

# SERVICE MANUAL

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COLOR TELEVISION

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This Service Manual is the "Revision Publishing" and replaces "Simple Manual"  
(S/M Code No. 09-995-333-9T1).

## SPECIFICATIONS

Category:	Color television	Earphone Jack	Mini jack
TV Broadcasting System:	NTSC-M	Operating Temperature	5°C – 40°C
Channel Coverage:	TV: 2 – 69	Operatin Humidity	35% – 80%
	Cable (CATV): 5A, 2 – 13,A-5 – A-1, A–W, W+1 – W+84 (A-8)	Dimensions	520 (W) x 479.5 (D) x 425 (H) mm (20 1/2 x 19 x 16 3/4 in.)
Number of Preset Channels	181	Weight	18 kg (39.6 lbs.)
Aerial Input	75 ohms, unbalanced		
Picture Tube	20" (510 mm)		
Screen Size	404 (W) x 303 (H) x mm (16 x 12 in.) 480 mm (diagonal) (19 in.)		
Video Input/Output	1 Vp-p, 75 ohms		
Audio Input	0.5 Vrms., 33 k ohms more		
Audio Output	0.5 Vrms., 2.2 k ohms less		
Speaker	76 mm (3 in.) round: 2		
Operating Voltage	110 – 240 V AC, 50/60 Hz		
Power Consumption	85 W		

•Design and specifications are subject to change without notice.

## ACCESSORIES LIST

DESCRIPTIONで判断できない物は "REFERENCE NAME LIST" を参照してください。  
If can't understand for Description please kindly refer to "REFERENCE NAME LIST".

REF. NO	PART NO.	KANRI NO.	DESCRIPTION
1	87-JBG-902-010	IB,NH (E) -CN202/142 -M	
2	87-JBG-953-010	RC UNIT,RC-7VT02	
3	87-B30-136-010	ANT ASSY,TV 5 SEC ( NTSC)	
4	87-A90-786-010	PLUG,CONVERSION IR46	

## NOTICES BEFORE REPAIRING

To make the best use of this equipment, make sure to obey the following items when repairing (or mending).

1. Do not damage or melt the tunicate of the leading wire on the AC1 side, including the power supply cord.
2. Do not soil or stain the letters on the spec. inscription plates, notice labels, fuse labels, etc.
3. When repairing the part extracted from the conducted side of the board pattern, fix it firmly with applying bond to the pattern and the part.
4. Restore the following items after repairing.
  - 1) Conditions of soldering of the wires (especially, the distance on the AC1 side).
  - 2) Conditions of wiring, bundling of wires, etc.
  - 3) Types of the wires.
  - 4) Attachment conditions of all types of the insulation.
5. After repairing, always measure the insulation resistance and perform the voltage-withstand test (See Fig-1).
  - 1) The insulation resistance must be 7.0 to 9.5 M $\Omega$  when applying 500V per second.
  - 2) In the voltage withstand test, apply 3.6 KV for 3 seconds and check that the GO lamp lights.

- \* Breaking current set to 5 mA.
- \* Connect the safety checker as shown in Fig-1, then measure the resistance and perform the test.
- \* Do not touch the equipment during testing.
- \* For details of the safety checker, refer to the supplied Operation manual.

Insulation resistance: 7.0 to 9.5 M $\Omega$  (500 V/s)  
Voltage-withstand: 3.6 KV for 3 or more seconds

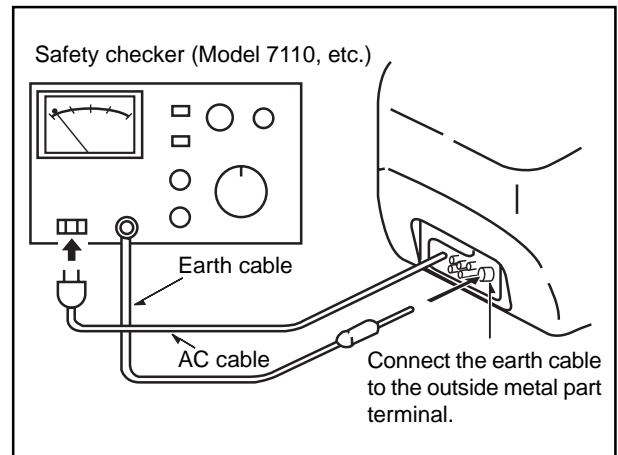


Fig-1

When servicing and checking on the TV, note the followings.

1. Keep the notices  
As for the places which need special attentions, they are indicated with the labels or seals on the cabinet, chassis and parts. Make sure to keep the indications and notices in the operation manual.
2. Avoid an electric shock.  
There is a high voltage part inside. Avoid an electric shock while the electric current is flowing.
3. Use the designated parts.  
The parts in this equipment have the specific characters of incombustibility and withstand voltage for safety.  
Therefore, the part which is replaced should be used the part which has the same character. Especially as to the important parts for safety which is indicated in the circuit diagram or the table of parts as a  $\triangle$  mark, the designated parts must be used.
4. Put parts and wires in the original position after assembling or wiring.  
There are parts which use the insulation material such as a tube or tape for safety, or which are assembled so that these parts do not contact with the printed board. The inside wiring is designed not to get closer to the pyrogenic parts and high voltage parts. Therefore, put these parts in the original positions.
5. Take care of the cathode-ray tube.  
By setting an explosion-proof cathode-ray tube is set in this equipment, safety is secured against implosion.  
However, when removing it or serving from backward, it is dangerous to give a shock. Take enough care to deal with it.
6. Avoid an X-ray.  
Safety is secured against an X-ray by considering about the cathode-ray tube and the high voltage peripheral circuit, etc. Therefore, when repairing the high voltage peripheral circuit, use the designated parts and do not change the circuit. Repairing except indicates causes rising of high voltage, and the cathode-ray tube emits an X-ray.
7. Perform a safety check after servicing.  
Confirm that the screws, parts and wiring which were removed in order to service are put in the original positions, or whether there are the portions which are deteriorated around the places serviced.

# DISASSEMBLY INSTRUCTIONS

## 1. HIGH-VOLTAGE CAP (ANODE CAP) REMOVAL

### 1-1. Cautions before Removing

#### Discharge the anode voltage

- (1) The anode voltage is not discharged completely from the CRT of this unit even after the power is turned off. Be sure to discharge the residual anode voltage before removing the anode cap.

#### Do not use pliers

- (2) Do not use pliers, etc. to remove the anode cap. If you used pliers and bent the hook to remove the cap, the spring characteristics of the hook could be lost, and when reinstalled, the cap would come off from the CRT anode button easily, causing an accident.

#### Do not turn the anode cap

- (3) If the anode cap is turned in the direction of its circumference, the hook is likely to come off.

### 1-2. Anode Cap Removal

Discharge the anode voltage. (See Figure 1)

- (1) Connect a flat-bladed screwdriver to the CRT GND via an alligator clip.
- (2) Use a tester to check the end of the screwdriver and ground of the TV for continuity.
- (3) Touch the hook with the end of the screwdriver.

**Caution :** Be careful not to damage the anode cap.

- (4) Turn over the anode cap.

**Caution :** Be careful not to damage the anode cap.

- (5) Push the anode cap with your thumb in the direction of arrow ① as shown in the figure, then lift the cap in the direction of arrow ② to release the hook on one side. (See Figure 3)

- (6) Turn over the anode cap on the side where the hook was released and pull out the cap in the direction opposite to that on which the cap was pushed. (See Figure 4)

**Caution :** Do not pull out the anode cap straight up.  
: Do not pull the cap forcibly. After removing the cap, check that the hook is not deformed.

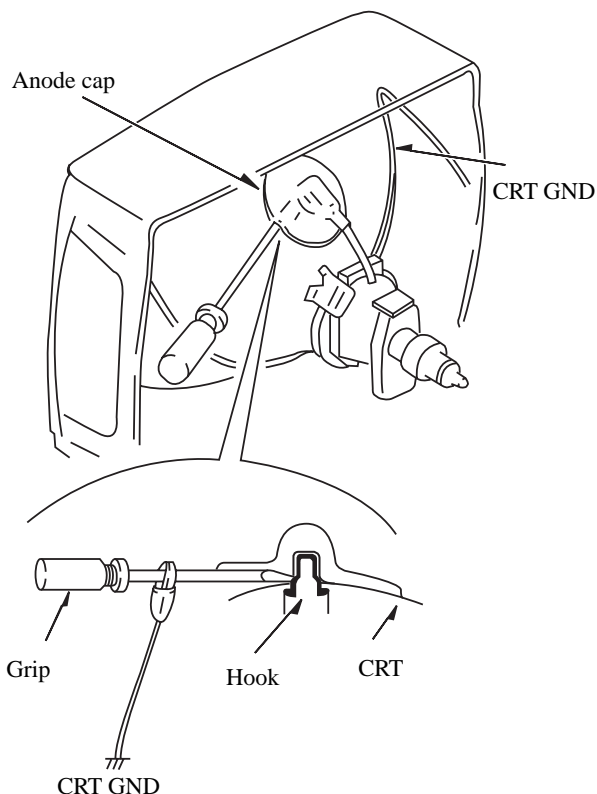


Fig. 1

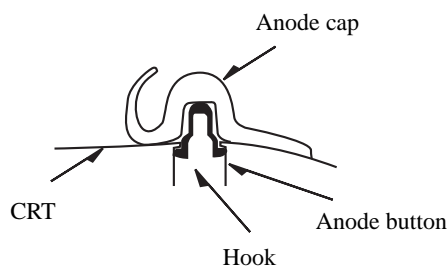


Fig. 2

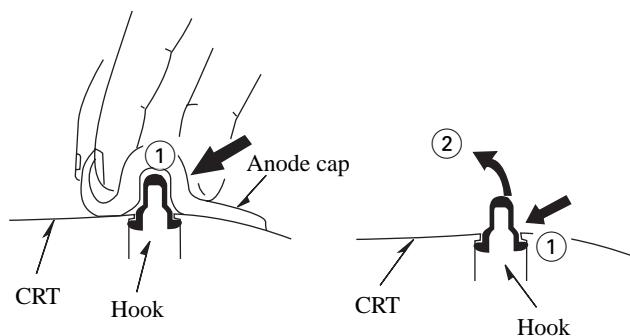


Fig. 3

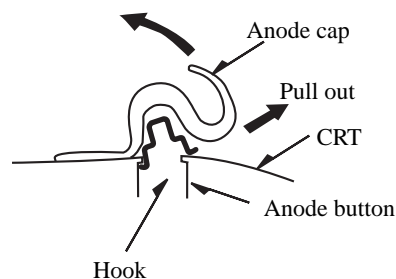


Fig. 4

## 2. ANODE CAP REINSTALLTION

Observe the cautions carefully so that no accident occurs due to a defect in installing the anode cap and so it does not come off.

### 2-1. Caution before Reinstalling

Never turn the anode cap after installing it

Never re-use the hook when it has been deformed

- (1) If the anode cap is turned after it is installed, it may come off. Therefore, arrange the high-voltage cable before attaching the anode cap. (See Figure 1-1)
- (2) If you have attached the anode cap before arranging the high-voltage cable, arrange the cable carefully so the cap does not turn.

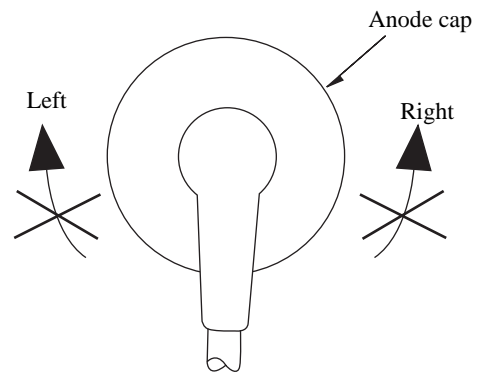


Fig. 1-1

### 2-2. Anode cap reinstallation

- (1) Use a clean cloth moistened slightly with alcohol to clean the installation section. (See Figure 2)  
**Caution :** Check that the installation section is free from dust, foreign matter, etc.
- (2) Coat the anode cap installation circumference with an appropriate amount of the specified silicone grease (KS-650N). (See Figure 2)  
**Caution :** Be careful that silicone grease does not enter the anode button.

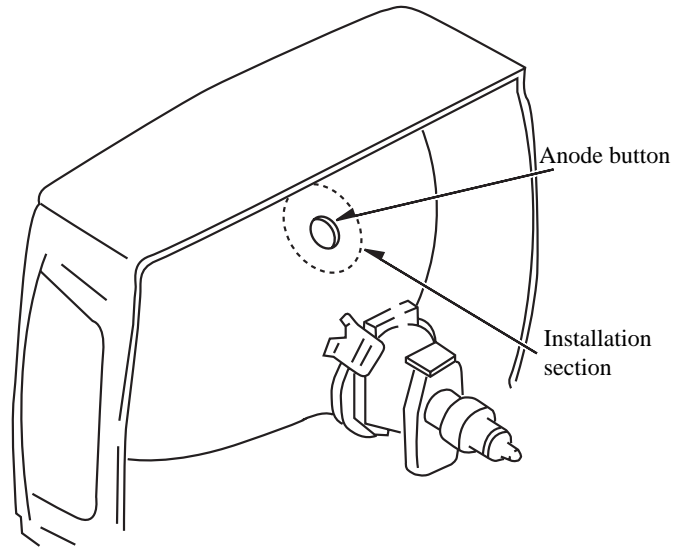


Fig. 2

- (3) Eliminate twisting, etc. of the high-voltage cable and arrange it so that no twisting occurs. (See Figure 3)  
**Caution :** If the cable is not arranged correctly, the anode cap could turn and cause an installation defect.

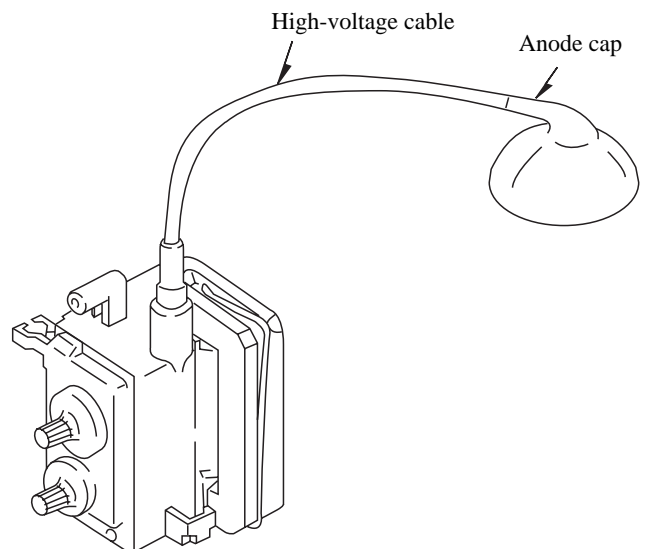


Fig. 3

- (4) Turn over the rubber cap symmetrically on the left and right. (See Figure 4)  
**Caution :** Take great care not to damage the anode cap.

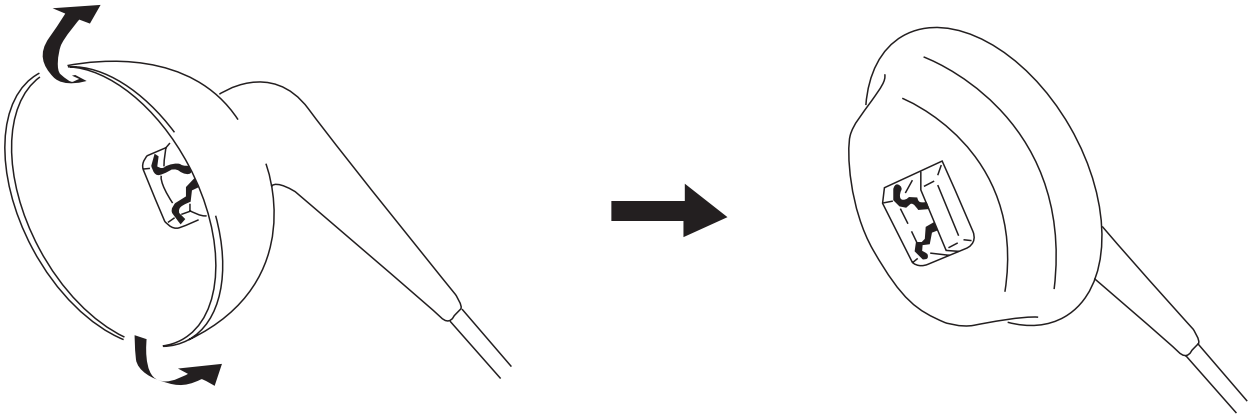


Fig. 4

- (5) Fit your forefinger over the projection at the center of the cap and hold the cap between your thumb and middle finger. (See Figure 5-1)  
 (6) Apply the hook on one side to the anode button as shown on the figure. (See Figure 5-2)  
**Caution :** Check that the hook is held securely.  
 (7) Apply the hook on the other side to the anode button as shown in Figure 5-3.

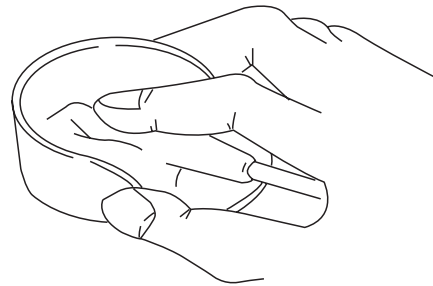


Fig. 5

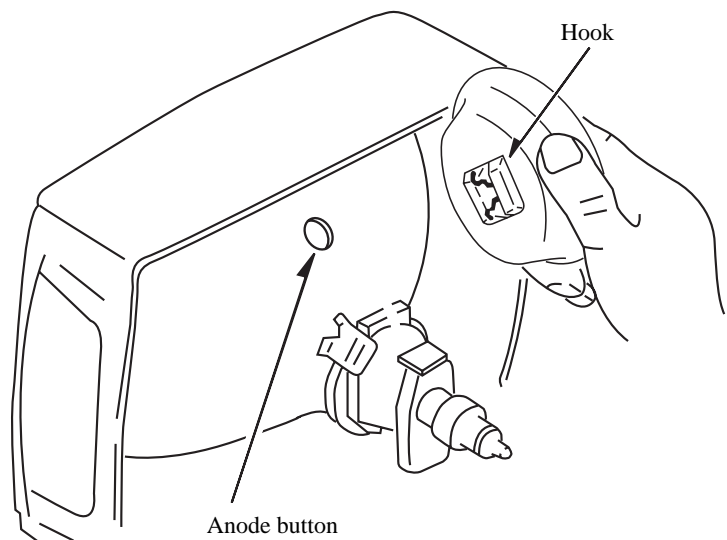
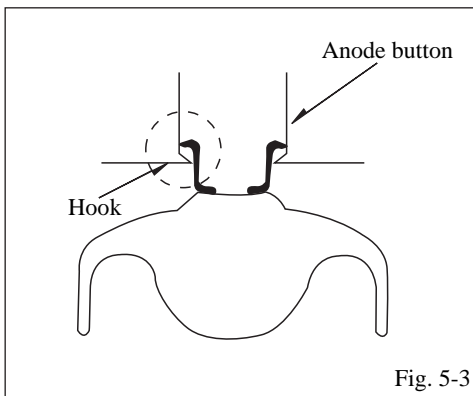
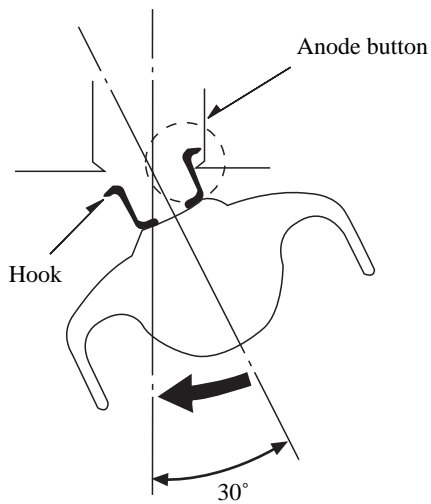


Fig. 5-2

- (8) Pull the anode cap slightly with the rubber cap turned over and visually check that the hook is engaged securely.
- (9) Release your hand from the rubber cap of the anode cap.
- Caution :** Cover the anode cap so that it does not lift.
- (10) Hold the skirt of the anode cap slightly to improve the close contact between the cap and CRT.
- (11) Check that the anode cap is in close contact with the CRT. (See Figure 6)

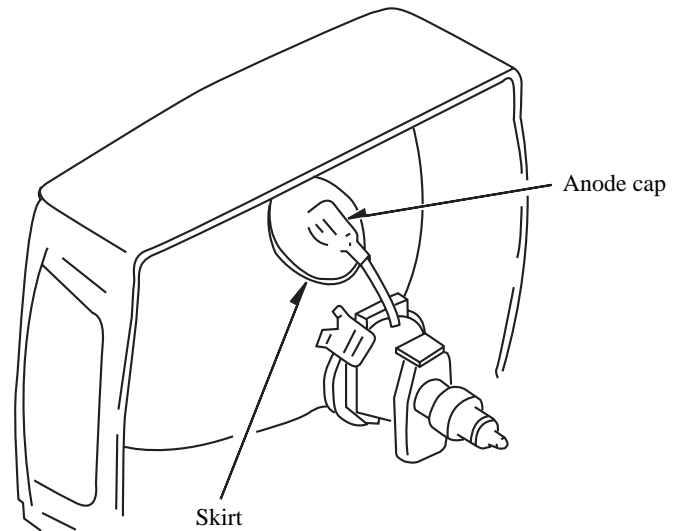


Fig. 6

### 3. CASE REMOVAL

#### 3-1. Rear Cabinet Removal (See Figure 1)

- (1) Remove four screws ① and three screws ②, then remove the rear cabinet in the direction of the arrow.

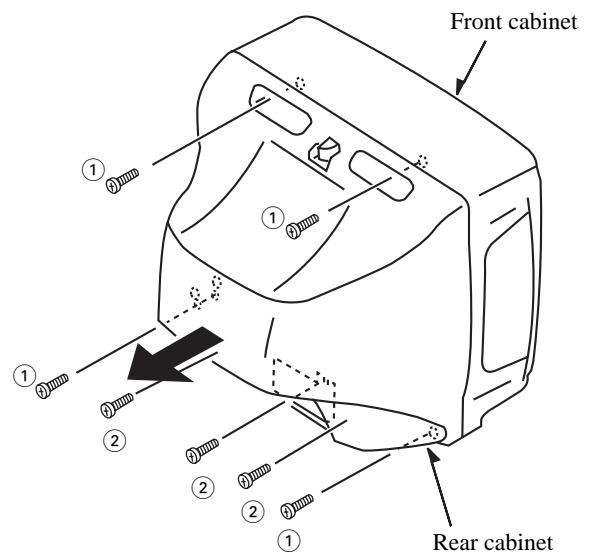


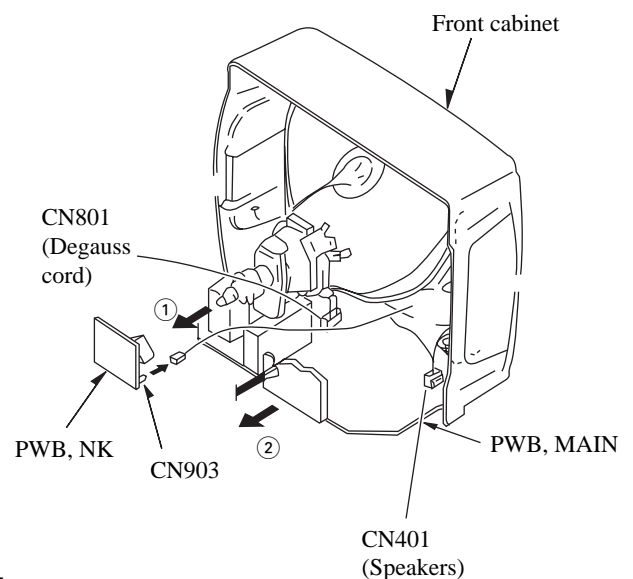
Fig. 1

#### 3-2. Neck C.B. (PWB, NK) Removal (See Figure 2)

- (1) Disconnect CN903 (CRT GND).
- (2) Remove the Neck C.B. in the direction of arrow ①.

#### 3-3. Main C.B. (PWB, MAIN) Removal (See Figure 2)

- (1) Remove connector (CN401).
- (2) Remove connector (CN801).
- (3) Pull out the Main C.B. in the direction of the direction of arrow ②.



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8



REF. NO	PART NO.	KANRI NO.	DESCRIPTION	REF. NO	PART NO.	KANRI NO.	DESCRIPTION
C606	87-A10-474-090		CAP,PP 0.01-1.25K J PHS	L301	87-003-051-080		COIL,470UH
C607	87-010-974-080		CAP,CER 220P-500 B	L303	87-003-149-080		COIL,47UH
C609	87-016-583-080		CAP,E 100-25 SSL	L304	87-003-147-080		COIL, 22UH
C610	87-016-594-090		CAP,E 1000-35 M SSL	L305	87-003-295-080		COIL,10UH
C611	87-010-976-080		CAP,CER 1000P-500 B	L306	87-003-147-080		COIL, 22UH
C612	87-010-974-080		CAP,CER 220P-500 B	L501	87-005-608-080		COIL,33UH J LAV35
C616	87-A10-674-090		CAP,M/P 0.47-250 J	L603	87-A50-040-010		COIL,2.2MH
C701	87-016-633-080		CAP,E 1-50 SSL	L802	87-A50-170-010		COIL,390UH RCH106
C702	87-016-637-080		CAP,E 10-50 SSL	L803	87-005-608-080		COIL,33UH J LAV35
C705	87-016-637-080		CAP,E 10-50 SSL	△LF801	87-JB8-650-010		FLTR,LINE SS24H-K18055
C707	87-016-633-080		CAP,E 1-50 SSL	△P801	87-A30-096-010		P-TR,TLP721F
C708	87-016-637-080		CAP,E 10-50 SSL	△P802	87-A30-096-010		P-TR,TLP721F
C710	87-016-622-080		CAP,E 470-10 SSL	△PR601	87-A90-757-080		PROTECTOR,0.75A 60V 491
C712	87-016-637-080		CAP,E 10-50 SSL	△PR801	87-A90-090-080		PROTECTOR,1.5A 491SERIES 60V
C715	87-016-633-080		CAP,E 1-50 SSL	△PR802	87-026-681-080		PROTECTOR,5A 60V 491
C716	87-016-634-080		CAP,E 2.2-50 SSL	△PR803	87-A90-247-080		RPOTECTOR,0.315A 60V 491
C801	87-A10-688-090		CAP,M/P 0.22-275 K (B81133)	R327	87-A00-161-090		RES,M/F 47-2W J RSF(S)
C802	87-A10-688-090		CAP,M/P 0.22-275 K (B81133)	R401	87-A00-150-090		RES,M/F 220-1W J RSF(S)
C803	87-012-370-010		CAP,CER 3300P-250NS	R402	87-A00-150-090		RES,M/F 220-1W J RSF(S)
C804	87-012-370-010		CAP,CER 3300P-250NS	△R406	87-029-158-060		RES,FUSE 1-1W J
C808	87-A10-646-090		CAP,E 220-400 SMH (25.4*40)	△R407	87-029-158-060		RES,FUSE 1-1W J
C809	87-016-584-080		CAP,E 220-25 SSL	R503	87-025-429-080		RES,M/F 47K-1/6W F
C810	87-A10-728-080		CAP,E 680-10 M LXV	R507	87-A00-197-090		RES,M/F 1.2-1W J RSF
C811	87-018-131-080		CAP, CER 1000P-50V	R603	87-A00-247-090		RES,M/F 100-3W J RSF
C812	87-A10-645-010		CAP,M/P 0.01-1K J MMH	R605	87-A00-300-090		RES,M/F 2.2-1W J RSF(F)
C813	87-012-372-010		CAP,CER 1000P-2K	R610	87-A00-225-090		RES,M/F 2.2K-5W J RSV5
C814	87-A10-832-010		CAP,CER 1000P-1K K R LONG	R611	87-A00-196-090		RES,M/F 0.47-1/2W J RSF(S)
C815	87-012-397-010		CAP,CER 1000P-2K BN	R804	87-A00-224-090		RES,SD 8.2M-1W J CE
C816	87-A10-731-090		CAP,E 220-160 M KMF	R805	87-A00-333-090		RES,M/F 100K-3W J RSS
C817	87-A10-756-090		CAP,E 100-160 M KMF	R806	87-A00-287-090		RES,CEM 0.33-5W K RGC5
C819	87-016-576-080		CAP,E 330-16 SSL	R807	87-A00-333-090		RES,M/F 100K-3W J RSS
C821	87-016-588-090		CAP,E 2200-25 SSL	R808	87-A00-243-090		RES,M/F 22-1W J RSF(S)
C822	87-016-587-090		CAP,E 1000-25 M SSL	R809	87-A00-332-090		RES,CEM 1-10W J RGC
C823	87-016-627-080		CAP,E 47-16 SSL	R810	87-A00-332-090		RES,CEM 1-10W J RGC
C824	87-016-583-080		CAP,E 100-25 SSL	R812	87-A00-170-090		RES,M/F 82K-3W J RSF(S)
C825	87-A10-469-080		CAP,CER 2200P-500 K B DD10	R815	87-A00-199-090		RES,M/F 12K-3W J RSF(S)
CF201	84-LB3-627-010		FLTR,SFSF 4.5MDB SIF	R816	87-A00-223-090		RES,M/F 47K-2W J RSF(S)
CF202	84-LB3-626-010		FLTR,TPS4.5MB2	SF201	87-A90-694-010		FLTR,SAW TSF1239P
CN401	87-049-469-010		CONN,4P V	SFR201	87-024-433-080		SFR,10K RH063EC
CN601	87-099-675-010		CONN,5P V V	SFR301	87-024-432-080		SFR,4.7K RH063EC
!CN801	87-099-454-010		CONN,2P TV-50 EYLET	SFR302	87-024-434-080		SFR,22K RH063EC
!CN802	87-099-674-010		CONN,2P VA V	SFR303	87-024-434-080		SFR,22K RH063EC
D1	87-070-110-010		LED,SLP-181B-51	SFR501	87-A90-385-080		SFR,22K H DIA6 EVM
!FB801	87-035-458-010		FUSE,4A 250V T W/C	SW2	87-A90-712-080		SW,TACT EVQ11L07K
FB801	87-003-320-080		F-BEAD,FBR07HA121NB	SW3	87-A90-712-080		SW,TACT EVQ11L07K
FB802	87-003-320-080		F-BEAD,FBR07HA121NB	SW4	87-A90-712-080		SW,TACT EVQ11L07K
FB803	87-003-320-080		F-BEAD,FBR07HA121NB	SW5	87-A90-712-080		SW,TACT EVQ11L07K
FB804	87-003-320-080		F-BEAD,FBR07HA121NB	SW6	87-A90-712-080		SW,TACT EVQ11L07K
FB805	87-003-320-080		F-BEAD,FBR07HA121NB	SW7	87-A90-712-080		SW,TACT EVQ11L07K
△FC801	87-033-213-080		CLAMP, FUSE	SW501	87-A90-567-010		SW,LVR 4-1-3 EVQRAAL10
△FC802	87-033-213-080		CLAMP, FUSE	△SW801	87-A90-364-010		SW,PUSH SDDLBI-C-D-2
△FR601	87-A00-063-060		RES,FUSE 2.2-1/2W J R-TYPE	△T601	84-LB2-606-010		FBT,HFL1530G
△FR602	87-A00-371-090		RES,FUSE 5.6-1W J R-TYPE	T602	85-JT2-653-010		PT,HDT-TV141-2
△FR604	87-A00-051-060		RES,FUSE 2.7-1W J R-TYPE	△T801	87-JBC-627-010		PT,SWT 7JB
△FR801	87-A00-081-090		RES,FUSE 1-1/2W	TH801	87-A90-830-010		POS-THMS,PTH451C463BF9RQ270
J401	87-A60-420-010		JACK,3.5 ST (MSC)	TU101	87-A90-660-010		TU UNIT, BTP-AB455
J701	87-A60-321-010		JACK,PIN 2P BLK-Y	X1	87-030-212-080		CERA LOCK CST8.0M
J702	87-A60-323-010		JACK,PIN 4P Y-BLK	X301	87-A70-007-080		VIB,XTAL 3.58MHZ AQC-1001
L1	87-005-614-080		COIL 100UH LAV35 J	X302	87-A70-017-010		VIB,CER 503KHZ F45
L2	87-005-614-080		COIL 100UH LAV35 J				
L101	87-005-614-080		COIL 100UH LAV35 J	NK C.B			
L102	87-005-608-080		COIL,33UH J LAV35				
L201	84-LB2-684-010		COIL,TRAP 47.25 SA		84-LB2-633-110		CONN ASSY,1P CRT GND
L202	87-003-140-080		CH COIL 0.82	C901	87-018-129-080		CAP, CER 680P-50V
L203	84-LB2-681-010		COIL,VCO 45.75 SA	C902	87-018-129-080		CAP, CER 680P-50V
L204	87-005-604-080		COIL,15UH J LAV35	C903	87-018-129-080		CAP, CER 680P-50V
L205	87-003-146-080		COIL,15UH LAL02	△C905	87-012-397-010		CAP,CER 1000P-2K BN
L206	84-LB2-682-010		COIL,AFT 45.75 SA	CN901	87-049-469-010		CONN,4P V
L207	84-LB2-683-010		COIL,SIF 4.5M SA	CN902	87-009-033-010		CONNECTOR, 5P
L208	87-005-485-080		COIL,100UH J FLR50	CN903	87-A60-485-010		CONN,2P V LV GRA

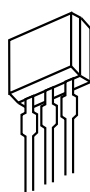
REF. NO	PART NO.	KANRI NO.	DESCRIPTION
L901	87-005-615-080		COIL,120UH J LAV35
△R904	87-A00-165-090		RES,M/F 15K-2W J RSF(S)
△R905	87-A00-165-090		RES,M/F 15K-2W J RSF(S)
△R906	87-A00-165-090		RES,M/F 15K-2W J RSF(S)
R907	87-025-355-080		RES,M/F 100-1/6W F
S901	84-LB3-610-010		SOCKET,CRT HPS1171
SFR901	87-024-519-080		SFR,470 DIA6 V NTP
SFR902	87-024-519-080		SFR,470 DIA6 V NTP
SFR903	87-024-520-080		SFR,1K DIA6 V NTP
SFR904	87-024-520-080		SFR,1K DIA6 V NTP
SFR905	87-024-520-080		SFR,1K DIA6 V NTP

## TRANSISTOR ILLUSTRATION



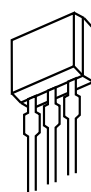
E C B

2SC3467



S D G

2SK2541  
2SJ460



E C B

2SC2785  
2SA1175



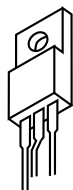
E C B

2SC2688



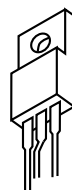
B E C

2SC3779



1 2 3

SE115N

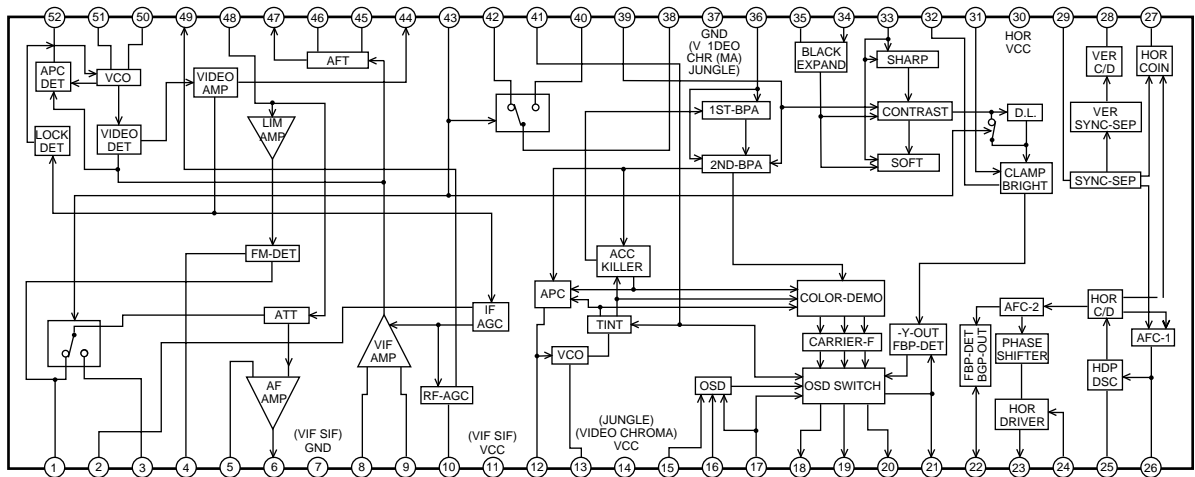


B C E

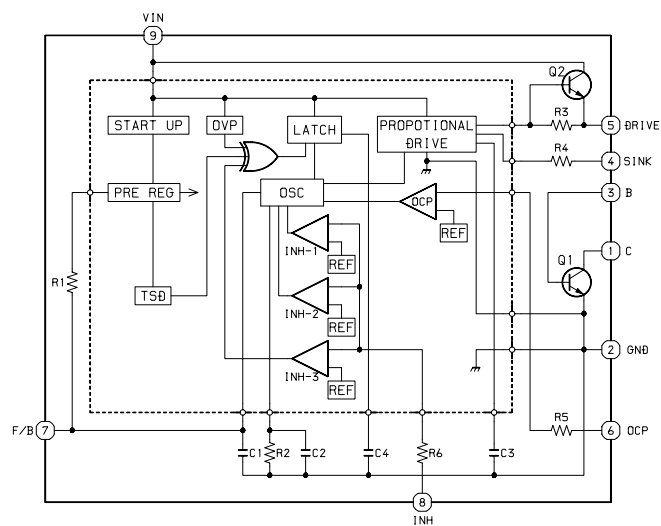
2SD2333

## IC BLOCK DIAGRAM

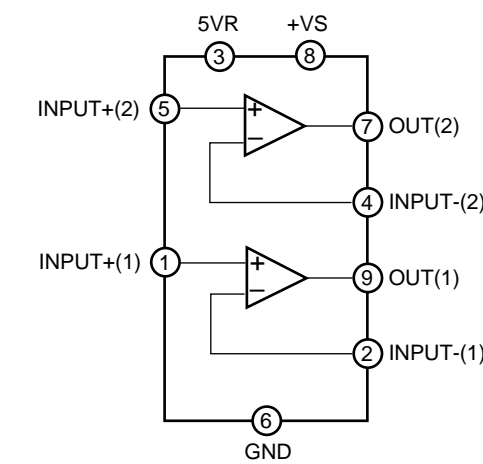
IC, LA7676D



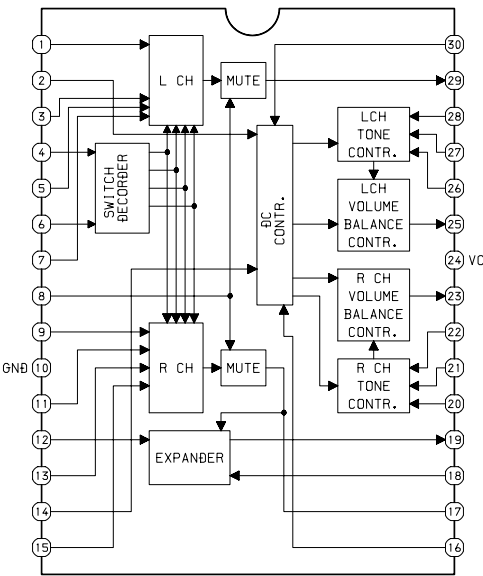
IC, STR-S6707



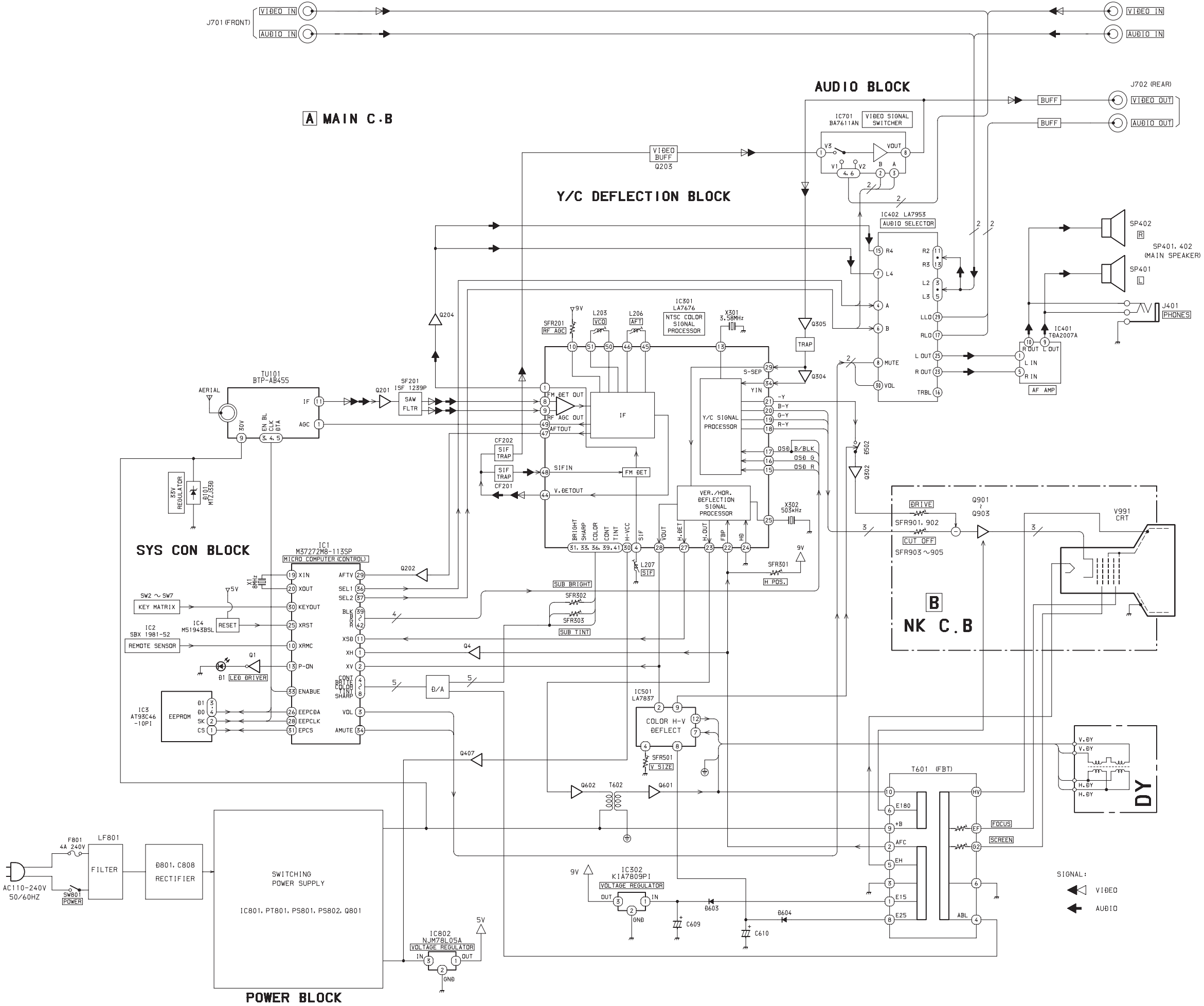
IC, TDA2007A



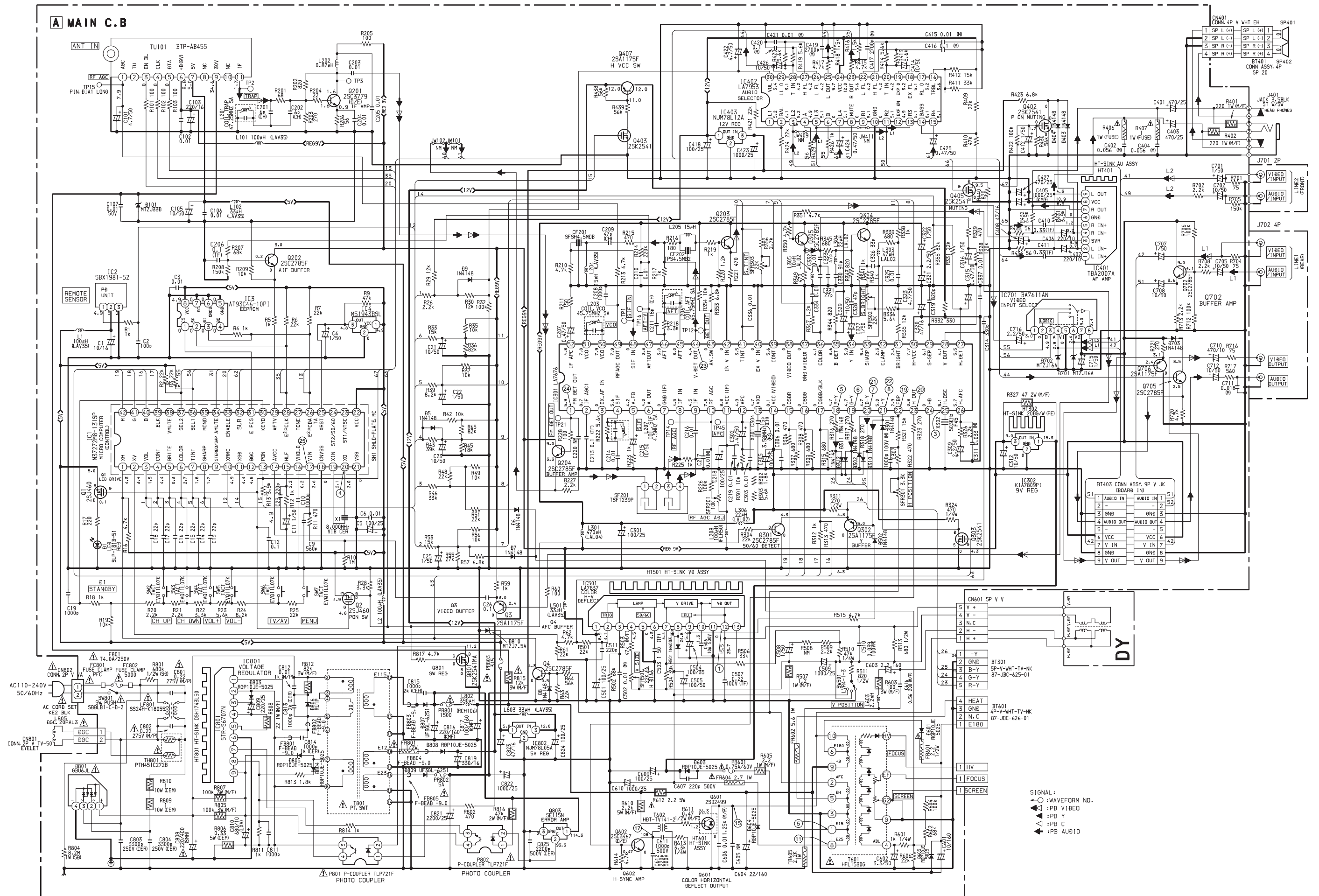
IC, LA7953



BLOCK DIAGRAM

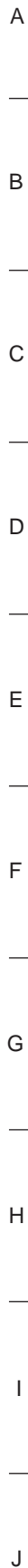


SCHEMATIC DIAGRAM-1 (MAIN C.B SECTION)

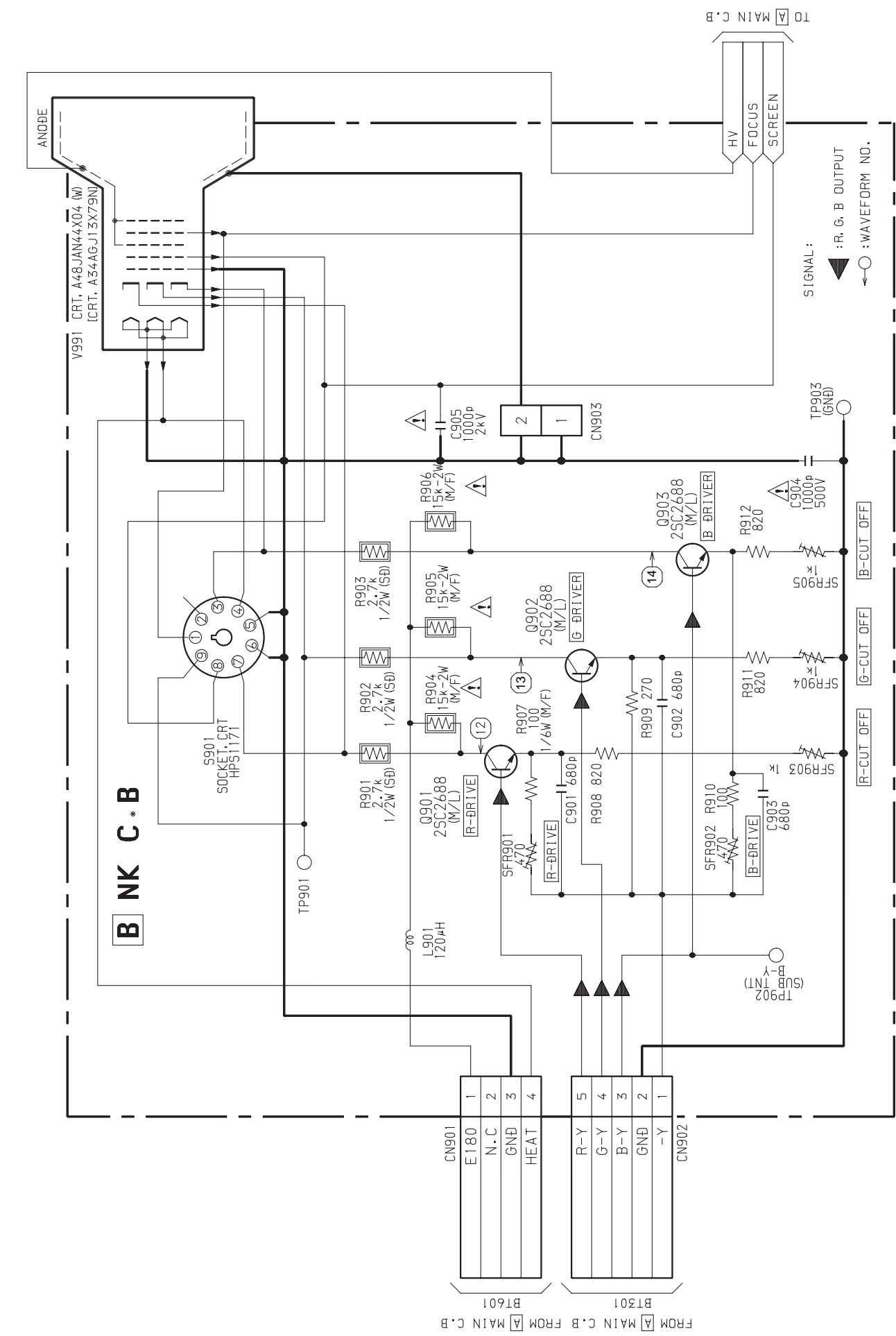




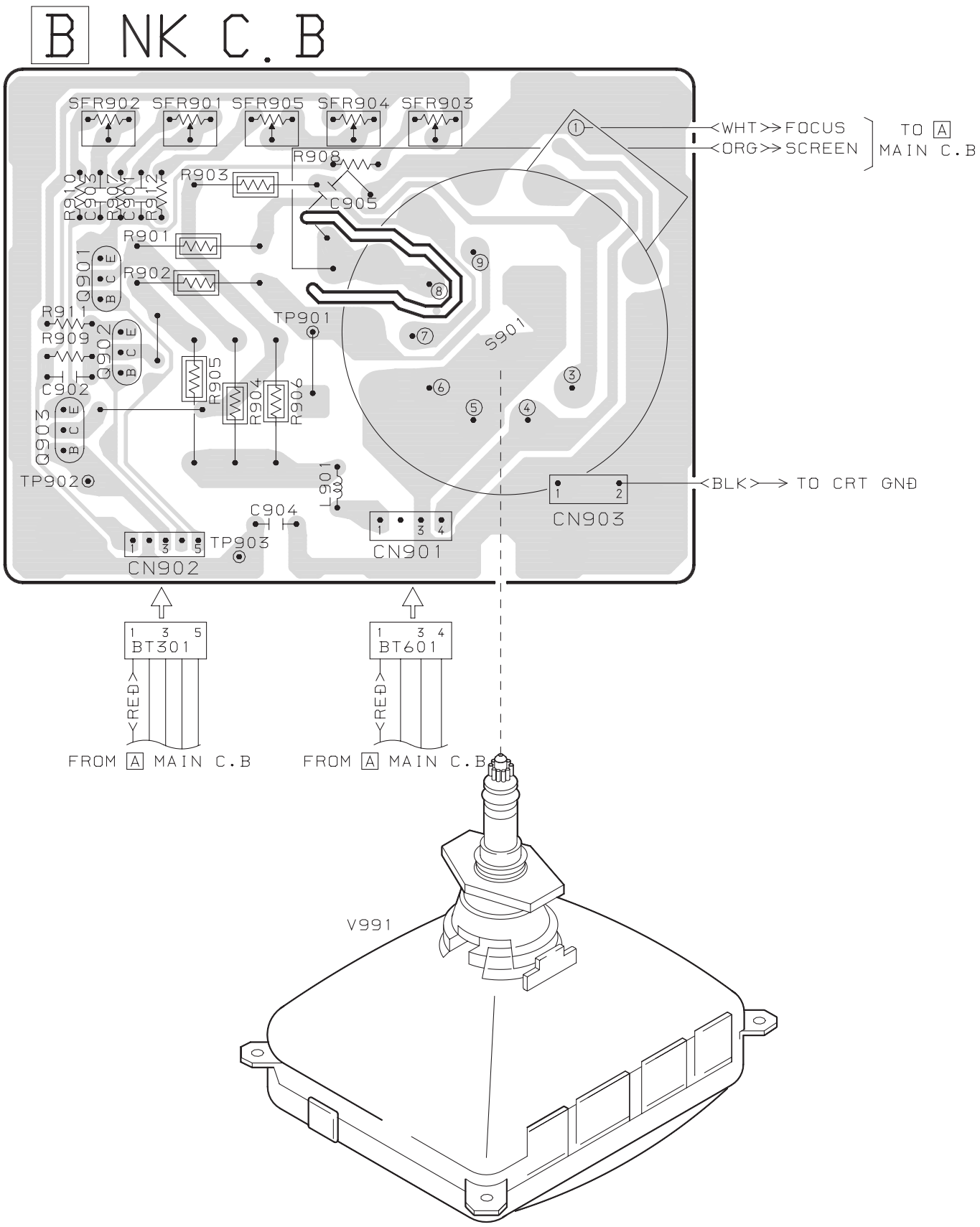
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
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SCHEMATIC DIAGRAM-2 (N.K C.B SECTION)



WIRING-2 (N.K C.B SECTION)

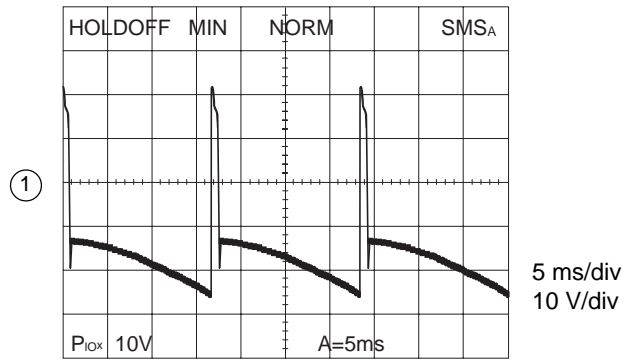




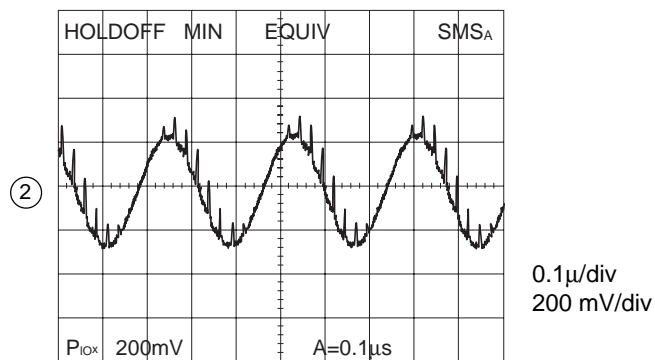
# WAVEFORM

Input condition : Tuner 11ch (199.25MHz), 80dBμ input : P = Full Field CB & S = 1kHz (Mono)

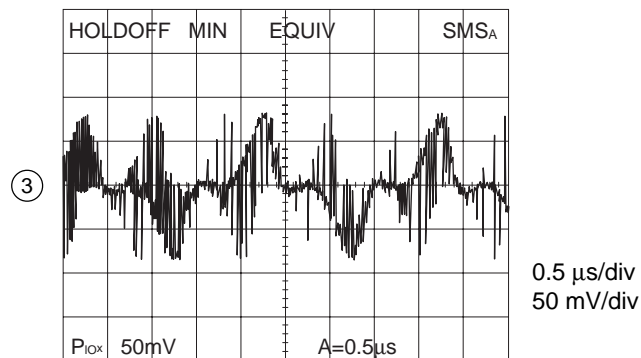
① IC501 Pin 12



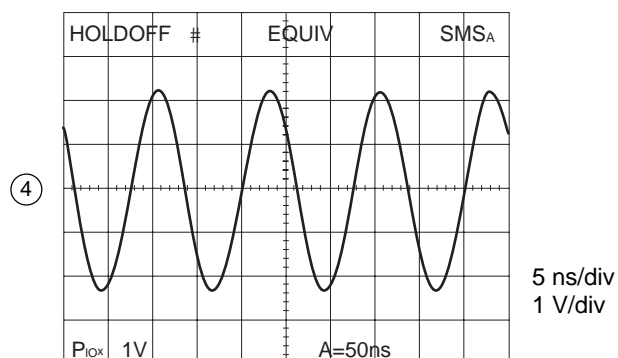
② Between X301 & C304



③ IC301 Pin 25

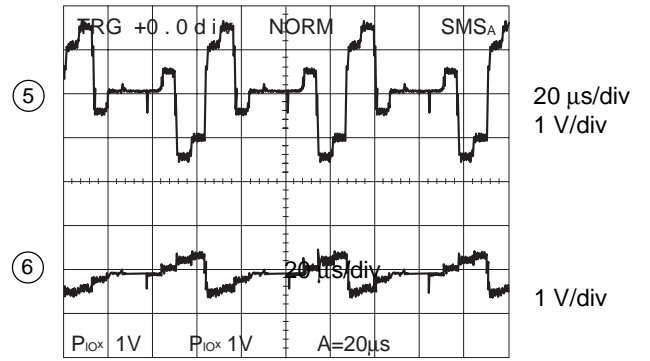


④ IC1 Pin 20



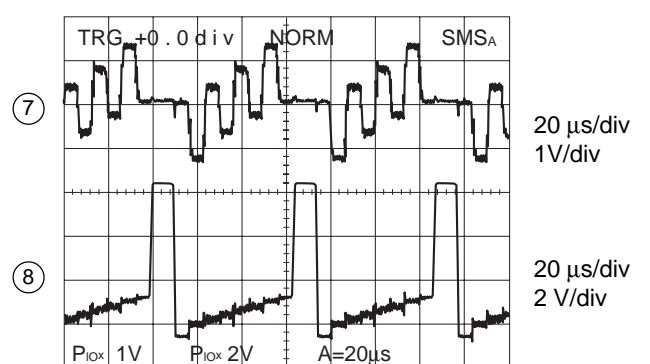
⑤ IC301 Pin 18

⑥ IC301 Pin 19

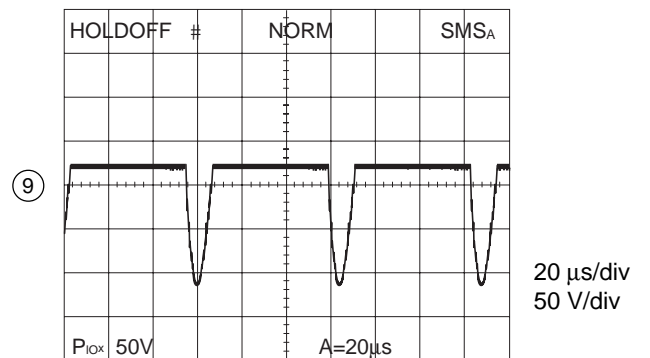


⑦ IC301 Pin 20

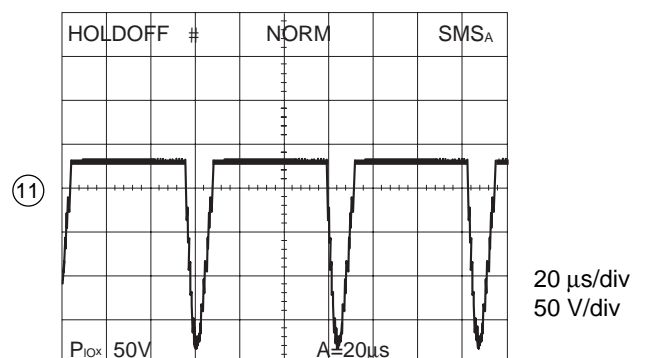
⑧ IC301 Pin 21



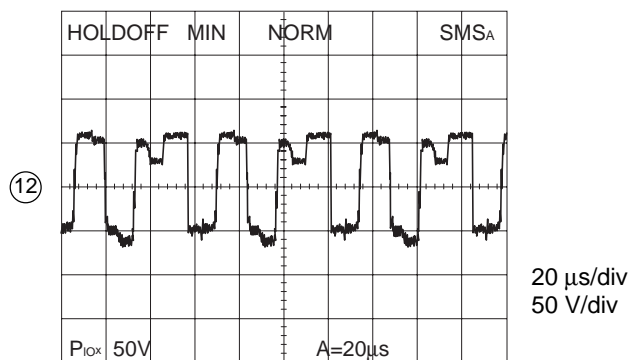
⑨ T601 Pin 1



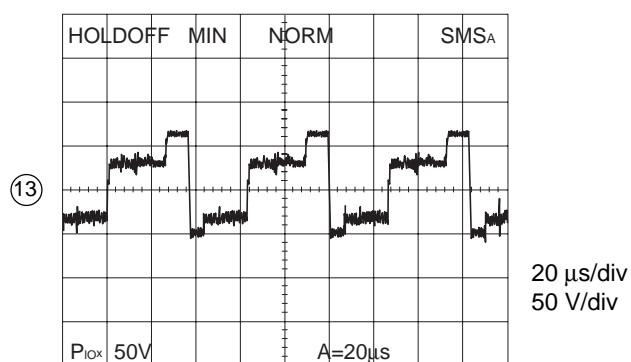
⑪ T601 Pin 8



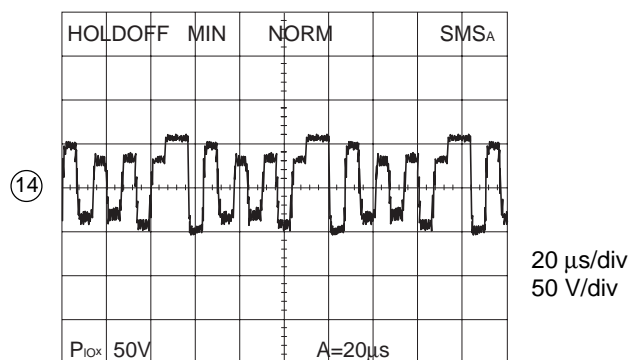
⑫ Q901 Collector



⑬ Q902 Collector

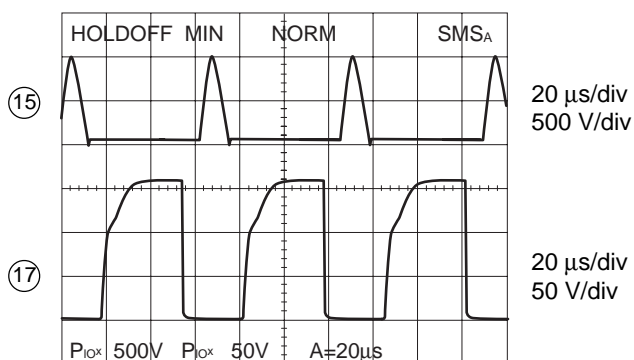


⑭ Q903 Collector



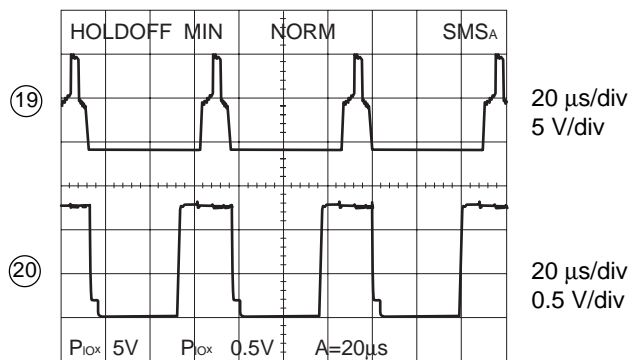
⑮ Q601 Collector

⑰ Q602 Collector



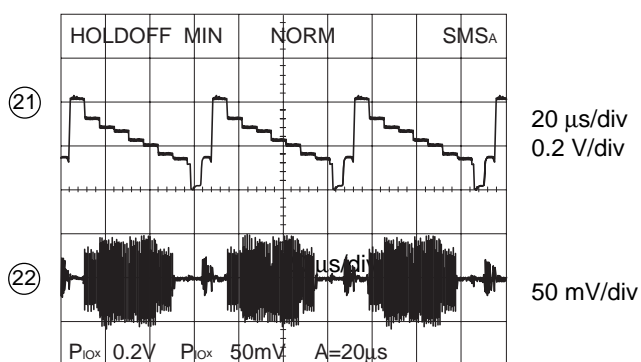
⑰ IC301 Pin 22

⑳ IC301 Pin 23

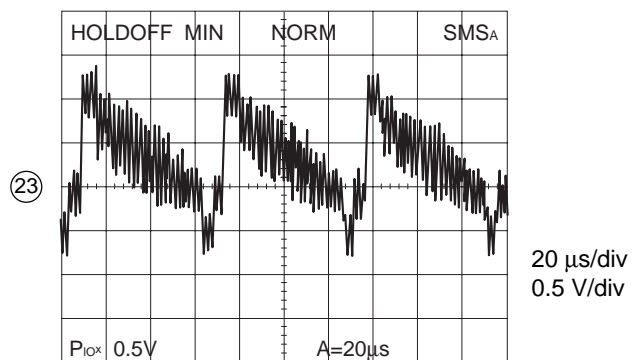


㉑ IC301 Pin 20

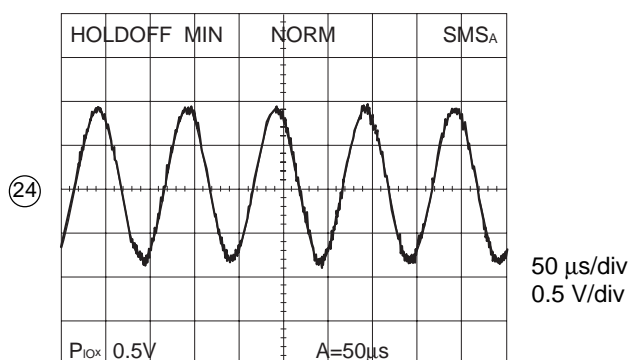
㉒ IC301 Pin 21



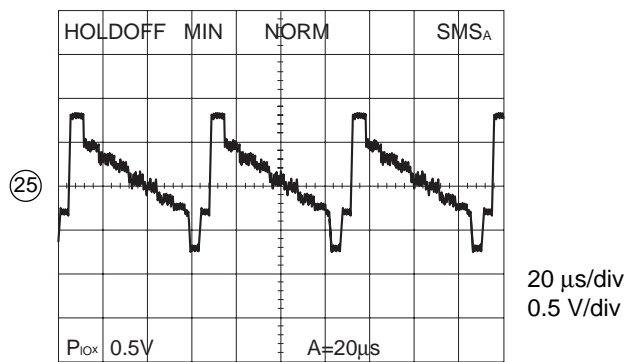
㉓ IC301 Pin 44



㉔ IC301 Pin 1



②⑤ IC1 Pin 17



# IC DESCRIPTION

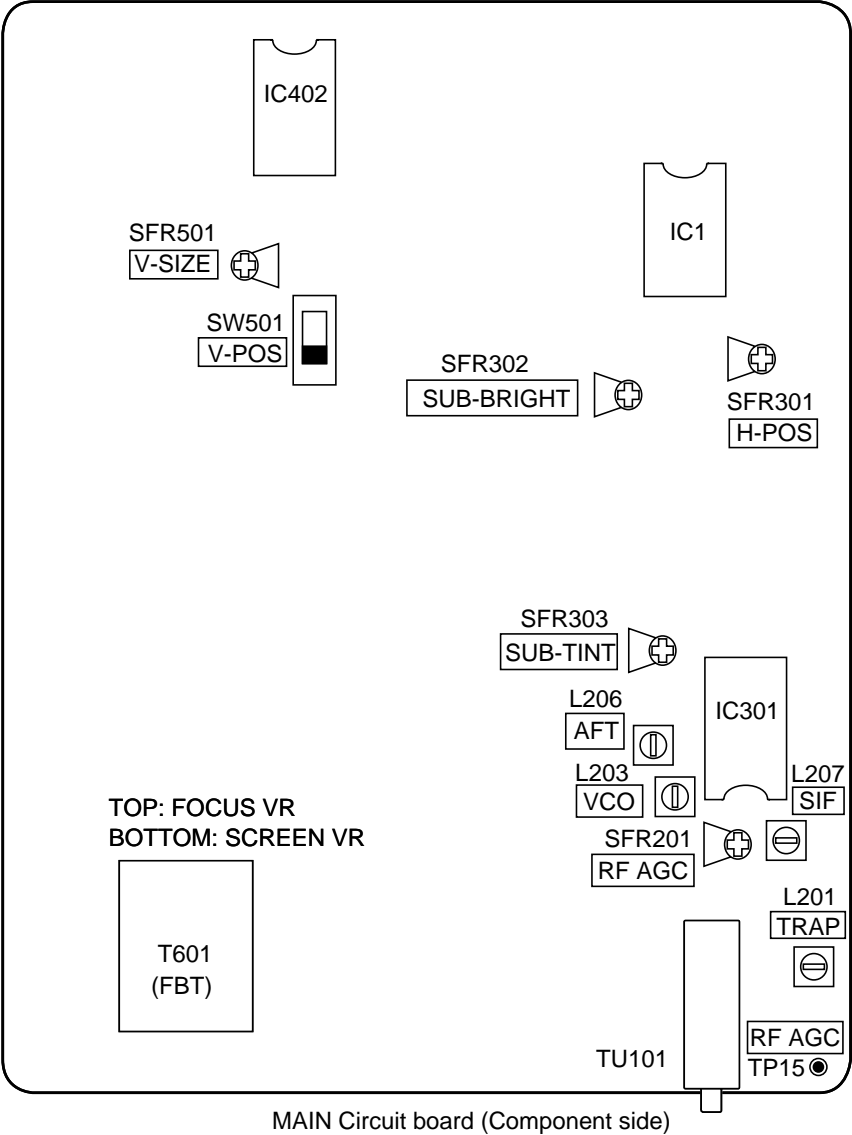
IC, M37272M8-113SP

Pin No.	Pin Name	I/O	Description																																																
1	$\overline{\text{HSYNC}}$	I	OSD horizontal synchronised signal input terminal. "L"= active.																																																
2	$\overline{\text{VSYNC}}$	I	OSD vertical synchronised signal input terminal. "L"= active.																																																
3	VOL	O	Volume control output. (Volume PWM 8 bit.)																																																
4	CONT	O	Contrast control output. (Contrast PWM 8 bit.)																																																
5	BRIGHT	O	Brightness control output. (Brightness PWM 8 bit.)																																																
6	COLOR	O	Color control output. (Color PWM 8 bit.)																																																
7	TINT	O	Tint control output. (Tint PWM 8 bit.)																																																
8	SHARP	O	Sharpness control output. (Sharpness PWM 8 bit.)																																																
9	STEREO / SAP	I	STEREO / SAP detect. (Not connected)																																																
10	$\overline{\text{RMC}}$	I	Remote control signal is led to this pin.																																																
11	SD	I	Horizontal sync. detected input. The level of this pin will be sampled by $\mu$ -P to determine whether there is picture signal detected.																																																
12	DGC	–	Not connected.																																																
13	$\overline{\text{PON}}$	O	During standby mode, "H" level is inserted to switch off horizontal deflection and high voltage.																																																
14	AVCC	–	5V supply.																																																
15	HLF	–	Connected to filter.																																																
16	VHOLD	–	Connected to condensor.																																																
17	CVIN	I	Video signal input.																																																
18	CNVSS	–	Connected to ground.																																																
19	XIN	I	8 MHz clock input.																																																
20	XOUT	O	8 MHz clock output.																																																
21	VSS	–	Connected to ground.																																																
22	VCC	–	5 V supply.																																																
23, 24	ST1, ST2 (NC)	O	<div> <div> <b>TUNER SAP</b> <table> <tr> <th></th><th>Pin 23</th><th>Pin 24</th><th>Pin 35</th></tr> <tr> <td>MONO/SAP</td><td>L</td><td>L</td><td>L</td></tr> <tr> <td>MONO</td><td>L</td><td>H</td><td>L</td></tr> <tr> <td>SAP</td><td>H</td><td>L</td><td>L</td></tr> </table> </div> <div> <b>TUNER STEREO</b> <table> <tr> <th></th><th>Pin 23</th><th>Pin 24</th><th>Pin 35</th></tr> <tr> <td>STEREO</td><td>L</td><td>L</td><td>L</td></tr> <tr> <td>MONO</td><td>L</td><td>H</td><td>H</td></tr> </table> </div> </div> <div> <b>TUNER STEREO / SAP</b> <table> <tr> <th></th><th>Pin 23</th><th>Pin 24</th><th>Pin 35</th></tr> <tr> <td>MONO/SAP</td><td>L</td><td>L</td><td>L</td></tr> <tr> <td>STEREO</td><td>L</td><td>H</td><td>L</td></tr> <tr> <td>SAP</td><td>H</td><td>L</td><td>L</td></tr> <tr> <td>MONO</td><td>L</td><td>H</td><td>H</td></tr> </table> </div> <div> <b>PIN 35 : MONO</b> </div>		Pin 23	Pin 24	Pin 35	MONO/SAP	L	L	L	MONO	L	H	L	SAP	H	L	L		Pin 23	Pin 24	Pin 35	STEREO	L	L	L	MONO	L	H	H		Pin 23	Pin 24	Pin 35	MONO/SAP	L	L	L	STEREO	L	H	L	SAP	H	L	L	MONO	L	H	H
	Pin 23	Pin 24	Pin 35																																																
MONO/SAP	L	L	L																																																
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SAP	H	L	L																																																
	Pin 23	Pin 24	Pin 35																																																
STEREO	L	L	L																																																
MONO	L	H	H																																																
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MONO/SAP	L	L	L																																																
STEREO	L	H	L																																																
SAP	H	L	L																																																
MONO	L	H	H																																																
25	$\overline{\text{RST}}$	I	Used to reset the $\mu$ -P when power up.																																																
26	SLDA	I/O	Data bus between $\mu$ -P and E <sup>2</sup> PROM / tuner.																																																
27	TONE	–	Not connected.																																																
28	SLCK	O	Synchronizing clock between $\mu$ -P and E <sup>2</sup> PROM / tuner provided by $\mu$ -P through this pin.																																																
29	AFTV	I	AFT voltage from IC301 is received by $\mu$ -P during channel tuning.																																																
30	KEY0	I	Input key is detected by monitor.																																																

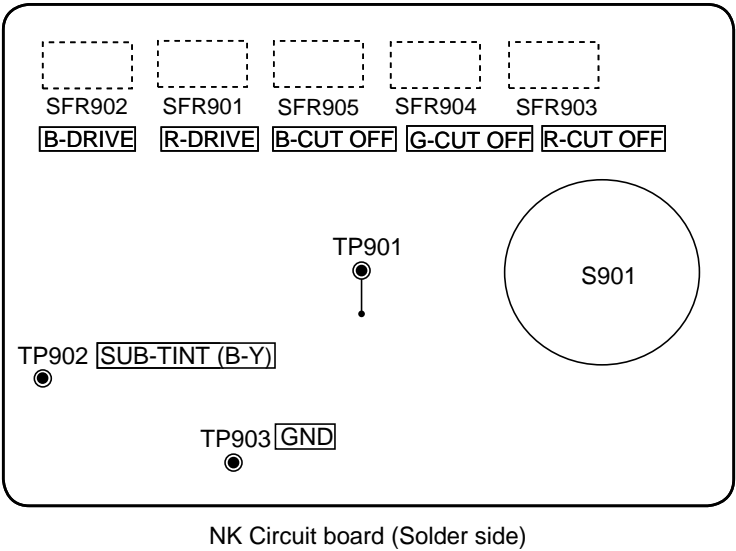
Pin No.	Pin Name	I/O	Description												
31	EEP CS	O	EEP-ROM chip selection.												
32	SUR	O	Surround ON "H", OFF "L".												
33	ENABLE	O	Timing data bus between $\mu$ -P and tuner.												
34	AMUTE	O	Used to mute line out sound and picture when no input signal is detected. "H" to mute.												
35	MONO	O	Compel the sound system to monaural. (Not connected)												
36, 37	SEL1, SEL2	O	Selecting tuner receiving band. <table><tr><td></td><td>Pin 36</td><td>Pin 37</td></tr><tr><td>TUNER</td><td>L</td><td>L</td></tr><tr><td>VIDEO 1</td><td>H</td><td>L</td></tr><tr><td>VIDEO 2</td><td>L</td><td>H</td></tr></table>		Pin 36	Pin 37	TUNER	L	L	VIDEO 1	H	L	VIDEO 2	L	H
				Pin 36	Pin 37										
			TUNER	L	L										
			VIDEO 1	H	L										
VIDEO 2	L	H													
Reset start : Both of Pin 36, Pin 37 are "H".															
38	VMUTE	–	Not connected.												
39	BLK	O	OSD blanking output.												
40	B	O	OSD blue output.												
41	G	O	OSD green output.												
42	R	O	OSD red output.												

ADJUSTMENT

**A** MAIN C.B

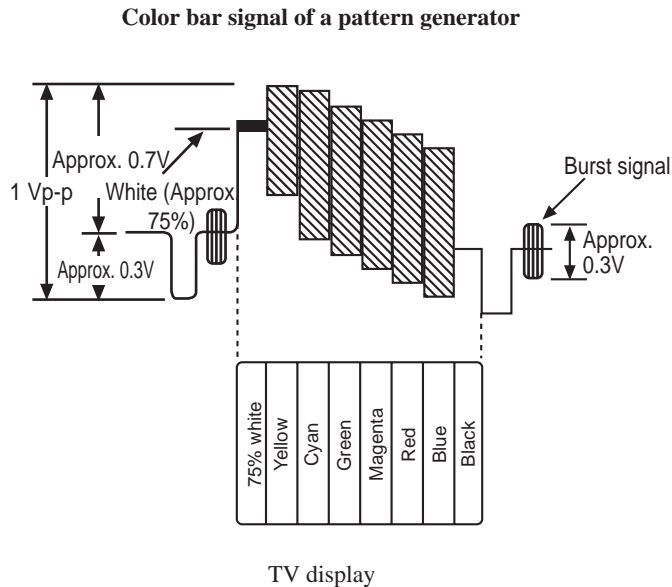


**B** NK C.B



## SET-UP FOR ADJUSTMENT

Because the video signal output from a pattern generator is used as the adjustment signal input during adjustment, the video signal output from the pattern generator must conform with the specifications. Measure the output waveform across  $75\ \Omega$  load. Confirm that the synchronizing signal has an amplitude of about 0.3 V, the video signal portion has an amplitude of about 0.7 V and the burst signal has an amplitude of about 0.3 V with flat envelope. Confirm that ratio of the burst signal amplitude and the red signal amplitude is 0.30 : 0.66. If the output signal does not conform with the specifications, calibrate the pattern generator. (Refer to pattern generator operation manual.) Use the LEADER: LCG 404 for the pattern generator.



### Precautions before starting adjustment

Satisfy the following setting conditions before starting adjustment.

- Allow warm-up of 20 minutes or longer. (Do not turn off during warm-up.)
- Set all picture quality controls of users' setting to initial set-up, unless otherwise specified.
- Picture quality reset
  1. Select "Picture" on the screen menu and press enter button.
  2. Select "Normal" and press enter button.
  3. Select "Reset" and press enter button.
- Set the pattern generator's output level at 1.0Vp-p (across  $75\Omega$  load).

## 1. CRT ADJUSTMENT

### 1-1. Precautions

- (1) Receive the white raster signal, and then perform edging for at least 20 minutes.
- (2) Demagnetize the area surrounding the CRT with a degausser before making adjustments.
- (3) Set the picture quality for each mode to the factory setting.
- (4) Position the front screen facing to the east as much as possible.

### 1-2. Purpose

- (1) Beam landing adjustment (purity magnet)

Set the left/right balance of beam landing. If there is a discrepancy in this adjustment, a color irregularity will occur. After completion of the landing adjustment, it is necessary to perform a convergence adjustment.

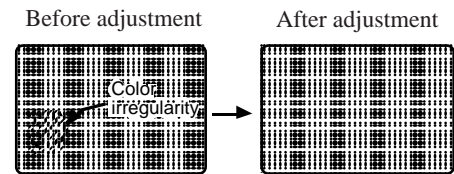
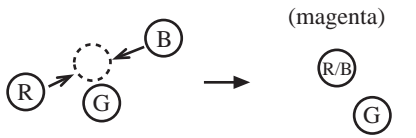


Fig. 1-1

(2) Beam convergence adjustment (4-pole magnet)

Align the R beam with the B beam. The G beam does not move with this adjustment.

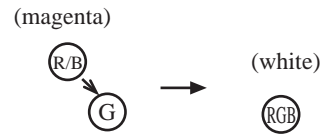


Align the R beam with the B beam

Fig. 1-2

(3) Beam convergence adjustment (6-pole magnet)

With a 4-pole magnet align the G beam with the already aligned R/B beam.



Align the G beam with the R/B beam

Fig. 1-3

(4) The composition of each magnet is as appears in Fig. 1-4.

In making adjustments, rotate the lock ring clockwise (looking from the CRT's back screen) and disengage.

Be careful not to loose the lock ring too much. If the magnet assembly has become shifted during adjustments, secure it to the position in Fig. 1-4.

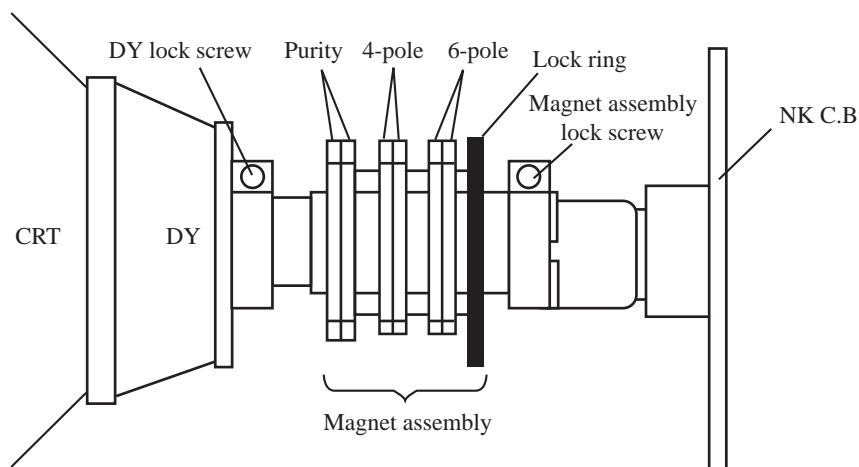


Fig 1-4



### 1-3. Beam Landing Adjustment

- (1) Receive the green raster signal through the pattern generator.
- (2) Loosen the magnet lock screw, and shift the magnet assembly backward (toward the neck).
- (3) Loosen the DY lock screw, and shift the DY deflecting yoke backward (toward the neck).
- (4) After opening the two purity magnets to the same angle, adjust the color width of the bands on both sides of the screen so that they are of equal width. (refer to Fig. 1-5 (a)).

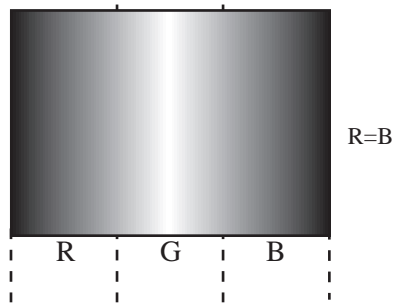


Fig 1-5 (a)

As shown in Fig. 1-5 (b), the purity magnet functions in relation to the electron beam.

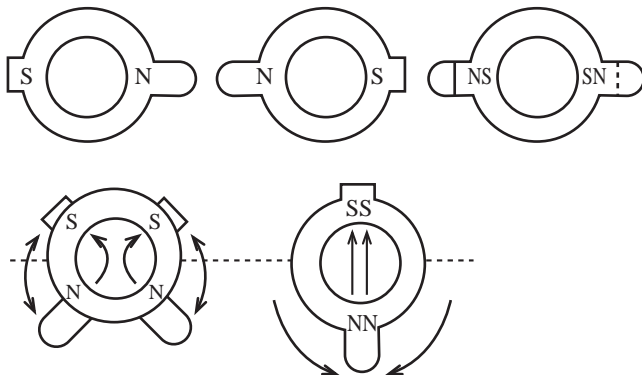


Fig 1-5 (b)

- (5) Gradually shift the deflecting yoke toward the front (toward the CRT funnel). Stop movement at the point when the screen has become completely green.
  - (6) Also, verify the respective monochromatics of red and blue.
  - (7) While looking at the screen, adjust the tilt of the deflecting yoke and tighten the DY lock screw.
  - (8) Shift the magnet assembly to the front (toward the CRT funnel), stop movement before the adjustment position and then tighten the magnet lock screw.
- At this time, be careful not to shift the position of the purity magnet.

- ✳ As there is occurrence of convergence distortion after completing the landing adjustments, be certain to carry out convergence adjustments.
- ✳ If the color irregularity in the screen's corner section are not improved, correct them with the landing magnet. After using the landing magnet, be sure to demagnetize the CRT with degausser and verify that there is no occurrence of color irregularity. (refer to Fig. 1-6)

Landing magnet: 81-JTI-710-010  
(two-sided adhesive tape) : 80-XVI-218-010 Cushion

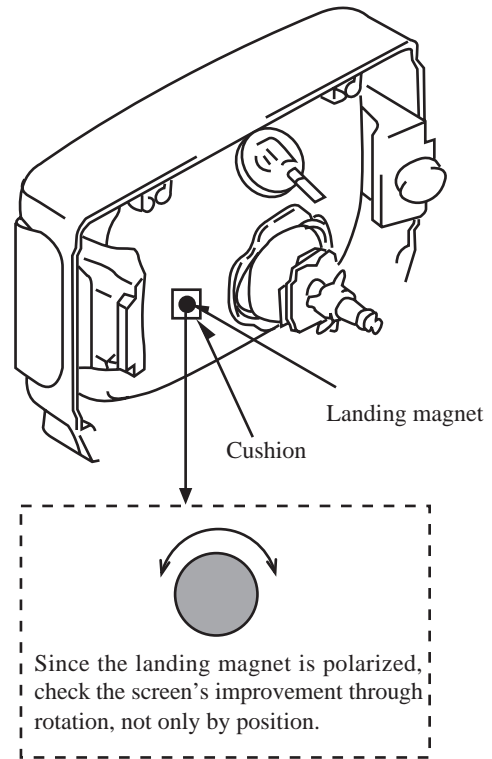


Fig 1-6

## 1-4. Beam Center Convergence Adjustment

Make adjustments on the convergence with 4-pole and 6-pole magnets. Operate each magnet in relation to the electron beam as shown in Figs. 1-7 and 1-8. When performing this adjustment, verify whether there is distortion in the focus adjustment. If necessary, carry out adjustments again.

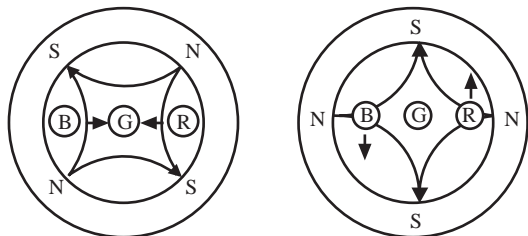


Fig 1-7

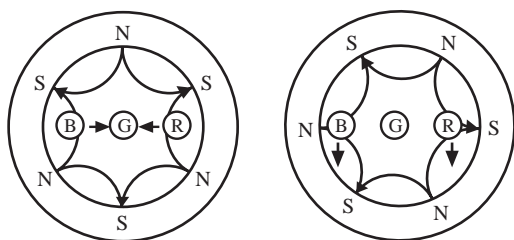


Fig 1-8

In Fig. 1-7, two 4-pole magnets are stacked together so as to be of the same polarity. Move the B and R beams to their respective direction, by rotating the two 4-pole magnets together. By adjusting the opening of the two magnets, it is possible to adjust the amount of the beam's movement.

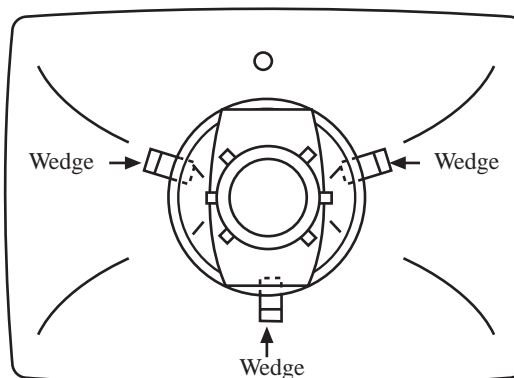
In Fig. 1-8, the two 6-pole magnets are stacked together so as to be of the same polarity. Move the B and R beams to their respective direction, by rotating the two 6-pole magnets together. By adjusting the opening of the two magnets, it is possible to adjust the amount of the beam's movement.

- (1) Receive the dot pattern signal through the pattern generator.
- (2) Pay attention to the center of the screen, and perform adjustments with two 4-pole magnets so that the R beam and the B beam perfectly align and become a magenta color. (refer to Fig. 1-2)
- (3) In the same way, pay attention to the screen, and perform adjustments with a 6-pole magnet so that the magenta beam and the G beam align and become a white dot. (refer to Fig. 1-3)
- (4) After adjustments are completed, secure all magnets with the lock link. (Refer to Fig. 1-4)

## 1-5. The Surrounding Convergence Adjustment

Make this adjustment after completion of adjustment 1-4.

- (1) Shake the deflecting yoke up, down, right and left, and adjust any discrepancies in the screen's surroundings.
- (2) Insert wedges in three locations in the gap between the deflecting yoke and the surface of the CRT funnel in order to secure the deflecting yoke. (refer to Fig. 1-9)



Position of wedge

Fig. 1-9

## 2. ELECTRICAL ADJUSTMENT

### 2-1. White Balance Adjustment (NK C.B.)

- (1) Receive a NTSC raster signal (white).
  - (2) Set the customer picture controls "bright" and "contrast" to minimum.
  - (3) Set the CUT OFF SFR (SFR903, SFR904, SFR905) and DRIVE SFR (SFR901, SFR902) to their mechanical centers.
  - (4) Leaves the CUT OFF SFR of the color which is brightest on the screen as it is and use other two CUT OFF SFR to adjust the white balance.
  - (5) Set the customer picture controls "brightness" and "contrast" to maximum.
  - (6) Turn SFR901 (R DRIVE) fully counterclockwise so the whole screen becomes red.
  - (7) Turn SFR901 (R DRIVE) gradually clockwise and stop it where red disappears from the screen.
  - (8) Turn SFR902 (B DRIVE) fully counterclockwise so the whole screen becomes blue.
  - (9) Turn SFR902 (B DRIVE) gradually clockwise and stop it where blue disappears from the screen.
  - (10) Repeat steps (2)-(4) and (5)-(9) until the white balance has been adjusted completely.
  - (11) Return the customer picture controls to their original positions.
  - (12) Receive a staircase signal (color bar with chroma off) and check that there is no unnatural color at any bands.
- \* Perform 2-3 Sub-bright adjustment after completing the white balance adjustment.

### 2-2. Screen Adjustment

- (1) Short the IC501 Pin2 and Pin5 (or 11) and set the screen in single horizontal line.
- (2) Set the TV to the external input mode (no input).
- (3) Connect an oscilloscope to TP901 (JW901) Pin9 of S901 (on the NK C.B.).
- (4) Adjust SFR302 (Sub-bright) so the voltage at TP901 (JW901) Pin9 of S901 is  $170 \pm 5\text{VDC}$ . (See Figure 2-1)
- (5) Adjust the SCREEN VR (FBT) so that a horizontal line begins to appear at the center of the screen.
- (6) Release the short-circuit point.

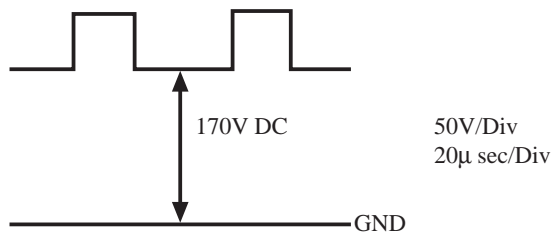


Fig 2-1

- \* Be sure to perform the next sub-bright adjustment after completing this adjustment.

### 2-3. Sub-bright Adjustment

- (1) Receive a NTSC staircase signal (color bar with chroma off).
- (2) Adjust SFR302 so the band next to the right end start to light. (See Figure 2-2)

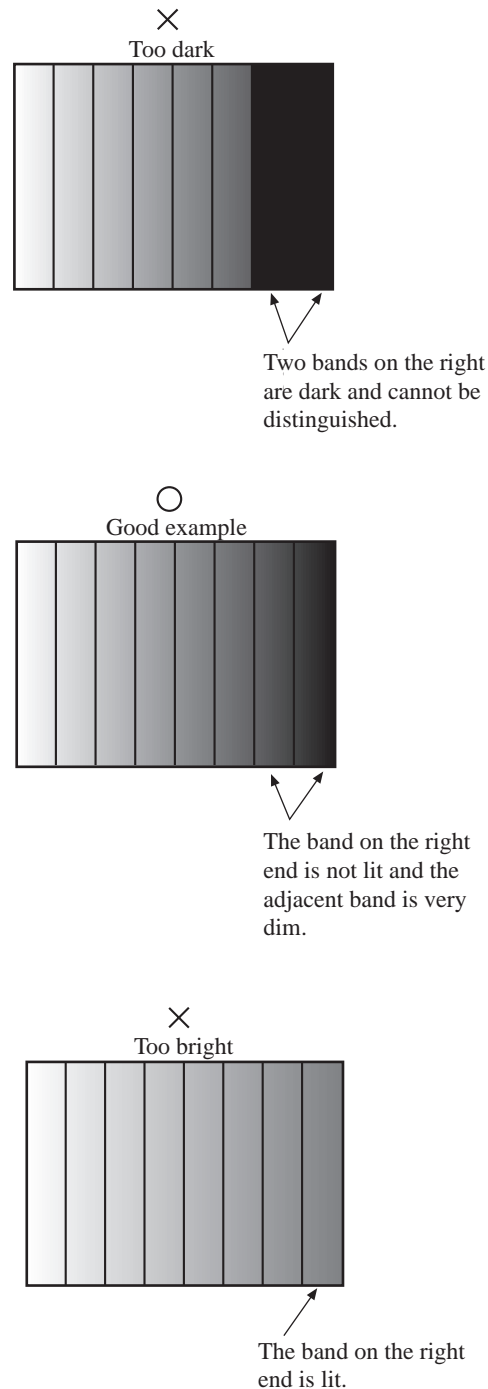


Fig 2-2

### 2-4. Focus Adjustment

- (1) Receive a NTSC dot pattern signal.
- (2) Adjust the FOCUS SFR (FBT) so the focus of the dots is optimum.

## 2-5. Horizontal Position Adjustment

- (1) Input the following signals.  
Monoscope signal of the test tape TTV-06T (connect video)
- (2) As is shown in Fig. 2-3, make adjustments with SFR301 so that the scales on both sides of the screen are the same.

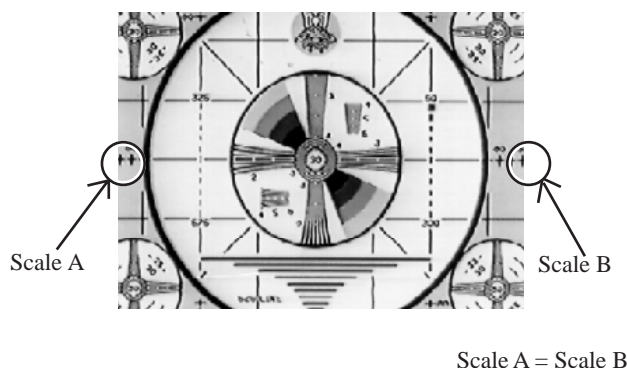


Fig 2-3

## (Simple Adjustment Method)

- (1) Using LEADER LCG-404, input the cross hatch signal.
- (2) As is shown in Fig. 2-4 (b), make adjustments with SFR501 so that the number of vertical squares is 13.

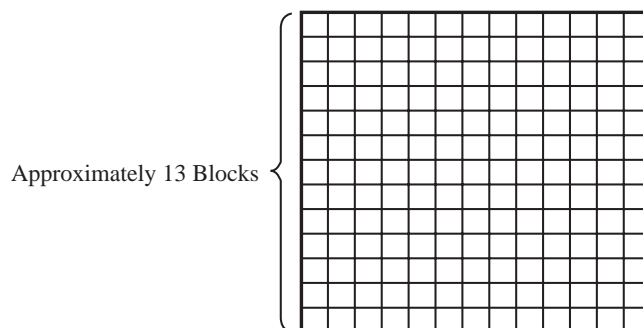


Fig. 2-4 (b)

## 2-6. Vertical Size Adjustment

- (1) Input the monoscopic signal of the test tape TTV-06T. (connect video)
  - (2) Make adjustments with SFR501 so that the upper and lower scales on the monoscope screen have the numerical values that appear below. (refer to Fig. 2-4 (a))
- \* SW501 is used only for initial setting in the factory. Make sure that the selector of SW501 is positioned at B (center) before adjusting.

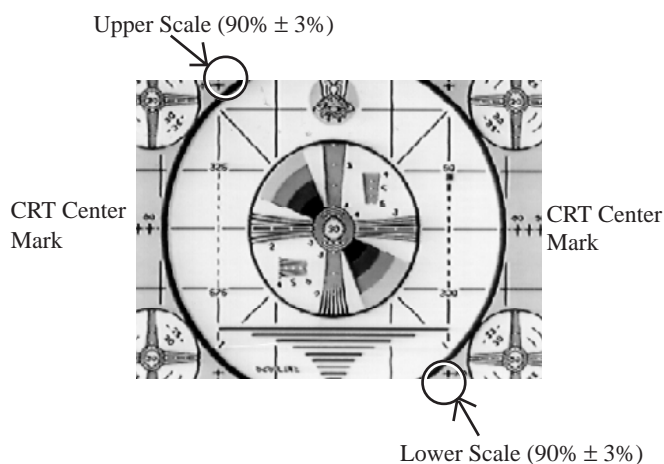


Fig 2-4 (a)

## 2-7. Sub-tint Adjustment

- (1) Receive an NTSC 3.58 MHz color bar signal.
- (2) Connect an oscilloscope to Q903 Collector (on the NK C.B.).
- (3) Adjust SFR303 so the bottom edges of the waveform fall on one line. (See figure 2-5)

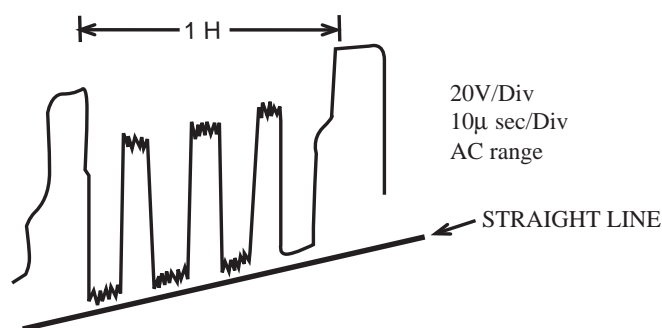


Fig. 2-5

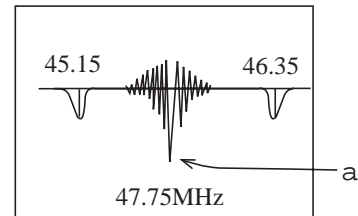
### 3. TUNER ADJUSTMENT

#### 3-1. AGC Adjustment

- (1) Receive a NTSC signal of RF INPUT under the following conditions.  
Input level: 58 dBμ  
Modulation percentage: 87.5%  
Received channel : US TV 10ch (fp = 193.25MHz)
- (2) Adjust SFR201 so the voltage at the TU101 Pin1 (TP15 or JW101) is  $6.8V \pm 0.2VDC$ .

##### (Simple Adjustment Method)

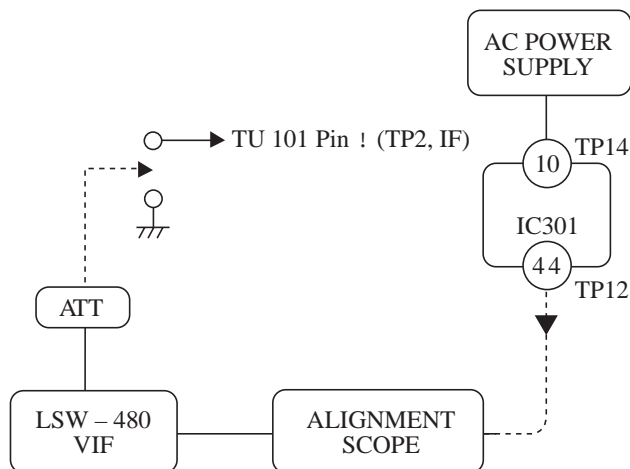
- (1) Using the LEADER LCG-401 (65dBμ), receive the color bar signal on channel 2.
- (2) With SFR201, make adjustments so that the voltage of TU101 pin1 becomes 3.6VDC.
- (3) Receive a television broadcast, and verify that the screen is clear.



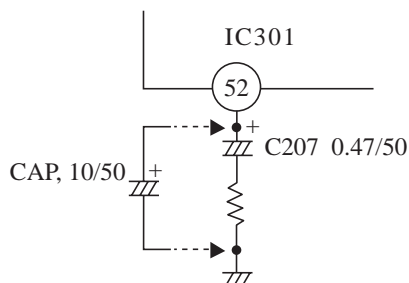
#### 3-2. VCO Adjustment

##### ( Rough Adjustment )

- (1) Make connections as they appear below.



- (2) Connect between Pin52 and GND of IC301 with capacitor.

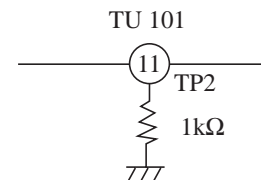


- (3) Using a DC power supply, add  $DC3.0V \pm DC0.2V$  of voltage to the IC301 Pin10 (TP14).
- (4) Make adjustments with L203 so that the waveform's center section ( section in the figure below) of the ALIGNMENT SCOPE becomes  $45.75 MHz \pm 50 kHz$ .

- (5) Remove the capacitor.

#### 3-3. AFT Adjustment

- (1) Connect the resistance of 1 kΩ between the TU101 Pin11 and the GND.



- (2) Input the following signal conditions to the TU101 Pin11.  
(AM/FM SSG)  
CARRIER 45.75 MHz  
LEVEL 100 dBμ  
MOD OFF
- (3) Make adjustments with L206 so that the voltage of the IC301 Pin47 (TP16) is  $DC4.5V \pm DC0.2V$ .
- (4) Remove resistance (1 kΩ).

##### ( Simple Adjustment Method )

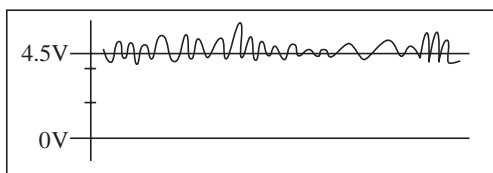
- (1) Using the pattern generator LCG-401, receive the signal for channel 2.
- (2) Adjust L206 so that the voltage at IC301 Pin47 (TP16) becomes  $4.5V \pm 0.3VDC$ .
- (3) Receive each television broadcasts and verify that the picture is clear.

### 3-4. SIF Adjustment

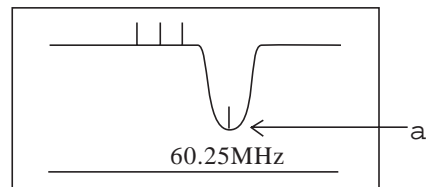
- Input the following signal conditions to the IC301 Pin48 (TP1).  
(FM/SG)  
CARRIER 4.5MHz  
LEVEL 90dBμ  
MOD OFF
- Adjust L207 so that the voltage at IC301 Pin1 (TP21) becomes  $4.5V \pm 0.3VDC$ .

#### (Simple Adjustment Method)

- Connect an oscilloscope to IC301 Pin1 (TP21), then receive a television broadcast.
- Adjust L207 so that the center of audio signal level becomes 4.5V.

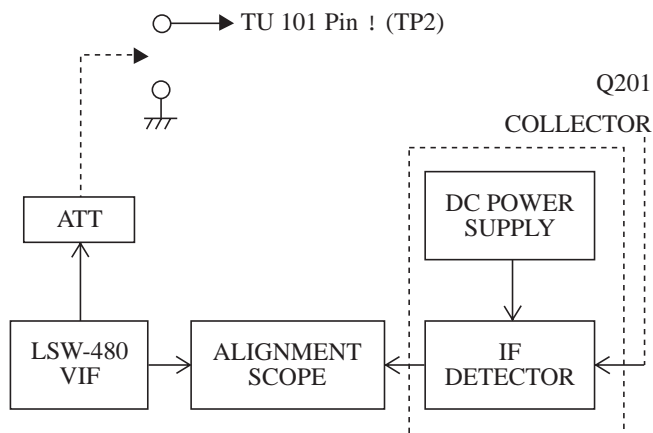


- Adjust L201 so that center section (section in the figure below) of the ALIGNMENT SCOPE waveform becomes  $60.25 \text{ MHz} \pm 50 \text{ kHz}$ .

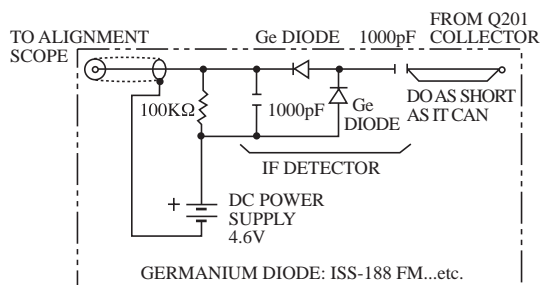


### 3-5. TRAP Adjustment

- Make connections as shown in figure below.



#### <IF DETECTOR>



1. How To Activate /Release Service Mode

<JIG remote control unit>  
JIG remote control unit to operate the service mode should be used with the remote control unit for RC-6VT03 (86-LBR-951-010) or 86-6VT07 (86-LBP-951-010).

Test mode is activated by pressing TEST key (Hidden Key under the label). (Refer to Fig.1).

When the Test Mode is activated, below menu (refer to Fig.2) will be appeared and turn on and off at one second interval.

- ❖ Jig Remote Controller
- (1) Remove label of jig remote controller.
- (2) Cut label of two hidden keys (Finish and Test) into button size.
- (3) Place two timer buttons on the two hidden keys.
- (4) Place label back after above steps.

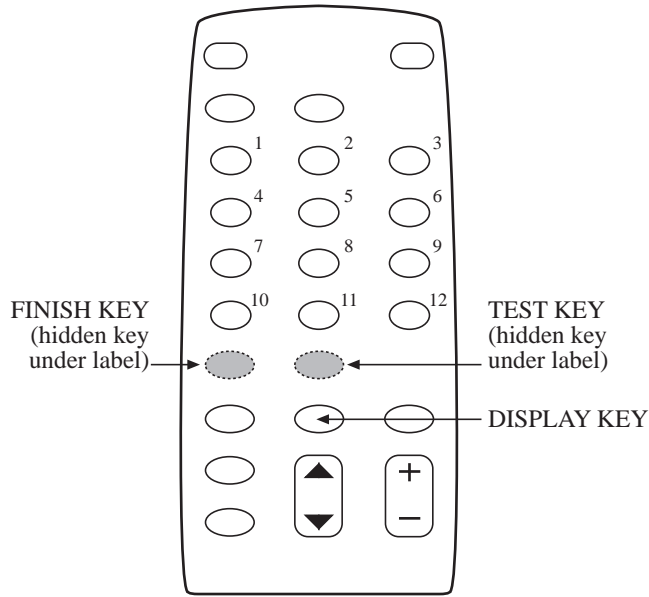


Fig. 1

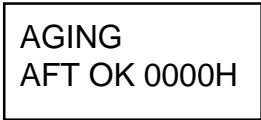


Fig. 2

Test mode is released by pressing TEST KEY again.

2. Content of Service Mode.

- Test mode have the following functions.
- 1 Function for releasing Auto Power OFF.
  - 2 Display AFT S curb status.
  - 3 Display the product Hours of CRT ON.

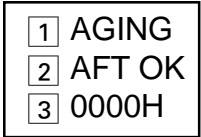


Fig. 3

- 1 Release the function of Auto Power OFF.  
It releases the function of Auto Power OFF when no input occurs.  
  
It is used for warming up (Aging) of CRT Adjustment.
- 2 Display of AFT S curb.  
It displays OK, UP, DN in the status of AFT S curb.  
(Observe the Voltage of IC301 Pin47)

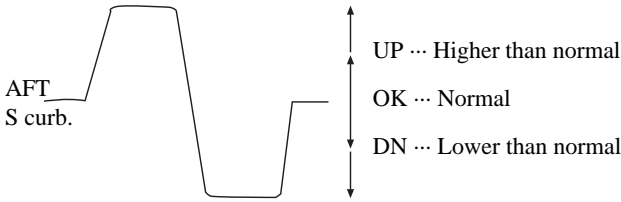


Fig. 4

- 3 Display the product hours of CRT ON.  
It product hours of CRT ON at one hour interval count up by (HEX).

Display is 4 digits in HEX.  
The product hours is connected to the decimal scale number from the displayed number.

(Example) Display "1 2 3 4"

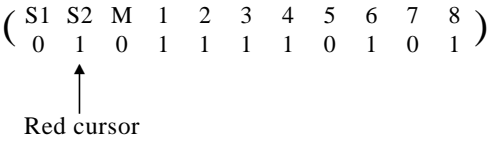
$$1 \times 16^3 + 2 \times 16^2 + 3 \times 16^1 + 4 \times 16^0 = 4660 \text{ Hours}$$

- ❖ When it exceeds 7FFF H (32768 hours), it will reflect to 0000 H again.

Precautions to replace EEPROM

When replacing the EEPROM (IC3, AT93C46-10PI), be certain to follow the sequence appearing below to carry out initialization.

- 1. Press " TEST " key (hidden key) on the remote control unit to activate the Service Mode. (Refer to Fig. 1)
- 2. Press " DISPLAY " key on the remote control unit and verify that the screen is the same as in Fig. 2.
- 3. Press " CHANNEL 1 " key and move the red cursor to S2 position.
- 4. Press "VOLUME + -" key, and display data appears as below.



- 5. With conditions as they are in step 4, press the "DISPLAY" key and then press the "FINISH key (hidden key)". (refer to Fig. 1)
- 6. Following the display of "INITIAL" on the screen for a few seconds, the power will automatically go off.

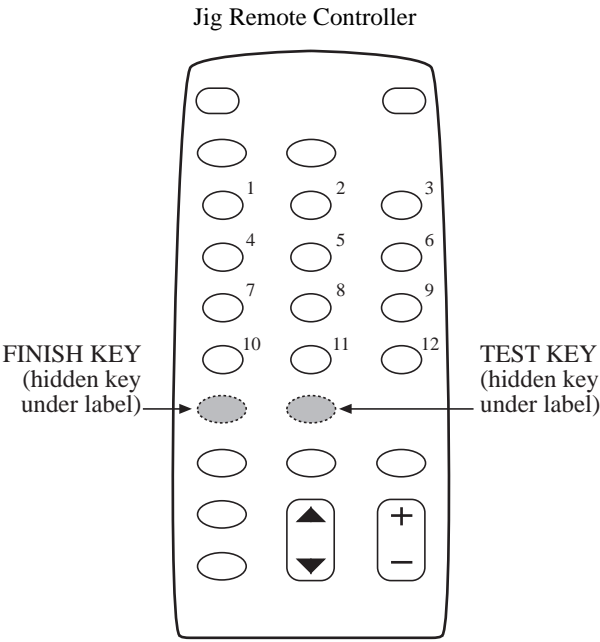


Fig. 1

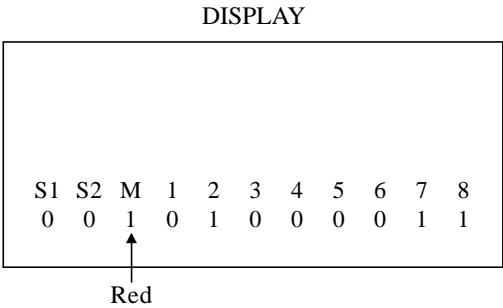
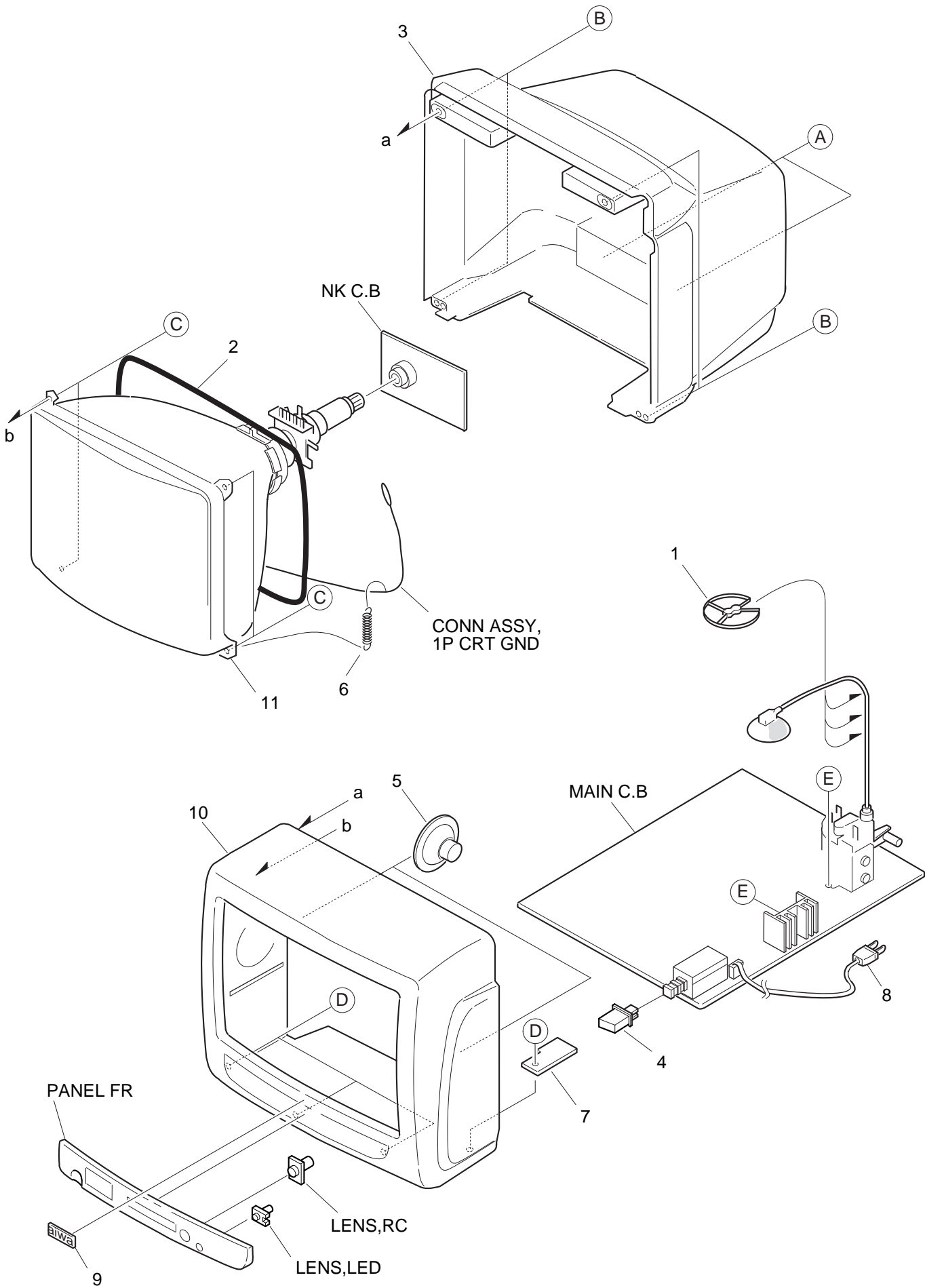


Fig. 2



MECHANICAL MAIN PARTS LIST

DESCRIPTIONで判断できない物は "REFERENCE NAME LIST" を参照してください。  
If can't understand for Description please kindly refer to "REFERENCE NAME LIST".

REF. NO	PART NO.	KANRI NO.	DESCRIPTION	REF. NO	PART NO.	KANRI NO.	DESCRIPTION
1	87-054-086-010		BADGE,AIWA 52.5	16	86-LB4-002-110		CABI,REAR
2	8Z-JBW-001-010		PANEL,FR CN202	17	87-JBG-004-010		PLATE,JACK NH
3	86-LB4-006-010		LENS,LED	18	84-LB3-216-010		HLDR,LED
4	86-LB4-005-010		LENS,RC	A	87-067-758-010		BVT2+3-12 W/O SLOT
5	86-LB4-001-210		CABI,FR	B	87-067-680-010		BVI T3+3-10
6	86-LBU-201-010		HLDR,AC CORD	C	86-LBB-206-010		S-SCREW,ASSY TV5-40 W20
7	86-LB4-004-010		BTN,POWER	D	87-067-844-010		BVT2+4-16 BLK
8	87-JBC-628-010		AC CORD SET,NH BLK	E	87-067-761-010		TAPPING SCREW, BVT2+3-10
9	86-LB7-202-110		HLDR,FBT	F	87-067-579-010		TAPPING SCREW, BVT2+3-8
10	84-LB3-641-010		SP,F DIA 7.6				
11	87-A90-332-010		HLDR,SF-2001 HV CABLE				
12	87-JBD-605-010		CRT,A48JAN44X04(W)				
13	84-LB3-205-010		SPR-E,EARTH				
14	84-LB2-633-110		CONN ASSY,1P CRT GND				
15	87-JBD-625-010		DGC,20 15 OHM				





サービス技術ニュース	
番号	連絡内容
Gーー	
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