SANYO

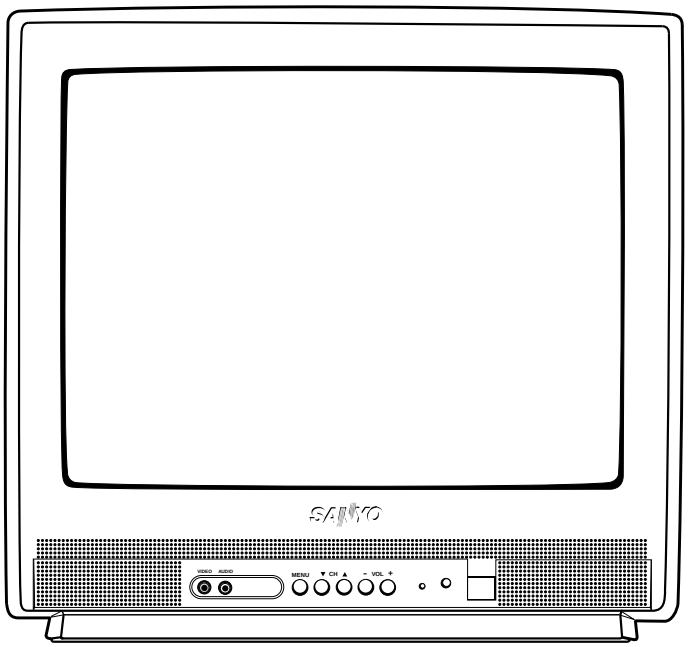
FILE NO.

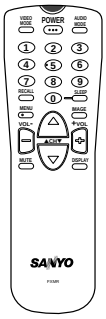
SERVICE MANUAL Colour Television

Model No. C20LB87B

(Argentina)

Service Ref. No. C20LB87B-00





Specifications

Power Source . . . . . AC220V, 50Hz / 60Hz
Receiving System . . . . . PAL (M/M, N/N), NTSC (M/M)
Channel Coverage
Antenna mode VHF: CH02-CH13, UHF: CH14-CH69
CATV mode VHF band: CH01-CH13, Mid band: CH14-CH22
Super band: CH23-CH36, Hyper band: CH37-CH64
Ultra band: CH65-CH94 and CH100-CH125
Low mid band: CH95-CH99
Video IF 45.75MHz
Aerial Input Impedance . . 75Ω
Ext. Terminals
Video inputs: Phono jack × 2(1Vp - p, 75Ω)
Audio inputs: Phono jack × 2 (436mVrms, more than 40KΩ)
Speaker . . . . . 5cm × 9cm × 2
Sound Output (Music) . . . 2.0W
Dimensions . . . . . 496(W) × 464(H) × 472(D)mm
Weight . . . . . approx. 16.7Kg

Specifications subject to change without notice.

Product Code: 1 113 378 15

Original Version

Chassis Series: LC1-B

Give complete “SERVICE REF. NO.” for parts order or servicing. It is shown on the rating plate at the cabinet back of the unit.

This T.V. receiver will not work properly in foreign countries where the television transmission system and power source differ from the design specifications. Refer to the specification table.

F5TT

Contents

Safety Notice

SAFETY PRECAUTIONS

1: An isolation transformer should be connected in the power line between the receiver and the AC line when a service is performed on the primary of the converter transformer of the set.

2: Comply with all caution and safety-related notes provided on the cabinet back, inside the cabinet, on the chassis or the picture tube.

3: When replacing a chassis in the cabinet, always be certain that all the protective devices are installed properly, such as, control knobs, adjustment covers or shields, barriers, isolation resistor-capacitor networks etc.. Before returning any television to the customer, the service technician must be sure that it is completely safe to operate without danger of electrical shock.

X-RADIATION PRECAUTION

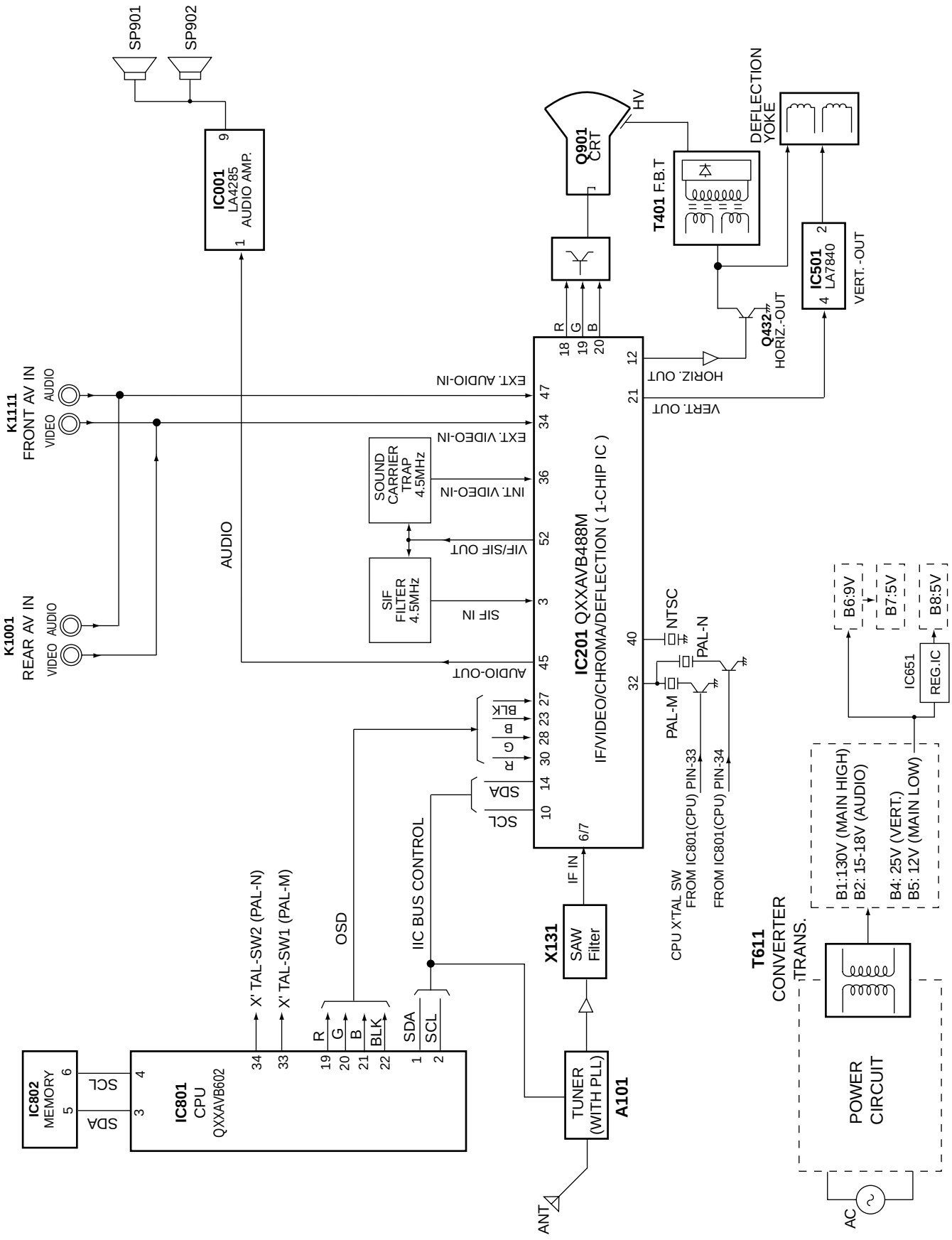
The primary source of X-RADIATION in television receiver is the picture tube. The picture tube is specially constructed to limit X-RADIATION emissions. For continued X-RADIATION protection, the replacement tube must be the same type as the original including suffix letter. Excessive high voltage may produce potentially hazardous X - RADIATION. To avoid such hazards, the high voltage must be maintained within specified limit. Refer to this service manual, high voltage adjustment for specific high voltage limit. If high voltage exceeds specified limits, take necessary corrective action. Carefully follow the instructions for + B1 volt power supply adjustment, and high voltage check to maintain the high voltage within the specified limits.

PRODUCT SAFETY NOTICE

Product safety should be considered when a component replacement is made in any area of a receiver. Components indicated by mark ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. It is particularly recommended that only parts designated on the parts list in this manual be used for component replacement designated by mark ⚠ . No deviations from resistance wattage or voltage ratings may be made for replacement items designated by mark ⚠ .

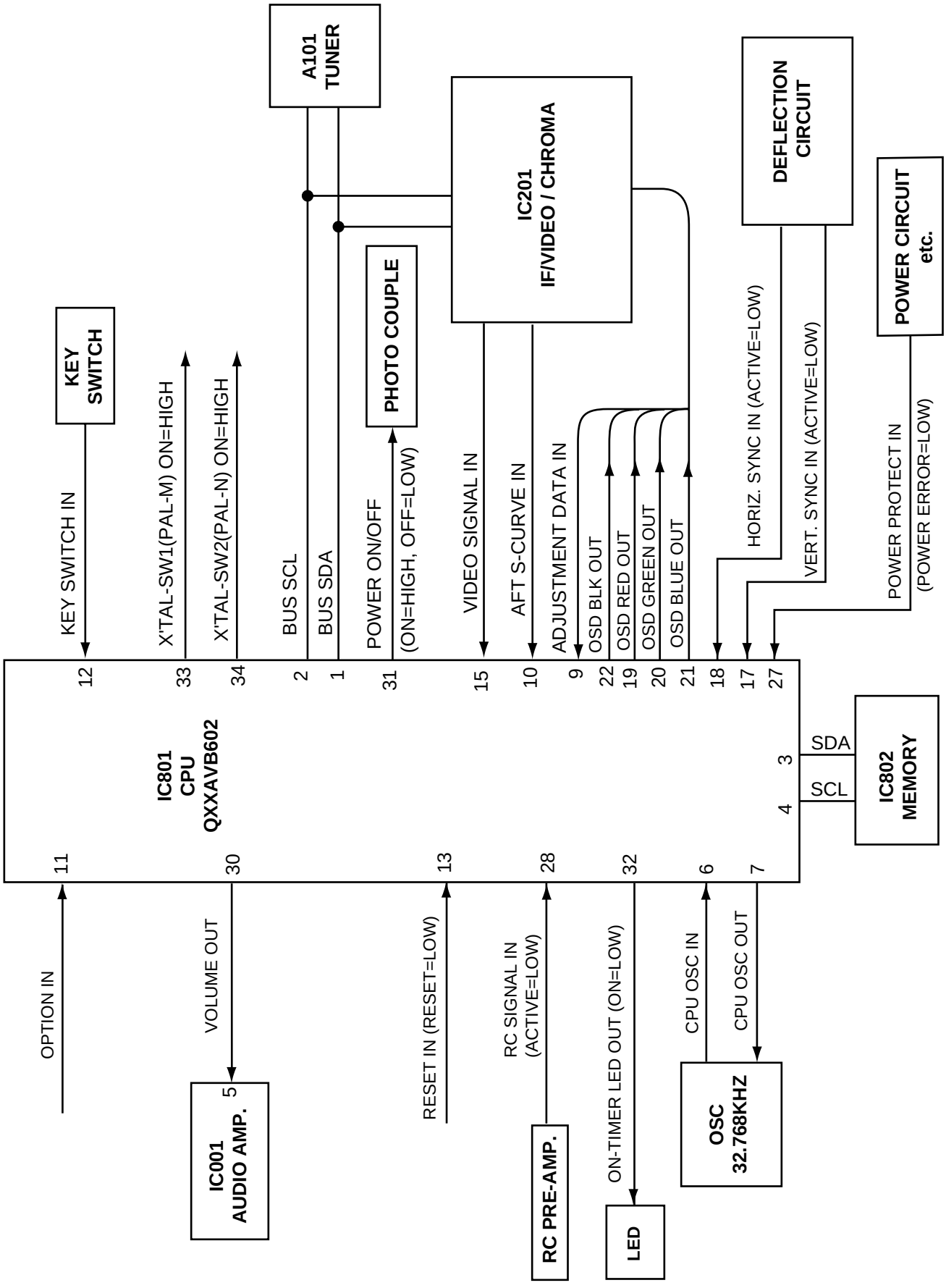
Chassis Block Diagrams

MAIN SIGNAL PROCESSING CIRCUIT



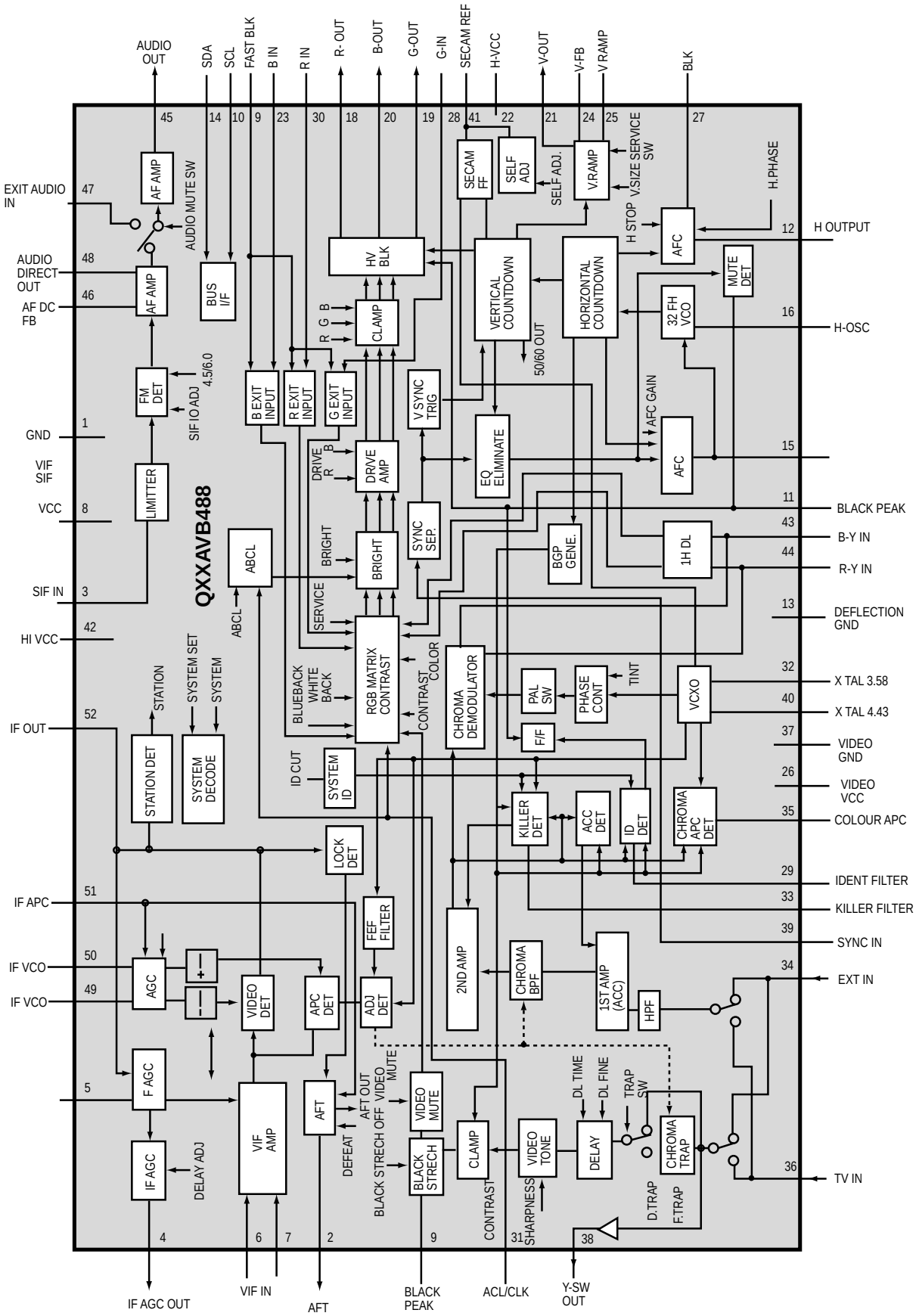
Chassis Block Diagrams

SYSTEM CONTROL



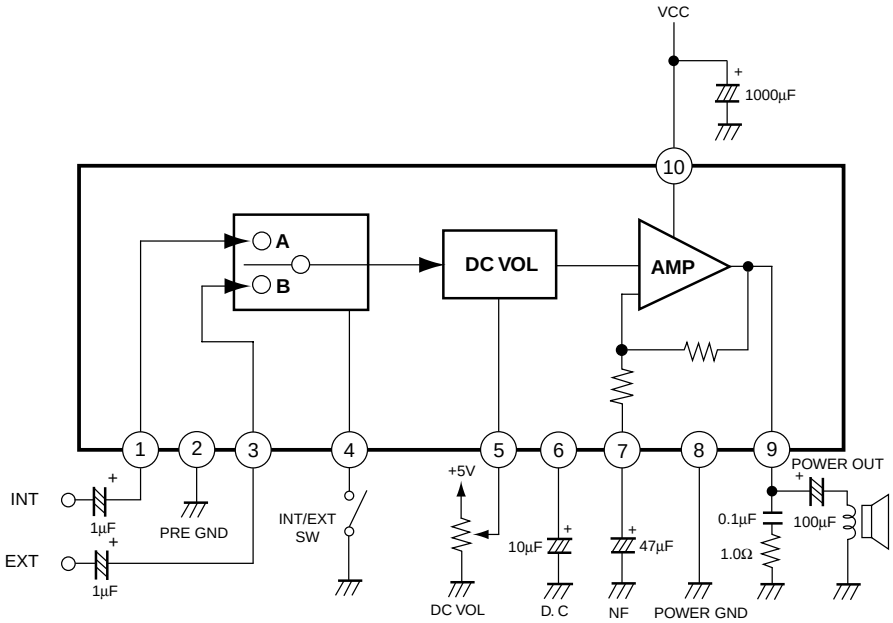
IC Block Diagrams

IC201 < IF/Video/Chroma/Def. > QXXAVB488

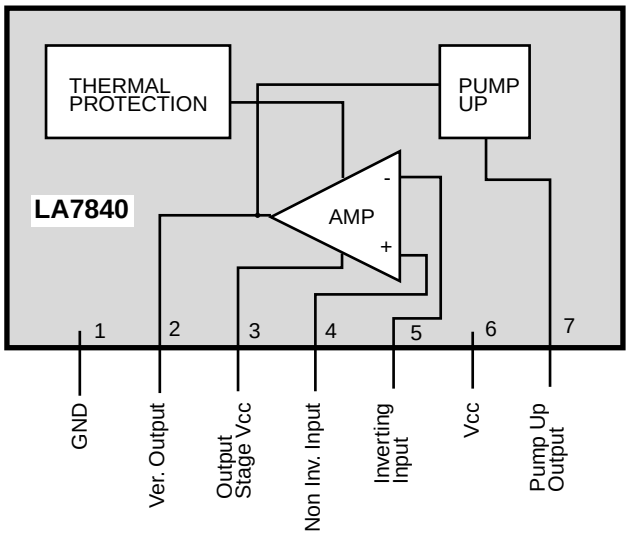


IC Block Diagrams

IC001 < Audio AMP. > LA4285



IC501 < Vertical Output > LA7840



Protection Circuit

This TV set has a built-in power supply protection circuit.
It is provided to protect the TV set in case of a power supply circuit malfunctions. When something abnormality occurs during TV reception, the TV set goes to the stand-by mode.

When an abnormality occurs during TV reception, it causes pin 27 of the CPU to go continually Low(less than 0.75V) for about one second. The CPU detects that this has occurred and outputs the signal from pin 31 to switch off the power supply lines.

Releasing the protective circuit and restoring power supply

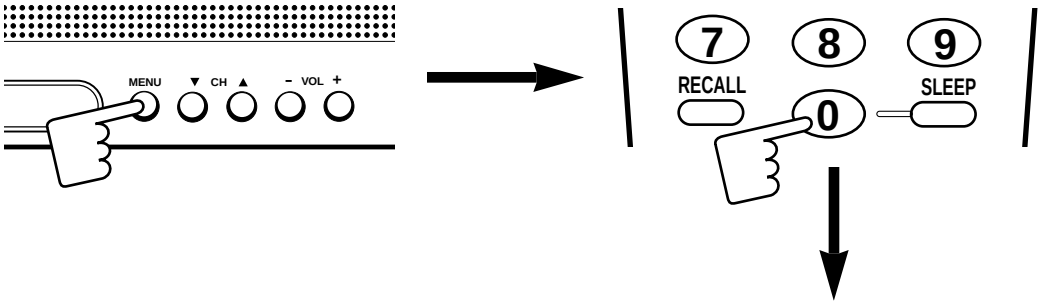
To release the protective circuit and restore power supply, turn the power to the TV set OFF and then ON again via either the main power switch or the ON-OFF button on the remote control. This will work only if the power supply trouble was temporary. If there is permanent trouble such as a damaged circuit, power cannot be restored and the circuit will have to be repaired.

Service Adjustments with Replacing Memory IC(IC802)

Note: The CPU (IC801) and memory IC (IC802) store the service adjustments data and controls data for each circuit. When the Memory IC(IC802) is replaced, some of the service adjustments should be readjusted to obtain the best performance. The necessary service adjustments are carried out by using the RC handset. Please set up the TV set with following steps [1] to [3].

[1] Initializing Procedure

1. Put a new memory IC.
2. Turn on the TV set
3. Press and hold the **MENU button** on the TV set, then press **0 button** on the remote control transmitter.



The following picture appears on the screen.

This completes the initialization of memory IC.

Following shows the initialized contents of memory data by this procedure.

1. TV/AV mode : TV mode
2. Antenna or cable setting : Antenna
3. Colour system : AUTO
4. Channel Memory : Clear
5. Receiving Channel : Ch02
6. Sound Volume : 11/63 steps
7. Color : 30/63 steps
8. Contrast : 63/63 steps
9. Brightness : 32/63 steps
10. Sharpness : 31/63 steps
11. Tint : 31/63 steps
12. Language : Spanish
13. Password : Clear
14. Channel Block : Clear
15. Sleep Timer : Clear
16. Picture Mode : MANUAL
17. Video status (Picture mode data)

Item	NORMAL	STRONG	SOFT	MANUAL
Colour	28	34	22	28
Contrast	63	63	63	63
Brightness	35	15	40	35
Sharpness	31	31	31	31

[2] Service Adjustments-1

Following table shows the initial values which have been stored in the CPU ROM, and items for the service adjustments.

Service mode adjustments table in CPU ROM

No.	Item	Initial value	Range	Description	
01	H-P	08	00~15	Horizontal centre adjustment	
02	V-P	04	00~07	Vertical centre adjustment	
03	V-S	64	00~127	Vertical size adjustment	
04	OSD	20	01~63	OSD position adjustment	
05	AGC	64	00~127	RF AGC adjustment	
06	VCO	128	00~255	VCO (AFT) adjustment	
07	SIF	00	00	SIF VCO adjustment	
08	SELF	00	00~15	SELF-adjusting	
09	DLT	02	00~03	DL-time adjustment	
10	DL F	00	00, 01	DL-fine adjustment	
11	B–ST	00	00, 01	Black stretch on/off setting	
12	ABCL	01	00, 01	ABCL adjustment	
13	AB-G	00	00, 01	ABCL gain adjustment	
14	TRAP	03	00~03	Trap frequency adjustment	
15	WBK	00	00, 01	White back setting	
16	BBK	00	00, 01	Blue back setting	
17	AFCG	02	00~02	AFC gain adjustment	
18	RBI	00	00~255	Red bias adjustment	Grey scale adjustment
19	GBI	00	00~255	Green bias adjustment	
20	BBI	00	00~255	Blue bias adjustment	
21	RD	64	00~127	Red drive adjustment	
22	BD	64	00~127	Blue drive adjustment	
23	DRV	--	--	White balance adjustment	
24	--	--	--	Y-cut setting	
25	CCD	20	1~31	Caption H-Position Adjustment	

Notes:

The initial value that the CPU writes down the CPU ROM data to the memory when replaced the memory IC. TV set may not operate correctly with this initial value. It is required to set up the fine adjustment for service adjustments described below.

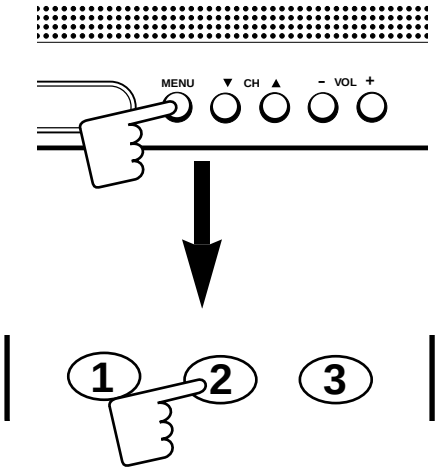
Adjustments	**Service Mode No. & Item**
Horizontal centre adjustment	Item 01, H-P
Vertical centre adjustment	Item 02, V-P
Vertical size adjustment	Item 03, V-S
OSD position adjustment	Item 04, OSD
RF AGC adjustment	Item 05, AGC
AFT adjustment	Item 06, VCO
Grey scale adjustment	Item 18-24

Further adjustment please refer to pages 10 and 11.

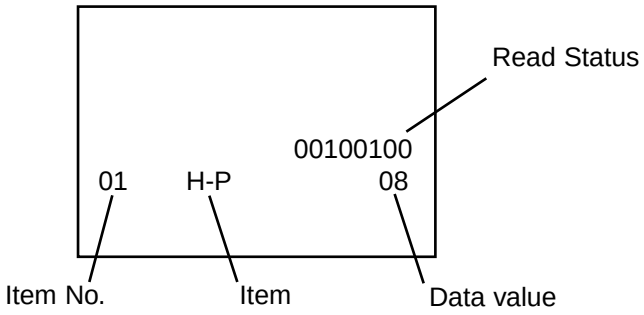
Service Adjustments with Replacing Memory IC(IC802)

[Entering to Service Mode]

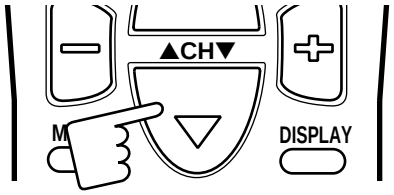
1. Press and hold the **MENU** button on the TV set and press the **2** button on the remote control handset. Following setting items appears on the screen.



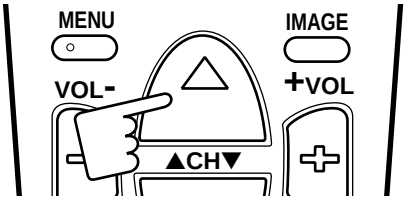
Display for [H-P] Horizontal centre adjustment



2. Select item by pressing the **CHANNEL DOWN** (Item No. UP) or **CHANNEL UP** (Item No. DOWN) button on the remote control handset.



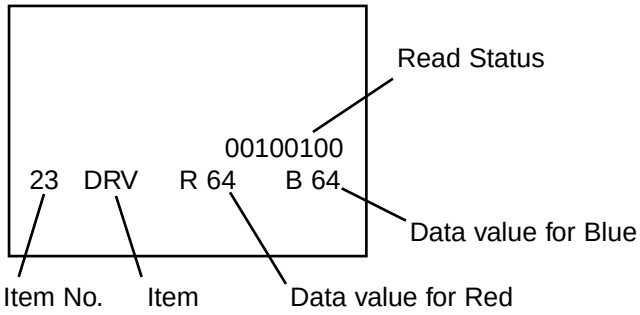
01➔02➔03➔04➔05.....27



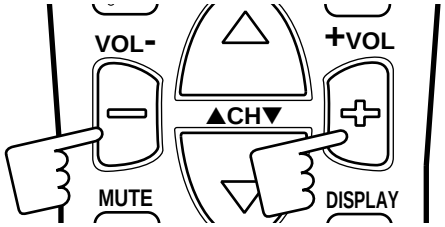
27➔26➔25➔24➔23.....01

Example

Display for [DRV] White balance adjustment



3. Adjust data value by pressing the **VOLUME +** or **VOLUME –** button on the remote control handset.

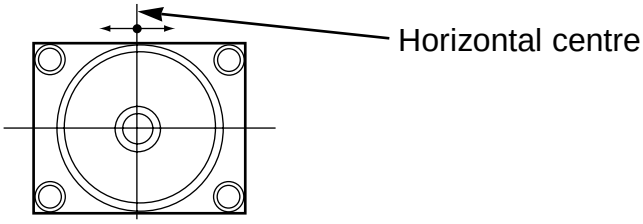


To return to normal TV mode, press the **MENU** button on the TV set or remote control handset.

Service Adjustments with Replacing Memory IC(IC802)

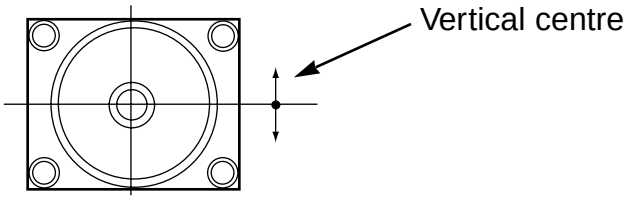
Item 01 [H-P] HORIZONTAL CENTRE

(1) Receive the monochrome circular pattern.
(2) Set the brightness and contrast to normal.
(3) Select [H-P] in the service mode.
(4) Change value to be optimum horizontal centre position.
(5) Exit from the service mode.



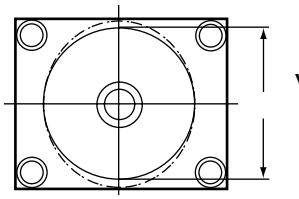
Item 02 [V-P] VERTICAL CENTRE

(1) Receive the monochrome circular pattern.
(2) Set the brightness and contrast to maximum.
(3) Select [V-P] in the service mode.
(4) Change value to be optimum vertical centre position.
(5) Exit from the service mode.



Item 03 [V-S] VERTICAL SIZE

(1) Receive the monochrome circular pattern.
(2) Set the brightness and contrast to maximum.
(3) Select [V-S] in the service mode.
(4) Change value to be optimum vertical size.
(5) Exit from the service mode.



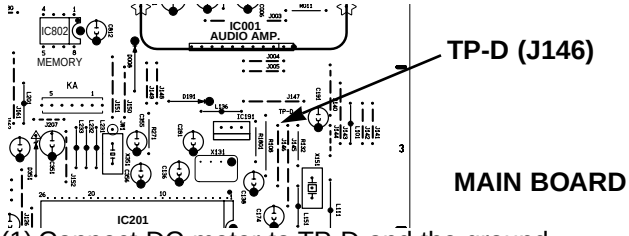
Item 04 [OSD] OSD POSITION

(1) Receive the monochrome circular pattern.
(2) Set the brightness and contrast to normal.
(3) Select [OSD] in the service mode.
(4) Change value to be proper OSD position.
(5) Exit from the service mode.

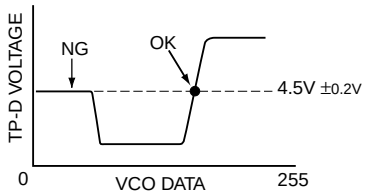
Item 05 [AGC] AGC

NOTE: Do not attempt this adjustment with weak signal.
(1) Tune the receiver to most clearest (or strongest) VHF station in your area. Set the brightness and contrast controls to maximum. Set the colour control to minimum.
(2) Select [AGC] in the service mode.
(3) Change value until the snow noise just disappears.
(4) Exit from the service mode.

Item 06 [VCO] AFT



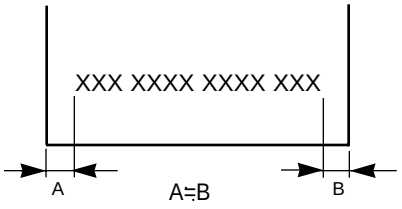
(1) Connect DC meter to TP-D and the ground.
(2) Tune the receiver to the clearest station.
(3) Disconnect RF input. (Disconnect antenna plug from the antenna socket.)
(4) Select same channel. (If you have selected channel 03 in step 2, press “0” button next “3” button on the remote control to select channel 03.)
(5) Connect antenna plug to the antenna socket.
(6) Select [VCO] in the service mode.
(7) Change value until the voltage (on TP-D) to be 4.5±0.2V at OK point.



(8) Exit from the service mode.

CAPTION H-POSITION ADJUSTMENT

(1) Tune receiver to a CAPTION channel.
(2) Check that CAPTION position is in the horizontal center of TV screen. If CAPTION center is too right or left, perform steps 3-6. (See Figure below.)
(3) Select [CCD] in the service mode.
(4) Adjust the data with + or - key for proper horizontal center.
(5) Exit from the service mode.

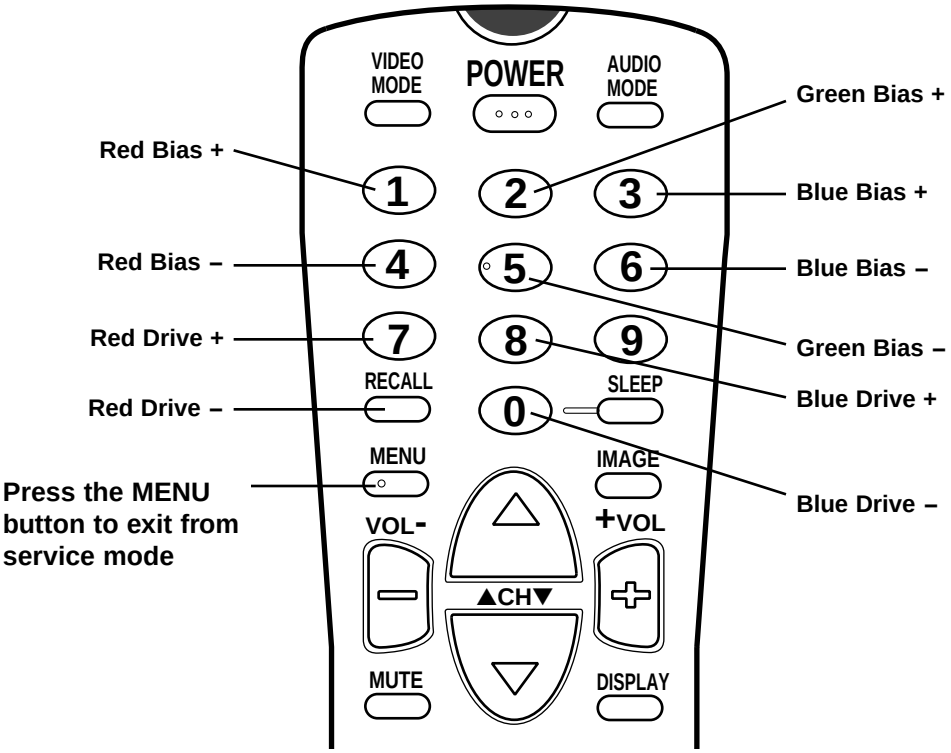


Caption H-Position Adjustment

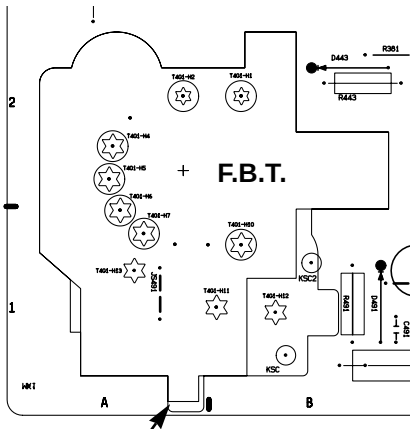
Items 18-24 GREY SCALE

(1) Receive the monochrome circular pattern.
(2) Set the brightness and colour to normal, contrast to maximum.
(3) Enter to the service mode.
(4) Set each value of Item-**18 RBI**, **19 GBI**, **20 BBI** mode to 00. Set each value of Item-**21 RD**, **22 BD** mode to 64.
(5) Select Item-**24** mode to be one horizontal scanning line and turn the screen volume on the FBT to obtain just visible one coloured line.
(6) Press the **1 (Red Bias +)**, **4 (Red Bias –)**, **2 (Green Bias +)**, **5 (Green Bias –)**, **3 (Blue Bias +)** or **6 (Blue Bias –) button** to adjust the brightness of each colour until a dim white line produced. Please see the control button allocations in this mode.
(7) Select Item-**23 DRV** mode to enter the white balance adjusting mode.
(8) Press the **7 (Red Drive +)**, **CHANNEL RECALL (Red Drive –)**, **8 (Blue Drive +)** or **0 (Blue Drive –) button** alternately to produce normal black and white picture.
(9) Exit from the service mode.
(10) Check for proper grey scale tracking at all brightness levels.

NOTE: If the grey scale adjustment is made after picture tube replacement, check the high voltage.



MAIN BOARD



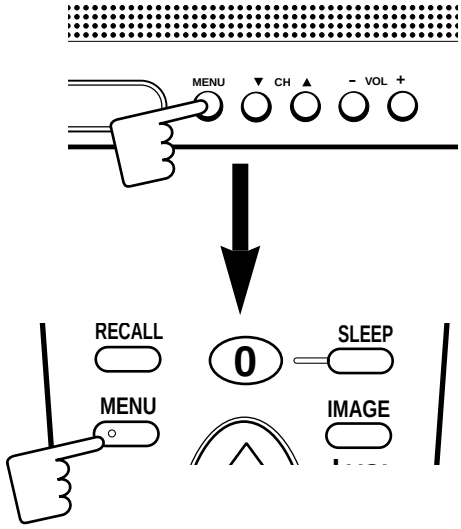
SCREEN VR
(Under side)

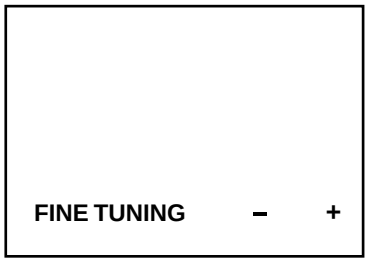
[3] Service Adjustment-2

FINE TUNING

This adjustment is used to do a fine tuning of the channels with poor reception after they have been stored by the automatic tuning.This function is available for one channel only and the fine-tuned channel is memorized into IC802 (EEPROM).

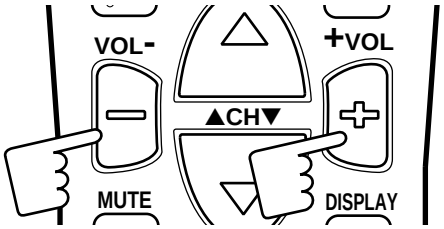
1. Press and hold the **MENU** button on the TV set and press the **4** or **MENU** button on the remote control handset to enter to the service mode.





Fine tuning service mode

2. Press and hold the **VOLUME +** or **VOLUME –** button on the remote control handset or TV set to make fine tuning adjustment. Press and hold the **VOLUME +** button for higher frequency tuning, and press and hold the **VOLUME –** or lower frequency tuning.



Fine tuning data value will be automatically stored in memory.

To return to normal TV mode, press the **MENU** button on the TV set or remote control handset. (Or will automatically return to normal TV mode after 5 seconds.)

Service Adjustments

Following adjustments are not required to readjust when replacing the memory IC.

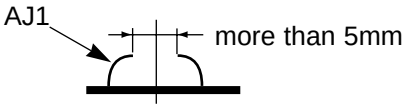
FOCUS ADJUSTMENT

(1) Receive the monochrome circular pattern.
(2) Set the brightness to normal and contrast to maximum.
(3) Adjust the focus control on the F.B.T. for the best focus on the screen centre.

HORIZ. WIDTH AND HIGH VOLTAGE CHECK

(1) Receive the monochrome circular pattern.
(2) Set the brightness and contrast to maximum.
(3) If the picture is too wide, or narrow, cut or short the "**AJ1**" on the main unit. When AJ1 is shorted, the horizontal width increase. When AJ1 is cut, the horizontal width decrease.

Important note: When AJ1 is cut, in order to prevent a spark, leave the opening between cutting portions 5mm or more.



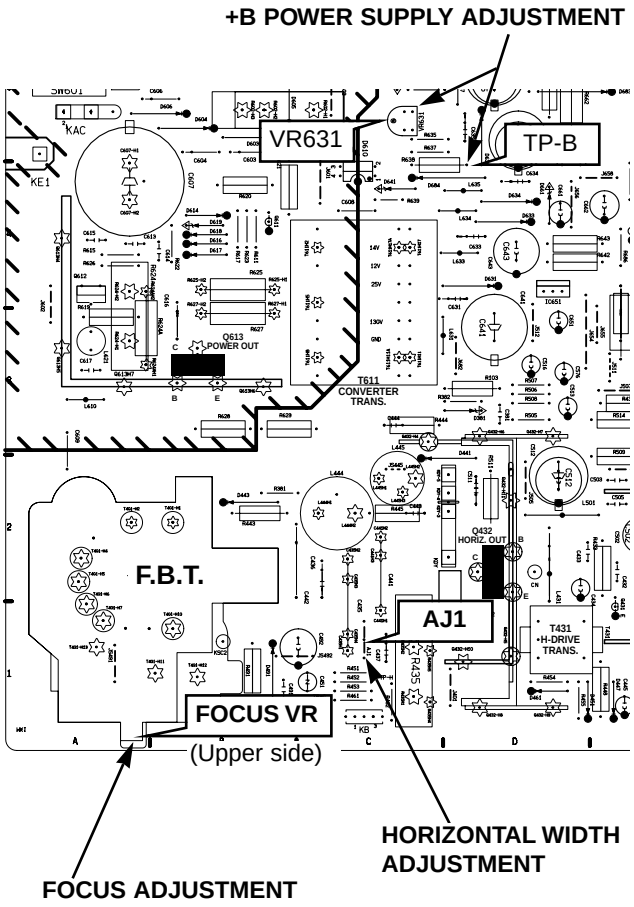
(4) Connect a high voltage probe to anode lead of the picture tube.
(5) The high voltage must be 25KV ± 1KV and less than 27.5KV at 0 beam current (Brightness and contrast minimum setting).

Note: If the picture tube is replaced, check the high voltage. The horiz. width adjustment affects the high voltage. Therefore, re-check the high voltage.

+B POWER SUPPLY ADJUSTMENT

(1) Connect DC meter to "TP-B" (R638) and the ground. Set the +B adjustment control (VR631) to mid-range.
(2) Set the brightness to normal and contrast to maximum. Tune the receiver to an active channel and synchronized picture.
(3) Adjust +B adjustment control (VR631) for 130 ± 1,0 volt DC.

MAIN BOARD



Purity and Convergence Adjustment

CAUTION: The Convergence and Purity adjustments have been made at the factory. Readjustment should be made only after picture tube or deflection yoke replacement, following the steps below:

PURITY ADJUSTMENT

1. Demagnetize the picture tube and receiver using an external degaussing coil. When replacing picture tube or deflection yoke, mount deflection yoke and purity-convergence magnets assembly properly, see figures 1 and 4.
2. Turn Red and Blue guns off and provide only Green raster. Rotate Screen control to fully counterclockwise. Rotate Red and Blue Bias controls fully counterclockwise. Slowly rotate Green Bias control clockwise to produce Green raster.
3. Loosen the screw holding the Deflection Yoke and remove the 3 Rubber Wedges, and slide the Deflection Yoke fully forward.
4. Rotate and spread the Tabs of the two Purity Magnets to centre the vertical green belt in the picture screen. The Purity Magnets are also adjusted to obtain vertical centring of the raster.
5. Slowly slide the Deflection Yoke backward until a uniform green screen is obtained.
6. Check the purity of the red and blue screens for uniformity, turn off other colours to check this (use bias controls). Readjust the yoke position if necessary until all screens are pure.
7. Adjust each Bias control and screen control to obtain white raster. Refer to Gray Scale Adjustment. If part of the picture screen is coloured, adjust the Deflection Yoke position forward or backward slightly.
8. Tighten the mounting screw of the Deflection Yoke. Adjust Convergence next.

CENTRE CONVERGENCE ADJUSTMENT

1. Use a dot crosshatch pattern signal.
2. Turn Red and Blue guns on and turn off Green gun. Adjust the angle between the Tabs of the Four Pole Magnet 1 and 2, and superimpose the Red and Blue vertical lines in the centre area of the picture screen. Refer to figure 2.
3. Keeping the mutual angle of the Tabs of the Four Pole Magnet turn them together to superimpose the Blue and Red horizontal lines in the centre area of the picture screen. Refer to figure 2.
4. Turn Green gun on and adjust Six Pole Magnet 3 and 4 that the Green line superimposed on the Red/Blue lines. This is the same procedure used in steps 2 and 3. Refer to figure 3.

OUTER AREA CONVERGENCE ADJUSTMENT

Slightly loosen the screw holding the Deflection Yoke. Adjust the Deflection Yoke to converge the detail in the outer area (left side and right side) of the picture screen by orbital movement of the front of the Yoke, then secure the Deflection Yoke in appropriate position by putting the wedges as illustrated. Tighten screw holding the Deflection Yoke.

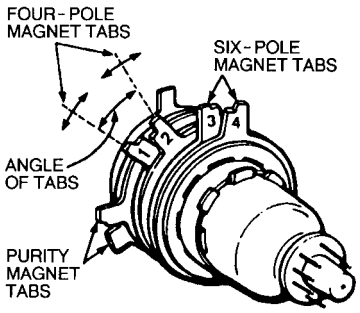


Figure-1. PURITY AND CONVERGENCE MAGNETS

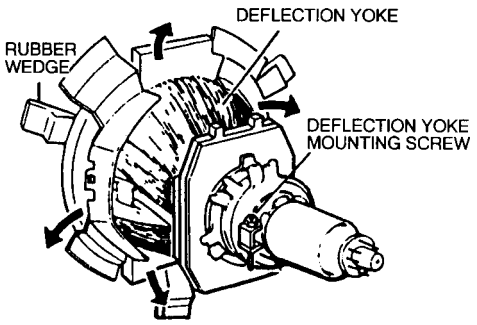


Figure-4. ADJUSTMENT DEFLECTION YOKE

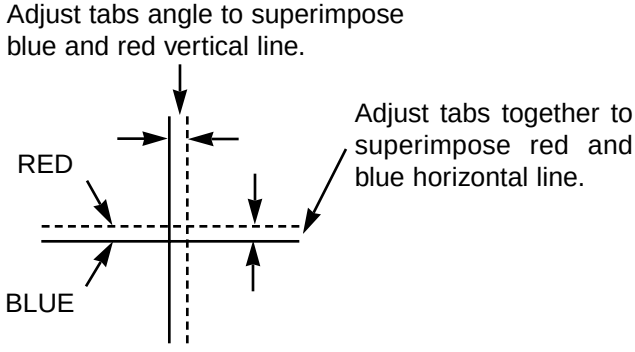


Figure- 2 BLUE AND RED LINE MOVEMENT

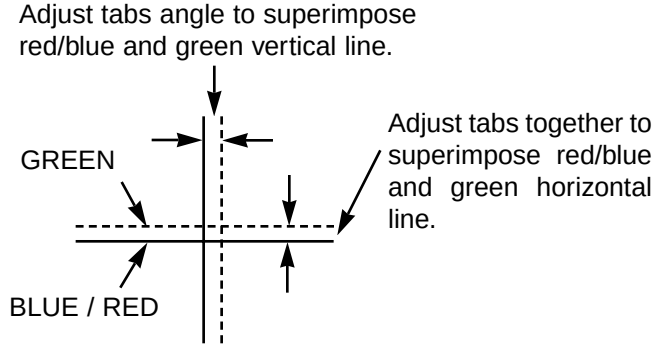
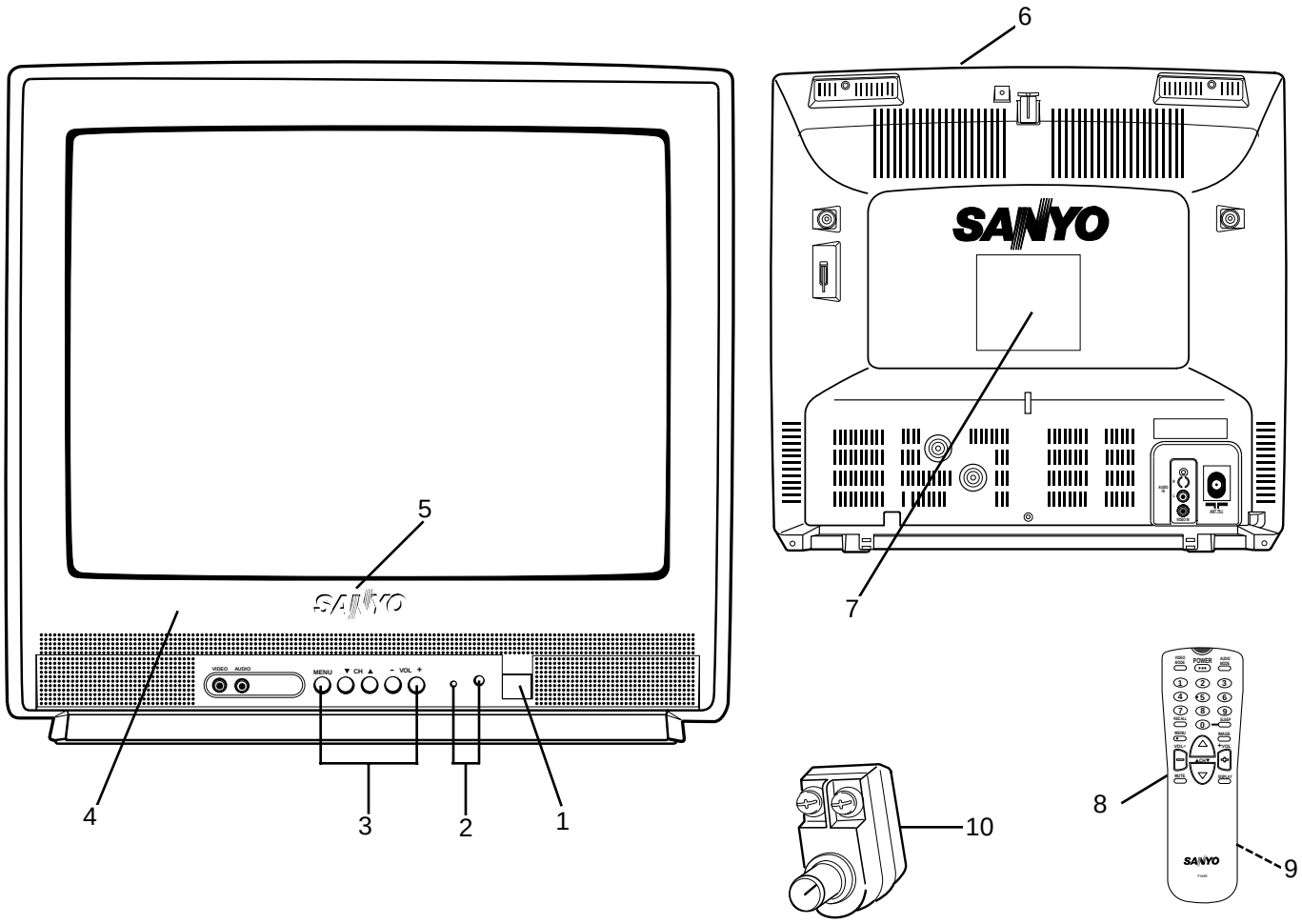


Figure- 3 BLUE/RED AND GREEN MOVEMENT

Cabinet Parts List

Note: Parts order must contain Service Ref. No., Part No., and descriptions.



Key No.	Part No.	Description	Key No.	Part No.	Description
1	610 269 8923	BUTTON POWER			
	610 252 8725	SPRING			
or	610 270 5591	SPRING			
2	610 269 9166	DEC IND			
3	610 269 8930	BUTTON UNITED			
4	610 270 7229	CABINET FRONT			
5	645 040 1107	BADGE,SANYO			
6	610 269 6585	CABINET BACK			
7	610 297 1699	LABEL RATING			
8	645 029 2590	ASSY,REMOCON FXMR			
9	610 273 0173	RC-BATTERY LID			
10	645 004 3925	ANT MATCHING BOX			
or	645 005 0251	ANT MATCHING BOX			
	610 297 1651	INSTRUCTIONS MANUAL			

Chassis Electrical Parts List

Product safety should be considered when a component replacement is made in any area of a receiver. Components indicated by a ⚠ mark in this parts list and the circuit diagram show components whose value have special significance to product safety. It is particularly recommended that only parts specified on the following parts list be used for components replacement pointed out by the mark.

Note: Parts order must contain Service Ref. No., Part No., and descriptions. The main PCB unit will be supplied without tuner and flyback transformer. They should be ordered separately.

Ref. No.	Part No.	Description

NOTES:

Read description in the Capacitor and Resistor as follows:

CAPACITOR

CERAMIC 100P K 50V

- 50V — Rated Voltage
- K — Tolerance Symbols:

Less than 10pF

A : Not specified	B : ±0.1pF	C : ±0.25pF
D : ±0.5pF	F : ±1PF	G : ±2pF
R : ±0.25-0pF	S : ±0-0.25pF	E : +0-1pF

More than 10pF

A : Not specified	B : ±0.1%	C : ±0.25%
D : ±0.5%	F : ±1%	G : ±2%
H : ±3%	J : ±5%	K : ±10%
L : ±15%	M : ±20%	N : ±30%
P : +100-0%	Q : +30-10%	T : +50-10%
U : +75-10%	V : +20-10%	W : +100-10%
X : +40-20%	Y : +150-10%	Z : +80-20%

- 100P — Rated value: P=pico farad, U=micro farad
- CERAMIC — Material:

CERAMIC..... Ceramic
MT-PAPER..... Metallized Paper
POLYESTER..... Polyester
MT-POLYEST..... Metallized Polyester
POLYPRO..... Polypropylene
MT-POLYPRO.... Metallized Polypropylene
COMPO FILM..... Composite film
MT-COMPO..... Metallized Composite
STYRENE..... Styrene
TA-SOLID..... Tantalum Solid
AL-SOLID..... Aluminium Solid
ELECT..... Electrolytic
NP-ELECT..... Non-polarised Electrolytic
OS-SOLID..... Aluminium Solid with Organic Semiconductive Electrolytic
DL-ELECT..... Double Layered Electrolytic

RESISTOR

CARBON 4.7K J A 1/4W

- 1/4W — Rated Wattage
- A — Performance Symbols:
  A: General B: Non flammable Z: Low noise
  Other: Temperature coefficient
- J — Tolerance Symbols:
  A: ±0.05% B: ±0.1% C: ±0.25% D: ±0.5%
  F: ±1% G: ±2% J: ±5% K: ±10%
  M: ±20% P: +5-15%
- 4.7K — Rated value, ohms:
  K: 1,000, M: 1,000,000
- CARBON — Material:

CARBON..... Carbon
MT-FILM..... Metal Film
OXIDE-MT..... Oxide Metal Film
SOLID..... Composition
MT-GLAZE..... Metal Glaze
WIRE WOUND... Wire Wound
CERAMIC RES.. Ceramic
FUSIBLE RES.... Fusible

Ref. No.	Part No.	Description

OUT OF CIRCUIT BOARD

PICTURE TUBE

⚠ Q901	414 010 4604	CRT A48EJN05X101

COIL

⚠ L901	645 004 5691	COIL,DEGAUSSING
	645 045 4479	COIL,DEGAUSSING
	610 238 2105	DEGAUSSING COIL

MISCELLANEOUS

SP901	652 000 0612	SPEAKER,16
SP902	652 000 0612	SPEAKER,16
⚠ W901	645 037 2490	CORD,POWER-2.4MK-A5102
W902	610 210 5520	GROUNDING CONNECTOR
	610 261 8655	ASSY,WIRE GND CONNECTOR F

610 292 3001 ASSY,PWB,CTV F3BW 1AA0B10E646B0

610 292 2981 ASSY,PWB,MAIN F3BW 1AA0B10E646BA

TRANSISTOR

Q111	405 015 9701	TR 2SC2814-F4-TB
Q140	405 134 5905	TR 2SA1037AK-T146-R
	405 147 2205	TR 2SA1037AK-S-T146
	405 002 0308	TR 2SA1037K T146 R
	405 002 0407	TR 2SA1037K T146 S
	405 002 6706	TR 2SA1179-M6-TB
	405 002 6904	TR 2SA1179-M7-TB
	405 163 1503	TR 2SA1179N-M6-TB
	405 163 2708	TR 2SA1179N-M7-TB
Q141	405 134 5905	TR 2SA1037AK-T146-R
	405 147 2205	TR 2SA1037AK-S-T146
	405 002 0308	TR 2SA1037K T146 R
	405 002 0407	TR 2SA1037K T146 S
	405 002 6706	TR 2SA1179-M6-TB
	405 002 6904	TR 2SA1179-M7-TB
	405 163 1503	TR 2SA1179N-M6-TB
	405 163 2708	TR 2SA1179N-M7-TB
Q171	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 163 1602	TR 2SC2812N-L6-TB0
	405 163 1701	TR 2SC2812N-L7-TB0
Q212	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 163 1602	TR 2SC2812N-L6-TB0
	405 163 1701	TR 2SC2812N-L7-TB0
Q213	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB

Ref. No.	Part No.	Description
	405 163 1602	TR 2SC2812N-L6-TB0
	405 163 1701	TR 2SC2812N-L7-TB0
Q261	405 134 5905	TR 2SA1037AK-T146-R
	405 147 2205	TR 2SA1037AK-S-T146
	405 002 0308	TR 2SA1037K T146 R
	405 002 0407	TR 2SA1037K T146 S
	405 002 6706	TR 2SA1179-M6-TB
	405 002 6904	TR 2SA1179-M7-TB
	405 163 1503	TR 2SA1179N-M6-TB
	405 163 2708	TR 2SA1179N-M7-TB
Q431	405 018 0507	TR 2SC3332-R
	405 018 0606	TR 2SC3332-S
Q432	405 157 1304	TR 2SD2634-YB
Q576	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 163 1602	TR 2SC2812N-L6-TB0
	405 163 1701	TR 2SC2812N-L7-TB0
Q611	406 000 6804	TR 2SA1015-GR(SAN)
	405 001 7407	TR 2SA1015-O(SAN)
	405 001 7605	TR 2SA1015-Y(SAN)
	405 004 3109	TR 2SA564A-Q(CU)
	405 004 3208	TR 2SA564A-R(CU)
	405 151 3304	TR 2SA608NF-NPA
	405 006 1707	TR 2SA933S-Q
	405 006 1806	TR 2SA933S-R
Q612	405 058 0208	TR 2SC3807-R-CTV-YA
Q613	405 022 8506	TR 2SD1710-CTV-YB
Q631	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 163 1602	TR 2SC2812N-L6-TB0
	405 163 1701	TR 2SC2812N-L7-TB0
Q661	405 059 9903	TR 2SD1913-R-RA
	405 060 0005	TR 2SD1913-S-RA
Q681	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 163 1602	TR 2SC2812N-L6-TB0
	405 163 1701	TR 2SC2812N-L7-TB0
Q683	405 089 0000	TR 2SA1707-S
	405 089 0109	TR 2SA1707-T
	405 009 6907	TR 2SB985-S
	405 009 7003	TR 2SB985-T
Q684	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 163 1602	TR 2SC2812N-L6-TB0
	405 163 1701	TR 2SC2812N-L7-TB0
Q685	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 163 1602	TR 2SC2812N-L6-TB0
	405 163 1701	TR 2SC2812N-L7-TB0
Q686	405 134 5905	TR 2SA1037AK-T146-R
	405 147 2205	TR 2SA1037AK-S-T146
	405 002 0308	TR 2SA1037K T146 R
	405 002 0407	TR 2SA1037K T146 S
	405 002 6706	TR 2SA1179-M6-TB
	405 002 6904	TR 2SA1179-M7-TB
	405 163 1503	TR 2SA1179N-M6-TB
	405 163 2708	TR 2SA1179N-M7-TB
Q861	405 134 5905	TR 2SA1037AK-T146-R
	405 147 2205	TR 2SA1037AK-S-T146
	405 002 0308	TR 2SA1037K T146 R
	405 002 0407	TR 2SA1037K T146 S
	405 002 6706	TR 2SA1179-M6-TB
	405 002 6904	TR 2SA1179-M7-TB
	405 163 1503	TR 2SA1179N-M6-TB
	405 163 2708	TR 2SA1179N-M7-TB
Q871	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 163 1602	TR 2SC2812N-L6-TB0
	405 163 1701	TR 2SC2812N-L7-TB0
Q881	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 163 1602	TR 2SC2812N-L6-TB0
	405 163 1701	TR 2SC2812N-L7-TB0
Q886	405 014 4509	TR 2SC2412K T146 R
	405 014 4608	TR 2SC2412K T146 S
	405 015 8704	TR 2SC2812-L6-TB
	405 015 8902	TR 2SC2812-L7-TB
	405 163 1602	TR 2SC2812N-L6-TB0
	405 163 1701	TR 2SC2812N-L7-TB0

INTEGRATED CIRCUIT

IC001	409 365 3006	IC LA4285
IC191	409 241 5407	IC BA178M05T
	409 172 1509	IC MC78M05CT
	409 320 5700	IC UPC78M05AHF
IC201	410 342 8907	IC QXXAVB488—-M
	410 410 1205	IC QXXAVB889—-M
IC501	409 340 1805	IC LA7840
IC651	409 241 5407	IC BA178M05T
	409 124 5302	IC L78M05T
	409 172 1509	IC MC78M05CT
	409 320 5700	IC UPC78M05AHF
IC801	410 360 3304	IC LC863428V-5P71-TLM
IC802	409 470 3304	IC KS24C021C
	409 497 0706	IC S524C20D21-DCB0
	409 333 3700	IC 24LC02B/P

CAPACITOR

C001	403 049 0008	ELECT	1U M	50V
C002	403 157 6701	CERAMIC	560P K	50V
C005	403 043 9106	ELECT	47U M	16V
C006	403 042 2405	ELECT	100U M	16V
C007	403 045 9807	ELECT	2200U M	25V
C008	403 164 0204	CERAMIC	0.1U Z	25V
C009	403 281 5205	CERAMIC	0.22U Z	16V
C010	403 045 1504	ELECT	1000U M	25V
C015	401 150 6001	MT-GLAZE	0.000 ZA	1/10W
C101	403 044 1703	ELECT	470U M	16V
C102	403 038 8602	ELECT	33U M	6.3V
C103	403 051 0607	ELECT	4.7U M	50V
C106	403 051 0607	ELECT	4.7U M	50V
C111	403 149 9208	CERAMIC	0.01U Z	50V
C112	403 149 9208	CERAMIC	0.01U Z	50V
C113	403 149 9208	CERAMIC	0.01U Z	50V
C132	403 149 9208	CERAMIC	0.01U Z	50V
C136	403 043 3906	ELECT	33U M	16V
C137	403 149 9208	CERAMIC	0.01U Z	50V
C138	403 048 1907	ELECT	0.22U M	50V
C142	403 042 7707	ELECT	22U M	16V
C151	403 157 2901	CERAMIC	47P J	50V

Ref. No.	Part No.	Description
C152	403 157 2901	CERAMIC 47P J 50V
C171	403 048 1907	ELECT 0.22U M 50V
C172	403 049 0008	ELECT 1U M 50V
C173	403 155 2200	CERAMIC 3300P K 50V
C177	403 048 4205	ELECT 0.33U M 50V
C191	403 041 2109	ELECT 47U M 10V
C201	403 043 9106	ELECT 47U M 16V
C202	403 149 9208	CERAMIC 0.01U Z 50V
C206	403 218 3106	ELECT 1000U M 16V
C207	403 149 9208	CERAMIC 0.01U Z 50V
C211	401 150 6001	MT-GLAZE 0.000 ZA 1/10W
C212	401 150 6001	MT-GLAZE 0.000 ZA 1/10W
C216	403 049 0008	ELECT 1U M 50V
C221	403 164 0204	CERAMIC 0.1U Z 25V
C222	403 164 0204	CERAMIC 0.1U Z 25V
C223	403 164 0204	CERAMIC 0.1U Z 25V
C241	403 155 9704	NP-ELECT 0.1U M 50V
C243	403 155 9704	NP-ELECT 0.1U M 50V
C246	403 049 0008	ELECT 1U M 50V
C247	403 215 2409	CERAMIC 0.015U K 50V
C248	403 149 9208	CERAMIC 0.01U Z 50V
C281	403 049 9803	ELECT 2.2U M 50V
C351	403 044 1703	ELECT 470U M 16V
C354	403 215 2201	CERAMIC 0.01U K 50V
C355	403 048 6308	ELECT 0.47U M 50V
C356	403 048 6308	ELECT 0.47U M 50V
C357	403 215 2201	CERAMIC 0.01U K 50V
C359	403 215 2201	CERAMIC 0.01U K 50V
C361	403 260 2003	MT-COMPO 1U J 50V
	403 270 2109	MT-COMPO 1U J 50V
C371	403 157 6800	CERAMIC 680P K 50V
C372	403 049 0008	ELECT 1U M 50V
C383	403 281 5007	CERAMIC 0.033U K 25V
C432	403 075 7101	CERAMIC 1000P K 500V
C433	403 076 3102	CERAMIC 3900P K 500V
C434	403 054 0703	ELECT 47U M 35V
C435	404 077 5508	MT-POLYPRO 9600P H 1.5K
C436	403 324 2604	CERAMIC 470P K 3K
	403 264 4300	CERAMIC 470P K 3K
C437	403 067 7805	MT-COMPO 0.47U J 50V
	403 256 0808	MT-COMPO 0.47U J 50V
C441	403 083 1009	POLYPRO 0.47U J 200V
C445	403 049 4204	ELECT 10U M 50V
C451	404 056 5307	NP-ELECT 2.2U M 100V
C491	403 076 5304	CERAMIC 680P K 500V
C492	403 115 0802	ELECT 22U M 100V
C501	403 054 1502	ELECT 470U M 35V
C502	403 053 2104	ELECT 220U M 35V
C503	403 023 9607	CERAMIC 39P J 50V
C504	403 149 9208	CERAMIC 0.01U Z 50V
C511	403 188 1201	MT-POLYEST 0.15U K 100V
	403 313 7603	MT-COMPO 0.15U J 100V
C512	403 045 1504	ELECT 1000U M 25V
C513	403 049 4204	ELECT 10U M 50V
C576	403 041 8804	ELECT 10U M 16V
C601	404 072 7705	MT-POLYEST 0.068U M 250V
	404 079 6503	MT-POLYEST 0.068U M 250V
	404 073 7506	MT-POLYEST 0.068U M 275V
C606	403 076 6707	CERAMIC 1000P K 1K
	403 312 8205	CERAMIC 1000P K 1K
C607	404 067 4009	ELECT 100U M 400V
	404 035 6004	ELECT 100U T 400V
⚠ C608	404 073 5106	CERAMIC 470P K 250V
	404 073 3300	CERAMIC 470P M 250V
	404 071 4507	CERAMIC 470P K 400V
⚠ C609	404 073 5106	CERAMIC 470P K 250V
	404 073 3300	CERAMIC 470P M 250V
	404 071 4507	CERAMIC 470P K 400V
C613	403 056 8103	POLYESTER 1000P K 50V
C614	403 067 5603	MT-COMPO 0.1U J 50V
C615	403 058 2604	POLYESTER 0.015U J 50V
	403 311 9609	POLYESTER 0.015U J 50V
C616	403 247 0008	CERAMIC 1500P K 2K
	403 263 6602	CERAMIC 1500P K 2K
C617	403 059 6205	POLYESTER 0.022U K 50V
	403 312 0506	POLYESTER 0.022U K 50V
C631	403 247 5003	CERAMIC 470P K 1K
	403 269 1809	CERAMIC 470P K 1K
C633	403 247 5003	CERAMIC 470P K 1K
	403 269 1809	CERAMIC 470P K 1K
C641	404 073 9005	ELECT 220U M 160V
C643	403 054 1502	ELECT 470U M 35V
C644	403 045 1504	ELECT 1000U M 25V
C645	403 045 1504	ELECT 1000U M 25V
C651	403 040 9406	ELECT 330U M 10V
C661	403 043 0202	ELECT 220U M 16V
C662	403 043 6006	ELECT 330U M 16V
C685	403 049 0008	ELECT 1U M 50V
C801	403 155 4204	CERAMIC 15P J 50V
C802	403 155 4204	CERAMIC 15P J 50V
C803	403 149 9208	CERAMIC 0.01U Z 50V
C804	403 224 7006	CERAMIC 0.047U Z 50V
C811	403 149 9208	CERAMIC 0.01U Z 50V
C812	403 041 8804	ELECT 10U M 16V
C832	403 149 9208	CERAMIC 0.01U Z 50V
C851	403 155 1609	CERAMIC 33P J 50V
C853	403 155 1609	CERAMIC 33P J 50V
C854	403 155 1609	CERAMIC 33P J 50V
C855	403 155 1609	CERAMIC 33P J 50V
C861	403 049 0008	ELECT 1U M 50V
C878	403 060 8403	POLYESTER 0.033U K 50V
	403 312 1305	POLYESTER 0.033U K 50V
C891	403 113 3805	CERAMIC 1000P K 50V
C892	403 049 0008	ELECT 1U M 50V
C893	403 049 9803	ELECT 2.2U M 50V
C894	403 281 5007	CERAMIC 0.033U K 25V
C895	403 041 8804	ELECT 10U M 16V
RESISTOR		
R001	401 150 5905	MT-GLAZE 10K JA 1/10W
R002	401 150 5905	MT-GLAZE 10K JA 1/10W
R005	401 256 6905	MT-GLAZE 680 JA 1/10W
R006	401 162 4002	MT-GLAZE 560 JA 1/10W
R009	401 150 6100	MT-GLAZE 2.2K JA 1/10W
R011	401 019 6203	CARBON 4.7 JA 1/4W
R1001	401 256 2709	MT-GLAZE 75 JA 1/10W
R1006	401 150 6209	MT-GLAZE 1K JA 1/10W
R1007	401 150 5806	MT-GLAZE 100K JA 1/10W
R103	401 061 8101	OXIDE-MT 39K JA 1W
R106	401 255 6500	MT-GLAZE 100 JA 1/10W
R107	401 255 6500	MT-GLAZE 100 JA 1/10W
R108	401 026 1307	CARBON 27K JA 1/6W
R109	401 162 3005	MT-GLAZE 22K JA 1/10W
R1106	401 105 0504	MT-GLAZE 1K JA 1/16W
R111	401 150 6209	MT-GLAZE 1K JA 1/10W
R112	401 162 4101	MT-GLAZE 5.6K JA 1/10W
R113	401 255 6500	MT-GLAZE 100 JA 1/10W
R114	401 162 2909	MT-GLAZE 220 JA 1/10W
R116	401 256 7407	MT-GLAZE 39 JA 1/10W
R132	401 025 2305	CARBON 150K JA 1/6W
R133	401 256 0200	MT-GLAZE 120K JA 1/10W
R134	401 256 5809	MT-GLAZE 270K JA 1/10W
R140	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R141	401 025 7409	CARBON 220 JA 1/6W

Ref. No.	Part No.	Description
R142	401 162 2909	MT-GLAZE 220 JA 1/10W
R144	401 256 7506	MT-GLAZE 390 JA 1/10W
R145	401 162 3609	MT-GLAZE 470 JA 1/10W
R146	401 150 6001	MT-GLAZE 0.000 ZA 1/10W
R147	401 150 6100	MT-GLAZE 2.2K JA 1/10W
R151	401 152 3206	MT-GLAZE 330 JA 1/10W
R170	401 150 5905	MT-GLAZE 10K JA 1/10W
R171	401 150 6001	MT-GLAZE 0.000 ZA 1/10W
R172	401 150 5905	MT-GLAZE 10K JA 1/10W
R173	401 150 6001	MT-GLAZE 0.000 ZA 1/10W
R174	401 255 9501	MT-GLAZE 220K JA 1/10W
R1902	401 256 7209	MT-GLAZE 18K JA 1/10W
R1903	401 256 7308	MT-GLAZE 6.8K JA 1/10W
R1904	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R1905	401 256 5908	MT-GLAZE 2.7K JA 1/10W
R1906	401 025 7805	CARBON 2.2K JA 1/6W
R1907	401 256 6202	MT-GLAZE 270 JA 1/10W
R1908	401 150 5905	MT-GLAZE 10K JA 1/10W
R1911	401 162 3609	MT-GLAZE 470 JA 1/10W
R1912	401 162 3609	MT-GLAZE 470 JA 1/10W
R1913	401 162 3609	MT-GLAZE 470 JA 1/10W
R212	401 256 5304	MT-GLAZE 56K JA 1/10W
R213	401 256 5304	MT-GLAZE 56K JA 1/10W
R214	401 256 3607	MT-GLAZE 15K JA 1/10W
R215	401 256 3607	MT-GLAZE 15K JA 1/10W
R216	401 256 6301	MT-GLAZE 47K JA 1/10W
R217	401 256 1702	MT-GLAZE 33K JA 1/10W
R221	401 105 0504	MT-GLAZE 1K JA 1/16W
R222	401 105 0504	MT-GLAZE 1K JA 1/16W
R223	401 105 0504	MT-GLAZE 1K JA 1/16W
R225	401 256 7605	MT-GLAZE 3.9K JA 1/10W
R231	401 150 6100	MT-GLAZE 2.2K JA 1/10W
R232	401 150 6100	MT-GLAZE 2.2K JA 1/10W
R233	401 150 6100	MT-GLAZE 2.2K JA 1/10W
R246	401 162 3104	MT-GLAZE 3.3K JA 1/10W
R248	401 256 7704	MT-GLAZE 3.9M JA 1/10W
R261	401 162 3104	MT-GLAZE 3.3K JA 1/10W
R262	401 025 7409	CARBON 220 JA 1/6W
R263	401 025 7409	CARBON 220 JA 1/6W
R271	401 024 6700	CARBON 100 JA 1/6W
R272	401 255 6500	MT-GLAZE 100 JA 1/10W
R281	401 162 3807	MT-GLAZE 470K JA 1/10W
R351	401 063 1001	OXIDE-MT 680 JA 1W
R356	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R357	401 256 5106	MT-GLAZE 560K JA 1/10W
R361	401 150 6209	MT-GLAZE 1K JA 1/10W
R364	401 162 3005	MT-GLAZE 22K JA 1/10W
R372	401 162 4002	MT-GLAZE 560 JA 1/10W
R373	401 256 5106	MT-GLAZE 560K JA 1/10W
R380	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R381	401 012 7009	CARBON 10K JA 1/4W
R382	401 021 3009	CARBON 5.6K JA 1/4W
R383	401 025 7409	CARBON 220 JA 1/6W
R384	401 150 5905	MT-GLAZE 10K JA 1/10W
R385	401 024 7400	CARBON 10K JA 1/6W
R430	401 150 6209	MT-GLAZE 1K JA 1/10W
R432	401 150 6001	MT-GLAZE 0.000 ZA 1/10W
R433	401 007 1104	CARBON 1K JA 1/2W
R434	401 008 0908	CARBON 180 JA 1/2W
R435	402 069 8704	WIRE WOUND 8.2 KA 7W
	402 076 0609	WIRE WOUND 8.2 KA 7W
R443	401 062 1200	OXIDE-MT 470 JA 1W
R444	401 058 3706	OXIDE-MT 1K JA 1W
R445	401 058 3706	OXIDE-MT 1K JA 1W
R447	401 026 7002	CARBON 3.9K JA 1/6W
R448	401 010 3102	CARBON 470 JA 1/2W
R451	401 013 7305	CARBON 120K JA 1/4W

Ref. No.	Part No.	Description
R453	401 024 7004	CARBON 1K JA 1/6W
R454	401 024 7400	CARBON 10K JA 1/6W
R455	401 012 8105	CARBON 100K JA 1/4W
R461	401 025 4903	CARBON 180K JA 1/6W
R462	401 026 9907	CARBON 4.7K JA 1/6W
R481	401 061 0808	OXIDE-MT 3.9 JA 1W
R491	401 008 3800	CARBON 2.2 JB 1/2W
R501	401 018 2800	CARBON 330 JA 1/4W
R505	401 025 7805	CARBON 2.2K JA 1/6W
R506	401 026 4605	CARBON 33K JA 1/6W
R507	401 025 1902	CARBON 15K JA 1/6W
R508	401 027 8305	CARBON 820 JA 1/6W
R509	401 006 8807	CARBON 1.8 JA 1/2W
R511	401 059 6706	OXIDE-MT 180 JA 1W
R514	401 007 1104	CARBON 1K JA 1/2W
R571	401 024 7004	CARBON 1K JA 1/6W
R576	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R577	401 256 0309	MT-GLAZE 820 JA 1/10W
R601	401 008 8607	CARBON 220K JA 1/2W
R602	402 060 8109	WIRE WOUND 3.9 KA 5W
	402 072 4205	WIRE WOUND 3.9 KA 5W
R611	401 027 2600	CARBON 5.6K JA 1/6W
R615	401 025 8208	CARBON 22K JA 1/6W
R617	401 026 5800	CARBON 3.6K JA 1/6W
R619	401 008 6009	CARBON 22 JA 1/2W
R620	401 007 5805	CARBON 120K JA 1/2W
R621	401 007 5805	CARBON 120K JA 1/2W
R622	401 014 5201	CARBON 15K JA 1/4W
R623	401 024 7400	CARBON 10K JA 1/6W
R624A	401 069 1708	OXIDE-MT 68 JA 2W
R625	401 067 4206	OXIDE-MT 33 JA 2W
R626	401 018 3401	CARBON 3.3K GA 1/4W
R627	401 067 4206	OXIDE-MT 33 JA 2W
⚠R628	402 000 8305	SOLID 5.6M KA 1/2W
⚠R629	402 000 8305	SOLID 5.6M KA 1/2W
R635	401 012 8105	CARBON 100K JA 1/4W
R636	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R637	401 014 6109	CARBON 150K JA 1/4W
R638	401 062 3006	OXIDE-MT 47K JA 1W
R639	401 025 8208	CARBON 22K JA 1/6W
R642	401 012 7009	CARBON 10K JA 1/4W
R644	401 058 1108	OXIDE-MT 10 JA 1W
R661	401 060 2704	OXIDE-MT 220 JA 1W
R662	401 069 0404	OXIDE-MT 6.8 JA 2W
R663	401 013 6407	CARBON 12K JA 1/4W
R681	401 162 2800	MT-GLAZE 1.8K JA 1/10W
R682	401 025 8208	CARBON 22K JA 1/6W
R683	401 256 5106	MT-GLAZE 560K JA 1/10W
R684	401 150 5905	MT-GLAZE 10K JA 1/10W
R685	401 162 3005	MT-GLAZE 22K JA 1/10W
R686	401 012 7009	CARBON 10K JA 1/4W
R687	401 019 1901	CARBON 3.9K JA 1/4W
R688	401 162 3005	MT-GLAZE 22K JA 1/10W
R689	401 256 5106	MT-GLAZE 560K JA 1/10W
R801	401 256 5809	MT-GLAZE 270K JA 1/10W
R811	401 256 6301	MT-GLAZE 47K JA 1/10W
R812	401 150 5905	MT-GLAZE 10K JA 1/10W
R814	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R816	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R818	401 256 6905	MT-GLAZE 680 JA 1/10W
R819	401 256 6905	MT-GLAZE 680 JA 1/10W
R831	401 150 5905	MT-GLAZE 10K JA 1/10W
R832	401 150 6001	MT-GLAZE 0.000 ZA 1/10W
R834	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R835	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R836	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R837	401 162 3708	MT-GLAZE 4.7K JA 1/10W

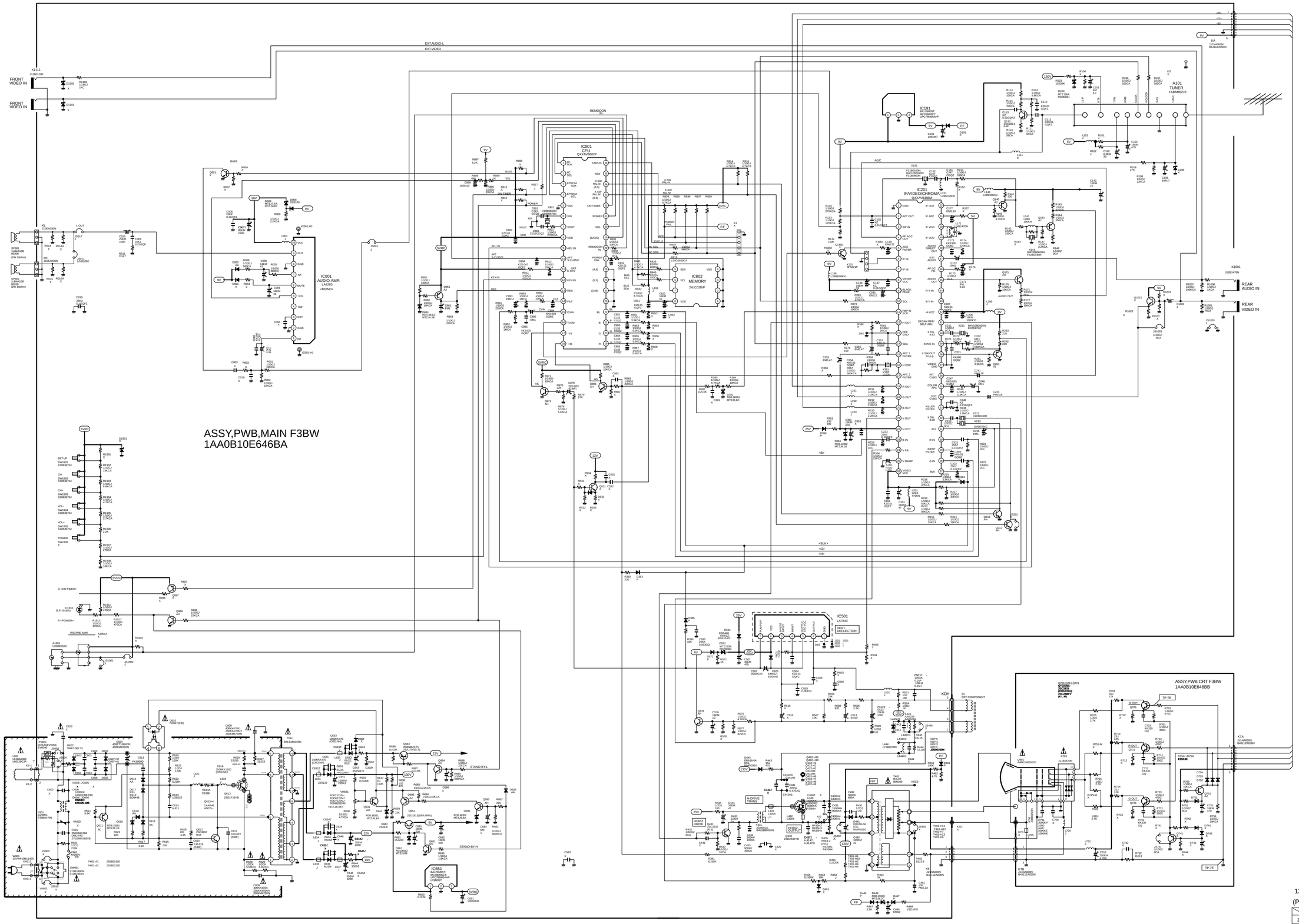
Ref. No.	Part No.	Description
R838	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R839	401 255 6500	MT-GLAZE 100 JA 1/10W
R840	401 255 6500	MT-GLAZE 100 JA 1/10W
R841	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R842	401 162 3708	MT-GLAZE 4.7K JA 1/10W
R851	401 256 7605	MT-GLAZE 3.9K JA 1/10W
R853	401 162 4101	MT-GLAZE 5.6K JA 1/10W
R855	401 162 4101	MT-GLAZE 5.6K JA 1/10W
R857	401 162 4101	MT-GLAZE 5.6K JA 1/10W
R861	401 152 3206	MT-GLAZE 330 JA 1/10W
R862	401 150 5905	MT-GLAZE 10K JA 1/10W
R863	401 150 5905	MT-GLAZE 10K JA 1/10W
R870	401 025 8208	CARBON 22K JA 1/6W
R871	401 150 5905	MT-GLAZE 10K JA 1/10W
R878	401 162 4101	MT-GLAZE 5.6K JA 1/10W
R879	401 024 7400	CARBON 10K JA 1/6W
R881	401 150 5905	MT-GLAZE 10K JA 1/10W
R883	401 256 1702	MT-GLAZE 33K JA 1/10W
R886	401 162 3005	MT-GLAZE 22K JA 1/10W
R891	401 162 2909	MT-GLAZE 220 JA 1/10W
R892	401 255 6005	MT-GLAZE 1M JA 1/10W
R893	401 255 6005	MT-GLAZE 1M JA 1/10W
R894	401 255 6500	MT-GLAZE 100 JA 1/10W
R896	401 256 1702	MT-GLAZE 33K JA 1/10W
R897	401 027 8602	CARBON 8.2K JA 1/6W
R898	401 027 5205	CARBON 680 JA 1/6W
R899	401 024 7004	CARBON 1K JA 1/6W
VARIABLE RESISTOR		
VR631	645 006 5514	VR,SEMI,2.2K N
	645 003 5579	VR,SEMI,2.2K N
	645 023 5160	VR,SEMI,2K N
	610 239 7574	VR B-2K
TRANSFORMER		
⚠T401	652 000 0711	TRANS,FLYBACK
T431	610 000 1060	DRIVE TRANS
	652 000 0698	TRANS,DRIVE
⚠T611	652 000 1640	TRANS,POWER,PULSE
COIL		
L136	645 008 2894	INDUCTOR,5.6U K
L140	645 001 4567	INDUCTOR,10U K
L141	645 003 9751	INDUCTOR,18U K
L151	645 003 9713	INDUCTOR,15U K
L171	645 032 8633	TRANS,OSC,45.75MHZ
L201	645 008 0159	INDUCTOR,47U K
L431	610 031 9998	PIPE CORE
	652 001 0475	CORE,PIPE
L432	610 031 9998	PIPE CORE
	652 001 0475	CORE,PIPE
L444	645 036 7458	COIL,LINEARITY
L445	610 000 0278	COIL
	610 205 1117	COIL
L601	610 031 5938	LINE FILTER
	645 017 6159	LINE FILTER
DIODE		
D002	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D008	407 012 4406	DIODE 1SS133
D009	407 099 5808	ZENER DIODE MTZJ7.5A
	407 057 6304	ZENER DIODE RD7.5EB1
D103	407 100 0204	ZENER DIODE MTZJ36A
	407 056 2307	ZENER DIODE RD36EB1

Ref. No.	Part No.	Description
D191	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
D1910	407 116 6504	LED SLP-181B-51
D350	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
D351	407 099 6003	ZENER DIODE MTZJ9.1B
	407 057 9701	ZENER DIODE RD9.1EB2
D381	407 063 8903	ZENER DIODE MTZJ5.6C
	407 057 0104	ZENER DIODE RD5.6EB3
D383	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
D384	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
D385	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
D443	407 124 6404	DIODE ERA18-04
	407 007 6606	DIODE ES1
	407 124 5506	DIODE RMPG06G
D445	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
D446	407 099 5907	ZENER DIODE MTZJ8.2C
	407 057 8407	ZENER DIODE RD8.2EB3
D447	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
D461	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
D491	407 124 6404	DIODE ERA18-04
	407 007 6606	DIODE ES1
	407 124 5506	DIODE RMPG06G
D501	407 005 7308	DIODE EM01Z
	408 009 9008	DIODE BYD33D
D521	407 005 7308	DIODE EM01Z
	407 005 8602	DIODE ERA15-02
	408 009 9008	DIODE BYD33D
D571	407 099 7901	ZENER DIODE MTZJ20B
	407 055 1806	ZENER DIODE RD20EB2
D572	408 008 2406	DIODE 1N4148
	407 013 4306	DIODE 1S2076A
D603	407 006 6300	DIODE ERC05-10B
	407 009 6901	DIODE RM11C
D604	407 006 6300	DIODE ERC05-10B
	407 009 6901	DIODE RM11C
D605	407 006 6300	DIODE ERC05-10B
	407 009 6901	DIODE RM11C
D606	407 006 6300	DIODE ERC05-10B
	407 009 6901	DIODE RM11C
⚠D610	407 104 2402	PHOTO COUPLE PC817C
	407 106 6101	PHOTO COUPLE PC817D
D614	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D616	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D617	407 007 6606	DIODE ES1
	407 007 6903	DIODE ES1Z
	408 009 9008	DIODE BYD33D
D618	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D619	407 063 9405	ZENER DIODE MTZJ8.2A
	407 057 8209	ZENER DIODE RD8.2EB1
D631	407 007 7702	DIODE EU2A
D633	407 007 7603	DIODE EU2

Ref. No.	Part No.	Description
	407 007 7801	DIODE EU2Z
D634	407 009 8905	DIODE RU3M
D635	407 009 8905	DIODE RU3M
D641	407 099 5600	ZENER DIODE MTZJ6.8A
	407 057 4003	ZENER DIODE RD6.8EB1
D661	407 099 6102	ZENER DIODE MTZJ10B
	407 054 0008	ZENER DIODE RD10EB2
D683	408 008 2406	DIODE 1N4148
	407 012 4406	DIODE 1SS133
	407 013 4306	DIODE 1S2076A
	407 013 7109	DIODE 1S2473
D685	407 099 5600	ZENER DIODE MTZJ6.8A
	407 057 4003	ZENER DIODE RD6.8EB1
D861	407 099 4801	ZENER DIODE MTZJ4.3B
	407 056 4707	ZENER DIODE RD4.3EB2
MISCELLANEOUS		
⚠F601	423 024 8409	FUSE 250V 4A
F601-A1	645 000 5077	HOLDER,FUSE
F601-A2	645 000 5077	HOLDER,FUSE
A101	645 045 4455	TUNER,U/V
A1901	645 027 4213	UNIT,REMOCON RECEIVER
K1001	645 015 7462	JACK,RCA-2(3-1)
K1111	645 002 1145	TERMINAL,BOARD
PS601	408 015 1904	THERMISTOR PA3A5180B270
	408 042 1601	THERMISTOR PTH451A180M21
SW1901	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1902	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1903	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1904	645 027 7382	SWITCH,PUSH 1P-1TX1
SW1905	645 027 7382	SWITCH,PUSH 1P-1TX1
⚠SW601	645 017 0928	SWITCH,PUSH POWER 2P-2T
	645 024 0607	SWITCH,PUSH POWER 2P-2T
X131	421 006 3206	SAW F TSF5221P
X141	610 015 3059	TRAP,CERAMIC 4.5MHZ
	652 000 0230	TRAP,CERAMIC 4.5MHZ
X151	610 015 2946	CERAMIC FILTER 4.5MHZ
	645 030 1049	CERAMIC FILTER 4.5MHZ
	652 000 1466	CERAMIC FILTER 4.5MHZ
X211	610 012 0655	CRYSTAL OSCILLATOR
	652 000 1695	OSC,CRYSTAL 3.579545MHΩ
X212	645 001 6172	OSC,CRYSTAL 3575.611KHZ
X213	610 012 1294	CRYSTAL OSCILLATOR
X351	645 030 1889	OSC,CERAMIC 503KHZ
X801	645 004 1938	OSC,CRYSTAL 32.768KHZ
	645 004 1945	OSC,CRYSTAL 32.768KHZ

610 292 2998 ASSY,PWB,CRT F3BW 1AA0B10E646BB

Ref. No.	Part No.	Description
TRANSISTOR		
Q701	405 041 6507	TR 2SC2621-D-RA
	405 041 6705	TR 2SC2621-E-RA
	405 066 9903	TR 2SC2688(1)-K
	405 067 0008	TR 2SC2688(1)-L
	405 067 0107	TR 2SC2688(1)-M
	406 000 3605	TR 2SC3620(LB-SAN-1)
Q711	405 041 6507	TR 2SC2621-D-RA
	405 041 6705	TR 2SC2621-E-RA
	405 066 9903	TR 2SC2688(1)-K
	405 067 0008	TR 2SC2688(1)-L
	405 067 0107	TR 2SC2688(1)-M
	406 000 3605	TR 2SC3620(LB-SAN-1)
Q721	405 041 6507	TR 2SC2621-D-RA
	405 041 6705	TR 2SC2621-E-RA
	405 066 9903	TR 2SC2688(1)-K
	405 067 0008	TR 2SC2688(1)-L
	405 067 0107	TR 2SC2688(1)-M
	406 000 3605	TR 2SC3620(LB-SAN-1)
Q751	405 134 5905	TR 2SA1037AK-T146-R
	405 147 2205	TR 2SA1037AK-S-T146
	405 002 0308	TR 2SA1037K T146 R
	405 002 0407	TR 2SA1037K T146 S
	405 002 6706	TR 2SA1179-M6-TB
	405 002 6904	TR 2SA1179-M7-TB
	405 163 1503	TR 2SA1179N-M6-TB
	405 163 2708	TR 2SA1179N-M7-TB
CAPACITOR		
C701	403 157 6404	CERAMIC 330P K 50V
C710	403 056 0008	ELECT 4.7U M 250V
C711	403 157 6404	CERAMIC 330P K 50V
C721	403 157 6404	CERAMIC 330P K 50V
C731	403 077 2708	CERAMIC 1000P P 2K
	403 077 2807	CERAMIC 1000P Z 2K
C751	403 044 1703	ELECT 470U M 16V
RESISTOR		
R701	401 105 4502	MT-GLAZE 390 JA 1/16W
R703	401 105 5202	MT-GLAZE 470 JA 1/16W
R704	401 065 4604	OXIDE-MT 12K JA 2W
R705	401 009 1508	CARBON 2.7K JA 1/2W
R711	401 105 4502	MT-GLAZE 390 JA 1/16W
R713	401 105 5202	MT-GLAZE 470 JA 1/16W
R714	401 065 4604	OXIDE-MT 12K JA 2W
R715	401 009 1508	CARBON 2.7K JA 1/2W
R721	401 105 4502	MT-GLAZE 390 JA 1/16W
R723	401 105 5202	MT-GLAZE 470 JA 1/16W
R724	401 065 4604	OXIDE-MT 12K JA 2W
R725	401 009 1508	CARBON 2.7K JA 1/2W
R732	401 015 6504	CARBON 2.2 JA 1/4W
R751	401 150 6001	MT-GLAZE 0.000 ZA 1/10W
R752	401 150 5905	MT-GLAZE 10K JA 1/10W
R753	401 150 5905	MT-GLAZE 10K JA 1/10W
DIODE		
D751	407 012 4406	DIODE 1SS133
D752	407 012 4406	DIODE 1SS133
D753	407 012 4406	DIODE 1SS133
D754	407 012 4406	DIODE 1SS133
MISCELLANEOUS		
⚠K701	645 026 2005	SOCKET,CRT 8P



THE SERVICE PRECAUTION:
The area enclosed by this line(⏚⏚⏚) is directly connected with AC mains voltage. When servicing the area, connect an isolating transformer between TV receiver and AC line to eliminate hazard of electric shock.

SANYO

COLOUR TELEVISION

LC1-B

CHASSIS SERIES

SERVICE REF. NO. **C20LB87B-00**

20-F5TT

PRODUCT SAFETY NOTICE:

Product safety should be considered when a component replacement is made in any area of a receiver.

Components indicated by a mark ⚠ in this circuit diagram show components whose values have special significance to product safety. It is particularly recommended that only parts specified on the part service manual be used for components replacement pointed out by the mark.

CIRCUIT DIAGRAM NOTICE:

1. All resistance value are in ohms, K=1,000, M=1,000,000.
2. All resistance rated wattages are 1/6W unless otherwise noted.
3. Excepting electrolytic capacitors, all capacitance values of less than 1 are expressed in μ F and more than 1 are pF.
4. All capacitance rated voltages are 50V unless otherwise noted.
5. All inductance values are in μ H.
6. Voltage readings take with a "VTVM" are from point indicated chassis ground. Voltage readings taken by using PAL colour bar signal are with all controls at normal position. Some voltage may vary with signal strength.
7. Waveform were taken with PAL colour bar and controls adjusted for normal picture. Waveforms were taken by using a wide band oscillo-scope and a low capacity probe.
8. This circuit diagram covers a basic or representative chassis only. There may be some components or partial circuit differences between the actual chassis and the circuit diagram.
9. Parts specified with "X" are not installed in this model.
10. Parts specified with "J" are just jumper wires.

11. Expression of capacitance and resistance in circuit diagrme.

Capacitance (Example)

1000 C M 2000 D

- Characteristic
- Capacitance value (220pF)
- Allowable error (±20%)
- Kind (Ceramic)
- Rated voltage (1,000V)

Characteristic: T, A, U, D: Electrolytic; C, K, B: Ceramic; F: Mylar film; M, N: Polypropylene; Z: Metalized paper

Allowable error: J= ± 5%; K= ±10%; M= ±20%

Resistance (Example)

1/2 N J 1.2

- Resistance value (1.2Ω)
- Allowable error (±5%)
- Kind (M.carbon)
- Rated wattage (1/2W)

Kind: D: Carbon; N: Metalized carbon; S: Oxied metalized; W: Wire wounding; C: Solid

TRANSISTOR, DIODE AND INTEGRATED CIRCUIT TERMINAL GUIDE

C: COLLECTOR
B: BASE
E: EMITTER

A: ANODE
K: KATHODE

CHIP COMPONENTS
TRANSISTOR
DIODE
RESISTOR

PARTICULAR PARTS SYMBOL

FUSIBLE RESISTOR
NON POLE ELECTRIC CAPACITOR
POSISTER

12. List of replaceable transistors and diodes.

(PNP. TR)

	2SA608	2SA564A	2SA1015	2SA933	2SA933S	KSA733C
Z	E,F	Q,R	O,Y,G	Q,R	Q,R	
Y	E,F	Q,R	O,Y,G	Q,R		
W	F	R	Y,G	R		
V	E,F	Q,R	O,Y,G	Q,R		Y,G
U	F	R	Y,G	R		G

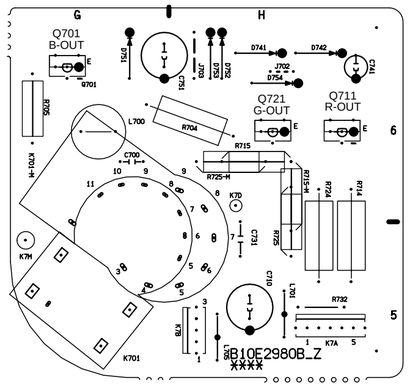
(DIODE)

	DIODE
M	1SS176, 1SS133, GMA01
P	1S1553, 1S2076A, 1S2471, 1N4148
R	1S1555, 1S2473, 1S2076, DS442, 1N4148

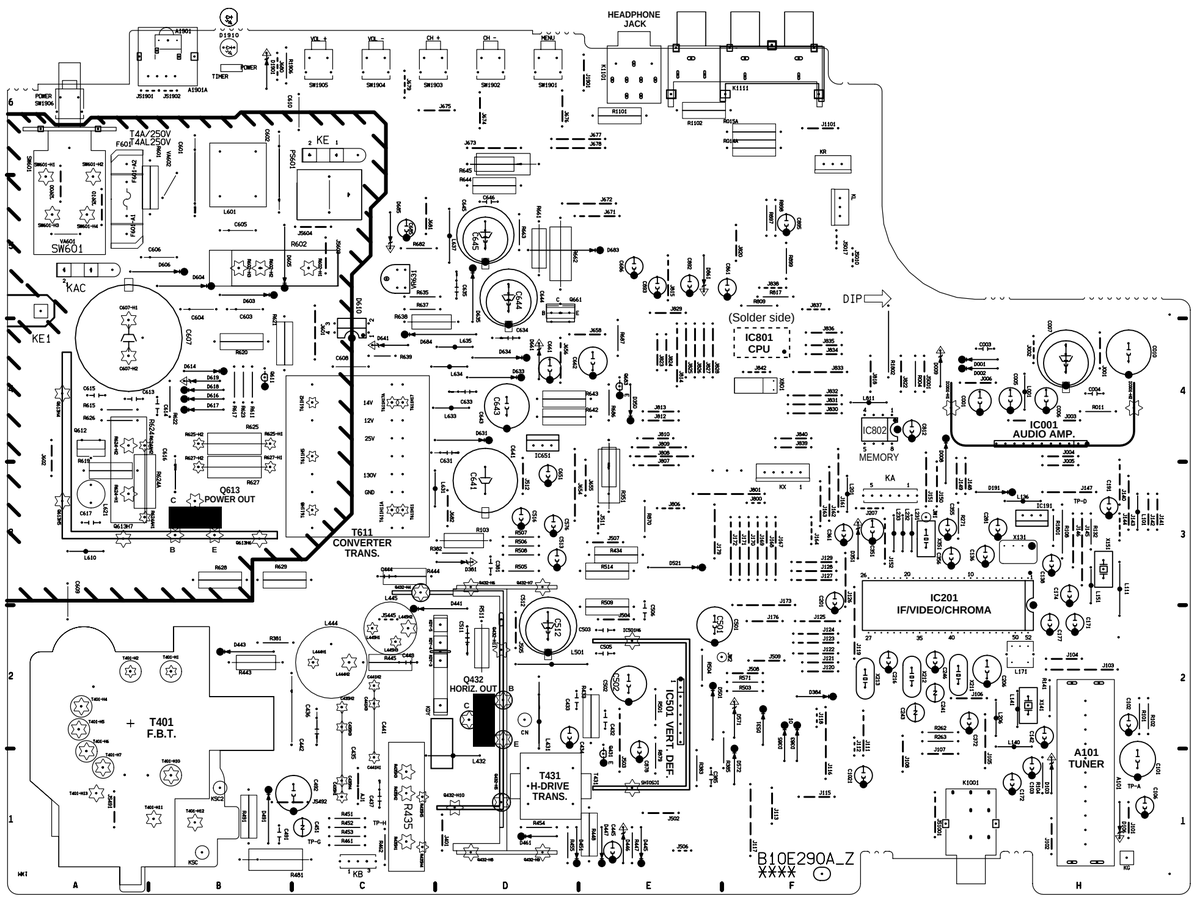
(NPN. TR)

	2SC536	2SC945A	2SC1815	2SC1740	2SC1740S	KSC945C
A	E,F,G	P,Q,R	O,Y,G	Q,R,S	Q,R,S	
B	E,F,G	P,Q,R	O,Y,G	Q,R,S		
D	F,G	P,Q	Y,G	Q,R,S		
F	F,G	P	G	R,S		
H	F,G	P,Q	Y,G	Q,R,S		Y,G
I	E,F,G	P,Q,R	O,Y,G	Q,R,S		Y,G
G	F,G	P	G	R,S		G

CRT BOARD (Component Location)



MAIN BOARD (Component Location)



Waveforms & Voltages

(On the Main Board)

IC201 (IF/VIDEO/CHROMA) ::

Pin-1: GND	**2:** 4.5V	**3:** 0.4V	**4:** 5.3V	**5:** 1.0V	**6:** 1.5V	**7:** 1.5V	**8:** 4.9V	**9:** 0V
10: 4.6V	**11:** 0.6V	**12:** 2.4V	**13:** 0V	**14:** 4.7V	**15:** 5.4V	**16:** 5.1V	**17:** 4.4V	**18:** 2.5V
19: 2.3V	**20:** 2.4V	**21:** 4.1V	**22:** 8.6V	**23:** 2.5V	**24:** 2.6V	**25:** 5.2V	**26:** 4.8V	**27:** 1.0V
28: 2.6V	**29:** 3.4V	**30:** 2.5V	**31:** 2.7V	**32:** 3.1V	**33:** 3.7V	**34:** 1.6V	**35:** 3.0V	**36:** 1.9V
37: 0V	**38:** 1.6V	**39:** 2.7V	**40:** 3.1V	**41:** 1.4V	**42:** 9.2V	**43:** 1.7V	**44:** 1.7V	**45:** 3.5V
46: 2.8V	**47:** 2.3V	**48:** 2.3V	**49:** 4.0V	**50:** 4.1V	**51:** 3.1V	**52:** 5.6V		

IC191

Pin-1: 9.2V **2:** GND **3:** 5.0V

IC651

Pin-1: 12.9V **2:** GND **3:** 5.0V

IC501 (VERT. OUT)

Pin-1: GND **2:** 14.8V **3:** 24.8V **4:** 4.4V **5:** 4.4V **6:** 24.4V **7:** 2.4V

IC001 (AUDIO AMP.)

Pin-1: 6.3V **2:** GND **3:** 6.3V **4:** 0.7V **5:** 3.1V **6:** 5.6V **7:** 5.5V **8:** GND **9:** 5.7V
10: 12.5V

IC802 (MEMORY)

Pin-1 GND **2:** GND **3:** GND **4:** GND **5:** 5.0V **6:** 5.0V **7:** GND **8:** 5.0V

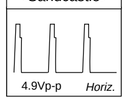
IC801 (CPU)

Pin-1: 4.7V	**2:** 4.6V	**3:** 5.0V	**4:** 5.0V	**5:** GND	**6:** 1.8V	**7:** 2.5V	**8:** 5.0V	**9:** 1.4V
10: 2.5V	**11:** 0.9V	**12:** 0V	**13:** 4.9V	**14:** 3.3V	**15:** 2.6V	**16:** 0V	**17:** 4.8V	**18:** 4.1V
19: 0V	**20:** 0V	**21:** 0V	**22:** 0V	**23:** GND	**24:** GND	**25:** GND	**26:** GND	**27:** 4.5V:
28: 5.0V	**29:** 0V	**30:** 2.4V	**31:** 4.9V	**32:** 5.0V	**33:** 0V	**34:** 4.9V	**35:** 5.0V	**36:** 5.0V

Q111	Q140	Q141	Q171	Q212	Q213	Q261	Q431	Q432	Q576	Q611	Q612	Q613
B 1.1V	B 5.7V	B 5.9V	B 3.5V	B 0V	B 0.6V	B 1.6V	B 0.3V	B 2.5V	B 0V	B 15.3V	B 0V	B 0V
C 0.4V	C 0V	C 0V	C 9.3V	C 4.7V	C 0V	C 0V	C 10.5V	C 131.7V	C 4.5V	C -0.2V	C -0.3V	C 324V
E 6.2V	E 6.3V	E 6.5V	E 2.9V	E 0V	E 0V	E 2.3V	E 0V	E 2.5V	E 0V	E 14.9V	E -0.2V	E -0.3V

Q631	Q661	Q681	Q683	Q684	Q685	Q686	Q861	Q871	Q881	Q886
B 3.5V	B 9.9V	B 0V	B 23.9V	B 0.7V	B 0V	B 36.2V	B 4.4V	B 0V	B -5.9V	B 0.7V
C 18.0V	C 11.3V	C 9.9V	C 24.5V	C 0V	C 36.1V	C 0V	C 4.9V	C 4.8V	C 4.1V	C 0V
E 3.3V	E 9.3V	E 0V	E 24.6V	E 0V	E 1.0V	E 36.2V	E 5.0V	E 0V	E 0V	E 0V

IC201-pin11 <Sandcastle>



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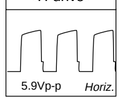

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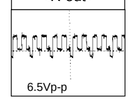

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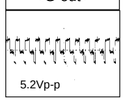

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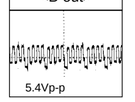

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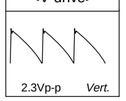

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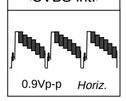
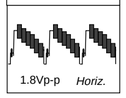


IC201-pin38 <Y out>



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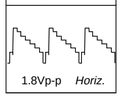

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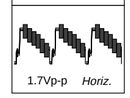
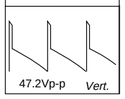


IC501-pin2 <V out>



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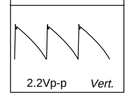
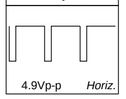


IC801-pin18 <H sync>



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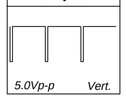
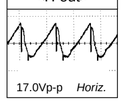


Q432-B <H out>



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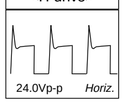

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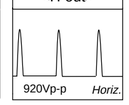

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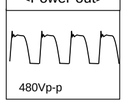
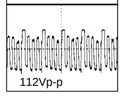


(On the CRT Board)

Q701	Q711	Q721	Q751
B 2.1V	B 2.1V	B 2.0V	B 9.2V
C 139.4V	C 139V	C 142.5V	C 0V
E 1.7V	E 1.7V	E 1.6V	E 9.1V

Q701-C <B-out>



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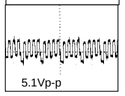

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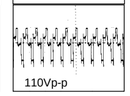

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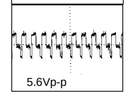

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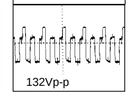

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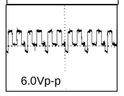

Sep. /’01

NEWSAN S. A. Una empresa del grupo SANYO Electric Co.