



# Colour TV Service Manual

**CHASSIS: CN-9**

**MODEL:  
CT-14XJ9N**

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## SPECIFICATIONS

RF system:	Color system: PAIA.43, NTSC3.58, NTSC4.43, PAL-M, PAL-N Sound system: D/K, I, M, B/G
Video system:	PAIA.43, NTSC4.43, NTSC3.58, PAL-M, PAL-N (50/60Hz)
Receiving channel:	VHF: <i>C1~C12</i> (49.75 ~ 85.25MHz, 168.25 ~ 216.25MHz) UHF: C 13~C57 (471.25 ~ 863.25MHz) CATV: Z1~Z7 (111.0 ~ 167.0MHz) ZS~Z35 (223.0~447.0MHz)
Programs Preset:	236
Antenna. input:	75Ω (imbalance)
Picture tube:	Effective screen dimension: 406mmx305mm; Flat-square tube
Audio output:	Main channel: 5W+5W (THD=7%)
Power supply:	AC 150~260V (50Hz)
Weight:	~26kg
Dimensions:	566mm(w) x 4551mm(h) x 480mm(d)
Power consumption:	~87W (AC 220V 50Hz)

## GENERAL DESCRIPTION

CN-9 is a CTV monolithic chassis. It introduces a monolithic IC TB1231N to carry out all the small signal processing. TB1231N is a kind of IC used by color TV in PAL/NTSC system, which is controlled by Inter IC Bus. Together with the SECAM decoder TA1275Z, it can form a signal processing circuit for multi-system color TV. This chassis is used in many fashionable TV receiver technologies, which makes the performance/price reach the advanced level of the world.

Figure 1 shows the block diagram of CN-9.

Table 1 provides CN-9 mainly ICs and functions.

Figure 2 shows the whole set power supply system for CN-9

Figure 3 shows the system control circuit of CN-9

**Table 1: CN-9 mainly ICs and functions**

Location	Type	Mainly function
N001	CH0807(TMP87CM38N-3673)	System control microprocessor
N002	AT24C04	Memory
N945	HS0038	Remote control receiver
NM01	TC9028F-022	Remote control transmitter
N101	LA7910	Band decoder
N202	HEF4052	Sound system switching
N201	TB 1238AN	Small signal processing
N401	TA8403	Vertical output power amplifier
N601	TDA7057AQ	Audio power amplifier
N602	CD4066	Audio TV/AV switching

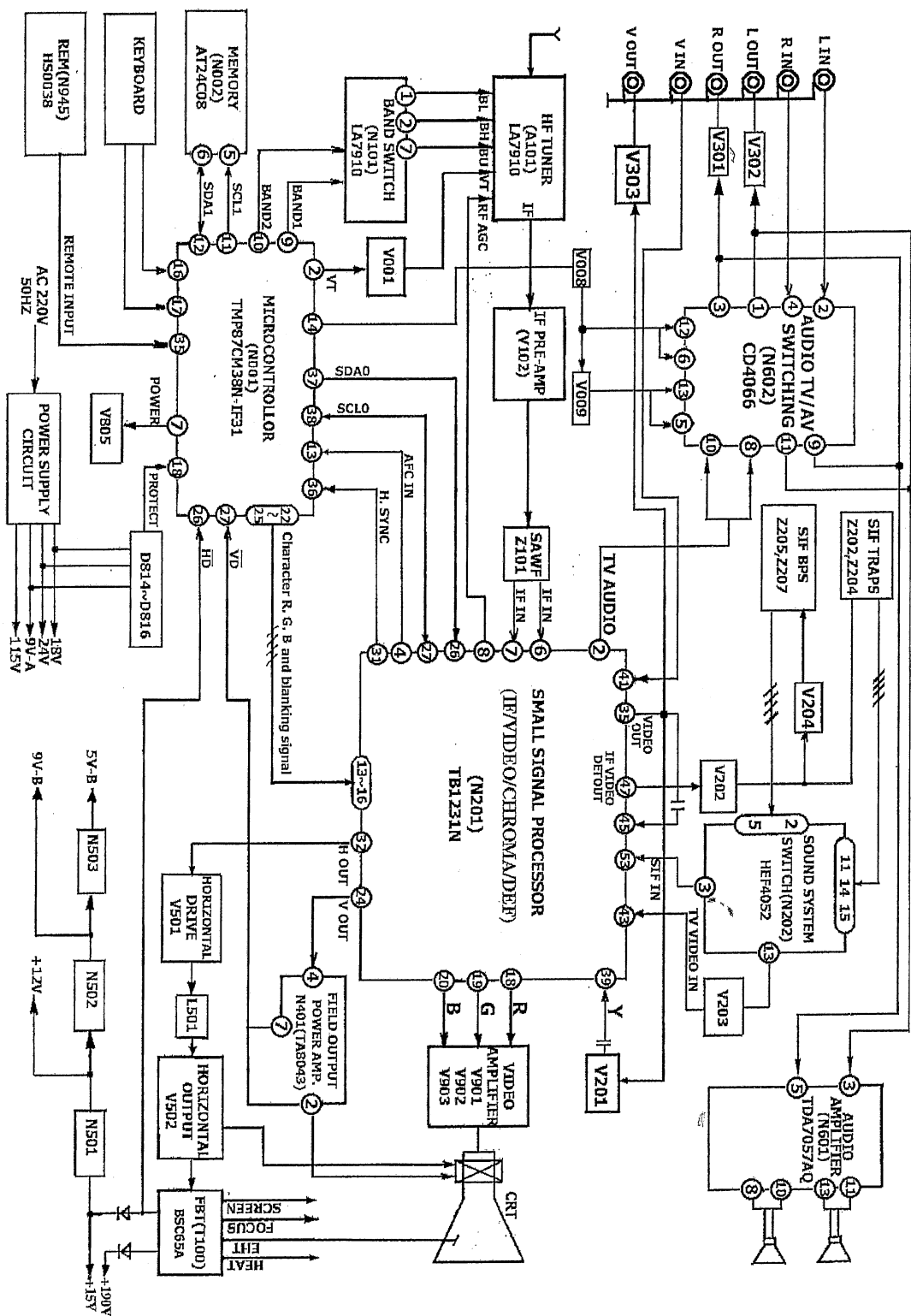


Figure 1 BLOCK DIAGRAM OF CN-9(21BS32EA)

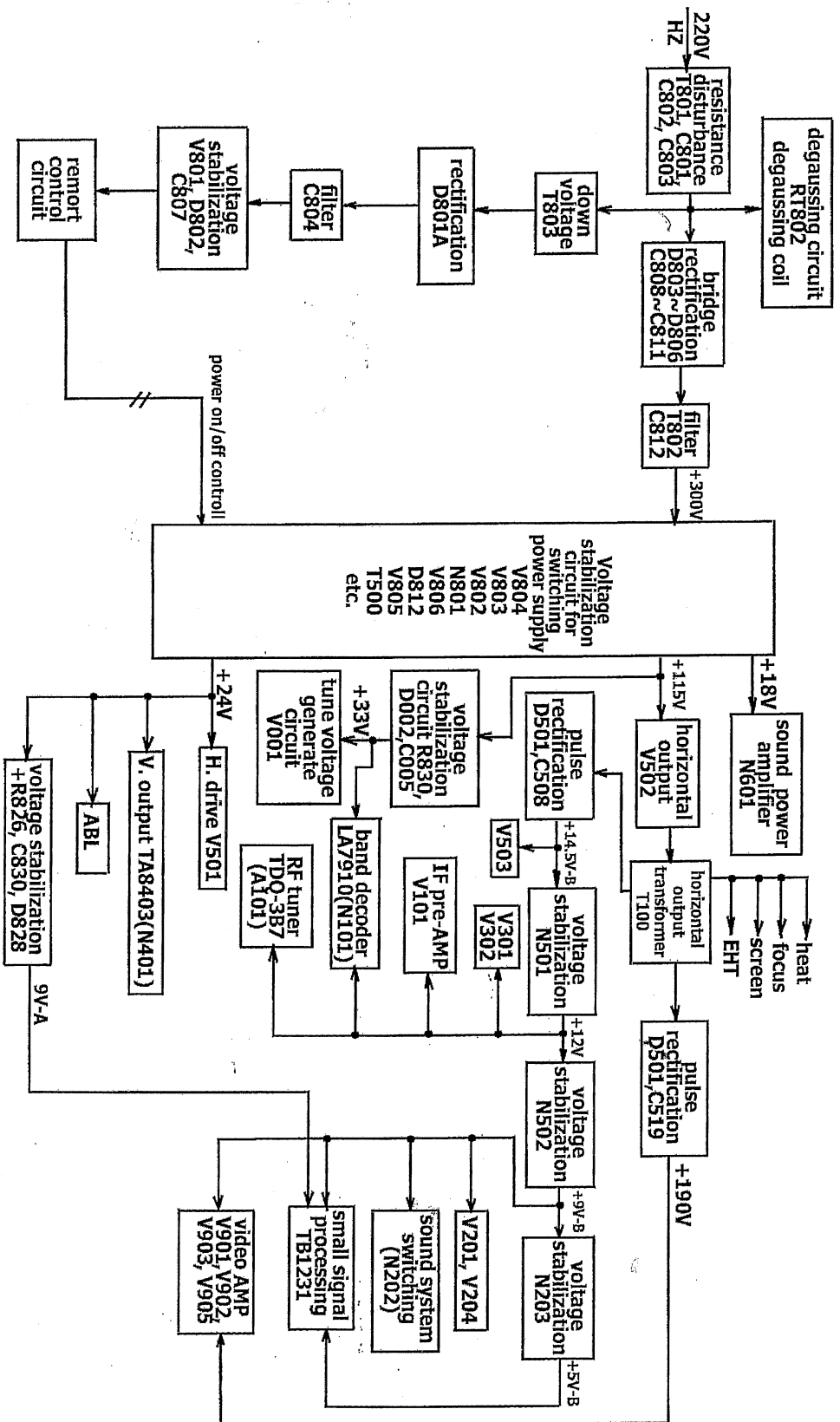


Figure 2 Whole set power supply system for CN-9

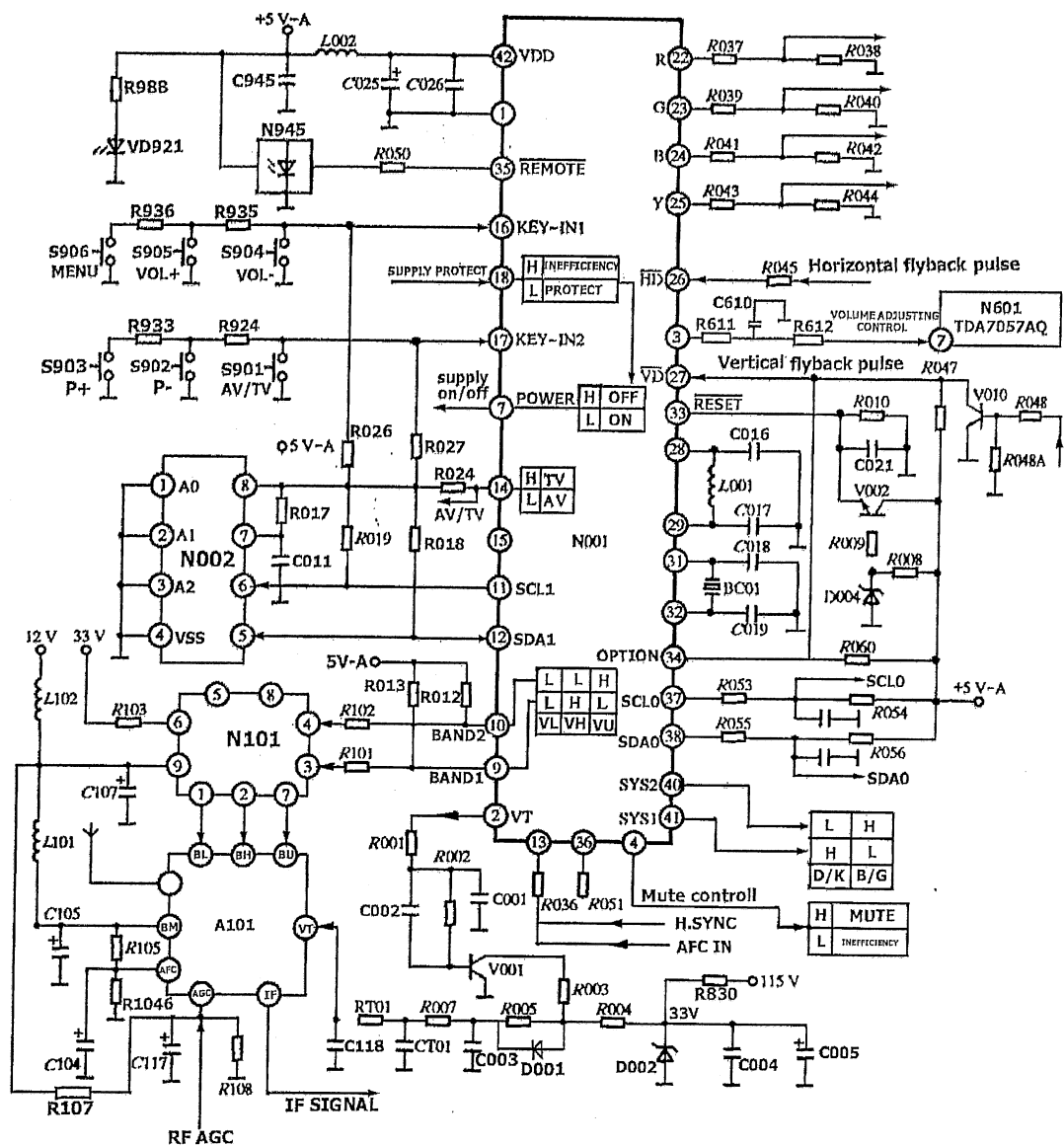
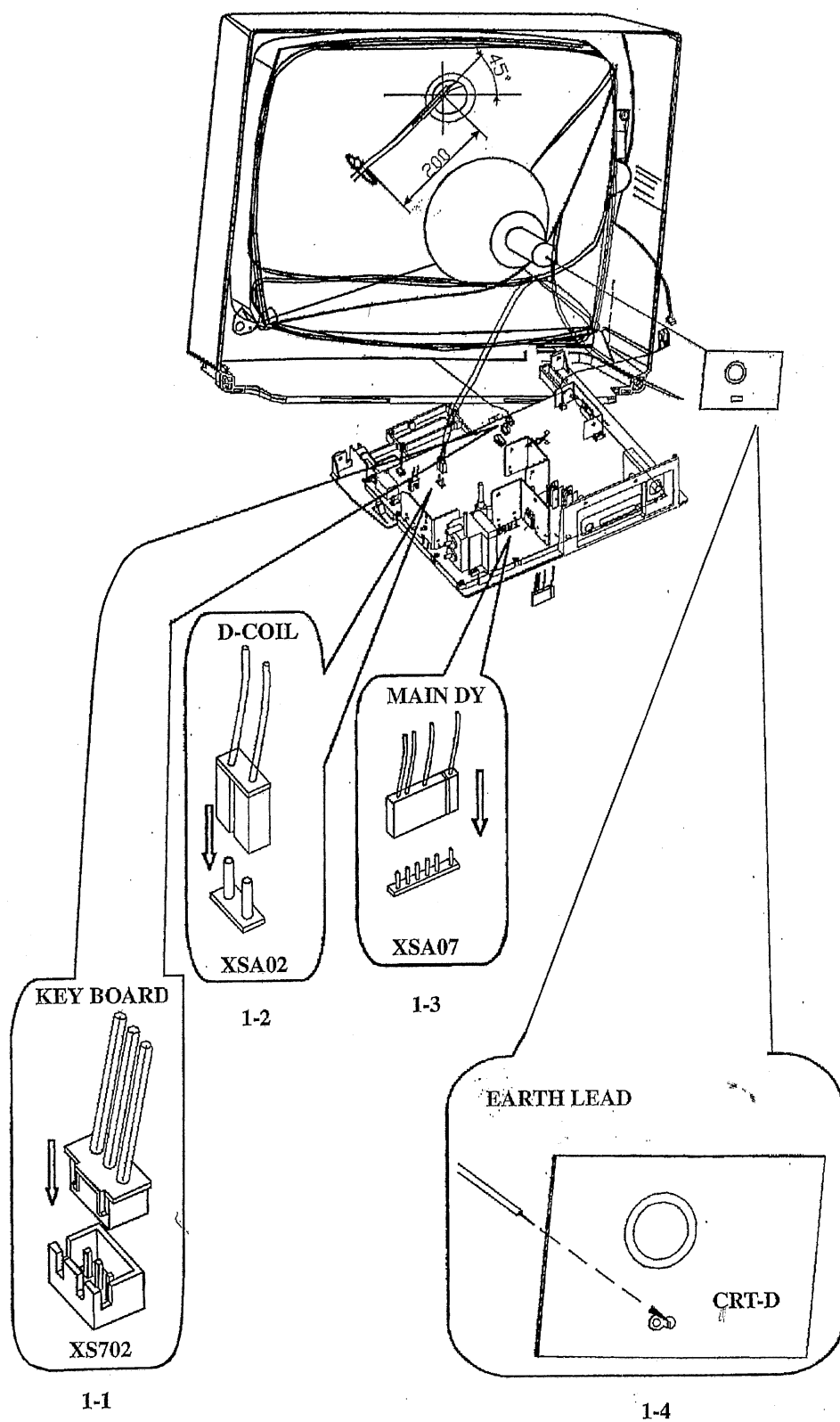


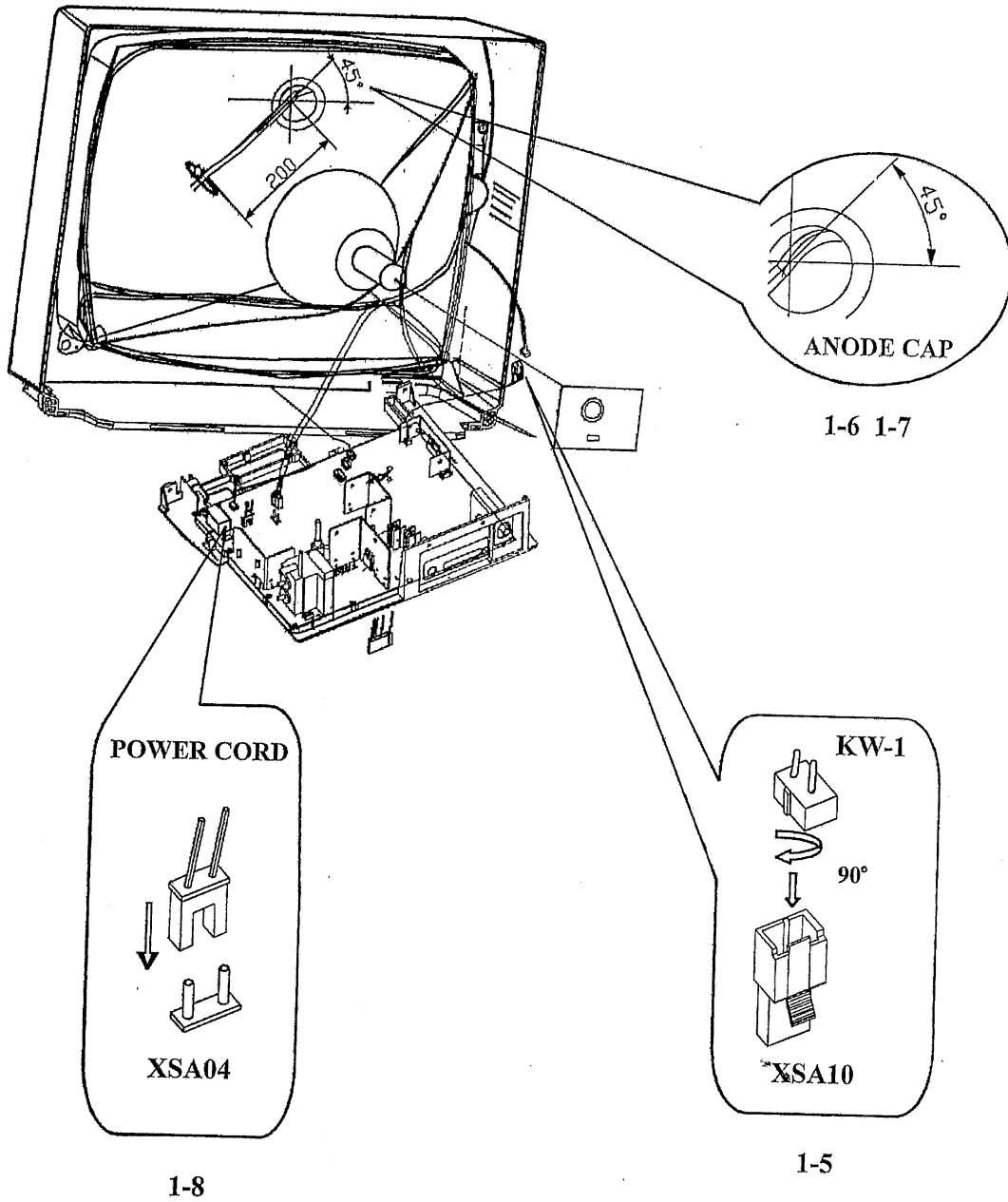
Figure 3 System control circuit for CN-9(21BS32EA)

## CONNECTOR VIEW

- |                                |                       |
|--------------------------------|-----------------------|
| 1-1 KEY BOARD UNIT             | 1-5 SPEAKER CONNECTOR |
| 1-2 DEGAUSSING COIL            | 1-6 ANODE CAP         |
| 1-3 MAIN DEFLECTION YOKE       | 1-7 ANODE CLAMP FLX   |
| 1-4 CRT DRIVER INSERT CRT NECK | 1-8 POWER CORD XSA04  |







## **SAFETY INSTRUCTION**

**WARNING: BEFORE EXAMINING AND SERVICING THIS CHASSIS, READ CAREFULLY THE FOLLOWING SAFETY INSTRUCTIONS.**

### **X-RAY RADIATION PRECAUTION**

1. The EHT must be checked every time the receiver is serviced to ensure that the CRT does not emit X-ray radiation as result of excessive EHT voltage. The nominal EHT for this receiver is 27.5kv at zero beam current (minimum brightness) operating at AC 220V. The maximum EHT voltage permissible in any operating circumstances must not exceed 30KV. When checking the EHT, use the High Voltage Check procedure in this manual using an accurate EHT voltmeter.
2. The only source of X-RAY radiation in this receiver is the CRT to prevent X-ray radiation you should use the same type of CRT when replacing it.
3. Some components used in this receiver have safety-related characteristics preventing the CRT from emitting X-ray radiation. For continued safety, replacement component should only be made after referring the Product Safety notice below.

### **SAFETY PRECAUTION**

1. The high voltage in the TV reaches to 27.5KV when the TV is in operation. Be more careful during opening the back cover.
  - a. The high voltage existing in the TV is very dangerous. Refer servicing to qualified personnel only.
  - b. Before removing the high voltage cap, discharge the anode of the CRT and the chassis in case of electric shock.
  - c. Wear a pair of goggles when handling the CRT to void broken pieces damaging your eyes.
  - d. Do not hold the CRT neck in case of causing damage to the CRT.
2. When the power cord needs replacing, use the same one as stated in this manual.
3. Voltage exists between the hot and cold ground when the TV is in operation. Install a separation transformer during repairing or connecting to any tester for the sake of safety. The power of the separation transformer should be beyond rated overall power.
4. When replacing a burnout fuse, use the one with the same specifications as the original.
5. When replacing old wire, wind new one round the shaft to weld. When replacing components with safety in performance, use the same type as that specified by this manual and install it in the former way.
6. Never place wire near high-temperature or high-voltage components.

### **SAFETY CAUTIONS FOR PRODUCTS**

Many electric and mechanical components in CN-9 chassis have special, safety performances, which are always neglected. Even if replacing them with some components with the same voltage and power, you can not get effective protection to X-ray. In the circuit diagram, these special electric components are indicated by the special mark  $\Delta$ , and on the shadow. When replacing any of them, use the one with the same specifications as the originals. Otherwise, it may cause X-ray radiation and damage to overall safety.

## **CIRCUIT ADJUSTMENTS**

### **GENERAL INFORMATIONS**

All adjustment are thoroughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper colour and B/W pictures upon installation. However, several minor adjustments may be required depending on the particular location in which the receiver is operated.

This receiver is shipped completely in carton. Carefully draw out the receiver from the carton and remove all packing materials. Power cord into a convenient 220 volts 50 Hz AC two pin power outlet. Turn the receiver ON. Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain natural colour or B/W picture.

### **AUTOMATIC DEGAUSSING**

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON. If the set is moved or faced in a different direction, the power switch must be switched off at least 30 minutes in order that the automatic degaussing circuit operates properly. Should the chassis or parts of the cabinet become magnetized to cause poor colour purity, use an external-degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube, the sides and front of the receiver and slowly withdraw the coil to a distance of about 2m before disconnecting it from AC source. If colour shading still persists, perform the COLOUR PURITY ADJUSTMENT and CONVERGENCE ADJUSTMENTS procedures.

### **POWER SUPPLY ADJUSTMENT**

CAUTION: +B voltage has close relation to high voltage. To avoid X-ray radiation, +B voltage should be to +115V.

1. Set RVS01 to the mechanical center and AC power supply to 220-+2V.
2. Connect a digital voltmeter to two pins of C822, and then turn on the TV.
3. Receive Philips test signal.
4. Adjust RVS01 to make the voltmeter read  $115 \pm 0.5V$ .

### **HIGH VOLTAGE EXAMINATION**

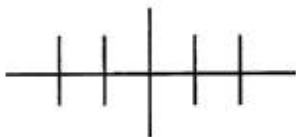
CAUTION: No high voltage adjustment should be done in CN-9 chassis.

1. Connect a precise high voltmeter to the second anode of the CRT.
2. Turn on the TV and set the brightness and contrast to minimum (i.e. set beam current of the CRT to zero).
3. The high voltage tested should be  $27.5 \pm 0.5KV$ .
4. Set the brightness to minimum or maximum, and ensure high voltage not beyond limitation of 30KV in any case.

## FOCUS ADJUSTMENT

1. Use the remote control to set the contrast to maximum and the brightness, chroma to medium.
2. Set H. V. lines near Philips picture center to thinnest with the focus adjustment potentiometer on the FBT. After finishing adjustment, ensure that no poor focusing exist near the center or around of the frame.

Before Adjusting



After adjusting



## SET-UP ADJUSTMENT

The following adjustments should be made when a complete realignment is required or a new picture tube is installed. Perform the adjustments in order as follows:

1. Colour purity
2. Convergence
3. White Balance (See page 17)

Note: The PURITY/CONVERGENCE MAGNET assembly and rubber wedges need mechanical positioning. Refer to figure 4.

## COLOUR PURITY ADJUSTMENT

**NOTE: Before attempting any purity adjustment, the receiver should be operated for at least fifteen minutes.**

1. Demagnetize the picture tube and cabinet using a degaussing coil.
2. Set the brightness and contrast to maximum
3. Receive the green raster test signal.
4. Loosen the clamp screw holding the deflection coil and slide, the backward or forward to provide vertical green belt (zone) in the picture screen.
5. Remove the Rubber Wedges.
6. Rotate and spread the tabs of the purity magnet (See figure 5) around the neck of the picture tube until the green belt is in the centre of the screen.
7. Slowly move the deflection coil forward or backward until a uniform green screen is obtained. Tighten the Clamp screw of the coil temporarily.
8. Check the purity of the red and blue raster.

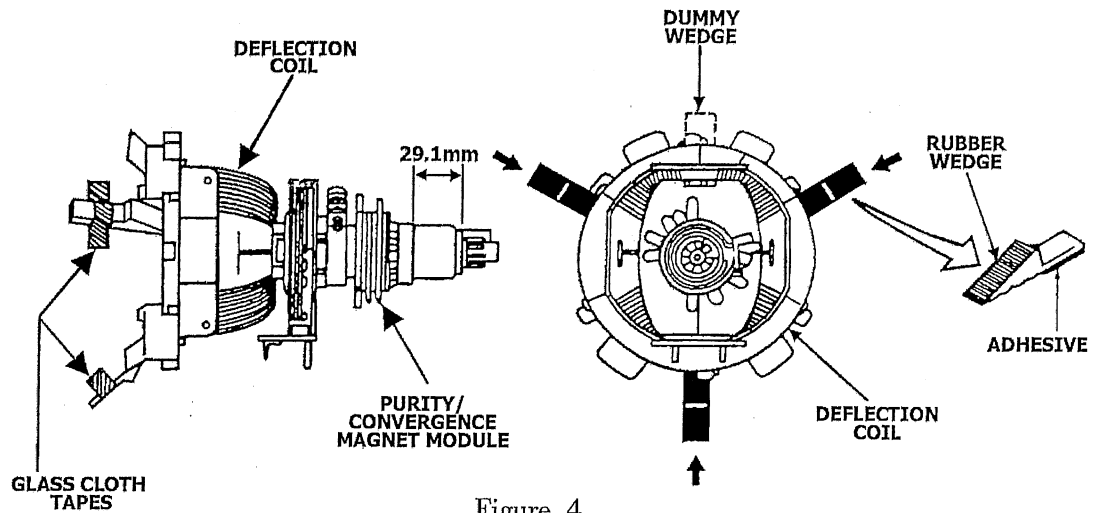


Figure 4

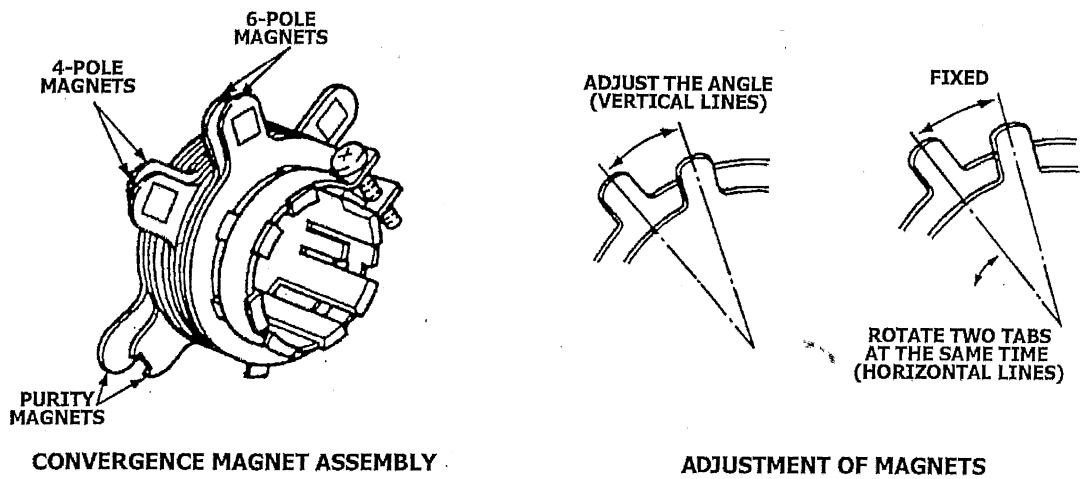


Figure 5

## CONVERGENCE ADJUSTMENTS

**NOTE:** Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

### CENTRE CONVERGENCE ADJUSTMENT

1. Receive the pane pattern test signal.
2. Set the brightness and contrast for well-defined pattern.
3. Adjust two tabs of the 4-Pole Magnets to change the angle between them (See figure 5) and superimpose red and blue vertical lines in the centre area of the picture screen.
4. Turn the both tabs at the same time keeping the angle constant to superimpose red and blue horizontal lines at the centre of the screen.
5. Adjust two tabs of 6-Pole Magnets to superimpose red/blue line (and green line. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 3, 4, 5 keeping in mind red, green and blue movement, because 4-Pole Magnets and 6-Pole Magnets have mutual interaction and make dot movement complex.

### CIRCUMFERENCE CONVERGENCE ADJUSTMENT

1. Loosen the clamping screw of deflection coil slightly to allow the coil to tilt.
2. Temporarily put a wedge as shown in figure 4. (Do not remove cover paper on adhesive part of the wedge.)
3. Tilt front of the deflection coil up or down to obtain better convergence in circumference. (See figure 6) Push the mounted wedge into the space between picture tube and the coil to fix the coil temporarily.
4. Put other wedge into bottom space and remove the cover paper to stick.
5. Tilt front of the deflection coil right or left to obtain better convergence in circumference. (See figure 6)
6. Keep the deflection coil position and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to fix the coil.
7. Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to fix the coil.
8. After fixing three wedges, recheck overall convergence. Tighten the screw firmly to fix the coil and check the coil is firm.
9. Stick three adhesive tapes on wedges as shown in figure 4.

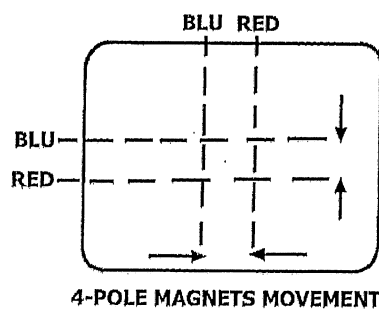
## SERVICE MODE GENERAL INSTRUCTIONS

### 1. ENTERING TO SERVICE MODE

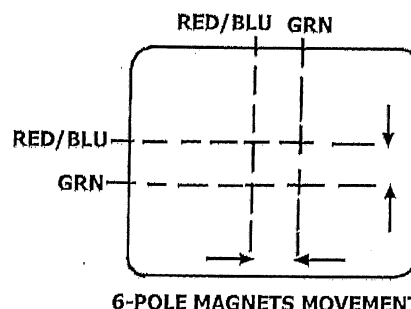
Use the user remote receiver K10 series. Set the volume to minimum. Press the MUTE button on Remote Control. Keep pressing the MUTE button, press MENU button on TV set until the character D and an adjustment item appears on the screen.

### 2. SELECTING THE ADJUSTING ITEMS

Every pressing of the MENU “□” or “□” button on remote control transmitter changes the adjustment items in the following BUS DATA table.

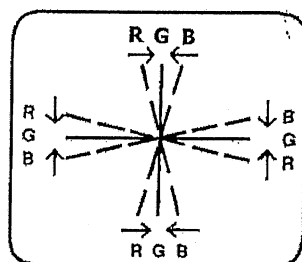


4-POLE MAGNETS MOVEMENT

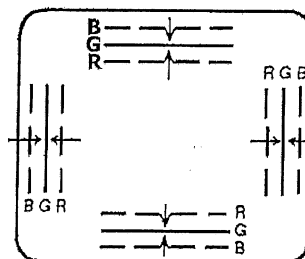


6-POLE MAGNETS MOVEMENT

Centre Convergence by Convergence magnets



INCLINE THE COIL UP(OR DOWN)



INCLINE THE COIL RIGHT(OR LEFT)

Circumference Convergence by DEF coil

Figure 6



Table 2 The BUS DATA FOR CN-9

Number	Adjustment Item	Adjustment Function	Type Data
1	RCUT	Red Dark Balance	40
2	GCUT	Green Dark Balance	42
3	BCUT	Blue Dark Balance	64
4	GDRN	Green Light Balance	3B
5	BDRN	Blue light Balance	3B
6	CNTX	Sub contrast max	3F
7	BRTC	Sub-bright centre	2A
8	COLC	Sub color center (NTSC)	40
9	TNTC	Sub tint center	40
10	COLP	Sub color center (PAL difference)	00
11	COLS	Sub color center (SECAM)	10
12	SCNT	Sub contrast	08
13	CNTC	Sub contrast center	20
14	CNTN	Sub contrast min	08
15	BRTX	Sub bright max (difference)	1C
16	BRTN	Sub bright min (difference)	20
17	COLX	Sub color max (difference)	35
18	COLN	Sub color min	00
19	TNTX	Sub tint max (difference)	28
20	TNTN	Sub tint min (difference)	28
21	ST3	Sub sharp center (3.58NTSC TV)	20
22	SV3	Sub sharp center (3.58NTSC AV)	20
23	ST4	SUB SHARP CENTER (OTHER TV)	20
24	SV4	Sub sharp center (other AV)	20
25	SHPX	Sub sharpness max (difference)	1A
26	SHPN	Sub sharpness min (difference)	1A
27	TXCX	Text RGB contrast max	29
28	RGCN	Text RGB contrast min	16
29	VM0	V/C/D mode data 0	3C
30	VM1	V/C/D mode data 1	20
31	HPOS	Horizontal center of 50 Hz	00
32	VP50	Vertical centering of 50 Hz	07
33	HIT	Vertical amplitude of 50 Hz	23
34	HPS	Horizontal centering difference of 50/60 Hz	10
35	VP60	Horizontal centering difference of 50/60 Hz	04

Number	Adjustment Item	Adjustment Function	Type Data
36	HITS	Vertical amplitude deflection of 50/60 Hz	25
37	VLIN	Vertical line of 50 Hz	0D
38	VSC	Vertical S correction	0E
39	VLIS	Vertical line deflection of 50/60 Hz	0D
40	SBY	SECAM B-Y	08
41	SRY	SECAM R-Y	08
42	R AGC	RF AGC	IF
43	AFT	PIF VCO center	IF
44	HAFC	AFC gain	00
45	V25	Volume 25%	3A
46	V50	Volume 50%	57
47	BRTS	Sub bright (difference)	00
48	SELF	TB1231N P40UT select	00
49	SELF VCO	Self adjust VCO initial data	80
50	SELF AGC	Self adjust AGC initial data	80
51	SELF BRTC	Self adjust BRTC initial data	80
52	SELF CNTC	Self adjust CNTC initial data	20
53	SELF TNTC	Self adjust TNTC center initial data	00
54	SELF COLC	Self adjust COLC initial data	10
55	PNUM	Protect number	7F
56	VHFL-L	Factory ASM VT limit of VHFL low byte	50
57	VHFL-H	Factory ASM VT limit of VHFL high byte	03
58	VHFH-L	Factory ASM VT limit of VHFH low byte	50
59	VHFH-H	Factory ASM VT limit of VHFH high byte	03
60	UHF-L	Factory ASM VT limit of UHF LOW byte	00
61	UHF-H	Factory ASM VT limit of UHF high byte	03
62	VM2	TB1231N V/C/D mode data	00
63	OSD	OSD position	07
64	OPT	Option	77
65	MODE	Factory data	00

### 3. ADJUSTMENT THE DATA

Pressing of the MENU "□" or "□" button on remote control transmitter will change the value of data, in the range from 00 to FF. The variable range depends on the adjusting item.

### 4. EXIT FROM SERVICE MODE

Use the keyboard on remote control transmitter or TV set to turn off the TV once.

## SERVICE MODE ADJUSTMENT

### 1. AFT VOLTAGE ADJUSTMENT

Enter the TV to the SERVICE mode. Press the PICTURE MODE SELECTION button on the remote control transmitter once the TV will adjust the AFT automatically. When the adjustment is over, the characters AFT-OK will appear on the screen.

### 2. SUB-BRIGHTNESS

1. Receive colour signals.
2. Set the contrast to maximum and the brightness to medium.
3. Set the chroma to medium. Enter the TV to the SERVICE mode. Select the BRTC item by pressing the item adjustment button on the remote transmitter, and set the data to 2A by pressing the data adjustment button. Operate the TV for 5 min in the mode.
4. Adjust the BRTC data until fuzzy picture does not appear on the high bright area of the screen and too dim picture not on the low-bright area.
5. Set the contrast and brightness to maximum or minimum, and then test normal picture alternation.
6. If the picture does not become dark when the contrast and brightness are set to minimum, or not become bright when set to maximum, then adjust the BRTC data to get normal picture.

### 3. WHITE BALANCE ADJUSTMENT

1. Turn on the TV and preheat it for over 7 minute.
2. Use the remote control to set the contrast to maximum and the brightness to medium. Set the chroma to minimum.
3. Enter the TV to the SERVICE mode, and set the following data without changing other items.

RCUT .....	40
GCUT .....	42
BCUT .....	64
GDRN .....	3B
BDRN .....	3B
4. Pull out the external antenna and press the MUTE button once on the remote control until a bright horizontal line appears on the screen. Adjust the GCUT data to get 160V+0.5 green gun voltage across the Y board.
5. Adjust the RCUT and BCUT data according to the given at Step 4 so that the bright horizontal line turns to yellow, then to white.

### 4. HORIZONTAL CENTERING ADJUSTMENT

Enter the TV to the service mode, and receive Philips test signal. Select the HPOS or HPS item by pressing the item adjustment button on the remote control, and adjust horizontal picture position in the centre of screen by pressing the data, adjustment button.

### 5. VERTICAL CENTERING ADJUSTMENT

Enter the TV to the service mode, and receive Philips test signal. Select the VPS0 or VP60 item by pressing the item adjustment button on the remote transmitter, and adjust vertical picture position in the centre of screen by pressing the data adjustment button.

**6. VERTICAL AMPLITUDE ADJUSTMENT**

Enter the TV to the service mode, and receive pane test signals. Select the HIT item by pressing the item adjustment button on the remote transmitter, and adjust vertical amplitude by pressing the data, adjustment button so that vertical amplitude lacks a little. Continue to adjust vertical amplitude by pressing the data adjustment button until the first bar on pane signal touches edge of screen.

**7. HORIZONTAL AMPLITUDE ADJUSTMENT**

Receive Philips test signals. Adjust the horizontal amplitude adjustment inductance L506 so that the edge of the CRT covers the right and left borderlines of Philips picture by 1/3 grille.

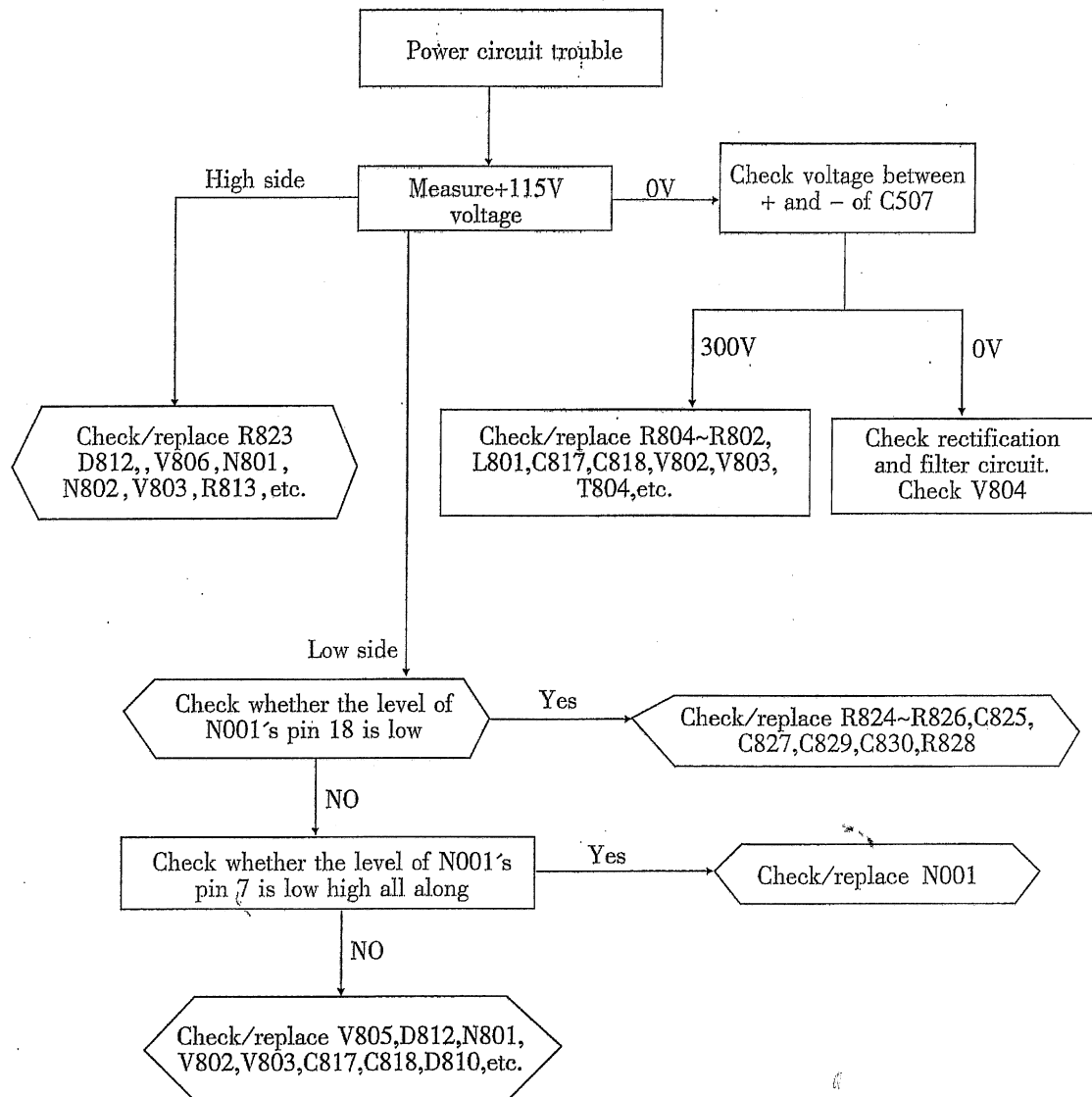
**8. BUS DATA INITIALIZATION**

When the BUS DATA of TV is confused, enter the TV to the service mode. Press the SLEEP button on the Remote Control will initialize the BUS DATAS for all adjustment items.

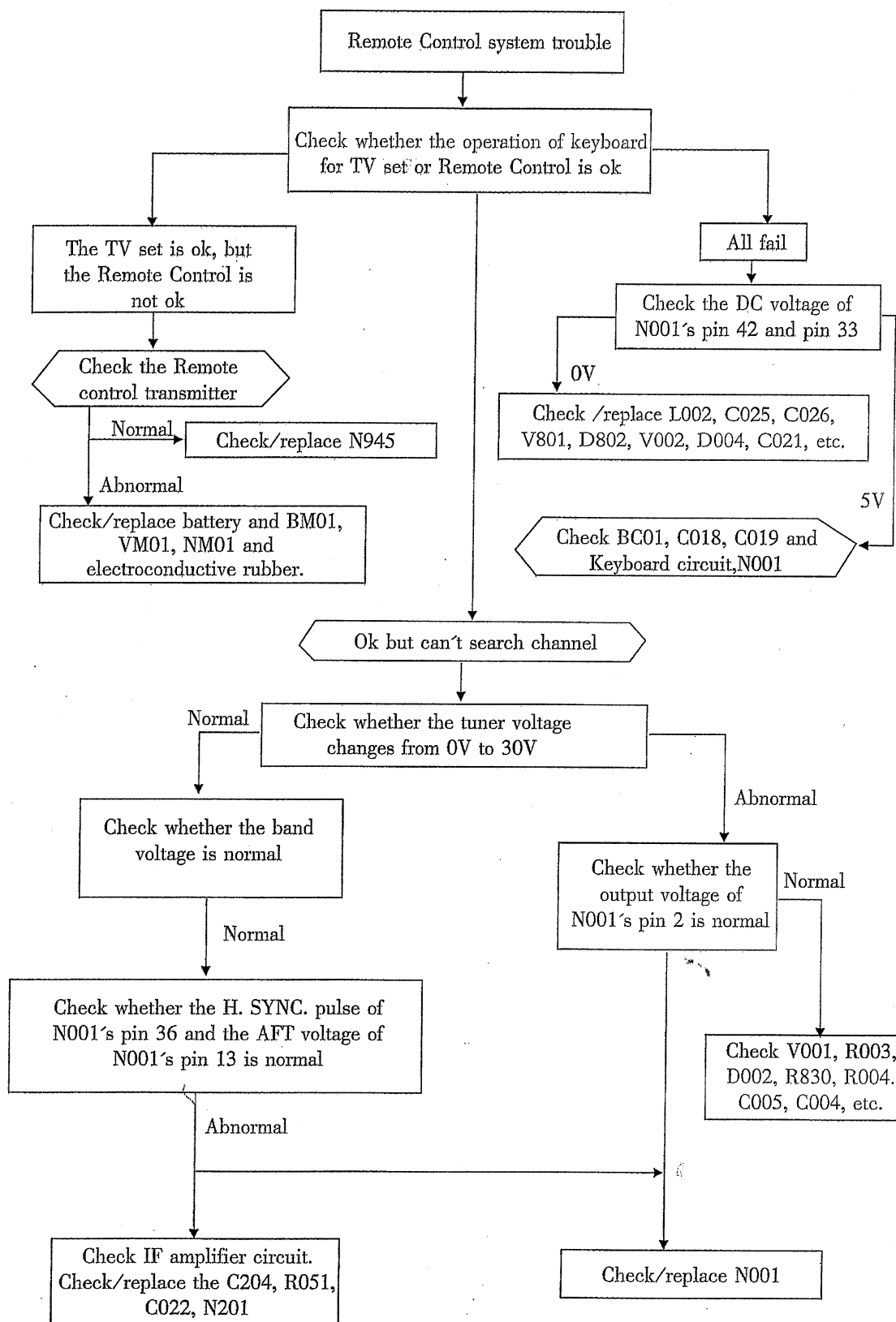
**MAIN REPAIRING FLOW DIAGRAM**

The following flow diagrams are for the corresponding troubleshooting, which can help you find the causes for troubles. Check as the order shown on the flow diagrams, you can find the defective component.

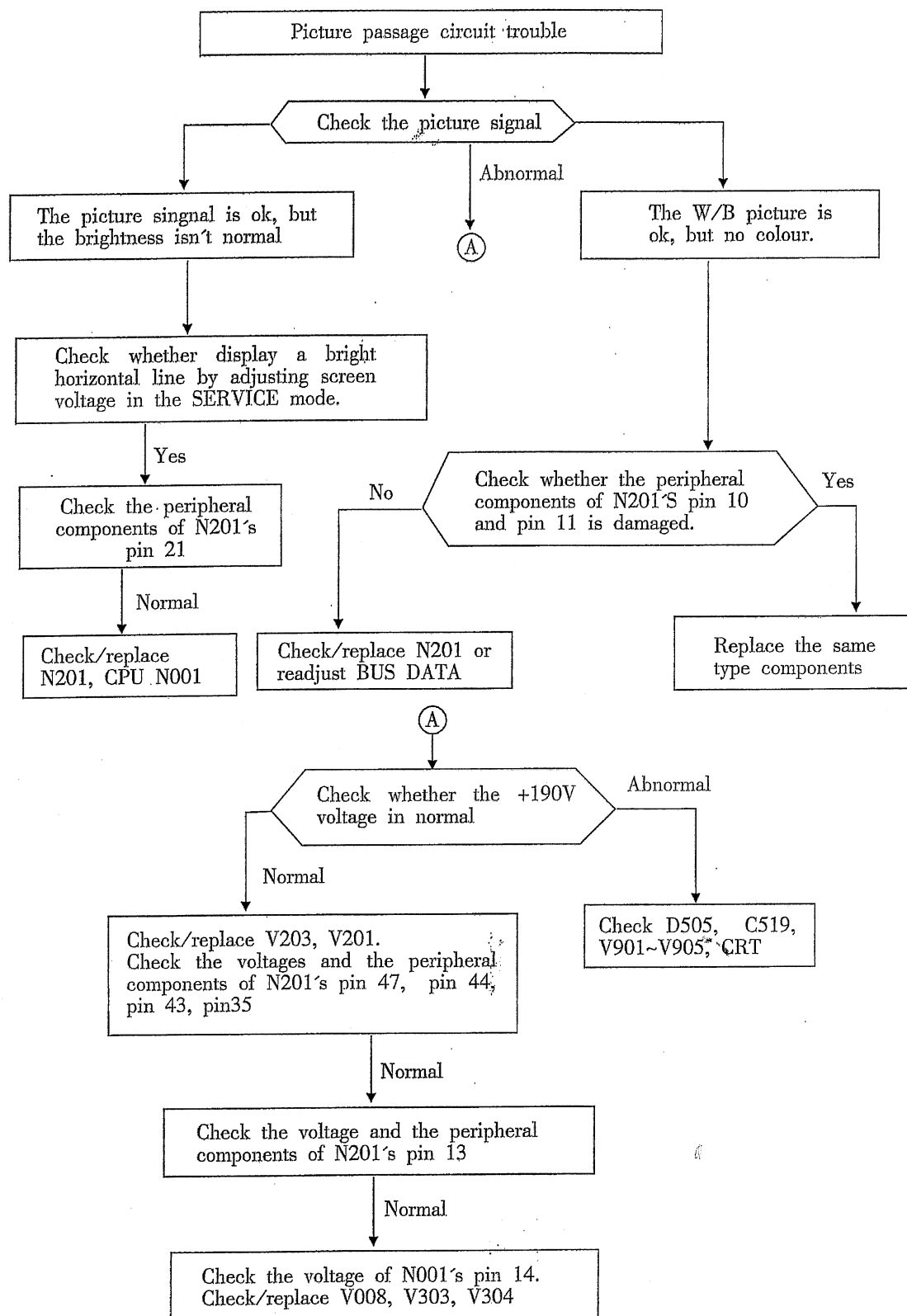
## POWER SUPPLY CIRCUIT TROUBLESHOOTING



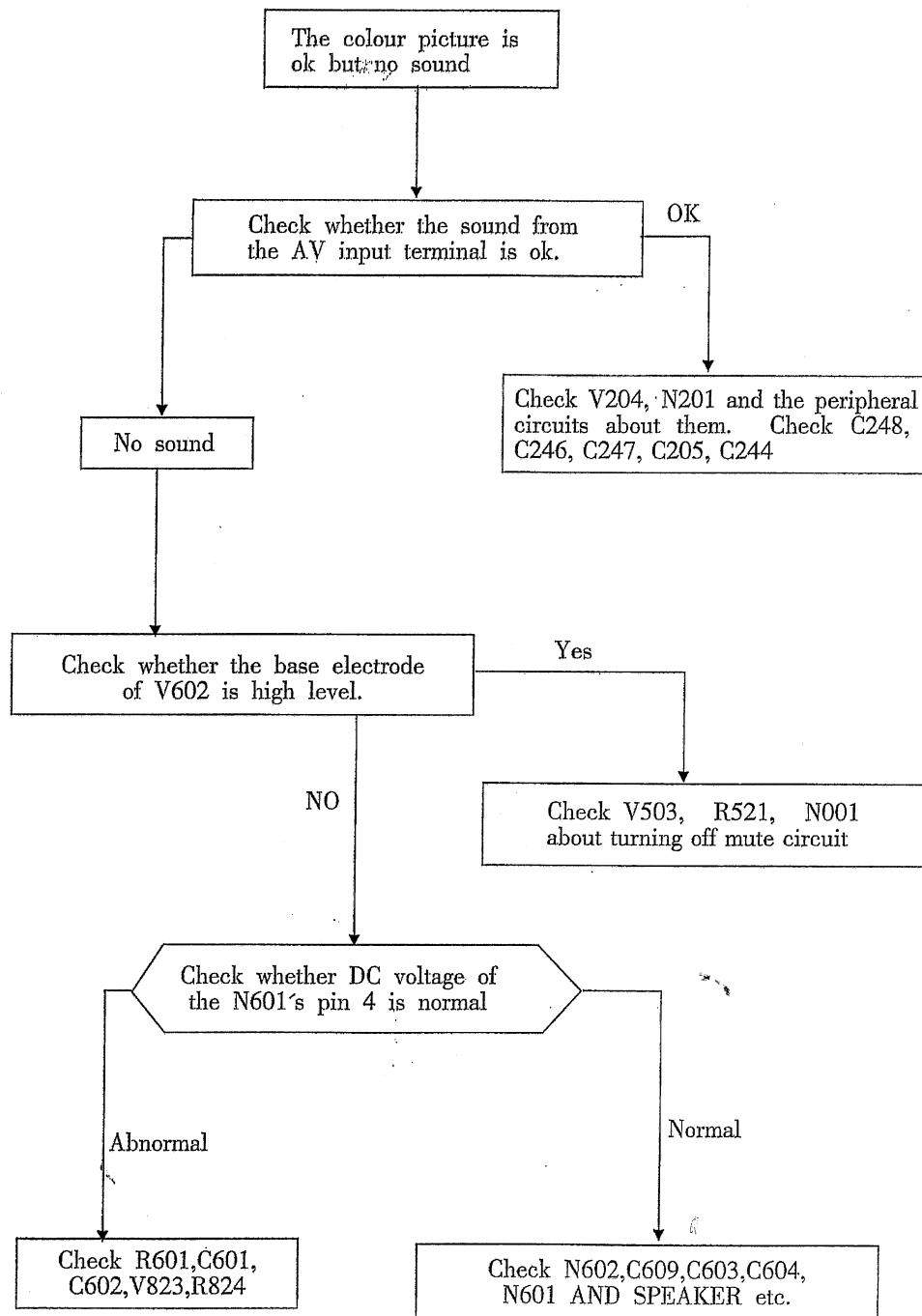
## REMOTE CONTROL SYSTEM CIRCUIT TROUBLESHOOTING



# PICTURE SIGNAL PROCESSING PASSAGE CIRCUIT TROUBLESHOOTING

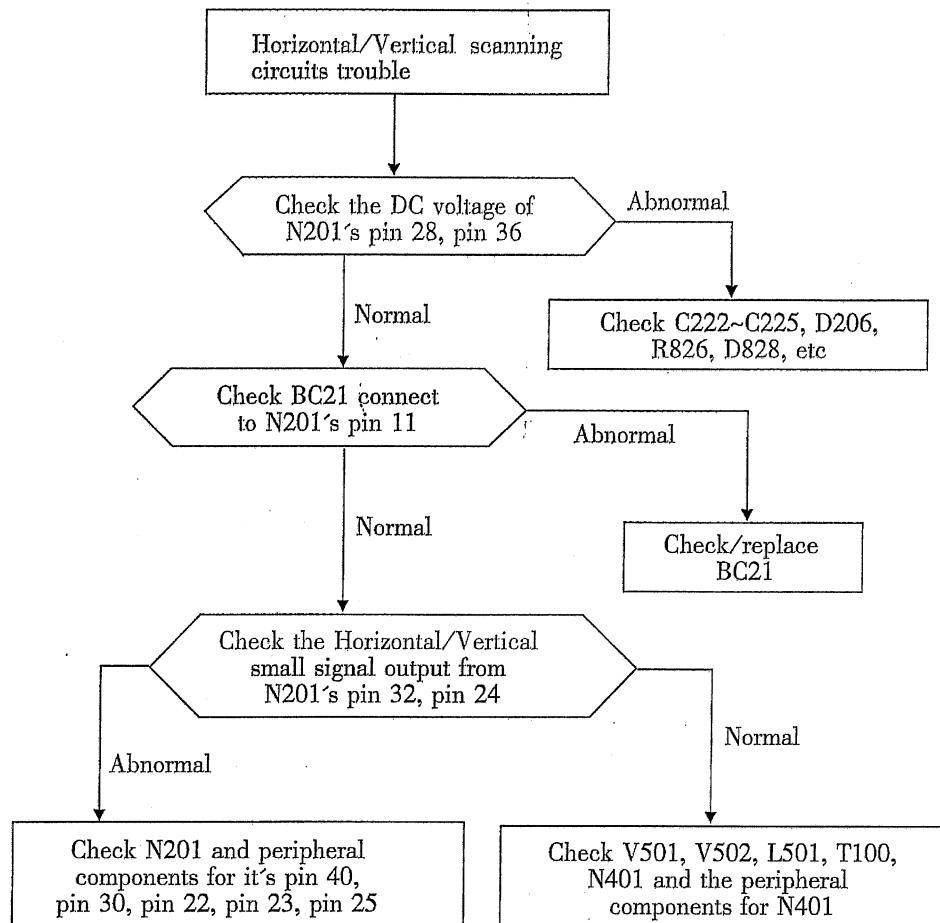


## SOUND SIGNAL PROCESSING PASSAGE CIRCUIT TROUBLESHOOTING





## HORIZONTAL/FRAME SCANNING CIRCUITS TROUBLESHOOTING



## MAIN ICS DESCRIPTION AND REPAIR DATA OFFERING

### 1. INTRODUCTION FOR IC TB1238AN (N201)

TB1238AN is a PAL/NTSC system color TV specific monolithic IC currently developed by Toshiba Co., which is controlled by Inter IC Bus. TB1238AN includes a picture IF processing circuit, a sound IF processing circuit, PLL video detection circuit, PLL sound frequency discrimination circuit, a luminance signal processing circuit, PAL/NTSC chro-ma signal processing circuit and RGB signal processing circuit. TV/AV switching circuit and Horizontal/Vertical scanning small signal processing circuit etc.

Figure 7 shows the inner structure block diagram of TB1238AN.  
The pin functions and repair data of TB1238AN is listed in the Table 3.

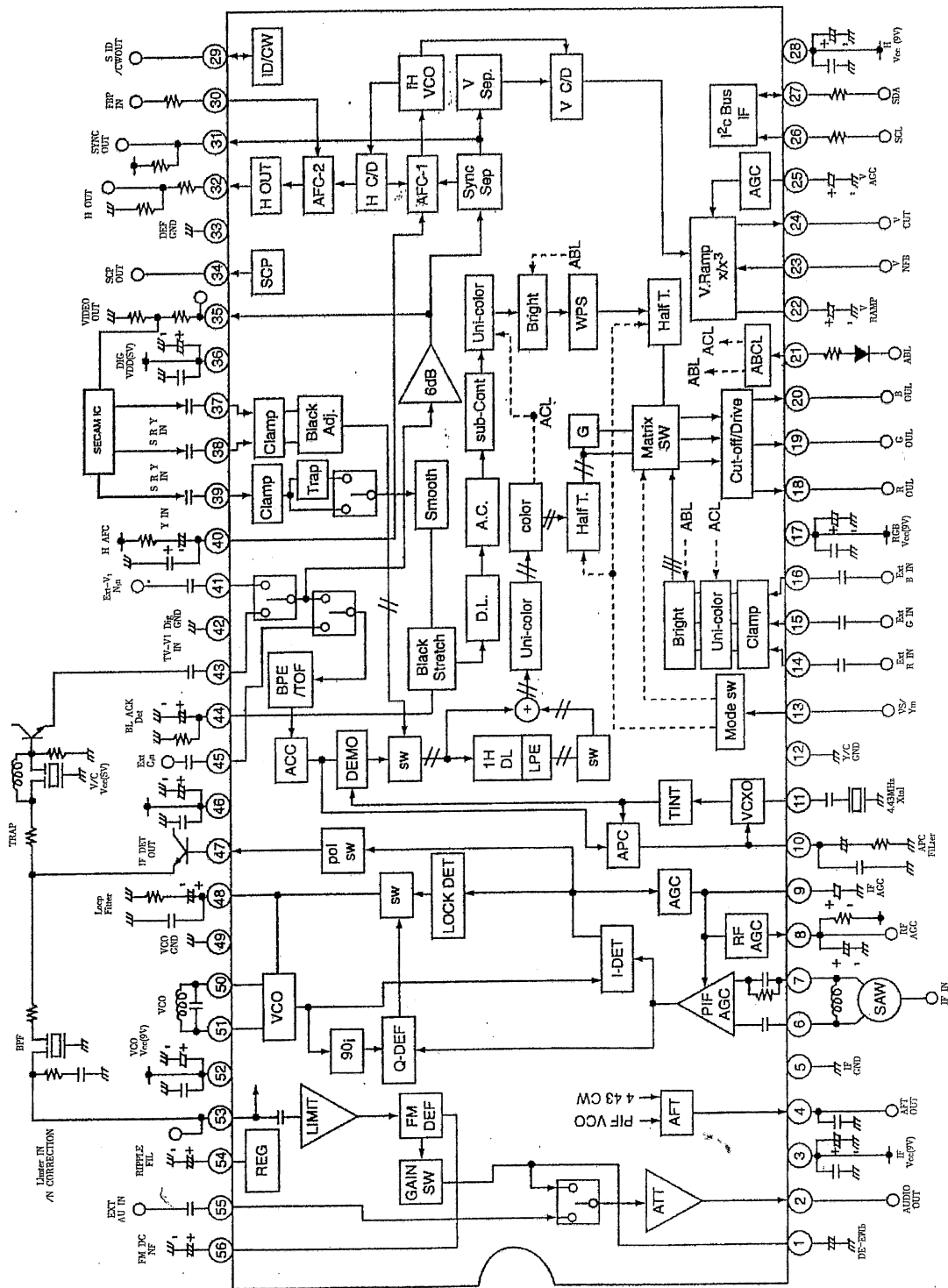


Figure7:TB1238AN inner structure block diagram

Table 3 Pin functions and repair data of TB1238AN

Pin	Symbol	Function	Index type multimeter (r=20k $\Omega$ )			
			'Quiescent state (V)	Dynamic state (V)	Resistance for GND (R $\times$ 1K)	
					Red pen measure	Black pen measure
1	DE-EMP	Audio deemphasis capacitor connect pin	5	4.9	7.2	9.0
2	AUDIO OUT	Audio signal output	3.5	3.4	6.5	7.3
3	IF VCC	+9V supply input for IF amplify circuit	9	9	0.8	0.8
4	AFT OUT	AFT voltage output	2	1.7	6.2	8.3
5	IF GND	Ground for IF amplifier circuit	0	0	0	0
6	IF IN	IF signal input	0.20	0	6.8	11.2
7	IF IN	IF signal input	1.4	1.4	6.8	11.2
8	RF AGC	RF amplifier AGC control voltage output	7.2	5.6	7	10
9	IF AGC	IF amplifier AGC filter	6	4.4	7.2	11.2
10	APC FILTER	APC filtering	1.8	1.8	10	11.2
11	4.43MHZXTA	4.43MHZ crystal oscillating	2.2	2.2	7.4	120
12	Y/C GND	Ground (Y/C signal processor)	0	0	0	0
13	YS/YM	Y-switch signal input	0	0	1	2
14	EXT R IN	Character R signal input	0.9	0.9	7.2	11.2
15	EXT G IN	Character G signal input	0.9	0.9	7.2	11.2
16	EXT B IN	Character B signal input	0.9	0.9	7.2	11.2
17	RGB VCC	Supply input (RGB)	9	9	0.8	0.9
18	R OUT	R output	2.1	2.4	7	10
19	G OUT	G output	2	2.4	6.8	10
20	B OUT	B output	2.2	2.5	6.8	10
21	ABCL	automatic brightness, contrast control	5.3	5.4	7.4	11
22	V Ramp	vertical Ramp generator capacitor connect pin	5.4	4.4	7	11
23	V NFB	V NFB input	5	5	7	9.3
24	V OUT	vertical pulse signal output	1	1	1	1
25	V AGC	V AGC filter capacitor connect pin	0.2	0.3	7.2	18
26	SCL	(I2C) clock line	3.8	3.8	6	18.1

28	H VCC	Horizontal deflection supply input (+9V)	9.6	9.6	4	18.3
29	SID/CW OUT	SECAM identification/CW signal output	1.8	3.8	7.2	11.2
30	FBP IN	Horizontal flyback pulse input	4	4.8	6	11
31	SYNC OUT	SYNC pulse output	4	4.8	6	4
32	H VCC	Horizontal excitation output	2	2	0.8	1
33	DEF GND	Ground (detection circuit)	0	0	0	0
34	FBP IN	Sandcastle pulse output	1.5	1.4	7.2	11
35	VIDEO OUT	Video signal output	2.8	3	2	2.5
36	DIG. VD	Digital circuit Supply	5.3	5.3	4	5.9
37	S R-Y IN	SESECAM R-Y signal input CAM B-Y signal input	2.6	2.7	7.2	11
38	S B-Y IN	SECAM R-Y signal input	2.6	2.6	7.2	11
39	Y IN	Luminance signal input	1.1	1.1	7.2	12
40	H AFC	Connecting RC network for horizontal AFC filter	6.8	6.8	7.2	18.5
41	EXT.VIDEO/Y IN	External video/luminance signal input	1.6	1.6	7.2	11
42	DIG. GND	Digital circuit ground	0	0	0	0
43	TV.VIDEO IN	TV. Video signal input	2.8	3.2	7.2	11
44	BLACK DET	Black level detecting filter	3.2	2.4	7.2	12
45	EXT.CIN	External chroma signal input	2.9	2.9	7.2	11.5
46	Y/C VCC	+5V supply input (Y/C processing system)	5.2	5.2	1.6	2
47	IF DETOUT	IF video detected output	4.6	3.7	1	1.3
48	LOOP Filter	Connecting RC filter network for phase loop circuit	4	4.8	7.2	11
49	VCO GND	Ground (IF VCO circuit)	0	0	0	0
50	VCO	Voltage control oscillating coil connecting pin	8.1	8	1	0.7
51	VCO	Voltage control oscillating coil connecting pin	8	8	1	0.7
52	VCO VCC	+9V supply input (IF VCO circuit)	9	9	0.8	0.6
53	Limiter IN	Sound IF signal input	3.9	3.8	7.2	11
54	RIPPLE FILTER	Ripple filter circuit	5.8	4.8	7.2	10
55	EXT AUDIO	External audio signal input	3.4	3.4	7.2	11
56	FM DEC NF	FM direct current negative feedback filter capacitor connecting pin	necting pin	3.8	3.7	7

## 2. INTRODUCTION FOR CPU IC TMP87CM38N-3673 (N001)

The pin functions and repair data of TMP87CM38N-3673 is listed in the table 4.

**Table 4 Pin functions and repair data of TMP87CM38N-3673**

Pin	Symbol	Function	Index type multimeter (r=20k $\Omega$ )			
			Quiescent state (v)	Dynamic state (v)	Resistance for GND (Rx1K)	
					Red pen measure	Black pen measure
1	Vss	Ground	0	0	0	0
2	VT	Tuning voltage output PWM phase-reversed wave.	1	0.1	6	19
3	KARA-ENA	NC	0	0	6	21.5
4	MUTE	Sound mute signal output, high level=Mute	4.9	0	6	21.5
5	EXT-MUTE	NC	0	0	6	13.5
6	S.ID	NC	0	0	6	23.5
7	POWER	Supply on/off control signal output, high level = off, low level = on	4.9	0	6	21.5
8	KARA-CLK	NC	0	0	6	23.5
9	BAND1	Tuner band switching control signal output	4.9	5	6	16.7
10	BAND2	Tuner band switching control signal output	0	0	6	14
11	SCL1	Inter IC Bus clock line	4.3	4.3	5.8	21.3
12	SDA1	Inter IC Bus data line 1	4.5	4.5	5.6	21.3
13	AFC IN	Automatic frequency control input	0	1.8	6	10
14	AV0	AV switch control signal O output	0	4	6	18
15	EXT G IN	NC	0	0	0	0
16	EXT B IN	Keypad analog voltage input 1	4.2	4.2	6	21.5
17	RGB VCC	Keypad analog voltage input 2	4.2	9	6	24.8
18	R OUT	Supply protect checkout signal input, low level= protect	1.8	4.9	6	24.8
19	G OUT	NC	0	0	6.4	28
20	B OUT	BUS on/off control output	4	3.9	6	21.5
21	ABCL	Ground	0	0	0	0
22	R OUT	OSD character It output	4.4	0	1.4	1.3
23	G OUT	OSD character G output	4.5	0	1.4	1.3
24	B OUT	OSD character B output	4.5	0	1.4	1.3
25	Y OUT	Character window signal/fast blanking signal for OSD	4.5	0	2	2

26	HD	Horizontal flyback for OSD	0	3.8	5.8	19
27	VD	Vertical sync pulse for OSD	4.9	4.7	5.6	14.8
28	OSC1	OSD character oscillator pin 1	4.8	4.9	5.6	23.8
29	OSC2	OSD character oscillator pin 2	4.8	4.9	5.6	24
30	TEST	Test pin	0	0	0	0
31	XIN	10MHZ clock oscillation input	1.5	0.5	6.2	24.3
32	XOUT	10MHZ clock oscillation output	2.2	2.2	4.8	24.3
33	RESET	CPU reset pin	5	5	5.4	5
34	OPTION	Option pin	4.9	4.6	6	14.5
35	RMT IN	Remote control instructions input	3.5	3.4	6	24
36	H. SYNC	Picture identification signal input	1	4.5	6	15
37	SCL0	Inter IC Bus clock line0	4.7	0	6	23
38	SDA0	Inter IC Bus data line 0	4.7	4.8	6	23
39	KARA	ON/OFF NC	0	0	6	24
40	SYS0	Sound system switch control	0	0	6	11.3
41	SYS1	Sound system switch control	1.2	4	6	11.3
42	VDD	+5V supply input	5	5	6	8.3

### 3. Repair data for IC TDA7057AQ(N601)

TDA7057AQ is the audio power amplifier OF CN-9, the pin functions and repair data of it is listed in the table 5.

Table 5 Pin functions and repair data of TDA7057AQ

Pin	Symbol	Function	Index type multimeter (r=20k $\Omega$ )			
			Quiescent state (v)	Dynamic state (v)	Resistance for GND (Rx1K)	
					Red pen measure	Black pen measure
1	VC1	Control pin for direct current volume	0.96	0.96	13.5	6.2
2	N.C.	No connected	0	0	$\square$	$\square$
3	VI(1)	Audio signal input 1	2.38	2.38	18.7	6.4
4	Vp	Supply input pin	15	15	12.8	3.9
5	VI(2)	Audio signal input 2	2.38	2.38	$\square$	6.4
6	S-GND	Signal ground	0	0	0	0
7	VC2	Control pin for direct current volume	0.98	0.98	16.8	6.2
8	OUT2+	Audio signal output 2+	7.0	7.0	12.8	5.4
9	PGND2	Ground 2(supply circuit)	0	0	0	0
10	OUT2-	Audio signal output 2-	7.0	7.0	12.8	5.4
11	OUT1-	Audio signal output 1-	7.0	7.0	12.8	5.4
12	PGND1	Ground 1(supply circuit)	0	0	0	0
13	OUT1+	Audio signal output 1+	7.0	7.0	12.8	5.4

### 4. Repair data for IC LA7910(N101)

LA7910 is the band decoder of CN-9, the pin functions and repair data of it is listed in the table 6.

Table 6 Pin functions and repair data of LA7910

Pin	Symbol	Function	Index type multimeter (r=20k $\Omega$ )			
			Quiescent state (v)	Dynamic state (v)	Resistance for GND (Rx1K)	
					Red pen measure	Black pen measure
1	OUT1	Decoder output	0	0	2.1	2.1
2	OUT2	Decoder output 2	0	0	2.1	2.1
3	BD1	Band control level input 1	5	0	39	11
4	BD2	Band control level input 2	0	0	22	10
5	GND	Connect to ground	0	0	0	0
6	VC2	+33V supply input pin	33	13.5	5.8	25.5
7	OUT3	Decoder output 3	0	12	1.6	1.5
8	OUT4	Decoder output 4	0	0	0	12
9	VC1	+12V supply input pin	12	12	4.1	4.5



## 5. Repair data for IC TA8403(N401)

TA8403 is the vertical output power amplifier IC of CN-9, the pin functions and repair data of it is listed in the table 7.

**Table 7 Pin functions and repair data of TA8403**

Pin	Symbol	Function	Index type multimeter (r=20k $\Omega$ )			
			Quiescent state (v)	Dynamic state (v)	Resistance for GND (Rx1K)	
					Red pen measure	Black pen measure
1	GND	Connect to ground	0	0	0	0
2	OUT	Field pulse output	15	15	4	9.5
3		Pump power supply input	24.5	24.5	4.4	2
4	IN	V saw tooth pulse input	1	1.1	2.2	2.2
5		Connect to Phase compensate capacitance	0.8	0.8	3.6	9.0
6	Vcc	Power supply pin	24.5	24.5	3.5	7.3
7		Pump power supply output	1.2	1.2	5.5	11

## 6. Repair data for IC AT24C08(N002)

AT24C08 is the Memory of CN-9, the pin functions and repair data of it is listed in the table 8.

**Table 8 Pin functions and repair data of AT24C08**

Pin	Symbol	Function	Index type multimeter (r=20k $\Omega$ )			
			Quiescent state (v)	Dynamic state (v)	Resistance for GND (Rx1K)	
					Red pen measure	Black pen measure
1	A0	A0 address pin	0	0	0	0
2	A1	A1 address pin	0	0	0	0
3	A2	A2 address pin	0	0	0	0
4	VSS	Connect to ground	0	0	0	0
5	SDA	Inter IC Bus data line	4.5	4.5	5.6	22
6	SCL	Inter IC Bus clock line	4.3	4.3	5.8	22
7	TEST	Test terminal	0	0	0	0
8	YDD	+5V supply input	5	5	3.6	8.5

## 7. Voltage data of pin for main audion

Position Pin	V00	V10	V20	V20	V20	V20	V30	V30	V30	V30	V50	V50
Ub(v)	0.4	1.8	1.2	4.4	1.9	3.2	4.9	0	2.5	-2.5	0.3	2.1
Uc(v)	3.5	11.5	0	6.6	0	6.6	11.5	11.5	11.5	8.4	15.2	125
Ue(v)	0	1.1	1.9	3.6	2.5	2.9	4.2	4.2	1.8	0	0	2.15

Position Pin	V5.03	V602	VS01	V802	V803	V804	V805	V806	V901	V902	V903	V904	V905
Ub(v)	15.2	0.6	5.6	11.5	-0.5	-0.4	0	6.3	1.4	1.4	0	0	0.4
Uc(v)	4.5	0	15	-0.5	-0.4	290	36.5	36.5	110	110	120	4.3	0
Ue(v)	15	0	5	11.5	0	0	0	6.1	1.1	1.1	1.1	0.1	0.7

## SPARE PARTS LIST OF 21BS32EA

### Main-board/AV-board/K-board

Location No.	Part No.	Name	Description
R112	51113470JU0	carbon film resistor	0.166W 47J
R307	51113470JU0	carbon film resistor	0.166W 47J
R116	51113560JU0	carbon film resistor	0.166W 56 J
R115	51113680JU0	carbon film resistor	0.166W 68 J
R080	51113101JU0	carbon film resistor	0.166W 100J
R081	51113101JU0	carbon film resistor	0.166W 100J
R229	51113101JU0	carbon film resistor	0.166W 100J
R301	51113101JU0	carbon film resistor	0.166W 100J
W275	51113101JU0	carbon film resistor	0.166W 100J
R230	51113221JU0	carbon film resistor	0.166W 220J
R231	51113221JU0	carbon film resistor	0.166W 220J
R232	51113221JU0	carbon film resistor	0.166W 220J
R241	51113221JU0	carbon film resistor	0.166W 220J
R242	51113221JU0	carbon film resistor	0.166W 220J
R244	51113221JU0	carbon film resistor	0.166W 220J
R038	51113391JU0	carbon film resistor	0.166W 390J
R040	51113391JU0	carbon film resistor	0.166W 390J
R042	51113391JU0	carbon film resistor	0.166W 390J
R226	51113471JU0	carbon film resistor	0.166W 470J
R217	51113561JU0	carbon film resistor	0.166W 560J
R114	51113681JU0	carbon film resistor	0.166W 680J
R001	51113102JU0	carbon film resistor	0.166W 1KJ
R037	51113102JU0	carbon film resistor	0.166W 1KJ
R039	51113102JU0	carbon film resistor	0.166W 1KJ
R041	51113102JU0	carbon film resistor	0.166W 1KJ
R043	51113102JU0	carbon film resistor	0.166W 1KJ
R044	51113102JU0	carbon film resistor	0.166W 1KJ
R050	51113102J20	carbon film resistor	0.166W 1KJ
R057	51113102JU0	carbon film resistor	0.166W 1KJ
R058	51113102JU0	carbon film resistor	0.166W 1KJ
R219	51113102JU0	carbon film resistor	0.166W 1KJ
R220	51113102JU0	carbon film resistor	0.166W 1KJ
R225	51113102JU0	carbon film resistor	0.166W 1KJ
R240	51113102JU0	carbon film resistor	0.166W 1KJ
R306	51113102JU0	carbon film resistor	0.166W 1KJ
R111	51113122JU0	carbon film resistor	0.166W 1.2KJ
R113	51113122JU0	carbon film resistor	0.166W 1.2KJ
R216	51113272JU0	carbon film resistor	0.166W 2.7KJ
R104	51113682JU0	carbon film resistor	0.166W 6.8KJ
R010	51113472JU0	carbon film resistor	0.166W 4.7KJ
R062	51113472JU0	carbon film resistor	0.166W 4.7KJ

**Main-board/AV-board/K-board**

<b>Location No.</b>	<b>Part No.</b>	<b>Name</b>	<b>Description</b>
R048A	51113472JU0	carbon film resistor	0.166W 4.7KJ
R025	51113472JU0	carbon film resistor	0.166W 4.7KJ
R028	51113472JU0	carbon film resistor	0.166W 4.7KJ
R009	51113822JU0	carbon film resistor	0.166W 8.2KJ
R012	51113103JU0	carbon film resistor	0.166W 10KJ
R013	51113103JU0	carbon film resistor	0.166W 10KJ
R018	51113103JU0	carbon film resistor	0.166W 10KJ
R019	51113103JU0	carbon film resistor	0.166W 10KJ
R082	51113103JU0	carbon film resistor	0.166W 10KJ
R201	51113103JU0	carbon film resistor	0.166W 10KJ
R238	51153103JU0	carbon film resistor	0.166W 10KJ
R239	51153103JU0	carbon film resistor	0.166W 10KJ
W102	51153103JU0	carbon film resistor	0.166W 10KJ
RV01	51113103J20	carbon film resistor	0.166W 10KJ
R221	51113123JU0	carbon film resistor	0.166W 12IG
R002	51113223JU0	carbon film resistor	0.166W 22KJ
R607A	51113473JU0	carbon film resistor	0.166W 47KJ
R027	51113333JU0	carbon film resistor	0.166W 33KJ
R048	51113333JU0	carbon film resistor	0.166W 33KJ
R203	51113333JU0	carbon film resistor	0.166W 33KJ
R607	51113393JU0	carbon film resistor	0.166W 39KJ
R107	51113623JU0	carbon film resistor	0.166W 62KJ
R014	51113683JU0	carbon film resistor	0.166W 68KJ
RV02	51113683JU0	carbon film resistor	0.166W 68KJ
R209	51113104JU0	carbon film resistor	0.166W 100KJ
R222	51113224JU0	carbon film resistor	0.166W 220KJ
R070	51113474JU0	carbon film resistor	0.166W 470KJ
R071	51113474JU0	carbon film resistor	0.166W 470KJ
R072	51113474JU0	carbon film resistor	0.166W 470KJ
R227	51113225JU0	carbon film resistor	0.166W 2.2MJ
R223	51113275JU0	carbon film resistor	0.166W 2.7MJ
R611	511242*2JU0	carbon film resistor	0.25W 2.2J
R109	51124100JU0	carbon film resistor	0.25W 10J
R808	51124220JU0	carbon film resistor	0.25W 22J
R305	51194750JU0	carbon film resistor	0.25W 75J
R245	51124101JU0	carbon film resistor	0.25W 100J
R503	51124101JU0	carbon film resistor	0.25W 100J
R501B	51124151JU0	carbon film resistor	0.25W 150J
R053	51124331JU0	carbon film resistor	0.25W 330J
R055	51124331JU0	carbon film resistor	0.25W 330J
R059	51124471JU0	carbon film resistor	0.25W 470J
R236	51124471JU0	carbon film resistor	0.25W 470J
R815	51124471JU0	carbon film resistor	0.25W 470J

**Main-board/AV-board/K-board**

<b>Location No.</b>	<b>Part No.</b>	<b>Name</b>	<b>Description</b>
R988	51124681JU0	carbon film resistor	0.25W 680J
R036	51124102JU0	carbon film resistor	0.25W 1KJ
R045	51124102JU0	carbon film resistor	0.25W 1KJ
R403	51124102JU0	carbon film resistor	0.25W 1KJ
R411	51124102JU0	carbon film resistor	0.25W 1KJ
R610	51124102JU0	carbon film resistor	0.25W 1KJ
W205	51124102JU0	carbon film resistor	0.25W 1KJ
R008	51124152JU0	carbon film resistor	0.25W 1.5KJ
R811	51124182JU0	carbon film resistor	0.25W 1.8KJ
R224	51124222JU0	carbon film resistor	0.25W 2.2KJ
R302	51124222JU0	carbon film resistor	0.25W 2.2KJ
R813	51124272JU0	carbon film resistor	0.25W 2.7KJ
R103	51124392JU0	carbon film resistor	0.25W 3.9KJ
R820	51124512JU0	carbon film resistor	0.25W 5.1KJ
R603	51124512JU0	carbon film resistor	0.25W 5.1KJ
R110	51124562JU0	carbon film resistor	0.25W 5.6KJ
R809	51124562JU0	carbon film resistor	0.25W 5.6KJ
R105	51124562JU0	carbon film resistor	0.25W 5.6KJ
R051	51124822JU0	carbon film resistor	0.25W 8.2KJ
R047	51124103JU0	carbon film resistor	0.25W 10KJ
R054	51124103JU0	carbon film resistor	0.25W 10KJ
R056	51124103JU0	carbon film resistor	0.25W 10KJ
R060	51124103JU0	carbon film resistor	0.25W 10KJ
R102	51124103JU0	carbon film resistor	0.25W 10KJ
R310	51124103JU0	carbon film resistor	0.25W 10KJ
R511	51124103JU0	carbon film resistor	0.25W 10KJ
R515	51124103JU0	carbon film resistor	0.25W 10KJ
R521	51124103JU0	carbon film resistor	0.25W 10KJ
R810	51124103JU0	carbon film resistor	0.25W 10KJ
R004	51124123JU0	carbon film resistor	0.25W 12KJ
R806	51124153JU0	carbon film resistor	0.25W 15KJ
R409	51124183JU0	carbon film resistor	0.25W 18KJ
R924	51124183J20	carbon film resistor	0.25W 18KJ
R935	51124183J20	carbon film resistor	0.25W 18KJ
R005	51124223JU0	carbon film resistor	0.25W 22KJ
R101	51124223JU0	carbon film resistor	0.25W 22KJ
R812	51124223JU0	carbon film resistor	0.25W 22KJ
R822	51124223JU0	carbon film resistor	0.25W 22KJ
R602	51124273JU0	carbon film resistor	0.25W 27KJ
R406	51124303JU0	carbon film resistor	0.25W 30KJ
R007	51124333JU0	carbon film resistor	0.25W 33KJ
R026	51124333JU0	carbon film resistor	0.25W 33KJ
R816	51124473JU0	carbon film resistor	0.25W 47KJ

**Main-board/AV-board/K-board**

<b>Location No.</b>	<b>Part No.</b>	<b>Name</b>	<b>Description</b>
R817	51124473JU0	carbon film resistor	0.25W 47KJ
R818	51124513JU0	carbon film resistor	0.25W 51KJ
R819	51124513JU0	carbon film resistor	0.25W 51KJ
R510	51124563JU0	carbon film resistor	0.25W 56KJ
R933	51124623JU0	carbon film resistor	0.25W 62KJ
R936	51124623JU0	carbon film resistor	0.25W 62KJ
R404	51124683JU0	carbon film resistor	0.25W 68KJ
R405	51124683JU0	carbon film resistor	0.25W 68KJ
R402	51124124JU0	carbon film resistor	0.25W 120KJ
R509	51124124JU0	carbon film resistor	0.25W 120KJ
R821	51124154JU0	carbon film resistor	0.25W 150KJ
R108	51124184JU0	carbon film resistor	0.25W 180KJ
R520	51124224JU0	carbon film resistor	0.25W 220KJ
R505	51135102J50	carbon film resistor	0.5W 1KJ
R823	51135473J50	carbon film resistor	0.5W 47KJ
R212	51315121JH0	Metal oxide film resistor	0.5W 120J
R410B	51315222JH0	Metal oxide film resistor	0.5W 2.2KJ
R512	51315472JH0	Metal oxide film resistor	0.5W 4.7KJ
R407	513161*5JK0	Metal oxide film resistor	1W 1.5J
R601	513162*2JK0	Metal oxide film resistor	1W 2.2J
R408	51316241JK0	Metal oxide film resistor	1W 240J
R518	51316102JK0	Metal oxide film resistor	1W 1KJ
R802	51316102JK0	Metal oxide film resistor	1W 1KJ
R814	51317680JM0	Metal oxide film resistor	2W 68J
R826	51317181JK0	Metal oxide film resistor	2W 180J
R504	51317391JL0	Metal oxide film resistor	2W 390J
R519	51317102JL0	Metal oxide film resistor	2W 1KJ
R830	51317682JM0	Metal oxide film resistor	2W 6.8KJ
R827	51317223JM0	Metal oxide film resistor	2W 22KJ
R807	51318470JM0	Metal oxide film resistor	3W 47J
R804	51615124K30	Solid resistor	0.5W 120KJ
R805	51615124K30	Solid resistor	0.5W 120KJ
R803	5144G3*9K00	Wire-wound resistor	5W 3.9K
R502	5144G8*2K00	Wire-wound resistor	6W 8.2K
R507	51515*82J40	Fuse resistor	0.5W 0.82J
R825	51515*82J40	Fuse resistor	0.5W 0.82J
R824	51516010J70	Fuse resistor	1W 1J
R513	51526010J70	Fuse resistor	1W 1J
RV801	51J1B202A00	Glass glaze film resistor	0.125W 2KJ
RT802	51C20120M00	Thermistor	12M
C211	5251C120JV0	Ceramic capacitor	63V 12PFJ
CC01	5251C180JV0	Ceramic capacitor	63V 18PFJ
C111	5251C300JV0	Ceramic capacitor	63V 30PFJ

**Main-board/AV-board/K-board**

<b>Location No.</b>	<b>Part No.</b>	<b>Name</b>	<b>Description</b>
C018	5251C300JV0	Ceramic capacitor	63V 30PFJ
C019	5251C300JV0	Ceramic capacitor	63V 30PFJ
C114	5251C470JV0	Ceramic capacitor	63V 47PFJ
C246	5251C470JV0	Ceramic capacitor	63V 47PFJ
C247	5251C470JV0	Ceramic capacitor	63V 47PFJ
C110	5251C820JV0	Ceramic capacitor	63V 82PFJ
C022	5251C101JV0	Ceramic capacitor	63V 100PFJ
C080	5251C101JV0	Ceramic capacitor	63V 100PFJ
C081	5251C101JV0	Ceramic capacitor	63V 100PFJ
C109	5251C101JV0	Ceramic capacitor	63V 100PFJ
C002	5251C221JV0	Ceramic capacitor	63V 220PFJ
C001	5251S331JV0	Ceramic capacitor	63V 330PFJ
C514	52532471KV0	Ceramic capacitor	63V 470PFK
C530	52532471KV0	Ceramic capacitor	63V 470PFK
C112	52532102KV0	Ceramic capacitor	63V 1000PFK
C113	52532102KV0	Ceramic capacitor	63V 1000PFK
C116	52532102KV0	Ceramic capacitor	63V 1000PFK
C204	52532102KV0	Ceramic capacitor	63V 1000PFK
C220	52532102KV0	Ceramic capacitor	63V 1000PFK
C236	52532102KV0	Ceramic capacitor	63V 1000PFK
C404	52532102KV0	Ceramic capacitor	63V 1000PFK
C115	52532152KV0	Ceramic capacitor	63V 1500PFK
C201	52532152KV0	Ceramic capacitor	63V 1500PFK
C210	52532222KV0	Ceramic capacitor	63V 2200PFK
C518	52532472K11	Ceramic capacitor	63V 4700PFK
C604	52532472K11	Ceramic capacitor	63V 4700PFK
C021	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C026	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C028	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C202	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C207	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C212	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C213	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C214	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C215	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C218	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C223	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C225	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C233	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C242	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C248	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C509	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C511	5253F103ZV0	Ceramic capacitor	63V 10nFZ

**Main-board/AV-board/K-board**

Location No.	Part No.	Name	Description
C602	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C829	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C805	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C238	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C237	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C306B	5253F103ZV0	Ceramic capacitor	63V 10nFZ
C108	5253F223Z10	Ceramic capacitor	63V 0.022µFZ
C251	5253F223Z10	Ceramic capacitor	63V 0.022µFZ
C507	52542221K10	Ceramic capacitor	500V 220PFFK
C402	52542391K10	Ceramic capacitor	500V 390PFFK
C824	52542471K10	Ceramic capacitor	500V 470PFFK
C826	52542471K10	Ceramic capacitor	500V 470PFFK
C501	52542102K10	Ceramic capacitor	500V 1000PFFK
C503	52542392K20	Ceramic capacitor	500V 3900PFFK
C808	52582102M30	Ceramic capacitor	1KV 1000PFM
C809	52582102M30	Ceramic capacitor	1KV 1000PFM
C810	52582102M30	Ceramic capacitor	1KV 1000PFM
C811	52582102M30	Ceramic capacitor	1KV 1000PFM
C813	52582102M30	Ceramic capacitor	1KV 1000PFM
C821	52592471K20	Ceramic capacitor	2KV 470PFFK
C819	52592681K30	Ceramic capacitor	2KV 680PFFK
C505	52592812K30	Ceramic capacitor	2KV 820PFFK
C820	525RP471K9Y	Ceramic capacitor	400VAC 470PFFK
C820	52572471K90	Ceramic capacitor	400VAC 470PFFK
C814	525RP471K9Y	Ceramic capacitor	400VAC 470PFFK
C814	52572471K90	Ceramic capacitor	400VAC 470PFFK
C228	52367472J10	Mylar capacitor	50V 4700PFJ
C815	52367472J10	Mylar capacitor	50V 4700PFJ
C818	52367153J10	Mylar capacitor	50V 0.015µFJ
C403	52367563J10	Mylar capacitor	50V 0.056µFJ
C003	52367104J10	Mylar capacitor	50V 0.1µFJ
C118	52367104J10	Mylar capacitor	50V 0.1µFJ
C226	52367104J10	Mylar capacitor	50V 0.1µFJ
C229	52367104J10	Mylar capacitor	50V 0.1µFJ
C230	52367d04J10	Mylar capacitor	50V 0.1µFJ
C235	52367104J10	Mylar capacitor	50V 0.1µFJ
C607	52367104J10	Mylar capacitor	50V 0.1µFJ
C609	52367104J10	Mylar capacitor	50V 0.1µFJ
C816	52367104J10	Mylar capacitor	50V 0.1µFJ
CT01	52367104J10	Mylar capacitor	50V 0.1µFJ
C523	52367474J10	Mylar capacitor	50V 0.47µFJ
C209	52367474J10	Mylar capacitor	50V 0.47µFJ
C221	52367474J10	Mylar capacitor	50V 0.47µFJ



**Main-board/AV-board/K-board**

<b>Location No.</b>	<b>Part No.</b>	<b>Name</b>	<b>Description</b>
C520	5236C104J10	Mylar capacitor	250V 0.1i FJ
C817	52337183J10	Mylar capacitor	50V 0.018i FJ
C409	52329473J10	Mylar capacitor	100V 0.047i FJ
C801	5246Q104M50	Polypropylene capacitor	250VAC 0.1i FM
C802	5246Q104M50	Polypropylene capacitor	250VAC 0.1i FM
C512	5241D394JC0	Polypropylene capacitor	400V 0.39i FJ
C504	5248K912JB0	Polypropylene capacitor	1.6KV 9100PFJ
C008	52613100MV0	Aluminum electrolytic capacitor	16V 10i FM
C010	52613100MV0	Aluminum electrolytic capacitor	16V 10i FM
C025	52613100MV0	Aluminum electrolytic capacitor	16V 10i FM
CC01	52613100MV0	Aluminum electrolytic capacitor	16V 10i FM
C205	52613100MV0	Aluminum electrolytic capacitor	16V 10i FM
C217	52613100MV0	Aluminum electrolytic capacitor	16V 10i FM
C241	52613100MV0	Aluminum electrolytic capacitor	16V 10i FM
C243	52613100MV0	Aluminum electrolytic capacitor	16V 10i FM
C249	52613100MV0	Aluminum electrolytic capacitor	16V 10i FM
C304	52613100MV0	Aluminum electrolytic capacitor	16V 10i FM
C305	52613100MV0	Aluminum electrolytic capacitor	16V 10i FM
C104	52613100MV0	Aluminum electrolytic capacitor	16V 10i FM
C101	52613100M10	Aluminum electrolytic capacitor	16V 10i FM
C244	52613220MV0	Aluminum electrolytic capacitor	16V 22i FM
C603	52613220MV0	Aluminum electrolytic capacitor	16V 22i FM
C105	52623470MV0	Aluminum electrolytic capacitor	16V 47i FM
C234	52623470MV0	Aluminum electrolytic capacitor	16V 47i FM
C526	52623470MV0	Aluminum electrolytic capacitor	16V 47i FM
C203	52623470M10	Aluminum electrolytic capacitor	16V 47i FM
C239	52623470M10	Aluminum electrolytic capacitor	16V 47i FM
C216	52623101MV0	Aluminum electrolytic capacitor	16V 100i FM
C222	52623101MV0	Aluminum electrolytic capacitor	16V 100i FM
C232	52623101MV0	Aluminum electrolytic capacitor	16V 100i FM
C513	52623101MV0	Aluminum electrolytic capacitor	16V 100i FM
C806	52623101MV0	Aluminum electrolytic capacitor	16V 100i FM
C807	52623101MV0	Aluminum electrolytic capacitor	16V 100i FM
C224	52623101M10	Aluminum electrolytic capacitor	16V 100i FM
C510	52623471M10	Aluminum electrolytic capacitor	16V 470i FM
C610	52623471M10	Aluminum electrolytic capacitor	16V 470i FM
C830	52623471M10	Aluminum electrolytic capacitor	16V 470i FM
C601	52624101M10	Aluminum electrolytic capacitor	25V 100i FM
C804	52624471M10	Aluminum electrolytic capacitor	25V 470i FM
C408	52624102M10	Aluminum electrolytic capacitor	25V 1000i FM
C508	52624102M10	Aluminum electrolytic capacitor	25V 1000i FM
C827	52624222M60	Aluminum electrolytic capacitor	25V 2200i FM
C502	52626470MV0	Aluminum electrolytic capacitor	35V 47i FM

**Main-board/AV-board/K-board**

Location No.	Part No.	Name	Description
C405	52626101M10	Aluminum electrolytic capacitor	C35V 100i FM
C406	52626101M10	Aluminum electrolytic capacitor	35V 100i FM
C825	52626102M10	Aluminum electrolytic capacitor	35V 1000i FM
C227	52617*47MV0	Aluminum electrolytic capacitor	50V 0.47i FM
C208	52617010MV0	Aluminum electrolytic capacitor	50V 1i FM
C219	52617010MV0	Aluminum electrolytic capacitor	50V 1i FM
C231	52617010MV0	Aluminum electrolytic capacitor	50V 1i FM
C608	52617010MV0	Aluminum electrolytic capacitor	50V 1i FM
C606	526172*2MV0	Aluminum electrolytic capacitor	50V 2.2i FM
C117	526174*7MV0	Aluminum electrolytic capacitor	50V 4.7i FM
C407	526174*7MV0	Aluminum electrolytic capacitor	50V 4.7i FM
C005	52617100MV0	Aluminum electrolytic capacitor	50V 10i FM
C822	5268A221MA0	Aluminum electrolytic capacitor	160V 220i FM
C524	526AA4*7M10	Aluminum electrolytic capacitor	160V 4.7i FM
C519	5262C100M10	Aluminum electrolytic capacitor	250V 10i FM
C506	526Ea100M10	Aluminum electrolytic capacitor	160V 10i FM
C812	5268D101MA1	Aluminum electrolytic capacitor	400V 100i FM
C812	5268D101MA0	Aluminum electrolytic capacitor	400V 100i FM
L104	55632*33K10	Invariablenes inductor	LGB0606-0.33i HK
L206	556328*2J10	Invariablenes inductor	LGB0606 8.2i HJ
L207	556328*2310	Invariablenes inductor	LGB0606 8.2i HJ
L205	55632120J10	Invariablenes inductor	LGB0606 12i HJ
L208	55632120J10	Invariablenes inductor	LGB0606 12i HJ
L202	55632680310	Invariablenes inductor	LGB0606 68i HJ
L301	55632680J10	Invariablenes inductor	LGB0606 68i HJ
L002	55632101310	Invariablenes inductor	LGB0606 100i HJ
L102	55632101310	Invariablenes inductor	LGB0606 100i HJ
L201	556321.01J10	Invariablenes inductor	LGB0606 100i HJ
L204	55632101J10	Invariablenes inductor	LGB0606 100i HJ
L806	55646101K70	Invariablenes inductor	LGB W1216 100i HK
L806	84757001600	Invariablenes inductor	LGB 1216 100i HK
L804	55572011080	Feed-through inductor	TEM2011
L502	555756106A6	Feed-through inductor	ZZ008
L503	555756106A6	Feed-through inductor	TY6.0X1.0X6.0
T801	5771202B1A0	ceramic filter	LQ0002B1A
T801	84757002400	ceramic filter	LCL F8
T802	5771203B1A0	ceramic filter	LQ0003B1A
T802	84757002500	ceramic filter	LCL F9
L506	84756003700	width-adjustment coil	HF60A
	8475900010B	Degaussing coil	XC 2118
L203	00000000000	Mid-frequency transformer	TRF1239AV
L103	5589767950Y	Mid-frequency transformer	TRF767950
L001	55891166J10	Mid-frequency transformer	TRF1166T1

**Main-board/AV-board/K-board**

<b>Location No.</b>	<b>Part No.</b>	<b>Name</b>	<b>Description</b>
T100	5931165A000	Flyback transformer	BSC65A
T804	84726004900	Switch transformer	BCK-45
T803	59351014600	Remote transformer	PT0146
T803	84700004600	Remote transformer	YKDB05
L501	59331000100	H. Drive transformer	AD 0001
L501	84739003100	H. Drive transformer	BCT-5
L505	55983390070	H. Drive transformer	RXT 39
	82967000700	Impedance convertor	ZB4
D005	61411075DU0	Diode	2CK75D
D005	614144148U0	Diode	1N4148
D101	61411075DU0	Diode	2CK75D
D101	614144148U0	Diode	1N4148
D204	61411075DU0	Diode	2CK75D
D204	614144148U0	Diode	1N4148
D301	61411075DU0	Diode	2CK75D
D301	614144148U0	Diode	1N4148
D508A	61411075DU0	Diode	2CK75D
D508A	614144148U0	Diode	1N4148
D508	61411075DU0	Diode	2CK75D
D508	614144148U0	Diode	1N4148
D807	61411075DU0	Diode	2CK75D
D807	614144148U0	Diode	1N4148
D809	61411075DU0	Diode	2CK75D
D809	614144148U0	Diode	1N4148
D811	61411075DU0	Diode	2CK75D
D811	614144148U0	Diode	1N4148
D813	61411075DU0	Diode	2CK75D
D813	614144148U0	Diode	1N4148
D814	61411075DU0	Diode	2CK75D
D814	614144148U0	Diode	1N4148
D815	61411075DU0	Diode	2CK75D
D815	614144148U0	Diode	1N4148
D816	61411075DU0	Diode	2CK75D
D816	614144148U0	Diode	1N4148
DV02	61411075D50	Diode	2CK75D
DV02	61414414850	Diode	1N4148
D803	61131011C5Y	Diode	RM11C
D804	61131011C5Y	Diode	RM11C
D805	61131011C5Y	Diode	RM11C
D806	61131011C5Y	Diode	RM11C
D506	61131011C6Y	Diode	IIM11C
D402	61112529 G50	Diode	2CZ5295G
V821	611308RG27Y	Diode	RG2

**Main-board/AV-board/K-board**

Location No.	Part No.	Name	Description
V821	611308RG257	Diode	S2L60
D507	61411075 D40	Diode	2CK75D
D507	61.414414840	Diode	IN4148
V822	611120ITU260	Diode	2CZRU2
V823	611120ITU260	Diode	2CZRU2
D501	611120ITU260	Diode	2CZRU2
D505	611120ITU260	Diode	2CZRU2
DS01A	61138001Z40	Diode	ZEM01Z
D808	611120ES140	Diode	2CZES1
D004	61212036AU0	Diode	W05Z3.6A
D004	612180361UY	Diode	RD3.6EL
D206	61212051BU0	Diode	W05Z5.1B
D802	61212056BU0	Diode	W05Z5.6B
D201.	61212056BU0	Diode	W05Z5.6B
D202	61212056BU0	Diode	W05Z5.6B
D203	61212056BU0	Diode	W05Z5.6B
D812	61212062BU0	Diode	W05Z6.2B
D810	61212075BU0	Diode	W05Z7.5B
D504	612120912U0	Diode	W05Z9.1B
D828	61123619140	Diode	1W9.1V
D828	61110210740	Diode	2CW107
VD921	61512050R00	Diode	FG5RD
N801	66120817BOY	Photo electricity coupler	PC817B
NS01	6611561530Y	Photo electricity coupler	SFH615A 3
V002	62210150YW0	Audion	3CG1015 Y
V002	62510150YWY	Audion	2SA1015 Y
V201	62210150YW0	Audion	3CG1015 Y
V201	62510150YWY	Audion	2SA1015 Y
V203	62210150YW0	Audion	3CG1015 Y
V203	62510150YWY	Audion	2SA1015 Y
V503	62210150YW0	Audion	3CG1015 Y
V503	62510150YWY	Audion	2SA1015 Y
V802	62210150YW0	Audion	3CG1015 Y
V802	62510150YWY	Audion	2SA1015 Y
V001	6211~8150YW0	Audion	3DG1815 Y
V001	62418150YWY	Audion	2SC1815 Y
V010	62118150YW0	Audion	3DG1815 Y
V010	62418150YWY	Audion	2SC1815 Y
V202	62118150YW0	Audion	3DG1815 Y
V202	62418150YWY	Audion	2SC1815 Y
V204	62118150YW0	Audion	3DG1815 Y
V204	62418150YWY	Audion	2SC1815 Y
V301	62118150YW0	Audion	3DG1815 Y

## Main-board/AV-board/K-board

Location. No.	Part No.	Name	Description
V301	62418150YWY	Audion	2SC1815 Y
V303	62118150YW0	Audion	3Dg1815 Y
V303	62418150YWY	Audion	2SC1815 Y
V805	62118150YW0	Audion	3DG1815 Y
V805	62418150YWY	Audion	2SC1815 Y
V806	62118150YW0	Audion	3DG1815 Y
V806	62418150YWY	Audion	2SC1815 Y
V602	6242878AOWY	Audion	2SC2878 .A
V102	62103882040	Audion	3Dg388ATM
V102	6240388204Y	Audion.	2SC388ATM
V102	64762388Y4Y	Audion	KSC388C Y
V101	626120400WY	Audion	ILN1204
VS01	62126880L60	Audion	3DG2688 L
V501	62123830040	Audion	3DC2383 O
V501	62123830Y40	Audion	3DG2383 Y
V501	6242383004Y	Audion	2SC2383 O
V501	62423830Y4Y	Audion	2SC2383 Y
V501	6476238304Y	Audion	KSC2383 O
V501	64762383Y4Y	Audion	KSC2383 Y
V501	62123830Y40	Audion	3DG2383 Y
V803	6343807006Y	Audion	2SC3807
V803	6343807A05Y	Audion	2SC3807A
V804	62107528700	Audion	3DD5287
V804	6240752870Y	Audion	2SC5287
V502	649250830YY	Audion	BU2508DX
V502	6442499000Y	Audion	2SD2499
D002	67312574J1Y	Integrate circuit	iPC574J
D002	67311574C1Y	Integrate circuit	CW574CS
N203	6724178055Y	Integrate circuit	L7805CV
N502	6724718090Y	Integrate circuit	L7809CV
N501	6731978125Y	integrate circuit	N7812
N501	6724278125Y	Integrate circuit	MC7812CT
N002	6721224C 14Y	Integrate circuit	AT24C04 10PI
N101	67113791CPY	Integrate circuit	LA7910CP
N101	6710379100	Integrate circuit	CD7910CS
N202	671304052BY	Integrate circuit	HEF4052BP
N202	671071405CY	Integrate circuit	MC 14052BCP
N202	67107140528	Integrate circuit	HD14052BP
N401	671098403KY	Integrate circuit	TA8403K
N201	671401231NY	Integrate circuit	TB1238AN
N601	671102611AY	Integrate circuit	TDA2611A
N601	671102611A4	Integrate circuit	CD2611GS
N001	67105081906	Integrate circuit	TMP87CM38N 3673(CH0807)

**Main-board/AV-board/K-board**

Location No.	Part No.	Name	Description
N945	671320038AY	Integrate circuit	HS0038A
N945	672250638YY	Integrate circuit	SFH506 38
N945	67132003804	Integrate circuit	HRM3800
FS01	59817122500	Delay time fuse tube	ItT1 20 2.5A
BC01	58310800080	XTLO	JA18A 8MHz
BC21	583D0443380	XTLO	JA18A1 4.433619MHz
S801	54111A04S00	Power supply switch	KDC A04 S
S901	54167605410	touch switch	KA1W6 5 41
S902	54167605410	touch switch	KA1W6 5 41
S903	54167605410	touch switch	KA1W6 5 41
S904	54167605410	touch switch	KA1W6 5 41
S905	54167605410	touch switch	KA1W6 5 41
S906	54167605410	touch switch	KA1W6 5 41
Z208	5731345MBOY	Ceramic filter	SFSH4.5MCB
Z208	57311045MH5	Ceramic filter	LT4.5MH
Z208	57311045MJ5	Ceramic filter	LT4.5JH
Z206	5731360MB0Y	Ceramic filter	SFSH6.0MCB
Z206	57311060MH5	Ceramic filter	LT6.0MH
Z206	57311060MJ5	Ceramic filter	LT6.0MJ
Z205	5731365MB0Y	Ceramic filter	SFSH6.5MCB
Z205	57311065MH5	Ceramic trap filter	LT6.5MH
Z205	57311065MJ5	Ceramic trap filter	LT6.5M
Z203	5741445MB0Y	Ceramic trap filter	TPS4.5MB
Z203	5741145MB05	Ceramic trap filter	XT4.5MB
Z201	5741460MB0Y	Ceramic trap filter	TPS6.0MB
Z201	5741160MB05	Ceramic trap filter	XT6.0MB
Z204	5741465MB0Y	Ceramic trap filter	TPS6.5MB
Z204	5741165MB05	Ceramic trap filter	XT6.5MB
ZI01	57111387800	SAWF	LBN-38-78
A101	82891001100	Electric tuner	TDQ-3B9-C
BC641	56232605160	Electromotion speaker	YDT513-AI-5W-16J
BC642	56232605160	Electromotion speaker	YDT513-AI-5W-16J
XV01	5384102PA60	Audio and video faucet	AV 1 2PA6
XV02	5384102PA60	Audio and video faucet	AV 1 2PA6
X901	5384102PA60	Audio and video faucet	AV 1 2PA6
XPS01	53411214300	Power-line with a socket	RVVZ 2P C2143
	681217631 C0	21" CRT	A51JFC63X 13(C)
	681217631C0	21" CRT	A51KPD12XX02

## Y Board

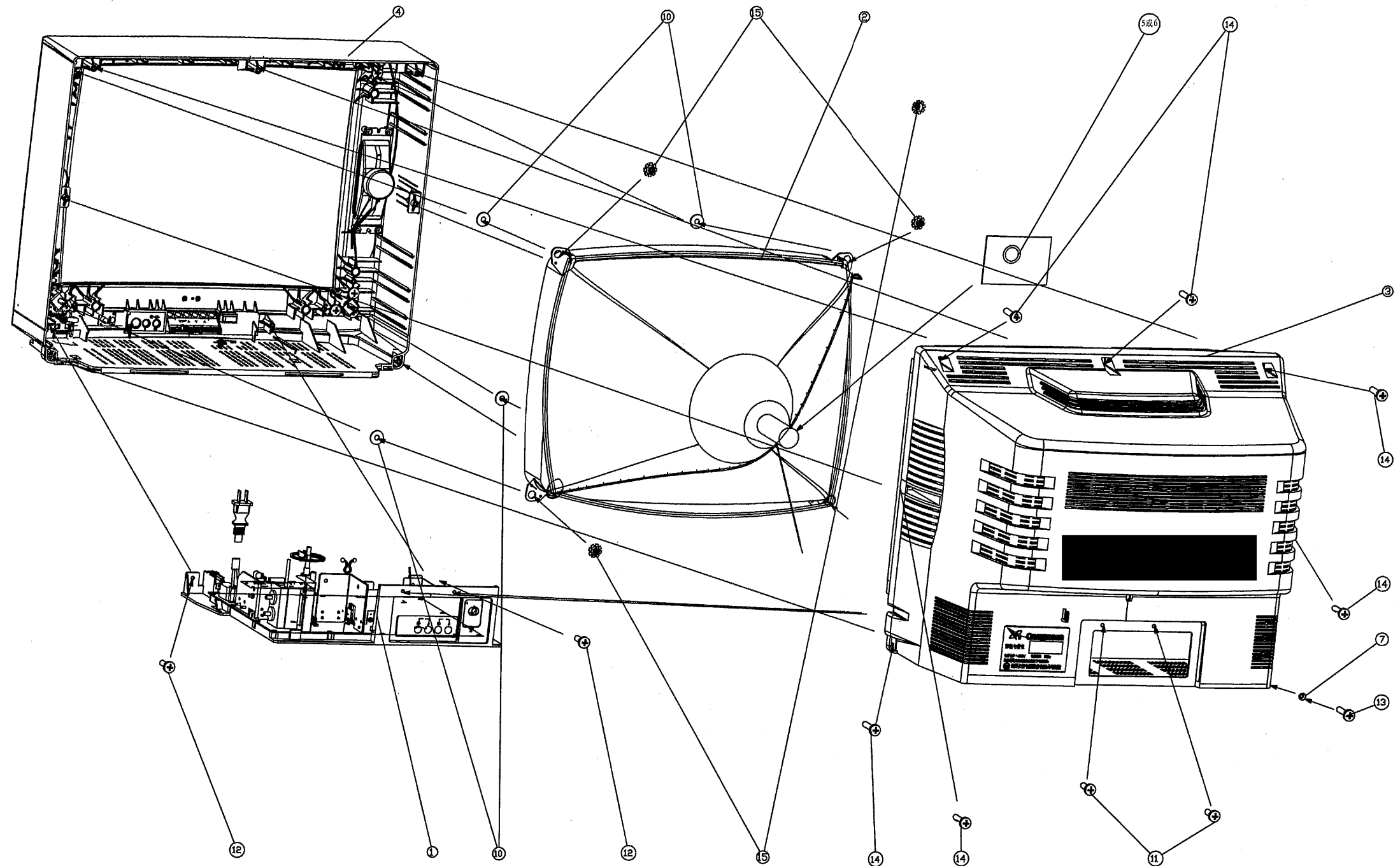
Location No.	Part No.	Name	Description
RW01	51113561J20	carbon film resistor	0.166W 560J
RW03	51113561J20	carbon film resistor	0.166W 560J
RW02	51124561JU0	carbon film resistor	0.25W 560J
R902	51124200J30	carbon film resistor	0.25W 20J
R903	51124471J30	carbon film resistor	0.25W 470J
R905	51124471J30	carbon film resistor	0.25W 470J
R907	51124471J30	carbon film resistor	0.25W 470J
R909	51124681J30	carbon film resistor	0.25W 680J
R904	51124102J30	carbon film resistor	0.25W 1KJ
R906	51124102J30	carbon film resistor	0.25W 1KJ
R908	51124102J30	carbon film resistor	0.25W 1KJ
R911	51124102J30	carbon film resistor	0.25W 1KJ
R912	51124102J30	carbon film resistor	0.25W 1KJ
R910	51124272J30	carbon film resistor	0.25W 2.7KJ
R901	51124472J30	carbon film resistor	0.25W 4.7KJ
R917	51135122J50	carbon film resistor	0.5W 1.2KJ
R918	51135122J50	carbon film resistor'	0.5W 1.2KJ
R919	51135122J50	carbon film resistor	0.5W 1.2KJ
R913	51315680JH0	Metal oxide film resistor	0.5W 68J
R913	51325680JUY	Metal oxide film resistor	2W 680J
R914	51317183JL0	Metal oxide film resistor	2W 18KJ
R914	51327183JKY	Metal oxide film resistor	2W 183J
R915	51317183JL0	Metal oxide film resistor	2W 18KJ
R915	51327183JKY	Metal oxide film resistor	2W 183J
R916	51317183JL0	Metal oxide film resistor	2W 18KJ
R916	51327183JKY	Metal oxide film resistor	2W 183J
C901	52532391K10	Ceramic capacitor	63V 390PFK
C902	52532391K10	Ceramic capacitor	63V 390PFK
C903	52532471K10	Ceramic capacitor	63V 390PFK
C909	52592102M20	Ceramic capacitor	2KV 1000PFK
C904	52613100M10	Aluminum electrolytic capacitor	16V 10i FM
C905	52613220M10	Aluminum electrolytic capacitor	16V 22i FM
C906	52623471M10	Aluminum electrolytic capacitor	16V 470i FM
C907	52617*47M10	Aluminum electrolytic capacitor	50V 0.47i FM
L901	55632101K10	Invariablenes inductor	LGB0606 100i HJ
D901	61411075D60	Diode	2CK75D
D901	61414414860	Diode	IN4148
D902	61411075D60	Diode	2CK75D
D902	61414414860	Diode	IN4148
D903	61411075D60	Diode	2CK75D
D903	61414414860	Diode	IN4148
D904	61411075D60	Diode	2CK75D
D904	61414414860	Diode	IN4148
D905	61411075D60	Diode	2CK75D
D905	61414414860	Diode	IN4148
D906	61411075D60	Diode	2CK75D
D906	61414414860	Diode	IN4148

**Y Board**

<b>Location No.</b>	<b>Part No.</b>	<b>Name</b>	<b>Description</b>
V905	62210150Y40	Audion	3CG1015-Y
V905	62510150Y4Y	Audion	2SA1015-Y
V904	62118150Y40	Audion	3DG1815-Y
V904	62418150Y4Y	Audion	2SC1815
V901	62124821060	Audion	3DG2482(FA-1 )
V901	6242482100Y	Audion	2SC2482 (lq'A-1)
V902	62124821060	Audion	3DG2482(FA-1 )
V902	6242482100Y	Audion	2SC2482(FA-1 )
V903	62124821060	Audion	3DG2482 (FA-1)
V903	6242482100Y	Audion	2SC2482 (FA-1)
GZ01	53610210800	CRT socket	GZS10-2-108
GZ01	5361021AC20	CRT socket	GZS10-2-AC2



# Exploded view of 21BS32EA



NO.	PART NAME	DESCRIPTION	Q'TV	NO.	PART NAME	DESCRIPTION	Q'TV
1	MAIN PCB ASSY	JU5.049.273	1	8	WASHER	T/JU86.942.264	4
2	CRT UNITS	JU5.370.083	1	9	SCREW SELF TAPPING		2
3	BACK COVER	JU6.116.719	1	10	SCREW SELF TAPPING		2
4	FRONT COVER UNIT	JU6.116.720	1	11	SCREW SELF TAPPING	GB845-76	1
5	CRT PCB	JU6.672.1172	1	12	SCREW TAPPING		6
6	CRT PCB	JU6.672.1173	1	13	NUT		4
7	NUT	T/JU86.634.115	1				

