

HITACHI

No. 0202

17LD4200



SERVICE MANUAL MANUEL D'ENTRETIEN WARTUNGSHANDBUCH

CAUTION:

Before servicing this chassis, it is important that the service technician read the "Safety Precautions" and "Product Safety Notices" in this service manual.

ATTENTION:

Avant d'effectuer l'entretien du châassis, le technicien doit lire les «Précautions de sécurité» et les «Notices de sécurité du produit» présentés dans le présent manuel.

VORSICHT:

Vor Öffnen des Gehäuses hat der Service-Ingenieur die „Sicherheitshinweise" und „Hinweise zur Produktsicherheit" in diesem Wartungshandbuch zu lesen.

Data contained within this Service manual is subject to alteration for improvement.

Les données fournies dans le présent manuel d'entretien peuvent faire l'objet de modifications en vue de perfectionner le produit.

Die in diesem Wartungshandbuch enthaltenen Spezifikationen können sich zwecks Verbesserungen ändern.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

**Colour Television
December 2003**

17LD4200 TFT LCD TV

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1 SCOPE

This short specification describes the electrical, optical and functional performance requirements for a 43.1cm (17") TFT LCD color TV monitor with VGA/CVBS/S-Video/COMPONENT/TV compatible interface.

1.1 PRODUCT FEATURES

- 43.1 cm (17") a-si TFT Active matrix LCD panel, 0.289 mm dot pitch, 262.144 colors.
- Microprocessor controlled scan technology
- 12 factory presets
- Vertical refresh rate 55Hz to 75 Hz
- Horizontal frequency 29KHz to 61KHz
- Resolutions: 640 x 480 up to 1280 x 768
- Recommended Resolution 1024 x 768 @ 60Hz
- Universal power supply designed for worldwide application
- UL, FCC, CE certification
- Speaker 2.5W x 2
- Closed Caption (OPTION)
- V-CHIP (OPTION)
- BTSC Stereo/SAP or NICAM Stereo/ DUAL

1.2 MAIN DIMENSIONS / WEIGHT

	Monitor	Packed Monitor
Width:	518mm	586mm
Height:	333mm	502mm
Depth:	198mm	154mm
Weight:	5.0kg (Net Weight)	6.8kg (Gross Weight)

1.3 LOADING QUANTITY

1056 sets for 40' container(w. pallet)

480 sets for 20' container(w. pallet)

1.4 NICAM

- Support stereo/ mono. selection
- Support stereo/ DUAL / mono. selection

2 ELECTRICAL PERFORMANCE

All tests must be performed under “standard testing conditions” (item 2.1) unless otherwise specified

2.1 STANDARD TESTING CONDITIONS

- Warm up time	: >30 min.
- AC supply voltage	: 110V or 230V $\pm$ 5%, 50 $\pm$ 3 Hz
- Ambient temperature	: 20°C $\pm$ 5°C
- Humidity	: 65% $\pm$ 20%
- Display mode	: 1024x768@ 60 Hz, all white
- Contrast control	: Set to factory preset value, which allows that the brightest two of 32 linear distributed gray-scales (0 ~ 700mv) can be distinguished.
- Brightness control	: Set to maximum value
- Input signal	: 0.7Vpp
- Picture position and size	: Factory preset value,
- Viewing angle	90 ° H and V
- Viewing distance	100 cm for LCD performance, 30 cm for LCD failures
Ambient illumination	Dark room (< 1 cd/m2)

2.2 VIDEO SIGNALS

2.2.1 ANALOG RGB VIDEO INPUTS

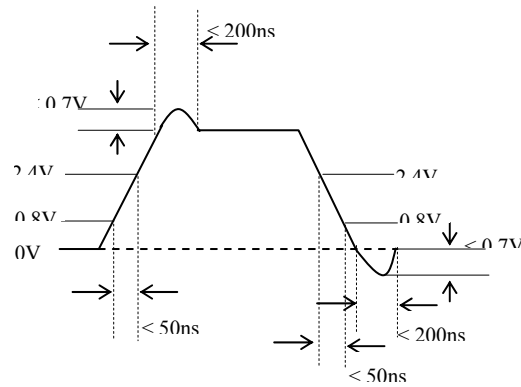
Level	: 0.7Vpp
Polarity	: positive
Impedance	: 75 Ohm
Max. dot clock	: 80 MHz

2.2.2 ANALOG RGB SYNC INPUTS

Level: L = 0V ~ 0.8V H = 2.4V ~ 5V

Separate sync. Polarity: positive or negative

The Monitor has to operate up to the following specified TTL-input signals:



H- Sync. and V – Sync. signals at the monitor input

High logic level : $\geq 2.4V$

Low logic level : $\leq 0.8V$

Rise time : 0.8V ~ 2.4V: < 50ns

Fall time : 2.4V ~ 0.8V: < 50ns

Overshoot : $\leq 0.7V$

Undershoot : $\leq 0.7V$

2.2.3 ANALOG RGB VIDEO BLANKING

Video is blanked for a period of 2sec. to 3sec. during change of modes or if undefined signals are applied. No switching effects are visible.

2.2.4 ANALOG RGB SIGNAL TIMING

VESA MODES							
			Horizontal		Vertical		
Mode	Resolution	Total	Nominal Frequency (KHz)	Sync Polarity	Nominal Freq. (Hz)	Sync Polarity	Nominal Pixel Clock (MHz)
VGA	640x480@60Hz	800 x 525	31.469	N	59.940	N	25.175
	640x480@72Hz	832 x 520	37.861	N	72.809	N	31.500
	640x480@75Hz	840 x 500	37.500	N	75.00	N	31.500
SVGA	800x600@56Hz	1024 x 625	35.156	N/P	56.250	N/P	36.000
	800x600@60Hz	1056 x 628	37.879	P	60.317	P	40.000
	800x600@72Hz	1040 x 666	48.077	P	72.188	P	50.000
	800x600@75Hz	1056x625	46.875	P	75.000	P	49.500
XGA	1024x768@60Hz	1344x806	48.363	N	60.004	N	65.000
	1024x768@70Hz	1328x806	56.476	N	70.069	N	75.000
	1024x768@75Hz	1312x800	60.023	P	75.029	P	78.750

IBM MODES							
			Horizontal		Vertical		
Mode	Resolution	Total	Nominal Frequency (KHz)	Sync Polarity	Nominal Freq. (Hz)	Sync Polarity	Nominal Pixel Clock (MHz)
DOS*	720x400@70Hz	900 x 449	31.469	N	70.087	P	28.322
DOS	640x350@70Hz	800 x 449	31.469	P	70.087	N	25.175

2.2.5 CVBS/S-VIDEO INPUTS

S-Video	Type	Y/C	: NTSC/PAL
	Level	0.7Vpp	
	Impedance	75 ohm terminated	
Composite Video	Type	Composite	: NTSC/PAL
	Level	0.7Vpp	
	Impedance	75 ohm terminated	
Component	Type	Y , Cb ,Cr	: NTSC/PAL
	Level	0.7Vpp	
	Impedance	75 ohm terminated	

2.2.6 PAL TV INPUTS

Tuner Model Name	: FI/FQ1216	: PHILIPS
Receiving System	: PAL	
Channel System	: Air / Cable	
US	: VHF Low	: 48.25MHz ~ 160.00MHz
	: VHF High	: 160.00MHz ~ 442.00MHz
	: UHF	: 442.00MHz ~ 863.25MHz
IF Frequency	: PIF	: 38.90MHz
	: CIF	: 34.47MHz
	: SIF1/SIF2	: B/G: 33.40MHz ; 33.16MHz
		: D/K: 32.40 MHz
		: I: 32.9 MHz
	NICAM	: B/G, D/K: 33.05 MHz :32.348 MHz
Impedance	: 75 ohm terminated	
Output	: Video	: CVBS (PAL)
	: Sound	: Normal / NICAM

2.3 DDC SIGNALS (VESA DDC1/2B)

This monitor is equipped with VESA DDC 1/2B according to VESA DISPLAY DATA CHANNEL STANDARD V. 1.0 Rev.1 (tt.mm.199j)

It transmits the EDID-file as a continuous data stream, clocked by V-SYNC (DDC 1); the controller may increase the Vert. frequency to 25 kHz max. for improved transmission rate.

As an alternative, it sends the EDID-file upon request by the host-system (Read EDID, Device A0h Start address 00h) in an I²C compatible format (DDC 2).

The monitor has installed a 10k Ω pull-up on the SCL-line (pin 15 of 15-pin VGA-connector).

	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF
00:	00	FF	FF	FF	FF	FF	FF	00	22	83	42	17	01	00	00	00
10:	33	0D	01	03	68	25	17	78	EA	C9	9D	A3	59	49	96	25
20:	24	4B	4E	AF	CE	00	01	01	01	01	01	01	01	01	01	01
30:	01	01	01	01	01	01	FA	1E	00	81	51	00	19	30	37	8A
40:	13	00	71	DD	10	00	00	1C	00	00	00	FD	00	32	4B	1E
50:	3C	08	00	0A	20	20	20	20	20	20	00	00	00	FC	00	31
60:	37	4C	44	34	32	30	30	0A	20	20	20	20	00	00	00	FF
70:	00	31	0A	20	20	20	20	20	20	20	20	20	20	20	00	00

2.4 DIGITAL CONTROL OPERATION

Signals used for mode detection:

- Nominal horizontal frequency (± 0.5 KHz from center frequency)
- Nominal vertical frequency (± 1 Hz from center frequency)
- Horizontal sync. pulse polarity
- Vertical sync. pulse polarity

2.4.1 FACTORY RECALL MODES

Starting the “RECALL” function in the OSD-MENU will clear all old settings of auto configuration in preset modes.

2.4.2 PROTECTION CIRCUIT

Missing or improper sync pulses will not damage the monitor. Additionally, under these conditions, the monitor shall not cause damage to the driving source

2.5 POWER SUPPLY

2.5.1 FEATURES

A/C Line voltage range	: 100 V ~ 240 V
A/C Line frequency range	: 50 ± 3Hz, 60 ± 3Hz
Current	: 1.5A max. at 90V, 0.75A max. at 265V
Peak surge current	: < 50A peak at 220 VAC, : < 30A peak at 110 VAC and cold starting
Leakage current	: < 3.5mA
Power line surge	: No advance effects (no loss of information or defect) with a maximum of 1 half-wave missing per second

2.5.2 AC ADAPTER OUTPUT

Voltage	: 12VDC ± 5%
Current	: 6.25 Amp (max)

2.5.3 POWER CONSUMPTION

The monitor is equipped with a power-management according to the below.

There is a delay of 5s ... 7s before the transition from On-state to any power saving state to avoid unintentionally entering of a power saving stage during display resolution and timing mode changes. Transition from any power saving state to another can be instantaneous.

The recovery from Off-state requires no manual power on.

Mode	H-Sync.	V-Sync.	Video	Pw-cons.	Indicator	Rec. time*
Power-On	on	on	Active	< 65W	Green LED	--
Power-off	off	off	Blanked	< 5 W	Orange LED	< 5S
Switch-off				< 5W	Dark LED	

SYNC. On means: Normal operation

SYNC. Off means: H sync. F < 10KHz duty cycle > 25%

V sync. F < 10Hz duty cycle > 25%

2.5.4 INVERTER SPECIFICATION

2.5.4.1 Electrical Characteristics:

No.	Item	Sym	Condition	Min	Typ.	Max.	Unit
1	Input Voltage	Vin	Vin -5% / +15%	11.4	12	12.6	V
2	Input Current	Iin	Vin=12V±5% Vbri=3.3V	-	2	-	A
3	Input Power	Pin	Vin=12V±5% Vbri=3.3V	-	35	-	W
4	Inrush current	Irush	Vin -5% ,under 14 times of rating current of Fuse	-	-	TBD	A
5	Output Voltage	Vout	Vin=12V, Vbri =1.8V	590	630	670	Vrms
6	Output Current	Iout(max)	Vin=12V, Vbri =1.8V	9.5	10.5	11	mArms
7	Output Power	Pout	Vin=12V, Vbri =1.8V	-	26.5	-	W
8	Working Frequency	Fo	Vin=12V -5%/+5%, Vbri =0.45~1.8V	40	50	60	KHz
9	Backlight	ON	Normal Operation	2	-	5.5	V
	ON/OFF Control	OFF	Shutdown (Lamp off)	0	-	1.0	V
10	Lamp Current Control	Vbri	Adjustable continuou mode (Fdim)	-	-	-	%
11	Kick off voltage	Vkickoff	No load, Vin=12V - 5%	1600	-	-	Vrms
12	Efficiency	Efficiency	Vin=12V , Vbri =1.8V	-	75	-	%
13	Time Delay to strike	Ts	ON/OFF=5V , Vin=12V	60	80	100	ms
14	Open lamp period /every lamp	Topen	Vin=12V, ON/OFF=5V	1000	-	1200	ms
15	audible Noise		30mm upon the part	-	-	34	dBm
16	Vin drop and Td	Vd Td	When Vin drop to Vd and recovery to the normal voltage during Td, the inverter won't be locked (don't need to release the input voltage and apply it again)	8 200	- -	- -	V ms
17	Case Temp. of part and derating of parts	-	Vin=12V -5%, ON/OFF=5V,Vbri=1.8V, Please refer the derating table to design	-	-	65	°C

2.5.4.2 Fuse rating:

2.5.4.2.1 Rating current is under 60% of rating current decreasing curve of fuse at maximum ambient temperature.

2.5.4.2.2 Inrush current

Fuse vender guarantee 100,000 cycles.

Rush current is under 14 times of rating current of Fuse.

IA^2t is under 25% of vender's I^2t -T curve.

2.5.4.3 Functional Pin Description:

2.5.4.3.1 Input Connector: E&T 4500 10P P2.0

Pin No.	Symbol	Description
1,2	Vcc	5V
3,4,5	GND	Power System Return
6	ON/OFF	ON/OFF Control ON>2.0V OFF <1.0V
7	Vbri	Lamp Current Control
8,9,10	Vin	Input Voltage (11.4V TO 12.6V)
11	Lin	Backlight ON/OFF control (Active High) ON:1.5~5.5V, OFF:-0.3~1.0V
12	Rin	+5Vdc supply to micro-P, always on.
13	GND/Audio	

2.5.4.3.2 Output Connector: JST SM04(4.0)B-BHS-1 or equivalent

Pin No.	Symbol	Description
1,2	Lamp H1, H2	High voltage connection to high side of lamp.
4	Lamp L1	Low voltage connection to low side of lamp.

2.5.5 DC/DC Specification

2.5.5.1 Electrical Characteristics:

No.	Item	Sym	Condition	Min	Typ.	Max.	Unit
1	Input Voltage	Vin	Vin -5% / +5%	11.4	12	12.6	V
2	Output Voltage	Vout	Vout -5% / +5%	4.9	5	5.2	V
3	Output Current	Iout	Vin=12V±5%	0	1.0	1.5	A
4	Output Power	Pout	Vin=12V±5%	-	5	7.5	W
5	Efficiency	Efficiency	Vin=12V , Vbri =3.3V	-	75	-	%
6	Regulation	ΔV_{out}	Item 1, 2, 3 condition	-5	-	+5	%

7	Ripple	Vripple	Item 1, 2, 3 condition	-	-	50	mVpp
8	Noise	Vnoise	Item 1, 2, 3 condition	-	-	150	mVpp

2.5.5.2 Functional Pin Description:

Input Connector: SCD437CCS DIA:2.0mm

Pin No.	Symbol	Description
1	Vin	+12V
2,3	GND	Ground

2.6 CONNECTORS / CONTROLS

2.6.1 CONNECTORS

- Power : Monitor rear side : Φ 2.5mm DC Jack
- Analog RGB : Monitor rear side / Data Cable : 15-pin D-sub female / male

Pin – Assignment of 15-pin D-sub:

1	Red Video	9	+5V FOR DDC
2	Green Video	10	Detect
3	Blue Video	11	Serial Data for ISP
4	Serial Clock for ISP	12	Serial Data for DDC
5	Ground	13	H-Sync.
6	Red Ground	14	V-Sync.
7	Green Ground	15	Serial Clock for DDC
8	Blue Ground		

- S-Video (Y/C) : Monitor rear side : 4 Pin Mini-DIN female
- Composite Video : Monitor rear side : RCA female (Yellow)
- Component : Monitor rear side : RCA female (G, B, R)
- TV : Monitor rear side : F or IEC type female
- Audio : Monitor rear side :
 - PC I/P for PC : 3.5mm Stereo female
 - AV1 for S-Video : 4 Pin Mini-DIN female (Red/White)
 - AV2 for Component and Composite Video : RCA female (Red/White)

2.6.2 MONITOR CONTROL KEYS

KEY : Power , Menu , Function Up/Down , Vol. Up/Down , Source

2.6.3 POSITION OF CONTROLS

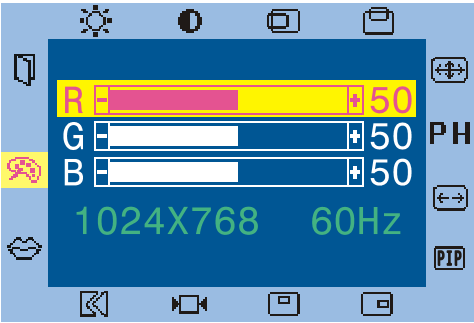
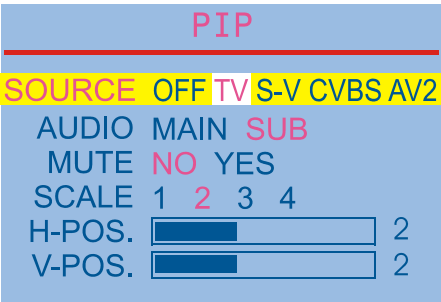
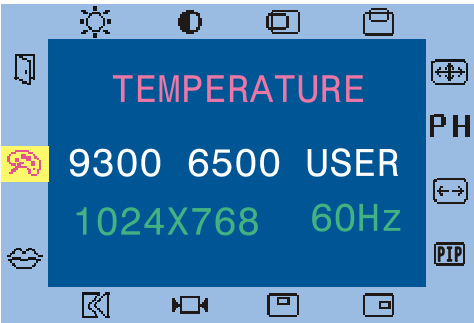
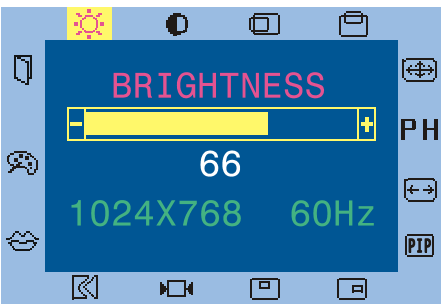
- Position of all switches : Top side of front bezel
- Position of LED and IR sensor : Bottom side of front bezel

2.6.4 MONITOR CONTROL FUNCTION

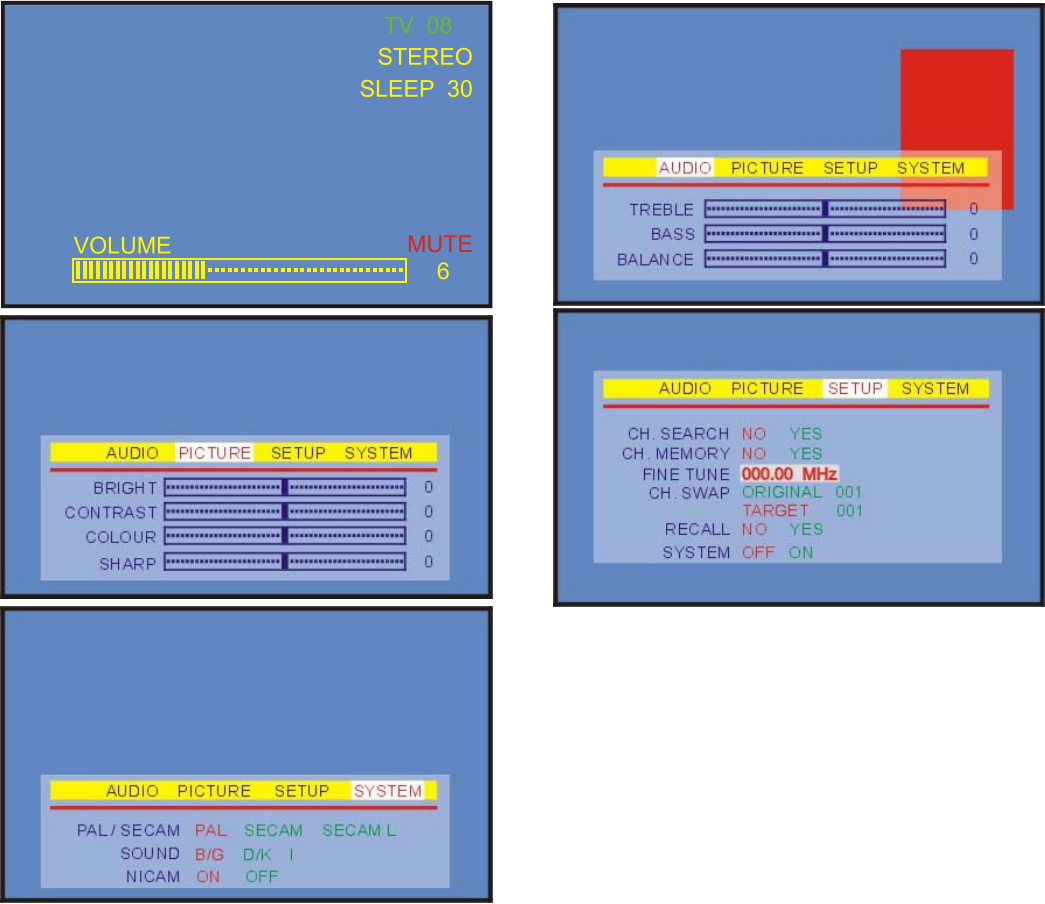
PC mode	Bright, Contrast, Picture position, OSD position, Auto adjustment, Clock, Phase, OSD Transparence, Language, Color Temperature Graphic/Text select
VIDEO mode	AUDIO , PICTURE , SETUP
TV mode	AUDIO , PICTURE , SETUP , SYSTEM

2.6.5 OSD Pattern

PC mode



Video, TV mode

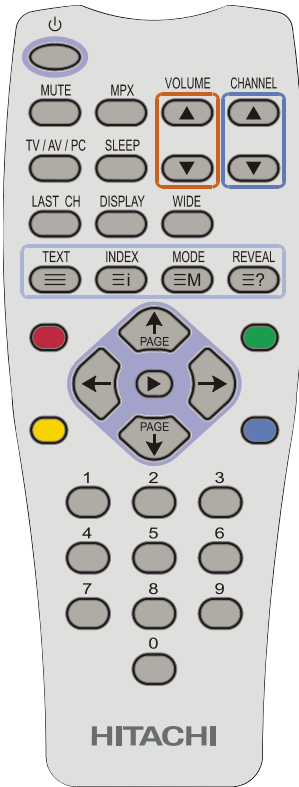


2.7 TESTING CONDITIONS

Pattern	Checking	
Circle	Overall Linearity , Geometry Framing. Reflections aspect ratio format	On a black background is suited for checking the overall linearity and geometry The white circle changes automatically to black when used with the white pattern and is useful for checking reflection.
Center Cross	Pin-cushion correction Deflection Linearity	It is applied to check the deflection linearity And for pin-cushion correction
Crosshatch	Static convergence Dynamic convergence Pin-cushion correction	Full screen definition pattern of 8vert. Bars 0.8MHz to 4.8MHz.
Multi burst	Video Bandwidth Amplitude response/resolution	Contains eight full screen vertical bars of definition lines in the frequency ranges 0.8, 1.8,2.8,3.0,3.2,3.4,3.8,and 4.8 MHz This checks the bandwidth of the video or luminance amplifier in black and white or color TV as well as the resolution of monitor and video recorders
Color Bars	Overall color performance Burst keying Sub-carrier regenerator Matrix circuit RGB amplifiers Delay color versus b/w signal Saturation check 562.5KHz interference check	The vertical bars are white, yellow, cyan, green, magenta, red, blue, and black. The luminance content depends on the TV system selected and is automatically correct after the user makes the selection. The color bar pattern in fact provides sufficient information for a good overall check on color performance. This includes the checks on burst keying, sub-carrier regeneration, RGB amplifiers, the delay color versus B/W signal and saturation check
VCR	White level Amplitude response, resolution of VCR and other video recorders Linearity of chroma amplitude Sensitivity color amplitude Color AGC Ratio chroma / luminance Writing current Recording performance Slow/quick-motion Still picture	Check the bandwidth , linearity , sensitivity , and AGC of the chroma amplifiers in color video recorders . This combined test pattern is divided into the following four horizontal segments: -Horizontal 100% white bar covering 1/16 field for exact level adjustment -Eight bars of resolution of which 2.8-3.0-3.2-3.4MHz are used to align the high-pass filter for a maximum resolution in VCR bandwidth -The next part of the pattern contains eight steps of decreasing linear levels of saturation of 100%to 0% to check the chroma amplifier linearity and color AGC circuitry. For example, if the chroma writing current is too high, color will be visible in the last bar where no color should be seen normally -The bottom section consists of black horizontal bar with a moving white field to check moving pictures on video recorders

2.8 OSD FUNCTION

2.8.1 IR Control



POWER

Switch between power-on and power-off.

MUTE

Turn the sound on/off.

MPX

Select the language and the sound output

VOLUME

Adjust the volume.

CHANNEL

Select channels up or down.

TV/AV/PC

Select input sources of TV, AV1/S-V, AV2/CVBS, COMPONENT, and PC.

SLEEP

Select timer to turn power off. The default timer is 10, 20, 30, 40, 50, 60, and 90 minutes (Only enable in TV function).

LAST CH

Turn back the last select channel.

DISPLAY

Show the information on screen.

4:3 / 16:9

Select the screen scale.

TEXT

Turn the Teletext function ON/OFF

INDEX

Turn page to index page.

MODE

Turn ON/OFF list mode.

REVEAL

Turn ON/OFF conceal information



Turn on/off the OSD menu.



Adjust the selected item on menu or adjust the volume.



* Press to select desired item on the menu

* Press to select desired page on the text mode

Teletext color Keys

For special teletext functions

0~9 Number Keys

Used to select cable TV or Terrestrial programs.

2.8.1.1 Teletext

Teletext is an optional function, therefore only the set of the teletext system can receive the teletext broadcast.

Teletext is a free service broadcast by most TV stations which gives up-to-the-minute information on news, weather, television programs, stock prices and many other topics. The teletext decoder of this TV can support the SIMPLE, TOP and FASTEXT systems. SIMPLE (standard teletext) consists of a number of pages which are selected by directly entering the corresponding page number. TOP and FASTEXT are more modern methods allowing quick and easy selection of teletext information.

Switch ON/ OFF

Press the **TEXT**  button to switch the teletext. The initial page or last page appears on the screen.

Two page numbers, TV station name, date and time are displayed on the screen headline. The first page number indicates your selection, while the second shows the current page displayed.

Press the **TEXT** or TV/AV/PC button to switch off teletext. The previous mode reappears.

SIMPLE text

Page selection

1. Enter the desired page number as a three-digit number with the NUMBER buttons. If you press a wrong number during selection, you must complete the three-digit number and then reenter the correct page number.
2. The $\uparrow$ / $\downarrow$ button can be used to select the previous or next page.

Programming a color button in LIST mode

If the TV is in SIMPLE text, TOP text or FASTEXT mode, press the “**MODE**” button to switch to LIST mode.

Four teletext page numbers of your choice can be colored and easily selected by pressing the corresponding colored button on the remote control handset.

1. Press a colored button.
2. Using the NUMBER buttons to select the page you wish to program.
3. Press the $\blacktriangleright$ button. Then the selected page is stored as the selected page number with blinking once. From now on, you can select this page with the same colored button.
4. The three other colored buttons are programmed in the way.

TOP text

The User's Guide displays four fields-red, green, yellow and blue at the bottom of the screen. The yellow field denotes the next group and blue field indicates the next block.

Block/ group/ page selection

1. With the blue button you, can progress from block to block.
2. Use the yellow button to proceed to the next group with automatic overflow to the next block.
3. With the green button, you can proceed to the next existing page with automatic overflow to the next group. (Alternatively the $\uparrow$ button can be used.)
4. The red button permits you to return to the previous selection. (Alternatively the $\downarrow$ button can be used.)

Direct page selection

In the SIMPLE teletext mode, you can select a page by using the NUMBER buttons in TOP mode to enter the three-digit number.

FASTEXT

The teletext pages are color coded along the bottom of the screen and are selected by pressing the corresponding colored button.

Page selection

1. Press the "INDEX" button to select the index page.
2. You can select the pages which are color coded along the bottom line with the same colored buttons.
3. Corresponding to the SIMPLE teletext mode, you can select a page by entering its three-digit page number with the NUMNER buttons in FASTEXT mode.
4. The ↑ / ↓ button can be used to select the previous or next page.

REVEAL

Press this button to display hidden information, such as solution of riddles or puzzles.

Press this button again to remove the information from the display.

2.8.2 Advanced Setting

2.8.2.1 AV1/S-Video, AV2/CVBS and COMPONENT, TV settings

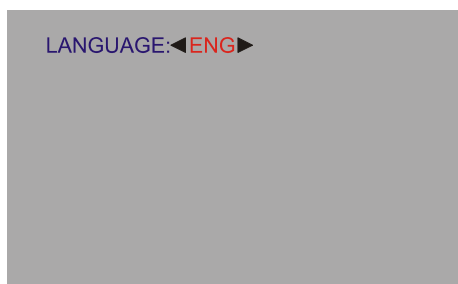
The OSD shown below displays when you press "MENU" (on main body) or "►" (on remote control) button. You can see four options shown as below.

AUDIO: Treble, Bass and Balance.

PICTURE: Bright, Contrast, Colour and Sharp.

SETUP: Channel search, Channel memory, Fine Tune, Channel Swap and Recall System.

SYSTEM: PAL / SECAM / SECAM L, Sound, NICAM.

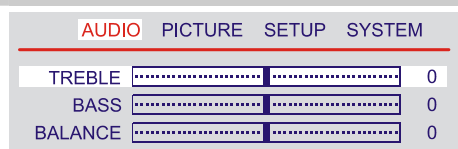


LANGUAGE

When you start using your set for the first time, you must select the language which will be used for displaying menus and indications.

Press "←, →" (on remote control) button to select English, German, French, Spanish, or Italian as your preferred OSD language.

AUDIO

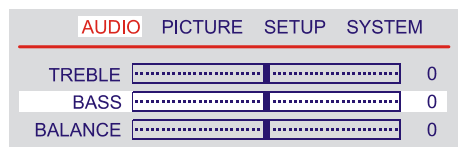


TREBLE

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **TREBLE**.
3. Press "F+" (on main body) or "←, →" (on remote control) button to lower or raise the treble for sound.

BASS

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **BASS**.
3. Press "F+" (on main body) or "←, →" (on remote control) button to lower or raise the bass for sound.



AUDIO	PICTURE	SETUP	SYSTEM
TREBLE			0
BASS			0
BALANCE			0

BALANCE

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **BALANCE**.
3. Adjust the speaker balance on Left/Right by pressing "⏮" (on main body) or "←, →" (on remote control) button.

PICTURE

AUDIO	PICTURE	SETUP	SYSTEM
BRIGHT			0
CONTRAST			0
COLOUR			0
SHARP			0

BRIGHT

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press "⏮" (on main body) or "→" (on remote control) button to select **PICTURE**.
3. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **BRIGHT**.
4. Press "⏮" (on main body) or "←, →" (on remote control) button to increase or decrease the screen brightness.

AUDIO	PICTURE	SETUP	SYSTEM
BRIGHT			0
CONTRAST			0
COLOUR			0
SHARP			0

CONTRAST

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press "⏮" (on main body) or "→" (on remote control) button to select **PICTURE**.
3. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **CONTRAST**.
4. Press "⏮" (on main body) or "←, →" (on remote control) button to increase or decrease the screen contrast.

AUDIO	PICTURE	SETUP	SYSTEM
BRIGHT			0
CONTRAST			0
COLOUR			0
SHARP			0

COLOUR

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press "⏮" (on main body) or "→" (on remote control) button to select **PICTURE**.
3. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **COLOUR**.
4. Press "⏮" (on main body) or "←, →" (on remote control) button to lower or higher the screen colour intensity.

AUDIO	PICTURE	SETUP	SYSTEM
BRIGHT			0
CONTRAST			0
COLOUR			0
SHARP			0

SHARP

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press "⏮" (on main body) or "→" (on remote control) button to select **PICTURE**.
3. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **SHARP**.
4. Press "⏮" (on main body) or "←, →" (on remote control) button to adjust the contrast for soft or sharp.

SETUP

AUDIO	PICTURE	SETUP	SYSTEM
CH. SEARCH	NO	YES	
CH. MEMORY	NO	YES	
FINE TUNE	000.00 MHz		
CH. SWAP	ORIGINAL	001	
	TARGET	001	
RECALL	NO	YES	
SYSTEM	OFF	ON	

AUDIO	PICTURE	SETUP	SYSTEM
CH. SEARCH	NO	YES	
CH. MEMORY	NO	YES	
FINE TUNE	000.00 MHz		
CH. SWAP	ORIGINAL	001	
	TARGET	001	
RECALL	NO	YES	
SYSTEM	OFF	ON	

AUDIO	PICTURE	SETUP	SYSTEM
CH. SEARCH	NO	YES	
CH. MEMORY	NO	YES	
FINE TUNE	000.00 MHz		
CH. SWAP	ORIGINAL	001	
	TARGET	001	
RECALL	NO	YES	
SYSTEM	OFF	ON	

AUDIO	PICTURE	SETUP	SYSTEM
CH. SEARCH	NO	YES	
CH. MEMORY	NO	YES	
FINE TUNE	000.00 MHz		
CH. SWAP	ORIGINAL	001	
	TARGET	001	
RECALL	NO	YES	
SYSTEM	OFF	ON	

CH. SEARCH

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press "⏏" (on main body) or "→" (on remote control) button to select **SETUP**.
3. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **CH. SEARCH**.
4. Press "⏏" (on main body) or "←, →" (on remote control) button to select **NO** or **YES**. If you select **YES**, the TV will scan program channels automatically.

CH. MEMORY

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press "⏏" (on main body) or "→" (on remote control) button to select **SETUP**.
3. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **CH. MEMORY**.
4. Press "⏏" (on main body) or "←, →" (on remote control) button to select **NO** or **YES**. If you select **YES**, the TV will add the you are currently watching to the memory.

FINE TUNE

If the reception is clear, you do not have to fine-tune the channel, as this is done automatically during the search and store operation. If however the signal is weak or distorted, you may have to fine-tune the channel manually.

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press "⏏" (on main body) or "→" (on remote control) button to select **SETUP**.
3. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **FINE TUNE**.
4. Press "⏏" (on main body) or "←, →" (on remote control) button to fine-tune the channel manually if the reception is not very clear. You can increase or decrease the number to achieve the best picture.

CH. SWAP

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press "⏏" (on main body) or "→" (on remote control) button to select **SETUP**.
3. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **CH. SWAP**.
4. Press "⏏" (on main body) or, press the appropriate numbers on remote control to select the original channel number you'd like to change.(eg 001).
5. Repeat the last operation to assign the target channel number to the original channel.

AUDIO	PICTURE	SETUP	SYSTEM
CH. SEARCH	NO YES		
CH. MEMORY	NO YES		
FINE TUNE	000.00 MHz		
CH. SWAP	ORIGINAL 001		
	TARGET 001		
RECALL	NO YES		
SYSTEM	OFF ON		

AUDIO	PICTURE	SETUP	SYSTEM
CH. SEARCH	NO YES		
CH. MEMORY	NO YES		
FINE TUNE	000.00 MHz		
CH. SWAP	ORIGINAL 001		
	TARGET 001		
RECALL	NO YES		
SYSTEM	OFF ON		

RECALL

1. Press “**MENU**” (on main body) or “**▶**” (on remote control) button.
2. Press “**→**” (on main body) or “**→**” (on remote control) button to select **SETUP**.
3. Press “**Fn**” (on main body) or “**↑, ↓**” (on remote control) button to select **RECALL**.
4. Press “**←, →**” (on main body) or “**←, →**” (on remote control) button to select **NO** or **YES**. If you select **YES**, the TV will recall all the picture settings to default.

SYSTEM

1. Press “**MENU**” (on main body) or “**▶**” (on remote control) button.
2. Press “**→**” (on main body) or “**→**” (on remote control) button to select **SETUP**.
3. Press “**Fn**” (on main body) or “**↑, ↓**” (on remote control) button to select **SYSTEM**.
4. Press “**←, →**” (on main body) or “**←, →**” (on remote control) button to select **OFF** or **ON**. If you select **OFF**, the **SYSTEM** menu will have no function when you push the menu button. This menu is not normally needed once you have tuned the set in for the first time. To see the **SYSTEM** menu select **ON** in the **SETUP** menu.

SYSTEM

Please make sure the **SYSTEM** menu is **ON** status before selecting it. (Please refer to above **SYSTEM- OFF ON** setting in the **SETUP** menu.)

AUDIO	PICTURE	SETUP	SYSTEM
PAL / SECAM	PAL	SECAM	SECAM L
SOUND	B/G	D/K	I
NICAM	ON	OFF	

PAL/SECAM/SECAM L

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press " " (on main body) or "→" (on remote control) button to select **SYSTEM**.
3. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **PAL / SECAM / SECAM L**.
4. Press " " (on main body) or "←, →" (on remote control) button to select the appropriate PICTURE signal type from **PAL**, **SECAM**, and **SECAM L**.

AUDIO	PICTURE	SETUP	SYSTEM
PAL / SECAM	PAL	SECAM	SECAM L
SOUND	B/G	D/K	I
NICAM	ON	OFF	

SOUND

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press " " (on main body) or "→" (on remote control) button to select **SYSTEM**.
3. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **SOUND**.
4. Press " " (on main body) or "←, →" (on remote control) button to select the appropriate sound system from **B/G**, **D/K**, or **I**. The sound system will display on top-righter corner of screen "B", "D" or "I" of your choice.

AUDIO	PICTURE	SETUP	SYSTEM
PAL / SECAM	PAL	SECAM	SECAM L
SOUND	B/G	D/K	I
NICAM	ON	OFF	

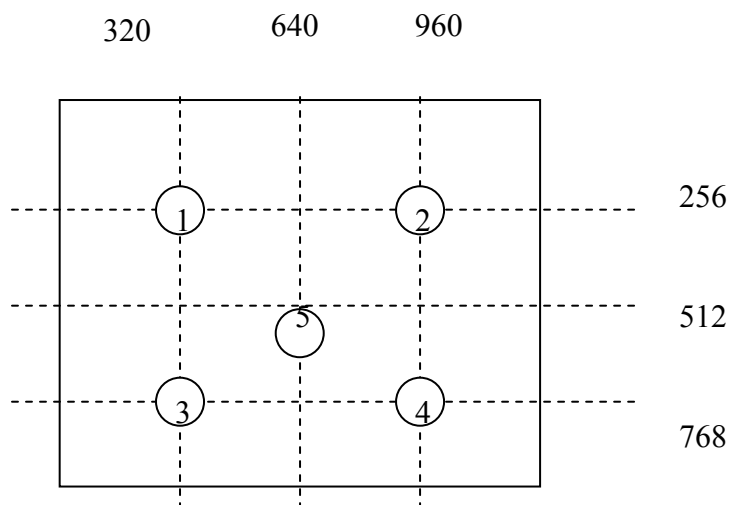
NICAM

1. Press "MENU" (on main body) or "►" (on remote control) button.
2. Press " " (on main body) or "→" (on remote control) button to select **SYSTEM**.
3. Press "Fn" (on main body) or "↑, ↓" (on remote control) button to select **NICAM**.
4. Press " " (on main body) or "←, →" (on remote control) button to select **ON** or **OFF**. You can select **ON** if your set is equipped with the receiver for **NICAM** reception. The high quality **NICAM** (Near Instantaneous Companded Audio Multiplex) digital sound can be received.

3 VISUAL PERFORMANCE

3.1 MEASUREMENT CONDITIONS

Warm up time: 30min.
Angle for measurement: 90°H and V
Distance: 100cm
Equipment: Minolta CS-100
Measurement positions:



Grey scale definition: White means digital value for RGB=255,255,255
50% gray, RGB=127,127,127
Black, RGB=0,0,0

3.2 PICTURE SIZE AND CENTERING

For 1280 X 768 resolution the picture size is equal to the active area of the display. For Smaller Resolution (SVGA, VGA Text and VGA Graphics) there is an expansion algorithm which expands the picture to a maximum possible size. The display is centered with respect to the front bezel opening with a tolerance of 0.5mm

3.2.1 SIZE CONTROL RANGE

The picture size can be adjusted to achieve activation of all pixels of the display in 1280 X

768 resolution

Resolution, for XGA, SVGA, VGA Text and VGA Graphics the conditions of 3.2 can be met.

3.2.2 POSITION CONTROL RANGE

The picture position can be adjusted that a complete picture can be displayed centered

3.2.3 Max. BRIGHTNESS : PC Mode

340(MIN.), 400(Typ.) cd/m²

Test conditions:

- center of display (5)
- video input (RGB) = 0.7V_{pp}
- brightness control is set to max.
- contrast control is set to max.

3.2.4 MIN. BRIGHTNESS : PC Mode

< 100 cd/m²

Test conditions:

- center of display (5)
- video input (RGB) = 0.700V
- brightness control is set to min.
- contrast control is set to min..

3.2.5 CONTRAST RATIO : PC Mode

The contrast ratio(CR) measured at center position (5) of the display for it should be better than 210(MIN.), 400(Typ.).

and is calculated according to the following formula.

$$CR = \frac{\text{Brightness of all pixels white}}{\text{Brightness of all pixels black}}$$

3.3 BRIGHTNESS UNIFORMITY

The brightness uniformity has to be better than 70% and is calculated according to the following formula:

$$\Delta Y = \left[\frac{Y_{\min}}{Y_{\max}} \right] \times 100\%$$

With Y1 to Y5 as the brightness values with all pixels white at the 5 measurement positions

3.4 WHITE COLOR COORDINATES

The white color temperature should be app. (CIE1931, Normal : 9300 and 6500), A 3th channel should be available, which can be defined by the user. The measurement position is the center of the display(5) at brightness set to maximum and Contrast set to center. The tolerance of the color coordinates should be less than ± 0.020

3.5 WHITE COLOR UNIFORMITY

The deviation of the white color coordinates at the 4 positions (1)...(4) should not exceed ± 0.020 with respect to the measurement at the center position(5).

3.6 PURITY

Purity is defined as the uniformity of the chromaticity of the three primary colors. The Deviation of the color coordinates of the primary colors red/green/blue at the 4 positions (1)...(4) should not exceed ± 0.020 with respect to the measurement at the center position(5)

3.7 RESPONSE TIME

The response time of the display for Fujitsu should be better than 15ms typ. The response time is measured from 90% to 10% (tr) and from 10% to 90% (tf) for a transition from white (100%) to black (0%) to white (100%)

3.8 VIEWING ANGLE

Panel	Horizontal view angle	Vertical view angle at CR >10
Fujitsu	160	160

3.9 SURFACE TREATMENT OF FRONT POLARIZER

The front polarize should have hard coating (3H) and anti-glare treatment.

4. AUDIO Electrical Performance

4.1 STANDARD TESTING CONDITIONS :

4.1.1 **Test Equipment** : Audio Analyzer test equipment

4.1.2 Conditions of Input Signal

1). Input Impedance : 600 ohm

2). Input Level : 700m Vrms $\pm$ 10%

3). Signal Frequency : 1 KHz

- 4.1.3 Ambient Temperature** : $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$
- 4.1.4 Warm up Time** : minimum 10 minutes after power on and audio signal input
- 4.1.5 Test Distance** : 50cm from monitor screen and at the center of left and right speaker
- 4.1.6 Output Impedance** : 4.5 ohm $\pm 15\%$
- 4.1.7 Output Voltage** : Effective output state means standard testing conditions

4.2 AMPLIFIER CHARACTERISTIC

4.2.1 Output Power (Unit : Watt)

- 1). Effective Output : 2.5 Watts (measure at the output voltage of 1% Distortion Factor)
- 2). Maximum Output : 3 Watts (measure at the output voltage of 20% Distortion Factor)
- 3). Measurement method

- Set Test Equipment

Meas : LEVEL , Freq : 1KHz

AMPTD : Vrms, HPF/LPF : OFF RANGE : AUTO

- Measure output voltage (RMS)
- Output calculation formula : $P=V^2/R$

V: RMS value of output voltage P : Output Power R: Speaker Impedance

4.3 SPEAKER CHARACTERISTIC :

4.3.1 Input : Normal 2.5 Watt

4.3.2 Impedance : 4.5 ohm $\pm 15\%$ ohm at 1KHz

4.3.3 Resonant Frequency (f0) : $150 \pm 10\%$ Hz

4.3.4 Frequency Range: 20Hz ~ 20KHz

5 TUNER Electrical Performance

5.1.1 Receiving System : (PAL STANDARD SYSTEM)

Channel	VHF	Low BAND	: 48.25MHz	~	160.00 MHz
		High BAND	: 160.00MHz	~	442.00 MHz
	UHF	BAND	: 442.00MHz	~	863.25 MHz

Intermediate Frequency

- PIF : (38.90)MHz
- CIF : (34.47)MHz
- SIF : B/G: 33.40 MHz : 33.16 MHz
- D/K: 32.40 MHz
- I: 32.9 MHz
- B/G, D/K: 33.05 MHz : I : 33.348 MHz

Input Impedance : UHF/VHF Terminal (75) Ohm, Unbalanced

Output Impedance : VIDEO : C.V.B.S

AUDIO : AF/MPX

IF : SECOND IF

Band Chang - Over System : (PLL Control System)

Tuning System : (Electronic Tuning System With PLL)

(1) PAL B/G Air Channel

Channel	Frequency (Mhz)	Channel	Frequency (Mhz)
2	48.25	48	687.25
3	55.25	49	695.25
4	62.25	50	703.25
5	175.25	51	711.25
6	182.25	52	719.25
7	189.25	53	727.25
8	196.25	54	735.25
9	203.25	55	743.25
10	210.25	56	751.25
11	217.25	57	759.25
12	224.25	58	767.25
21	471.25	59	775.25
22	479.25	60	783.25
23	487.25	61	791.25
24	495.25	62	799.25
25	503.25	63	807.25
26	511.25	64	815.25
27	519.25	65	823.25
28	527.25	66	831.25
29	535.25	67	839.25
30	543.25	68	847.25
31	551.25	69	855.25
32	559.25		
33	567.25		
34	575.25		
35	583.25		
36	591.25		
37	599.25		
38	607.25		
39	615.25		
40	623.25		
41	631.25		
42	639.25		
43	647.25		
44	655.25		
45	663.25		
46	671.25		
47	679.25		

(2) PAL B/G Cable Channel

Channel	Frequency (Mhz)	Channel	Frequency (Mhz)	Channel	Frequency (Mhz)
2	48.25	39	311.25	76	607.25
3	55.25	40	319.25	77	615.25
4	62.25	41	327.25	78	623.25
5	69.25	42	335.25	79	631.25
6	76.25	43	343.25	80	639.25
7	83.25	44	351.25	81	647.25
8	90.25	45	359.25	82	655.25
9	97.25	46	367.25	83	663.25
10	105.25	47	375.25	84	671.25
11	112.25	48	383.25	85	679.25
12	119.25	49	391.25	86	687.25
13	126.25	50	399.25	87	695.25
14	133.25	51	407.25	88	703.25
15	140.25	52	415.25	89	711.25
16	147.25	53	423.25	90	719.25
17	154.25	54	431.25	91	727.25
18	161.25	55	439.25	92	735.25
19	168.25	56	447.25	93	743.25
20	175.25	57	455.25	94	751.25
21	182.25	58	463.25	95	759.25
22	189.25	59	471.25	96	767.25
23	196.25	60	479.25	97	775.25
24	203.25	61	487.25	98	783.25
25	210.25	62	495.25	99	791.25
26	217.25	63	503.25	100	799.25
27	224.25	64	511.25	101	807.25
28	231.25	65	519.25	102	815.25
29	238.25	66	527.25	103	823.25
30	245.25	67	535.25	104	831.25
31	252.25	68	543.25	105	839.25
32	259.25	69	551.25	106	847.25
33	266.25	70	559.25	107	855.25
34	273.25	71	567.25		
35	280.25	72	575.25		
36	287.25	73	583.25		
37	294.25	74	591.25		
38	303.25	75	599.25		

(3) PAL D/K Air Channel

Channel	Frequency (Mhz)	Channel	Frequency (Mhz)
1	49.75	38	711.25
2	57.25	39	719.25
3	65.75	40	727.25
4	77.25	41	735.25
5	85.25	42	743.25
6	168.25	43	751.25
7	176.25	44	759.25
8	184.25	45	767.25
9	192.25	46	775.25
10	200.25	47	783.25
11	208.25	48	791.25
12	216.25	49	799.25
13	471.25	50	807.25
14	479.25	51	815.25
15	487.25	52	823.25
16	495.25	53	831.25
17	503.25	54	839.25
18	511.25	55	847.25
19	519.25	56	855.25
20	527.25	57	863.25
21	535.25		
22	543.25		
23	551.25		
24	559.25		
25	607.25		
26	615.25		
27	623.25		
28	631.25		
29	639.25		
30	647.25		
31	655.25		
32	663.25		
33	671.25		
34	679.25		
35	687.25		
36	695.25		
37	703.25		

(4) PAL D/K Cable Channel

Channel	Frequency (Mhz)	Channel	Frequency (Mhz)	Channel	Frequency (Mhz)
1	49.75	38	368.25	75	671.25
2	57.75	39	376.25	76	679.25
3	65.75	40	384.25	77	687.25
4	77.25	41	392.25	78	695.25
5	85.25	42	400.25	79	703.25
6	112.25	43	408.35	80	711.25
7	120.25	44	416.25	81	719.25
8	128.25	45	424.25	82	727.25
9	136.25	46	432.25	83	735.25
10	144.25	47	440.25	84	743.25
11	152.25	48	448.25	85	751.25
12	160.25	49	456.25	86	759.25
13	168.25	50	471.25	87	767.25
14	176.25	51	479.25	88	775.25
15	184.25	52	487.25	89	783.25
16	192.25	53	495.25	90	791.25
17	200.25	54	503.25	91	799.25
18	208.25	55	511.25	92	807.25
19	216.25	56	519.25	93	815.25
20	224.25	57	527.25	94	823.25
21	232.25	58	535.25	95	831.25
22	240.25	59	543.25	96	839.25
23	248.25	60	551.25	97	847.25
24	256.25	61	559.25	98	855.25
25	264.25	62	567.25	99	863.25
26	272.25	63	575.25		
27	280.25	64	583.25		
28	288.25	65	591.25		
29	296.25	66	599.25		
30	304.25	67	607.25		
31	312.25	68	615.25		
32	320.25	69	623.25		
33	328.25	70	631.25		
34	336.25	71	639.25		
35	344.25	72	647.25		
36	352.25	73	655.25		
37	360.25	74	663.25		

(5) PAL I Air Channel

Channel	Frequency (Mhz)	Channel	Frequency (Mhz)
1	45.75	49	695.25
2	53.75	50	703.25
3	61.75	51	711.25
4	175.25	52	719.25
5	183.25	53	727.25
6	191.25	54	735.25
7	199.25	55	743.25
8	207.25	56	751.25
9	215.25	57	759.25
21	471.25	58	767.25
22	479.25	59	775.25
23	487.25	60	783.25
24	495.25	61	791.25
25	503.25	62	799.25
26	511.25	63	807.25
27	519.25	64	815.25
28	527.25	65	823.25
29	535.25	66	831.25
30	543.25	67	839.25
31	551.25	68	847.25
32	559.25	69	855.25
33	567.25		
34	575.25		
35	583.25		
36	591.25		
37	599.25		
38	607.25		
39	615.25		
40	623.25		
41	631.25		
42	639.25		
43	647.25		
44	655.25		
45	663.25		
46	671.25		
47	679.25		
48	687.25		

(6) PAL I Cable Channel

Channel	Frequency (Mhz)	Channel	Frequency (Mhz)	Channel	Frequency (Mhz)
1	45.75	39	319.25	77	623.25
2	53.75	40	327.25	78	631.25
3	61.75	41	335.25	79	639.25
4	69.25	42	343.25	80	647.25
5	76.25	43	351.25	81	655.25
6	83.25	44	359.25	82	663.25
7	90.25	45	367.25	83	671.25
8	97.25	46	375.25	84	679.25
9	105.25	47	383.25	85	687.25
10	112.25	48	391.25	86	695.25
11	119.25	49	399.25	87	703.25
12	126.25	50	407.25	88	711.25
13	133.25	51	415.25	89	719.25
14	140.25	52	423.25	90	727.25
15	147.25	53	431.25	91	735.25
16	154.25	54	439.25	92	743.25
17	161.25	55	447.25	93	751.25
18	168.25	56	455.25	94	759.25
19	175.25	57	463.25	95	767.25
20	182.25	58	471.25	96	775.25
21	189.25	59	479.25	97	783.25
22	196.25	60	487.25	98	791.25
23	203.25	61	495.25	99	799.25
24	210.25	62	503.25	100	807.25
25	217.25	63	511.25	101	815.25
26	224.25	64	519.25	102	823.25
27	231.25	65	527.25	103	831.25
28	238.25	66	535.25	104	839.25
29	245.25	67	543.25	105	847.25
30	252.25	68	551.25	106	855.25
31	259.25	69	559.25	107	863.25
32	266.25	70	567.25		
33	273.25	71	575.25		
34	280.25	72	583.25		
35	287.25	73	591.25		
36	294.25	74	599.25		
37	303.25	75	607.25		
38	311.25	76	615.25		

(7) SECAM L' Air Channel

Channel	Frequency (Mhz)	Channel	Frequeny (Mhz)
1	47.75	49	695.25
2	55.75	50	703.25
3	60.5	51	711.25
4	63.75	52	719.25
5	176	53	727.25
6	184	54	735.25
7	192	55	743.25
8	200	56	751.25
9	208	57	759.25
10	216	58	767.25
21	471.25	59	775.25
22	479.25	60	783.25
23	487.25	61	791.25
24	495.25	62	799.25
25	503.25	63	807.25
26	511.25	64	815.25
27	519.25	65	823.25
28	527.25	66	831.25
29	535.25	67	839.25
30	543.25	68	847.25
31	551.25	69	855.25
32	559.25		
33	567.25		
34	575.25		
35	583.25		
36	591.25		
37	599.25		
38	607.25		
39	615.25		
40	623.25		
41	631.25		
42	639.25		
43	647.25		
44	655.25		
45	663.25		
46	671.25		
47	679.25		
48	687.25		

6 ACCESSORIES

6.1 POWER CABLE

Length	: 1.8m + 5cm/-5cm	
Color	: black	
Connectors	: Monitor-side / Mains-side	: IEC 320-1 / CEE7-VII (EU) : IEC 320-1 / BS-1363 (UK)

6.2 EXTERNAL ADAPTER

Type	: Worldwide type	
Length of DC cable	: 1.5m + 1.5cm/-0cm	
Color of adapter	: black	
Connectors	: Monitor-side	: Φ 2.5mm DC plug
	: Mains-side	: IEC 320 male

6.3 REMOTE CONTROL & BATTERIES

Remote Control	: 35 keys
Battery	: 1.5V AAA x 2 pcs

7 ENVIRONMENTAL

7.1 ENVIRONMENTAL CONDITIONS (CLIMATIC)

Operation (according to IEC 721 / EN 60721 Class 3K3) : (unpacked for a long time)

Temperature	+5°C ~ + 40°C
Humidity	20% ~ 85%
Max. Dew Point Temperature	+27°C
Max. abs. Air Humidity	25 g/m ³
Max. change of Temperature	0.5°C/min
Height	3000m
Air pressure	700~1060 mbar (70~10Kpa)
Dewing	Not allowed

Storage (according to IEC 721 / EN 60721 Class 1K2): (unpacked for a long time)

Temperature	-10°C ~ + 50°C
Relative Humidity	5% ~ 85%
Absolute Air Humidity	1 ~ 25 g/m ³
Max. Change of Temperature	0.5°C/min. (max. 10°C/30min.)
Air pressure	700~1060 mbar (70~106Kpa)
Radiation Solar heat	700 W/m ²

7.2 ENVIRONMENTAL CONDITION (MECHANICAL)

Storage and Transport: (according to IEC 721 / EN 60721 class 2M2)

	Test Procedure IEC 68/EN 60068			
Vibration (random vibration) IEC 68-2-64 EN 60068-2-64	Freq. range	Hz	5~10	10~100 100~500
	Change	db/oct	+12	-6
	Spectral acceleration density	m ² /s ³	0.75	
	Accel. RMS	m/s ²	11.4	
	Axis	-	3	
	Duration/Axis	Minutes	30	
Free fall ISO 2248 EN 22248	Weight	kg	0~9.1	9.1~18.2 18.2~27.2
	Fall height	m	0.9	0.76 0.61
	Direction and number		1 time on 1 corner, 3 edge,	6 surface
	Underground		concrete	

8 MECHANICAL REQUIREMENTS

8.1 VIBRATION AND SHOCK

All testing shall be done in each of three mutually perpendicular axes, referenced to the position of the system as it is in front of the user (i.e., front-to back, side-to-side, and top-to-bottom).

8.1.1 Non-Operating

The unit should suffer minimal visible cosmetic damage or damage that presents a safety hazard, or impairs the setup and operation of the system after testing.

Sinusoidal Vibration: 0.75 G zero-to-peak, 10 to 500Hz, 0.5 octave / minute sweep rate. This requires one sweep, 10 to 500 to 10Hz, along each of the three axes.

Random Vibration: 0.008 G²/Hz, 10 to 500 Hz, nominal 2 GRMS. The test shall be for one hour for each of the three axes.

Half Sine Wave Shock: 120 G peak, half sine pulse, 2 ms pulse duration. Testing shall consist of one shock in each direction in each axis, for a total of 6 shock inputs.

Square Wave Shock: 40 G peak acceleration, 160 inches / second velocity change. There shall be one shock in each direction in each axis, for a total of 6 shock inputs.

8.2 PACKAGE DROP SPECIFICATION

Listed below are standards of drop heights for monitor product

Product Weight	height Specs
<9.1 kg	0.91 m
9.2~18.2 kg	0.76 m
18.3~27.2 Kg	0.61 m
27.3~45.4 Kg	0.46 m

8.2.1 Drop Test Sequence

Drop Order	Drop point	Drop Times
1	Right Front Bottom Corner	1
2	Right Bottom Edge	1
3	Right Front Edge	1
4	Front Bottom Edge	1
5	Bottom Side	1
6	Top Side	1
7	Front Side	1
8	Back Side	1
9	Left Side	1
10	Right Side	1

8.3 DIMENSION SIZE AND WEIGHT

Dimension size	518 (W) x 333 (H) x 198 (D)
Net Weight	5.0 Kg $\pm$ 0.3kg
Gross Weight	6.8 Kg $\pm$ 0.3kg

8.4 GAP SPEC.

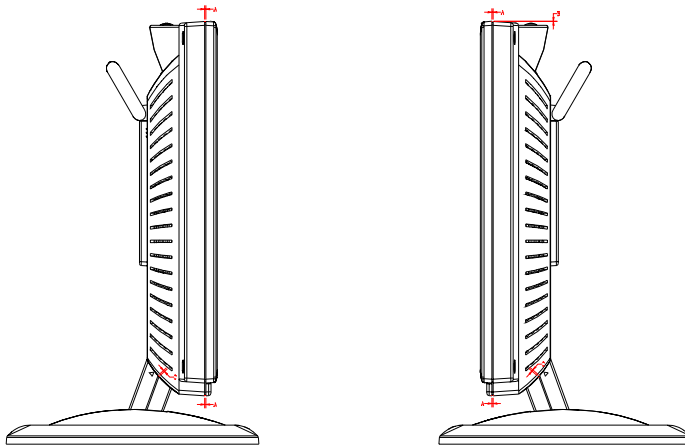
8.4.1 The step between front bezel and back cover shall be within specification.

Back Cover & Bezel Gap Neck Front & Neck Back

$$1.0\text{mm} \leq A \leq 1.4\text{mm} \quad 1.0\text{mm} \leq C \leq 1.4\text{mm}$$

Back Cover & Bezel Alignment

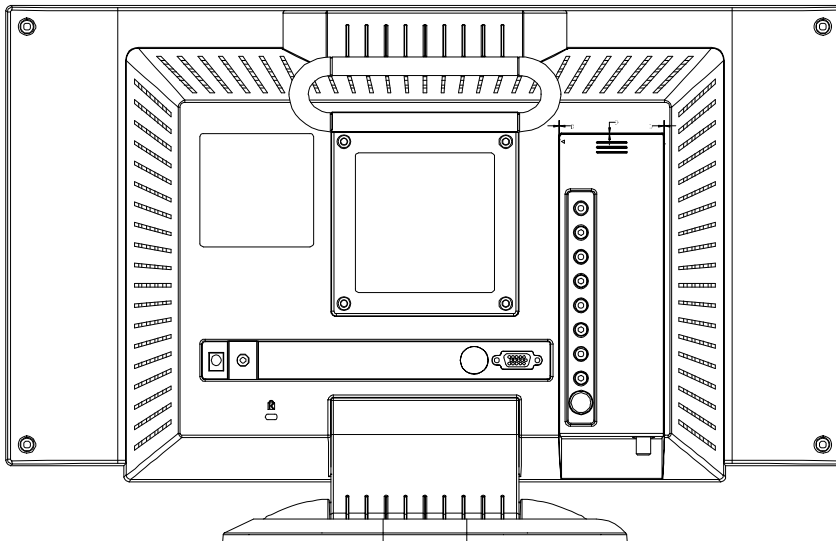
$$0\text{ mm} \leq B \leq 0.5\text{mm}$$



LV171-E06

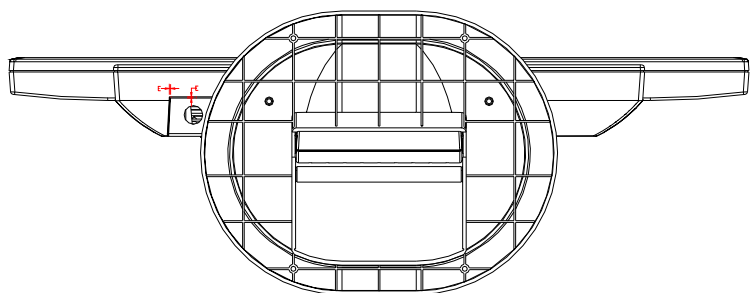
Back Cover & Tuner Door

$$0.8\text{ mm} \leq D \leq 1.2\text{mm}$$



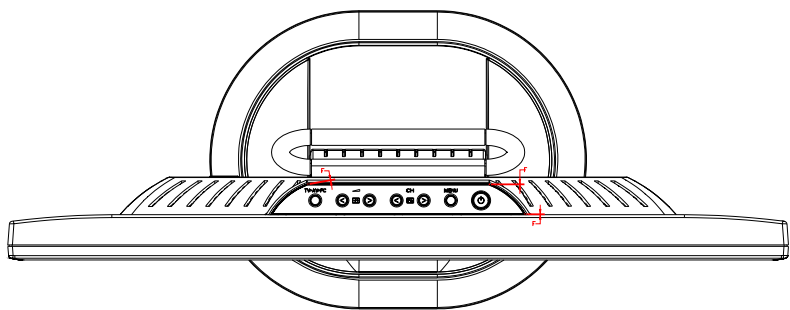
LV171-E07

Back Cover & Tuner Door
 $0.8\text{ mm} \leq E \leq 1.2\text{ mm}$



LV171-E08

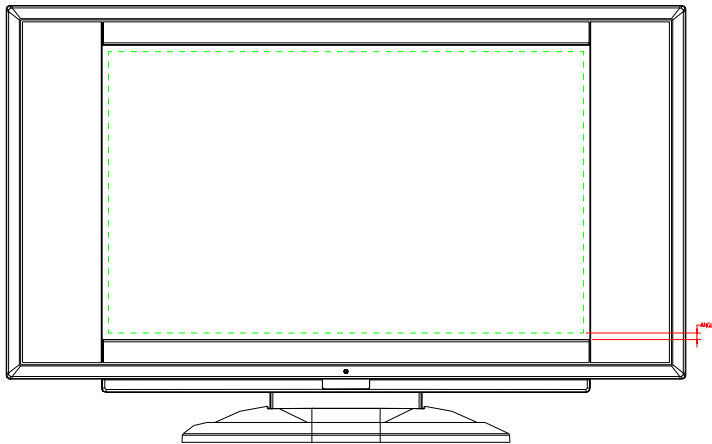
Back Cover & Key Plate
 $0.6\text{ mm} \leq F \leq 1.2\text{ mm}$



LV171-E09

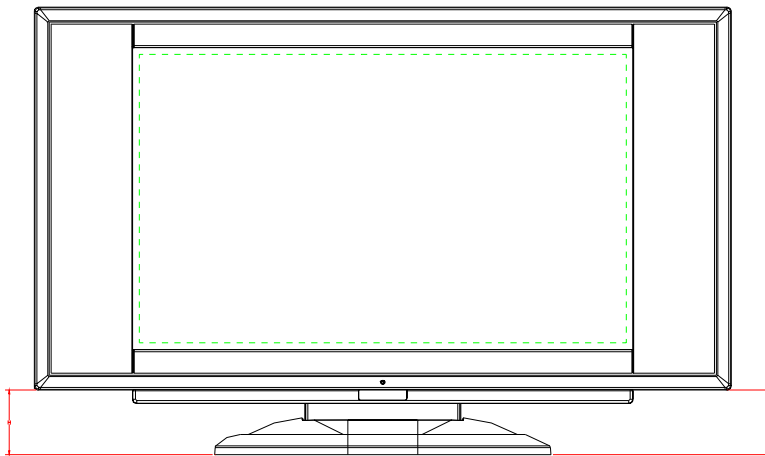
8.4.2 LCD Horizontally

The angle between front bezel and LCD unit in bottom side should be not large than 1.0mm.



LV171-E10

The distance G-H of the LCD display unit from left side to right should be not large than 4.0mm.



LV171-E11

Tilt Base Rotation

Tilt up $25 \pm 2^\circ$ / down $5 \pm 2^\circ$

8.5 PLASTIC MATERIAL

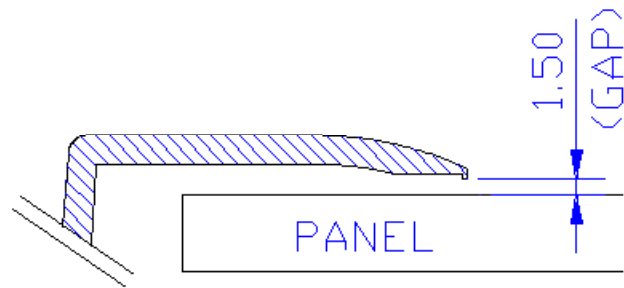
Front Bezel ABS 94HB, 94V-0

Back Cover ABS 94HB, 94V-0

The Others ABS 94HB

8.6 GAP SPEC.

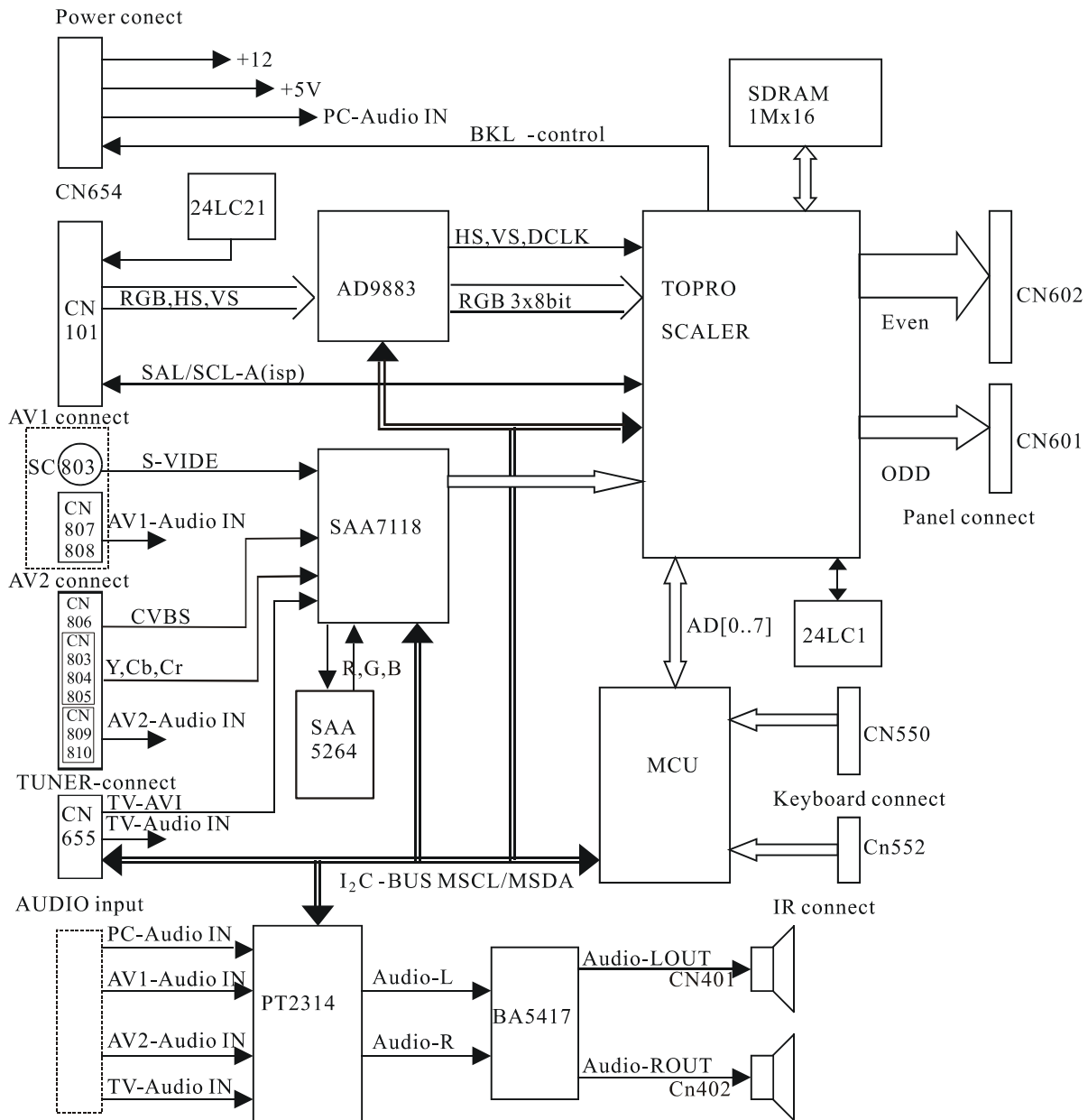
Gap between panel with bezel is $0.2\text{ mm} < \text{gap} < 1.5\text{ mm}$



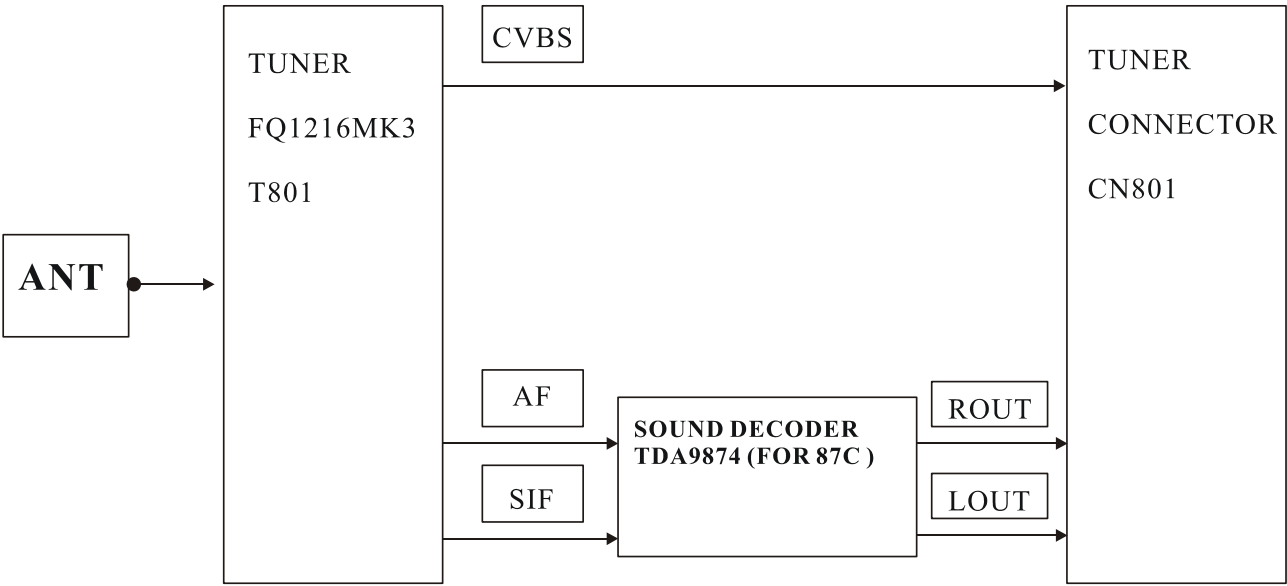
NOTE: $\text{GAP} \leq 1.5\text{mm}$

9 Block

9.1 MAIN BOARD BLOCK DIAGRAM



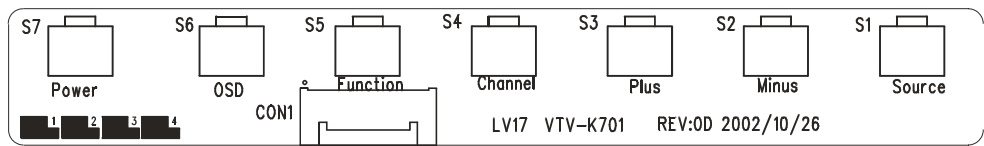
9.2 TUNER BOARD BLOCK DIAGRAM



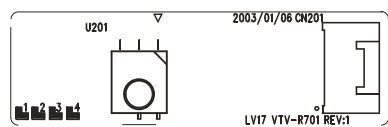
10 Connect

10.1 PCBA CONNECTOR LOCATION

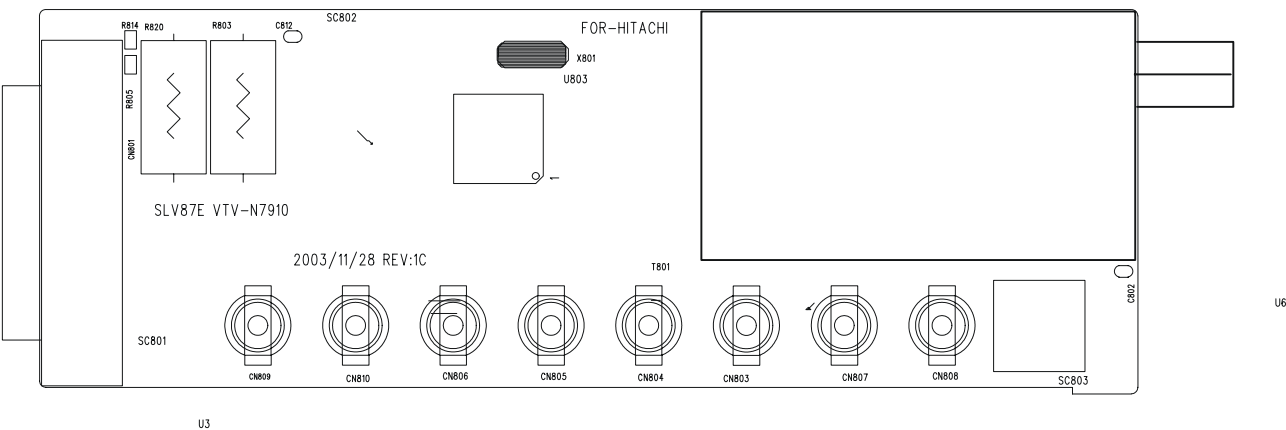
10.1.1 K701-DM



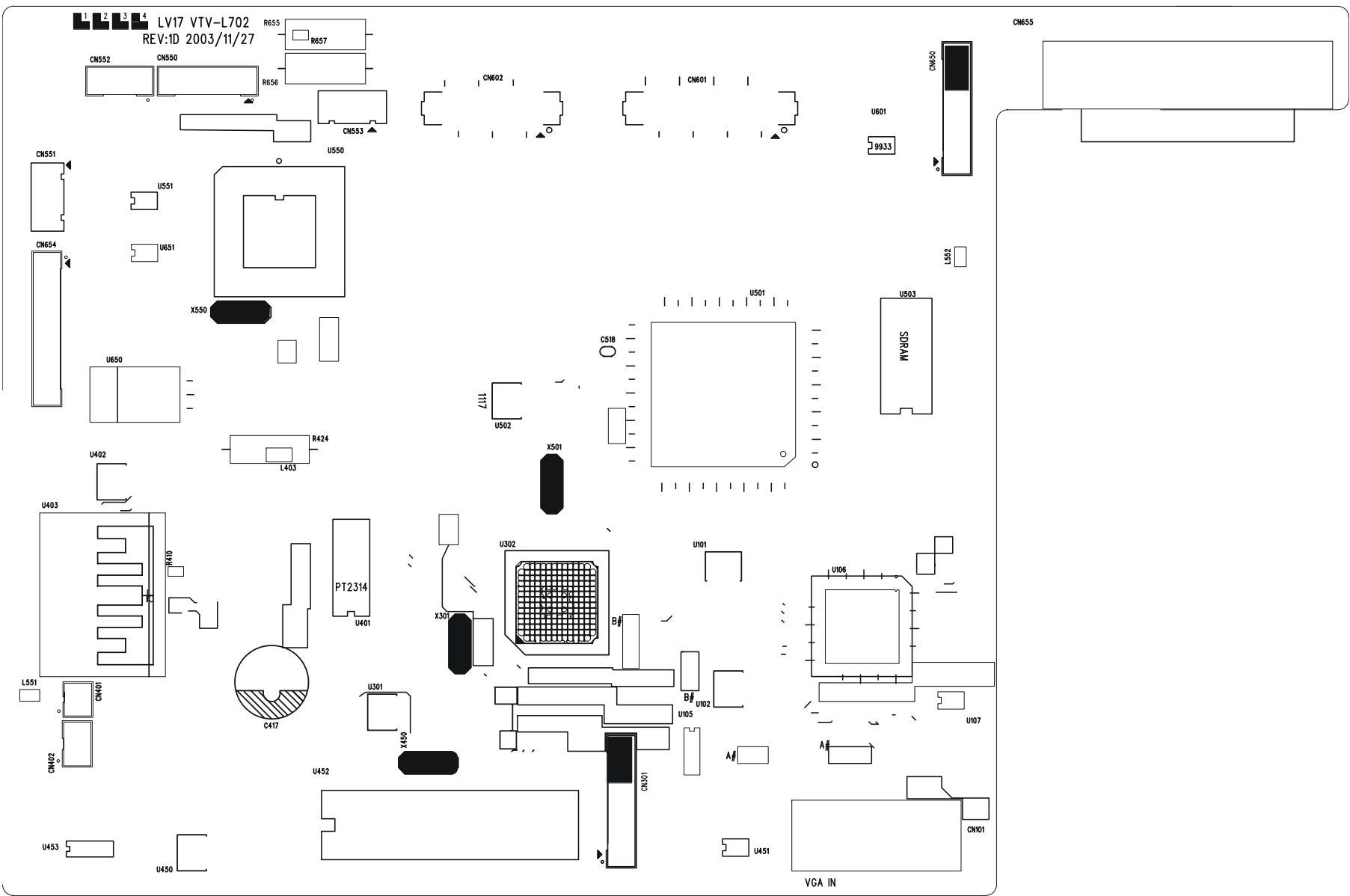
10.1.2 R701-DM



10.1.3 VTV-N7910



10.1.4 VTV-VL702ID-M



10.2 CONNECTOR P/N ASSIGNMENT

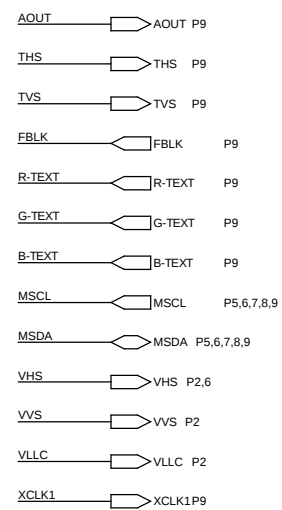
10.2.1 CONNECTOR Function

Location	Function	Type
CN101	VGA I/P	D-sub 15P Female -A
CN201/CN552	Remote control	5P Housing
CN202/CN550	KEY pad control	8P Housing
CN1/CN654	Inverter PW I/P	13P Housing
CN653/CN801	Tuner IN connector	D-sub 15P M/Female -R
CN301/CN652	Tuner I/P	6P wire
CN651	S-Video I/P	4 Pin Mini-DIN female
CN650	Component I/P	RCA female(G, B, R)
CN655	Composite I/P	RCA female(Y, W, R)
CN656	Component audio I/P	RCA female(W, R)
CN401	Speaker L	2P Housing
CN402	Speaker R	3P Housing
CN601	Panel ODD O/P	40P Housing
CN602	Panel EVEN O/P	30P Housing
JZ1	PC Audio I/P	3P Wafer
CN2	Power I/P	2P Wafer

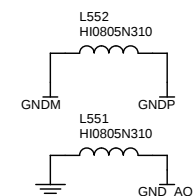
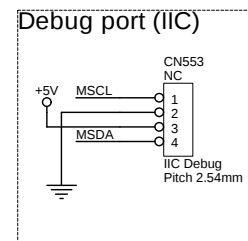
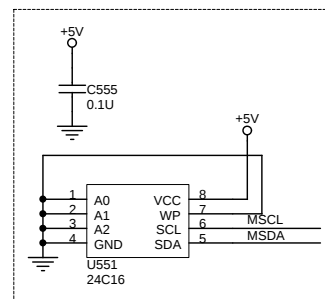
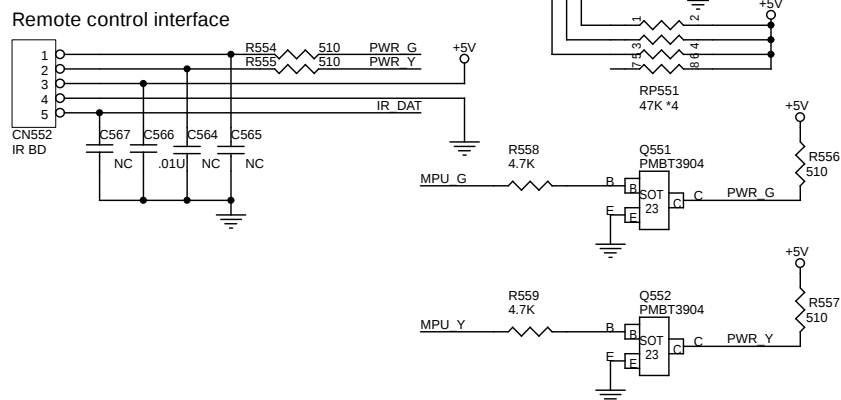
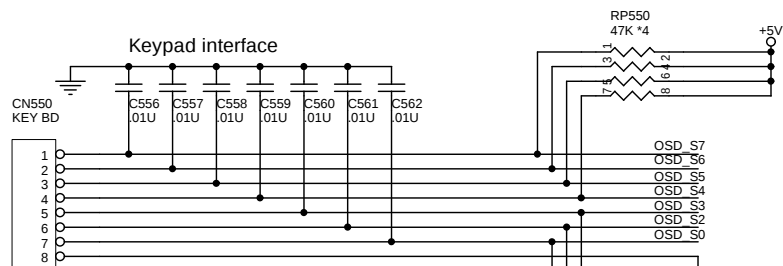
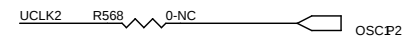
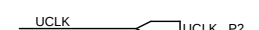
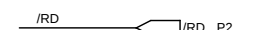
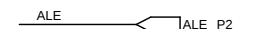
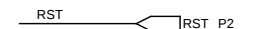
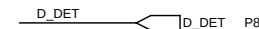
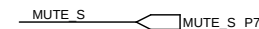
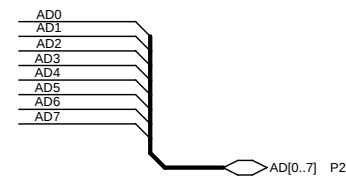
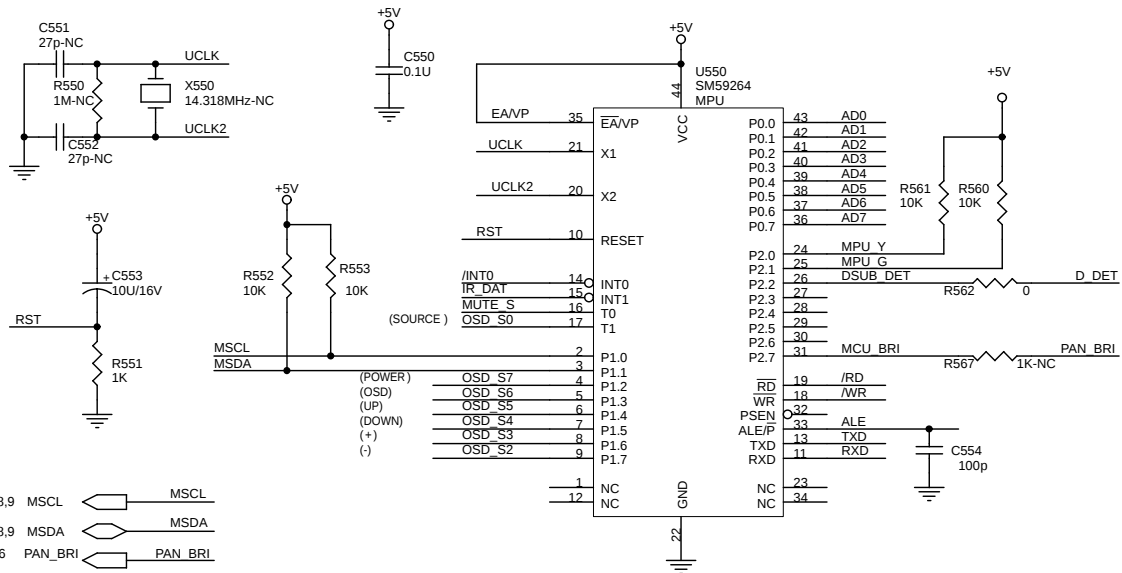
10.2.2 CONNECTOR PIN ASSIGNMENT

Location\ PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CN101	R-IN	G-IN	B-IN	ISP-SCL	GND	GND	GND	GND	DDC 5V	DET.	ISP-DDC	DDC-SDA	Hsync	Vsync	DDC-SCL
CN201/ CN552	PWR-G	PWR-Y	5V	GND	IR-DAT										
CN202/ CN550	OSD-S7	OSD-S6	OSD-S5	OSD-S4	OSD-S3	OSD-S2	OSD-S0	GND							
CN1/ CN654	5V	5V	GND	GND	GND	PAN-ON	PAN-BRI	12V	12V	12V	PC-RIN	PC-LIN	GND		
CN653/ CN801	TV-AVOUT	PW-TV	TV-LOUT	TV-ROUT	GND	GND	MSDA	MTS-SU	VHS-2	MODE	MSCL	MTS-ST	MTS-MA	5V	12V
CN301/ CN652	VHS-2	TV-AVOUT	GND	TV-ROUT	GND	TV-LOUT									
CN651	GND	GND	S-LUM	S-CHR											
CN650	GND	AU1-R	GND	AU1-L	GND	AV-CVBS									
CN655	GND	COMP-Cr	GND	COMP-Cb	GND	COMP-Y									
CN656	GND	AU2-R	GND	AU2-L											
CN401	LFSPEAK	GND													
CN402	RFSPEAK	NC	GND												
CN601	REF. Schematic														
CN602	REF. Schematic														

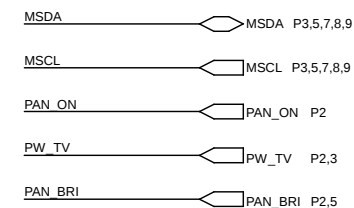
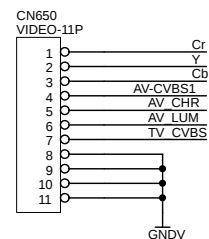
Appendix A: PCBA Assembly

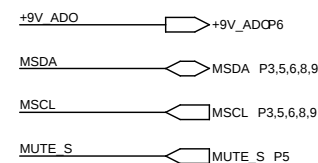
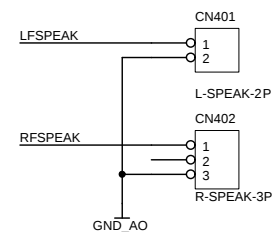
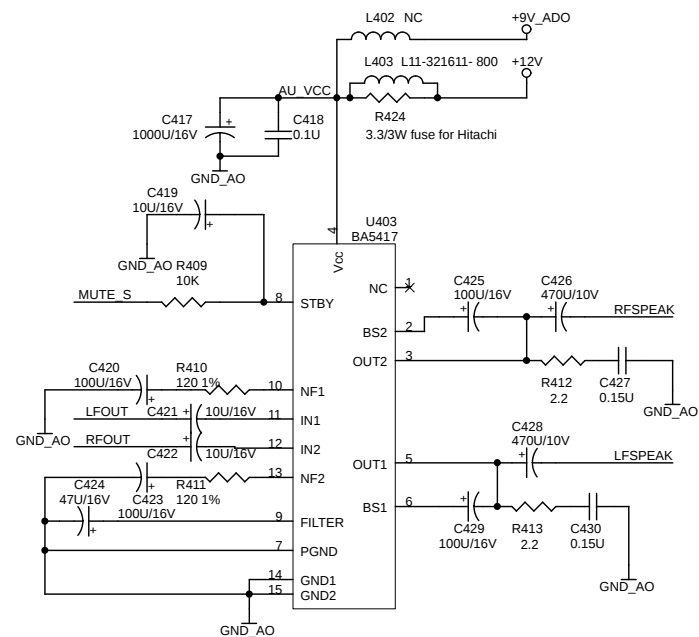
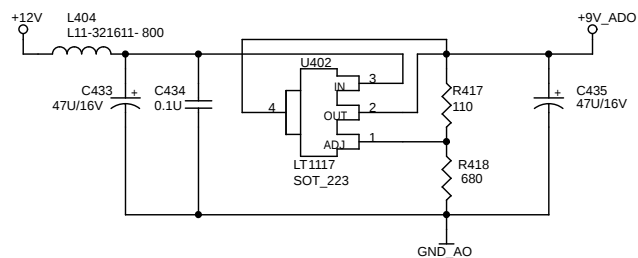
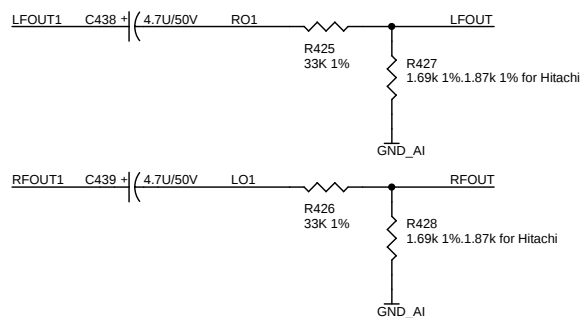
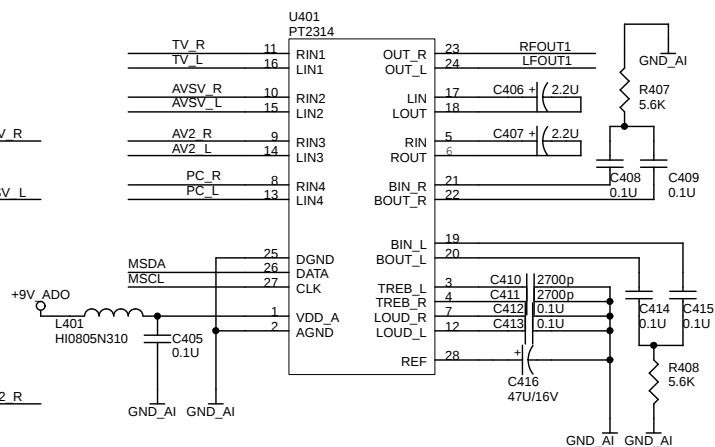
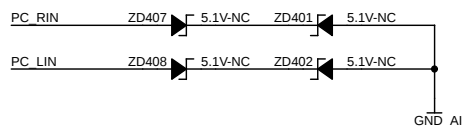
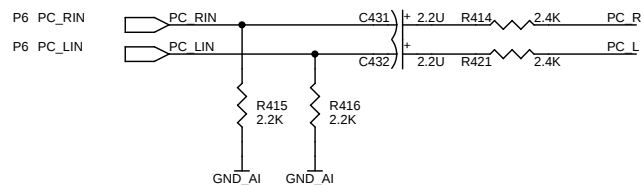
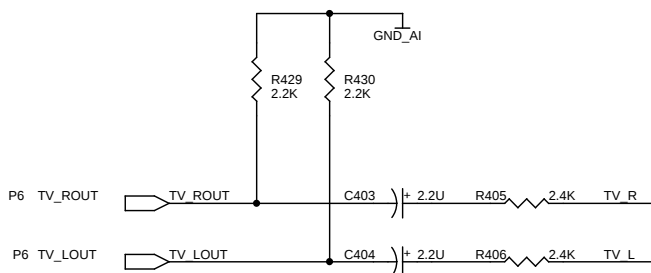
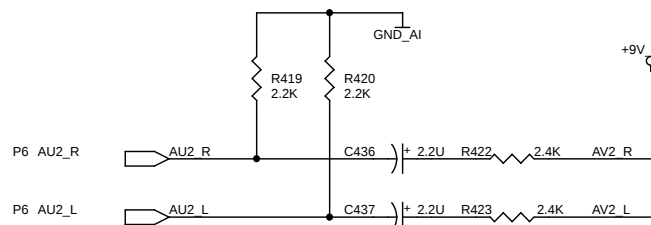
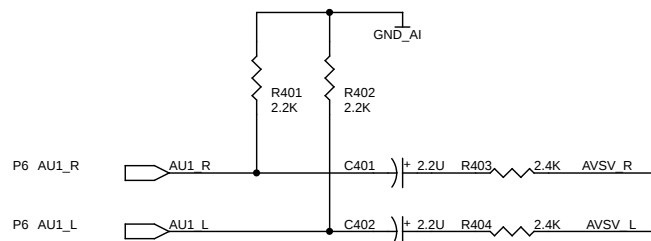


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Date:	Friday, December 05, 2003	Sheet	3	of 9



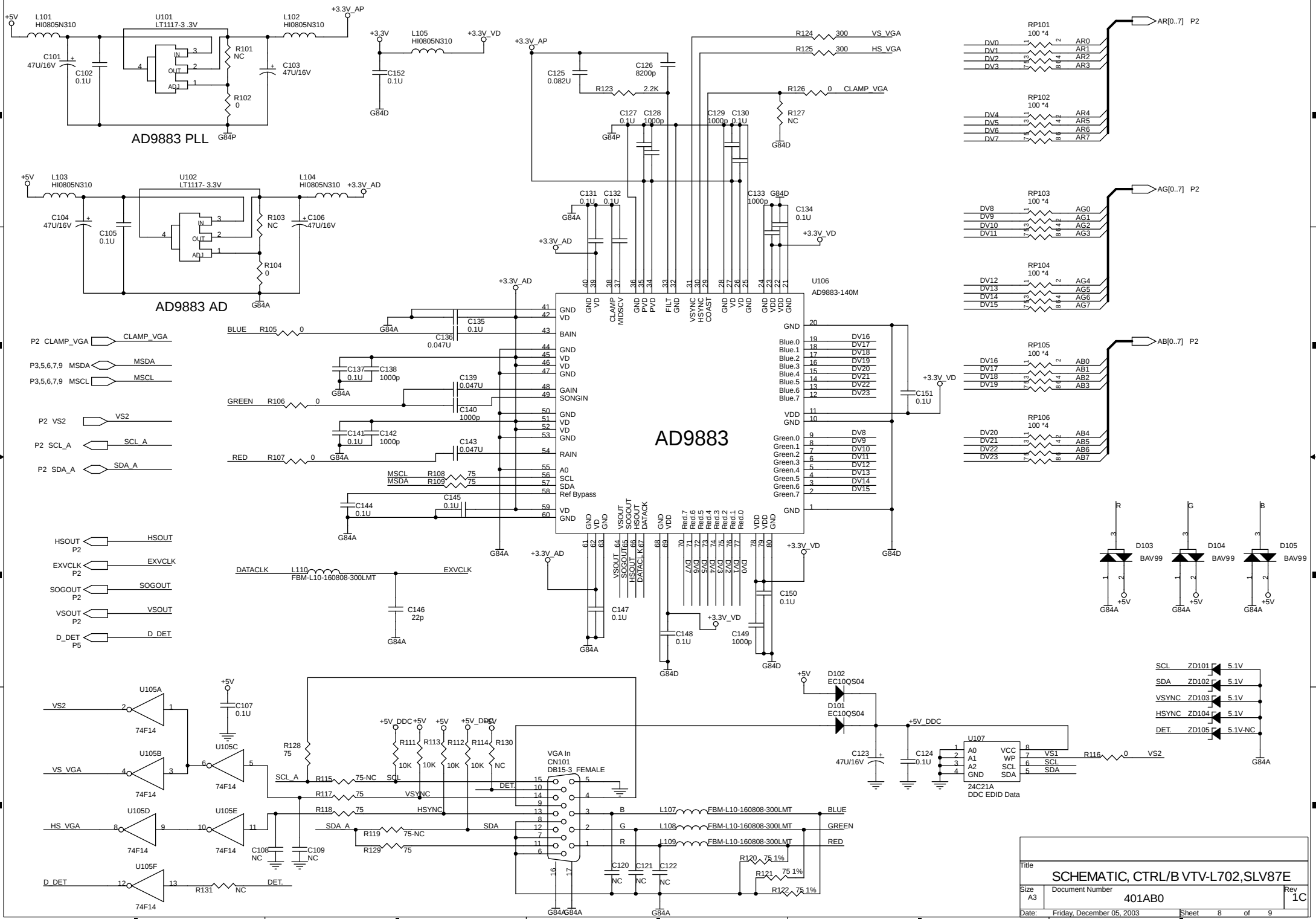
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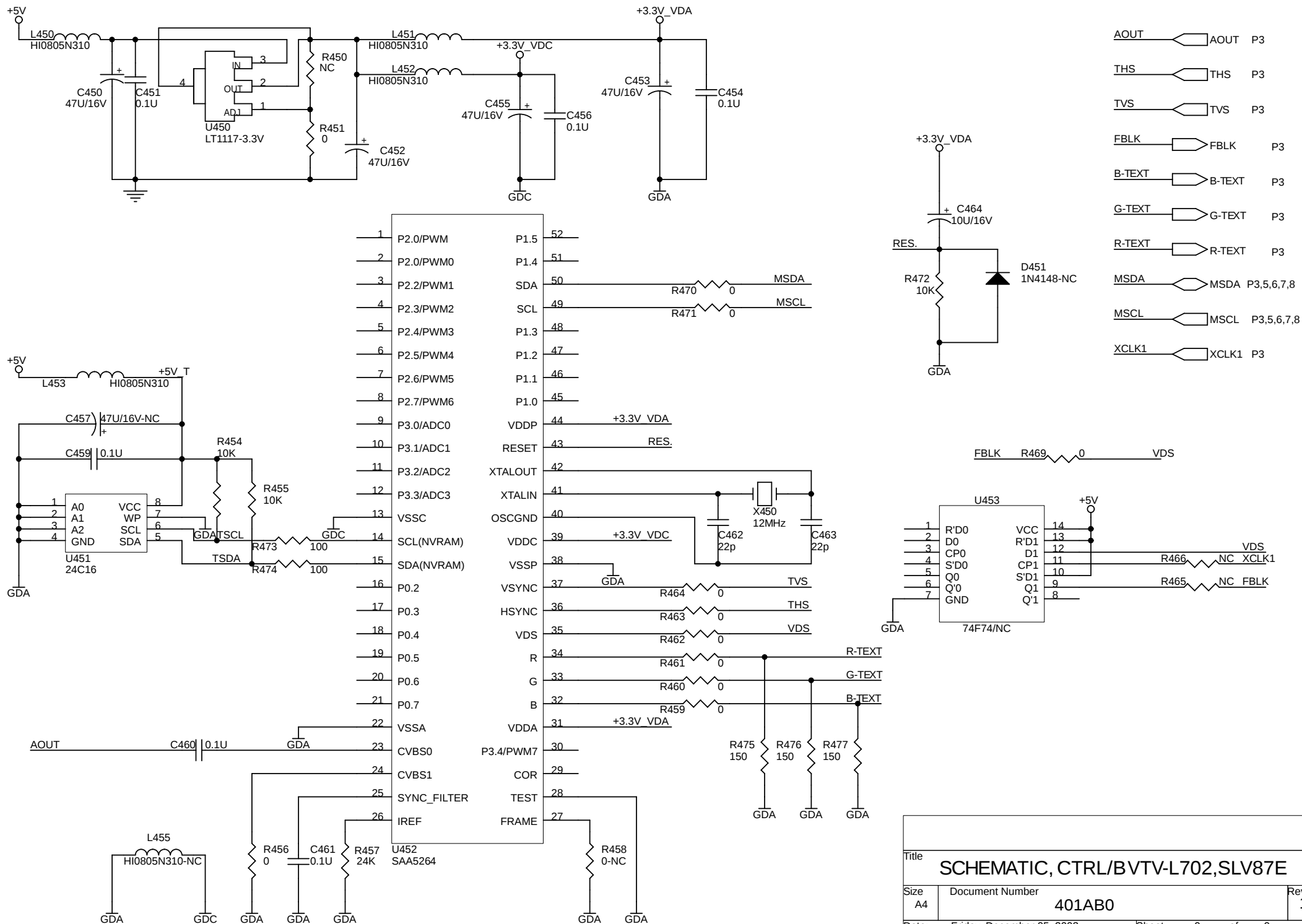


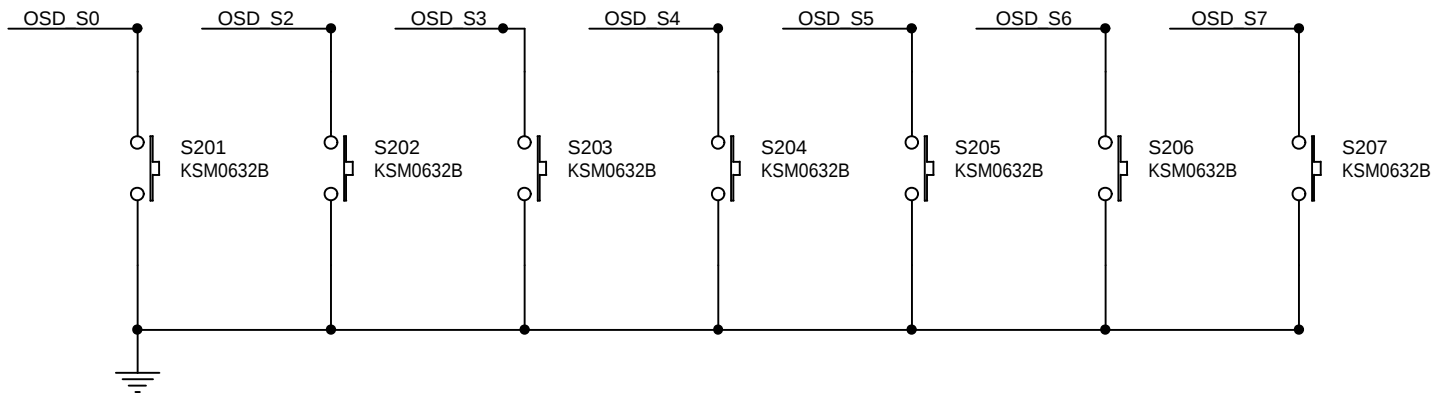


Power Line : +9V_ADO,+9V_AUI,+9V_AUC
Ground Plane : GND_AI,GND_AO

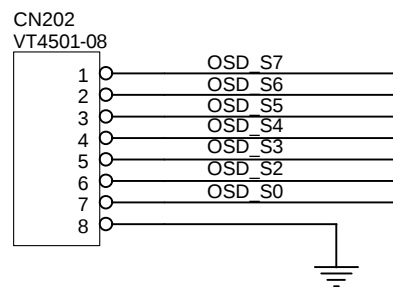
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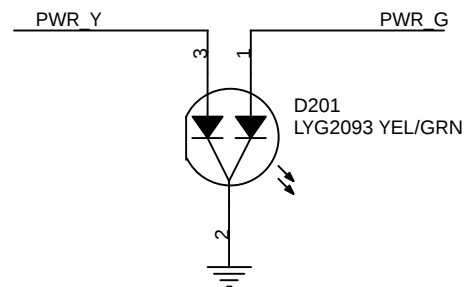
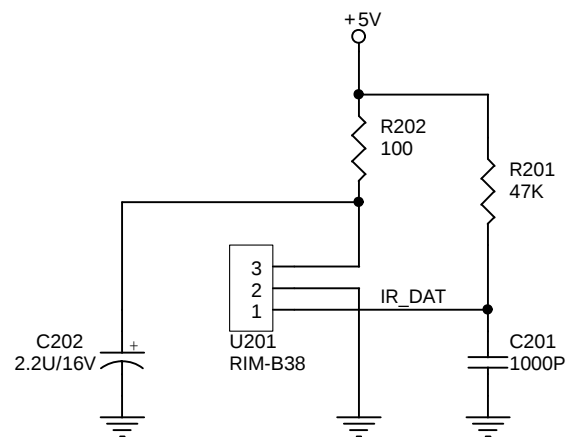




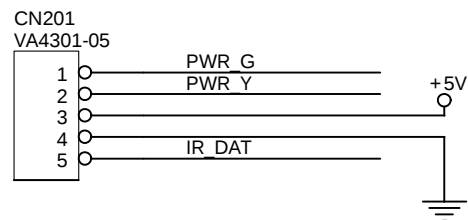
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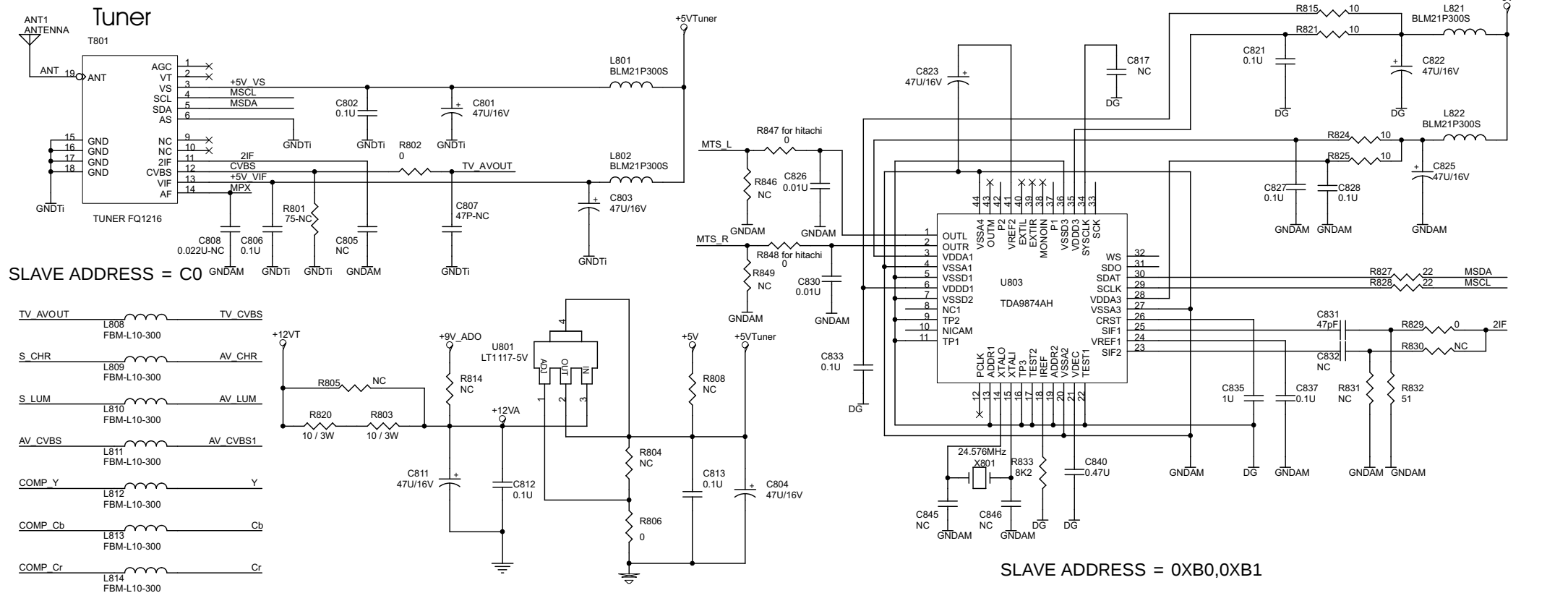
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Size A	Document Number				Rev
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Date:		Tuesday, June 17, 2003		Sheet	2 of 2



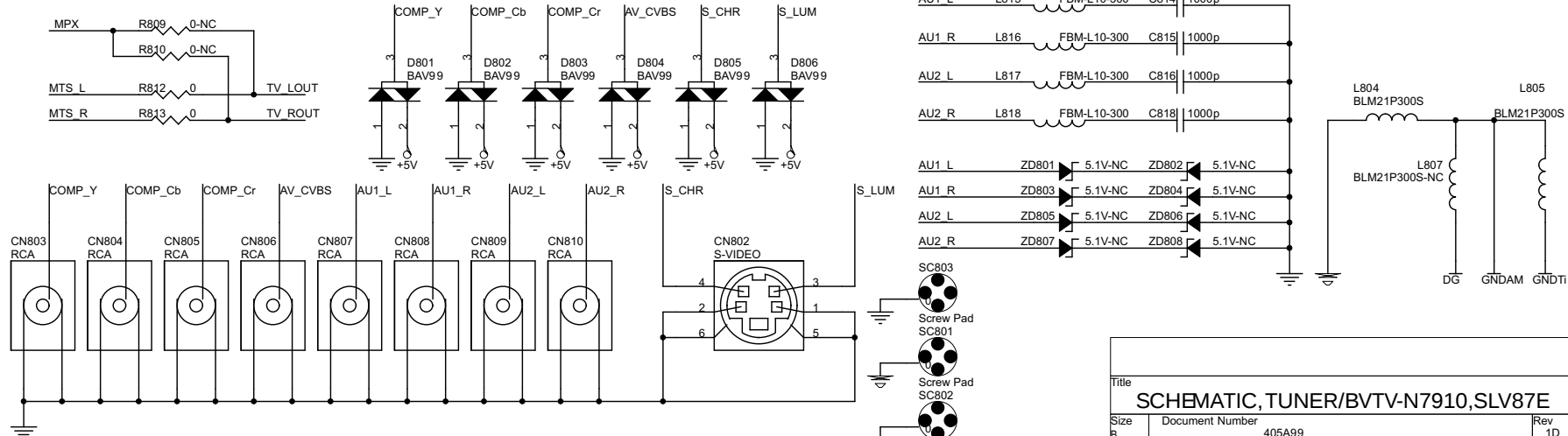
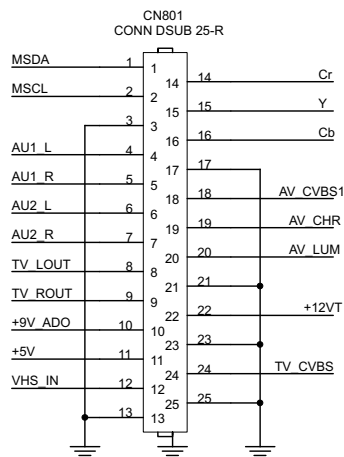
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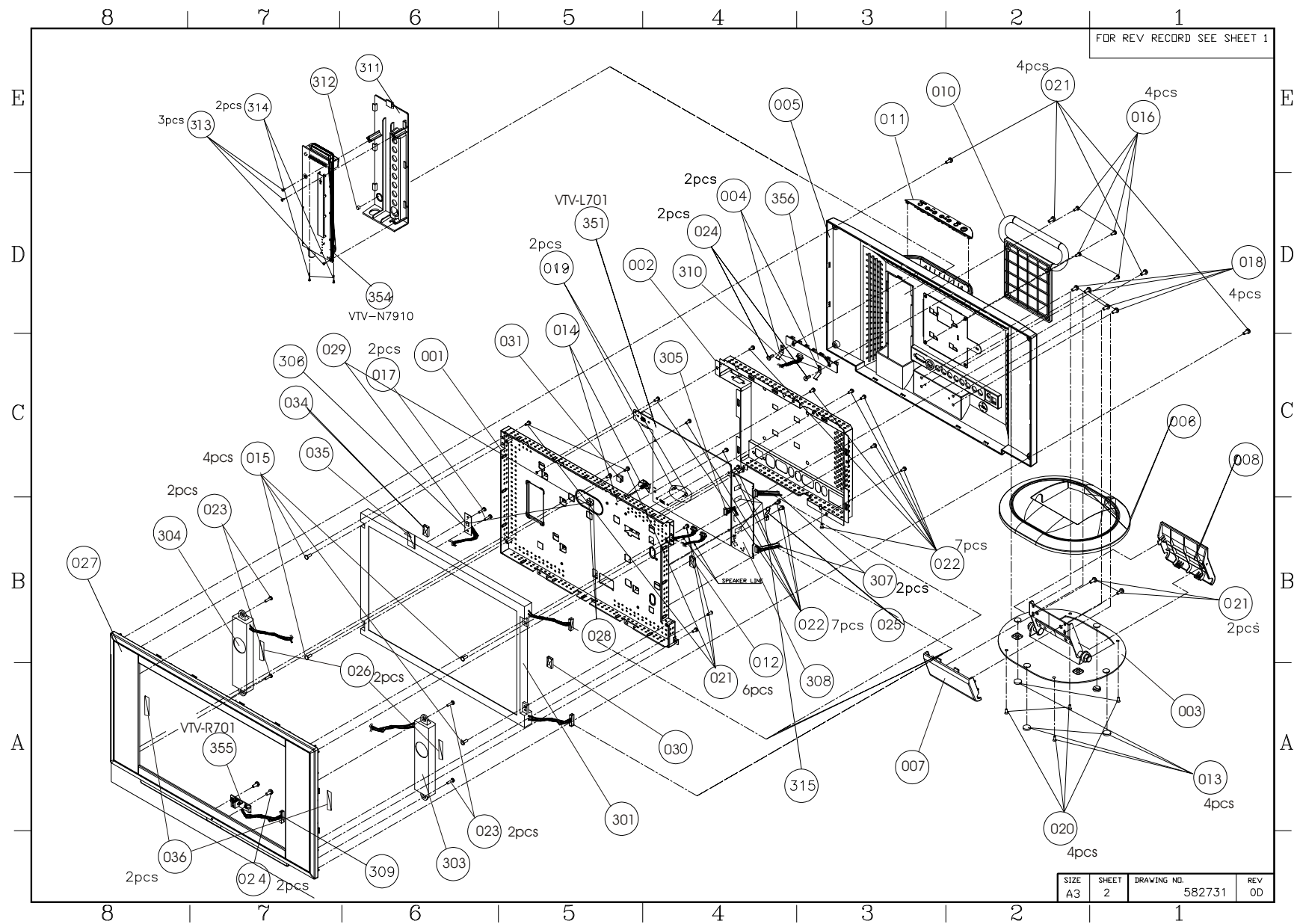
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Size A	Document Number 404AB1	Rev 1A
Date:	Tuesday, June 17, 2003	Sheet 2 of 2



TUNER IN Connector



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SCHEMATIC, TUNER/BVTV-N7910,SLV87E			
Size	Document Number	Rev	
B	405A99	1D	
Date:	Tuesday, December 16, 2003	Sheet	3 of 3



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