



**LCT TV**  
**Service Manual**

# Model: LCT-20PSST

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## SAFETY PRECAUTIONS

### 1. Instructions

Be sure to switch off the power supply before replacing or welding any components 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

- a. Screens are different from one model to another and therefore not interchangeable. Be sure to use the screen of the original model for replacement.
- b. 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.
- c. Do not use any adapter that is not identical with the TV set. Otherwise it will cause fire or damage to the set.
- d. 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.
- e. 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.
- f. 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.
- g. 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.

- h. When operating or installing LCD please don't subject the LCD components to bending, twisting or extrusion, collision lest mishap should result.
- i. As most of the circuitry in LCD TV set is composed of CMOS integrated circuits, it's necessary to pay attention to anti static. Before servicing LCD TV make sure to take anti static measure and ensure full grounding for all the parts that have to be grounded.
- j. 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.
- k. Special care must be taken in transporting or handling it. Exquisite chock vibration may leas to breakage of screen glass or damage to driving circuit. Therefore it must be packed in a strong case before the transportation or handling.
- l. 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:

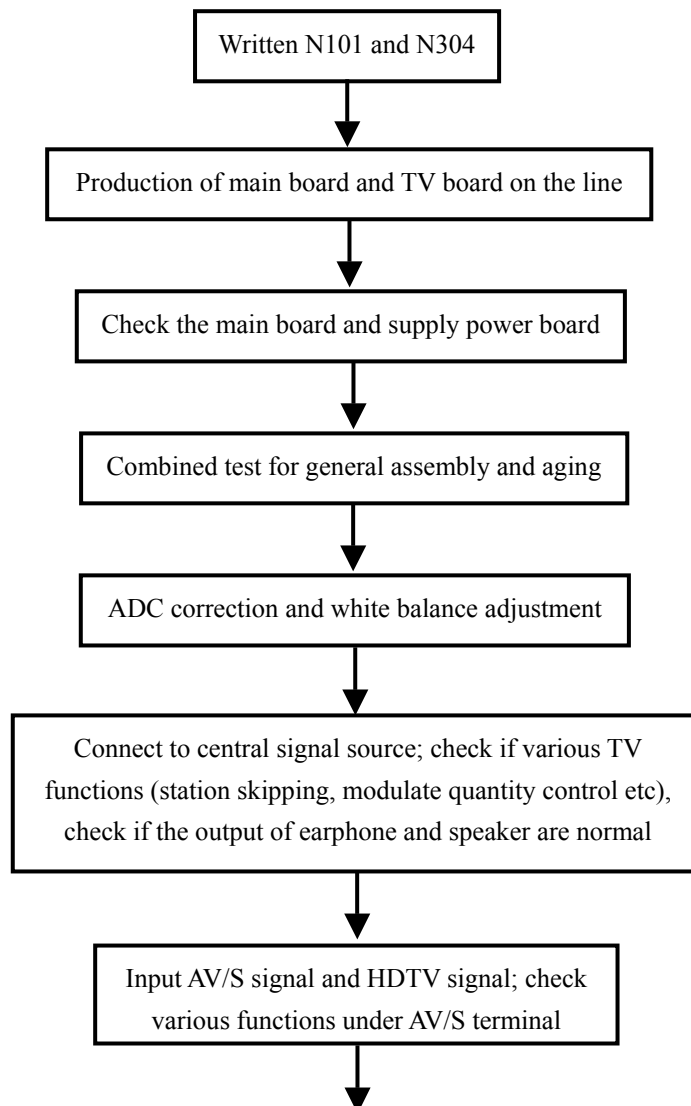
Temperature	Scope for operation	0 ~+50°C
	Scope for storage	-20 ~ +60°C
Humidity	Scope for operation	20% ~ 85%
	Scope for storage	10% ~ 90%

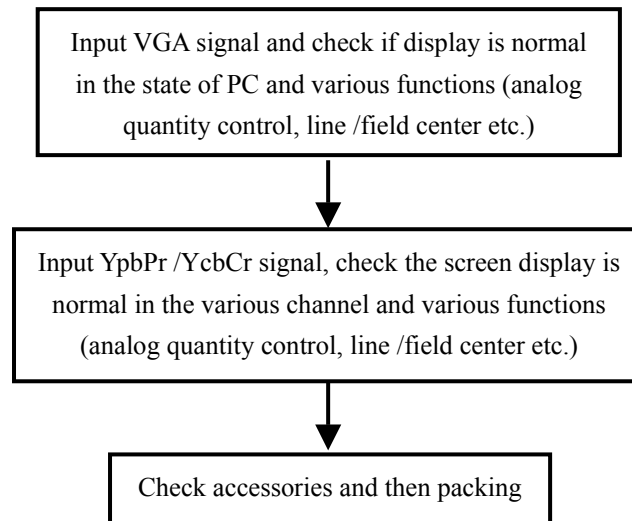
- m. Display of a fixed picture for a long time may result in appearance of picture residue on the screen, as commonly called "ghost shadow". The extent of the residual picture varies with the maker of LCD screen. This "ghost shadow" may remain in the picture for a period of time (several minutes). But when operating it please avoid displaying still picture in high brightness for a long time.
3. Points for attention during installation
- a. The front panel of LCD screen is of glass. When installing it please make sure to put it in place.
  - b. For service or installation it's necessary to use specified screw lest it should damage the screen.
  - c. 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.
  - d. 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.
  - e. Be sure to protect the cabinet from damage or scratch during service, dismantling or mounting.

## ALIGNMENT INSTRUCTION

1. Test equipment  
PM5518 (Video signal generator)  
K-7253 (VGA signal generator)  
CA210 (White balancer)

2. The alignment flow chart





3. Written program  
Written program of IC(N101, N304)
4. Main board adjustment
  - a. According to wiring diagram, connect main board to supply power, the indicator to red.
  - b. Press the POWER button in the sensor control, the indicator to blue.
  - c. Check the picture and sound is normal of TV /SCART /YPBPR /RGB /DVI channel.
5. Aging
  - a. Install the set.
  - b. Turn on the set, select the TV channel, then let the set no signal in state.
  - c. Aging one hour.
6. White balance
  - a. Enter RGB channel
  - b. Input grid signal (C\_Hat\_16x12(w)) of 60Hz of VGA terminal, resolution to 640 x 480 of in optimum resolution. Adjust H-center and V-center, let to the picture normal.
  - c. Input gray (H)-16 signal, enter the factory menu, select "VGA AUTO COLOR"
  - d. Exit the factory menu, select the YPBPR /YCBCR channel.
  - e. Input the YPBPR signal, adjust different signal.
  - f. Input gray (H)-8 signal, using the CA-210 test the third level, adjust brightness and contrast, let brightness to 180nit, enter factory menu, still the green color temperature value, adjust blue color temperature and red color temperature, let to  $x = 0.28 \pm 0.02$ ,  $y = 0.299 \pm 0.02$ .

## 7. Performance inspection

### a. TV function

Enter the search menu → auto search, connect RF-TV terminal to the central signal source, check if there is station skipping.

### b. AV /S input terminal

Input AV /S signal, check the picture and sound is normal.

### c. VGA terminal

Input the VGA signal (table 1), and auto correction it, check the picture and sound is normal.

Table 1: VGA signal format

Resolution	Pixel clock (MHz)	H-SYNC (KHz)	V-SYNC (Hz)
640 x 480 @ 60	25.175	31.469	59.900
640 x 480 @ 75	31.500	37.500	75.000
720 x 400 @ 70	28.322	31.469	70.086
800 x 600 @ 60	40.000	37.879	60.317
800 x 600 @ 75	49.500	46.875	75.000

### d. YPBPR /YCBCR terminal

Input YPBPR /YCBCR signal (table 2) and auto correction it, check the picture and sound is normal.

Table 2: YpbPr /YcbCr signal format

Resolution	Pixel clock (MHz)	H-SYNC (KHz)	V-SYNC (Hz)
768 x 576 @ 50i	14.750	15.625	50
776 x 482 @ 60i	15.734	15.734	60
720 x 480 @ 60p	27.027	31.500	60
720 x 576 @ 50p	27.000	31.250	50
1280 x 720 @ 60p	74.250	45.000	60
1920 x 1080 @ 50i	74.250	28.125	50
1920 x 1080 @ 60i	74.250	33.750	60

### e. For factory preset.

Table3: Factory preset

Item	Factory Preset	Item	Factory Preset
Picture mode	NATURE	OSD language	English
Sound mode	User	Color temperature	Standard
Volume	30	Backlight	50



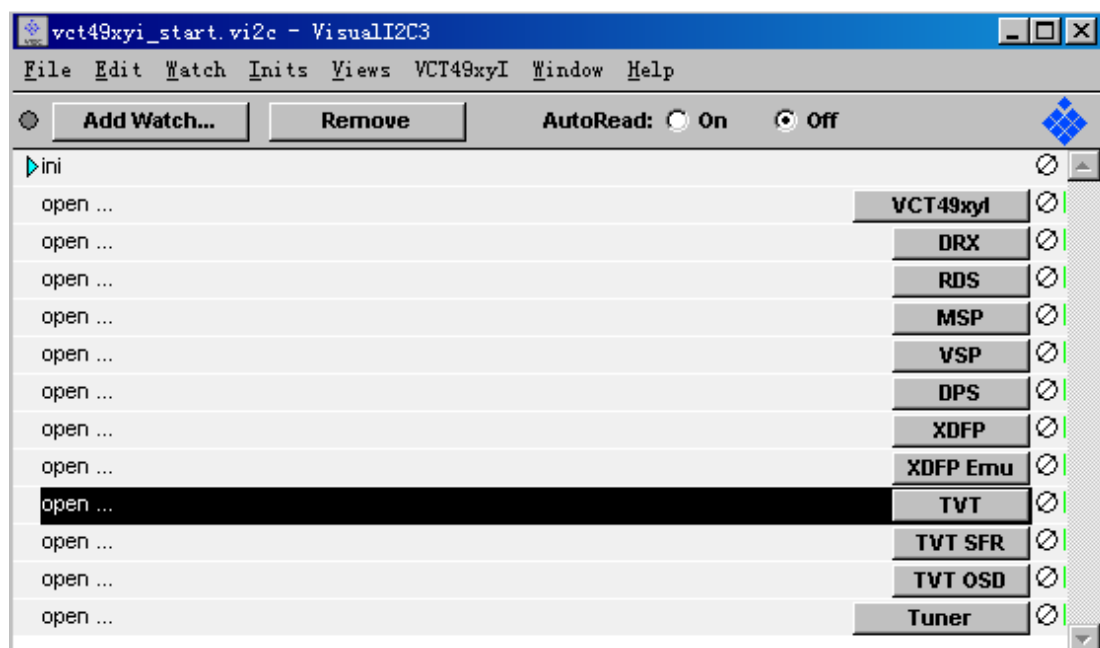
## METHOD OF SOFTWARE UPGRADING

Step of software upgrading are as follows:

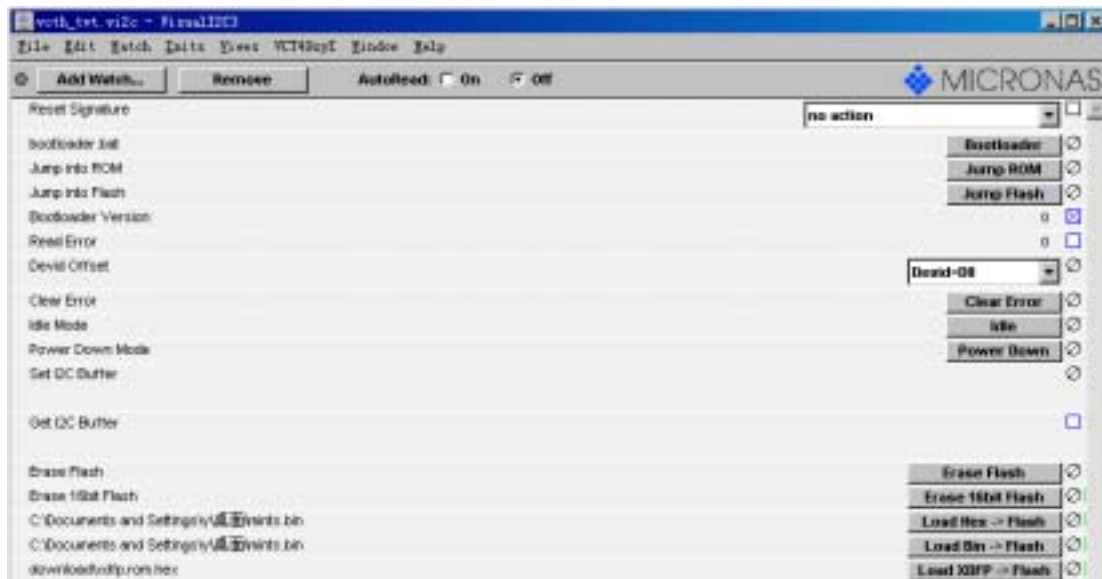
1. Using the parallel port wire and DVI transfer to VGA connection wire and then connect them by an upgrade board.
2. Enter the factory menu, select upgrading item.
3. Connect main board to PC.



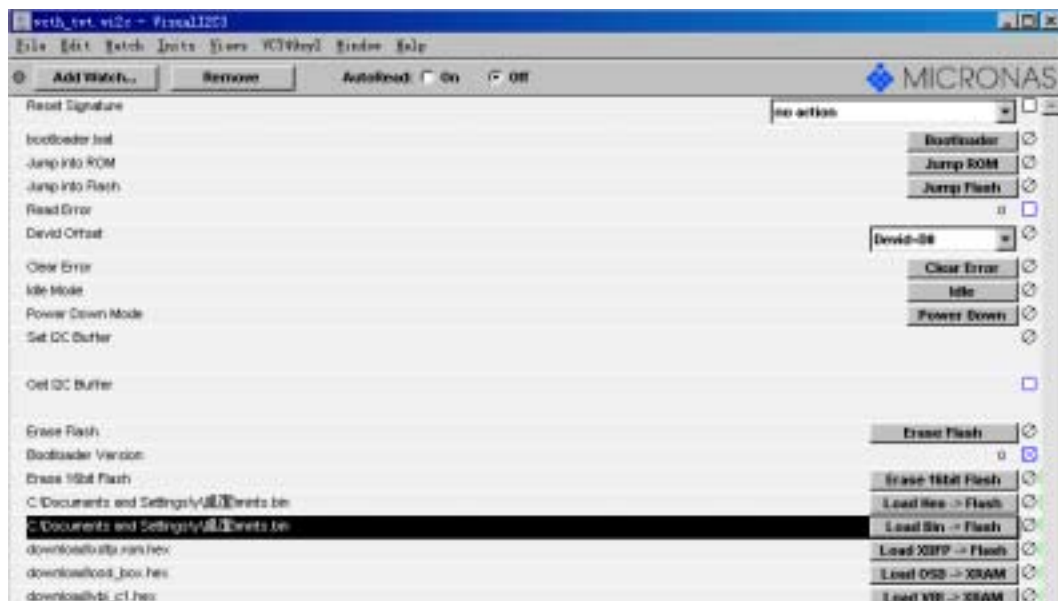
4. Operation the vct49xyi\_start.exe display the software interface follow as:



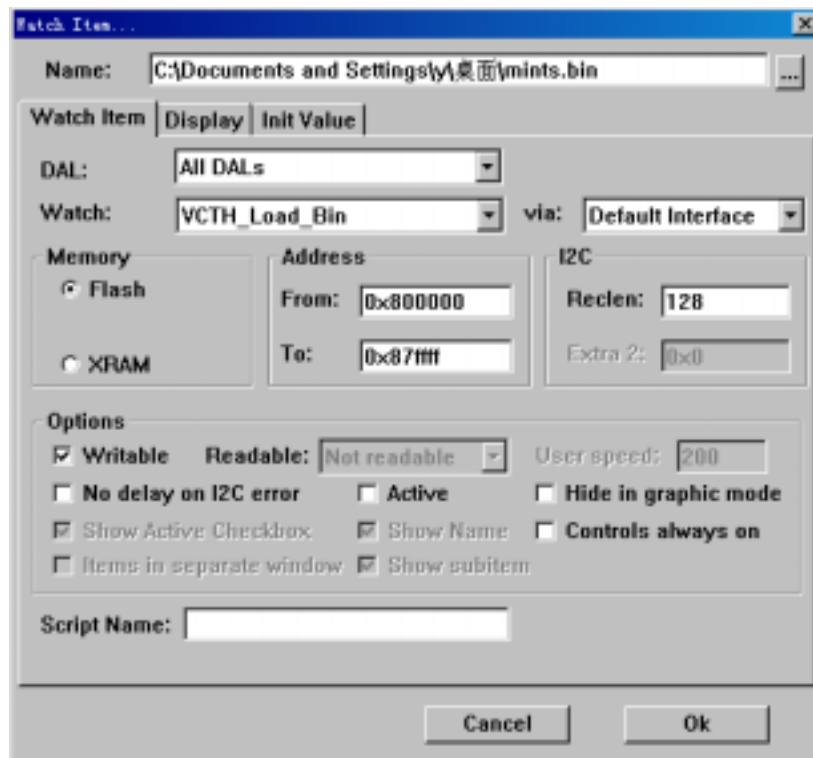
- Click the “TVT” item:



- Click the BOOTLOADER button, display the DOS interface, after the interface disappear, click the BOOTLAODER VERSION, if it value form 0 to 21, connecting is normal.
- Click the ERASE 16 BIT FLASH, erasure the program. Click the BOOTLAODER VERSION, if it value form 21 to 1, the program is erasure.
- After erasure the program, click the black bar,



then display the interface, select the upgrade program.



After select the program, press the OK button, return the menu, click LOAS BIN----- FLASH, after the written the program is finish, the BAR disappear.

9. Turn off the power supply, return the set is over.

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.

## **Working principle analysis of the unit**

The set is multi-media LCD TV broadcast receiver, it contain PAL /SECAM B/G, I, D K L L' of color system and AV input, S-VHS input, PC, VGA, DVI and earphone output terminals. The power circuit is built-in, it adopt the power manage chip STR-W6586N, output the 12v and 18v voltage, provide a 12V for the picture processing and 18V for sound amplifier. It is composed of the power board and the video signal digital image processing.

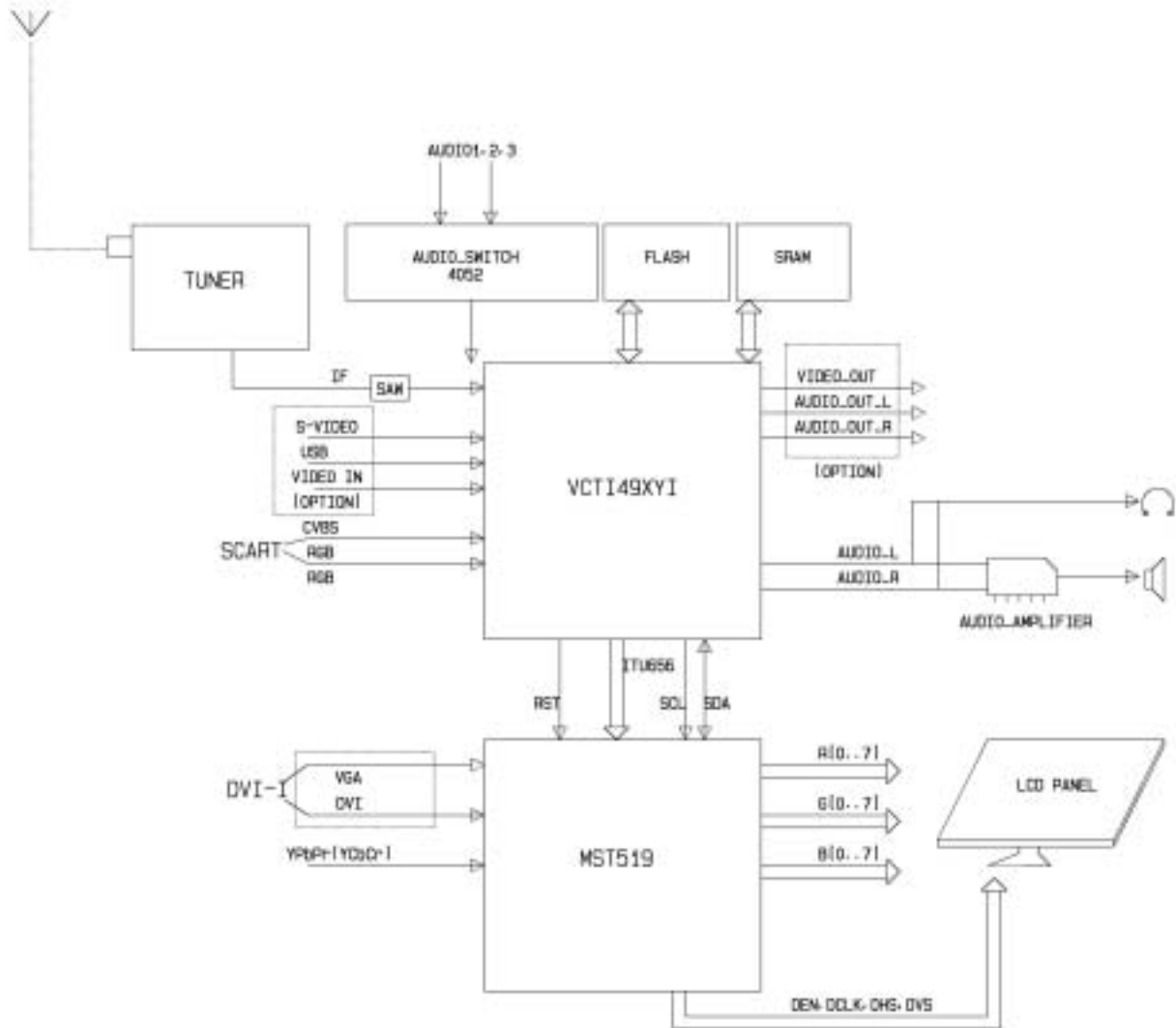
VCT4993R (N102) is a integrative chip of digital IF amplifier, video decode, sound processing, image processing and CPU, it has teletext decode function and 8M FLASH (N103) and 1M SRAM, there can deposit 250 page teletext.

FR signal via the image IF signal of the tuner TUNER101, the signal is send to PIN109 and PIN110 of multi-system video /sound signal of N102 VCT4993 via Z103 of SAWF (Surface Acoustic Wave Filter), IF signal is demodulated for image and sound, output a composite video signal, then select switch signal source for video and s-video of AV board and RGB signal of SCART of the main board, it send to digital image processing chip (MST519VA) via image processing (ITU656 of digital signal).

After sound of DVI and YPBPR via switch selection N301 HEF4052, this signal and sound of the AV and SCART, with sound of demodulation IF via internal switch selection and stereo processing from PIN124 and PIN125 of VCT4993 (N102) output, then sent to sound amplifier (N504) of the power board, it is amplified for speaker.

MST519VA (N202) is digital image processing chip, it process the YPBPR, VGA, DVI signal and the ITU656 signal from VCT4993 (N102), though auto ADC correction and internal arithmetic processing, then outputs 24 BIT TTL level RGB signal to socket X202. through N501 cable, the signal is sent to LCD panel interface to perform reproduction of image.

## BLOCK DIAGRAM

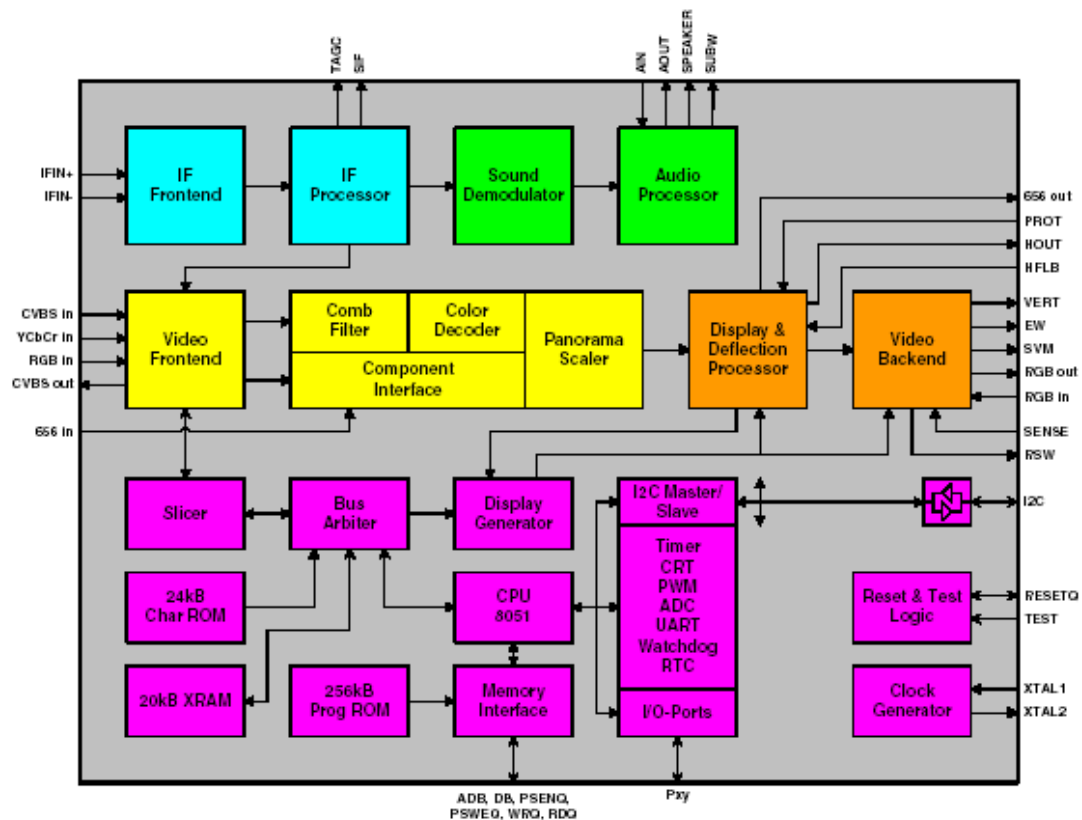


## IC BLOCK DIAGRAM

### 1. VCT4993R

VCT4993R (N102) is a integrative chip of digital IF amplifier, video decode, sound processing, image processing and CPU, it has teletext decode function and 8M FLASH (N103) and 1M SRAM, there can deposit 250 page teletext. It has 10 VIDEO input, 3 VIDEO output. 3 SOUND input and output, analog RGB output, ITU656 of digital signal output.

Figure 1-1: VCT4993R internal block diagram



VCT4993R PIN instructions:

PIN	Function	PIN	Function
41	SDA_M	78	656102
42	SCL_M	78	656101
44	CSZ	79	656100
45	SCART_SWITCH	80	AUDIO_SEL_1
47	IR	81	AUDIO_SEL_0
48	MUTE	82	656CLK
50	INT	97	BKLON
58	VOUT2	98	STANDBY
60	VIN1	109	IF IN+
62	Y_IN	110	IF IN-
63	C_IN	112	TAGC
66	SCART_CVBS	113	AIN1R
67	SCART_R	114	AIN1L
68	SCART_G	115	AIN2R
69	SCART_B	116	AIN2L
70	FBL	117	AIN3R
71	656107	118	AIN3L
72	656106	122	AOUT1R
73	656105	123	AOUT1L
74	656104	124	SAPEAKEAR
77	656103	125	SAPEAKEAL

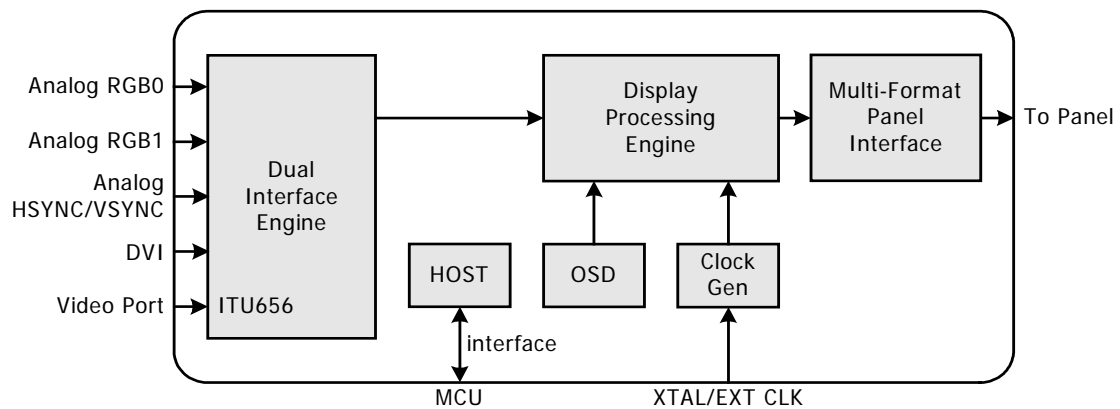
## 2. MST518 digital image processing

MST519VA (N202) is digital image processing chip, it process the YPBPR, VGA, DVI signal and the ITU656 signal from VCT4993 (N102), through auto ADC correction and internal arithmetic processing, then outputs 24 BIT TTL level RGB signal to socket X202. Through N501 cable, the signal is sent to LCD panel interface to perform reproduction of image.

MST518 PIN instructions:

Pin	Function	Pin	Function	Pin	Function
43	DVI_IN R+	65	VGA RIN	83	SDA_M
44	DVI_IN R-	63	VGA GIN	33	RESET
46	DVI_IN G+	60	VGA BIN	85	INT
47	DVI_IN G-	40	HSYNC	86	PWM
49	DVI_IN B+	41	VSYNC	87	LCDON
50	DVI_IN B-	75	CRIN	90	656 CLK
52	DVI_IN CLK+	72	YIN	91-98	656100-656107
53	DVI_IN CLK-	70	CBIN	103-110	BA()-BA(7)
30	DVI_IN DDC_SCL	82	SCZ	131-138	RA(0)-RA(7)
29	DVI_IN DDC_SDA	84	SCL_M	115-120 127-128	GA()-GA(7)
34	XIN	143	HSYNC		
35	XOUT	144	VSYNC		

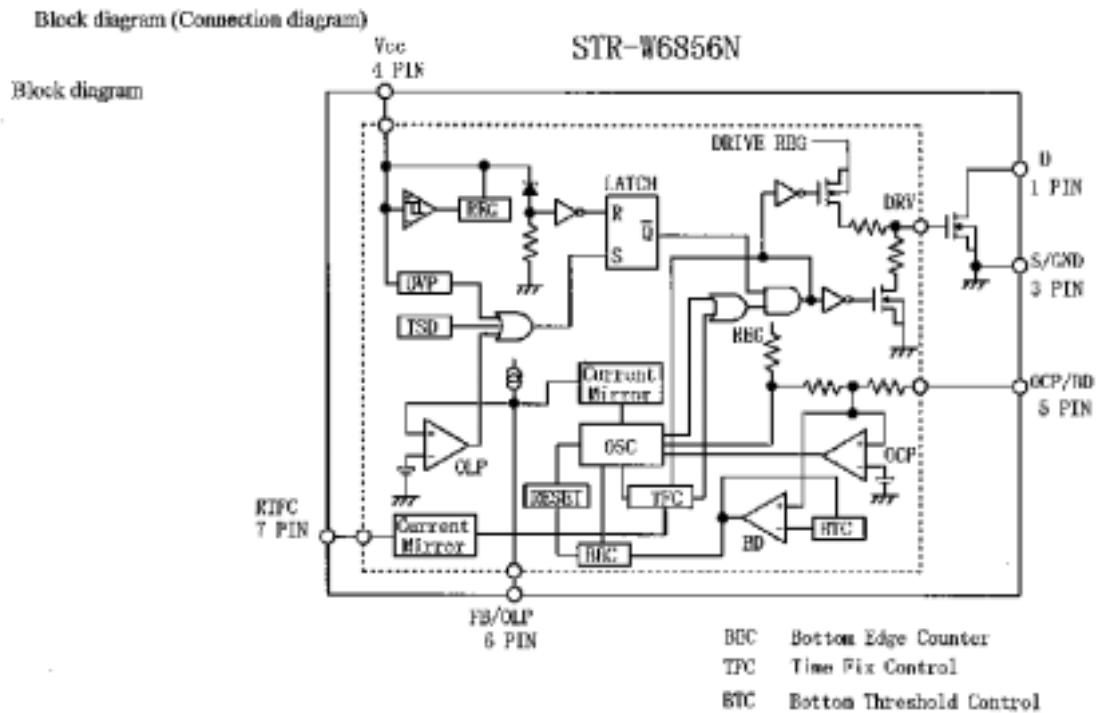
Figure1-2: MST518 internal block diagram





### 3. STR-W6856N switch adjustment IC

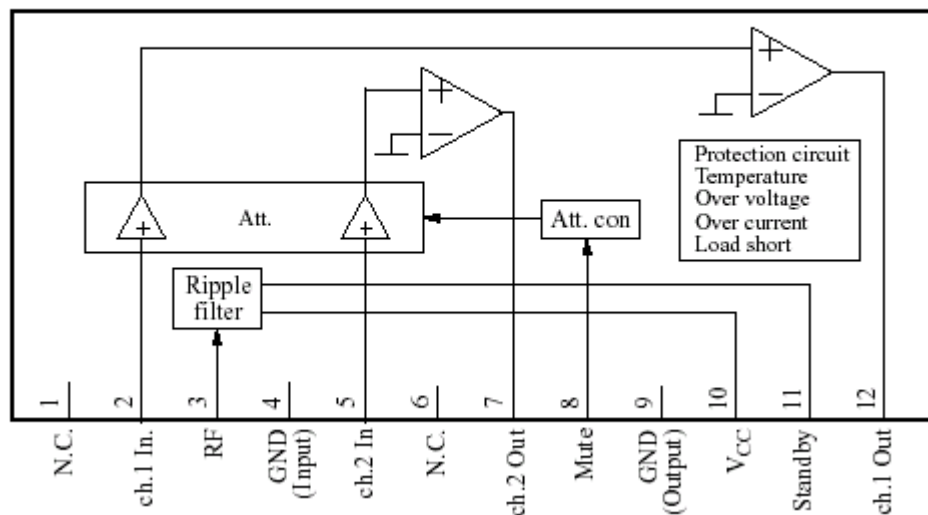
Figure 1-3: STR-W6856N internal block diagram



### 4. AN7522: dual-channel single-end push and pull audio power amplifier (10Wtyp)

#### ■ Block Diagram

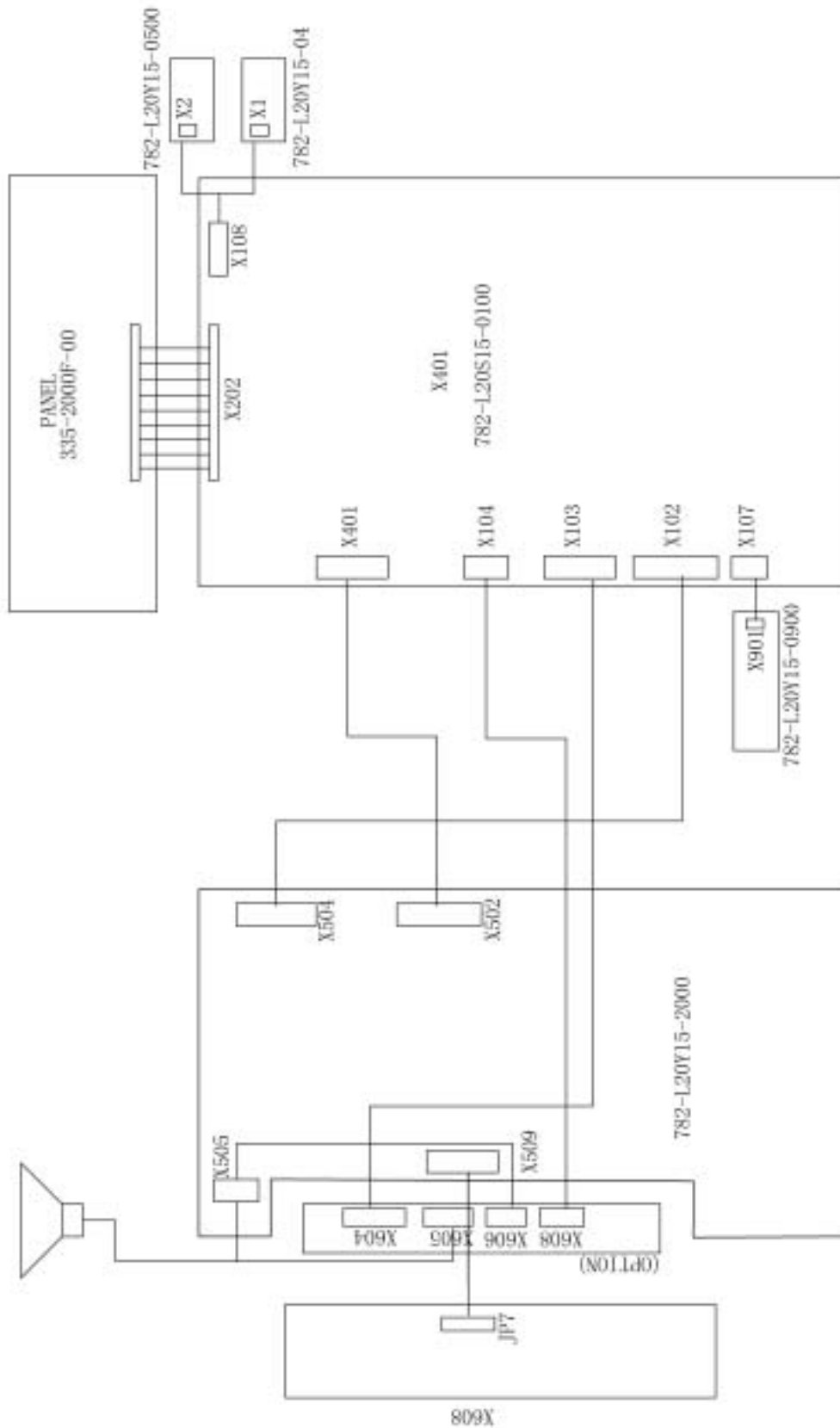
Figure 1-4: AN7522 internal block diagram



#### AN7522 PINS instruction

Pin	Function	Pin	Function	Pin	Function
2, 5	Input	8	MUTE	9	GND (output)
7, 12	Output	4	GND (input)	10	VCC

## WIRING DIAGRAM



## IDENTIFICATION CRITERIA FOR THE BRIGHT SPOT AND DARK SPOT

Category	Criteria	Quantity allowed	Distance between two spots
Bright spot	One single spot	$\leq 2$	$\geq 15\text{mm}$
	Two neighboring spots	$\leq 1$	
	Total No.	$\leq 2$	
Dark spots	One single spot	$\leq 7$	$\geq 10\text{mm}$
	Two neighboring spots	$\leq 2$	
	Total No.	$\leq 7$	
Total defected point		$\leq 7$	

### Notes:

1. Definition of defected point (bright spot, dark spot): It is identified as a defected point if its area exceeds  $\frac{1}{2}$  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 while field and it dark size remains unchanged.
4. Definition of two neighboring points: Defect of a group of picture elements (RB, RG, GB).

## TROUBLE SHOOTING

### 1. Fault clearance

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

#### a. Antenna (signal):

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

## b. TV set:

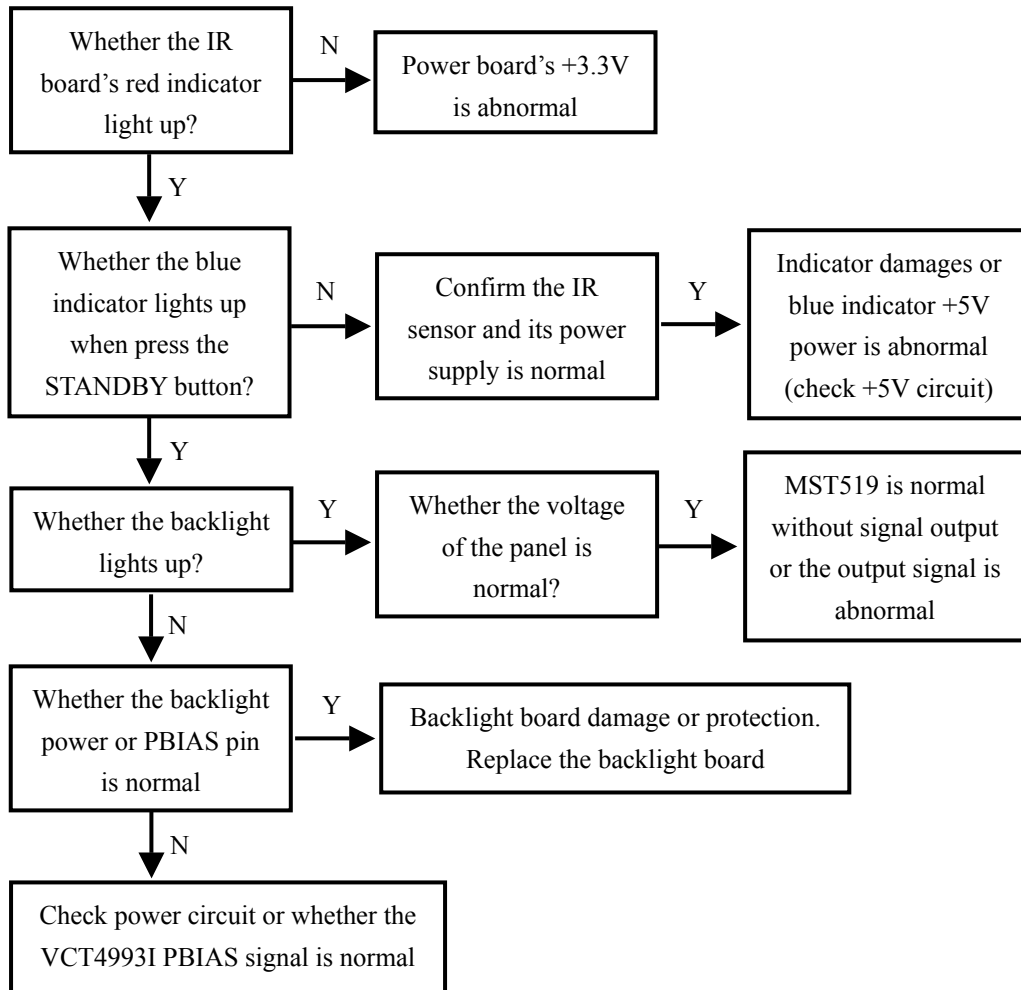
Symptoms	Possible cause
Unable to switch the power on	<input type="checkbox"/> Check to see if the power plug has been inserted properly into the socket.
No picture and sound	<input type="checkbox"/> Check to see if the power supply of liquid crystal TV has been switched on. (As can be indicated by the red LED at the front of the TV set). <input type="checkbox"/> See if it's receiving the signal that is transmitted from other source than the station. <input type="checkbox"/> Check if it's connected to the wrong terminal or if the input mode is correct. <input type="checkbox"/> 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	<input type="checkbox"/> Check if all the picture setups have been corrected.
Screen position or size is not proper	<input type="checkbox"/> Check is the screen position and size is correctly set up.
Picture is twisted and deformed	<input type="checkbox"/> Check to see if the picture-frame ratio is properly set up.
Picture color changed or colorless	<input type="checkbox"/> Check the "Components" 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	<input type="checkbox"/> Check if the contrast setting is too high. <input type="checkbox"/> Possibly the output quality of DVD broadcaster is set too high. <input type="checkbox"/> 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 of the picture	<input type="checkbox"/> Check if the setting for the brightness is too high. <input type="checkbox"/> Possibly the brightness grade of DVD player (broadcaster) is set too high.
No picture or signal produced from the displayer is "XXX in search" appears	<input type="checkbox"/> Check if the cable is disconnected. <input type="checkbox"/> Check if it's connected to the proper terminal or if the input mode is correct.
There appears an indication- "outside the receivable scope)	<input type="checkbox"/> Check if the TV set can receive input signal. The signal is not correctly identified and VGA format is beyond the specified scope.

Symptoms	Possible cause
Remote control cannot work properly	<ul style="list-style-type: none"> <li><input type="checkbox"/> Check if the batteries are installed in the reverse order.</li> <li><input type="checkbox"/> Check if the battery is effective.</li> <li><input type="checkbox"/> Check the distance or angle from the monitor.</li> <li><input type="checkbox"/> Check if there is any obstruct between the remote control and the TV set.</li> <li><input type="checkbox"/> Check if the remote control signal-receiving window is exposed to strong fluorescence.</li> </ul>
No picture and sound but only hash	<ul style="list-style-type: none"> <li><input type="checkbox"/> Check if the antenna cable is correctly connected, or if it has received the video signal correctly.</li> </ul>
Blur picture	<ul style="list-style-type: none"> <li><input type="checkbox"/> Check if the antenna cable is correctly connected.</li> <li><input type="checkbox"/> Of if it has received the right video signal.</li> </ul>
No sound	<ul style="list-style-type: none"> <li><input type="checkbox"/> Check if the “mute” audio frequency setting is selected.</li> <li><input type="checkbox"/> Check if the sound volume is set to minimum.</li> <li><input type="checkbox"/> Make sure the earphone is not connected.</li> <li><input type="checkbox"/> Check if the cable connection is loose.</li> </ul>
When playing VHS picture search tape, there are lines at the top or bottom of the picture	<ul style="list-style-type: none"> <li><input type="checkbox"/> 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.</li> </ul>

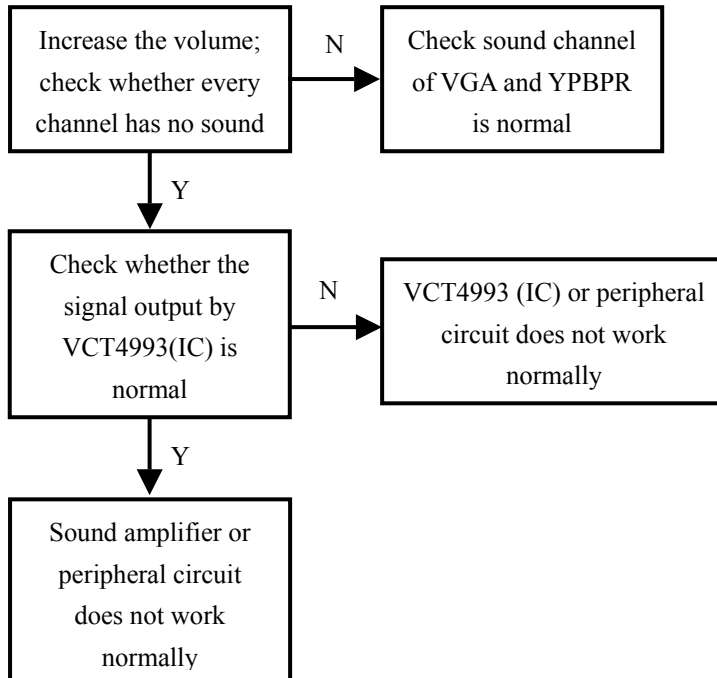
## 2. Trouble shooting guide

### a. No raster, no picture and no sound

When the main power is turned on, the unit's indicator light up in red (red indicator is controlled by +3.3VSTANDBY), use the remote control or the unit's STANDBY to lights up the blue indicator.



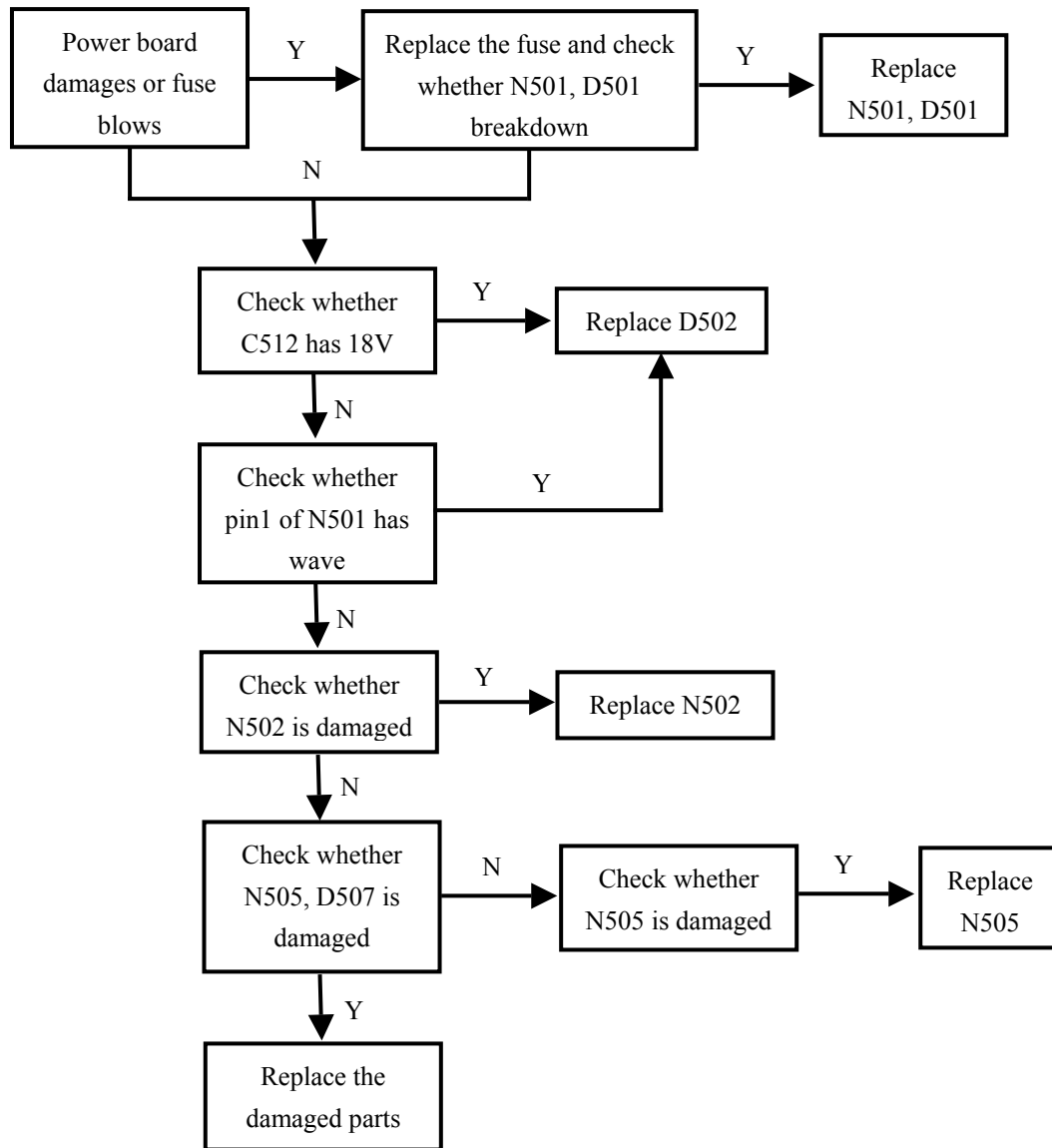
- b. With picture and without sound when turning on



- c. When receiving TV signal, there is no picture or dark snow  
Confirm the +5V, +32V power supply of TUNER. If they are normal, check whether peripheral circuit of the TUNER or IF amplifier is normal. If they are all no problem, then VCT4993 or its input signal is abnormal.



d. The power board trouble shooting guide



## CIRCUIT DIAGRAM

