COLOR TELEVISION

SERVICE MANUAL

SERVICE MANUAL SERVICE MANUAL

TQ2092

CONTENTS

Safety precautions…… 1
Alignment instructions …… 2
Working principle analysis of the unit…… 7
Block diagram…… 8
IC block diagram…… 9
Wiring diagram …… 14
Troubleshooting…… 15
Schematic diagram …… 18
APPENDIX-A: Main assembly list
APPENDIX-B: Exploded view

Note: This service manual is only for professional service personnel's reference. Before servicing the unit, please read the following items carefully.

Safety instruction

1. X-RAY radiation precaution

1.1 Excessive voltage will cause harmful X-ray. To avoid this radiation hazard, the high voltage should fall within the limitation. The appliance works at AC 110V, 60Hz. The high voltage of zero beam current (brightness is min) should be within 29kV on condition that the main power voltage is AC110V. And it should not exceed 33kV in any condition.

When servicing, please refer to the HIGH VOLTAGE CHECK procedure this service manual before check the high voltage and the high voltage meter should be reliable and accurate.

* Keep the main power voltage at 110V when checking the high voltage.

1.2 The primary source of X-RAY RADIATION is the CRT. The CRT of this TV set have gotten the approval of safety authentication inspection. The replacement CRT should be exactly the same type and specification CRT which has gotten a similar safety approval, and check the high voltage according to the HIGH VOLTAGE CHECK procedure.

2. Safety precaution

a. Since the power supply circuit of this receiver is directly connected to the AC power line, an isolation transformer is necessary during dynamic service to avoid possible shock hazard.

b. Always discharge the graphite layer conductor when moving the CRT.

c. Disconnect the power cord before replacing parts.

d. When replacing high-power resistor, keep the resistor 10 mm away from the circuit board.

3. Component safety precaution

Many electrical and mechanical parts in the chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection. Replacement parts which have these special safety characteristics are identified in this manual and its supplement electrical components having such features are shaded or marked by ⚠ on the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same characteristic as specified in the parts list may create shock, fire, X-RAY RADIATION or other hazards.

General instruction

1. Copy the standard model data to let EEPROM (N101 M24C16)of the chassis have those data before placing it on the unit, do "factory adjustment" if necessary. If use a blank EEPROM directly, you should preset IIC data and then do other common adjustment.

2.The adjustment should be done under following circumstances without additional instruction

a) Alternating current 110V/60Hz

b) Preheat at least 30 min

3.The unit has auto degaussing circuit, the auto degaussing process can be finished within 1s when the main power. Only when turn on the unit at least 30min after last time turn off TV does the auto degaussing circuit work.

4. If the CRT with magnetism affects color purity and convergence, when the auto degaussing eraser. if the color purity and convergence are still not very good, then corresponding adjustment should be done. Refer to picture tube adjustment method for adjustment.

Alignment instruction

1. Debugging item

a) VIF adjustment
b) S-TRAP adjustment
c) H VCO adjustment
d) OSD adjustment
e) B+ voltage adjustment
f) RF AGC voltage adjustment
g) Focus adjustment
h) Screen-grid voltage white balance adjustment
i) Field, line scan center adjustment
j) Filed, line amplitude adjustment
k) Raster adjustment

2. Alignment flow

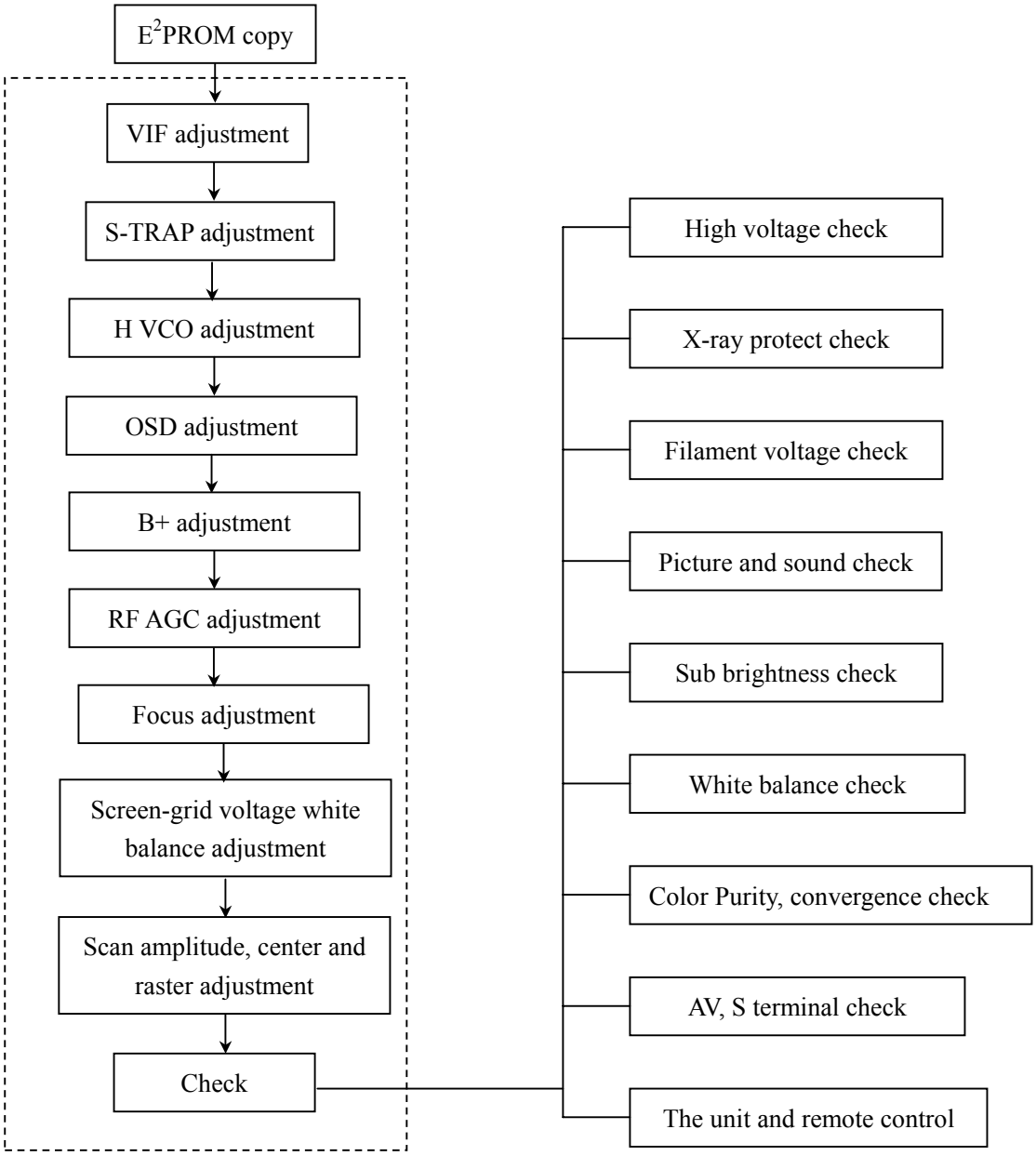


Fig-1 alignment flow

3. Factory menu adjustment (FACTORY MENU PAGE)

3.1 VIF adjustment

Receive a signal at will, enter factory menu VCJ ADJ, select VIF VCO, press “VOL+/_”, then display “END” and it means IC has adjust IF to 45.75MHz automatically.

3.2 S-TRAP adjustment

Receive a signal at will, enter factory menu VCJ ADJ, select S-TRAP, press “ VOL+/_”, then IC will adjust S-TRAP to the best situation.

3.3 H VCO adjustment

Receive a signal at will, enter factory menu RASTER ADJ, select H VCO ADJ, press “ VOL+/_”, then IC will auto adjust H VCO to the best situation.

3.4 OSD adjustment

Receive NTSC signal, check the OSD, if OSD is not at the center of the screen, you can adjust ”110: OSD H-POS” of the last page of SERVICE MENU.

3.5 B+ voltage adjustment

a) Make sure that the power is AC 110V/60Hz
b) Connect B+ point with a digital voltmeter, receive A-7 signal, set the picture to “standard”, the value of B+ voltage should be 110 V ±0.5 V

3.6 AGC adjustment

a) Receive 60 dB split field signal(A-7).
b) Use oscilloscope or digital voltmeter to monitor check TUNER 1# pin’s voltage (AGC output).
c) Enter factory menu VCJ ADJ, select RE DELAY, increase the value until the voltage just about 3.8V, now the picture should just without noisy, otherwise adjust R-AGC slightly.

3.7 Focus adjustment

a) Receive A-12 PHILIPS signal, set user control to “standard”.
b) Adjust focus electrode potentiometer on FBT to optimize B area focus of screen.

3.8 Screen-grid voltage and white balance adjustment

a) Receive A-7 signal, set user control to “vivid”.
b) Select CRT ADJ of factory menu, fixed C-OFF G(175), adjust C-OFF R, C-OFF B, DRV-R, DRV-B, till the white balance is normal basically.
c) Adjust potentiometer of SCREEN till the bottom right two scales appear, now the SCREEN voltage is about 530V±10V. If SCREEN voltage is normal, while the picture not, you can adjust SUB BRIGHT and SUB CONTRAST of PICTURE ADJ.
d) fine adjust white balance (color temperature:12000K±8MPCD,X=0.270±0.008, Y=0.283±0.008)
e) At YUV state adjust C-OFF R YCbCr, C-OFF B YCbCr, DRV-R YCbCr, DRV-B YcbCr, till the white balance is normal.

3.9 line, field center adjustment

NTSC(60Hz) line, field center adjustment

Receive A6 signal, set user control to “standard”, enter RASTER ADJ item, adjust field center V-POS, line center H-POS, let the center of picture coincide with center of screen.

3.10 field amplitude adjustment

NTSC(60Hz) field amplitude adjustment

Receive A12 signal, set user control to “standard”, adjust field amplitude V-SIZE, let the vertical reproduction ratio of picture acceptable 8%.

3.11 if the linearity and geometry are not satisfied, you may adjust the following items of RASTER ADJ:

Corner PARA

Trape VS-CORE V-LIN

4. Checking point

4.1 High voltage check

Connect High Voltage meter between CRT second anode and GND.

1) Receive A7 signal, set user control to “STANDARD”, measure the high voltage value, the reading should be 25.5 kV±1 kV

Set the brightness and contrast to minimum (zero beam current), measure the high voltage, the reading should not exceed 32kV.

4.2 CRT filament voltage check

Receive A7 signal, set picture to “STANDARD”, use effective voltage meter to measure CRT filament voltage, the reading should be (6.3±0.3) Vrms

4.3 X-ray protection check

1) Receive A7 signal, set user control to “vivid”.
2) Short circuit R309 (TP302, TP303), X-Ray protection circuit should function.

4.4 Picture and sound check

1) Receive standard TV signal.
2) Use picture control buttons to check color, contrast, brightness, sharpness, tint’s function.
3) Use sound control buttons to check volume control function.

4.5 Sub-brightness check

Receive A7 signal, set user control to “vivid”, picture bottom right side 2 lattices slightly light up.

4.6 Color purity and convergence check (in normal way)

4.7 AV terminals IN/OUT check

4.8 Y, Cb, Cr video and sound IN check .

4.8 Other buttons on the TV set and remote controller function check.

5 Ex-factory setting

5.1 picture menu

CONTRAST	45
BRIGHT	35
COLOR	30
TITN	0
SHARPNESS	30
PICTURE MODE	STANDARD

5.2 Volulme: 30

5.3 Language: English

5.4 TV mode: channel 1

6 Factory menu

6.1 enter factory menu method

1) Press factory button to enter factory menu.
2) Press CH+ or CH- to select sub-menu and VOL+ or VOL- to enter.
3) Press MENU to exit.

6.2 the content of factory menu see table 1

table 1 factory menu

FACTORY MENU		
1: VCJ ADJ	01. VIF VCO	VIF VCO auto regulation
	02. RF DELAY	TUNER AGC adjustment
	03. S-TRAP	S-TRAP auto regulation
2: RASTER ADJ	06. H VCO	H VCO auto regulation
	07. V-POS	Field center adjustment
	08. V-SIZE	Field amplitude adjustment
	09. V-LIN	Field linearity adjustment
	10. VS-CORE	Corner adjustment
	11. H-POS	Line position adjustment
3: CRT ADJ	12. H-SIZE	Field amplitude adjustment
	13. PARA	Pincushion adjustment
	14. CONTER	Angle adjustment
	15. Trape	Trapezia adjustment
	16. C-OFF R	TV-NTSC white balance adjustment
	17. C-OFF G	
	18. C-OFF B	
	19. DRV-R	
	20. DRV-B	
	21. C-OFF R YCBCR	YCBCR white balance adjustment
	22. C-OFF G YCBCR	
	23. C-OFF B YCBCR	
	24. DRV-R YCBCR	
	25. DRV-B YCBCR	
4: PICTURE ADJ	1. SUB BRIGHT	Sub bright adjustment
	2. SUB CONTRAST	Sub contrast adjustment
5: USER MENU RESET OFF	User menu pre-set	
6: SERVICE MENU		
7: AGING OFF	Aging switch	

Working principle:

Power part:

The power adopts thick film integrate circuit STR-W6553 of SANKEN Company, which embedded power MOSFET and controller. It usually works at quasi-resonance or Bottom-Skip quasi-resonance and realizes the performance of high efficiency of switch power and low noise. Work at gap oscillation when stand-by to reduce the power consumption. Small insulation packing(T0220-6L) can reduce the reality area and make the power smaller and standard. The design is simpler because of the little peripheral components.

N102 pin3 (STANDBY) output high level when standby, V503 b# is high level, and triode turn-on, V503 C# is low level. When the unit works normally, N102 pin3(STANDBY) output low level, V503 cut-off, B+ takes samples of RP502, V501 then sends to N502 to monitor B+ fluctuation, the samples will be converted into current to adjust the power output.

Video and sound parts:

TQ2092 adopts the super single IC R2J10161G8-AOOFP(N102) with I2C bus controlled processor produced by RENEDAS, which includes IF, color decoder, 8-bits MCU, pre-video amplify, H/V deflection, AV switch, audio processing, ect.. The main interfaces are: one AV IN, one S-VIDEO IN, YCbCr, one AV OUTPUT.

The signal flow is below:

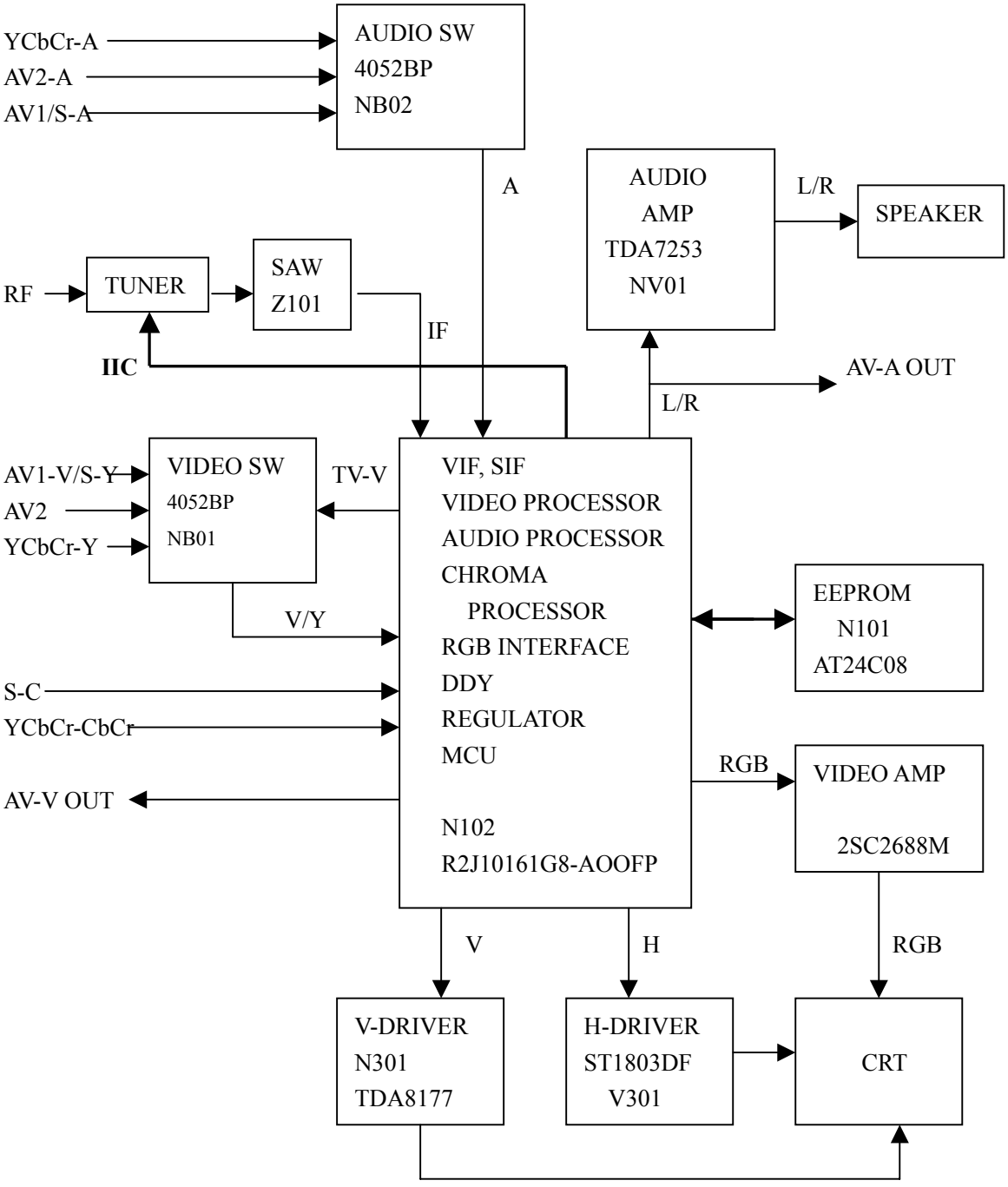
The antenna reception signal RF will be sent to tuner, via HF and mixing, output IF, via V111 after, it sent to SAW Z101 filtering and gain better IF. Then it feed to main IC N102 (R2J10161G8-AOOFP) from 38#, 39# IF amplify, phase-lock loop VCO and synchronous detection, output from 34# as composite video signal VIF-VIDEO. After filtering, VIF-VIDEO changes to VIDEO-TV. VIDEO-TV and Y component from AV1/S, AV2 and YCbCr via NB01(4052BP)9#,10# AV/Y, AV1/AV2 (TV/AV) select, output VIDEO, it will be sent to N102 form 32# again. C of S terminal is sent to N102 30#, component Cb, Cr is sent to N102 19#,20#, then video decoding and processing, it sent to the internal RGB interface matrix, pre-video amplify, contrast, bright and blacking, output RGB form 51#,52#,53#. After N102 internal video switch selecting, the video is sent to decoding and processing, it also output from 24# as AV OUT.

The main IC N102 has the H/V deflection internal. VDRV output from 11#, via N301(TDA8177) amplifying to push the vertical deflection coil. HDRV output from 15#, via V301(ST1803DF) driving to push the horizontal deflection coil. EW-OUT output form 25# via V303(2SC3852) driving then sent to the horizontal deflection.

The IF signal is sent to N102 from 38# 39# demodulating TV audio L/R. L/R of AV1/S, AV2, YCbCr via audio switch NB02(4052BP) selecting, it sent to N102 29#,43# switch selection and audio process together with TV audio signal, then output L/R from 46# 48#, it sent to sound amplifier NV01(TDA7253) amplifying to push the speaker; at the same time, the L/R from 46# 48# is also audio of AV OUT.

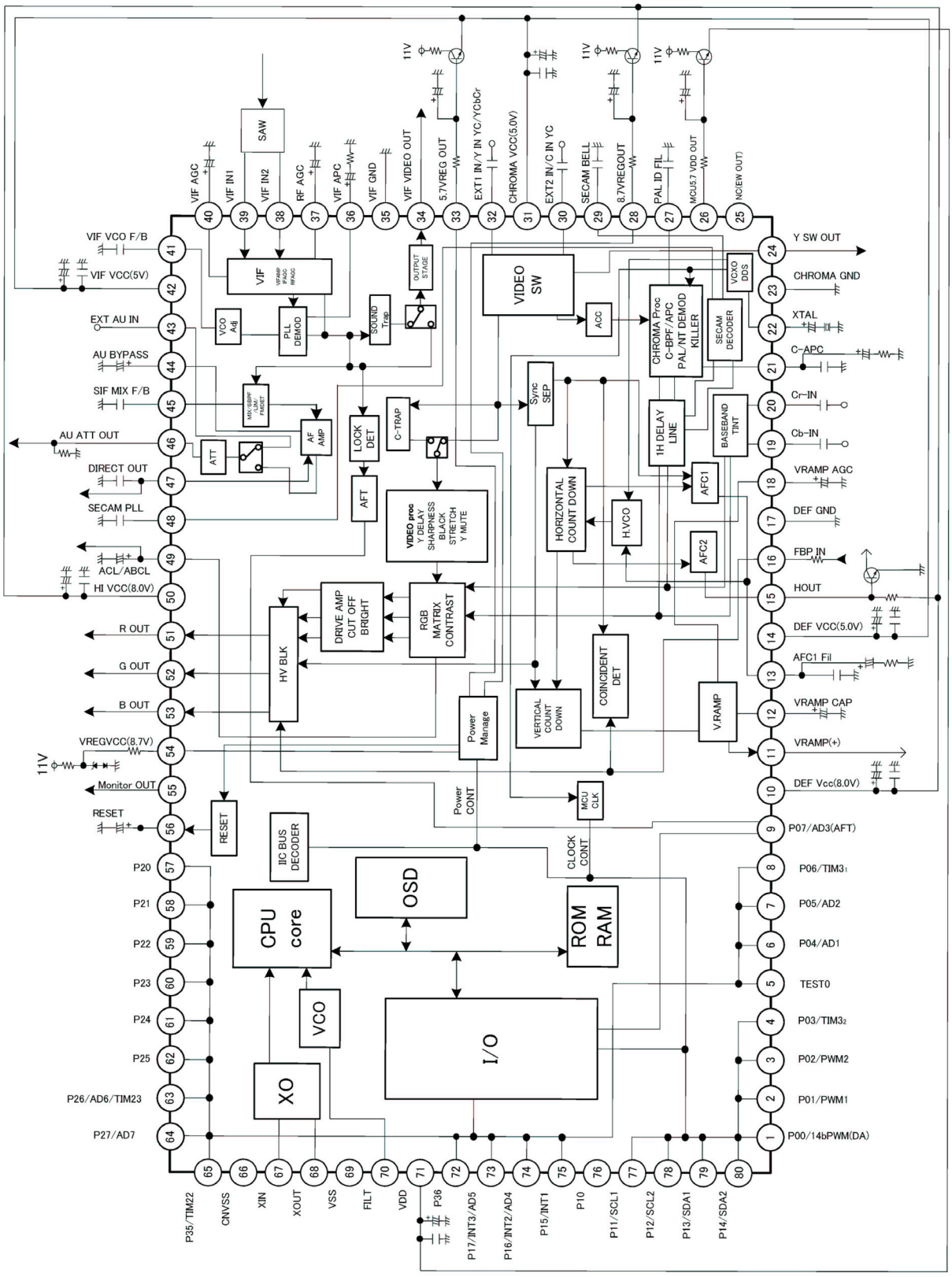
The unit is control by the MCU built in N102, it connects tuner and E2PROM through IIC bus line and controls the whole unit working.

Block diagram



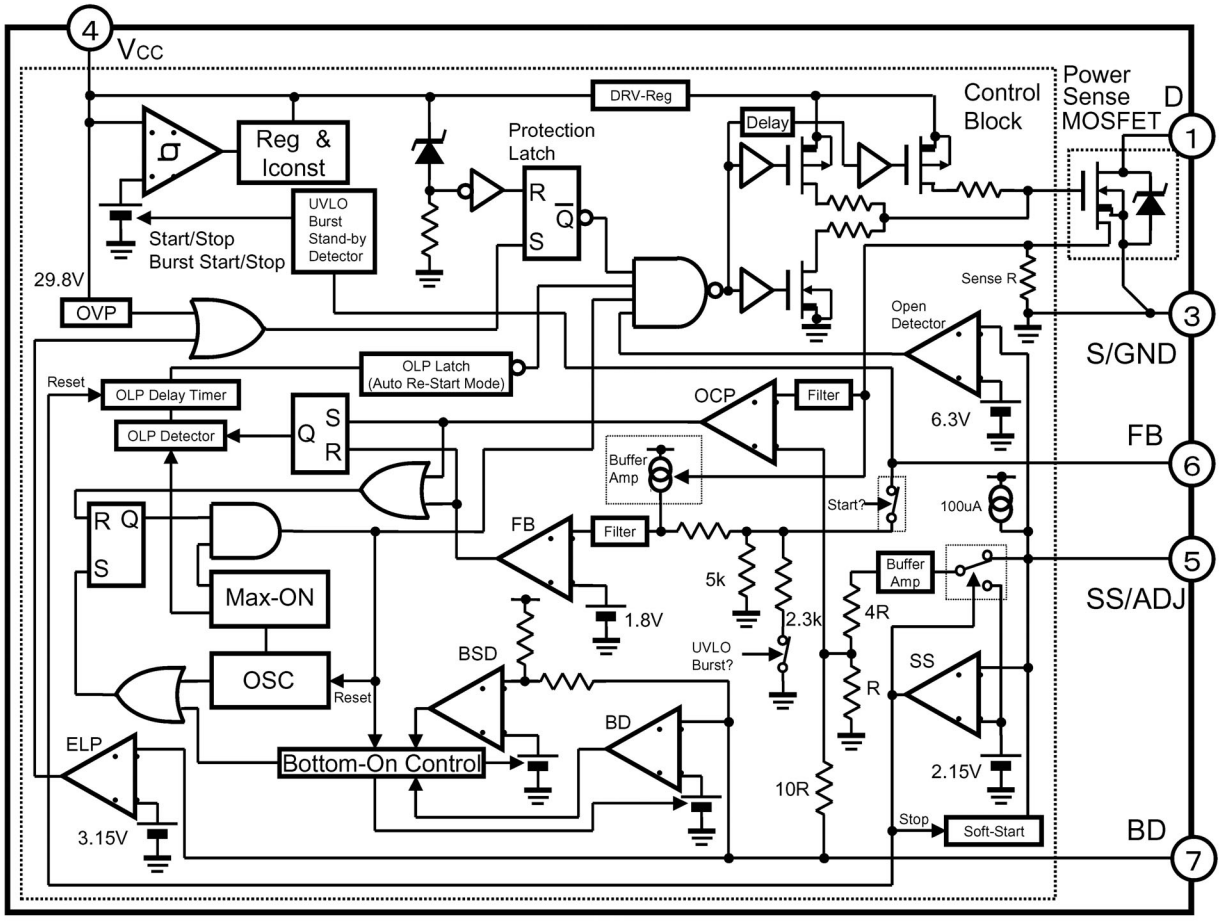
IC Block diagram:

1.R2J1016XFP



Pin	Function	Voltage (V)	Pin	Function	Voltage (V)
1	S-IN	5	80	P14	5.00
2	X-RAY	5	79	SDA	0
3	STANDBY	0.04	78	P12	0
4	S_MUTB	0.04	77	SCL	5
5	TEST0	0	76	P10	0
6	AV1/AV2 AV1/TV control	0.08	75	P15	0
7	AV/Y AV/Y control	0.04	74	REMOTE	5.00
8	PAL/N	0	73	KEY1	0.7
9	AFT	2.5	72	P36	0
10	VCC + 8V	8	71	MCU +5V	5
11	VDRV	3	70	FILT	2.1
12	VRAMP_CAP	2.3	69	GND	0
13	AFC_FIL	2.9	68	XOUT	5.00
14	VCC + 5V	5	67	XIN	0.4
15	HOUT	1	66	GND	0
16	FBP_IN	0.85	65	P35	0
17	GND	0	64	KEY2	5
18	AGC	2	63	P26	0
19	Cb_IN	1.1	62	CVIN	0
20	Cr_IN	1.1	61	VHOLD	0
21	C_APC	2.9	60	HLF	0
22	XTAL crystal 4.43M		59	P22	0
23	GND	0	58	P21	0
24	Y_SW_OUT video output	3	57	P20	0
25	EW_OUT	3.2	56	MCU_RESBT	5.00
26	MCU 5.7V	5.7	55	MONITOR_OUT SVM out	0.4
27	PAL_FIL	3.8	54	VREG 8.7V	8.7
28	VREG 8.7V	8.7	53	B_OUT	3.00
29	L_IN	3.2	52	G_OUT	3.00
30	C_IN	1.9	51	R_OUT	3.00
31	VCC +5V	5.00	50	HI_VCC	8
32	V/Y in	2.4	49	ABCL	2.5
33	VREG 5.7V	5.7	48	L_OUT	3.3
34	VIF-VIDEO_OUT	3.3	47	DIRECT_OUT	3.3
35	VIG_GND	0	46	R_OUT	3.3
36	VIF_APC	2.1	45	SIF_MIX	2.5
37	RF_AGC	3.8	44	AU_BYPASS	3.3
38	VIF_IN2	1.4	43	R_IN	3.3
39	VIF_IN1	1.4	42	VIF_VCC	5
40	VIF_AGC	2.6	41	VIF_VCO	3

2.STR-W6553A



Pin function:

No	STR-W6500 [T0220F-6L]	STR-X6500 [T03PF-7L]	Name	Function
1	D		Drain terminal	Drain of MOSFET
2	-	S	Source/Ground terminal	MOSFET Source and Ground
3	S/GND	GND		
4	Vcc		Power terminal	Control power input
5	SS/ADJ		Soft-Start/over current protect	Over current protect and Soft-Start timer adjust
6	FB		Feed Back terminal	Timing voltage control signal input Gap oscillation control
7	BD		Bottom check terminal	Bottom check signal input and external Latch signal input

3.TDA7253

Figure 3. Pin Connection (Top view)

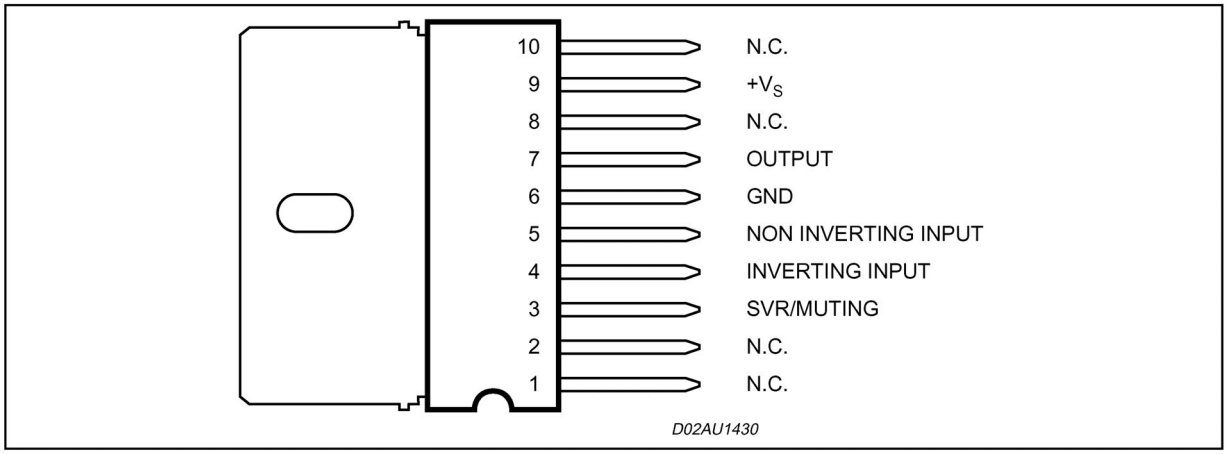
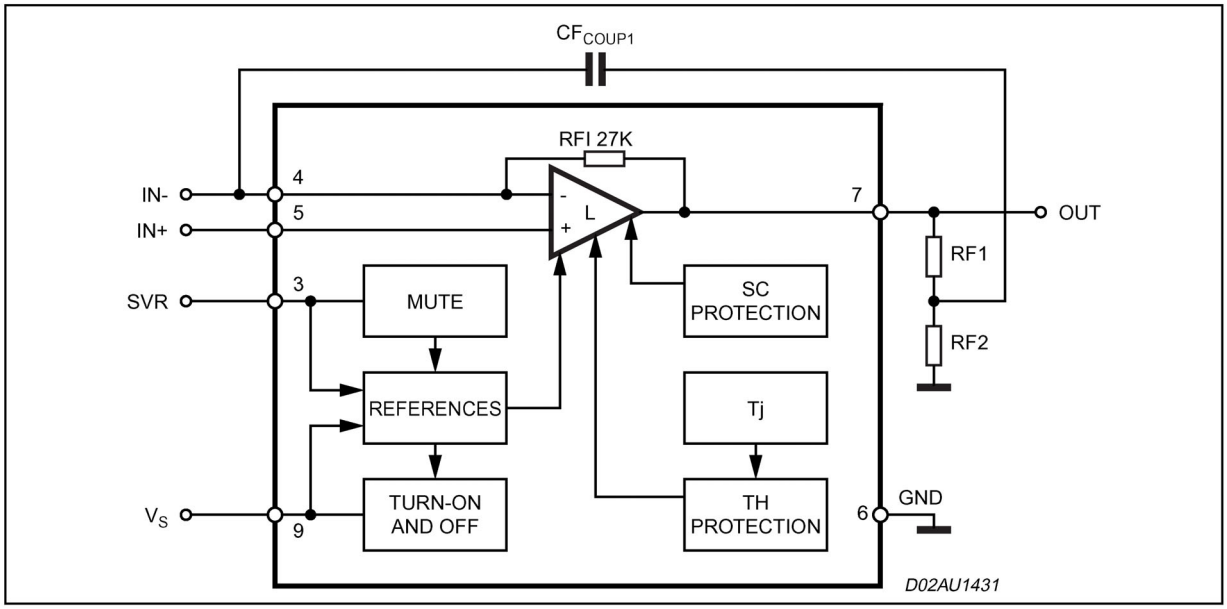
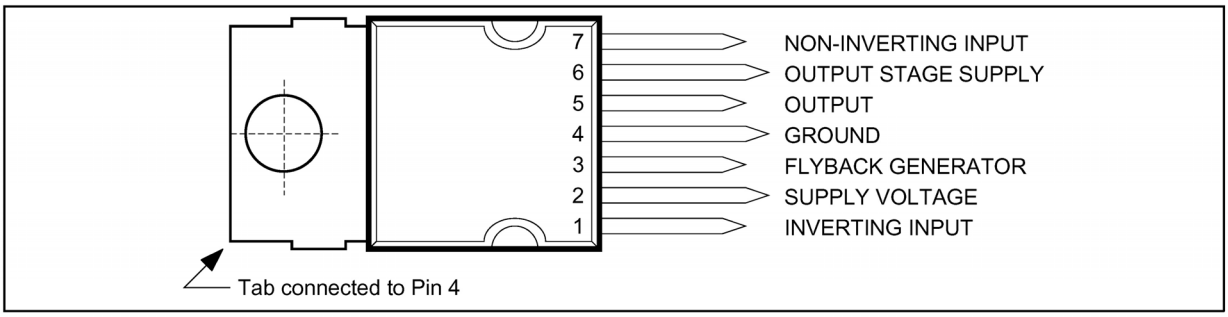


Figure 4. Block Diagram

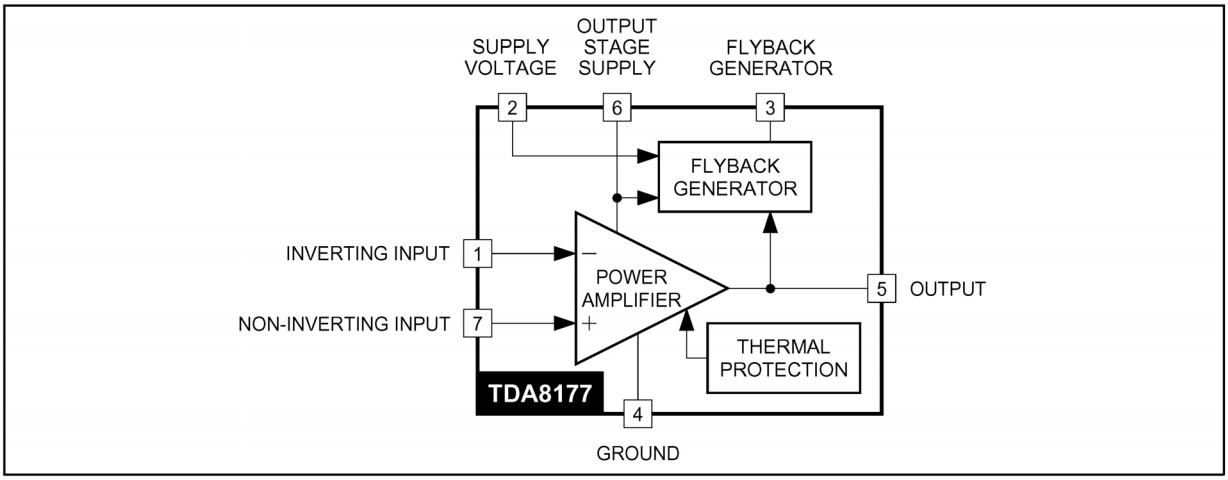


4.TDA8177

PIN CONNECTIONS



BLOCK DIAGRAM



AC~220V 50HZ

DEGUASS COIL

782-M2988-0500

XS901

XS902

X504

X501

XK01

X104

XV01

CRT GZ

SCREEN

GND

FOCUS

X401

X402

H 26KV

CRT

SAMSUNG

K.R

K.G

K.B

HV

GND

SPEAKER

X106

T301

H 26KV

FOCUS

SCREEN

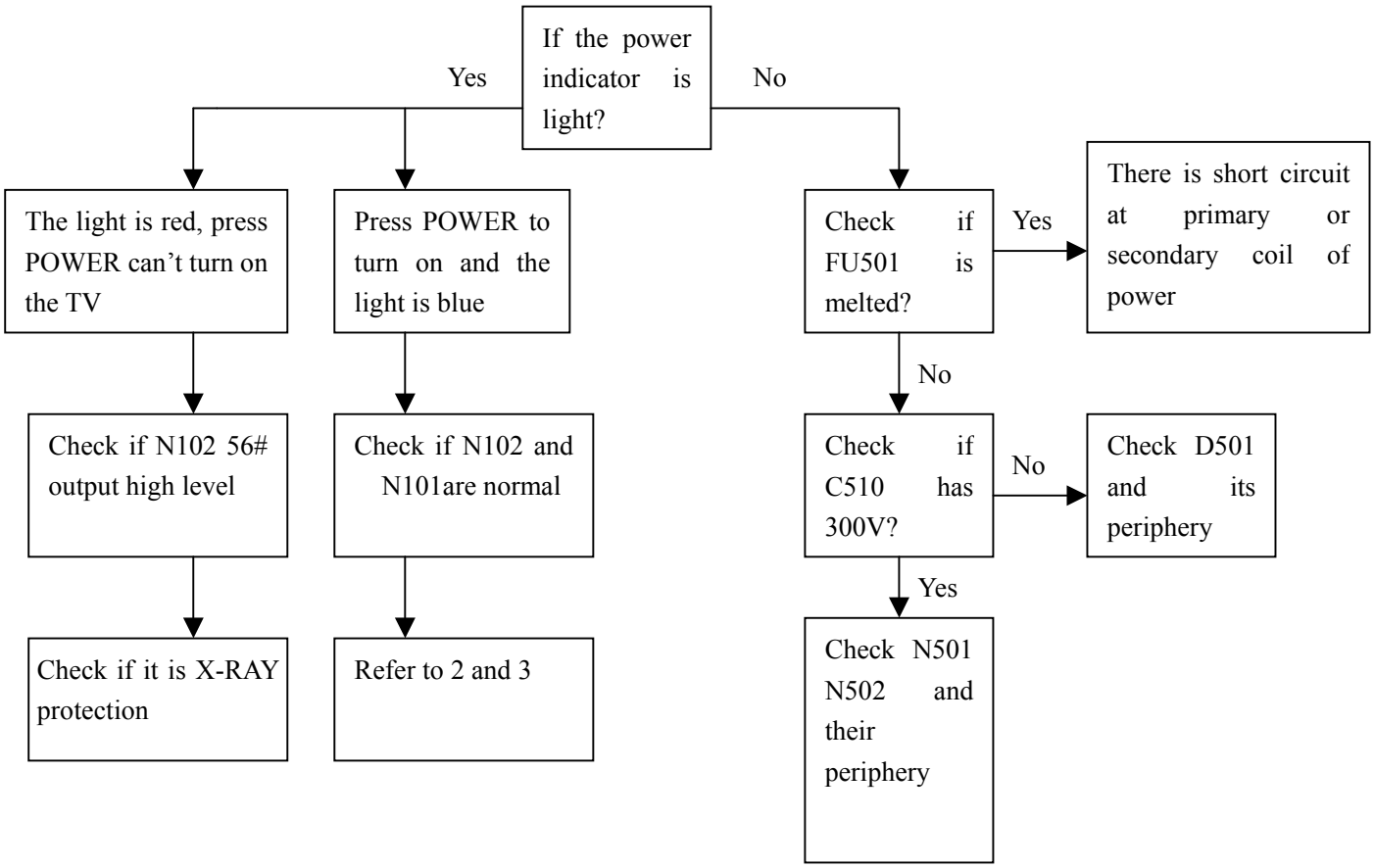
X303

X301

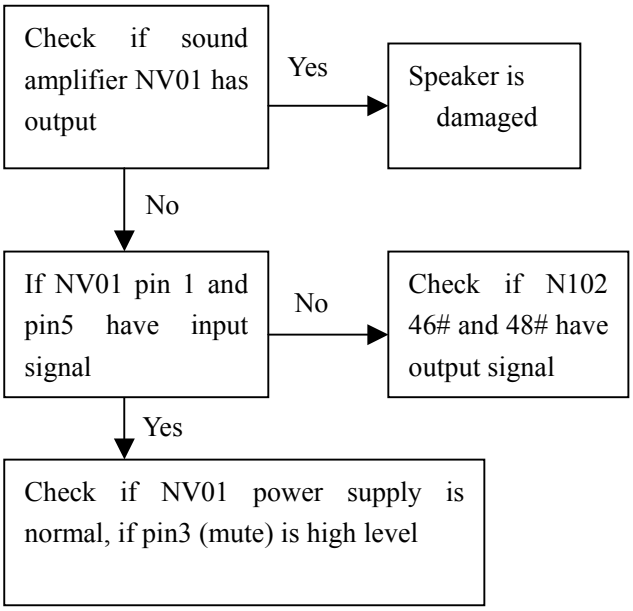
782-TQ2192-0100

Troubleshooting guide

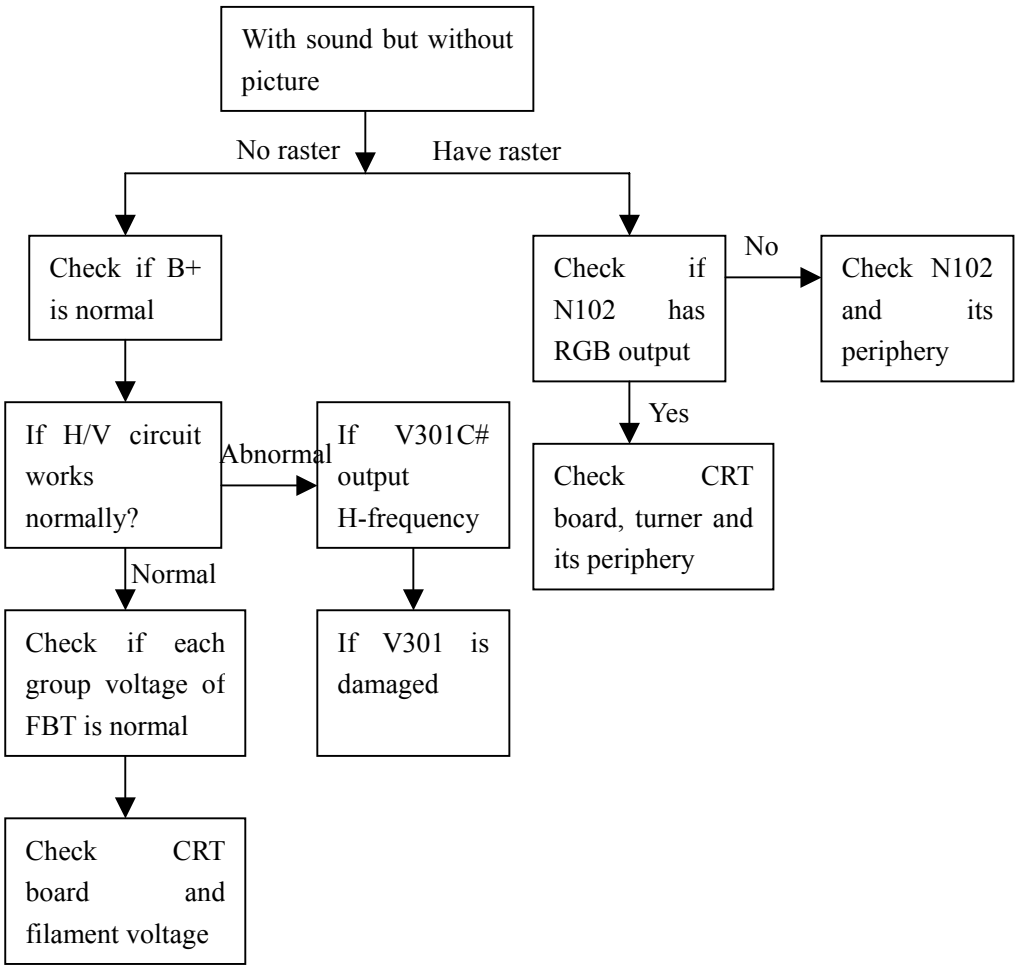
1. no raster, no sound



2. with picture, without sound



3. with sound, without picture



A B C D E F G H I J K

1 2 3 4 5 6 7 8

X403 GZS10-2-108 K.R K.G K.B HV

X401 MUTE

X402

NV01 TDA7259L OUTPUT(L) +Vs NC OUTPUT(R) GND NON IN(R) IN(R) SVR/MUTING IN(L) NON IN(L)

VCC_AU R_AU_ATT L_AU_ATT S_MUTE MUTE_1 14V

N104 FM-6038LM For J21A

5V_MCU REMOTE 5V

LED101 HFR205

X102

RC901 HRM1388

V901 GH0505602

X901 X902 782-M2988-0500

S901 S902 S903 S904 S905 S906

S101 S102 S103 S104 S105 S106 S107

X103 X104

X105 X101 667-MC117-3100

N101 AT24C016-10PC

SDA SCL

N102 *LAB1

P14/SDA2 P13/SDA1 P12/SCL2 P11/SCL1 P10 P15/INT1 REMOTE KEY1(POWERON) P36 VDD FILT VSS XOUT XIN CNVSS P35/TIM22

S_IN X-RAY STANDBY S_MUTE TEST0 AV1/AV2 AV/Y PAL/N AFT(ADO) DEF_Vcc VRAMP(+) VRAMP_CAP AFC_FIL DEF_VCC(5.0V) HOUT FBP_IN DEFGND VRAMP_AGC Cb_IN Cr_IN C-APC XTAL CHROMA_GND Y_SW_OUT

EW_OUT 8.7V L_EXTAU C_IN 5V VIDEO 5.7V 8V RF_AGC VIF1 VIF2 V_AVOUT SIF

MCU5.7_VDD_OUT PAL_ID_FIL 8.7VREGOUT EXTAU(I)IN EXT_2-IN/C-IN_Y CHROMA_VCC(5.0V) EXT1-IN/YIN_YC/YCbCr 5.7VREG_OUT VIF_VIDEO_OUT VIG_GND VIF_APC RF_AGC VIF_IN2 VIF_IN1 VIF_AGC

KEY2 ADS/TIM23/P26 CVIN VHOLD HLF P22 P21 P20 MCU_RESET_IN MONITOR-OUT VREGVCC(8.7V) B_OUT G_OUT R_OUT HI_VCC(8.0V) ACL/ABCL AU-ATT(L)_OUT/ATT-OUT DIRECT_OUT AU_ATT(R)OUT/AU_SW_OUT SIF_MIX_F/B AU-BYPASS EXT_AU(R)IN VIF_VCC(5.0V) VIF_VCO_F/B

T501 STR-W6553A N501 T502 T503 T301 T302 T303 T2.5A/250V FUS01 X501 X502 X503 X504 X301 X303 JA1 JA2

TUNER101 IF1 BT/LOCK ADC BP NC SDA SCL AS AGC

782-TQ2192-0100

APPENDIX-A: Main assembly 9520TQ9218

NAME	NO.	MAIN COMPONENT AND IT'S NO.	
Main board	6TQ05101L0	N102 N301 NV01 N501	R2J10165 (5271012502) STV8172A (5268172002) TDA7263L (5267263001) STRW6553A (5266553001)
Line output transformer		T301	BSC26-N1013A(UL) (5432210043)
Side AV board	6TQ0112910		
Key board	6TQ0170510		
Stereo board	6TQ0113110	NS01	LA72700V (5277270001)
Remote control	6010Q03404	RC-Q34-0D	
CRT	520121470C	A51ALJ13X02A	