

LCD TELEVISION

SERVICE MANUAL

LC20H15



Functional Board List LCD/Plasma Televisions

Please note that this BOM list may vary from the original documentation. This part list supersedes the parts list contained within the body of the service manual. Please reference the part numbers below when ordering replacement boards of the servicing of this model.

If you require additional technical support, please contact our Tech Support line at **1-866-396-6322**

Model	Part Number	Description	Boards
FLM-2011	667-L20H15-04	4 Switch Keypress Board	1
	667-L20H15-05	3 Switch Keypress Board	1
	667-L20H15-09	IR Receive Board	1
	667-L20H8-01D	Main Board	1
	667-L20H8-29	AV Board	1
	667-L20H8-55	Tuner(H Frequency) Board	1
	301-U20H15-41RB	Remote RC-U41R-0B	1
	302-AD16A-02	Power Adapter FSP060-1A	1
	615-10483-03	Stand Assy	1
	667-L20H3-14A	Backlight Board	1

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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 instructions

1. Instructions

- 1.1 Be sure to switch off the power supply before replacing or welding any components or inserting/plugging in connection wire
- 1.2 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.
- 1.3 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.
- 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. Wheng installing it please make sure to put it in place.
- 3.2. For service or instatallation 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.

Instructions on adjusting and testing

1 Adjusting and calibrating equipment

Digital multi-meter (or oscilloscope)

5515 signal generator

5518 signal generator

PC set(FLASH writing programs have to be installed first.)

K7253(VGA, YprPb signal generator)

CA210 (LCD white balancer)

DVD broadcaster

2 Flow chart for the adjustment and calibration

See fig.1.

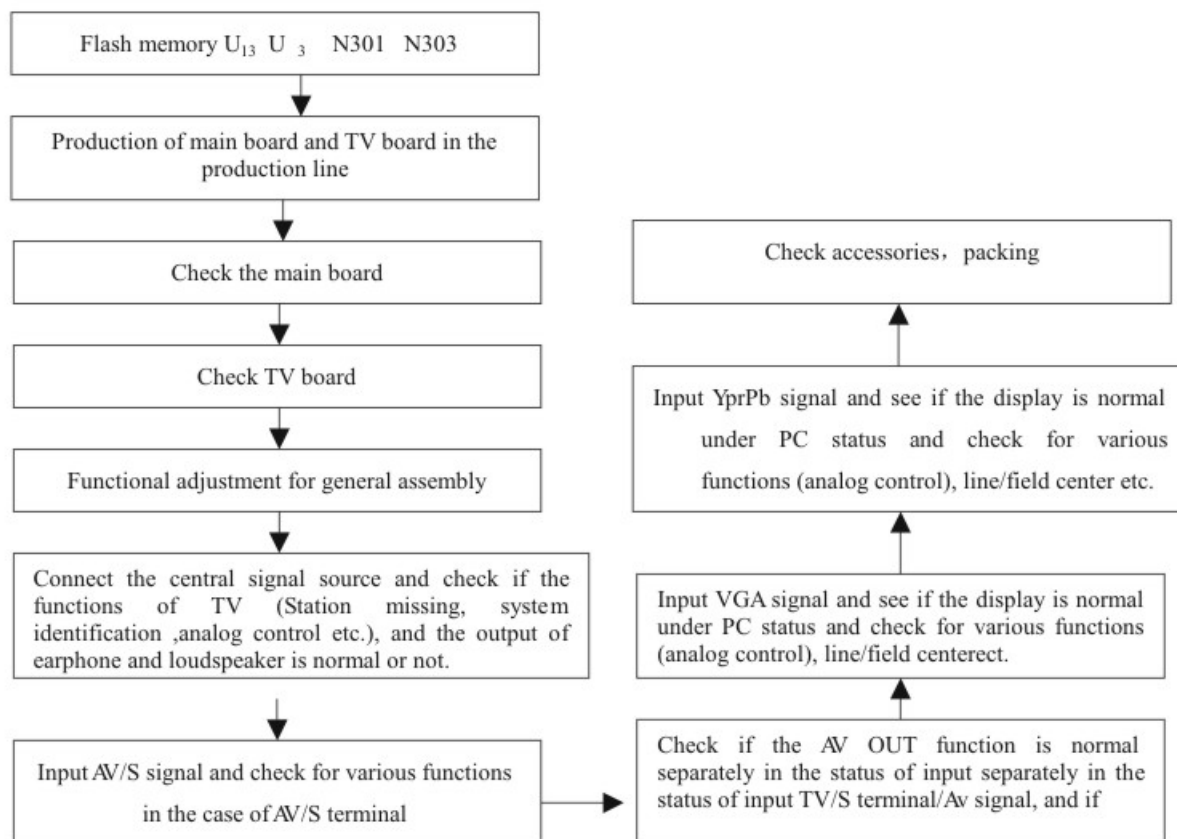


Fig.1 Adjustment and calibration process

3 Flash writing programs

Flash write memory U₁₃ U₃ N₁ N₂

4 Adjustment and calibration for the main board

- Connect the main board X501 to infrared receiving board (as per wiring diagram 203-L20H80-01JL) and insert the plug of power supply adapter (FSP060-1AD103) into X101. Now the indication lamp of the infrared receiving board is red.
- Connect PC, upgrade the program of FLASH U₁₃, push the POWER key on the remote control set. Now the indication lamp of the infrared receiving board is out.
- About 4 minutes later the indication lamp of the infrared receiving board turns blue. Measure U₂ PIN2 to be 3.3 V, measure U₄ PIN2 to be 1.8 V, and measure U₅ PIN2 to be 1.8 V.
- Flash write DDC program.

5 Adjustment and calibration for the TV board

Connect the main board X501 to infrared receiving board (as per wiring diagram 203-L20H80-01JL) and press the POWER key on the remote control set. Now the indication lamp of the infrared receiving board is blue. Measure N3 PIN2 of TV board to be 3.3 V, one terminal of inductor L107 to be 5 V and one terminal of inductor L4 to be 12 V

6 Adjustment of white balance (using the white balancer CA210 and K7253 signal generator specialized for LCD)

- a) Install the whole TV set
- b) Enter the factory menu and perform "PW1306 reset"
- c) Exit from the factory menu. Press "signal source" key and enter YpbPr.
- d) Input YpbPr signal: 640x480p 60Hz (K7253).
- e) Enter the user menu. Set the brightness to 50 and contrast to 50. Press "factory" key to enter the factory menu, perform "ADC calibration", input signals of "black field"(EMPT),"white field"(White-(100%))"fully red"(Full_Magenta)respectively and then calibrate three times.
- f) Input signal of "four grade gray"(Gray(H)-4). Use CA-210 to measure the third grade and adjust the brightness and contrast so that Y is around 150. Enter factory menu and adjust the green color temperature and blue color temperature so that $x=270, y=283$ (red color temperature is constant as 128).
- g) Exit from the factory menu and enter route RGB. Input 640x480 @75Hz "pane signal"(C_Hat_16x12(W))through port VGA. Enter the user menu and adjust the brightness to 50 and contrast to 50. Adjust the line center and the field center so that the picture is correctly positioned.
- h) Input signal of "16 gray grades" (Gray(H)-16). Enter the factory menu and perform "calibration of ADC".
- i) Exit from the factory menu, input the signal of "four grade gray" (Gray(H)-4)and enter the user menu. Adjust the brightness and contrast. Use CA-210 to measure the third grade so that Y is around 200. Enter the factory menu and adjust the green color temperature and blue color temperature so that $x=270, y=283$ (red color temperature is constant as 128).
- j) Enter TV mode and adjust channel No. Enter "D8"signal and adjust the color to 0. Adjust the brightness and contrast. Use CA-210 to measure the third grade so that Y is around 200.
- k) Enter the factory menu and adjust the green color temperature and blue color temperature so that $x=270, y=283$ (red color temperature is fixed as 128).

7 Performance check

a) TV Interfaces

Connect RF port to central signal source. Enter station search menu - auto station search. After system adjustment is over, check if there is any station missing and then check semi-auto station search. Check if fine tuning is normal.

Check if the output of earphone or loudspeaker is normal and if the picture is normal.

b) Interface of AV/S Terminals

Connect to access the signal of AV/S terminals separately and check if the picture or sound is normal.

c) AV OUT Terminal

Input the signals separately in the status of TV/AV/S terminal. Connect AV OUT terminal to monitor and check if the output picture and sound from AV OUT is normal. (Note: In the status of S terminal,

the output picture from AV OUT is colorless.)

d) VGA Interface

Input VGA signal(K7253 signal generator). Separately input the four types of VGA format signals as listed in Table 1. Wait till auto calibration is over. Then check if the picture and sound is normal. If there has been interference to the picture then press the auto set key on the remote control once again and check if the display is normal.

Table 1 Display Format of PC

Item	Resolution	Picture element clock (MHz)	H-SYNC (kHz)	V-SYNC (Hz)	Remark
1	640 x 480 @ 60	25.175	31.469	59.900	
2	720 x 400 @ 70	28.322	31.469	70.086	
3	800 x 600 @ 60	40.000	37.879	60.317	
5	1024 x 768 @ 60	65.000	48.363	60.004	

e) YprPb Interface

Connect to access YPrPb signal(K7253 signal generator). Separately input the five types of YprPb format signals -- 480P/50 Hz,480P/60 Hz,720P/60 Hz,1080I/50 Hz,1080I/60 Hz and check if the picture and sound is normal after auto calibration is over.

Connect to access YprPb signal(DVD signal generator). Input the signals -- 480I/50 Hz,480I/60 Hz separately and check if the picture and sound is normal.

8 Preset ex-works

In the status of TV enter the factory menu by pushing the factory key and then perform presetting.

9 Ex-works packing

Check accessories and then pack them in box.

Trouble shooting

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

1.Antenna:

Picture is out of focus or jumping	● Bad status in signal receiving ● Maybe broadcast signal itself is not good ● Check if the outdoor antenna is disconnected. ● Check if the antenna is correctly oriented.
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.
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.

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 TVIn 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

Method of software upgrading

Steps of software upgrading are as follows:

1. Select a serial connection wire and a VGA connection wire and then connect them by means of a patch panel;
2. Use a serial wire to connect the PC to the patch panel and set TV set to off state;
3. Open the software upgrade file holder and double click

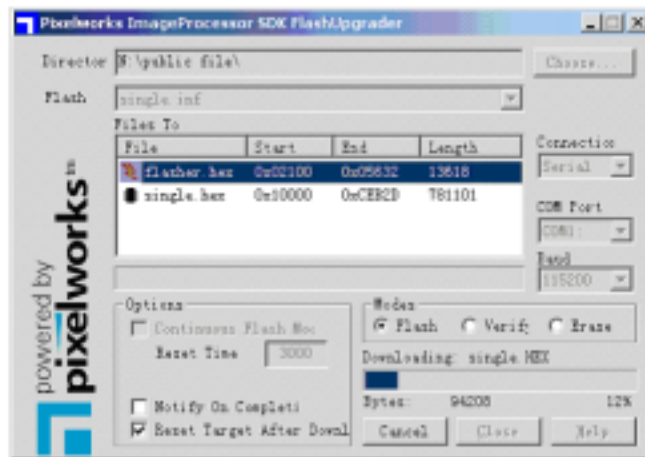


FlashUpgraderNT(use under window 2000/XP/NT)



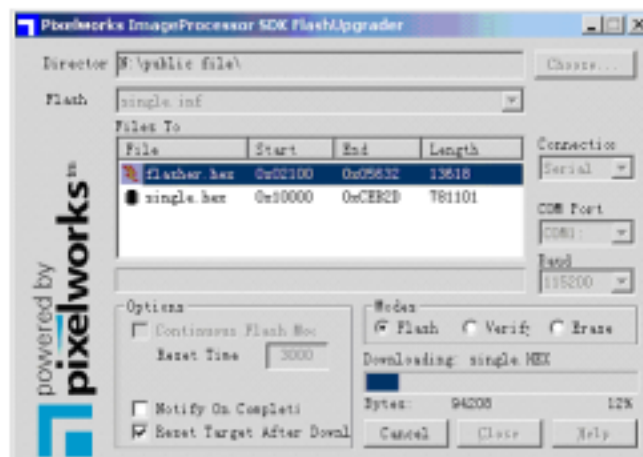
FlashUpgrader(use under window 98),

The following interfaces will show up after running the program:



Based on the computer features, set up the serial port(COM Port). Select corresponding serial port (if it's unable to FLASH WRITE, change to another port). Baud is selected to be 115200. Then select Reset Target After Download. Click FLASH pushbutton, it's ready to run. For other settings, please refer to the Fig. Above (already defaulted by the system, normally no need to change).

4. Switch on TV set the FLASH write program begins to run;



5. After FLASH write is over, push button "cancel" will become flash. Then shut the main power supply and it's OK just switch it on again.

Note: Do not shut the power off or turn the TV set on during the FLASH write. Otherwise it may lead to no way for flash to rewrite.

Briefing on LC20H15 and its working principle

LC20H15 multi-media liquid crystal TV broadcast and receiving set adopts liquid crystal display screen of LG 20.1, which is provided with NTSC color system receiving function in addition to AV input, S-VHS input, high definition signal port for component YPrPb/YcbCr, PC VGA port, earphone output and other signal ports. For power supply an externally connected power adaptor is provided.

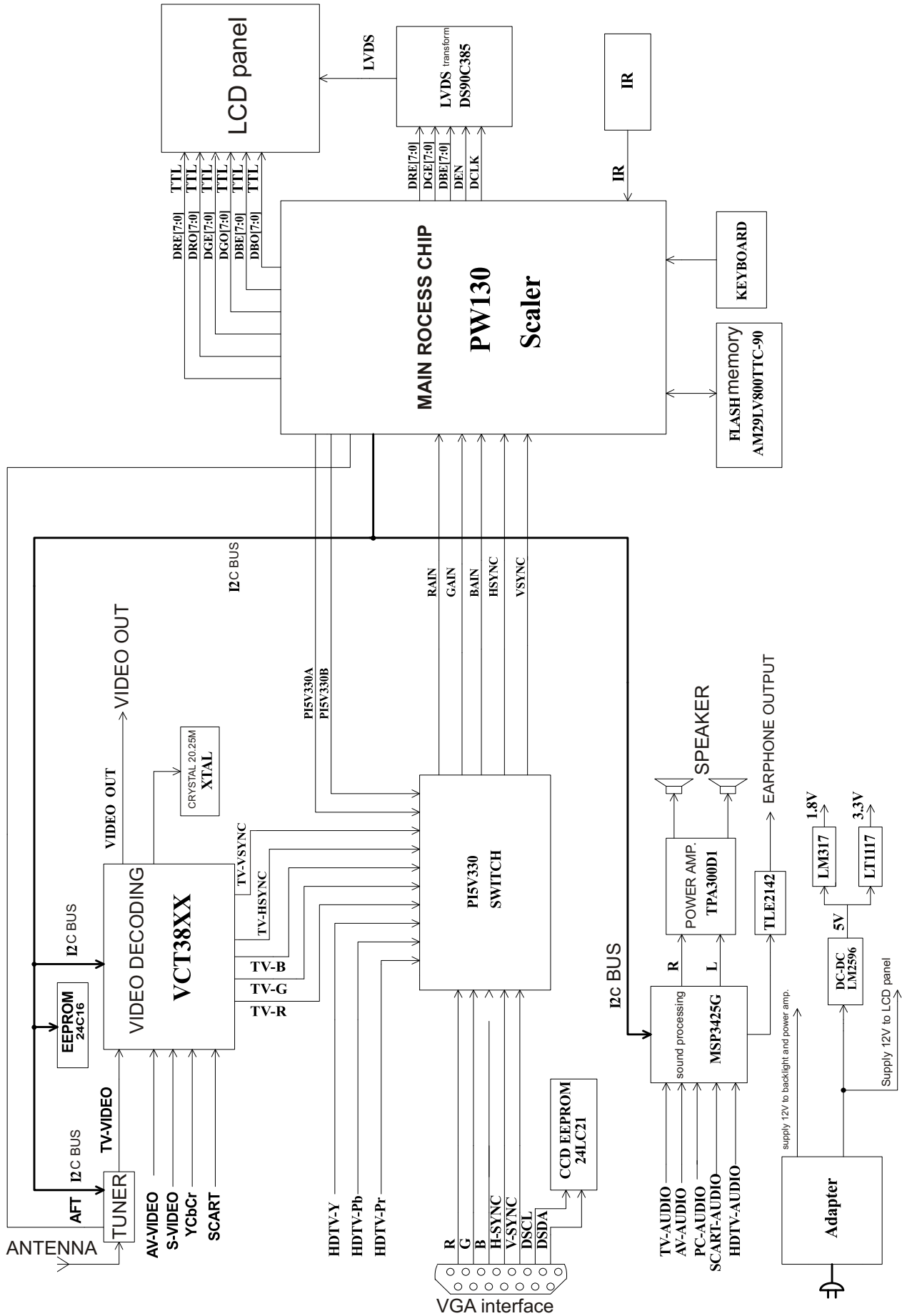
The circuitry of LC20H15 is composed of RF module board, video signal board, digital signal picture processor and AC-DC transformer, and DC-DC circuit board.

The working process is as follows. The radio frequency signal undergoes an integrated tuner U1 before a color full video signal is generated. This video signal then enters analog board decoder IC N1 VCT3833 Pin19 where it is processed and its output as analog signals R, G, B through Pin42, PIN43, PIN44. Audio frequency signal is processed with sound in IC N1 VCT3833 Pin19 and then output through MSP3420G Pin28, Pin27 to SRS for surround sound processing in IC N6 M62494E. Finally it is subject to power amplification in IC N8 TDA3002D2 before it is output to speaker.

VGA signal/high definition signal is input to personal computer through the main board. The signal selected by Y/Pb/Pr through 5 way 1/2 switches IC(U9 BA7657F) is subject to reselection together with signal TVRAIN, TVGAIN, TVBAIN through 5 way 1/2 switches IC(U7 BA7657F). Finally signals R, G, B are selected and sent to the main processing chip PW1306.

PW1306 is a built-in X86 CPU of the main processing IC, externally connected by 8M Flash(U13) memory to control the whole system. The input signal of V-port and G-port is subject to internal arithmetic processing and then output as R, G, B signals with electric level of 24 bit TTL to sockets JP3 and JP4, where through connection wires the signals are sent to the port of LG liquid crystal screen and for the realization of picture reproduction.

(1). BLOCK DIAGRAM



Among which:

Video decoder: VCT3833

Audio processing: MSP3420

Signal selection:BA7657F

FLASH memory:M29LV800TTC-90

Picture processing: Pw1306

Sound amplification:TDA3002D2

LVDS conversion:DS90C385

SRS sound field:M6294E

(2). Power supply

12 V is input through power supply adaptor and then is transformed through DC-DC into output of 5 V, which after going through various kinds of three terminal stabilizing integrated circuits, is output as 1.8 V and 2.2 V. U3 is a power supply managing IC, which cuts off the 5 V output in the case of standby so as to keep low power consumption.

1.U3(ATTINY12L):Power supply manager IC is a small CPU.

This IC is supplied with 5 V that is transformed from 12 V by stabilizer Tube VD102. This CPU only receives POWER signal;

When its PIN7 outputs high electric level,U1 LM2596 will be in operation and outputs 5V. Then the whole system starts to work and ensures low power consumption in the case of Standby.

2.U19(IRF7307):double tube MOS switching tube

The voltage of this part V12-STB is for power amplification of sound. Only when LCDON/LVDS ON is of high electric level can the output of Pin7 and Pin8 be low,and the output of Pin5.Pin6 be 12V.When LCDON/LVDS ON is of low electric level, output of Pin7 and Pin8 is low,and the output of Pin5 and Pin6 is 0. This ensures low power consumption when Standby.

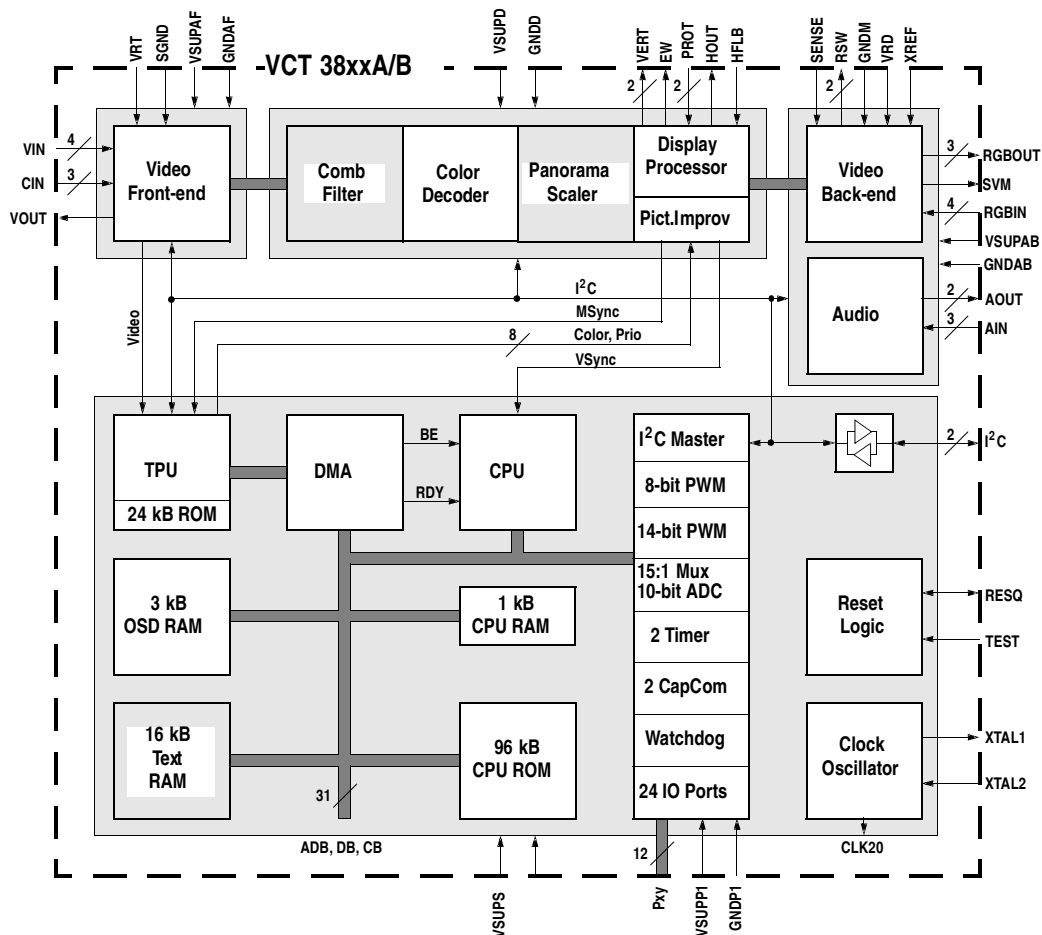
3.Other IC

U1(LM2596):with on/off DC-DC stabilizer 5V output.

U2(AS2830):three terminal stabilizer, 3.3V output.

U4 U5(LM1117MPX):three terminal stabilizer, 1.8 V output

(3). Video decoder (VCT3833)



VCT38XXA/B is a single chip TV processing IC for high picture quality. Modular design and workmanship of sub-micro level enables it to use in all TV equipment. It includes complete display of video format processing. The video front terminal unit provides an analog interface for all video inputs and performs analog-digital conversion for the downstream digital video processing.

As many as 8 analog inputs can be connected of which 4 inputs are used for the input of composite video or S-VHS brightness signal, 2 color inputs can be used to connect the signal of S-VHS carrier frequency (chroma). For analog YcbCr signal, the input of the brightness that is selected is used together with the input of CBIN and CRIN. Automatic gain control works in digital manner. In the mode of YCbCr, the gain of chroma channel is fixed and is applicable for 0.7Vp-p nominal amplitude. However, should there appear ADC overflow, an excessive signal scope 1Vp-p can be selected. Two ADC (analog-digital conversion) are used to digitalized the input signal. The converter has an analytic degree of 8 digits. Reference voltage required by the converter is produced by an integrated band-gap circuit. An adaptive comb filter is used to carry out high quality Y/C separation for PAL/NTSC signal and to improve the resolution of brightness (band width) and reduce the interference of color contamination and brightness contamination. Proper programmable limit to the quantity of characteristic Luma Comb improves the uniformity of 2D resolution. This limitation is set up by the data of CLIM (turning point).

Color decoder

Processing of both brightness and color is shown here. The color decoder also provides the format of broad band chroma etc. for the use of S-VHS broad band broad chroma. If self-adaptive comb filter is used to carry out high quality Y/C separation, then the color decoder conducts the processing in S-VHS manner. The format of color decoder input is YCrCb 4:2:2. Rear terminal of video frequency Digital RG B signal can all be converted into analog RGB. It is provided by 3 DAC (digital-analog conversion), an analog brightness value and another 3 DACs. Its regulation scope is 40% of the whole RG B.

TV controller

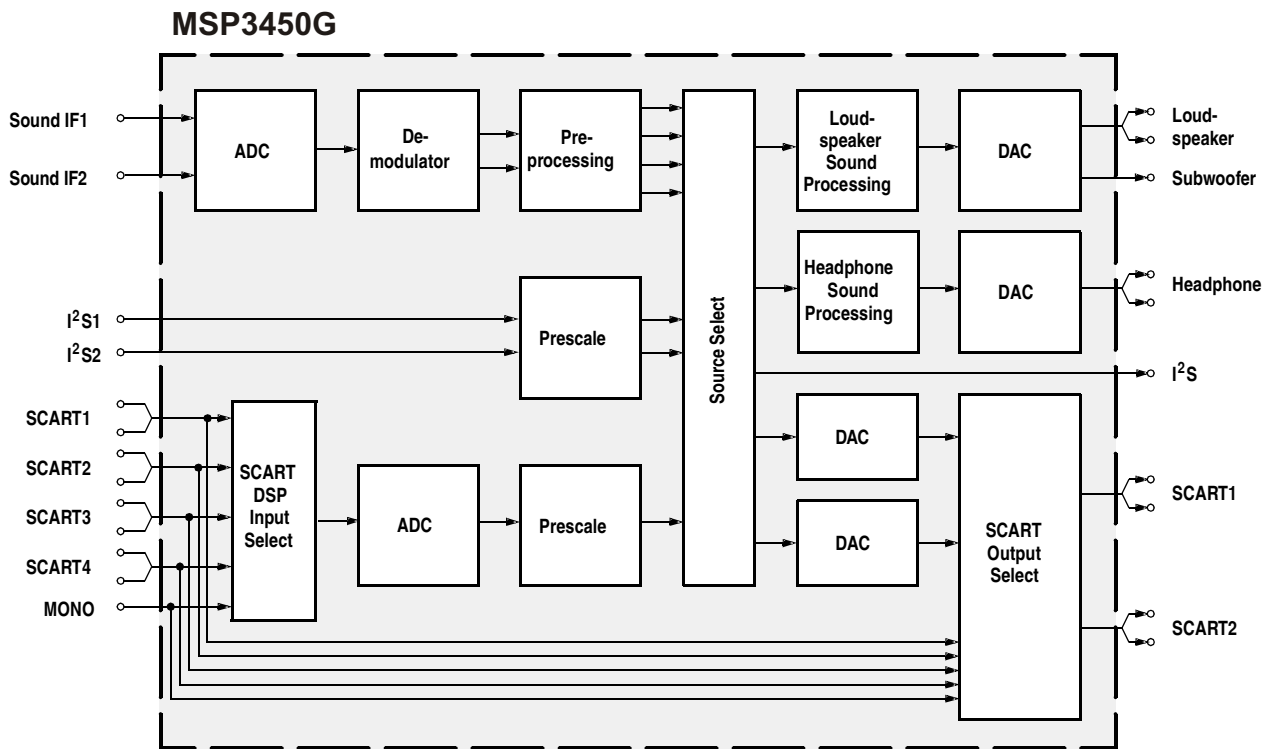
TV controller is composed of CPU, RAM, ROM and some peripheral modules. It includes a memory module that can access over 64 KB, a pilot installation software allowing for downloading the external codes into Flash memory. The controller runs a complete set of software required to control TV. The software includes such control functions as video, OSD and text processing. It also includes the control for external parts and components such as tuner and stereo decoder. The communication between the controller and external parts is interfaced by means of I2C bus line (highway) and can also be connected by the pin at programmable port.

(3).Audio frequency part

1.MSP3450G

MSP3450G is one of MSP34x0G series. It is a single chip multi-system processor for sound, which covers global wide analog TV system processing for sound. In the case of NICAM digital sound system, all the TV sound processing from analog IF signal input to AF-OUT (audio output) after processing is performed in this single chip.

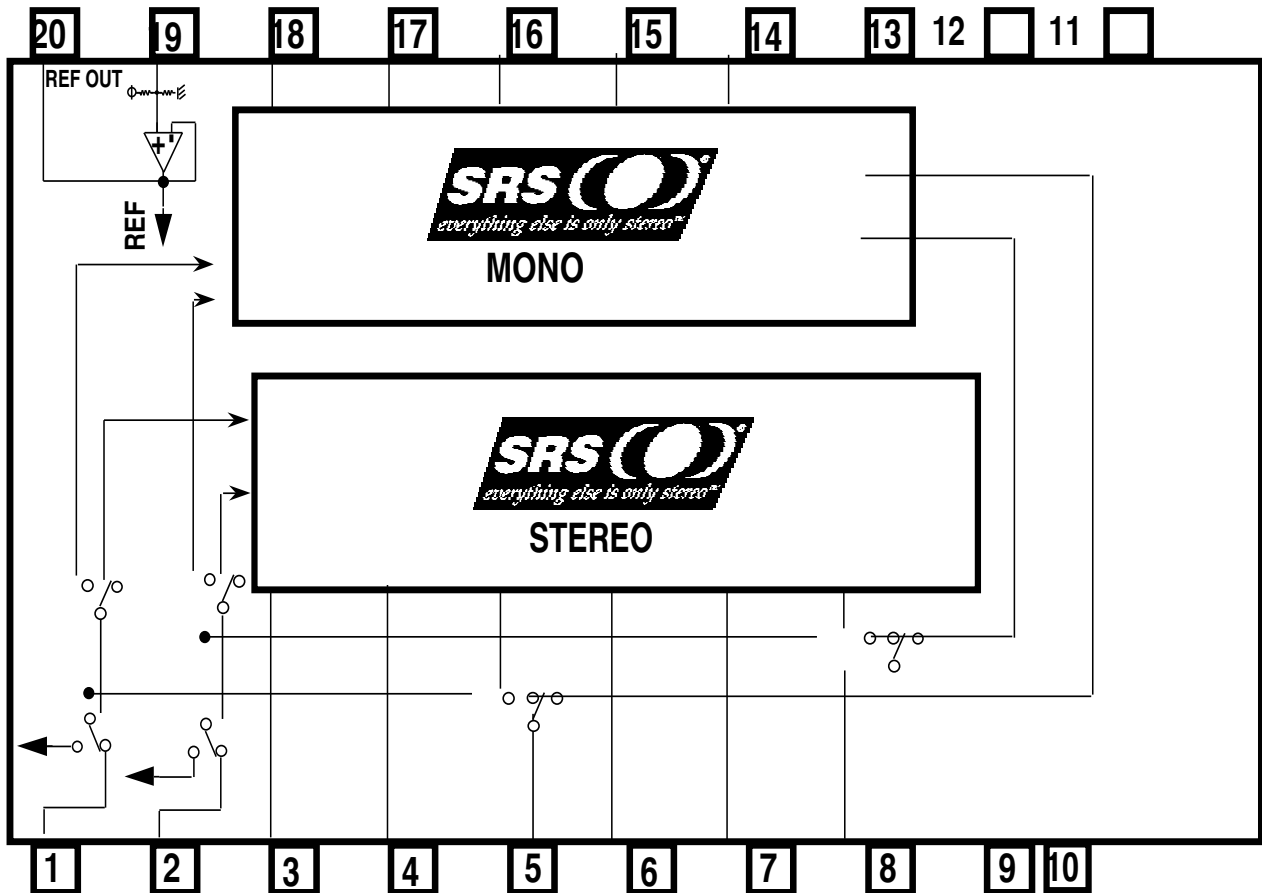
The sound signal of TV, AV, S-VIDEO, Y.Pb.Pr, VGA is input through the ports of MSP34x0G (pin 67 for TV), (pins 53,54 for AV1), (pins 56,57 for AV2), (pins 50,51 for YPBPR), (47,48 pins for VG) and the present sound form is automatically inspected. Besides, the electric level s of pilot frequency and identification signal is inspected and measured internally by the sequence switch between MONO/STEREO/BILINGUAL, and it's unnecessary to be processed through the bus line. The processed signal is output through pins 27 and 28 and then fed to pins 1 and 2 of N403 M6249 for SRS treatment.



2. M62494SP

SRS technology is incorporated in M62494SP. The full name of SRS is sound retrieval system, implying a sound system that can reproduce and restore the stereo sound that is taking place at the site. It is a patented sound technology of SRS Lab USA.

The signal is fed to pins 1 and 2 of M62494 through pins 27 and 28 of MSP34x0. After processing it is sent to pins 3 and 5 of TPA3002D of N404 where it is amplified and output. From pins 11 and 12 the control signal of stereo and mono sound channel is sent to pin 2 (mono sound) and pin 63 (stereo), where selection is made.

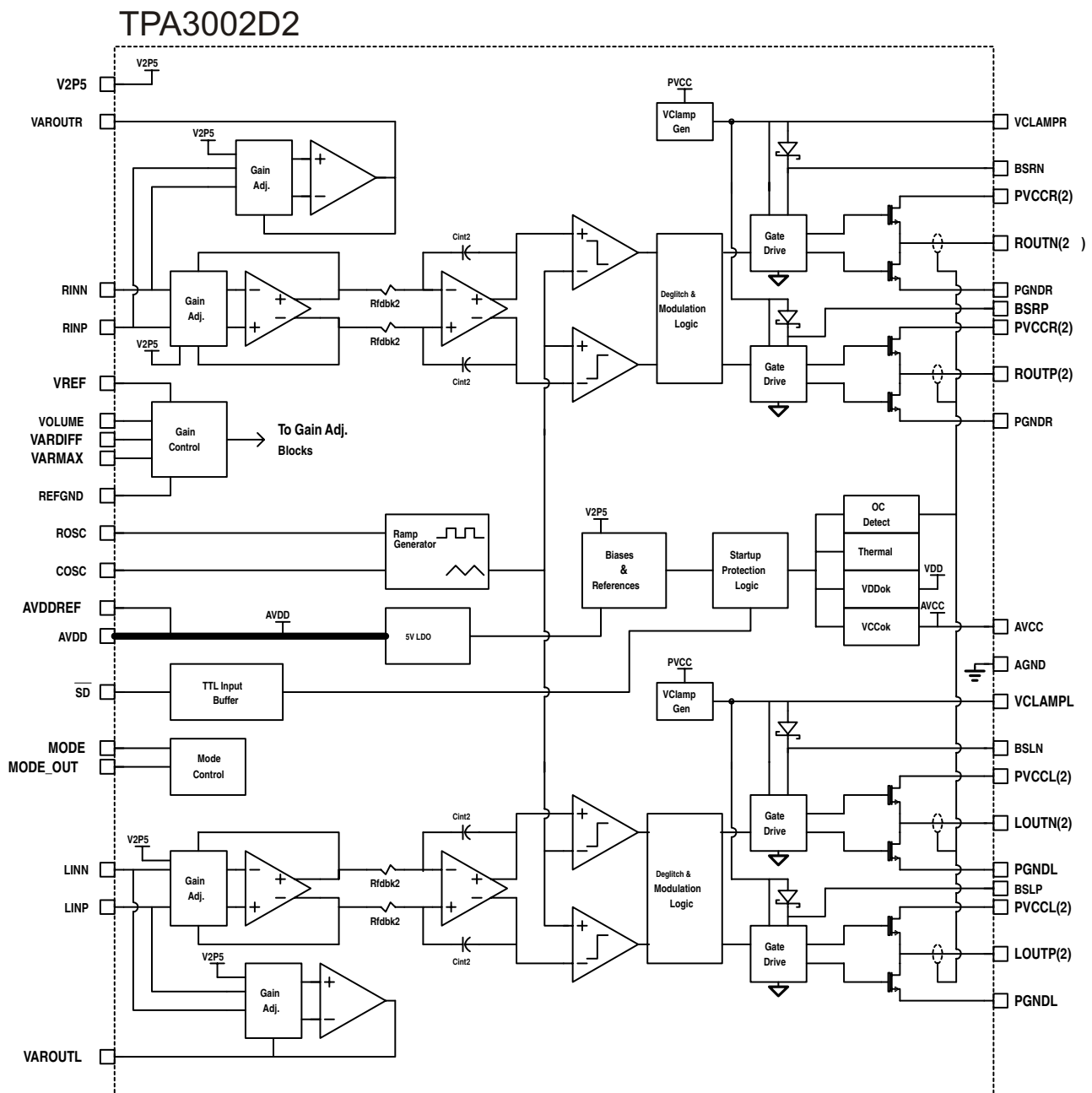


3.TPA3002D2

Sound power amplification TPA3002D2:(power amplification of stereo category D with volume control)

TPA3002D2 is a high efficiency audio frequency amplifier of category D. The gains scope provided is -40dB to -36dB. Supply voltage is 12V. The input of the amplifier is differential input (any noise at the two input sides of the channel can be eliminated). The modulation of TPA3002D2 for various outputs is from 0 to the supply voltage. However out P (positive output) and out N (negative output) are now at the phase where they have no input to each other. For positive output voltage, the duty cycle of OUT P is bigger than 50% and that for OUT N is less than 50%. For negative input voltage, the duty cycle of OUT P is lower than 50% and that for OUT N is higher than 50%. In most of the period the voltage to the load is 0V, which greatly reduces the switching current thus lowering the power consumption of the load.

For BTL output (differential output), the voltage at the two output pins is 180 degree out of phase. Load is connected between the two pins, thus enabling the load to get four times the output power and reducing the baffle to the DC capacitor (BTL output is equal to balanced output).



(5). Processing of photograph

PW1306 is an optimized graph processing IC used for plane displayer (monitor).

1.U12 74LVC541A is an 8-digit buffer. Its input and output have 3 state functions. When OE1 and OE2 are both low electric level, Ii and Oi are in on state. Otherwise Qi is three states. Controlled by RD,CSO signal of PW1306, PW1306 reads the information about the push key and decodes the key according to the state of D0 \ D7.

2.PW1306 provides three terminals for data of 24 bits,of which one is specialized for input (VG port) of Video/graphics data, one is specialized for the display of output port (terminal D), another one is a terminal (DG port) for the data of definable double direction display output/graphics input. DG port is defined as input mode, which can be independently considered as a VG port or can be formed, together with the original VG terminal, into an input port for 48 bit 2 picture element/every clock. Once DG port is defined as output mode, it can be formed, together with D terminal, into a displayer of 48 bit for double point (double click) screen.

- PW1306 with built in OSD function,in support of transparent and semi-transparent OSD,and with phased-in and phased-out function.

- PW1306 includes an 80X86 CPU,16 bit micro processor, with interruption port, universal I/O ports, VART port, IR decoder, PWM output port and timer and a memory port applicable for various PROM,ROM,FLASH,RAM.

Signal flow direction of PW1306:

1. LG screen(single point screen)display of data output

- DRE[7:0],DGE[7:0],DBE[7:0]
- DCLK ,DEN,DHS, DVS

2.PW1306 FLASH interface

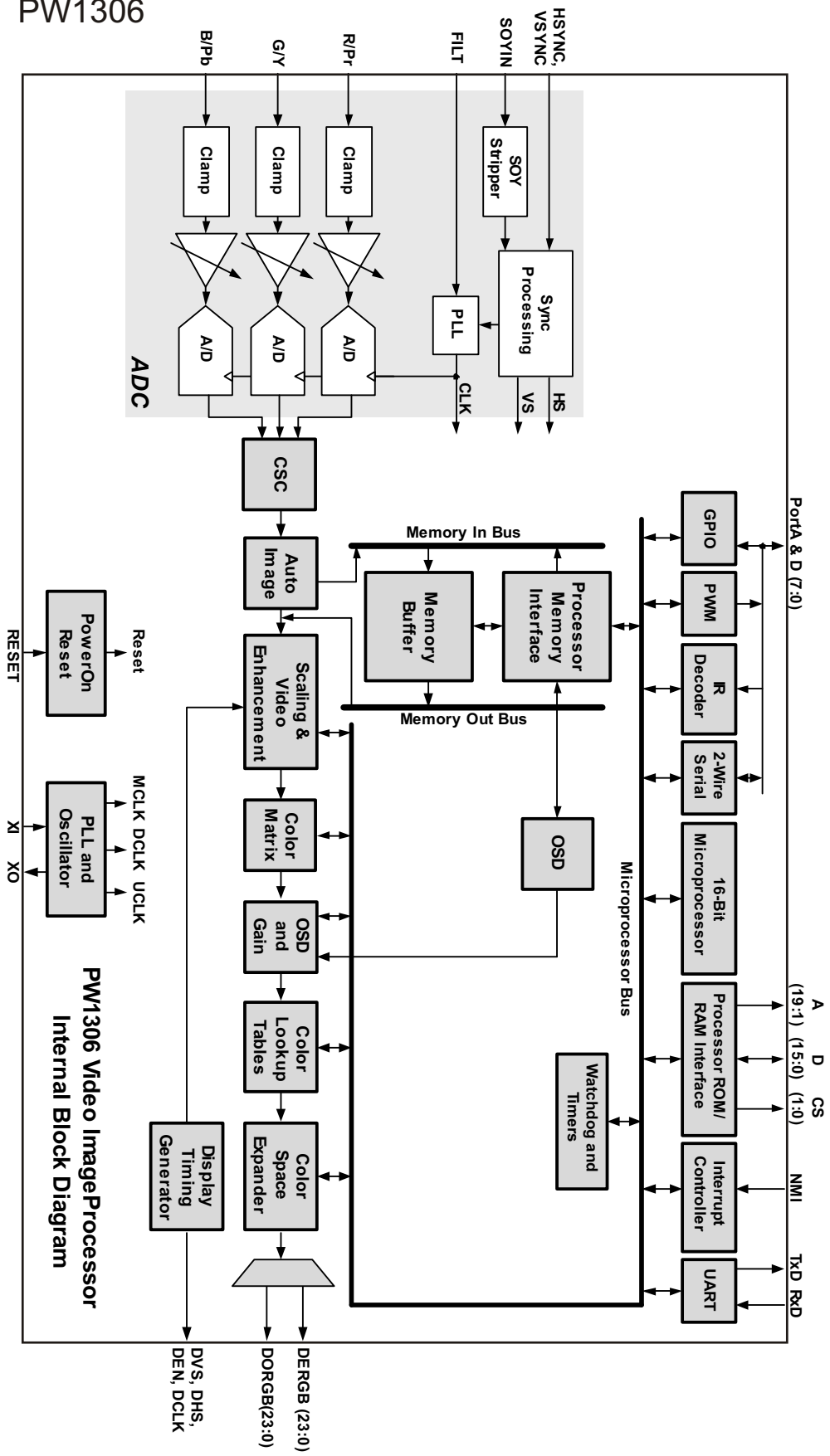
- A(19:1) to the address bus of flash.
- D(15:0) to the data bus of flash.
- ROMWEN write in enable of Flash.
- ROMOEN output enable of Flash.

3. other signals

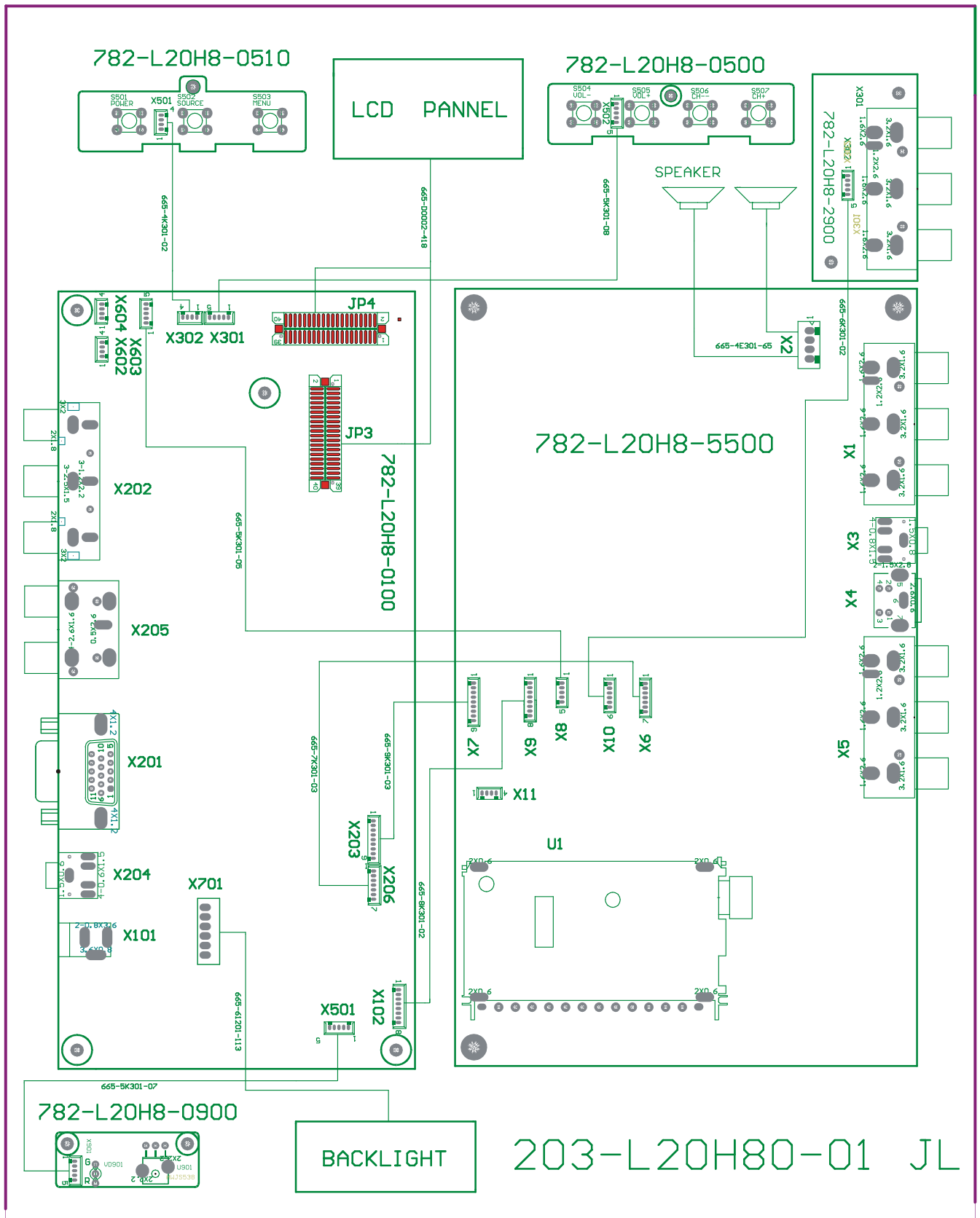
- Reset signal from small CPU.
- RD,CSO,I/O extension control.
- TXD,RXD universal asynchronous sending and receiving.
- SDA,SCL I2C bus
- IR: infrared signal input from remote controlled receiving board.
- P15V330A P15V330B controls the 5 way 1/2 switch of BA7657F.
- NMI non-screened interruption.(for access to programs)
- RAIN GAIN BAIN R,G,B three base color input

· HSYNC VSYNC input

- PWM OUT: output of modulated pulse width for the control of the brightness of display screen ·
- LVDSON:to control the POWER DOWN of the sender of LVDS
- BKLON:control signal for back lights
- LCDON :control signal for the power supply of PANEL · SDA1,SCL1,ACK,REQ to X603 and the to analog plate for communication with the analog plate.
- Flash ID: for normal operation when in low electric level and for flash write software when in high electric level.



WIRING DIAGRAM



Serial No. of Parts

335-2000-00	Display screen
203-L20H8-01W	Parts of main board
302-AD16A-02	adapter
667-L20H8-05	Parts of big key board
667-L20H8-09	Parts of infrared receiving board
667-L22H8-55	Parts of TV board
667-L20H81-05	Parts of small key board
667-L20H8-55	High frequency board

Identification criteria for the bright spot and dark spot of the LCD screen

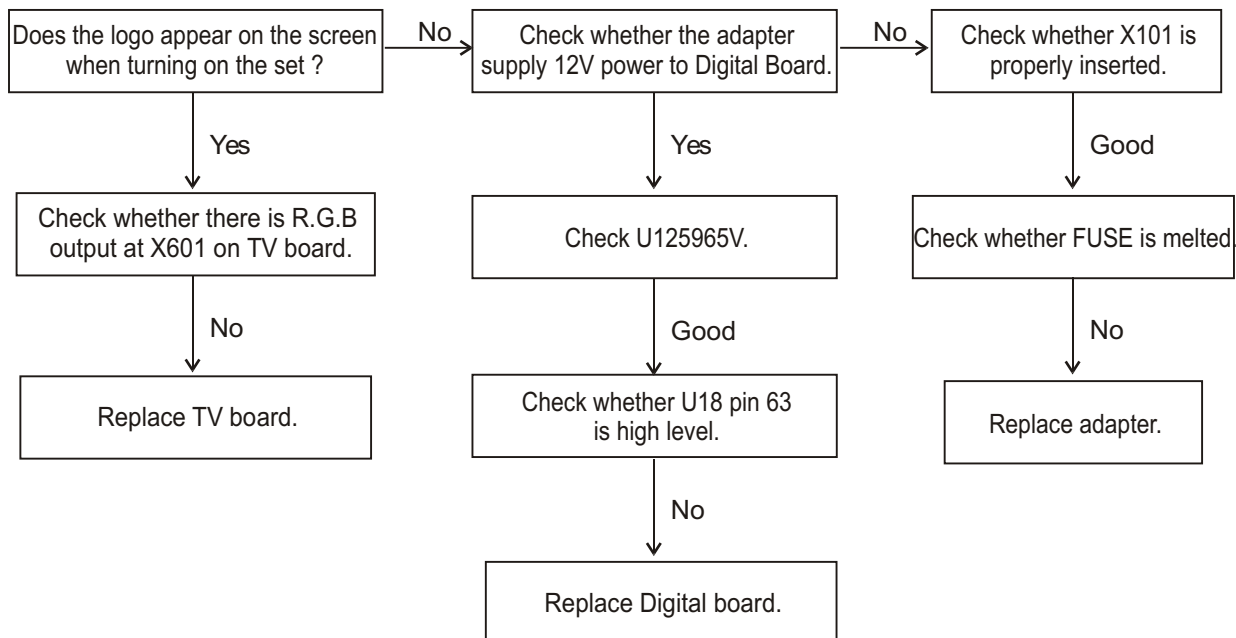
Category	criteria	Q'ty allowed					Distance between two spots						
		15"	20"	22"	30"	40"	15"	20"	22"	30"	40"		
Bright spot	One single spot	≤5	≤2	≤5	≤2	≤3	≥15mm	≥15mm					
	2 neighboring spots	≤2	≤1	≤2	≤1	≤1							
	Total No.	≤5	≤2	≤5	≤2	≤3							
Dark spots	One single spot	≤6	≤7	≤5	≤4	≤10		≥10mm	≥5mm				
	Two neighboring spots	≤2	≤2	≤2	≤1	≤5							
	Total No.	≤6	≤7	≤5	≤4	≤10							
Total defected point		≤8	≤7	≤5	≤4	/							

Notes:

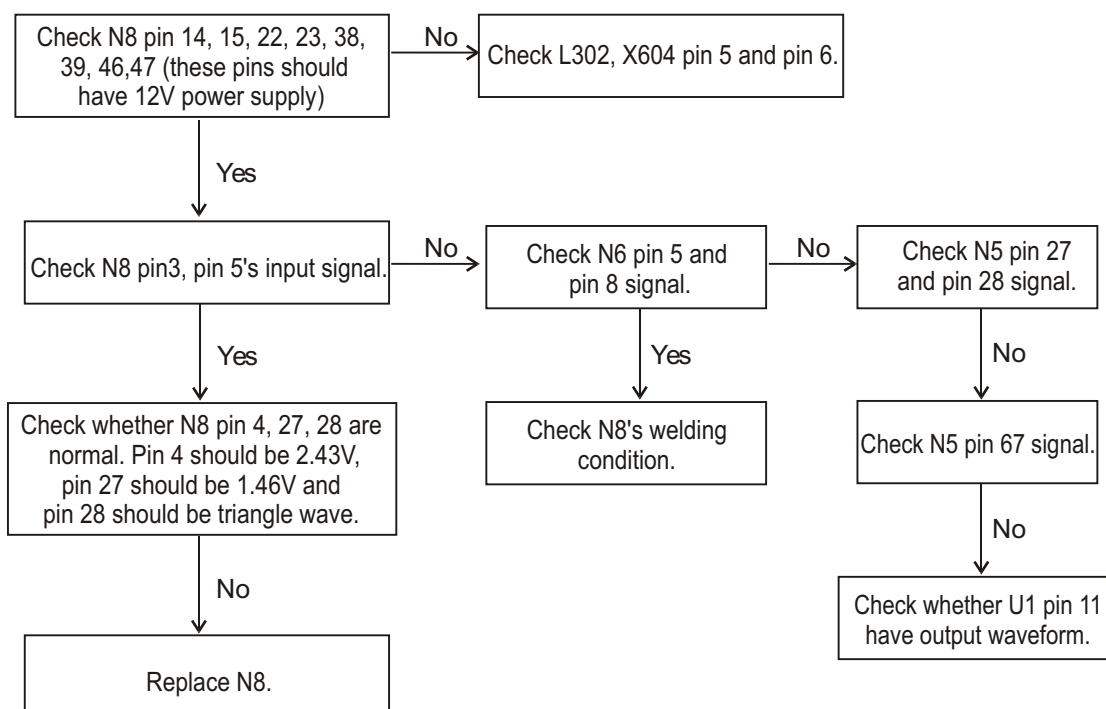
1. Definition of defected point (bright spot, dark spot): It is identified as a defected point if its area exceeds 1/2 of a single picture element (R,G,B).
2. Definition of bright spot: It is identified as a bright spot if it is bright in the state of dark field and its bright size remains unchanged
3. Definition of dark spot: It is identified as a dark spot if it is dark in the state of white field and its dark size remains unchanged
4. Definition of two neighboring points: Defects of a group of picture elements(RB,RG,GB).

Troubleshooting guide

No raster

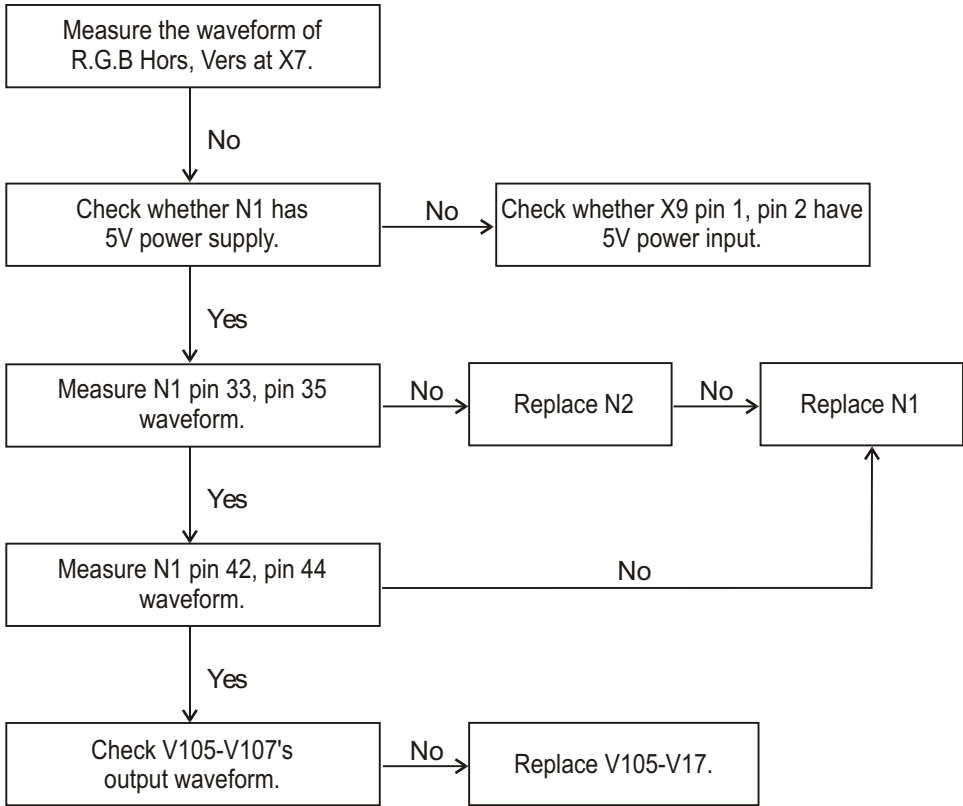


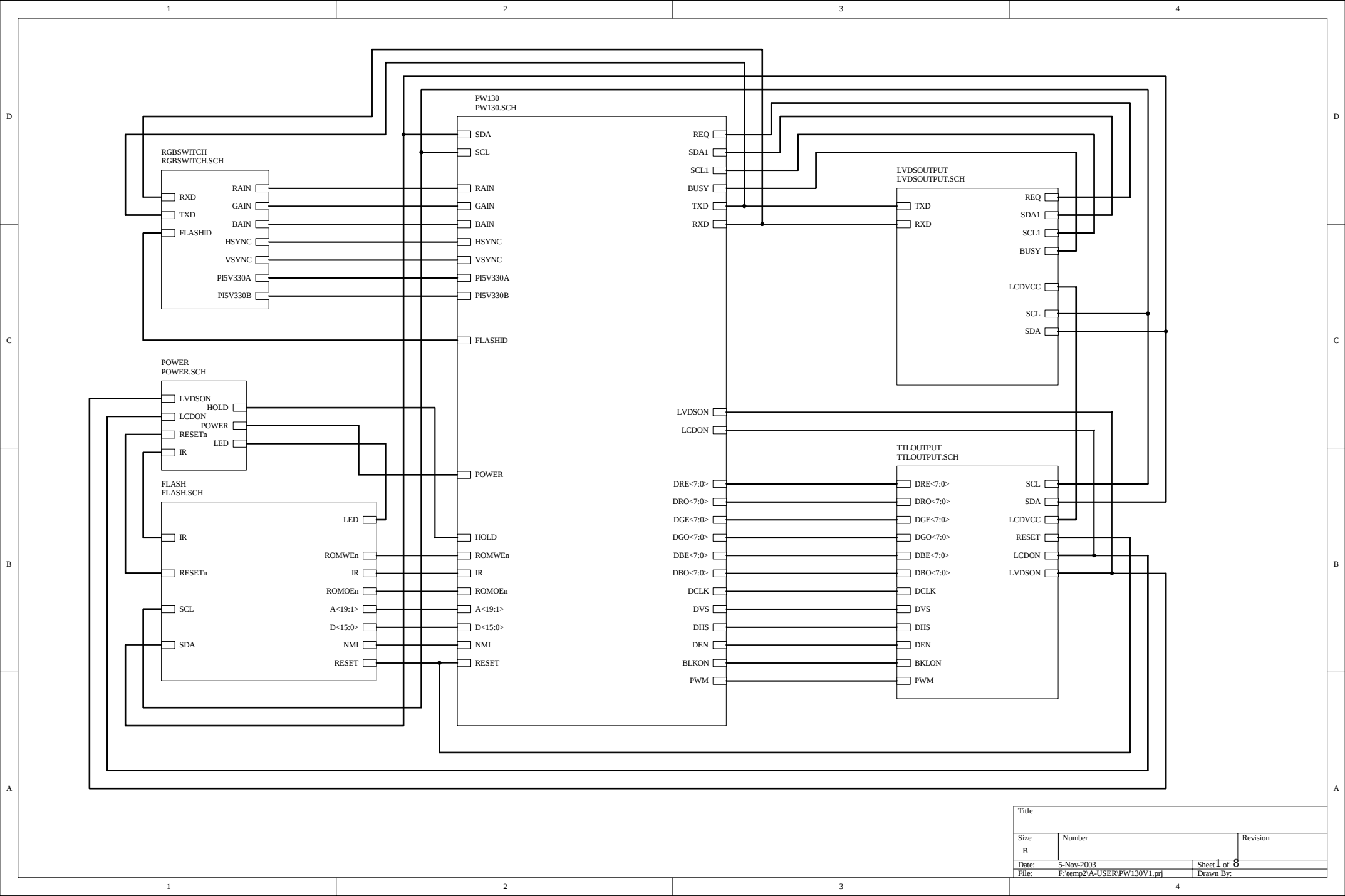
No sound



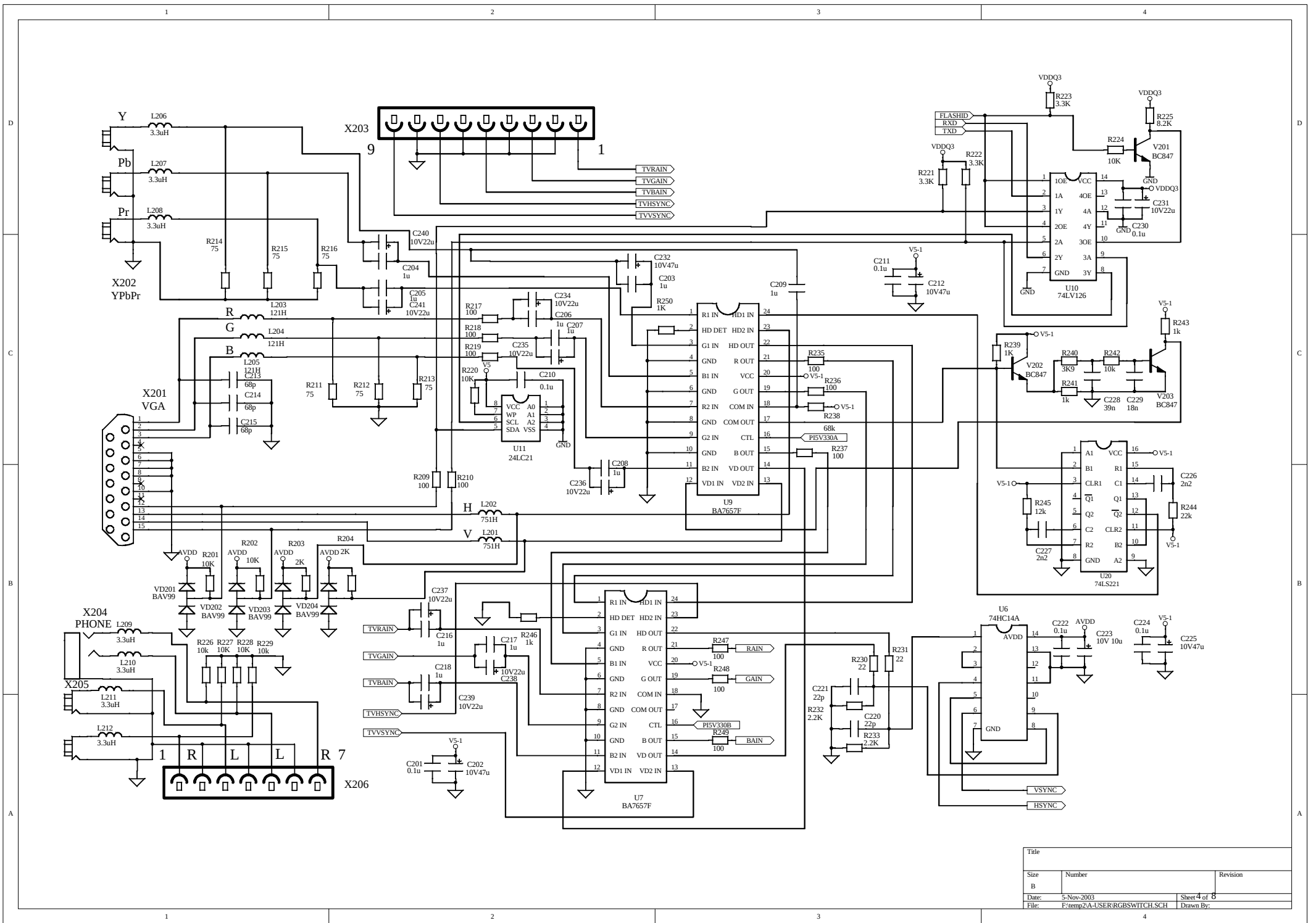
TV board troubleshooting

No picture but have raster.

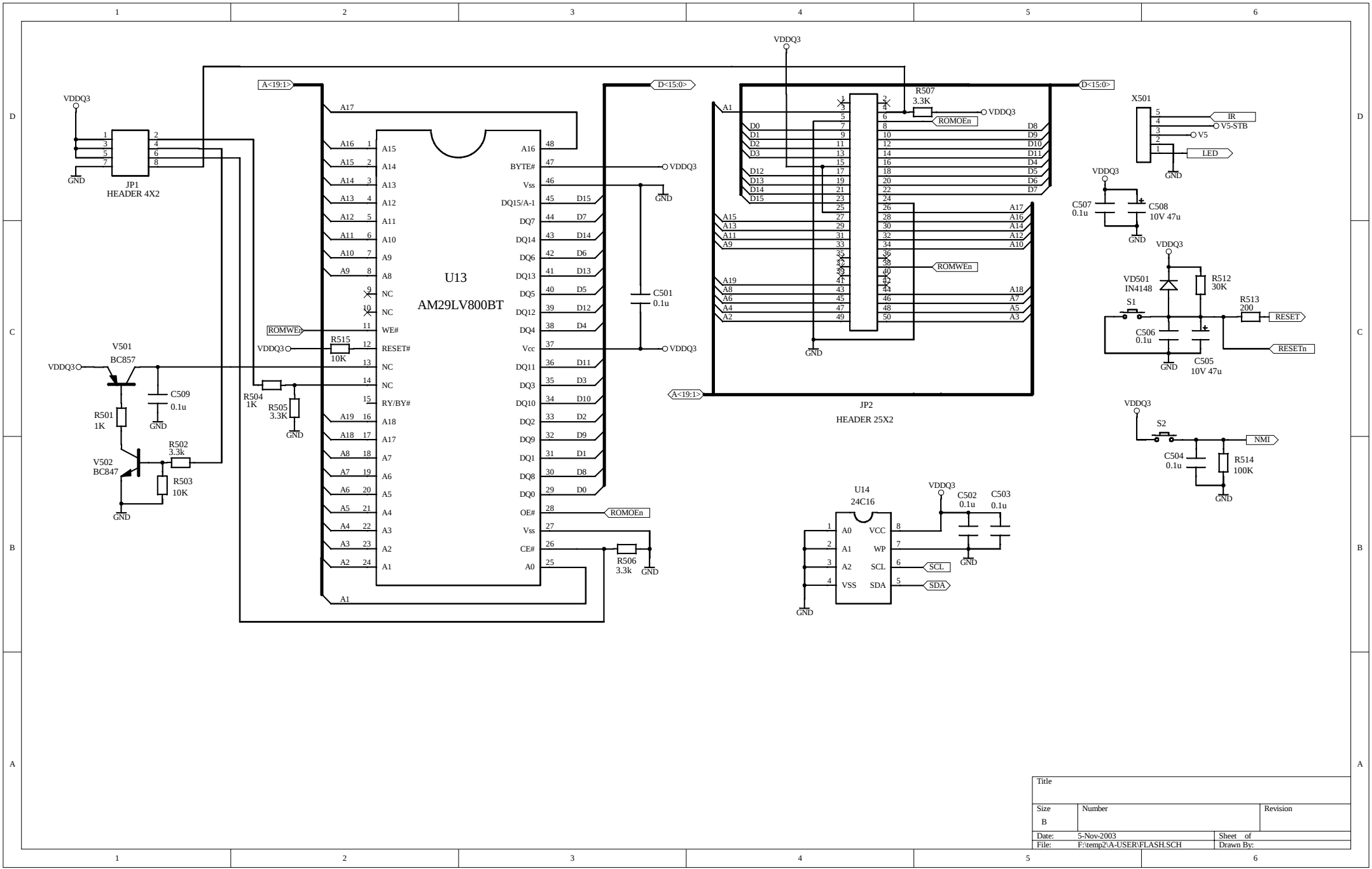




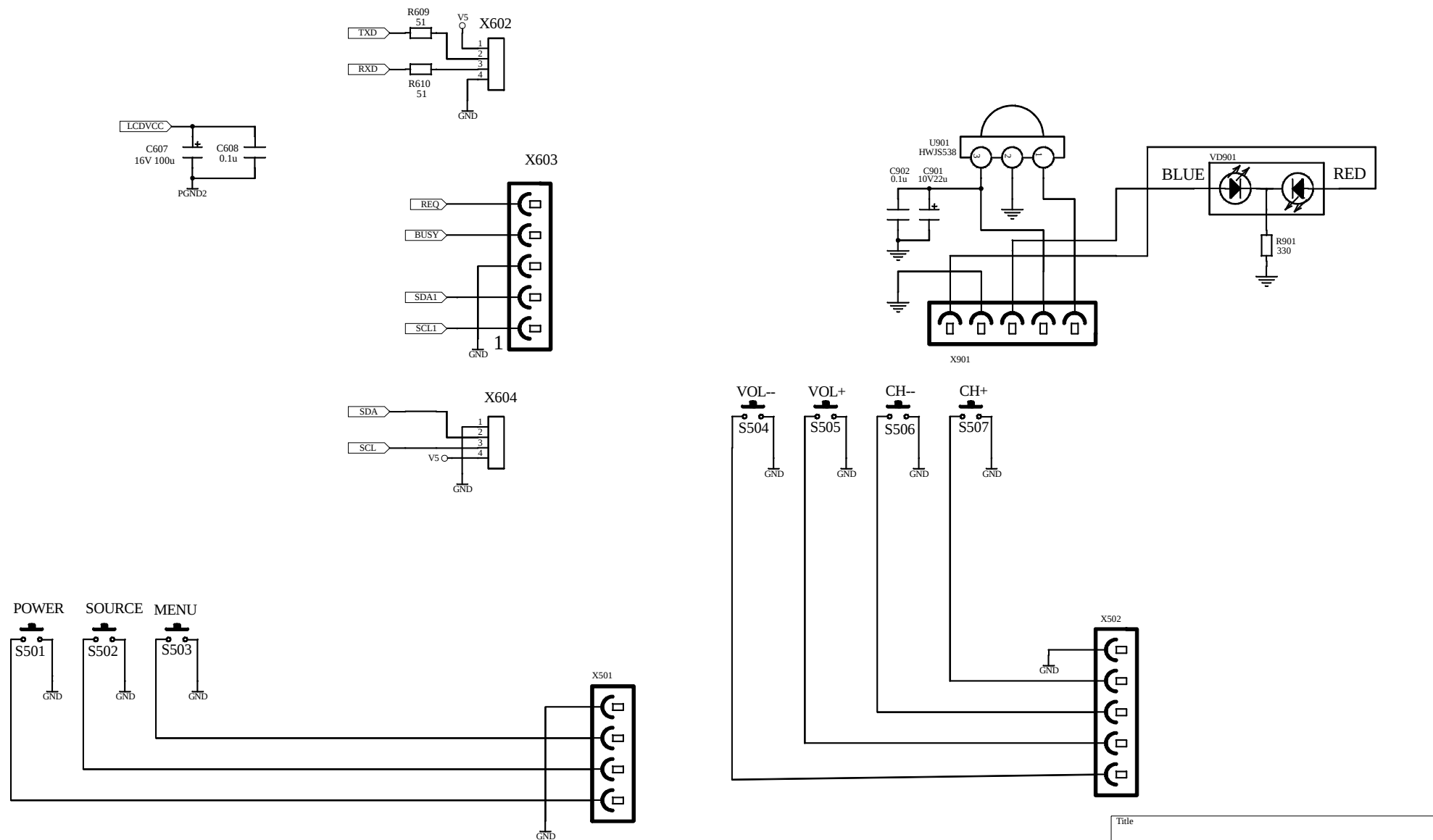
Title		
Size B	Number	Revision
Date:	5-Nov-2003	Sheet 1 of 8
File:	F:\temp2\A-USER\PW130V1.prj	Drawn By:



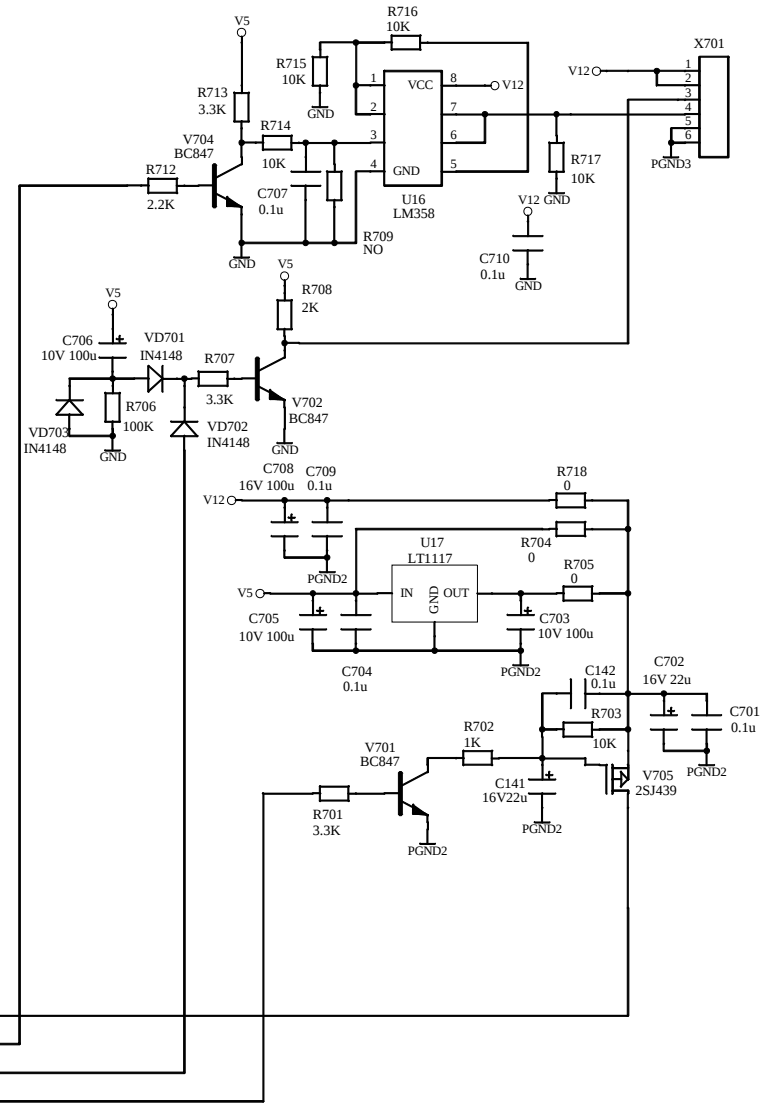
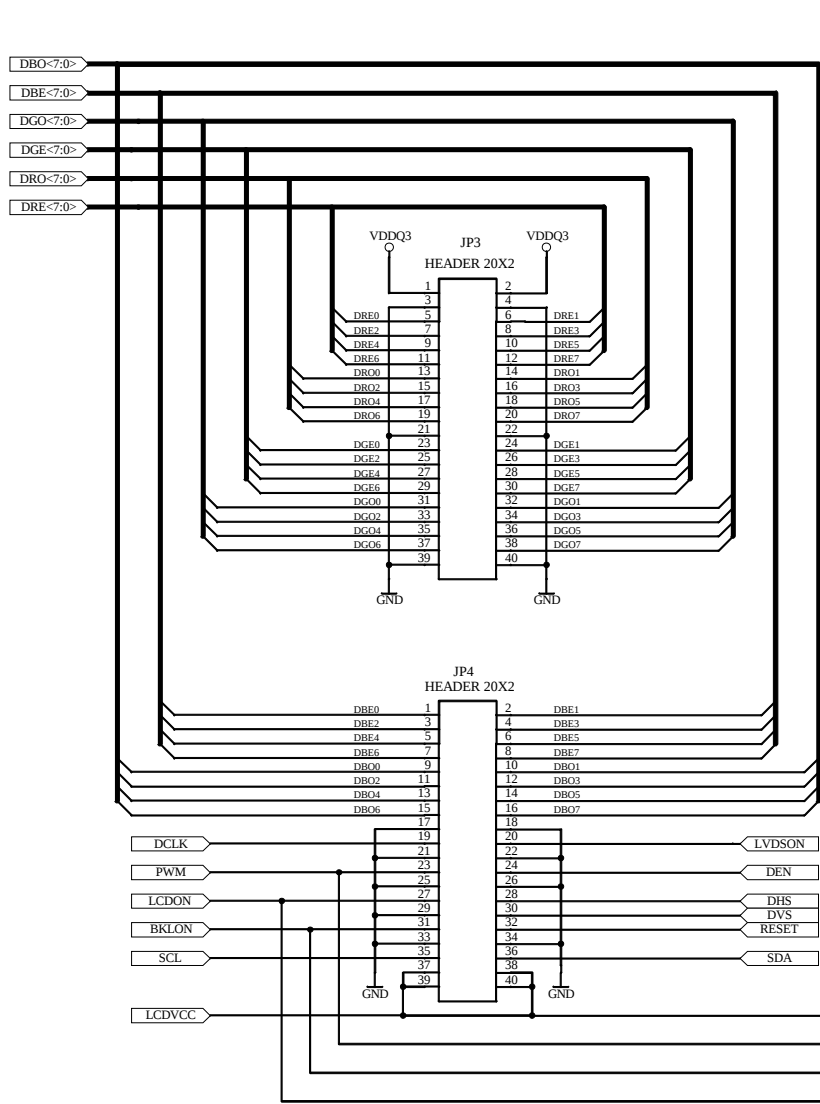
Title		
Size	Number	Revision
B		
Date:	5-Nov-2003	Sheet 4 of 8
File:	F:\temp2\A-USER\RGBSWITCH.SCH	Drawn By:



Title		
Size	Number	Revision
B		
Date:	5-Nov-2003	Sheet of
File:	F:\temp2\A-USER\FLASH.SCH	Drawn By:



Title		
Size	Number	Revision
A4		
Date:	5-Nov-2003	Sheet of
File:	F:\temp2\A-USER\LVDSOUTPUT.SCH	Drawn By:



Title		
Size	Number	Revision
B		
Date:	5-Nov-2003	Sheet 8 of 8
File:	F:\temp2\A-USER\TTL\OUTPUT.SCH	Drawn By:

