FD-230

SERVICE MANUAL

US Model
Canadian Model

SONY - 07863

watchman

SPECIFICATIONS

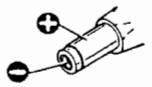
TV standard	American TV standard
Channel Coverage	VHF channels 2-13 UHF channels 14-69
Antenna	VHF/UHF telescopic antenna
Picture tube	2.7-inch picture measured diagonally
Output	EAR: minijack impedance 8-300 ohms
Power requirements	6V DC
Dimensions	Approx. 83×155×48.4 mm ($3^{3}/_{8}$×$6^{1}/_{8}$×$1^{15}/_{16}$ inches) (w/h/d) excl. projecting parts and controls
Weight	Approx. 450g (15.87oz) incl. batteries
Supplied accessories	Hand strap (1) Stand (1)

Design and specifications subject to change without notice.

Battery	Life (hrs.)
Sony Alkaline AM3 (N)	approx. 4
EBP-6 external battery case (optional) with Sony alkaline AM2 (N)	approx. 7

Notes

Use only recommended AC power adaptor or a car baterry cord manufactured by Sony. Polarity of the plugs of other manufacturers may be different.



Polarity of the Sony plug

PRECAUTIONS

- Operate the unit only on 6 V DC. For AC operation, use the optional Sony AC-D4M AC power adaptor. For car battery operation, use the optional Sony DCC-127A car battery cord. Do not use any other type in both cases for this unit.
- Do not open the casing. Refer servicing to qualified personnel only.
- Do not place the set in a hot or humid place or in a place subject to excessive dust or vibration.
- Avoid rough handling.
- Clean the unit with a soft cloth slightly dampened with a mild detergent solution. Never use strong solvents, such as thinner or benzine, as they may damage the finish.

FLAT BLACK & WHITE TV

SONY®

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Check that all control knobs, shields, covers, ground straps, and mounting hardware have been replaced. Be absolutely certain that you have replaced all the insulators.
4. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
5. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
6. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
7. Check the condition of the monopole antenna (if any).
   Make sure the end is not broken off, and has the plastic cap on it. Point out the danger of impalement on a broken antenna to the customer, and recommend the antenna's replacement.
8. Check the B+ and HV to see they are at the values specified. Make sure your instruments are accurate; be suspicious of your HV meter if sets always have low HV.
9. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

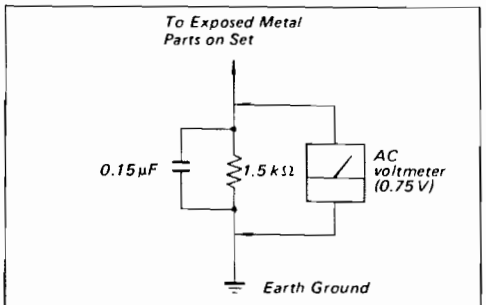


Fig. A. Using an AC voltmeter to check AC leakage.

LEAKAGE TEST

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 microampers). 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)

HOW TO FIND A GOOD EARTH GROUND

A cold-water pipe is guaranteed earth ground; the cover-plate retaining screw on most AC outlet boxes is also at earth ground. If the retaining screw is to be used as your earth-ground, verify that it is at ground by measuring the resistance between it and a cold-water pipe with an ohmmeter. The reading should be zero ohms. If a cold-water pipe is not accessible, connect a 60–100 watts trouble light (not a neon lamp) between the hot side of the receptacle and the retaining screw. Try both slots, if necessary, to locate the hot side of the line, the lamp should light at normal brilliance if the screw is at ground potential. (See Fig. B)

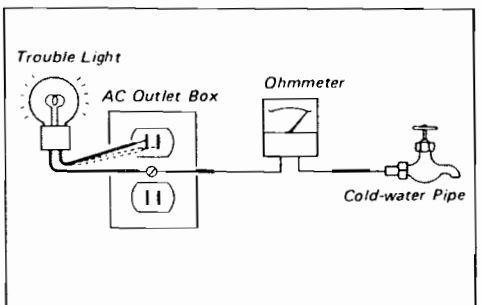


Fig. B. Checking for earth ground.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ 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 ⚠ 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.

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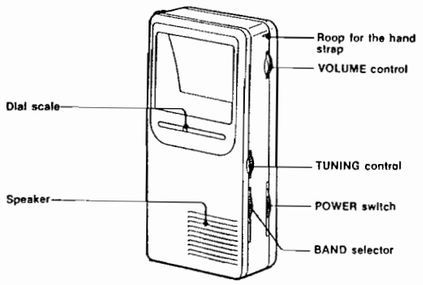
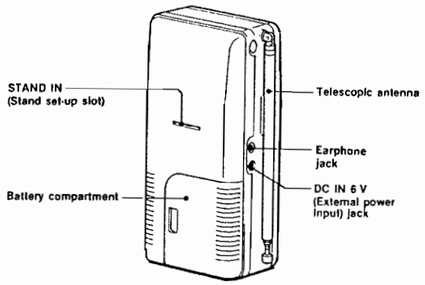
SECTION 1
GENERAL

1-1. LOCATION OF CONTROLS





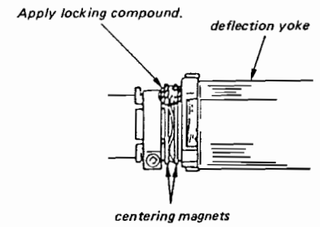
SECTION 2
ELECTRICAL ADJUSTMENTS

NOTE

1. Test Equipment Required
   - regulated dc power supply
   - color-bar/pattern generator
   - frequency counter
   - digital voltmeter
2. Input Signal
   cross hatch color-bar or off-the-air signal.
3. The adjustment should be performed with 6 V dc and about 5 minutes warmup unless otherwise noted.
4. Position the set vertically with the front side faced to the north for TV-section adjustments.

Centering Adjustment

1. Tune in a test or off-the-air signal.
2. Place the set vertically and face the CRT toward north.
3. Adjust the two centering magnets so that the picture is at the center.
4. Lock the magnets with locking compound after the adjustment.



SERVICING NOTE

Flexible Circuit Board Repairing

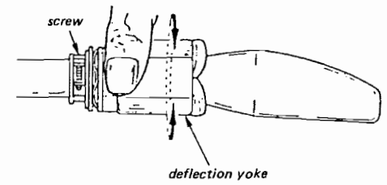
- Keep the temperature of the soldering iron around 270°C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

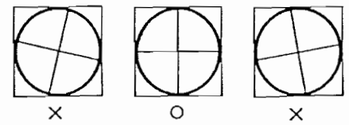
Notes on chip component replacement

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

Horizontal Adjustment

1. Loosen the adjustment screw.
2. Tune in a test or off-the-air signal and adjust deflection yoke for optimum horizontal picture.
3. Tighten the screw after the adjustment.





4 V Adjustment

1. Connect digital voltmeter to TP4V.
2. Confirm that the 4.0±0.12V.
   If not, adjust patterns A or B.

Pattern connection	4.0 V DVM reading
B	up
A, B open	↕
A	down

32 V Adjustment

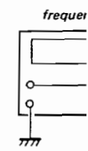
1. Connect digital voltmeter to TP32V.
2. Tune in a VHF-LOW BAND TV station or VHF-LOW off-the-air signal.
3. Adjust RV601 to be 32.2±0.1V in reading on VTVM.

Focus Adjustment

1. Set the regulated dc
2. Tune in a test or of
3. Adjust RV801 for

Horizontal Frequen

1. Short-circuit betwe wire.
2. Connect the freque
3. Adjust RV502 (H· frequency counter
4. After the adjustmer



RF AGC Adjustmer

1. Tune in a TV sta
2. Adjust RV201 so t

Adjustment Locatio

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   - digital voltmeter
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   cross hatch color-bar or off-the-air signal.
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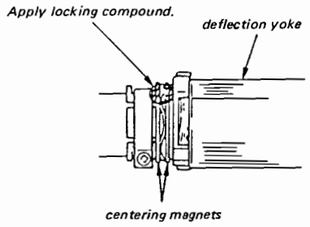
4. Position the set vertically with the front side faced to the north for TV-section adjustments.

Centering Adjustment

1. Tune in a test or off-the-air signal.
2. Place the set vertically and face the CRT toward north.
3. Adjust the two centering magnets so that the picture is at the center.
4. Lock the magnets with locking compound after the adjustment.



SERVICING NOTE

Flexible Circuit Board Repairing

- Keep the temperature of the soldering iron around 270°C during repairing.
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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.

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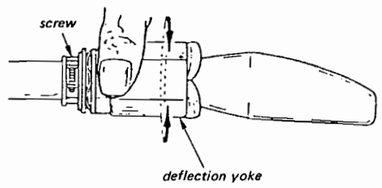
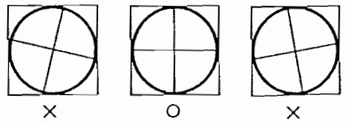
3. Tighten the screw after the adjustment.





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1. Connect digital voltmeter to TP4V.
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Pattern connection	4.0 V DVM reading
B	up
A, B open	↕
A	down

32 V Adjustment

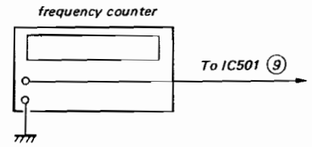
1. Connect digital voltmeter to TP32V.
2. Tune in a VHF-LOW BAND TV station or VHF-LOW off-the-air signal.
3. Adjust RV601 to be 32.2±0.1V in reading on VTVM.

Focus Adjustment

1. Set the regulated dc power supply voltage to 6 V.
2. Tune in a test or off-the-air signal.
3. Adjust RV801 for the best focus of the picture.

Horizontal Frequency (H·FREQ) Adjustment

1. Short-circuit between IC501 pin (13) and ground with jumper wire.
2. Connect the frequency counter to IC501 pin (9).
3. Adjust RV502 (H·FREQ) for a 15.584-15.884kHz reading on frequency counter.
4. After the adjustment, remove the jumper wire step 1.

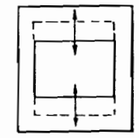


RF AGC Adjustment

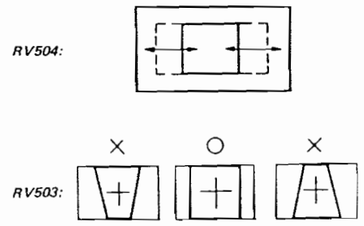
1. Tune in a TV station.
2. Adjust RV201 so that snow noise disappears from the picture.

Picture Size Adjustment

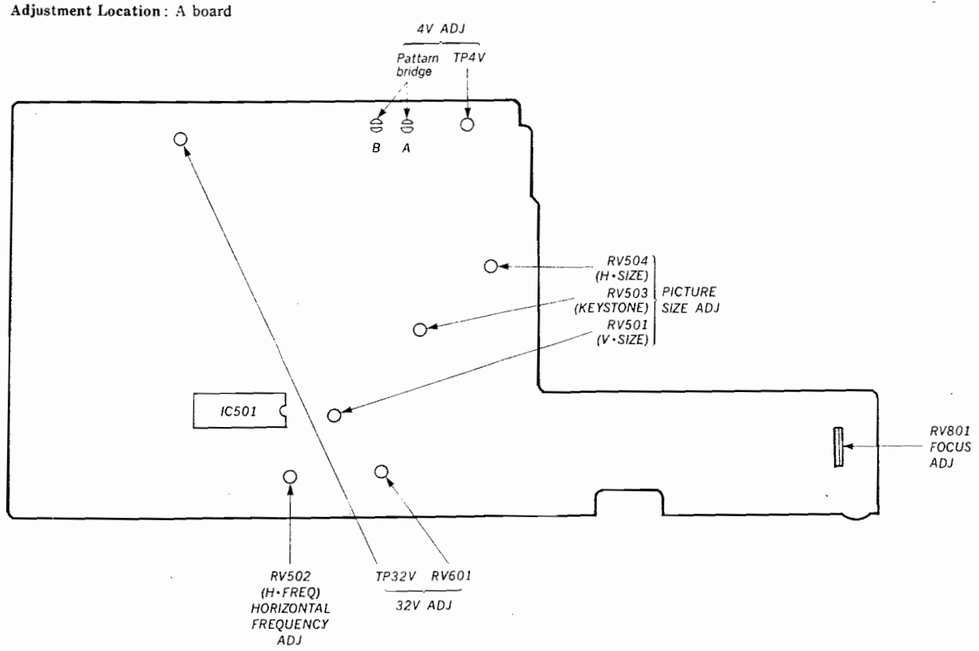
1. Tune in a TV station.
2. Adjust RV501 (V·SIZE) for the best vertical amplitude.



3. Adjust RV504 (H·SIZE) and RV503 (KEYSTONE) for the best horizontal amplitude.



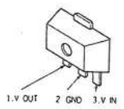
Adjustment Location: A board



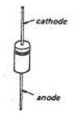
SECTION 3
DIAGRAMS

3-1. SEMICONDUCTOR LEAD LAYOUTS

M5236ML



1SS83
1S1585

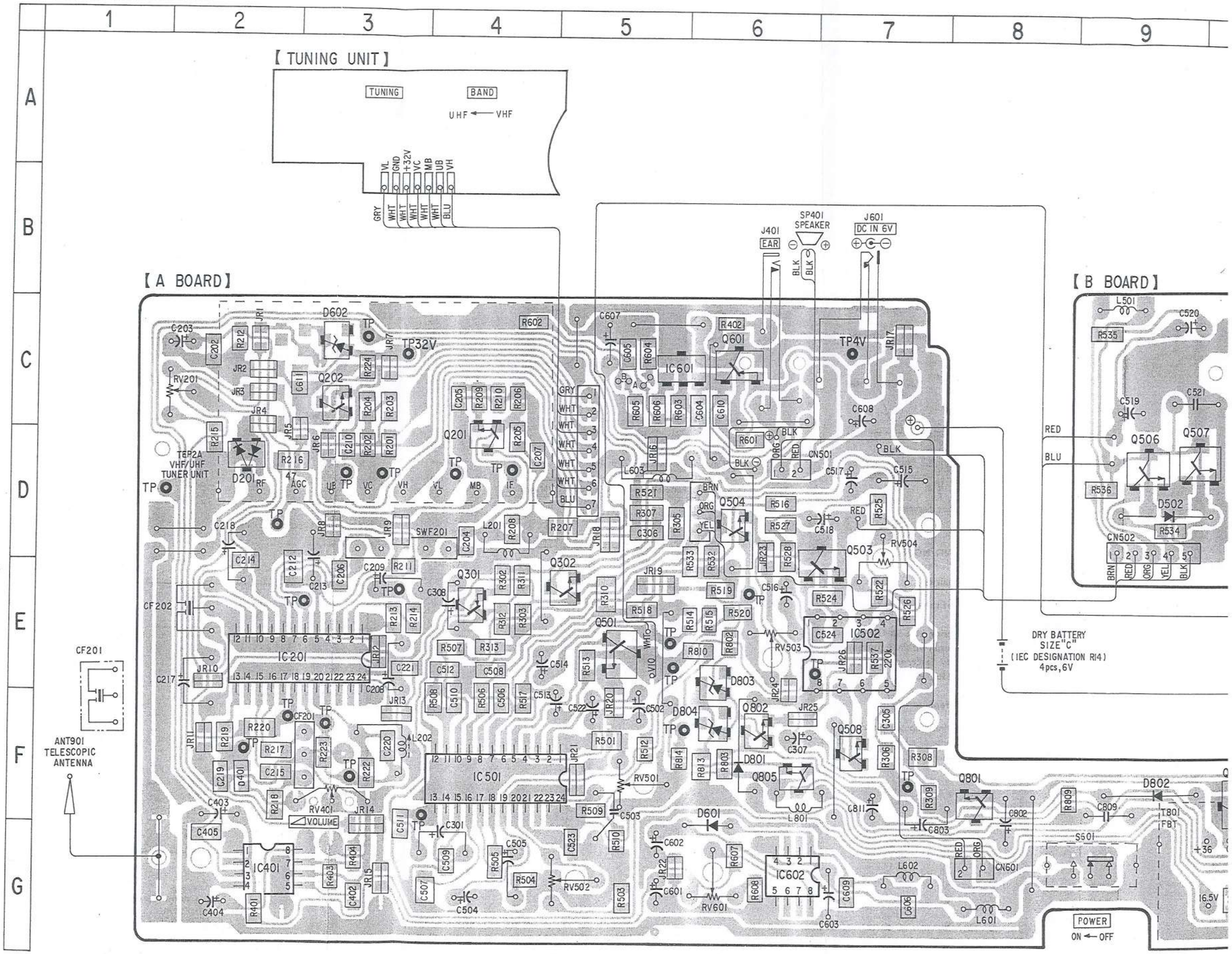


• **Semiconductor Location**

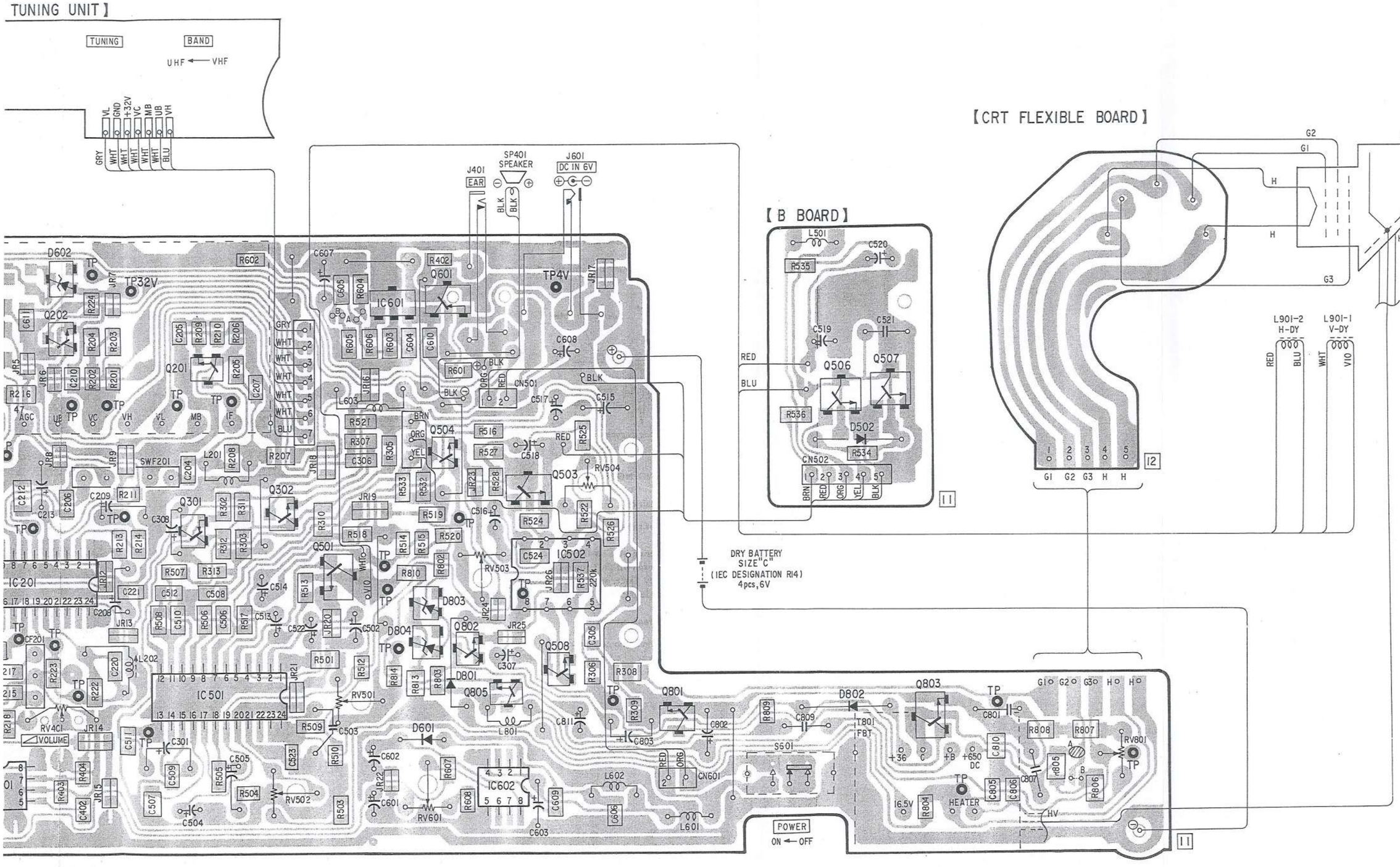
Ref. No.	Location
D201	D-2
D502	D-9
D601	F-6
D602	C-3
D801	F-6
D802	F-9
D803	E-6
D804	F-6
IC201	E-2
IC401	G-2
IC501	F-4
IC502	E-7
IC601	C-5
IC602	G-6
Q201	D-4
Q202	C-3
Q301	E-4
Q302	E-5
Q501	E-5
Q503	D-7
Q504	D-6
Q506	D-9
Q507	D-9
Q508	F-7
Q601	C-6
Q801	F-8
Q802	F-6
Q803	F-10
Q805	F-6

• ○—— : parts extracted from the component side.

3-2. PRINTED WIRING BOARDS

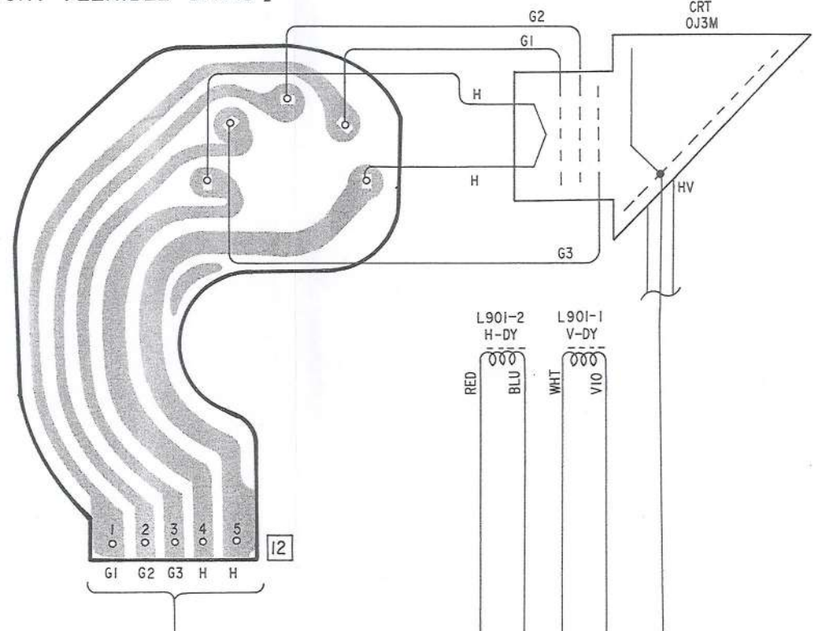


TUNING UNIT】

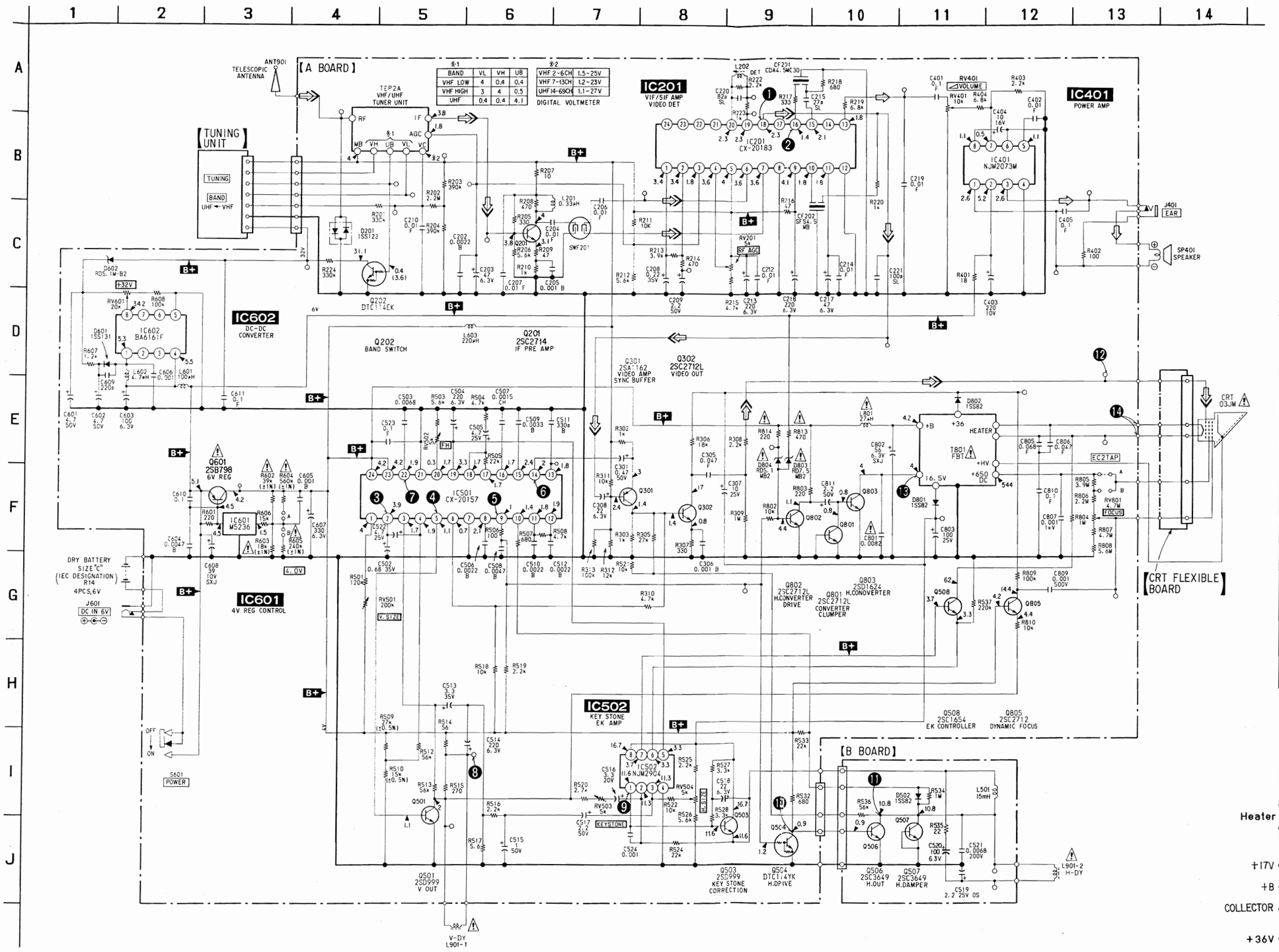


【B BOARD】

【CRT FLEXIBLE BOARD】



3-3. SCHEMATIC DIAGRAM



※1	VL	VH	UB
VHF LOW	4	0.4	0.4
VHF HIGH	3	4	0.5
UHF	0.4	0.4	4.1

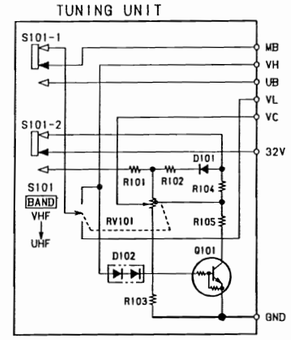
※2	
VHF 2-6CH	1.5-25V
VHF 7-13CH	1.2-23V
UHF 14-69CH	1.1-27V

DIGITAL VOLTMETER

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.
- % : indicates tolerance.
- ▭ : adjustment for repair.
- Power voltage is dc 6V and fed with regulated dc power supply from external power voltage jack.
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark: TV
- Voltages are taken with a VOM (Input Impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope.
  Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ⇨ : AUDIO
  ⇨ : VIDEO

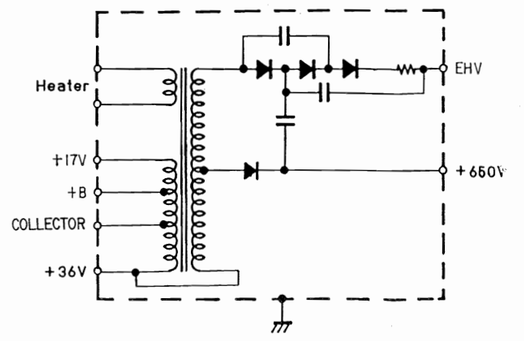
Note:	**Note:**
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

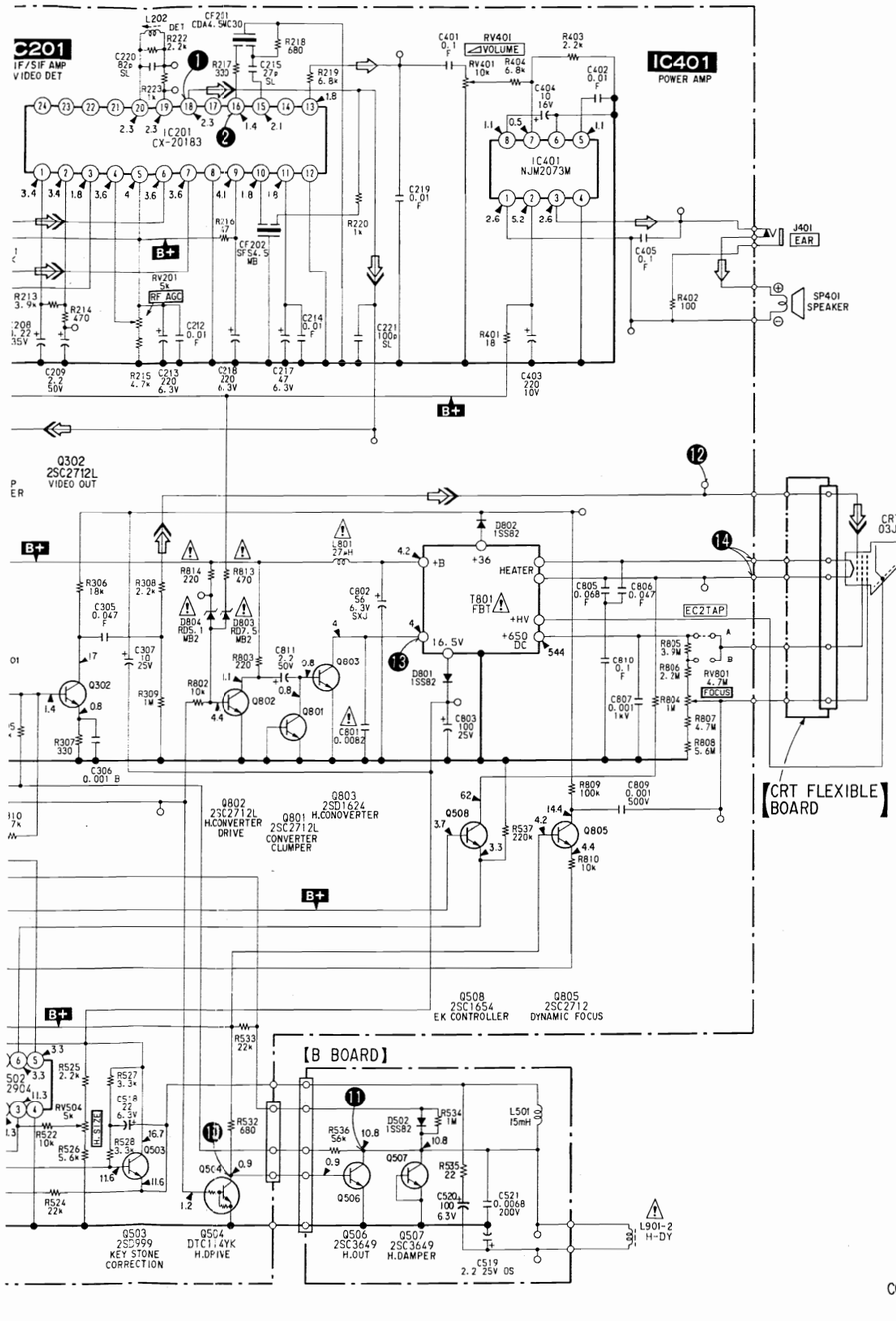
TUNING UNIT



(This unit is supplied as the assembled block.)

T801 FLYBACK TRANSFORMER SCHEMATIC DIAGRAM





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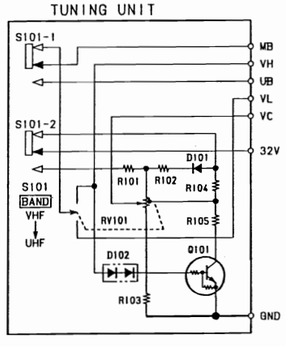

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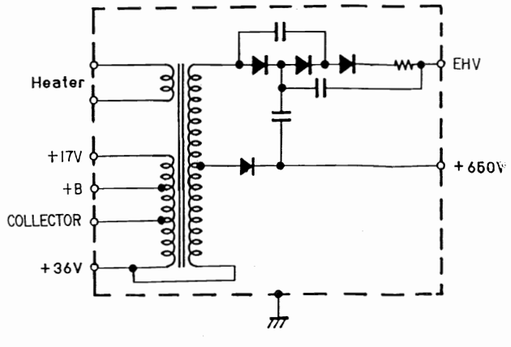
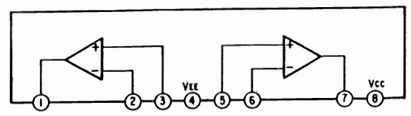
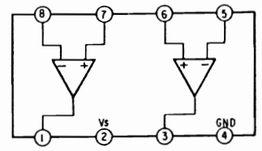


3-4. IC BLOCK DIAGRAM

NJM2904D

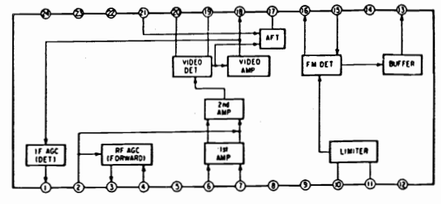


NJM2073M

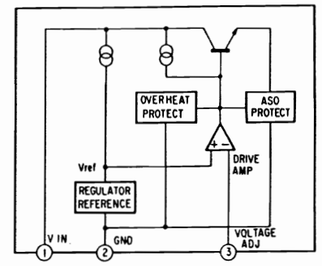


CX20157

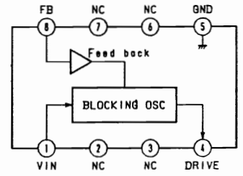
CX20183



M5236ML



BA6161F

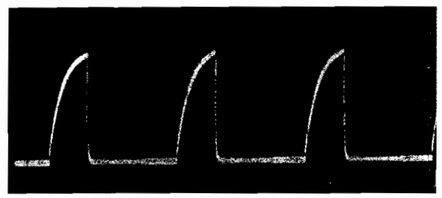


3-5. WAVEFORMS

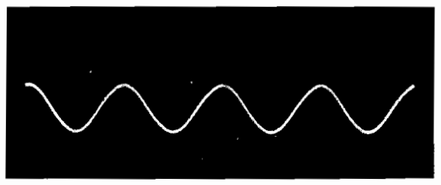
Circled numbers are test points and concide with those in the Printed Wiring Boards and Schematic Diagrams.

① 0.9 Vp-p (H)
⑥ 0.85 Vp-p (H)

⑤ 2.7 Vp-p (H)

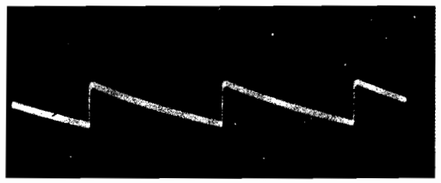


② 0.55 Vp-p 4.5 MHz



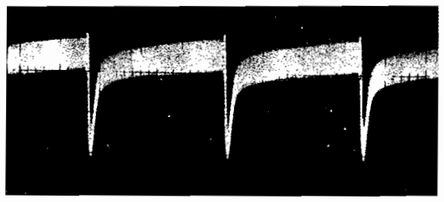
⑦ 0.44 Vp-p 32 μsec

③ 0.4 Vp-p (V)

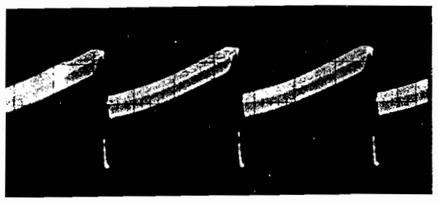


⑧ 4.2 Vp-p (V)

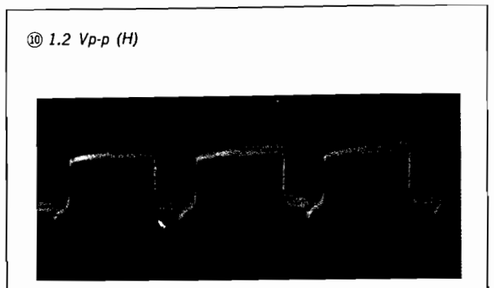
④ 0.4 Vp-p (V)



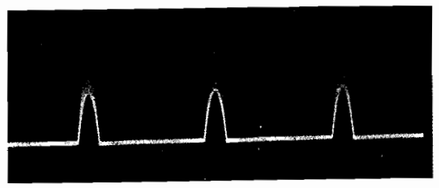
⑨ 15 Vp-p (V)



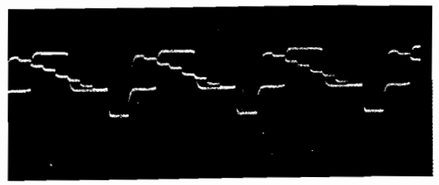
⑩ 1.2 Vp-p (H)



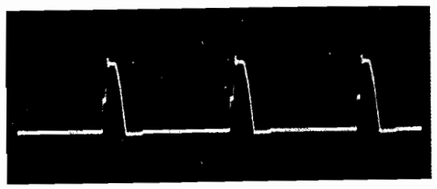
⑪ 120 Vp-p (H)



⑫ 32 Vp-p (H)



⑬ 30 Vp-p (H)
⑭ 2.1 Vp-p (H)



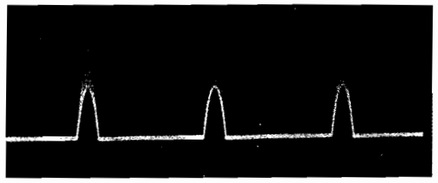
NOTE:
- The me number supplie
- The co part ar ber in t
- Items r they a service. pated v

1. M

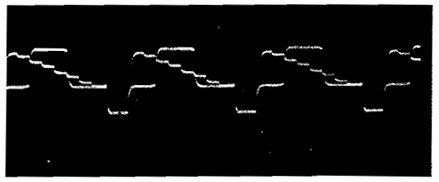
Ref.No	P
1	3
	3
2	3
3	3
4	3
5	3
6	3
7	3
8	9
9	3
10	*3
11	3
12	A
	A
13	*3
14	9
15	9
16	3
17	3
18	3

⑩ *1.2 Vp-p (H)*

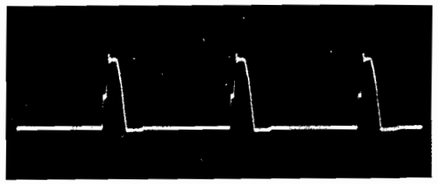
⑪ *120 Vp-p (H)*



⑫ *32 Vp-p (H)*



⑬ *30 Vp-p (H)*
⑭ *2.1 Vp-p (H)*



SECTION 4
EXPLODED VIEW

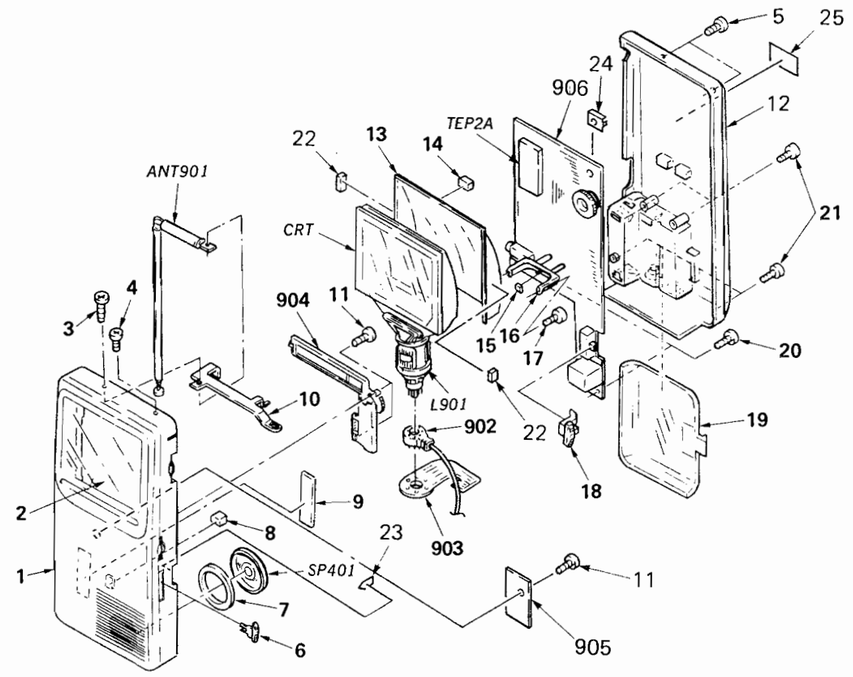
NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part number suffix -XX and -X may be different from the parts specified in the components used on the set.
- Color Indication of Appearance Parts
  Example:
  (RED) ...KNOB, BALANCE (WHITE)
  ↑ ↑
  Cabinet's Color Parts' Color

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

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

1. MAIN SECTION



Ref.No	Part No.	Description	Remarks
1	3-349-326-01	(CHARCOAL GREY)....CABINET (FRONT)	
	3-349-326-11	(GREY)....CABINET (FRONT)	
2	3-349-324-01	FILTER	
3	3-342-721-01	SCREW (M2X8), PWH, 0	
4	3-703-502-31	SCREW	
5	3-703-502-71	SCREW	
6	3-342-712-01	KNOB (SW)	
7	3-342-777-01	SHEET, ADHESIVE, SPEAKER	
8	9-911-838-XX	CUSHION	
9	3-314-062-00	(US)....LABEL, CAUTION, SERVICE	
10	*3-342-782-01	BRACKET, ANTENNA	
11	3-318-201-51	SCREW (B) (1.4X4), TAPPING	
12	A-3041-080-A	(US)....CABINET (REAR) SUB ASSY	
	A-3041-082-A	(Canadian)....CABINET (REAR) SUB ASSY	
13	*3-342-713-01	COVER, CRT	
14	9-911-839-XX	RUBER, (B)	
15	9-911-840-XX	CUSHION, LID	
16	3-342-781-01	BRACKET, CRT	
17	3-318-201-61	SCREW (B) (1.4X6), TAPPING	
18	3-342-783-01	KNOB (POWER SW)	

Ref.No	Part No.	Description	Remarks
19	3-349-325-01	LID, BATTERY CASE	
20	3-318-203-71	SCREW (B1.7X5), TAPPING	
21	3-342-759-21	SCREW (B1.7X8), TAPPING	
22	*4-612-945-01	CUSHION	
23	*3-338-931-01	PLATE	
24	*3-349-329-01	BRACKET, ANTENNA	
25	*3-349-323-01	(Canadian)....LABEL, MODEL NUMBER	
902	1-526-992-11	SOCKET, CRT	
903	1-626-675-11	PC BOARD, CRT FLEXIBLE	
904	1-465-009-11	TUNING UNIT	
905	*1-630-388-11	PC BOARD, B	
906	A-3015-759-A	(US)....PC BOARD ASSY, A	
	A-3015-761-A	(Canadian)....PC BOARD ASSY, A	
ANT901	1-501-409-11	ANTENNA, TELESCOPIC	
CRT	⚠8-733-321-05	CRT 03JM	
L901	⚠1-451-328-11	DEFLECTION YOKE	
SP401	1-503-540-11	SPEAKER	
TEP2A	1-463-911-31	(US)....TUNER UNIT	
	1-463-911-41	(Canadian)....TUNER UNIT	

SECTION 5
ELECTRICAL PARTS LIST

NOTE:

- 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.
- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:
MF: μF, PF: μμF.

RESISTORS
- All resistors are in ohms.
- F: nonflammable

COILS
- MMH: mH, UH: μH

SEMICONDUCTORS
In each case, U: μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC, UPD...: μPD...

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

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

Ref.No	Part No.	Description
902	1-526-992-11	SOCKET, CRT
903	1-626-675-11	PC BOARD, CRT FLEXIBLE
904	1-465-009-11	TUNING UNIT
905	*1-630-388-11	PC BOARD, B
906	A-3015-759-A	(US)....PC BOARD ASSY, A
	A-3015-761-A	(Canadian)....PC BOARD ASSY, A
ANT901	1-501-409-11	ANTENNA, TELESCOPIC

CAPACITOR

Ref.No	Part No.	Description			
C202	1-164-161-11	CERAMIC CHIP	0.0022MF	10%	50V
C203	1-126-154-11	ELECT	47MF	20%	6.3V
C204	1-163-021-00	CERAMIC CHIP	0.01MF		50V
C205	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C206	1-163-021-00	CERAMIC CHIP	0.01MF		50V
C207	1-163-021-00	CERAMIC CHIP	0.01MF		50V
C208	1-131-343-00	TANTALUM	0.22MF	10%	35V
C209	1-124-257-00	ELECT	2.2MF	20%	50V
C210	1-163-021-00	CERAMIC CHIP	0.01MF		50V
C212	1-163-059-00	CERAMIC CHIP	0.01MF		50V
C213	1-126-176-11	ELECT	220MF	20%	6.3V
C214	1-163-021-00	CERAMIC CHIP	0.01MF		50V
C215	1-163-103-00	CERAMIC CHIP	27PF	5%	50V
C217	1-126-154-11	ELECT	47MF	20%	6.3V
C218	1-126-176-11	ELECT	220MF	20%	6.3V
C219	1-163-021-00	CERAMIC CHIP	0.01MF		50V
C220	1-163-115-00	CERAMIC CHIP	82PF	5%	50V
C221	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C301	1-124-465-00	ELECT	0.47MF	20%	50V
C305	1-163-035-00	CERAMIC CHIP	0.047MF		50V
C306	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C307	1-126-096-11	ELECT	10MF	20%	25V
C308	1-126-153-11	ELECT	22MF	20%	6.3V
C401	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C402	1-163-021-00	CERAMIC CHIP	0.01MF		50V
C403	1-126-176-11	ELECT	220MF	20%	10V
C404	1-126-157-11	ELECT	10MF	20%	16V
C405	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C502	1-131-587-11	TANTALUM	0.68MF	10%	35V
C503	1-130-481-00	MYLAR	0.0068MF	5%	50V
C504	1-124-635-00	ELECT	220MF	20%	6.3V
C505	1-126-094-11	ELECT	4.7MF	20%	25V
C506	1-164-161-11	CERAMIC CHIP	0.0022MF	10%	50V
C507	1-163-209-00	CERAMIC CHIP	0.0015MF	5%	50V
C508	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C509	1-163-015-00	CERAMIC CHIP	0.0033MF	10%	50V
C510	1-164-161-11	CERAMIC CHIP	0.0022MF	10%	50V
C511	1-163-129-00	CERAMIC CHIP	330PF	10%	50V
C512	1-164-161-11	CERAMIC CHIP	0.0022MF	10%	50V
C513	1-126-162-11	ELECT	3.3MF	20%	35V
C514	1-126-355-11	ELECT	220MF	10%	6.3V
C515	1-126-160-11	ELECT	1MF	20%	50V
C516	1-131-356-00	TANTALUM	3.3MF	10%	20V
C517	1-124-257-00	ELECT	2.2MF	20%	50V
C518	1-126-153-11	ELECT	22MF	20%	6.3V
C519	1-127-508-00	ELECT(SOLID)	2.2MF	20%	25V
C520	1-124-225-00	ELECT	100MF	20%	6.3V
C521	1-106-363-00	MYLAR	0.0068MF	5%	200V
C522	1-126-094-11	ELECT	4.7MF	20%	25V
C523	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C524	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C601	1-126-163-11	ELECT	4.7MF	20%	50V
C602	1-126-163-11	ELECT	4.7MF	20%	50V
C603	1-126-177-11	ELECT	100MF	20%	6.3V
C604	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C605	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C606	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C607	1-124-442-00	ELECT	330MF	20%	6.3V
C608	1-126-213-11	ELECT	39MF	20%	10V
C609	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
C610	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C611	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C801	⚠1-130-482-00	MYLAR	0.0082MF	5%	50V
C802	1-124-565-00	ELECT	56MF	20%	6.3V
C803	1-124-478-11	ELECT	100MF	20%	25V
C805	1-163-036-00	CERAMIC CHIP	0.068MF		50V
C806	1-163-035-00	CERAMIC CHIP	0.047MF		50V
C807	1-162-697-11	CERAMIC	0.001MF		1KV
C809	1-102-038-00	CERAMIC	0.001MF		500V
C810	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C811	1-124-257-00	ELECT	2.2MF	20%	50V

Ref.No	Part No.	Description
CF201	1-567-513-11	FILTER, CERAMIC
CF202	1-567-115-00	FILTER, CERAMIC
CRT	⚠8-733-321-05	CRT 03JM
D201	8-719-800-76	DIODE 1SS226
D502	8-719-901-83	DIODE 1SS83
D601	8-719-815-85	DIODE 1S1585
D602	8-719-105-82	DIODE RD5.1M-B2
D801	8-719-901-83	DIODE 1SS83
D802	8-719-901-83	DIODE 1SS83
D803	⚠8-719-106-23	DIODE RD7.5M-B2
D804	⚠8-719-105-82	DIODE RD5.1M-B2
IC201	8-759-602-99	IC CX20183
IC401	8-759-701-02	IC NJM2073M
IC501	8-752-030-28	IC CX20157
IC502	8-759-700-42	IC NJM2904D
IC601	8-759-630-27	IC M5236ML
IC602	8-759-945-44	IC BA6161F
J401	1-565-457-11	JACK (EAR)
J601	1-562-961-11	JACK (DC IN 6V)

JR1	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR2	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR3	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR4	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR5	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR6	1-216-295-00	METAL GLAZE	0	5%	1/10W

Ref.No	Part No.	Description			
JR7	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR8	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR9	1-216-296-00	METAL GLAZE	0	5%	1/8W
JR10	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR11	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR12	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR13	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR14	1-216-296-00	METAL GLAZE	0	5%	1/8W
JR15	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR16	1-216-296-00	METAL GLAZE	0	5%	1/8W
JR17	1-216-296-00	METAL GLAZE	0	5%	1/8W
JR18	1-216-296-00	METAL GLAZE	0	5%	1/8W
JR19	1-216-296-00	METAL GLAZE	0	5%	1/8W
JR20	1-216-296-00	METAL GLAZE	0	5%	1/8W
JR21	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR22	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR23	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR24	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR25	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR26	1-216-295-00	METAL GLAZE	0	5%	1/10W
L201	1-408-715-11	INDUCTOR	0.33UH		
L202	1-404-808-	TRANSFORMER, IF (VIF DETECTOR)			
L501	1-410-777-11	INDUCTOR	15MMH		
L601	1-410-645-31	INDUCTOR	100UH		
L602	1-410-771-11	INDUCTOR	4.7MMH		
L603	1-410-525-11	INDUCTOR	220UH		
L801	⚠1-410-668-11	INDUCTOR	27UH		
L901	⚠1-451-328-11	DEFLECTION YOKE			
Q201	8-729-200-87	TRANSISTOR 2SC2714Y			
Q202	8-729-900-53	TRANSISTOR DTC114EK			
Q301	8-729-100-76	TRANSISTOR 2SA812-M6			
Q302	8-729-271-23	TRANSISTOR 2SC2712L			
Q501	8-729-103-72	TRANSISTOR 2SD1005			
Q503	8-729-103-72	TRANSISTOR 2SD1005			
Q504	8-729-900-52	TRANSISTOR DTC114YK			
Q506	8-729-808-56	TRANSISTOR 2SC3649			
Q507	8-729-808-56	TRANSISTOR 2SC3649			
Q508	8-729-103-52	TRANSISTOR 2SC1654			
Q601	⚠8-729-101-07	TRANSISTOR 2SB798			
Q801	8-729-271-23	TRANSISTOR 2SC2712L			
Q802	8-729-271-23	TRANSISTOR 2SC2712L			
Q803	8-729-808-42	TRANSISTOR 2SD1624			
Q805	8-729-271-23	TRANSISTOR 2SC2712L			

RESISTOR

R201	1-216-109-00	METAL GLAZE	330K	5%	1/10W
R202	1-216-129-00	METAL GLAZE	2.2M	5%	1/10W
R203	1-216-111-00	METAL GLAZE	390K	5%	1/10W
R204	1-216-111-00	METAL GLAZE	390K	5%	1/10W
R205	1-216-037-00	METAL GLAZE	330	5%	1/10W
R206	1-216-067-00	METAL GLAZE	5.6K	5%	1/10W
R207	1-216-150-00	METAL GLAZE	10	5%	1/8W
R208	1-216-041-00	METAL GLAZE	470	5%	1/10W
R209	1-216-017-00	METAL GLAZE	47	5%	1/10W
R210	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R211	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R212	1-216-067-00	METAL GLAZE	5.6K	5%	1/10W
R213	1-216-063-00	METAL GLAZE	3.9K	5%	1/10W
R214	1-216-041-00	METAL GLAZE	470	5%	1/10W
R215	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R216	1-216-166-00	METAL GLAZE	47	5%	1/8W
R217	1-216-037-00	METAL GLAZE	330	5%	1/10W
R218	1-216-045-00	METAL GLAZE	680	5%	1/10W
R219	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R220	1-216-198-00	METAL GLAZE	1K	5%	1/8W

Ref.No	Part No.	Description			
R222	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R223	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R224	1-216-109-00	METAL GLAZE	330K	5%	1/10W
R302	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R303	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R305	1-216-083-00	METAL GLAZE	27K	5%	1/10W
R306	1-216-079-00	METAL GLAZE	18K	5%	1/10W
R307	1-216-037-00	METAL GLAZE	330	5%	1/10W
R308	1-216-206-00	METAL GLAZE	2.2K	5%	1/8W
R309	1-216-121-00	METAL GLAZE	1M	5%	1/10W
R310	1-216-214-00	METAL GLAZE	4.7K	5%	1/8W
R311	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R312	1-216-075-00	METAL GLAZE	12K	5%	1/10W
R313	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R401	1-216-007-00	METAL GLAZE	18	5%	1/10W
R402	1-216-025-00	METAL GLAZE	100	5%	1/10W
R403	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R404	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R501	1-216-248-00	METAL GLAZE	120K	5%	1/8W
R503	1-216-067-00	METAL GLAZE	5.6K	5%	1/10W
R504	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R505	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R506	1-216-025-00	METAL GLAZE	100	5%	1/10W
R507	1-216-045-00	METAL GLAZE	680	5%	1/10W
R508	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R509	1-216-685-11	METAL CHIP	27K	0.50%	1/10W
R510	1-216-679-11	METAL CHIP	15K	0.50%	1/10W
R512	1-216-091-00	METAL GLAZE	56K	5%	1/10W
R513	1-216-091-00	METAL GLAZE	56K	5%	1/10W
R514	1-216-019-00	METAL GLAZE	56	5%	1/10W
R515	1-216-035-00	METAL GLAZE	270	5%	1/10W
R516	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R517	1-216-309-00	METAL GLAZE	5.6	5%	1/10W
R518	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R519	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R520	1-216-059-00	METAL GLAZE	2.7K	5%	1/10W
R521	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R522	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R524	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R525	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R526	1-216-067-00	METAL GLAZE	5.6K	5%	1/10W
R527	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R528	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R532	1-216-045-00	METAL GLAZE	680	5%	1/10W
R533	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R534	1-216-121-00	METAL GLAZE	1M	5%	1/10W
R535	1-216-009-00	METAL GLAZE	22	5%	1/10W
R536	1-216-091-00	METAL GLAZE	56K	5%	1/10W
R537	1-216-105-00	METAL GLAZE	220K	5%	1/10W
R601	1-216-033-00	METAL GLAZE	220	5%	1/10W
R602	⚠1-216-748-11	METAL GLAZE	39K	1%	1/10W
R603	⚠1-216-339-11	METAL GLAZE	18K	1%	1/10W
R604	⚠1-216-740-11	METAL GLAZE	560K	1%	1/10W
R605	⚠1-216-776-11	METAL GLAZE	240K	1%	1/10W
R606	1-216-077-00	METAL GLAZE	15K	5%	1/10W
R607	1-216-051-00	METAL GLAZE	1.2K	5%	1/10W
R608	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R802	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R803	1-216-033-00	METAL GLAZE	220	5%	1/10W
R804	1-216-121-00	METAL GLAZE	1M	5%	1/10W
R805	1-216-284-00	METAL GLAZE	3.9M	5%	1/8W
R806	1-216-278-00	METAL GLAZE	2.2M	5%	1/8W
R807	1-216-286-00	METAL GLAZE	4.7M	5%	1/8W
R808	1-216-288-11	METAL GLAZE	5.6M	5%	1/8W
R809	1-216-097-00	METAL GLAZE	100K	5%	1/10W

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

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

Ref.No	Part No.	Description			
R810	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R813 ⚠	1-216-190-00	METAL GLAZE	470	5%	1/8W
R814 ⚠	1-216-033-00	METAL GLAZE	220	5%	1/10W
RV201	1-230-720-11	RES, ADJ, CARBON 5K			
RV401	1-238-162-11	RES, VAR, CARBON 10K (◿ VOLUME)			
RV501	1-228-998-00	RES, ADJ, CARBON 200K			
RV502	1-228-993-00	RES, ADJ, CARBON 5K			
RV503	1-228-993-00	RES, ADJ, CARBON 5K			
RV504	1-228-993-00	RES, ADJ, CARBON 5K			
RV601	1-230-600-11	RES, ADJ, CARBON 20K			
RV801	1-230-954-11	RES, ADJ (HIGH VOLTAGE) 4.7M			
S601	1-571-478-11	SWITCH, SLIDE (POWER)			
SP401	1-503-540-11	SPEAKER			
SWF201	1-404-635-11	FILTER, CERAMIC			
T801 ⚠	1-439-433-11	TRANSFORMER ASSY, FLYBACK			
TEP2A	1-463-911-31	(US)....TUNER UNIT			
	1-463-911-41	(Canadian).... TUNER UNIT			

ACCESSORY & PACKING MATERIAL

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Part No.	Description
3-342-772-01	STAND
3-329-450-11	STRAP

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

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

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