

SERVICE MANUAL



Model:

LCT-4216

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Software Upgrade

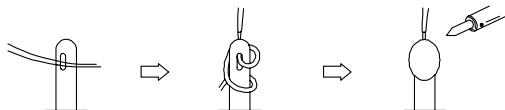
This manual is the latest at the time of printing, and does not include the modification which may be made after the printing, by the constant improvement of product.

Safety Precaution

 <div style="border: 1px solid black; padding: 5px; text-align: center;">CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN</div> 	<p>The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.</p> <p>The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.</p>
<p>CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.</p>	

PRECAUTIONS DURING SERVICING

- In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements.
Examples: RF converters, tuner units, antenna selection switches, RF cables, noise-blocking capacitors, noise-blocking filters, etc.
- Use specified internal Wiring. Note especially:
 - Wires covered with PVC tubing
 - Double insulated wires
 - High voltage leads
- Use specified insulating materials for hazardous live parts. Note especially:
 - Insulating Tape
 - PVC tubing
 - Spacers (insulating barriers)
 - Insulating sheets for transistors
 - Plastic screws for fixing micro switches
- When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



- Make sure that wires do not contact heat generating parts (heat sinks, oxide metal film resistors, fusible resistors, etc.)
- Check if replaced wires do not contact sharply edged or pointed parts.
- Make sure that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

MAKE YOUR CONTRIBUTION TO PROTECT THE ENVIRONMENT

Used batteries with the ISO symbol



for recycling as well as small accumulators (rechargeable batteries), mini-batteries (cells) and starter batteries should not be thrown into the garbage can.

Please leave them at an appropriate depot.

WARNING:

Before servicing this TV receiver, read the **SAFETY INSTRUCTION** and **PRODUCT SAFETY NOTICE**.

SAFETY INSTRUCTION

The service should not be attempted by anyone unfamiliar with the necessary instructions on this apparatus. The following are the necessary instructions to be observed before servicing.

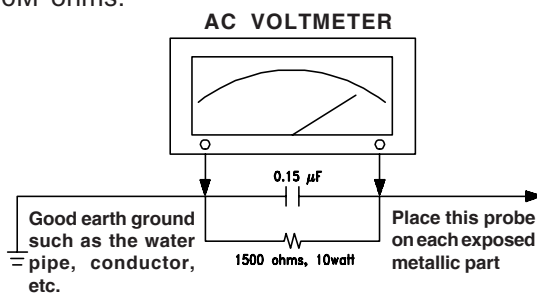
- An isolation transformer should be connected in the power line between the receiver and the AC line when a service is performed on the primary of the converter transformer of the set.
- Comply with all caution and safety related provided on the back of the cabinet, inside the cabinet, on the chassis or picture tube.
- To avoid a shock hazard, always discharge the picture tube's anode to the chassis ground before removing the anode cap.
- Completely discharge the high potential voltage of the picture tube before handling. The picture tube is a vacuum and if broken, the glass will explode.

5. When replacing a MAIN PCB in the cabinet, always be certain that all protective are installed properly such as control knobs, adjustment covers or shields, barriers, isolation resistor networks etc.
6. When servicing is required, observe the original lead dressing. Extra precaution should be given to assure correct lead dressing in the high voltage area.
7. Keep wires away from high voltage or high temperature components.
8. Before returning the set to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as antennas, terminals, screwheads, metal overlay, control shafts, etc., to be sure the set is safe to operate without danger of electrical shock. Plug the AC line cord directly to the AC outlet (do not use a line isolation transformer during this check). Use an AC voltmeter having 5K ohms volt sensitivity or more in the following manner. Connect a 1.5K ohm 10 watt resistor paralleled by a 0.15 μ F AC type capacitor, between a good earth ground (water pipe, conductor etc.,) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of the 1.5K ohm resistor and 0.15 μ F capacitor. Reverse the AC plug at the AC outlet and repeat the AC voltage measurements for each exposed metallic part.

The measured voltage must not exceed 0.3V RMS.

This corresponds to 0.5mA AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.

The resistance measurement should be done between accessible exposed metal parts and power cord plug prongs with the power switch "ON". The resistance should be more than 6M ohms.



AC Leakage Current Check

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this apparatus have special safety-related characteristics.

These characteristics are often passed unnoticed by visual inspection and the protection afforded by them cannot necessarily be obtained by using replacement components rated for a higher voltage, wattage, etc.

The replacement parts which have these special safety characteristics are identified by \triangle marks on the schematic diagram and on the parts list.

Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

9. Must be sure that the ground wire of the AC inlet is connected with the ground of the apparatus properly.

Technical Specifications		MODEL : <u>LCT-4216</u> 42" LCD-TV		
DATE FIRST ISSUED	ISSUE 1	RAISED BY	CHECKED BY	NUMBER OF PAGES 9

REVISIONS			
ISSUED	DATE	DESCRIPTION	RAISED BY :

SPECIFICATION AGREED :	SIGNATURE	DATE
R & D DEPARTMENT
COMMERCIAL DEPARTMENT
PRODUCTION DEPARTMENT
Q/A DEPARTMENT
CUSTOMER

SPECIFICATION APPROVED :	SIGNATURE :	DATE :

NOTE : Only documents stamped "Controlled Document" to be used for manufacture of production parts.

1. Standard Test Conditions

All tests shall be performed under the following conditions, unless otherwise specified.

- 1.1 Ambient light : 150ux (When measuring I_B , the ambient luminance $\cong 0.1\text{Cd/m}^2$)
- 1.2 Viewing distance : 50cm in front of LCD
- 1.3 Warm up time : 30 minutes
- 1.4 PDP Panel facing : no restricted
- 1.5 Measuring Equipment : PC, Chroma 2225 signal generator (with Chroma digital additional card) or equivalent, Minolta CA100 photometer
- 1.6 Magnetic field : no restricted
- 1.7 Control settings : Brightness, Contrast, Tint, Color set at Center(50)
- 1.8 Power input : 100~240Vac
- 1.9 Ambient temperature : $20^\circ\text{C} \pm 5^\circ\text{C}$ ($68^\circ\text{F} \pm 9^\circ\text{F}$)
- 1.10 Display mode : 31.5KHz/60Hz (Resolution 1366 x 768)
- 1.11 Other conditions :
 - 1.11.1 With image sticking protection of LCD module, the luminance will descend by time on a same still screen and rapidly go down in 5 minutes. When measuring the color tracking and luminance of a same still screen, be sure to accomplish the measurement in one minute to ensure its accuracy.
 - 1.11.2 Due to the structure of LCD, the extra-high-bright same screen should not hold over 5 minutes for fear of branding on the panel.

ELECTRICAL CHARACTERISTICS**2. Power Input**

- 2.1 Voltage : 100 ~ 240VAC
- 2.2 Input Current : 2.5 / 1.1A
- 2.3 Maximum Inrush Current : <30 A (FOR AC110V ONLY)
Test condition : Measured when switched off for at least 20 mins
- 2.4 Frequency : 50Hz to 60Hz(±3Hz)
- 2.5 Power Consumption : ≤250W
Test condition : full white display with maximum brightness and contrast
- 2.6 Power Factor : Meets IEC1000-3-2
- 2.7 Withstanding voltage : 1.5kVac or 2.2kVdc for 1 sec

3. Display

- 3.1 Screen Size : 42" LCD
- 3.2 Aspect Ratio : 16:9
- 3.3 Pixel Resolution : 1366x768
- 3.4 Peak Brightness : 400 cd/m² (TYPE)
- 3.5 Contrast Ratio (Dark room) : 500:1 (TYPE)
- 3.6 Viewing Angle : Over 176°
- 3.7 OSD language : English/Frensh/Spanish

4. Signal**4.1 AV & Graphic input**

- 4.1.1 TV standard : NTSC
- 4.1.2 TV Tuning system : PLL 181Ch
- 4.1.3 CATV : 125CH
- 4.1.4 Composite signal : CVBS
- 4.1.5 Y,C Signal : S-Video
- 4.1.6 Component signal : Y, Pb/Cb, Pr/Cr, HDTV compatible
- 4.1.7 Graphic I/P : Analog: D-sub 15pin detachable cable
Digital: DVI
- 4.1.8 PnP compatibility : DDC 1.0
- 4.1.9 I/P frequency : f_H: 31.5kHz to 60kHz/f_V: 56.25Hz to 75Hz (1024x768 recommended)

4.2 Audio input
Audio I/P(L/Rx5) : 1 for DVI / D-Sub
1 for Y/ Pb/Pr
1 for Y/ Cb/Cr
1 for CVBS
1 for S-Video

4.3 Audio output
Audio/Video O/P(RCAx3) : Monitor out(L/R,CVBS),Subwoofer out

4.4 Other function : PIP/POP/PBP, Zoom,Last Memory,User-friendly OSD menu

5. Environment

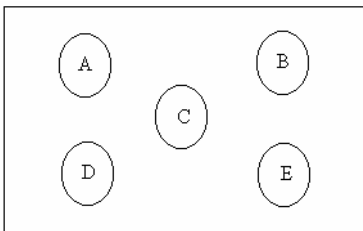
5.1 Operating environment
5.1.1 Temperature : 5° to 30°C
5.1.2 Relative humidity: 20% to 85%(non-condensing)

5.2 Storage and Transport
5.2.1 Temperature : -20°C to 60°C(-4° to 140°F)
5.2.2 Relative humidity: 5% to 95%

6. Panel Characteristics

6.1 Type : LG420W02
6.2 Size : 42.02inches diagonal,
1006mm(H)x610mm(V)x59mm(D)(TYPE)
6.3 Aspect ratio : 16:9
6.4 Viewing angle : Over 176°
6.5 Resolution : 1366X768
6.6 Weight : 14.8kg ±0.5 kg (Net)
6.7 Color : 16.77 million colors by combination of 8 bits R,G,B digital
6.8 Contrast : Typical 400:1
6.9 Peak brightness : Typical 500cd/m²

6.10 Color Coordinate Uniformity : Contrast; Brightness and Color control at normal setting
Test Pattern : Full white pattern



Average of point A,B,C,D and E +/- 0.01

6.11 Color temperature : Contrast at center (50); Brightness center (50);
Colortemperature set at Natural
 $x=0.295\pm 0.02$
 $y=0.300\pm 0.02$

6.12 Cell Defect Specifications
Subject to Panel supplier specification as appends.

7. Front Panel Control Button

- 7.1 CH Up / Down Button : Push the key to changing the channel up or down.
When selecting the item on OSD menu.
- Volume Up/ Down Button : Push the key to increase the volume up or down.
When selecting the adjusting item on OSD menu
increase or decrease the data-bar.
- Menu Button : Enter to the OSD menu.
- Source Select Button : Push the key to select the input signals source.
- 7.2 Stand by Button : Switch on main power, or switch off to enter power
Saving modes.
- 7.3 Main Power Switch : Turn on or off the unit.

8. OSD Function

- 8.1 Picture : State (Normal,Dark,Bright,User); Display (Bright,contrast,Color,Hue)
Temp (warm,Cool,Normal,User);
Position (H-posit,V-posit,Phase,H-size,Auto Adjust)
- 8.2 Sound : Setup (Mode,AVC,Volume,Balance);
Equalizer (120HZ,500HZ,1.5KHZ,5KHZ,10KHZ)
BBE Setup (Gain,Treble,Bass)
- 8.3 OSD : Size (Panorama,16:9,Normal,Anamorphic,Letter Box,TV Mode)
OSD Set (Language,OSD Position,Time Out)
Option (Burn Protect, Version)
V-Chip , C/C
- 8.4 Layout : Layout (Full Screen,PIP,Split Screen,Grid,POP 3,POP 12)
PIP Set (Sub Win Source,Sub Win Size,PIP Size.PIP Position)
- 8.5 Time : Sleep (30Min,60Min,90Min,120Min,180Min)
Wake Up (Time Edit,Volume,TV Mode,Channel)
Time Set
- 8.6 TV Set : TV Set (Auto Search,Manul Search,System,MTS,Auto Fine,Fine)
CH Edit

9. Agency Approvals

Safety	UL60950
Emissions	FCC class B

10. Reliability

11.1 MTBF : 50,000 hours(Use moving picture signal at 25°C ambient)

11. Accessories : User manual x1, Remote control x1, Stand x1, Power cord x1, Battery x 2, Accessories box x 1.

12. Support the Signal Mode

A. D-Sub Mode (VGA or DVI)






NO.	Resolution	Horizontal Frequency (KHz)	Vertical Frequency (Hz)	Dot Clock Frequency (MHz)
1	640 x 400	31.47	70.08	25.17
2	640 x 480	31.50	60.00	25.18
3	640 x 480	35.00	67.00	30.24
4	640 x 480	37.50	75.00	31.50
5	640 x 480	37.86	72.81	31.50
6	720 x 400	31.47	70.08	28.32
7	800 x 600	35.16	56.25	36.00
8	800 x 600	37.90	60.32	40.00
9	800 x 600	46.90	75.00	49.50
10	800 x 600	48.08	72.19	50.00
11	832 x 624	49.00	74.00	57.27
12	1024 x 768	48.40	60.00	65.00
13	1024 x 768	56.50	70.00	75.00
14	1024 x 768	60.00	75.00	78.75
15	1152 x 864	54.53	61.13	80.37
16	1152 x 864	63.86	70.02	94.51
17	1152 x 864	67.52	75.02	108.03
18	1280 x 960	60.02	60.02	108.04
19	1280 x 1024	64.00	60.01	108.00

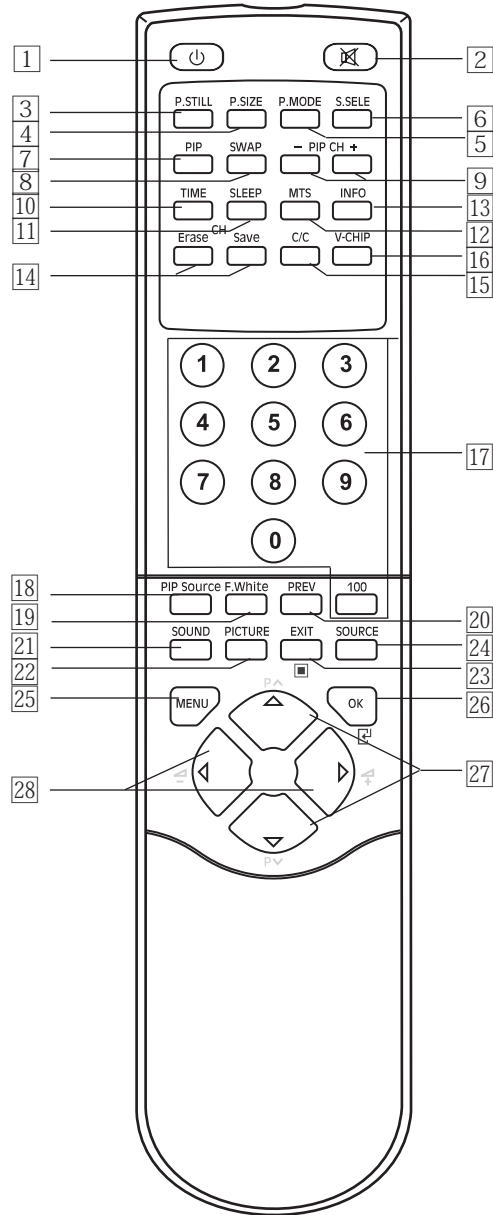
B. DTV Mode

NO.	Resolution	Horizontal Frequency (KHz)	Vertical Frequency (Hz)	Dot Clock Frequency (MHz)
1	480 i	15.734	59.94	13.50
2	576 i	15.625	50.00	13.50
3	480p(720x480)	31.468	59.94	27.00
4	576p(720x576)	31.25	50.00	27.00
5	720p(1280x720)	45.00	60.00	74.25
6	720p(1280x720)	37.50	50.00	74.25
7	1080i(1920x1080)	28.125	50.00	74.25
8	1080i(1920x1080)	33.75	60.00	74.25

- When the signal received by the Display exceeds the allowed range, a warning message "Out Of Range" shall appear on the screen.
- You can confirm the input signal format from the "OSD Menu".

13. Remote Control

- 1 **Power** (): Press to turn on and off.
- 2 **Mute** (): Press to mute the sound. Press again or press  to restore the sound.
- 3 **P.STILL**: Press to freeze the picture. Press again to restore the picture.
- 4 **P.SIZE**: Press to cycles through the picture size: Normal, Fill Screen, Anamorphic, Letter Box or TV Mode, Panorama..
- 5 **P. MODE**: Press to cycles through the picture mode: Normal, Bright, Dark, User.
- 6 **S.SELE**: Press to cycles through the sound select: Main window sound or Sub window sound.
- 7 **PIP**: Press to turns on PIP (picture-in-picture) feature. Such as Full Screen, PIP or Split Screen.
- 8 **SWAP**: Press to switches the Main window or Sub window pictures.
- 9 **PIP CH+** : Press to select Sub window Channel Up.
PIP CH- : Press to select Sub window Channel Down.
- 10 **TIME**: Press to display the current time.
- 11 **SLEEP**: Press repeatedly until it displays the time in minutes (30 Min, 60 Min, 90 Min, 120 Min, 180 Min or Off) that you want the PDP to remain on before shutting off. To cancel Sleep Time, press SLEEP repeatedly until Sleep Off appears. And you can press  or  to select sleep time shut down.
- 12 **MTS**: Press repeatedly to cycle through the Multi-channel TV sound (MTS) options: Mono, Stereo and SAP (Second Audio Program).
- 13 **INFO**: Press to display on-screen information. Press it again to turn the display off.
- 14 **CH Erase, CH Save buttons**: Press to erase or save channel.
- 15 **C/C**: Press to select the Closed Caption mode.
- 16 **V-Chip**: Press to select the child protect mode.
- 17 **Number buttons**: Press 0~9,100 to select a channel; the channel changes after 2 seconds.
- 18 **PIP Source**: Press to select the signal for Sub Window.(Only for PIP.)
- 19 **F.WHITE**: Press to show a full white picture.
- 20 **PREV**: Press it returns to the last viewed channel.(Only for TV.)



(Continued on next page)

- [21] **SOUND:** Press to select different sound system, such as Normal, Flat, News, Cinema, User or BBE Digital.
- [22] **PICTURE:** Press to select “BRIGHTNESS”, “COLOR”, “CONTRAST”, ”HUE” or “SHARPNESS”, and you can use ◀ or ▶ to adjust.
- [23] **EXIT:** Press to return or exit OSD menu.
- [24] **SOURCE:** Press to select the signal sources directly. Such as TV, AV1, S-VIDEO, YCbCr, YPbPr, Analog RGB or Digital RGB.
- [25] **MENU:** Press to display the OSD Menu.
- [26] **OK:** Press to enter or confirm.
- [27] ▲ / ▼ : They are used as ▲ / ▼ buttons in the OSD Menu screen and they can be used for the selection of the program when the OSD Menu is not shown on the screen.
- [28] ◀ / ▶ : They are used as ◀ / ▶ buttons in the OSD Menu screen and they can be used for the adjustment of volume when the OSD Menu is not shown on the screen.

PHYSICAL CHARACTERISTICS

14. Power Cord

Length : 1.8m nominal

Type : optional

15. Cabinet

15.1 Color : “Black” colour as defined by colour plaque reference number

15.2 Weight

Net weight : 114.7lbs (52.1kg)

Gross weight : 139.2lbs(63.1kg)

15.3 Dimensions(with stand)

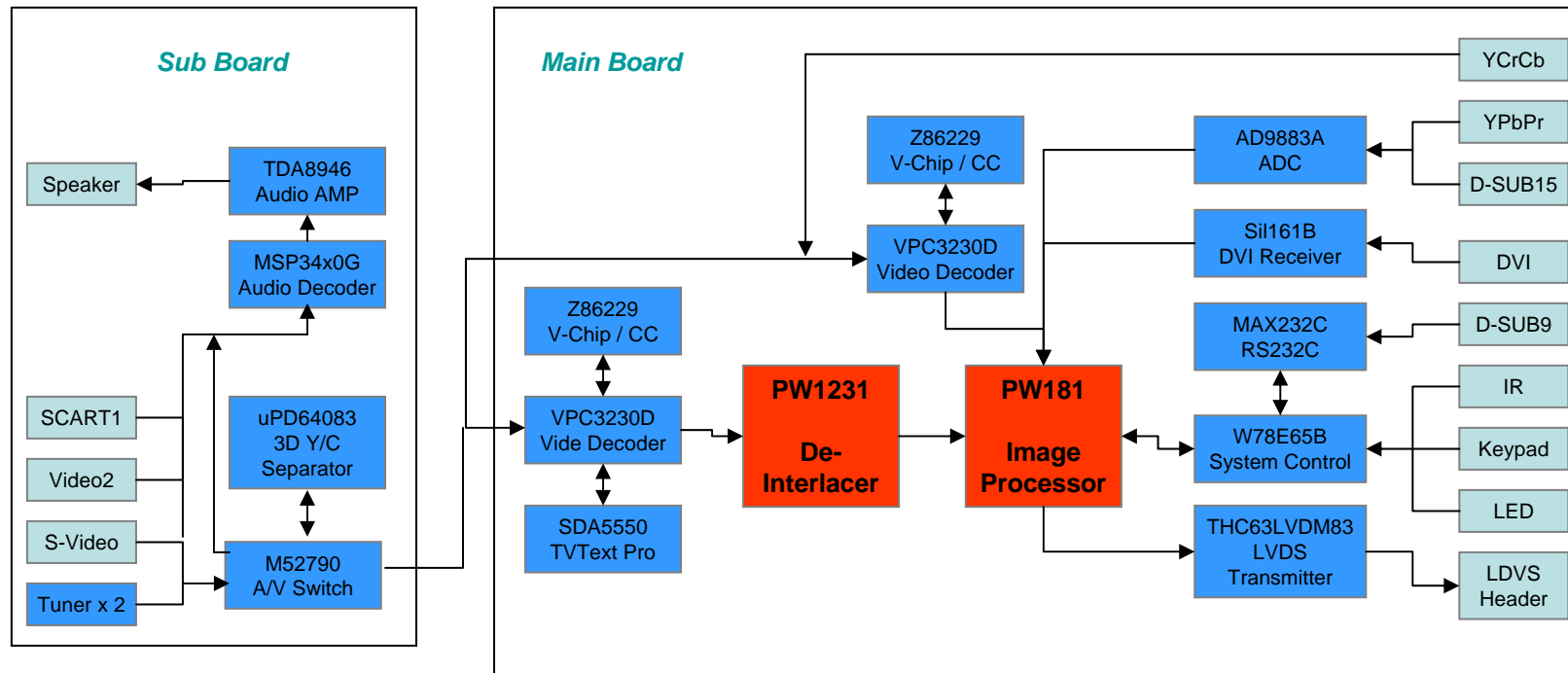
Width : 57 inches (1444mm)

Height : 45.59 inches (1155mm)

Depth : 14.61 inches (370mm)

Block Diagram

MAIN/AUDIO BOARD



Circuit Diagram

- **Power supply board of LCD Module, PSM250-405**
- **Main (Video) board**
- **Audio/Tuner board**
- **Keypad board**
- **Remote control receiver board**
- **Remote control board**

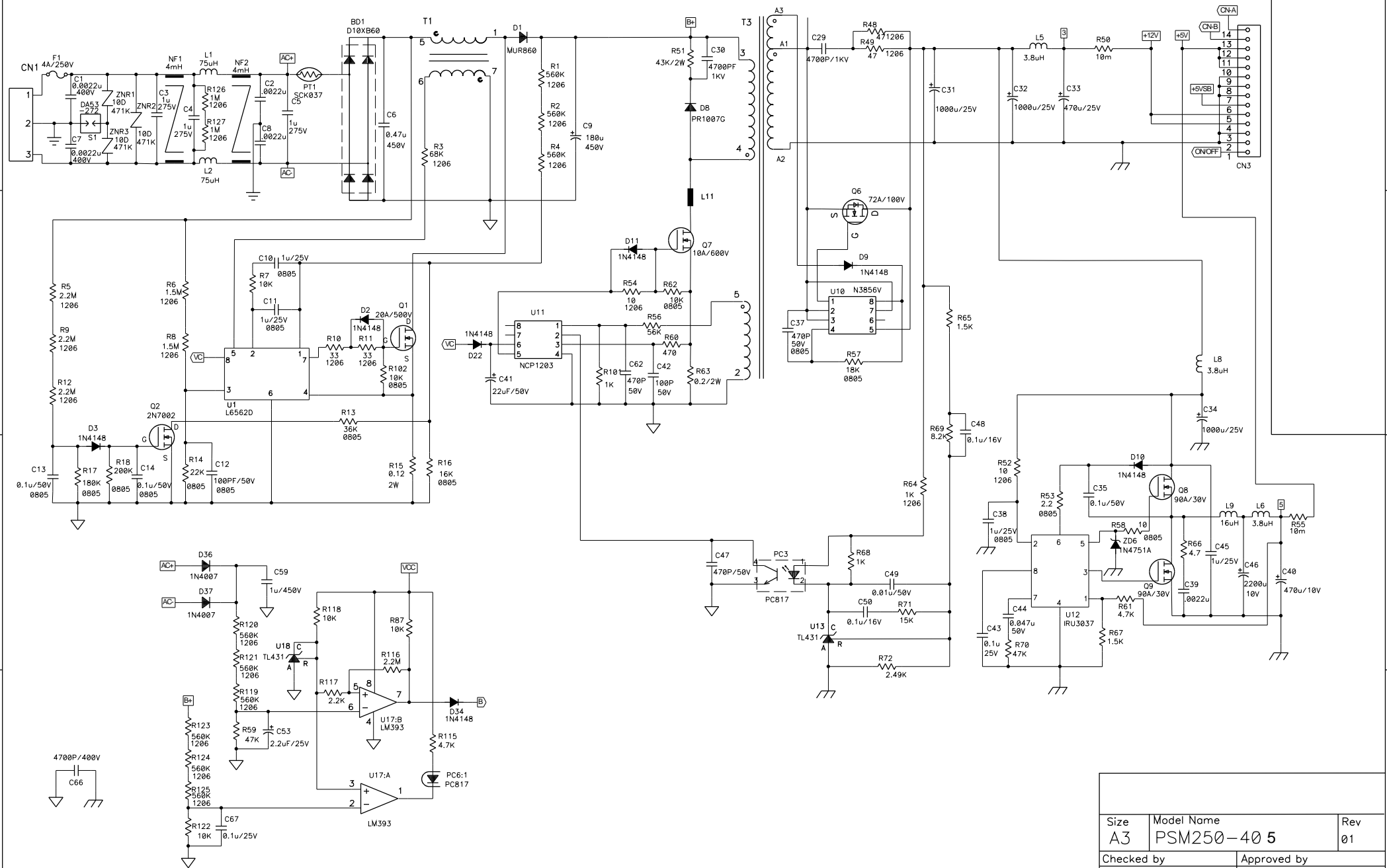
A

B

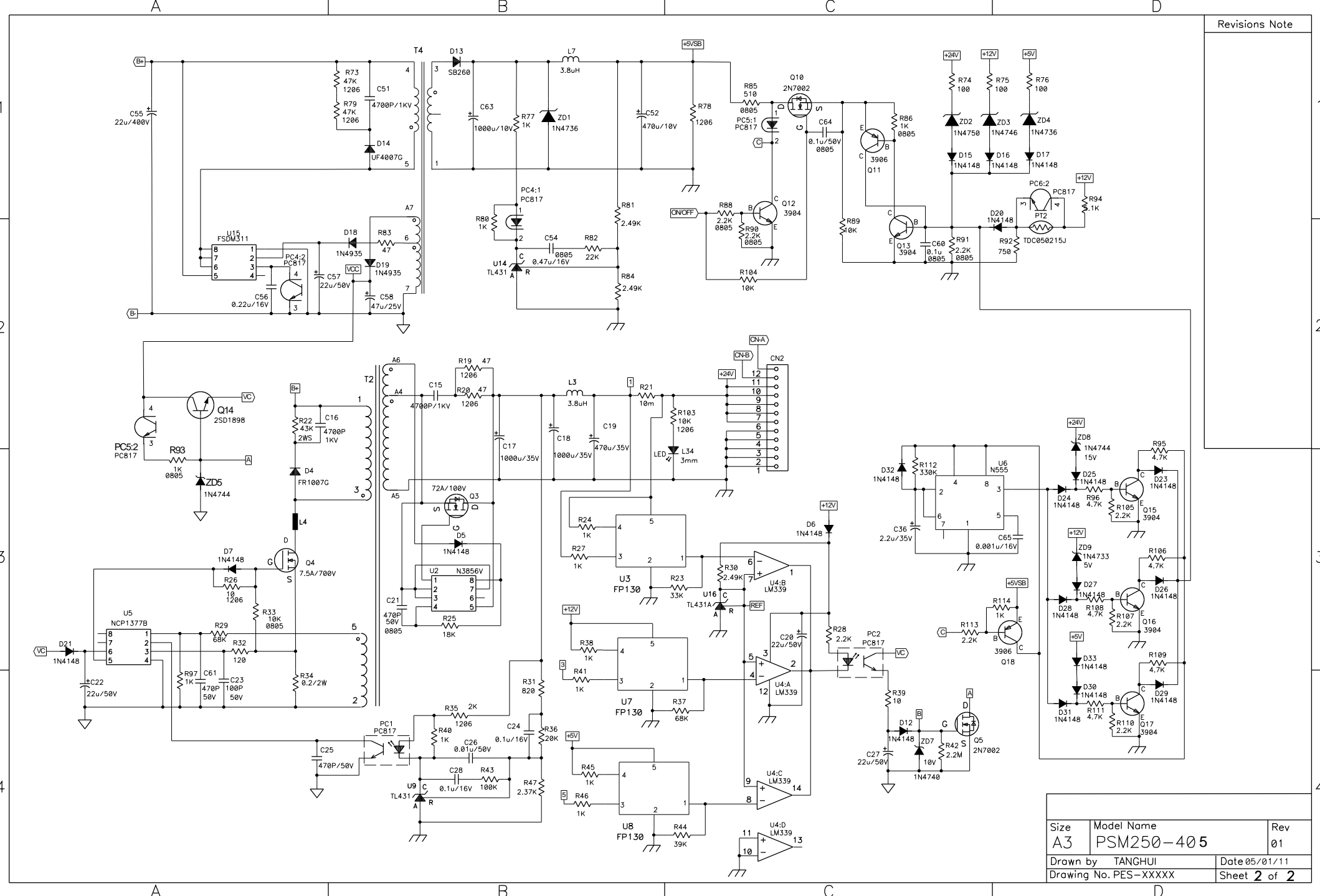
C

D

Revisions Note



Size	Model Name	Rev
A3	PSM250-40 5	01
Checked by	Approved by	
Drawn by TANGHUI	Date 05/01/11	
Drawing No. PES-XXXXX	Sheet 1 of 2	



Size	A3	Model Name	PSM250-405	Rev	01
Drawn by	TANGHUI			Date	05/01/11
Drawing No.	PES-XXXXX			Sheet	2 of 2

DUBHE MAIN
PW181A BASED FLAT PANEL TV
REV 1.2

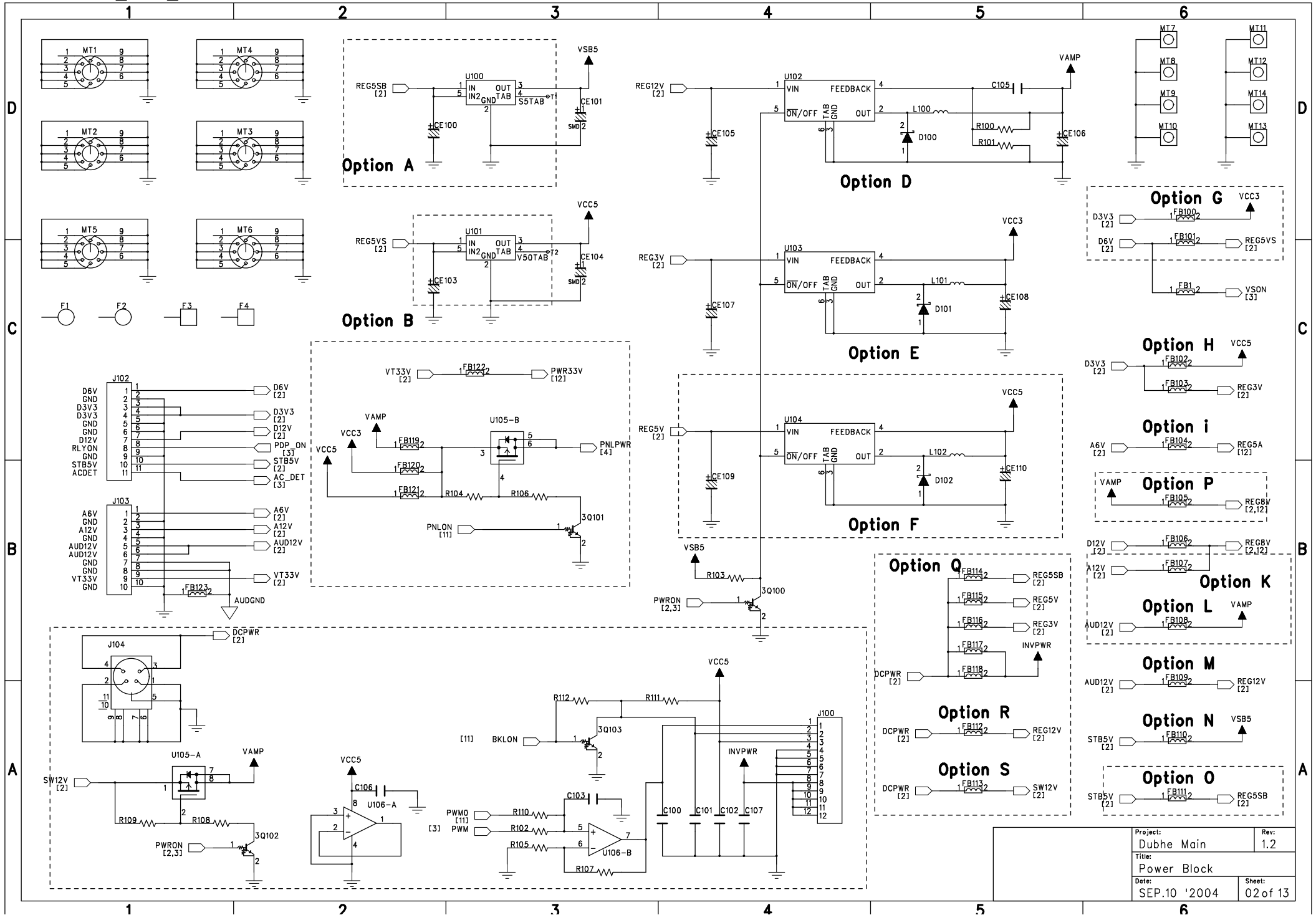
ROAD MAP

DESCRIPTION	REFERENCE	UPDATE
1.THIS SHEET		Apr.29 `04
2.POWER	100 ~ 200	Apr.29 `04
3.MICOM	200 ~ 250	Apr.29 `04
4.OUPUT (TTL & LVDS)	250 ~ 300	Apr.29 `04
5.INPUT CONNECTORS	300 ~ 400	Apr.29 `04
6.PC(ANALOG) INPUT	400 ~ 450	Apr.29 `04
7.PC(DIGITAL) INPUT	450~ 500	Apr.29 `04
8.VIDEO(GPORT) INPUT	500 ~ 600	Apr.29 `04
9.VIDEO(VPORT) INPUT	600 ~ 700	Apr.29 `04
10.DEINTERLACER PW1231	700 ~ 800	Apr.29 `04
11.SCALER PW181A	800 ~ 900	Apr.29 `04
12.MEMORY & ETC	900 ~ 999	Apr.29 `04
13.TTX		Apr.29 `04

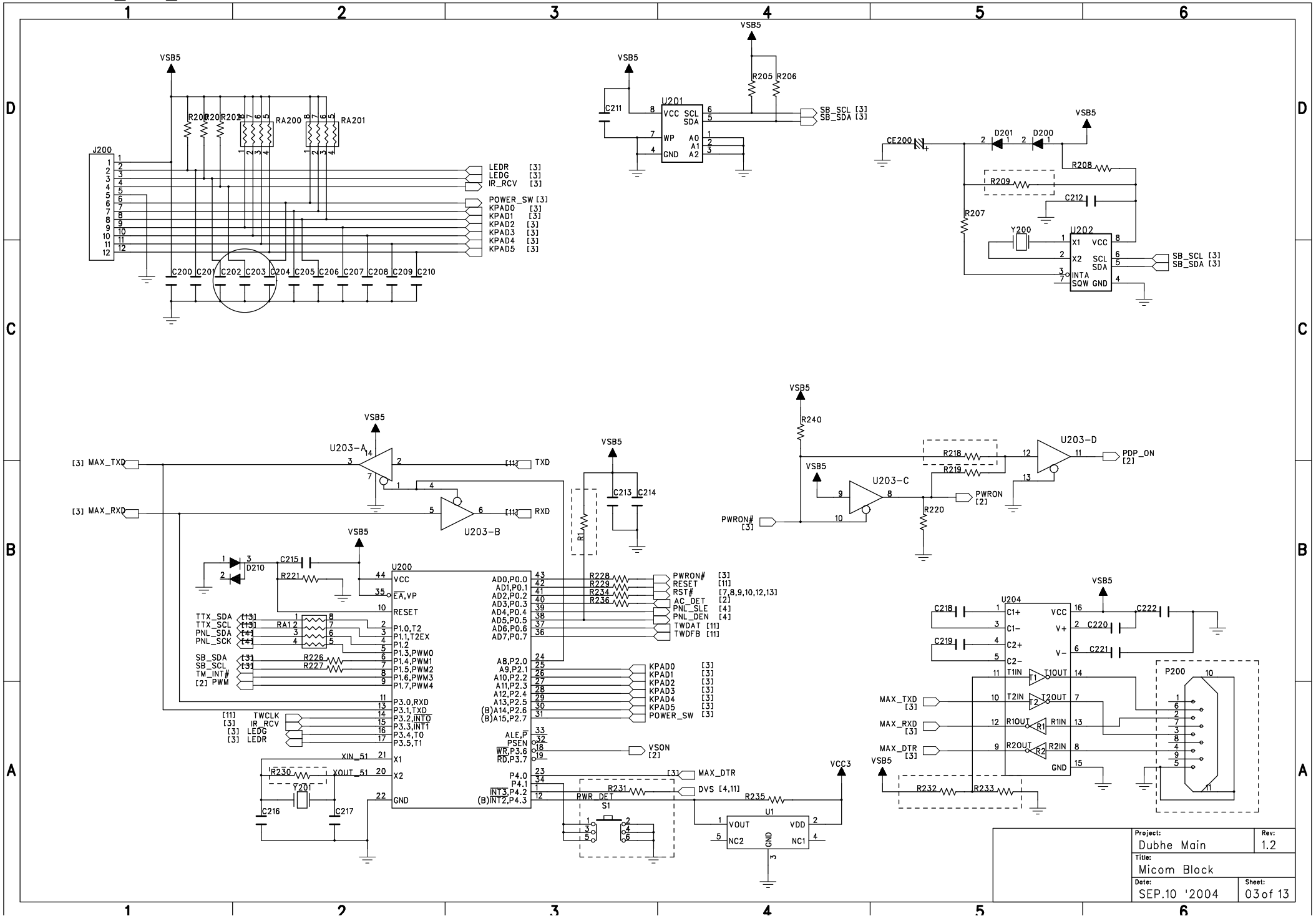
REVISION HISTORY

REV.	DESCRIPTION	BY	LAST UPDATE
0.1	PW181 based TV	K.K.W.	Apr.29 '2004
1.0	Custermer Sample	K.K.W.	Jun.10 '2004
1.2	Custermer Sample	K.K.W.	SEP.10 '2004

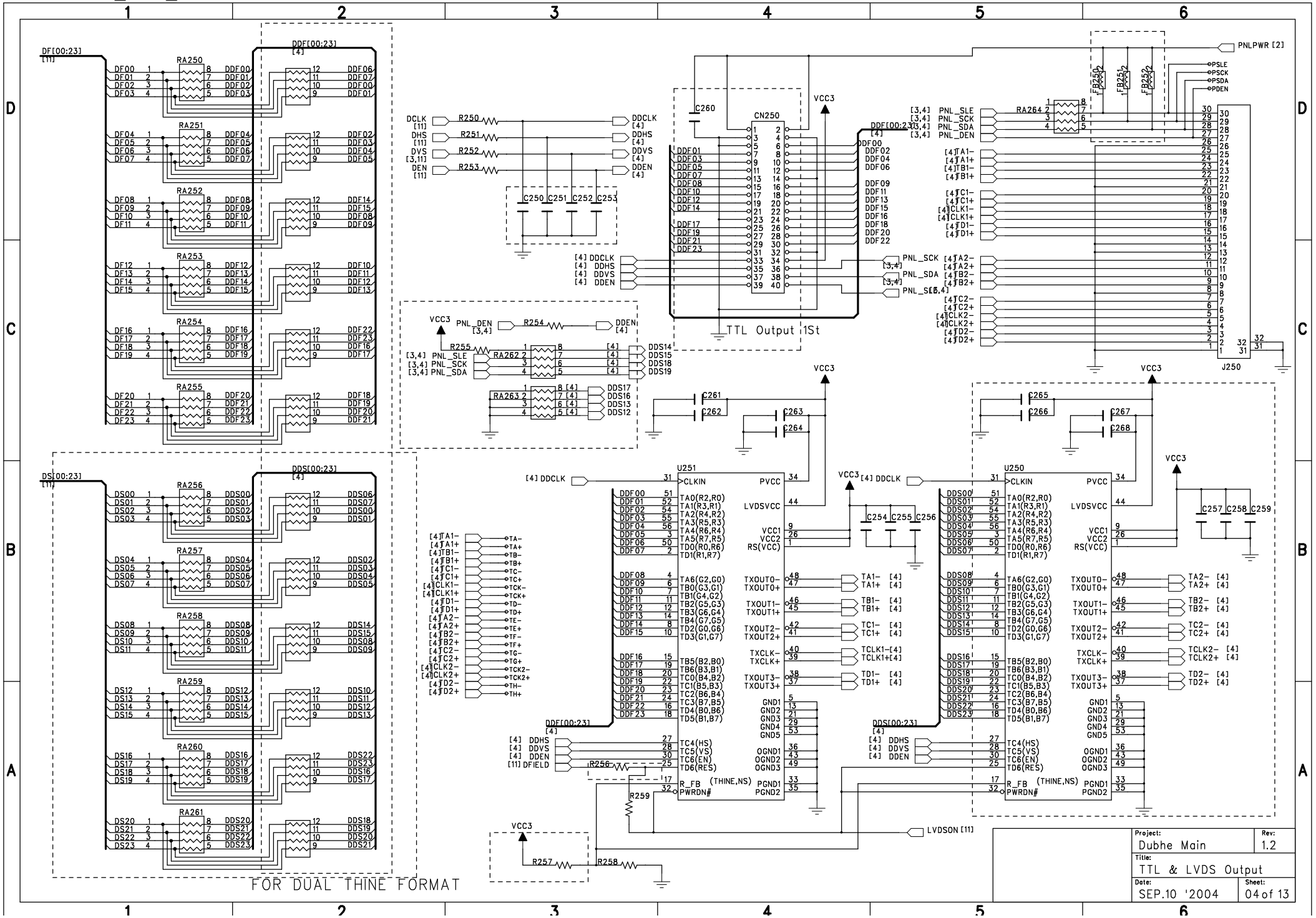
Project:	Dubhe Main	Rev:	1.2
Title:	Title Page		
Date:	SEP.10 '2004	Sheet:	01 of 13



Project:	Dubhe Main	Rev:	1.2
Title:	Power Block		
Date:	SEP.10 '2004	Sheet:	02 of 13

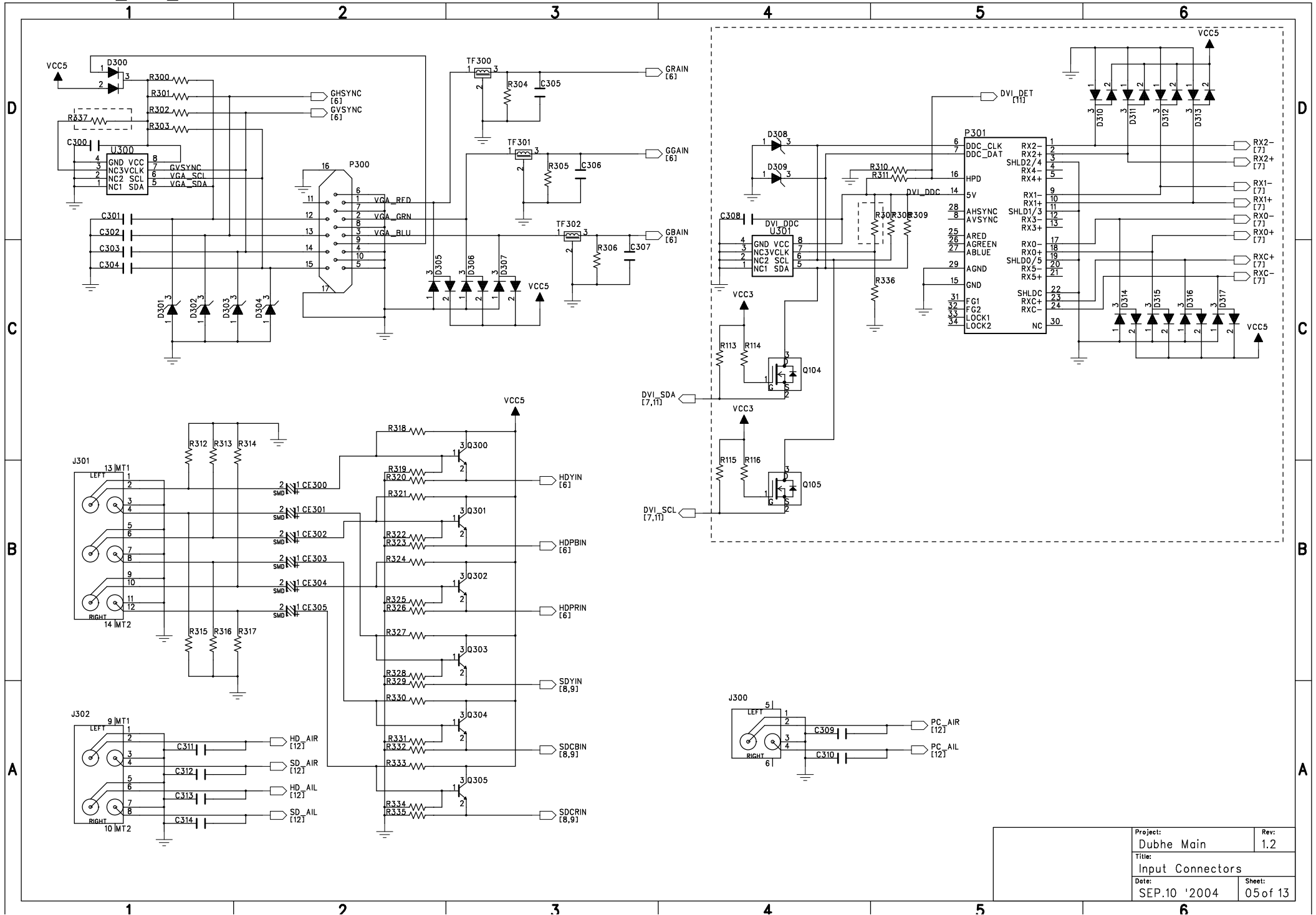


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Title:	Micom Block		
Date:	SEP.10 '2004	Sheet:	03 of 13

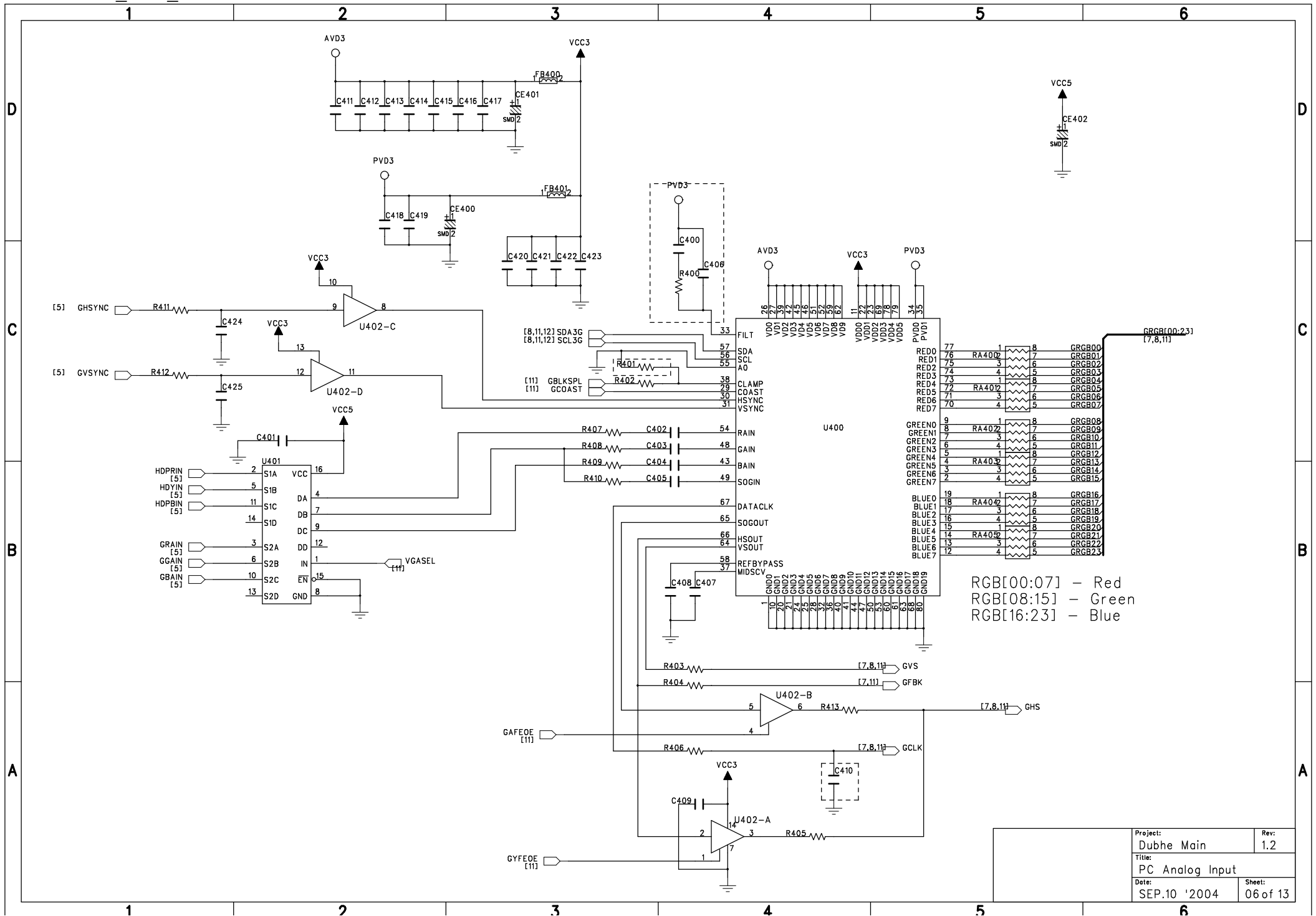


FOR DUAL THINE FORMAT

Project:	Dubhe Main	Rev:	1.2
Title:	TTL & LVDS Output		
Date:	SEP.10 '2004	Sheet:	04 of 13

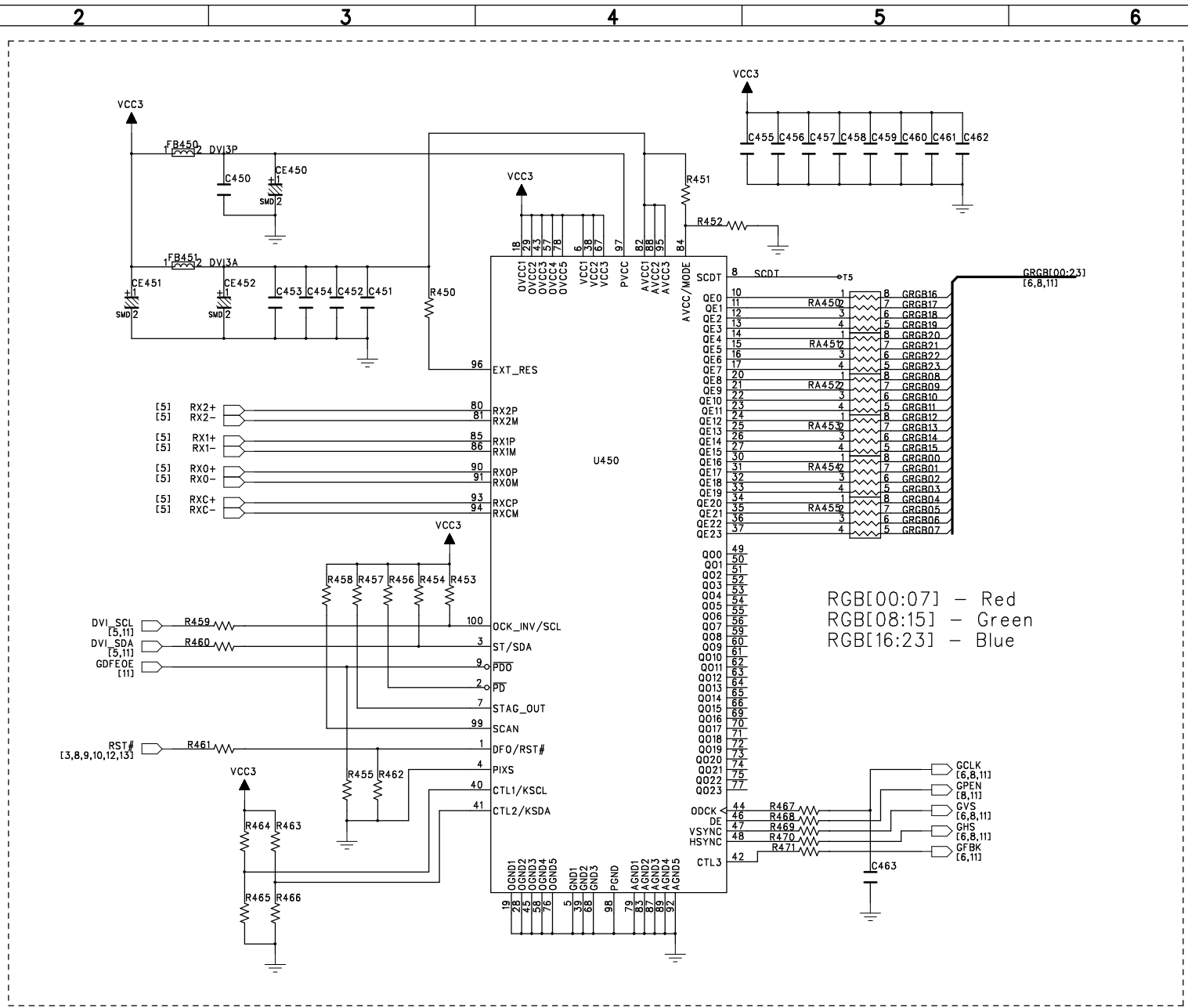


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Title:	Input Connectors		
Date:	SEP.10 '2004	Sheet:	05 of 13



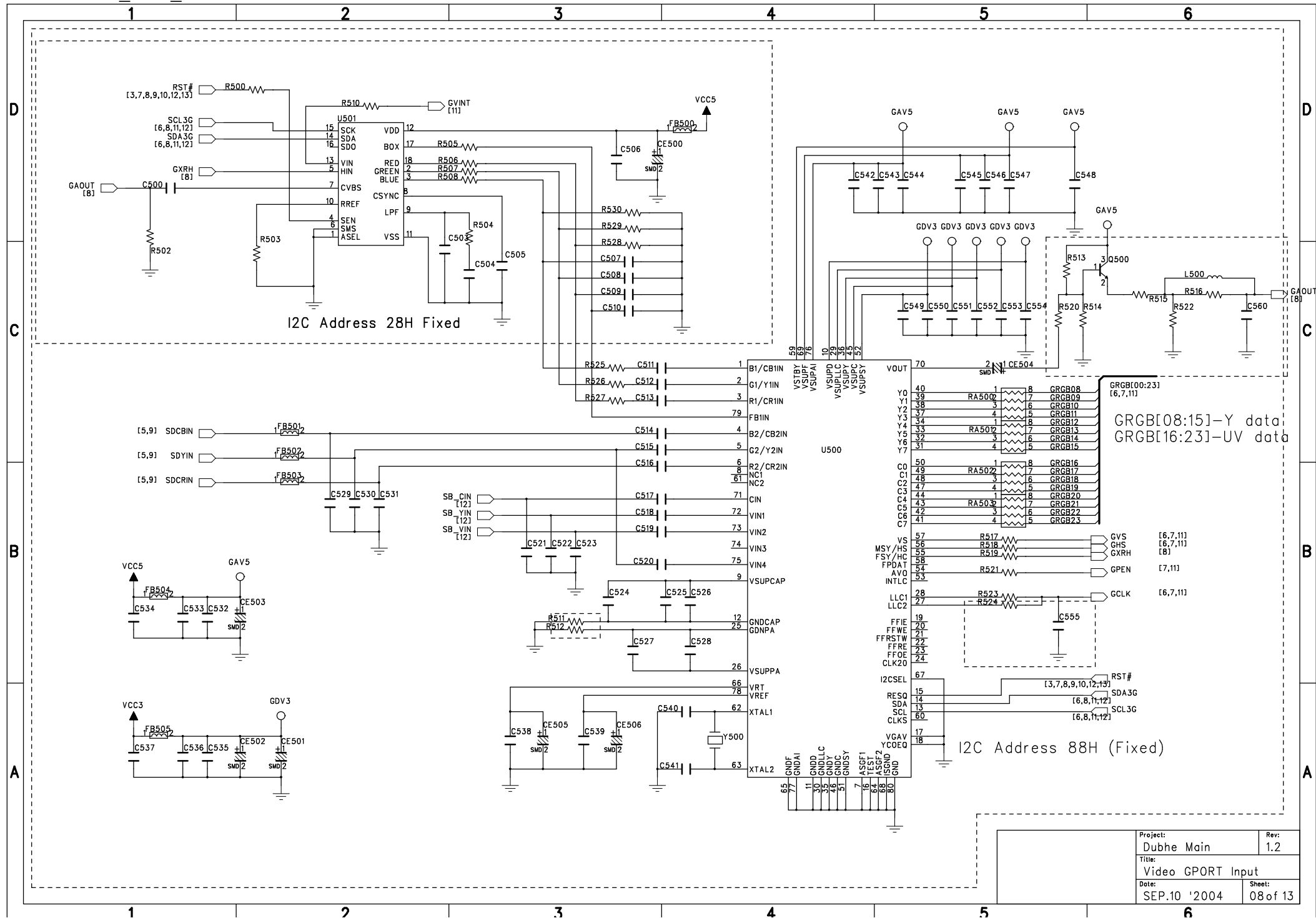
RGB[00:07] - Red
 RGB[08:15] - Green
 RGB[16:23] - Blue

Project:	Dubhe Main	Rev:	1.2
Title:	PC Analog Input		
Date:	SEP.10 '2004	Sheet:	06 of 13

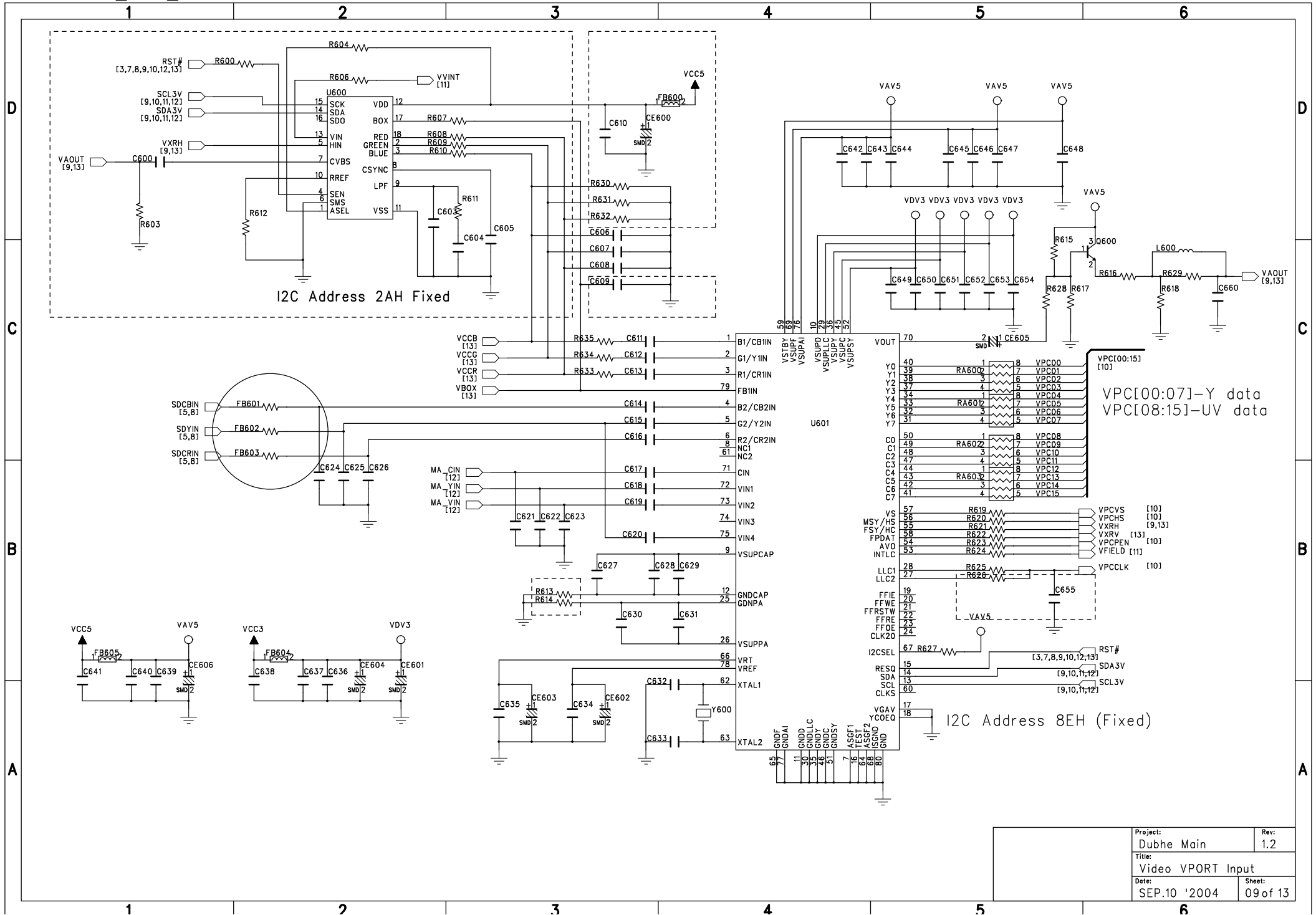


RGB[00:07] - Red
 RGB[08:15] - Green
 RGB[16:23] - Blue

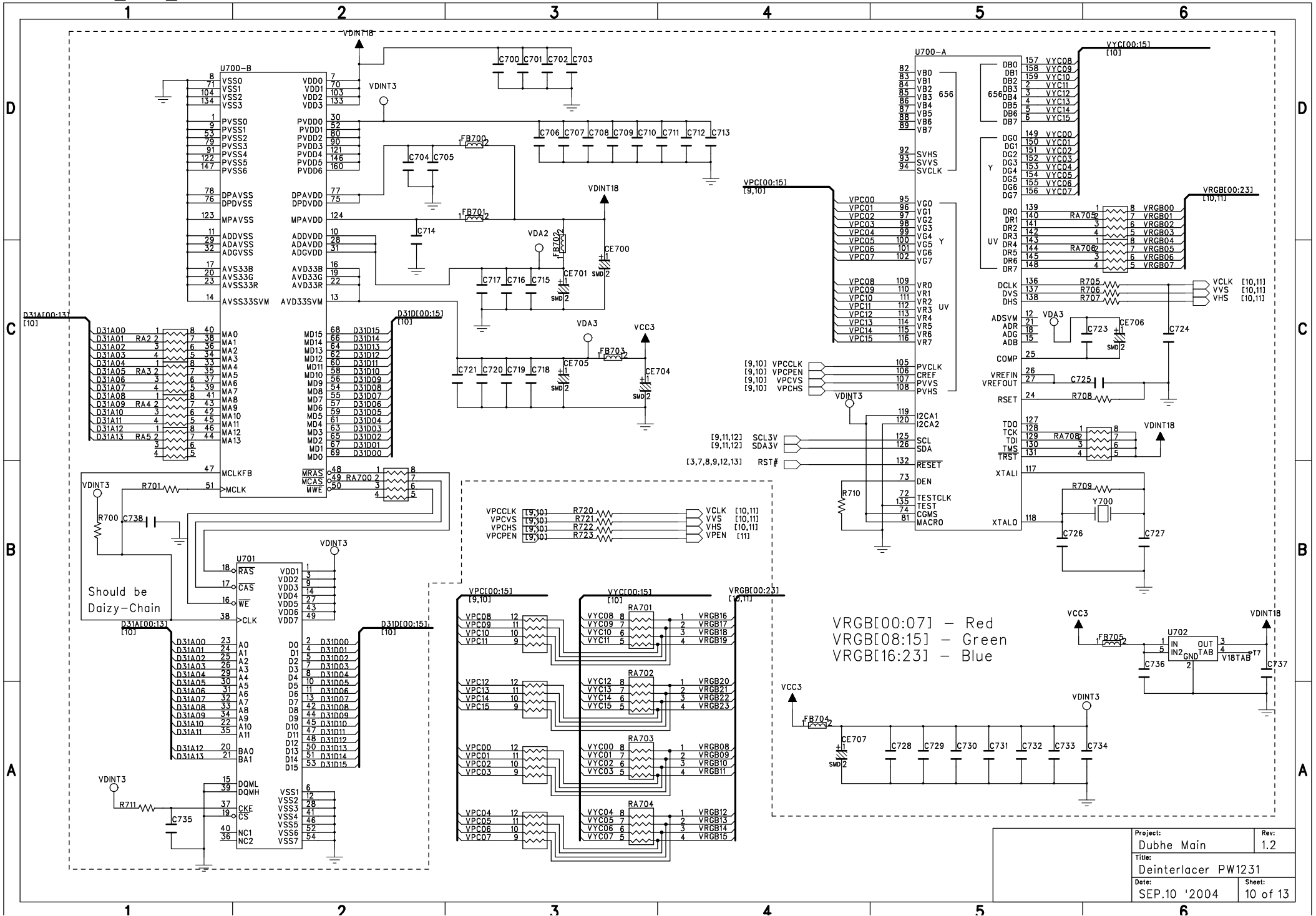
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Title:	PC Digital Input		
Date:	SEP.10 '2004	Sheet:	07 of 13



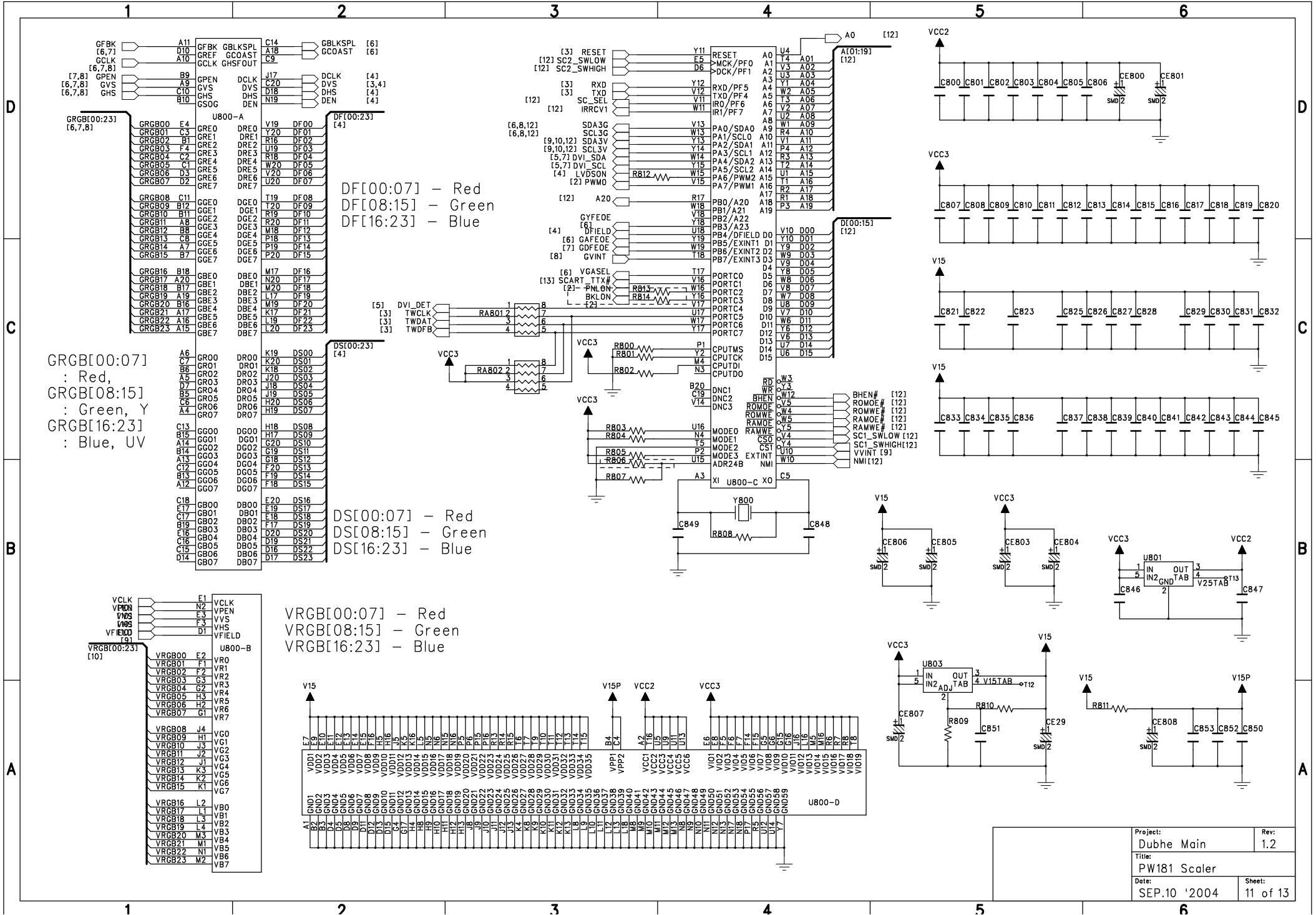
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Title:	Video GPORT Input		
Date:	SEP.10 '2004	Sheet:	08 of 13



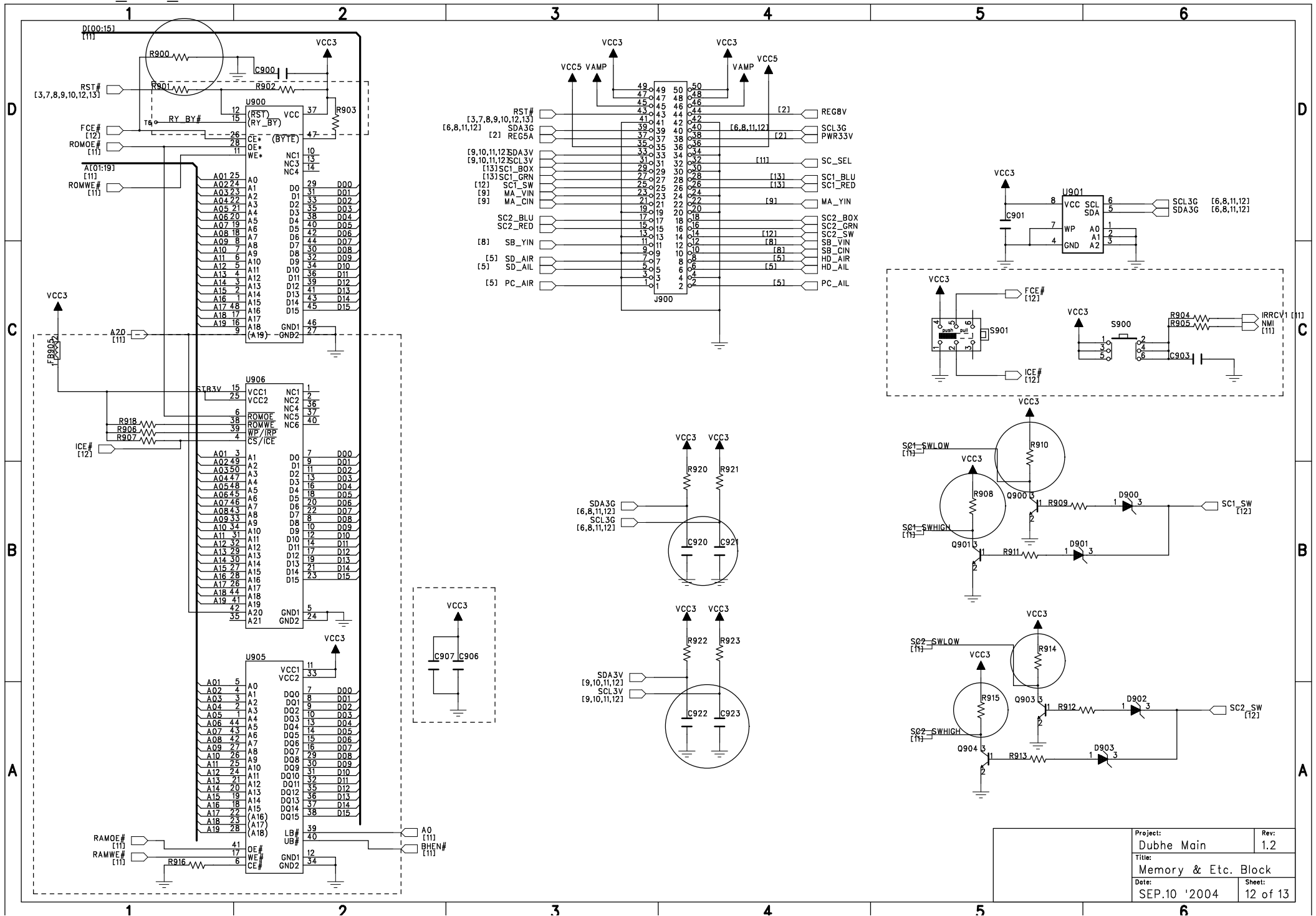
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Title:	Video VPORT Input		
Date:	SEP.10 '2004	Sheet:	09 of 13



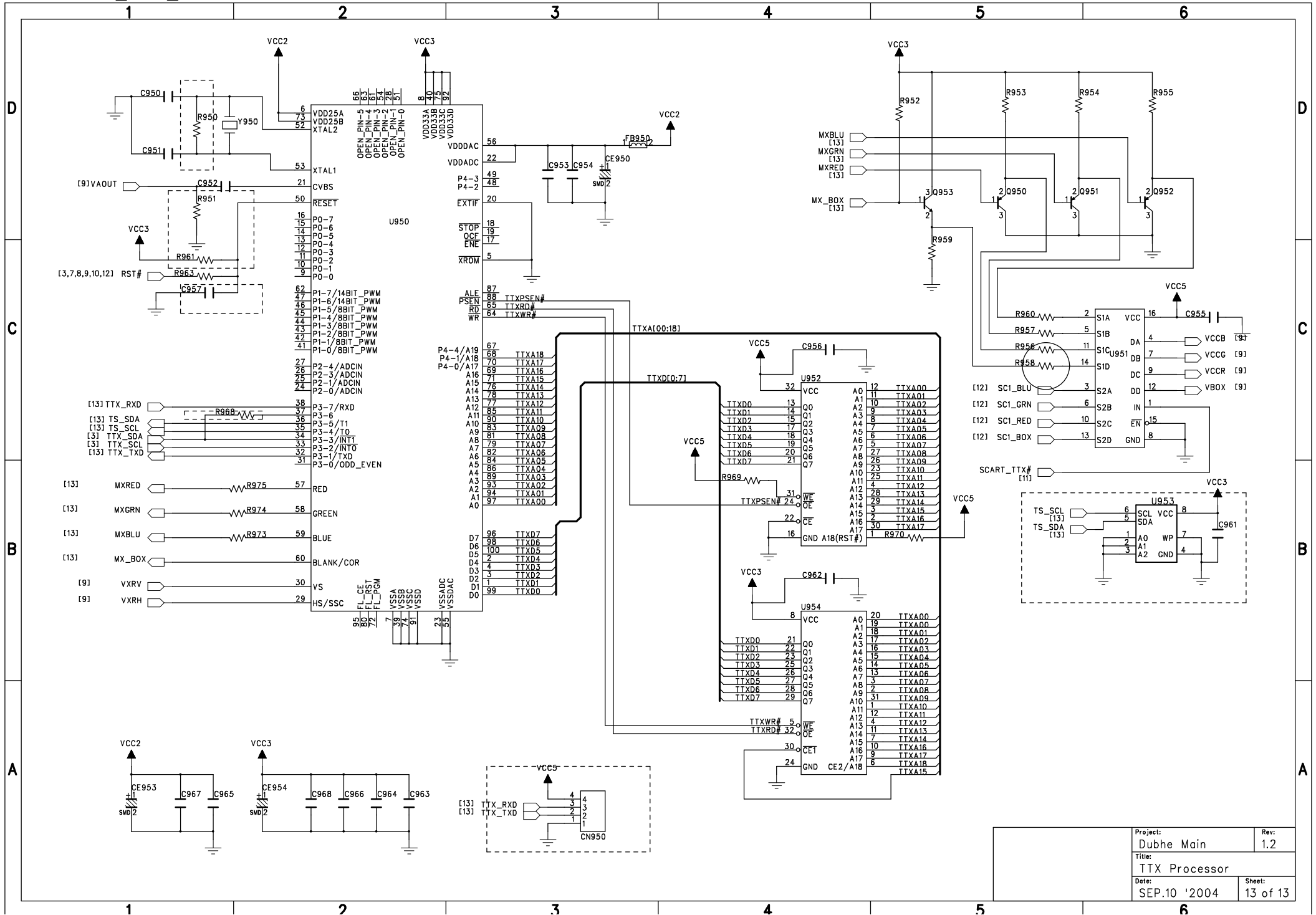
VRGBL00:07] - Red
 VRGB[08:15] - Green
 VRGBL16:23] - Blue



Project:	Dubhe Main	Rev:	1.2
Title:	PW181 Scaler		
Date:	SEP.10 '2004	Sheet:	11 of 13



Project:	Dubhe Main	Rev:	1.2
Title:	Memory & Etc. Block		
Date:	SEP.10 '2004	Sheet:	12 of 13



Project:	Dubhe Main	Rev:	1.2
Title:	TTX Processor		
Date:	SEP.10 '2004	Sheet:	13 of 13

DUBHE SUB_1
FLAT PANEL TV INTERFACE
REV 1.2

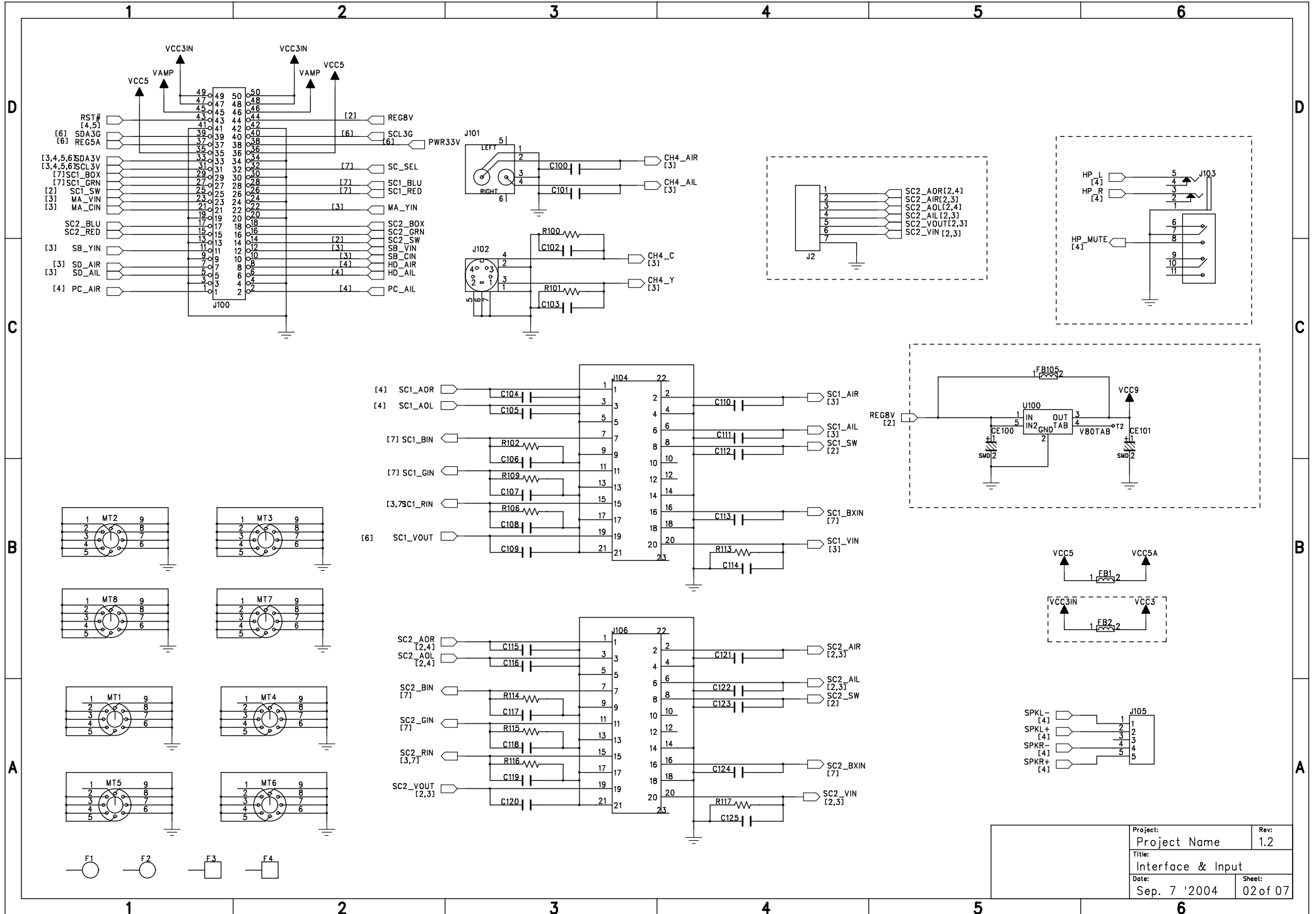
ROAD MAP

DESCRIPTION	REFERENCE	SHEET NO.
THIS SHEET		1
INTERFACE		2
INPUT_MUX		3
AUDIO		4
3DCOMB		5
TUNER		6
INPUT_SCART		7

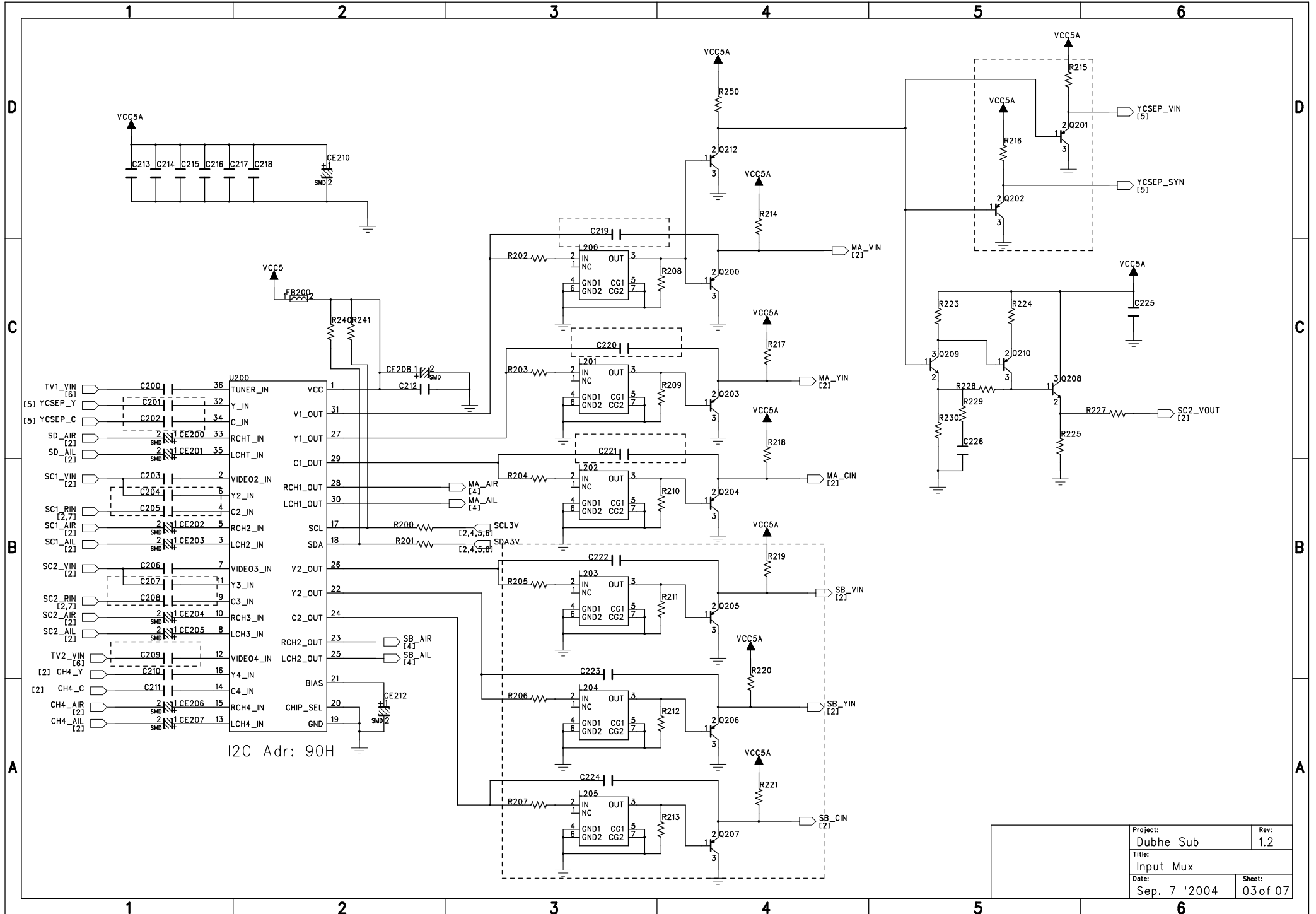
REVISION HISTORY

REV.	DESCRIPTION	BY	LAST UPDATE
0.1	PW181 based TV	K.K.W.	May.22 '2004
1.0	Customer Sample	K.K.W.	Jun.10 '2004
1.2	Interface of SUB_2 Change	K.J.B.	Sep. 7 '2004

Project:		Rev:	
Dubhe Sub		1.2	
Title:			
Title Page			
Date:		Sheet:	
Sep. 7 '2004		01 of 07	

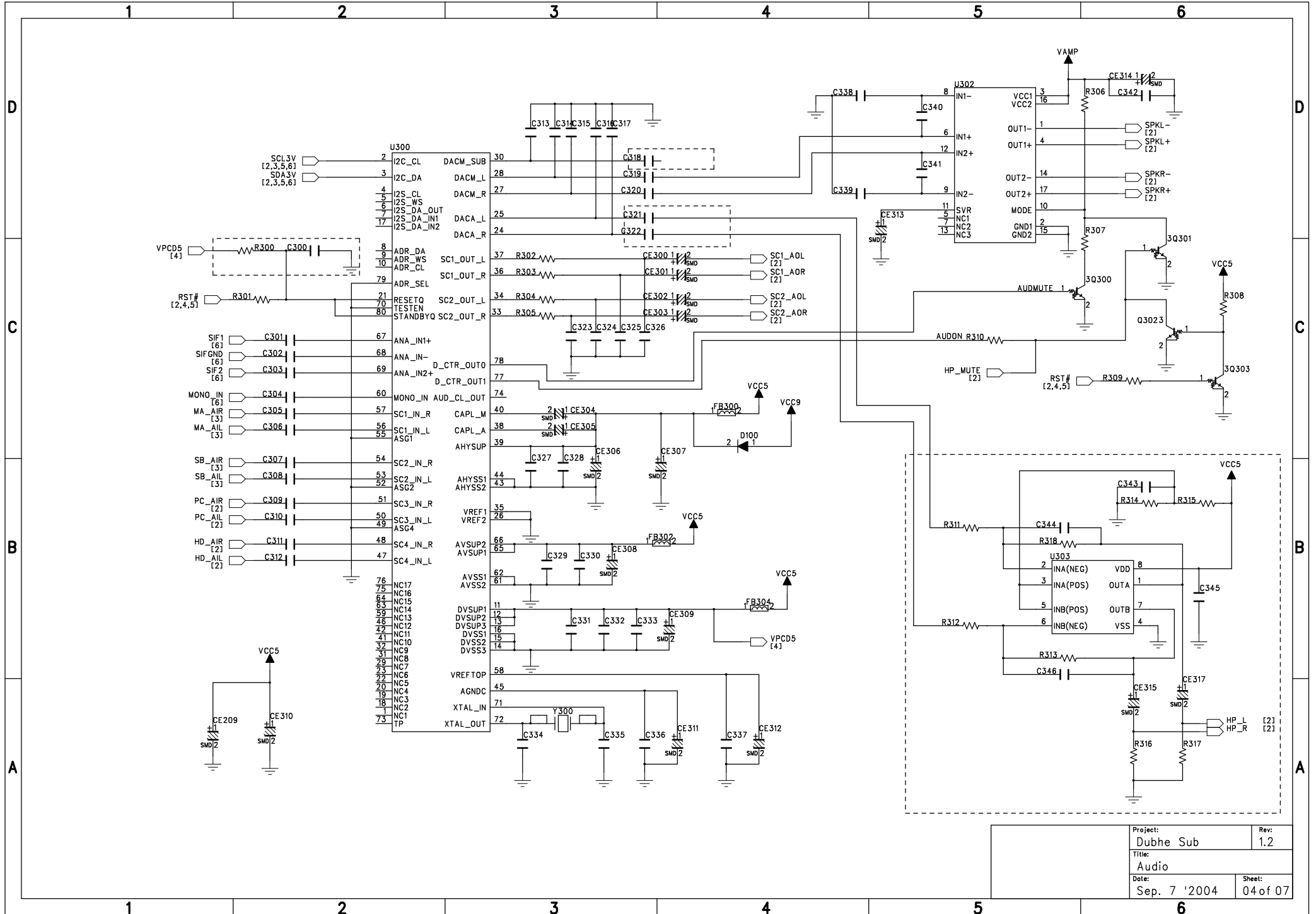


Project:	Project Name	Rev:	1.2
Title:	Interface & Input		
Date:	Sep. 7 '2004	Sheet:	02 of 07

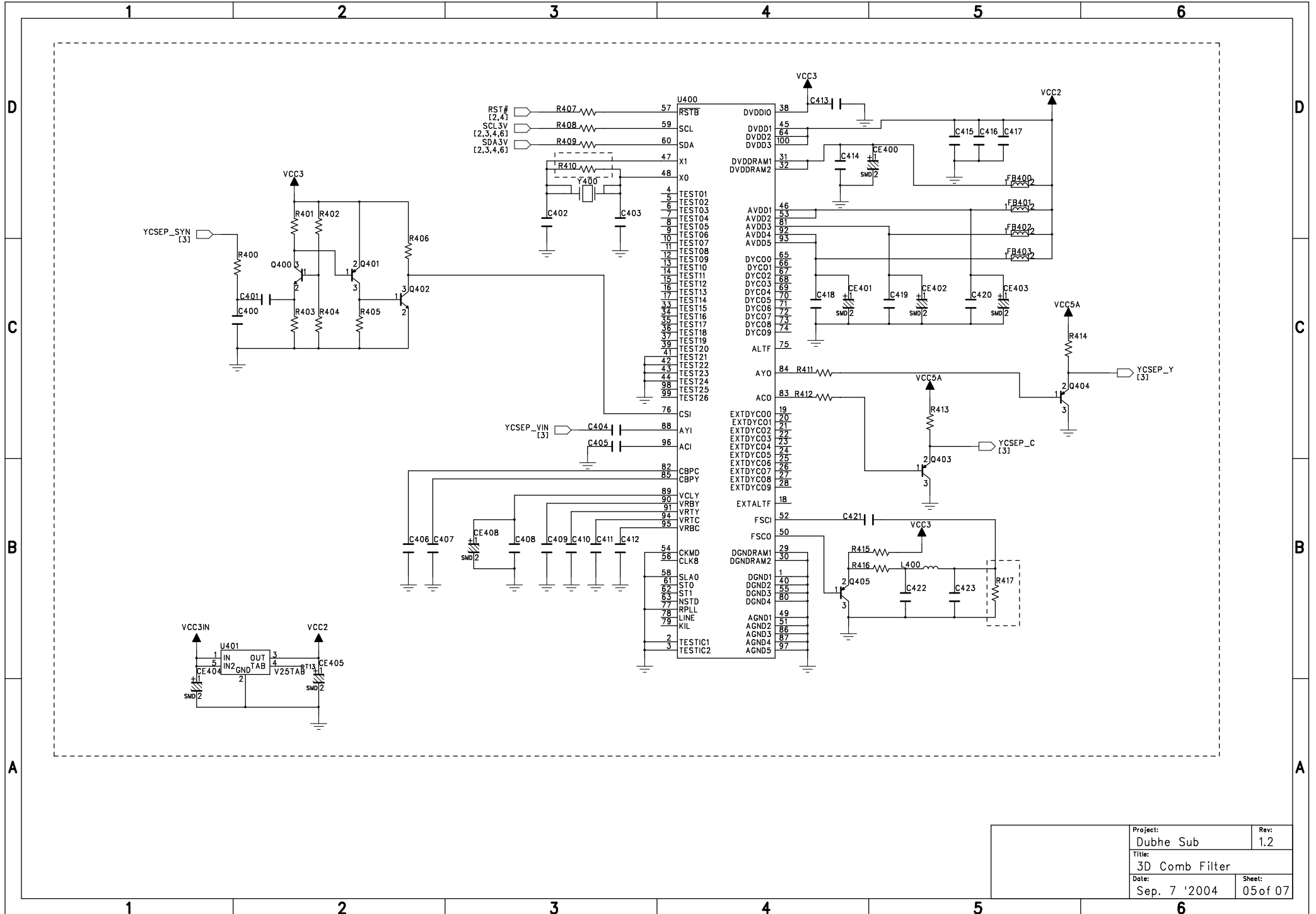


I2C Adr: 90H

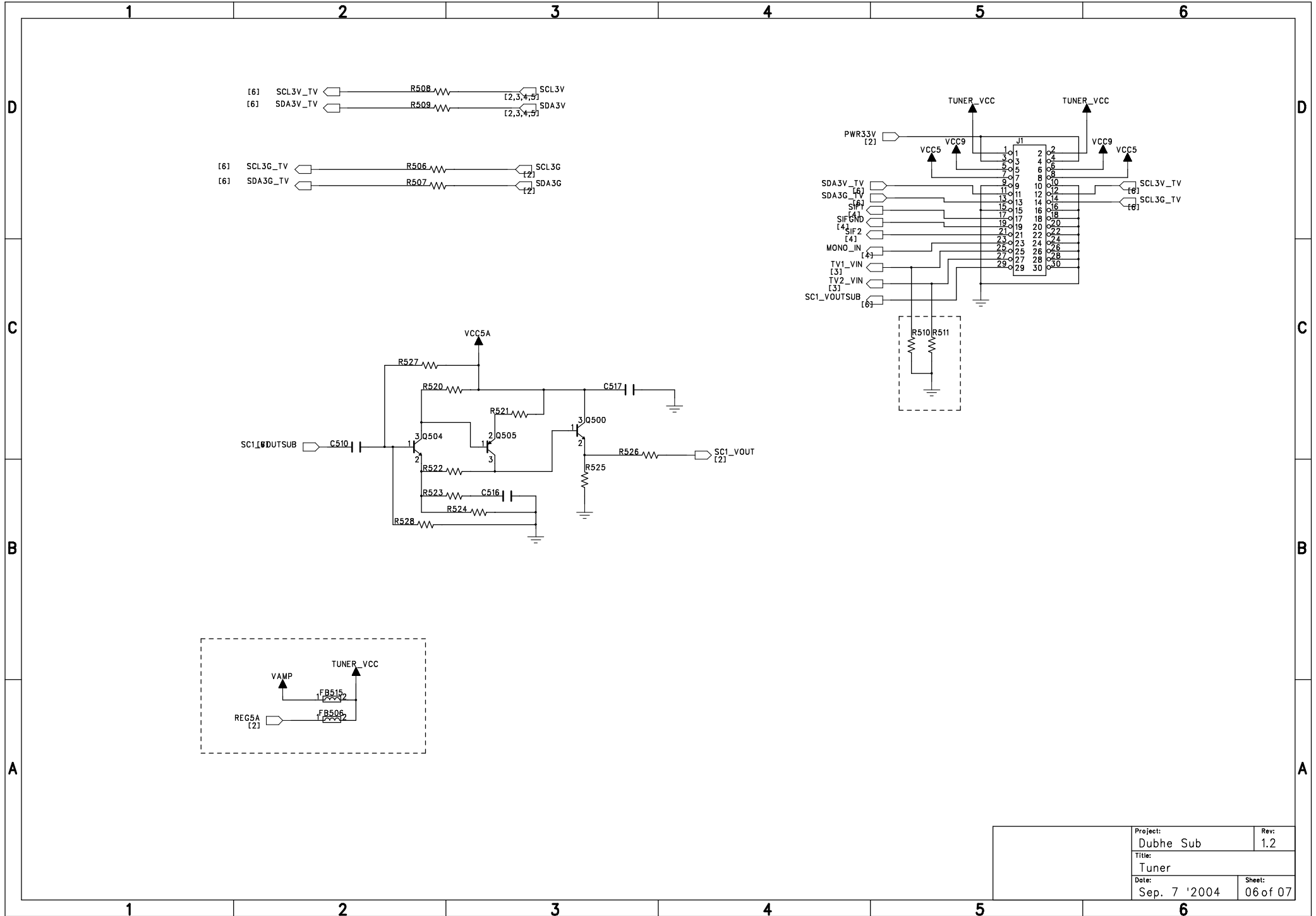
Project: Dubhe Sub		Rev: 1.2
Title: Input Mux		
Date: Sep. 7 '2004	Sheet: 03 of 07	



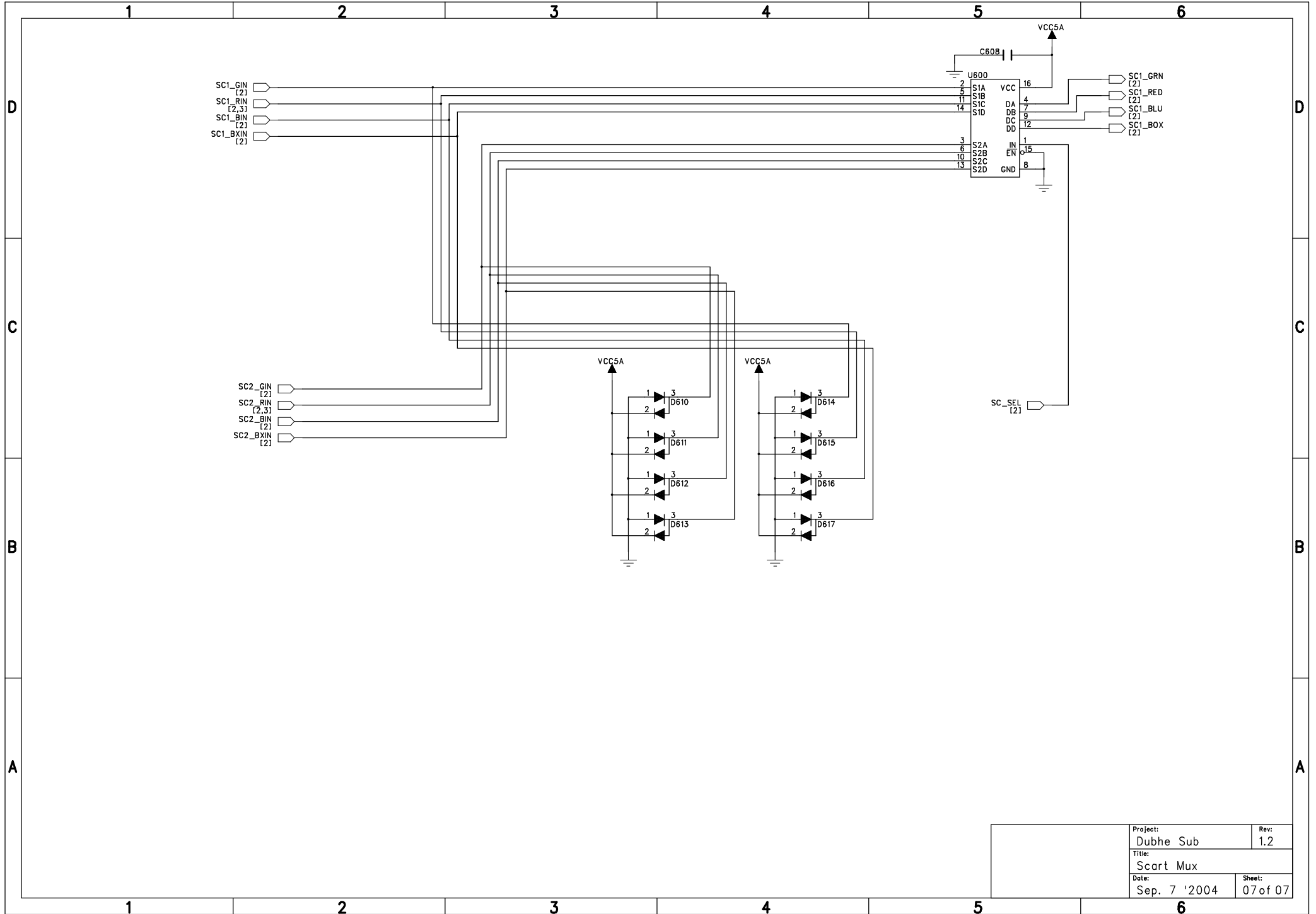
Project:	Dubhe Sub	Rev:	1.2
Title:	Audio		
Date:	Sep. 7 '2004	Sheet:	04 of 07



Project:	Dubhe Sub	Rev:	1.2
Title:	3D Comb Filter		
Date:	Sep. 7 '2004	Sheet:	05 of 07

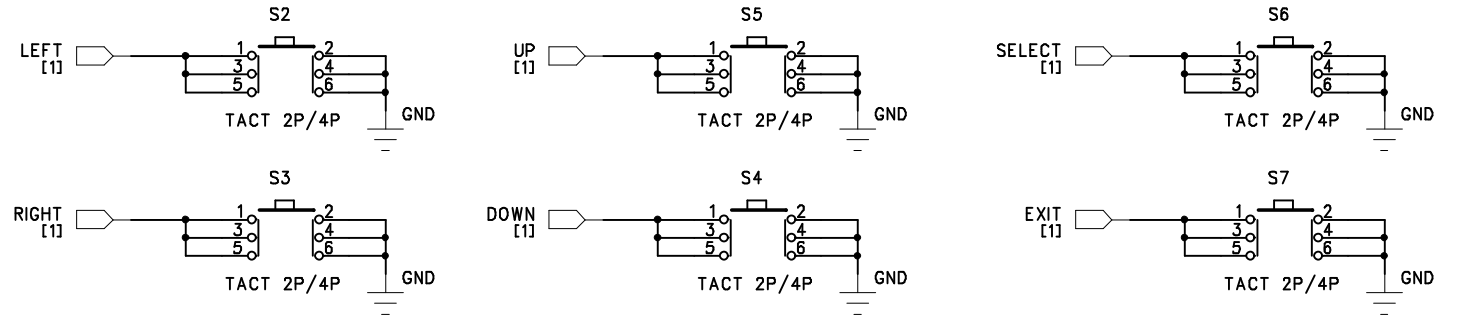
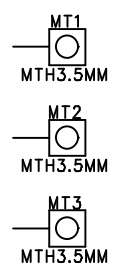
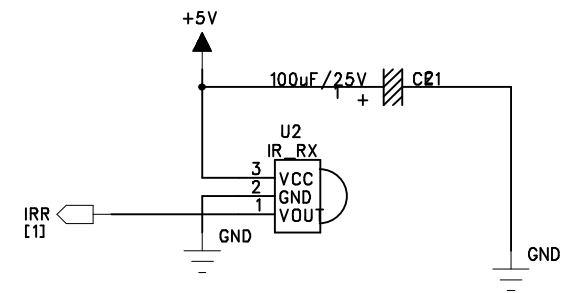
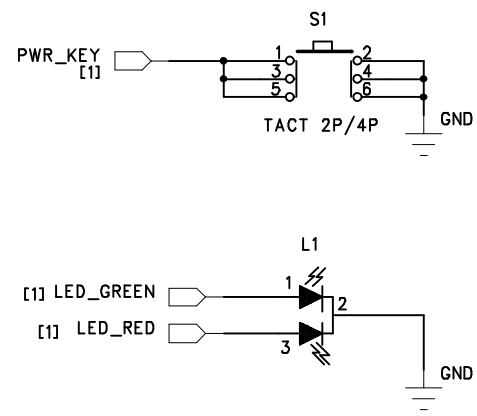
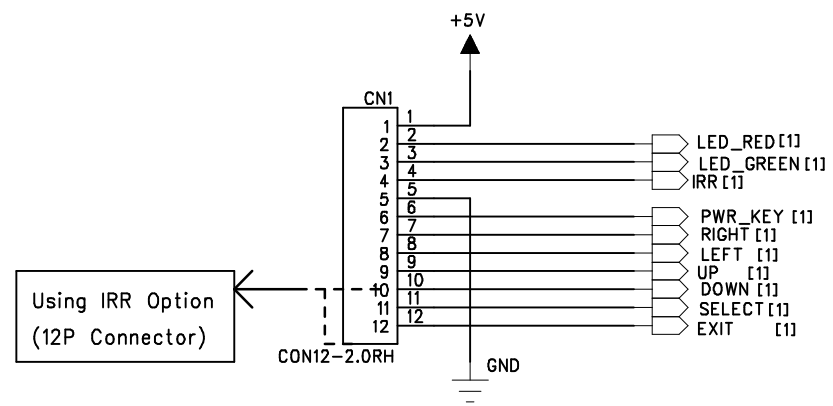


Project:		Dubhe Sub		Rev:		1.2	
Title:							
Tuner							
Date:				Sep. 7 '2004			
Sheet:				06 of 07			



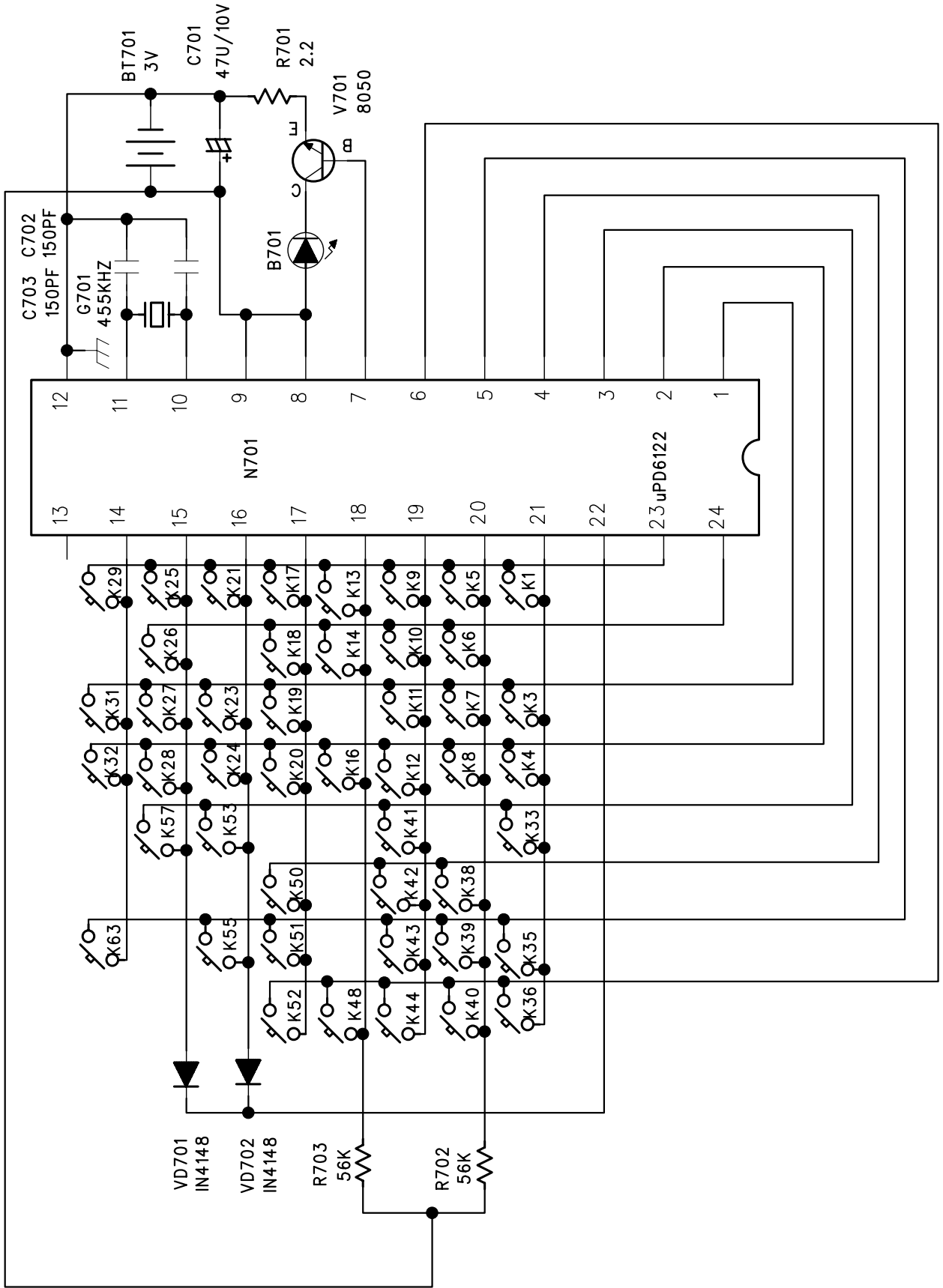
Project:		Dubhe Sub		Rev:		1.2	
Title:							
Scart Mux							
Date:				Sep. 7 '2004			
Sheet:				07 of 07			

DUBHE OSD
6-Key OSD



Project:	Project Name	Rev:	1.2
Title:	DUBHE OSD		
Date:	June. 15,2004	Sheet:	xx of xx

REMOTE PCB



Basic Operations & Circuit Description

Main Electric Components

(1). MODULE:

There are 1 pc. panel and 3 pcs. PCB including 2 pcs. INVERTER board(L&R), 1 pc. T-CONTROL board,

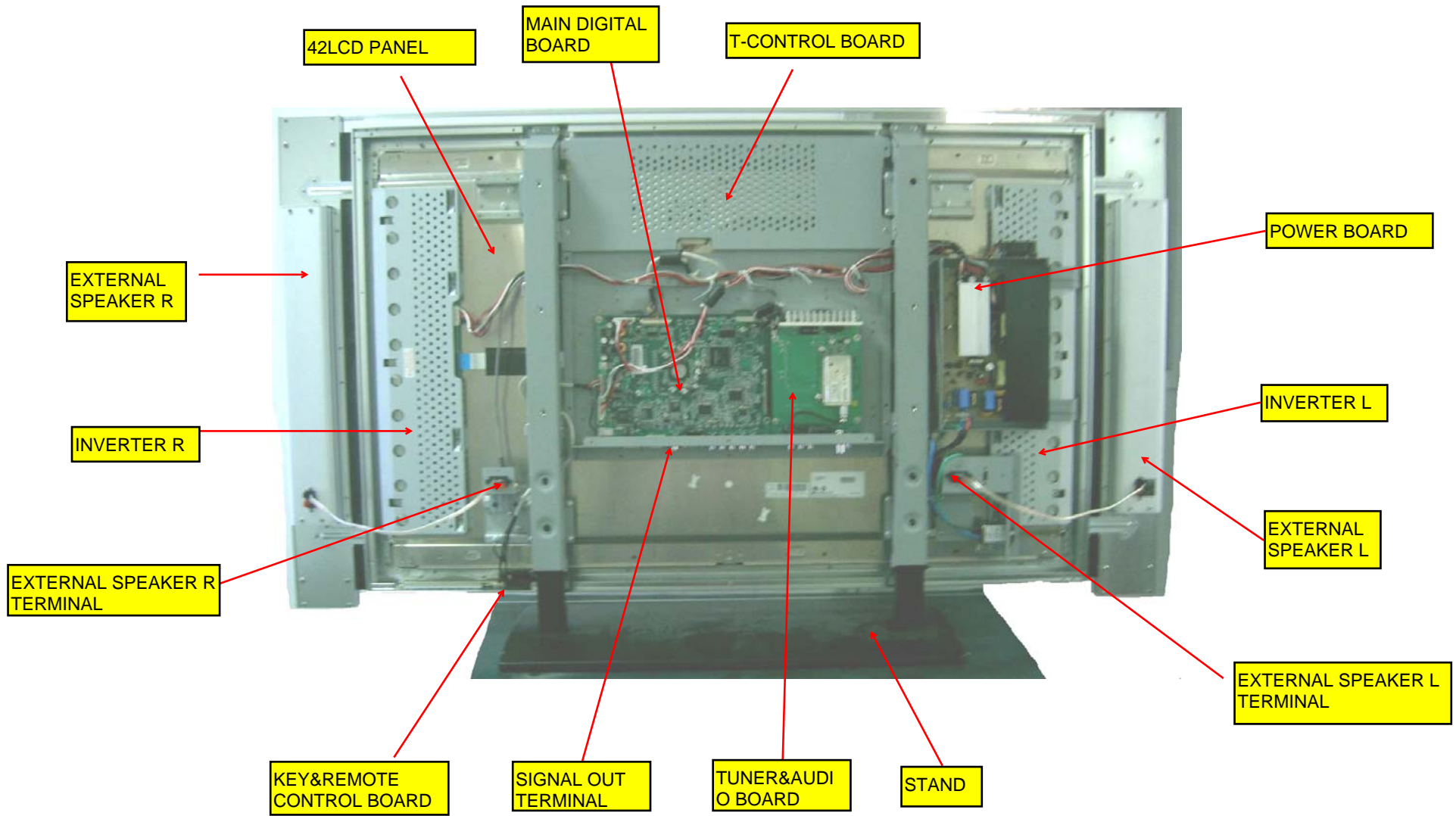
(2).SIGNAL PROCESS

There are 7 pcs. PCBs including

- 1 pc. Tuner board,
- 1 pc. Audio board,
- 1 pc. Main digital board,
- 1 pc. Keypad board,
- 1 pc. Remote Control Receiver board,
- 2 pc. L/R Speakers converter board.

(3).POWER

There are 1 pc. PCB for power.



PCB function

1. Power:

- (1). Input voltage: AC 100V~240V, 47Hz~63Hz.
Input range: AC 90V(Min)~264V(Max) auto regulation.
- (2). To provide power for PCBs.
 - a). +24V for Inverter.
 - b). +5Vsb for standby,
 - c). +5V for signal power,
 - d). +18V for Audio Amp power and converter to +12V for Lvds power.

2. Main (Video InterFace) board:

- (1).Decoder the video signal (TV,CVBS,S-VIDEO,YCbCr) from analog to digital signal.
- (2).Converter the Video signals(TV,CVBS,S-VIDEO,YCbCr) and graphics signal (DVI,VGA,YPbPr) from internace to progressive,
- (3). Converter the Digital to fit the panel display mode and output the LVDS signal to Panel.

3. Tuner Board :

Convert TV RF signal to video and audio signal to Main board.

4. Audio board:

- (1).Decoder the TV SIF signal to audio signal,
- (2).Converter the audio to audio Ampifile and out put to the external speaker.
- (3).3D comb-filter

5. KEYBOARD

To get the main button control on LCD_TV as SOURCE,MENU, CHANNEL +,CHANNEL -, VOL +,VOL-, STANDBY functions.

6. Remote control board

Receive the remote signal and active for the control.

7. T-CONTROL board

Converter the LVDS signal to the digital signal for fitting the PANEL.

8. INVERTER board

Converter the low DC voltage +24V to high AC voltage about AC600V to drive the backlight.

PCB failure analysis

1. CONTROL:

- a. Abnormal noise on screen.
- b. No picture.

2. MAIN (VIDEO):

- a. Lacking color, Bad color scale.
- b. No voice.
- c. No picture but with signals output, OSD and back light.
- d. Abnormal noise on screen.

3. POWER:

- No picture, no power output.

Basic operation of LCD-TV

1. After turning on power switch, power board sends 5Vst-by Volt to Micro Processor IC waiting for ON signals from Key Switch or Remote Receiver.

2. When the ON signal from Key Switch or Remote Receiver is detected, Micro Processor will send ON Control signals to Power. Then Power sends (5Vsc, 18Vsc, 24V and RLY ON, Vs ON) to PCBs working. This time VIF will send signals to display back light, OSD on the panel and start to search available signal sources. If the audio signals input, them will be amplified by Audio AMP and transmitted to Speakers.

3. If some abnormal signals are detected (for example: over volts, over current, over temperature and under volts), the system will be shut down by Power off.

LCD basic display theory.

When an electrical field is applied to the LC planes, the LC molecules re-align themselves so that they are parallel to the electrical field. This electrical process is known as **twisted nematic field effect** or **TNFE**. In this alignment, polarized light is not twisted as it passes through the LC material (see Diagram 3A and 3B). If the front polarizer is oriented perpendicular to the rear polarizer, light will pass through the energized display but will be blocked by the rear polarizer. An LCD in this form is acting as a light shutter.

Displays with variable characters are created by selectively etching away the conductive surface that was originally deposited on the glass. Etched areas become the display's background; unetched areas become the display's characters.

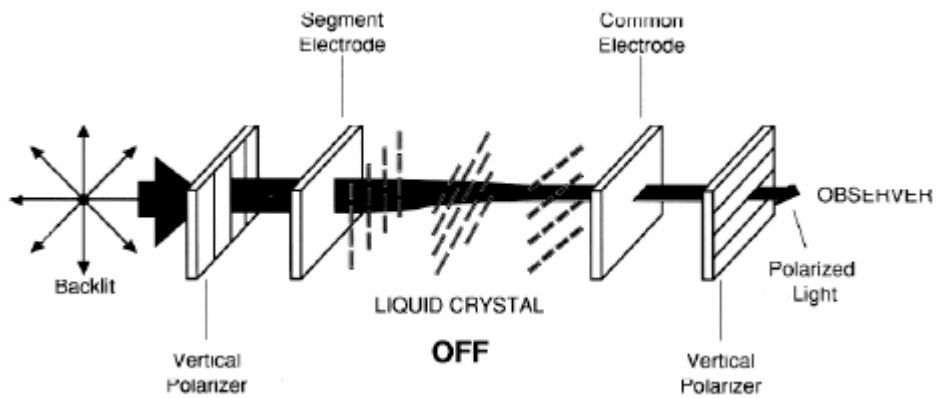


Diagram 3A. The "off" state of a TN LCD—the LC molecules form a twist and therefore cause polarized light to twist as it passes through.

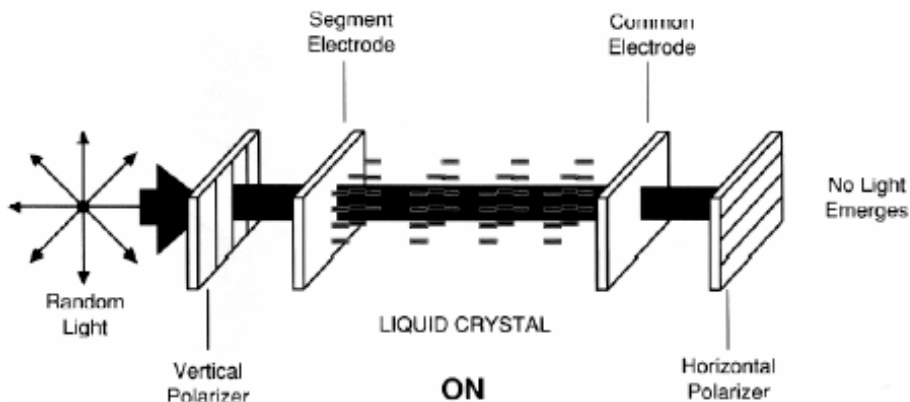


Diagram 3B. The "on" state—the electrical field re-aligns the LC molecules so they do not twist the polarized light.

Main IC Specifications

- **PW181 Image Processor, Scaler**
- **PW1231 Digital Video Signal Processor**
- **uPD64083 Three –Dimensional Y/C Separation LSI
With On-Chip Memory**
- **AD9883A 110MSPS/140MSPS Analog Interface**
- **VPC 323XD Comb-filter Video Processor**
- **Si161B Panel Link Receiver**
- **Z86229 NTSC Line 21 CCD decoder**
- **MSP34x0G Multistandard Sound Processor**

PW181

Product Specification



General Description

The PW181 ImageProcessor is a highly integrated “system-on-a-chip” that interfaces computer graphics and video inputs in virtually any format to a fixed-frequency flat panel display.

Computer and video images from NTSC/PAL to WUXGA at virtually any refresh rate can be resized to fit on a fixed-frequency target display device with any resolution up to WUXGA. Video data from 4:3 aspect ratio NTSC or PAL and 16:9 aspect ratio HDTV or SDTV is supported. Multi-region, nonlinear scaling allows these inputs to be resized optimally for the native resolution of the display.

Advanced scaling techniques are supported, such as format conversion using multiple programmable regions. Three independent image scalers coupled with frame locking circuitry and dual programmable color lookup tables create sharp images in multiple windows, without user intervention.

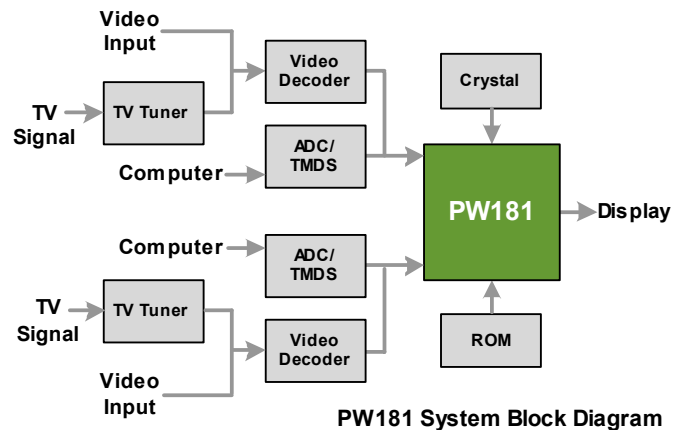
Embedded SDRAM frame buffers and memory controllers perform frame rate conversion and enhanced video processing completely on-chip. A separate memory is dedicated to storage of on-screen display images and CPU general purpose use.

Advanced video processing techniques are supported using the internal frame buffer, including motion adaptive, temporal deinterlacing with film mode detection. When used in combination with the new third-generation scaler, this advanced video processing technology delivers the highest quality video for advanced displays.

Both input ports support integrated DVI 1.0 content protection using standard DVI receivers.

A new advanced OSD Generator with more colors and larger sizes supports more demanding OSD applications, such as on-screen programming guides. When coupled with the new, faster, integrated microprocessor, this OSD Generator supports advanced OSD animation techniques.

Programmable features include the user interface, custom start-up screen, all automatic imaging features, and special screen effects.



Features

- Third-generation, two-dimensional filtering techniques
- Third-generation, advanced scaling techniques
- Second-generation Automatic Image Optimization
- Frame rate conversion
- Video processing
- On-Screen Display (OSD)
- On-chip microprocessor
- JTAG debugger and boundary scan
- Picture-in-picture (PIP)
- Multi-region, non-linear scaling
- Hardware 2-wire serial bus support

Applications

- Multimedia Displays
- Plasma Displays
- Digital Television

Device	Application	Package
PW181-10V	Up to XGA Displays	352 PBGA
PW181-20V	Up to UXGA Displays	



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Tualatin, OR 97062 USA
Telephone: 503.454.1750
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110 MSPS/140 MSPS Analog Interface for Flat Panel Displays

AD9883A

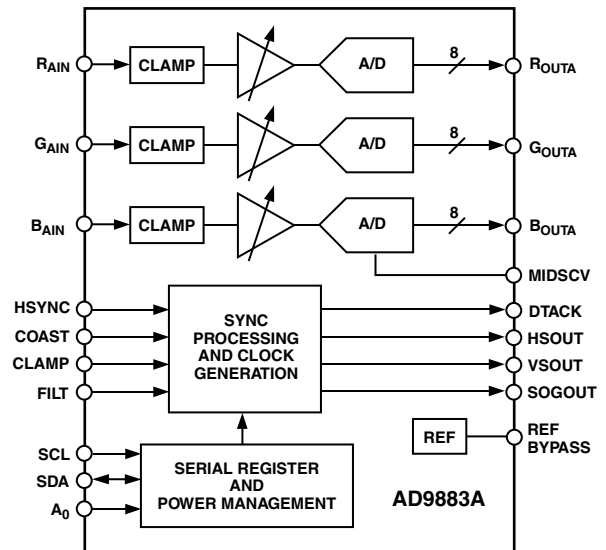
FEATURES

- 140 MSPS Maximum Conversion Rate
- 300 MHz Analog Bandwidth
- 0.5 V to 1.0 V Analog Input Range
- 500 ps p-p PLL Clock Jitter at 110 MSPS
- 3.3 V Power Supply
- Full Sync Processing
- Sync Detect for "Hot Plugging"
- Midscale Clamping
- Power-Down Mode
- Low Power: 500 mW Typical
- 4:2:2 Output Format Mode

APPLICATIONS

- RGB Graphics Processing
- LCD Monitors and Projectors
- Plasma Display Panels
- Scan Converters
- Microdisplays
- Digital TV

FUNCTIONAL BLOCK DIAGRAM



GENERAL DESCRIPTION

The AD9883A is a complete 8-bit, 140 MSPS monolithic analog interface optimized for capturing RGB graphics signals from personal computers and workstations. Its 140 MSPS encode rate capability and full power analog bandwidth of 300 MHz supports resolutions up to SXGA (1280 × 1024 at 75 Hz).

The AD9883A includes a 140 MHz triple ADC with internal 1.25 V reference, a PLL, and programmable gain, offset, and clamp control. The user provides only a 3.3 V power supply, analog input, and Hsync and COAST signals. Three-state CMOS outputs may be powered from 2.5 V to 3.3 V.

The AD9883A's on-chip PLL generates a pixel clock from the Hsync input. Pixel clock output frequencies range from 12 MHz to

140 MHz. PLL clock jitter is 500 ps p-p typical at 140 MSPS. When the COAST signal is presented, the PLL maintains its output frequency in the absence of Hsync. A sampling phase adjustment is provided. Data, Hsync, and clock output phase relationships are maintained. The AD9883A also offers full sync processing for composite sync and sync-on-green applications.

A clamp signal is generated internally or may be provided by the user through the CLAMP input pin. This interface is fully programmable via a 2-wire serial interface.

Fabricated in an advanced CMOS process, the AD9883A is provided in a space-saving 80-lead LQFP surface-mount plastic package and is specified over the 0°C to 70°C temperature range.

REV. A

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PW1231A

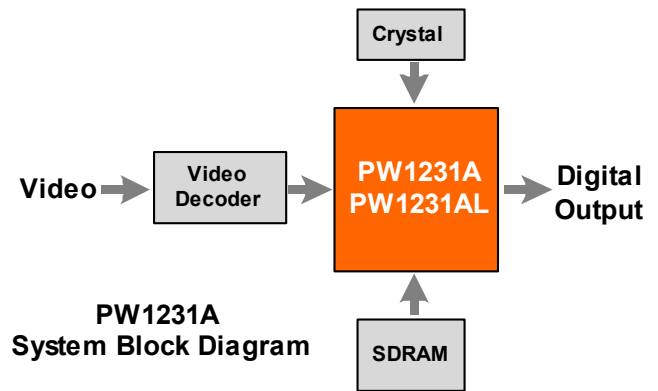
Product Specification



General

The PW1231A is a high-quality, digital video signal processor that incorporates Pixelworks' patented deinterlacing, scaling, and video enhancement algorithms. The PW1231A accepts industry-standard video formats and resolutions, and converts the input into many desired output formats. The highly efficient video algorithms result in excellent quality video.

The PW1231A combines many functions into a single device, including a memory controller, auto-configuration, and others. This high level of integration enables simple, flexible, cost-effective solutions that require fewer components.



Features

- Built-In Memory Controller
- Motion-Adaptive Deinterlace Processor
- Intelligent Edge Deinterlacing
- Digital Color/Luminance Transient Improvement (DCTI/DLTI)
- Interlaced Video Input Options, including NTSC and PAL
- Independent horizontal and vertical scaling
- Copy Protection
- Two-Wire Serial Interface

Applications: For use with Digital Displays

- Flat-Panel (LCD, DLP) TVs
- Rear Projection TVs
- Plasma Displays
- LCD Multimedia Monitors
- Multimedia Projectors

Device	Application	Package
PW1231A PW1231AL	Up to XGA	160-pin PQF

NOTE: "L" denotes lead (Pb) free



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P/N 001-0097-00 Rev B
July 2003

PRELIMINARY—CONFIDENTIAL

THREE-DIMENSIONAL Y/C SEPARATION LSI WITH ON-CHIP MEMORY

DESCRIPTION

The μ PD64083 realizes a high precision Y/C separation and a noise reduction by the three-dimension signal processing for NTSC signal.

This product has the On-chip 4-Mbit memory for frame delay, 2ch of high precision internal 10-bit A/D converter, and adapting 10-bit signal processing (only for luminance signal) and high picture quality. The μ PD64083 is completely single-chip system of 3D Y/C separation.

This LSI includes the Wide Clear Vision ID signal (Japanese local format) decoder and ID-1 signal decoder.

FEATURES

- On-chip 4-Mbit frame delay memory.
- 4 Operation mode (Compatible to the μ PD64082)
 - Motion adaptive 3D Y/C separation (for Composite video input)
 - Frame recursive Y/C NR (for Y/C separated video input)
 - Frame comb type YNR + 1H delayed C signal (for Y/C separated video input)
 - 2D Y/C separation + Frame recursive Y/C NR (for Composite video input)
- Embedded A/D converter (2ch), D/A converter (2ch), clock generator.
- Embedded Y coring, Vertical enhancer, Peaking filter, and Noise detector.
- Embedded WCV-ID decoder and ID-1 decoder.
- I²C bus control.
- Dual power supply of 2.5 V and 3.3 V.
 - For digital : DV_{DD} = 2.5 V
 - For analog : AV_{DD} = 2.5 V
 - For DRAM : DV_{DDRAM} = 2.5 V
 - For I/O : DV_{DDIO} = 3.3 V

ORDERING INFORMATION

Part number	Package
μ PD64083GF-3BA	100-pin plastic QFP (14 × 20)

Comb Filter Video Processor

1. Introduction

The VPC 323xD is a high-quality, single-chip video front-end, which is targeted for 4:3 and 16:9, 50/60-Hz and 100/120 Hz TV sets. It can be combined with other members of the DIGIT3000 IC family (such as DDP 331x) and/or it can be used with 3rd-party products.

The main features of the VPC 323xD are

- high-performance adaptive 4H comb filter Y/C separator with adjustable vertical peaking
- multi-standard color decoder PAL/NTSC/SECAM including all substandards
- four CVBS, one S-VHS input, one CVBS output
- two RGB/YC_rC_b component inputs, one Fast Blank (FB) input
- integrated high-quality A/D converters and associated clamp and AGC circuits
- multi-standard sync processing
- linear horizontal scaling (0.25 ... 4), as well as non-linear horizontal scaling 'Panoramavision'
- PAL+ preprocessing
- line-locked clock, data and sync, or 656-output interface
- peaking, contrast, brightness, color saturation and tint for RGB/YC_rC_b and CVBS/S-VHS
- high-quality soft mixer controlled by Fast Blank
- PIP processing for four picture sizes ($\frac{1}{4}$, $\frac{1}{9}$, $\frac{1}{16}$, or $\frac{1}{36}$ of normal size) with 8-bit resolution
- 15 predefined PIP display configurations and expert mode (fully programmable)
- control interface for external field memory
- I²C-bus interface
- one 20.25-MHz crystal, few external components
- 80-pin PQFP package

1.1. System Architecture

Fig.1-1 shows the block diagram of the video processor

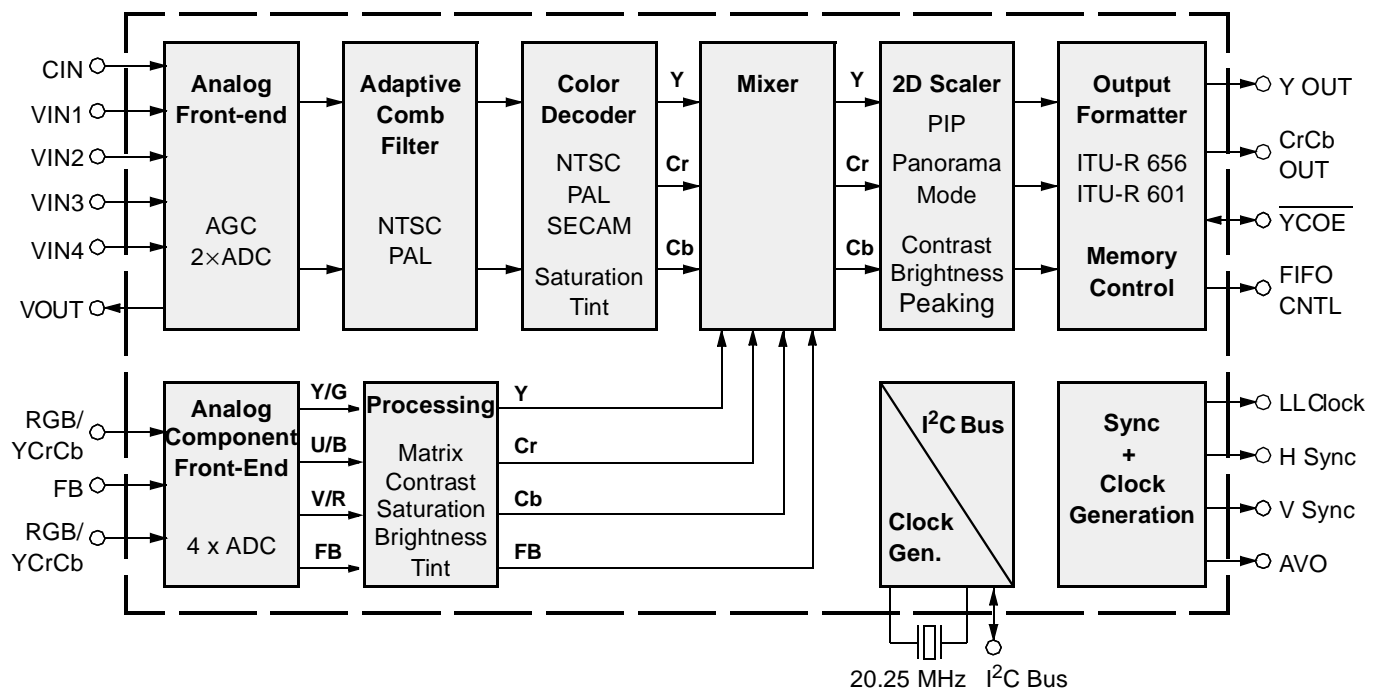


Fig. 1-1: Block diagram of the VPC 323xD

General Description

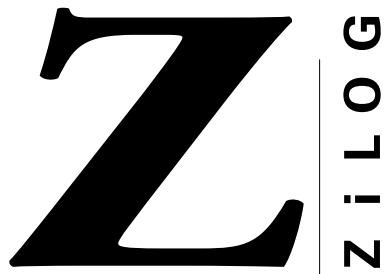
The SiI 161B receiver uses PanelLink Digital technology to support high-resolution displays up to UXGA (25-165MHz). This receiver supports up to true color panels (24 bits per pixel, 16M colors) with both one and two pixels per clock.

All PanelLink products are designed on a scaleable CMOS architecture, ensuring support for future performance enhancements while maintaining the same logical interface. System designers can be assured that the interface will be stable through a number of technology and performance generations.

PanelLink Digital technology simplifies PC and display interface design by resolving many of the system level issues associated with high-speed mixed signal design, providing the system designer with a digital interface solution that is quicker to market and lower in cost.

Features

- Low Power Operation: 280mA max. current consumption at 3.3V core operation
 - Time staggered data output for reduced ground bounce and lower EMI
 - Sync Detect feature for Plug & Display
 - Cable Distance Support: over 5m with twisted-pair, fiber-optics ready
 - ESD tolerant to 5kV (HBM on all pins)
 - Compliant with DVI 1.0 (DVI is backwards compatible with VESA® P&D™, FPDI-2™ and DFP)
 - HSYNC de-jitter circuitry enables stable operation even when HSYNC contains jitter
 - Low power standby mode
 - Automatic entry into standby mode with clock detect circuitry
 - Standard and Pb-free packages (see page 25).
-



Totally Logical

Z86229

NTSC LINE 21 CCD DECODER

FEATURES

Devices	Speed (MHz)	Pin Count/ Package Types	Standard Temp. Range	Automatic Data Extraction		
				On-Screen Display & Closed Captioning	Program Rating	Time of Day
Z86229	12	18-Pin DIP, SOIC	0°C to +70°C	Yes	Yes	Yes

- Complete Stand-Alone Line 21 Decoder for Closed-Captioned and Extended Data Services (XDS)
- Preprogrammed to Provide Full Compliance with EIA-608 Specifications for Extended Data Services
- Automatic Extraction and Serial Output of Special XDS Packets (Time of Day, Local Time Zone, and Program Blocking)
- Programmable XDS Filter for a Specific XDS Packet
- Cost-Effective Solution for NTSC Violence Blocking inside Picture-in-Picture (PiP) Windows
- Minimal Communications and Control Overhead Provide Simple Implementation of Violence Blocking, Closed Captioning, and Auto Clock Set Features
- Programmable, On-Screen Display (OSD) for Creating Full Screen OSD or Captions inside a Picture-in-Picture (PiP) Window
- User-Programmable Horizontal Display Position for easy OSD Centering and Adjustment
- I²C Serial Data and Control Communication
- Supports 2 Selectable I²C Addresses

GENERAL DESCRIPTION

Capable of processing Vertical Blanking Interval (VBI) data from both fields of the video frame in data, the Z86229 Line 21 Decoder offers a feature-rich solution for any television or set-top application. The robust nature of the Z86229 helps the device conform to the transmission format defined in the Television Decoder Circuits Act of 1990, and in accordance with the Electronics Industry Association specification 608 (EIA-608).

The Line 21 data stream can consist of data from several data channels multiplexed together. Field 1 consists of four data channels: two Captions and two Texts. Field 2 consists of five additional data channels: two Captions, two Texts, and Extended Data Services (XDS). The XDS data structure is

defined in EIA-608. The Z86229 can recover and display data transmitted on any of these nine data channels.

The Z86229 can recover and output to a host processor via the I²C serial bus. The recovered XDS data packet is further defined in the EIA-608 specification. The on-chip XDS filters in the Z86229 are fully programmable, enabling recovery of only those XDS data packets selected by the user. This functionality allows the device to extract the required XDS information with proper XDS filter setup for compatibility in a variety of TVs, VCRs, and Set-Top boxes.

In addition, the Z86229 is ideally suited to monitor Line 21 video displayed in a PiP window for violence blocking, CCD, and other XDS data services. A block diagram of the Z86229 is illustrated in Figure 1.

Multistandard Sound Processor Family

Release Note: Revision bars indicate significant changes to the previous edition. The hardware and software description in this document is valid for the MSP 34x0G version B8 and following versions.

1. Introduction

The MSP 34x0G family of single-chip Multistandard Sound Processors covers the sound processing of all analog TV-Standards worldwide, as well as the NICAM digital sound standards. The full TV sound processing, starting with analog sound IF signal-in, down to processed analog AF-out, is performed on a single chip. Figure 1–1 shows a simplified functional block diagram of the MSP 34x0G.

This new generation of TV sound processing ICs now includes versions for processing the multichannel television sound (MTS) signal conforming to the standard recommended by the Broadcast Television Systems Committee (BTSC). The DBX noise reduction, or alternatively, Micronas Noise Reduction (MNR) is performed alignment free.

Other processed standards are the Japanese FM-FM multiplex standard (EIA-J) and the FM Stereo Radio standard.

Current ICs have to perform adjustment procedures in order to achieve good stereo separation for BTSC and EIA-J. The MSP 34x0G has optimum stereo performance without any adjustments.

All MSP 34xxG versions are pin compatible to the MSP 34xxD. Only minor modifications are necessary to adapt a MSP 34xxD controlling software to the MSP 34xxG. The MSP 34x0G further simplifies controlling software. Standard selection requires a single I²C transmission only.

The MSP 34x0G has built-in automatic functions: The IC is able to detect the actual sound standard automatically (Automatic Standard Detection). Furthermore, pilot levels and identification signals can be evaluated internally with subsequent switching between mono/stereo/bilingual; no I²C interaction is necessary (Automatic Sound Selection).

The MSP 34x0G can handle very high FM deviations even in conjunction with NICAM processing. This is especially important for the introduction of NICAM in China.

The ICs are produced in submicron CMOS technology. The MSP 34x0G is available in the following packages: PLCC68 (not intended for new design), PSDIP64, PSDIP52, PQFP80, and PLQFP64.

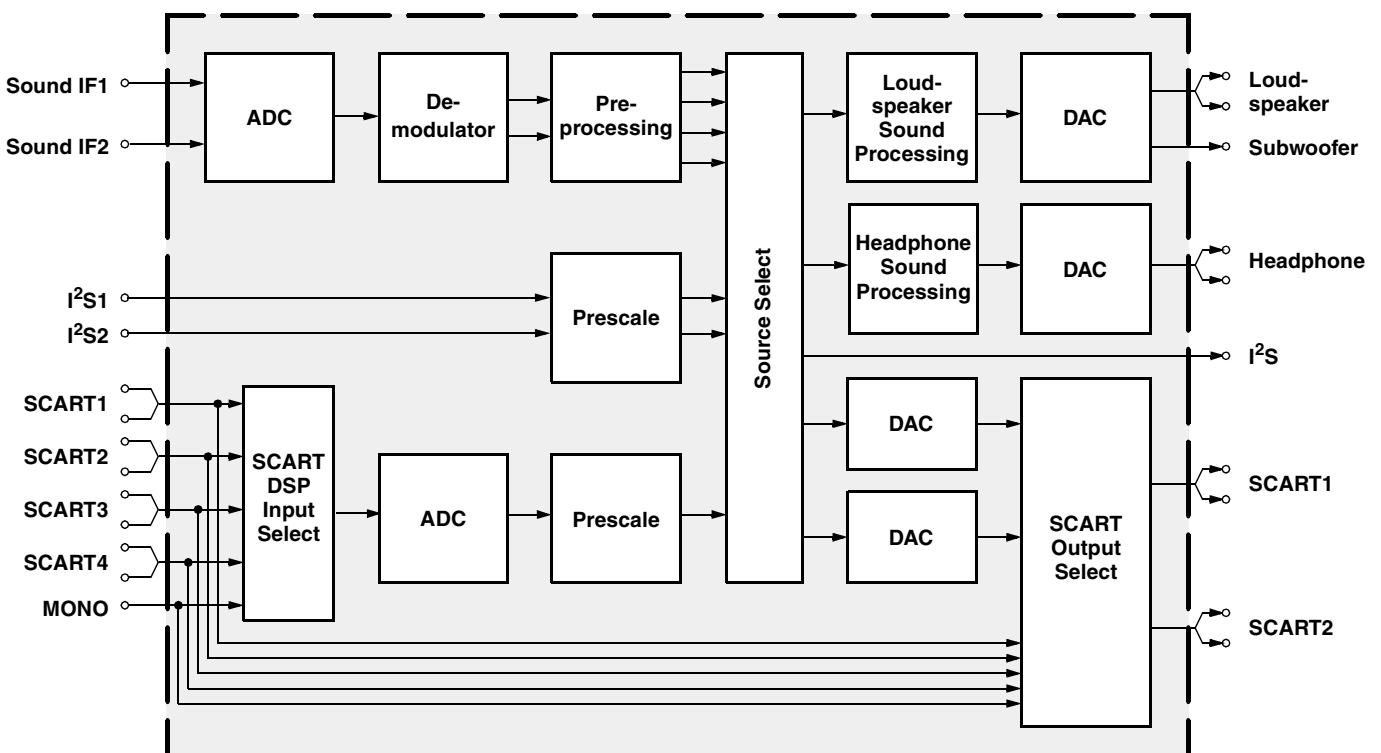


Fig. 1–1: Simplified functional block diagram of the MSP 34x0G

POWER SPECIFICATION

SPECIFICATION			
	MODEL NO.	PSM250-405	
	REVISION	01	DATE 2005.03.14

1. REVISION HISTORY :

Date	Rev.	Page	Summary
2005.03.14	00	All	
2005.03.15	01	6	Change 24V peak power 8A @ 3 minutes.

SPECIFICATION

MODEL NO. PSM250-405

REVISION 01

DATE

2005.03.14

2. SCOPE :

This specification describes a full range of AC input with DC output switching mode power supply, it is an Open Frame type with build in active power factor correction circuit, the PSU performance driver for a Smart Switching-mode with Green / Power-savor function.

3. ELECTRICAL SPECIFICATIONS :

3.1. AC INPUT CHARACTERISTICS :

:

3.1.1. Input voltage :

For the outputs to be within their specified limits, the input voltage shall be single phase sinusoidal with the RMS input voltage within the following limits :

Minimum	Nominal	Maximum	Unit
90	120 ~ 240	264	VRMS

Note : The input voltage should be remained within limit +/- 1V.

3.1.2. Input frequency :

Minimum	Nominal	Maximum	Unit
47	50 ~ 60	63	Hz

3.1.3. Maximum Input current :

AC Input	Maximum	AC Input	Maximum
90 ~ 127V	4Amps	200 ~ 264V	2Amps

SPECIFICATION

MODEL NO.

PSM250-405

REVISION

01

DATE

2005.03.14

3.1.4. Inrush current :

After AC power is applied to the power supply in the stage of cold start, any peak inrush current surge shall not damage the PSU and the input fuse shall not blow under any conditions of DC output loading, temperature, input voltage including repeated, rapid cycling of the power line.

Less than 100A at 115Vac and 25°C ambient cold starting condition

Less than 100A at 240Vac and 25°C ambient cold starting condition

3.1.5. Efficiency :

80% or greater at DC output with full loading and nominal AC input voltage range of 120V / 240Vac, 60Hz / 50Hz.

3.1.6. Power factor :

Power factor of power supply shall meet 0.90 minimum @full load to be meet EN61000-3-2

3.1.7. Power Line Harmonics requirement & PF :

The input current harmonics requirement shall be met with EN 61000-3-2 for power harmonics models. The PF shall ≥ 0.9 at 240Vac. ≥ 0.95 at 100Vac for both 50/60Hz and DC output with full load.

3.1.8. No load power saving :

1W Max. @240Vac without load

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3-2. DC OUTPUT CHARACTERISTICS:

3.2.1. Output Characteristics:

Item	CH1	CH2	CH3	CH4
Output Voltage	+5V	+5Vsb	+18V	+24V
Minimum load current	0.5A	0.1A	0.2A	0.5A
Normal load current	3A	0.5A	3A	7.2A
Maximum load current (@ max. total power)	3.5A	0.75A	3.5A	7.5 A
Line regulation	±5%	±5%	±5%	±5%
Load regulation	±5%	±5%	±5%	±5%
Cross regulation	±5%	±5%	±5%	±5%
Ripple and noise	100mVp-p	100mVp-p	180mVp-p	240mVp-p

Note 1 : The maximum DC output power should be less than 258 Watts.
+24V peak power 8.2A @ 3 minute.

Note 2 : The output voltage shall stay within regulation band as specified in above for a 25 % step load change at 1A/uSec. Load capacitance is defined at minimum load capacitance shall be zero and maximum load capacitance shall be 2200uF for 35V output.

Note 3 : Ripple is defined as a composite of a power line frequency component plus a high frequency component due to the power oscillator. Common mode noise which may be observed due to oscilloscope connections, different ripple and noise at power supply shall be as shown below when measured under nominal load with an oscilloscope with a bandwidth of 20 MHz, the output should be by passed a 0.1uF ceramic disk capacitor in parallel with 10uF electrolytic capacitor to the system load, the length of ground wire on probe should not longer than 40mm.

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3.2.2. Remote on / off:

The PSU DC output (except for the +5Vsb) shall be enabled with an active-high, TTL compatible signal (" PS-ON "), the +5Vsb is on whenever the AC power is present.

* When PS-ON is pulled to TTL high, the DC outputs are to be enabled.

* When PS-ON is pulled to TTL low or open circuited, the DC outputs are to be disabled.

* The DC output enable circuit shall be SELV compliant.

3.2.3. Over-shoot:

Any over-shoot at initial turn-on and turn-off must be less than 10% of nominal voltage value.

3.2.4. Turn-on delay time: 2 sec. Max. @ 120Vac/60Hz

3.2.5. Rise time:

The output voltage should be rise from 0 volt and settle within regulation in less than 30 ms (measured at T1) firm apply of nominal AC input voltage.

Maximum	Unit
30	ms

3.2.6. Hold up time:

5ms typical at full load applied to the output, 115Vac / 60Hz and 100% power down at zero crossing on the AC input.

3.2.7. Response time:

All outputs return within $\pm 5\%$ of nominal voltage within 5m sec. For a 50% load change.

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tacking time of 5V,18V and 24V.

3.2.8. All of main outputs tracking time should under 20ms

4. PROTECTION:

4.1. Input protection:

The input power line will be fused with a 4A / 250Vac fuse.

4.2. Over voltage protection:

By used a latch mode, the output shall be protected from over voltage fault at all conditions including open-loop by breakdown that is set to trip as following table.

4.3. Short circuit protection:

The output will withstand a short circuit across the outputs with latch-off function, Output can be shorted without damage.

Item	CH1	CH2	CH3	CH4
Output Voltage	+5V	+5Vsb	+18V	+24V
Over voltage protection	6.5-7	Auto restart	22.-25.3	27.6-31.2
Over current protection	4.5A	1.5A	4.5A	10A

4.6. Over current protection:

By auto restart mode,

4.7. Over thermal protection:

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By used latch mode,

5. ENVIRONMENTS:

5.1. Temperatures:

Condition	Minimum	Maximum	Unit
Operating	0	+50	°C
Storage	-30	+85	°C

Temperature coefficient $\pm 0.04\%$ per °C

5.2. Humidity:

It based on relative humidity and non-condensing.

Condition	Minimum	Maximum	Unit
Operating	20%	90%	RH
Storage	5%	95%	RH

5.3. Altitude:

Operating – From sea level to 10,000 ft with 40°C maximum ambient temperature.

Storage – From sea level to 40,000 ft.

5.4. Vibration and shock:

The PSU shall withstand forces of 2 G at variable recurrent frequencies of 10 to 55 Hz and a simulated transportation test. The transportation test will consist of a 1/2 G vibration force at the resonant frequencies of the board or components.

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The test should be within 15 min. and the PSU will be tested in a configuration representative of the intended application with shipping cartons. The PSU must survive a 50 G force for duration of 20 ms in all 3 orthogonal planes from normal mounting points.

6. SAFETY AND EMC:

6.1. Safety (design to meet below standard) :

Safety	Standard
CUL	IEC60065
TUV / GS	EN60065
Nemko	
Demko	
Fimko	
Semko	
PSE	
CB	
CCC	

6.2. EMS:

Test item	Test specification	IEC Standard
ESD	Contact 8 KV	61000-4-2
ESD	Air 15 KV, Contact 8KV	61000-4-2
RS	FR : 26 MHz ~ 1 GHz, Field / Strength : 3 V / M	61000-4-3
EFT	2 KV on AC power line	61000-4-4
SURGE	1 KV (L – N) & 2 KV (L/N – PE) / 1.2 ~ 50Usec.	61000-4-5
CS	3 V / M	61000-4-6
DIPS	0 % 250 Cy. / 40% 5 Cy. / 70% 5 Cy.	61000-4-11

6.3. Conducted EMI:

For 240 Vac input operation, the PSU must below the limit of CISPR 22, Class B for HF equipment and DP equipment with a 3 dB margin. For 120 Vac input operation, the PSU must below the limit of FCC part 15 sub-part B for Class B computing device with a 3 dB margin. For 100 Vac operation, the PSU must below the limit of VCCI by a 3 dB margin. Each conducted and

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radiated emissions shall be measured in the applicable system and complied with the required standards.

6.4. Radiated EMI and EMC:

No peak emission in the frequency range from 30 MHz to 1 GHz and it shall not exceed Class B limit when measured per ANSI C63.4, CISPR 22 and VCCI measurement procedures. Each conducted and radiated emissions shall be measured in the applicable system.

6.5. Dielectric with stand Hi Pot Test:

6.5.1. Primary to Secondary:

3000 Vac or 4242 Vdc Hi-Pot Test from primary to secondary for a minimum of one second, trip current <10mA.

6.5.2. Primary to FG:

1500 Vac Hi-Pot Test from primary to FG for a minimum of one second.

6.6. Insulation resistance:

6.6.1. Aafter 500Vdc is applied which between primary to secondary or secondary to FG for one minute the Impedance shall be >20M ohm.

6.6.2. Leakage Current: 0.5mA Max. @264Vac / 60Hz

7. RELIABILITIES

7.1. M.T.B.F.:

The mean time between failures of PSU shall equal or exceed 60000 hours when operated at 75% continuous load in an ambient temperature of 25 °C as calculated by parts stress method of

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MIL-HDBK-217F.

7.2. Temperature rise:

The Maximum temperature measured at any point on the case surface shall not exceed 70 °C at room temperature of 25 °C i.e., the maximum temperature rise on the surface of case shall not exceed 45 °C.

7.3. Surge withstand and EFT:

The PSU shall withstand the line transient for both Common Mode at 2 KV and Differential Mode at 2 KV operations.

7.4. Burn-in:

100 % burn-in on production line with 80 ~ 100% loading at 40 °C ± 5 °C environment temperature for 4 hours.

8. ACOUSTICS:

The noise should be less than 40 dB when one meter away from the PSU at full loading.

9. MECHANICALS:

9.1. Input connection:

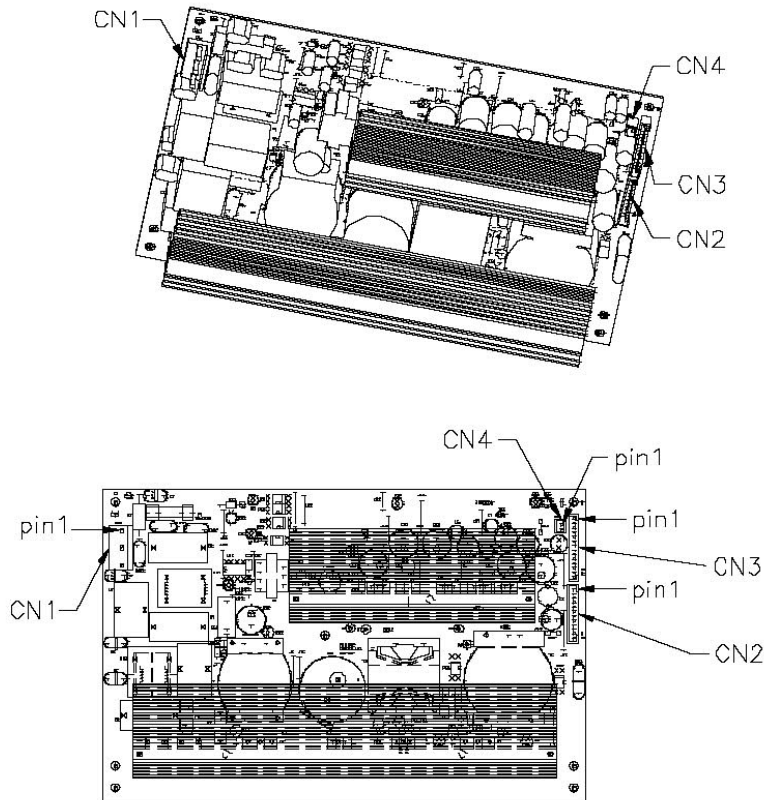
CN1: 3961P0500T (3.96mm)

9.2. Output connection

CN2: 2002P1200T CN3: 2002P1400T (2.0mm)

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Pin assignment			
CN1	CN2	CN3	CN4
PIN1. LINE	PIN1. -24V	PIN1. ON/OFF	PIN1. -18V
PIN2.	PIN2. -24V	PIN2. -18V	PIN2. +18V
PIN3. GROUND	PIN3. -24V	PIN3. -18V	
PIN4.	PIN4. -24V	PIN4. +18V	
PIN5. NATURE	PIN5. -24V	PIN5. +18V	
	PIN6. +24V	PIN6. +5VSB	
	PIN7. +24V	PIN7. -5V	
	PIN8. +24V	PIN8. -5V	
	PIN9. +24V	PIN9. -5V	
	PIN10. +24V	PIN10. +5V	
	PIN11. CON	PIN11. +5V	
	PIN12. BRI	PIN12. +5V	
		PIN13. CON	
		PIN14. BRI	

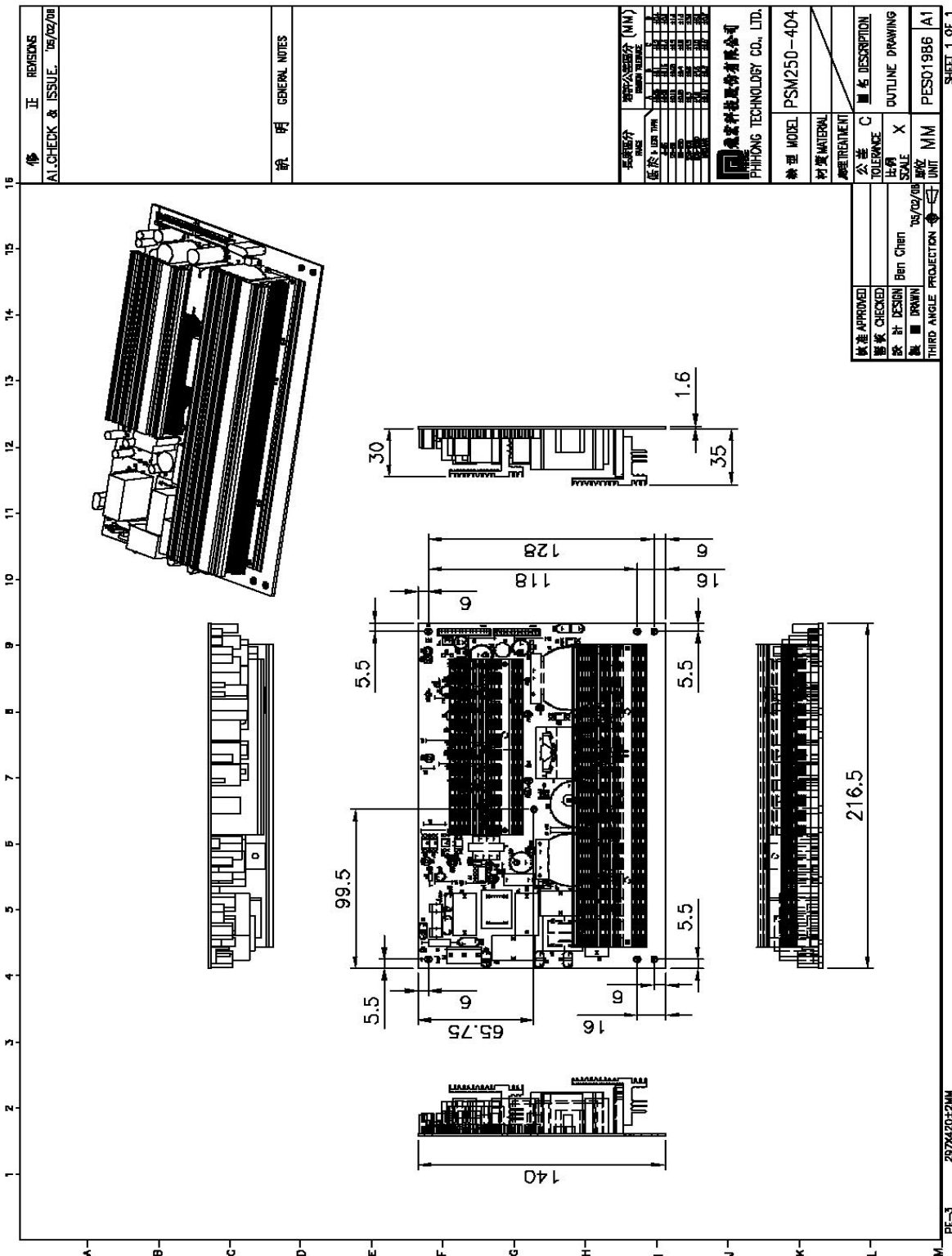
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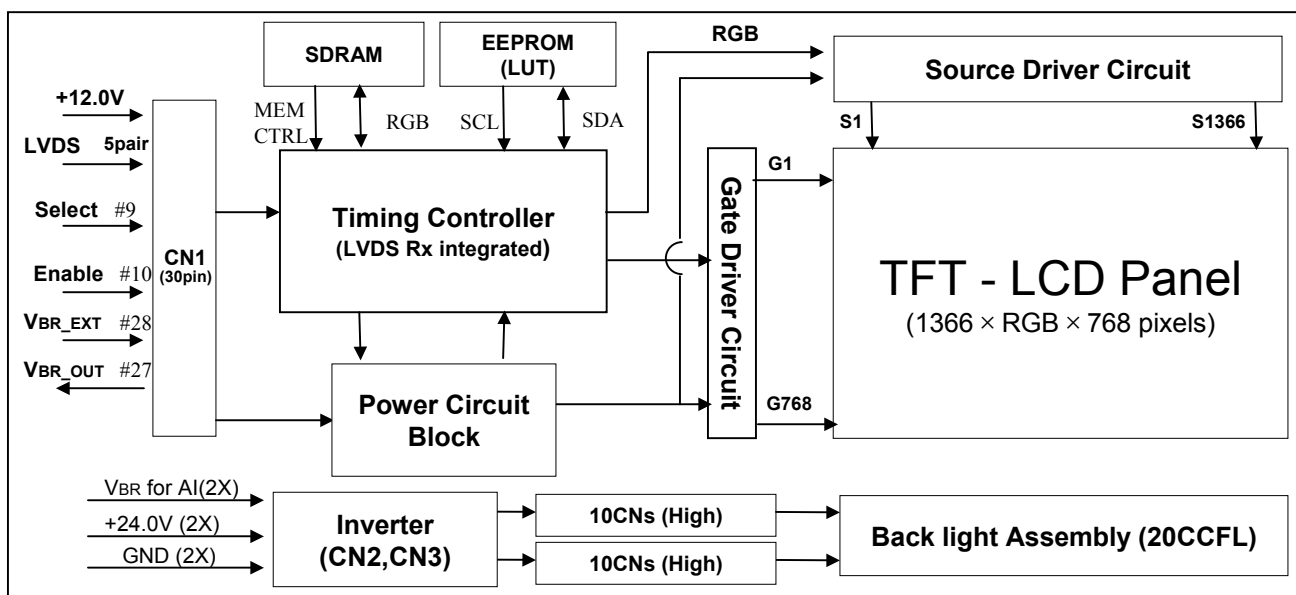
Product Specification

1. General Description

The LC420W02 is a Color Active Matrix Liquid Crystal Display with an integral Cold Cathode Fluorescent Lamp(CCFL) backlight system. The matrix employs a-Si Thin Film Transistor as the active element. It is a transmissive type display operating in the normally black mode. It has a 42.0 inch diagonally measured active display area with WXGA resolution (768 vertical by 1366 horizontal pixel array). Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the luminance of the sub-pixel color is determined with a 8-bit gray scale signal for each dot, thus presenting a palette of more than 16.7M(true) colors.

It has been designed to apply the 8-bit 1-port LVDS interface.

It is intended to support LCD TV, PCTV where high brightness, super wide viewing angle, high color gamut, high color depth and fast response time are important.



General Features

Active Screen Size	42.02 inches(1067.308mm) diagonal
Outline Dimension	1006 mm(H) x 610 mm(V) x 59 mm(D) (Typ.)
Pixel Pitch	0.227mm x 0.681mm x RGB
Pixel Format	1366 horiz. by 768 vert. Pixels RGB stripe arrangement
Color Depth	8-bit, 16.7 M colors
Luminance, White	500 cd/m ² (Center 1-point) (Typ.)
Dynamic C/R (for AI)	1000:1 (Typ.)
Viewing Angle (CR>10)	Viewing Angle Free (R/L 176 (Typ.), U/D 176 (Typ))
Power Consumption	Total 172W (Typ.) (Logic=5.4W, Inverter=165.6W [Lamp current=6.0mA])
Weight	11,000g (Typ.)
Display Operating Mode	Transmissive mode, normally black
Surface Treatment	Hard coating(3H), Anti-glare treatment of the front polarizer

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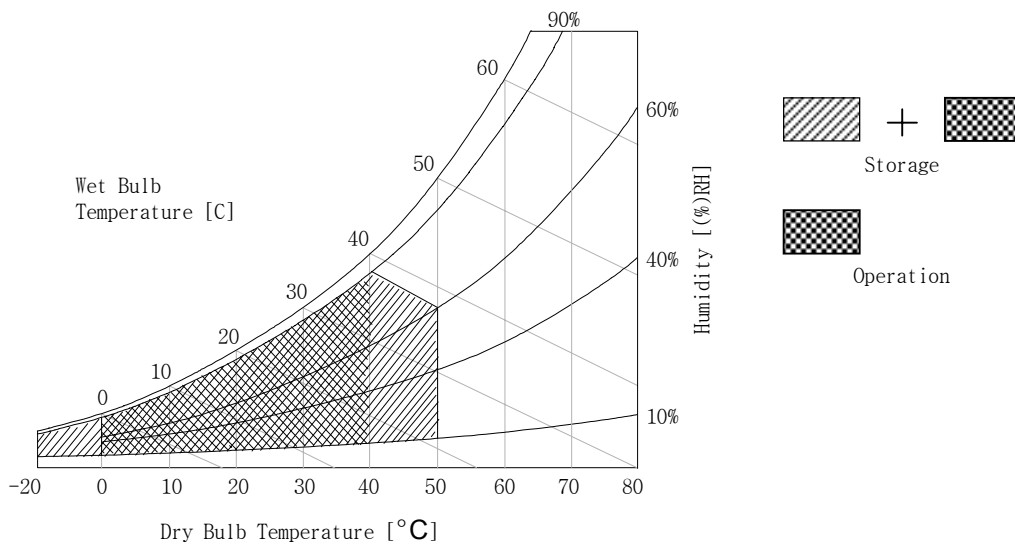
2. Absolute Maximum Ratings

The following items are maximum values which, if exceeded, may cause faulty operation or damage to the LCD module.

Table 1. ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	Value		Unit	Remark
			Min	Max		
Power Input Voltage	LCD circuit	V _{LCD}	-0.3	+14.0	V _{DC}	at 25 ± 2 °C
	Inverter	V _{BL}	21.6	+27.0	V _{DC}	
Inverter Control Voltage	ON/OFF	V _{OFF/VON}	-0.30	+5.25	V _{DC}	
	Brightness	V _{BR}	0.0	+3.3	V _{DC}	
Operating Temperature		T _{OP}	0	+40	°C	Note 1
Storage Temperature		T _{ST}	-20	+50	°C	
Operating Ambient Humidity		H _{OP}	10	90	%RH	
Storage Humidity		H _{ST}	10	90	%RH	

Note 1. Temperature and relative humidity range are shown in the figure below.
Wet bulb temperature should be 39 °C Max, and no condensation of water.



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3. Electrical Specifications

3-1. Electrical Characteristics

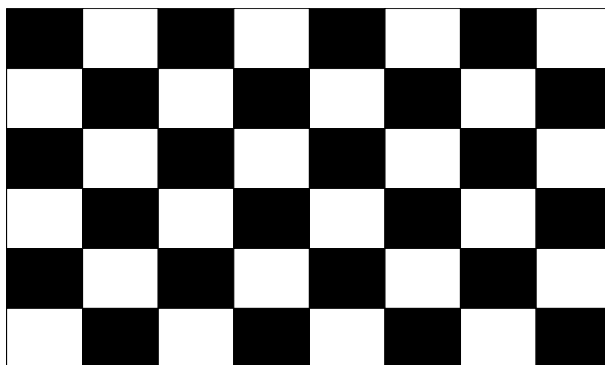
It requires two power inputs. One is employed to power for the LCD circuit. The other input power for the CCFL/Backlight is to power inverter.

Table 2. ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Value			Unit	Note
		Min	Typ	Max		
Circuit :						
Power Input Voltage	V _{LCD}	11.4	12.0	12.6	V _{DC}	
Power Input Current	I _{LCD}	-	540	620	mA	1
		-	700	835	mA	2
Power Consumption	P _{LCD}		6.8	7.8	Watt	1
Rush current	I _{RUSH}	-	-	3.0	A	3

- Note :
1. The specified current and power consumption are under the $V_{LCD}=12.0V$, $25 \pm 2^{\circ}C$, $f_v=60Hz$ condition whereas mosaic pattern(8 x 6) is displayed and f_v is the frame frequency.
 2. The current is specified at the maximum current pattern.
 3. The duration of rush current is about 2ms and rising time of power input is 1ms (min.).

White : 255Gray
Black : 0Gray



Mosaic Pattern(8 x 6)

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Table 3. ELECTRICAL CHARACTERISTICS (Continue)

Parameter	Symbol	Values			Unit	Notes	
		Min	Typ	Max			
Inverter :							
Power Supply Input Voltage	VBL	22.8	24.0	25.2	Vdc	1	
Power Supply Input Voltage Ripple		-0.2		0.2	Vp-p		
Unloading Input Voltage				28.0	Vdc		
Power Supply Input Current	IBL	-	6.74	8.11	A		
Power Consumption	PBL	-	161.8	194.6	W		
Input Voltage for Control System Signals	Brightness Adjust	VBR	0.0		3.3	Vdc	2
	On/Off	On	V on	4.0	-	5.0	Vdc
		Off	V off	-0.3	0.0	0.5	Vdc
Lamp :							
Life Time		50,000			Hrs	3	

Notes :

- Electrical characteristics are determined after the unit has been 'ON' and stable for approximately 120 minutes at 25±2° C
The specified current and power consumption are under the typical supply Input voltage 24V and Vbr 3.3V, it is total power consumption.
The ripple voltage of the power supply input voltage is under 0.2 Vp-p.
LPL recommend Input Voltage is 24.0V ± 5%.
- Brightness Control.
This VBR Voltage control brightness.

VBR Voltage	Function
3.3V	Maximum Brightness (100%)
0V	Minimum Brightness.(15~25%)

- The life is determined as the time at which luminance of the lamp is 50% compared to that of initial value at the typical lamp current on condition of continuous operating at 25 ± 2° C.
Specified value is when lamp is aligned horizontally.

Product Specification

3-2. Interface Connections

This LCD module employs two interface connections, a 30-pin connector is used for the module electronics and two 12-pin connectors are used for the integral backlight system.

3-2-1. LCD Module

- LCD Connector(CN1) : FI-X30SSL-HF (Manufactured by JAE) or Equivalent
- Mating Connector : FI-X30C2L (Manufactured by JAE) or Equivalent

Table 4. MODULE CONNECTOR(CN1) PIN CONFIGURATION

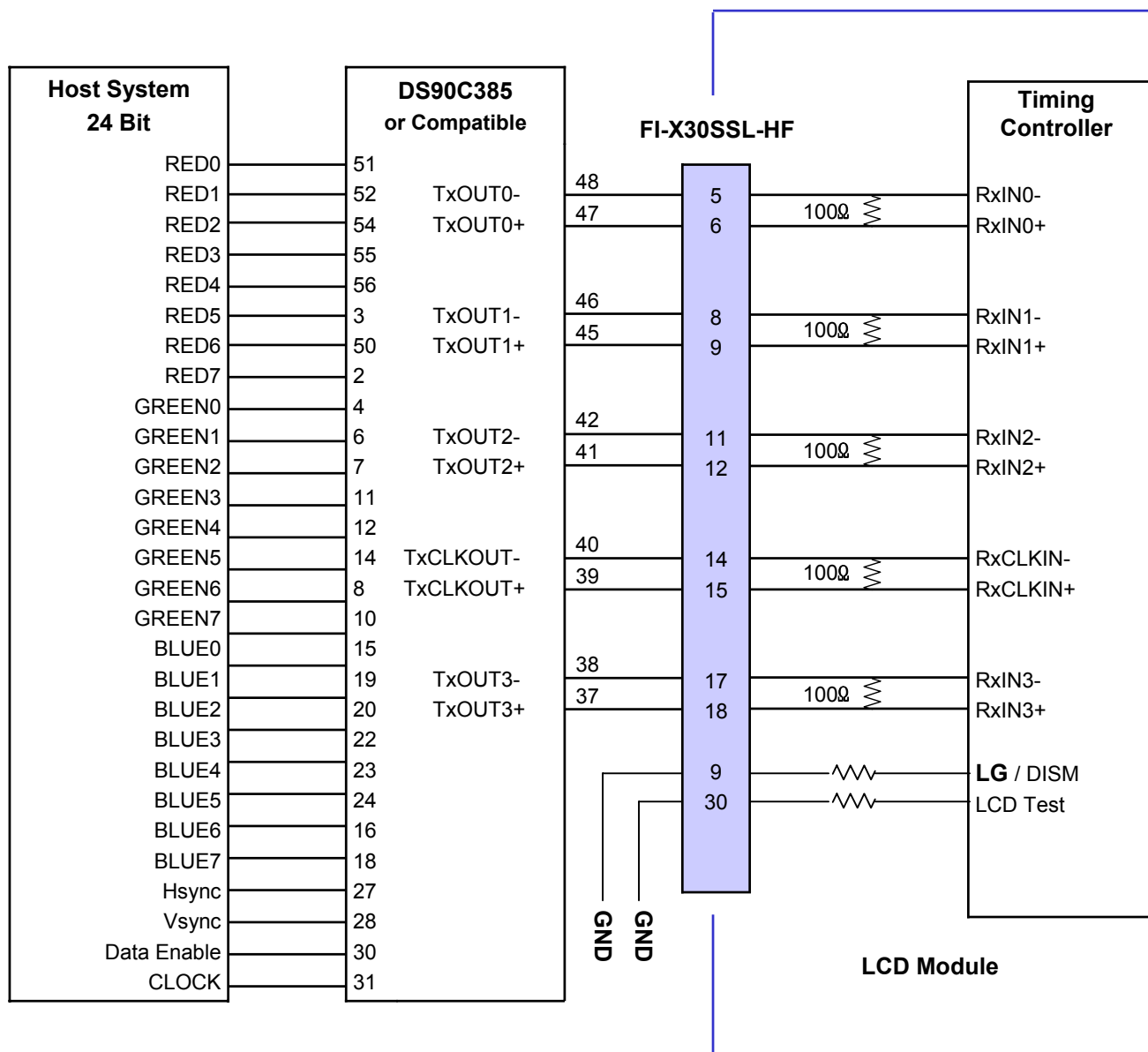
Pin No.	Symbol	Description	Note
1	V _{LCD}	Power Supply +12.0V	
2	V _{LCD}	Power Supply +12.0V	
3	V _{LCD}	Power Supply +12.0V	
4	V _{LCD}	Power Supply +12.0V	
5	GND	Ground	
6	GND	Ground	
7	GND	Ground	
8	GND	Ground	
9	Select	Select LVDS Data format	1
10	Enable	AI Enable ('H' = Enable , 'L' = Disable)	
11	GND	Ground	
12	RA-	LVDS Receiver Signal(-)	
13	RA+	LVDS Receiver Signal(+)	
14	GND	Ground	
15	RB-	LVDS Receiver Signal(-)	
16	RB+	LVDS Receiver Signal(+)	
17	GND	Ground	
18	RC-	LVDS Receiver Signal(-)	
19	RC+	LVDS Receiver Signal(+)	
20	GND	Ground	
21	RCLK-	LVDS Receiver Clock Signal(-)	
22	RCLK+	LVDS Receiver Clock Signal(+)	
23	GND	Ground	
24	RD-	LVDS Receiver Signal(-)	
25	RD+	LVDS Receiver Signal(+)	
26	GND	Ground	
27	V _{BR_OUT}	V _{BR} output from LCD module	
28	V _{BR_EXT}	External V _{BR} input from System to LCD module	
29	GND	Ground	
30	GND	Ground	2

Note: 1. If Pin 9 is Ground, Interface format is "LG", and if Pin9 is Vcc(3.3V), Interface format is "DISM"
See page 9 and 10.

2. Pin 30 should be ground, this pin is necessary for LCD test.
3. All GND(ground) pins should be connected together, which should be also connected to the LCD module's metal frame.
4. All V_{LCD} (power input) pins should be connected together.
5. Input Level of LVDS signal is based on the IEA 664 Standard.

Product Specification

Table 5. REQUIRED SIGNAL ASSIGNMENT FOR LVDS TRANSMITTER (Pin9="L" or "Open")



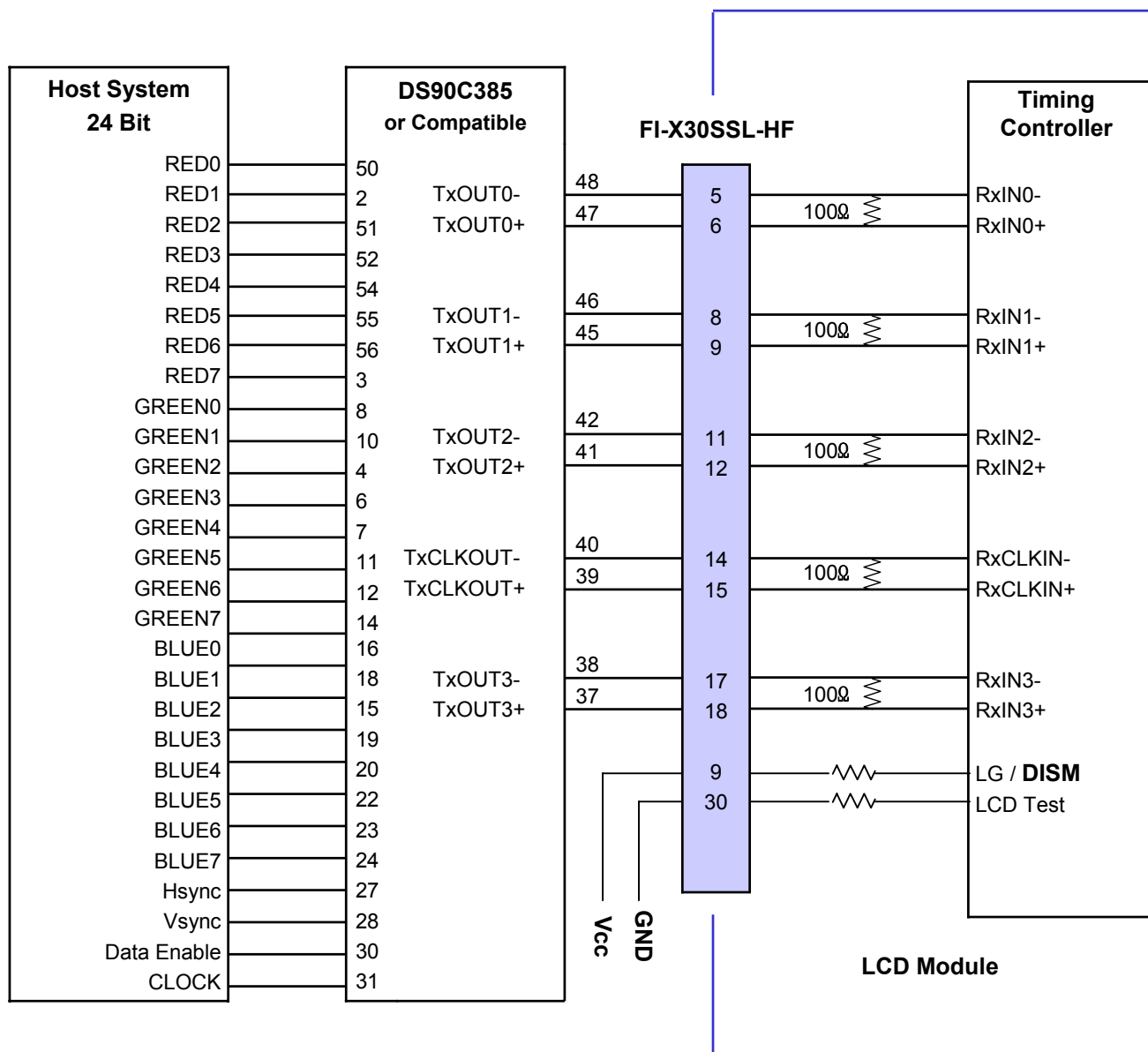
Note: 1. The LCD Module uses a 100 Ohm[Ω] resistor between positive and negative lines of each receiver input.

2. Refer to LVDS Transmitter Data Sheet for detail descriptions. (DS90C385 or Compatible)

3. '7' means MSB and '0' means LSB at R,G,B pixel data.

Product Specification

Table 6. REQUIRED SIGNAL ASSIGNMENT FOR LVDS TRANSMITTER (Pin9="H")



- Note: 1. The LCD module uses a 100 Ohm[Ω] resistor between positive and negative lines of each receiver input.
 2. Refer to LVDS Transmitter Data Sheet for detail descriptions. (DS90C385 or Compatible)
 3. '7' means MSB and '0' means LSB at R,G,B pixel data.

Product Specification

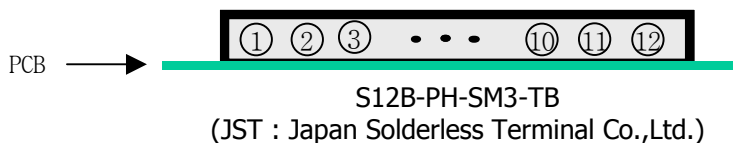
3-2-2. Backlight Inverter

- Inverter Connector : S12B-PH-SM3(manufactured by JST) or Equivalent
- Mating Connector : PHR-12 or Equivalent

Table 7. INVERTER CONNECTOR PIN CONFIGURATION

Pin No	Symbol	Description	Remarks
1	VBL	Power Supply + 24V	
2	VBL	Power Supply + 24V	
3	VBL	Power Supply + 24V	
4	VBL	Power Supply + 24V	
5	VBL	Power Supply + 24V	
6	GND	POWER GND	Note 1
7	GND	POWER GND	
8	GND	POWER GND	
9	GND	POWER GND	
10	GND	POWER GND	
11	VBR	0V ~ 3.3V	Note 2
12	On/Off	0V ~ 5.0V	Note 3

Notes : 1. GND is connected to the LCD module metal frame.



2. 0V : Minimum Brightness.
3.3V : Maximum Brightness.
3. On : 4.0~5.0V
Off : -0.3~0.5V

Product Specification

4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 30Min in a dark environment at $25\pm 2^{\circ}\text{C}$. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of Φ and θ equal to 0° .

It is presented additional information concerning the measurement equipment and method in FIG.1.

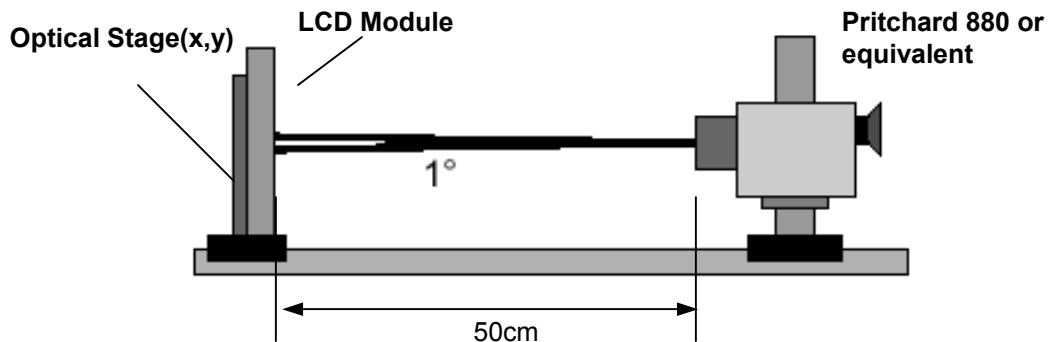


FIG.1 Optical Characteristic Measurement Equipment and Method

Table 12. OPTICAL CHARACTERISTICS

$T_a = 25\pm 2^{\circ}\text{C}$, $V_{LCD} = 12.0\text{V}$, $f_v = 60\text{Hz}$, $D_{clk} = 72\text{MHz}$, $V_{BR} = 3.3\text{V}$

Parameter	Symbol	Value			Unit	Note	
		Min	Typ	Max			
Contrast Ratio	CR	300	400			1	
	CR with AI	700	1,000				
Surface Luminance, white	L_{WH}	400	500		cd/m ²	2	
Luminance Variation	δ_{WHITE} 5P			1.3		3	
Response Time (Gray-to-Gray)	Rise Time	Tr_R	-	10	16	ms	4
	Decay Time	Tr_D	-	10	16	ms	
Color Coordinates [CIE1931]	RED	R_x		0.639			
		R_y		0.342			
	GREEN	G_x		0.282			
		G_y	Typ	0.610	Typ		
	BLUE	B_x	-0.03	0.147	+0.03		
		B_y		0.073			
	WHITE	W_x		0.281			
	W_y		0.293				
Viewing Angle (CR>10)							
	x axis, right($\phi=0^{\circ}$)	θ_r	85	88	-	degree	5
	x axis, left ($\phi=180^{\circ}$)	θ_l	85	88	-		
	y axis, up ($\phi=90^{\circ}$)	θ_u	85	88	-		
	y axis, down ($\phi=270^{\circ}$)	θ_d	85	88	-		
Gray Scale	Without AI						6
	With AI						

Product Specification

Measuring point for surface luminance & measuring point for luminance variation

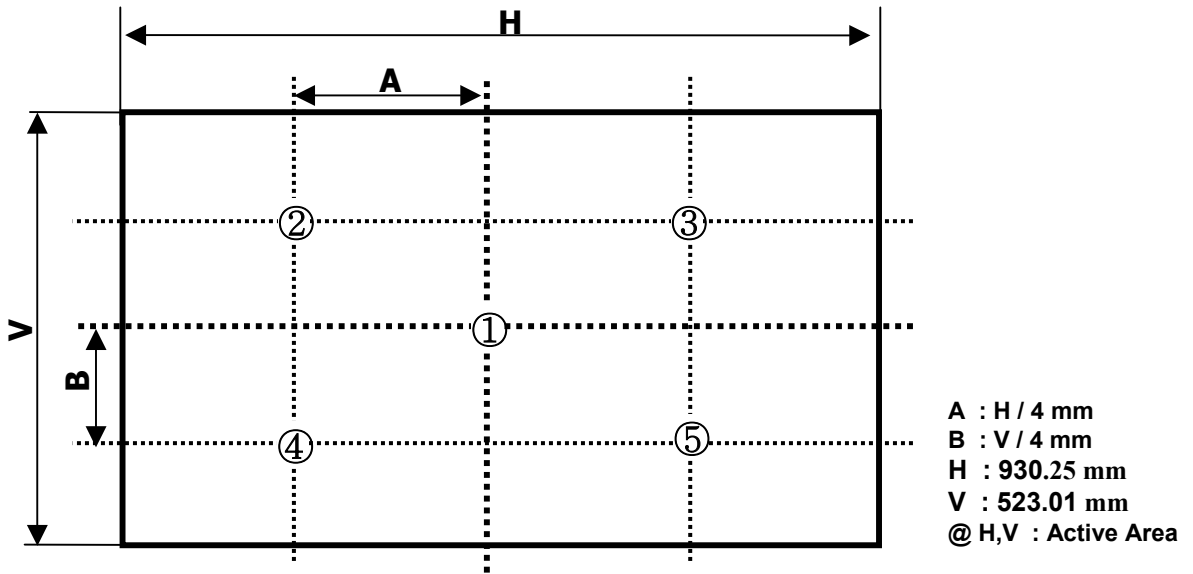


FIG.2 Measure Point for Luminance

Response time is defined as the following figure and shall be measured by switching the input signal for “Gray(N)” and “Gray(M)”.

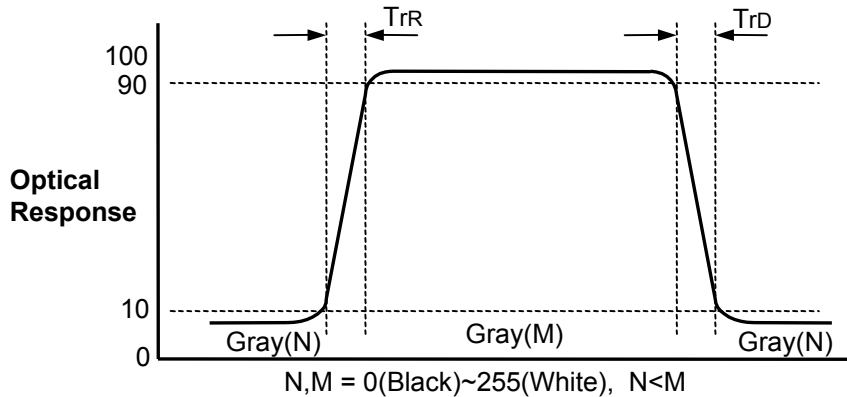


FIG.3 Response Time

Product Specification

Dimension of viewing angle range

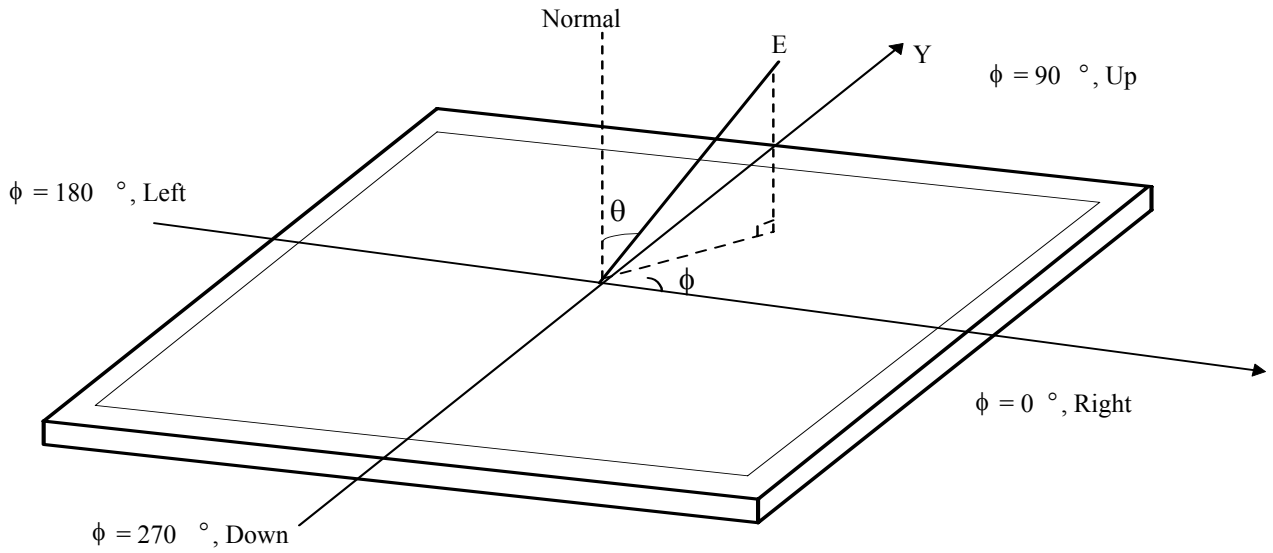


FIG.4 Viewing Angle

Product Specification

5. Mechanical Characteristics

The contents provide general mechanical characteristics. In addition the figures in the next page are detailed mechanical drawing of the LCD module.

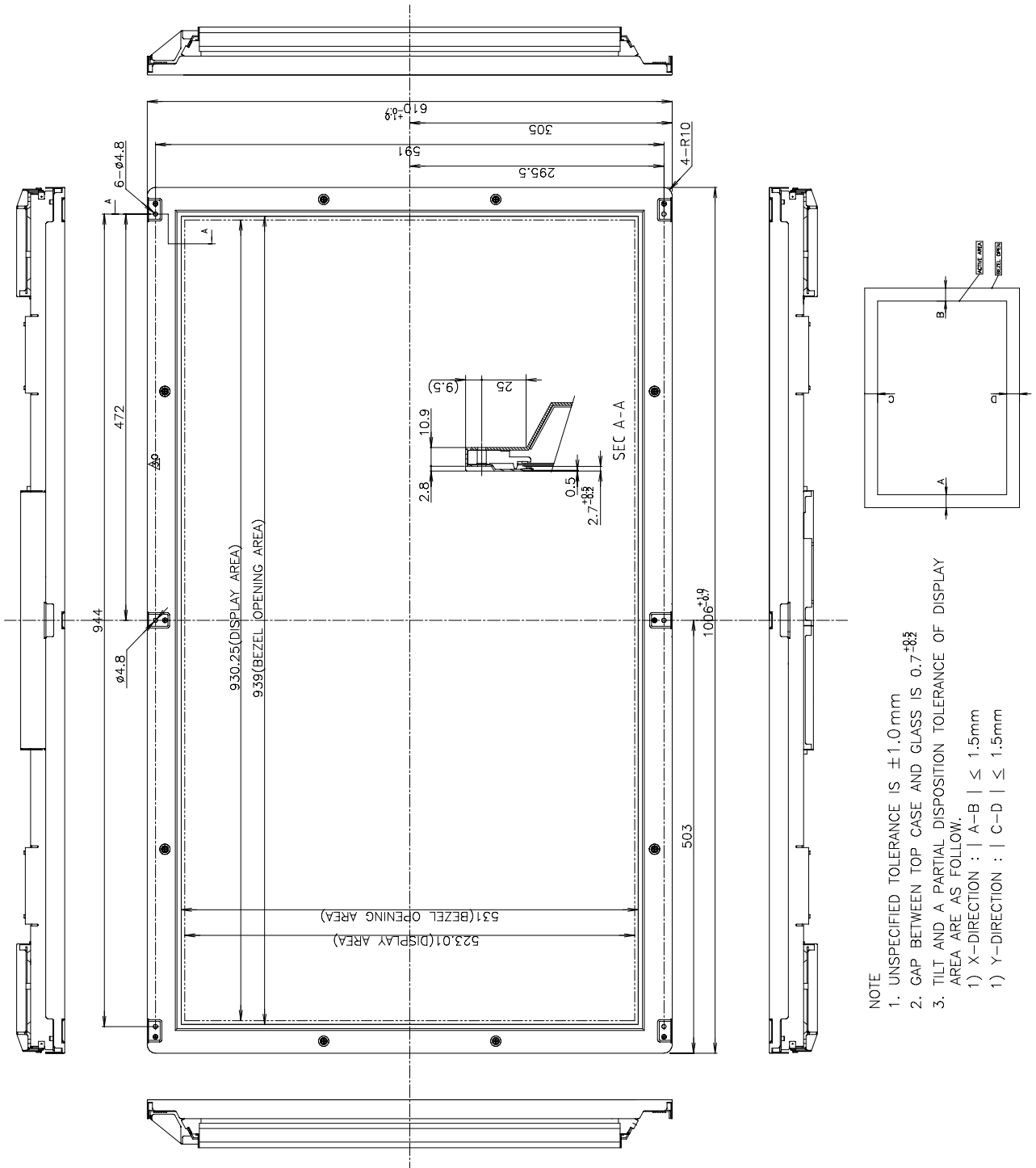
Table 14. MECHANICAL CHARACTERISTICS

Item	Value	
Outline Dimension	Horizontal	1006.0 mm
	Vertical	610.0 mm
	Depth	59.0 mm
Bezel Area	Horizontal	939.0 mm
	Vertical	531.0 mm
Active Display Area	Horizontal	930.25 mm
	Vertical	523.01 mm
Weight	11,800g (Typ.) , 12,400g (Max.)	
Surface Treatment	Hard coating(3H) Anti-glare treatment of the front polarizer	

Note : 1.Please refer to a mechanic drawing in terms of tolerance at the next page.

Product Specification

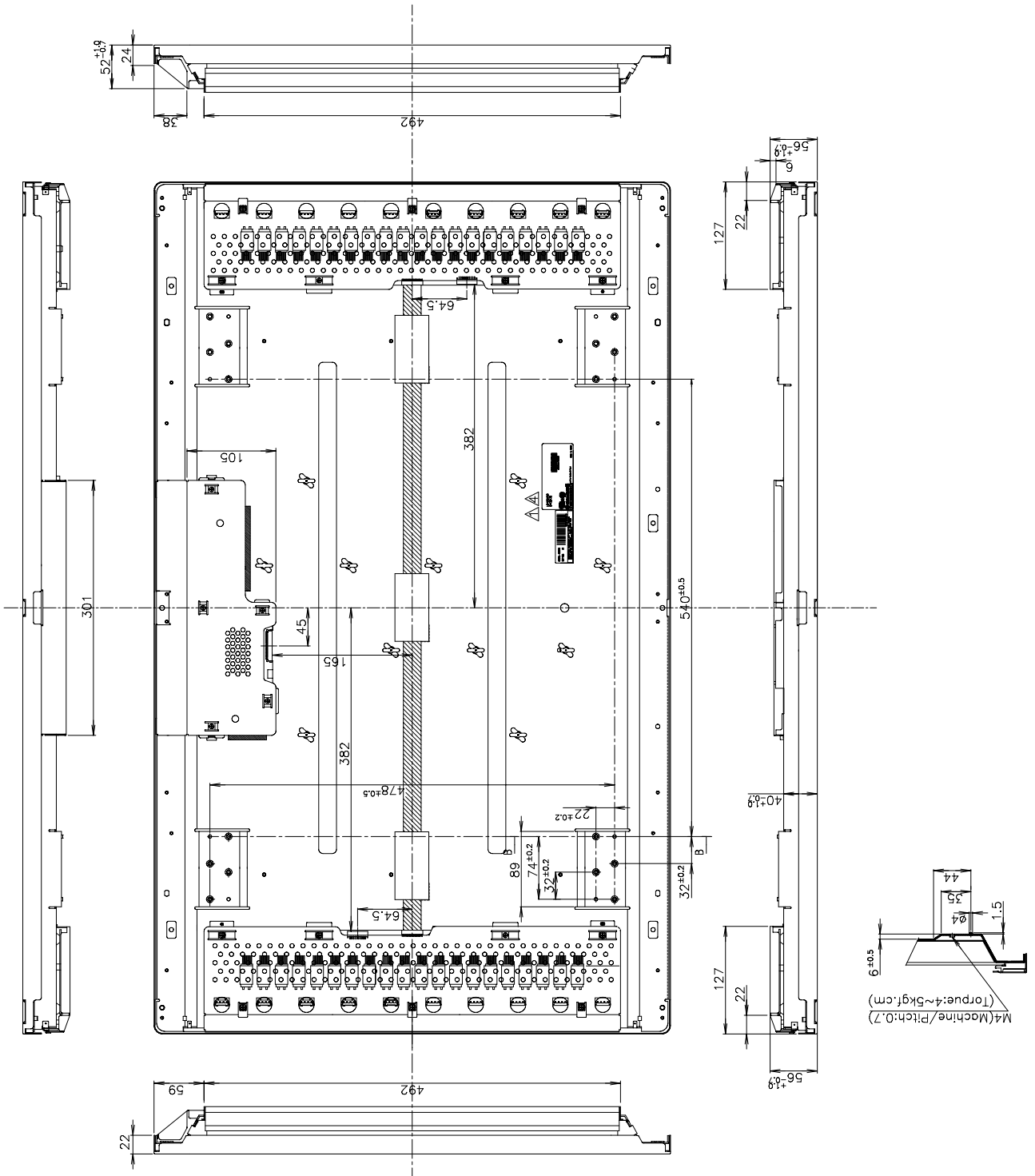
<FRONT VIEW>



- NOTE
1. UNSPECIFIED TOLERANCE IS ± 1.0 mm
 2. GAP BETWEEN TOP CASE AND GLASS IS $0.7^{+0.3}$
 3. TILT AND A PARTIAL DISPOSITION TOLERANCE OF DISPLAY AREA ARE AS FOLLOW.
 - 1) X-DIRECTION : | A-B | ≤ 1.5 mm
 - 1) Y-DIRECTION : | C-D | ≤ 1.5 mm

Product Specification

<REAR VIEW>



Product Specification

6. Reliability

Table 15. ENVIRONMENT TEST CONDITION

No.	Test Item	Condition
1	High temperature storage test	Ta= 50°C 240h
2	Low temperature storage test	Ta= -20°C 240h
3	High temperature operation test	Ta= 40°C 50%RH 240h
4	Low temperature operation test	Ta= 0°C 240h
5	Vibration test (non-operating)	Wave form : random Vibration level : 1.0Grms Bandwidth : 10-500Hz Duration : X,Y,Z, 10 min One time each direction
6	Shock test (non-operating)	Shock level : 100Grms Waveform : half sine wave, 2ms Direction : ±X, ±Y, ±Z One time each direction
7	Humidity condition Operation	Ta= 40 °C ,90%RH
8	Altitude operating storage / shipment	0 - 14,000 feet(4267.2m) 0 - 40,000 feet(12192m)

Product Specification

9. Precautions

Please pay attention to the followings when you use this TFT LCD module.

9-1. Mounting Precautions

- (1) You must mount a module using holes arranged in four corners or four sides.
- (2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
- (3) Please attach the surface transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to resist external force.
- (4) You should adopt radiation structure to satisfy the temperature specification.
- (5) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
- (6) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of polarizer for bare hand or greasy cloth.(Some cosmetics are detrimental to the polarizer.)
- (7) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front / rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
- (8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
- (9) Do not open the case because inside circuits do not have sufficient strength.

9-2. Operating Precautions

- (1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage :
 $V = \pm 200\text{mV}$ (Over and under shoot voltage)
- (2) Response time depends on the temperature.(In lower temperature, it becomes longer.)
- (3) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
And in lower temperature, response time(required time that brightness is stable after turned on) becomes longer.
- (4) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (5) When fixed patterns are displayed for a long time, remnant image is likely to occur.
- (6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimized the interference.
- (7) Please do not give any mechanical and/or acoustical impact to LCM. Otherwise, LCM can't be operated its full characteristics perfectly.
- (8) A screw which is fastened up the steels should be a machine screw.
(if not, it causes metallic foreign material and deal LCM a fatal blow)
- (9) Please do not set LCD module on its edge.

Product Specification

9-3. Electrostatic Discharge Control

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.

9-4. Precautions for Strong Light Exposure

Strong light exposure causes degradation of polarizer and color filter.

9-5. Storage

When storing modules as spares for a long time, the following precautions are necessary.

- (1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.
- (2) The polarizer surface should not come in contact with any other object.
It is recommended that they be stored in the container in which they were shipped.

9-6. Handling Precautions for Protection Film

- (1) The protection film is attached to the bezel with a small masking tape.
When the protection film is peeled off, static electricity is generated between the film and polarizer.
This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
- (2) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the bezel after the protection film is peeled off.
- (3) You can remove the glue easily. When the glue remains on the bezel surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.

Handling Guide

for Color TFT LCD Module

Color TFT LCD Module is apt to be damaged by both electrical and mechanical stresses.

Users, therefore, are requested to follow the "Guidance of handling color TFT LCD Module" on the followings.

- **System Assembler**
- **System Assembler/End Customer**

Guidance of handling Color TFT LCD Module

System Assembler

1 Follow power sequence.

- Abnormal power sequence may cause critical malfunction or electrical damage.
- Please follow power sequences described in the specification sheet.

2 Prevent mechanical stress.

- Please fix the LCD by screw at the four mounting holes on the corners.
- Please make LCD free from physical stress such as bending, twisting, banging or pressing.

3 Prevent overheat.

- High temperature on the surface of the screen may cause poor quality.
- Please make LCD used on specified temperature. Heat from backlight should be considered.

4 Keep LCD dust-free.

- LCD Module is sensitive against dust. Dust can cause functional and/or visual defect.
- So, please keep LCD dust-free.

5 Need EMI solution.

- LCD Module is produced to be EMI solved. However, system is needed to be matched for EMI solution.

EMI : Electro-Magnetic Interference

6 If possible, avoid low temp. operating.

- Low temperature under 10°C make LCD respond slowly, make backlight worse operated and shorten very much the lifetime accordingly.
- LCD is strongly recommended to be used at room temperature.

Guidance of handling Color TFT LCD Module

System Assembler

7 Do not touch TCP area

- Do not touch TCP area at any case. It causes Driver IC crack, film crack etc.
- TCP is the weakest point of LCD.

8 Do not pull Backlight wire

- Please do not pull the Backlight wire to pick up the LCD, it can cause the wire disconnected or damaged.
- At lifting the LCM from conveyor belt, please hold the Case Top area with both hands.

9 Certainly connect the I/F & B/L connectors.

- Incomplete connection with LCD can cause burnt in Backlight connector or damage the interface IC.
- Taping after connecting is highly recommended.

10 Handle with care

- Please do not drop, bend or hit the LCD. Physical stress can cause the defect such as broken.

11 Keep mounting screw length and motor driver's torque.

- Strong/Weaken motor driver's torque can make a mechanical defect on CD. Please keep the specification.
- The length of mounting screw should be exactly followed the specification.

12 Do not operate for a long time under the same pattern.

- Operating LCD for a long time under the same pattern can cause image persistence and can damage it.
- Please follow following guidance.
 1. Turn the power off when do not use.
 2. Change the pattern periodically.

Guidance of handling Color TFT LCD Module

System Assembler

13 Defect panel also handled with care

- To prevent another defect, please handle the defective LCD as a good one.
- Defective LCD should be repaired.

14 Do not stack LCDs.

- LCD consists of fragile components such as TCPs or Glasses.
- Stacking LCD can cause undesired defects.

15 Do not provide strong pressure at connecting

- Strong pressure can transfer the force to TCP which is the weakest parts of LCD. Eventually can make TCP crack or other unexpected defect.

16 Let the B/L wire backside of LCD.

- If let the backlight wire front side of LCD, the backlight connector can hurt the surface of polarizer.

17 Never connect/disconnect at power on.

- LCD consists of CMOS which is known as weak component against EOS. Please do not connect or remove at power on.

18 Electro-static discharge can make damage.

- Semi-assembled product should be handled with wrist strap.
- Earth human body when handle the LCD. Please do not touch the interface connector pin with human body or charged device.

Guidance of handling Color TFT LCD Module

System Assembler/End User

1 Keep clean the surface.

- Please wear rubber glove when touch the surface of LCD screen.
- Please use soft and anti-static material with n-Hexane as cleaner.

2 Be careful not to make polarizer scratch.

- Surface of polarizer is soft, so it's easily scratched.
- Please do not touch, press or rub on polarizer surface with materials over HB hardness.

3 Prevent swift Temperature & Humidity change.

- Swift temperature and/or humidity change can make dew condensation or ice which cause nonconformance such as malfunction.

4 Keep out of water.

- Water on/in the LCD can cause electrical short or corrosion.
- Please wipe out or dry water carefully.

5 Keep LCD corrosive gases free.

- Corrosive gas makes the polarizer and the circuitry parts chemical damages and eventually cause defects.

6 High temp. & high humidity shorten the lifetime.

- LCD is not proper to be used at high temperature and high humidity.
- Please keep specified temperature and humidity condition.

SPARE PARTS LIST

LCD 42" AC100V-240V USA LCT4216

Item	Component	Description/Country Origin	Unit	Quantity
一. ELECT PART				
1	E1101-178001	COIL FB 5000HM 1.0A	PCS	2
2	E3101-094013	PLUG V TJC3-3Y 3P	PCS	1
3	E3213-011001	SOCKET ANT F/RCA	PCS	1
4	E3301-017002	TERMINAL PUSH WP2-19	PCS	1
5	E3301-037001	TERMINAL PUSH BP1-7.5 BLACK ONE TERM	PCS	1
6	E3403-004001	TUBE SUMITUBE D5.0 BLK 600V	M	1
7	E3413-003001	CABLE COAXIAL RCA/F FOR USA L=45	PCS	1
8	E3421-925019	WIRE ASSY 30MM 2PIN 1HOUSING2.0 FOR	PCS	1
9	E3421-925020	WIRE ASSY 300MM 3WIRES FOR 42 LCD PO	PCS	1
10	E3421-926017	WIRE ASSY 12P/8P+5P KEY/REMOTE E-ROO	PCS	1
11	E3421-940002	WIRE ASSY FOR 42LCD SPEAKER EROOM	PCS	1
12	E3461-064002	WIRE WF FLAT WIRE1 FOR 42LCD INVERT	PCS	1
13	E3471-000038	WIRE WS SHIELD WIRE LVDS FOR 42LCD E	PCS	1
14	E3471-000039	WIRE WS SHIELD WIRE FOR 42LCD EROOM	PCS	1
15	E4901-001002	FAN 50X50X15MM 18V VOLTAGE FOR 42LCD	PCS	1
16	E6203-042001	DISPLAY LCD/LG42" WXGA TFT LCD LC42W	PCS	1
17	E7301-011002	BATTERY AA R6P1.5V <2>	PCS	2
18	E7802-002001	PCB ASSY MAIN BOARD EROOM FOR 42LCD	PCS	1
19	E7802-002002	PCB ASSY TUNER BOARD FOR 42LCD EROOM	PCS	1
20	E7802-002003	PCB ASSY POWER FOR 42LCD EROOM	PCS	1
21	774PL42OB01-01	POWER INPUT ASSY	PCS	1
22	771-L42OB02-01	OUTSIDE SPEAKER CONNECTOR ASSY	PCS	1
23	771-L42OB01-03	REMOTE RECEIVE PCB ASSY	PCS	1
24	786-L42OB02-01	SPEAKER	PCS	1
二. 771-L42OB01-04 KEY PCB ASSY				
1	HD360-10001-00	SWITCH TACT SOA-123HS	PCS	7
2	E3701-045010	PCB V0 140X25MM KEY PDP46SD W=1.6MM	PCS	1
3	E3101-170005	PLUG H HX2207 (PH)-8WA P2.0 8P WHT	PCS	1
4	277-42D101-01S	FUNCTION KNOB 42D1	PCS	1
5	614-260208-10	S-TAP. SCREW BID 2.6X8 A NIP +	PCS	3
6	388-42D101-01	PC SHEET FOR KEY PCB 42D1 94V0 0.	PCS	1
三. MECH PART				
1	244-34B801-01	GIFT BOX HANDLE 34B8	PCS	2
2	248-46D201-01	HANDLE FOR PLASMA	PCS	2
3	269-46SA01-01L	REMOTE RECEIVE LENS 46SA	PCS	1
4	284-L42AA01-01	SPACER PLATE (TOP)	PCS	1
5	284-L42AA02-01	SPACER PLATE (BOTTOM)	PCS	1
6	284-L42AA03-01	SPACER PLATE (L/R)	PCS	2
7	361-101261-01	CABLE TIE	PCS	20

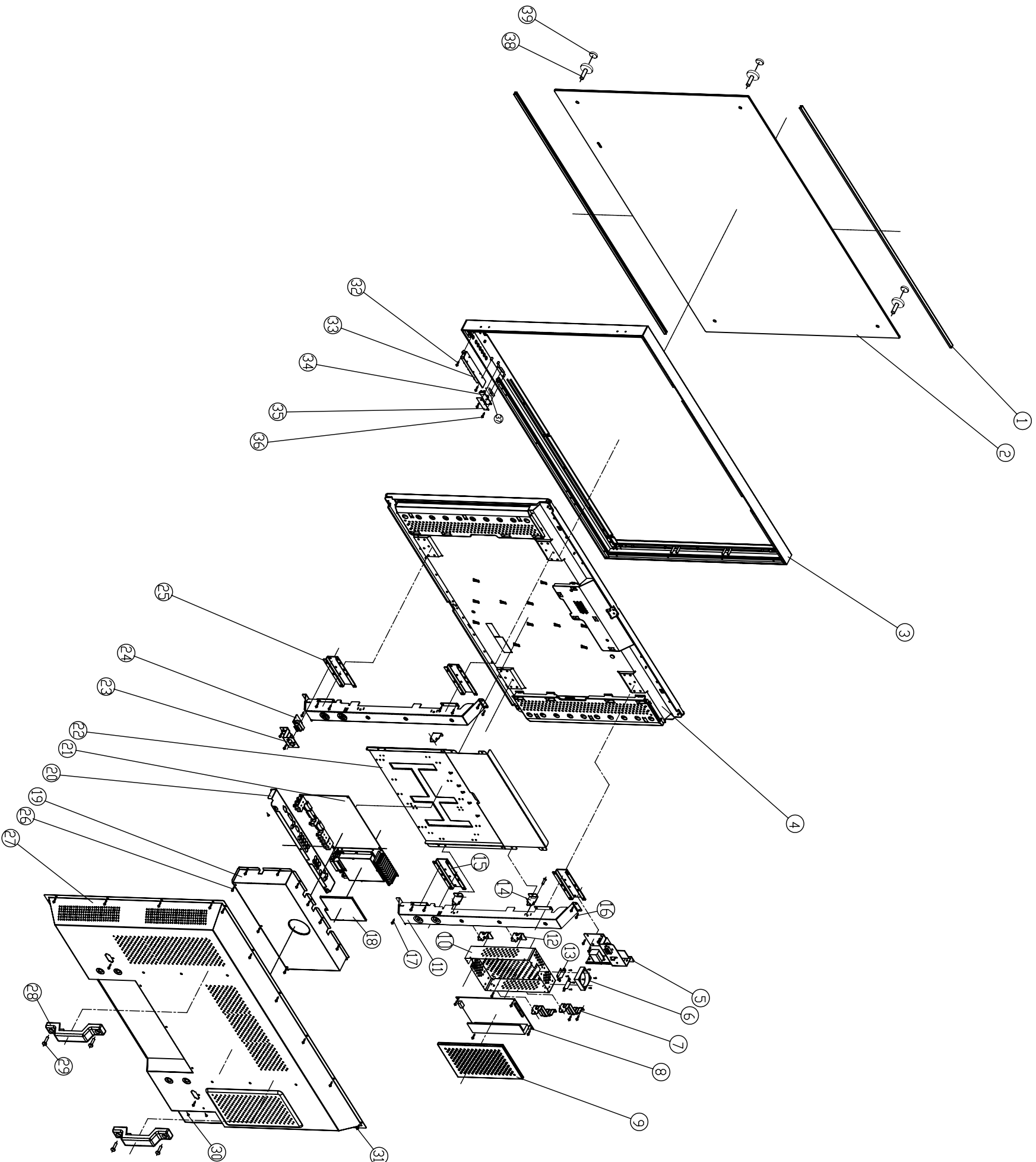
8	364-L42AA01-02L	PMMA FRONT PANEL AKAI LC42HOB L REV	PCS	1
9	367-42D101-01	EDGE SADDLE 14MM 42D1	PCS	2
10	384-42D103-05H	PVC SHEET FOR E-ROOM PCB USA W/SUB-W	PCS	1
11	387-L420B01-01H	MODEL PLATE AKAI LC42HOB CHI	PCS	1
12	388-42D103-01H	CAUTION PLATE ENG 42D1 H	PCS	1
13	388-42P101-01	PC SHEET FOR REMOTE PCB 42P1 94V0	PCS	1
14	388-42SB04-01H	POWER PLATE SANSUI 42SB	PCS	1
15	388-L420B01-01	PC COVER (94V0) BLACK T=0.5MM	PCS	1
16	388-P46C01-01H	SPK PLATE L SANSUI 46" P46C	PCS	1
17	388-P46C01-02H	SPK PLATE R SANSUI 46" P46C	PCS	1
18	400-L42AA11-02	FRONT CABINET L42AA BLACK	PCS	1
19	402-L42AA11-01S	BACK COVER	PCS	1
20	420-L42AA11-01S	MAIN BRACKET	PCS	2
21	424-L420B01-01S	MAIN PCB BOX BRACKET	PCS	4
22	424-L420B02-01S	POWER BOX BRACKET (A)	PCS	2
23	424-L420B03-01S	POWER BOX BRACKET (B)	PCS	2
24	426-L42AA11-01S	POWER/AV JACK BKT	PCS	1
25	429-L42AA02-01S	BKT FOR MAIN BKT(B)	PCS	2
26	429-L42AA11-01S	BRACKET FOR MAIN BKT(A)	PCS	2
27	429-L420B03-01S	FAN BRACKET	PCS	2
28	429-L420B04-01S	SPEAKER JACK BRACKET	PCS	1
29	430-42D102-01	HEAT SINK FOR E-ROOM 42D1	PCS	1
30	436-L420B01-01S	TERMINAL SHEET	PCS	1
31	457-42D101-01	CLAMP ID=4.3MM L=46MM	PCS	10
32	481-L420B01-01S	POWER SHIELD BOX BOTTOM	PCS	1
33	483-L42AA13-01S	SHIELD COVER FOR PANEL	PCS	1
34	483-L420B01-01	MAIN PCB SHIELD BOX COVER	PCS	1
35	483-L420B02-01	POWER BOX COVER	PCS	1
36	484-P46T11-01	SPACER SLEEVE H=11.8MM	PCS	1
37	489-L42AA01-01	DECORATION BAR	PCS	2
38	489-P46T04-01	DECORATION COVER FOR SCREW	PCS	4
39	553-010009-25A	SHIELD GASKET 100X9X2.5MM W/CONDUCTI	PCS	2
40	553-014509-40A	SHIELD GASKET 145X9X4.0MM W/CONDUCTI	PCS	4
41	554-090030-01	SHIELD CLOTH 90X30MM W/CONDUCTIVE AD	PCS	1
42	563-119-	SERIAL NO. LABEL	PCS	1
43	568-P46T02-02	WARNING LB ENG 42SF NIL	PCS	1
44	579-42D103-02	ON/OFF LB ENG 42D1 NIL	PCS	1
45	579-42D105-01	PROTECTIVE EARTH LABEL FOR ESA 42TD1	PCS	1
46	579-50AD02-01	SERIAL NO/BAR CODE LABEL 50HA (USA)	PCS	1
47	579-L420B01-01	BAR CODE W/SERIAL NO AKAI LC42HOB	PCS	2
48	590-L420B01-01	WARRANTY CARD ENG AKAI LC42HOB	PCS	1
49	592-L420B01-01	TRANSIT CAUTION CARD FOR AKAI ENG L	PCS	1
50	592-L420B01-02	TECHNICAL SUPPORT SHEET AKAI ENG LC	PCS	1
51	600-305006-10	MACH. SCREW PAN 3X0.5PX6MM	PCS	2
52	601-305008-00	MACH. SCREW CTS 3X8 BZN +	PCS	2
53	602-305006-10	MACH. SCREW WHR 3X6 NIP +	PCS	26
54	602-305008-10	MACH. SCREW WHR 3X8 NIP +	PCS	24

55	604-305005-10	MACH. SCREW BID 3X5	NIP +	PCS	28
56	604-305005-30	MACH. SCREW BID 3X5	BNI +	PCS	13
57	604-305008-10	MACH. SCREW BID 3X8	NIP +	PCS	2
58	604-305020-10	MACH. SCREW BINDING HEAD M3*20	NID +	PCS	10
59	604-407020-10	MECH. SCREW BIN 4X20 W NIP +H		PCS	4
60	604-601020-00	MACHINE SCREW BINDING M6X1.0PX20MM B		PCS	6
61	60D-407010-40	MACH. SCREW W/SPRING WASHER M4.0X0.7		PCS	36
62	610-300210-00	S-TAP. SCREW RND 3X10	A BZN +	PCS	4
63	614-300210-10	S-TAP. SCREW BID 3X10	A NIP +	PCS	8
64	623-401808-00	TAPING SCREW B-TYPE TRUSS 4X8 B ZNP		PCS	23
65	624-401808-10	S TAP SCREW B-TYPE BINDING 4X8 WNC +		PCS	8
66	734-BM0401-01	SECC STAND BASE42" LCD W/PACKIING BI		SET	1
67	802-002020-20	3M(4941)VHB DOUBLE SIDE TAPE 20MMX2		RLS	0.16
68	802-005005-21	DOUBLE SIDE TAPE NITTO NO.500 5MMX5		RLS	0.0448
69	844-L420B01-01	WOODEN PALLET 1445X1115		PCS	0.33

四. PACKING

1	300-L420B01-01N	POLYFOAM EPE BOTTOM L		PCS	1
2	300-L420B02-01N	POLYFOAM EPE BOTTOM R		PCS	1
3	300-L420B03-01N	POLYFOAM EPE TOP L		PCS	1
4	300-L420B04-01N	POLYFOAM EPE TOP R		PCS	1
5	300-L420B05-01N	POLYFOAM EPE BOTTOM MID		PCS	1
6	300-L420B06-01N	POLYFOAM EPE TOP MID		PCS	1
7	310-041204-01V	POLYBAG 4"X12"X0.04		PCS	1
8	310-111404-07V	POLYBAG 11"X14"X0.04		PCS	1
9	310-633810-02T	POLYBAG 63"X38"X1.0MM W/WARNING &REC		PCS	1
10	510-L420B02-01K	GIFT BOX AKAI ENG LC42HOB		PCS	1
11	511-42D102-01A	ACCESSORY BOX		PCS	1
12	512-L420B01-01	SHEET 1445X1115 3.0MM L42HOB		PCS	0.66
13	518-L42AA01-01K	BOTTOM BOX		PCS	1
14	E3404-157001	AC CORD UL 1.88M MET-4D7+SJT 16AWG/		PCS	1
15	580-L420B02-01	INSTRUCTION BOOKLET NEW FOR AKAI LC4		PCS	1
16	790-002514-A3	AKAI Remote		PCS	1
17	E7301-011002	BATTERY AA R6P1.5V <2>		PCS	2

NOTE : THIS RELEASED DRAWING WAS PRODUCED BY COMPUTER , DO NOT UPDATE MASTER MANUALLY



ITEM	PART NO.	DESCRIPTION	QTY	REMARK
40				
39	489-P46T04-01	DECORATION COVER FOR SCREW	4	
38	604-407012-10	MACH. SCREW M4X12	4	
37	269-42D101-01L	REMOTE LENS	1	
36	614-260208-10	MCHA. SCREW 2.6X8	2	
35	388-42D102-01	PVC SHEET FOR REMOTE PCB	1	
34	771-42D103-01	REMOTE PCB	1	
33	277-42D101-XXS	FUNCTION KNOB	1	
32	614-400408-10	MACH. SCREW 4X8	2	
31	614-400412-00	STP SCREW 4X12	21	
30	614-300210-10	SCREW 3X10	8	
29	604-601020-00	MACH. SCREW M6X20	4	
28	248-P46J02-01	HANDLE	2	
27	402-L42AA11-01S	BACK COVER	1	
26	602-305006-10	MACH SCREW 3X6	13	
25	429-L42AA11-01S	BRACKET FOR MAIN	2	
24	786-L420B03-02	AV-JACK-1	1	
23	429-L420B04-01S	SPEAKER JACK BRACKET	1	
22	483-L42AAB-01S	SHIELD COVER FOR PAND	1	
21	LC42H0ALE-801	E-ROOM PCB	1	
20	436-L420B01-01	TERMINAL SHEET	1	
19	483-L420B01-01	POWER SHIELD BOX BOTTOM	1	
18	483-42D104-01	SHIELD-RF BOX COVER	1	
17	614-4000412-00	TAP SCREW 4X12	1	
16	604-400412-00	MACH SCREW 4X10	2	
15	429-L42AA11-01S	BRACKET FOR MAIN BKT	2	
14	424-L420B01-01S	MAIN PCB BOX BRACKET	4	
13	429-L420B03-01S	BRACKET OF FAN	2	
12	424-L420B03-01S	POWER BOX BRACKET	2	
11	420-L420B01-01S	MAIN BRACKET	2	
10	481-L420B01-01S	POWER SHIELD BOX BOTTOM	1	
9	483-L420B02-01	POWER BOX COVER	1	
8	E7802-002003	POWER PCB	1	
7	424-L420B02-01S	POWER BOX BRACKET	2	
6	E4901-001002	FAN 50X15	1	
5	426-L42AA11-01S	POWER/AV JACK BKT	1	
4	E6203-042001	LCD/LG42PANEL	1	
3	400-L420A01-01	FRONT CABINET (AL)	1	
2	863-L420A01-01	TOUGHENED GLASS	1	
1	489-L42AA01-01	DECORATION BAR	2	

DRAWN.	TOLERANCE UNLESS OTHERWISE SPECIFIED	KAWA	ENGINEERING R & D CENTRE
CHECKED	0 MM-8 MM ± 0.1	MATL.	
APPRD.	8 MM-25MM ± 0.15	FINISH	
	25MM-80MM ± 0.2		
	80MM-250MM ± 0.3		
	250MM-ABOVE ± 0.5		
	ANGULAR ± 1		

3RD ANGLE PROJECTION	EXPLODE VIEW E-ROOM
	MODEL NO. 42TD1
	PART NO. EXP-LC42HDA-01
	DWG. NO.
	SCALE
	QTY.
	SHEET 1 OF 1

If you forget your V-Chip Password

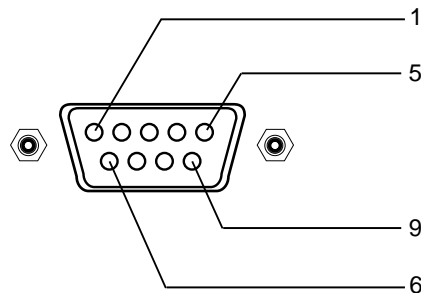
- Omnipotence V-Chip Password: **1234**.
- Press **MENU** button.
- Press **Up, Down** and CH+, CH- buttons to highlight "V-Chip" Control.
- Press OK button to pop up "INPUT PASSWORD".
- Use the Number buttons (0~9) to enter the omnipotence Password 1234.
- Press Down to highlight "Password change" Control.
- Press **OK** button to confirm and will pop up "Password Change" item.
- Change to your familiar Password again.

Software upgrade

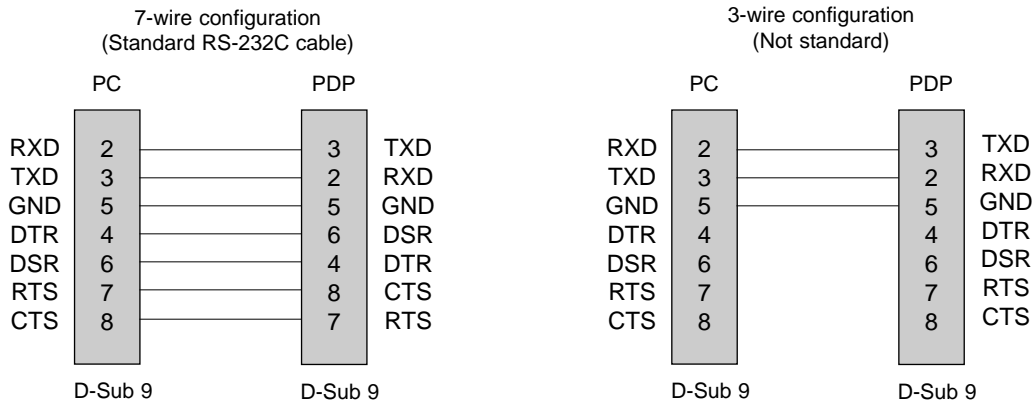
- Connect the RS-232C input jack to an external control device (such as a computer) and software upgrade.

Type of connector; D-Sub 9-pin male

No.	Pin name
1	No connection
2	RXD (Receive data)
3	TXD (Transmit data)
4	DTR (DTE side ready)
5	GND
6	DSR (DCE side ready)
7	RTS (Ready to send)
8	CTS (Clear to send)
9	No Connection



RS-232C configurations



Software upgrade Process

- Power Switch OFF.
- Connect the serial port of the control device to the RS-232 jack on the LCD-TV back panel.
RS-232C connection cables are not supplied with the LCD-TV.
- Power Switch ON. The power indicator on the front of the panel should now display red, means that the LCD-TV is in standby mode.
- Copy the software (Flash Upgrader) to the computer.
- Open the software (Flash Upgrader.exe)
- Point "Flash" on the interface of the Flash Upgrader.exe.
- Press STANDBY button on the front panel or POWER button of Remote control, Power indicator green, the LCD-TV is in power ON mode, software start upgrader immediately.
- Waiting for the upgrader programing, when it is finished, the LCD-TV will auto power on.
- After the upgrader is finished, shut down the power switch, take out the RS-232C connection after the power indicator is extinguished.

Note: The computer and LCD-TV must be keep **Power ON** in the software upgrade processing.