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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

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.

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

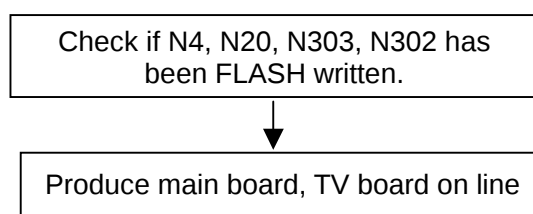
PC set(FLASH writing programs have to be installed first.)

K7253(VGA, YprPb signal generator)

CA210 (LCD white balancer)

DVD broadcaster

2.Flow chart for the adjustment and calibrationSee fig.1.



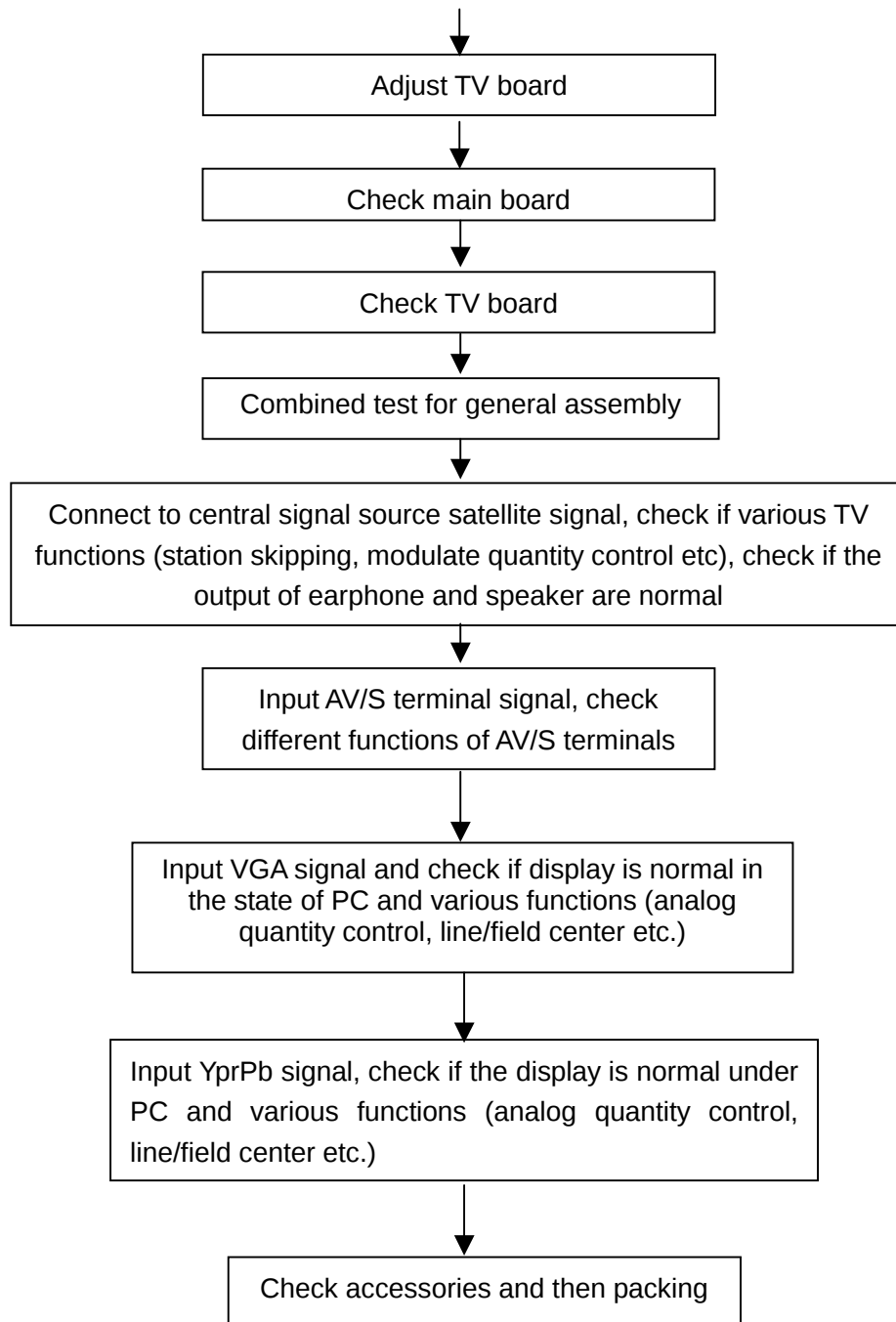


Figure 1. Flow process of adjustment and calibration

3. Flash writing programs

Flash write memory N4, N20, N303, N302

4. Adjustment and calibration for the main board

a) Connect the main board X501 to infrared receiving board (as per wiring diagram 203-L15H30-01JL) and insert the plug of power supply adapter (FSP048-1AD101C for 15", FSP060-1AD103 for 17", 20") into X1. Now the indication lamp of the infrared receiving board is red.

b) Connect PC, upgrade the program of FLASH N20, push the POWER key on the remote control set. Now the indication lamp of the infrared receiving board is out.

c) About 4 minutes later the indication lamp of the infrared receiving board turns blue or yellow. Measure L102 PIN2 to be 5.0 V, measure L107 PIN2 to be 3.3 V.

d) Flash write DDC program.

5. Adjustment for the TV board

Connect the main board and infrared receiving board (as per wiring diagram 203-L15H30-01JL) and press the POWER key on the remote control set. Now the indication lamp of the infrared receiving board is blue or yellow. Measure N301 PIN2 of TV board to be 3.3 V, one terminal of inductor L630 to be 5 V and one terminal of inductor L632 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 "eight grade gray"(Gray(H)-8). Use CA-210 to measure the sixth grade and adjust the brightness and contrast so that Y is around 180. Enter factory menu and adjust the green color temperature and blue color temperature so that x=270,y=283(red color temperature is constant as128).

g).Exit from the factory menu and enter route RGB. Input 60Hz "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 "eight grade gray" (Gray(H)-8)and enter the user menu. Adjust the brightness and contrast. Use CA-210 to measure the sixth grade so that Y is around 180. Enter the factory menu and adjust the green color temperature and blue color temperature so that x=284,y=299(red color temperature is constant as128).

j).Enter the factory menu and adjust the green color temperature and blue color temperature so that x=284,y=299.

Notice: For the best discrimination rate of LCD screen, see table 1.

Table 1:LCD resolution of best

Screen size	Factory	LCD resolution of best
15"	Samsung	1024x768
	AU	
	Sanyo	
	CPT	
17"	Samsung	1280x1024
	AU	
20"	AU	800x600
	Chimei	640x480
	LG	

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 2.VGA format signal

screen size	resolution	Image clock(MHz)	H-SYNC(kHz)	V-SYNC(Hz)	remark
15"	640x480 @ 60	25.175	31.469	59.900	
	720x400 @ 70	28.322	31.469	70.086	
	800x600 @ 60	40.000	37.879	60.317	
	1024x768 @ 60	65.000	48.363	60.004	
	640x480 @ 75	31.500	37.500	75.000	
	800x600 @ 75	49.500	46.875	75.000	
	1024x768 @ 75	78.750	60.023	75.029	
17"	640x480 @ 60	25.175	31.469	59.900	
	720x400 @ 70	28.322	31.469	70.086	
	800x600 @ 60	40.000	37.879	60.317	
	1024x768 @ 60	65.000	48.363	60.004	
	640x480 @ 75	31.500	37.500	75.000	
	800x600 @ 75	49.500	46.875	75.000	
	1024x768 @ 75	78.750	60.023	75.029	
	1280x1024@60	108	63.981	60.2	
	1280x1024@75	135	79.976	75.025	
20"	640x480 @ 60	25.175	31.469	59.900	
	720x400 @ 70	28.322	31.469	70.086	
	800x600 @ 60	40.000	37.879	60.317	
	640x480 @ 75	31.500	37.500	75.000	CMOSscreen nonsupport
	800x600 @ 75	49.500	46.875	75.000	CMOSscreen nonsupport

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/50Hz,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

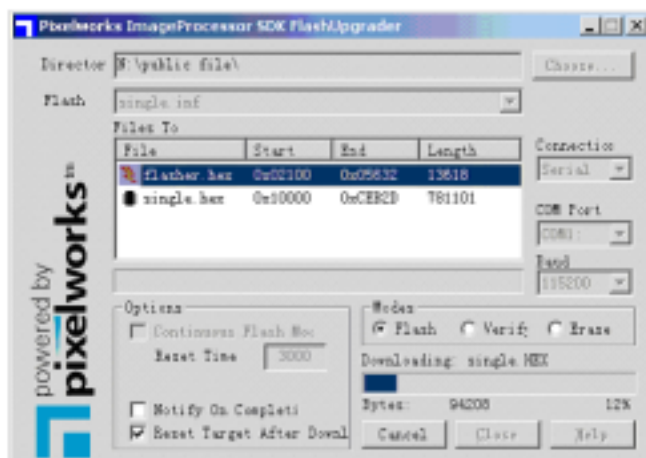


FlashUpgraderNT(use under window 2000/XP/NT)



FlashUpgrader(use under window 98),

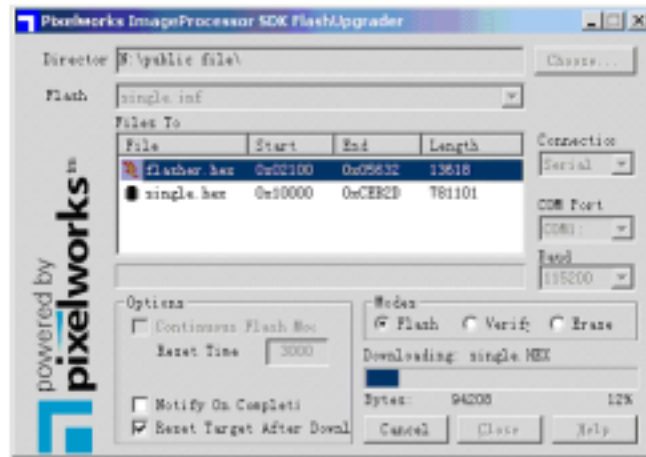
The following interfaces will show up after running the program:



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.

Brief introduction and working principle of LC15H3

LC15H3 multi-media liquid crystal TV broadcast and receiving set adopts liquid crystal display screen, 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.

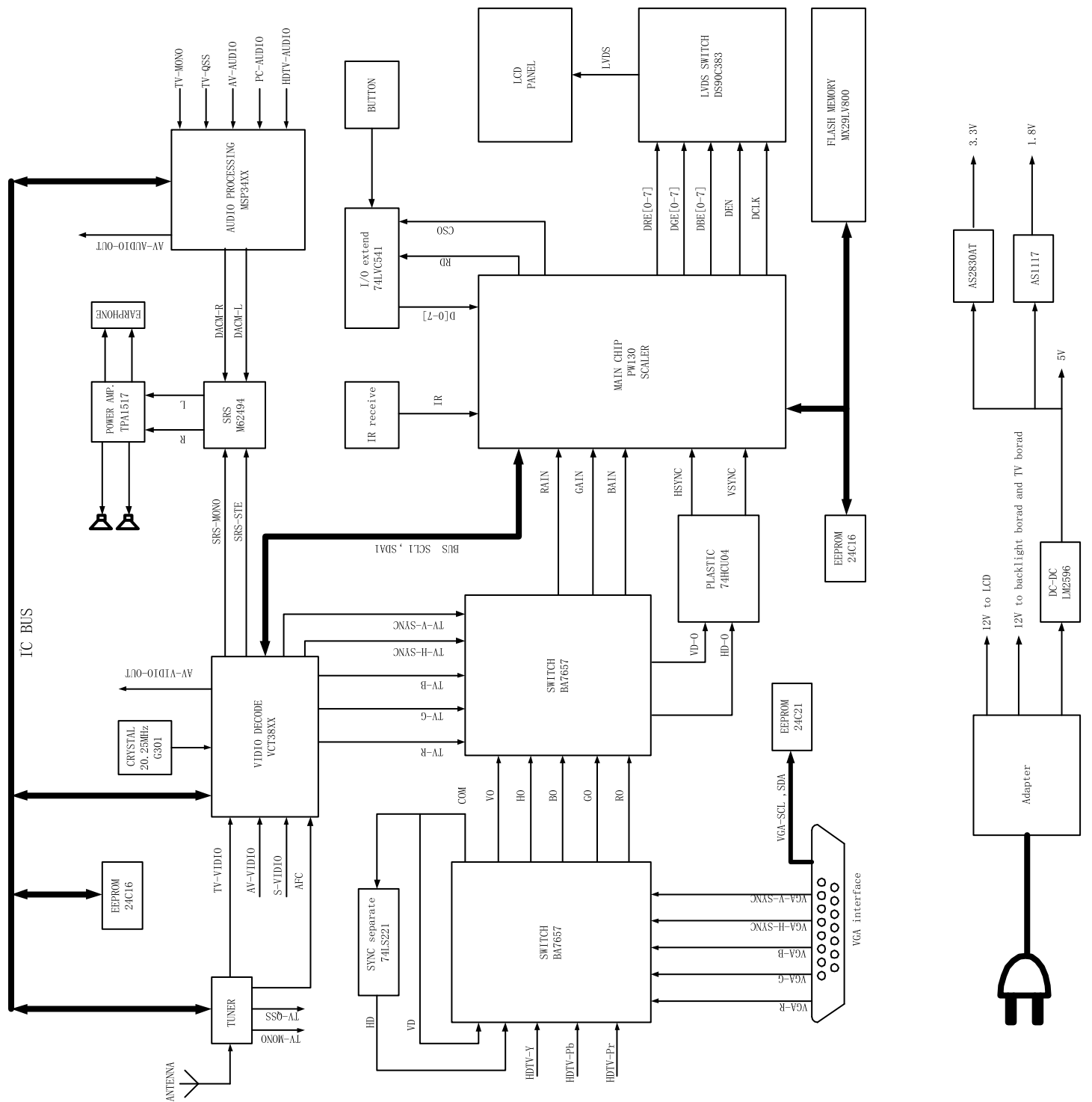
The circuitry of LC15H3 is composed of RF module board, video signal board, digital signal picture processor and AC-DC transformer, and DC-DC circuit board.

The working process is as follows. The radio frequency signal undergoes an integrated tuner TUNER1 before a color full video signal is generated. This video signal then enters analog board decoder IC N303 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 N401 MSP3420G and then output through MSP3420G Pin28, Pin27 to SRS for surround sound processing in IC N403 M62494E. Finally it is subject to power amplification in IC N404 TDA1517 before it is output to speaker.

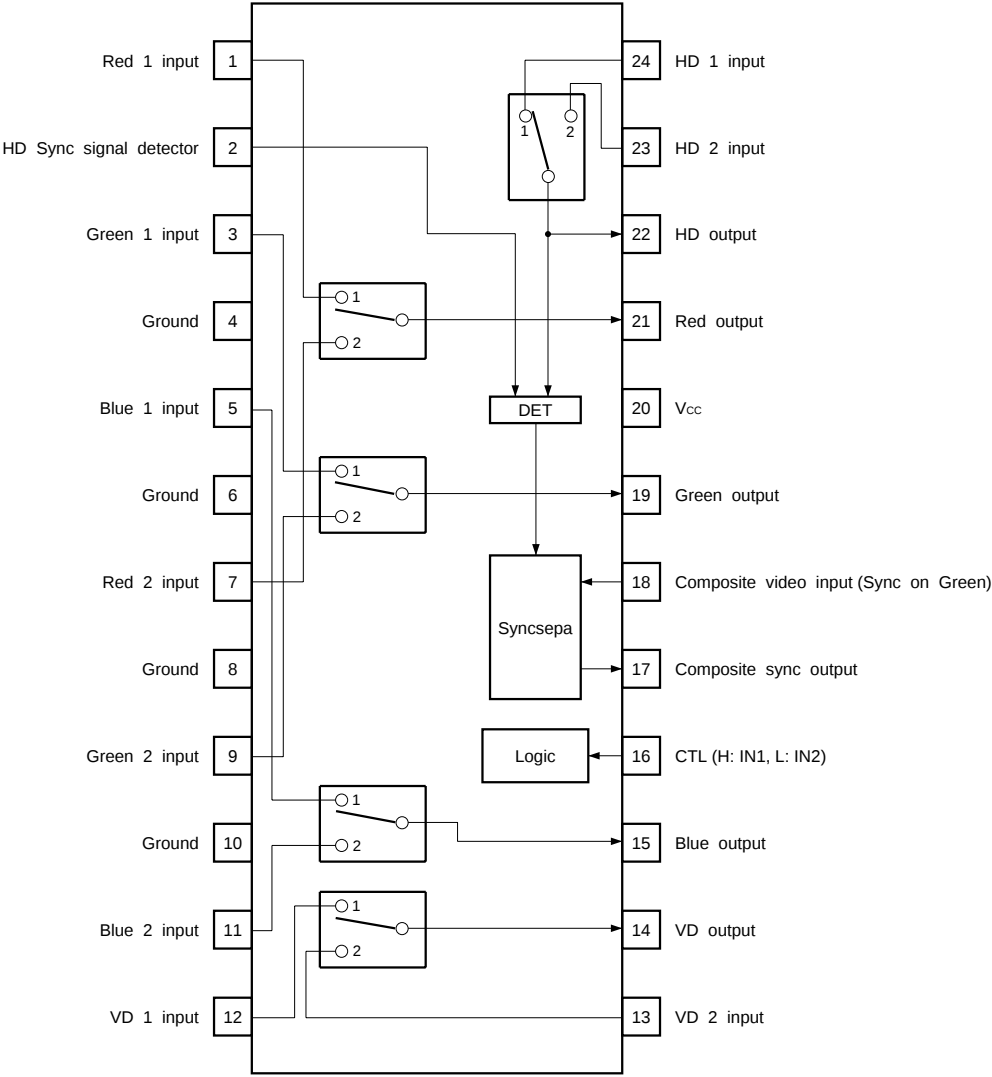
VGA signal/high definition signal is input to personal computer through the main board. The signal selected by Y/Pb/Pr through 5 way 1/2 switches IC(N1 BA7657F) is subject to reselection together with signal TVRAIN, TVGAIN, TVBAIN through 5 way 1/2 switches IC(N5 BA7657F). Finally signals R, G, B are selected and sent to the main processing chip IC N19 PW1306.

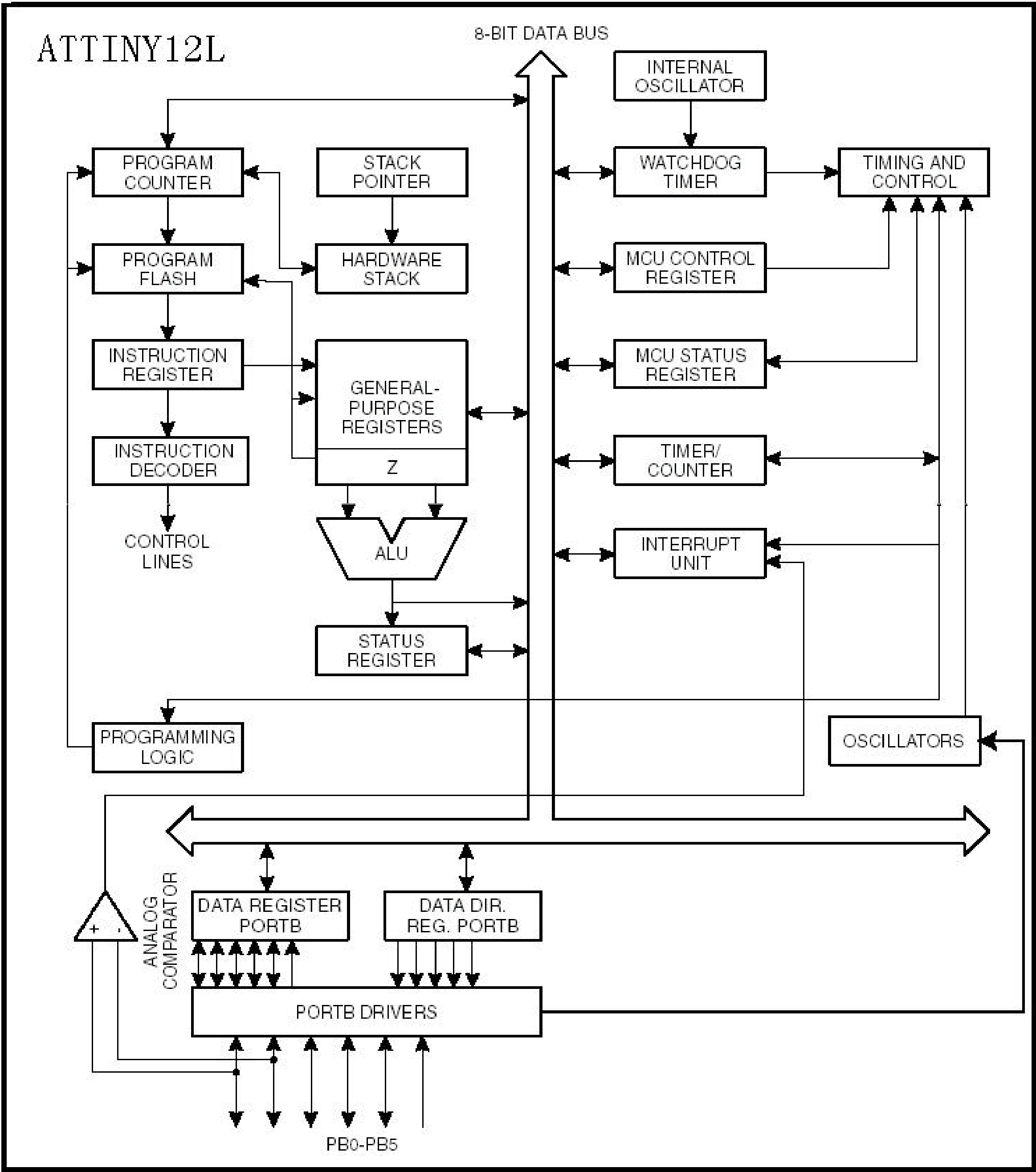
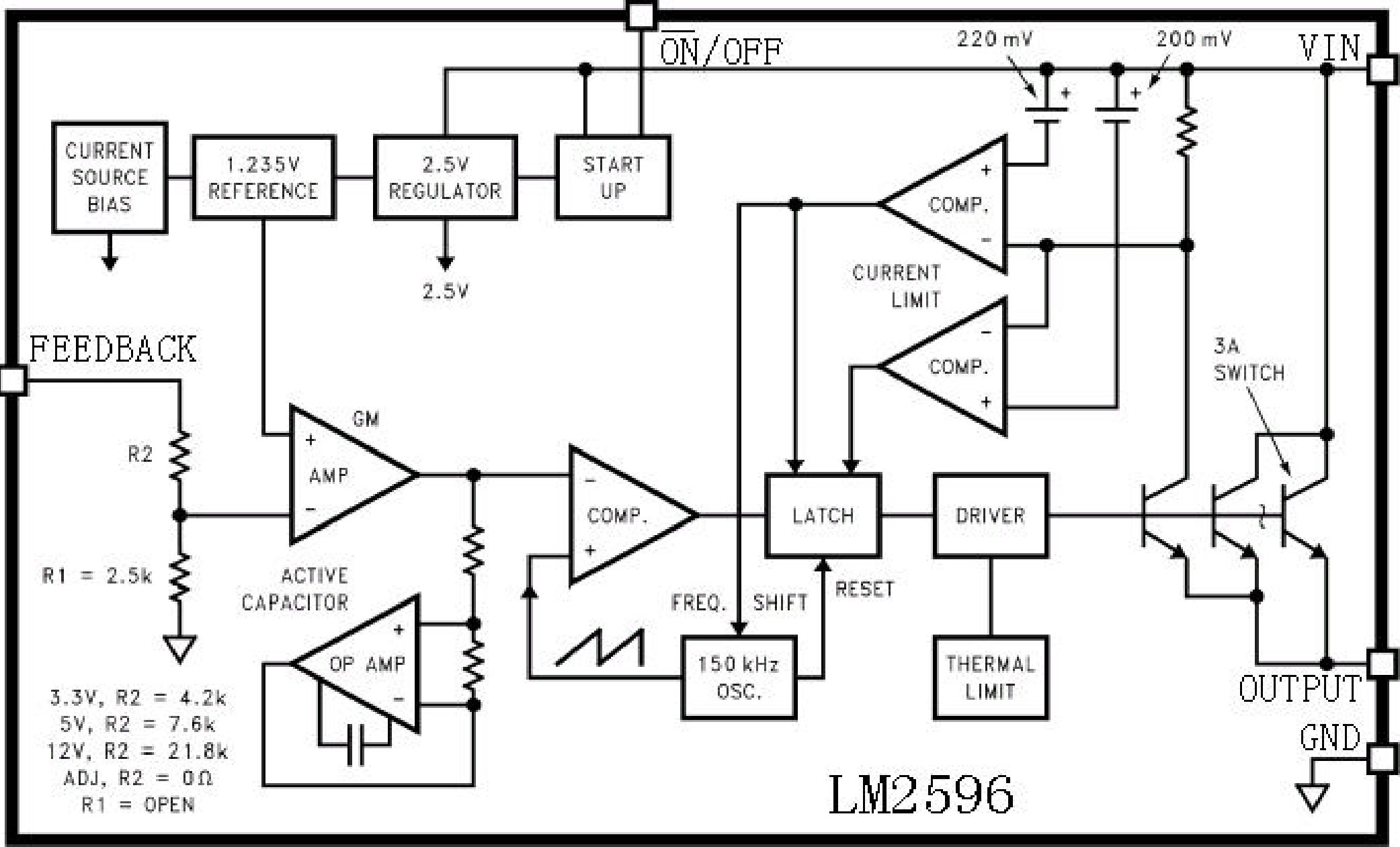
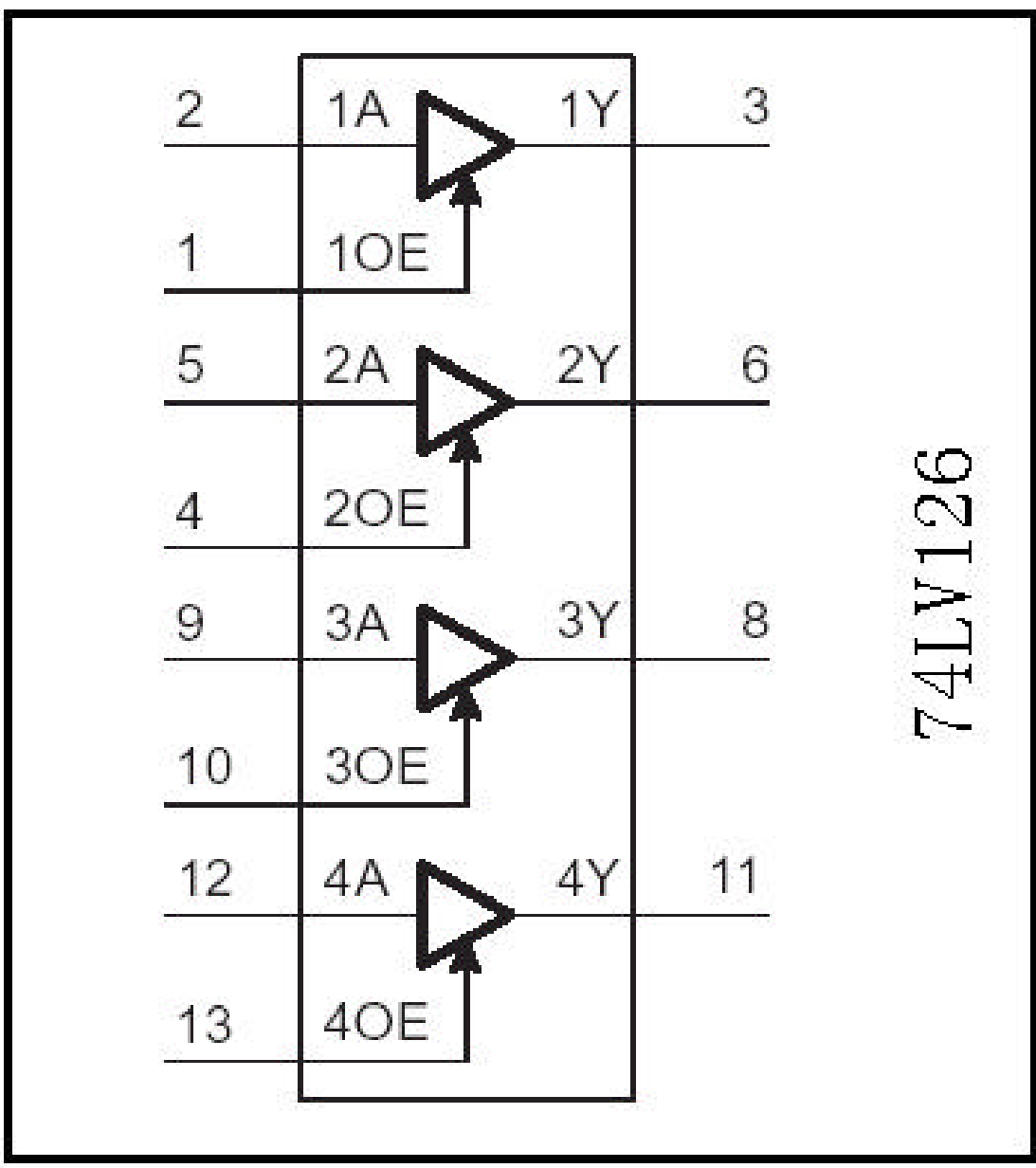
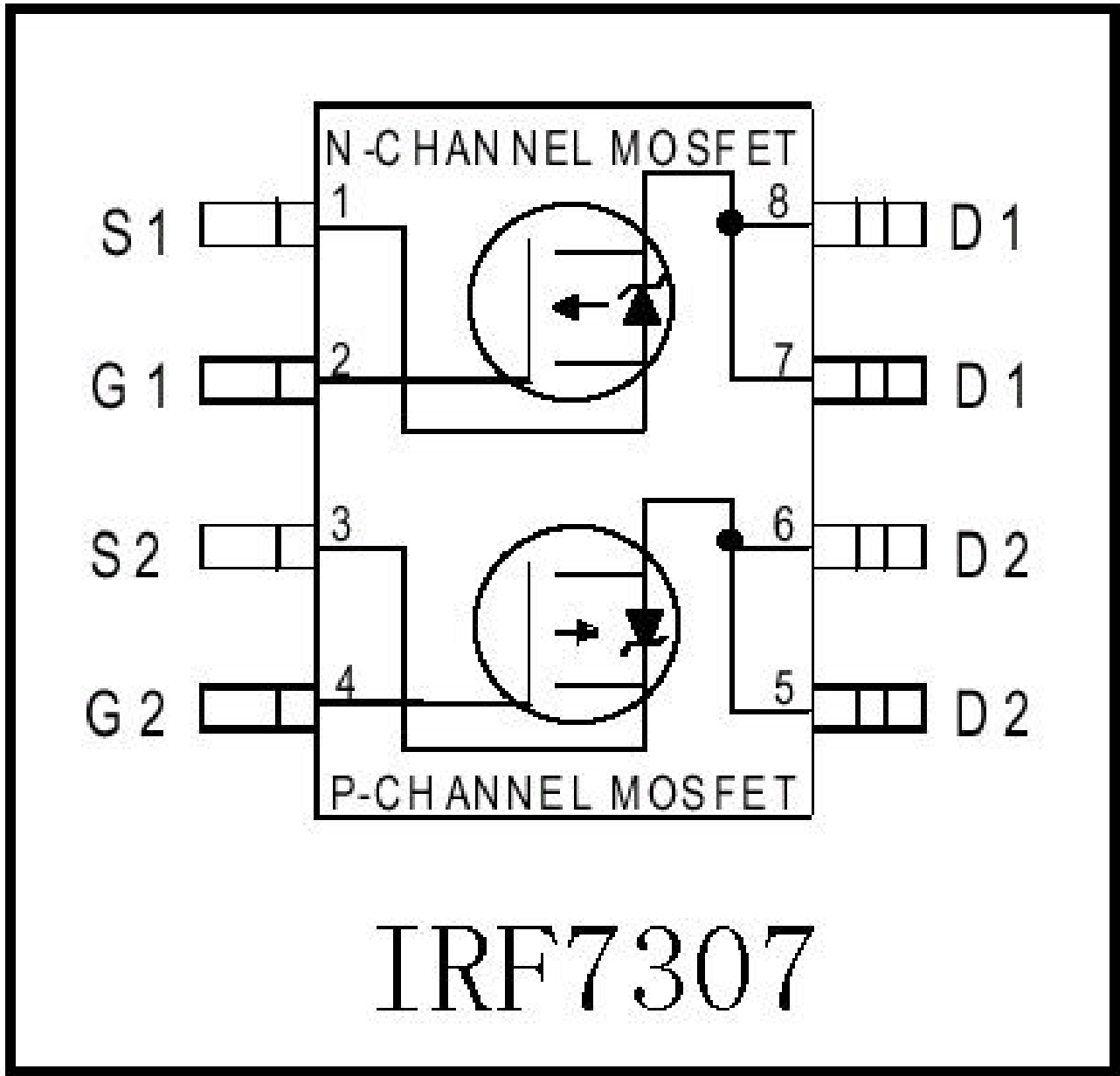
IC N19 PW1306 is a built-in X86 CPU of the main processing IC, externally connected by 8M Flash(N20) memory to control the whole system. The input signal of V-port and G-port is subject to internal arithmetic processing and then output as R, G, B signals with electric level of 24 bit TTL to sockets JP3 and JP4, where through connection wires the signals are sent to the port of liquid crystal screen and for the realization of picture reproduction.

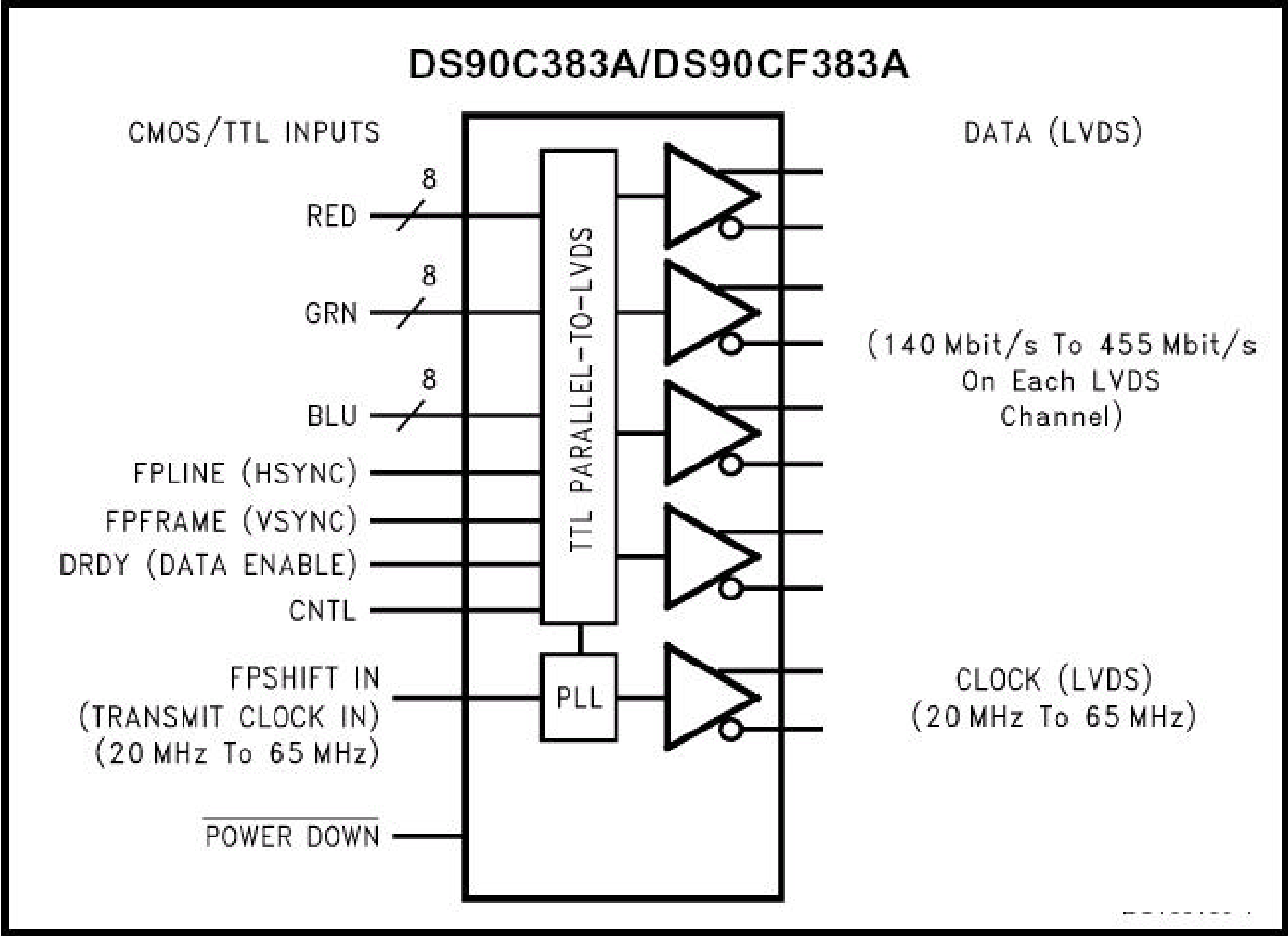
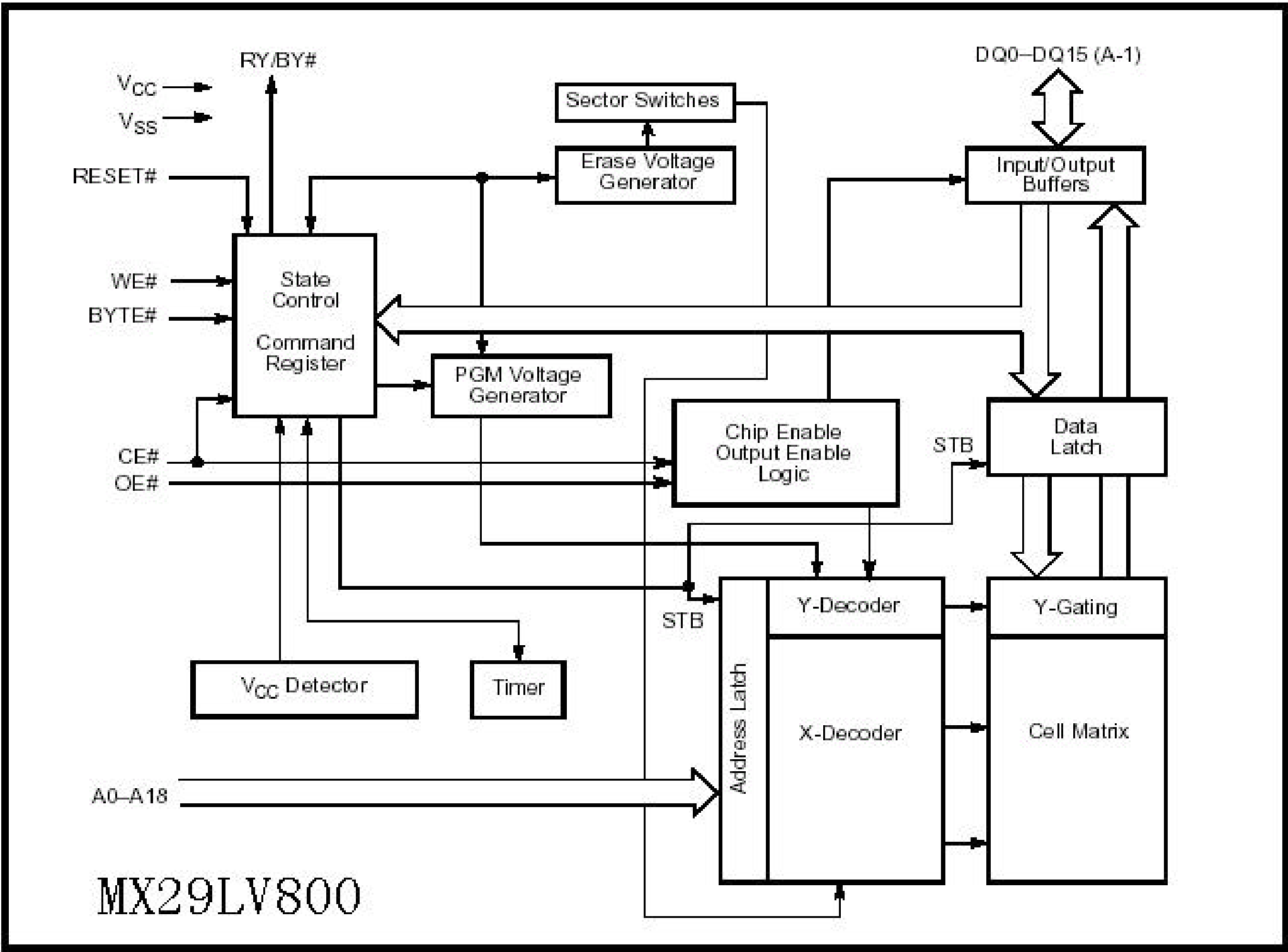
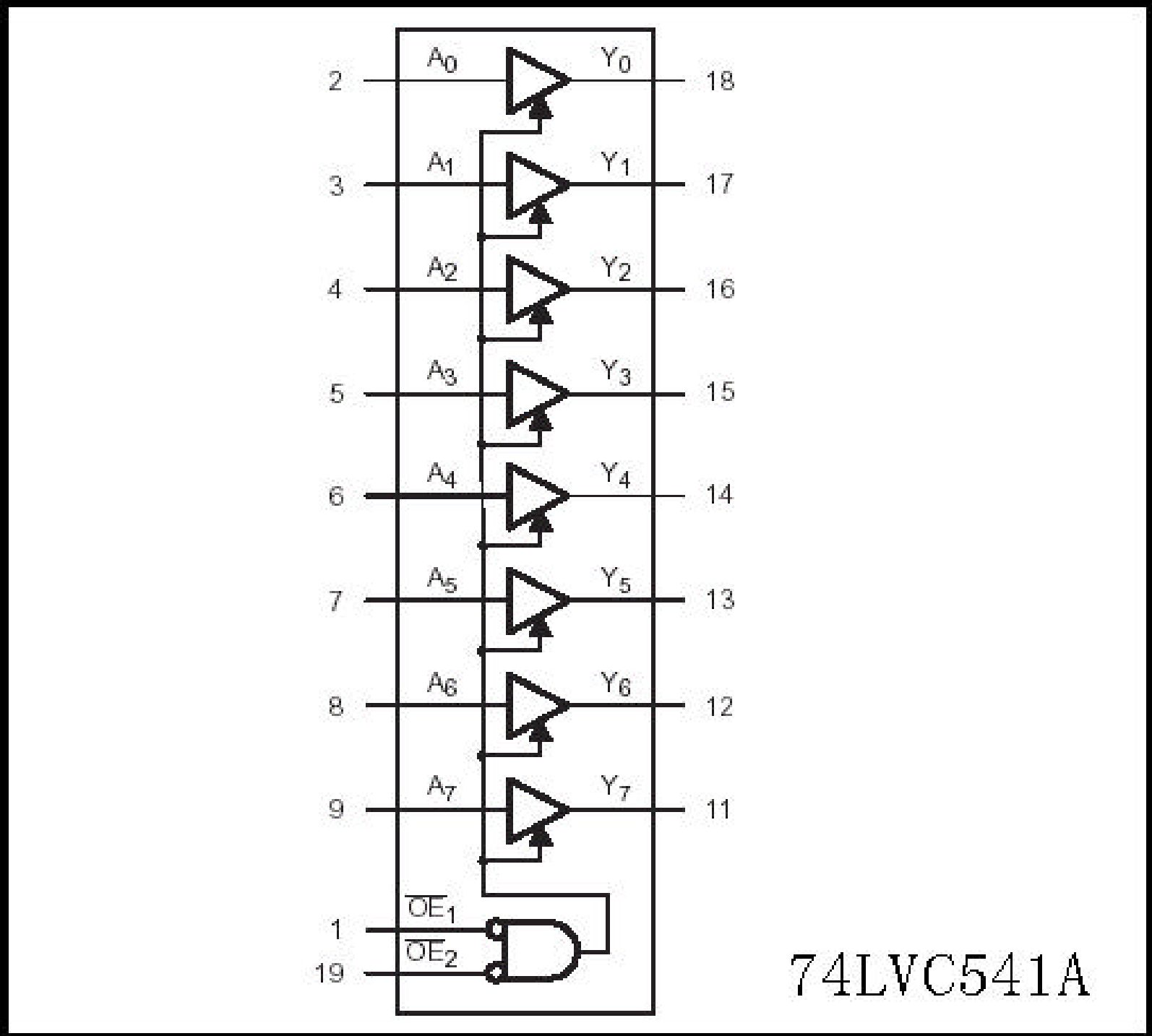
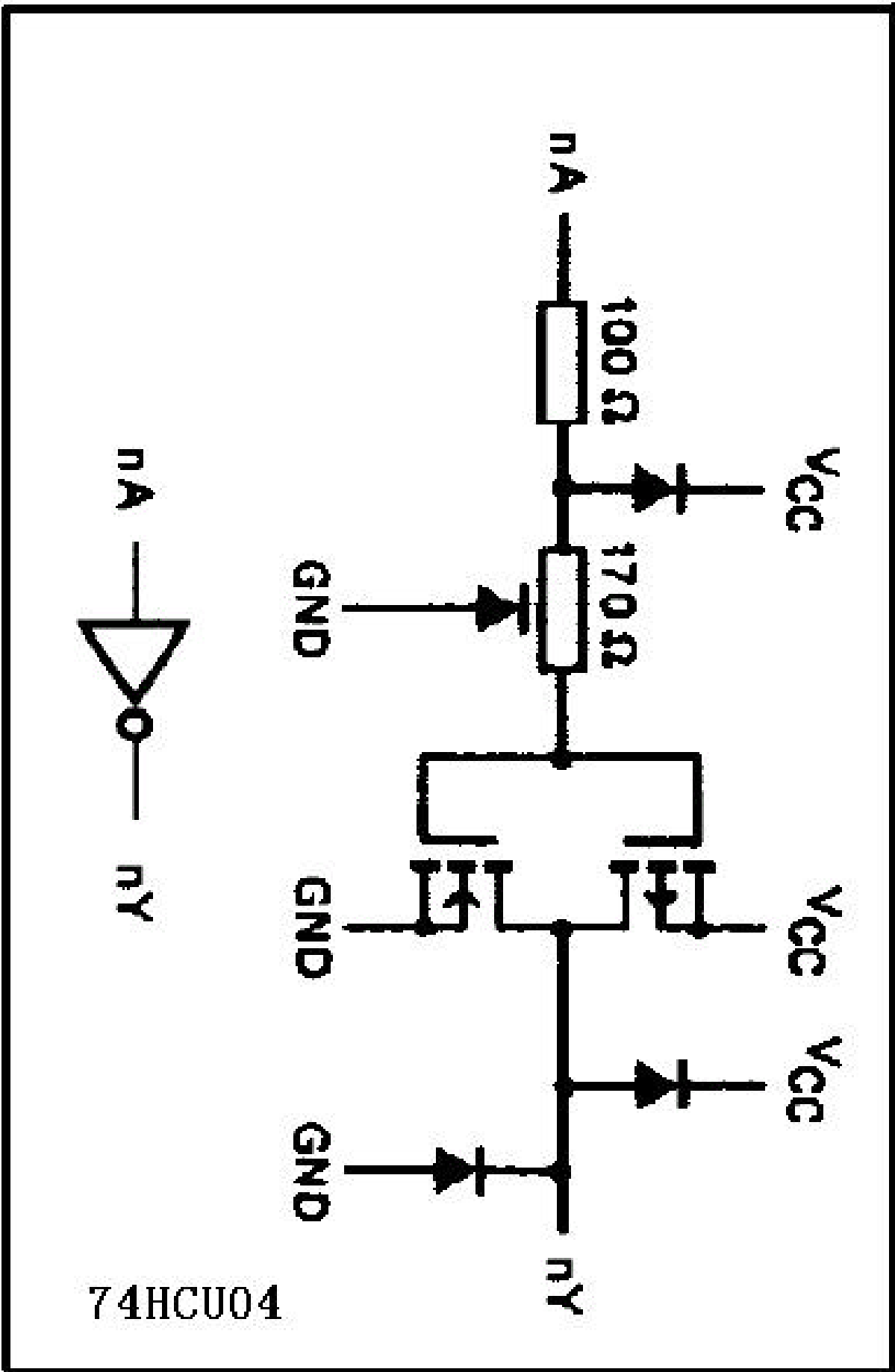
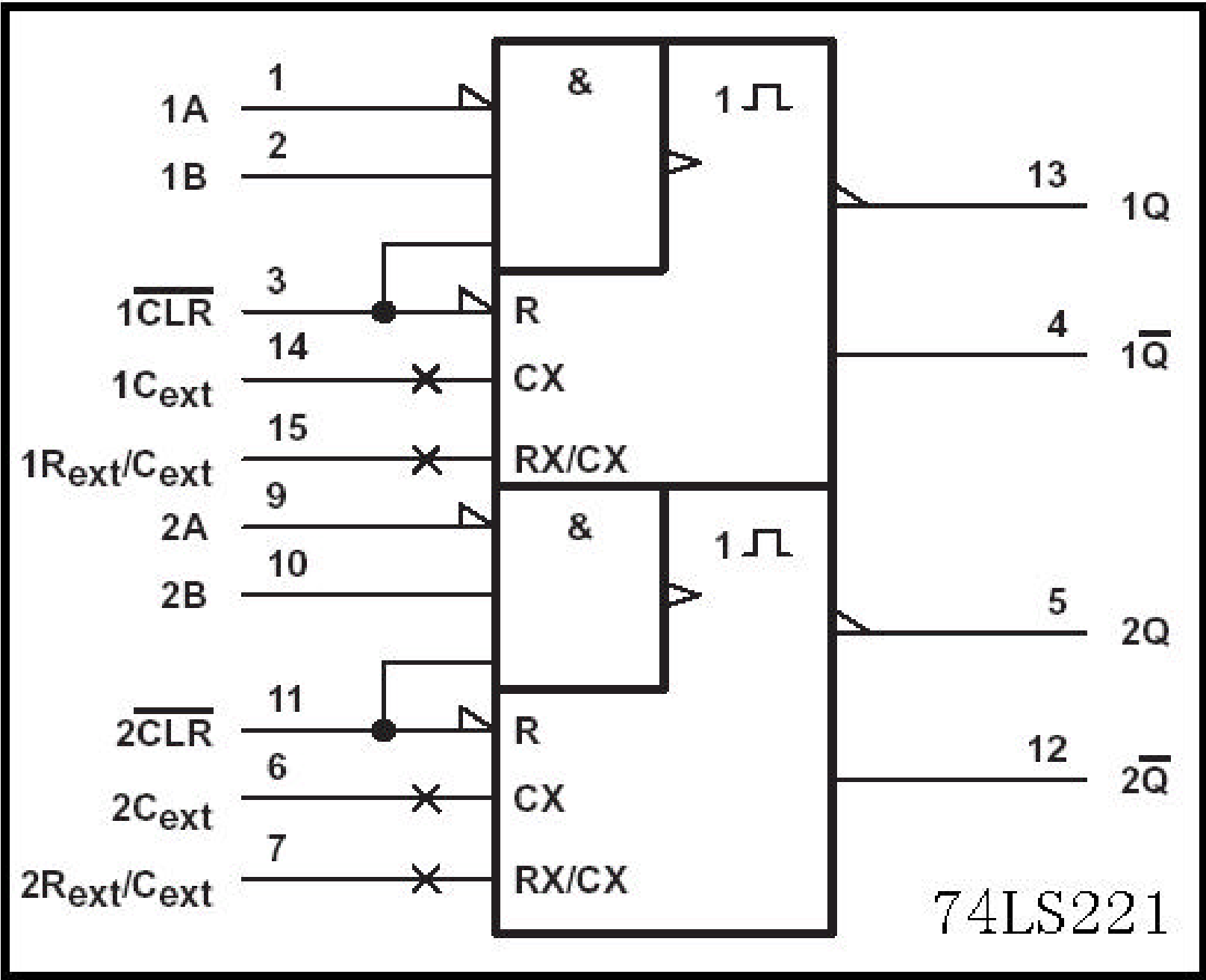
BLOCK DIAGRAM



BA7657F / BA7657S







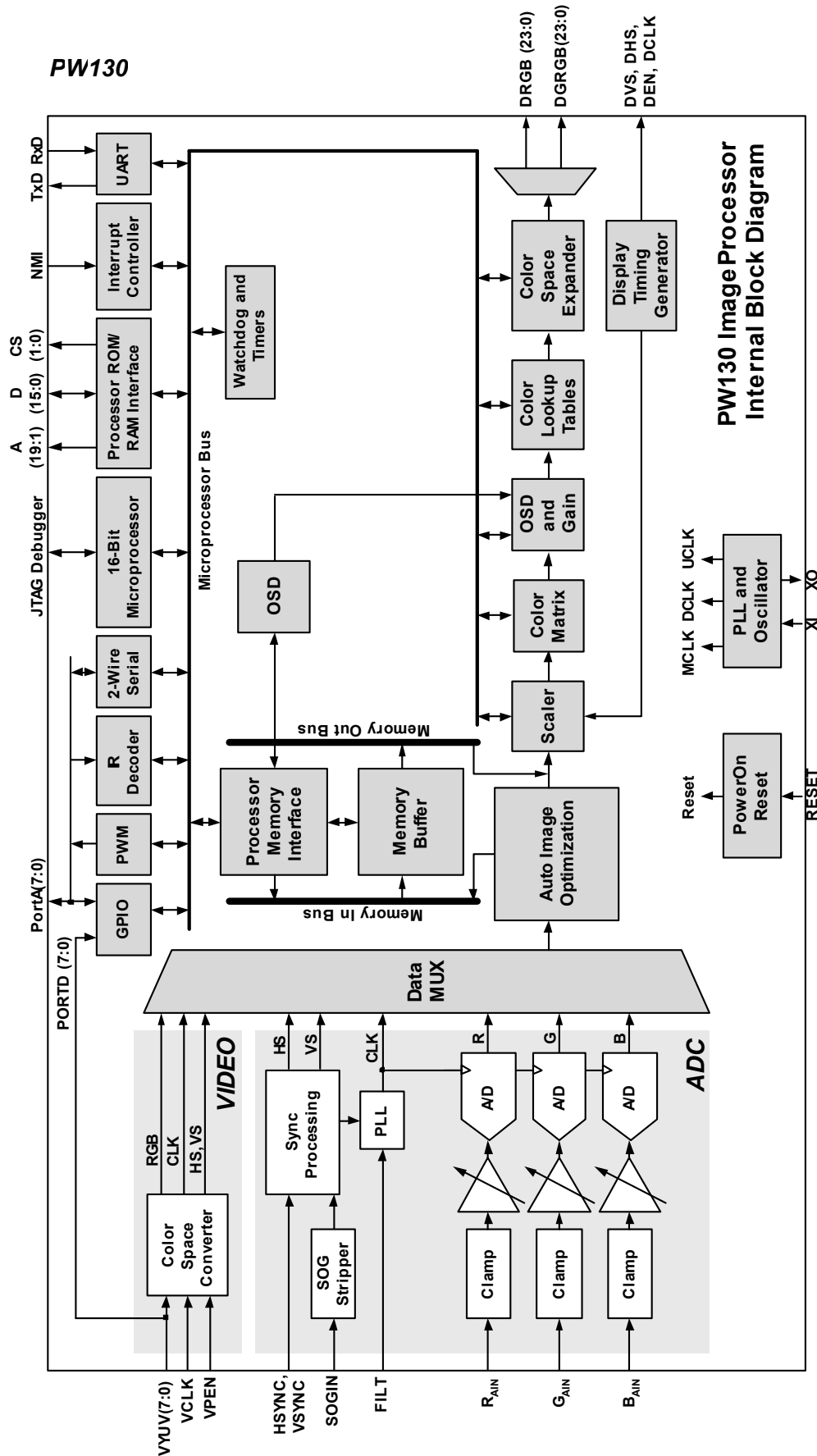
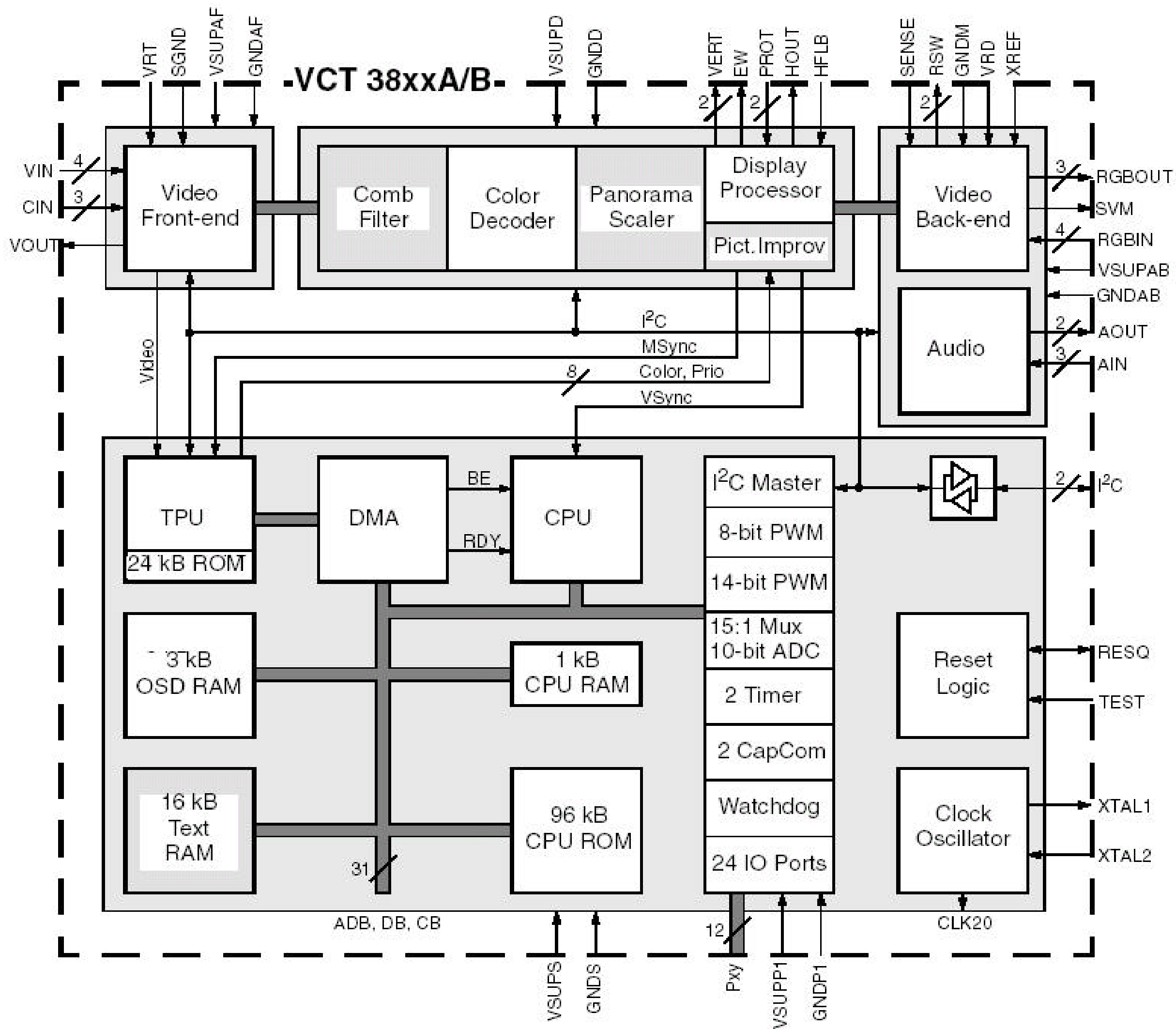
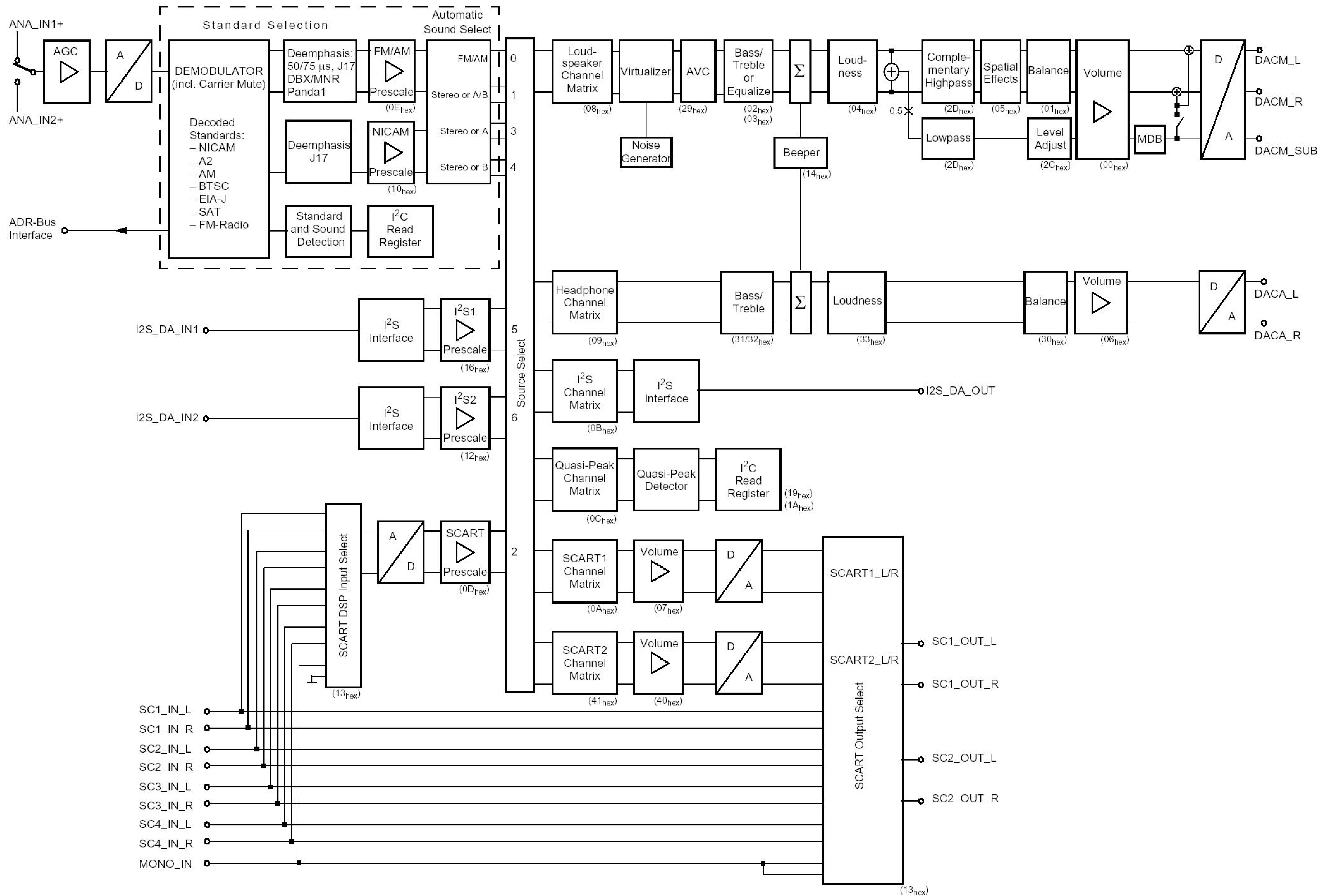
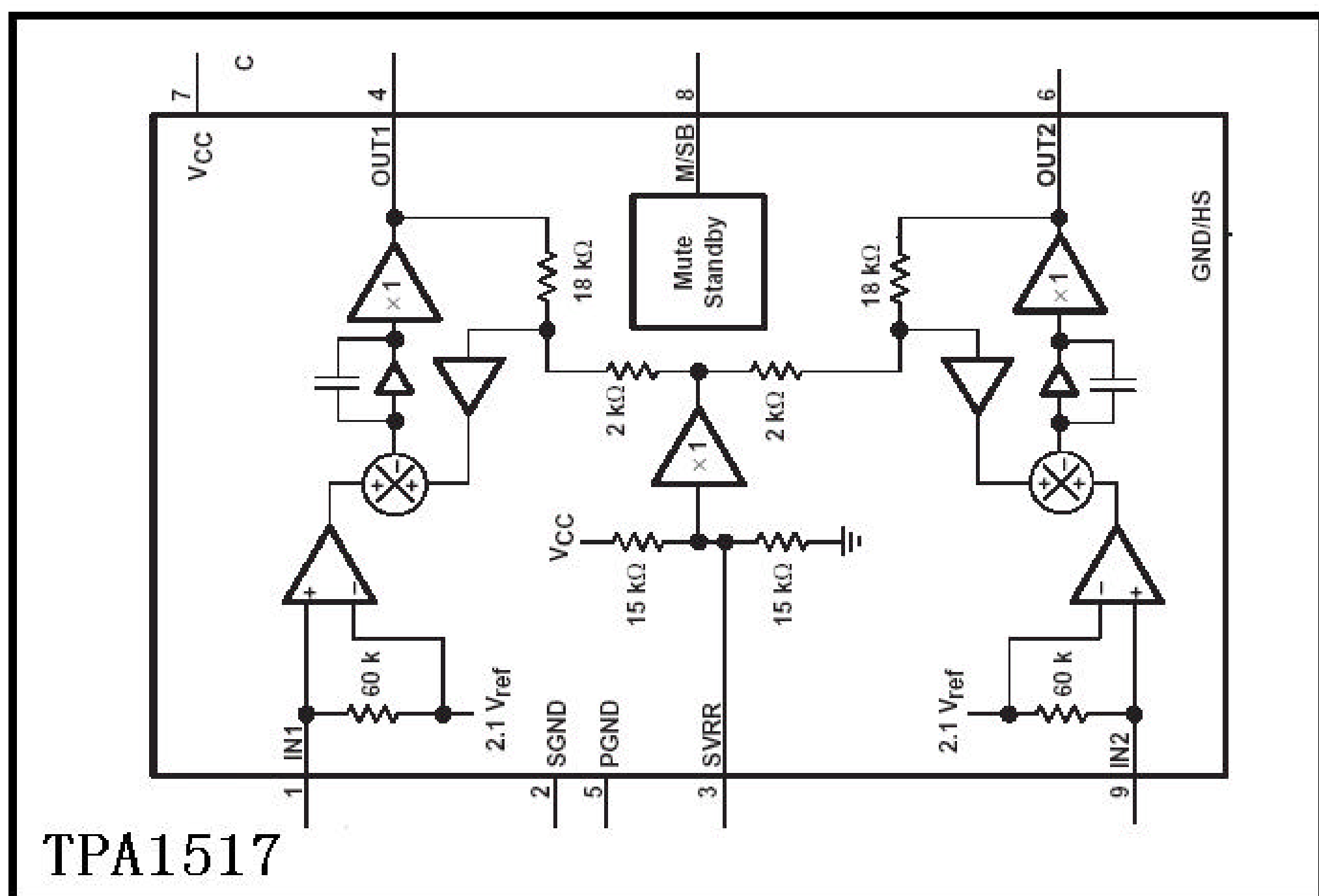
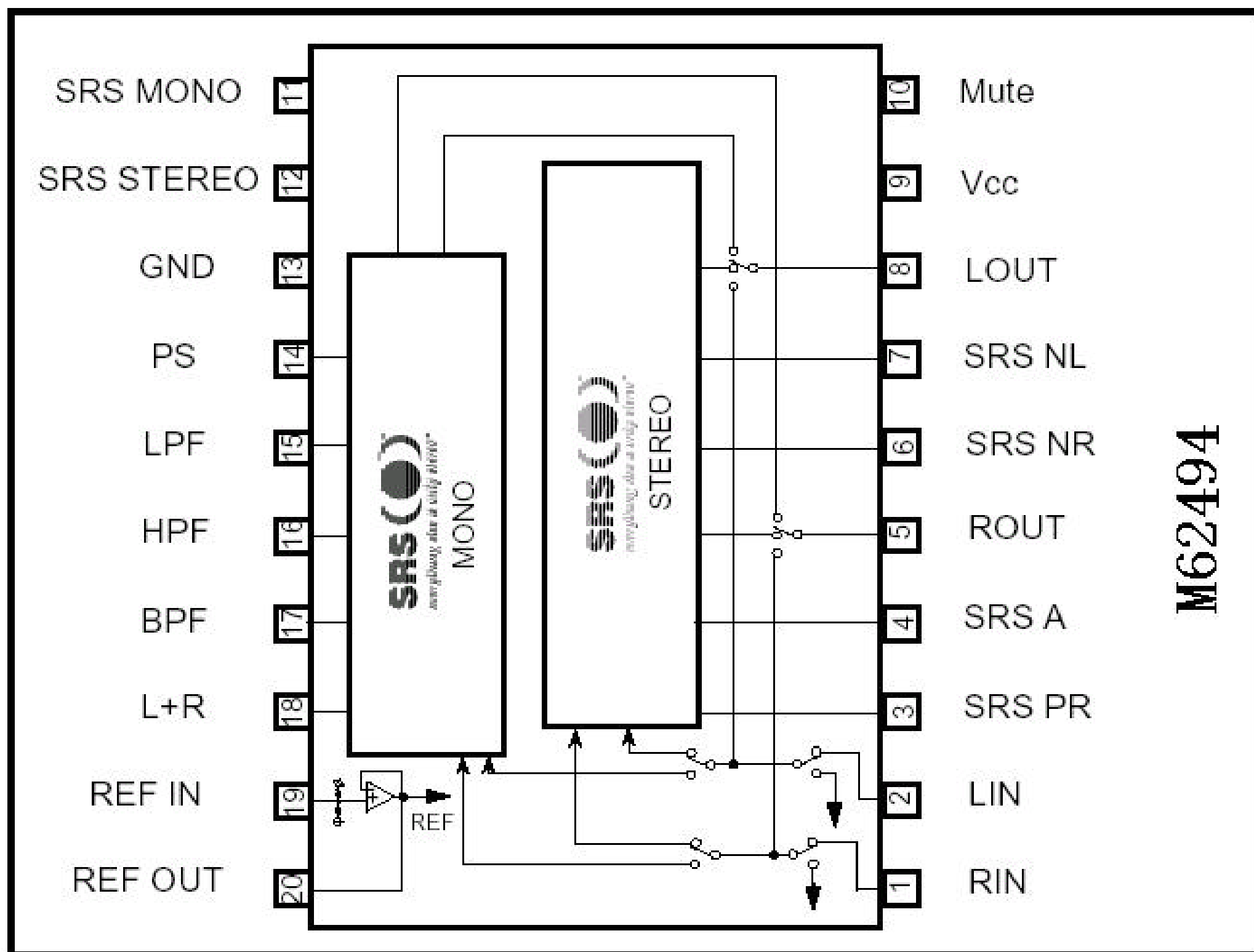


Figure 1-1 ImageProcessor Block Diagram







TDA4470

Block Diagram

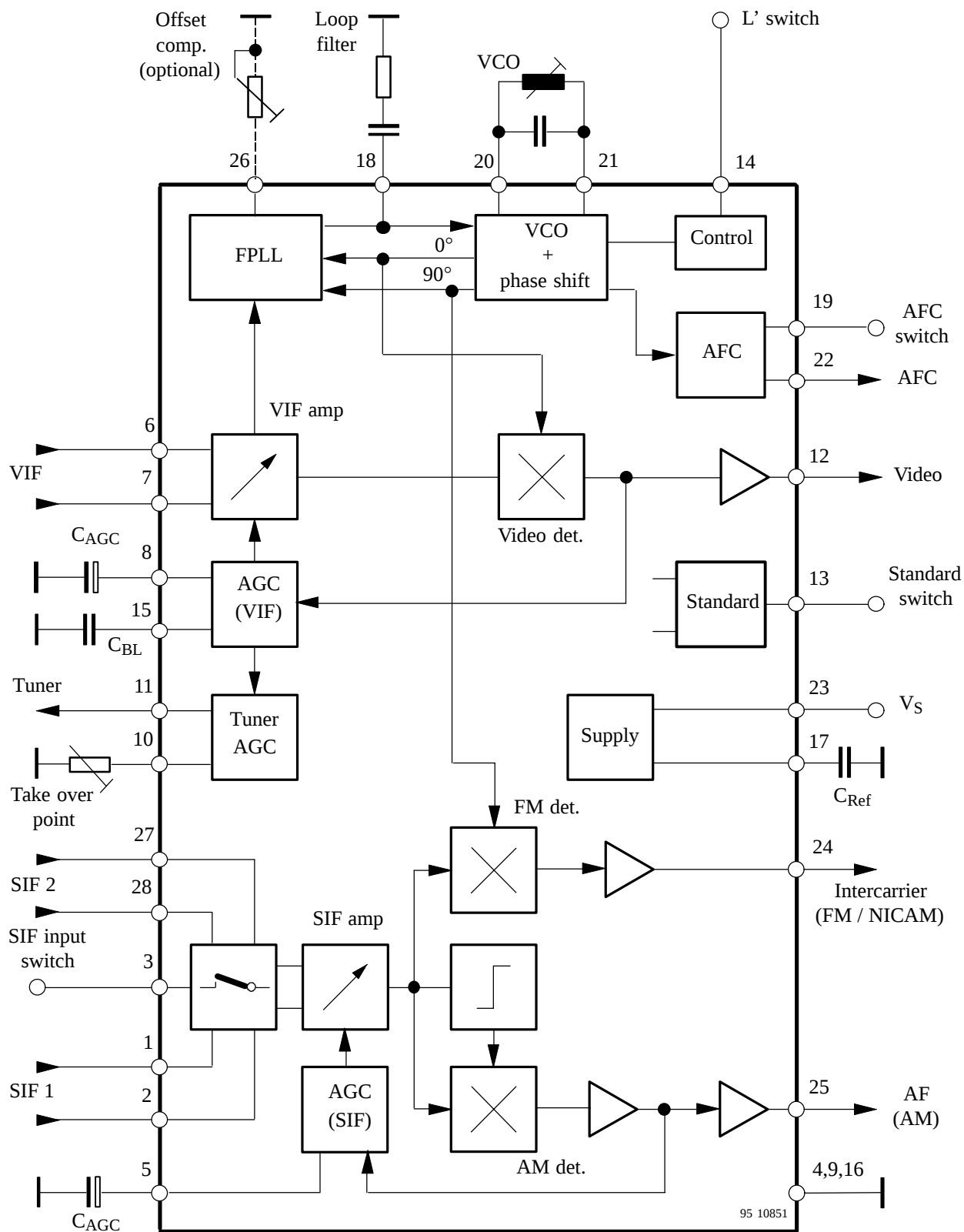
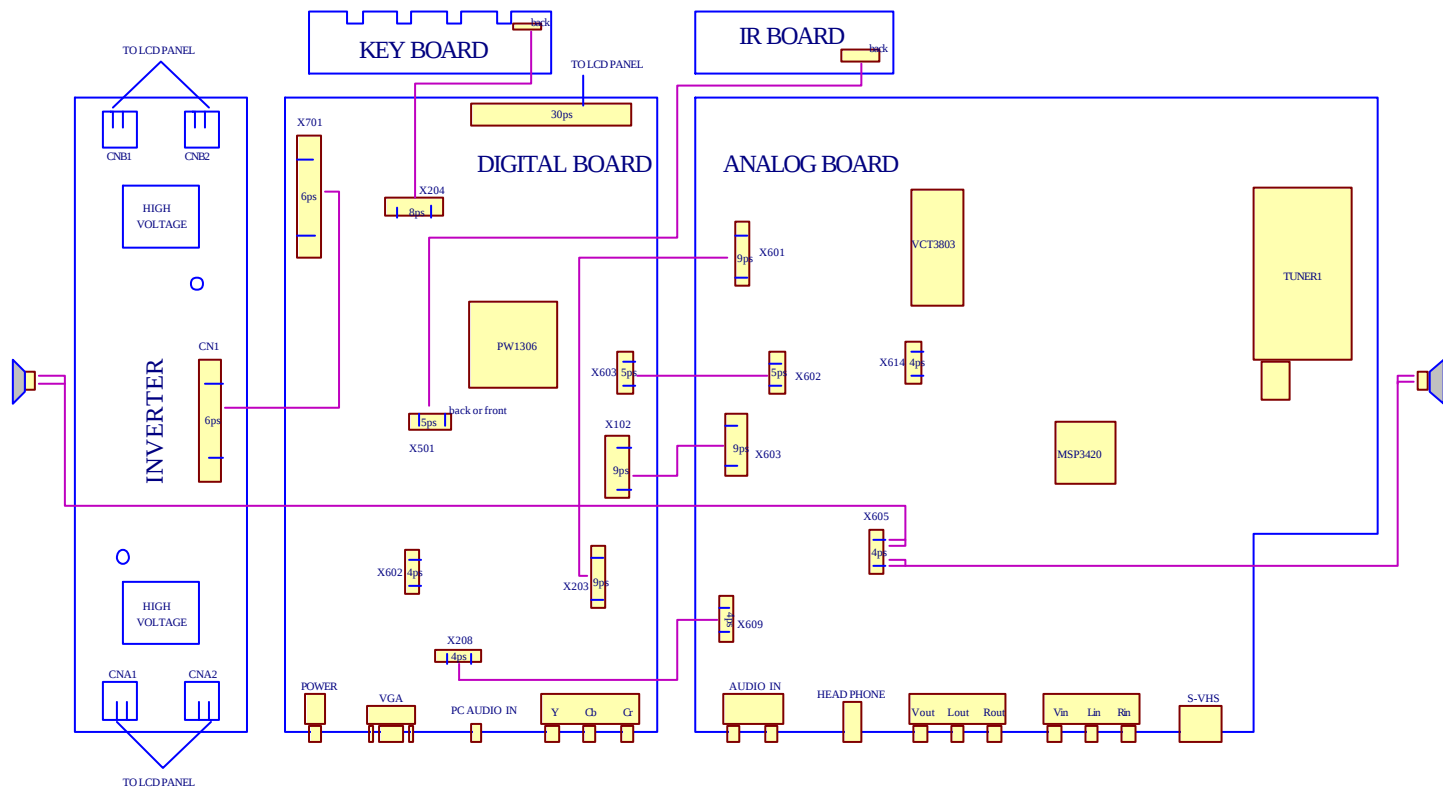


Figure 1. Block diagram



wiring diagram

Serial No. of Parts

	15"	17"	20"	
Sell area	America	America	Europe	America
LCD panel	Samsung 335-15012-00	Samsung 335-17050-00	Chimei 335-2000F-00	
Back light board	667-L15H3-14	667-L17H3-14	667-L20H3-14A	
High frequency board	667-L15H3S-55	667-L15H3-55		667-L20H3-55
Main board	667-L15H3-01	667-L17H3-01		667-L20H3-01
adapter	302-L1510-02	302-AD16A-02	302-AD16A-02	
antetype	203-L15H30-01	203-L17H30-01		
Sell area	Europe	Europe	Europe	America
LCD panel	AU335-15112-00	AU335-17051-0 0	AU335-2000F-00	
Back light board	667-L15H3-14A	667-L17H3-14A	667-L20H3-14A	
High frequency board	667-L15H3S-55	667-L15H3S-55		667-L20H3-55
Main board	667-L15H3-01BS	667-L17H3-01S		667-L20H3-01
adapter	302-L1510-02	302-AD16A-02	302-ADA6A-02	
antetype	203-L15H30-03	203-L17H40-02		203-L20H30-02

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

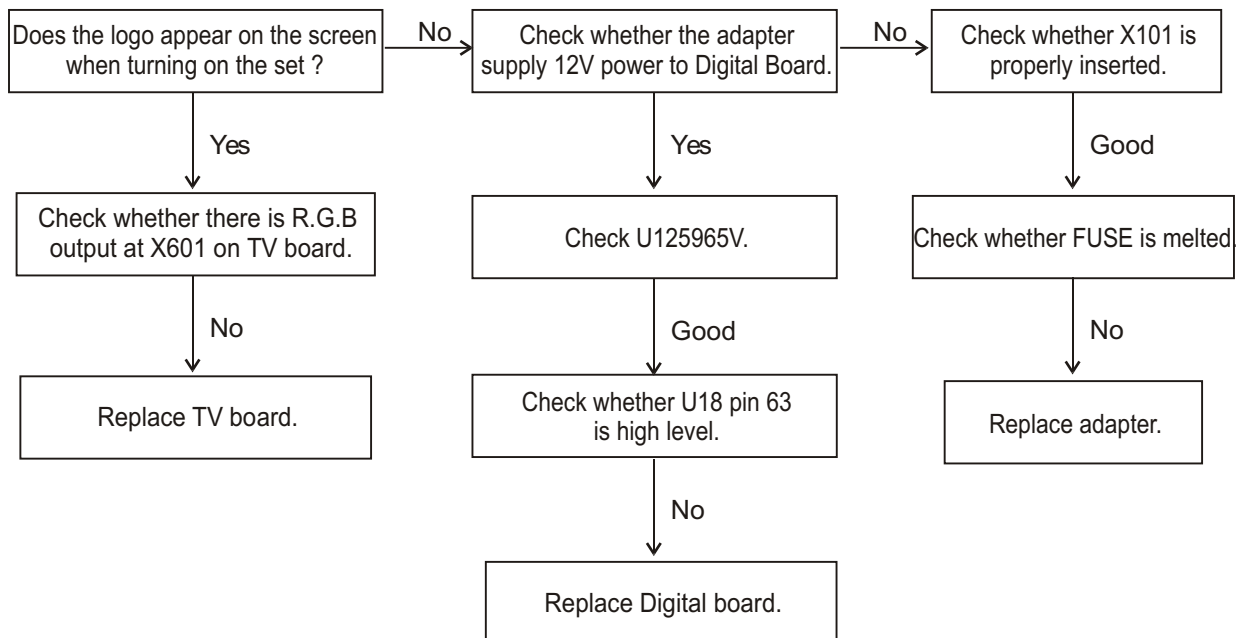
Category	criteria	Q'ty allowed					Distance between two spots				
		15"	20"	22"	30"	40"	15"	20"	22"	30"	40"
Bright spot	One single spot	≤5	≤2	≤5	≤2	≤3	≥15mm	≥15mm			
	2 neighboring spots	≤2	≤1	≤2	≤1	≤1					
	Total No.	≤5	≤2	≤5	≤2	≤3					
Dark spots	One single spot	≤6	≤7	≤5	≤4	≤10		≥10mm	≥5mm		
	Two neighboring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

Notes:

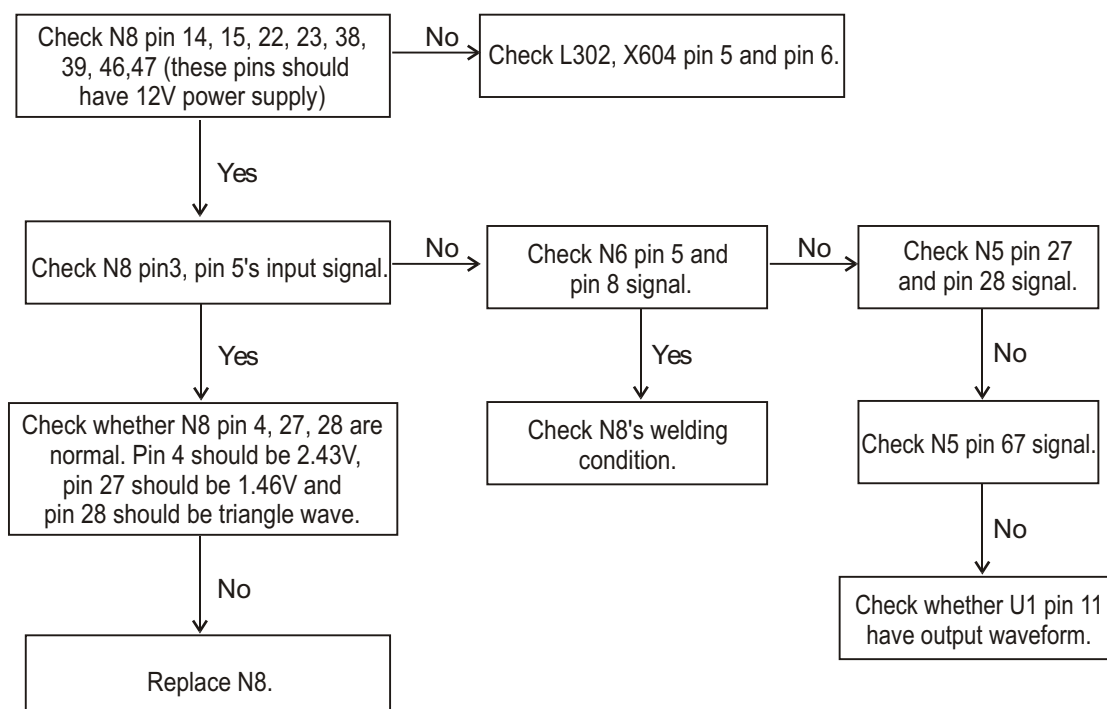
1. Definition of defected point (bright spot, dark spot): It is identified as a defected point if its area exceeds 1/2 of a single picture element (R,G,B).
2. Definition of bright spot: It is identified as a bright spot if it is bright in the state of dark field and its bright size remains unchanged
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

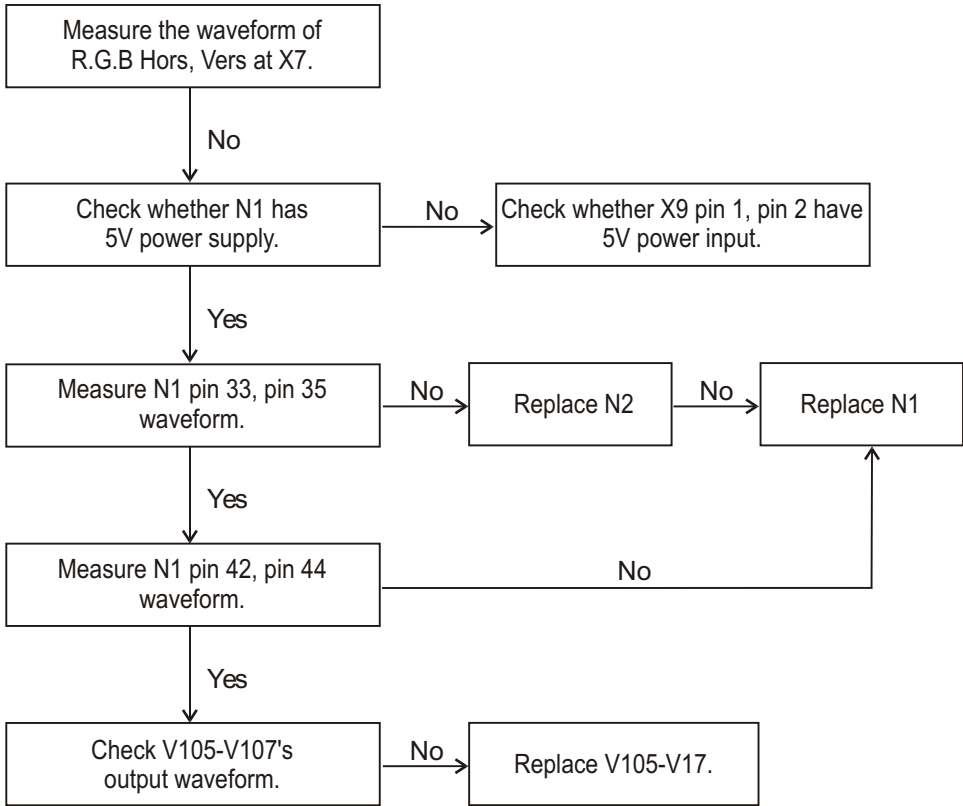


No sound

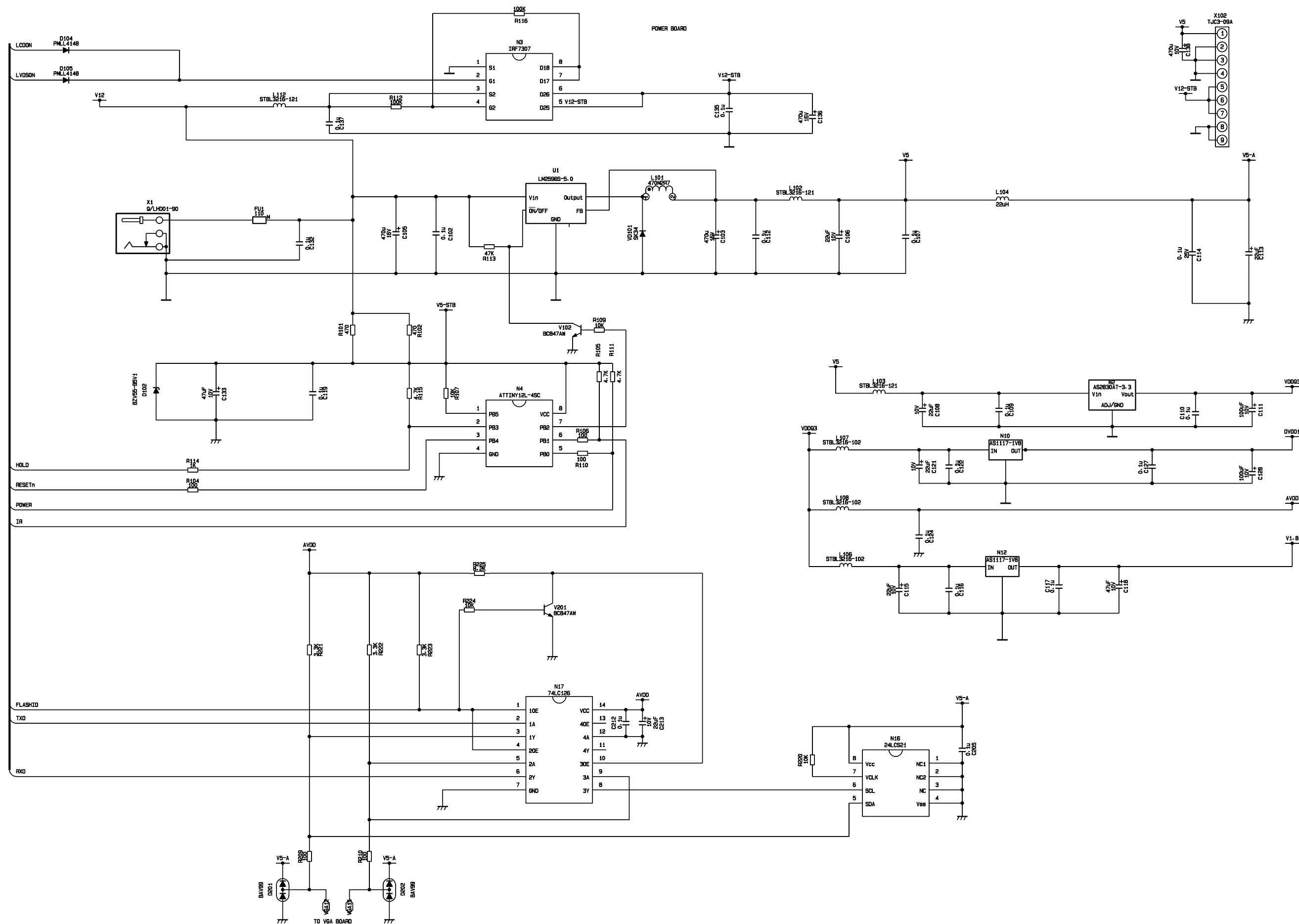


TV board troubleshooting

No picture but have raster.







A

B

C

D

E

F

G

H

VGA BORAD

P15V330A

