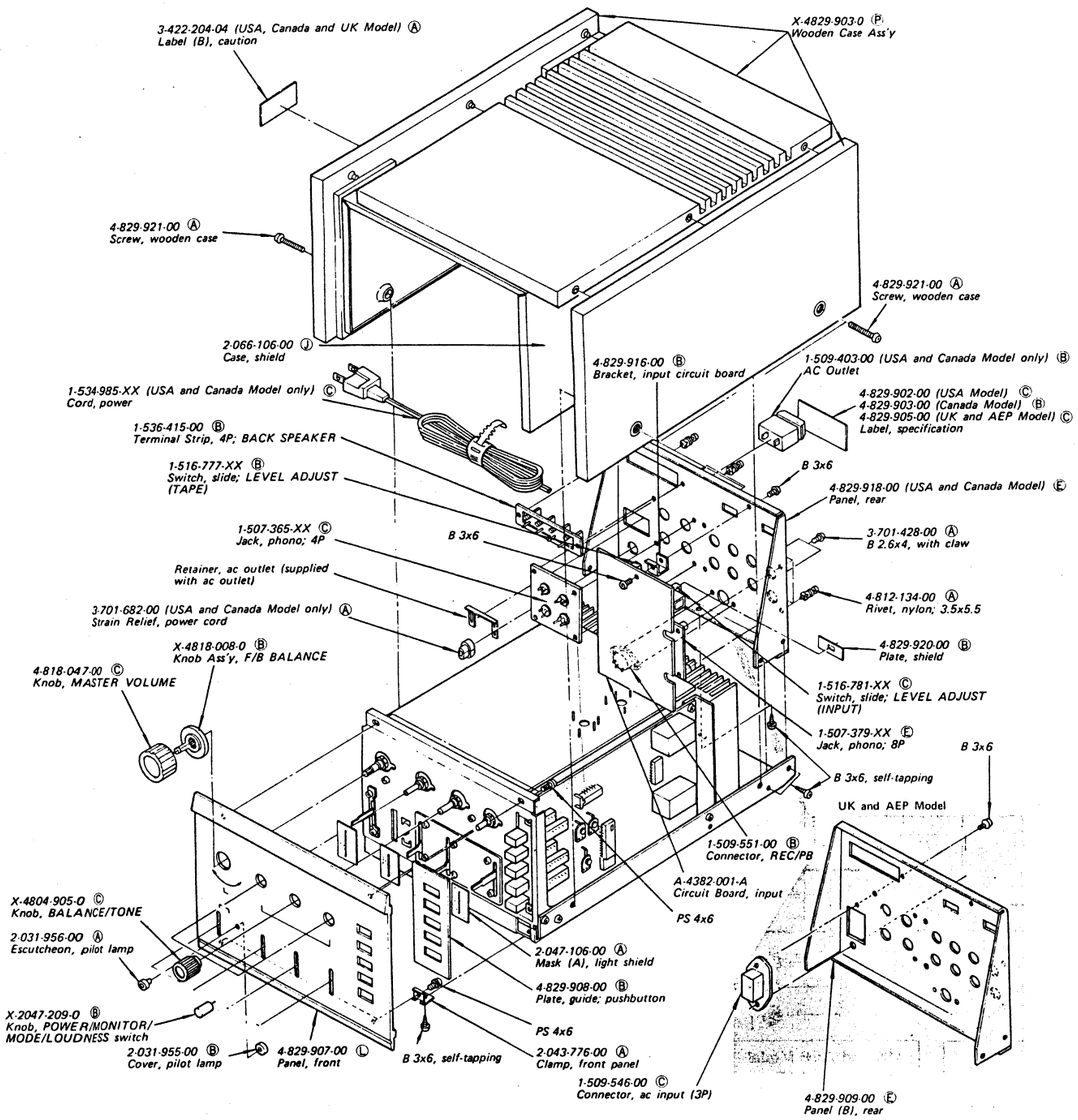
VOLTAGE SELECTOR WIRING





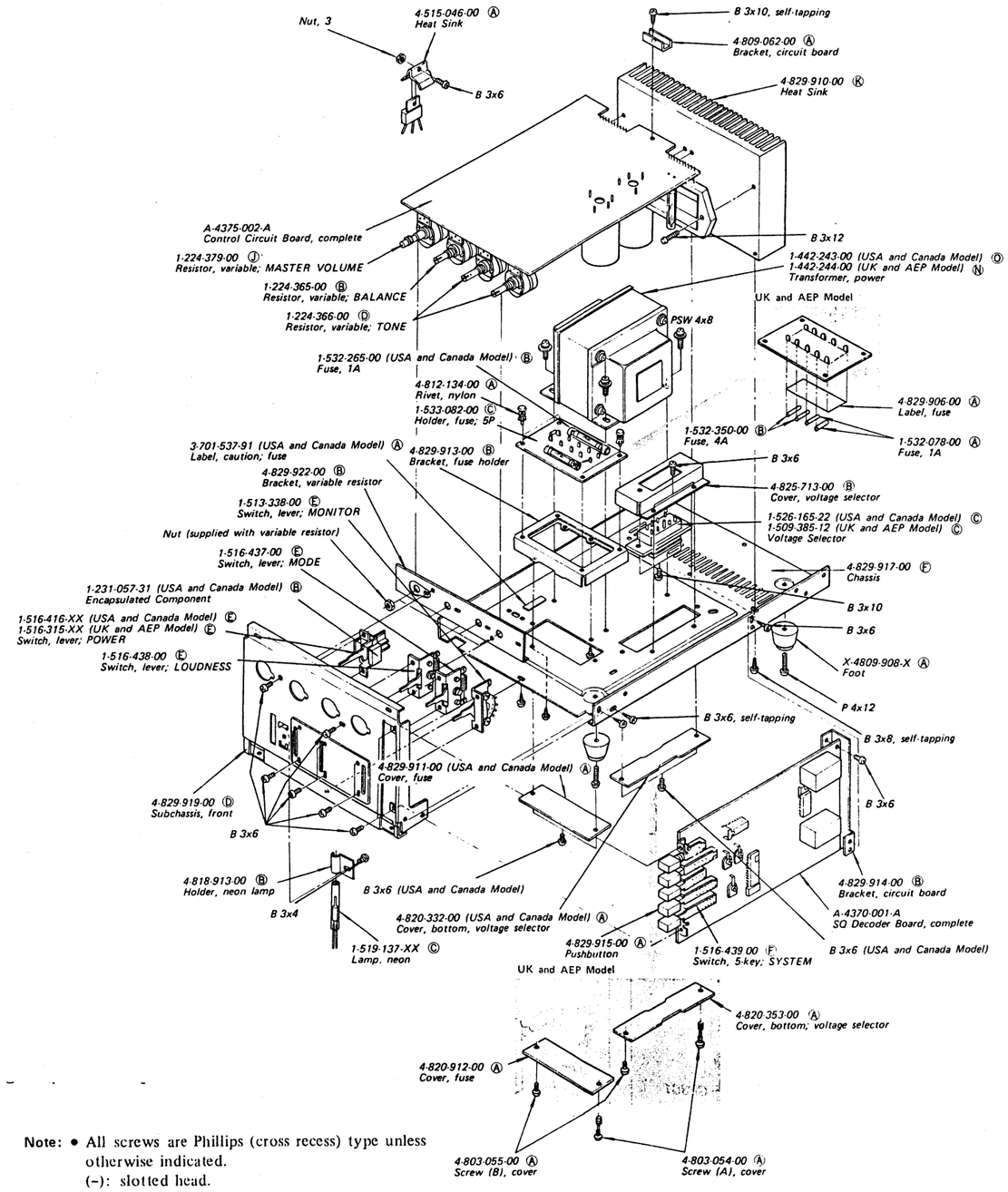
SECTION 5
EXPLODED VIEWS

(1)



Note: • All screws are Phillips (cross recess) type unless otherwise indicated.
(-): slotted head.
• The circled letters (Ⓐ to Ⓩ) are applicable for the European model only.

(2)



Note: • All screws are Phillips (cross recess) type unless otherwise indicated.
(-): slotted head.
• The circled letters (Ⓐ to Ⓩ) are applicable for the European model only.

Ref. No.	Part No.		Description			
C506,556	1-121-912-11	Ⓐ	1		50V	
C601,651	1-105-677-12	Ⓐ	0.022	±10%		mylar
C602,652	1-102-976-11	Ⓐ	180p	±5%		ceramic
C603,653	1-121-912-11	Ⓐ	1		50V	
C604,654	1-105-661-12	Ⓐ	0.001	±10%		mylar
C605,655	1-121-913-11	Ⓐ	3.3		25V	
C606	1-105-665-12	Ⓐ	0.0022	±10%		mylar
C607,657 C608,658)	1-105-679-12	Ⓐ	0.033	±10%		mylar
C609,659 C610,660)	1-121-916-11	Ⓐ	10		16V	mylar
C611,661	1-101-880-11	Ⓐ	47p	±5%		ceramic
C612,662	1-121-352-11	Ⓐ	47		10V	
C613,663 C614,664)	1-121-912-11	Ⓐ	1		50V	
C616,666	1-121-410-11	Ⓑ	47		25V	
C617,667 C618,668)	1-121-738-11	Ⓐ	10		50V	
C619,669	1-105-881-12	Ⓐ	0.047	±20%	100V	mylar
C620,670	1-105-681-12	Ⓐ	0.047	±10%		mylar
C701,751 C702,752)	1-105-879-12	Ⓐ	0.033	±20%	100V	mylar
C703,753	1-123-110-11	Ⓕ	4700		35V	
C704,754	1-123-064-11	Ⓑ	330		35V	
C705,755	1-121-935-11	Ⓑ	100		25V	
C706,756	1-123-068-11	Ⓑ	220		16V	
C707,757	1-105-679-12	Ⓐ	0.033	±10%		mylar
C708	1-121-419-11	Ⓑ	220		6.3V	
C709	1-123-063-11	Ⓑ	220		35V	

RESISTORS

All resistors are in ohms. Regular-type ¼W carbon and composition resistors are omitted. Check the schematic diagram for the resistance values. (k=1000)

R622,672	1-202-517-11	Ⓐ	4.7		½W	composition
R701,751	1-212-376-11	Ⓐ	22		1W	metal-oxide

Note: The circled letters (Ⓐ to Ⓩ) are applicable for the European model only.

Ref. No.	Part No.		Description
RV401,402	1-224-649-XX	Ⓑ	220k, adjustable
RV403	1-224-646-XX	Ⓑ	22k, adjustable
RV501,551	1-224-379-00	Ⓙ	250k, variable; MASTER VOLUME, F/B BALANCE
RV601,651	1-224-379-00	Ⓙ	250k, variable; MASTER VOLUME
RV602	1-224-365-00	Ⓑ	20k, variable; BALANCE
RV603,653	1-224-366-00	Ⓓ	50k, variable; TREBLE
RV604,654	1-224-366-00	Ⓓ	50k, variable; BASS

SWITCHES

S1	1-516-777-XX	Ⓑ	Lever-slide, LEVEL ADJUST-TAPE
S2	1-516-781-XX	Ⓒ	Lever-slide, LEVEL ADJUST-INPUT
S3	1-513-338-11	Ⓔ	Lever, MONITOR
S4	1-516-439-00	Ⓕ	Pushbutton, 5-key; SYSTEM
S5	1-516-437-00	Ⓔ	Lever, MODE
S6	1-516-438-00	Ⓔ	Lever, LOUDNESS
S7	1-516-416-XX	Ⓔ	Lever, POWER (USA, Canada Model)
	1-516-315-XX	Ⓔ	Lever, POWER (UK, AEP Model)

MISCELLANEOUS

CB601,651	1-532-380-41	Ⓔ	Breaker, circuit; 2.2A
CNJ801	1-509-403-00	Ⓑ	Outlet, ac (USA, Canada Model)
CNJ802	1-509-551-00	Ⓑ	Connector, REC/PB
CP301,302	1-231-266-00	Ⓑ	Encapsulated Component
CP801	1-231-057-31	Ⓑ	Encapsulated Component
F801,802	1-532-265-00	Ⓑ	Fuse, 1A (USA, Canada Model)
	1-532-078-00	Ⓑ	Fuse, 1A (UK, AEP Model)
F803,804	1-532-350-00	Ⓑ	Fuse, 4A (UK,AEP Model)
J801~804 J851~854)	1-507-379-XX	Ⓔ	Jack, phono; 8-P
J805,806 J855,856)	1-507-365-XX	Ⓒ	Jack, phono; 4-P
NL801	1-519-137-XX	Ⓒ	Lamp, neon

Ref. No.	*Part No.*	*Description*
TM801	1-536-415-00	Ⓑ Terminal Strip, 4-p; SPEAKER
VS801	1-509-385-12	Ⓒ Selector, voltage (UK, AEP Model)
	1-526-165-22	Ⓒ Selector, voltage (USA, Canada Model)
	1-533-082-00	Ⓒ Holder, fuse; 5-p
	1-534-049-51	Ⓔ Cord, connection; RK-74
	1-534-985-XX	Ⓔ Cord, power (USA, Canada Model)
	1-535-074-00	Ⓐ Terminal Post
	1-509-546-00	Ⓒ Connector, ac input; 3-p

Note: The circled letters (Ⓐ to Ⓩ) are applicable for the European model only.

ACCESSORIES

Part No.	*Description*
1-534-049-51	Ⓔ Cord, connection; RK-74
1-534-819-00	Ⓖ Cord, power (UK Model)
3-780-218-22	Ⓓ Manual, instruction (USA, Canada Model)
3-793-753-41	Ⓐ Leaflet (UK Model)