COLOR TELEVISION

SERVICE MANUAL

TS2151

CONTENTS

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 hazar d, the high volt age should fall within the limit ation. The appliance works at AC 110V, 60Hz. The high voltage of zero beam curr ent (brightness is min) should be within 29kV on condition that th e main power voltage is AC1 10V. 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-RA Y RADIA TION is t he CR T. The CR T of this TV set h ave gotten th e approval of safety authentication inspection. The replacement CRT should be exactly the same type and specification CRT which has gotten a similar safety appro val, and check the high volt age according to the HIGH VOLTAGE CHECK procedure.

2. Safety precaution

a. Since the power supply circuit of this receiver is directly c onnected 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 p arts in the chassis have spe cial safety-related characteristics. The se characteristics are often passed unnoticed by a visual inspection. Replacement parts which have th ese special safety characteristics ar e identified in this manual and it s supplement electrical component s having such features are shaded or marked by ⚠ on the schematic diagram and the parts list. Before replacing an y of these components, read the p arts list in this m anual carefully. The use of substitute replacement p arts which do not have t he same characteristic as specified in the parts list may c reate shock, fire, X-RAY RADIATION or other hazards.

General instruction

1. Copy the st andard model dat a to let EEPROM (N101 M24C16)of the c hassis have those dat a before placing it on the unit, do "f actory adjustment" if necessar y. 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 deg aussing circuit, the auto dega ussing process c an be finished within 1s whe n the main power . Only w hen turn on the unit at least 30min after last time turn of f 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 conver gence are still not very good, then corresponding adju stment 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

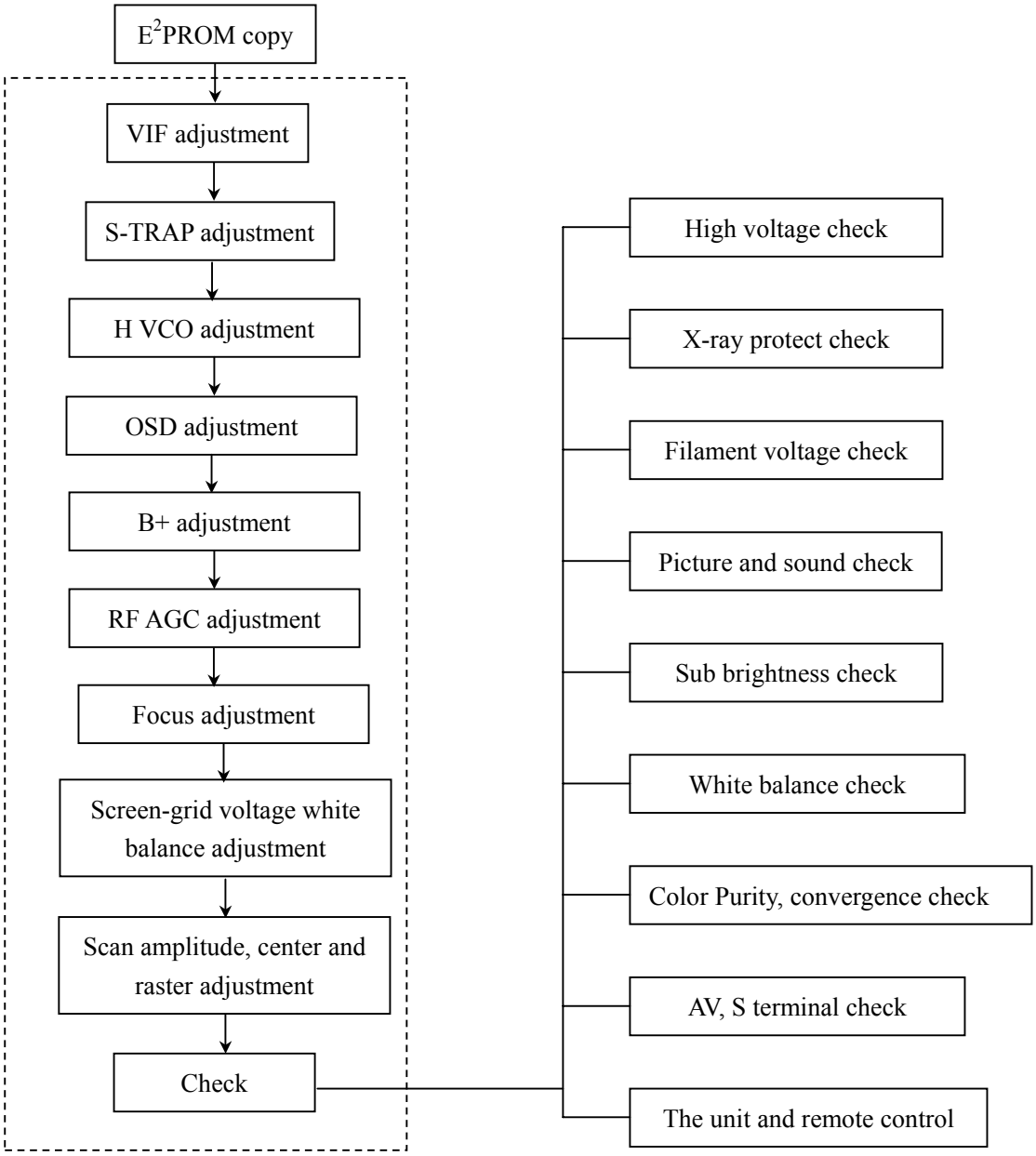


Fig-1 alignment flow

3. Factory menu adjustment (FACTORY MENU PAGE)

3.1 VIF adjustment

Receive a si gnal at will, enter factory menu VCJ AD J, select VIF VCO, pr ess “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 scr een, you c an 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 pictu re to “st andard”, 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 C RT ADJ of factory menu , fixed C- OFF G(175), a djust C-OFF R, C-OFF B, DR V-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 adj ust 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 u ser control to “st andard”, ent er RASTER ADJ ite m, 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 amplitu de V -SIZE, let the vertica l 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 P ARA

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.

With Remote Control

In TV state, press the " MENU " key, the main menu appears, then press the number keys: " 2 " , " 5 " , " 8 " and " 0 "

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 , which embedded power MOSFET an d controller . It usually works at quasi-resonance or Bottom- Skip quasi-resonance and realizes the performance of high efficiency of switch power and lo w noise. Work at gap oscillation when stand-by to reduce the power cons umption. Sma ll insulation packing(T0220-6L) can reduce the re ality area and ma ke the powe r smaller an d standard. The des ign is simpler be cause of the little periphera l components.

N102 pin3 (STANDBY) output high level whe n standby, V503 b# is high le vel, and triode turn-on, V50 3 C# is low level. When the unit works normally, N102 pin3(STANDBY) output low level, V5 03 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:

The super single IC R2J1016 1G8-AOOFP(N102) with I2 C bus controlled proces sor 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:

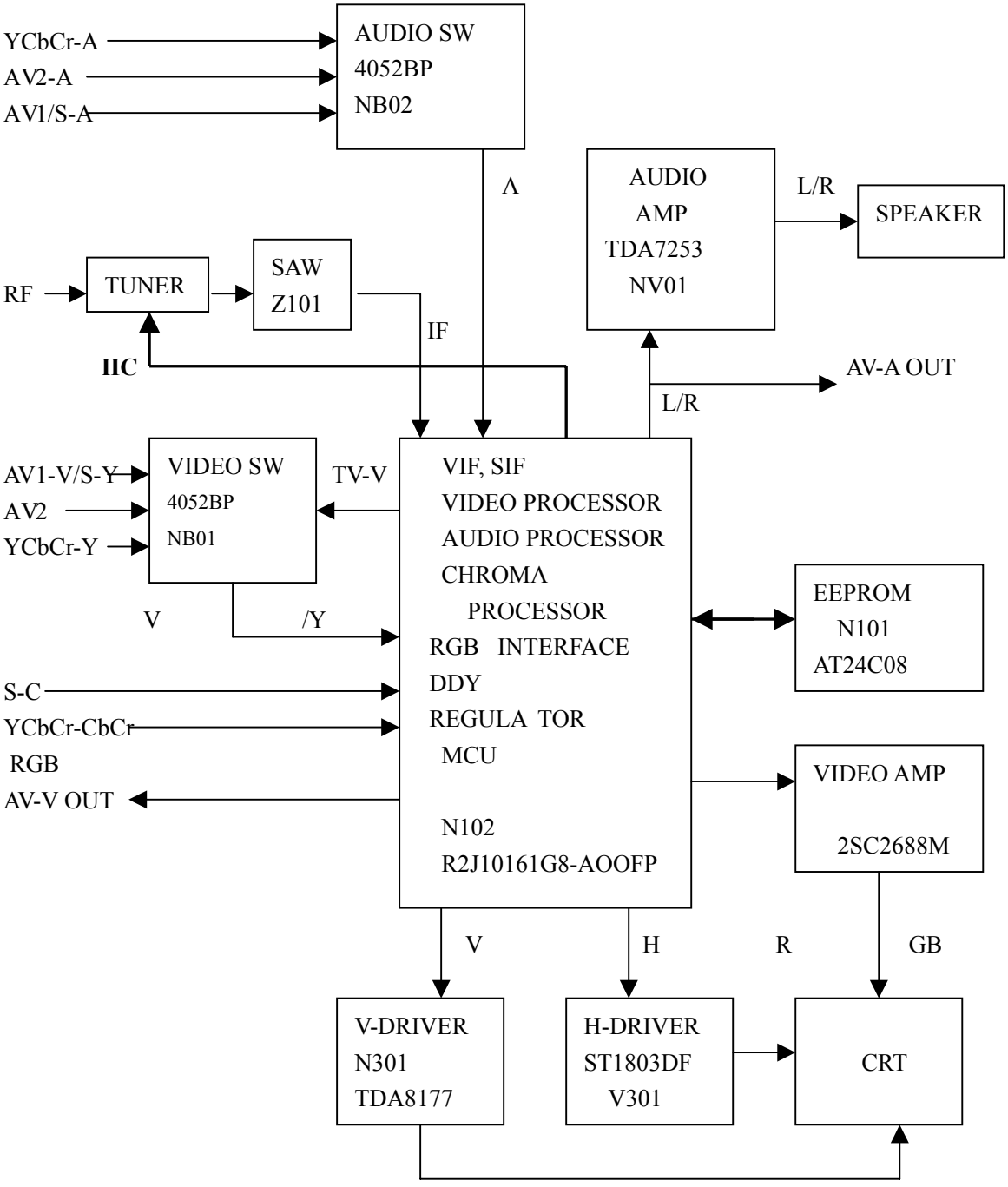
The antenna reception signal RF will be sent to tuner, via HF and mixing, output IF, via V111 after, it sent to SAW Z101 filtering and gain better IF. Then it feed to main IC N102 (R2J10161G8-AOOFP) from 38#, 39# IF amplify, phase-lock loop VCO and synchr onous detection, output from 34# as composite vid eo 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# ag ain. C of S terminal is sent to N102 3 0#, component Cb, Cr is sent to N10 2 19#,20#, then vide o dec oding a nd p rocessing, it sent to the internal R GB interface matrix, pre- video amplify, contrast, bright a nd bl acking, output RGB form 51#,52#,53#. After N102 intern al video switch selecting, the video is sent to decoding and processing, it also output from 24# as AV OUT.

The main IC N102 h as the H/V deflection inter nal. VDR V output from 1 1#, via N301 (TDA8177) amplifying to push the ve rtical deflection coil. HDR V output from 15#, via V301(ST18 03DF) dri ving 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 N 102 from 38# 39# demo dulating TV audio L/R. L/R of AV1/S, AV2, YCbCr via audio switch NB02(40 52BP) selecting, it sent to N102 2 9#,43# switch selection and audio pr ocess 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.

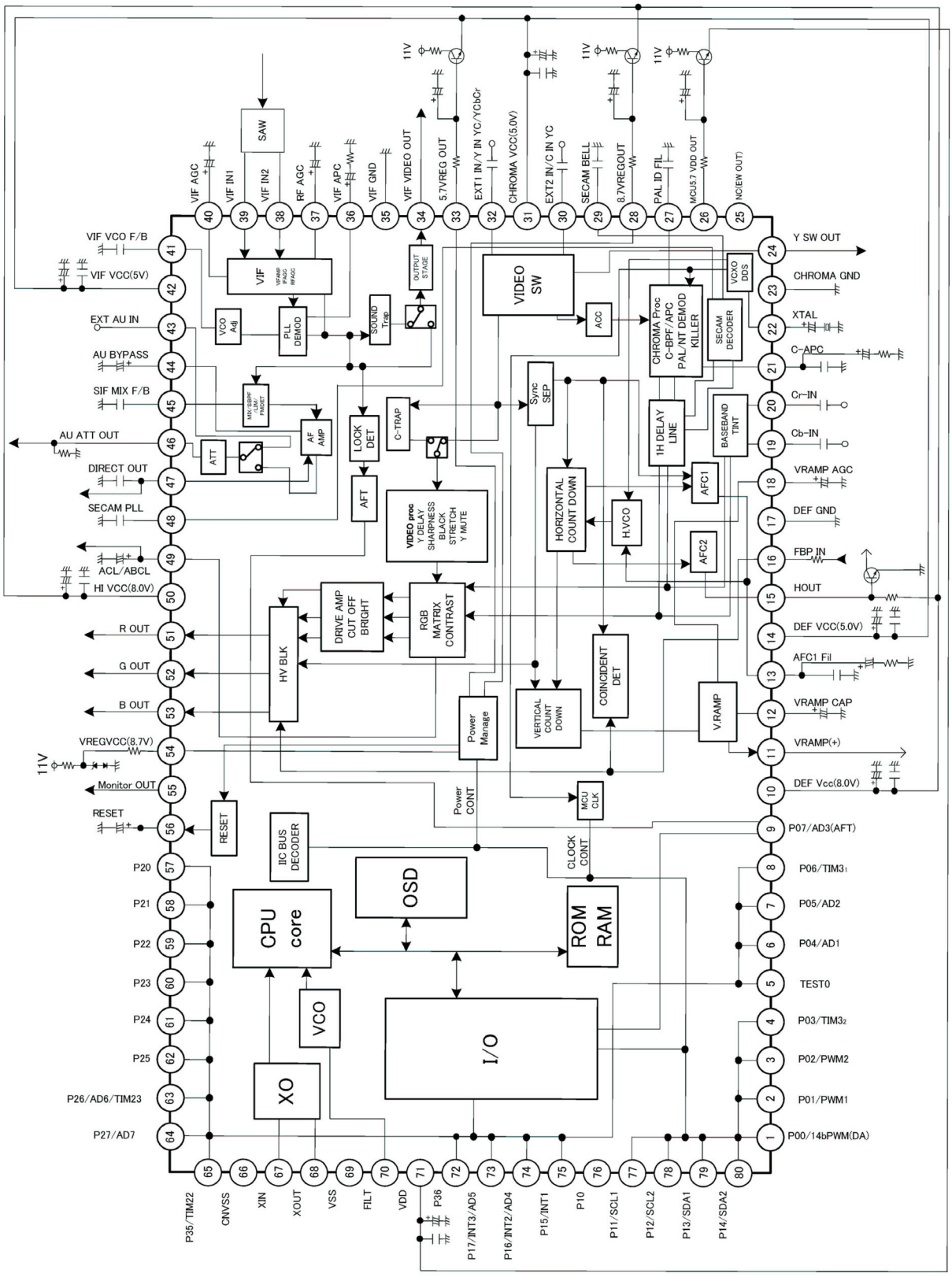
The unit is control by the MCU built in N102, it connects tuner and E2PROM through IIC bus line a nd controls the whole unit working.

Block diagram



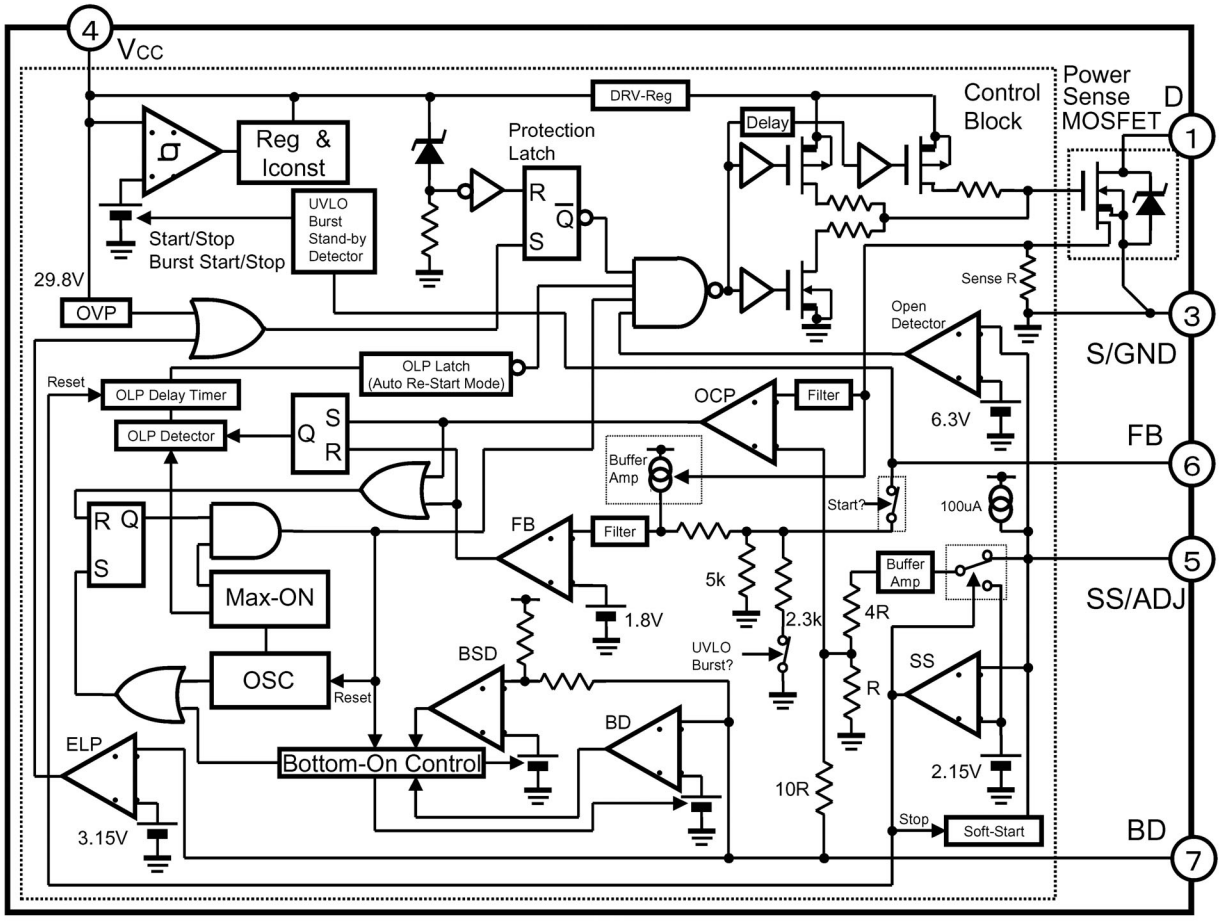
IC Block diagram:

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 ST	ANDBY	0.04	78	P12	0
4 S_MUTB		0.04	77	SCL	5
5 TEST0		0	76	P10	0
6	AV1/AV2 A V1/TV control	0.08	75	P15	0
7	AV/Y A V/Y control	0.04	74	REMOTE	5.00
8 P	AL/N	0	73	KEY1	0.7
9 AFT		2.5	72	P36	0
10	VCC + 8V	8	71	MCU +5V	5
11 VDR	V	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 MONI	TOR_OUT SVM out	0.4
27 P	AL_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_BYP	ASS	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)

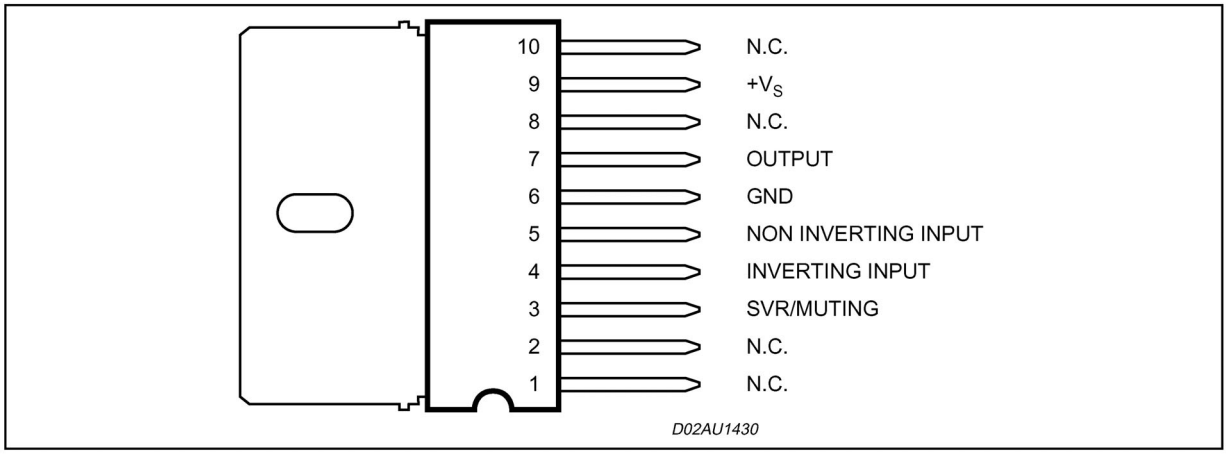
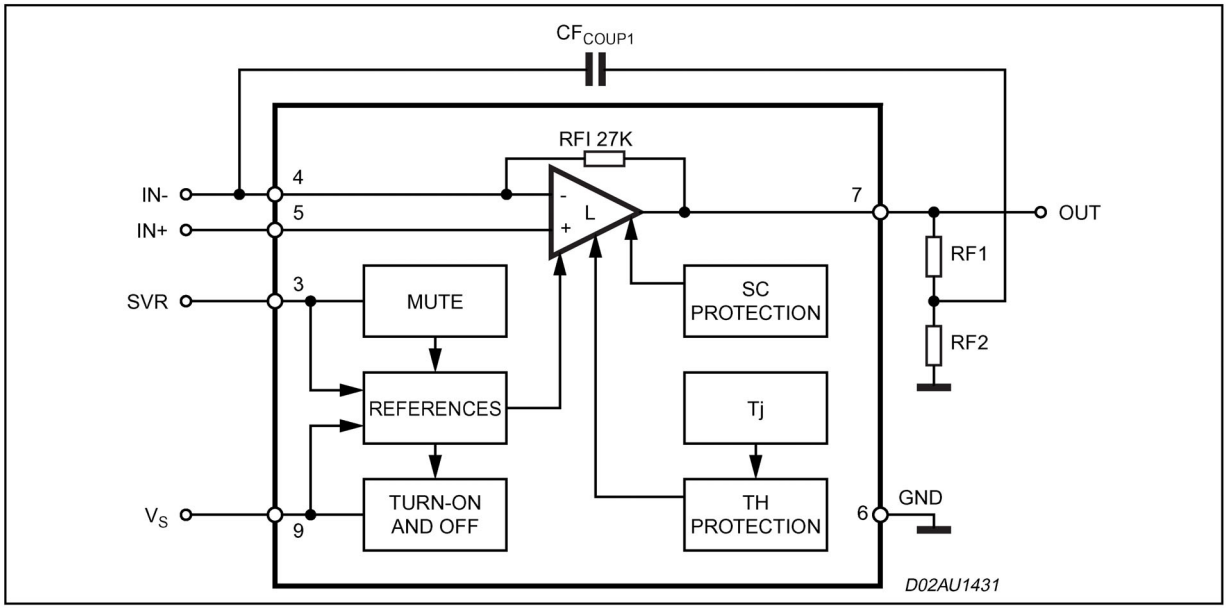
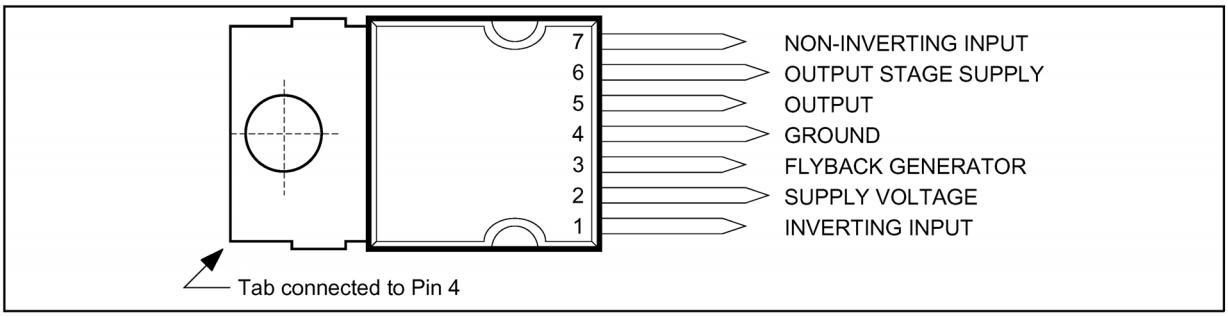


Figure 4. Block Diagram

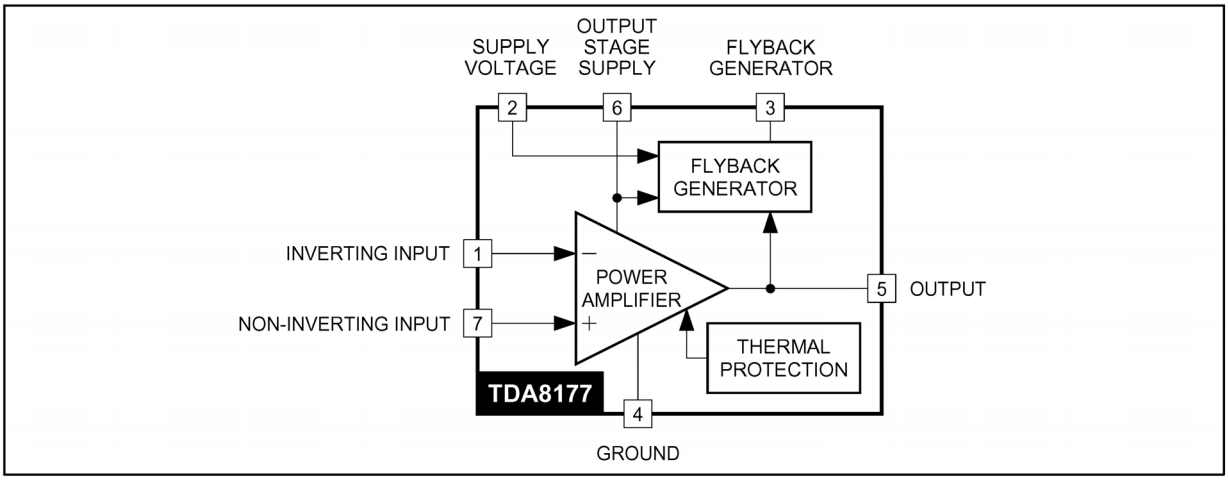


4.TDA8177

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

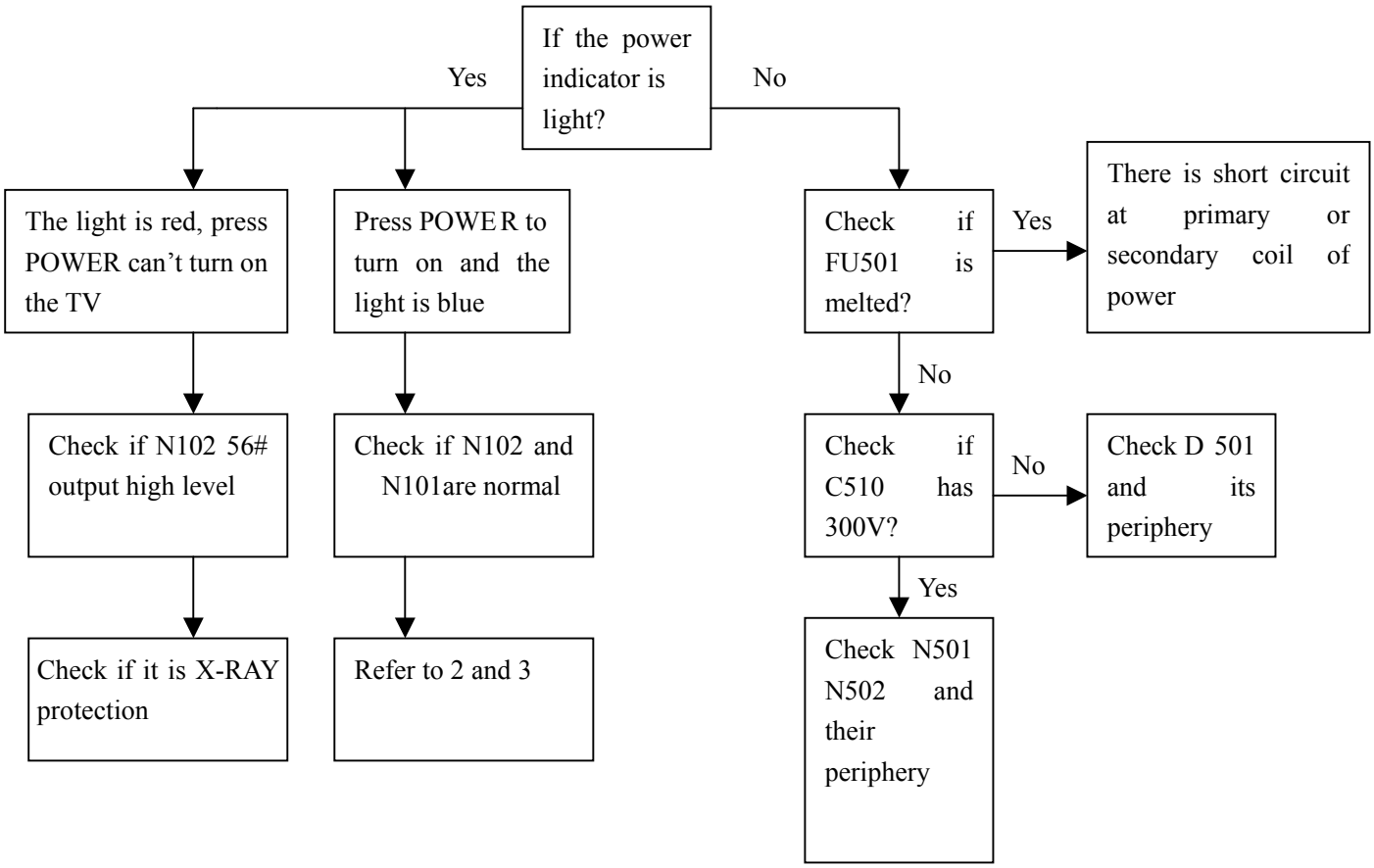
X303

X301

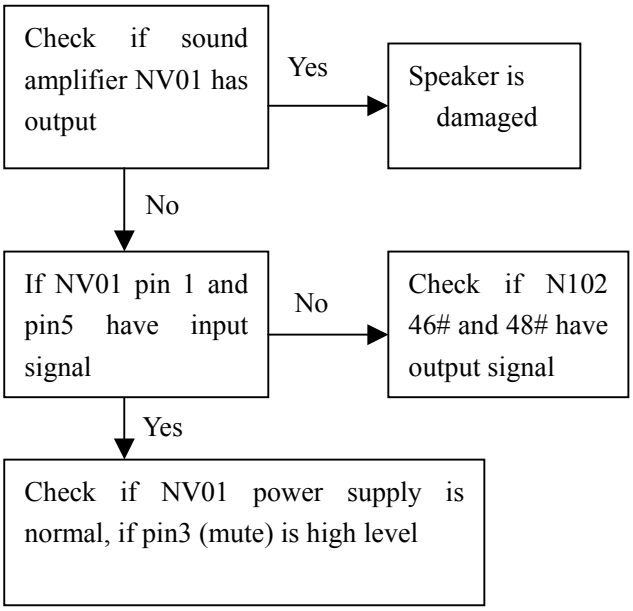
782-TQ2192-0100

Troubleshooting guide

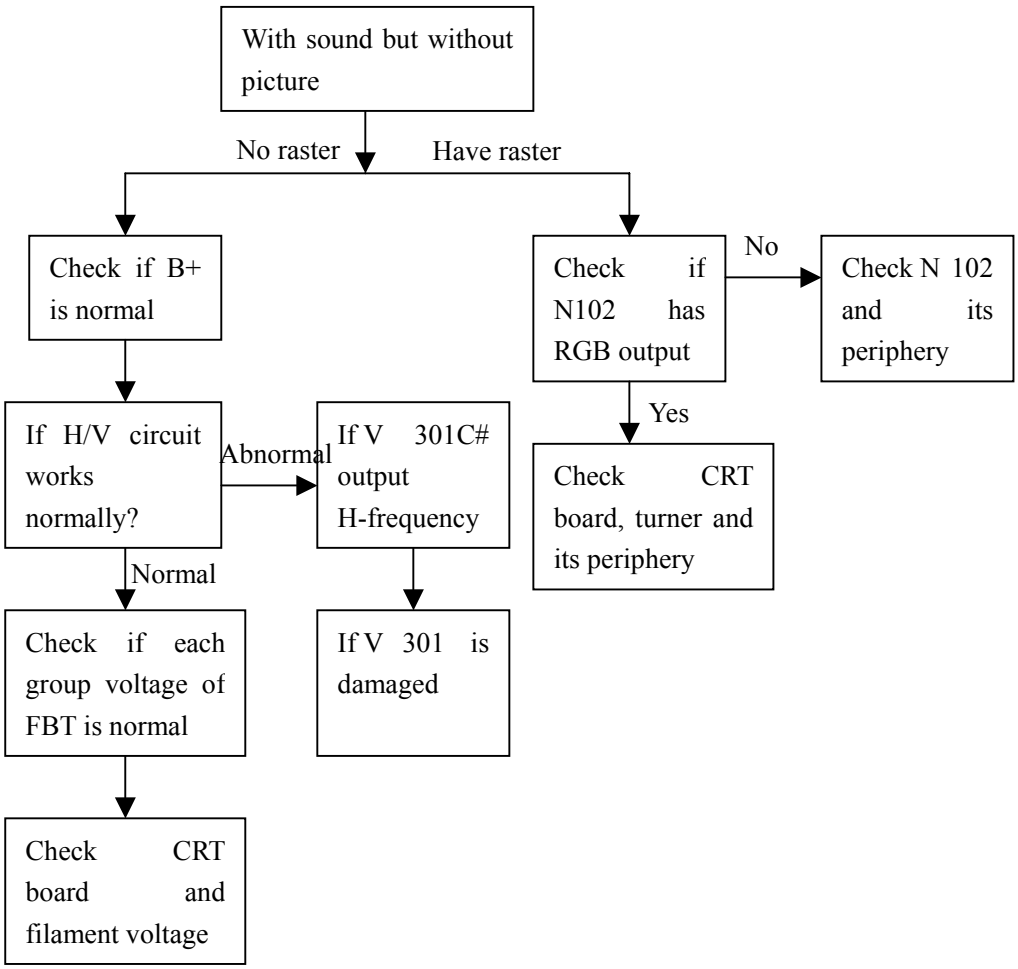
1. no raster, no sound

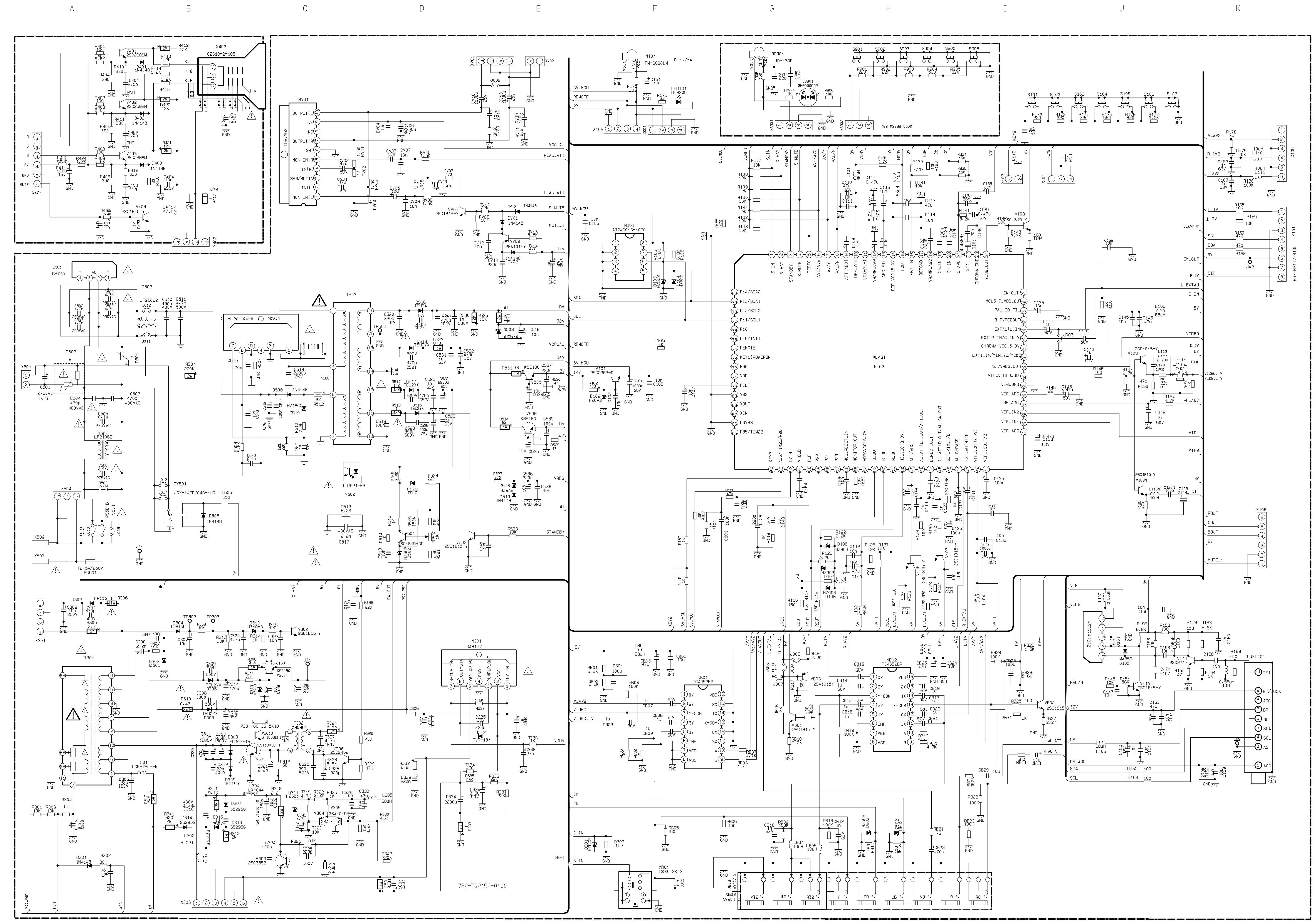


2. with picture, without sound



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 GZS10-2-10B
V401 2SC2688M
V402 2SC2688M
V403 2SC2688M
V404 2SC1815-Y
X401
X402
HV
NV01 TDA7253L
OUTPUT(L)
OUTPUT(R)
NON IN(R)
NON IN(L)
SVR/MUTING
VV01 2SC1815-Y
VV02 2SA1015Y
XV01
XV02
VCC_AU
R_AU_ATT
L_AU_ATT
S_MUTE
MUTE_1
14V
N104 FM-6038LM
For J21A
LED101 HFR205
5V_MCU
REMOTE
5V
X102
X103
RC901 HRM138B
VD901 GH050602
X9901
X9902
782-M2988-0500
S901
S902
S903
S904
S905
S906
S101
S102
S103
S104
S105
S106
S107
KEY2
X104
X105
X101
X106
V_AV2
R_AV2
L_AV2
R_TV
L_TV
V_AVOUT
SCL
SDA
9V
EW_OUT
B.7V
SIF
667-M2117-3100
JA2
N101 AT24C016-10PC
D501 T2S860
AC
T502
LF21062
T503
STR-W6553A N501
N503 uPC574
TP501
KSE180
V505
V506
TLP621-GB N502
N102
#LAB1
X501
X502
X503
X504
RY501 JQX-14FF/048-1HS
FU501 T2.5A/250V
LF21062 T501
V501 2SC1815-GR
V503 2SC1815-Y
STANDBY
VREG
B+
32V
S.IN
X-RAY
STANDBY
S.MUTE
AV1/AV2
AV/Y
PAL/N
FBP
Cr
P14/SDA2
P13/SDA1
P12/SCL2
P11/SCL1
P10
P15/INT1
REMOTE
KEY1(POWERON)
P36
VDD
FILT
VSS
XOUT
XIN
CNVSS
P35/TIM22
EW_OUT
MCU5.7_VDD_OUT
PAL_ID_FIL
B.7VREGOUT
EXTAU(L)IN
EXT_2_IN/C_IN_Y
CHROMA_VCC(5.0V)
EXT1_IN/YIN_Y/YCDC
5.7VREG_OUT
VIF_VDD_OUT
VIF_GND
VIF_APC
RF_AGC
VIF_IN2
VIF_IN1
VIF_AGC
L_EXTAU
C_IN
VIDEO
5.7V
8V
VIDEO_TV
VIF1
VIF2
ROUT
GOUT
BOUT
MUTE_1
X301
T301
X303
N301 TDA8177
782-TQ2192-0100
VDRV
HEHT
Vcc_Ver
ABCL
FBP
X-RAY
9V
EW_OUT
NB01 TC4052BP
NB02 TC4052BP
XB01 CKX5-2K-2
XB02 AV901-B
XB03 AV417-3
V_AV2
VIDEO
VIDEO_TV
C_IN
S_IN
Cr
Cb
Z101 M1962M
TUNER101
IF1
BT/LOCK
ADC
BP
NC
SDA
SCL
AS
AGC
PAL/N
32V
RF_AGC
R_AU_ATT
L_AU_ATT