

LCD TELEVISION

SERVICE MANUAL

LC-22HU36

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Attention: This service manual is only for service personnel to take reference with. Before servicing please read the following points carefully.

Safety precautions

1. Instructions

Be sure to switch off the power supply before replacing or welding any components or inserting/plugging in connection wire. Anti static measures to be taken (throughout the entire production process!):

- a) Do not touch here and there by hand at will;
- b) Be sure to use anti static electric iron;
- c) It's a must for the welder to wear anti static gloves.

Please refer to the detailed list before replacing components that have special safety requirements. Do not change the specs and type at will.

2. Points for attention in servicing of LCD

2.1 Screens are different from one model to another and therefore not interchangeable. Be sure to use the screen of the original model for replacement.

2.2 The operation voltage of LCD screen is 700-825V. Be sure to take proper measures in protecting yourself and the machine when testing the system in the course of normal operation or right after the power is switched off. Please do not touch the circuit or the metal part of the module that is in operation mode. Relevant operation is possible only one minute after the power is switched off.

2.3 Do not use any adapter that is not identical with the TV set. Otherwise it will cause fire or damage to the set.

2.4 Never operate the set or do any installation work in bad environment such as wet bathroom, laundry, kitchen, or nearby fire source, heating equipment and devices or exposure to sunlight etc. Otherwise bad effect will result.

2.5 If any foreign substance such as water, liquid, metal slices or other matters happens to fall into the module, be sure to cut the power off immediately and do not move anything on the module lest it should cause fire or electric shock due to contact with the high voltage or short circuit.

2.6 Should there be smoke, abnormal smell or sound from the module, please shut the power off at once. Likewise, if the screen is not working after the power is on or in the course of operation, the power must be cut off immediately and no more operation is allowed under the same condition.

2.7 Do not pull out or plug in the connection wire when the module is in operation or just after the power is off because in this case relatively high voltage still remains in the capacitor of the driving circuit. Please wait at least one minute before the pulling out or plugging in the connection wire.

2.8 When operating or installing LCD please don't subject the LCD components to bending, twisting or extrusion, collision lest mishap should result.

2.9 As most of the circuitry in LCD TV set is composed of CMOS integrated circuits, it's necessary to pay attention to anti statics. Before servicing LCD TV make sure to take anti static measure and ensure full grounding for all the parts that have to be grounded.

2.10 There are lots of connection wires between parts behind the LCD screen. When servicing or moving the set please take care not to touch or scratch them. Once they are damaged the screen

would be unable to work and no way to get it repaired.

If the connection wires, connections or components fixed by the thermotropic glue need to disengage when service, please soak the thermotropic glue into the alcohol and then pull them out in case of damage.

2.11 Special care must be taken in transporting or handling it. Exquisite shock vibration may lead to breakage of screen glass or damage to driving circuit. Therefore it must be packed in a strong case before the transportation or handling.

2.12 For the storage make sure to put it in a place where the environment can be controlled so as to prevent the temperature and humidity from exceeding the limits as specified in the manual. For prolonged storage, it is necessary to house it in an anti-moisture bag and put them altogether in one place. The ambient conditions are tabulated as follows:

Temperature	Scope for operation	0 ~ +50 °C
	Scope for storage	-20 ~ +60 °C
Humidity	Scope for operation	20% ~ 85%
	Scope for storage	10% ~ 90%

2.13 Display of a fixed picture for a long time may result in appearance of picture residue on the screen, as commonly called “ghost shadow”. The extent of the residual picture varies with the maker of LCD screen. This phenomenon doesn’t represent failure. This “ghost shadow” may remain in the picture for a period of time (several minutes). But when operating it please avoid displaying still picture in high brightness for a long time.

3. Points for attention during installation

3.1 The front panel of LCD screen is of glass. When installing it please make sure to put it in place.

3.2 For service or installation it’s necessary to use specified screw lest it should damage the screen.

3.3 Be sure to take anti dust measures. Any foreign substance that happens to fall down between the screen and the glass will affect the receiving and viewing effect

3.4 When dismantling or mounting the protective partition plate that is used for anti vibration and insulation please take care to keep it in intactness so as to avoid hidden trouble.

3.5 Be sure to protect the cabinet from damage or scratch during service, dismantling or mounting.

Alignment instructions

1. Test equipment

PM5518 (video signal generator)
VG-848 (VGA, HDMI signal generator)
VG-849 (digital video signal generator)
CA210 (color analyzer)

2. Power test

Connect main board, power board and IR board according the wiring diagram, connect the power and press “standby” to turn on the TV.

Test the pin voltage of XS15, the data is shown in table1:

Table1 voltage data of XS15

	Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Pin7	Pin8	Pin9	Pin10	Pin11
LC-26HUXX	8.55-9.45V	0	4.75-5.5V	0	11.69-12.92V	0			4.75-5.5V	0	H
LC-32HUXX	8.55-9.45V	0	4.85-5.36V	0	11.4-12.6V	0			4.85-5.36V	0	H

Test the pin voltage of XS16, the data is shown in table2:

Table2 voltage data of XS16

	Pin1	Pin2	Pin3	Pin4	Pin5	Pin6
LC-26HUXX	0	4.75-5.5V	0	8.55-9.45V	0	30.4-33.6V
LC-32HUXX	0	4.85-5.36V	0	8.55-9.45V	0	31.36-32.64V

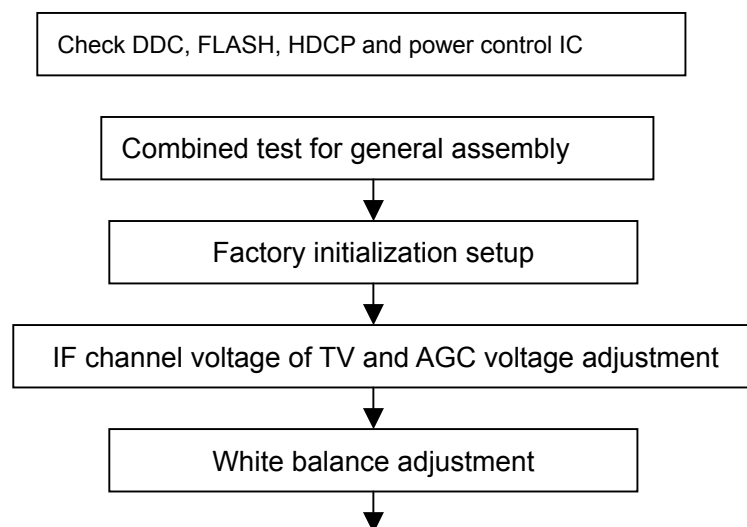
Test the pin voltage of XS11, the data is shown in table3:

Table3 voltage data of XS11

	Pin1	Pin2	Pin3	Pin4	Pin5
LC-26HUXX	20.25-23.63V		0		
LC-32HUXX	22.8-25.2V		0		

3. Alignment flow-chart

The alignment flow-chart is shown as fig-1



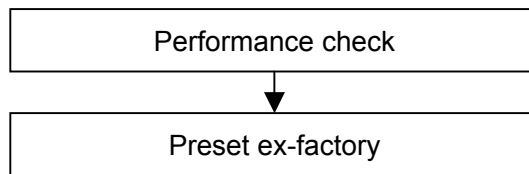


Fig-1 adjustment flow-chart

4. Adjustment instruction

4.1 Unit adjustments

Connect all the boards according to wiring diagram, then power on and observe the display.

Method for entering factory menu: press “INPUT”, “2”, “5”, “8” and “0” in turn to enter factory menu; press “CH+” and “CH-” to select adjustment items and press “VOL+” and “VOL-” to adjust value items, press “MENU” repeatedly to exit.

Method for software upgrading: When software upgrading please enter factory menu first, select ISP of OPTION, set ISP to 1 and you can begin to upgrade. After upgrade finished, it needs to set ISP back to 0. If the picture can’t display when upgrading, it needs to solder JB1 on main board. Please unsolder JB1 again after upgrading.

4.2 Initialization

Enter factory menu, select “OPTION”, “EEPROM” and “HOTEL OPTION” sub-menu, adjustment of items to see table4.

Table1 sub-menu adjustment

Items	Preset	Introduce
HOTEL	0	1: HOTEL OPTION of factory menu is optional 0: HOTEL OPTION of factory menu is not optional
LOGO	1	1: display LOGO in no signal or turn on 0: no LOGO display
ADC PRESCALE	046	Software will preset the data according unit
SIF PRESCALE	02E	Software will preset the data according unit
BACK LIGHT	FF	Software will preset the data according the type of panel
ALL COLOR	1	1: white balance of each channel auto offset based on the HDMI white balance 0: white balance of each channel adjust the offset base separately Note: don't set ALL COLOR to 1after the offset adjustment, if you do so, the adjusted parameter of each channel will recover to the parameter of HDMI.
EEPROM-MEMORAY RECALL	>	EEPROM Initialization (operate when EEPROM data chaos)

4.3 Adjustment for AFT voltage and AGC voltage of IF channel in TV

4.3.1 IF AFC adjustment

Disconnect J1(B face), input 38.9MHz PAL signal of 80dB to the pole of J1 near L11, Adjust L5 to value 1.25V of TP2. Enter factory menu, adjust TDA4470 from BG to LL, input 33.9MHz SECAM signal of 80dB, adjust R71 to value 1.25V of TP2 then solder J1.

4.3.2 IF AGC adjustment

Input 184.25MHz(PAL/BG) RF signal of 60dBuv to RF terminal, adjust R64 to value 4V of TP4 and there should be no obvious snowy picture. Increase the signal to 90dBuv and it should be display normally and no obvious noise.

4.4 White balance adjustment

4.4.1 white balance adjustment of HDMI

a. Input VG-849 signal from HDMI: TIMING854 (800* 600/60Hz) and eighth-level gray scale signal of PAT920. Use color analyzer CA210 to adjust white balance.

b. Enter submenu of COLOR TEMP, Select 9300k of color temperature

c. Fixed value of B OFF, adjust R OFF and G OFF, let the color coordinate of the second level be (285, 293) and the brightness be about 3nit-6nit. Fixed value of B GAIN, adjust R GAIN and G GAIN, let the color coordinate of the seventh level be (285, 293). Adjustment R OFF, G OFF, R GAIN and G GAIN repeatedly until the value of the two levels gray-scale are (285, 293).

4.4.2 VGA/YPBPR/AV white balance check and correct

a. Input VG-848 signal of VGA to VGA terminal: TIMING854(800*600/60Hz) (PATIERN:CROSS) and auto adjust to full screen, then input PAT948 black/white signal, enter factory menu ADC ADJ, select AUTOTUNE and wait for OK display. Input PAT920(8 gray levels), check if the white balance is normal, if not, enter COLOR TEMP menu and set ALL COLOR to 0 and fine adjust according the method of 4.4.1c)

b. Connect VG-848 signal of YPBPR to YPBPR terminal and input TIMING972(1080i/60HZ) 100% color bar of PAT976(include black/white bars), Enter ADC ADJ submenu, select AUTOTUNE and wait for OK display. Input PAT920(8 gray levels), check if the white balance is normal, if not, set ALL COLOR to 0 and fine adjust according the method of 4.4.1c)

c. Input AV signal (PM5518, 8 gray levels, NTSC) to VIDEO1 terminal, check if the white balance is normal, if not, set ALL COLOR to 0 and fine adjust according the method of 4.4.1c)

Note: it can't set back to 1 once ALL COLOR changes to 0.

5. Performance check

5.1 TV function

Enter searching menu → auto search, connect RF-TV terminal with central signal source and check if the picture is normal, if there are channels be skipped. Check TXT and parental control.

5.2 AV, YPbPr terminals

Input AV/S, YPbPr/YCbCr HD signal, check if it is normal.

5.3 VGA terminal

Insert VGA terminal, input VGA format signal of 640X480@60 Hz and check if the display is normal.

5.4 check sound channel

Check the speaker of each channel.

5.5 other function check

Check the turn on/turn off timer, asleep timer, picture/sound mode, OSD, freeze/mute, stereo, etc.

5.6 presetting before ex-factory

Item	Setting
PICTURE MODE	STANDARD
COLOR MODE	NORMAL
NR	WEAK
ZOOM	FULL
SOUND MODE	STANDARD
AVC	OFF

Item	Setting
BALANCE	50
VOLUME	50
SLEEP TIMER	OFF
TTX LANGUAGE	WEST
BLUE SCREEN	OFF
WSS	OFF

Item	Setting
OSD LANGUAGE	English
OSD HPOSITION	50
OSD VPOSITION	50
OSD HALFTONE	50
OSD DURATION	15

6. Software instruction

Table6 software instruction

No.	Code No.	Type	Function	Flash written before paste	Method
NS14	5270008001	ATMEGA8L	Power image	Yes	Written with instrument like ALL11
NS3	5272540001	PM25VF040	Main CPU program	Yes	
NB3	5272402002	24C02N-10SI27	HDMI EDID	Yes	
NB7	5272402002	24C02N-10SI27	VGA EDID	Yes	
NS5	5272404002	24C02N-10SI27	Store some important information	No	No written software

Method of software upgrading

1. The tools and software demanded

1) Please confirm that PC has the software of ISP_TOOL and install the parallel interface drive program Port95nt.

2) ISP_TOOL icon is bellow:

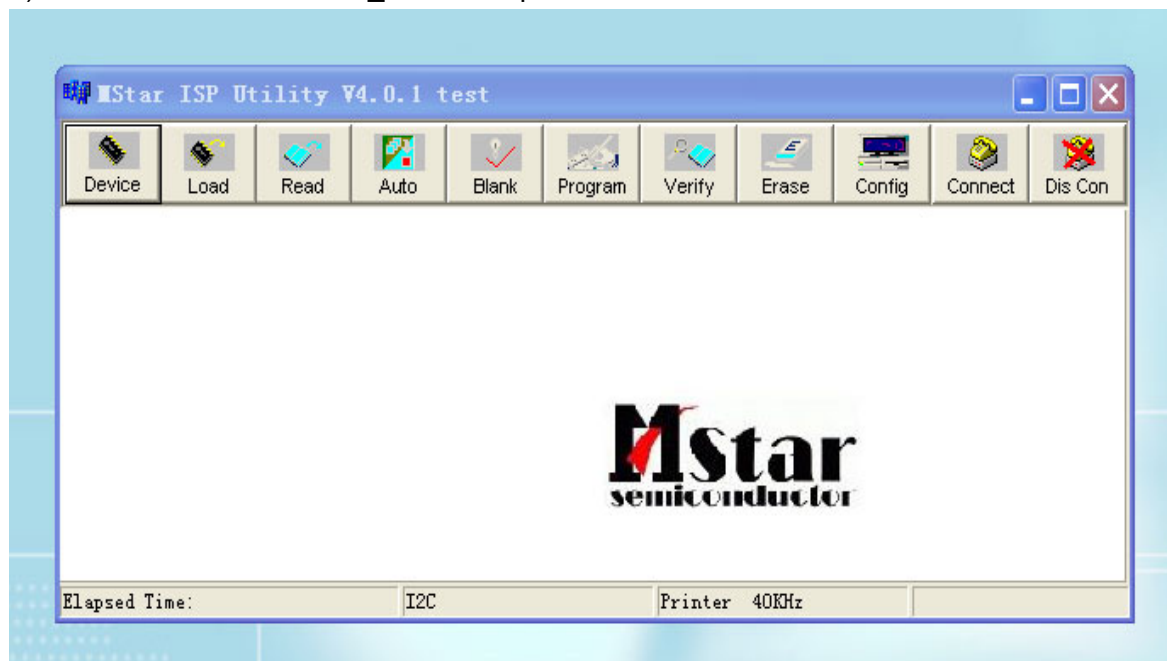


3) One parallel cable (25 pins) and one VGA cable (15 pins), the parallel cable connects the PC and the upgrade instrument, the VGA cable connects the TV and the upgrade instrument.

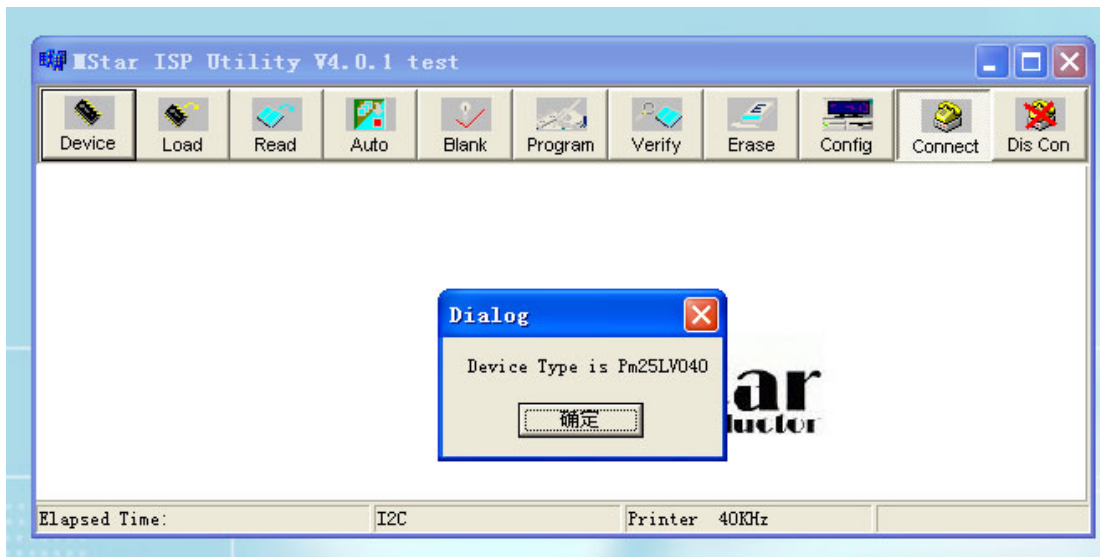
2. The steps for upgrading software

1) Please confirm that the connection wires and the upgrade instrument are connected well before the software written and then power on the TV.

2) Double click the icon ISP_TOOL to open it:

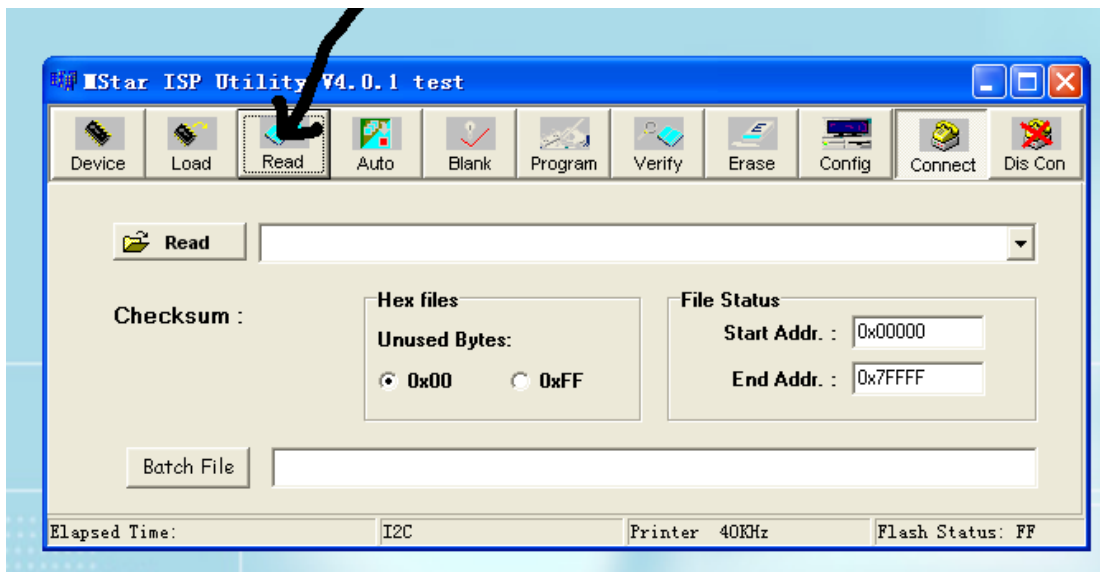


3) Press “Connect” to connect TV, if the connection is done successfully as shown below, then press “enter”.

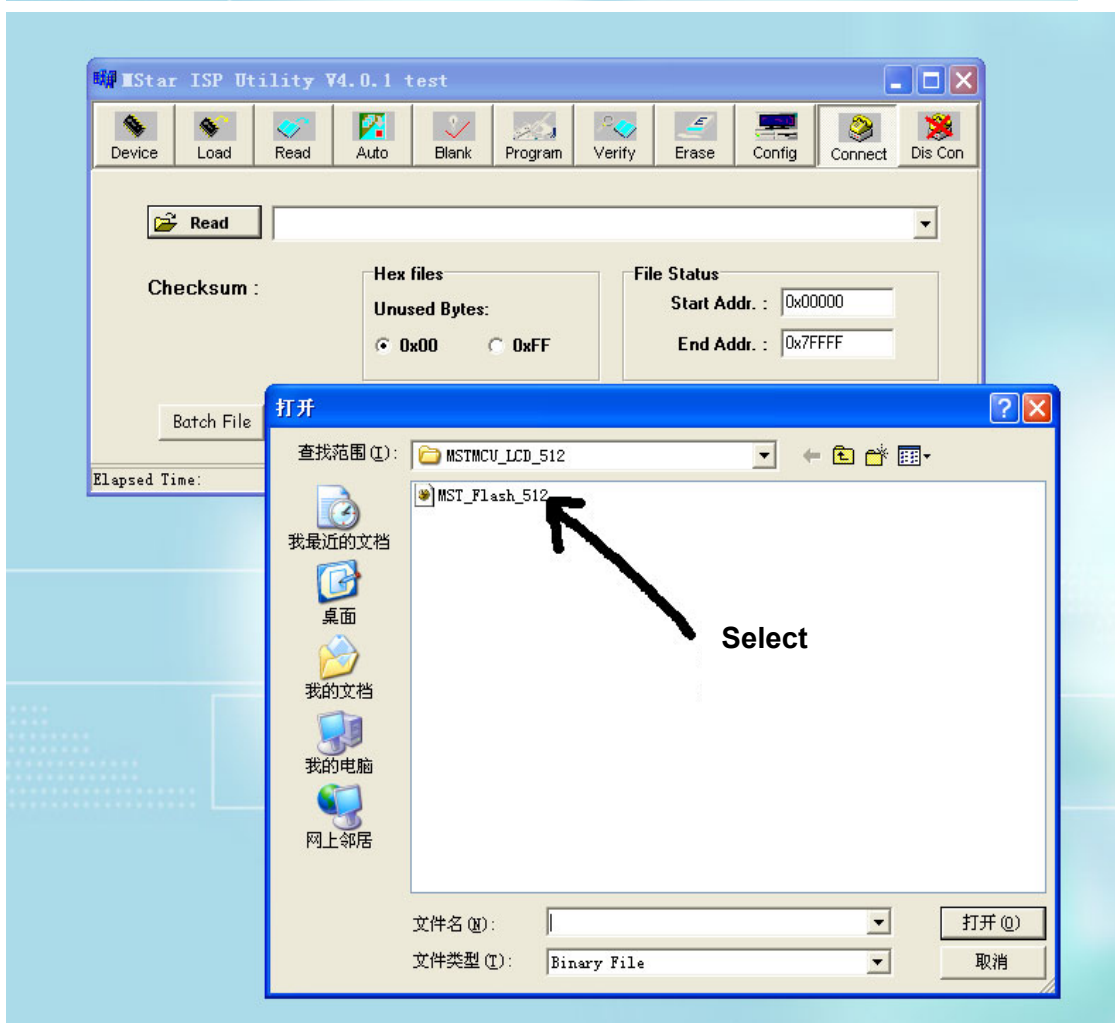
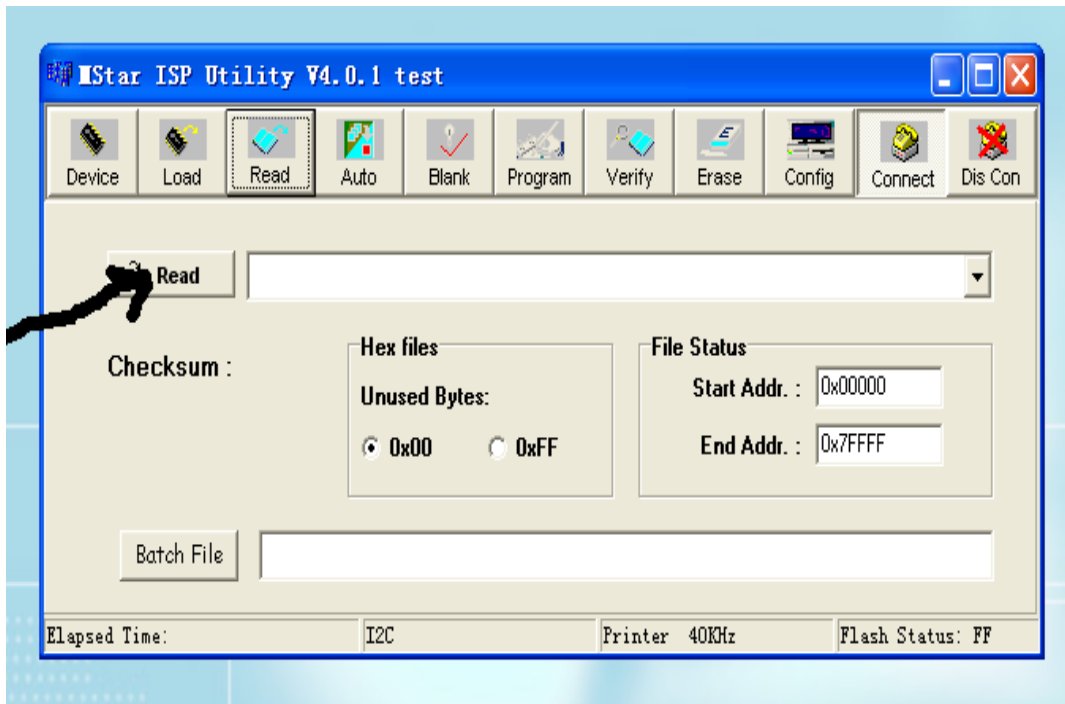


Note: if it appears error, check the connection wires and check if ISP item of the factory menu is set to 1, if not, please set it to 1.

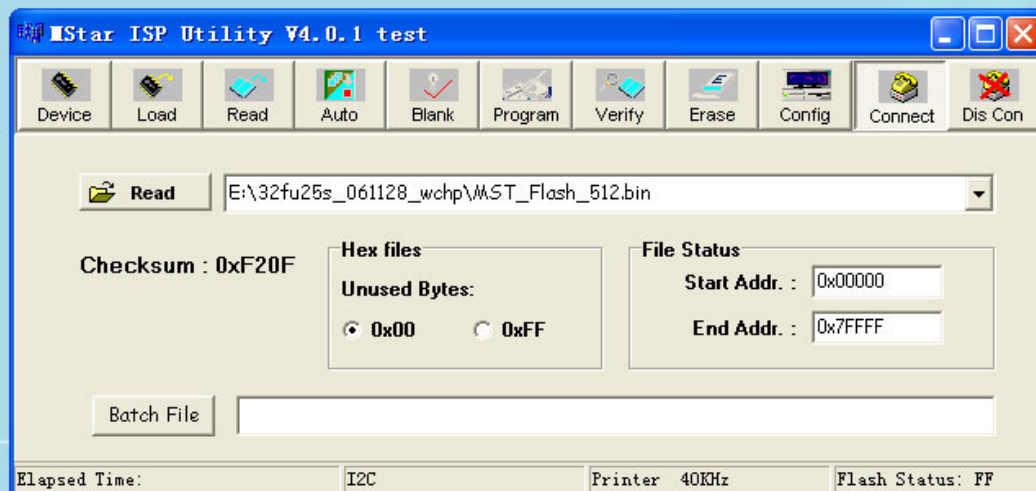
4) After connection is done, it needs to read the Binary document. Press “Read” as shown below:



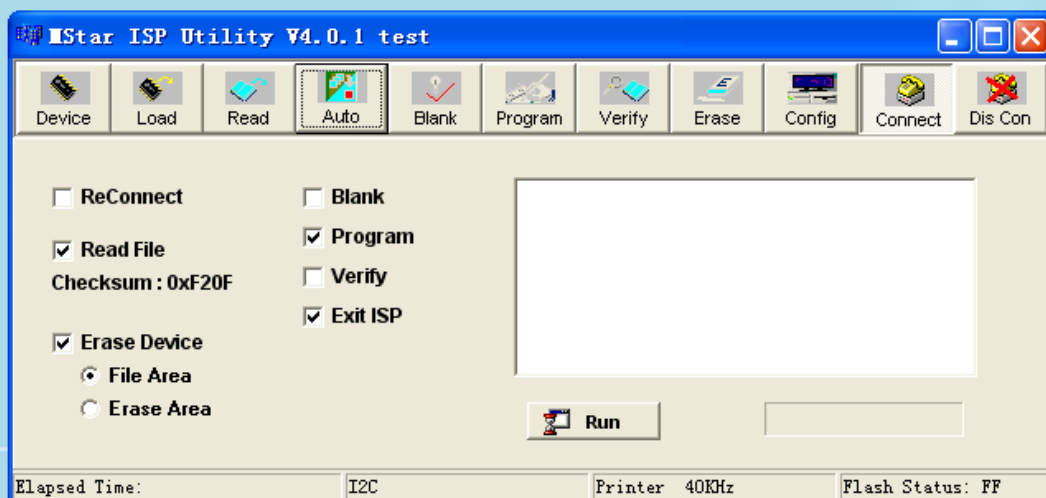
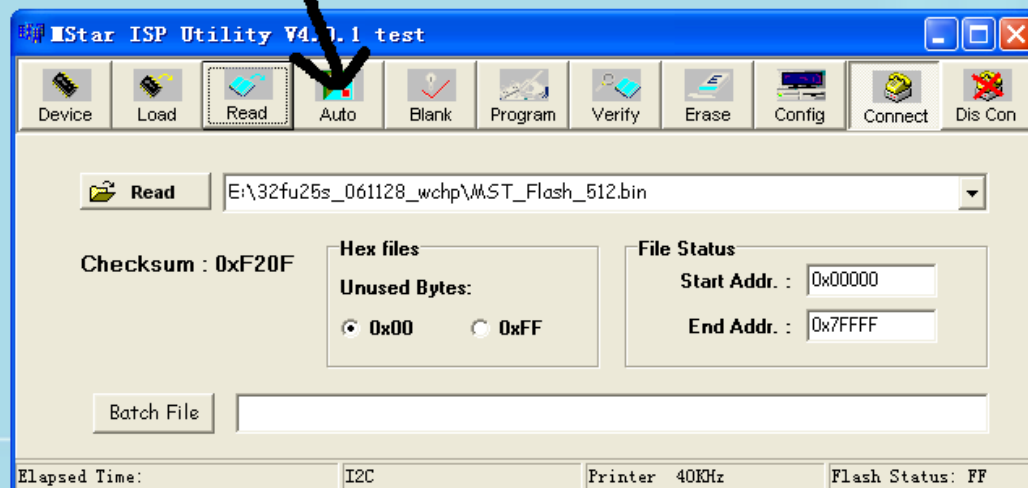
5) Search the document needed to write in the “Read” check box.



6) Select the document then the window will appear as shown below:



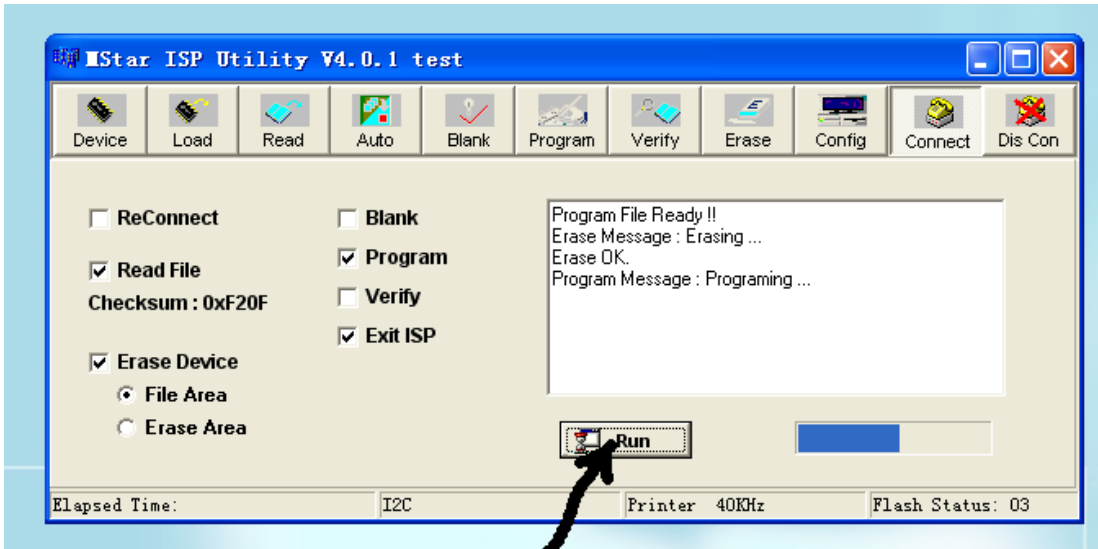
7) Press "Auto" to select the writing function.



Select the items shown in the picture above:

- (a) Read File
- (b) Program
- (c) Exit ISP
- (d) Erase Device
- (e) File Area

8) Press “Run” to begin the writing program, wait till the blue bar is complete.



After writing, it will display OK:

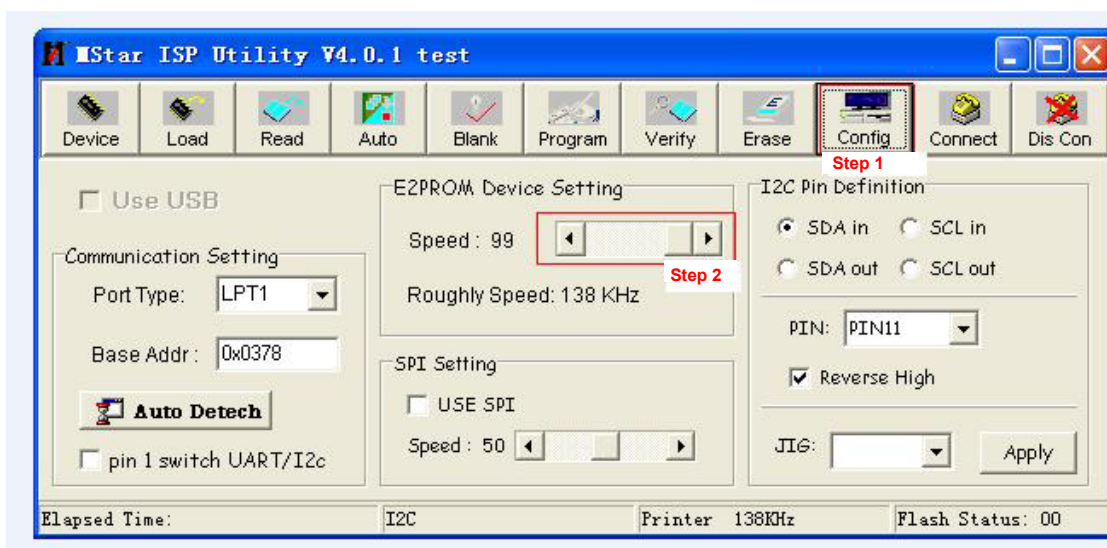


If there is error appeared (shown as below), press “Run” again to rewrite the program till it is success.



Note1: keep the connection well and don't cut off the power during the writing process.

Note2: the writing speed can be adjusted as shown below. Select "Config" then adjust Speed BAR, the value is bigger the speed is faster. But it is easier to appear error when increase the speed, so it need to select a suitable speed according the PC.



Working principle analysis of the unit

The RF signal received by antenna will be sent to tuner TUNER1, then IF signal will be obtained through high amplifier and mixed frequency, through pre-intermediate amplified by V15, then it will be sent to acoustic surface-wave Z17 to do IF filter and get better IF characteristics, then it will be sent to N3 (TDA4470) to do intermediate amplification, phase-locked loop VCO and synchronous wave detection to get video signal TV-V; after pre-intermediate amplification IF will also be sent to acoustic surface-wave Z16 to do filter at the same time, then it will be sent to TDA4470 to do intermediate amplification and output the second sound intermediate frequency signal TV-SIF.

The TV-V signal output from TDA4470 together with TV-SIF will be sent to main IC NS2(MST9E19B).

Video signals of VGA and HDMI will be sent to MST9E19B, too.

Video signal of YPbPr and Video RGB of SCART1 via video switch N5(PI5V330) will be sent to MST9E19B.

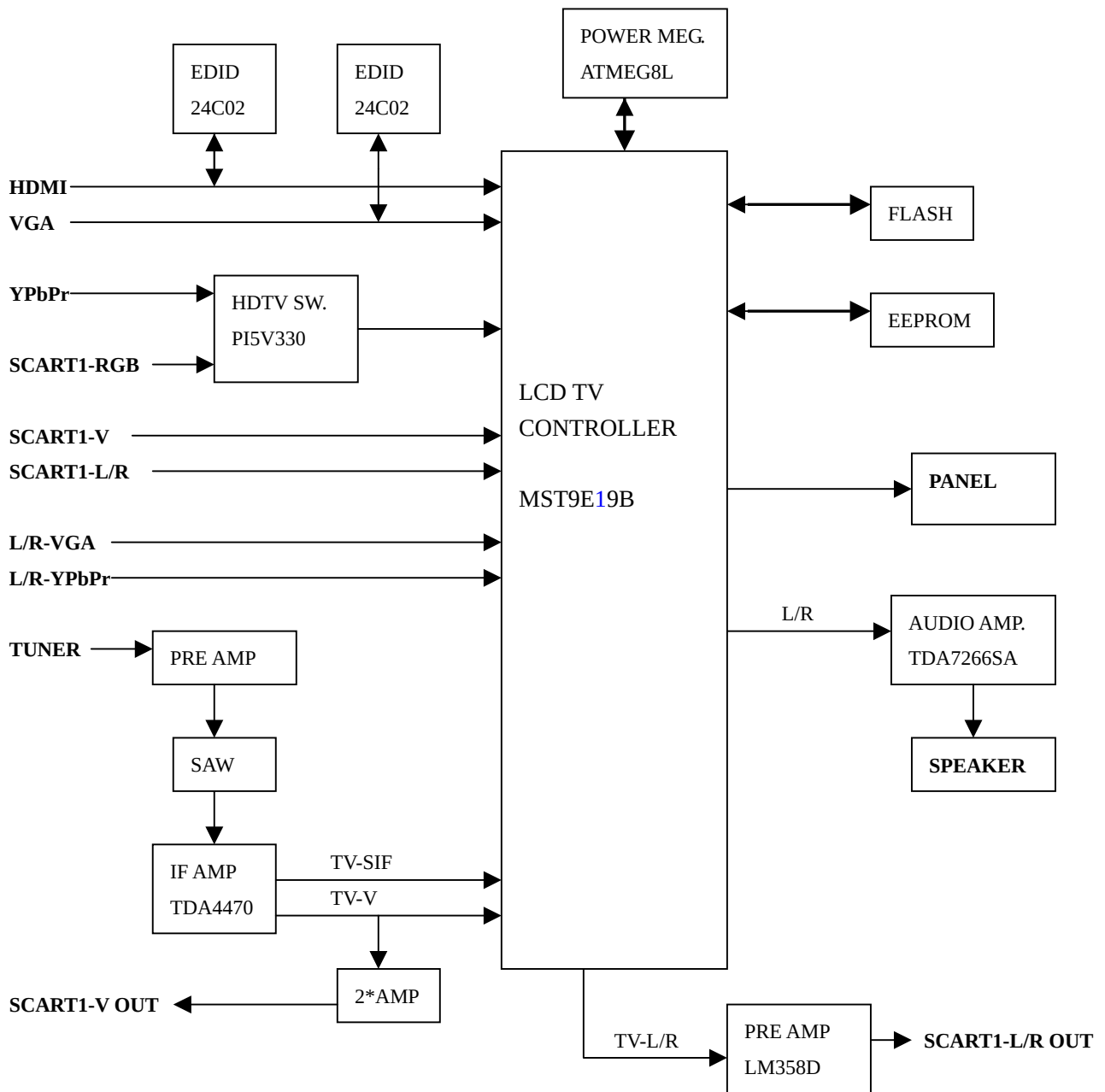
Video signal V (CVBS) of SCART1, YPbPr L/R and SCART1 L/R will be sent to MST9E19B.

The main IC NS2(MST9E19B) is a high performance and fully integrated IC, which can realize video demodulating, video switch selection, A/D and D/A conversion, interlace/de-interlace processing, modes conversion, OSD and low-voltage differential output, etc. And it also has functions of audio demodulation, selection, processing and MCU.

The video signal via MST9E19B processing, output 4 pairs differential signal and 1 pair clock signal for LCD panel display. TV-V output from TDA4470 via double video amplifying, it will be sent to SCART1 for AV-OUT.

Audio signal via MST9E19B processing will be sent to sound amplifier NV1 (TDA7266SA) amplifying to speaker. TV-SIF via MST9E19B demodulating and sound processing then output to LM358D amplifying, the signal will be sent to SCART1 as AV-OUT.

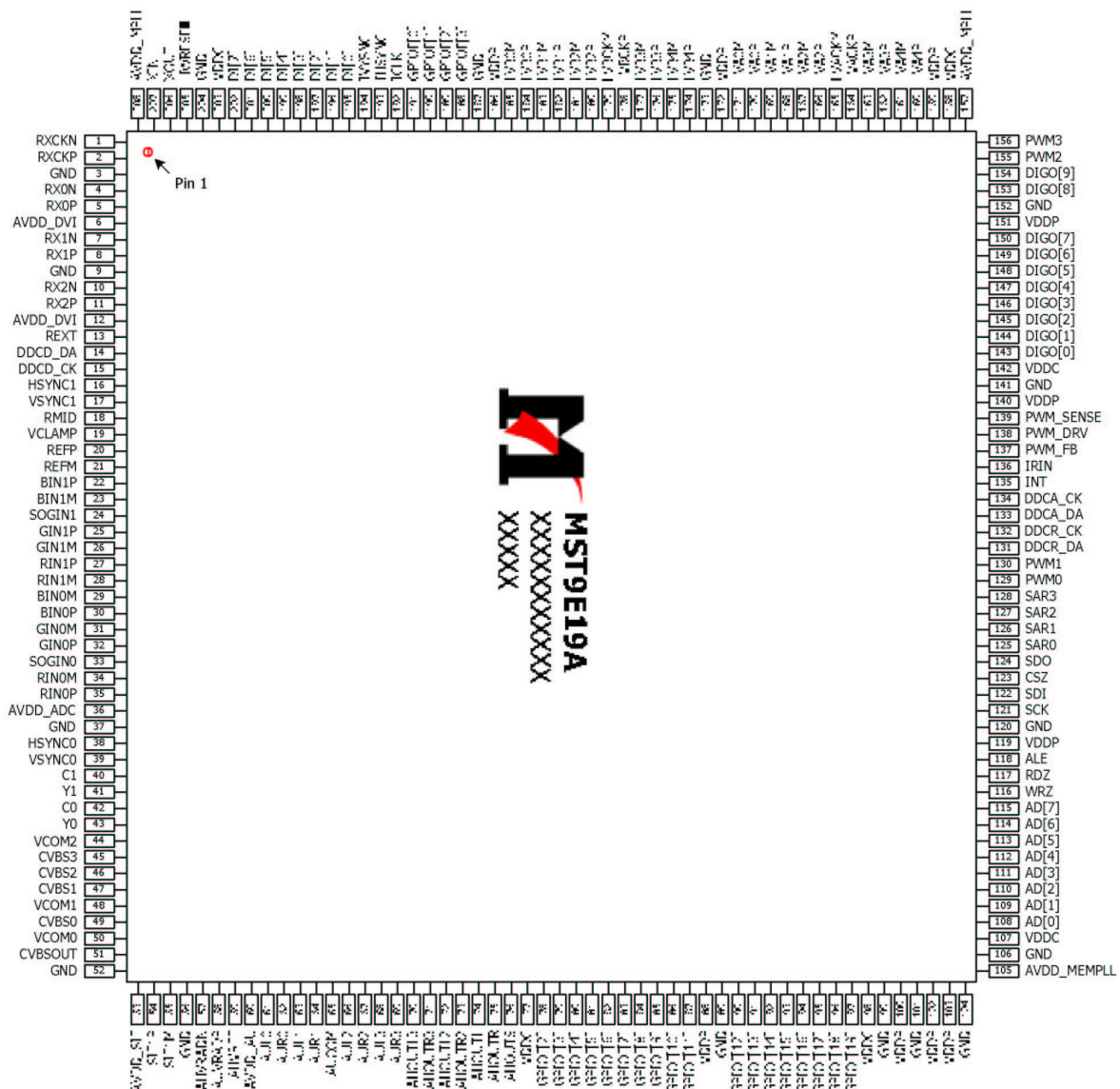
Block diagram



IC block diagram

1. MST9E19A

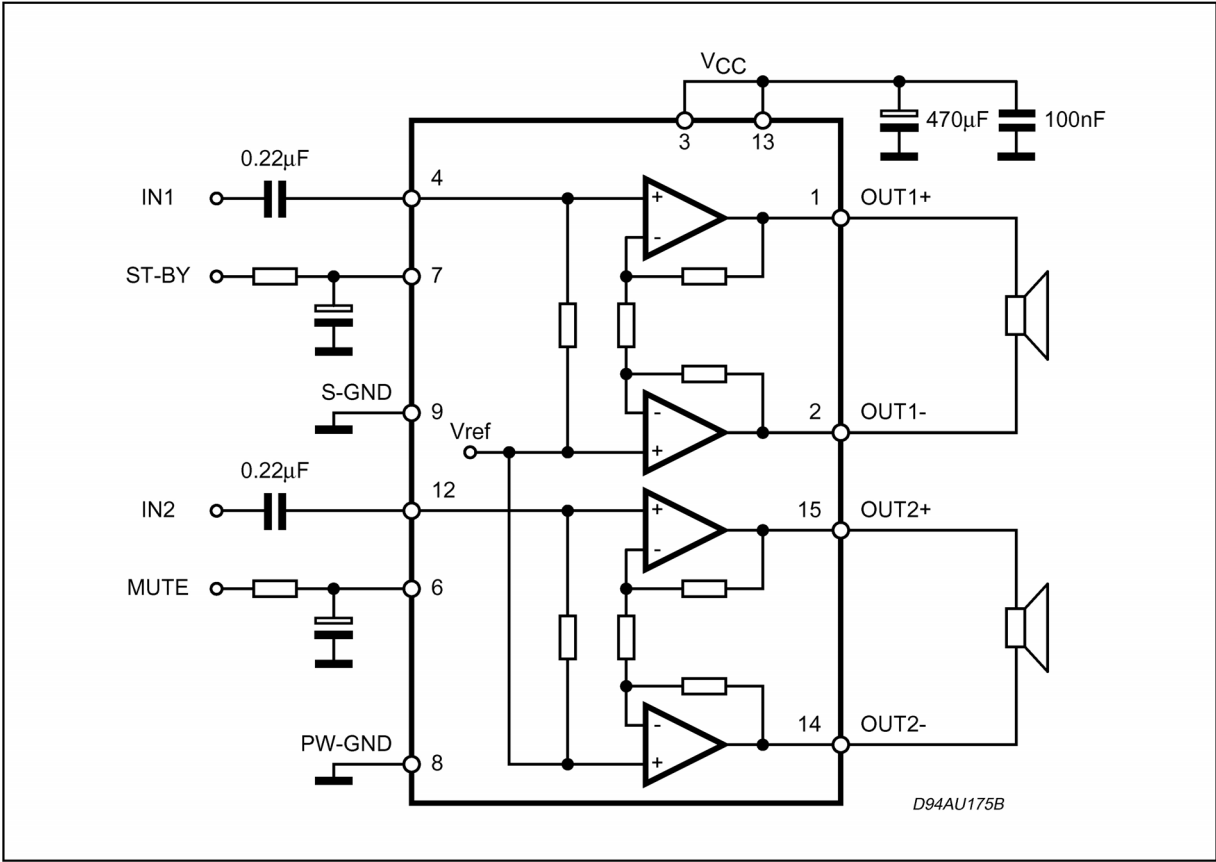
The MST9E19A is a high performance and fully integrated IC for multi-function LDC monitor/TV with resolutions up to SXGA (1280X1024)/WXGA+(1440X900). It is configured with an integrated triple-ADC/PLL, an integrated DVI/HDCP/HDMI receiver, a multi-standard TV video and audio decoder, a video de-interlacer, a scaling engine, the MStarACE-3 color engine, an on-screen display controller, an 8-bit MCU, and a built-in output panel interface. To further reduce system costs, the MST9E19A also integrates intelligent power management control capability for green-mode requirements and spread-spectrum support for EMI management.



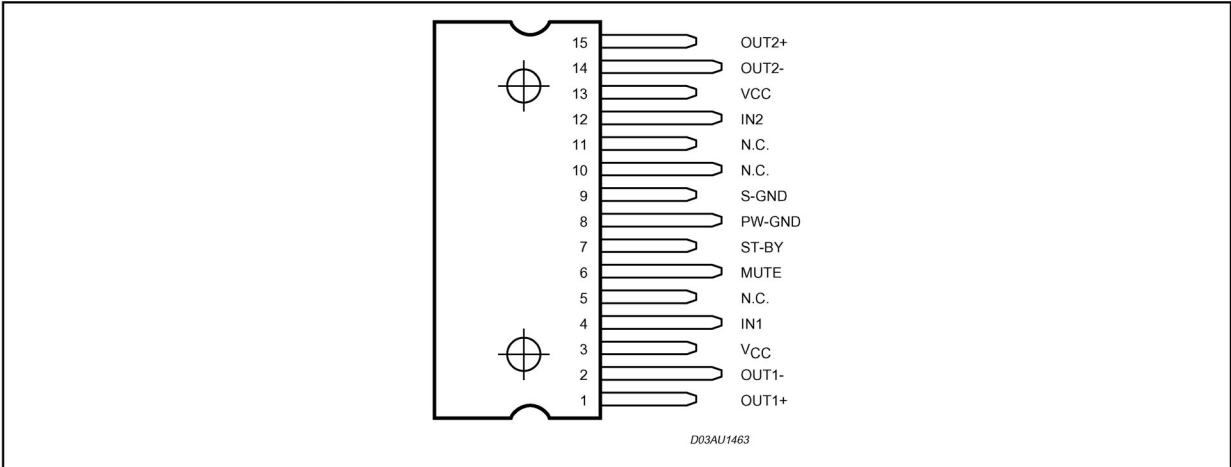
2. TDA7266SA

The TDA7266SA is a dual bridge amplifier.

BLOCK AND APPLICATION DIAGRAM



PIN CONNECTION (Top view)



3. TDA4470

The TDA4470 is an integrated bipolar circuit for multi-standard video/sound IF(VIF/SIF) signal processing in TV/VCR and multimedia applications. The circuit processed all TV video IF signals with negative modulation (e.g., B/G standard), positive modulation (e.g., L standard) and the AM, FM/NICAM sound IF signals.

Block Diagram

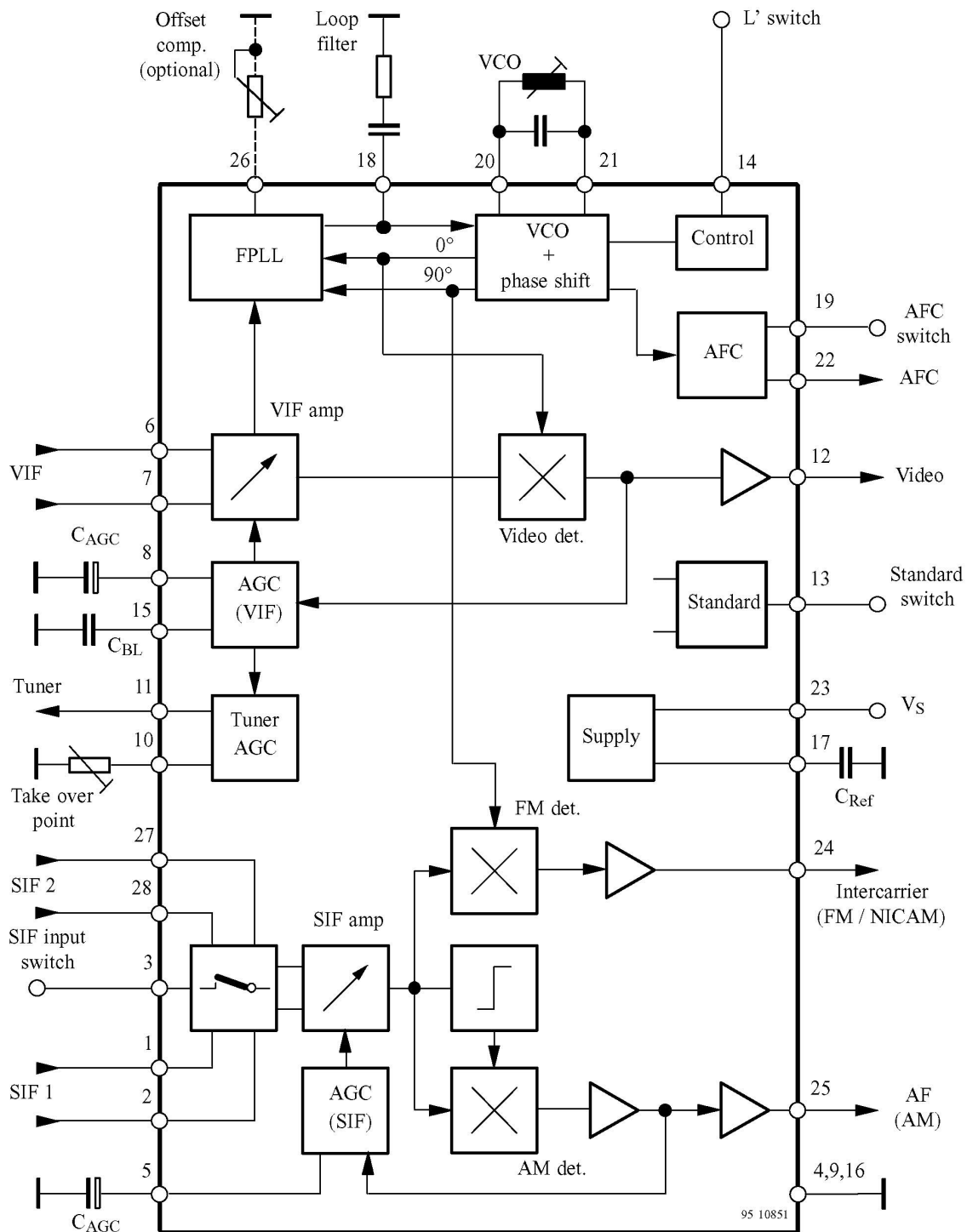


Figure 1. Block diagram

Pin Description

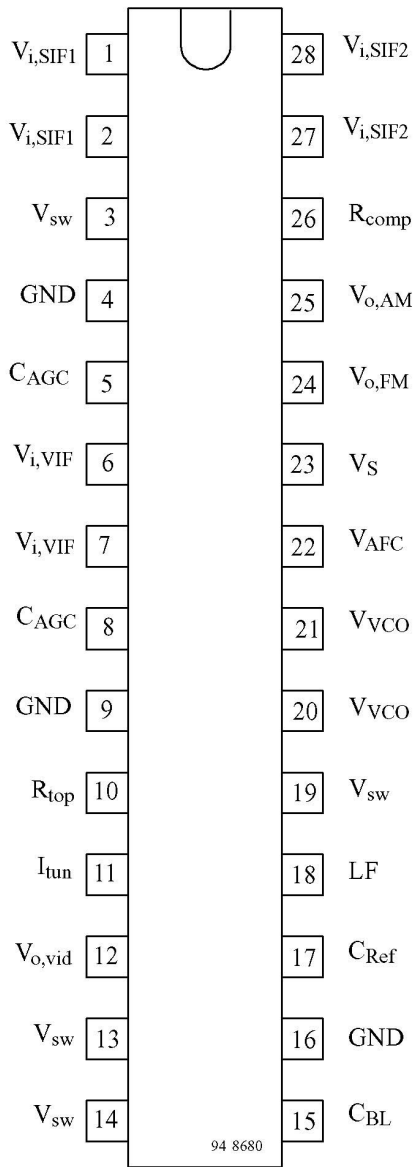
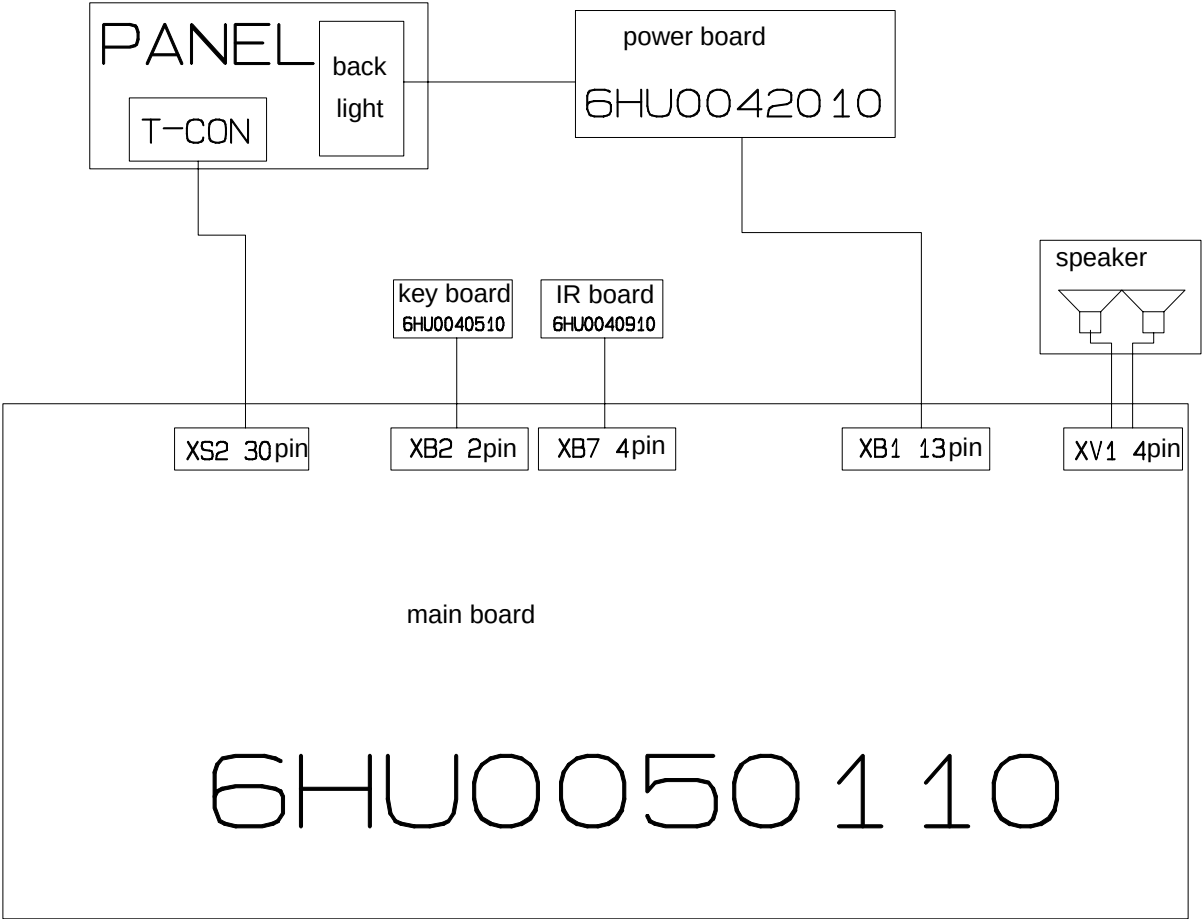


Figure 2. Pinning

Pin	Symbol	Function
1, 2	$V_{i, SIF1}$	SIF1 input (symmetrical)
3	V_{sw}	Input selector switch
4, 9, 16	GND	Ground
5	C_{AGC}	SIF-AGC (time constant)
6, 7	$V_{i, VIF}$	VIF input (symmetrical)
8	C_{AGC}	VIF-AGC (time constant)
10	R_{top}	Take over point, tuner AGC
11	I_{tun}	Tuner AGC output current
12	$V_{o, vid}$	Video output
13	V_{SW}	Standard switch
14	V_{SW}	L' switch
15	C_{bl}	Black level capacitor
17	C_{ref}	Internal reference voltage
18	LF	Loop filter
19	V_{sw}	AFC switch
20, 21	V_{VCO}	VCO circuit
22	V_{AFC}	AFC output
23	V_S	Supply voltage
24	$V_{O, FM}$	Intercarrier output
25	$V_{O, AM}$	AF output – AM sound
26	R_{comp}	Offset compensation
27, 28	$V_{i, SIF2}$	SIF 2 input (symmetrical)

Wiring diagram



Trouble shooting

1. Fault clearance

Before servicing please check to find the possible causes of the troubles according to the table below.

1.1 Antenna (signal):

Picture is out of focus or jumping	● Bad status in signal receiving ● Poor signal ● Check if there are failures with the electrical connector or the antenna. ● Check if the antenna is properly connected.
Fringe in picture	● Check if the antenna is correctly oriented. ● Maybe there is electric wave reflected from hilltop or building.
Picture is interfered by stripe shaped bright spots	● Possibly due to interference from automobile, train, high voltage transmission line, neon lamp etc. ● Maybe there is interference between antenna and power supply line. Please try to separate them in a longer distance. ● Maybe the shielded-layer of signal wire is not connected properly to the connector.
There appear streaks or light color on the screen	● Check if interfered by other equipment and if interfered possibly by the equipment like transmitting antenna, non-professional radio station and cellular phone.

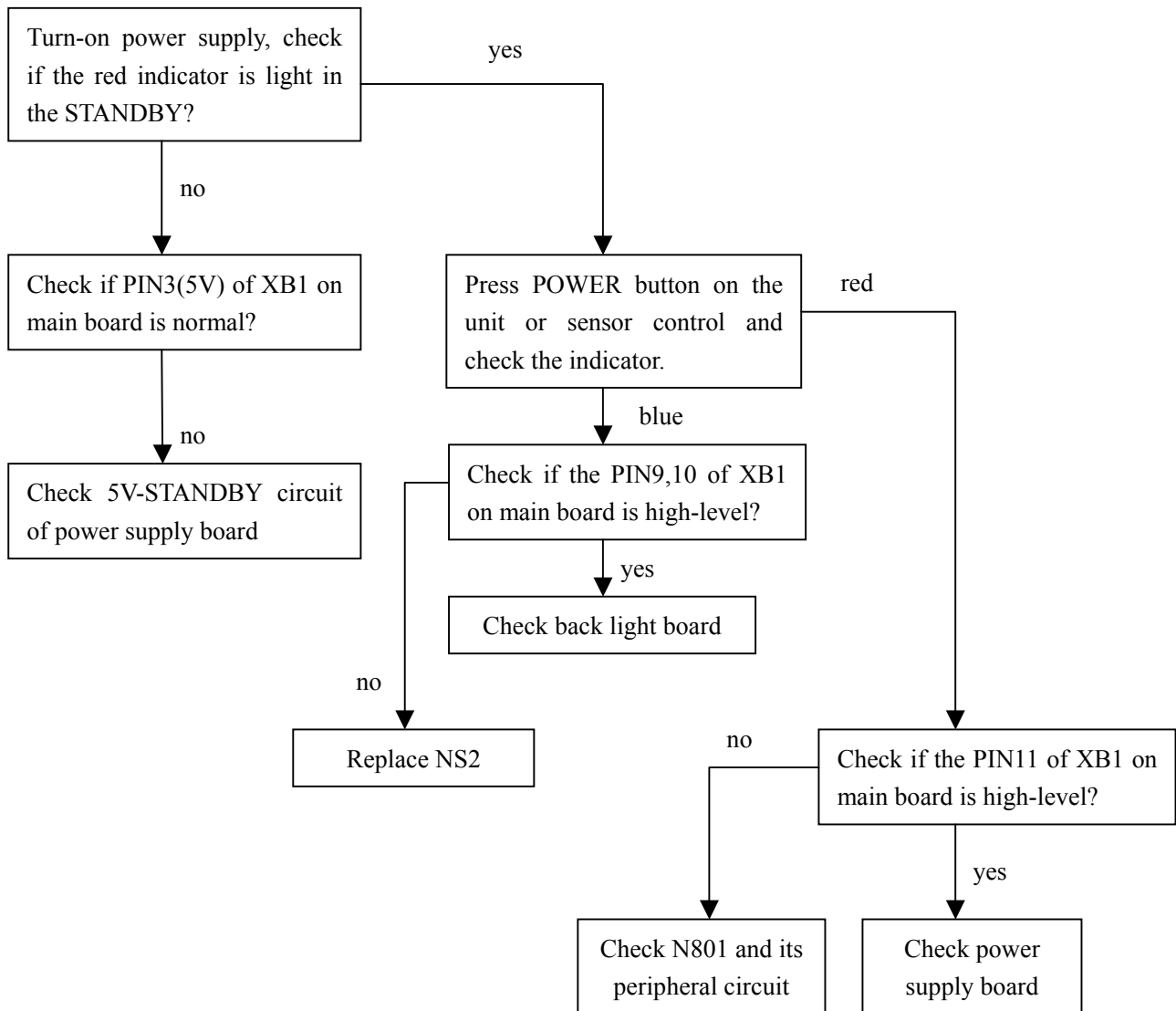
1.2 TV set:

Symptoms	Possible cause
Unable to switch the power on	● Check to see if the power plug has been inserted properly into the socket.
No picture and sound	● Check to see if the power supply of liquid crystal TV has been switched on. (As can be indicated by the red LED at the front of the TV set) ● See if it's receiving the signal that is transmitted from other source than the station ● Check if it's connected to the wrong terminal or if the input mode is correct. ● Check if the signal cable connection between video frequency source and the liquid crystal TV set is correct.
Deterioration of color phase or color tone	● Check if all the picture setups have been corrected.
Screen position or size is not proper	● Check is the screen position and size is correctly set up.
Picture is twisted and deformed	● Check to see if the picture-frame ratio is properly set up.
Picture color changed or colorless	● Check the "Component" or "RGB" settings of the liquid crystal TV set and make proper adjustment according to the

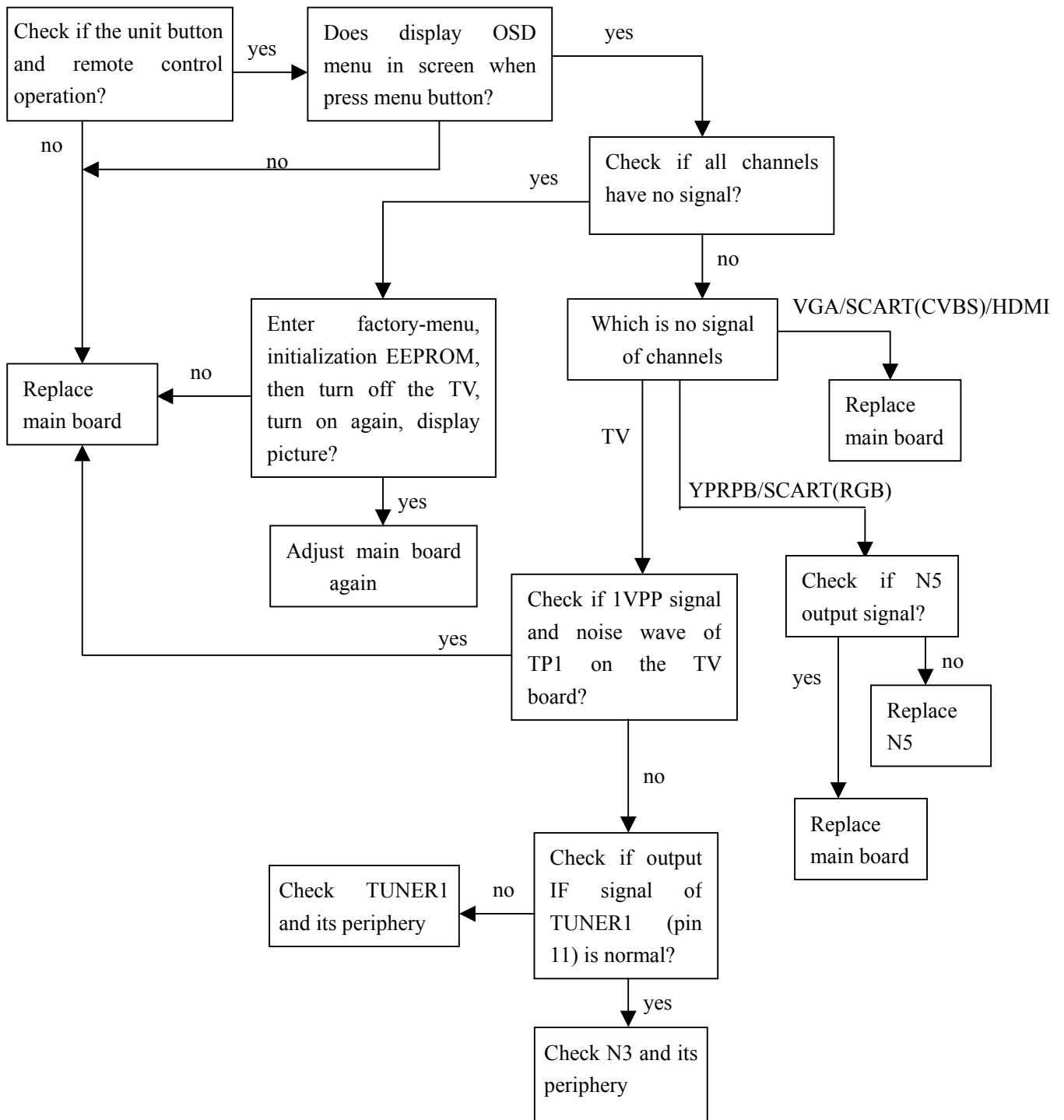
	signal types.
Picture too bright and there is distortion in the brightest area	● Check if the contrast setting is too high. ● Possibly the output quality of DVD broadcaster is set too high. ● It maybe also due to improper terminal connection of the video frequency signal in a certain position of the system.
Picture is whitish or too bright in the darkest area of the picture	● Check if the setting for the brightness is too high ● Possibly the brightness grade of DVD player (broadcaster) is set too high.
No picture or signal produced from the displayer if “XXX in search” appears.	● Check if the cable is disconnected. ● Check if it's connected to the proper terminal or if the input mode is correct.
There appears an indication - “outside the receivable scope)	● Check if the TV set can receive input signal. The signal is not correctly identified and VGA format is beyond the specified scope.
Remote control cannot work properly	● Check if the batteries are installed in the reverse order. ● Check if the battery is effective. ● Check the distance or angle from the monitor. ● Check if there is any obstruct between the remote control and the TV set. ● Check if the remote control signal- receiving window is exposed to strong fluorescence.
No picture and sound, but only hash.	● Check if the antenna cable is correctly connected, or if it has received the video signal correctly.
Blur picture	● Check if the antenna cable is correctly connected. ● Of if it has received the right video signal.
No sound	● Check if the “mute” audio frequency setting is selected. ● Check if the sound volume is set to minimum. ● Make sure the earphone is not connected. ● Check if the cable connection is loose.
When playing VHS picture search tape, there are lines at the top or bottom of the picture.	● When being played or in pause VHS picture search tape sometimes can't provide stable picture, which may lead to incorrect display of the liquid crystal TV, In this case please press “auto” key on the remote control so as to enable the liquid crystal TV set to recheck the signal and then to display correct picture signal

2. Troubleshooting guide

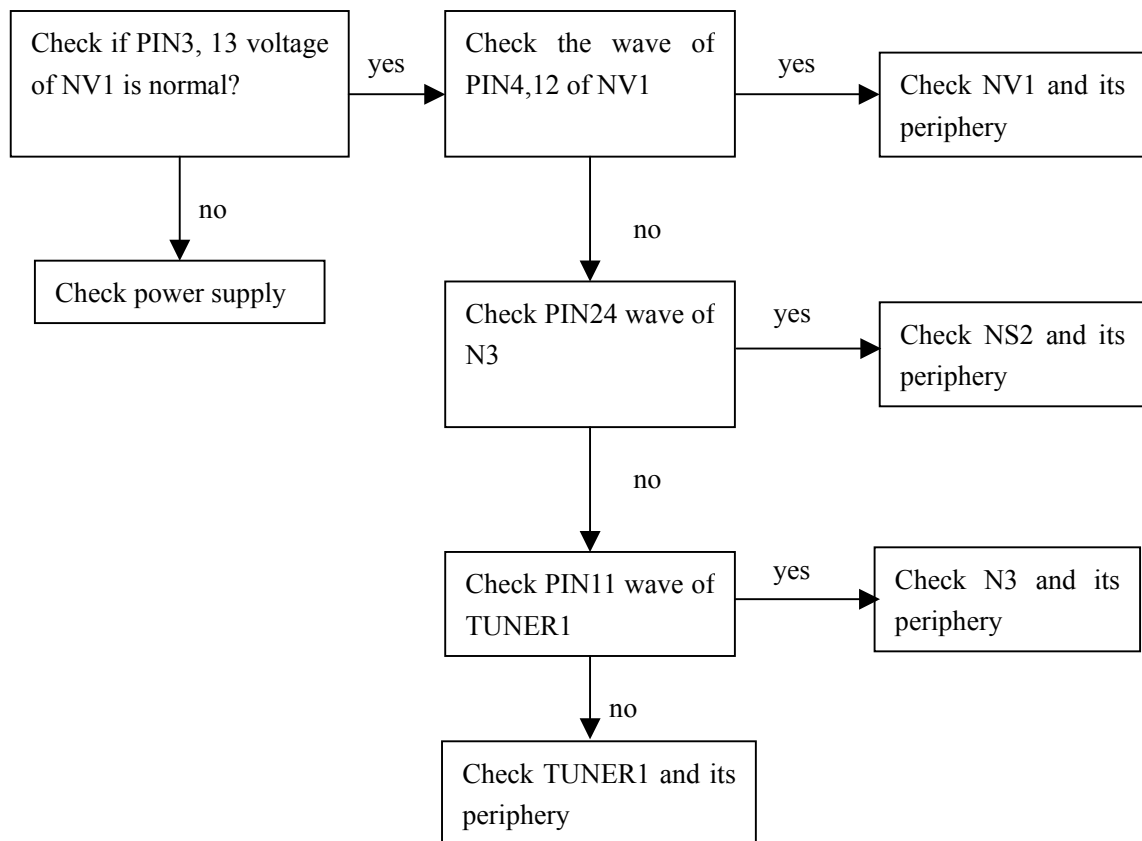
2.1. No raster



2.2. Raster, but no picture



2.3.no sound



1

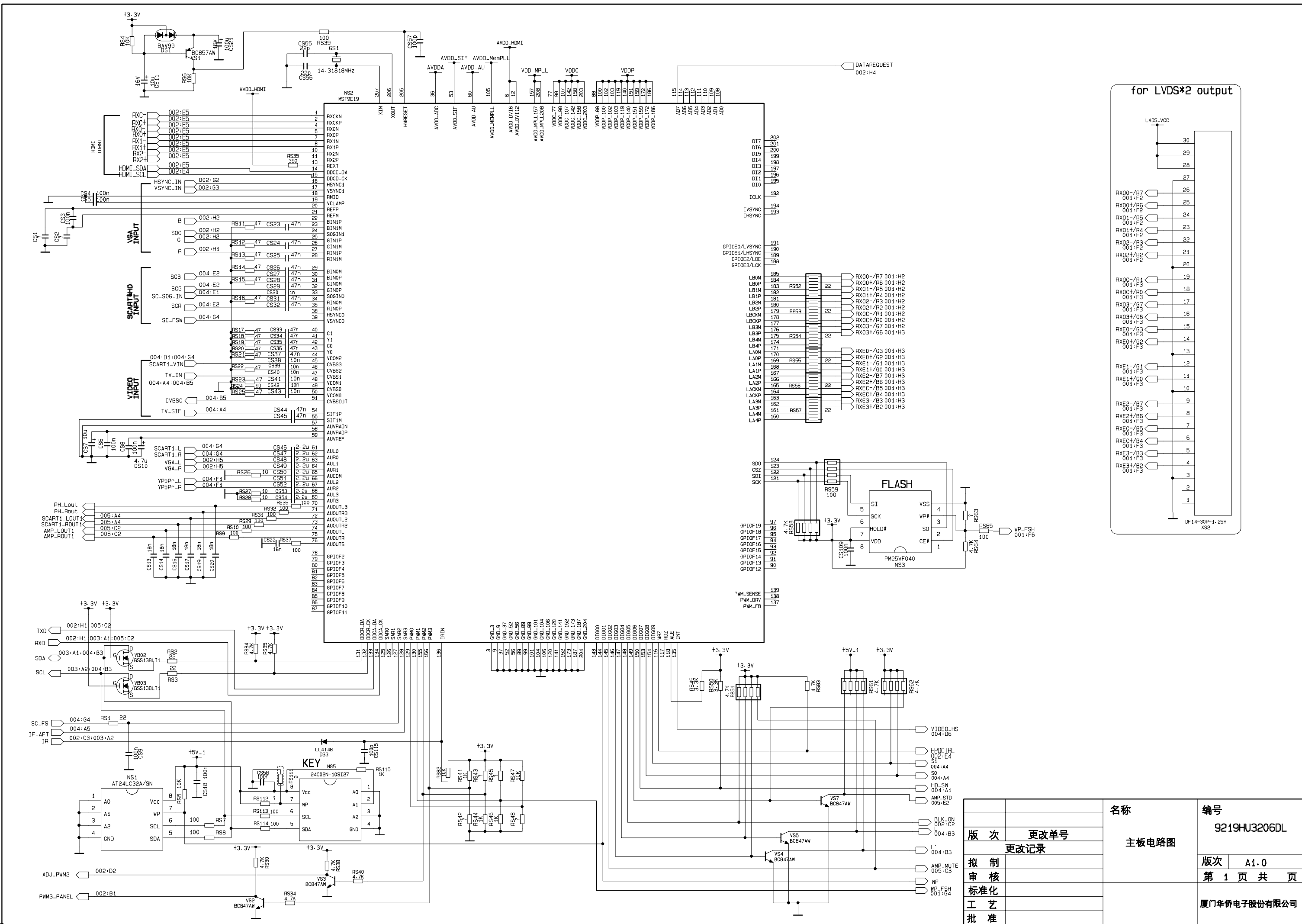
2

3

4

5

6



更改单号		名称	编号
版次	更改记录		
拟制		主板电路图	9219HU3206DL
审核			版次 A1.0
标准化			第 1 页 共 页
工艺			厦门华侨电子股份有限公司
批准			

1

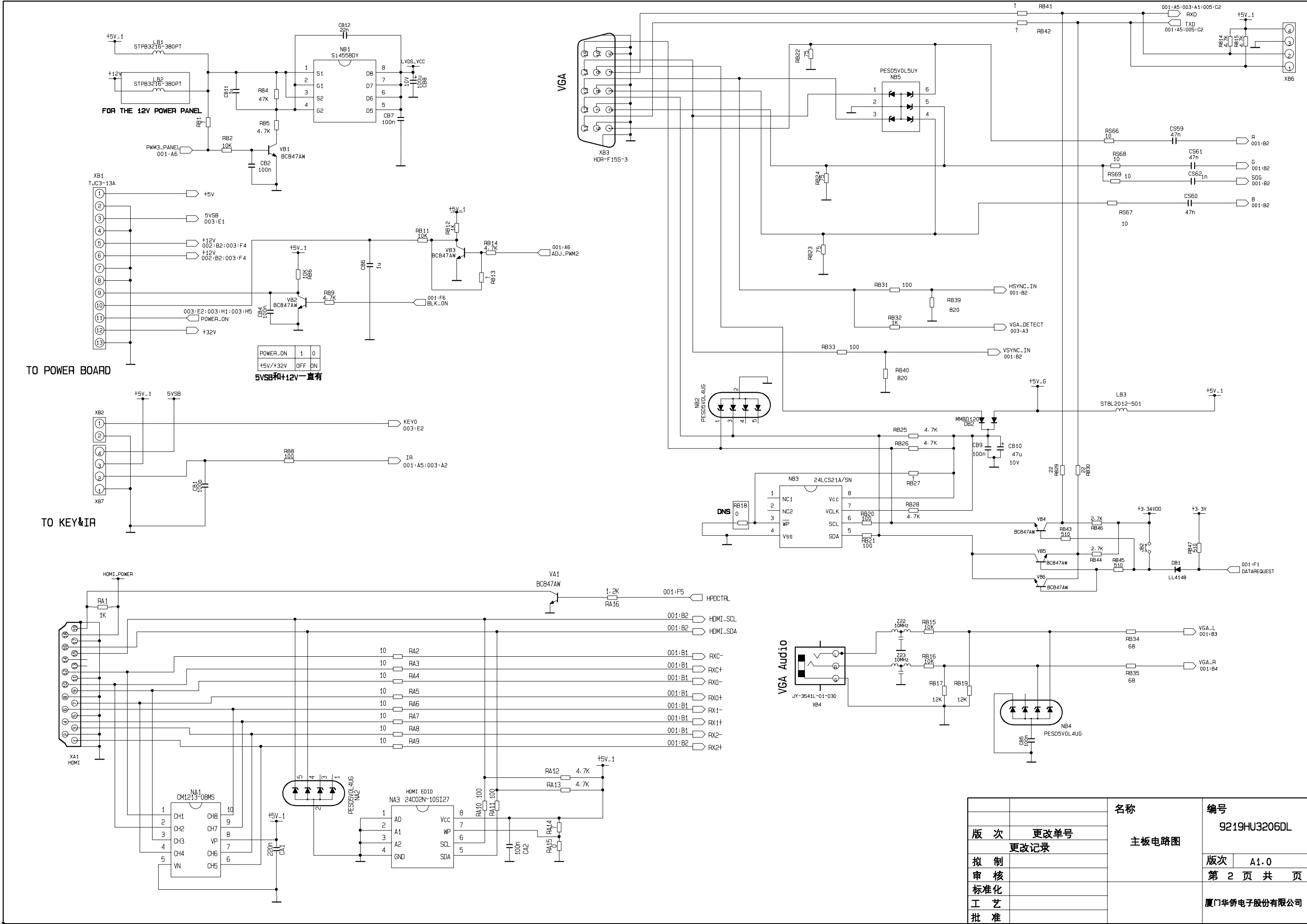
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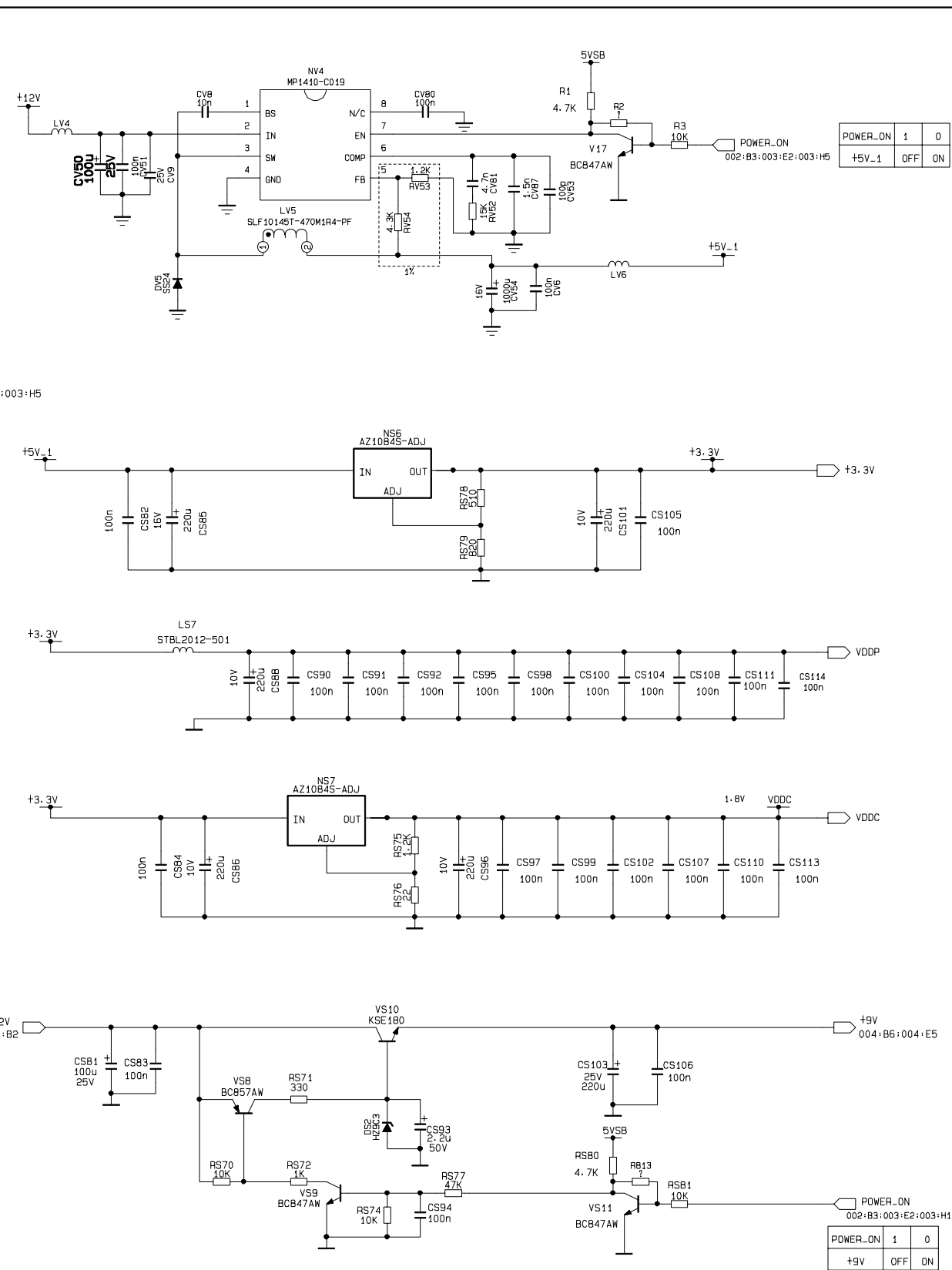
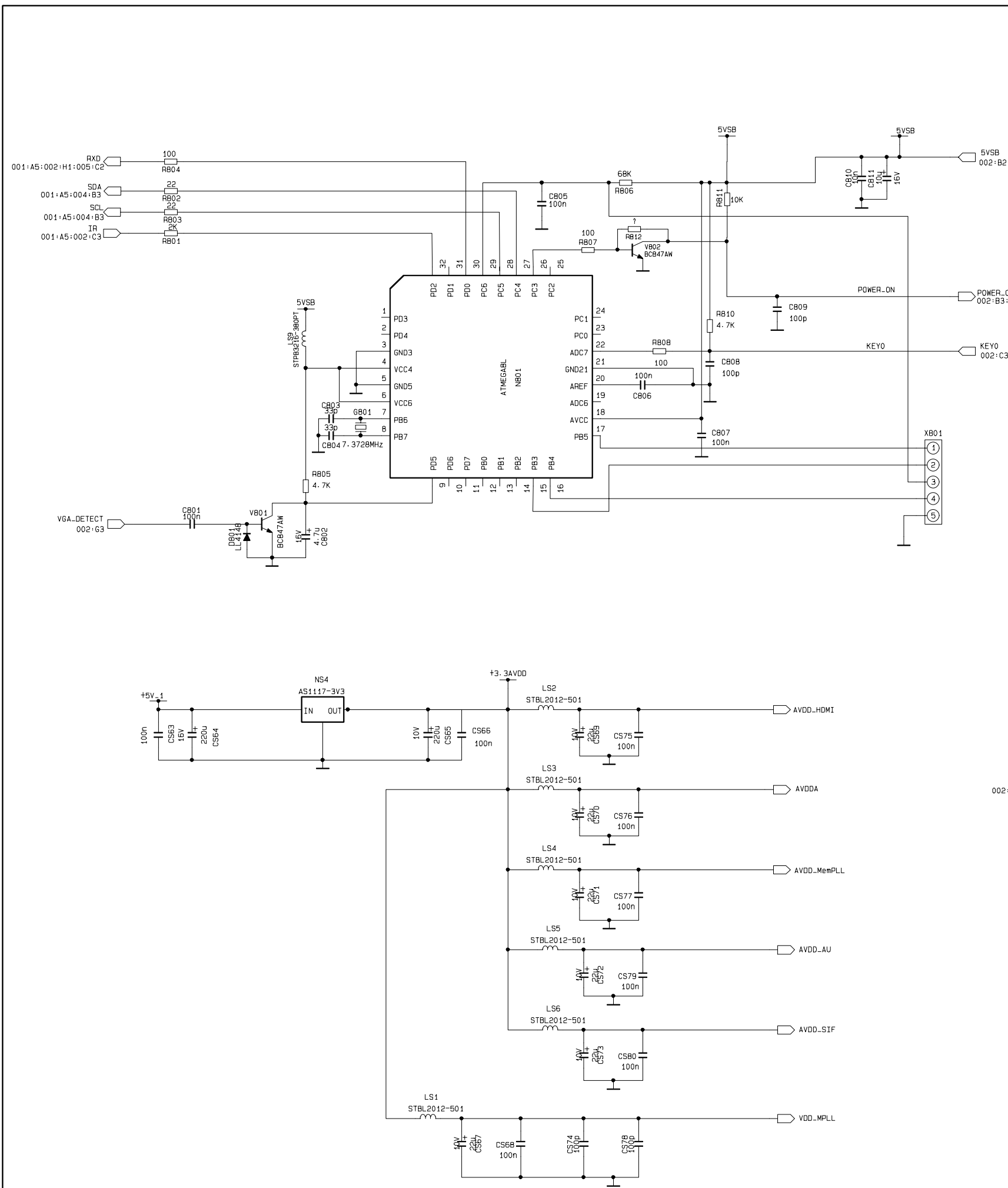
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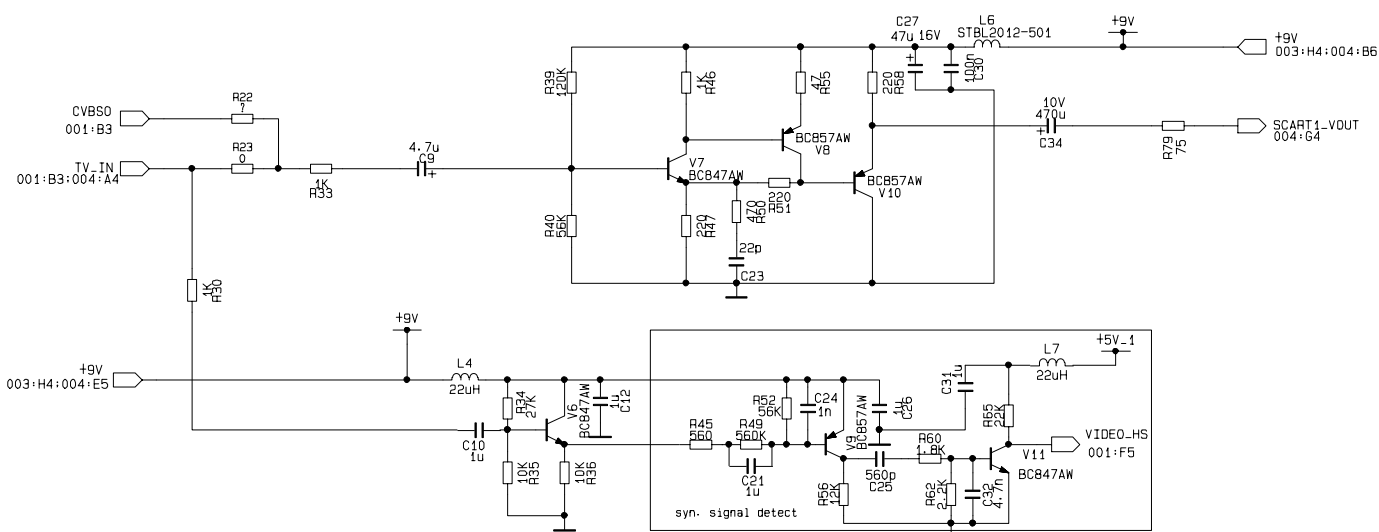
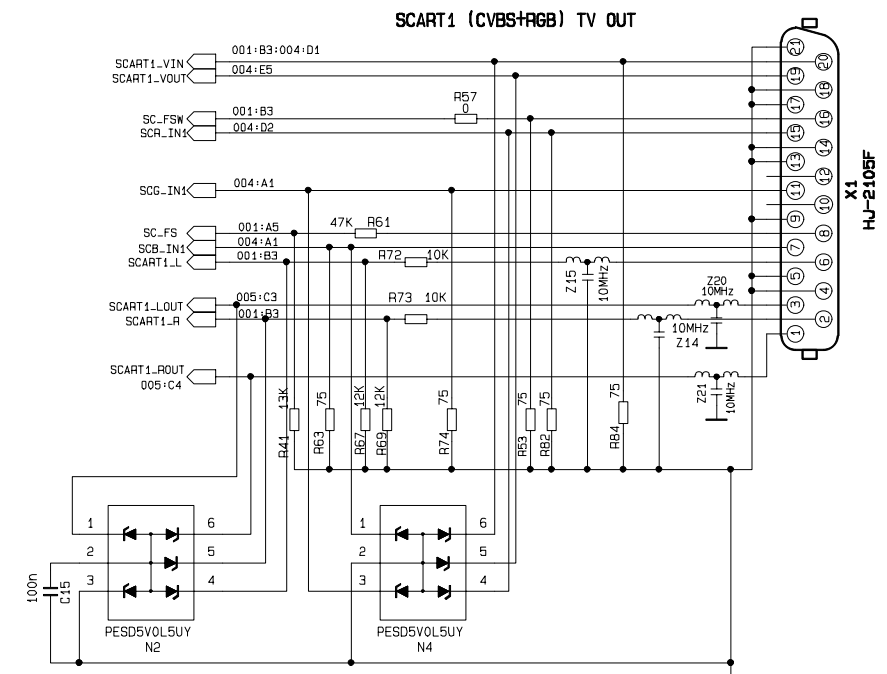
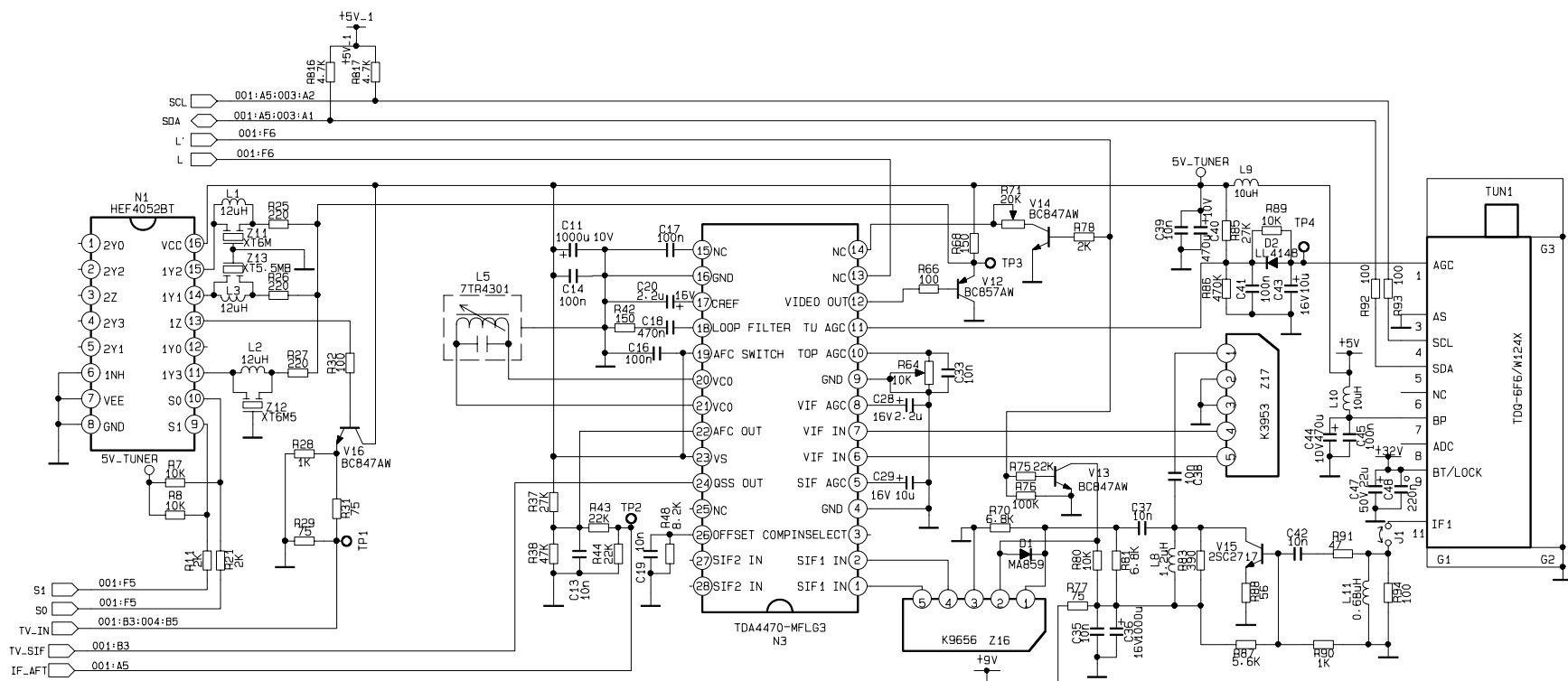
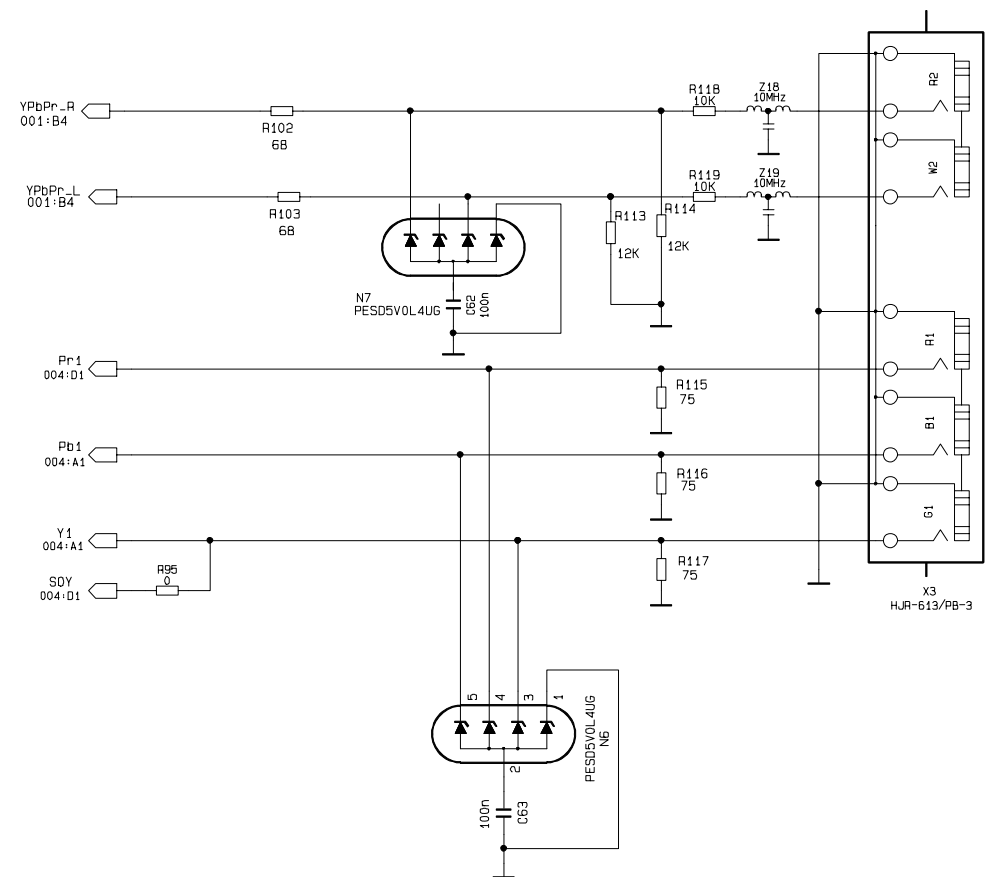
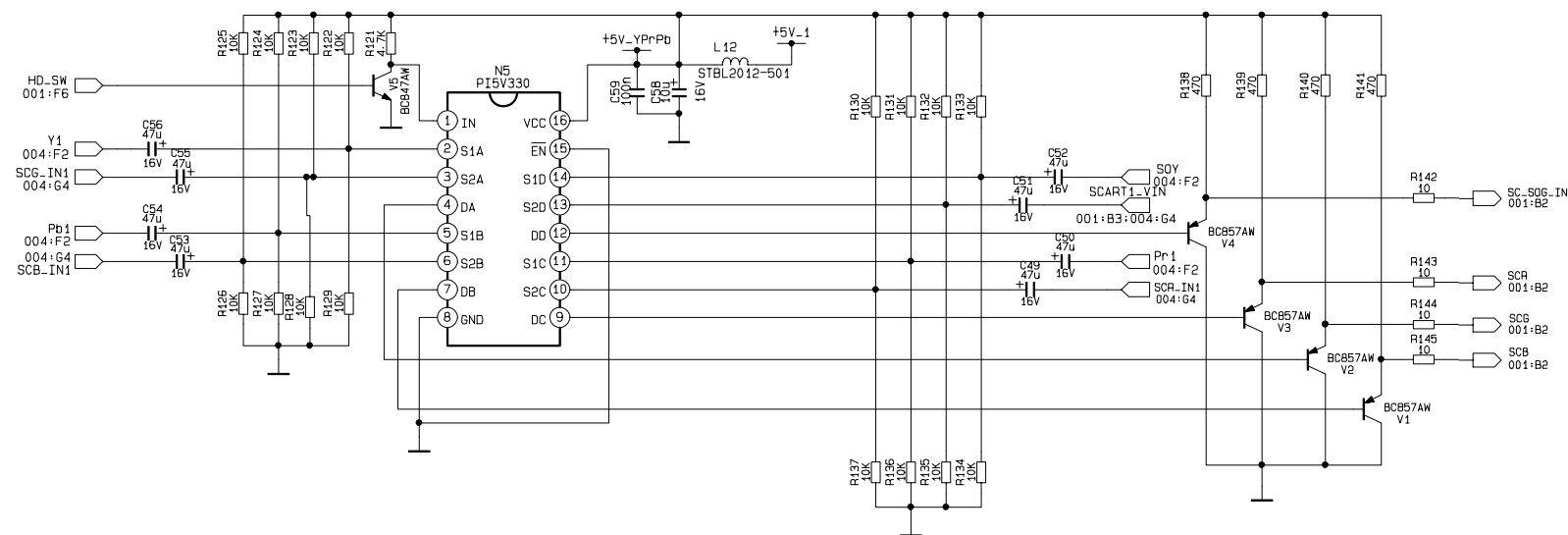
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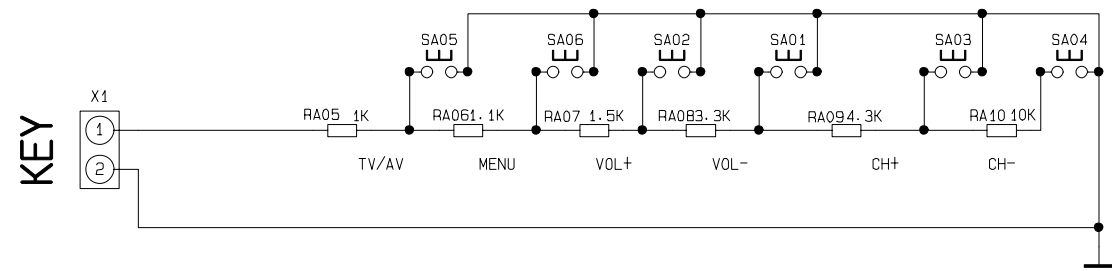
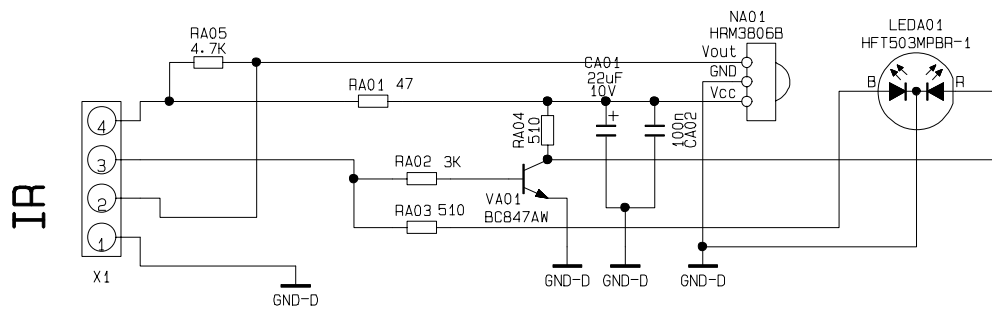


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标准化			
工艺			
批准			



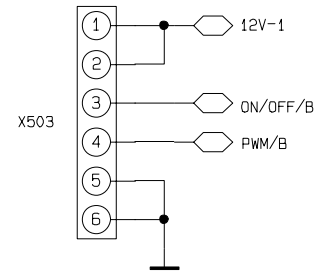
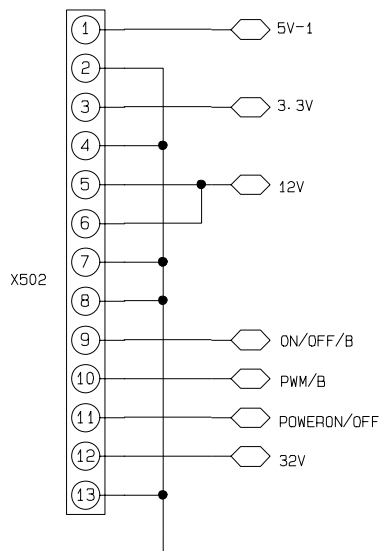
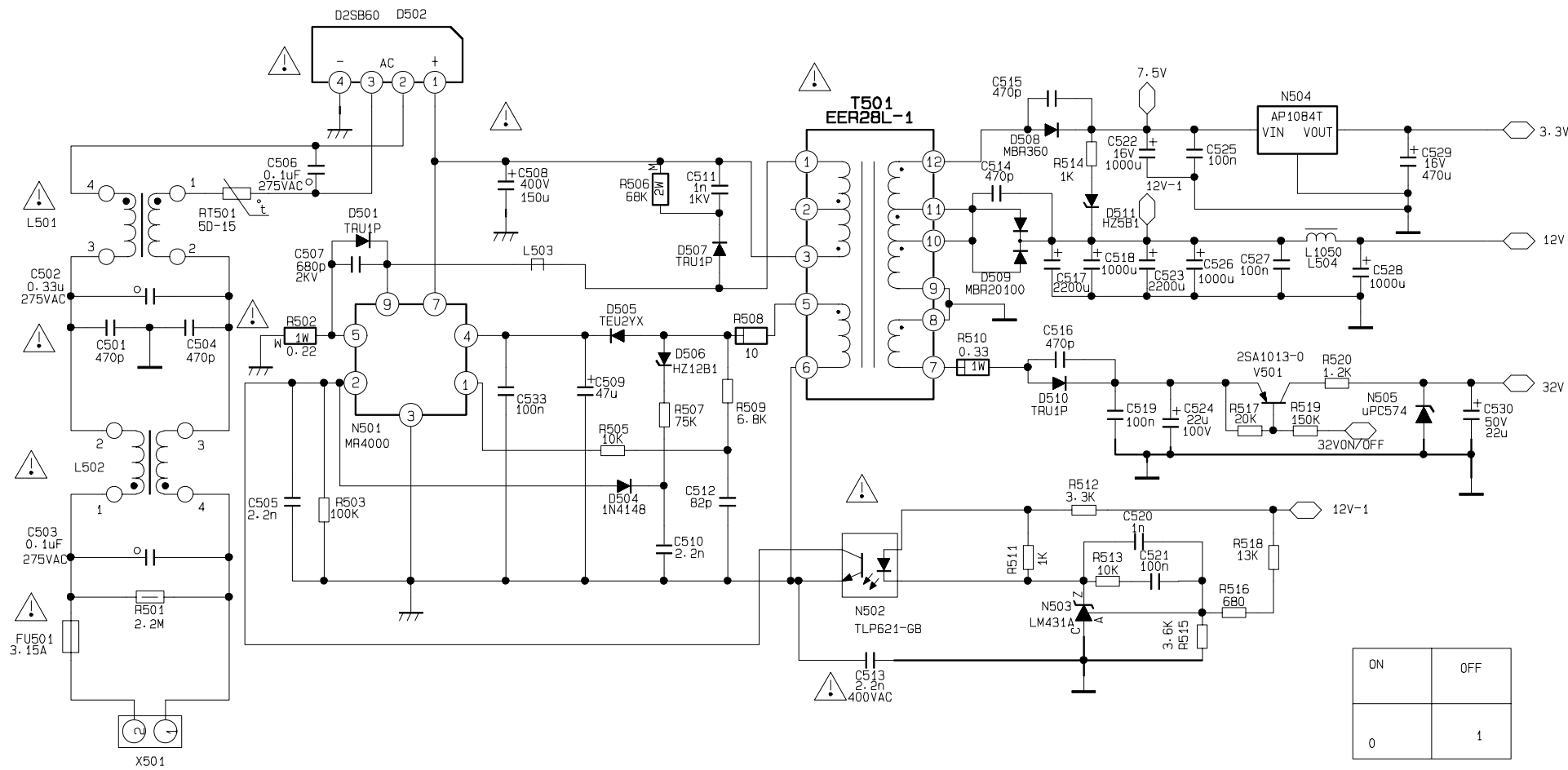
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批准				

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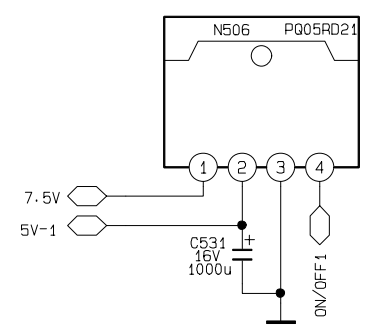
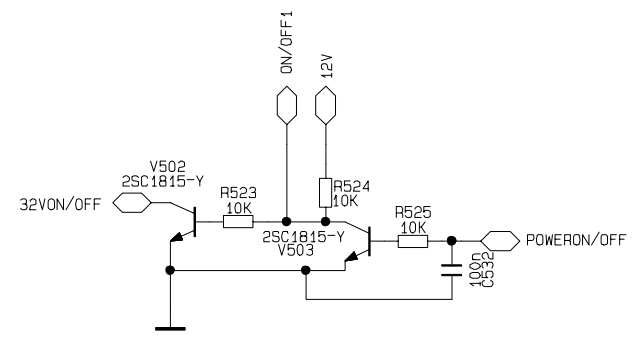
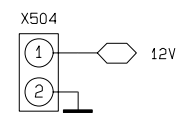
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POWER



ON	OFF
0	1

4

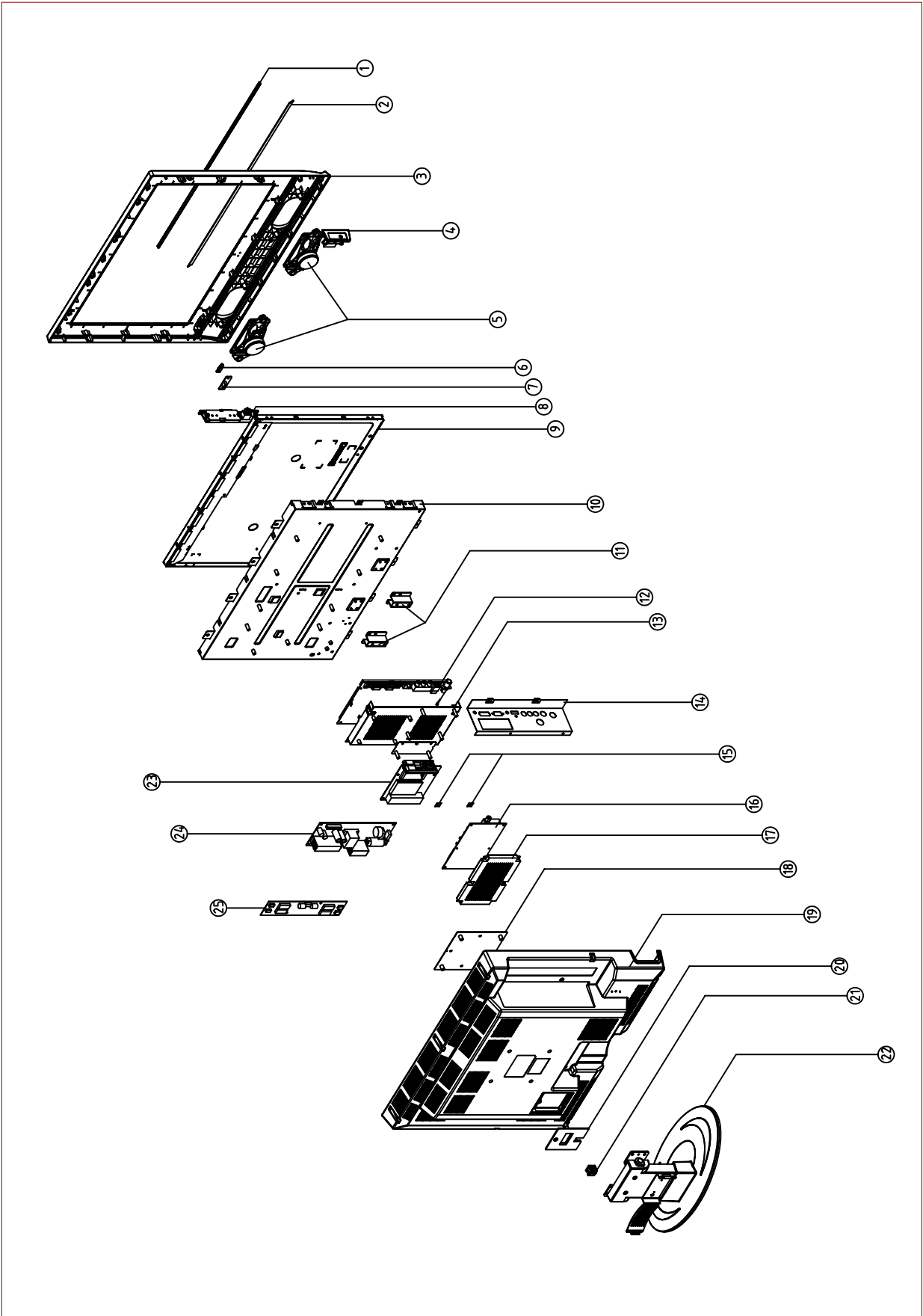


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版次	更改单号			
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拟制			第 6 页 共 6 页	
审核				
标准化			厦门华侨电子股份有限公司	
工艺				
批准				

APPENDIX-A: Main assembly 9222HU3611

NAME	NO.	MAIN COMPONENT AND IT'S NO.	
Main board	6HU0050110	N3 NS2 NV1	TDA4470 (5274470001) MST9E19B (5270919002) TDA7266SA (5267266001)
Key board	6HE0060510		
IR board	6HE0060910		
Backlight board	6LY01214B0		
Power board	6HU0042010		
Remote control	6010Y03512	RC-Y35-0K	
Panel	5203227201	CLAA220WA01	

APPENDIX-B: Exploded view (LC-22X36)



PART LIST OF EXPLODED VIEW

NO.	PART NO.	DESCRIPTION
1	573C245010	decorative bar
2	5850428010	decorative board
3	5QK36U0020	front cabinet
4		earphone interface board
5	5500806004	speaker
6	570021501A	light conducting column
7		IR board
8		key board
9		panel
10	58A0A60900	LCD panel fixed bracket
11	58A0060800	stand connection
12		main board
13	6154102000	shielding cover
14	5810C61800	interface baffle
15	5880397000	leaf insulator
16	6450000011	ISDB-T module
17	5820151500	shielding cover
18	58A0A42500	wall mounting fixed bracket
19	5HK36UH010	back cabinet
20	583A107440	power cord cover
21	5720117000	power cord clasp
22	6151090000	stand
23		B-CAS assy
24		power board
25		back light board

Note: design and specifications are subject to change without notice.

