COLOR TELEVISION

SERVICE MANUAL

TQ2092

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 hazard, the high voltage should fall within the limitation. The appliance works at AC 120V, 60Hz. The high voltage of zero beam current (brightness is min) should be within 30kV on condition that the main power voltage is 110V(13", 20"), 130V(24") and 135V(37"). 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(13", 20"), 130V(24") and 135V(37") 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)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 120V/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

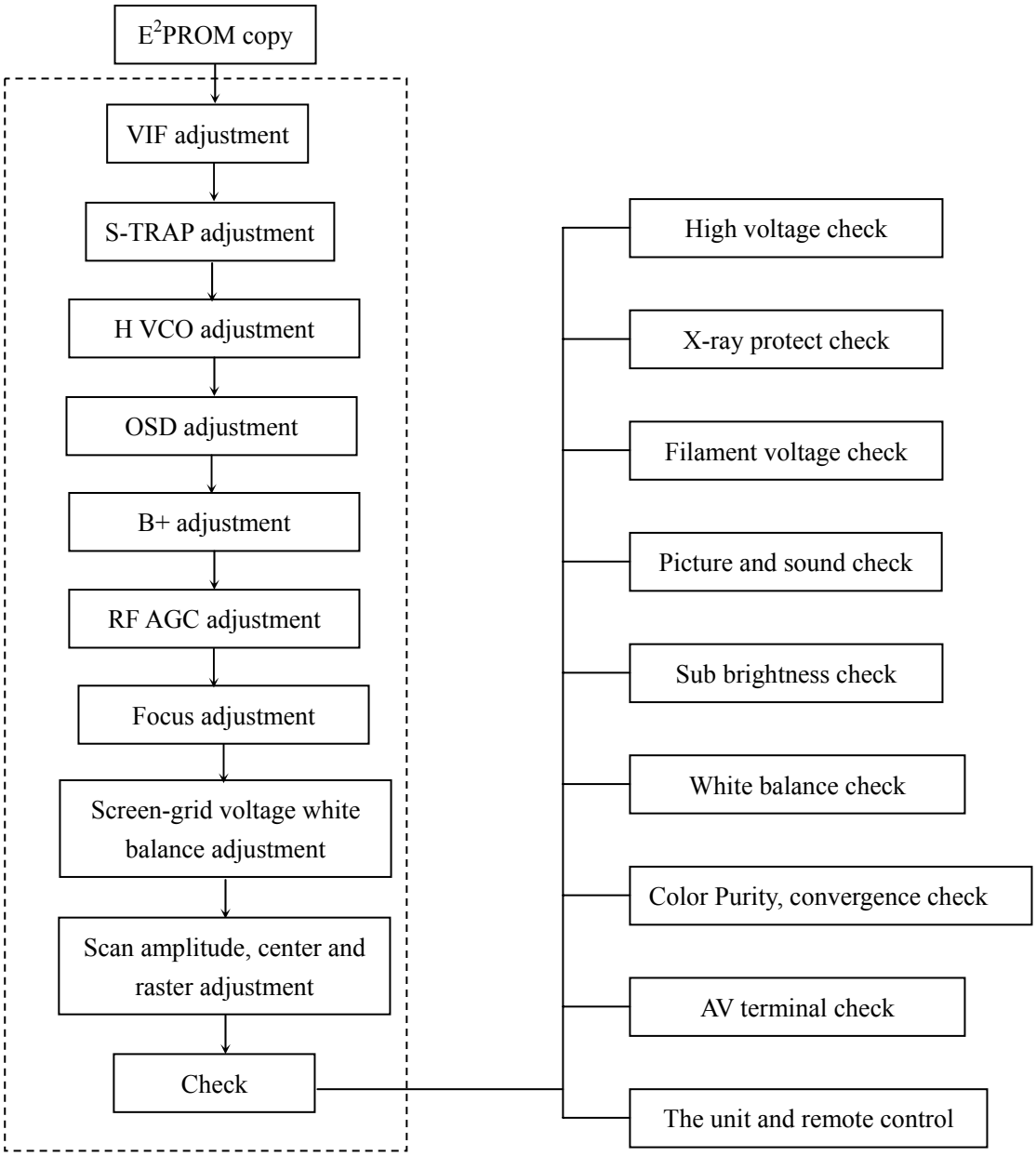


Fig-1 alignment flow

3. Factory menu adjustment (FACTORY MENU PAGE)

3.1 VIF adjustment

Receive a NTSC 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 NTSC 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 NTSC 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 120V/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(13”, 20”), 130V ±0.5 V(24”), 135V±0.5 V(27”).

3.6 RF AGC adjustment

RF AGC is auto adjusted by the turner.

3.7 Focus adjustment

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

3.8 Screen-grid voltage and white balance adjustment

a) Receive A-7 signal, set user control to “user” and the brightness, contrast and color are zero.
b) Adjust potentiometer of SCREEN till the top side seven lattices slightly light up.
c) White balance adjustment of analog TV channel and AV channel.
   Input erect 10-gray scale signal of VP403, at AV channel, set user control to “standard”. Adjust the center of the right third level of dark balance and the center of the left second level of bright balance. Enter CRT ADJ of factory menu, fixed CUT G(150), adjust CUT R, CUT B, DRV-R, DRV-B till the white balance is normal basically.
d) White balance adjustment of COMPONENT channel and digital TV channel.
   Input erect 10-gray scale signal of VP403, at COMPINENT channel, set user control to “standard”. Adjust the center of the right third level of dark balance and the center of the left second level of bright balance. Enter CRT ADJ of factory menu, fixed CUT G YUV(150), adjust CUT R YUV, CUT B YUV, DRV-R YUV, DRV-B YUV till the white balance is normal basically. Then enter CR PED, CB PED to adjust the dark balance of COMPONET channel again, in order to let it more accurate.
   Enter digital TV channel and check if the balance is up to the mustard, if not, adjust CUT R DTV, CUT G DTV, CUT B DTV. The adjust method of DTV R PED, DTV B PED is as same as it of COMPONENT channel

3.9 line, field center adjustment

Receive CENTER CROSS 100IRE signal of VP403, set user control to “standard” of AV channel, 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 line, field amplitude adjustment

a) field amplitude adjustment

Receive PERCENT OVERSCAN signal of VP403, set user control to “standard” of AV channel, enter RASTER ADJ item, adjust field amplitude V-SIZE, let the vertical reproduction ratio of picture acceptable 5%.

b) line amplitude adjustment

receive PERCENT OVERSCAM single of VP403, set user control to “standard” of AV channel.

13” and 20”: adjust B+ potentiometer RP502, let the line reproduction ratio of picture acceptable 5%.

20”, 24” and 27”: enter RASTER ADJ item, adjust line amplitude H-SIZE, let the line reproduction ratio of picture acceptable 5%.

3.11 line, field linearity and geometry adjustment

receive CROSSHATCH single of VP403, set user control to “standard” of AV channel.if the linearity and geometry are not satisfied, you may adjust the following items of RASTER ADJ:

Corner PARA

Trape VS-CORE V-LIN

Note: CORNER, PATR, TRAPE need not adjust at 13” and 20”.

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 the value below:

13”: 22 kV±1 kV 20”: 25.5 kV±1 kV

24”: 27 kV±1 kV 27”: 29kV±1 kV

2) Set the brightness and contrast to minimum (zero beam current), measure the high voltage, the reading should not exceed 33kV.

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) 13”, 20”, 24”: Short circuit R309 (TP302, TP303), X-Ray protection circuit should function.
   27”: press S301, X-Ray protection circuit should function.

4.4 Picture and sound check

1) Receive standard TV signal, include NTSC and ATSC.
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, sub-contrast check

1) sub-brightness check

Receive full-screen 8IRE signal of VP403, set user control to “standard” and check if it is satisfied (for example: BESTBUY require brightness of 7.5IRE BLACK ≤0.20 ft.L), if not, enter PICTURE ADJ item.

AV channel: ATV BRIGHT

COMPONENT channel: YUV BRIGHT

DTV channel: DTV BRIGHT

Fine adjust the items to let it be satisfied (suggest 0.15 ft.L ≤BLACK brightness ≤0.20 ft.L).

2) sub-contrast check

Receive window 100IRE signal of VP403, set user control to “standard” and check if it is satisfied (for

example: BESTBUY require brightness of window 100IRE≥70 ft.L), if not, enter PICTURE ADJ item.
AV channel: ATV CONTRAST
COMPONENT channel: YUV CONTRAST
DTV channel: DTV CONTRAST
Fine adjust the items to let it be satisfied.
4.6 Color purity and convergence check (in normal way)
4.7 AV/S terminals video and sound IN/OUT check
4.8 COMPONENT channel video and sound IN check.
4.8 Other buttons on the TV set and remote controller function check.

5 Ex-factory setting

Enter factory menu SHIPMENT OFF, press right button to let OFF turn to ON, then exit the factory menu.
5.1 picture menu

CONTRAST	45
BRIGHTNESS	35
COLOR	45
TITN	0
SHARPNESS	30
PICTURE MODE	STANDARD
▽MORE	

5.2 Volulme: 30
5.3 Language: English
5.4 TV mode: channel 2

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
	12. H-SIZE	Field amplitude adjustment
	13. PARA	Pincushion adjustment
	14. CONTER	Angle adjustment
	15. Trape	Trapezia adjustment
3: CRT ADJ	16. CUT R	TV-NTSC, AV white balance adjustment
	17. CUT G	
	18. CUT B	
	19. DRV-R	
	20. DRV-B	
	21. CUT R YUV	COMPONENT white balance adjustment
	22. CUT G YUV	
	23. CUT B YUV	
	24. DRV-R YUV	
	25. DRV-B YUV	
	26. CR PED	
	27. CB PED	
	28. CUT R DTV	TV-ATSC white balance adjustment
	29. CUT G DTV	
	30. CUT B DTV	
	31. DTV R PED	
	32. DTV B PED	
	33. Y R OFSET	Correction offset, 30
	34. YUV B ADD	Correction offset, 30
	35. YUV B DEC	Correction offset, 30
4: PICTURE ADJ	36. ATV BRIGHT	TV-NTSC, AV Sub bright adjustment
	37. ATV CONTRAST	TV-NTSC, AV Sub contrast adjustment
	38. YUV BRIGHT	COMPONENT Sub bright adjustment
	39. YUV CONTRAST	COMPINENT Sub contrast adjustment
	40. DTV BRIGHT	TV-ATSC Sub bright adjustment
	41. DTV CONTRAST	TV-ATSC Sub contrast adjustment
5: SHIPMENT OFF		User menu pre-set
6: SERVICE MENU		E2 reference
7: AGING OFF		Aging switch, after aging function turns on, the unit will auto turn on and display HR sign on the top left of the screen, press return button to enter the factory menu

Working principle:

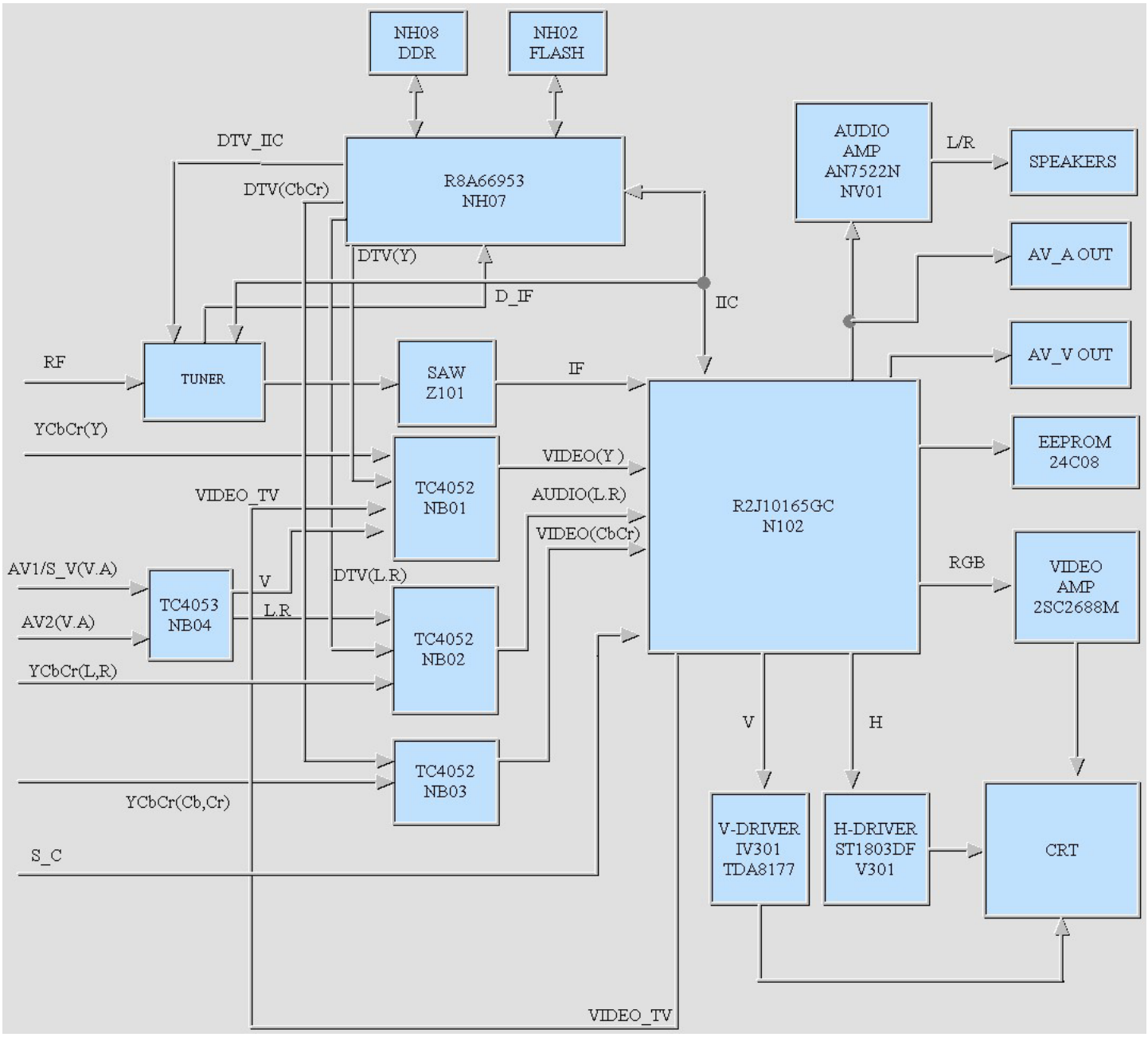
The unit adopts the super single IC R2J10165(N102) with I2C bus controlled processor produced by RENEsAS, which includes IF, color decoder, 8-bits MCU, pre-video amplify, H/V deflection, AV switch, audio processing, ect.. The main interfaces are: two AV IN, one S-VIDEO IN, YCbCr, one AV OUTPUT.

The signal flow is below:
The antenna reception signal RF will be sent to the integrative tuner (contains HF and IF amplifier circuits), which is controlled by SDA and SCL, selects appropriate channel and sends the selected IF signal to the next level for processing.
If receive the analog RF 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 (R2J10165) 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.
If receive the digital RF signal, the signal via HF and IF amplifying, output differential digital IF signal form 10#, 11#, then feed to NH07(R8A66953) demodulate and MPEG decoder, output YCbCr of DTV(DTV-Y and DTV-CbCr) and audio DTV-L/R.

VIDEO-TV, DTV-Y, Y component from YCbCr and V/Y signal of AV1/S, AV2 selected by switch NB04 (TC4053), they are all sent to NB01(TC4052)9#,10# select, output VIDEO, it will be sent to N102 form 32#. C of S terminal is sent to N102 30#. Components Cb, Cr and DTV-CbCr demodulated and MPEG decoded by R8A66953 are sent to N102 19#,20#, then switch selection, 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(TDA8172) 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 via audio switch NB04(TC4053) selecting, L/R of YCbCr and DTV-L/R demodulated and MPEG decoded by R8A66953, 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(AN7522) amplifying to push the speaker; at the same time, the L/R from 46# 48# is also audio of AV OUT.

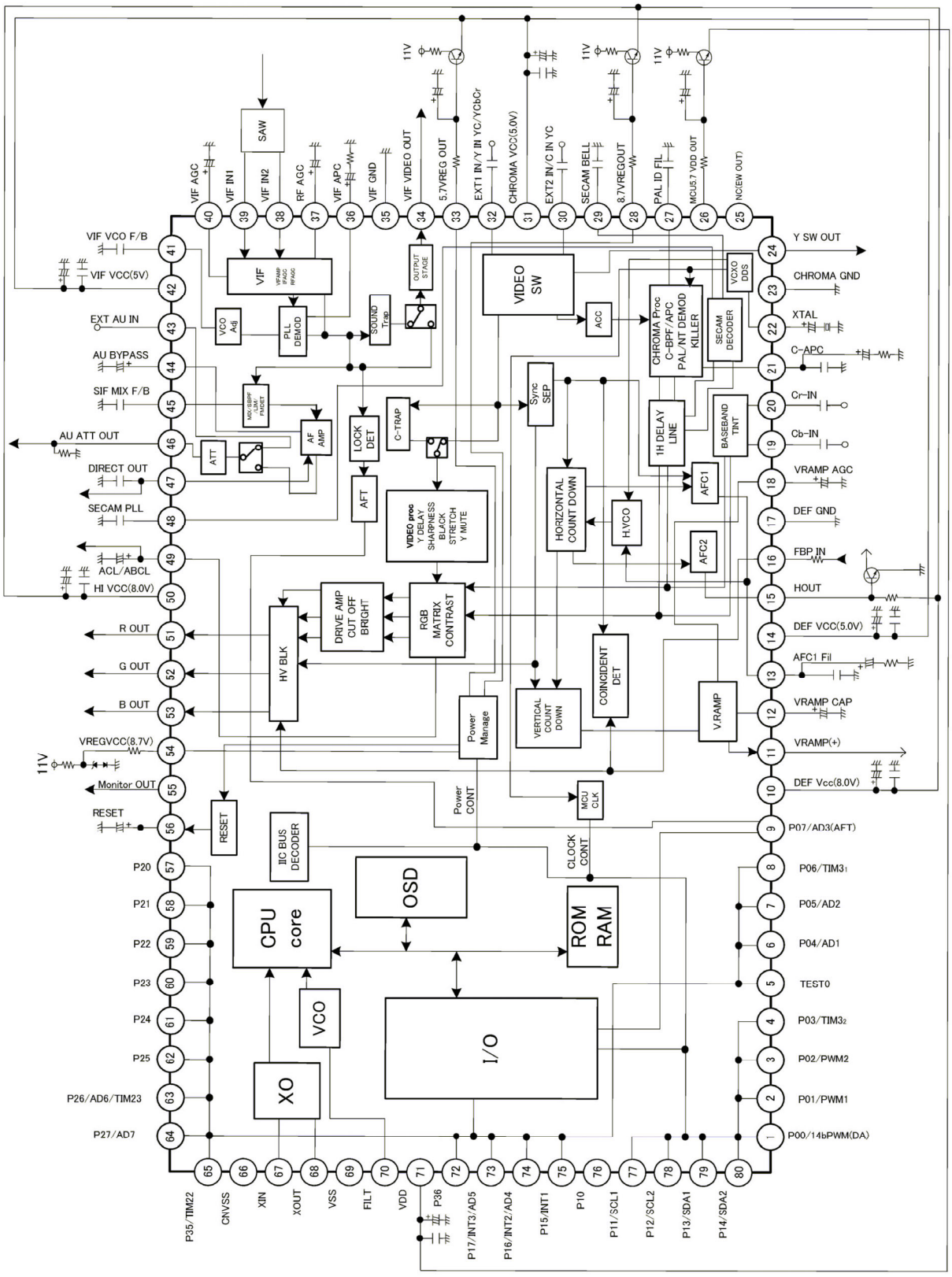
The unit is control by the MCU built in N102, it connects tuner and E2PROM through IIC bus line and controls the whole unit working.

Block diagram

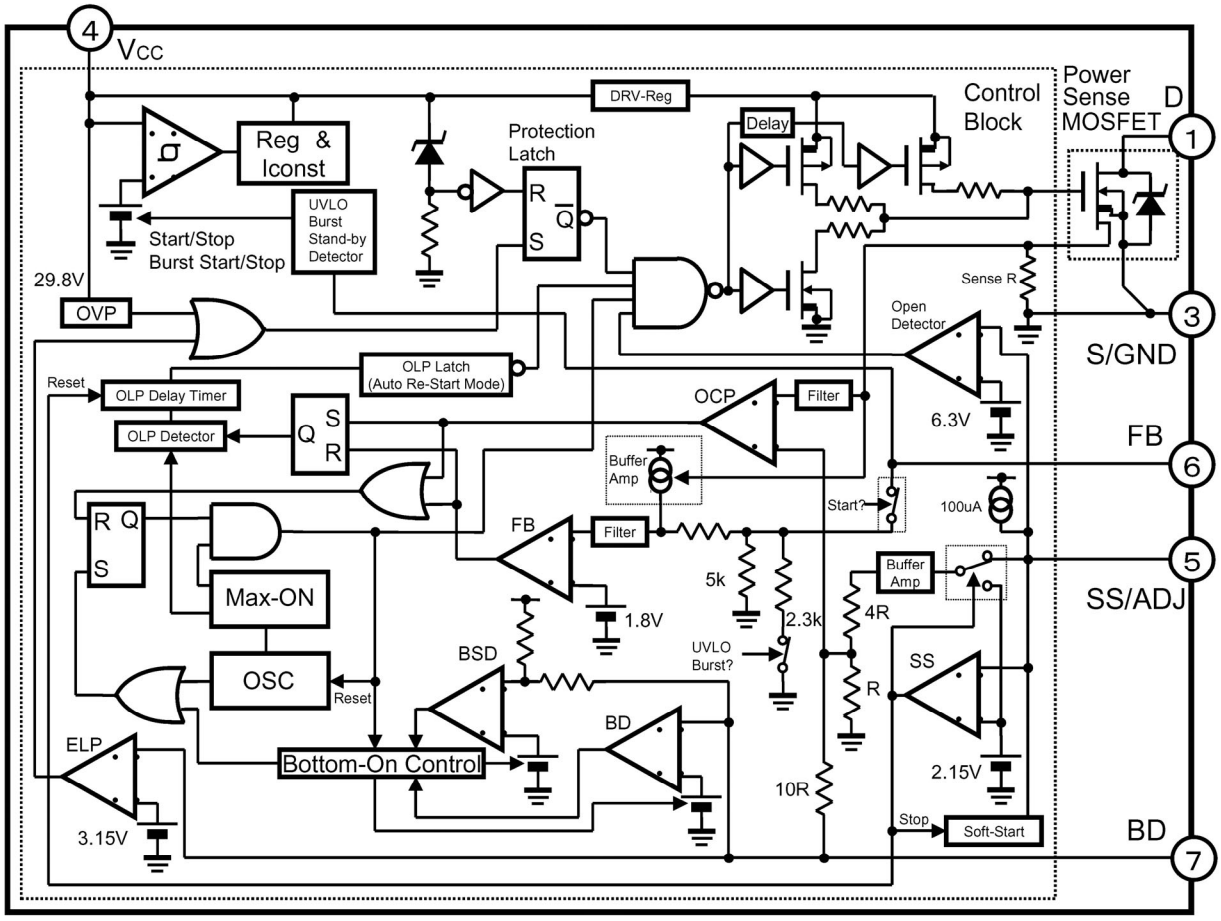


IC Block diagram:

1.R2J1016XFP



2.STR-W6553A

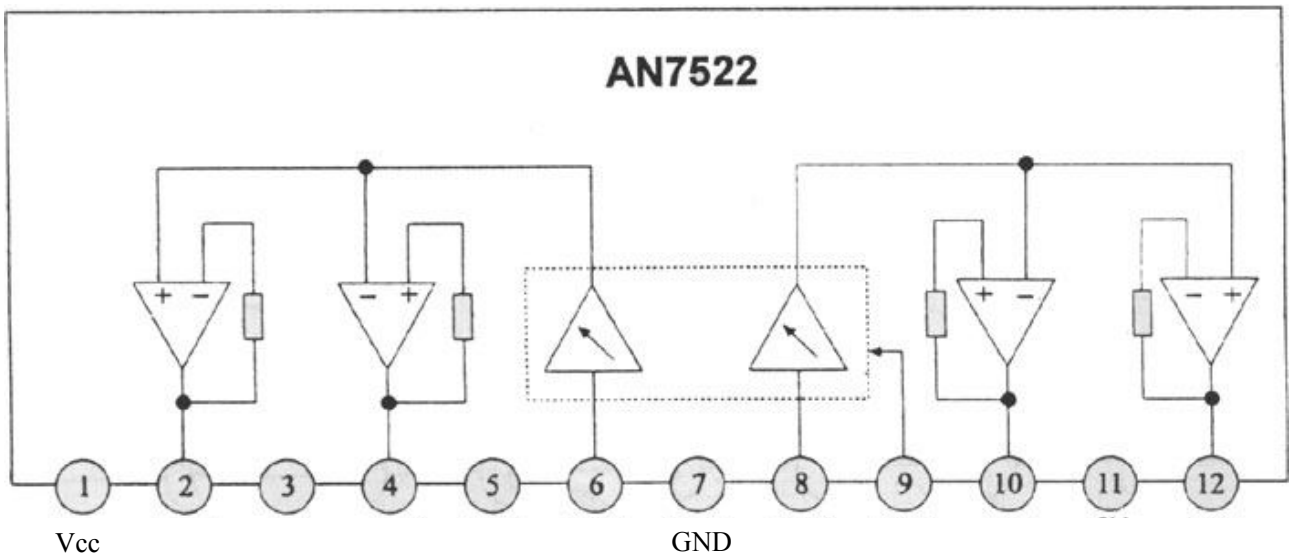


Pin function:

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. AN7522N

The AN7522 is a monolithic integrated circuits designed for 3.0WX2 channel BTS(8V, 8Ω)output audio power amplifier.



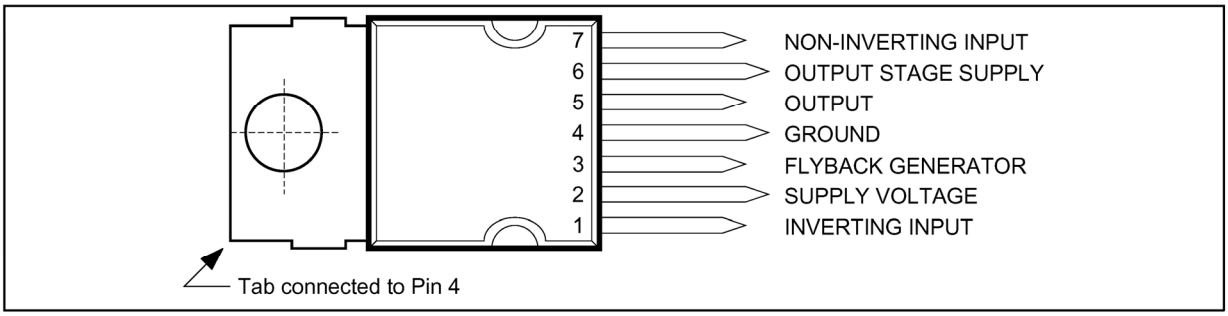
4.TDA8177

Designed for monitors and high performance TVs, the TDA8177 vertical deflection booster delivers flyback voltages up to 70V.

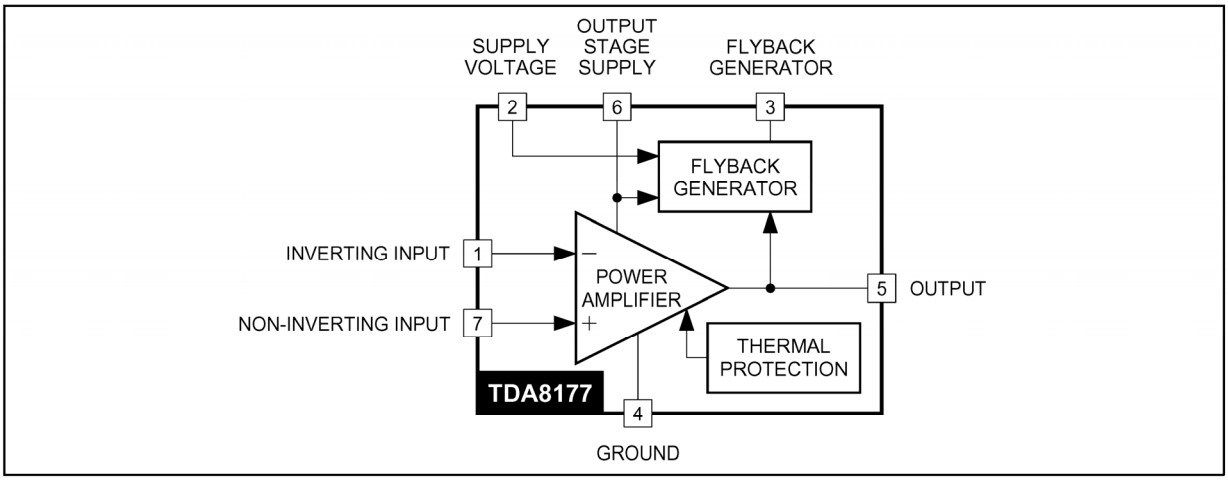
The TDA8177 operates with supplies up to 35V and provides up to 3App output current to drive the yoke.

The TDA8177 is offered in HEPTAWATT package

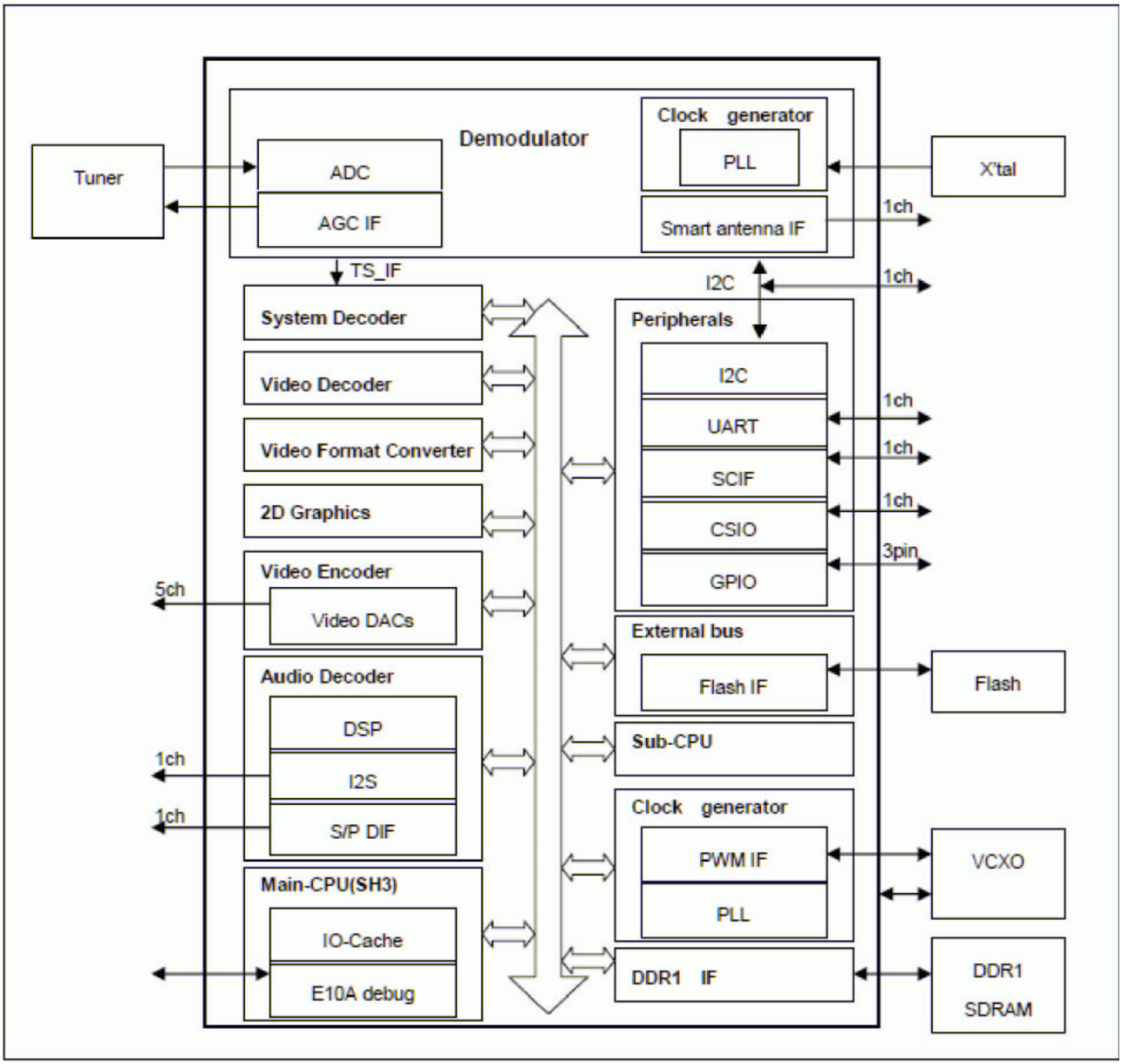
PIN CONNECTIONS



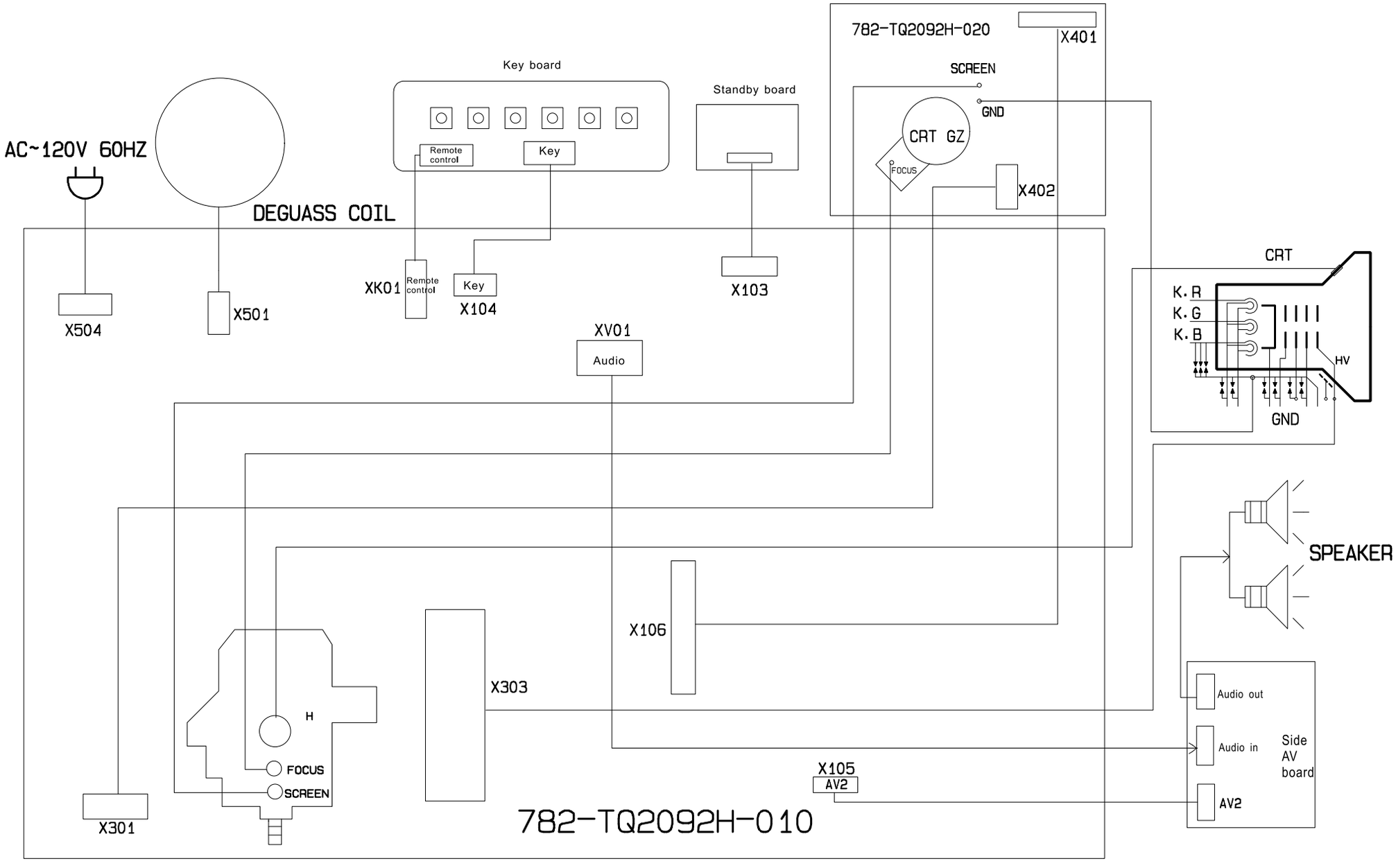
BLOCK DIAGRAM



5.R8A6695SFP

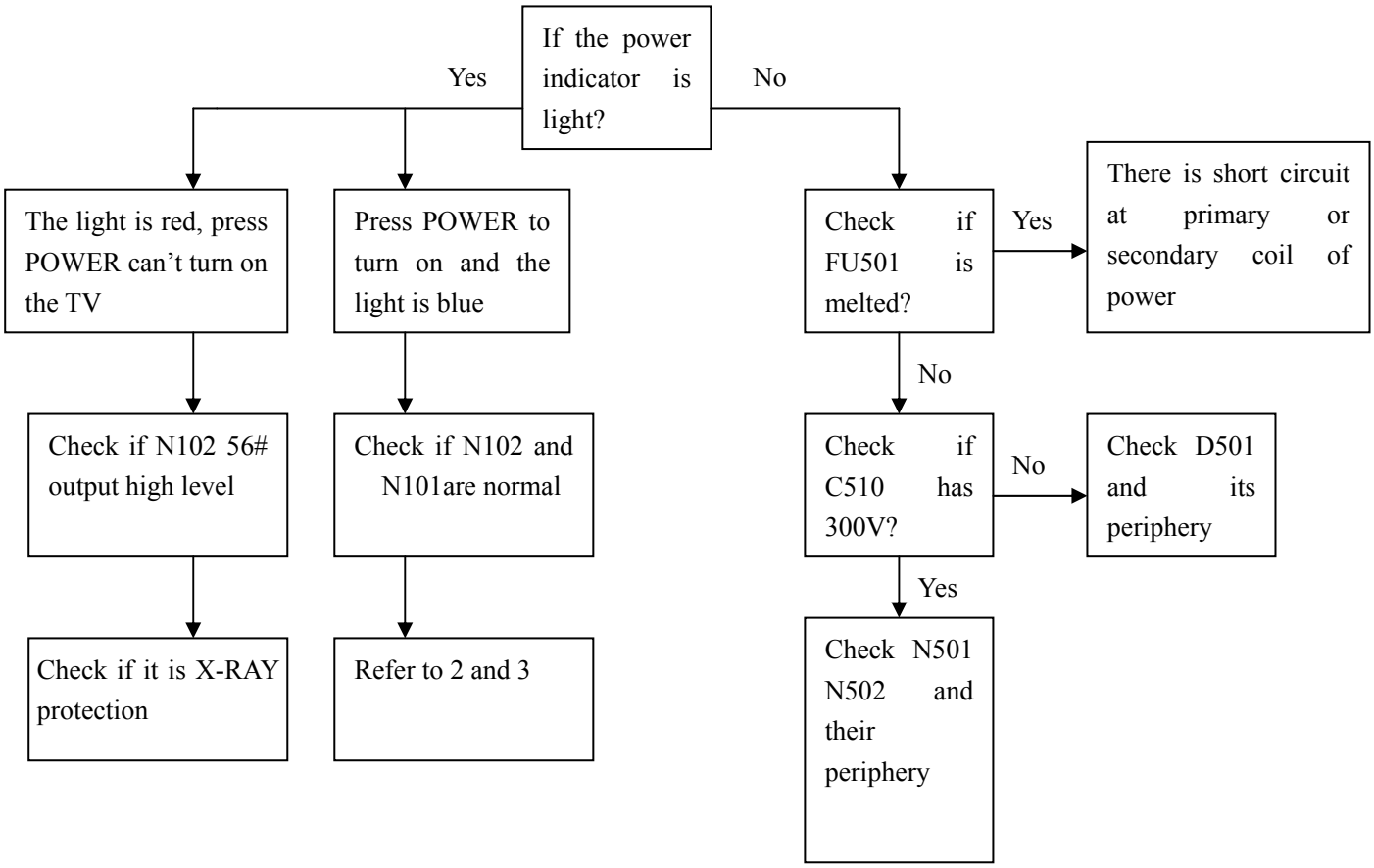


Pin Layout

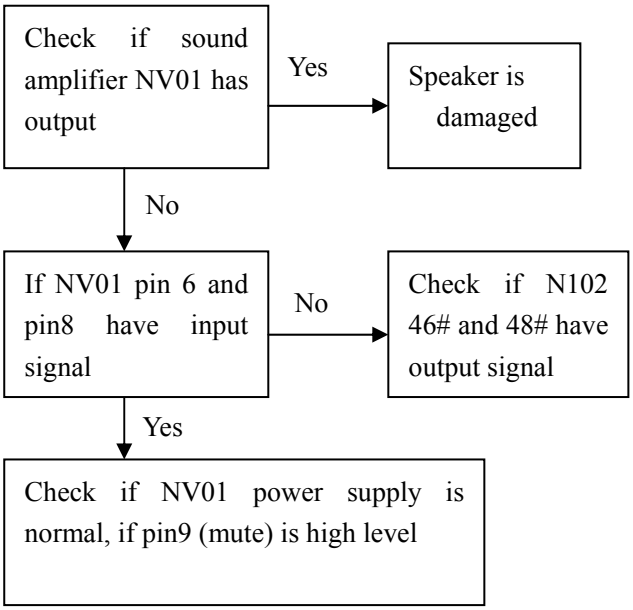

AC~120V 60HZ
DEGUASS COIL
X504
X501
Key board
Remote control
Key
XK01
Remote control
Key
X104
Standby board
X103
782-TQ2092H-020
X401
SCREEN
GND
CRT GZ
FOCUS
X402
CRT
K.R
K.G
K.B
HV
GND
XV01
Audio
X106
SPEAKER
X303
H
FOCUS
SCREEN
X301
X105
AV2
782-TQ2092H-010
Audio out
Audio in
AV2
Side AV board

Troubleshooting guide

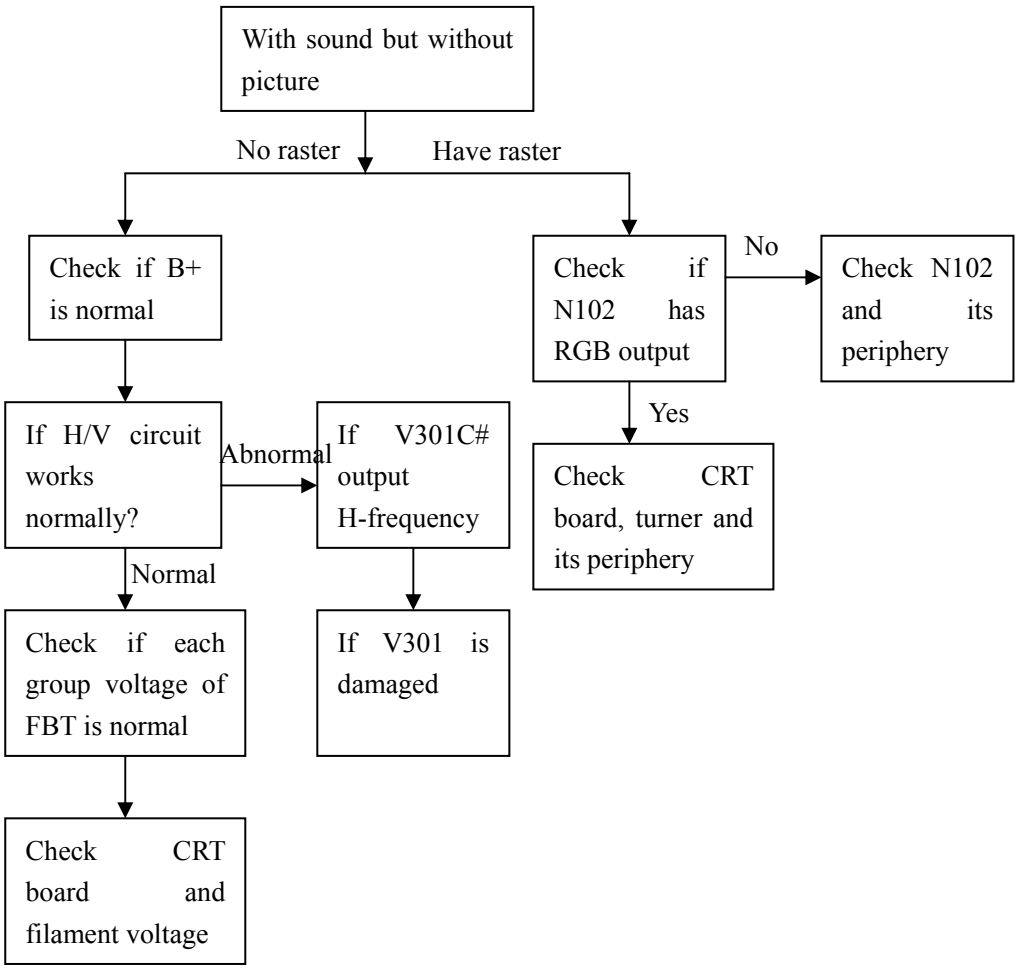
1. no raster, no sound

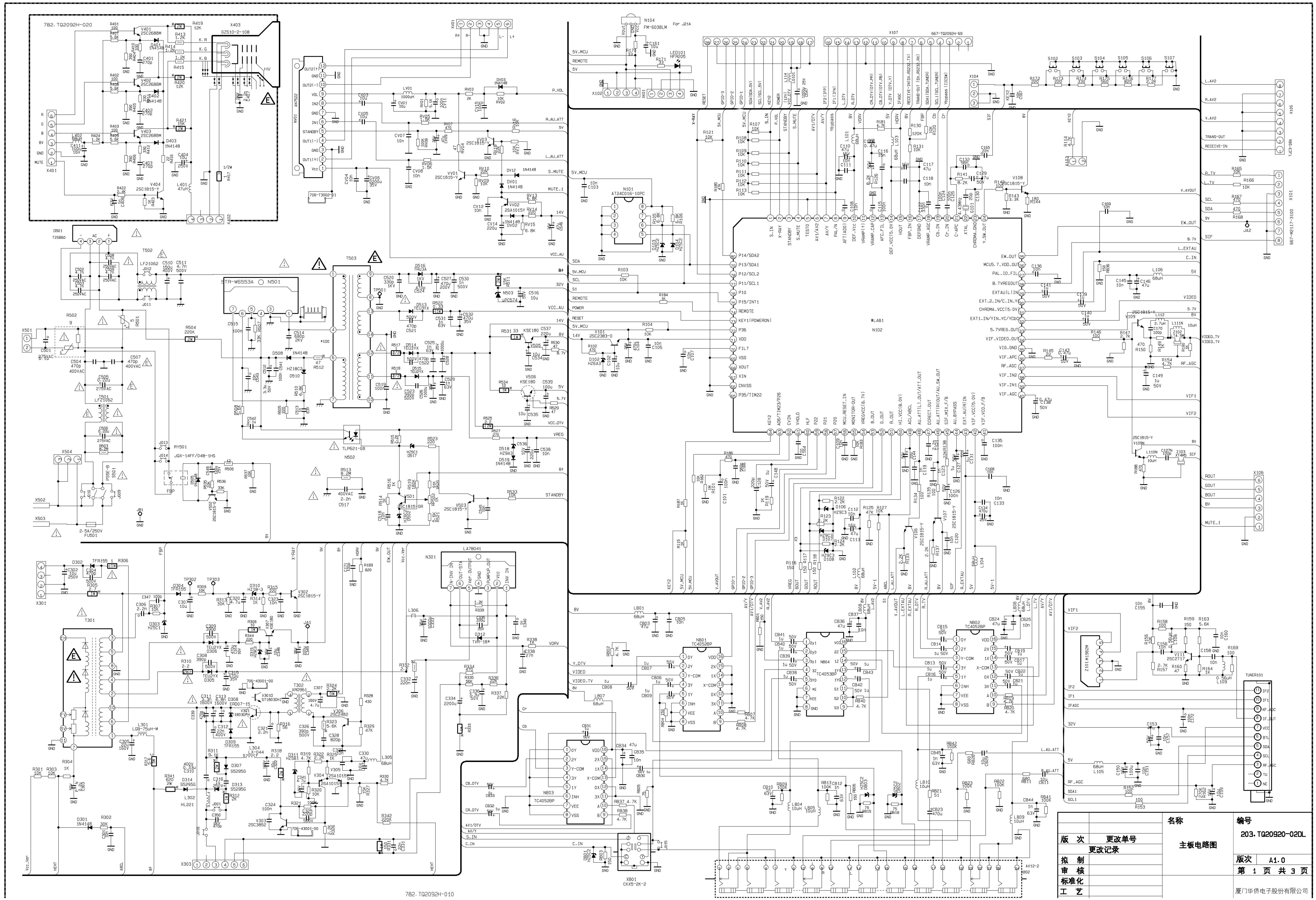


2. with picture, without sound



3. with sound, without picture





A B C D E F G H I J K
1 2 3 4 5 6 7 8
782.TQ2092H-020
X403 GZS10-2-108
X401
X402
NV01 AN7522
706-T3002-01
N104 FM-6038LM
For J21A
LED101 HFR205
X102
XK01
X107 667-TQ2092H-69
X104
S102 S103 S104 S105 S106 S107
X105 TJC3-08A
X101 667-M2117-3100
X106
N101 AT24C016-10PC
@LAB1
N102
D501 T2SB60
T502
T503
STR-W6553A N501
LF21062
TLP621-GB
N502
RY501 JQX-14FF/048-1HS
X504
PS5E-B S501
X502
X503
2.5A/250V FU501
X301
T301
T302 XR0961
N301 LA78041
NB01 TC4052BP
NB02 TC4052BP
NB03 TC4052BP
NB04 TC4053BP
XB01 CKX5-2K-2
AV12-2 KB02
Z101 M1962M
TUNER101
X303
782.TQ2092H-010
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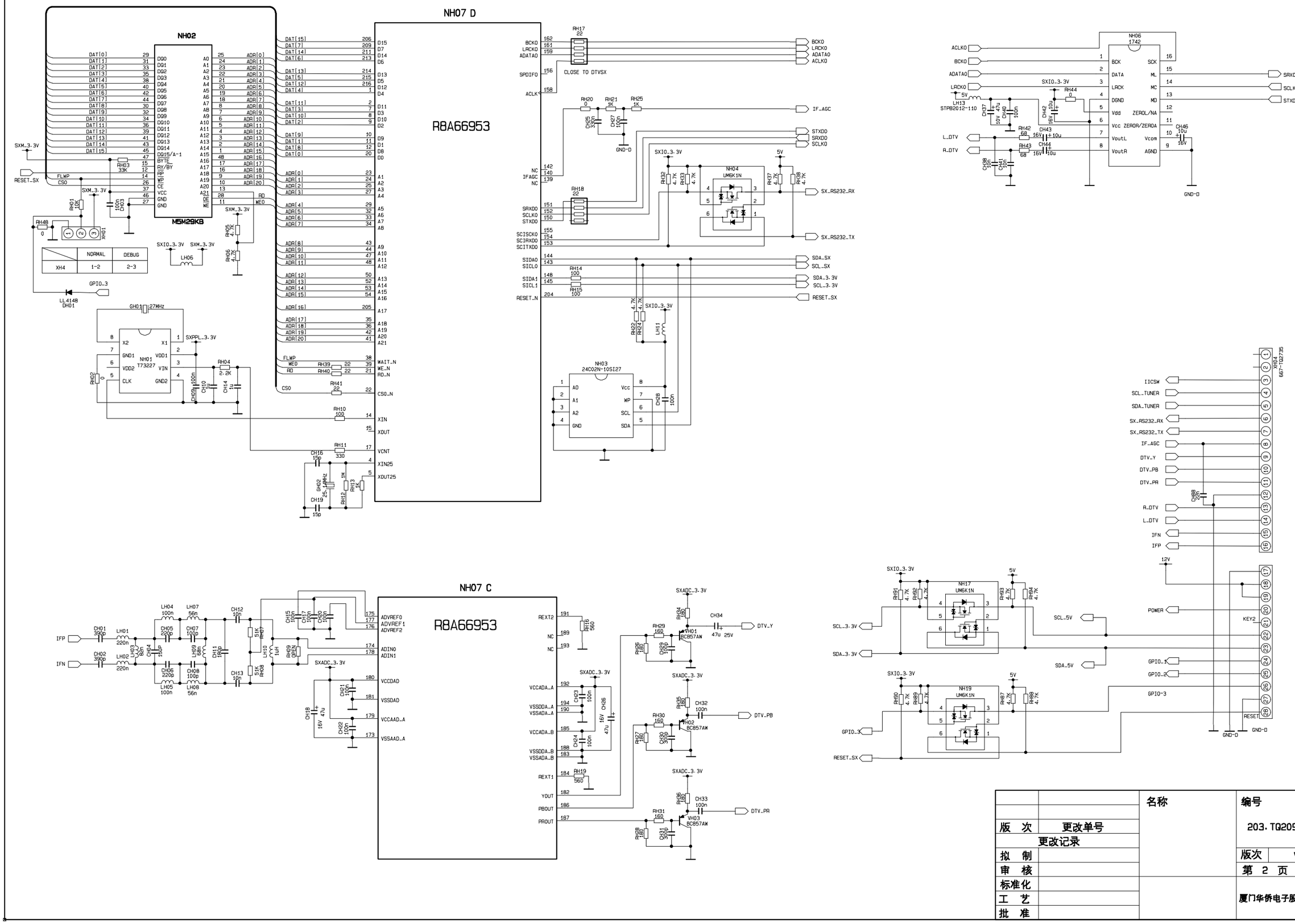

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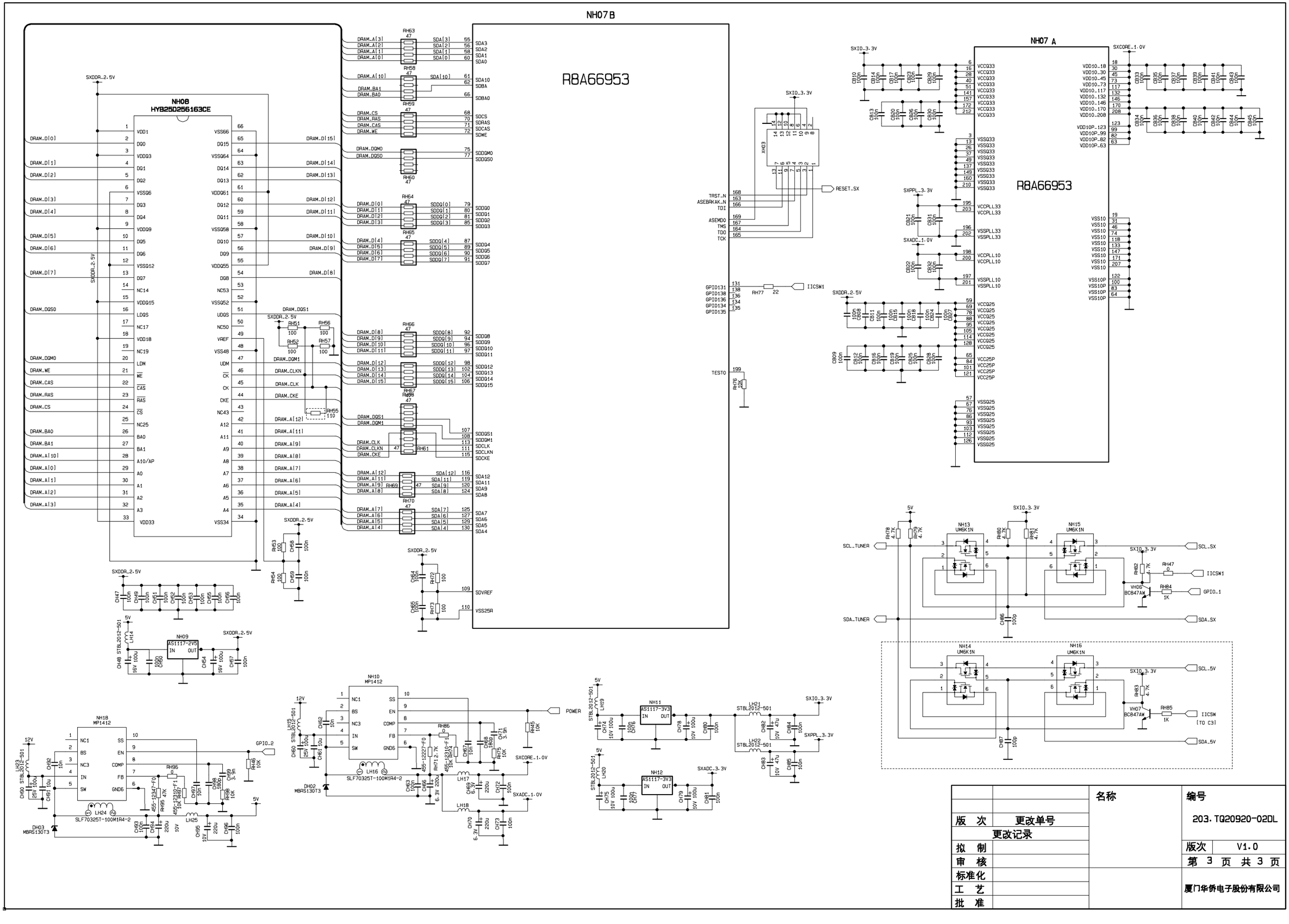
审 核			
标准化			
工 艺			
批 准			



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拟 制			
审 核			
标准化			厦门华侨电子股份有限公司
工 艺			
批 准			

APPENDIX-A: Main assembly list

NAME	NO.	MAIN COMPONENT AND it'S NO.	
Main board	667.TQP92-01I	N102 N301 NV01 N501 TUNER101 T301	R2J10165 (353.10165-00) STV8172 (352.81720-10) AN7522N (352.75220-00) STRW6556A (352.65560-10) ENV56M23D8F (590.40C09-00) FBT/BSC26-N1013A (472.24216-00U)
DTV digital processing board	667.TQ2092H-69	NH07	R8A66953 (353.66953-10)
Side AV board	667.TQ2092-29A		
Keypad board	667.TQ2092H-05		
CRT board	667.TQ2092H-02		
STANDBY board	667.TQ20921-05		
Remote control	301.VTQ2092-21	RC-V21	
CRT	335.2123C-00	A51QGD991X001	