

LT1703S/LT2003S

**SERVICE
MANUAL**

LT1703S/LT2003S

SERVICE MANUAL

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LT1703S/LT2003S SERVICE MANUAL

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NOTICE

THIS DOCUMENT IS BASED ON THE LCD TV WITH INTERNAL
MODEL : LT1703S(RU) AND LT2003S(RU).

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1. SAFETY PREAUTIONS

1.1 GENERAL GUIDELINES

- 1. When servicing, observe the original lead dress. if a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.**
- 2. After servicing, see to it that all the protective devices such as insulation barrier, insulation papers shields are properly installed.**
- 3. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.**

2. PREVENTION OF ELECTRO—STATIC DISCHARGE(ESD)TO ELECTROSTATICALLY SENSITIVE(ES)DEVICES

Some semiconductor(solid state)devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive(ES)Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor chip components. The following techniques should be used to help reduce the incidence of component damage caused by electro static discharge(ESD).

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any ESD on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging ESD wrist strap, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as anti-static (ESD protected) can generate electrical charge sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

Caution

Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity(ESD).

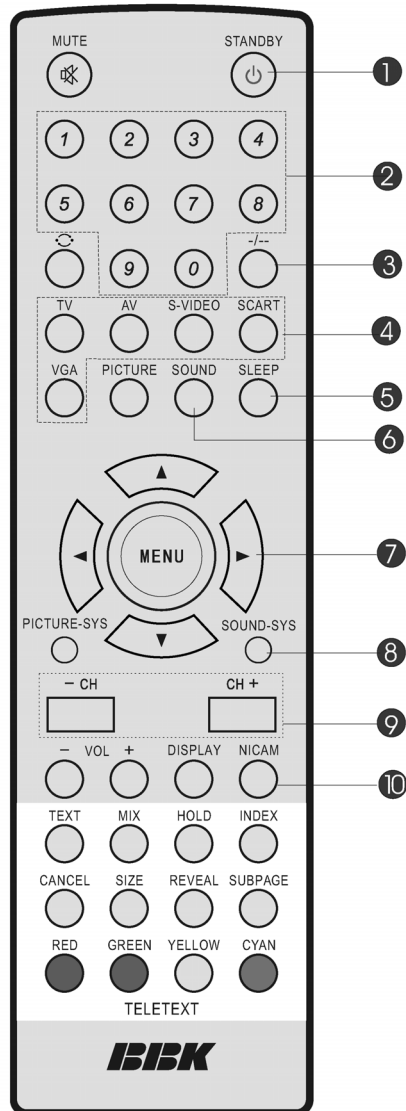
IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by  in the schematic diagrams, Exploded Views and replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire, or other hazards. Do not modify the original design without permission of manufacturer.

3. Control Button Locations and Explanations

Remote Control Illustration

LOCATION AND FUNCTION OF CONTROLS



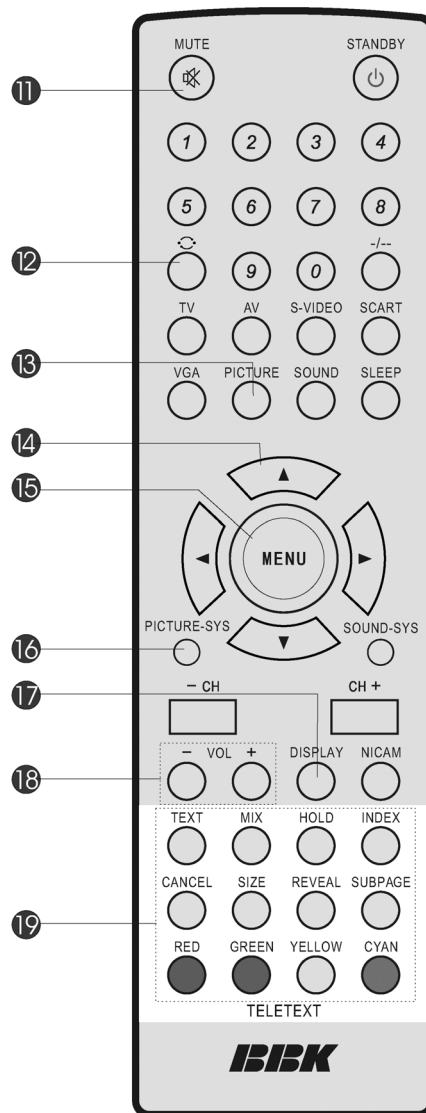
All the functions can be controlled with the remote controller. Some functions can also be adjusted with the buttons on the front panel of the set.

Remote Controller

- 1 STANDBY**
To switch the unit on from standby or off to standby.
- 2 NUMBER BUTTONS**
To directly select program number.
- 3 TWO-DIGIT NUMBER BUTTON**
To switch one or two-digit program number.
- 4 SOURCE**
Signal source select rapidly:
AV、S-VIDEO、SCART、TV、VGA
- 5 SLEEP**
Setting sleep timer.
- 6 SOUND BUTTON**
To adjust the sound effect. There are 4 modes for your selection in this function: Music, Film, News and User.
- 7 ◀/▶ (MENU LEFT/RIGHT)**
To adjust menu settings.
- 8 SOUND SYSTEM**
To select sound system.
- 9 CHANNEL**
To increase or decrease program number.
- 10 NICAM/A2 BUTTON**
To select the sound mode if receive NICAM or A2.

LOCATION AND FUNCTION OF CONTROLS

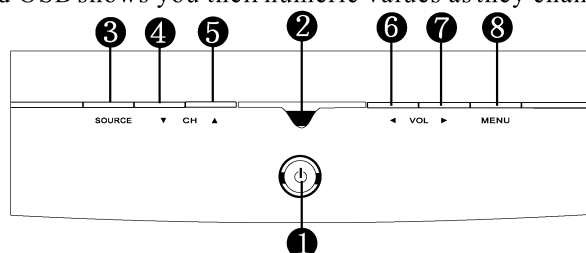
- 11 MUTE**
To switch on sound or turn off sound.
- 12 RETURN**
To return to previous selected program number.
- 13 PICTURE**
To select picture mode (user/soft/standard /dynamic)
- 14 ▲/▼(MENU UP/DOWN)**
To select a menu item.
- 15 MENU**
To enter into or exit from the menu.
- 16 PICTURE SYSTEM**
To select video system.
- 17 DISPLAY**
To display setup information of channel or source.
- 18 VOLUME**
To increase or decrease volume.
- 19 TELETEXT BUTTONS (OPTION)**
These buttons are used for teletext. For further details, see the TELETEXT FUNCTION section.



LOCATION AND FUNCTION OF CONTROLS

Front Panel Control

This TFT-LCD TV/monitor allows you to easily adjust the characteristics of the image being displayed. All of these adjustments are made using the control buttons on the front of the monitor. While you use these buttons to adjust the controls, and OSD shows you their numeric values as they change.

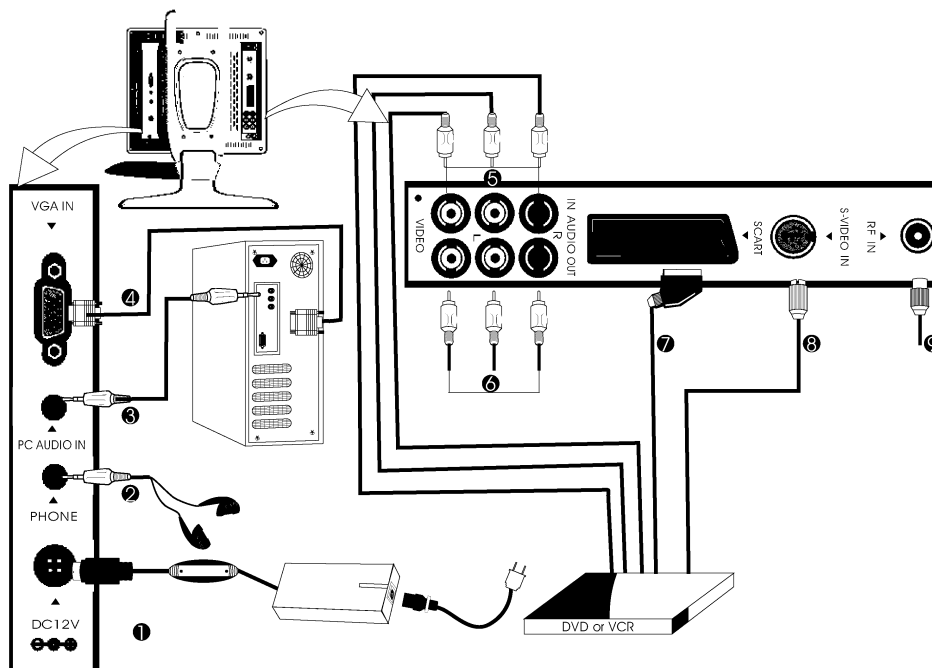


There are 7 keys for user's control including POWER, SOURCE, MENU, CH-, CH+, VOL- and VOL+. The following descriptions are the introduction of these keys.

Item	Name	Description
1	POWER	Turn ON/OFF the LCD TV/monitor. When there is no signal input from PC port, after 2 minutes, the machine will go to standby mode automatically, on the other hand if the input port is TV/AV, and there is no signal input until 5 minutes, the machine will go to standby mode automatically also, the indicator of the power will turn to red. If you want to power on the machine again, please press power button.
2	Remote signal sensor	
3	SOURCE	Select video sources 
4	CH-(▼)	When you watch the TV program, push the button to decrease channel number. In the main-menu, push the button to select the downward menu item.
5	CH+(▲)	When you watch the TV program, push the button to increase channel number. In the main-menu, push the button to select the upward menu item.
6	VOL-(◀)	Decreases/adjusts the values of the selected menu item, or decreases the level of audio volume.
7	VOL+(▶)	Increases/ adjust the values of the selected menu item, or increases the level of audio volume.
8	MENU	Enter or back to menu.

INSTALLATION AND CONNECTION

Connecting Your LCD TV/monitor



1. Connect the power cord to the DC adapter and connect the adapter jack to the DC 12V power port on the back of your TV/monitor.
2. Connect the headphone cable to PHONE port.
3. Connect the PC audio source to PC AUDIO IN port.
4. Connect the signal cable to the VGA port of your TV/monitor.
5. Connect the RCA cable to your DVD, VCR or camcorder.
6. Connect your external equipment to the RCA out port.
7. Connect the Euro scart connector to the Euro scart socket of your TV/monitor.
8. Connect the s-video cable to your DVD, VCR or camcorder.
9. Connect antenna or CATV cable to RF IN port.

NOTE

- Do not plug in the power cord until all connections have been completed.
- When connecting a video source via scart connector, please press the SOURCE button on remote controller or front panel to select the SCART mode.

17.0"TV SPECIFICATION

Panel	Size Display Size Type Pixel pitch Viewing Angle	17.0" Diagonal 337.9(H)×270.3(V)mm TFT color 0.264(H)×0.264(V)mm 70/70/70/70(Depending on the panel manufacturer, the viewing angle may be different from this spec.)
Frequency	Horizontal Vertical Display color	30~80KHz 56~75Hz 262 Kcolors
Display Mode	Optimum Mode Maximum Mode	1280×1024@60Hz 1280×1024@75Hz
Input Signal	Sync. Video signal	H/V Separate, TTL,P.or N. H/V Composite, TTL,P.or N. Sync-on-green 0.3 Vp-p,N. 0.7 Vp-p @ 75 ohm
TV, Video	Color system Sound system Video format	PAL/NTSC/SECAM DK/ I/ BG/L CVBS/ S-VHS/RGB
Power Supply	Input Output	AC 100~240 Vrms (50Hz/ 60Hz) DC 12V/4.0A
Power consumption	Maximum Power Saving	50W <3W
Dimensions/ Weight (W×H×D)		416×437×152mm/7.3kg
Environmental Considerations	Operating Temperature Operating Humidity Storage Temperature Storage Humidity	5°C to 35°C 10% to 80% -20°C to 45°C 5% to 95%
Audio Characteristics	Audio in Input L Audio in Input R Audio out Input L Audio out Input R Frequency Response	RCA Jack White(L), 0.5±0.3Vrms RCA Jack RED(R), 0.5±0.3Vrms RCA Jack White(L), 0.5±0.3Vrms RCA Jack RED(R), 0.5±0.3Vrms RF: 100Hz~15KHz (at -3dB) AV: 100Hz~20KHz (at -3dB)

20.1" TV SPECIFICATION

* Panel	Size Display Size Type Pixel pitch Viewing Angle	20.1" Diagonal 408(H)×306(V)mm TFT color 0.51(H)×0.51(V)mm 80/80/80/80(Depending on the panel manufacturer, the viewing angle may be different from this spec.)
*Frequency	Horizontal Vertical Display color	30~47KHz 56~75Hz 16.7M colors
*Display Mode	Optimum Mode Maximum Mode	800×600@75Hz 800×600@75Hz
Input Signal	Sync. Video signal	H/V Separate, TTL,P.or N. H/V Composite, TTL,P.or N. Sync-on-green 0.3 Vp-p,N. 0.7 Vp-p @ 75 ohm
TV, Video	Color system Sound system Video format	PAL/NTSC/SECAM DK/ I/ BG/L CVBS/ S-VHS/RGB
Power Supply	Input Output	AC 100~240Vrms (50Hz/ 60Hz) DC 12V/ 5A
Power consumption	Maximum Power Saving	60W <3W
Dimensions/ Weight (W×H×D)		504×489×194mm/10.3kg
Environmental Considerations	Operating Temperature Operating Humidity Storage Temperature Storage Humidity	5 °C to 35 °C 10% to 80% -20 °C to 45 °C 5% to 95%
Audio Characteristics	Audio in Input L Audio in Input R Audio out Input L Audio out Input R Frequency Response	RCA Jack White(L), 0.5 ± 0.3Vrms RCA Jack RED(R), 0.5 ± 0.3Vrms RCA Jack White(L) ,0.5 ± 0.3Vrms RCA Jack RED(R),0.5 ± 0.3Vrms RF:100Hz~15KHz (at -3dB) AV: 100Hz~20KHz (at -3dB)

* These items are depended on the TFT panel,Design and specification are subject to change without notice.

20.1" TV DISPLAY MODES

Incoming display mode (input)				
Resolution	Horizontal Frequency (KHz)	Vertical Frequency (Hz)	Pixel Frequency (MHz)	Comment
640×350	31.5	70.0	25.17	DOS
720×400	31.5	70.0	28.32	DOS
640×480	31.5	60.0	25.18	DOS
640×480	37.9	72.0	31.50	VESA
640×480	37.5	75.0	31.50	VESA
800×600	35.1	56.2	36.00	VESA
800×600	37.9	60.0	40.00	VESA
800×600	48.1	72.0	50.00	VESA
800×600	46.9	75.0	49.50	VESA

- ◆ Modes, which are not listed in the above table, may not be supported. For an optimal picture it is recommended to choose a mode listed in the table.
- ◆ You have 9 available modes compatible with Windows.
- ◆ It can happen that the image is disrupted. This can occur as result of a signal frequency from the VGA card, which does not correspond with the usual standard. This is not, however, an error. You can improve this situation by altering an automatic setting or by manually changing the phase setting and the pixel frequency menu.
- ◆ If you switch off the TV/monitor, interference lines can occur on your screen. But do not concern about this, as it is normal.
- ◆ To extend the service life of the product, we recommend that you use your computer's power management function.

NOTE

- Design and Specifications are subject to change without notice.
- Weight and Dimensions shown are approximate.

TROUBLESHOOTING

If you have a problem about setting up or using your LCD TV/monitor, you may be able to solve it yourself. Before contacting customer service, try the suggested actions that are appropriate to your problem.

Troubleshooting--Image

Problem	Suggested Actions
Screen is black and power indicator is off	◆ Ensure that the power cord is firmly connected and the LCD TV/monitor is on. ◆ Ensure that the signal cable is firmly connected to the PC or video sources. ◆ Ensure that the PC or video sources are turned on.
Image is not stable and may appear to vibrate	◆ Check that the display resolution and frequency from your PC or video board is an available mode for your monitor. ◆ On your computer check: Control Panel, Display, Settings. ◆ If the setting is not correct, change the display settings of your computer. NOTE: Your monitor supports multiscan display function within the following frequency domain. ◆ Horizontal frequency: 30 KHz~80KHz ◆ Vertical frequency: 56 Hz ~75 Hz ◆ Maximum timing: 17" 1280×1024@75Hz ◆ 20.1" 800×600@75Hz

Troubleshooting--Audio and TV

Problem	Suggested Actions
The TV/monitor does not turn on	◆ Be sure the power cord is plugged in.
No sound	◆ Ensure that the audio cable is firmly connected to both the audio-in port on your monitor and the audio-out port on your sound card. ◆ Check the volume level.
Sound level is too low	◆ Check the volume level. ◆ If the volume is still too low after turning the control to its maximum, check the volume control on the computer sound card or software program.
Snowy picture	◆ The aerial lead-in may be broken or disconnected.
Remote control does not work	◆ The battery in the remote control may be exhausted. ◆ The battery may be improperly installed. ◆ Check that there is no obstruction between the remote control and the remote (infrared) sensor. ◆ Check that a strong light is shining on the remote (infrared) sensor.

4. Assembling and disassembling the mechanism unit

SEE THE PIECE OF PAPER COME WITH THE MANUAL.

5. Test Scheme for LT1703S/LT2003S

Description of purpose of the test scheme:

The electric functional part of LT1703S/LT2003S LCD color TV set is composed of driving board, audio and video board, control key board and backlight power supply board. The backlight power supply is a bought module and the supplier and IQC of our company will check its function and consistency together; the other functional boards are designed and manufactured by us. This test scheme will make a guiding criterion of test method for these modules machined and manufactured by us.

After testing of all the functional modules, the assembled machine will be tested completely so as to confirm the indexes of all performance to be qualified or not.

This test scheme is only a guiding document which can not replace the operating manual book for the production. The test scope of the operating manual book shall be adjusted according to the real practice. However, the key technique index must reach the requirement prescribed by this test scheme.

2. The test scheme for driving board and control key board

1) Testing equipments

- | | |
|-------------------------------------|-----------|
| A. FLUKE45 multimeter | one set |
| B. Special test host computer | one set |
| C. DVD player with SCART terminal | one set |
| D. Audio-board in perfect condition | one set |
| E. Testing frock | one piece |
| F. Remote controller | one piece |

2) Testing flow

A. Tested driving board into clamp and connect the control key board, then fulfill and affirm the related testing set-ups.

B. Switch on power, check the power supply voltage of +5、+3.3V、+2.5V boards by multimeter so as to affirm they are in normal status or not, then press key “POWER” on the control key board to start the machine.

C. Link the VGA signal outputted from computer to the tested driving board (or linked by the thimble of clamp), then switch to “VGA” state by remote controller or “SOURCE” key on the control key board.

D. Check the display quality of all display modes under VGA mode, the character shall be clear and without distinct jamming.

E. Activate the special “DisplayMate for Windows” test software and select the “Set up Display”, the exact requirements as follow① There isn't distinct jamming. on the tested pictures; ② All colors are in normal status; ③ The brightness and definition of pane picture of horizontal lines should be consistent with that of vertical lines; ④ The color of color stripe is correct and transition edge is clear; ⑤ The tested picture of DisplayMate Utilities is clear and arranged properly, focalized normally without distinct jamming.

F. Switch signal source to “AV” mode, start DVD Player and play the Panasonic demonstration disc so as to check the picture display quality under AV state, it is required that picture is stable, clear without distinct transverse and netted striation jamming.

G. Switch signal source to “S-Video” state, the items to be checked and requirements are as same as that of “AV” state.

H. Switch signal source to “SCART” mode, test the Video mode outputted by “SCART” under “CVBS” mode and “RGB” mode respectively. It is required that the picture is stable and clear without any jamming. At the same time, test the picture under RGB mode and it shall have advantage over that of CVBS mode. The identification of RGB of the machine is in normal state.

3) The qualified criterion and others

Only if the functions of all tested signal source channels have reached their related standards, the tested board shall be affirmed to be qualified, as to the board not qualified will be maintained and retested.

3. Testing of audio & video board

1) Testing equipments

A. FLUKE 54200 television signal generator	one set
B. HITACHI VC-6545 oscillograph	one set
C. Testing frock	one piece
D. Driving board in perfect condition	one piece
E. CATV antenna	one piece
F. TV set with AV input port	one set
G. 5MHz Twin channel audio oscillograph	one set
H. Remote controller	one piece

2) Testing flow

A. Put the tested audio & video board into clamp and link well signal connections of AV In/Out、S- Video 、TV、SCART (or linked by thimble of clamp). Install the related instruments and equipments and mark the often used fixed devices with symbol strip codes.

B. Switch LCD TV to TV receiving mode, set Pattern as “MULTI BURST”+“GREY SCALE”+“COLOR BAR”, test respectively the watching situation on the three frequency points of 48.25、168.25、471.25MHZ. It is required that under any Pattern mode, it can reach to the following statuses that the layer of Pattern is distinct, each grayscale is clear; the color of color strip is real and transition edge is clear; the brightness of each section of 0.5MHZ/1.0/2.0/4.0MHZ of the multi-wave are consistent with each other, they are so clearly that the vertical lines inside pane can be identified, and so do 4.8MHZ (this section shall be a little darker under that of TV mode).

C. Set the sound mode as BG under TV mode, activate NICAM option as well, then adjust RF level to 45dB, test respectively the sound quality of FM MONO/DUAL/STEREO on 48.25、168.25、471.25MHZ, it is required that sound is clear without distinct noise, for example crack.

D. Set Pattern as “MULTI BURST”, select one channel and input modes of AV、S-VIDEO、SCART, measure the wave profile between R908 and 7th-contact by oscillograph, as indicated in the attached chart hereafter, it is required that the synchronizing header pulse wave profile of CVBS signal is square wave and its range of amplitude is $0.3+0.05/-0.1V_{pmp}$. The range of amplitude of whole video frequency signal is $1.0\pm0.2V_{P-P}$; the range of amplitude of multi-wave at 4.0MHZ is as same as that of 1.0MHZ, the difference shall be $\leq 2dB$ (calculated according to $20lg V_{4.0}/V_{1.0}$), the value of amplitude at 4.0MHZ shall be prescribed by the project office.

E. Under TV mode, set RF level as 50dBμV and receive anyone of the above mentioned three frequencies. Awaiting until the normalization of pattern, then press “TEXT” key on remote controller, the related information of picture will appear; again press “INDEX” key to let picture return to the menu page; press

“CHANNEL+”key to select picture’s 101 pages, it will be refreshed page by page. Please observe the character or graphics of each refreshed page so as to confirm any imperfect character or image, it is required that less two pictures with imperfect character or image in each 10 pictures; please test respectively the functions of keys including “MIX”、“HOLD”、“CANCEL”、“SIZE”、“REVEAL” and “RED”、“GREEN”、“YELLOW”、“CYAN” and confirm them normal or not.

F. Under SCART mode, use 54200 “Video” edit key to enter edit menu of Video, select CVBS and RGB from “SCAROUT” column in order to observe the image quality of picture, the transition edge of RGB’s COLOR BAR shall be clear and frequency spectrum of multi-wave are clear and bright under the two modes of CVBS and RGB., the image quality in CABS mode is consistent with that of AV state, in the same time, please note that there is any sound outputted and the receiving status of TEXT in CABS mode.

G. Link 5MHz audio oscillograph to the output ports of loudspeaker, adjust RF signal with 1KHz audio frequency, tune up volume and let audio outputting wave profile be distorted just, then measure the peak value of wave profile, it is required that the value is not less than 10Vp-p.

H. Turn on /off the machine with “POWER” key on remote controller or control key board and confirm there is any “POP” noise while turning on/off it, there isn’t any abnormal color block, flashing and astigmatism on picture as well.

4. The test scheme for machine

1) Testing equipment

A. FLUKE	54200	one set
B. FLUKE	5418	one set
C. Special test host computer		one set
D. DVD Player		one set
E. TV set with AV input port		one set
F. CATV antenna		4 pieces
G. Remote controller		several pieces

2) Testing requirement

The testing requirement for the related functions of PC and audio & video are consistent with that of above mentioned boards; the switch testing shall be done between all modes under PC mode (the display mode of 640×480、800×600、1024×768(LT1703S)、1280×1024(LT1703S)), and there will be no any abnormal grating during the switching. The project office may arrange reasonably the testing stations according to exact status and change of capacity of the production line.

In addition, the color sensitivity and FM sound sensitivity also shall be tested while testing the receiving station of RF signal. The color sensitivity is $\leq 37\text{db}$ and FM sound sensitivity is $\leq 30\text{db}$.

As to the qualified finished products, the related indexes of at least two machines adopted in accordance with the sample standard shall be tested.

The testing form, please refer to the attached page.

As to those products largely for exportation, it is suggested herein that a related placement test EMC should be done.

6. IC BLOCK DIAGRAM & DESCRIPTION

6.1 RTD2020

6.1.1 FEATURES

General

- Integrated Spread-Spectrum DCLK PLL
- Integrated 8-bit triple-channel 140MHz ADC/PLL
- Integrated programmable timing controller
- Integrated microcontroller compatible with the standard 8032
- 24 General-purpose input/outputs (GPIOs)
- Embedded fully functional multi-language OSD support
- Embedded DDC supports DDC1, DDC2B, and DDC/CI
- Supports ISP functionality on DDC channel
- 3 Embedded programmable PWM
- Zoom scaling up and down
- Embedded Pattern Generator
- No external memory required
- Requires only one crystal to generate all timing

Analog RGB Input Interface

- Supports up to 140MHz (SXGA @ 75Hz)
- Supports Sync On Green (SOG) and de-composite sync modes
- On-chip high-performance PLLs

Digital Input Interface

- Supports 24-bit pixel digital input up to 160MHz
- Supports 12-bit DVO input
- Supports 16/24-bit YUV422/444 video format input
- Supports 8-bit video format input
- Built-in YUV to RGB color space converter & de-interlace
- Capture window auto position & auto phase tracking capability

Auto Detection /Auto Calibration

- Input format detection
- Compatibility with standard VESA mode and support for user-defined mode
- Smart engine for Phase and Image position calibration

Scaling

- Fully programmable zoom ratios
- Independent horizontal/vertical scaling
- Advanced zoom algorithm provides high image quality
- Sharpness/Smooth filter enhancement

Color Processor

- Digital brightness and contrast adjustments
- Gamma correction
- Dithering logic for 18-bit panel color depth enhancement

Output Interface

- Fully programmable, built-in display timing generator
- 1 and 2-pixel/clock panel support, up to 140MHz
- Pin swap, odd/even swap and red/blue group swap
- Programmable TCON function support
- Reduced EMI and Power saving features

Host Interface

- Supports 3/4 pins MCU serial bus interface
- Support parallel bus interface while using internal MCU

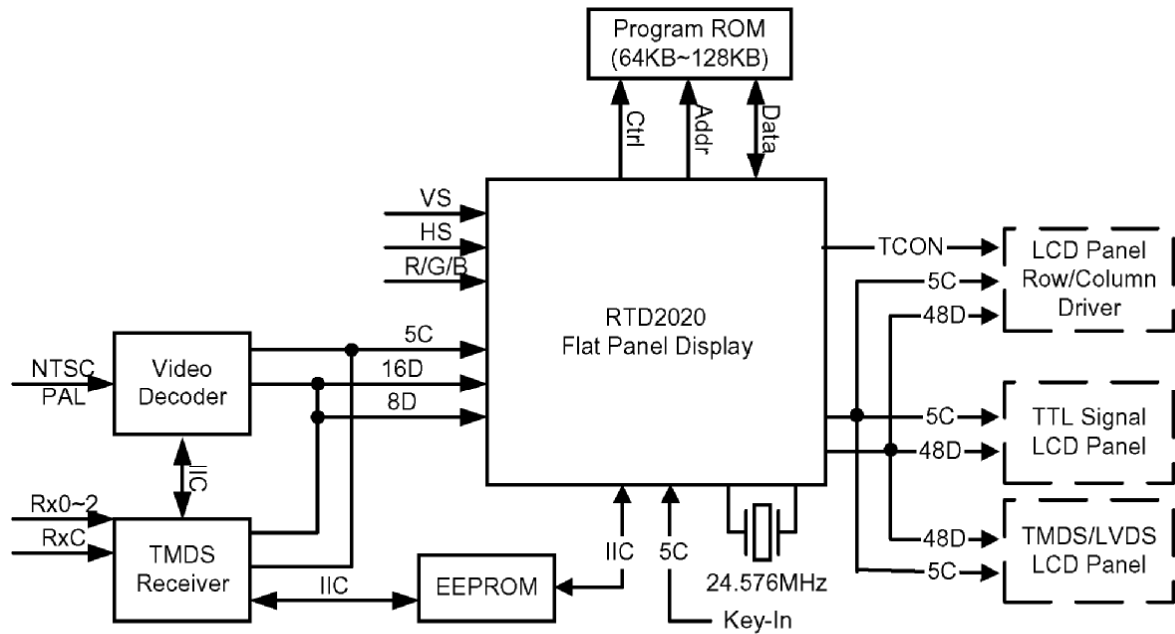
Embedded OSD

- 12*18 dot font per character
- Embedded 256 characters and symbols including 16 multi-color symbols
- User font RAM, which allows programming of 128 special symbols
- 7 background colors and 8 character colors
- Programmable width and height control
- 4 background windows
- Selectable shadow color for windows and characters
- Intensity, blinking effects
- Fade-in/out effect
- Frame shadowing and independent row shadowing
- Frame bordering and independent row bordering
- 4 channel 8-bits PWM output, and selectable PWM clock frequency
- Row-to-Row spacing to maintain constant display height
- Window alpha-blending effect

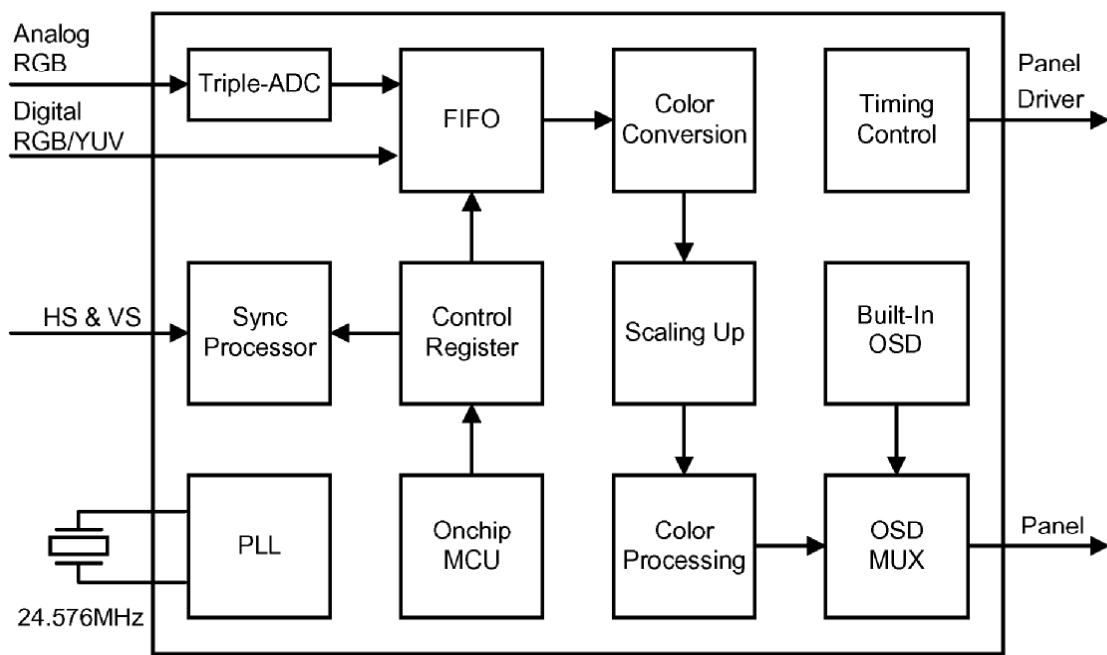
Power & Technology

- 2.5V/3.3V power supply
- 0.25μm CMOS process; 208-pin PQFP package

7.1.2 BLOCK DIAGRAM



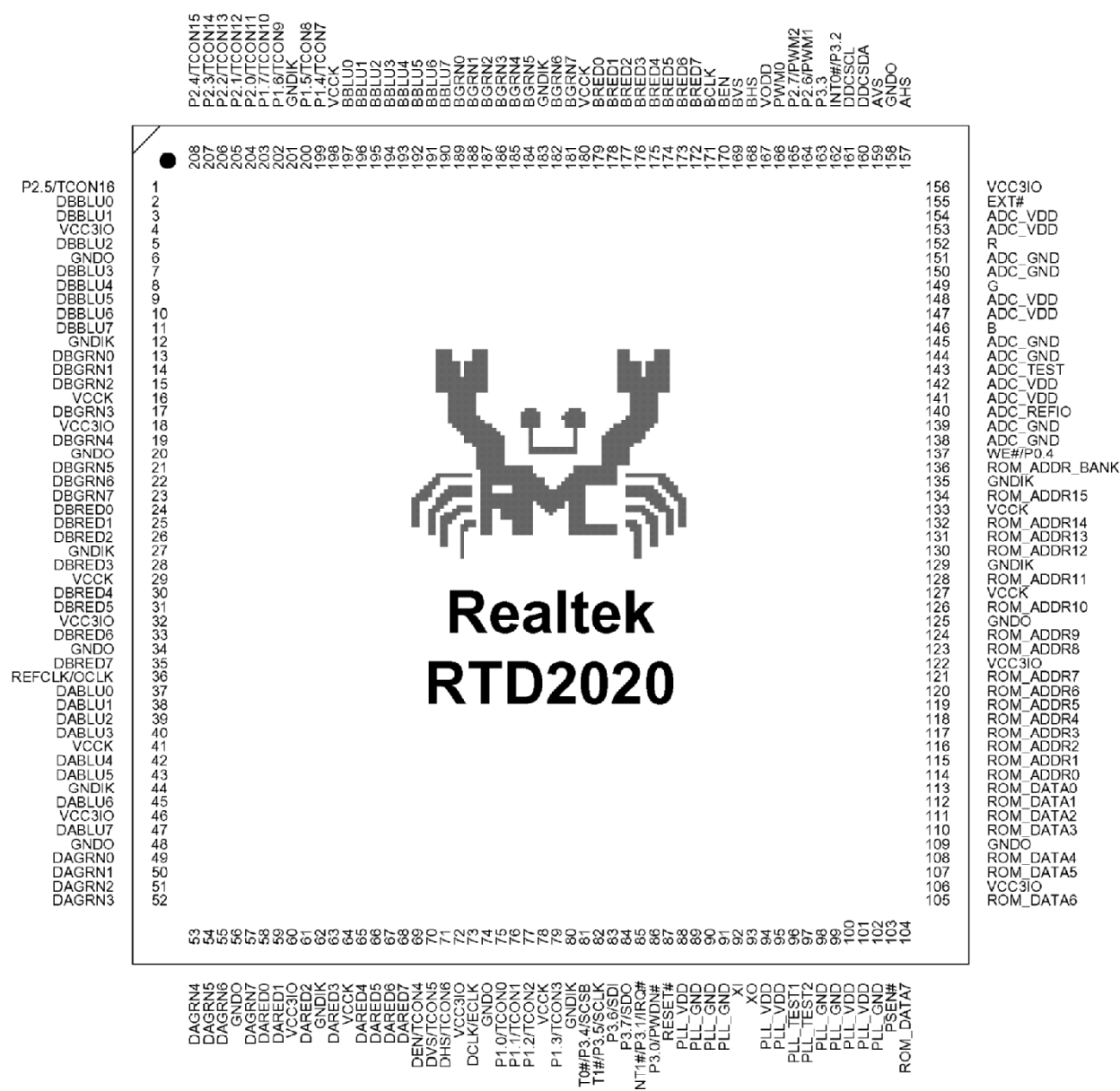
Application System Block Diagram



Flat Panel Display -- RTD2020

Chip Functional Block Diagram

7.1.3 PIN ASSIGNMENTS



RTD2020 Pin-Out Diagram

7.1.4 PIN DESCRIPTIONS

In order to reduce pin count, and therefore size and cost, some pins have multiple functions. In those cases, the functions are separated with a “/” symbol. Refer to the Pin Assignment diagram for a graphical representation.

A = Analog P = Power

I = Input G = Ground

O = Output

ADC

Name	Type	Pin No	Description
ADC_REFIO	AI	140	ADC Reference Pad
ADC_TEST	AIO	143	ADC Test Pin / SOG
B	AI	146	Analog Input from BLUE Channel
G	AI	149	Analog Input from GREEN Channel
R	AI	152	Analog Input from RED Channel
ADC_VDD	AP	141,142 147,148 153,154	ADC Analog Power
ADC_GND	AG	138,139 144,145 150,151	ADC Analog Ground
			Total: 17 Pins

PLL

Name	Type	Pin No	Description
XI	AI	92	Reference Clock Input
XO	AO	93	Reference Clock Output
PLL_TEST1	AIO	96	Test Pin 1
PLL_TEST2	AIO	97	Test Pin 2
PLL_VDD	AP	88,94 95,100 101	PLL Analog Power
PLL_GND	AG	89,90 91,98 99,102	PLL Analog Ground
			Total: 15 Pins

Control Interface

Name	Type	Pin No	Description
(EXT#=0): SCSB (EXT#=1): GPIO_P3.4	I I/O	81	Serial Control I/F Chip Select GPIO_P3.4 / T0#
(EXT#=0): SCLK (EXT#=1): GPIO_P3.5	I I/O	82	Serial Control I/F Clock GPIO_P3.5 / T1#
(EXT#=0): SDI (EXT#=1): GPIO_P3.6	I I/O	83	Serial Control I/F Data in GPIO_P3.6
(EXT#=0): SDO (EXT#=1): GPIO_P3.7	O I/O	84	Serial Control I/F Data out GPIO_P3.7
(EXT#=0): IRQ# (EXT#=1): GPIO_P3.1	O I/O	85	Controller's IRQ# Output; GPIO_P3.1 / INT#1
(EXT#=0): PWDN# (EXT#=1): GPIO_P3.0	I I/O	86	PowerDown# for Controller GPIO_P3.0
RESET#	I	87	(EXT#=0): RESET# for Controller; (EXT#=1): RESET# for MCU
			Total: 7 Pins

Digital Input

Name	Type	Pin No	Description
AHS	I	158	VGA-port Horizontal Sync
AVS	I	160	VGA-port Vertical Sync
VODD	I	167	Video ODD Signal
BHS	I	168	VGB-port Horizontal Sync
BVS	I	169	VGB-port Vertical Sync
BENA	I	170	VGB-port Input Data Enable
BCLK	I	171	VGB-port Input Clock
BRED/YIN [7:0] / DVODATA [11:4] / VIDEO8	I	172,173 174,175 176,177 178,179	VGB-port Input Data (Red/Y)
BGRN [7:0] / DVODATA [3:0]	I	181,182 184,185 186,187 188,189	VGB-port Input Data (Green)
BBLU/UVIN [7:0]	I	190,191 192,193 194,195 196,197	VGB-port Input Data (Blue/UV)
			Total: 31 Pins

Display Port

Name	Type	Pin No	Description
DCLK	O	73	Display clock; / TCON_ECLK
DHS	O	71	Display Horizontal Sync; / TCON_6
DVS	O	70	Display Vertical Sync; / TCON_5
DEN	O	69	Display Data Enable; / TCON_4
DARED [7:0]	O	68, 67, 66 65, 63, 61 59, 58	Display A-port RED Data
DAGRN [7:0]	O	57, 55, 54 53, 52, 51 50, 49	Display A-port GREEN Data
DABLU [7:0]	O	47, 45, 43 42, 40, 39 38, 37	Display A-port BLUE Data
DBRED [7:0]	O	35, 33, 31 30, 28, 26 25, 24	Display B-port RED Data
DBGRN [7:0]	O	23, 22, 21 19, 17, 15 14, 13	Display B-port GREEN Data
DBBLU [7:0]	O	11, 10, 9, 8 7, 5, 3, 2	Display B-port BLUE Data
			Total: 52 Pins

Miscellaneous Interface

Name	Type	Pin No	Description
REFCLK	IO	36	In/out Test Pin for DCLK; / TCON_OCLK
PWM_0	O	166	PWM_0 Output
			Total: 2 Pins

DDC Channel

Name	Type	Pin No	Description
DDCSDA	I O	156	DDC Serial Control I/F Data Input DDC Serial Control I/F Data Output
DDCSCL	I	161	DDC Serial Control I/F Clock
			Total: 2 Pins

Power & Ground

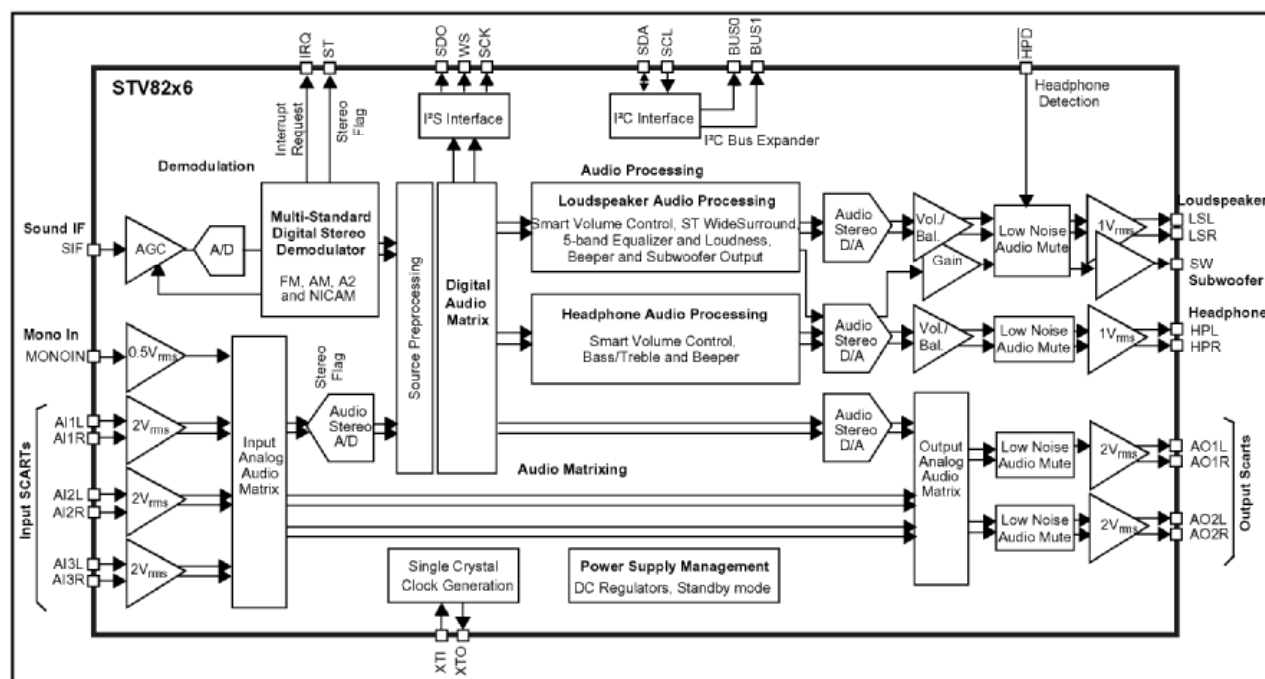
Name	Type	Pin No	Description
3.3V Power	P	4, 18 32, 46 60, 72 106, 122 157	VCC3IO: 9
3.3V Ground	G	6, 20 34, 48 56, 74 109, 125 159	GNDO: 9
2.5V Power	P	16, 29 41, 64 78, 127 133, 180 198	VCCK: 9
2.5V Ground	G	12, 27 44, 62 80, 129 135, 183 201	GNDIK: 9
			Total: 36 Pins

MCU Interface

Name	I/O	Pin No	Description
PSEN#	O	103	Program Load Enable
ROM_DATA [7:0]	I/O	104,105,107 108,110,111 112,113	ROM Data Input
ROM_ADDR [15:9]	O I	134,132,131 130,128,126 124	ROM Address Output DDC_CA latch
ROM_ADDR [8:0]	O	123,121,120 119,118,117 116,115,114	ROM Address Output
ROM_ADDR_BA NK	O	136	XDATA/PROG# Bank Select
GPIO_P0.4	I/O	137	GPIO_P0.4 / WR#
EXT#	I	155	External MCU, Internal MCU Disable
GPIO_P1.0	I/O	75	GPIO_P1.0 / TCON_0
GPIO_P1.1	I/O	76	GPIO_P1.1 / TCON_1
GPIO_P1.2	I/O	77	GPIO_P1.3 / TCON_2
GPIO_P1.3	I/O	79	GPIO_P1.3 / TCON_3
GPIO_P1.4	I/O	199	GPIO_P1.4 / TCON_7
GPIO_P1.5	I/O	200	GPIO_P1.5 / TCON_8
GPIO_P1.6	I/O	202	GPIO_P1.6 / TCON_9
GPIO_P1.7	I/O	203	GPIO_P1.7 / TCON_10
GPIO_P2.0	I/O	204	GPIO_P2.0 / TCON_11
GPIO_P2.1	I/O	205	GPIO_P2.1 / TCON_12
GPIO_P2.2	I/O	206	GPIO_P2.2 / TCON_13
GPIO_P2.3	I/O	207	GPIO_P2.3 / TCON_14
GPIO_P2.4	I/O	208	GPIO_P2.4 / TCON_15
GPIO_P2.5	I/O	1	GPIO_P2.5 / TCON_16
GPIO_P2.6	I/O	164	GPIO_P2.6 / PWM1
GPIO_P2.7	I/O	165	GPIO_P2.7 / PWM2
(EXT# =0): PWDN# (EXT# =1): GPIO_P3.0	I I/O	Share	PowerDown# for Controller GPIO_P3.0
(EXT# =0): IRQ# (EXT# =1): GPIO_P3.1	O I/O	Share	Controller's IRQ# output; GPIO_P3.1 / INT1#
GPIO_P3.2	I/O	162	GPIO_P3.2 / INT0#
GPIO_P3.3	I/O	163	GPIO_P3.3
(EXT# =0): SCSB (EXT# =1): GPIO_P3.4	I I/O	Share	Serial control I/F chip select GPIO_P3.4 / T0#
(EXT# =0): SCLK (EXT# =1): GPIO_P3.5	I I/O	Share	Serial control I/F clock GPIO_P3.5 / T1#
(EXT# =0): SDI (EXT# =1): GPIO_P3.6	I I/O	Share	Serial control I/F data in GPIO_P3.6
(EXT# =0): SDO (EXT# =1): GPIO_P3.7	O I/O	Share	Serial control I/F data out GPIO_P3.7
			Total: 46 pins (6 share)

7.2 STV82x6

Multistandard TV Audio Processor and Digital Sound Demodulator



*This device incorporates the
SRS (Sound Retrieval
System) under licence from
SRS Labs, Inc.*

Key Features

- NICAM, AM, FM Mono and FM 2 Carrier Stereo Demodulators for all sound carriers between 4.5 and 7 MHz
- Mono input provided for optimum AM Demodulation performances
- Demodulation controlled by Automatic Standard Recognition System
- Sound IF AGC with wide range
- Overmodulation and Carrier Offset recovery
- Smart Volume Control
- 5-band Equalizer & Bass/Treble Control
- Automatic Loudness Control
- Loudspeaker and Headphone outputs with Volume/Balance Controls and Beeper
- Subwoofer output with Volume Control and Programmable Bandwidth
- Spatial Sound Effects (ST WideSurround and Pseudo-Stereo)
- SRS® 3D Surround
- 3-to-2 Analog Stereo Audio I/Os (SCART compatible) with Audio Matrix
- Low-noise Audio Mutes and Switches
- I²S Output to interface with Dolby® Pro Logic® Decoder
- I²C Bus-controlled
- Single and standard 27 MHz Crystal Oscillator
- Power supplies: 3.3 V Digital, 5 V or 8 V Analog
- Embedded 3.3 V Regulators
- Packages: SDIP56 or TQFP80

Table 1: STV82x6 Version List

Feature	STV8206	STV8216	STV8226	STV8236
AM-FM Mono	X	X	X	X
Zweiton	X	X	X	X
NICAM		X		X
ST WideSurround	X	X	X	X
SRS® 3D Surround			X	X

I/O Pin Description

Legend / Abbreviations for [Table 2](#):

Type:

- AP = Analog Power Supply
- DP = Digital Power Supply
- I = Input
- O = Output
- OD = Open Drain
- B = Bidirectional
- A = Analog

Table 2: Pin Description

SDIP 56	TQFP 80	Name	Type	Function
1	73	SIF	A	Sound IF Input
2	74	VTOP	A	ADC V_{TOP} Decoupling Pin
3	75	VREFIF	A	AGC Voltage Reference Decoupling Pin
4	76	VDDIF	AP	3.3 V Power Supply for IF AGC & ADC
5	77	GNDIF	AP	0 V Power Supply for IF AGC & ADC
6	78	MONOIN	A	Mono Input
	79/80	N/C		Not Used
7	1	AO1L	A	Left SCART1 Audio Output
8	2	AO1R	A	Right SCART1 Audio Output
-	3/4/5/6	N/C		Not used
9	7	VDDC	AP	3.3 V Power Supply for Audio DAC/ADC
10	8	GNDC	AP	0 V Power Supply for DAC/ADC
11	9	AI1L	A	Left SCART1 Audio Input
12	10	AI1R	A	Right SCART1 Audio Input
13	11	VMC1	A	Switched V_{REF} Decoupling Pin for Audio Converters (VMCP)
14	13	VMC2	A	V_{REF} Decoupling Pin for Audio Converters (VMC)
15	14	AI2L	A	Left SCART2 Audio Input
16	15	AI2R	A	Right SCART2 Audio Input
17	16	VDDA	AP	3.3 V Power Supply for Audio Buffers, Matrix & Bias
18	17	GNDAH	AP	0 V Power Supply for Audio Buffers & SCART
19	18	AO2L	A	Left SCART2 Audio Output
20	19	AO2R	A	Right SCART2 Audio Output
21	20	VDDH	AP	8 V / 5 V Power Supply for SCART & Audio Buffers
-	21	N/C		Not Used
22	22	VREFA	A	Voltage Reference for Audio Buffers
23	23	AI3L	A	Left SCART3 Audio Input
24	24	AI3R	A	Right SCART3 Audio Input
-	25	N/C		Not Used
25	26	BGAP	A	Bandgap Voltage Source Decoupling
-	27	N/C		Not Used

Table 2: Pin Description (Continued)

SDIP 56	TQFP 80	Name	Type	Function
26	28	LSL	A	Left Loudspeaker Output
27	29	LSR	A	Right Loudspeaker Output
28	30	SW	A	Subwoofer Output
29	31	HPL	A	Left Headphone Output
30	32	HPR	A	Right Headphone Output
31	33	GNDSA	AP	Substrate Analog/Digital Shield
-	34	N/C		Not Used
32	35	HPD	B	Headphone Detection Input (Active Low)
33	36	ADR	I	Hardware I ² C Chip Address Control
-	37/38	N/C		Not Used
34	39	SCL	OD	I ² C Serial Clock
35	40	SDA	OD	I ² C Serial Data
-	41	N/C		Not Used
36	42	REG	A	5 V Power Regulator Control
37	43	RESET	I	Hardware Reset (Active Low)
38	44	SYSCK	B	System Clock Output
39	45	MCK	B	I ² S Master Clock Output
40	46	VDD1	DP	3.3V Power Supply for Digital Core & IO Cells
41	47	GND1	DP	0V Power Supply for Digital Core & IO Cells
-	48	N/C		Not Used
42	49	GNDSP	AP	Substrate Analog/Digital Shield for Clock-PLL
	50/51	N/C		Not Used
43	52	XTI	I	Crystal Oscillator Input
44	53	XTO	O	Crystal Oscillator Output
45	54	VDDP	AP	3.3 V Power Supply for Analog PLL Clock
46	55	GNDP	AP	0 V Power Supply for Analog PLL Clock
47	56	GND2	DP	0 V Power Supply for Digital Core, DSPs & IO Cells
48	57	VDD2	DP	3.3 V Power Supply for Digital Core, DSPs & IO Cells
49	58	CKTST	I	Must be Connected to 0 V
-	59/60	N/C		Not Used
50	61	SDO	B	I ² S Bus Data Output
51	62	ST/SDI	B	Stereo Detection Output / I ² S Bus Data Input
52	63	WS	B	I ² S Bus Word Select Output
53	64	SCK	B	I ² S Bus Clock Output
54	65	BUS1	B	I ² C Bus Expander Output 1
-	66/67	N/C		Not Used
55	68	BUS0	B	I ² C Bus Expander Output 2
56	69	IRQ	B	I ² C Status Read Request
-	70	N/C		Not Used
-	71	N/C		Not Used
-	72	N/C		Not Used

1. Introduction

1.1 Features

- Single chip Teletext system with Integrated digital data slicer.
- Ten pages of on-chip display RAM.
- Multi-alphabet solution : Latin, Cyrillic, Arabic and Greek.
- Minimum software requirement.
- Automatic Full Level One Features (FLOF) & Table Of Pages (TOP) decoding.
- Flicker-free packet 26 processing on chip.
- Program delivery control (PDC).
- Menu page capability.
- Instantaneous page memory clear.
- Two Digital PLLs to manage the composite synchronization signal.
- Backward Software Compatible with other ET Teletext solutions.
- Direct access to subtitles.
- VPS data decoding.
- WSS data capture and store.

1.2 Description

The ET-TVT0310A device is a ten page intelligent single-chip Teletext decoder for use with 625 line TV transmissions having Teletext in the Vertical Blanking Interval (VBI). The device integrates an on-chip digital data slicer and a decoder to provide a flexible Teletext solution incorporating internal software to implement FLOF and TOP Teletext decoding automatically. Additionally, the ET-TVT0310A supports decoding of Video Programming System (VPS) signals, and Wide Screen Signaling (WSS) data capture and storage.

The ET-TVT0310A is part of the ET Teletext family of devices. This chip supports all the languages of the ET family of devices comprising the Latin, Cyrillic, Arabic and Greek alphabets. A full list of languages supported is shown on Page 16.

On-chip processing of packet 26 characters (flicker free) is automatically implemented as required. All Teletext including packet 26 is processed in 'real time' without the need for any additional memory. This allows the decoder to store up to ten pages of Teletext irrespective of the language selected and the mode of operation. The decoder is controlled by an on-chip 11.5 MIPS micro-coded processor which manages all the Teletext processing requirements, including ghost row processing and TOP table processing. The output of the device is RGB and blanking signals.

Device management is by simple high level commands for most features. The commands are described in the Software Application Guide and allow the TV micro-controller to communicate with ET-TVT0310A through an I2C interface. These commands have been designed to give a backward software compatibility between the single chip ET-TVT0310A and two chip solutions (e.g. ET206 + ET417).

In addition to the FLOF and TOP modes, the ET-TVT0310A decoder has a default Normal mode for any TV channel that is not transmitting FLOF or TOP. The decoder is ideally suited to VCR applications as it is able to receive and decode PDC information from packets 26 and 8/30 and store this information inside the decoder. In this mode of operation, memory can also be assigned for menu pages (pages downloaded from main microprocessor).

2. Internal block diagram of the ET-TVT0310A device

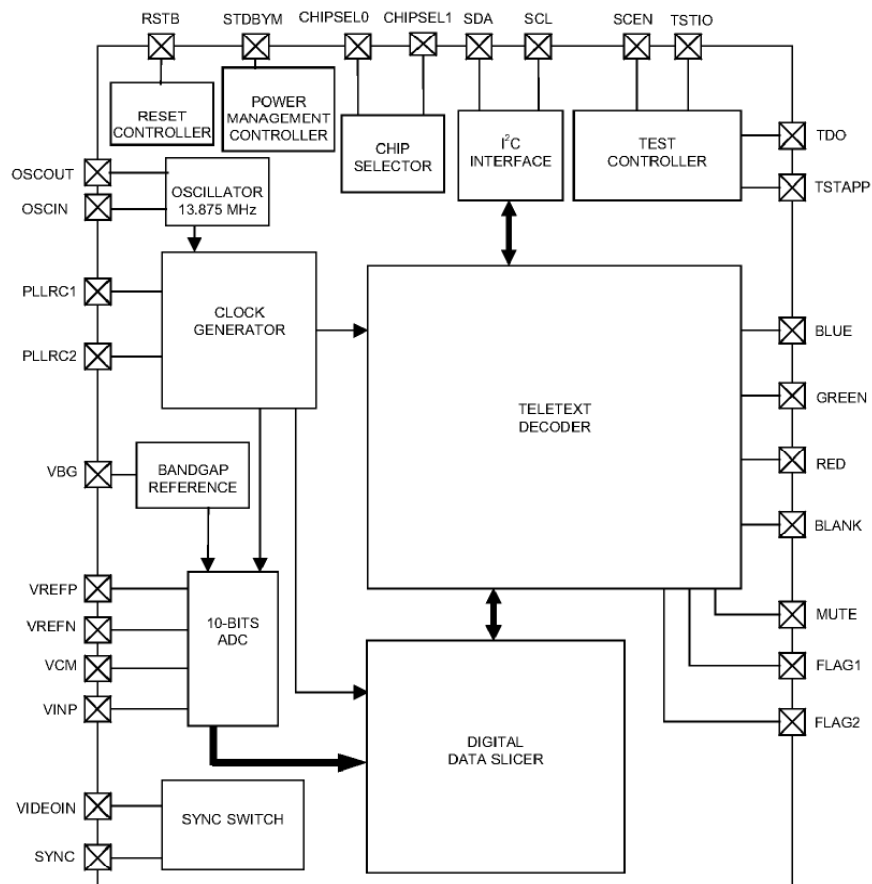
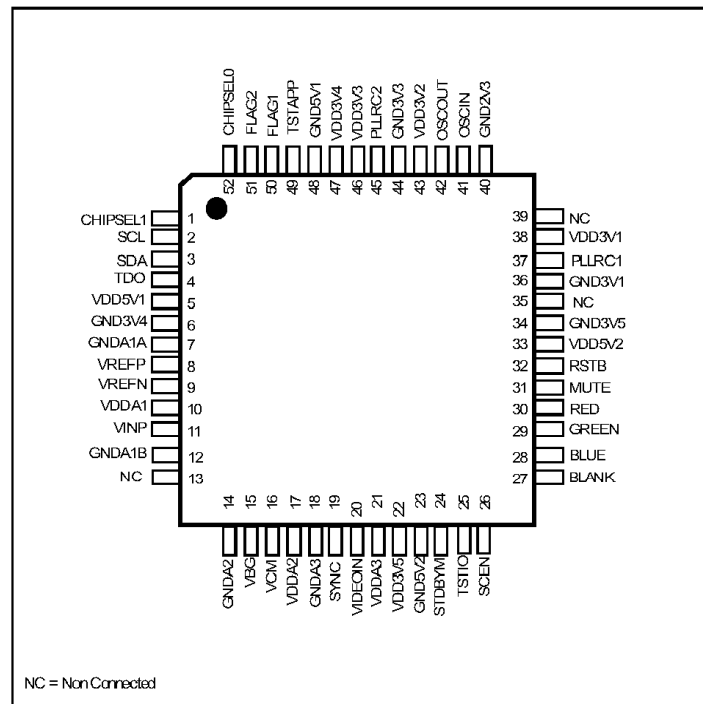


Figure 1: Internal bloc diagram

3. PINGOUT

Name	Type	Description
VDD5V1, VDD5V2	Power	Digital power supply.
VDD3V1, VDD3V2, VDD3V3, VDD3V4, VDD3V5	Power	Digital power supply.
VDDA1, VDDA2, VDDA3	Power	Analog power supply.
GND5V1, GND5V2	Power	Digital ground.
GND4A1, GND4A2, GND4A3, GND4A4	Power	Analog ground.
GND3V1, GND3V2, GND3V3, GND3V4, GND3V5	Power	Digital ground.
CHIPSEL0	Input	LSB of the chip select bus (see Table 9).
CHIPSEL1	Input	MSB of the chip select bus (see Table 9).
STDBYM	Input	Standby pin : active low.
RSTB	Input	Reset pin : active low. Internal pull-up to VDD5Vx
PLLRC1	Input	PLL1 input.
PLLRC2	Input	PLL2 input.
OSCIN	Input	Oscillator input.
TSTIO	Input	If TSTIO is high, RED, GREEN, BLUE, BLANK, MUTE are in high impedance state when ET-TVT0310A is in picture mode. If TSTIO is low, those outputs are active low when ET-TVT0310A is in picture mode.
SCEN	Input	Test pin. Must be always set to low.
TSTAPP	Input	Test pin. Must be always set to low.
VINP	Input	Analog input for video.
VIDEOIN	Input	Analog VIDEO input which is connected to SYNC when ET-TVT0310A is not in text mode.
SYNC	Output	Digital composite synchronization generated by ET-TVT0310A in text mode and VIDEOIN in other modes.
BLANK	Output	Blanking signal. This pin is high when teletext information is displayed on RGB lines.
BLUE	Output	Display signal.
GREEN	Output	Display signal.
RED	Output	Display signal.
MUTE	Output	Audio mute control. This signal is low when just text is display on the screen and bad video is detected. It is intended to be connected to the TV audio muting circuit.
OSCOUT	Output	Oscillator output.
TDO	Output	Test pin. Not connected.
VREFP	Output	Reference output voltage.
VREFN	Output	Reference output voltage.
VBG	Output	Reference output voltage.
VCM	Bi-directional	Input/output for common mode voltage decoupling and bypassing.
SCL	Bi-directional	I ² C clock line. Open drain pin.
SDA	Bi-directional	I ² C data line. Open drain pin.
FLAG1	Bi-directional	System information. User can configure this pin using the I ² C commands to output Line23 flag.
FLAG2	Bi-directional	System information. User can configure this pin using the I ² C commands to output ODD/EVEN field flag.

Packages top view



7.4 SN75LVDS83 FLATLINK TRANSMITTER

SLLS271D – MARCH 1997 – REVISED MAY 2001

- 28:4 Data Channel Compression at up to 227.5 Million Bytes per Second Throughput
- Suited for SVGA, XGA, or SXGA Display Data Transmission From Controller to Display With Very Low EMI
- 28 Data Channels and Clock-In Low-Voltage TTL
- 4 Data Channels and Clock-Out Low-Voltage Differential
- Operates From a Single 3.3-V Supply With 250 mW (Typ)
- ESD Protection Exceeds 6 kV
- 5-V Tolerant Data Inputs
- Selectable Rising or Falling Edge-Triggered Inputs
- Packaged in Thin Shrink Small-Outline Package With 20-Mil Terminal Pitch
- Consumes Less Than 1 mW When Disabled
- Wide Phase-Lock Input Frequency Range . . . 20 MHz to 68 MHz
- No External Components Required for PLL
- Outputs Meet or Exceed the Requirements of ANSI EIA/TIA-644 Standard
- Improved Replacement for the DS90C581

description

The SN75LVDS83 FlatLink transmitter contains four 7-bit parallel-load serial-out shift registers, a 7× clock synthesizer, and five low-voltage differential-signaling (LVDS) line drivers in a single integrated circuit. These functions allow 28 bits of single-ended low-voltage TTL (LVTTTL) data to be synchronously transmitted over five balanced-pair conductors for receipt by a compatible receiver, such as the SN75LVDS82. The SN75LVDS83 can also be used in 21-bit links with the SN75LVDS86 receiver.

When transmitting, data bits D0 through D27 are each loaded into registers upon the edge of the input clock signal (CLKIN). The rising or falling edge of the clock can be selected by way of the clock select (CLKSEL) terminal. The frequency of CLKIN is multiplied seven times (7×) and then used to unload the data registers in 7-bit slices and serially. The four serial streams and a phase-locked clock (CLKOUT) are then output to LVDS output drivers. The frequency of CLKOUT is the same as the input clock, CLKIN.

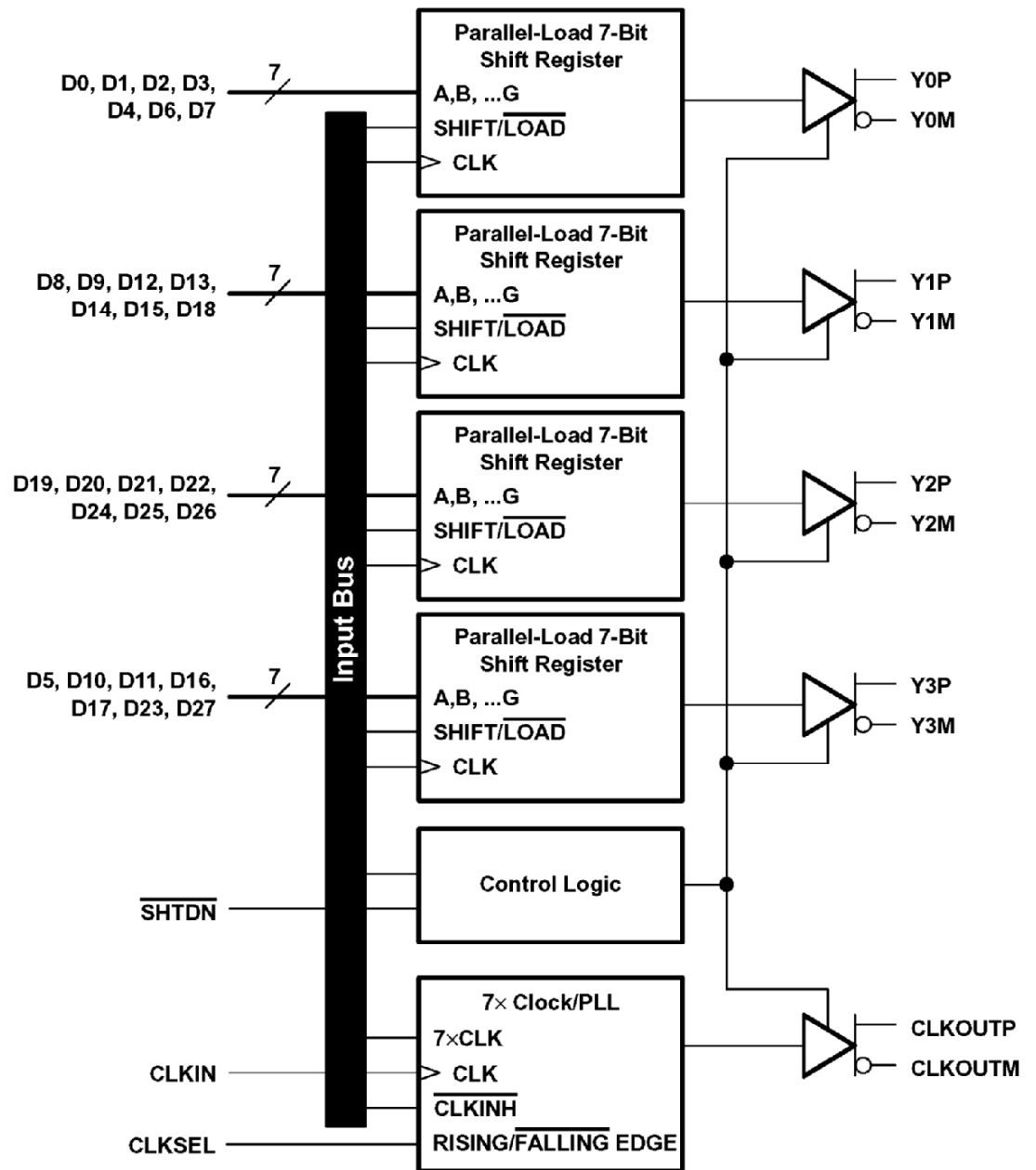
The SN75LVDS83 requires no external components and little or no control. The data bus appears the same at the input to the transmitter and output of the receiver with the data transmission transparent to the user. The only user intervention is the possible use of the shutdown/clear ($\overline{\text{SHTDN}}$) active-low input to inhibit the clock and shut off the LVDS output drivers for lower power consumption. A low-level signal on $\overline{\text{SHTDN}}$ clears all internal registers to a low level.

The SN75LVDS83 is characterized for operation over free-air temperature ranges of 0°C to 70°C.

DGG PACKAGE (TOP VIEW)

V _{CC}	1	56	D4
D5	2	55	D3
D6	3	54	D2
D7	4	53	GND
GND	5	52	D1
D8	6	51	D0
D9	7	50	D27
D10	8	49	LVDSGND
V _{CC}	9	48	Y0M
D11	10	47	Y0P
D12	11	46	Y1M
D13	12	45	Y1P
GND	13	44	LVDSV _{CC}
D14	14	43	LVDSGND
D15	15	42	Y2M
D16	16	41	Y2P
CLKSEL	17	40	CLKOUTM
D17	18	39	CLKOUTP
D18	19	38	Y3M
D19	20	37	Y3P
GND	21	36	LVDSGND
D20	22	35	PLL _{GND}
D21	23	34	PLL _{V_{CC}}
D22	24	33	PLL _{GND}
D23	25	32	$\overline{\text{SHTDN}}$
V _{CC}	26	31	CLKIN
D24	27	30	D26
D25	28	29	GND

functional block diagram



7.5 LM4950

7.5W Mono-BTL or 3.1W Stereo Audio Power Amplifier

General Description

The LM4950 is a dual audio power amplifier primarily designed for demanding applications in flat panel monitors and TV's. It is capable of delivering 3.1 watts per channel to a 4Ω single-ended load with less than 1% THD+N or 7.5 watts mono BTL to an 8Ω load, with less than 10% THD+N from a $12V_{DC}$ power supply.

Boomer audio power amplifiers were designed specifically to provide high quality output power with a minimal amount of external components. The LM4950 does not require bootstrap capacitors or snubber circuits. Therefore, it is ideally suited for display applications requiring high power and minimal size.

The LM4950 features a low-power consumption active-low shutdown mode. Additionally, the LM4950 features an internal thermal shutdown protection mechanism along with short circuit protection.

The LM4950 contains advanced pop & click circuitry that eliminates noises which would otherwise occur during turn-on and turn-off transitions.

The LM4950 is a unity-gain stable and can be configured by external gain-setting resistors.

Key Specifications

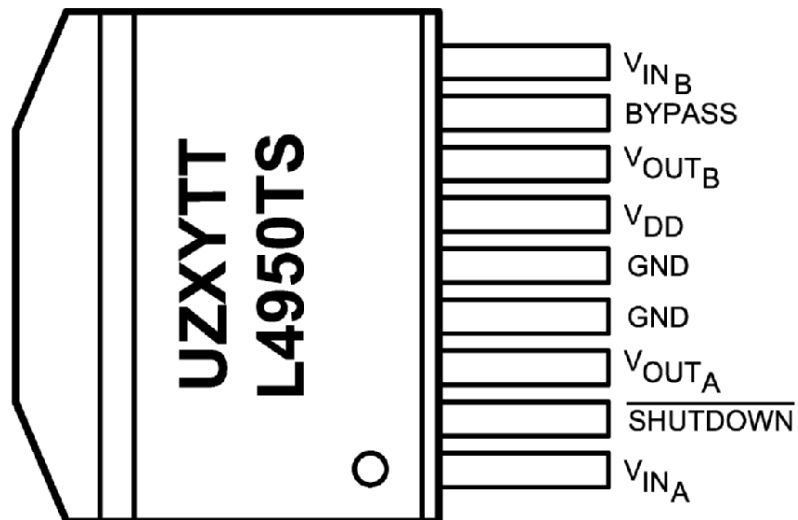
■ Quiescent Power Supply Current	16mA (typ)
■ P_{OUT} (SE)	
$V_{DD} = 12V, R_L = 4\Omega, 1\% \text{ THD+N}$	3.1W (typ)
■ P_{OUT} (BTL)	
$V_{DD} = 12V, R_L = 8\Omega, 10\% \text{ THD+N}$	7.5W (typ)
■ Shutdown current	40 μ A (typ)

Features

- Pop & click circuitry eliminates noise during turn-on and turn-off transitions
- Low current, active-low shutdown mode
- Low quiescent current
- Stereo 3.1W output, $R_L = 4\Omega$
- Mono 7.5W BTL output, $R_L = 8\Omega$
- Short circuit protection
- Unity-gain stable
- External gain configuration capability

Connection Diagrams

Plastic Package, TO-263

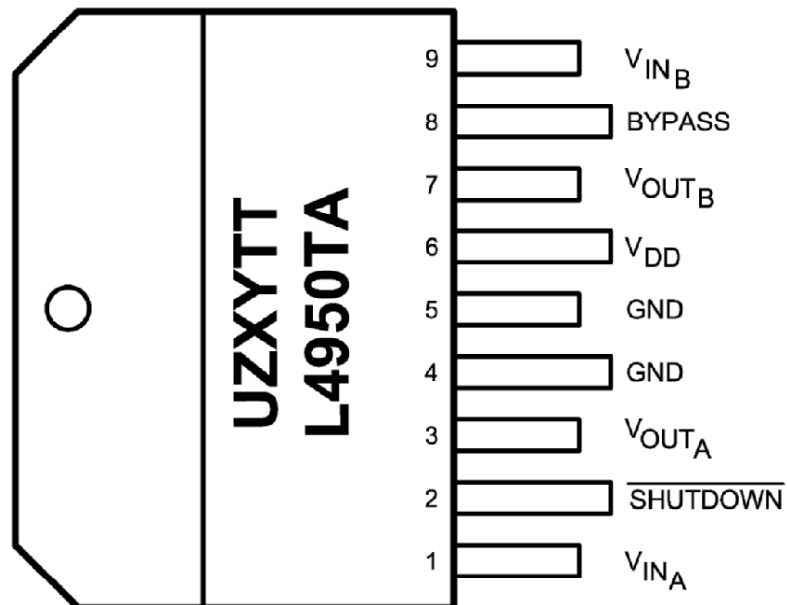


20047070

Top View

U = Wafer Fab Code
 Z = Assembly Plant Code
 XY = Date Code
 TT = Die Traceability
 Order Number LM4950TS
 See NS Package Number TS9A

Plastic Package, TO-220



20047071

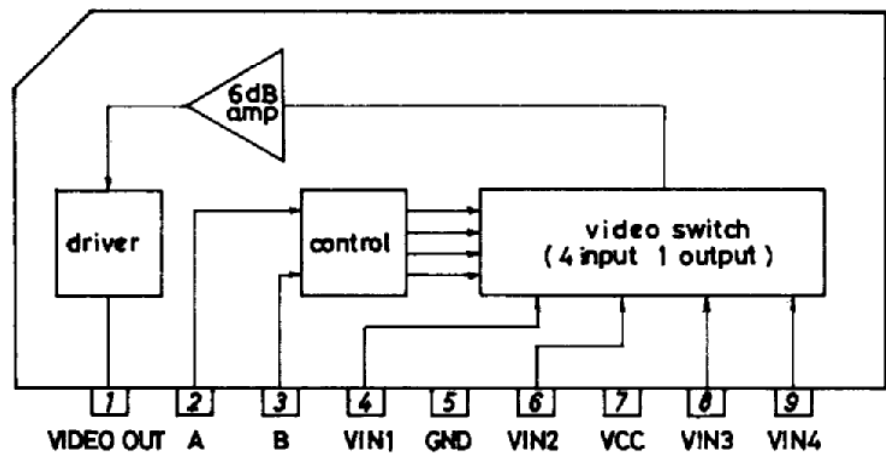
Top View

U = Wafer Fab Code
 Z = Assembly Plant Code
 XY = Date Code
 TT = Die Traceability
 Order Number LM4950TA
 See NS Package Number TA09A

Features

- On-chip driver with 4 inputs, 1 output, 75Ω termination.
- On-chip 6dB amplifier.
- Excellent crosstalk characteristic.
- Wide band.
- Input with DC restoration circuit.

Equivalent Circuit Block Diagram



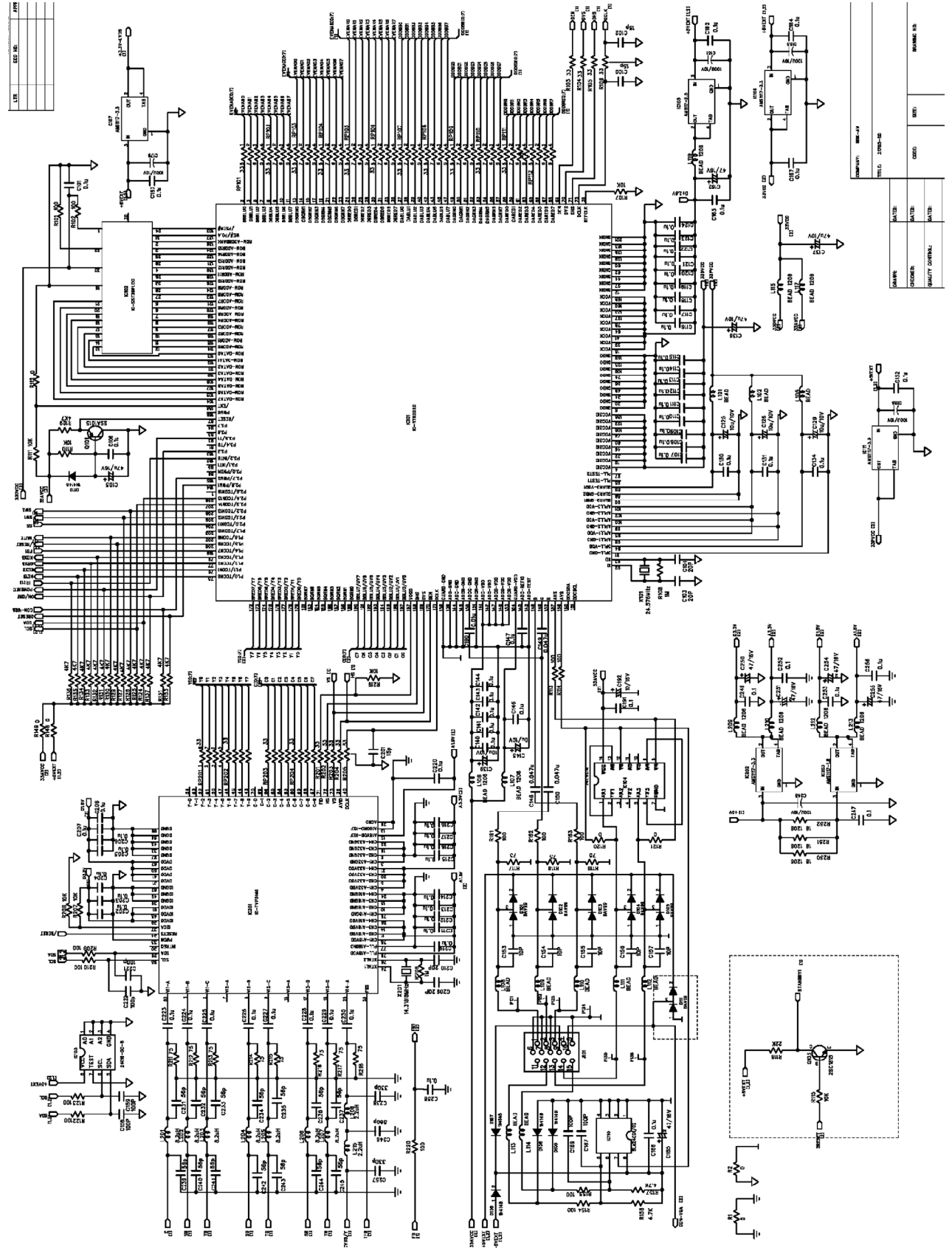
Video Switch Truth Table

S2 (Pin 2)	S3 (Pin 3)	V _{IN1} (Pin 4)	V _{IN2} (Pin 6)	V _{IN3} (Pin 8)	V _{IN4} (Pin 9)
H	H	ON	OFF	OFF	OFF
L	H	OFF	ON	OFF	OFF
H	L	OFF	OFF	ON	OFF
L	L	OFF	OFF	OFF	ON

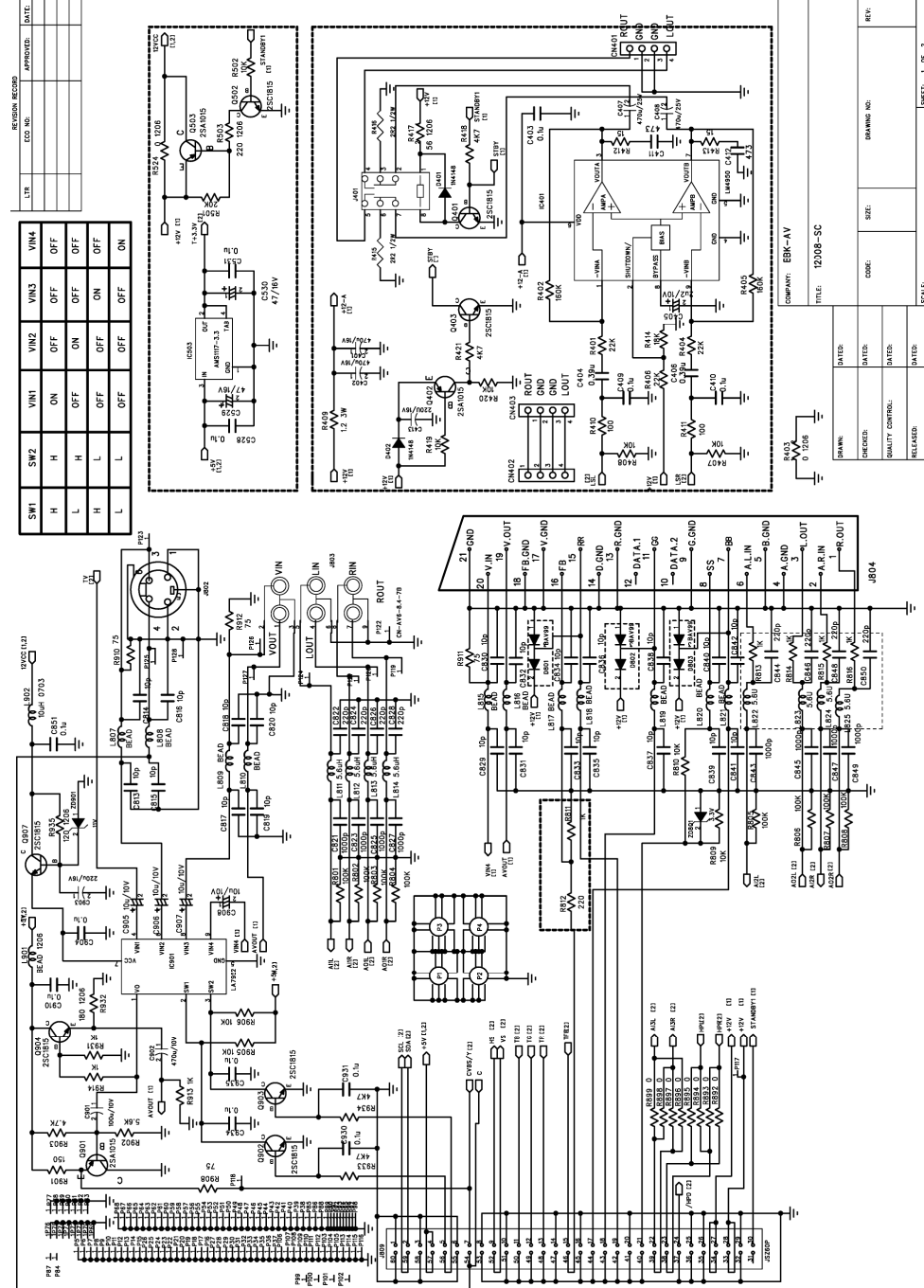
Note 1 : Refer to this Truth Table and make measurements by switching S2, S3.

7. SCHEMATIC & P.C.B WIRING DIAGRAM

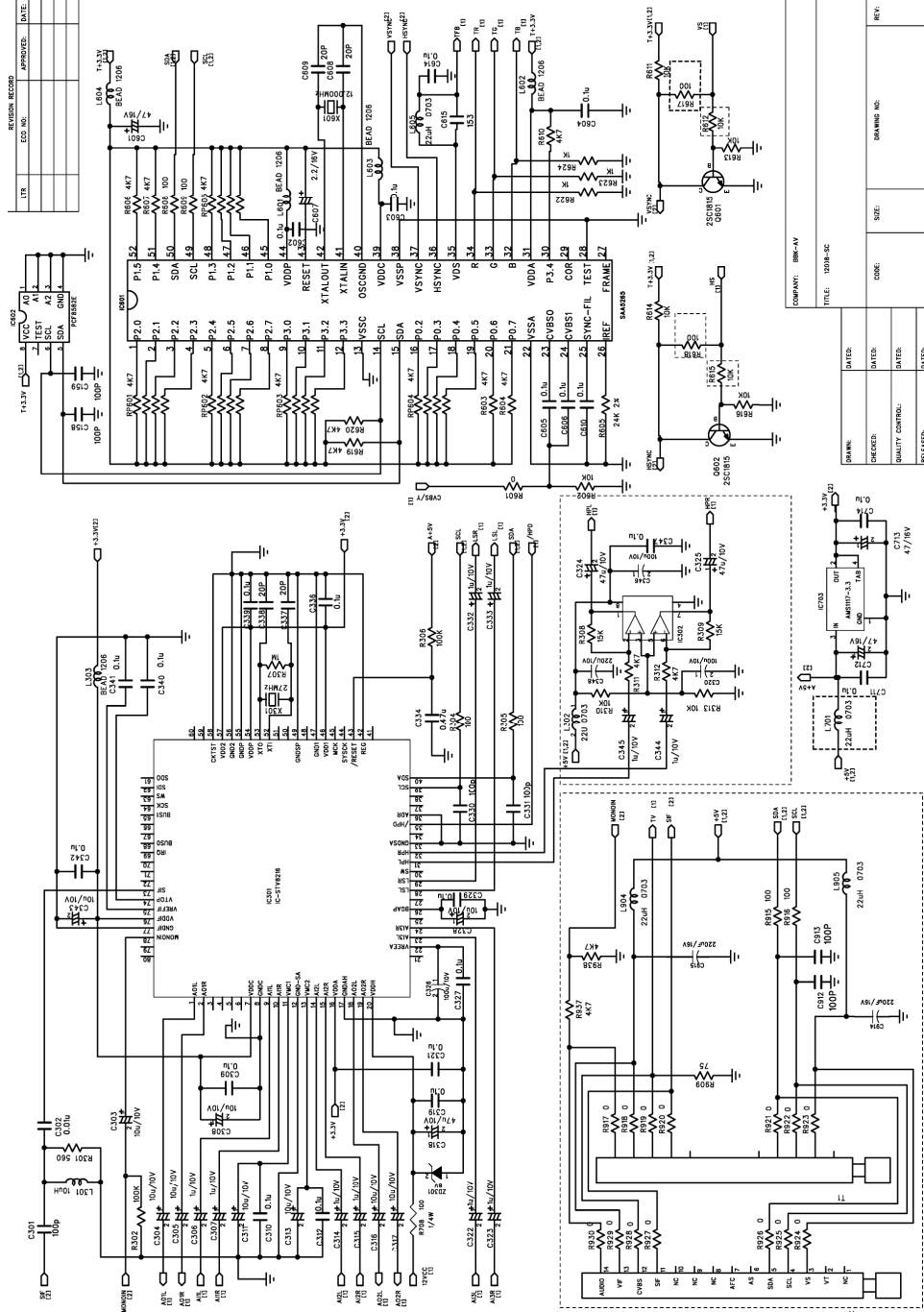
MAINBOARD FOR LT1703



AV BOARD FOR LT1703S AND LT2003S

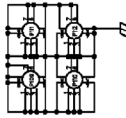


TELETEXT AND AUDIO DECODE BOARD FOR LT1703S AND LT2003S

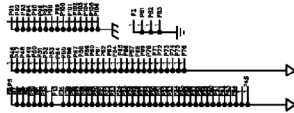


LVDS BOARD FOR LT1703S

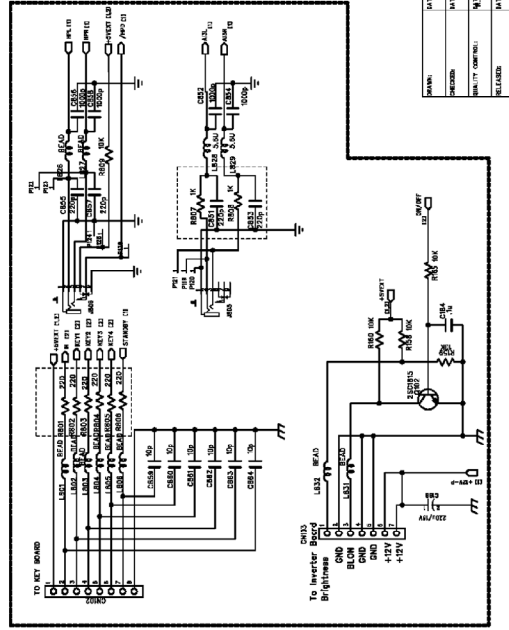
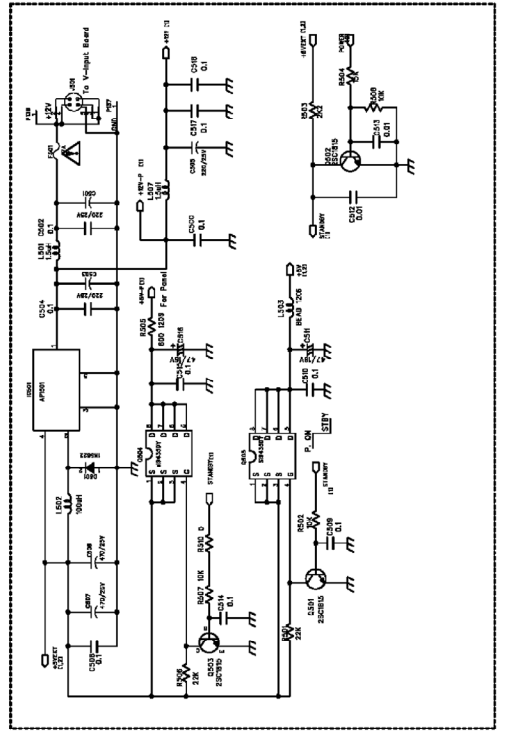
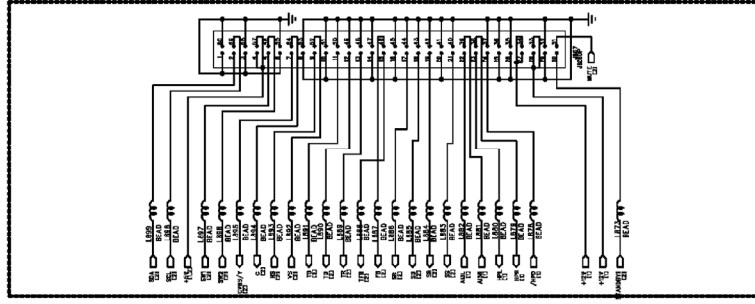
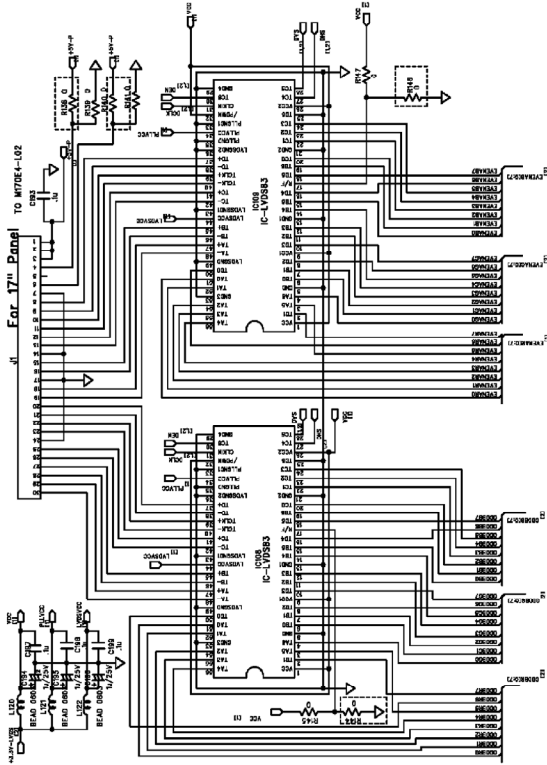
REV	DESCRIPTION	DATE
1.0	REVISED	10/12/00



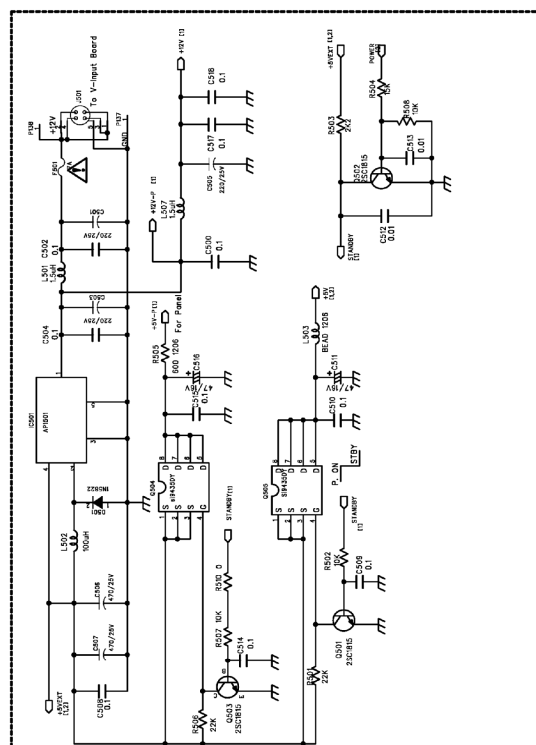
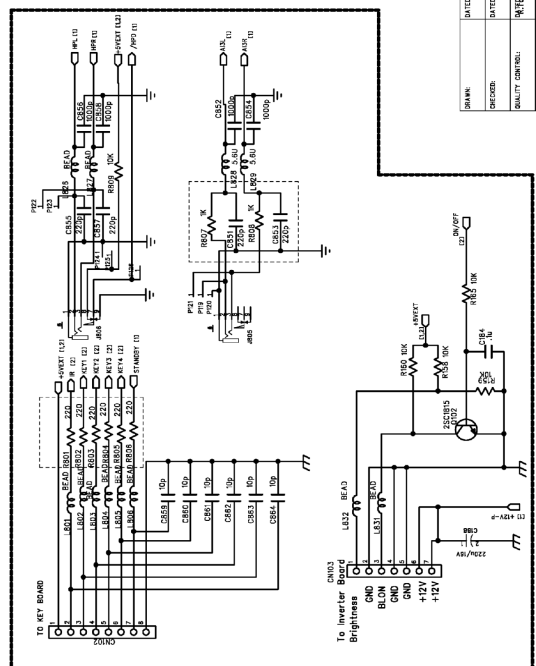
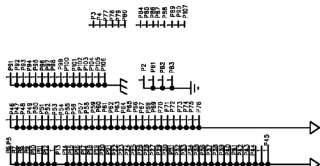
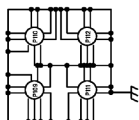
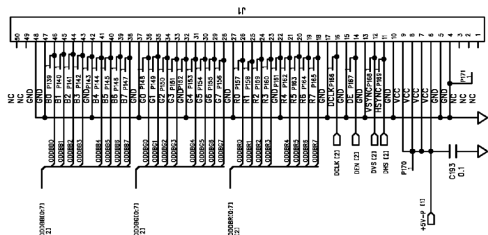
15" Panel Pinout



For 15" Panel



REV	DESCRIPTION	DATE
1.0	REVISED	10/12/00

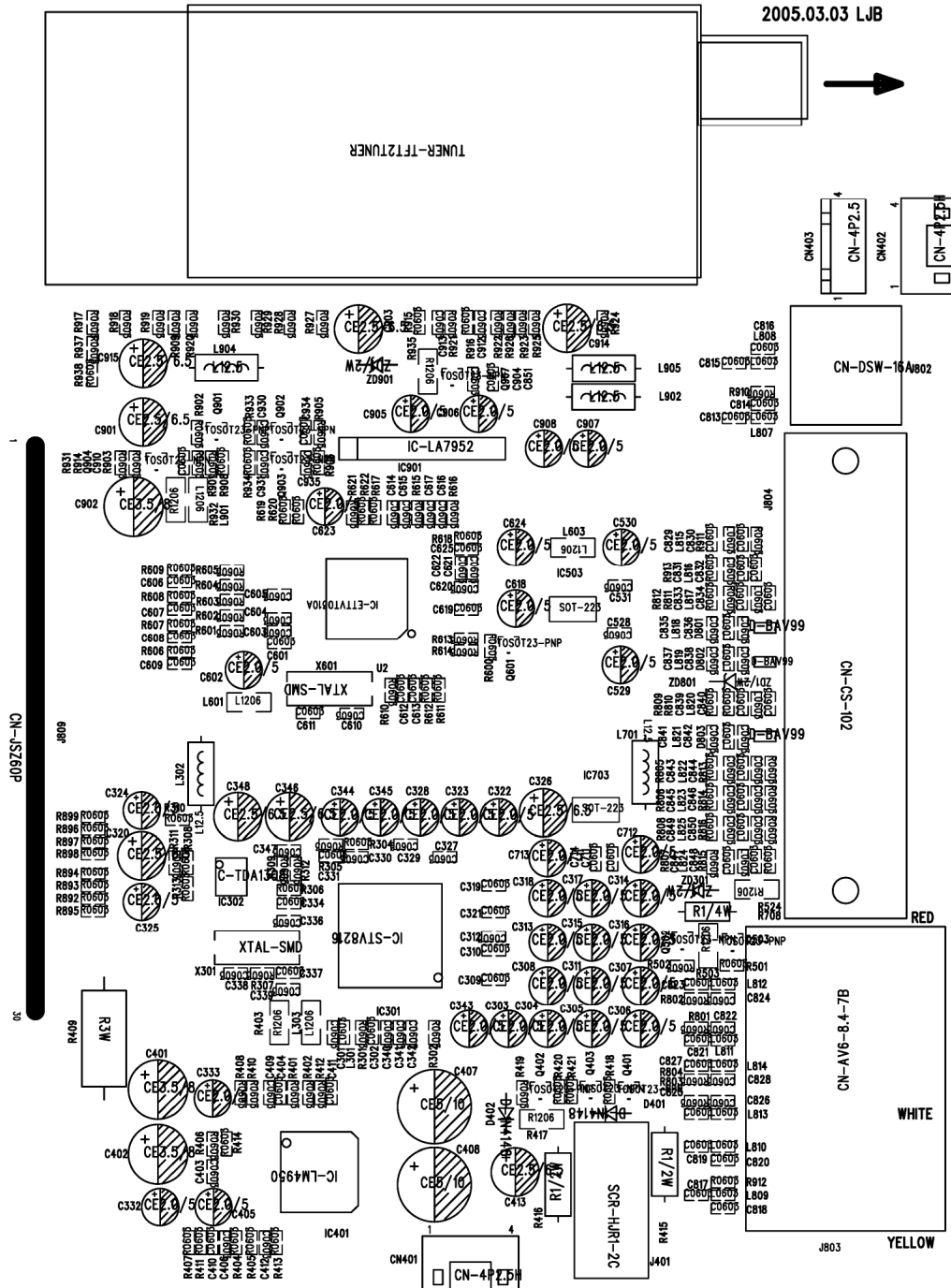


COMPANY:		TITLE:		DATE:		DRAWING NO:		RE:	
DRAWING		DATE		DATE		DATE		DATE	
CHECKED		DATE		DATE		DATE		DATE	
QUALITY CONTROL		DATE		DATE		DATE		DATE	

LTR	ECO NO.	APPROVED:	DATE:



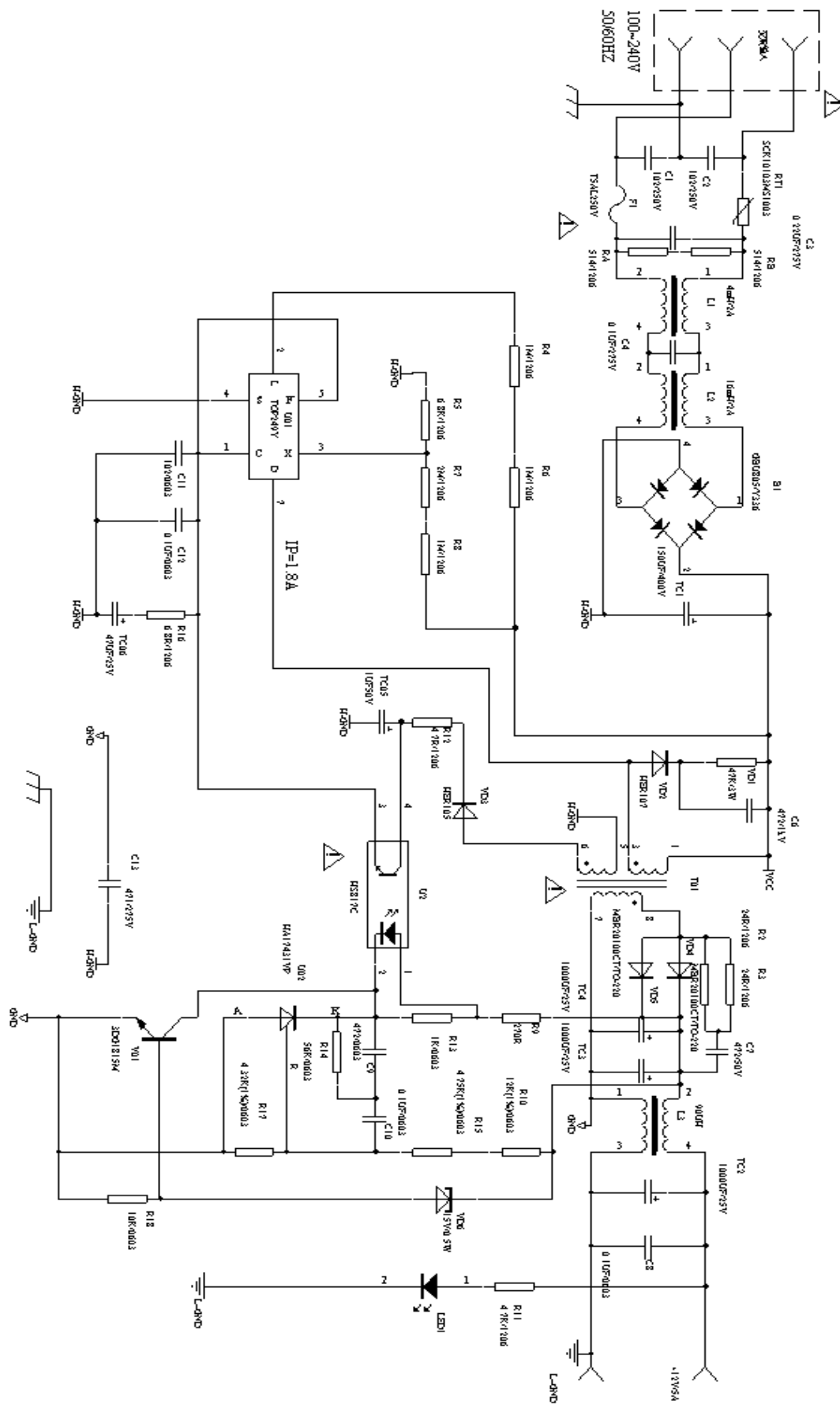
11703SRU-1
2005.03.03 LJB



SILKSCREEN TOP SIDE

3(5146)-SC.pcb - Sat Mar 26 10:22:03 2005

POWER SUPPLY BOARD FOR LT1703S AND LT2003S



8. MATERIAL LIST

BOM OF VIDEO BOARD FOR LT1703S AND LT2003S* VER: 1.2/Ver2.0

MATERIAL CODE	MATERIAL NAME	MODEL	UNIT	A M O U N T	NUMBER OF MATERIAL
90181	SMT RESISTOR	1/16W 100Ω ±5% 0603	PCS	14	R122,R123,R210,R209,R101,R102,R220,R154,R155,R161,R162,R163,R113,R114
90001	SMT RESISTOR	1/16W 0Ω ±5% 0603	PCS	5	R149,R144,R146,R510,L201
90019	SMT RESISTOR	1/16W 4.7K ±5% 0603	PCS	15	R109,R126,R127,R129~R135,R137,R151,R153,R156,R157
90018	SMT RESISTOR	1/16W 3.3K ±5% 0603	PCS	3	R125,R124,R100
90557	SMT RESISTOR	1/4W 18Ω±5% 1206	PCS	3	R250~R252
90003	SMT RESISTOR	1/16W 10Ω ±5% 0603	PCS	1	R203
90006	SMT RESISTOR	1/16W 75Ω ±5% 0603	PCS	8	R117~R119,R211,R212,R214,R216,R218
90024	SMT RESISTOR	1/16W 15K ±5% 0603	PCS	1	R504
90109	SMT RESISTOR	1/16W 1MΩ ±5% 0603	PCS	2	R206,R108
90005	SMT RESISTOR	1/16W 33Ω ±5% 0603	PCS	8	R201,R202,R204,R103~R105 ,R106,R205
90026	SMT RESISTOR	1/16W 22K ±5% 0603	PCS	3	R501,R506,R116
90008	SMT RESISTOR	1/16W 220Ω ±5% 0603	PCS	9	R801~R806,R213,R215,R217
90014	SMT RESISTOR	1/16W 1K ±5% 0603	PCS	2	R807,R808
90023	SMT RESISTOR	1/16W 10K ±5% 0603	PCS	12	R107,R110,R111,R158,R160,R208,R809,R502,R507,R219,R165,R115
90017	SMT RESISTOR	1/16W 2.2K ±5% 0603	PCS	1	R503
100019	SMTARRAY RESISTOR	1/16W33Ω ±5% 8P	PCS	16	RP201~RP204,RP101~RP112
390235	SMT INDOUCTOR	8.2uH±10% 1608	PCS	6	L202~L207
390177	SMT INDOUCTOR	2.2UH±10% 1608	PCS	2	L215,L208
410154	STAND SHIELD INDOUCTOR	100uH ±20% 3A SMD	PCS	1	L502
410153	INDOUCTOR	1.5uH ±20% 7A 6mm	PCS	2	L501,L507
390287	SMT BEAD	19Ω/100mHZ ±25% 1608	PCS	35	L108~L114,L878~L899,L801~L806
390300	SMT BEAD	600Ω/100MHZ±25% 1608	PCS	14	L101,L102,L105,L120,L121,L122,L831,L832,L873,L826~L829,L807
390301	SMT BEAD	600Ω/100MHZ±25% 3216	PCS	10	L107,L106,L209,L210,L212,L213,L115,L117,L119,R505
90114	SMT RESISTOR	1/8W 0Ω ±5% 1206	PCS	1	L503
310047	SMT CAPACITOR	50V 101 ±5% NPO 0603	PCS	6	C158,C159,C222,C221,C189,C187

310084	SMT CAPACITOR	50V 104 +80%-20% 0603	PCS	84	C202~C208,C258,C211~C219,C101,C106~C124,C130,C131,C134,C160,C163,C164,C167,C247,C249,C152,C253,C252,C25684,C186,C140~C144,C146,C509,C510,C504,C502,C515,C184,C508,C514,C191,C168~C177,C180,C197~C199,C500,C518,C517,C193
310057	SMT CAPACITOR	16V 104 ±10% 0603	PCS	10	C147,C220,C223~C230
310192	SMT CAPACITOR	50V 56P ±5% NPO 0603	PCS	14	C231~C237,C239~C245
310197	SMT CAPACITOR	50V 561 ±10% 0603	PCS	1	C246
310051	SMT CAPACITOR	50V 331 ±5% NPO 0603	PCS	2	C257,C238
310042	SMT CAPACITOR	50V 15P ±5% NPO 0603	PCS	3	C201,C100,C102
310085	SMT CAPACITOR	50V 20P ±5% NPO 0603	PCS	4	C209,C210,C103,C104
310188	SMT CAPACITOR	50V 10P ±5% NPO 0603	PCS	11	C153~C157,C859~C864
310593	SMT CAPACITOR	10V 474 ±10% X5R 0603	PCS	3	C148,C150,C149
310049	SMT CAPACITOR	50V 221 ±5% NPO 0603	PCS	4	C851,C853,C855,C857
310066	SMT CAPACITOR	50V 102 ±10% 0603	PCS	4	C856,C858,C852,C854
310072	SMT CAPACITOR	50V 103 ±10% 0603	PCS	3	C512,C513,C190
260025	CD	CD11 16V47U±20%5×11 2	PCS	5	C105,C192,C194~C196
260200	CD	CD11C 16V47U±20%5×7 2	PCS	2	C139,C145
260201	CD	CD11C 16V100U±20%6×7 2.5	PCS	15	C248,C161,C179,C165,C128,C15162,C250,C251,C254,C255,C185,C516,C511,C136, C137
260428	SMTCD	16V10U±20%4×4×5.4	PCS	3	C125,C126,C129
260593	CD	CD112 105℃ 25V220U±20% 8×12 3.5	PCS	3	C501,C503,C505
260604	CD	CD112S 105℃ 25V220U±20% 8×12 3.5	PCS	3	C501,C503,C505
260693	CD	CD288 25V470U±20%10×12 5	PCS	2	C507,C506
700007	SMT DIODE	1N4148	PCS	5	D106,D107,D108,D109,D110
680006	SCHOTTKY DIODE	1N5822	PCS	1	D501
700064	SMT DIODE	BAV99LT1 SOT-23	PCS	4	D101,D102,D103,D111
780198	SMT TRIODE	2SA1015	PCS	1	Q101
780197	SMT TRIODE	C1815	PCS	5	Q102,Q503,Q501,Q502,Q103
960235	SMTCRYSTAL	24.576MHz 49-S	PCS	1	X101
960234	SMTCRYSTAL	14.31818MHZ 49-S	PCS	1	X201
1940210	SOCKET	30PIN 1.25mm	PCS	1	J1
1940042	SOCKET	8PIN 2.0mm	PCS	1	CN102
1940209	SOCKET	7PIN 2.0mm	PCS	1	CN103

1860054	VGA SOCKET	15PIN	PCS	1J101
1910163	SOCKET	D-S DSW-34	PCS	1J501
1860053	PCB CONNECTOR	2×30P 2.54mm	PCS	1J807
1980067	HEADPHONE SOCKET	ST-417-060-100-FM	PCS	2J806,J805
2310002	FUSE	125V 5A SHAPED 12.5	PCS	1F501
881867	IC	FDS9435A SOP	PCS	2Q504,Q505
882084	IC	SI9435 SO8	PCS	2Q504,Q505
882167	IC	9435M SO8	PCS	2Q504,Q505
1850009	IC SOCKET	32P PLCC	PCS	1IC102
882026	IC	RTD2020 PQFP	PCS	1IC101
881388	IC	24C16 SOP	PCS	1IC103
882085	IC	LVC14A SOP	PCS	1IC104
882092	IC	74LVC14A SOP	PCS	1IC104
882053	IC	AK33 SOT-223	PCS	4IC107,IC106,IC202,IC111
882121	IC	AK18 SOT-223	PCS	1IC203
881146	IC	LM1117MP-1.8 SOT-223	PCS	1IC203
882052	IC	AK25 SOT-223	PCS	1IC105
882028	IC	AC1501 TO263-5L	PCS	1IC501
882376	IC	TVP5146M1 PQFP	PCS	1IC201
882027	IC	THC63LVDM83R TSSOP	PCS	2IC109,IC108
882226	IC	DS90C383 TSSOP	PCS	2IC109,IC108
1632176	PCB	21703-2	PCS	1

* THE MATERIALS OF LT2003S' VIDEO BOARD IS A LITTLE DIFFERENT FORM WHICH OF LT1703S,DUE TO THE LT1703S USING THE LVDS TO TRANSFER VIDEO SIGNAL RATHER THAN LT2003S USING TTL. THERE'S NO C168,C169,C170,C171,C172,C173,C174,C175, C176,C177, C193,C197,C198,C199,C194,C195,C196,J11,C108,IC109,L120,L121,L122,R138,R139,R140,R141,R144,R145,R146,R147 IN LT2003.

BOM OF AUDIO BOARD VER: 1.6/Ver2.0

MATERIAL CODE	MATERIAL NAME	MODEL	UNIT	AMOUNT	NUMBER OF MATERIAL
0090181	SMT RESISTOR	1/16W 100Ω ±5% 0603	PCS	5	R915,R916,R615,R616,R601
0090016	SMT RESISTOR	1/16W 1.5K ±5% 0603	PCS	2	R410,R411
0090642	SMT RESISTOR	1/4W 1.2K ±5% 1206	PCS	1	R503
0090537	SMT RESISTOR	1/4W 180Ω±5% 1206	PCS	2	R932,R417
0090538	SMT RESISTOR	1/4W 120Ω±5% 1206	PCS	1	R935

0090023	SMT RESISTOR	1/16W 10K ±5% 0603	PCS	13	R407,R408,R905,R906,R810,R809,R310,R313,R419,R420,R618,R502,R600
0090017	SMT RESISTOR	1/16W 2.2K ±5% 0603	PCS	2	L811,L812
0090179	SMT RESISTOR	1/16W 15Ω ±5% 0603	PCS	2	R412,R413
0090188	SMT RESISTOR	1/16W 18K ±5% 0603	PCS	1	R414
0090024	SMT RESISTOR	1/16W 15K ±5% 0603	PCS	4	R308,R309,R801,R802
0090008	SMT RESISTOR	1/16W 220Ω ±5% 0603	PCS	4	R812,R606~R608
0090019	SMT RESISTOR	1/16W 4.7K ±5% 0603	PCS	7	R311,R312,R421,R418,R933,R934,R937
0090021	SMT RESISTOR	1/16W 6.8K ±5% 0603	PCS	1	R903
0090006	SMT RESISTOR	1/16W 75Ω ±5% 0603	PCS	5	R908~R912
0090109	SMT RESISTOR	1/16W 1MΩ ±5% 0603	PCS	1	R307
0090232	SMT RESISTOR	1/16W 150Ω ±5% 0603	PCS	2	R901,R610
0090206	SMT RESISTOR	1/16W 360K ±5% 0603	PCS	2	R402,R405
0090026	SMT RESISTOR	1/16W 22K ±5% 0603	PCS	2	R406,R501
0090027	SMT RESISTOR	1/16W 27K ±5% 0603	PCS	2	R401, R404
0090014	SMT RESISTOR	1/16W 1K ±5% 0603	PCS	13	R913,R914,R931,R811,R813~R816,R617,R609,R602~R604
0090015	SMT RESISTOR	1/16W 1.2K ±5% 0603	PCS	1	R902
0090012	SMT RESISTOR	1/16W 560Ω ±5% 0603	PCS	3	R301,R304,R305
0090001	SMT RESISTOR	1/16W 0Ω ±5% 0603	PCS	16	R892,R894,R896,R898,R924~R930,R605,R619,R621,R612,R613
0090114	SMT RESISTOR	1/8W 0Ω ±5% 1206	PCS	1	R403
0090034	SMT RESISTOR	1/16W 100K ±5% 0603	PCS	8	R306,R302,R803~R808
0000276	CARBON FILM RESISTOR	1/4W100Ω±5%10	PCS	1	R708
0010257	METAL OXIDE FILM RESISTOR	1/2W 2.2Ω±5% R 12.5×7	PCS	2	R415,R416
0010253	METAL OXIDE FILM RESISTOR	3W 1.2Ω±5% 20×10	PCS	1	R409
0390291	INDUCTOR	10uH ±20% 350mA 0307	PCS	1	L902
0390292	INDUCTOR	22uH ±20% 350mA 0307	PCS	4	L904,L905,L701,L302
0390282	SMT INDUCTOR	10uH ±5% 1608	PCS	1	L301
0390286	SMT INDUCTOR	5.6uH±10% 1608	PCS	6	L813,L814,L822~L825
0390287	SMT BEAD	19Ω/100mHZ ±25% 1608	PCS	9	L807~L810,L816~L819,L821
0390300	SMT BEAD	600Ω/100MHZ±25% 1608	PCS	2	L815, L820
0390301	SMT BEAD	600Ω/100MHZ±25% 3216	PCS	4	L303,L901,L603,L601
0310047	SMT CAPICITOR	50V 101 ±5% NPO 0603	PCS	7	C301,C330,C331,C912,C913,C617,C616
0310068	SMT CAPICITOR	50V 222 ±10% 0603	PCS	2	C604,C613
0310202	SMT CAPICITOR	50V 223 ±10% 0603	PCS	2	C603,C612

0310072	SMT CAPICITOR	50V 103 ±10% 0603	PCS	3	C302,C409,C410
0310044	SMT CAPICITOR	50V 33P ±5% NPO 0603	PCS	2	C610,C611
0310085	SMT CAPICITOR	50V 20P ±5% NPO 0603	PCS	2	C338,C337,
0310188	SMT CAPICITOR	50V 10P ±5% NPO 0603	PCS	22	C813~C820,C829~C842
0310066	SMT CAPICITOR	50V 102 ±10% 0603	PCS	8	C821,C823,C825,C827,C843,C845,C847,C849
0310045	SMT CAPICITOR	50V 47P ±5% NPO 0603	PCS	4	C606~C609
0310049	SMT CAPICITOR	50V 221 ±5% NPO 0603	PCS	8	C822,C824,C826,C828,C844,C846,C848,C850
0310084	SMT CAPICITOR	50V 104 +80%-20% 0603	PCS	33	C340~C342,C310,C312,C309,C319,C321,C327,C329,C403,C711,C714,C910,C904,C531,C528,C930,C931,C934,C935,C851,C347,C336,C339,C619,C621,C622,C625,C614,C615,C601,C605
0310223	SMT CAPICITOR	25V 334 +80%-20% 0603	PCS	2	C404,C406
0310070	SMT CAPICITOR	50V 332 ±10% 0603	PCS	1	R938
0310593	SMT CAPICITOR	10V 474 ±10% X5R 0603	PCS	2	C334,C620
0310205	SMT CAPICITOR	50V 473 ±10% 0603	PCS	2	C411,C412
0260063	CD	CD11 50V1U±20%5×11 2	PCS	10	C306,C307,C314,C315,C322,C323,C332,C333,C344,C345
0260102	CD	CD110 25V10U±20%5×11 2	PCS	14	C343,C303~C305,C311,C313,C316,C317,C308,C328,C905~C908
0260206	CD	CD11C 10V100U±20%5×7 2	PCS	4	C901,C346,C326,C320
0260029	CD	CD11 16V470U±20%8×123.5	PCS	3	C401,C402,C902
0260693	CD	CD288 25V470U±20%10×12 5	PCS	2	C407,C408
0260028	CD	CD11 16V220U±20%6×12 2.5	PCS	5	C915,C914,C903,C348,C413
0260025	CD	CD11 16V47U±20%5×11 2	PCS	10	C712,C713,C529,C530,C318,C324,C325,C618,C624,C602
0260067	CD	CD11 50V2.2U±20%5×11 2	PCS	1	C405
0580008	VOLTAGE REGULATOR DIODE	8.2V ±5% 1/2W	PCS	1	ZD301
0580001	VOLTAGE REGULATOR DIODE	3.3V ±5% 1/2W	PCS	1	ZD801
0580010	VOLTAGE REGULATOR DIODE	11V ±5% 1/2W	PCS	1	ZD901
0570006	DIODE	1N4148	PCS	2	D401,D402
0780198	SMTTRIODE	2SA1015	PCS	4	Q901,Q402,Q503,Q601

0780197	SMT TRIODE	C1815	PCS	7	Q902~Q904,Q907,Q401,Q403,Q502
0700064	SMT DIODE	BAV99LT1 SOT-23	PCS	3	D801~D803
0960236	SMT CRYSTAL	27.00MHz 49-S	PCS	1	X301
0960250	SMT CRYSTAL	13.875MHZ±20PPM 49-S	PCS	1	X601
1250042	RELAY	HJR-2CL-12VDC	PCS	1	J401
1020028	TUNER	JS-6B2/121	PCS	1	T1
1860060	SCART SOCKET	CS-102	PCS	1	J804
1910160	SOCKET	S -SOCKET	PCS	1	J802
1910161	SOCKET	AV6-8.4-7	PCS	1	J803
1940012	SOCKET	4PIN 2.5mm	PCS	1	CN401
0882030	IC	STV8216 TQFP	PCS	1	IC301
0881537	IC	TDA1308 SOP	PCS	1	IC302
0882110	IC	LM4950 TO-263	PCS	1	IC401
0882431	IC	ET-TVT0310A PQFP	PCS	1	U2
0882053	IC	AK33 SOT-223	PCS	2	IC503,IC703
0882112	IC	LA7952 SIP	PCS	1	IC901
1632178	PCB	11703SRU-1	PCS	1	

BOM OF POWER SUPPLY VER: 1.8/Ver2.1

MATERIAL CODE	MATERIAL NAME	MODEL	UNIT	AMOUNT	NUMBER OF MATERIAL
0090521	SMT RESISTOR	1/8W510K±5% 1206	PCS	2	RA,RB
0090496	SMT RESISTOR	1/8W 1MΩ±5% 1206	PCS	3	R4,R6,R8
0090542	SMT RESISTOR	1/8W2MΩ±5% 1206	PCS	1	R7
0090526	PRECISION SMT RESISTOR	1/16W 6.8K±1% 0603	PCS	1	R5
0090525	SMT RESISTOR	1/8W 6.8Ω±5% 1206	PCS	1	R16
0090511	SMT RESISTOR	1/8W4.7Ω±5% 1206	PCS	3	R12,R2,R3
0090014	SMT RESISTOR	1/16W 1K ±5% 0603	PCS	1	R13
0090533	PRECISION SMT RESISTOR	1/16W4.32K ±1% 0603	PCS	1	R17
0090288	PRECISION SMT RESISTOR	1/16W12K±1% 0603	PCS	1	R10
0090534	PRECISION SMT RESISTOR	1/16W4.75K ±1% 0603	PCS	1	R15
0090171	SMT RESISTOR	1/8W 1K ±5% 1206	PCS	1	R11
0090023	SMT RESISTOR	1/16W 10K ±5% 0603	PCS	1	R18
0000679	CARBON FILM RESISTOR	1/6W270Ω±5%7.5	PCS	1	R9
1050007	HEAT SENSISTY RESISTOR	SCK10103MS1003	PCS	1	RT1
0310058	SMT CAPACITOR	25V 104 +80%-20% 0603	PCS	1	C12

0310594	SMT CAPACITOR	25V 104±10% X7R 0603	PCS	1	C10
0310066	SMT CAPACITOR	50V 102 ±10% 0603	PCS	1	C11
0090001	SMT RESISTOR	1/16W 0Ω ±5% 0603	PCS	1	C9
0200255	PORCELAIN CAPACITOR	1000V 103 +80%-20% 7.5mm	PCS	1	C6
0310031	SMT CAPACITOR	50V 472 ±10% 0805	PCS	1	C7
0200341	CAPACITOR	CT81 250VAC 102±20% 10mm	PCS	3	C1,C2, C13
0010286	METAL OXIDE FILM RESISTOR	3W 47K±5%	PCS	1	VD1
0210066	TERYLANE CAPACITOR	275V 104 ±20% 15mm	PCS	1	C3
0310169	SMT CAPACITOR	50V 105 +80%-20% 0805	PCS	1	C8
0210197	ANTIJAM CAPACITOR	MPX X2 275VAC 334 ±10% 15	PCS	1	C4
0260588	CD	CD288H 400V150U±20% 18×40 7.5	PCS	1	TC1
0260589	CD	GZ 25V1000U±20% 10×20 5	PCS	3	TC2,TC3,TC4
0260063	CD	CD11 50V1U±20%5×11 2	PCS	1	TC05
0260039	CD	CD11 25V47U±20%5×11 2	PCS	1	TC06
0410169	INDOUCTOR	22mH 2A Φ18×Φ10×8	PCS	2	L2, L1
0410160	INDOUCTOR	90UH 5A Φ9×Φ5×4	PCS	1	L3
0460425	TRANSISTOR	PQ26-080	PCS	1	T01
0700123	SMT VOLTAGE REGULATOR DIODE	15V ±5% 1/2W	PCS	1	VD6
0780197	SMT TRIODE	C1815	PCS	1	V01
0570050	DIODE	HER105 7.5mm	PCS	1	VD3
0570051	DIODE	HER107 5mm	PCS	1	VD2
0680076	SCHOTTKY DIODE	MBR20100CT320XC TO-220	PCS	2	VD4,VD5
1710026	MAGNETIC RING	φ4×φ2×2 BLACK	PCS	2	B1
1710025	MAGNETIC RING	φ3.5×φ3×1.5 BLACK	PCS	4	VD4,VD5, L3
0670011	DIODE ARRAY	GBU805 Y336	PCS	1	B1
0620004	LED	Φ3 GREEN	PCS	1	LED1
0882041	IC	MIK431C TO-92	PCS	1	U02
0880863	IC	HA17431VP TO-92	PCS	1	U02
1080011	OPTIC ELETRONIC CONVERTER	HS817	PCS	1	U2
0882130	IC	TOP249Y TO-220	PCS	1	U01
1563585	PCB	5AK080-2	PCS	1	
1563017	PCB	5AK080-GND	PCS	1	

1870035	SOCKET	2111-2-P7S	PCS	1	XS1
2140172	POWER WIRE	2p 1.5m 4PIN	PCS	1	
2300026	FUSE	T5A 250V	PCS	1	F1
3580153	HEAT SINKER	114.6×18×21.5 AK080	PCS	1	
3580154	HEAT SINKER	69.5×33.5×21.5 AK080	PCS	1	