

SA-IF70

SERVICE MANUAL

*US Model
Canadian Model
AEP Model
E Model*



• TRANSMITTER



• REAR SPEAKER

- This set consist of the following units.

TRANSMITTER	EMT-70
REAR SPEAKER	SA-IF70S

SPECIFICATIONS

Audio power Specifications

For the wireless speaker system: with 8 ohm loads, both channels driven, from 60Hz - 20Hz; rated 25 watts per channel minimum RMS power, with no more than 0.9% total harmonic distortion from 250 milliwatts to the rated output.

Power output	US, Canadian models: 30 W (8 Ω 9%) AEP, E models: 25 W (8 Ω DIN)
Infrared wave length	850 nm
Modulation	Frequency modulation
Carrier frequency	Left channel: 4.3 MHz Right channel: 4.8 MHz
Enclosure type	Bassreflex type
Speaker unit	10 cm cone type
Effective frequency range	80-20,000Hz
Power requirement	US, Canadian models: 120 V AC, 60 Hz AEP, E models: 220-230 V AC, 50/60 Hz
Power consumption	30 W

Dimensions

Wireless speaker system SA-IF70S	Approx. 132 x 231 x 183 mm (w/h/d) (5 ¹ / ₄ x 9 ¹ / ₈ x 7 ¹ / ₄ inches)
Wireless transmitter EMT-70	Horizontal: Approx. 159 x 40 x 86 mm (w/h/d) (6 ³ / ₈ x 1 ⁵ / ₈ x 3 ¹ / ₂ inches) Wall mounted: Approx. 159 x 64 x 91 mm (w/h/d) (6 ³ / ₈ x 2 ⁵ / ₈ x 3 ⁵ / ₈ inches)

Mass	
Wireless Speaker system SA-IF70S	2.9 kg (6 lb 6 oz)
Wireless Transmitter EMT-70	264 g (9.3 oz)

Design and specifications are subject to change without notice.

WIRELESS SPEAKER SYSTEM



SONY®

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SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer: Check the antenna terminals, metal trim, “metallized” knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE

The AC leakage from any exposed metal part to earth Ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microamperes). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers’ instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The “limit” indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

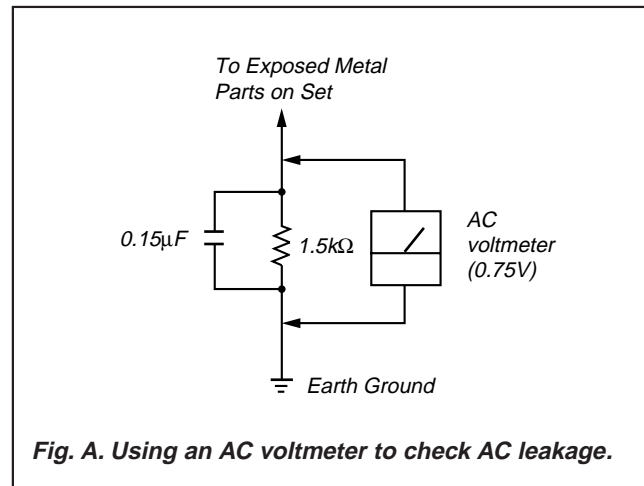


Fig. A. Using an AC voltmeter to check AC leakage.

Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

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.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE \triangle SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

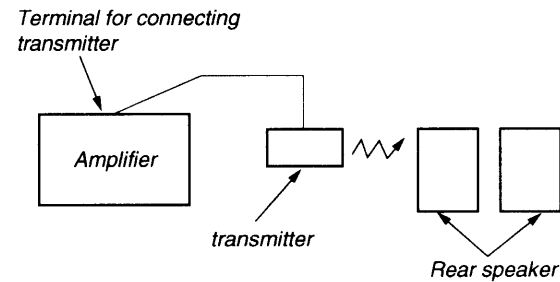
SECTION 1 SERVICING NOTE

CONNECTING THE UNIT

- This unit is composed of a transmitter (EMT-70) and rear speaker (SA-IF70S).
As the transmitter does not have its own power supply, connect it to the other units as shown below when repairing.

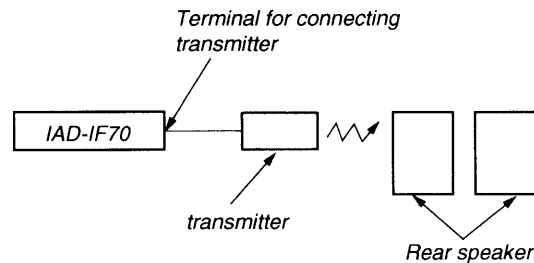
• Example of Connection 1

(Amplifiers, receivers, etc. with terminals for connecting the transmitter)



• Example of Connection 2

(Optional IAD-IF70)



AUTO POWER CONTROL OF REAR SPEAKER

- As the rear speaker is equipped with an auto power control, it will set into the STANDBY state if it does not receive carrier wave from the transmitter.
When performing repairs, connect the units according to the using environment.

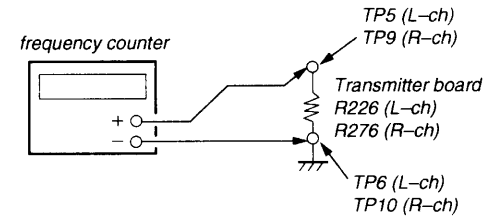
SECTION 2 ELECTRICAL ADJUSTMENT

CARRIER FREQUENCY Adjustment

Note:

Set the transmitter to the user's environment, connect it to the user's equipment and supply the power. (Refer to Service Note.)

Setting:



Procedure:

- Connect the frequency counter to the TPs of the two ends of the resistor (R226 or R276) of the TRANSMITTER board.
- Turn ON the power of the unit connected to the transmitter.
- Adjust L201 or L251 of the TRANSMITTER board, and adjust so that the reading of the frequency counter satisfies the following adjustment values.

Adjustment values:

Channel	Measuring Point	Adjusting Point	Adjustment Value
L channel	R226	L201	4.3MHz±0.01MHz
R channel	R276	L251	4.8MHz±0.01MHz

RECEIVING FREQUENCY, MUTING LEVEL adjustment

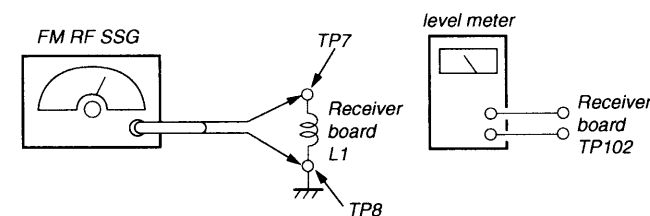
Note:

Perform procedure 1 if using FM RF SSG and method 2 if not. However, as procedure 2 is a simple procedure, adjustment is not accurate.

Perform adjustments for Lch and Rch.

• Procedure 1

Setting:



Carrier frequency : 4.3MHz (L-ch), 4.8MHz (R-ch)
Modulation : no modulation
Output level : 40dB (at 75 open)

Procedure:

- Connect SSG to TP7 and TP8 of the two ends of the coil (L1) of the RECEIVER board.
- Set the output level of SSG to 40 dB.
- Insert the AC plug of the unit to the power outlet and supply the power.
- Adjust IFT103 of the RECEIVER board, and adjust so that the voltage of both ends of TP102 becomes 0V. (RECEIVING FREQUENCY adjustment)
- Adjust the output level of SSG to 22 dB.
- Adjust RV102 until D109 turns green from red. (MUTING LEVEL adjustment)

• Procedure 2

Note:

The adjustment results of this procedure differs according to the distance between the transmitter and rear speaker.

Leave ample distance between the transmitter and rear speaker according to the user's using environment when performing the adjustment.

Procedure:

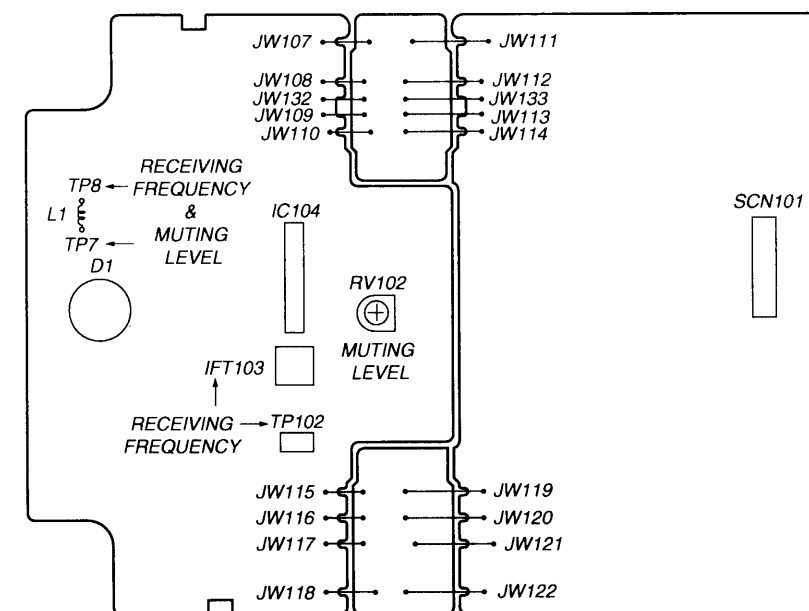
- Connect the transmitter to the unit used by the user, and turn ON the power.
- Adjust IFT103 of the RECEIVER board, and adjust so that the voltage of the two ends of TP102 becomes 0V. (RECEIVING FREQUENCY adjustment)
- Adjust RV102 of the RECEIVER board of the rear speaker until D109 turns green. (MUTING LEVEL adjustment)
- Turn OFF the power turned on at 1.
- Check that D109 of the RECEIVER board of the rear speaker becomes red.
If green, adjust RV102 so that it turns red, turn ON the power again, and repeat from step 3.
- After adjusting, check that D109 becomes red when the power of the unit connected to the transmitter is turned OFF and it becomes green when the power is turned ON.

Reference Information:

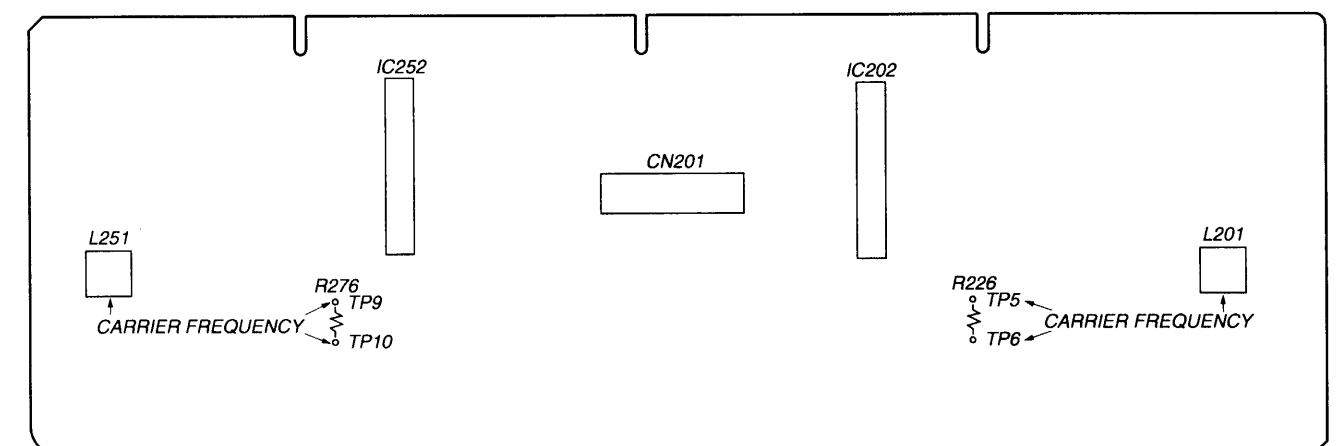
For this adjustment, the reaching distance of the infrared rays increases when the MUTING LEVEL (sensitivity) is raised, but if the power of the unit connected to the transmitter is turned OFF, pop noises are produced from the rear speaker.
If the MUTING LEVEL (sensitivity) is dropped on the other hand, pop noises are reduced, but the reaching distance of the infrared rays decreases.
Adjust according to the user's using environment.

Adjustment Location

[RECEIVER BOARD] — Component side —



[TRANSMITTER BOARD] — Component side —

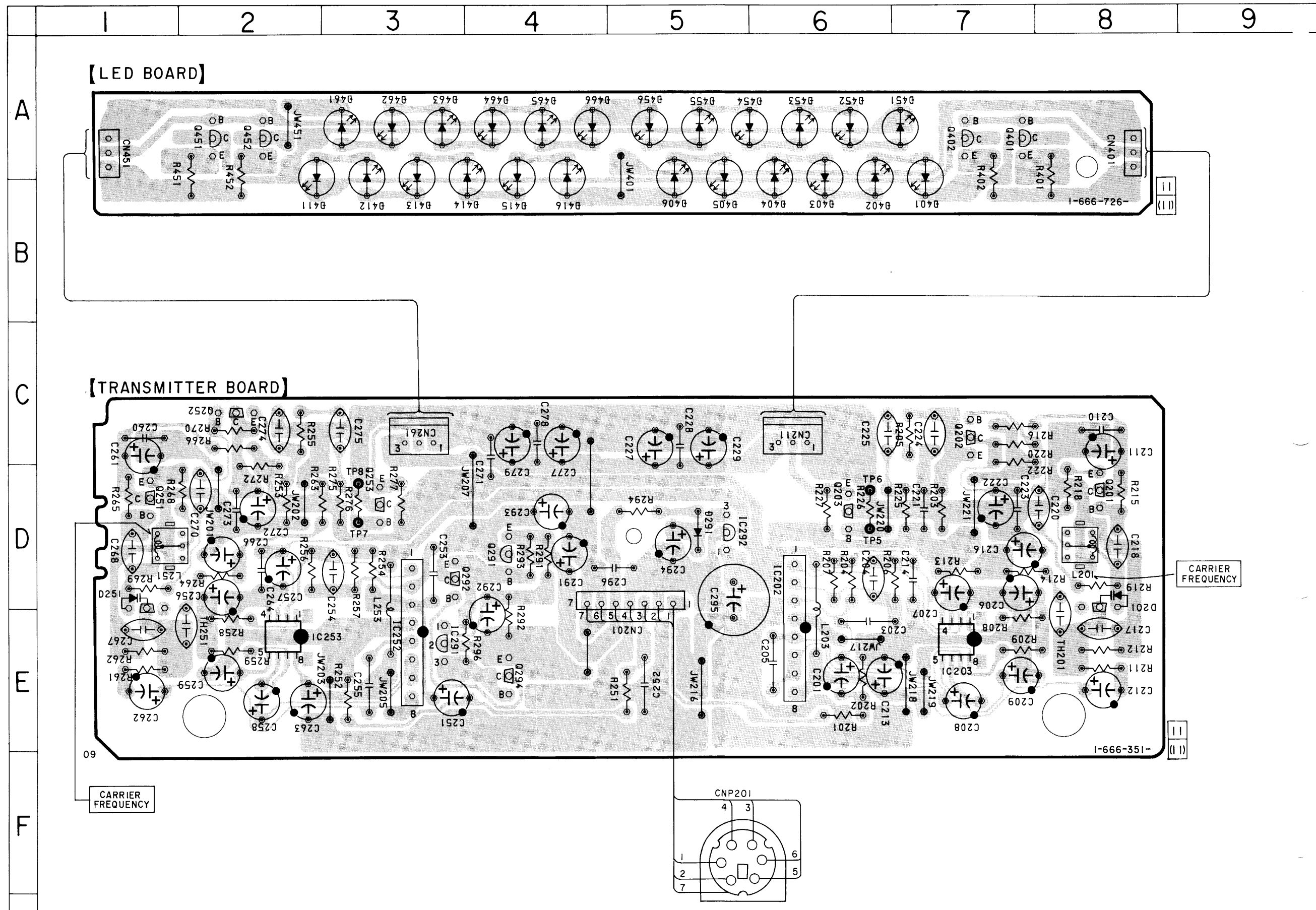


**SECTION 3
DIAGRAMS**

3-1. Printed Wiring Board — TRANSMITTER Section —

• Semiconductor Location

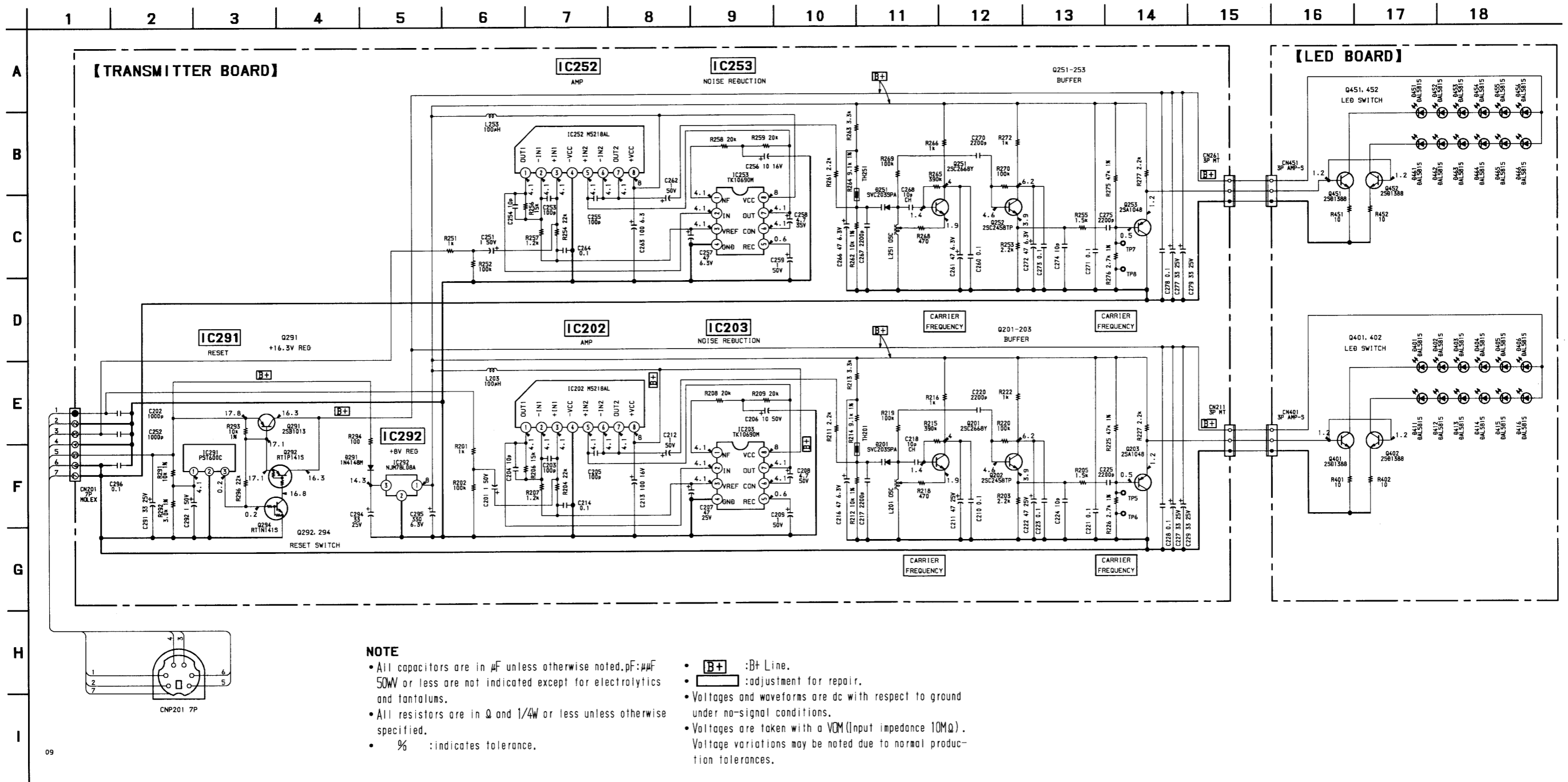
Ref. No.	Location
D201	D-8
D251	D-1
D291	D-5
D401	B-7
D402	B-6
D403	B-6
D404	B-6
D405	B-5
D406	B-5
D411	B-2
D412	B-3
D413	B-3
D414	B-4
D415	B-4
D416	B-4
D451	A-5
D452	A-5
D453	A-5
D454	A-5
D455	A-5
D456	A-5
D461	A-3
D462	A-3
D463	A-3
D464	A-4
D465	A-4
D466	A-4
IC202	D-6
IC203	E-7
IC252	E-3
IC253	E-2
IC291	E-3
IC292	D-5
Q201	D-8
Q202	C-7
Q203	D-6
Q251	D-1
Q252	C-2
Q253	D-3
Q291	D-4
Q292	D-3
Q294	E-4
Q401	A-7
Q402	A-7
Q451	A-2
Q452	A-2



Note:

- : parts extracted from the component side.
- : parts extracted from the conductor side.
- : Pattern from the side which enable seeing.

3-2. Schematic Diagram — TRANSMITTER Section —
 • See page 13 for IC Block Diagrams.



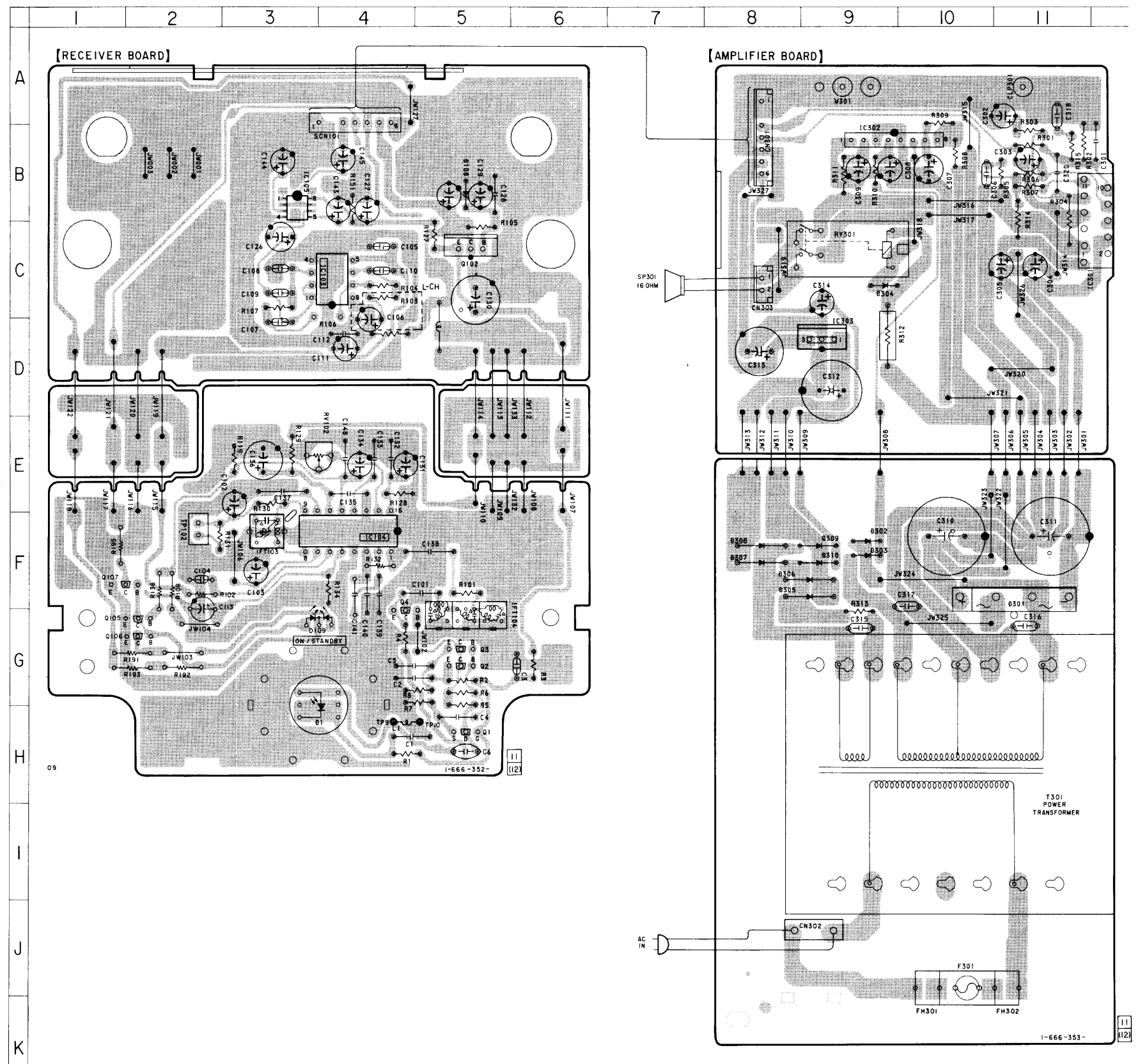
NOTE

- 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.
- % : indicates tolerance.
- **B+** : B+ Line.
- **□** : adjustment for repair.
- Voltages and waveforms are dc with respect to ground under no-signal conditions.
- Voltages are taken with a VOM (Input impedance $10\text{M}\Omega$). Voltage variations may be noted due to normal production tolerances.

3-3. Printed Wiring Board — RECEIVER Section —

• Semiconductor Location

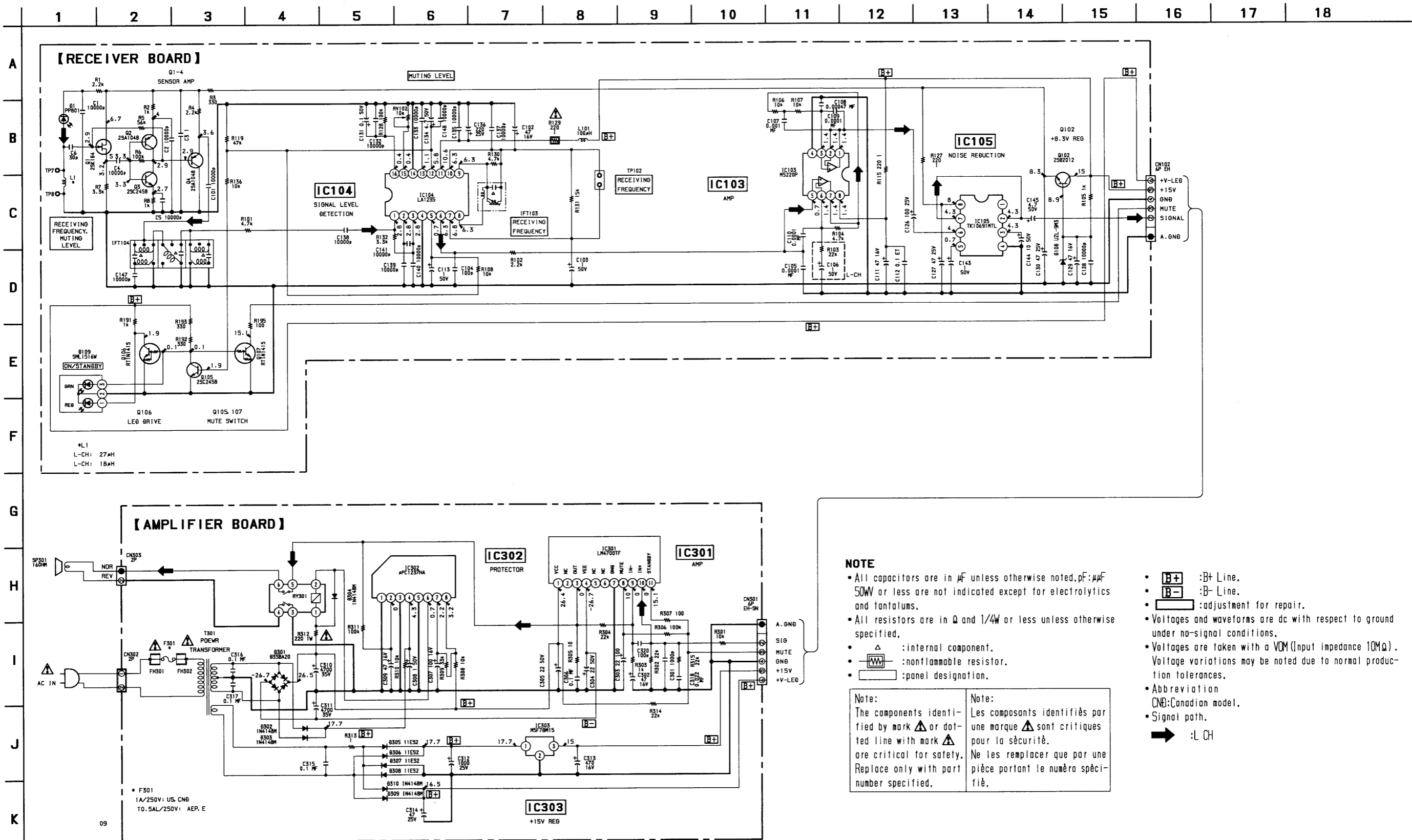
Ref. No.	Location
D1	H-3
D108	B-5
D109	G-3
D301	F-11
D302	F-9
D303	F-9
D304	C-9
D305	F-9
D306	F-9
D307	F-8
D308	F-8
D309	F-9
D310	F-9
IC103	C-4
IC104	F-4
IC105	B-3
IC301	C-12
IC302	B-9
Q1	H-5
Q2	G-5
Q3	G-5
Q4	F-4
Q102	C-5
Q105	F-2
Q106	G-2
Q107	F-2



Note:

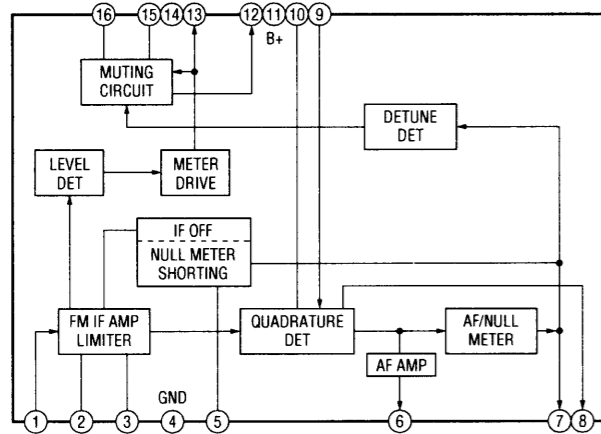
- ○ — : parts extracted from the component side.
- — : parts extracted from the conductor side.
- △ : internal component.
- [Pattern] : Pattern from the side which enable seeing.

3-4. Schematic Diagram — RECEIVER Section —
• See page 13 for IC Block Diagrams.

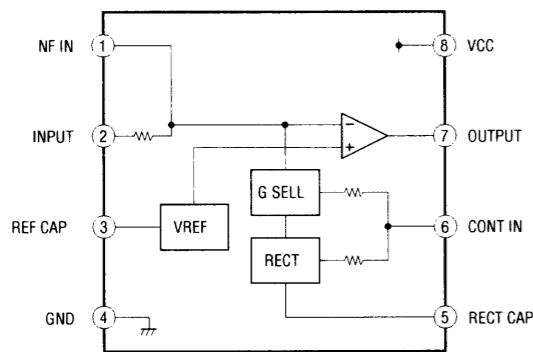


3-5. IC BLOCK DIAGRAMS

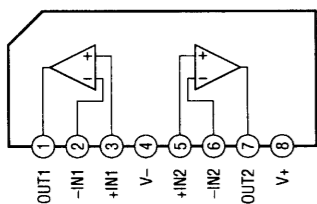
IC104 LA1235



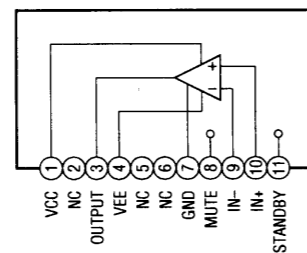
IC105 TK10691MTL
IC203, 251 TK10690MTL



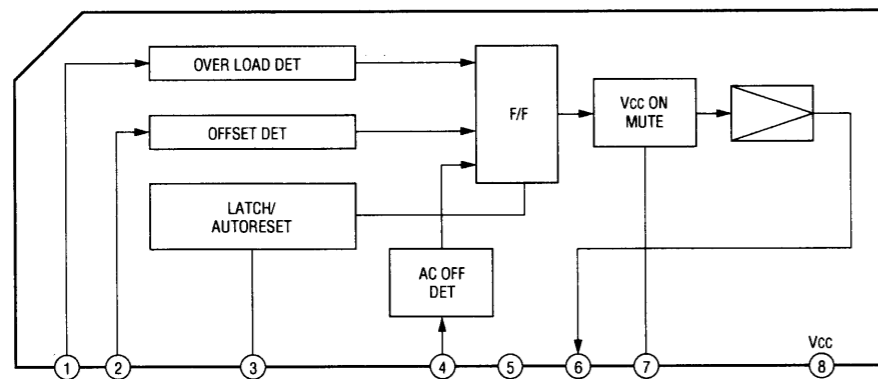
IC202, 252 M5218AL



IC301 LM4700TF



IC302 μPC1237HA



SECTION 4 EXPLODED VIEWS

NOTE:

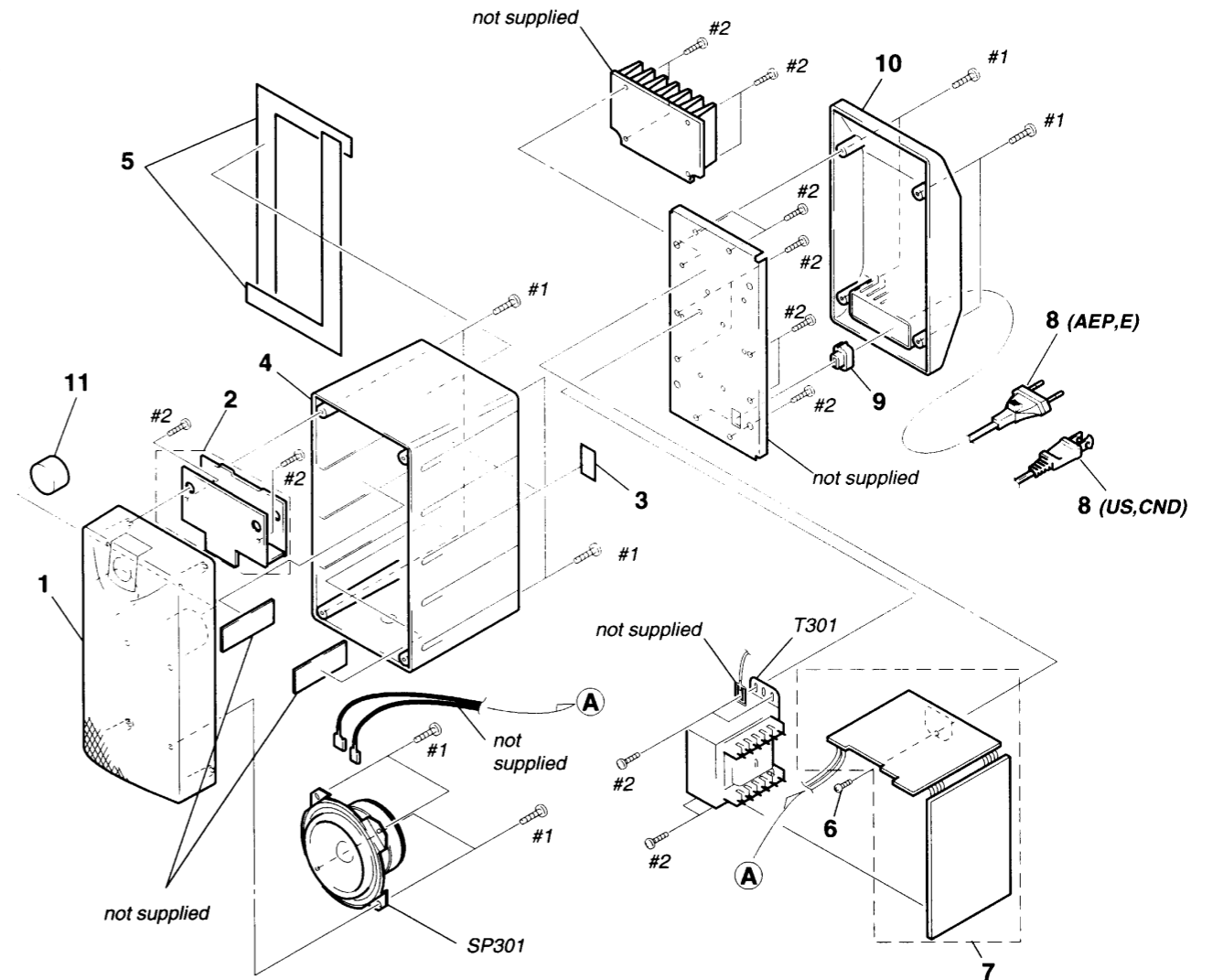
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.
- Abbreviation
CND : Canadian model

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

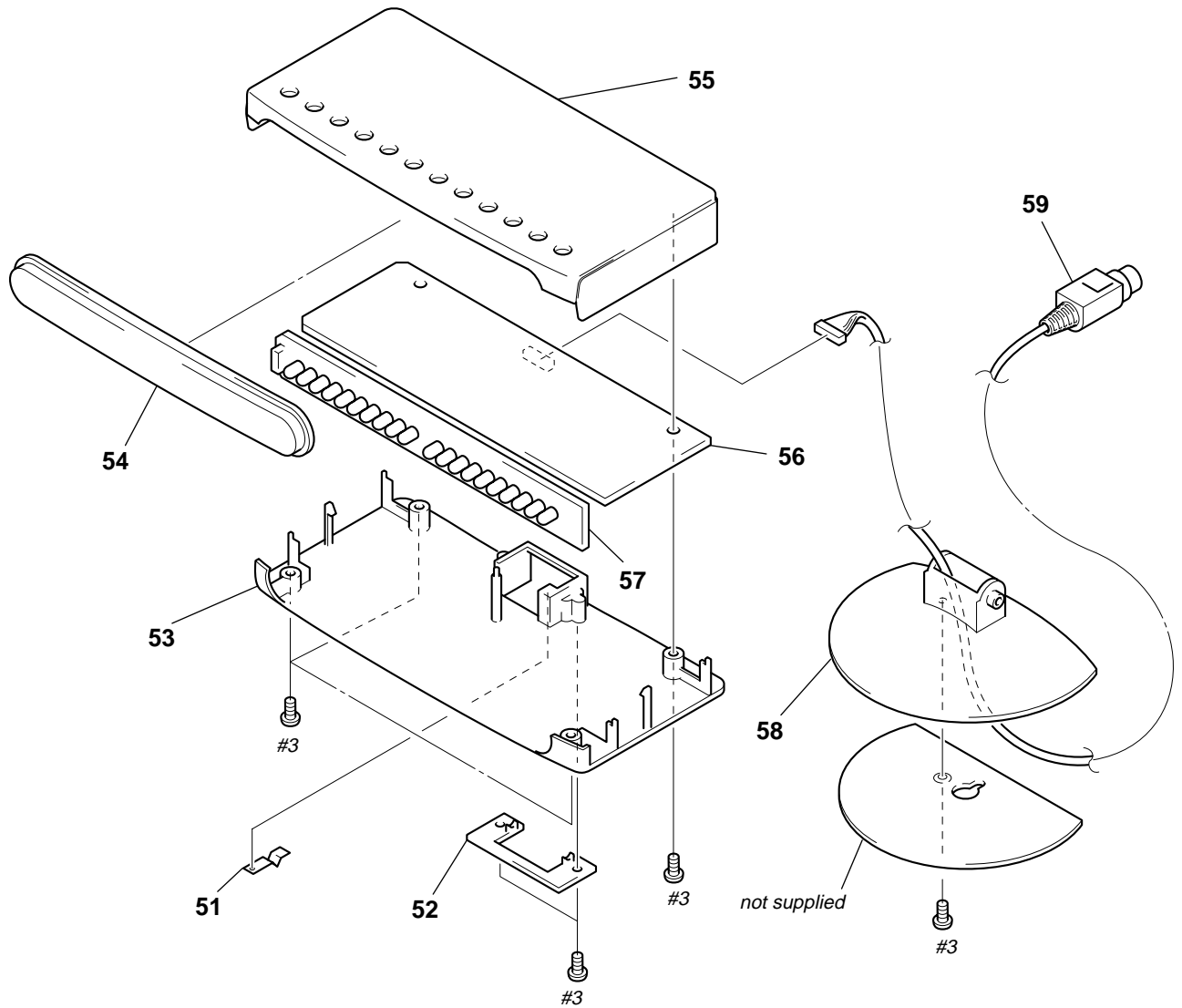
Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

4-1. SPEAKER SECTION (SA-IF70S)



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
1	X-4948-571-1	PANEL ASSY, FRONT		Δ 8	1-782-604-11	CORD, POWER (US,CND)	
* 2	A-4398-847-A	RECEIVER (L) BOARD, COMPLETE		* 9	3-703-244-00	BUSHING (2104), CORD (AEP,E)	
* 2	A-4398-848-A	RECEIVER (R) BOARD, COMPLETE		9	3-703-571-00	BUSHING (S) (4516), CORD (US,CND)	
3	3-846-312-01	SPACER		* 10	4-991-617-01	CABINET (REAR)	
* 4	X-4948-572-1	CABINET ASSY, SPEAKER		* 11	4-994-861-01	PLUG, DUCT	
5	4-991-610-01	PACKING (CABINET)		SP301	1-505-542-11	SPEAKER (10cm)	
6	3-905-609-01	SCREW (TRANSISTOR)		Δ T301	1-431-342-11	TRANSFORMER, POWER (AEP,E)	
* 7	A-4398-846-A	AMPLIFIER BOARD, COMPLETE		Δ T301	1-431-343-11	TRANSFORMER, POWER (US,CND)	
Δ 8	1-782-603-11	CORD, POWER (AEP,E)					

4-2. TRANSMITTER SECTION (EMT-70)



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
51	4-991-626-01	SPRING, CLICK		* 56	A-4403-194-A	TRANSMITTER BOARD, COMPLETE	
52	4-991-621-01	HOLDER, STAND		* 57	1-666-726-11	LED BOARD	
53	4-991-624-01	CASE (BOTTOM)		58	4-991-622-01	STAND	
54	4-991-627-01	COVER (FRONT)		59	1-782-270-11	CORD, CONNECTION	
55	4-991-623-01	CASE (TOP)					

**SECTION 5
ELECTRICAL PARTS LIST**

Note:

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

Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

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

- Due to standardization, replacements in the parts list may be different from the parts 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.
- Items marked “*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- **RESISTORS**
All resistors are in ohms
METAL: Metal-film resistor
METAL OXIDE: Metal Oxide-film resistor
F : nonflammable
- **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
- Abbreviation
CND : Canadian model

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
*	A-4398-846-A	AMPLIFIER BOARD, COMPLETE *****				< FUSE HOLDER >	
		< CAPACITOR >		FH301	1-533-293-11	FUSE HOLDER	
				FH302	1-533-293-11	FUSE HOLDER	
C301	1-162-294-31	CERAMIC	0.001uF 10% 50V			< IC >	
C302	1-104-664-11	ELECT	47uF 20% 25V				
C303	1-128-560-11	ELECT	22uF 20% 100V	IC301	8-759-467-10	IC LM4700TF	
C304	1-126-965-11	ELECT	22uF 20% 50V	IC302	8-759-111-68	IC uPC1237HA	
C305	1-126-965-11	ELECT	22uF 20% 50V	IC303	8-759-604-40	IC M5F78M15	
						< RESISTOR >	
C306	1-136-165-00	FILM	0.1uF 5% 50V	R301	1-249-429-11	CARBON	10K 5% 1/4W
C307	1-126-933-11	ELECT	100uF 20% 16V	R302	1-247-863-91	CARBON	22K 5% 1/4W
C308	1-126-960-11	ELECT	1uF 20% 50V	R303	1-249-417-11	CARBON	1K 5% 1/4W F
C309	1-104-664-11	ELECT	47uF 20% 25V	R304	1-247-863-91	CARBON	22K 5% 1/4W
C310	1-126-955-11	ELECT	4700uF 20% 35V	R305	1-249-393-11	CARBON	10 5% 1/4W F
				R306	1-249-441-11	CARBON	100K 5% 1/4W
C311	1-126-955-11	ELECT	4700uF 20% 35V	R307	1-247-807-31	CARBON	100 5% 1/4W
C312	1-126-942-61	ELECT	1000uF 20% 25V	R308	1-249-429-11	CARBON	10K 5% 1/4W
C313	1-126-935-11	ELECT	470uF 20% 16V	R309	1-249-435-11	CARBON	33K 5% 1/4W
C314	1-104-664-11	ELECT	47uF 20% 25V	R310	1-249-429-11	CARBON	10K 5% 1/4W
C315	1-136-165-00	FILM	0.1uF 5% 50V	R311	1-249-441-11	CARBON	100K 5% 1/4W
				Δ R312	1-215-865-11	METAL OXIDE	220 5% 1W F
C316	1-136-165-00	FILM	0.1uF 5% 50V	R313	1-249-381-11	CARBON	1 5% 1/4W F
C317	1-136-165-00	FILM	0.1uF 5% 50V	R314	1-247-863-91	CARBON	22K 5% 1/4W
C318	1-137-372-11	FILM	0.022uF 5% 50V	R315	1-247-863-91	CARBON	22K 5% 1/4W
C320	1-162-282-31	CERAMIC	100PF 10% 50V			< RELAY >	
		< CONNECTOR >		RY301	1-755-142-11	RELAY	
CN301	1-691-768-11	PLUG (MICRO CONNECTOR) 6P				< TRANSFORMER >	
CN302	1-580-230-31	PIN, CONNECTOR (PC BOARD), 2P		Δ T301	1-431-342-11	TRANSFORMER, POWER (AEPE)	
CN303	1-564-505-11	PLUG, CONNECTOR 2P		Δ T301	1-431-343-11	TRANSFORMER, POWER (US,CND)	
		< DIODE >		*****			
D301	8-719-028-23	DIODE D3SBA20-4101		*	1-666-726-11	LED BOARD	
D302	8-719-987-63	DIODE 1N4148M				*****	
D303	8-719-987-63	DIODE 1N4148M				< DIODE >	
D304	8-719-987-63	DIODE 1N4148M		D401	8-719-992-14	DIODE LIR5BEA	
D305	8-719-200-82	DIODE 11ES2		D402	8-719-992-14	DIODE LIR5BEA	
				D403	8-719-992-14	DIODE LIR5BEA	
D306	8-719-200-82	DIODE 11ES2		D404	8-719-992-14	DIODE LIR5BEA	
D307	8-719-200-82	DIODE 11ES2		D405	8-719-992-14	DIODE LIR5BEA	
D308	8-719-200-82	DIODE 11ES2					
D309	8-719-987-63	DIODE 1N4148M					
D310	8-719-987-63	DIODE 1N4148M					
		< FUSE >					
Δ F301	1-532-389-51	FUSE TIME-LAG (T0.5AL/250V) (AEPE)					
Δ F301	1-576-100-11	FUSE (1A/250V) (US,CND)					

LED

RECEIVER

Ref. No.	Part No.	Description	Remark
D406	8-719-992-14	DIODE LIR5BEA	
D411	8-719-992-14	DIODE LIR5BEA	
D412	8-719-992-14	DIODE LIR5BEA	
D413	8-719-992-14	DIODE LIR5BEA	
D414	8-719-992-14	DIODE LIR5BEA	
D415	8-719-992-14	DIODE LIR5BEA	
D416	8-719-992-14	DIODE LIR5BEA	
D451	8-719-992-14	DIODE LIR5BEA	
D452	8-719-992-14	DIODE LIR5BEA	
D453	8-719-992-14	DIODE LIR5BEA	
D454	8-719-992-14	DIODE LIR5BEA	
D455	8-719-992-14	DIODE LIR5BEA	
D456	8-719-992-14	DIODE LIR5BEA	
D461	8-719-992-14	DIODE LIR5BEA	
D462	8-719-992-14	DIODE LIR5BEA	
D463	8-719-992-14	DIODE LIR5BEA	
D464	8-719-992-14	DIODE LIR5BEA	
D465	8-719-992-14	DIODE LIR5BEA	
D466	8-719-992-14	DIODE LIR5BEA	
< TRANSISTOR >			
Q401	8-729-111-29	TRANSISTOR 2SD1616A-K	
Q402	8-729-111-29	TRANSISTOR 2SD1616A-K	
Q451	8-729-111-29	TRANSISTOR 2SD1616A-K	
Q452	8-729-111-29	TRANSISTOR 2SD1616A-K	
< RESISTOR >			
R401	1-249-393-11	CARBON 10 5% 1/4W F	
R402	1-249-393-11	CARBON 10 5% 1/4W F	
R451	1-249-393-11	CARBON 10 5% 1/4W F	
R452	1-249-393-11	CARBON 10 5% 1/4W F	

*	A-4398-847-A	RECEIVER (L) BOARD, COMPLETE *****	
*	A-4398-848-A	RECEIVER (R) BOARD, COMPLETE *****	
< CAPACITOR >			
C1	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C2	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C3	1-136-177-00	FILM 1uF 5% 50V	
C4	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C5	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C6	1-102-962-00	CERAMIC 30PF 5% 50V	
C101	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C102	1-104-664-11	ELECT 47uF 20% 25V	
C103	1-126-960-11	ELECT 1uF 20% 50V	
C104	1-102-973-00	CERAMIC 100PF 5% 50V	
C105	1-110-335-11	MYLAR 100PF 5% 50V	
C106	1-126-960-11	ELECT 1uF 20% 50V	
C107	1-137-364-11	CERAMIC 0.001uF 5% 50V	(L-ch)
C108	1-130-467-00	MYLAR 470PF 5% 50V	
C109	1-110-335-11	MYLAR 100PF 5% 50V	
C110	1-102-973-00	CERAMIC 100PF 5% 50V	
C113	1-126-960-11	ELECT 1uF 20% 50V	
C126	1-126-933-11	ELECT 100uF 20% 16V	

Ref. No.	Part No.	Description	Remark
C127	1-104-664-11	ELECT 47uF 20% 25V	
C128	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C129	1-104-664-11	ELECT 47uF 20% 25V	
C130	1-104-664-11	ELECT 47uF 20% 25V	
C131	1-126-956-91	ELECT 0.1uF 20% 50V	
C132	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C133	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C134	1-126-963-11	ELECT 4.7uF 20% 50V	
C135	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C136	1-104-666-11	ELECT 220uF 20% 25V	
C137	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C138	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C139	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C140	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C141	1-162-306-11	CERAMIC 0.01uF 20% 16V	
C143	1-126-960-11	ELECT 1uF 20% 50V	
C144	1-126-964-11	ELECT 10uF 20% 50V	
C145	1-126-963-11	ELECT 4.7uF 20% 50V	
C148	1-162-306-11	CERAMIC 0.01uF 20% 16V	
< DIODE >			
D1	8-719-992-09	PHOTO DIODE PP-801	
D108	8-719-001-18	DIODE UZL-9M3	
D109	8-719-313-40	DIODE SEL1516W (ON/STANDBY)	
< IC >			
IC103	8-759-602-01	IC M5220P	
IC104	8-759-812-35	IC LA1235	
IC105	8-759-384-90	IC TK10691MTL	
< IFT >			
IFT103	1-416-229-11	COIL (DISCRIMINATOR) (L-ch)	
IFT103	1-416-177-11	COIL (DISCRIMINATOR) (R-ch)	
IFT104	1-416-200-11	COIL (FILTER) (L-ch)	
IFT104	1-416-201-11	COIL (FILTER) (R-ch)	
< COIL >			
L1	1-410-363-11	INDUCTOR 27uH (L-ch)	
L1	1-408-412-00	INDUCTOR 18uH (R-ch)	
L101	1-410-521-11	INDUCTOR 100uH	
< TRANSISTOR >			
Q1	8-729-218-43	TRANSISTOR 2SK184-GR	
Q2	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q3	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q4	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q102	8-729-209-15	TRANSISTOR 2SD2012	
Q105	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q106	8-729-029-66	TRANSISTOR DTC114ESA	
Q107	8-729-029-66	TRANSISTOR DTC114ESA	
< RESISTOR >			
R1	1-249-421-11	CARBON 2.2K 5% 1/4W F	
R2	1-249-417-11	CARBON 1K 5% 1/4W F	
R3	1-249-411-11	CARBON 330 5% 1/4W	
R4	1-249-421-11	CARBON 2.2K 5% 1/4W F	
R5	1-249-438-11	CARBON 56K 5% 1/4W	

RECEIVER

TRANSMITTER

Ref. No.	Part No.	Description			Remark
R6	1-249-441-11	CARBON	100K	5%	1/4W
R7	1-247-843-11	CARBON	3.3K	5%	1/4W
R8	1-249-417-11	CARBON	1K	5%	1/4W F
R101	1-249-425-11	CARBON	4.7K	5%	1/4W
R102	1-249-421-11	CARBON	2.2K	5%	1/4W
R103	1-247-863-91	CARBON	22K	5%	1/4W (L-ch)
R104	1-249-425-11	CARBON	4.7K	5%	1/4W
R105	1-249-417-11	CARBON	1K	5%	1/4W F
R106	1-249-429-11	CARBON	10K	5%	1/4W F
R107	1-249-429-11	CARBON	10K	5%	1/4W F
R108	1-249-429-11	CARBON	10K	5%	1/4W F
R115	1-249-409-11	CARBON	220	5%	1/4W
R119	1-249-437-11	CARBON	47K	5%	1/4W
R127	1-249-409-11	CARBON	220	5%	1/4W
R128	1-249-441-11	CARBON	100K	5%	1/4W
△R129	1-249-409-11	CARBON	220	5%	1/4W
R130	1-249-425-11	CARBON	4.7K	5%	1/4W F
R131	1-249-431-11	CARBON	15K	5%	1/4W
R132	1-247-843-11	CARBON	3.3K	5%	1/4W
R136	1-249-429-11	CARBON	10K	5%	1/4W
R191	1-249-417-11	CARBON	1K	5%	1/4W F
R192	1-249-411-11	CARBON	330	5%	1/4W F
R193	1-249-411-11	CARBON	330	5%	1/4W F
R195	1-247-807-31	CARBON	100	5%	1/4W
< VARIABLE RESISTOR >					
RV102	1-238-600-11	RES, ADJ, CARBON 10K			
< TEST PIN >					
* TP102	1-565-513-11	PIN, CONNECTOR 2P			

* A-4403-194-A	TRANSMITTER BOARD, COMPLETE				

< CAPACITOR >					
C201	1-126-960-11	ELECT	1uF	20%	50V
C202	1-162-294-31	CERAMIC	1000PF	10%	50V
C203	1-162-282-31	CERAMIC	100PF	10%	50V
C204	1-102-508-91	CERAMIC	10PF	0.5PF	50V
C205	1-162-282-31	CERAMIC	100PF	10%	50V
C206	1-126-964-11	ELECT	10uF	20%	50V
C207	1-104-664-11	ELECT	47uF	20%	25V
C208	1-126-963-11	ELECT	4.7uF	20%	50V
C209	1-126-960-11	ELECT	1uF	20%	50V
C210	1-164-159-21	CERAMIC	0.1uF		50V
C211	1-104-664-11	ELECT	47uF	20%	25V
C212	1-126-960-11	ELECT	1uF	20%	50V
C213	1-126-933-11	ELECT	100uF	20%	16V
C214	1-164-159-21	CERAMIC	0.1uF		50V
C216	1-104-664-11	ELECT	47uF	20%	25V
C217	1-102-121-00	CERAMIC	2200PF	10%	50V
C218	1-102-508-91	CERAMIC	10PF	0.5PF	50V
C220	1-102-121-00	CERAMIC	2200PF	10%	50V
C221	1-164-159-21	CERAMIC	0.1uF		50V
C222	1-104-664-11	ELECT	47uF	20%	25V

Ref. No.	Part No.	Description			Remark
C223	1-164-159-21	CERAMIC	0.1uF		50V
C225	1-102-121-00	CERAMIC	2200PF	10%	50V
C227	1-104-663-11	ELECT	33uF	20%	25V
C228	1-164-159-21	CERAMIC	0.1uF		50V
C251	1-126-960-11	ELECT	1uF	20%	50V
C252	1-162-294-31	CERAMIC	1000PF	10%	50V
C253	1-162-282-31	CERAMIC	100PF	10%	50V
C254	1-102-508-91	CERAMIC	10PF	0.5PF	50V
C255	1-162-282-31	CERAMIC	100PF	10%	50V
C256	1-126-964-11	ELECT	10uF	20%	50V
C257	1-104-664-11	ELECT	47uF	20%	25V
C258	1-126-963-11	ELECT	4.7uF	20%	50V
C259	1-126-960-11	ELECT	1uF	20%	50V
C260	1-164-159-21	CERAMIC	0.1uF		50V
C261	1-104-664-11	ELECT	47uF	20%	25V
C262	1-126-960-11	ELECT	1uF	20%	50V
C263	1-126-933-11	ELECT	100uF	20%	16V
C264	1-164-159-21	CERAMIC	0.1uF		50V
C266	1-104-664-11	ELECT	47uF	20%	25V
C267	1-102-121-00	CERAMIC	2200PF	10%	50V
C268	1-102-508-91	CERAMIC	10PF	0.5PF	50V
C270	1-102-121-00	CERAMIC	2200PF	10%	50V
C271	1-164-159-21	CERAMIC	0.1uF		50V
C272	1-104-664-11	ELECT	47uF	20%	25V
C273	1-164-159-21	CERAMIC	0.1uF		50V
C275	1-102-121-00	CERAMIC	2200PF	10%	50V
C277	1-104-663-11	ELECT	33uF	20%	25V
C278	1-164-159-21	CERAMIC	0.1uF		50V
C291	1-104-663-11	ELECT	33uF	20%	25V
C292	1-126-960-11	ELECT	1uF	20%	50V
C294	1-104-663-11	ELECT	33uF	20%	25V
C295	1-126-924-11	ELECT	330uF	20%	6.3V
C296	1-164-159-21	CERAMIC	0.1uF		50V
< CONNECTOR >					
* CN201	1-506-989-11	PIN, CONNECTOR (PC BOARD) 7P			
CN211	1-506-468-11	PIN, CONNECTOR 3P			
CN261	1-506-468-11	PIN, CONNECTOR 3P			
< DIODE >					
D201	8-719-057-93	DIODE SVC203SPA-AL			
D251	8-719-057-93	DIODE SVC203SPA-AL			
D291	8-719-987-63	DIODE 1N4148M			
< IC >					
IC202	8-759-634-50	IC M5218AL			
IC203	8-759-384-88	IC TK10690MTL			
IC252	8-759-634-50	IC M5218AL			
IC253	8-759-384-88	IC TK10690MTL			
IC291	8-759-165-80	IC PST600C-T			
IC292	8-759-708-08	IC NJM78L08A			
< COIL >					
L201	1-416-171-11	COIL (OSC)			
L203	1-410-521-11	INDUCTOR 100uH			
L251	1-416-172-11	COIL (OSC)			
L253	1-410-521-11	INDUCTOR 100uH			

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TRANSMITTER

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
		< TRANSISTOR >					
Q201	8-729-266-83	TRANSISTOR 2SC2668-Y		R292	1-215-432-00	METAL 3K 1%	1/4W
Q202	8-729-266-83	TRANSISTOR 2SC2668-Y		R293	1-215-445-00	METAL 10K 1%	1/4W
Q203	8-729-119-76	TRANSISTOR 2SA1175-HFE		R294	1-247-807-31	CARBON 100 5%	1/4W
Q251	8-729-266-83	TRANSISTOR 2SC2668-Y		R296	1-247-863-91	CARBON 22K 5%	1/4W
Q252	8-729-230-45	TRANSISTOR 2SC2458-YGR				< THERMISTOR >	
Q253	8-729-119-76	TRANSISTOR 2SA1175-HFE		TH201	1-807-972-11	THERMISTOR	
Q291	8-729-801-84	TRANSISTOR 2SB1013-4		TH251	1-807-972-11	THERMISTOR	
Q292	8-729-029-20	TRANSISTOR RT1P141SK-TP				*****	
Q294	8-729-029-66	TRANSISTOR DTC114ESA				MISCELLANEOUS	
		< RESISTOR >				*****	
R201	1-249-417-11	CARBON 1K 5%	1/4W F	△ 8	1-782-603-11	CORD, POWER (AEP,E)	
R202	1-249-441-11	CARBON 100K 5%	1/4W	△ 8	1-782-604-11	CORD, POWER (US,CND)	
R203	1-249-421-11	CARBON 2.2K 5%	1/4W F	59	1-782-270-11	CORD, CONNECTION	
R204	1-247-863-91	CARBON 22K 5%	1/4W	SP301	1-505-542-11	SPEAKER (10cm)	
R205	1-249-419-11	CARBON 1.5K 5%	1/4W	△ T301	1-431-342-11	TRANSFORMER, POWER (AEP,E)	
R206	1-249-431-11	CARBON 15K 5%	1/4W	△ T301	1-431-343-11	TRANSFORMER, POWER (US,CND)	
R207	1-249-418-11	CARBON 1.2K 5%	1/4W F			*****	
R208	1-247-862-11	CARBON 20K 5%	1/4W			ACCESSORIES & PACKING MATERIALS	
R209	1-247-862-11	CARBON 20K 5%	1/4W			*****	
R211	1-249-421-11	CARBON 2.2K 5%	1/4W F			3-859-854-11	MANUAL, INSTRUCTION (ENGLISH,FRENCH,SPANISH,PORTUGUESE,CHINESE)
R212	1-215-445-00	METAL 10K 1%	1/4W			3-859-854-21	MANUAL, INSTRUCTION (GERMAN,DUTCH,SWEDISH,ITALIAN)(AEP,E)
R213	1-247-843-11	CARBON 3.3K 5%	1/4W				
R214	1-247-854-11	CARBON 9.1K 5%	1/4W				
R215	1-247-893-11	CARBON 390K 5%	1/4W				
R216	1-249-417-11	CARBON 1K 5%	1/4W F				
R218	1-249-413-11	CARBON 470 5%	1/4W F				
R219	1-249-441-11	CARBON 100K 5%	1/4W				
R220	1-247-441-11	CARBON 100K 5%	1/4W				
R222	1-249-417-11	CARBON 1K 5%	1/4W F			*****	
R225	1-215-461-00	METAL 47K 1%	1/4W			HARDWARE LIST	
R226	1-215-431-00	METAL 2.7K 1%	1/4W			*****	
R227	1-249-421-11	CARBON 2.2K 5%	1/4W F	#1	7-685-661-79	SCREW +P 4X12 TYPE2 NON-SLIT	
R251	1-249-417-11	CARBON 1K 5%	1/4W F	#2	7-685-647-79	SCREW +BVTP 3X10 TYPE2 IT-3	
R252	1-249-441-11	CARBON 100K 5%	1/4W	#3	7-685-134-19	SCREW +P 2.6X8 TYPE2 NON-SLIT	
R253	1-249-421-11	CARBON 2.2K 5%	1/4W F				
R254	1-247-863-91	CARBON 22K 5%	1/4W				
R255	1-249-419-11	CARBON 1.5K 5%	1/4W				
R256	1-249-431-11	CARBON 15K 5%	1/4W				
R257	1-249-418-11	CARBON 1.2K 5%	1/4W F				
R258	1-247-862-11	CARBON 20K 5%	1/4W				
R259	1-247-862-11	CARBON 20K 5%	1/4W				
R261	1-249-421-11	CARBON 2.2K 5%	1/4W F				
R262	1-215-445-00	METAL 10K 1%	1/4W				
R263	1-247-843-11	CARBON 3.3K 5%	1/4W				
R264	1-247-854-11	CARBON 9.1K 5%	1/4W				
R265	1-247-893-11	CARBON 390K 5%	1/4W				
R266	1-249-417-11	CARBON 1K 5%	1/4W F				
R268	1-249-413-11	CARBON 470 5%	1/4W F				
R269	1-249-441-11	CARBON 100K 5%	1/4W				
R270	1-249-441-11	CARBON 100K 5%	1/4W				
R272	1-249-417-11	CARBON 1K 5%	1/4W F				
R275	1-215-461-00	METAL 47K 1%	1/4W				
R276	1-215-431-00	METAL 2.7K 1%	1/4W				
R277	1-249-421-11	CARBON 2.2K 5%	1/4W F				
R291	1-215-445-00	METAL 10K 1%	1/4W				

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