



Service manual

LT2004S

TABLE OF CONTENTS

1. Precautions and Safety Notices	1
2. Specification	2
3. Front Panel Function Control Description	7
4. Adjusting Procedure	12
5. Trouble Shooting Flow Chart	15
6. Exploded Diagram and Spare Parts List	19
7. Block Diagram	20
8. Schematic Diagram	21
9. PCB Layout Diagrams	32

1. Precautions and Safety Notices

Prior to using this service manual, please ensure that you have carefully followed all the procedures outlined in the user's manual for this product.

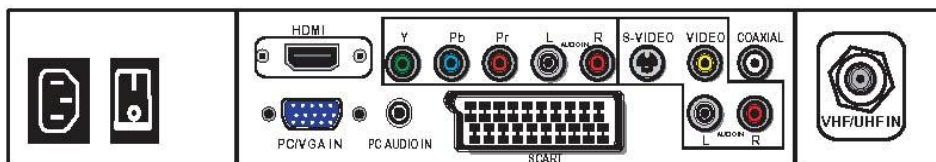
- (1)** Read all of these instructions.
- (2)** Save these instructions.
- (3)** Follow all warnings and instructions marked on the product.
- (4)** Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners, use a damp cloth for cleaning.
- (5)** Do not use this product near water.
- (6)** Do not place this product on an unstable cart, stand or table. The product may fall, causing serious damage to the product.
- (7)** Do not tear up the EMI label, if the label has been destroyed, that must to past same size label on the same position.
- (8)** Slots and openings in the cabinet and the back or bottom are provided for ventilation, to ensure reliable operation of the product and to protect it from overheating, those openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should not be placed in a built-in installation less proper ventilation is provided.
- (9)** This products should be operated from the type of power source indicated on the marketin label. If you are not sure of the type of power available, consult your dealer or local power company
- (10)** This product is equipped with a 3-wire grounding type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature, if you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.
- (11)** Pay attention to the code which connects with apheliotropism board of inside panel. and don't hook it.
- (12)** Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord.
- (13)** If an extension cord is used with this product, make sure that the total of the ampere ratings on the product plugged into the extension cord to the waplugged into outlet does not exceed 15 ampere.
- (14)** Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.
- (15)** Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage points or other risks. Refer all servicing to service personnel.
- (16)** Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions :
 - a.** When the power cord or plug is damaged or frayed.
 - b.** If liquid has been spilled into the product.
 - c.** If the product has been exposed to rain or water.
 - d.** If the product does not operate normally, when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of other controls may result in damage and will often require extension work by a qualified technician to restore the product to normal operation.
 - e.** If the product has been dropped or the cabinet has been damaged.
 - f.** If the product exhibits a distinct change in performance, indicating a need for service.

2. Specification

DK209 panel specification:

Item	Specifications
Display pixels	1400 (H) x1050 (V) pixels (1 pixel = 1 RGB cells)
Active Area	408.24mm (H) x 306.18mm (V)
Pixel Pitch	0.292mm (H) x 0.292mm (V)
Bezel opening	413 mm(H)x311 mm(V)
Display Colors	16.7M
Pixel Arrangement	R+G+B vertical stripe
Display Mode	Normally white
Brightness	300 cd/m ² typical
Contrast Ratio	1000:1 typical
Brightness Uniformity	75% min.
Viewing Angle	150°(V) at CR $\geq$ 10
Color Chromaticity (CIE)	White: x = 0.313 , y = 0.329 typical
Frame Rate	60Hz
Response Time	5ms typical
Surface Treatment	Hard Coating(3H), Anti-glare (Haze 25)

INPUT Source :

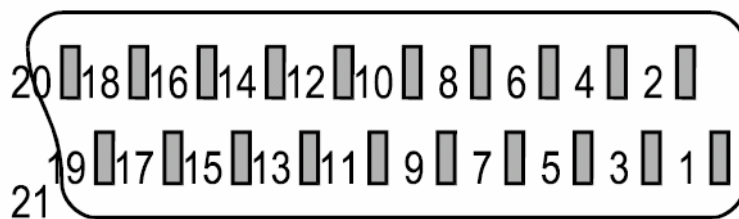


Inputs & Outputs	Signals	Video Format	Connector types	
				OSD
Main-TV	Analog TV	PAL/SECAM	PH Type	TV (CABLE/AIR)
VIDEO	Video + L/R Audio	CVBS	RCAX1+ RCAX2 (Red, White)	VIDEO1 (REAR)
S-VIDEO	S-VIDEO+ L/R Audio	Y/C	Mini Din 4 Pin	VIDEO2 (S-VIDEO)
SCART	RGB+Y/C+ CVBS(input/output)+ L/R(input/output)		SCART 21pin	VIDEO3(SCART IN)

YPbPr	Component (Y, Pb/Cb, Pr/Cr) + L/R Audio	480i, 576i, 480p, 576p, 720p, 1080i	RCAX3+RCAX2 (Red, White)	VIDEO4 (YPbPr)
VGA	VGA IN+ PC AUDIO IN	Analog RGB	VGA 15 Pin	VIDEO5 (VGA IN)
AC IN/Power Switch	AC Power IN	AC 100~240V	YC14	AC IN

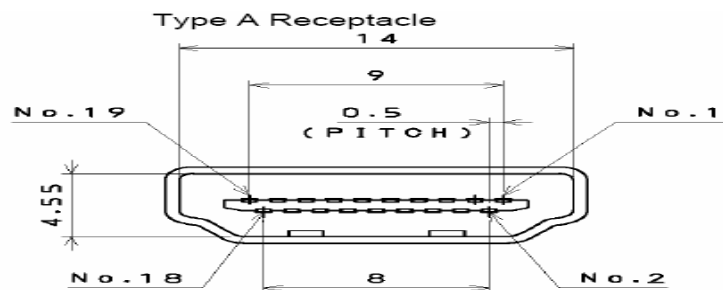
Note:

A. SCART connector.



Pin Number	Pin Name	Signal Level	Impedance
1	Audio Output, Right	0.5V RMS	<1 k Ω
2	Audio Input, Right	0.5V RMS	<1 k Ω
3	Audio Output, Left	0.5V RMS	<1 k Ω
4	Ground, Audio	-	-
5	Ground, Blue	-	-
6	Audio Input, Left	0.5V RMS	<1 k Ω
7	Blue Input	0.7V	75 Ω
8	Function Select (A/V Control)	High (9.5-12V) – A/V Mode, Mid (5-8V) – Wide-screen, Low (0-2V) – TV Mode	>10 k Ω
9	Ground, Green	-	-
10	Comms Data 2	-	-
11	Green Input	0.7V	75 Ω
12	Comms Data 1	-	-
13	Ground, Red	-	-
14	Ground, blanking	-	-
15	Red Input	0.7V	75 Ω
16	RGB switching Control	High (1-3V) – RGB, Low (0-0.4) – Composite	75 Ω
17	Ground, Video input & output	-	-
18	Ground, RGB Switching control	-	-
19	Video Output, composite	1V including sync	75 Ω
20	Video Input, composite	1V including sync	75 Ω
21	Common Ground, shield	-	-

B. HDMI connector is a type A receptacle for video/audio mode.



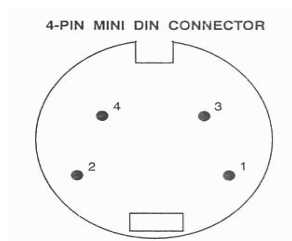
1. TMDS Data 2+	9. TMDS Data 0-	17. CEC/GND
2. TMDS Data 2 shield	10. Clock +	18. +5V Power
3. TMDS Data 2-	11. Clock shield	19. Hot Plug Detect
4. TMDS Data 1+	12. Clock -	
5. TMDS Data 1 shield	13. CEC	
6. TMDS Data 1-	14. NC	
7. TMDS Data 0+	15. DDC CLK	
8. TMDS Data 0 shield	16. DDC DATA	

C. VGA Connector.

VGA type connector pin assignment		
1.Red Video	6.Red Ground	11.ISP-SEL-I
2.Green Video	7.Green Ground	12.SDA
3.Blue Video	8.Blue Ground	13.H-sync.
4.None	9.+5V	14.V-sync.
5.GND	10.Sync GND	15.SCL

D.RCA jacks are all female type.

E.Mini DIN CNC 4 Pins (SCN570S3NS00000) for S-video, the pin assignment is described as below:



- 1: Ground
- 2: Ground
- 3: Y
- 4: C

HDMI	
Format	DVI 1.0
Level/Impedance	0.5~3.0Vp-p/100 Ohm (Differential),50 Ohm (Signal ending)
TMDS Mode	Signal Link

Frequency	Fh = 31~80 kHz Fv = 56~76 Hz			
Maximum Pixel Clock	135 MHz			
DDC 1/2B	Compliant with Revision 1.0			
Connector	HDMI x 1			
VGA				
Format	R, G, B Analog			
Level/Impedance	0.7Vp-p / 75Ω			
DDC 1/2B	Compliant with Revision 1.0			
Sync	H/V separate 3V TTL level / 1kΩ			
Frequency	Fh = 31~80 kHz Fv = 56~76 Hz			
Maximum Pixel Clock	135 Mhz			
Connector	Mini VGA 15 pin (female) x 1			
Video (Composite) CVBS Signal				
Format	NTSC, 4.43NTSC, PAL_M, PAL(B,G,H,D,N), SECAM			
Level / Impedance	1.0Vp-p / 75Ω			
S-Video (Y/C) Signal				
Format	Y, C			
Level / Impedance	Y: 1.0Vp-p / 75Ω C: ± 286 mV/ 75Ω			
Analog HD15 Video Signal (YPbPr/YCbCr)				
Format	Y, Pb, Pr or Y, Cb, Cr			
Level / Impedance	Y: 1.0Vp-p / 75Ω Pb/Cb, Pr/Cr: 0.7 ± 0.035Vp-p / 75Ω			
HDMI Timing				
STANDARD	RESOLUTION	V FREQ Hz	H FREQ kHz	CLK MHz
480p	720x480	60	31.46	27
576p	720x576	50	31.25	27
720p	1280x720	50	37.5	74.25
720p	1280x720	60	45.0	74.25
1080i	1920x1080	50	28.12	74.25
1080i	1920x1080	60	33.75	74.25
VGA Timing				
STANDARD	RESOLUTION	V FREQ Hz	H FREQ kHz	CLK MHz
VGA	640x480	60	31.47	25.17
VGA	640x480	72	37.86	31.5
VGA	640x480	75	37.5	31.5
SVGA	800x600	60	37.88	40
SVGA	800x600	72	48.07	50

SVGA	800x600	75	46.9	49.5
XGA	1024x768	60	48.36	65.0
XGA	1024x768	70	56.47	75
XGA	1024x768	75	60.02	78.75
SXGA	1280x1024	60	64	108

Video & S-Video AV Timing

STANDARD	RESOLUTION	V FREQ Hz	H FREQ kHz	CLK MHz
NTSC	525	60	15.734	12.65
PAL(B,G,H,D,I)	625	50	15.625	14.50
SECAM	625	50	15.625	14.50
4.43NTSC	525	60	15.734	12.65

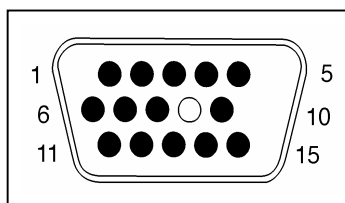
HDTV/Component AV Timing

SDTV 480p	720x480	60	31.461	27
SDTV 480i	720x480	60	15.734	13.5
SDTV 576p	720x576	50	31.25	27
SDTV 576i	720x576	50	15.62	13.5
HDTV 720p	1280x720	50	37.5	74.25
HDTV 720p	1280x720	60	45	74.25
HDTV 1080i	1920x1080	50	28.12	74.25
HDTV 1080i	1920x1080	60	33.7	74.25

Power Source AC100 – 240 V, 60/50 Hz

Sound Output 10W X2, 8 Ohm.

Signal Connector Pin Assignment



Pin	Assignment	Pin	Assignment	Pin	Assignment
1.	Red	6.	Red Ground	11.	Ground
2.	Green	7.	Green Ground	12.	SDA
3.	Blue	8.	Blue Ground	13.	Horizontal Sync.
4.	Ground	9.	Not Connected	14.	Vertical Sync.
5.	Self Test	10.	Sync. Ground	15.	SCL

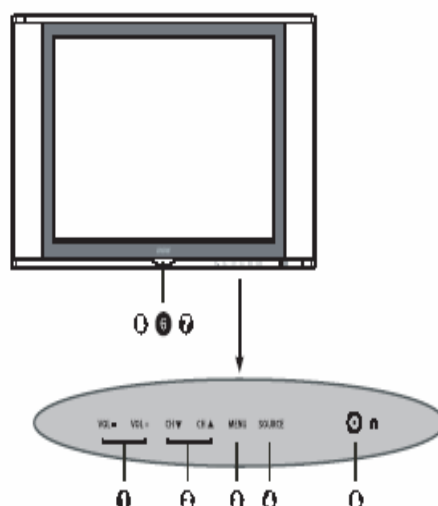
3. Front Panel Function Control Description

Operation, Adjust and Programming

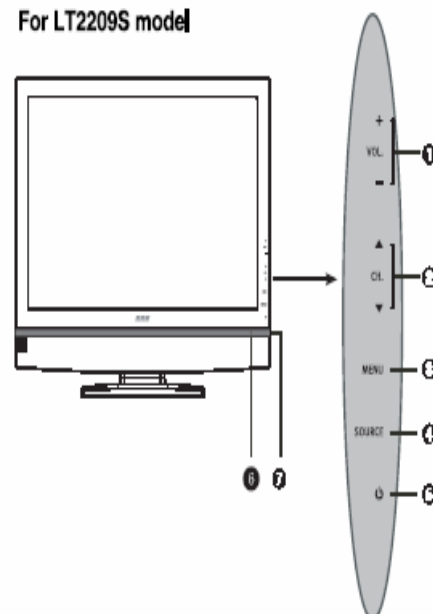
CONTROLS AND FUNCTIONS

Front panel

For LT1504S, LT1904S, LT2004S models



For LT2209S model



❶ VOL+/- buttons

Press to adjust the volume/change parameter point in OSD mode.

❷ CH, ▼/▲ buttons

Press to change the number of the channel/select menu item in OSD mode.

❸ MENU button

Press once to open OSD. Press once again to close OSD.

❹ SOURCE button

Press to select video input.

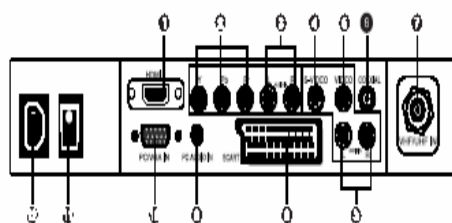
❺ ⏻/⏿ button

Press to switch into STANDBY mode.

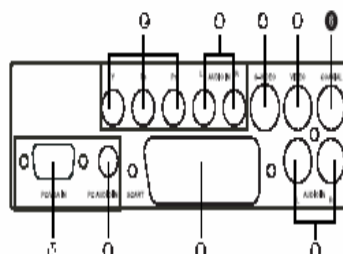
❻ Sensor of infrared beams

❼ STANDBY LED

Ⓣ Headphones output



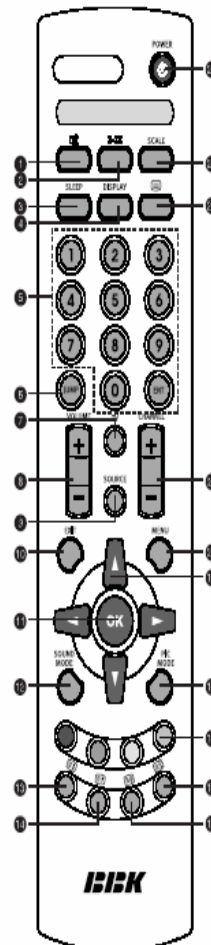
For LT1504S model



- ① **HDMI interface**
Meant for connection to devices with HDMI interface.
- ② **Y/Pb Pr output**
Video terminal.
- ③ **AUDIO L/R input**
Meant for external signal source connection.
- ④ **S-VIDEO**
Video input.
- ⑤ **VIDEO**
Video input.
- ⑥ **COAXIAL audio input**
Meant for multi-channel sound playback.
- ⑦ **WHFHF IN**
Antenna input.
- ⑧ **SCART connecting socket**
Meant for external audio and video signal source connection.
- ⑨ **PC AUDIO IN**
Meant for PC stereo audio output connection.
- ⑩ **PC/VGA IN**
Meant for PC connection.
- ⑪ **Power switch**
- ⑫ **Meant for power cord connection**

Remote control general view

- 1 **Button** Press to turn on/off the sound.
- 2 **Button** Press to change sound mode between MONO/DUAL/STEREO.
- 3 **SLEEP button** Press to set sleep timer.
- 4 **DISPLAY button** Press to display information.
- 5 **0-9 and ENT buttons** Numeric buttons and button for switching to one or two-digit program number.
- 6 **JUMP button** Press to select current or previous channel.
- 7 **TV button** Press to switch to TV mode.
- 8 **VOLUME +/- button** Press to adjust the volume.
- 9 **SOURCE button** Press to select video signal source.
- 10 **EXIT button** Press to exit OSD/Teletext mode.
- 11 **OK button** Press for confirmation.
- 12 **SOUND-MODE button** Press to select preset sound settings.
- 13 **Button** Press to open the main teletext page.
- 14 **Button** Press to open hidden teletext pages.
- 15 **Button** Press to freeze the passage in teletext mode.
- 16 **Button** Press to select teletext display mode: top, bottom, all page.
- 17 **Information access buttons**
- 18 **PC MODE button** Press to select picture mode.
- 19 **Cursor buttons**
- 20 **MENU button** Press to open menu.
- 21 **CHANNEL VA button** Press to select channel number.
- 22 **Button** Press to switch on/off teletext function.
- 23 **SCALE button** Press to select preset picture format.
- 24 **POWER button** Press to turn on/off the TV.



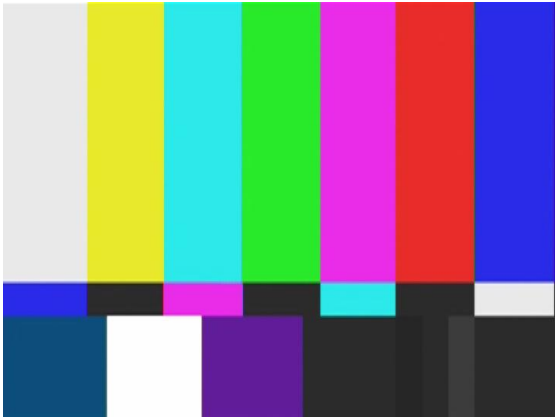
The operation of each OSD controls is described as following table:

Option	Description		
Picture	Picture (not support VGA)	User	Press ◀/▶ to change the Picture Mode to be User, Vivid, Game, Sport, and Movie
		Game	
		Movie	
		Vivid	
		Sport	
	Brightness		Press ◀/▶ to adjust the Brightness from 0 to 100
	Contrast		Press ◀/▶ to adjust the Contrast from 0 to 100
	Tint (not support PAL)		Press ◀/▶ to adjust the Tint from 0 to 100
	Saturation		Press ◀/▶ to adjust the Saturation from 0 to 100
	Sharpness		Press ◀/▶ to adjust the Sharpness from 0 to 100
	Scale (Input HDMI, YPbPr (except 480I) / VGA source, does not support scale function)	Full	Switch between user, zoom1, zoom2 and normal in all video mode
		Zoom1	
		Zoom2	
		Normal	
	Color temp	User	Press ◀/▶ to select the color Temperature to be User, Warm, or Cool
		Cool	
		Warm	
Audio setup	Sound mode	User	Press ◀/▶ to change Sound Mode to be User, Live, POP and Rock
		Live	
		Pop	
		Rock	
	Volume		Press ◀/▶ to adjust the Volume from 0 to 100
	Base		Press ◀/▶ to change the Bass from 0 to 100
	Treble		Press ◀/▶ to change the Treble from 0 to 100
Osd setup	Language (待定)		Allow you to select a language for all the on-screen menu.
		English,	
		German,	
		French,	
		Italian,	
		Spanish,	
		Portugal,	
		Holland	
		Poland	
	Time out		Press ◀/▶ to select the Menu Timeout to be 5,10,15,20,25, 30,35,40,45,50,55,60 seconds.
	Transparency		
	Sleep time		Press ◀/▶ to select the Sleep Timer to be 15, 30, 45, 60, 90, 120 minutes or Off.

	Reset		Recall factory setting.
TV setup	APS		Start auto search and auto process
	Fine tune		Press ◀/▶ to adjust the Fine Tune from -50 to 50
	Add/Erase		Allow you to add/remove channels.
	Channel Name		Edit the channel name. (Europe only)
	Channel Swap		Swap the channel location . (Europe only)
	Channel reset		Allow you to restore a default TV channel table. (TV only)
VGA setup	Auto		Allows you to auto adjust the display mode.
	H-Position		Allows you to adjust the position of the picture left and right in the window Press VOLUME (-, +) to adjust the Sharpness from 0 to 100
	V- Position		Allows you to adjust the position of the picture left and right in the window Press VOLUME (-, +) to adjust the Sharpness from 0 to 100
	Clock		Controls the width of the picture based on the VGA mode.
	Phase		Allows you to improve focus clarity and image stability Press VOLUME (-, +) to adjust the Hue from 0 to 100

4. Adjusting Procedure

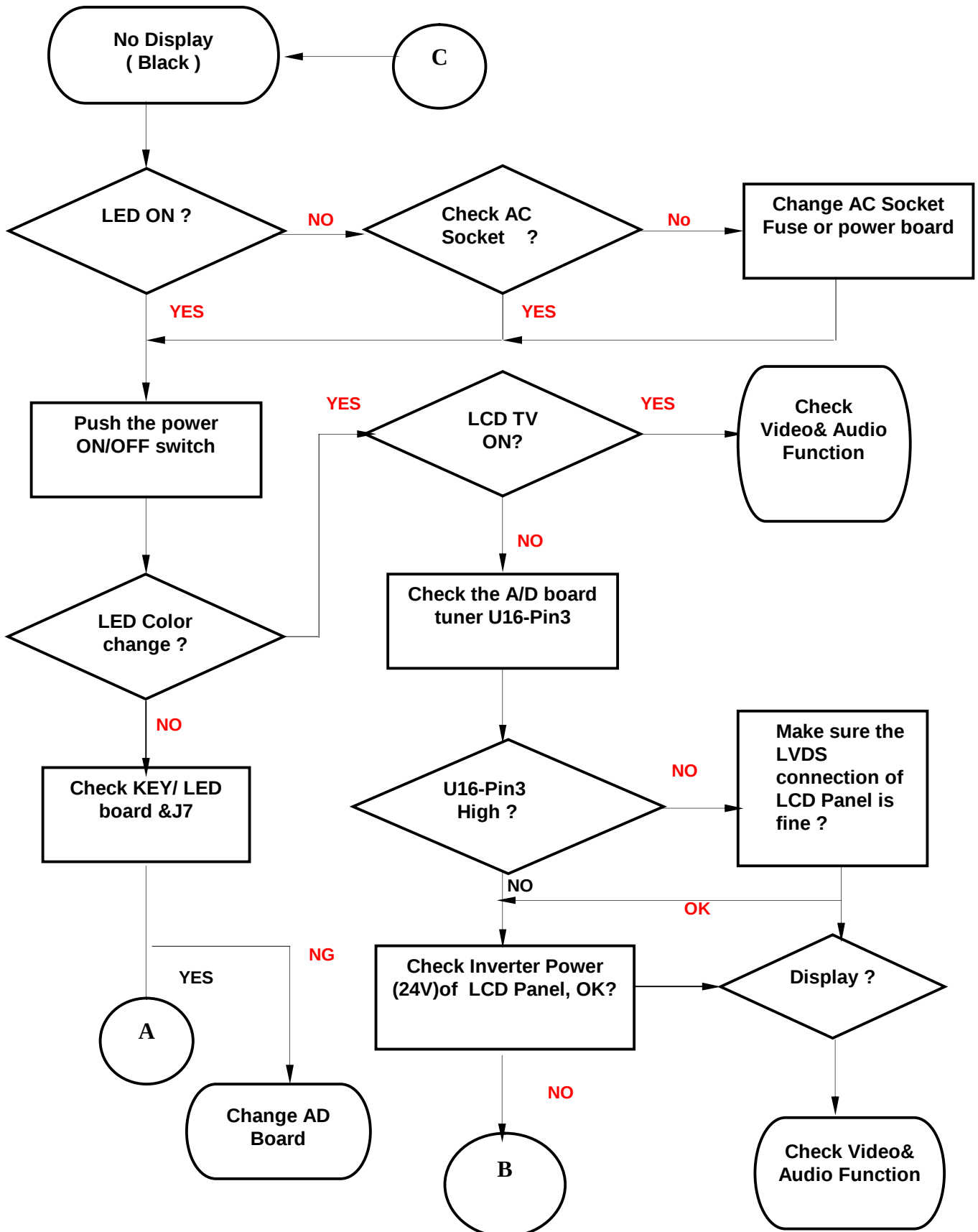
ITEM	Equipments	Requirements	Procedure and SPEC
Color Temp.Adustment White balance adjustment	VG828/Croma2327 Chroma 7120 (untouchable)	1280*800/60 all white balance	- Select SOURCE then choose VGA - Enter the factory area - Select Calibration - Enter Color Temp. to User - Enter User Color temp and adjust the R G B offset/gain value
a. warm	Brightness and Contrast =>50	Select the warm to enter the adjustment option of R.G.B.	Automatically adjust the value of R.G.B and adjust the Color Temp. of white image to be x : 313 ±20 , y : 316 ±20 Y: 200cd/ m ²
b. standard	Brightness and Contrast =>50	Select the standard to enter the adjustment option of R.G.B	Automatically adjust the value of R.G.B and adjust the Color Temp. of white image to be x : 295 ±20.y : 305 ±20 Y: 200%cd/ m ²
c. cool	Brightness and Contrast =>50	Select the cool to enter the adjustment option of R.G.B	Automatically adjust the value of R.G.B and adjust the Color Temp. of white image to be x : 281 ±20.y : 288 ±20 Y:200%cd/ m ²
TV mode test	Factory TV signal or TV signal generator	Output PAL signal	Check if the picture is normally display under User menu, and it will display snow without any signal, and then enter the standby mode after 15 mins without any signal.
S-VIDEO adsutment	DVD S-Video Cable	Play DVD Set DVD to interlaced output	Screen is clear and fluent
SACRT output test	To accept TV signal	Send TV signal through the SCART	Screen is clear and fluent
SDTV(Y,Pb,Pr) 576P 480P HDTV (Y,Pb,Pr) 720p/1080i	HDTV Receiver ATSC HDTV Tuner Component Cable Hard disc player	Play SDTV/HDTV (Y,Pr,Pb)	Screen is clear and fluent

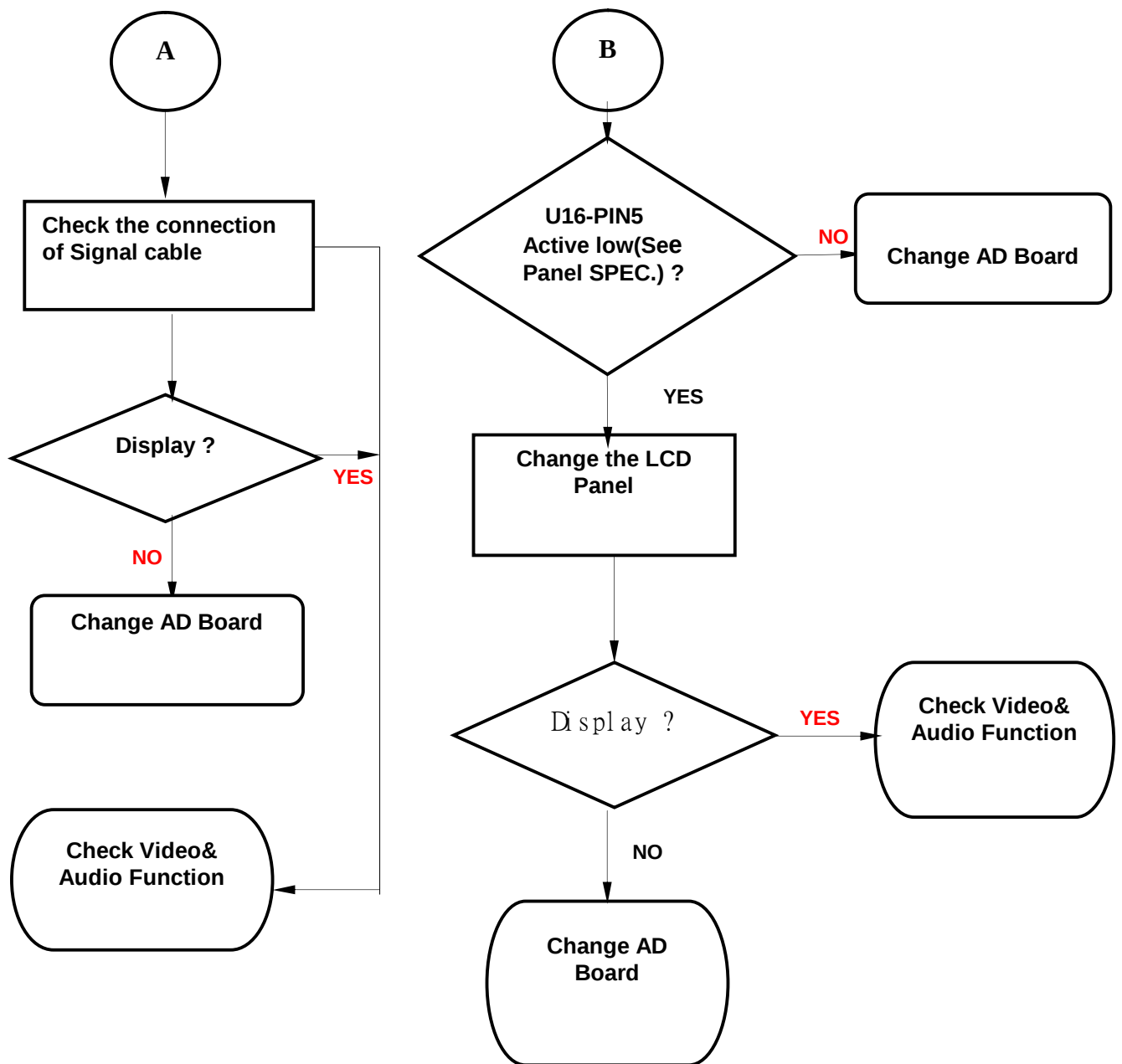
VGA INPUT	PC VGA Cable		- Each Mode can display normally. If there is a specific Mode that is not appropriate after switch, press Auto Adjust will to automatically adjust for appropriate screen. - Confirm PC can automated identify the hd155tpLCD NO.
VGA INPUT	TV BOX D-SUB Cable		Use external-connect TV BOX, watching the TV program; the screen is clear and fluent.
NTSC/PAL Switch	DVD S-Video Cable or TV Signal GENERTOR "FLUKE 54200" or approved equipment	Play DVD test disc VIDEO ESSENTIALS (A-1) Set DVD to interlaced output	- Select SOURCE then choose S-VIDEO. - Sending the signal from DVD test disc (sixth paragraph)  - Switch DVD output mode from NTSC and PAL, Watch the screen to check if has switch NTSC/PAL
.480P/480i switch	DVD Component Cable or TVSignalGENERTO R "FLUKE 54200" or approved equipment	Play DVD test disc VIDEO ESSENTIALS (A-1) Set DVD to progressive output (P- SCAN)	- Select SOURCE then choose Y CBCR/Y PBPR - Sending the signal from DVD test disc(sixth paragraph)  - Switch DVD to output mode P-SCAN ON/OFF - see if there is the action of switch (480i/480p).

.SOUND mode	Pattern Generator Audio source output External connect Left/Right speaker (2.5/8ohm)	Any Pattern	● Selects SOURCE menu ● Enter the SOUND adjustment item.
a. Volume	DVD/VCD plays music or DVD disc		● Press ▲/▼ to set audio volume ● Check if the action is normal.
b. Treble	DVD/VCD plays music or DVD disc		● Press ▲/▼ to set audio volume ● Check if the action is normal. ● The default is "50"
c. Bass	DVD/VCD plays music or DVD disc		● Press ▲/▼ to set Bass volume ● Check if the action is normal. ● The default is "50"
d. Balance			● Press ▲/▼ to set balance ● The default is "50"
e. Mute			● Press ▲/▼ to set balance ● The default is "off"
Surround Mode	DVD/VCD plays music or DVD disc		● Press ◀/▶ to set ON/OFF ● Check if the sound has change ● The default is "OFF"
NICAM	GENERATOR "FLUKE 54200" or approved equipment		● Press I-II button on the remote ● Check if the sound has change.
Super Freq. test	Pattern Generator VGA Cable		● Check if OSD displays "super Freq."
Remote function test.	PC Pattern Generator TV Signal Generator DVD or VCD HDTV Player		● Check if each function is normal under each mode
.TUNER	FLUKE54200		● Selects SOURCE to be TV ● Selects TV SOURCE AIR ● Check if Screen is clear and fluent ● Selects TV SOURCE CABLE ● Check if Screen is clear and fluent

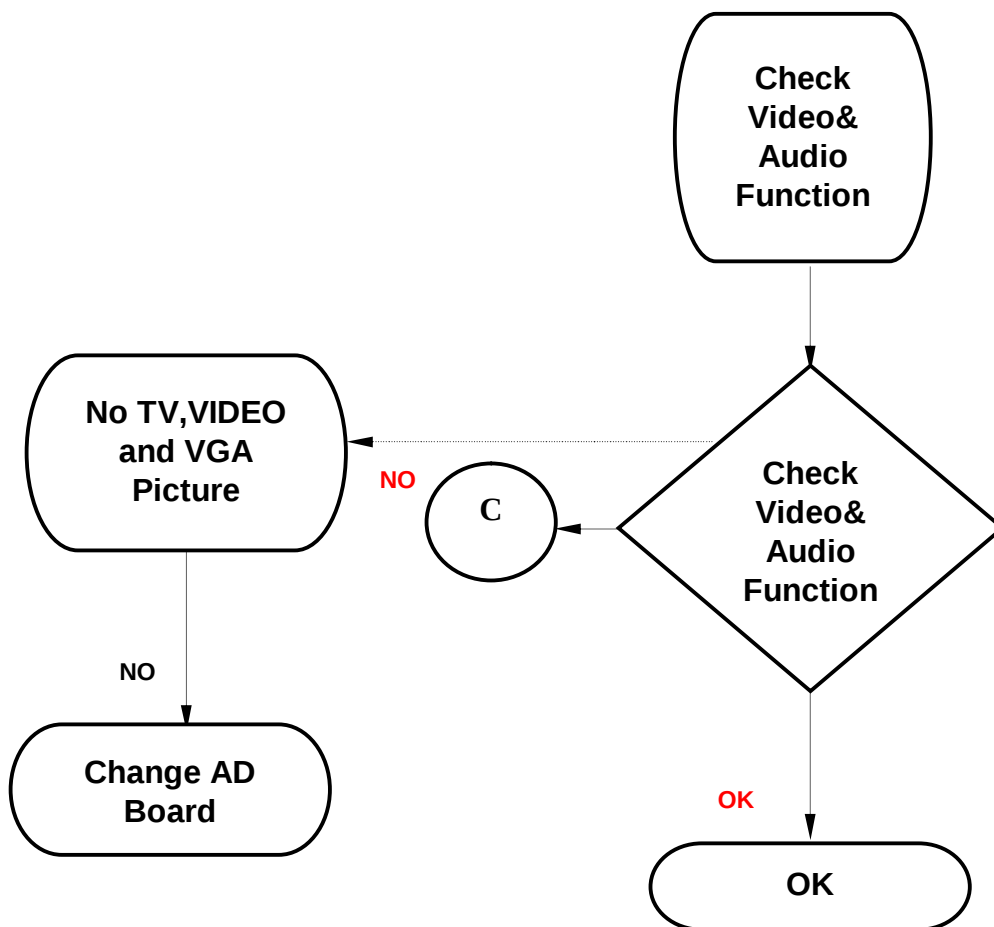
5. Trouble Shooting Flow Chart

STEP 1.

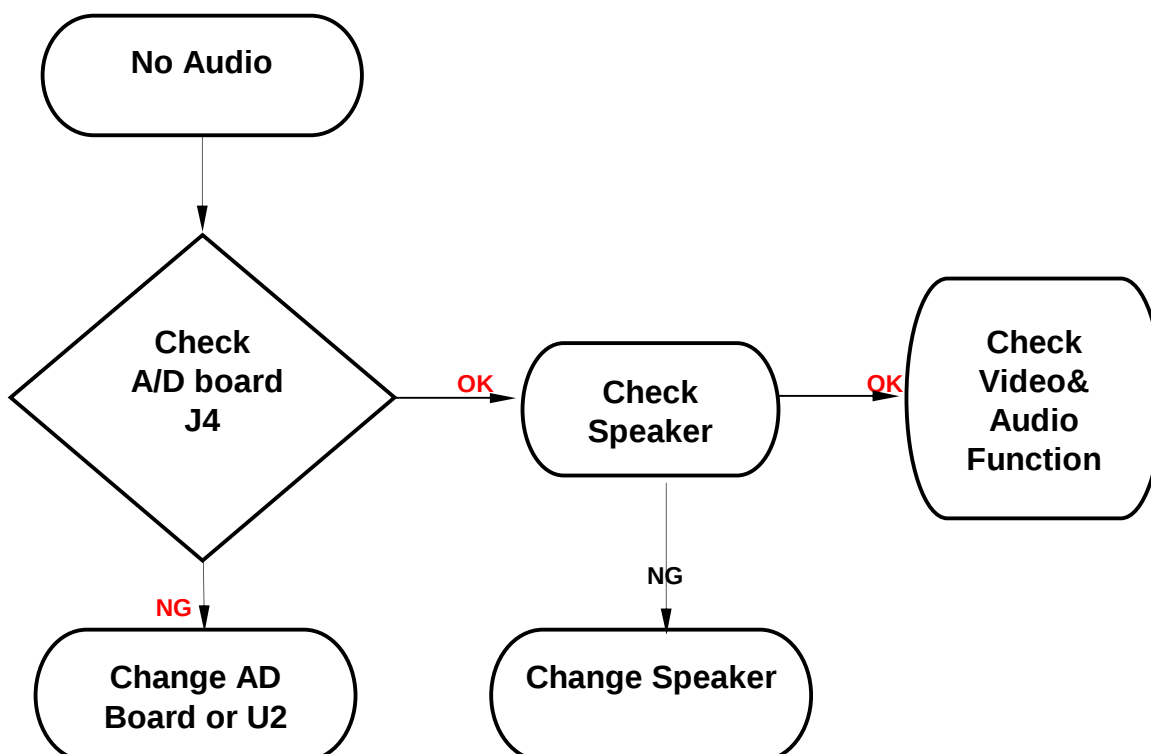




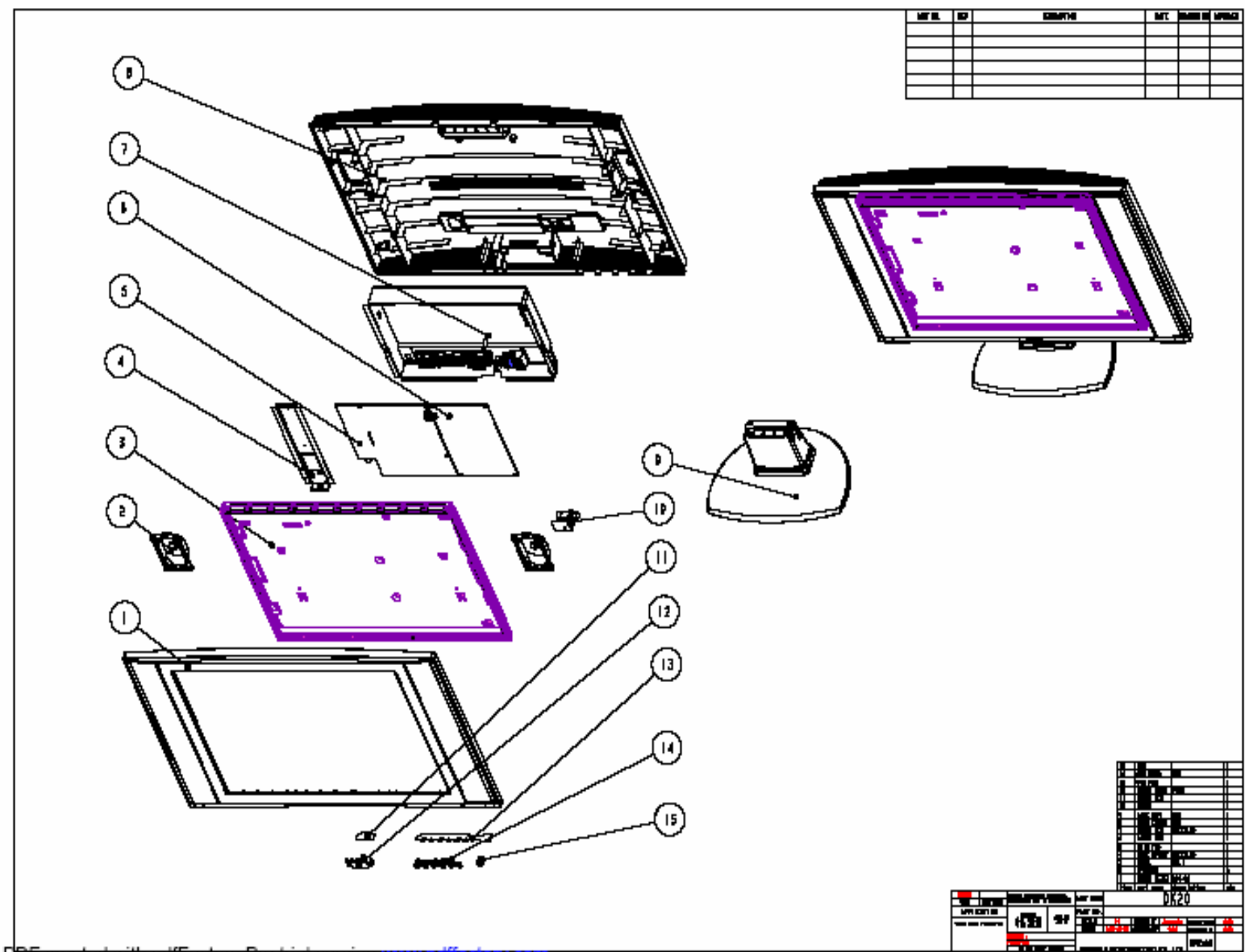
STEP 2.



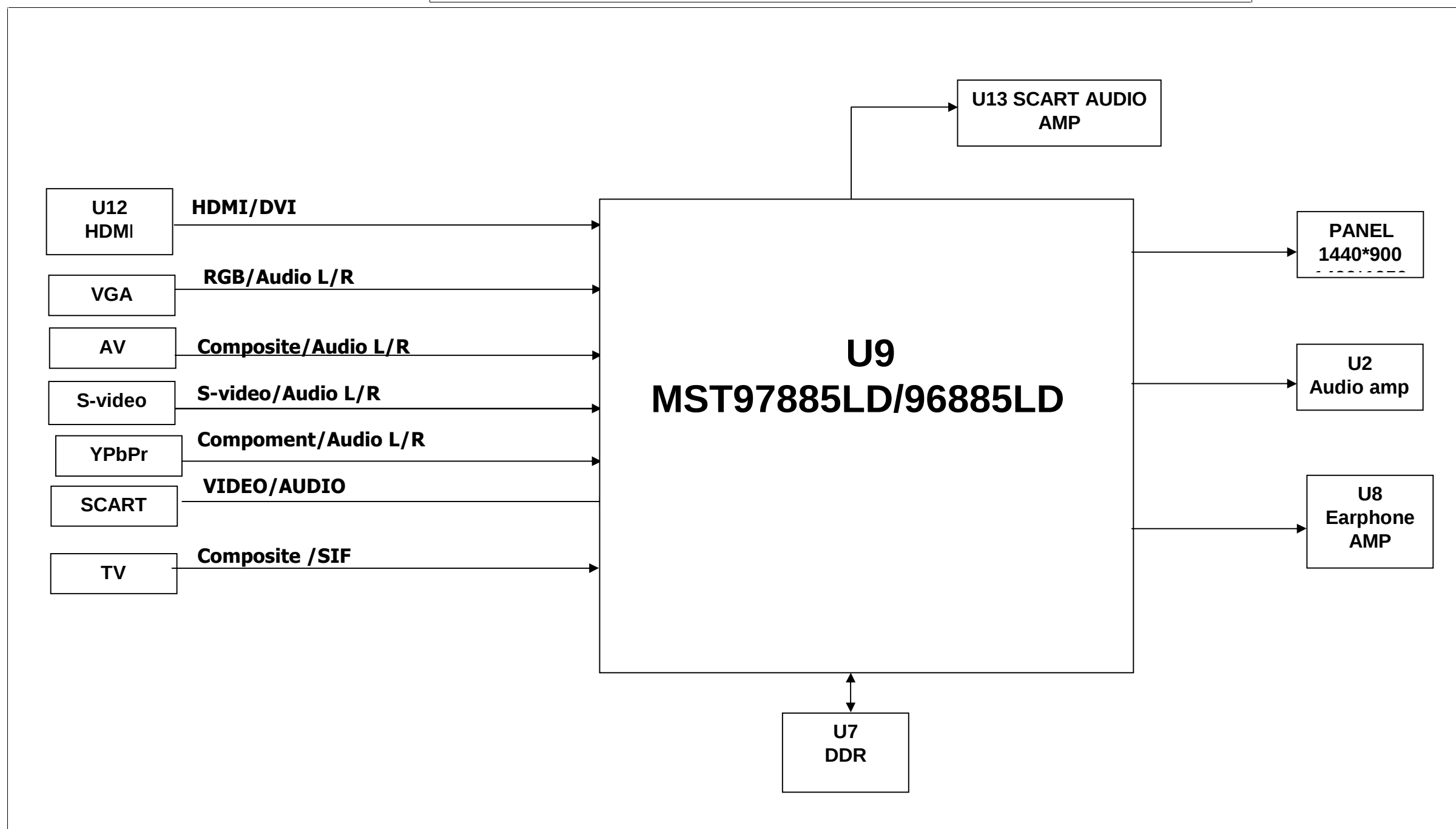
STEP 3.



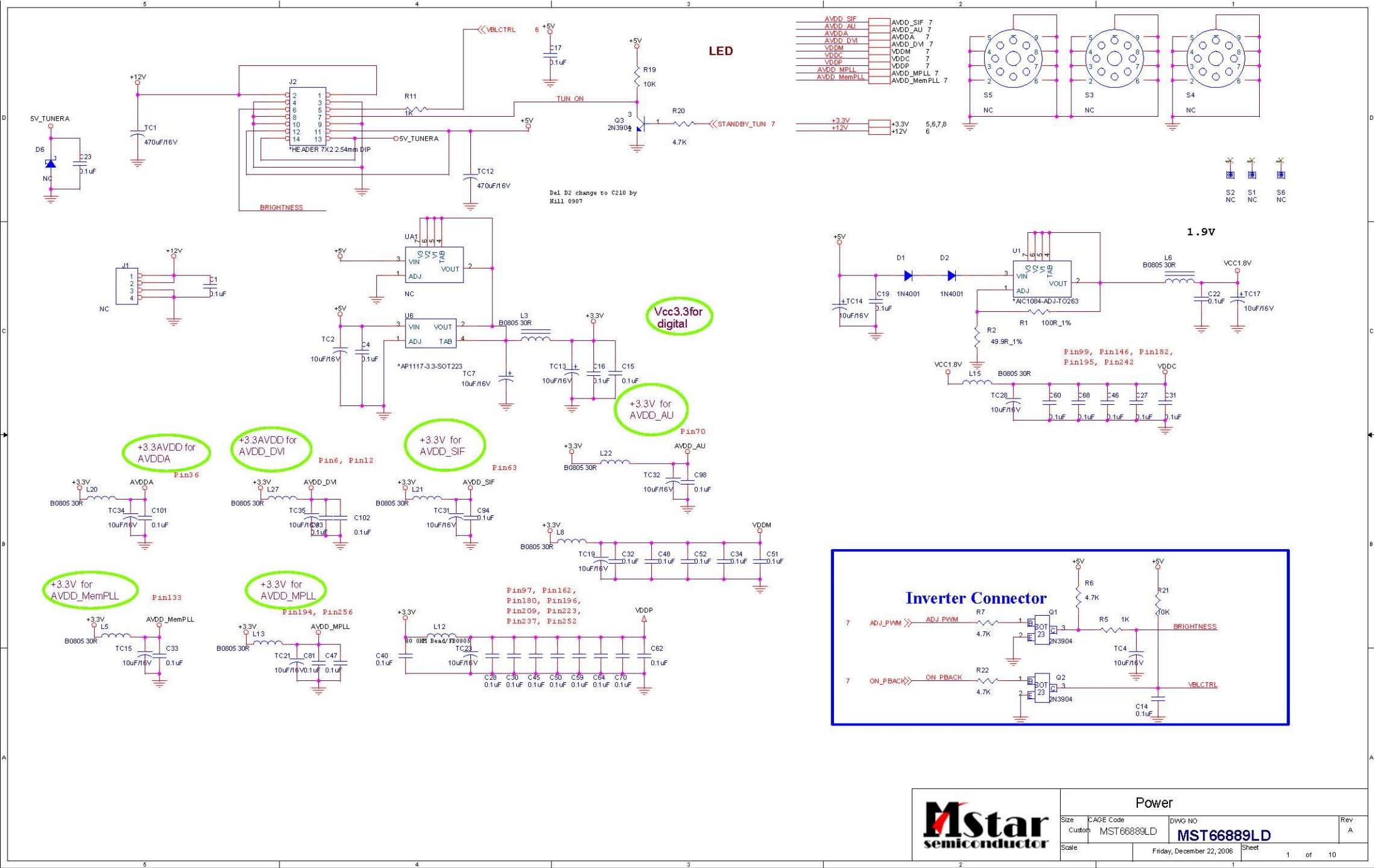
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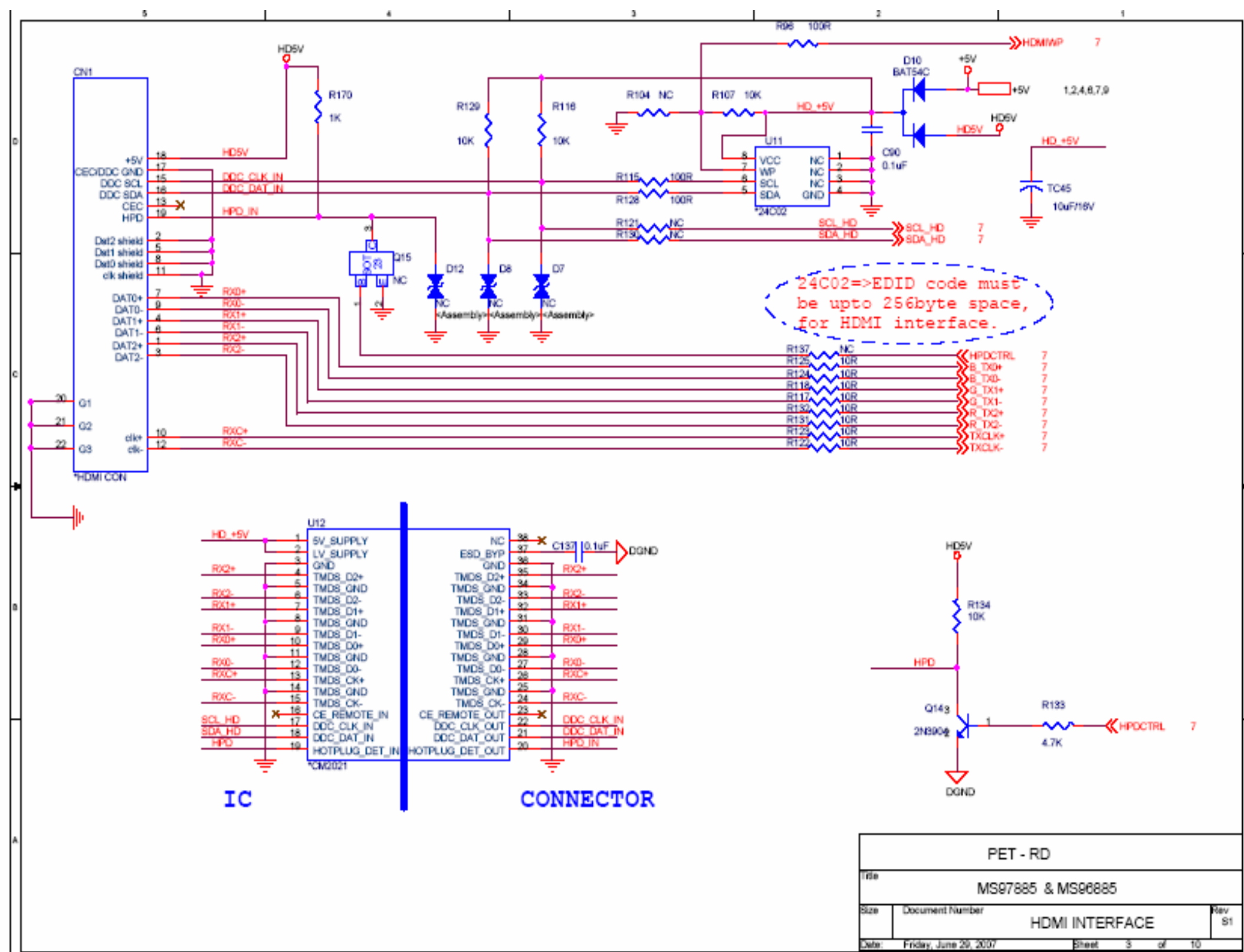


7. Block Diagram

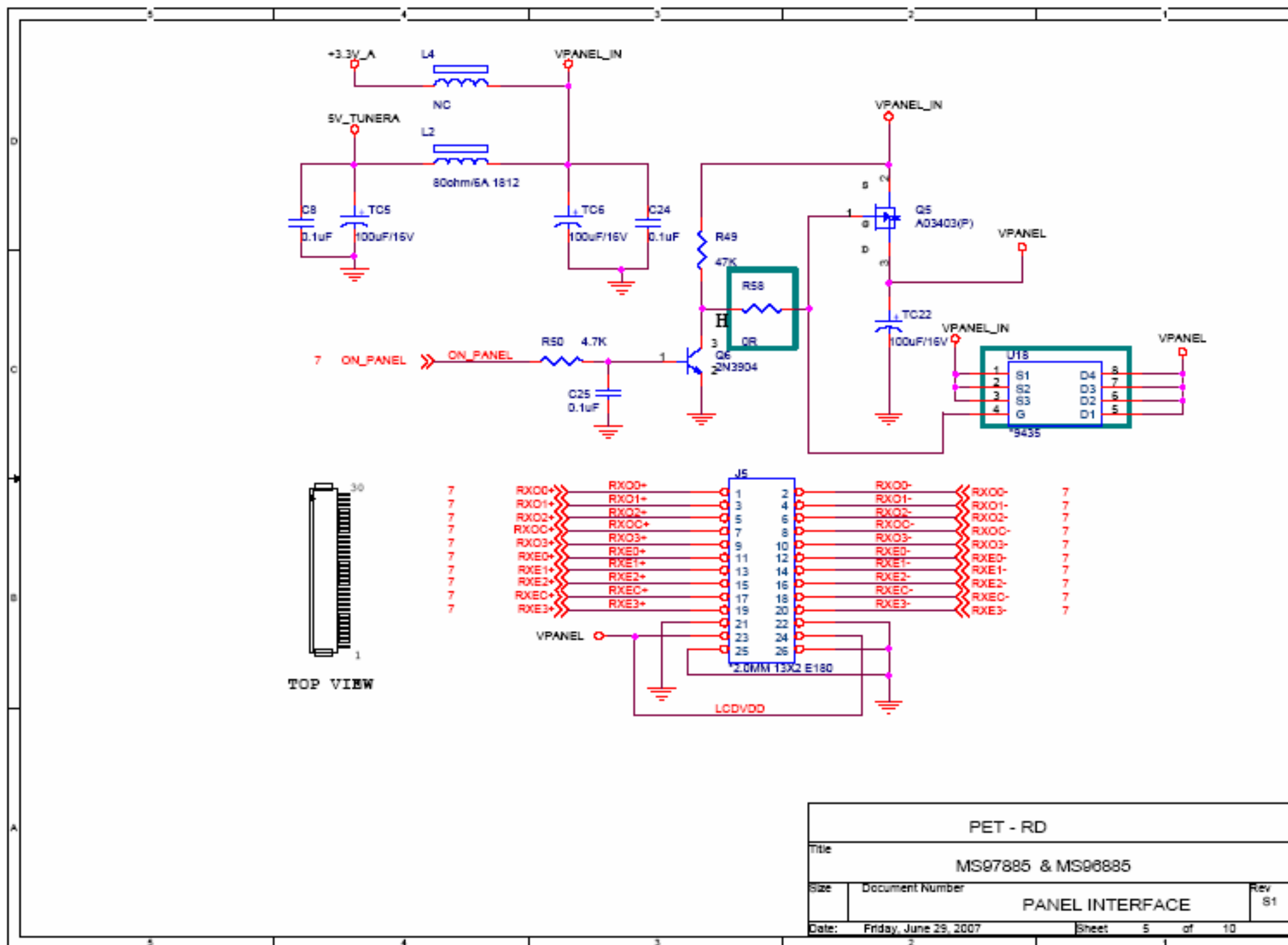


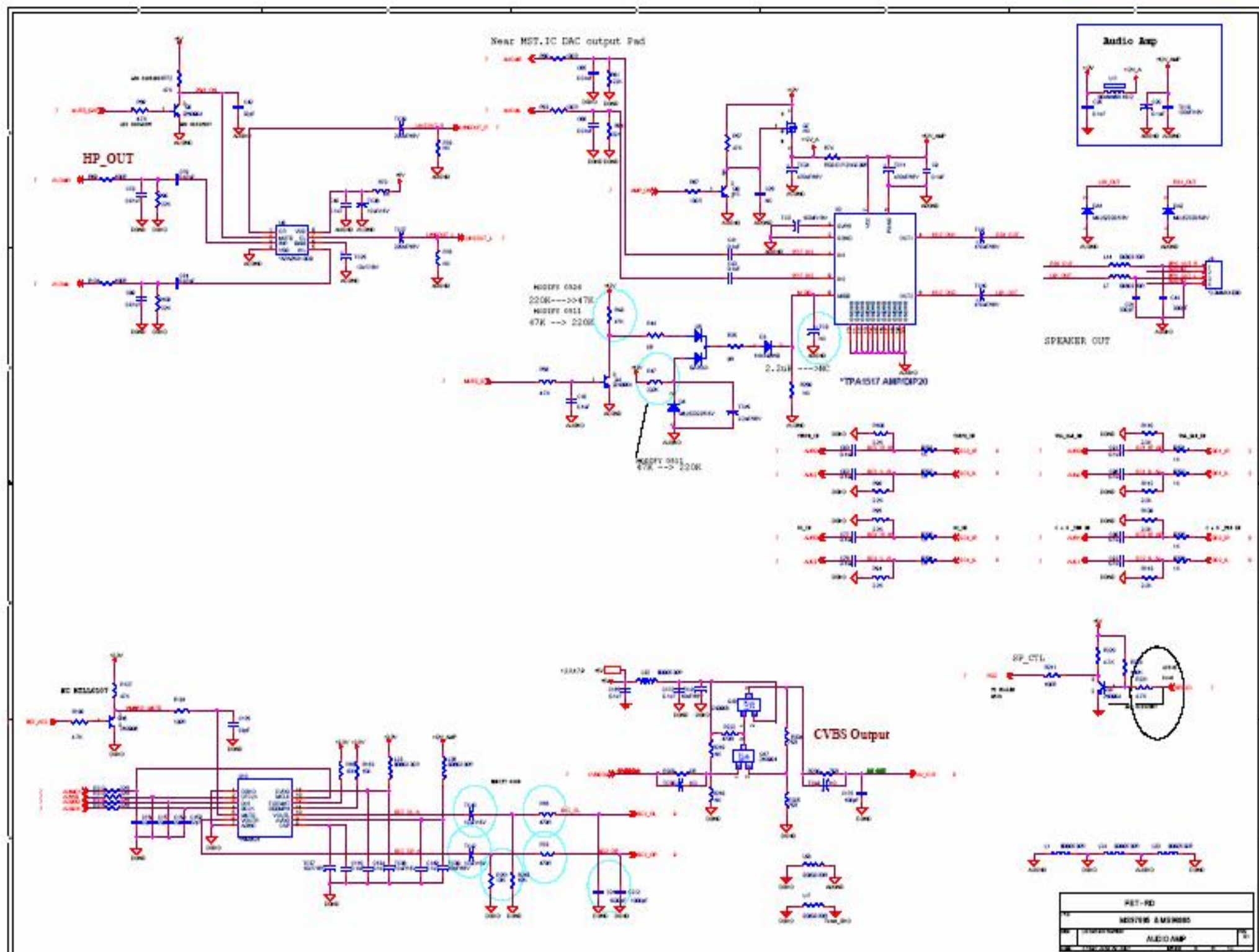
8. Schematic Diagram

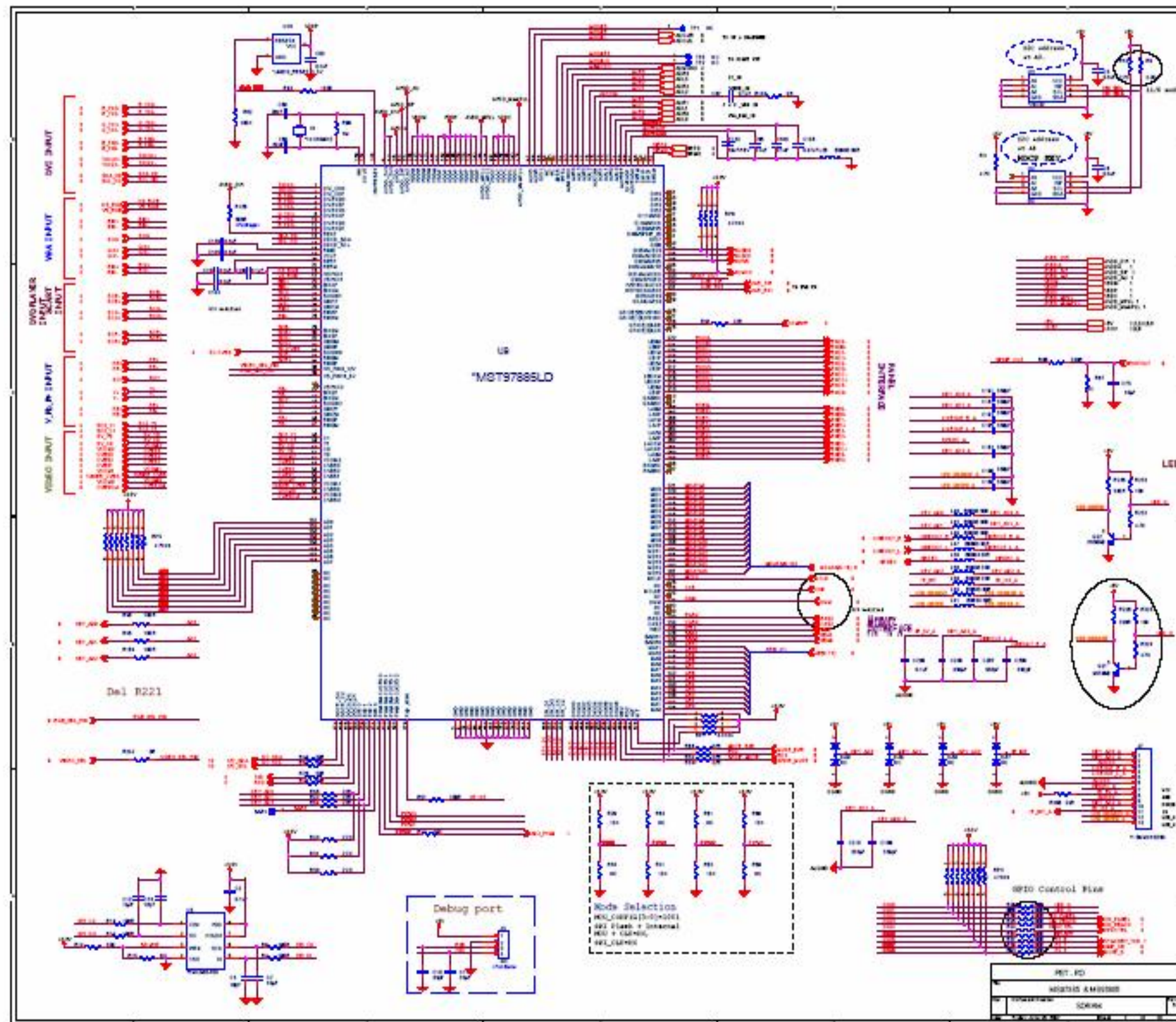


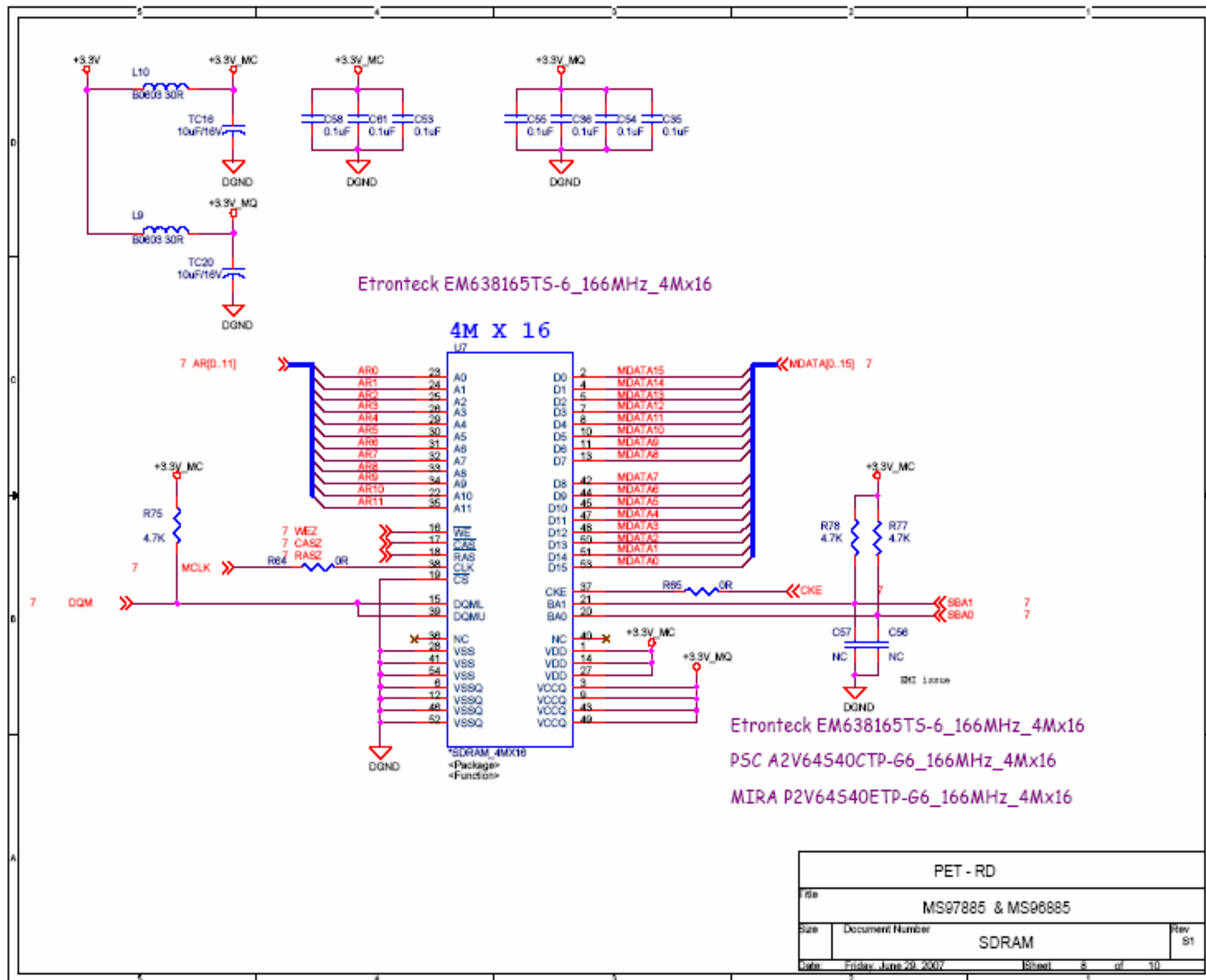


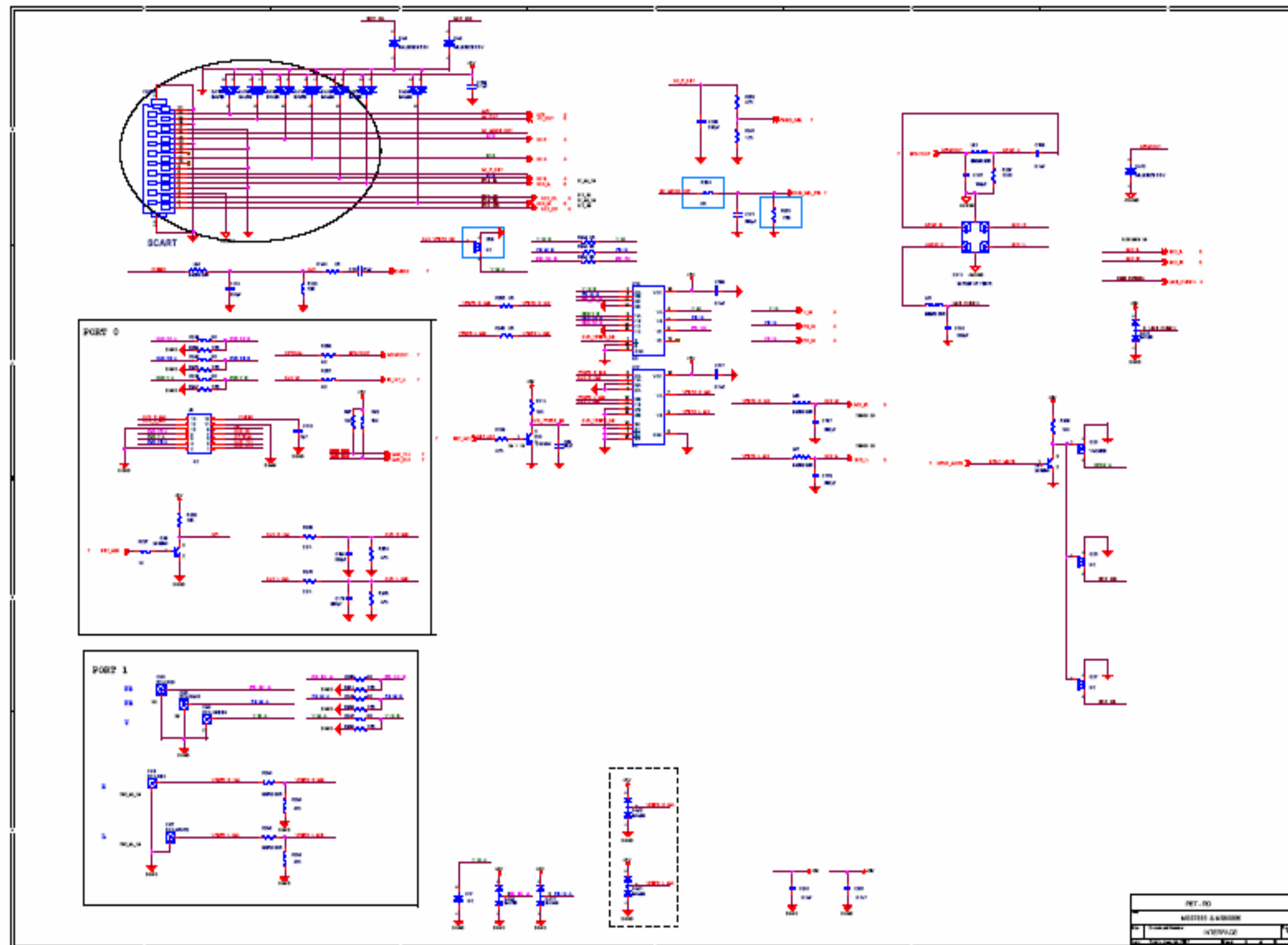


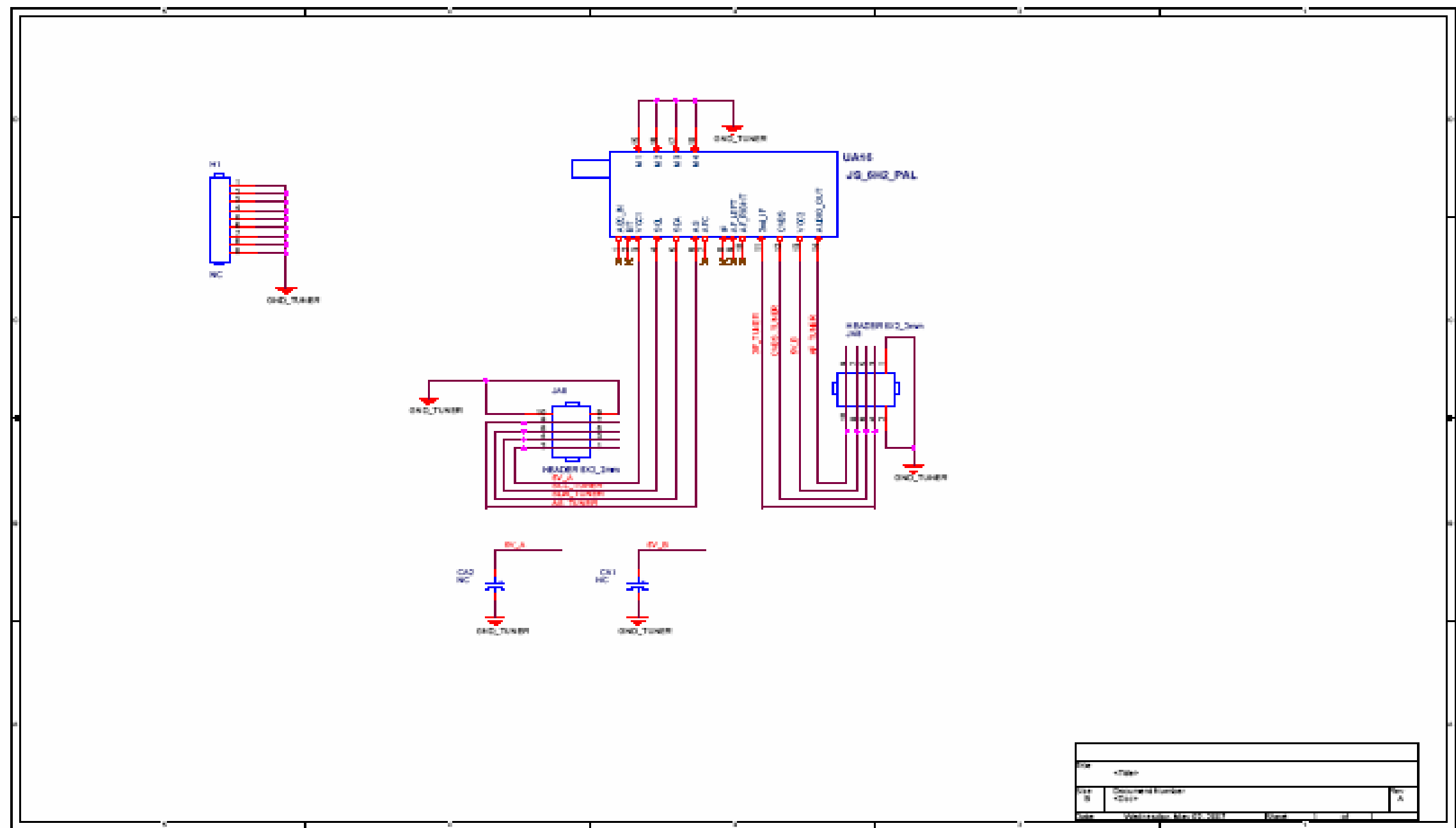










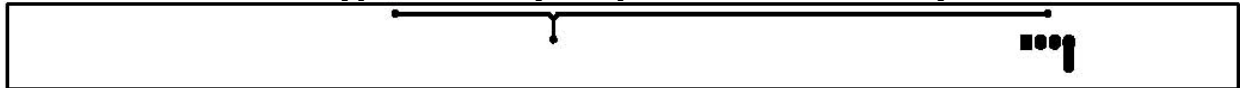


9. PCB Layout Diagram

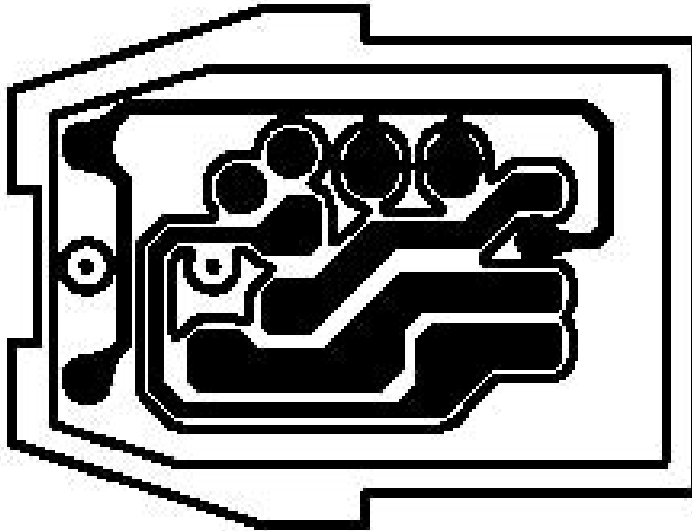
Keypad Board (Component Side Top)



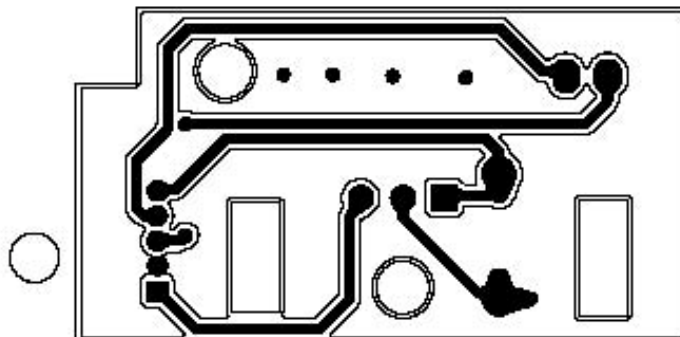
Keypad Board (Component Side Bottom)



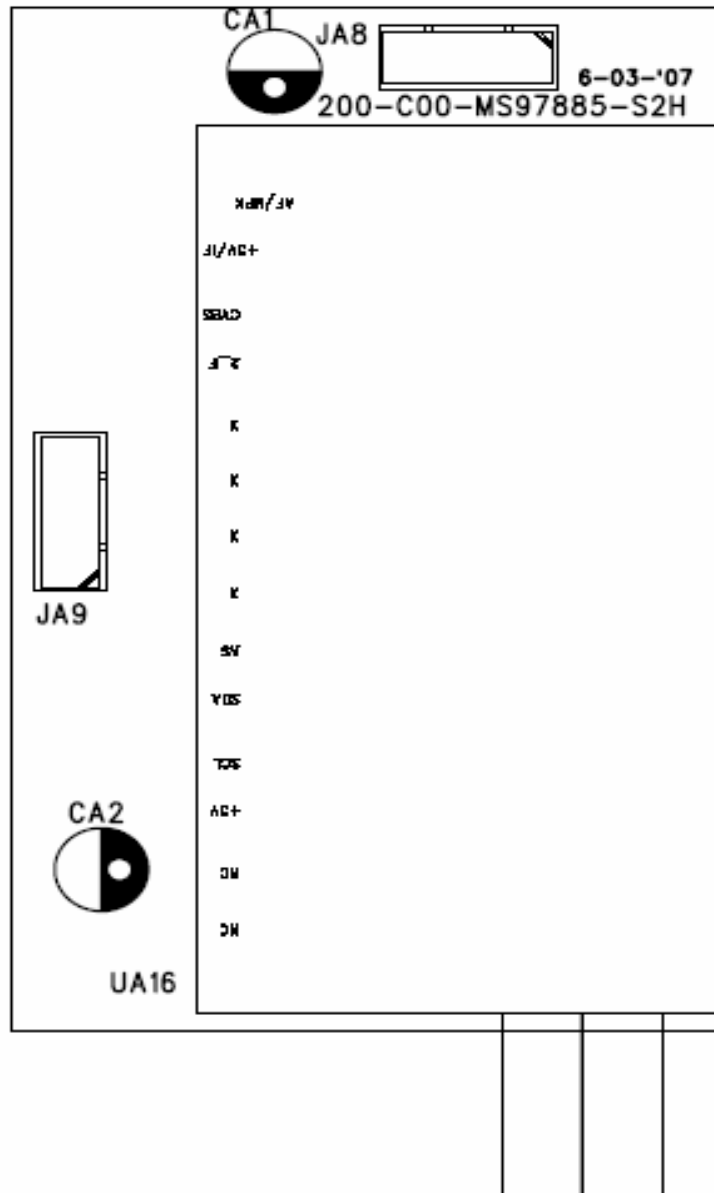
IR/LED Board (Component Side Top)



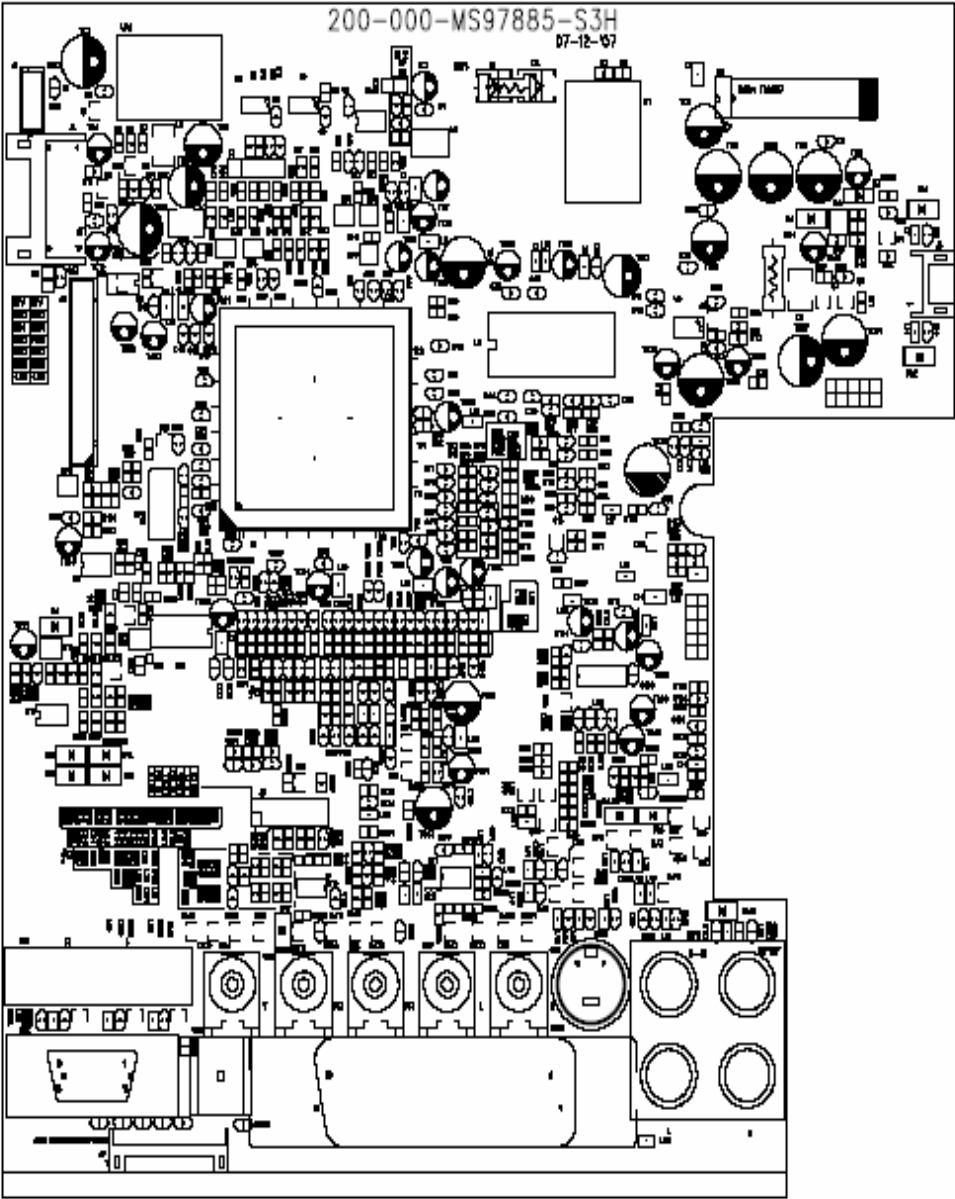
IR/LED Board (Component Side Bottom)



Tuner Board



Main Board (Component Side Top)



Main Board (Component Side bottom)

