

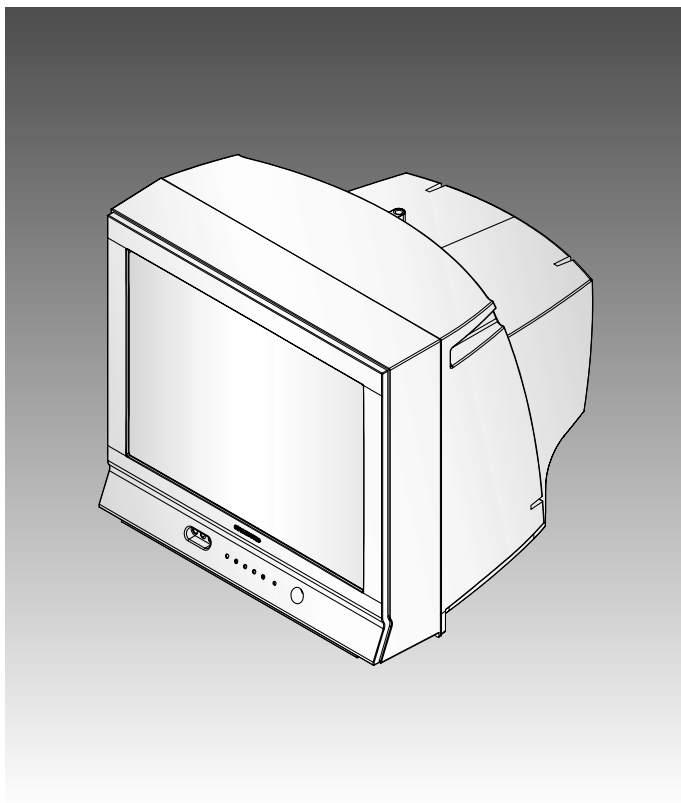
SAMSUNG

COLOR TELEVISION RECEIVER

Chassis : K15C
Model : TXM2090FX/XAA

SERVICE *Manual*

COLOR TELEVISION RECEIVER



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ELECTRONICS

1. Precautions

Follow these safety, servicing and ESD precautions to prevent damage and protect against potential hazards such as electrical shock and X-rays.

1-1 Safety Precautions

1. Be sure that all of the built-in protective devices are replaced. Restore any missing protective shields.
2. When reinstalling the chassis and its assemblies, be sure to restore all protective devices, including: nonmetallic control knobs and compartment covers.
3. Make sure that there are no cabinet openings through which people—particularly children—might insert fingers and contact dangerous voltages. Such openings include the spacing between the picture tube and the cabinet mask, excessively wide cabinet ventilation slots, and improperly fitted back covers.

If the measured resistance is less than 1.0 megohm or greater than 5.2 megohms, an abnormality exists that must be corrected before the unit is returned to the customer.

4. Leakage Current Hot Check (Figure 1-1):
Warning: Do not use an isolation transformer during this test. Use a leakage-current tester or a metering system that complies with American National Standards Institute (ANIS C101.1, Leakage Current for Appliances), and Underwriters Laboratories (UL Publication UL1410, 59.7).
5. With the unit completely reassembled, plug the AC line cord directly into the power outlet. With the unit's AC switch first in the ON position and then OFF, measure the current between a known earth ground (metal water pipe, conduit, etc.) and all exposed metal parts, including: antennas, handle brackets, metal cabinets, screwheads and control shafts. The current measured should not exceed 0.5 milliamp. Reverse the power-plug prongs in the AC outlet and repeat the test.

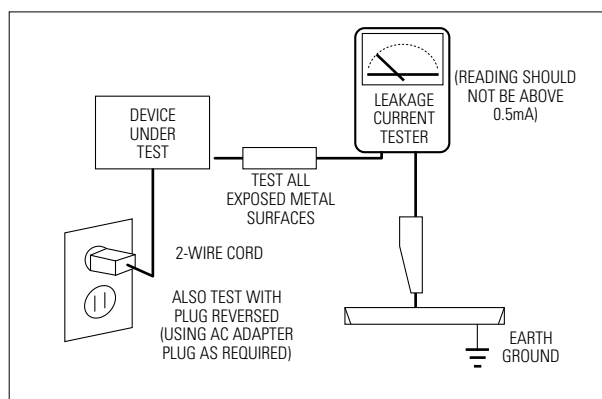


Fig. 1-1 AC Leakage Test



6. Antenna Cold Check:
With the unit's AC plug disconnected from the AC source, connect an electrical jumper across the two AC prongs. Connect one lead of the ohmmeter to an AC prong. Connect the other lead to the coaxial connector.
7. X-ray Limits:
The picture tube is especially designed to prohibit X-ray emissions. To ensure continued X-ray protection, replace the picture tube only with one that is the same type as the original. Carefully reinstall the picture tube shields and mounting hardware; these also provide X-ray protection.
8. High Voltage Limits:
High voltage must be measured each time servicing is done on the B+, horizontal deflection or high voltage circuits. Correct operation of the X-ray protection circuits must be reconfirmed whenever they are serviced. (X-ray protection circuits also may be called "horizontal disable" or "hold-down".)

Heed the high voltage limits. These include the X-ray Protection Specifications Label, and the Product Safety and X-ray Warning Note on the service data schematic.

1-1 Safety Precautions (Continued)

9. High voltage is maintained within specified limits by close-tolerance, safety-related components and adjustments. If the high voltage exceeds the specified limits, check each of the special components.
10. Design Alteration Warning:
Never alter or add to the mechanical or electrical design of this unit. Example: Do not add auxiliary audio or video connectors. Such alterations might create a safety hazard. Also, any design changes or additions will void the manufacturer's warranty.
11. Hot Chassis Warning:
Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord. If an isolation transformer is not used, these units may be safely serviced only if the AC power plug is inserted so that the chassis is connected to the ground side of the AC source.

To confirm that the AC power plug is inserted correctly, do the following: Using an AC voltmeter, measure the voltage between the chassis and a known earth ground. If the reading is greater than 1.0V, remove the AC power plug, reverse its polarity and reinsert. Re-measure the voltage between the chassis and ground.
12. Some TV chassis are designed to operate with 85 volts AC between chassis and ground, regardless of the AC plug polarity. These units can be safely serviced only if an isolation transformer inserted between the receiver and the power source.
13. Some TV chassis have a secondary ground system in addition to the main chassis ground. This secondary ground system is not isolated from the AC power line. The two ground systems are electrically separated by insulating material that must not be defeated or altered.
14. Components, parts and wiring that appear to have overheated or that are otherwise damaged should be replaced with parts that meet the original specifications. Always determine the cause of damage or overheating, and correct any potential hazards.
15. Observe the original lead dress, especially near the following areas: Antenna wiring, sharp edges, and especially the AC and high voltage power supplies. Always inspect for pinched, out-of-place, or frayed wiring. Do not change the spacing between components and the printed circuit board. Check the AC power cord for damage. Make sure that leads and components do not touch thermally hot parts.
16. Picture Tube Implosion Warning:
The picture tube in this receiver employs "integral implosion" protection. To ensure continued implosion protection, make sure that the replacement picture tube is the same as the original.
17. Do not remove, install or handle the picture tube without first putting on shatterproof goggles equipped with side shields. Never handle the picture tube by its neck. Some "in-line" picture tubes are equipped with a permanently attached deflection yoke; do not try to remove such "permanently attached" yokes from the picture tube.
18. Product Safety Notice:
Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection. These safety features and the protection they give might be lost if the replacement component differs from the original—even if the replacement is rated for higher voltage, wattage, etc.

Components that are critical for safety are indicated in the circuit diagram by shading, () or ().
Use replacement components that have the same ratings, especially for flame resistance and dielectric strength specifications. A replacement part that does not have the same safety characteristics as the original might create shock, fire or other hazards.

1-2 Servicing Precautions

Warning1: First read the "Safety Precautions" section of this manual. If some unforeseen circumstance creates a conflict between the servicing and safety precautions, always follow the safety precautions.

Warning2: An electrolytic capacitor installed with the wrong polarity might explode.

1. Servicing precautions are printed on the cabinet. Follow them.
2. Always unplug the unit's AC power cord from the AC power source before attempting to: (a) Remove or reinstall any component or assembly, (b) Disconnect an electrical plug or connector, (c) Connect a test component in parallel with an electrolytic capacitor.
3. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
4. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the portion around the serviced part has not been damaged.
5. Check the insulation between the blades of the AC plug and accessible conductive parts (examples: metal panels, input terminals and earphone jacks).
6. Insulation Checking Procedure: Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500V) to the blades of the AC plug.

The insulation resistance between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 megohm.
7. Never defeat any of the B+ voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
8. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the positive lead; always remove the instrument's ground lead last.

1-3 Precautions for Electrostatically Sensitive Devices (ESDs)

1. Some semiconductor (“solid state”) devices are easily damaged by static electricity. Such components are called Electrostatically Sensitive Devices (ESDs); examples include integrated circuits and some field-effect transistors. The following techniques will reduce the occurrence of component damage caused by static electricity.
2. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. (Be sure to remove it prior to applying power—this is an electric shock precaution.)
3. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of electrostatic charge.
4. Do not use freon-propelled chemicals. These can generate electrical charges that damage ESDs.
5. Use only a grounded-tip soldering iron when soldering or unsoldering ESDs.
6. Use only an anti-static solder removal device. Many solder removal devices are not rated as “anti-static”; these can accumulate sufficient electrical charge to damage ESDs.
7. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
8. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
9. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together, or lifting a foot from a carpeted floor can generate enough static electricity to damage an ESD.

CAUTION

These servicing instructions are for use by qualified service personnel only. To reduce the risk of electric shock do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

2. Specifications and IC Data

2-1 Specifications

Television System:

MODEL	SYSTEM
CT	NTSC ONLY

Channels:

System Band	NTSC
VHF	2 - 13
UHF	14 - 69
CABLE	1 - 125

Intermediate Frequencies (MHz) :

SYSTEM IF Carrier Frequency	NTSC
Picture IF Carrier	45.75
Sound IF Carrier	41.25
Color Sub Carrier	42.18

Picture Tube:

20 Inch	A51QDX991X001	20Inch	FLAT
25 Inch	A63QDB891X	25Inch	1.0R, +380MG
29 Inch	A68QDN891X001	29Inch	1.0R, +380MG

Power Requirements:

AC 120V, 60Hz

Antenna Input Impedance:

VHF, UHF : Telescopic dipole antenna (75 ohm unbalanced type)

Speaker Impedance

8 ohm, 2W+2W (Dual Type)

2-2 IC Line Up

Table 2-1 IC Line-Up			
Loc. No	Specification	Description	Remark
IC201S	SPM456AN	TDA9377, English/Spanish/French	Philips
IC301	LA7841	VERTICAL OUTPUT	Sanyo
IC501	TDA6107Q	RGB DRIVE AMP	Philips
IC602	TDA7268	SOUND-AMP (2W x 2CH)	Philips
IC801S	KA5Q0740RT (0765RT)	POWER IC (STR)	FIAIR CHILD
IC802	KA7632	CUSTOM REGULATOR (5V, 8V, 3.3V)	SEC
IC202	24C04	EEPROM	
PC801S	TCET1108 / LTV817B	PHOTO COUPLER	
IC101	LA7510	SIF - IC	SANYO
IC601	MSP3425G	Sound Processor	Micronas

2-3 Semiconductor Base Diagrams

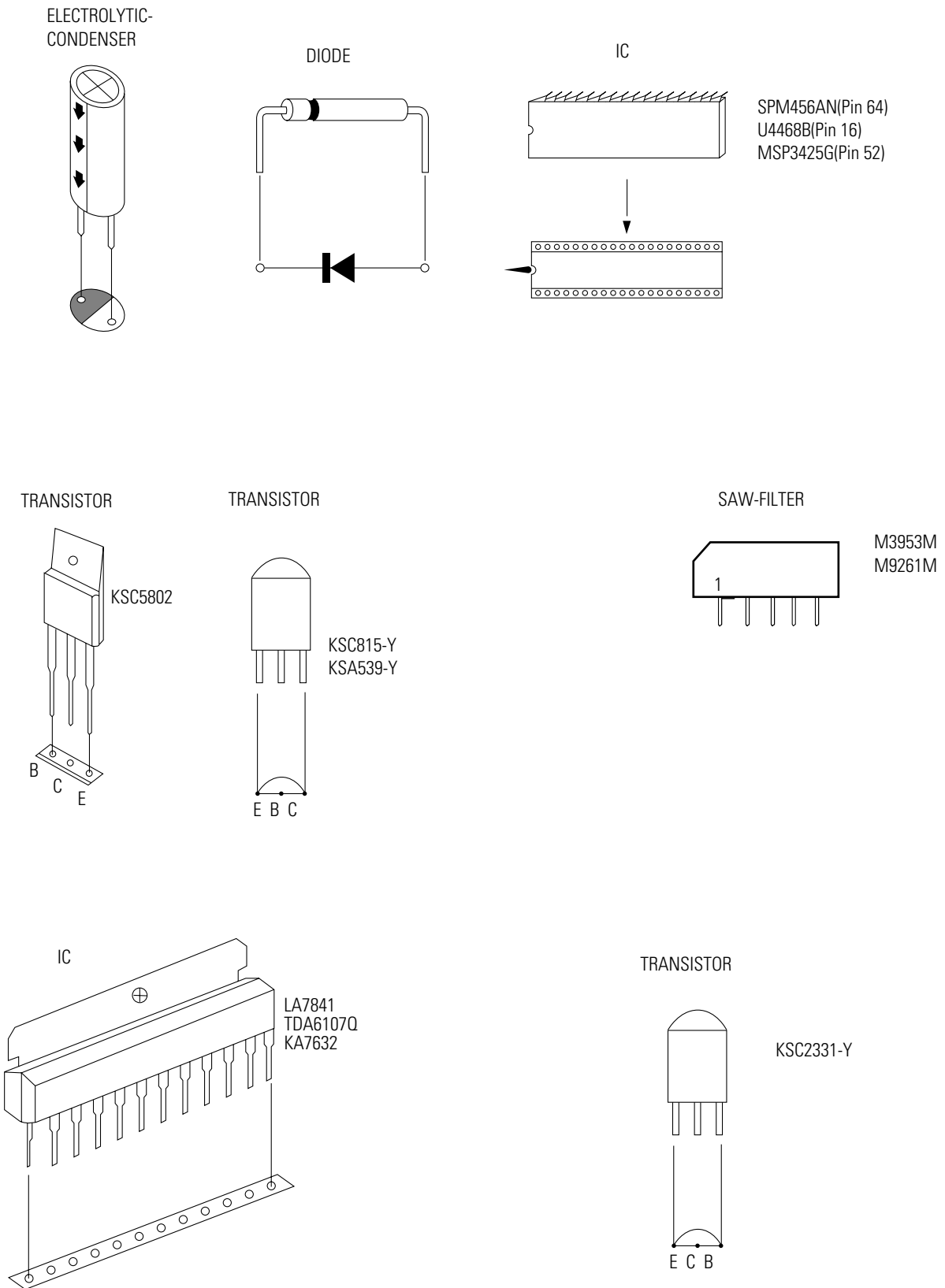
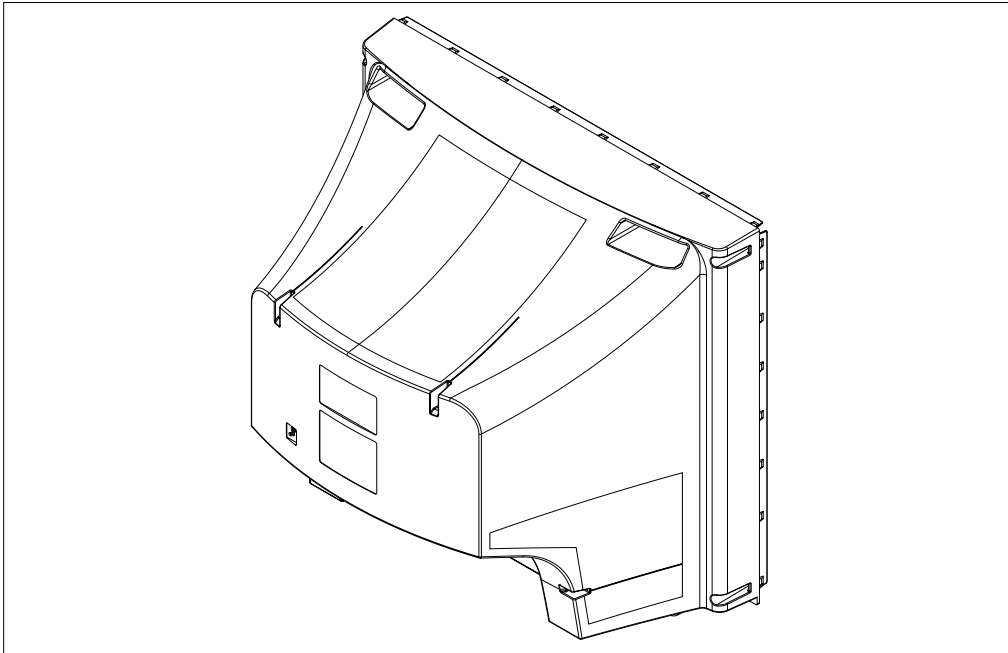


Fig. 2-1 Semiconductor Base Diagrams

MEMO

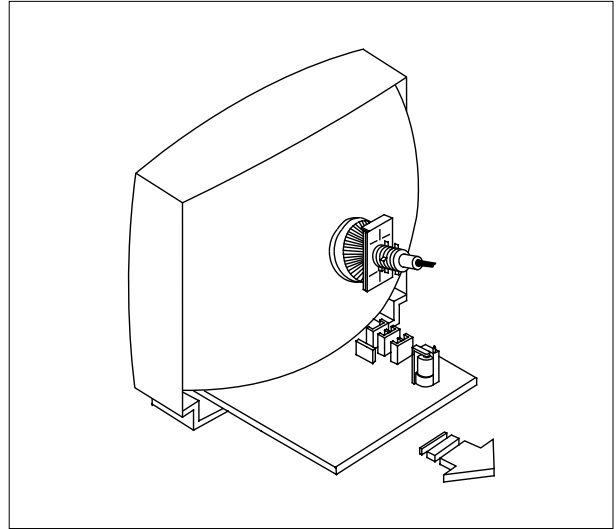
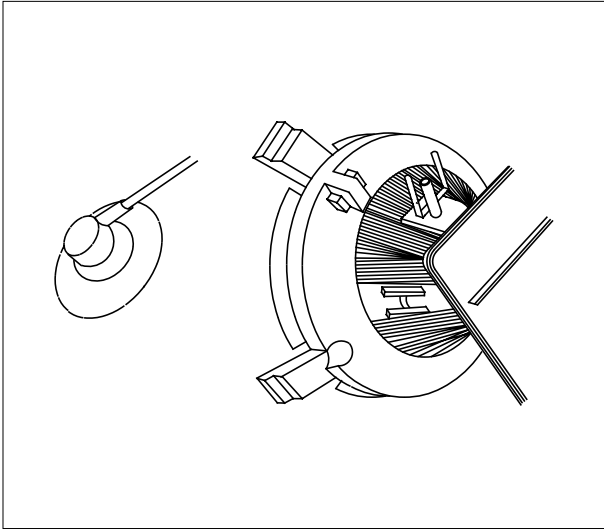
3. Disassembly and Reassembly

3-1 Back Cover Removal



1. After removing the screws, press the tension rib and pull the cabinet backwards.
2. To reassemble, press the tension rib (see diagram).

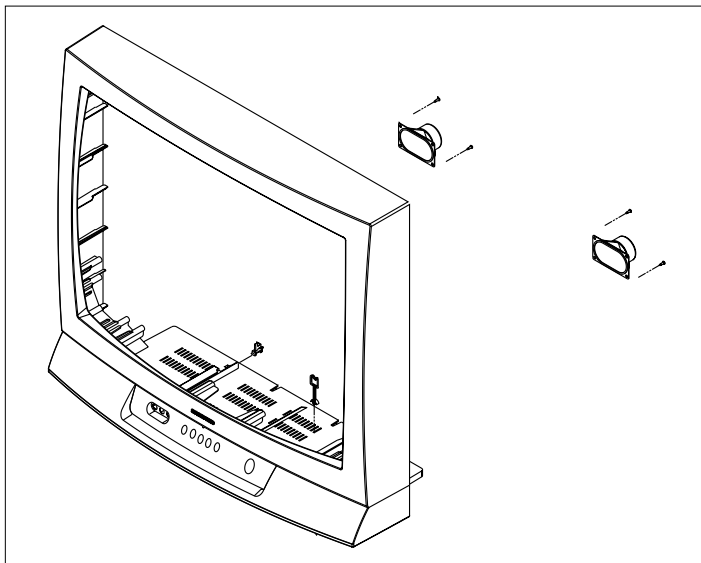
3-2 Main Board Removal



1. Separate the socket board from the CRT neck.
2. Remove the Anode Cap from the CRT.
3. Remove the main board by pulling it with both hands.

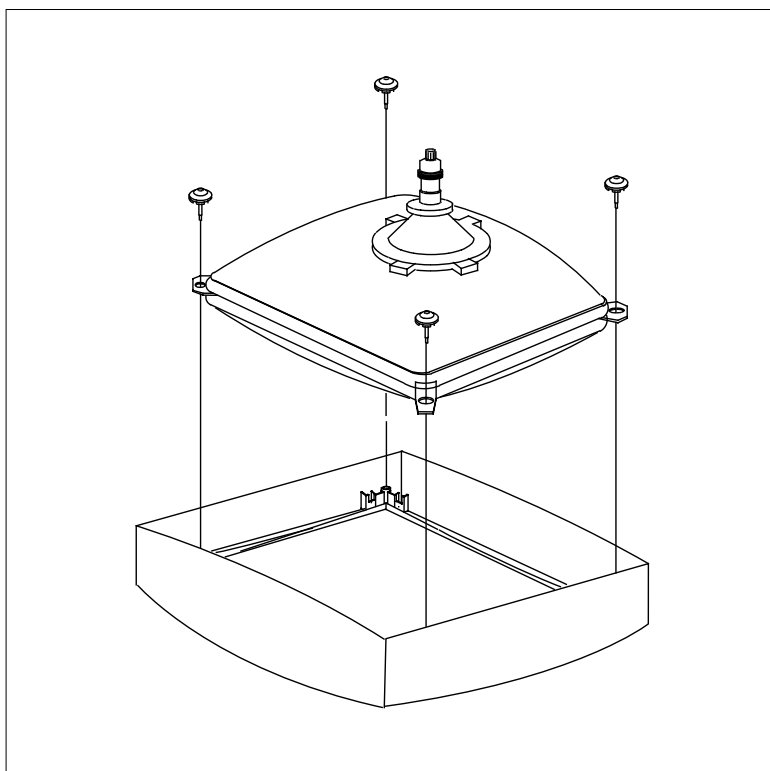
Warning: The FBT is charged with high voltage. Before removing the Anode Cap, discharge the voltage through one of the heat sinks on the main board.

3-3 Speaker Removal



1. Remove the speaker by pressing the tension rib.

3-4 CRT Removal



1. Spread a soft mat on the floor. Place the TV set face down.
2. Remove the 4 nuts mounting the CRT to the front cabinet. Lift the CRT.
3. Caution: Because of the high vacuum and large surface area of the picture tube, be careful while handling it: (1) Always lift the picture tube by grasping it firmly around the faceplate, (2) Never lift the tube by its neck. (3) Do not scratch the picture tube or apply excessive pressure. Fractures of the glass may cause an implosion.

MEMO

4. Alignment and Adjustments

4-1 Preadjustment

4-1-1 Factory Mode

1. Do not attempt these adjustments in the Video Mode.
2. The Factory Mode adjustments are necessary when either the EEPROM (IC902) or the CRT is replaced.
3. Do not tamper with the "Adjustment" screen of the Factory Mode menu. This screen is intended only for factory use.

4-1-2 When EEPROM (IC902) Is Replaced

1. When IC902 is replaced all adjustment data revert to initial values. It is necessary to re-program this data.
2. After IC902 is replaced, warm up the TV for 10 seconds.

4-1-3 When CRT Is Replaced

1. Make the following adjustments AFTER setting up after setting up purity and convergence :

White Balance
 Sub-Brightness
 Vertical Center
 Vertical Size
 Horizontal Size
 Fail Safe (This adjustment must be the last step).

2. If the EEPROM or CRT is replaced and set SC as 35(factory mode).

4-2 Factory/Service Mode

4-2-1 Procedure for the "Adjustment" Mode

1. This mode uses the standard remote control. The Service Mode is activated by entering the following remote-control sequence :
 - (1) DISPLAY → FACTORY.
 - (2) STAND-BY → MUTE → 1 → 8 → 2 → POWER ON.
2. The "SERVICE (FACTORY)" message will be displayed. The Service Mode has four components: ADJUST, OPTION , G2-ADJUST and RESET.
3. Access the Adjustment Mode by pressing the "VOLUME" keys (Up or Down). The adjustment parameters are listed in the accompanying table, and selected by pressing the CHANNEL keys (▲, ▼).
4. Selection sequences for the all system:

DOWN or UP key:

SCT>SBT>BLR>BLB>RG>GG>BG>VSL>VS>VA>HS>SC>CDL>STT>AKB>PDL>NDL>PSR>NSR>SCBT>VOL>CAP>MVOL>RP00>RP01>FMWS>AGC1>OMD>SCL>PWL>MUS>AGC>DSK>DVDB
5. The VOLUME keys increase or decrease the adjustment values (stored in the non-volatile memory) when Adjustment Mode is cancelled.
6. Cancel the Adjustment Mode by re-pressing the "FACTORY" or "Power OFF" keys.

4-2-2 Main Adjustment Parameter

NO	OSD	FUNCTION	RANGE	INITIAL DATA	SETTING	REMARK
1	SCT	Sub Contrast	0 ~ 23	15	(16)	W/B Adjustment
2	SBT	Sub Brightness	0 ~ 23	8	(6)	W/B Adjustment
3	BLR	Black Level offset Red	0 ~ 63	35	(37)	W/B Adjustment
4	BLB	Black Level offset Blue	0 ~ 63	32	(33)	W/B Adjustment
5	RG	Red Gain	0 ~ 63	40	(38)	W/B Adjustment
6	GG	Green Gain	0 ~ 63	30	30	FIX
7	BG	Blue Gain	0 ~ 63	42	(39)	W/B Adjustment
8	VSL	Vertical Slope	0 ~ 63	30	(32)	Vertical Picture Adjustment
9	VS	Vertical Shift	0 ~ 63	31	31	FIX
10	VA	Vertical Amplitude	0 ~ 63	20	(20)	Vertical Picture Adjustment
11	HS	Horizontal Shift	0 ~ 63	32	(33)	Picture Adjustment
12	SC	S-Correction	0 ~ 63	35	35	FIX
13	CDL	Cathode Drive Level	0 ~ 15	11	11	FIX
14	STT	Sub Tint	0 ~ 7	3	3	FIX
15	AKB	AKB On / off	0 ~ 1	0	0	FIX
16	PDL	PAL Delay	0 ~ 15	2	2	FIX
17	NDL	NTSC Delay	0 ~ 15	1	1	FIX
18	PSR	PAL Sub color	0 ~ 23	20	20	FIX
19	NSR	NTSC Sub color	0 ~ 23	3	3	FIX
20	SCBT	Screen Brightness	0 ~ 63	35	35	FIX
21	VOL	Volume pre setting	0 ~ 63	10	10	FIX
22	CAP	Caption Position	0 ~ 15	12	12	FIX
23	MVOL	Melody Sound Volume	0 ~ 50	7	7	FIX
24	RP00	Ratio Pre / overshoot	0 ~ 1	1	1	FIX
25	RP01	Ratio Pre / overshoot	0 ~ 1	1	1	FIX
26	FMWS	Window Selection Sound PLL	0 ~ 1	0	0	FIX (Mono)
27	AGC1	IF AGC Speed	0 ~ 3	1	1	FIX (Nomal)
28	OMD	Offset IF Demodulator	0 ~ 63	32	32	FIX (No Crrrection)
29	SCL	Soft Clipping Level	0 ~ 3	3	3	FIX (Off)
30	PWL	Peak White Limiting	0 ~ 15	15	15	FIX (100%)
31	MUS	Matrix USA	0 ~ 1	0	0	FIX (Mono)
32	AGC	Automatic Gain Control	0 ~ 63	33	33	FIX
33	DSK	Dynamic Skin Tone	0 ~ 1	0	0	FIX
34	DVDB	DVD Bright Offset	0 ~ 10	5	4	FIX

4-2-3 Option Bytes

In the Service Mode, various can be selected via the Option Table. Example:

Option Table : xx xx

	OSD	SETTING	REMARK
1	VIDEO MUTE	OFF	- Video Mute On/Off changing the channel
2	AUDIO	STEREO	- Audio Option (Mono / Steeo)
3	E/W	OFF	- E/W Option
4	ZOOM	NOR/ZOOM	- Picture Size Option
5	AUTO POWER	OFF	- Master S/w Option
6	AUDIO MUTE	ON	- Audio Mute On/ Off without signal
7	LANGUAGE	ENGLISH	- Inital Language agter Factory Reset
8	HOTEL MODE	OFF	- Hotel mode On/ Off
9	BULE SCREEN	OFF	- Bule Screen On/ Off without signal
10	2'nd SIF	INTERNAL	- SIF Option at Mono sound
11	V-CHIP	ON	- V-CHIP On/Off
12	AV Option	AV + DVD	- DVD, S-VHS Option
13	DEMO	OFF	- DEMONSTRATION On/Off

4-2-4 RESET

The Reset Mode is used during factory inspection.
Function Reset:

- | | |
|-----------------|---------|
| 1. Picture Mode | Custom |
| 2. Sound Mode | Custom |
| 3. Auto Volume | Off |
| 4. Melody | On |
| 5. Surround | Off |
| 6. Turbo Sound | Off |
| 7. MTS | Stereo |
| 8. Language | English |
| 9. Caption | Off |
| 10. Timer | Off |

4-3 Other Adjustments

4-3-1 General

1. Usually, a color TV needs only slight touch-up adjustment upon installation. Check the basic characteristics such as height, horizontal and vertical sync and focus.
2. The picture should have good black and white details. There should be no objectionable color shading; if color shading is present, perform the purity and convergence adjustments described below.
3. Use the specified test equipment or its equivalent.
4. Correct impedance matching is essential.
5. Avoid overload. Excessive signal from a sweep generator might overload the front-end of the TV. When inserting signal markers, do not allow the marker generator to distort test results.
6. Connect the TV only to an AC power source with voltage and frequency as specified on the backcover nameplate.
7. Do not attempt to connect or disconnect any wires while the TV is turned on. Make sure that the power cord is disconnected before replacing any parts.
8. To protect against shock hazard, use an isolation transformer.

4-3-2 Automatic Degaussing

A degaussing coil is mounted around the picture tube, so that external degaussing after moving the TV should be unnecessary. But the receiver must be properly degaussed upon installation.

The degaussing coil operates for about 1 second after the power is switched ON. If the set has been moved or turned in a different direction, disconnect its AC power for at least 30 minutes.

If the chassis or parts of the cabinet become magnetized, poor color purity will result. If this happens, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube and the sides and front of the receiver. Slowly withdraw the coil to a distance of about 6 feet before removing power.

4-3-3 High Voltage Check

CAUTION: There is no high voltage adjustment on this chassis. The B+ power supply must be set to +125 volts (Full color bar input and normal picture level).

1. Connect a digital voltmeter to the second anode of the picture tube.
2. Turn on the TV. Set the Brightness and Contrast controls to minimum (zero beam current).
3. The high voltage should not exceed 30KV.
4. Adjust the Brightness and contrast controls to both extremes. Ensure that the high voltage does not exceed 30KV under any conditions.

4-3-4 FOCUS Adjustment

1. Input a black and white signal.
2. Adjust the tuning control for the clearest picture.
3. Adjust the FOCUS control for well defined scanning lines in the center area of the screen.

4-3-5 Cathode Voltage Adjustment (Screen Adjustment)

1. Connect CRT socket pin GK to an oscilloscope probe.
2. Input a gray scale pattern. (Use a pattern generator, PM5518)
3. Use the P mode key (on the remote control) for the STANDARD picture.
4. Adjust the Screen VR (on the FBT) so that the voltage on the oscilloscope becomes $125 \pm 2.5V$ (See Fig. 4-1).

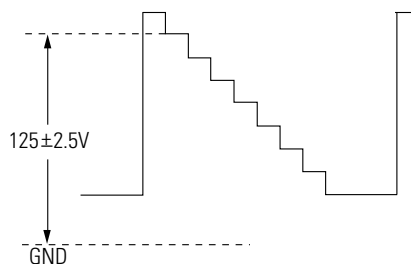


Fig. 4-1

4-3-6 Purity Adjustment

1. Warm up the receiver for at least 20 minutes.
2. Plug in the CRT deflection yoke and tighten the clamp screw.
3. Plug the convergence yoke into the CRT and set in as shown in Fig. 4-2.
4. Input a black and white signal.
5. Fully demagnetize the receiver by applying an external degaussing coil.
6. Turn the CONTRAST and BRIGHTNESS controls to maximum.
7. Loosen the clamp screw holding the yoke. Slide the yoke backward or forward to provide vertical green belt. (Fig. 4-3).
8. Tighten the convergence yoke.
9. Slowly move the deflection yoke forward, and adjust for the best overall green screen.
10. Temporarily tighten the deflection yoke.
11. Produce blue and red rasters by adjusting the low-light controls. Check for good purity in each field.
12. Tighten the deflection yoke.

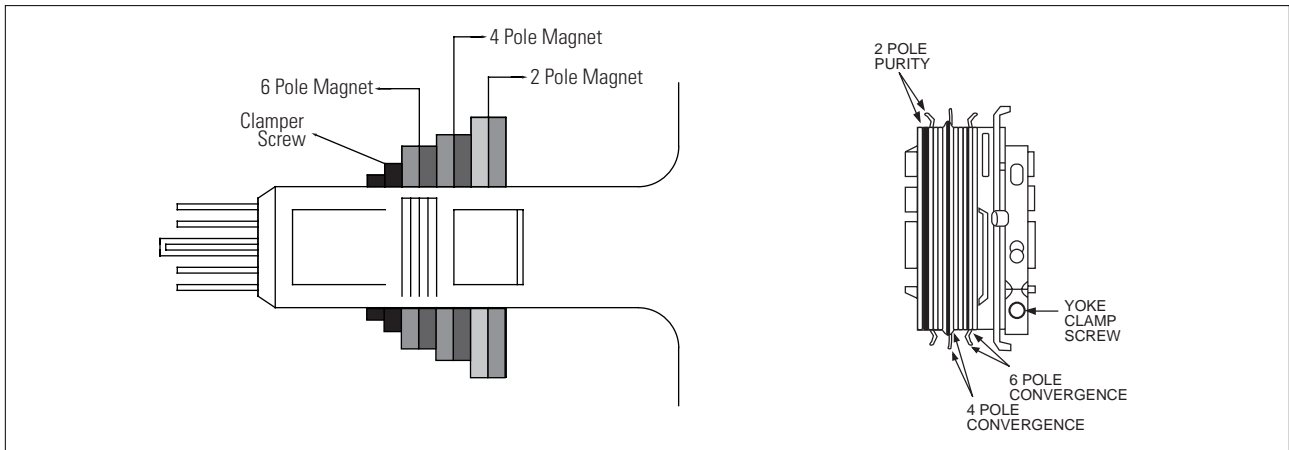


Fig. 4-2 Convergence Magnet Assembly

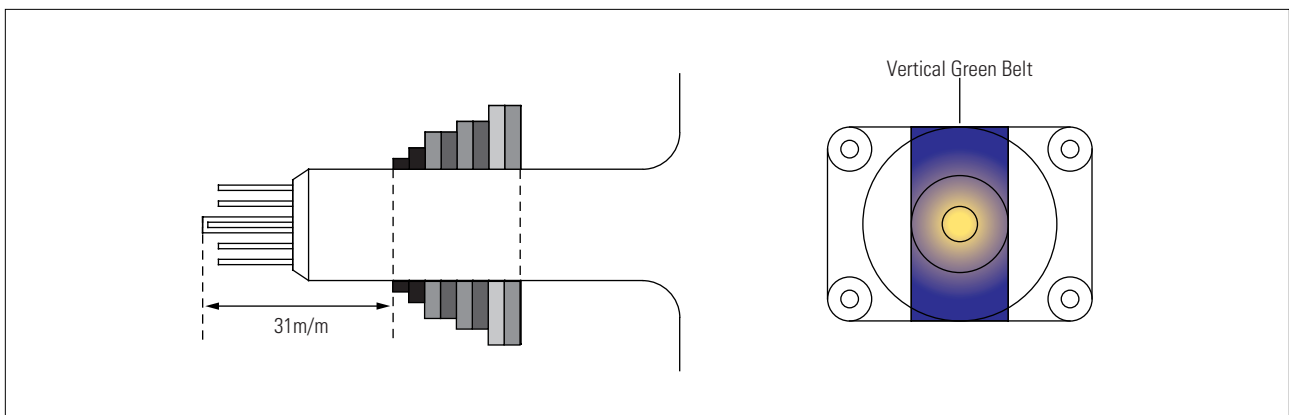


Fig. 4-3 Center Convergence Adjustment

4-3-7 White Balance Adjustment

(a) Set up

1. Warm up the TV for at least 30 minutes in the Aging Mode (OSD White). This mode is displayed by entering the following sequence:

DISPLAY →FACTORY → FACTORY

2. Input a Toshiba pattern.

(b) Low-Light Adjustment

1. Set SBT to 1.0 fL in the Factory Service Mode with using CA100. See Fig. 4-4.
2. Adjust RG,BG so that the levels are suitable to each local area.

(c) High-Light Adjustment

1. Set SCT to 35 FL in the Factory Service Mode with using CA100. See Fig. 4-4 .

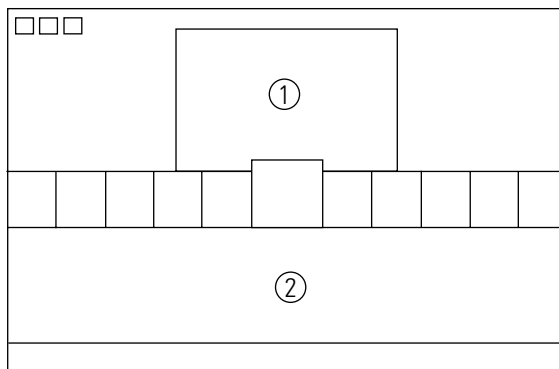


Fig. 4-4

4-3-8 Center Convergence Adjustment

1. Warm up the receiver for at least 20 minutes.
2. Adjust the two tabs of the 4 pole magnets to change the angle between them. Superimpose the red and blue vertical lines in the center area of the screen.
3. Adjust the Brightness and Contrast controls for a well defined picture.
4. Adjust the two-tab pairs of the 4 pole magnets, and change the angle between them. Superimpose the red and the blue vertical lines in the center area of the screen.
5. Turn the both tabs at the same time, keeping the angle constant, and superimpose the red and blue horizontal line in the center of the screen.
6. Adjust the two-tab pairs of the 6-pole magnets to superimpose the red and blue line onto the green. (Changing the angle affects the vertical lines, and rotating both magnets affects the horizontal lines.)
7. Repeat adjustments 2~6, if necessary.
8. Since the 4-pole magnets and 6-pole magnets interact, the dot movement is complex (Fig. 4-5).



Fig. 4-5 Center Convergence Adjustment

4-3-9 RF AGC Adjustment

Set the AGC data to 33 (Factory Mode).

4-3-10 Sub-Color Adjustment

Set $\frac{PSR}{NSR}$ data to $\frac{20}{3}$ (Factory Mode).

4-3-11 Geometry Adjustment

SC → VS → VA → VSL → HS

1. Input a lion head pattern.
2. Set the SC (S-Correction) as 35 and VS (Vertical Shift) 31 so that the lion head circle becomes oval.
3. Adjust with VA (Vertical Amplitude) so that the top margin of the picture is 4.

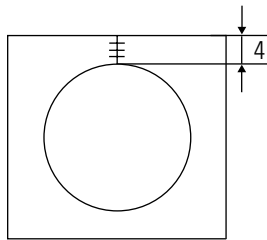


Fig. 4-7

4. Adjust with VSL (Vertical-Slope) so that the bottom margin of the picture is 4.

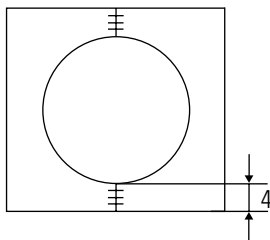


Fig. 4-8

5. Adjust with HS (Horizontal Shift) so that the lion-head pattern and CRT centers are aligned.

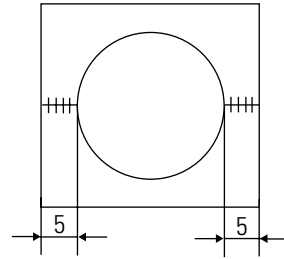
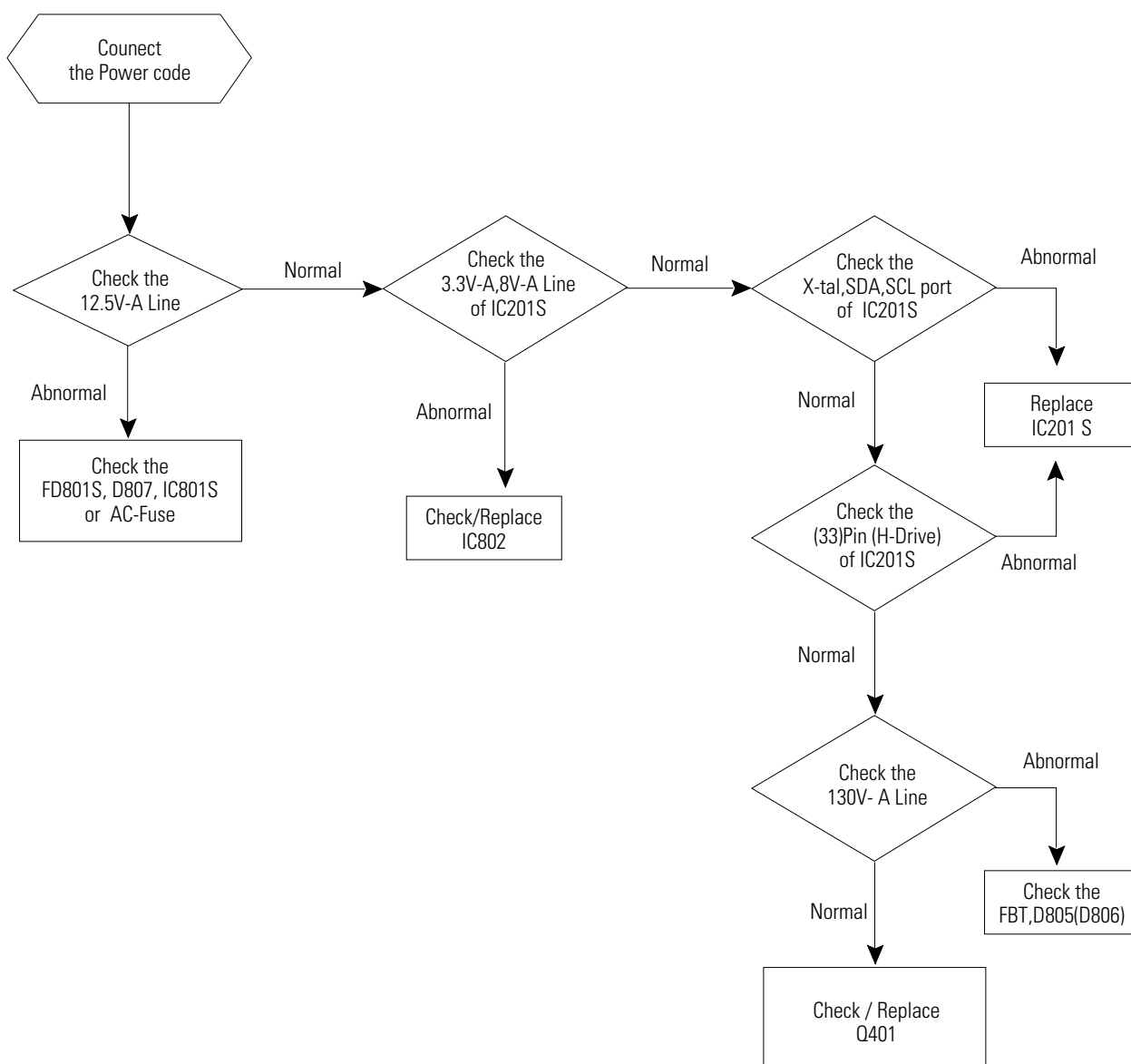


Fig. 4-9

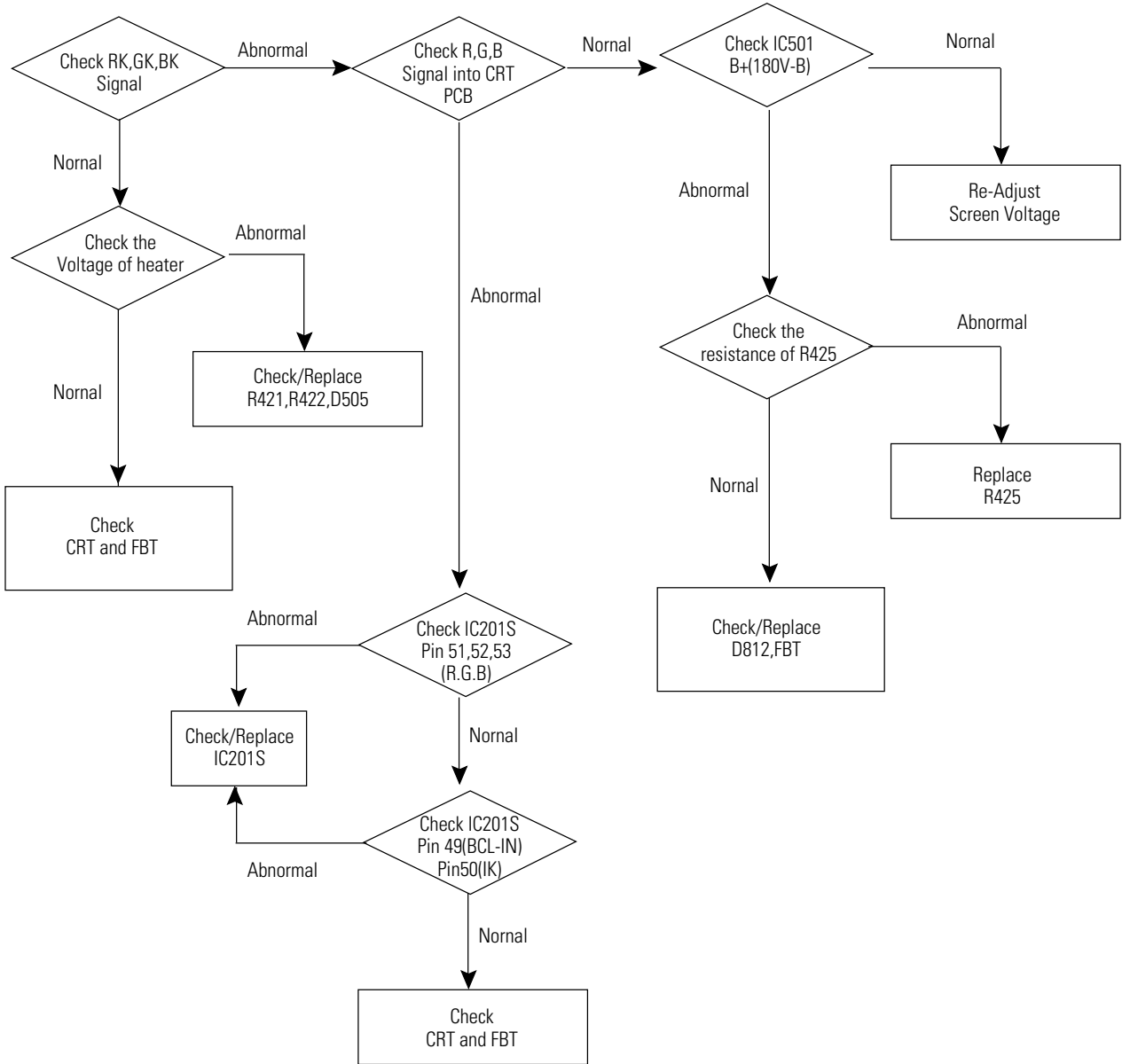
6. Adjust HS (Horizontal Shift) so that the left and right margins of the picture are 5.

5. Troubleshooting

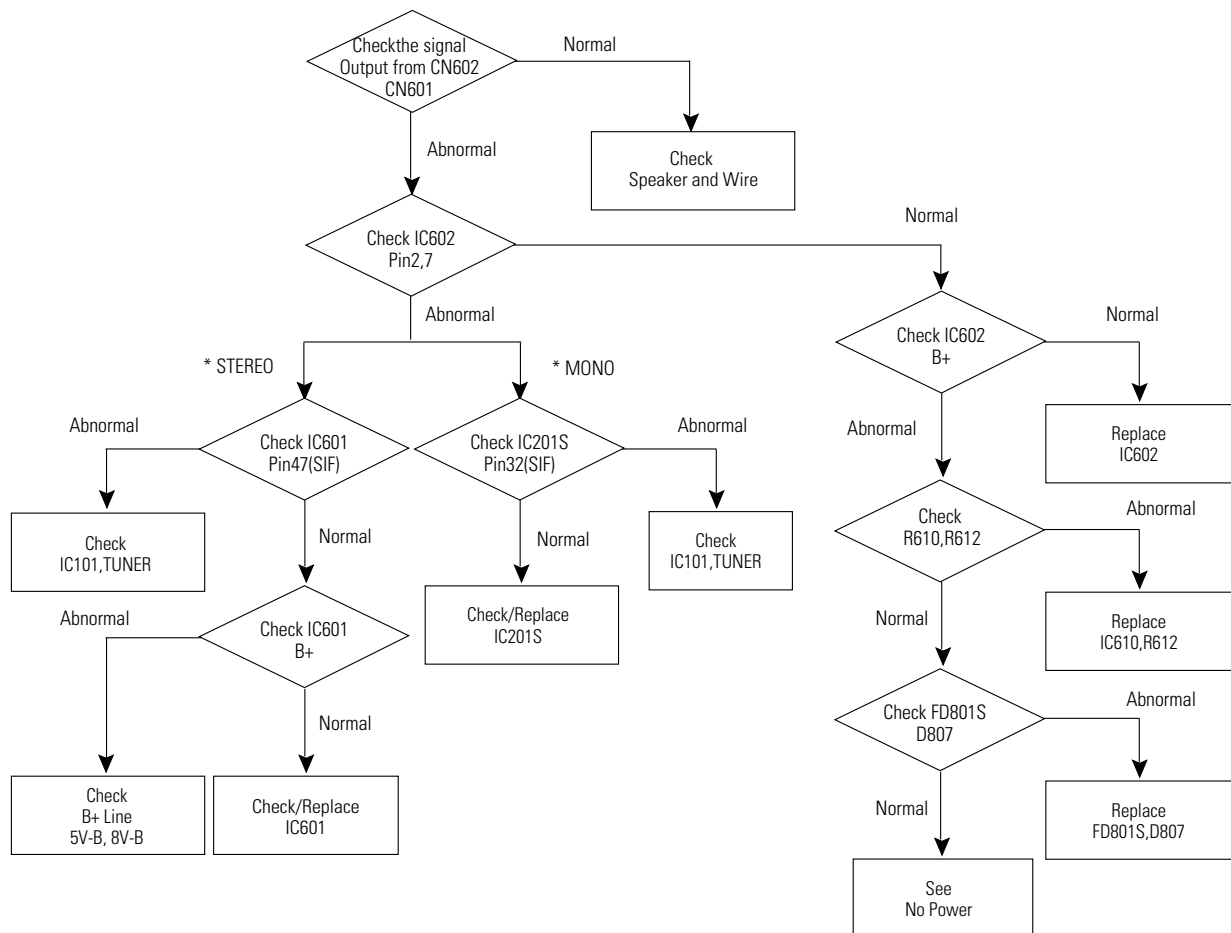
5-1 No Power



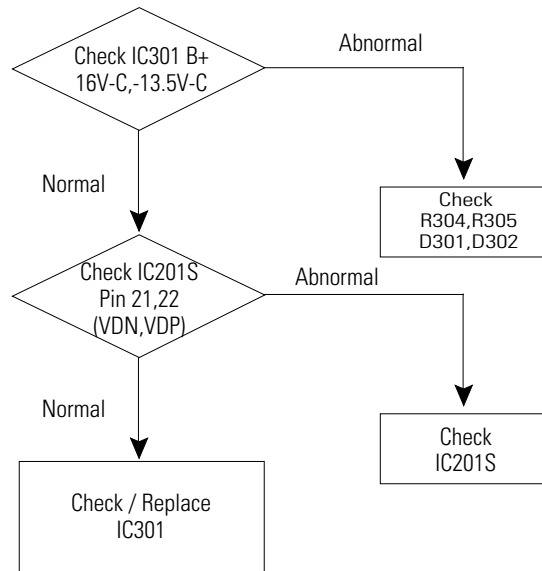
5-2 No Video (Sound OK)



5-3 No Sound (Video OK)

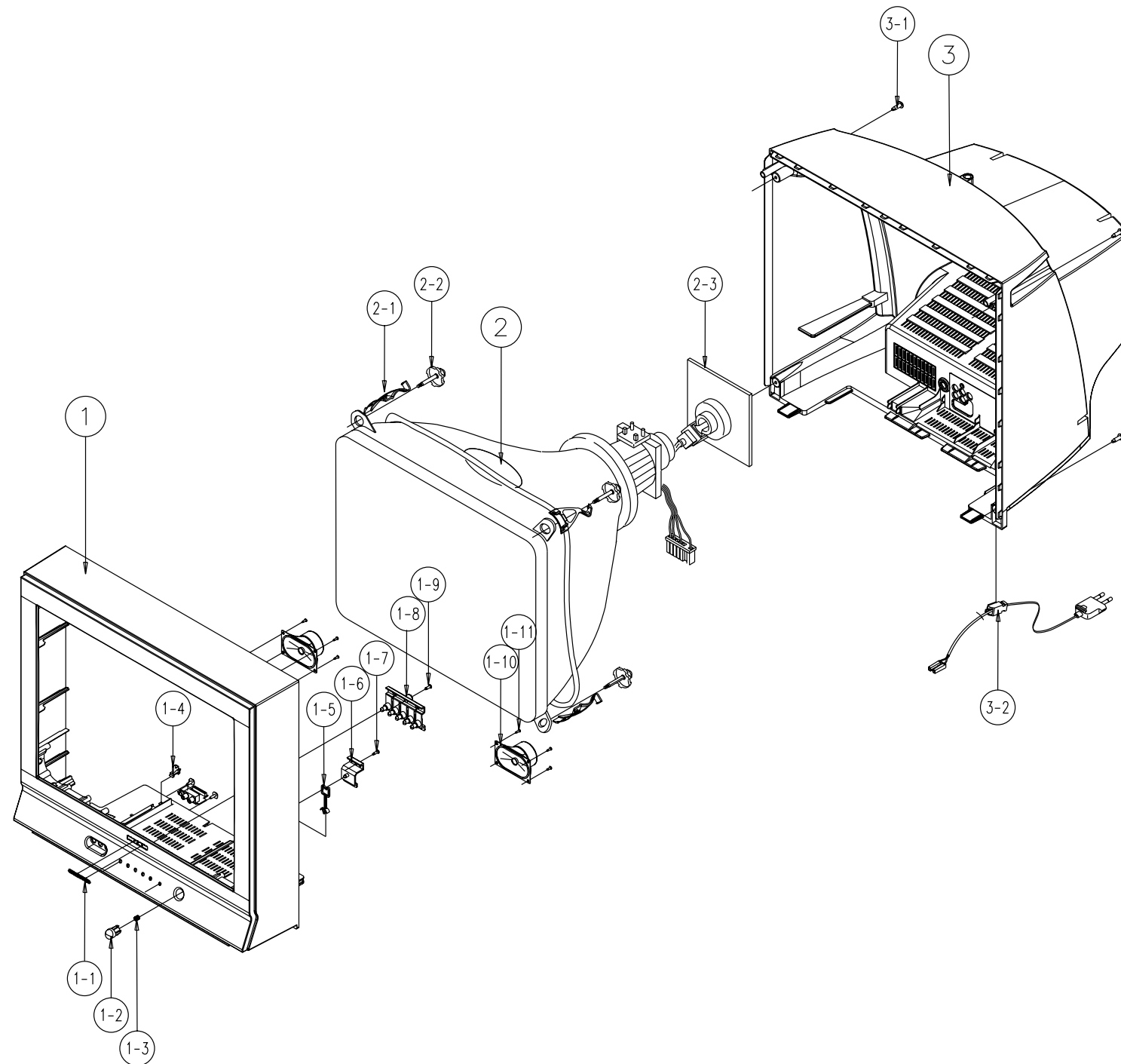


5-4 Horizontal Lines Appear or Screen



6. Exploded View & Parts List

6-1 TXM2090FX/XAA



No	Code No	Description	Specification	Q'ty	Remark
1	AA64-02958A	CABINET-FRONT:21K7,HIPS,VO,BLK,DG703P,SE		1	F/C
1-1	AA64-70123A	BADGE-BRAND;AL,SAMSUNG,SILVER,L=50,FLAT,		1	BADGE
1-2	AA64-02545A	KNOB-POWER;K15C,21K7,ABS,HB,G3676		1	KP
1-3	AA61-60003J	SPRING-CS;-,-,SUS304,0.5,OD6,H		1	SPRING
1-4	AA61-40113A	STOPPER-PCB;-,-ABS,HB,NTR.		1	STOPPE
1-5	AA64-02547A	KNOB-CONTROL;21K7,ABS,HB,G3676		1	KC
1-6	6003-001019	SCREW-TAPTITE;RH,+,B,M4,L12,ZPC(BLK),SWR		1	KC+CF
1-7	AA64-02549A	WINDOW-RMC,21K7,PC,VIOLET		1	WR
1-8	6003-001019	SCREW-TAPTITE;RH,+,B,M4,L12,ZPC(BLK),SWR		1	WR+CF
1-9	AA65-30105A	CLAMP-WIRE;NYLON 66N,VO,NTR,15MM		1	CWFCL
1-10	3001-001262	SPEAKER;3W,80HM,87DB,280HZ		2	SPK
1-11	AA60-10008A	SCREW-TAPPING;-,-TH,+,M3,L10,ZP		4	SPK+CF
2	AA03-00317A	CRT COLOR;A51QDX992X,0MG,1.85MH,18.0MH,2		1	CRT
2-1	AA65-00009B	CLAMP-D,COIL;NYLON 66,VO,-,-,21A8,-		4	CDCOIL
2-2	AA60-10050R	SCREW-ASSY;WC,HH,+,M5,L31.5,SWR		4	CRT+CF
3	AA64-02542A	CABINET-BACK,21K7,HIPS,VO,BLK		1	C/B
3-1	6003-001026	SCREW-TAPTITE;RH,+,B,M4,L15,ZPC(BLK),SWR		4	CB+CF
3-2	AA96-20129C	ASSY-POWER,CORD;-,-EP2/YES,H/C200,ME301P,		1	PWR/AC

Loc. No.	Code No.	Description ; Specification	Remark	Loc. No.	Code No.	Description ; Specification	Remark
4	EY850	AA60-40011A	EYELET;:ID2.0,OD2.8,--,BST	3	O504	0501-000283	TRANSISTOR:KSA539-Y(TAPG)/YTAM
4	EY851	AA60-40011A	EYELET;:ID2.0,OD2.8,--,BST	3	QG01	0501-000283	TRANSISTOR:KSA539-Y(TAPG)/YTAM
4	EY853	AA60-40011A	EYELET;:ID2.0,OD2.8,--,BST	3	QF03	0501-000369	TRANSISTOR:KSC2331-Y(TAPG)
4	EY854	AA60-40011A	EYELET;:ID2.0,OD2.8,--,BST	3	QF01	0501-000389	TRANSISTOR:KSC815-Y(TAPG)/YTAM
4	EY855	AA60-40011A	EYELET;:ID2.0,OD2.8,--,BST	3	QF02	0501-000389	TRANSISTOR:KSC815-Y(TAPG)/YTAM
4	EY856	AA60-40011A	EYELET;:ID2.0,OD2.8,--,BST	3	QG02	0502-000244	TR-POWER:KSA940,PNP,-150V,-150
4	EY857	AA60-40011A	EYELET;:ID2.0,OD2.8,--,BST	3	QG03	0502-001007	TR-POWER:KSC2073-H2,NPN,150V,1
4	EY858	AA60-40011A	EYELET;:ID2.0,OD2.8,--,BST	3	ICG01	1201-000191	IC:MC4558C
4	EY859	AA60-40011A	EYELET;:ID2.0,OD2.8,--,BST	3	R503	2001-000085	R-CARBON(S):100KOHM,5%,1/2W,AA
4	EY860	AA60-40011A	EYELET;:ID2.0,OD2.8,--,BST	3	R508	2001-000085	R-CARBON(S):100KOHM,5%,1/2W,AA
4	EY861	AA60-40011A	EYELET;:ID2.0,OD2.8,--,BST	3	R513	2001-000085	R-CARBON(S):100KOHM,5%,1/2W,AA
4	EL401	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	RF09	2001-000221	R-CARBON:1.2KOHM,5%,1/8W,AA,TP
4	EL402	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	RF12	2001-000221	R-CARBON:1.2KOHM,5%,1/8W,AA,TP
4	EL404	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	RF10	2001-000241	R-CARBON:1.5KOHM,5%,1/8W,AA,TP
4	EL405	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	RF11	2001-000241	R-CARBON:1.5KOHM,5%,1/8W,AA,TP
4	EL406	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	RF08	2001-000313	R-CARBON:11KOHM,5%,1/8W,AA,TP,
4	EL802	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	RF03	2001-000362	R-CARBON:150OHM,5%,1/8W,AA,TP,
4	EL803	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	R542	2001-000429	R-CARBON:1Kohm,5%,1/8W,AA,TP,1.8x3.2mm
4	EL805	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	R543	2001-000429	R-CARBON:1Kohm,5%,1/8W,AA,TP,1.8x3.2mm
4	EL806	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	R544	2001-000429	R-CARBON:1Kohm,5%,1/8W,AA,TP,1.8x3.2mm
4	EL807	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	R546	2001-000429	R-CARBON:1Kohm,5%,1/8W,AA,TP,1.8x3.2mm
4	EL808	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	R522	2001-000449	R-CARBON:2.2KOHM,5%,1/8W,AA,TP
4	EL809	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	RF04	2001-000449	R-CARBON:2.2KOHM,5%,1/8W,AA,TP
4	EL810	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	R504	2001-000515	R-CARBON:220OHM,5%,1/8W,AA,TP,
4	EL811	AA60-40011B	EYELET;:ID2.2,OD3.2,--,BSP	3	R509	2001-000515	R-CARBON:220OHM,5%,1/8W,AA,TP,
4	GT101	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	R539	2001-000515	R-CARBON:220OHM,5%,1/8W,AA,TP,
4	GT102	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	R521	2001-000522	R-CARBON:22KOHM,5%,1/8W,AA,TP,
4	GT103	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	RF05	2001-000522	R-CARBON:22KOHM,5%,1/8W,AA,TP,
4	GT104	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	RF02	2001-000734	R-CARBON:4.7KOHM,5%,1/8W,AA,TP
4	GT301	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	RF07	2001-000904	R-CARBON:620OHM,5%,1/8W,AA,TP,1.8X3.2MM
4	GT302	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	RF06	2001-000989	R-CARBON:820Kohm,5%,1/8W,AA,TP,1.8x3.2m
4	GT401	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	R517	2001-001062	R-CARBON(S):10MOHM,5%,1/2W,AA,
4	GT402	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	RF14	2001-001071	R-CARBON(S):12KOHM,5%,1/2W,AA,
4	GT409	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	R501	2001-001088	R-CARBON(S):1KOHM,5%,1/2W,AA,TP,2.4X6.4
4	GT410	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	R506	2001-001088	R-CARBON(S):1KOHM,5%,1/2W,AA,TP,2.4X6.4
4	GT411	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	R511	2001-001088	R-CARBON(S):1KOHM,5%,1/2W,AA,TP,2.4X6.4
4	GT412	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	R502	2001-001093	R-CARBON(S):2.2KOHM,5%,1/2W,AA,TP,2.4X6.
4	GT801	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	R507	2001-001093	R-CARBON(S):2.2KOHM,5%,1/2W,AA,TP,2.4X6.
4	GT802	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	R512	2001-001093	R-CARBON(S):2.2KOHM,5%,1/2W,AA,TP,2.4X6.
4	GT803	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	RF15	2001-001100	R-CARBON(S):2.7OHM,5%,1/2W,AA,
4	GT804	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	RF17	2001-001100	R-CARBON(S):2.7OHM,5%,1/2W,AA,
4	GT805	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	RG06	2001-001100	R-CARBON(S):2.7OHM,5%,1/2W,AA,
4	GT806	AA60-40014A	PIN-GT,ASSY:1P,--,AUTO	3	RG07	2001-001100	R-CARBON(S):2.7OHM,5%,1/2W,AA,
4	L/LINE	AA68-01544A	LABEL:LINE,ALL MDL COMMON	3	RG05	2001-001163	R-CARBON(S):560OHM,5%,1/2W,AA,
4	R621	2001-000890	R-CARBON:6.8KOHM,5%,1/8W,AA,TP	3	RG08	2001-001163	R-CARBON(S):560OHM,5%,1/2W,AA,
4	R622	2001-000890	R-CARBON:6.8KOHM,5%,1/8W,AA,TP	3	RF13	2001-001179	R-CARBON(S):68KOHM,5%,1/2W,AA,
4	R908	2001-000449	R-CARBON:2.2KOHM,5%,1/8W,AA,TP	3	RF16	2001-001179	R-CARBON(S):68KOHM,5%,1/2W,AA,
4	R906	2001-000449	R-CARBON:2.2KOHM,5%,1/8W,AA,TP	3	R519	2002-001009	R-COMPOSITION:2.7KOHM,10%,1/2W,AA,TP,3.7x9.0m
4	C410	2301-000213	C-FILM,PEF:220NF,5%,250V,21.5X	3	R505	2002-001017	R-COMPOSITION:1K,10%,1/2W,AA,TP,3.7x9.0m
3		0204-000442	SOLVENT:CH3-CH5H-CH396%IM-1000	3	R510	2002-001017	R-COMPOSITION:1K,10%,1/2W,AA,TP,3.7x9.0m
3		0202-000008	SOLDER-WIRE:S63S-D3.0,S63A,D3,63/37	3	R515	2002-001017	R-COMPOSITION:1K,10%,1/2W,AA,TP,3.7x9.0m
3		0204-001024	FLUX:DF-96TVS,-20%,	3	RF18	2003-000458	R-METALOXIDE(S):100OHM,5%,2W,A
3		0202-000187	SOLDER-WIREFLUX:-RS60S,D1,2.6	3	RF23	2003-000746	R-METALOXIDE(S):560OHM,5%,2W,AD
3	SH+CW	AA65-30105B	CLAMP-WIRE:NYLON 66,V2,NTR,25MM,ALL MODE	3	RF24	2003-000746	R-METALOXIDE(S):560OHM,5%,2W,AD
3	SH+H/S	AA61-00462B	SUPPORT-HEAT-SINK:21A9,ABS,HB,GRAY	3	RF19	2003-001023	R-METALOXIDE(S):120OHM,5%,2W,A
2	A/CRT	AA95-01158A	ASSY PCB CRT:KS3A,29FLAT,PAL	3	RF25	2003-002009	R-METALOXIDE(S):390OHM,5%,2W,A
3	DF01	0401-000005	DIODE:1N4148,100V,300mA,1V,8nS,TAPING	3	R518	2003-002171	R-METAL OXIDE(S):150ohm,5%,2W,AG,TP,3.9x
3	DF04	0401-000005	DIODE:1N4148,100V,300mA,1V,8nS,TAPING	3	RF20	2003-002214	R-METALOXIDE(S):680ohm,5%,2W,AG,TP,3x19
3	DG01	0401-000005	DIODE:1N4148,100V,300mA,1V,8nS,TAPING	3	RF21	2003-002214	R-METALOXIDE(S):680ohm,5%,2W,AG,TP,3x19
3	D502	0402-000132	DIODE-RECTIFIER:1N4004,400V,1A,DO-41	3	RF22	2003-002214	R-METALOXIDE(S):680ohm,5%,2W,AG,TP,3x19
3	D507	0402-001105	DIODE-RECTIFIER:ERB43-04SV1,40	3	R527	2004-000433	R-METAL:1KOHM,1%,1/8W,AA,TP,1.
3	D508	0402-001105	DIODE-RECTIFIER:ERB43-04SV1,40	3	R526	2004-000500	R-METAL:2.7Kohm,1%,1/8W,AA,TP,1.8x3.2m
3	D509	0402-001105	DIODE-RECTIFIER:ERB43-04SV1,40	3	RG01	2004-001397	R-METAL(S):4.7KOHM,1%,1/2W,AA,
3	D510	0402-001105	DIODE-RECTIFIER:ERB43-04SV1,40	3	RG03	2004-001987	R-METAL:4.3KOHM,1%,1/2W,AA,TP,
3	D511	0402-001105	DIODE-RECTIFIER:ERB43-04SV1,40	3	RG02	2004-002022	R-METAL,FILM:RM1/2T51K-F
3	D512	0402-001105	DIODE-RECTIFIER:ERB43-04SV1,40	3	RG04	2004-002022	R-METAL,FILM:RM1/2T51K-F
3	DF02	0402-001105	DIODE-RECTIFIER:ERB43-04SV1,40	3	R523	2008-000267	R-FUSIBLE(S):2.4OHM,5%,2W,AA,TP,3.9X10
3	DF03	0402-001105	DIODE-RECTIFIER:ERB43-04SV1,40	3	CF01	2201-000180	C-CERAMIC,DISC:10NF,10%,50V,Y5V,TP,6.5*3
3	DZF01	0403-001039	DIODE ZENER:MA2560,56V,52-60V,1W,DO-41,T	3	C501	2201-000247	C-CERAMIC,DISC:15PF,5%,50V,CH,
3	DZF02	0403-001039	DIODE ZENER:MA2560,56V,52-60V,1W,DO-41,T	3	C507	2201-000247	C-CERAMIC,DISC:15PF,5%,50V,CH,
3	DZ503	0403-001211	DIODE-ZENER:MTZJ12B,11.44-12.03V,500MW,D	3	CF03	2201-000376	C-CERAMIC,DISC:220PF,5%,50V,SL,4X4MM,5MM
3	RWK/CR	0403-001211	DIODE-ZENER:MTZJ12B,11.44-12.03V,500MW,D	3	CF06	2201-000516	C-CERAMIC,DISC:4.7nF,+100-0%,5
3	DZ504	0403-001325	DIODE-ZENER:MTZJ15C,14.35-15.09V,500mW,D	3	CF08	2201-000604	C-CERAMIC,DISC:56PF,+100-0%,50
3	DZ505	0403-001325	DIODE-ZENER:MTZJ15C,14.35-15.09V,500mW,D	3	CF04	2201-000653	C-CERAMIC,DISC:68PF,5%,50V,SL,4.0X3.5MM,
3	DZG501	0403-001328	DIODE-ZENER:MTZJ22A,20.15-21.20V,500mW,D	3	C513	2201-000723	C-CERAMIC,DISC:4.7nF,20%,3KV,Y5U,TP,16x5
3	Q502	0501-000283	TRANSISTOR:KSA539-Y(TAPG)/YTAM	3	C503	2201-002108	C-CERAMIC,DISC:1.5nF,10%,500V,B,TP,8.5x3
3	Q503	0501-000283	TRANSISTOR:KSA539-Y(TAPG)/YTAM	3	C506	2201-002108	C-CERAMIC,DISC:1.5nF,10%,500V,B,TP,8.5x3

Loc. No.	Code No.	Description ; Specification	Remark
2	L/IND	AA68-00524A	LABEL-INDICATOR:A/P 90(G),CXJ1352X/XAA,U
2	S/CRT	AA61-01009A	SUPPORT-CRT,29K7,HIPS,VO
2	H/BLOC	AA61-01066A	HOLDER-C,BLOCK,29K7,HIPS,VO,BLK
2	C-BLOC	AA26-00069A	TRANS FBT:FUJ-29C002C(S),DREAM3,4,-,-,-,
2	HB+CBK	AA60-10008A	SCREW-TAPPING:-,TH,+,M3,L10,ZP
2	L/SPK	AA39-00102M	LEAD-CONNECTOR,ASSY:4P,35155-0400,REC,80
2	A/A-V	AA96-00960A	ASSY-PCB:A/V FRONT:KS3A,29
3	BAND	AA63-10002A	BAND-TIE:-,NYLON66V2,-,-,L100,NTR,-,-
3	CN01A	AA39-20068E	LEAD CONNECTOR-ASSY:-,YBNH025-08,67096-0
3	CN05A	AA39-20069D	LEAD-CONNECTOR,ASSY:-,YBNH025-
3	CN06A	AA39-00070A	LEAD CONNECTOR-ASSY:4P,200mm,YBNH250-04,
3	JE01	3722-000143	JACKHONE:1P,3.4MM,-,MBAG
3	JR01	3722-001031	JACK-RCA:3P,3.6MM,#18,AU
3	O2VER	AA41-10358C	PCB-FRONT AV:CHASSIS-ALL,FR-1,1L,C,1.6T,
3	CA02	2202-000121	C-CERAMIC,MLC-AXIAL:100PF,10%,
3	CA03	2202-000121	C-CERAMIC,MLC-AXIAL:100PF,10%,
3	CA04	2202-000720	C-CERAMIC,MLC-AXIAL:8.2nF,20%,16V,Y5R,TP
3	CA05	2202-000720	C-CERAMIC,MLC-AXIAL:8.2nF,20%,16V,Y5R,TP
3	LA02	3812-000219	JUMPER-WIRE-SO,COPPER:TA0.6SN/52M/M(A
3	LA03	3812-000219	JUMPER-WIRE-SO,COPPER:TA0.6SN/52M/M(A
3	LA04	2701-000180	INDUCTOR-AXIAL:33UH,5%,2.5X3.4
3	LA05	2701-000180	INDUCTOR-AXIAL:33UH,5%,2.5X3.4
3	RA01	2001-000028	R-CARBON(S):1000HM,5%,1/2W,AB,
3	RA02	2001-000028	R-CARBON(S):1000HM,5%,1/2W,AB,
3	CA06	2401-003102	C-AL:100uF,20%,10V,GP,TP,5x11,5
3	CA07	2401-003102	C-AL:100uF,20%,10V,GP,TP,5x11,5
2	S/CRT	AA60-00038A	SPACER-CRT:PS,SHEET,T1.0,BLK,OD22,ID10.
2	F/C	AA64-02959A	CABINET-FRONT:29K7,HIPS,VO,BLK,DG703P,SE
3	KP	AA64-02544A	KNOB-POWER:29K7,ABS,HB,G3676
3	KC	AA64-02546A	KNOB-CONTROL:29K7,ABS,HB,G3676
3	WR	AA64-02548A	WINDOW-RMC,LED:29K7,PC,CLR
3	SPRING	AA61-60003J	SPRING-CS:-,-,SUS304,0.5,OD6,H
3	KC+CF	6003-001019	SCREW-TAPTITE:RH,+,B,M4,L12,ZPC(BLK),SWR
3	WR+CF	6003-001019	SCREW-TAPTITE:RH,+,B,M4,L12,ZPC(BLK),SWR
2	BCR+CF	6002-000522	SCREW-TAPPING:TH,+,2,M4,L15,ZP

ASSY-BOX

1	A/BOX	AA92-05516A	ASSY-BOX:KS3A,29K7,SEA/SECA
2	L/BOX	AA68-01542A	LABEL:(UNIBOX),PAPER WHT ALLMD
2	PCK	AA69-00063A	PACKING-CASE:29K7(SAMEX),D-3 AB,A1,750,6

ASSY-P/MATERIAL

1	A/PACK	AA92-05517A	ASSY-P/MATERIAL:KS3A,29K7,SEA/SECA
2	BXTAPE	0203-001295	TAPE-OPP MASKING:1242,T0.06,W100,L91.4M,
2	STAPLE	AA60-40006A	PIN-STAPLE:-,-,-,H18,33X17.8X2
2	C/SET	AA69-01564A	CUSHION-SET:29K7,PS FOAMED,C=0.02
2	PE-BAG	AA69-01209A	BAG:SHEET,25-27,W54,L60,FOAM,OEM.

ASSY CPT

1	A/CPT	AA91-01356A	ASSY CPT:TXL2791FX/XAA	
△	2	CRT	AA03-00360A	CRT COLOR:A68QCP891X100(M),+380MG,1.11MH
2	D-COIL	AA27-20002Q	COILDEGAUSSING:-,-,H18,33X17.8X2	
2	CDCOIL	AA65-30017A	CLAMP-D,COIL:-,NYLON-66,VO,NTR,DADH300,2	
2	CDCOIL	AA65-30113A	CLAMP-D,COIL:NYLON66,V2,BLK,TVI25-29,-	
2	A/TBC	AA98-70011A	ASSY-TBC,WIRE(P):-,-,29,NTSC,PAL,2P	

ASSY-LABEL

1	A/LABE	AA92-05443A	ASSY-LABEL:KS3A,27,SEA
2	INLAYB	AA64-00892F	INLAY BACK:D2,D3,RCA9P+DVD,PS SHEET,T0.3
2	L/RAT	AA68-02445A	LABEL-RATING:ART-PAPER:60X90MM,V17A,77HN
2	L/CRT	AA68-01557A	LABEL ENERGY:STAR,STATIC FREE FILM
2	L/SET	AA68-50394T	LABEL-D.H.H.S:TSK2792FX/XAA,A/P120(G),-

Loc. No.	Code No.	Description ; Specification	Remark
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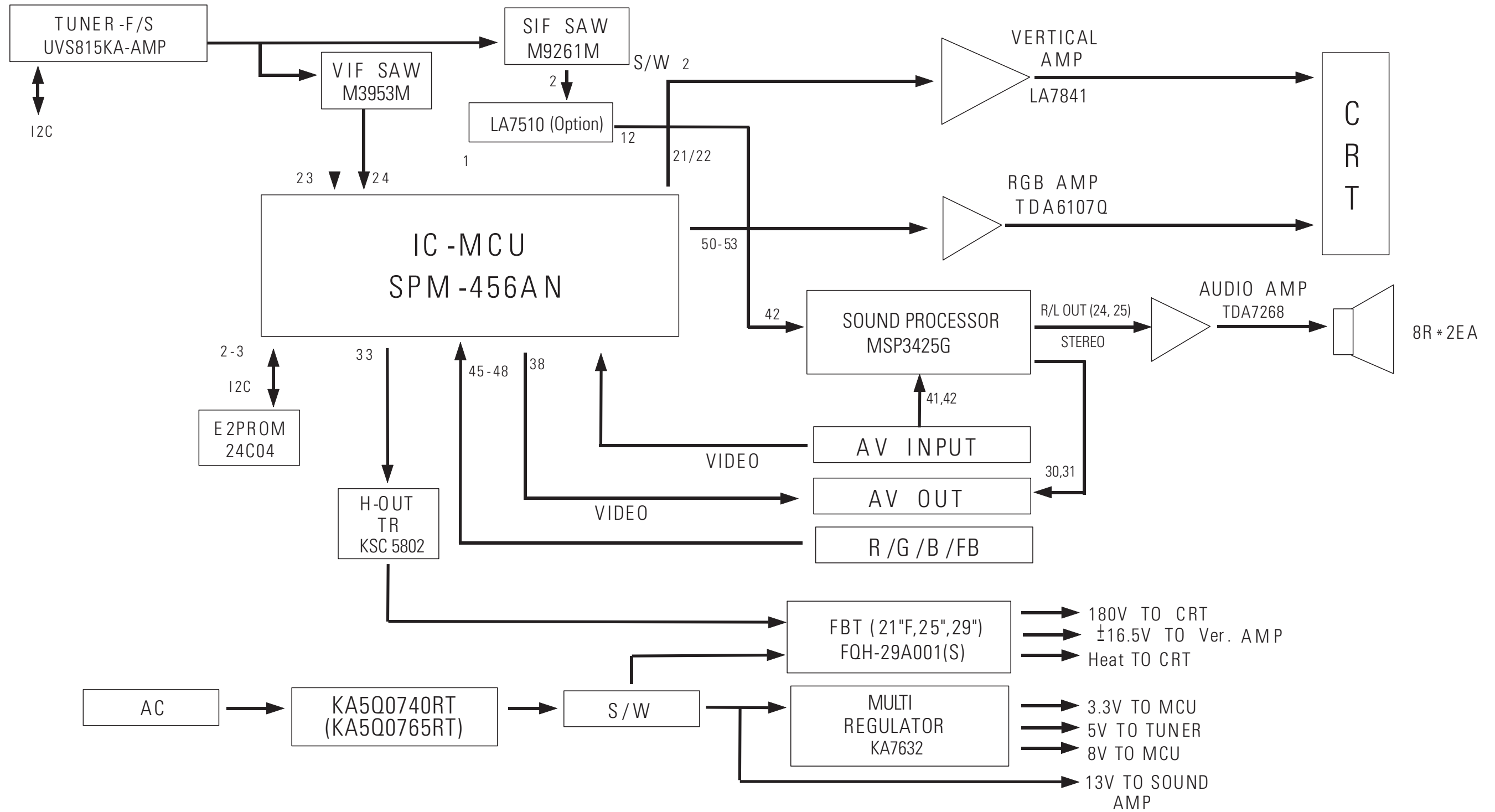
ASSY-ACCESSORY

1	A/ACCE	AA92-05575A	ASSY-ACCESSORY:KS3A,27,SEA
2	AC-TAP	0203-001279	TAPE-OPP MASKING:#232,T0.14,W15,L50000.Y
2	BATT	4301-000120	BATTERY-MN:1.5V,-,AA
2	C/RCA	AA39-40001B	PATCH-CORD:3P-3P1500MMRED,WHT,YEL,500
2	RMT	AA59-10113H	REMOCON:DP,TM59,-,-,-,-,AA59-10110H,
2	C/WARR	AA68-01433A	CARD WARRANTY:TV/TVCR,ALL,W/P100(G),B5,
2	B/WARR	AA68-01561A	CARD WARRANTY:BLOCK,STATEMENT ONLY,SEA/S
2	I/B	AA68-02463A	MANUAL-USERS:ENG,W/P100(G),B5,60P,KS3A
2	C/REG	AA68-01969A	CARD:REGISTRATION PRODUCT,W/P120(G),SEA
2	BAG-PE	AA69-01195A	BAG PE:CL29A6W8X,HDPETO.012,93/4X151

MEMO

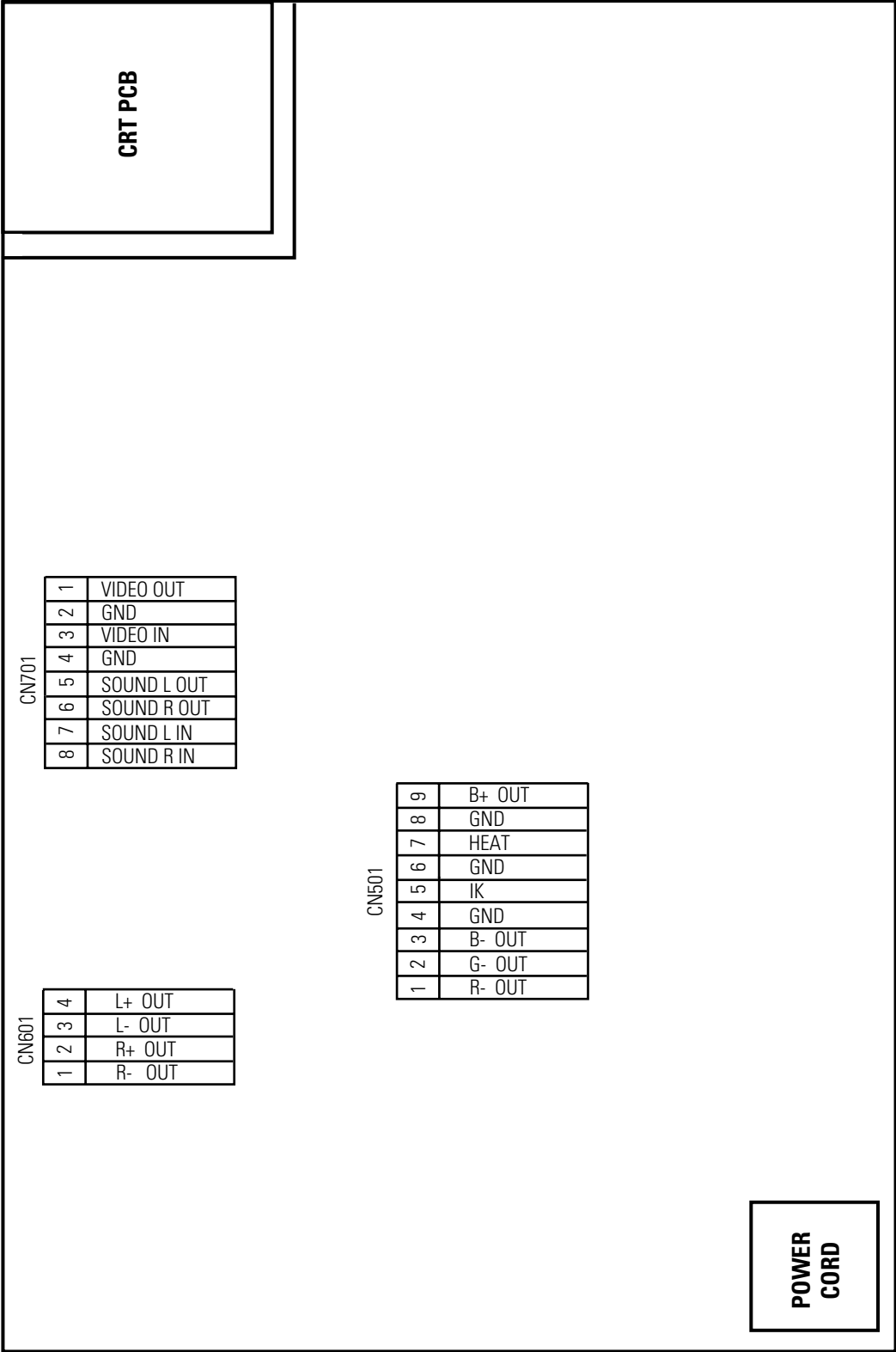
8. Block Diagram

8-1 K15C



9. Wiring Diagram

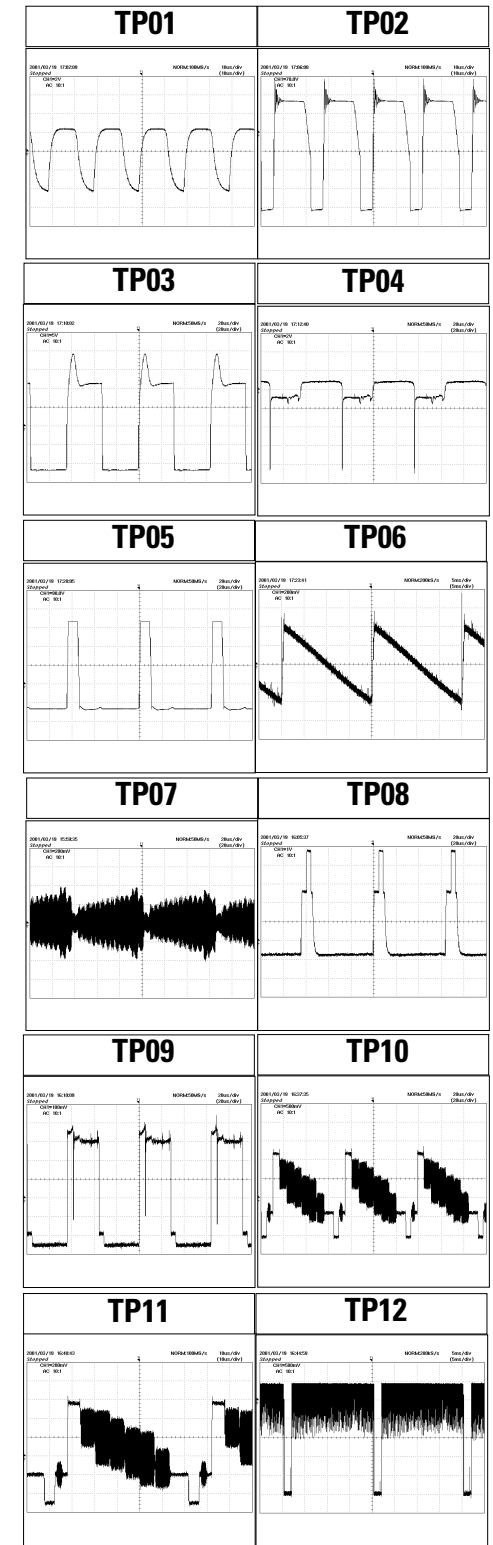
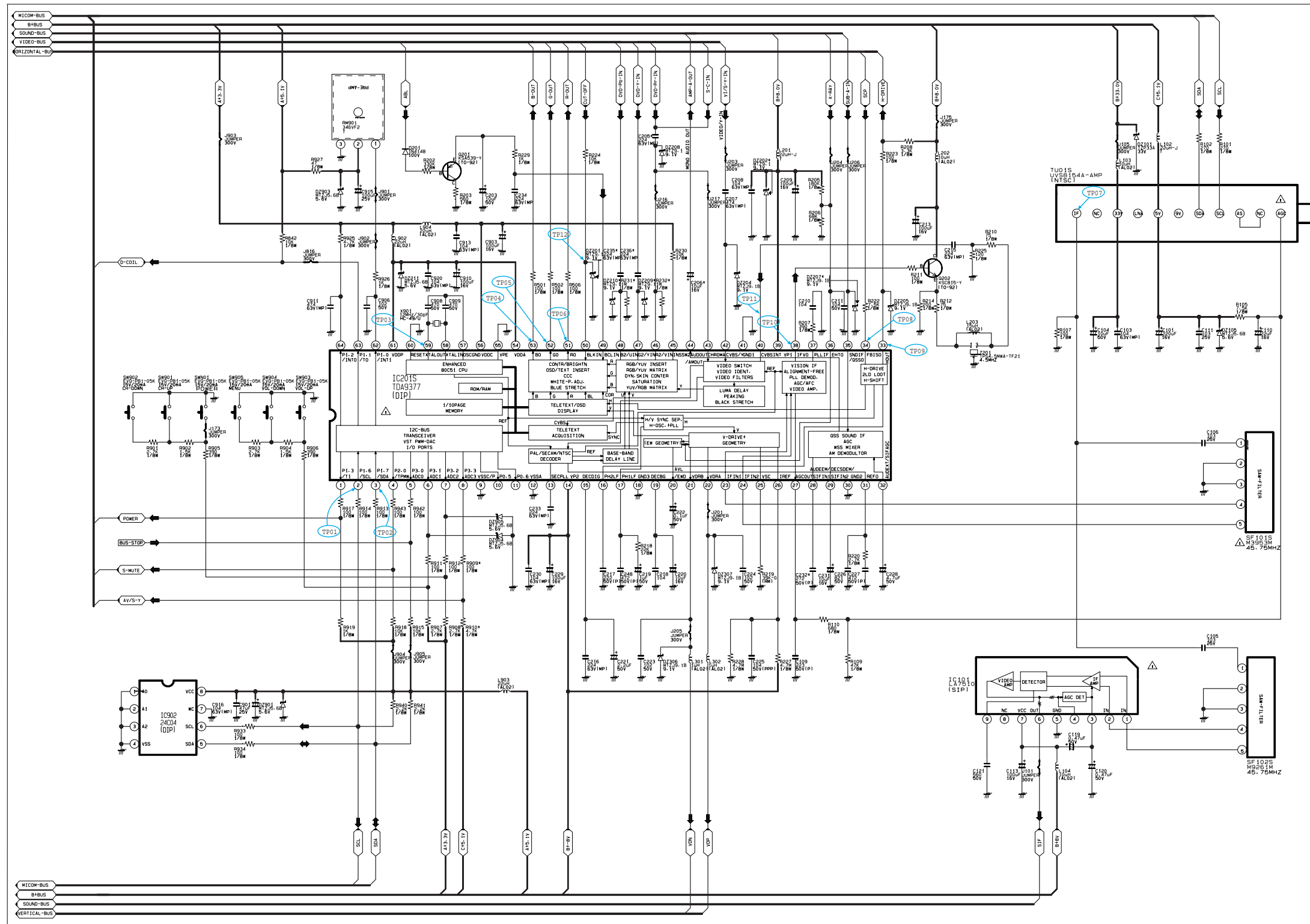
9-1 K15C



MEMO

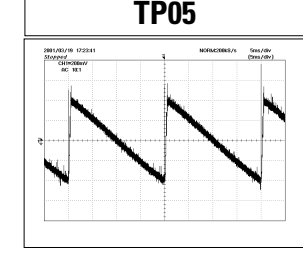
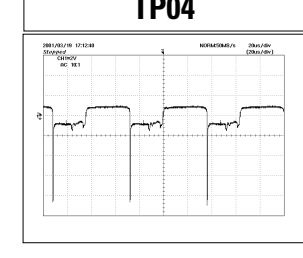
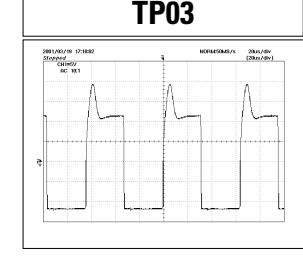
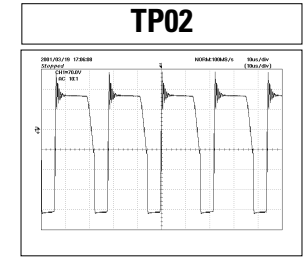
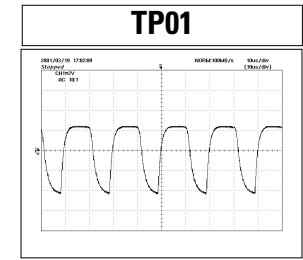
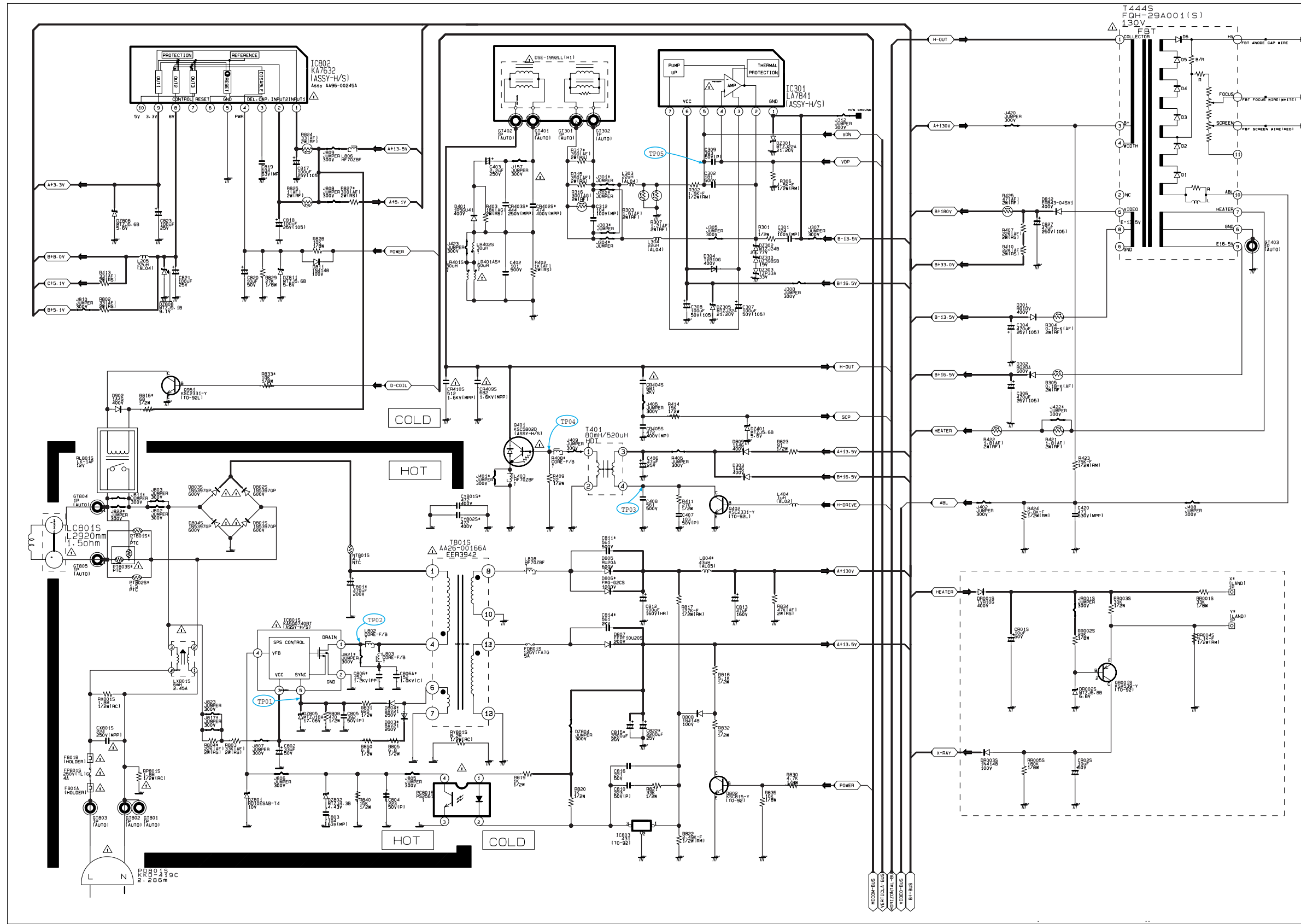
10. Schematic Diagrams

10-1 MAIN (1/4)



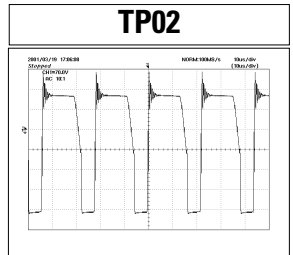
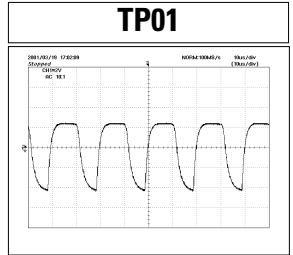
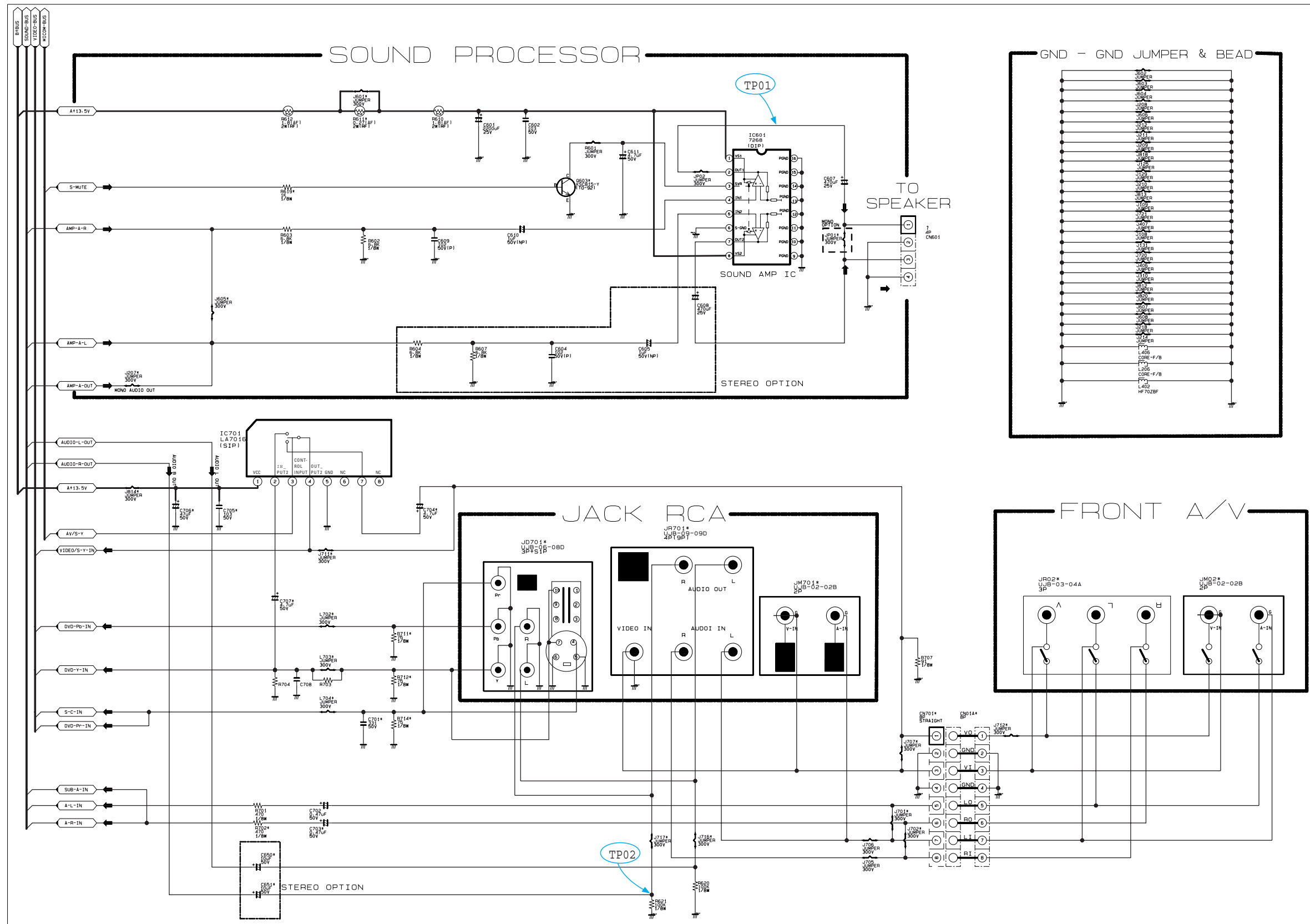
— : Power Line
— : Signal Line

10-2 MAIN (2/4)



— : Power Line
— : Signal Line

10-3 MAIN (3/4)



Power Line
Signal Line

10-4 MAIN (4/4)

