SERVICE MANUAL

Model:

PDP4206EA

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

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

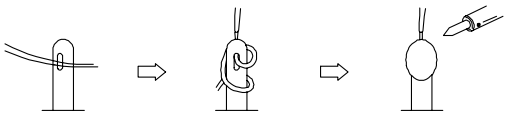
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.

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 enclo sure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

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.

PRECAUTIONS DURING SERVICING

1. 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.
2. Use specified internal Wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads
3. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulating Tape
   2) PVC tubing
   3) Spacers (insulating barriers)
   4) Insulating sheets for transistors
   5) Plastic screws for fixing micro switches
4. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



5. Make sure that wires do not contact heat generating parts (heat sinks, oxide metal film resistors, fusible resistors, etc.)
6. Check if replaced wires do not contact sharply edged or pointed parts.
7. 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:

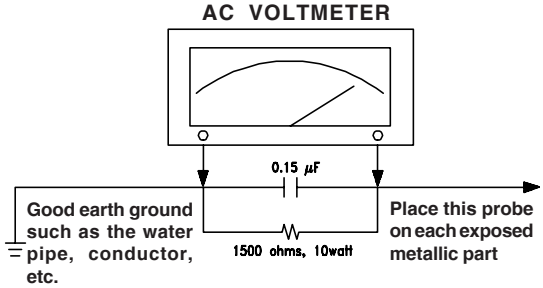
Before servicing this TV receiver, read the SAFETY INSTRUCTION and PRODUCT SAFETY NOTICE.

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.

1. 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.
2. Comply with all caution and safety related provided on the back of the cabinet, inside the cabinet, on the chassis or picture tube.
3. To avoid a shock hazard, always discharge the picture tube's anode to the chassis ground before removing the anode cap.
4. 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 tempera ture 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 0.15μF 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 uF 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 offer passed unnoticed by visual spection and the protection afforded by them cannot necessarily be obtained by using replacement components rates for a higher voltage, wattage, etc.

The replacement parts which have these special safety characteristics are identified by ⚠ 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 : *PDP4206EA* 42" Plasma Display			
DATE FIRST ISSUED	ISSUE 1	RAISED BY	CHECKED BY	NUMBER OF PAGES 10

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 :

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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 $\leqq 0.1Cd/m^2$)

1.2 Viewing distance : 50cm in front of PDP

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 : 110~120Vac,60Hz

1.9 Ambient temperature : 20°C ± 5°C (68°F ± 9°F)

1.10 Display mode : 31.5KHz/60Hz (Resolution 852 x 480)

1.11 Other conditions :

1.11.1 With image sticking protection of PDP 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 PDP, 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	:	110 ~120VAC
2.2	Input Current	:	3.5A
2.3	Maximum Inrush Current	:	<30 A (FOR AC110V ONLY)
	Test condition	:	Measured when switched off for at least 20 mins
2.4	Frequency	:	60Hz(±3Hz)
2.5	Power Consumption	:	≤ 330W
	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” Plasma display
3.2	Aspect Ratio	:	16:9
3.3	Pixel Resolution	:	852x480
3.4	Peak Brightness	:	1000 cd/m² (Panel module without filter)
3.5	Contrast Ratio (Dark room)	:	3000:1 (Panel module without filter)
3.6	Viewing Angle	:	Over 160°
3.7	OSD language	:	English,Spaish,French

4. Signal

4.1 AV & Graphic input

4.1.1 TV standard	:	NTSC/ATSC
4.1.2 TV Tuning system	:	181CH (for NTSC), 2~69CH (for ATSC)
4.1.3 CATV	:	125CH (for NTSC)
4.1.4 Composite signal	:	AV
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 (640x480 recommended)

4.2 Audio input

Audio I/P(L/Rx5)	:	1 for DVI 1 for D-Sub 2 for YPbPr 1 for S-Video /AV

4.3 Audio output

Audio O/P(L/Rx1)	:	Monitor out(L/R)
SPDIF	:	Optical x 1

5. Environment

5.1 Operating environment

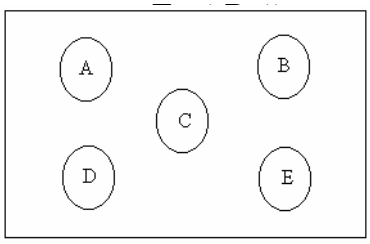
5.1.1 Temperature	:	5º to 33°C
5.1.2 Relative humidity	:	20% to 85%(non-condensing)

5.2 Storage and Transport

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

6. Panel Characteristics

6.1	Type	:	LG V6
6.2	Size	:	42”, 1005mm(width)x597mm(height)x61mm(depth)±1 mm)
6.3	Aspect ratio	:	16:9
6.4	Viewing angle	:	Over 160°
6.5	Resolution	:	852x480
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	:	Average 60:1 (In a bright room with 150Lux at center) Typical 3000:1 (In a dark room 1/25 White Window pattern at center).
6.9	Peak brightness	:	Typical 1000cd/㎡ (1/25 White Window)
6.10	Color Coordinate Uniformity	:	Contrast; Brightness and Color control at normal setting
		:	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);
Color temperature set at Natural
x=0.285±0.02
y=0.293±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.
	Input 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

Full on screen display

9. Agency Approvals

Safety	UL60950
Emissions	FCC class B

10. Reliability

11.1 MTBF : 20,000 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.

Support the Signal Mode

A. VGA and DVI Mode

Resolution	Horizontal Frequency (KHz)	Vertical Frequency (Hz)
640 x 480	31.50	60.00
	37.86	72.81
800 x 600	35.16	56.25
	37.90	60.32
	46.90	75.00
	48.08	72.19
1024 x 768	48.40	60.00
	56.50	70.00
	60.00	75.00
1280 x 720 *	45.00	60.00
1280 x 1024	64.00	60.01

Note:

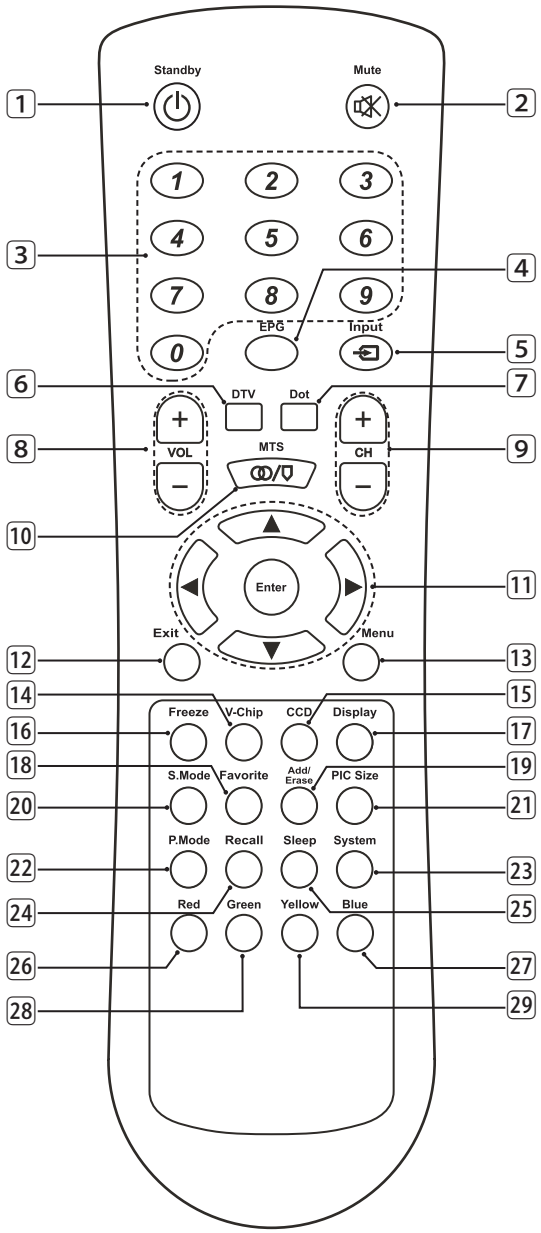
- VGA could not support * of signal mode.
- DVI could not support some PC Graphic cards, it is recommended that it should be connected VGA of PC to VGA of PDP by VGA cable.

B. HDTV Mode (YPbPr)

Resolution	Horizontal Frequency (KHz)	Vertical Frequency (Hz)
480i	15.734	59.94
480p(720x480)	31.468	59.94
720p(1280x720)	45.00	60.00
1080i(1920x1080)	33.75	60.00

- When the signal received by the Display exceeds the allowed range, a warning message “Main Not Support!” shall appear on the screen.
- You can confirm the input signal format from the on-screen.

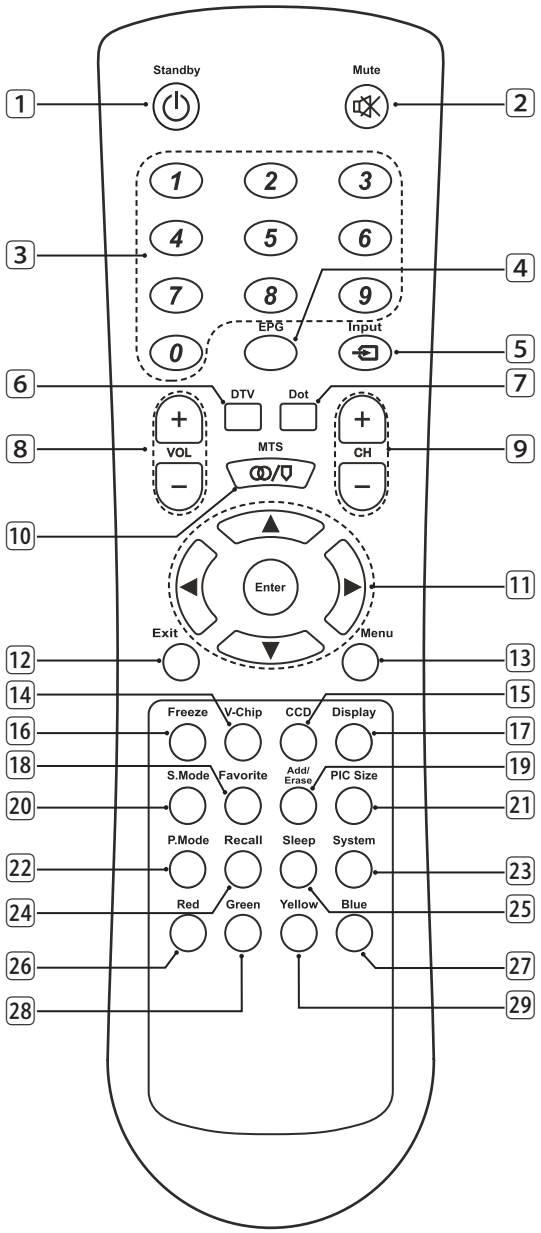
Remote Control



1. **Standby (⏻)**: Press to turn on and off.
2. **Mute (🔇)**: Press to mute the sound. Press again to restore the sound.
3. **0~9 Number Buttons**: Press 0~9 to select a channel, and used to input the password; the channel changes after 2 seconds.
4. **EPG**: Press to display EPG mode. Press it again to exit EPG mode.
5. **Input**: Press to select the signal source, such as TV, AV, S-Video, Component 1, Component 2, VGA, DVI or DTV.
6. **DTV**: Press to choose DTV directly.
7. **Dot:** Press number buttons with it to select the channels directly in DTV.
8. **VOL +/-**: Press to adjust the volume.
9. **CH +/-** : Press to select the channel forward or backward.
10. **MTS**: Press repeatedly to cycle through the Multi-channel TV sound (MTS) options: Mono, Stereo and SAP (Second Audio Program).
11. ◄,►,▲,▼, **Enter**: Press ◄,►,▲, ▼ to move the on-screen cursor. To select an item, press **Enter** to confirm. And it can also press ▲ or ▼ to select channels, press ◄ or ► to adjust the volume.
12. **Exit**: Press this button to exit.
13. **Menu**: Press to enter into the on-screen setup menu, press again to exit.
14. **V-Chip**: Press to select the child protect mode.
15. **CCD**: Press to select the Closed Caption mode.
16. **Freeze**: Press to freeze the picture, press again to restore the picture.
17. **Display**: Press to display the channel information and it disappear after 3 seconds.
18. **Favorite**: Press repeatedly to cycle through the favorite channel list.
19. **Add/Erase**: Press to add or delete favorite or dislike channels.
20. **S.Mode**: Press repeatedly to cycle through the sound mode: Normal, News, Cinema, Flat and User.
21. **PIC Size**: Press repeatedly to cycle through the picture size that best corresponds your viewing requirements: Normal, Full, Wide1, Wide2, Wide3, 4:3, No Scale and Panoramic.

(Continued on next page)

22 **P.Mode**: Press repeatedly to cycle through the picture mode: Normal, Vivid, Hi-Bright, User and Dark.
23 **System**: Press repeatedly to cycle through the system options: AUTO, and NTSC3.58.
24 **Recall**: Press to return to previous channel.
25 **Sleep**: Press repeatedly until it displays the time in minutes (5 Min, 10 Min, 15 Min, 30 Min, 60 Min, 90 Min, 120 Min and, OFF) that you want the TV to remain on before shutting off. To cancel sleep time, press SLEEP repeatedly until sleep OFF appears.
26 **Red**: Press this button to access the red item or page.
27 **Blue**: Press this button to access the blue item or page.
28 **Green**: Press this button to access the green item or page.
29 **Yellow**: Press this button to access the yellow item or page.



*Note: Press **CH +/-** on the remote control can turn on TV set from standby mode.*

Insertion of Batteries:
- Turn the remote control upside down, press and slide off the battery cover.
- Insert two 1.5V (AAA) batteries into the compartment, take care to observe the ⊕ and ⊖ markings indicated inside.
- Replace the cover and slide in reverse until the lock snaps.

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

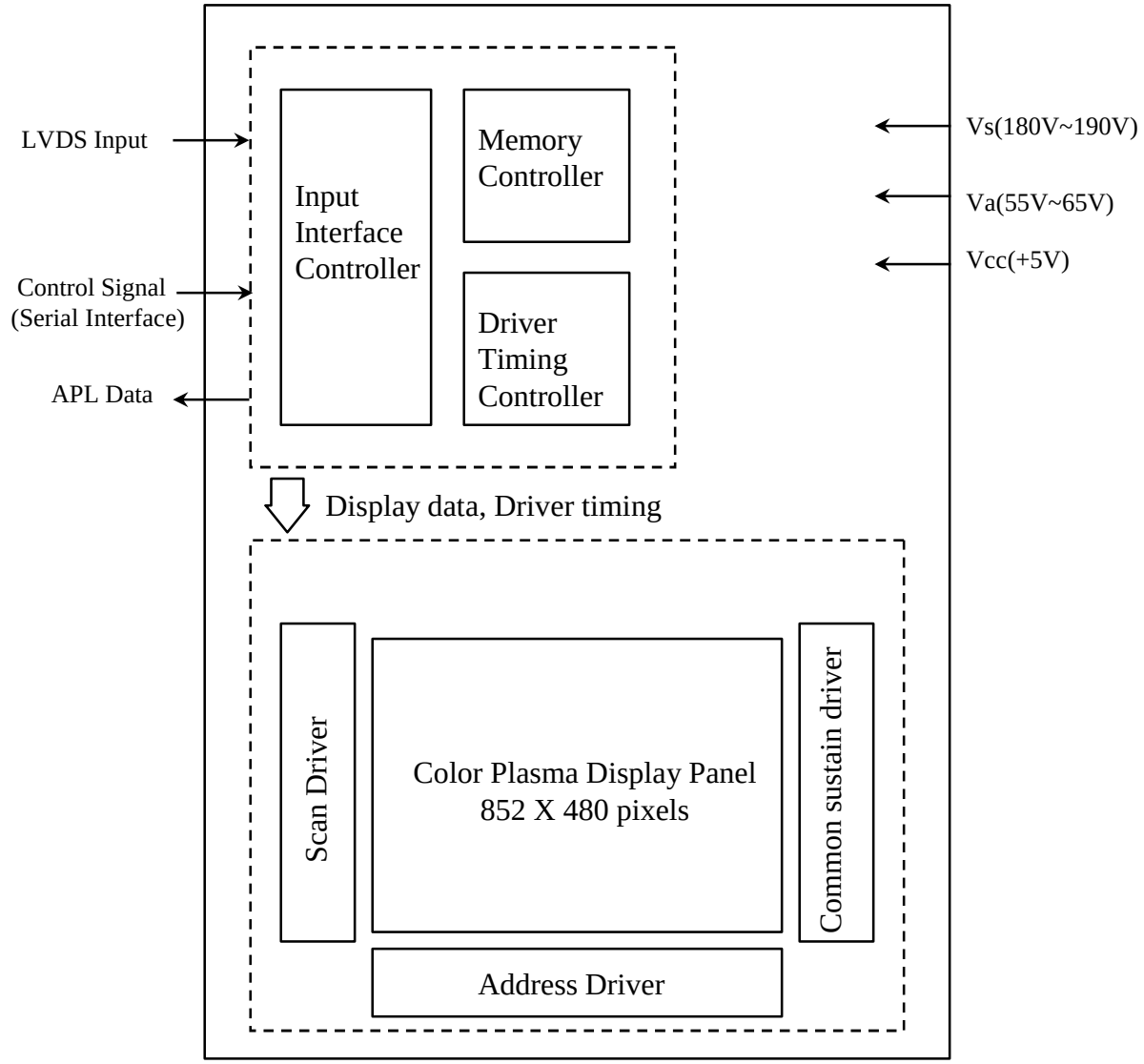
15.2 Weight

Net weight : 36.2 kg(with stand) /34.0kg(without stand)
Gross weight : 41.0 kg

15.3 Dimensions(with stand)

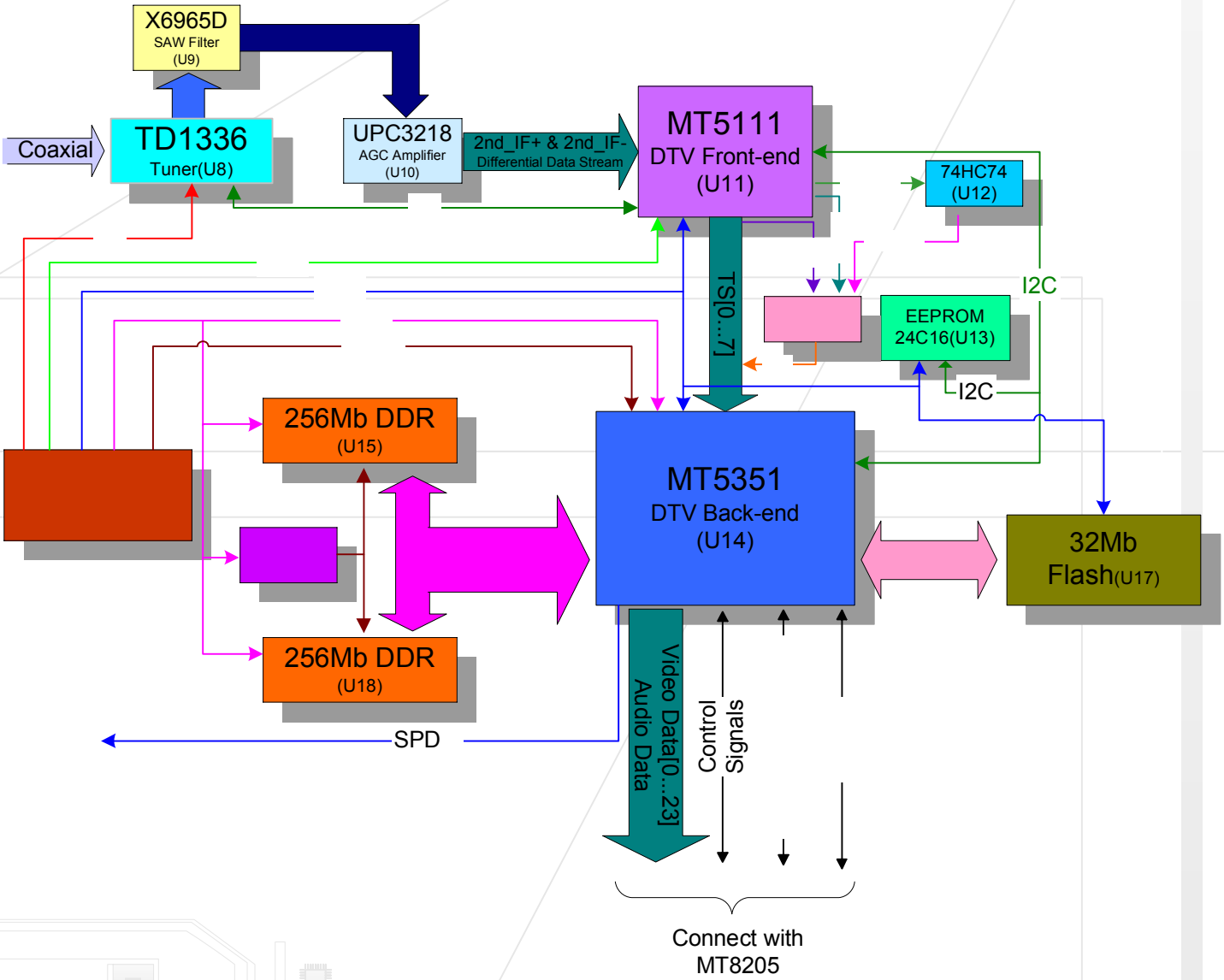
Width : 1040 mm
Height : 690 mm
Depth : 290 mm

Block Diagram

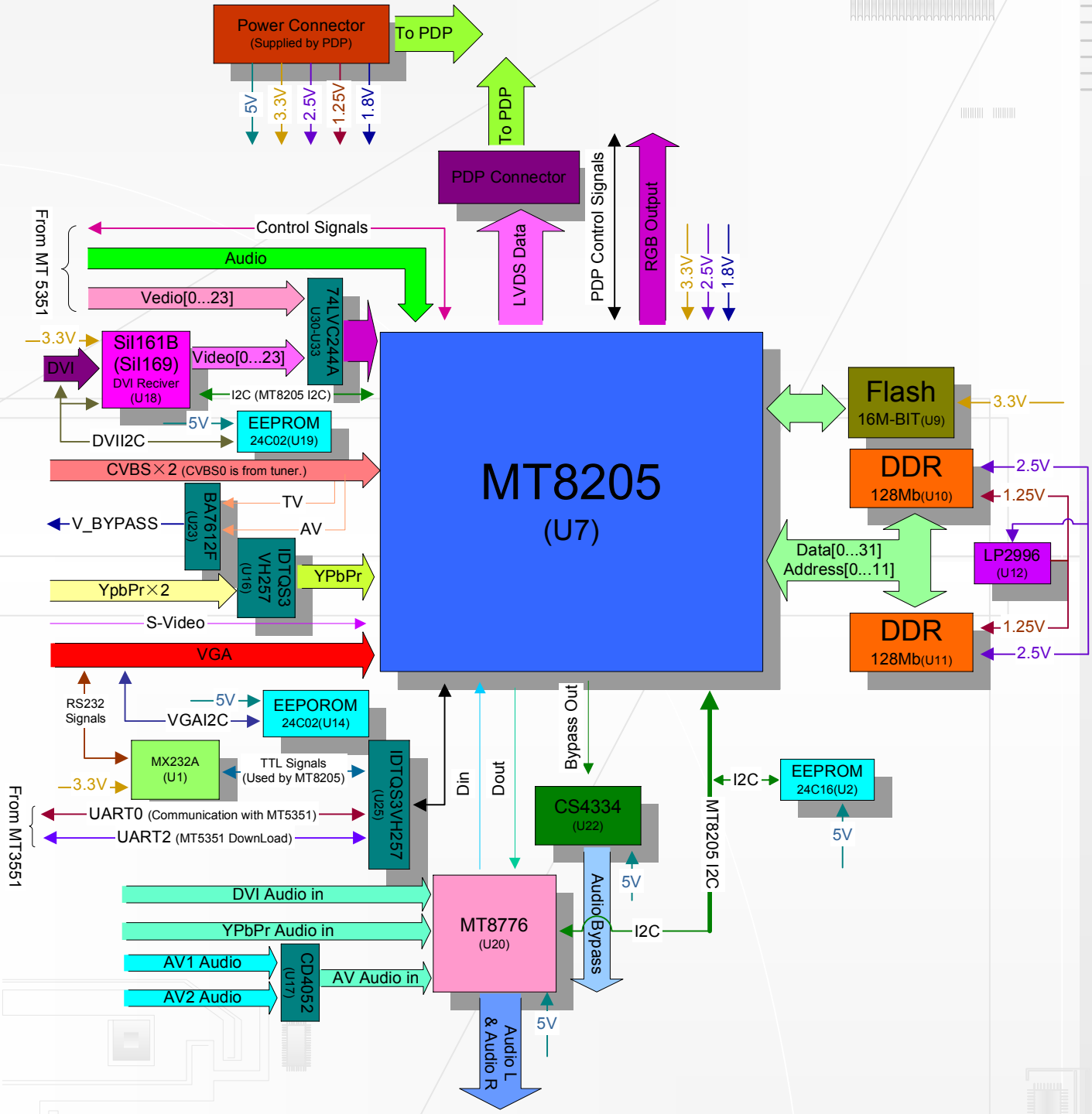


☞ Applied Voltage level is specified at the time when Full-White pattern is displayed on the panel.

Block Diagram



Block Diagram

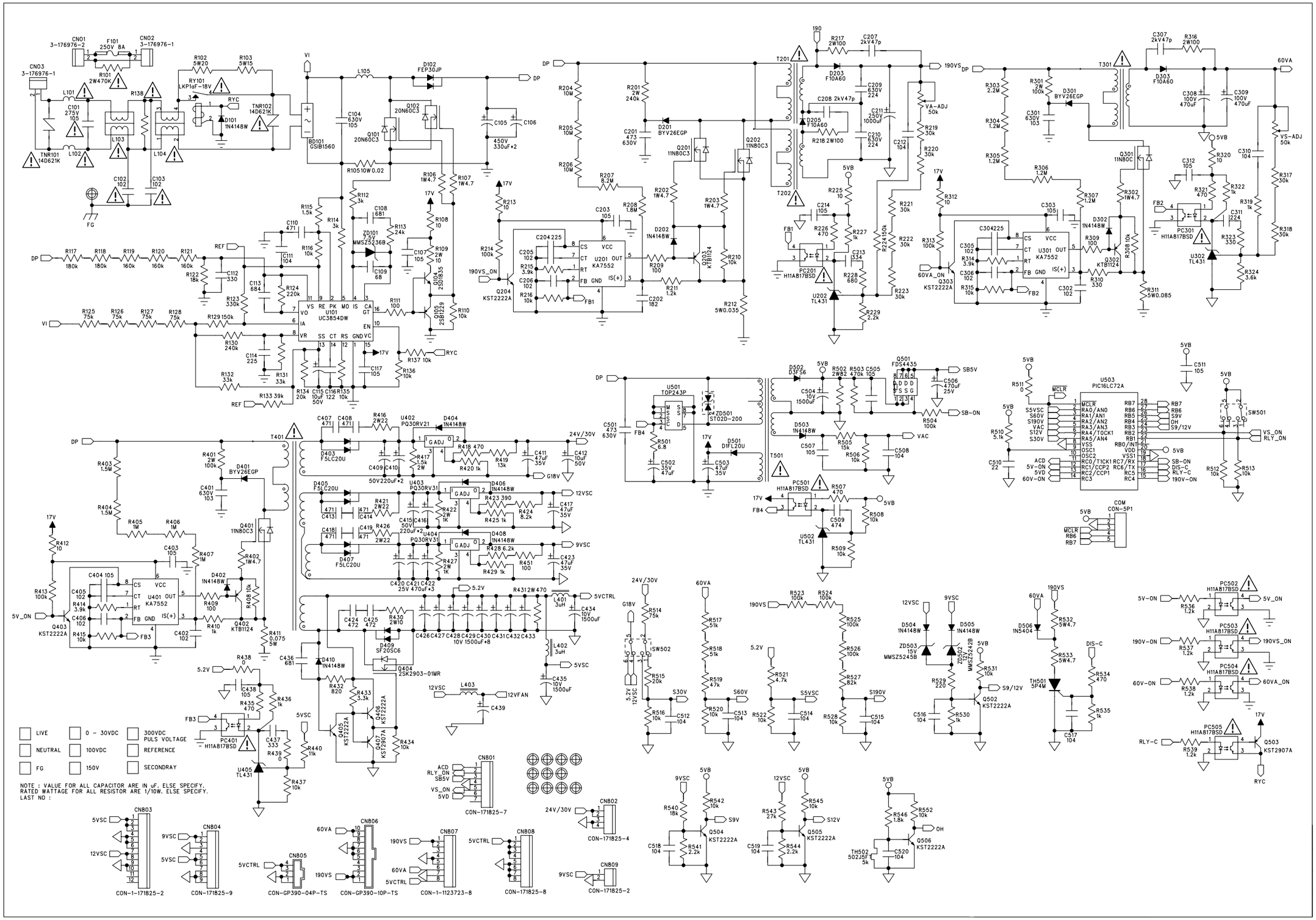


Circuit Diagram

- Power supply board of PDP Module, DGP-420WXGA
- Power supply board of PDP Module, USP490M-42LP
- Main (Video) board
- Audio/Tuner board
- ATSC board
- Keypad board
- Remote control receiver board
- External L/R Speakers board
- Remote control board

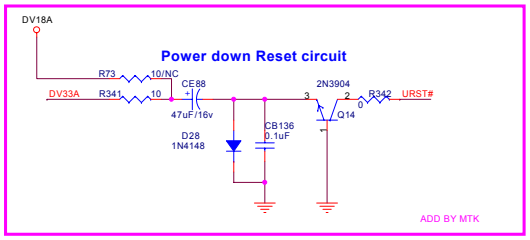
F101 250VAC 8A
CN02 3-176976-1
CN01 3-176976-2
CN03 3-176976-1
L101 23mH
L103 CH108200S
L104 CH108200S
R102 1W 390KJ
TNR101 14D 621K
C101 275VAC 1uF
L102 23mH
C102,103 250V 0.001uF
R108 5W 15
R103 5W 20
RELAY1 SDT-SH-118DM
RYC
D103 LL4148
TNR102 14D 621K
VI
T208 PFC COIL 200uH
D102 FEP30JP
PFC+
C104 630V 1uF
Q102,Q103,Q109 SPW20N60C3*3
C105,106 450V 330uF
R104 10W 0.02
BD101 D25XB60
R112 3KF
PFC VCC
C110 470pF
R115 15KF
R116 10KF
R114 3KF
C108 680pF
R113 24KF
D109 1N5238B
C109 68PF
C111 0.1uF
R109 1W 4.7
R106 1W 4.7
R107 1W 4.7
R144 10F
C123 35V 47uF
Q106 KSP2907
Q104 KTC3209
Q105 KTA1281
R110 10KF
R176 10KF
PC102 PC-17K1C
R117 180KF
R118 180KF
R119 180KF
R120 160KF
R121 160KF
C112 330pF
R122 18KF
R123 330KF
C113 2.2uF
R124 220KF
R129 150KF
R125 75KF
R126 75KF
R127 75KF
R128 75KF
R130 240KF
R133 33KF
C114 0.68uF
R131 33KF
U101 UC3854N
VO VS RE PK MO IS
IA VR SS CT RS GND VC EN GT CA
R137 10KF
D111 1N4148
C115 50V 10uF
C116 0.0022uF
R135 10KF
C117 35V 470uF
R136 10KF
R134 24KF
R132 33KF
T100 STBY EE1927
+5VSTBY
D300 SB560
L301 27uH
R143 3W 470K
R145 2W 240K
C121 630V 0.01uF
D104 US1M
C301,301A 10V 2200uF*2
R301 220F
PC101
C302 0.08uF
IC300 KA431AZ
R302 1.02KF
R303 1KF
R146 2W 100
GND
AC-1
D107 US1M
R199 56KF
R196 56KF
R193 56KF
R189 200KF
R198 56KF
R195 56KF
R192 56KF
R190 200KF
R140 7.5KF
Q107 KTC3198Y
PC100
D105 US1M
U100 5M0280R-YDTU
DRAIN VCC GND FB
R142 6.8KF
R175 0
R141 4.7KF
C118 0.01uF
C126 250V 0.47uF
C120 35V 47uF
D108 1N6236B
C119 0.1uF
PC101 PC-17K1C
C128 35V 470uF
D106 US1M
VA
D301 US1M
R305 5W15
VS
R155 100KF
R152 100KF
R154 100KF
R153 100KF
R151 100KF
R150 100KF
R149 100KF
R148 100KF
D302 US1M
R306 5W6.8
R307 5W6.8
Q300 FQP17N40
AC DET
PFC ON/OFF
PC100 PC-17K1C
PC102
R156 1KF
Q108 KTC3198Y
D303 1N5245B
C304 50V 4.7uF
T207 MULTI EER4042
R500 1W 10
C500 1KV0.001uF
C550~C554 10V 2200uF*5
L500 6+20 2.5uH
C504,C555~C557 10V 2200uF*4
MULTI ON/OFF
+5VCTRL
5VSC
+5V DET
GND
D500 SF30SC6
D5001 SF30SC6
R520 470F
PC202
VR500 2K
PC201
R502 0
R503 1KF
R504 1.8KF
IC500A KA431AZ
C530 1uF
R501 3.3KF
R522 4.7KF
PFC +
R209 2W 240K
D202 BYV26EGP
C200 630V 0.01uF
MULTI VCC
D200 LL4148
Q201 SPW11N80C3
D206 LL4148
R210 1W 10F
D203 LL4148
R212 10KF
Q200 KTA1281
R214 360RF
R237 5W 0.1
R505 1W 4R7
C505 1KV 0.001uF
D501 SUF30J
IC500 KA317
Adj Input Output
+30V/1.0A (+24V/1.25A)
+30V DET
5VCTRL
SEL CABLE
GND
R525 56KF
R509 3.3KF
R508 0R
C506 50V 220uF
R507 5W 2.7K
C507 35V 47uF
R510 5W 1K
R511 15KF
R512 15KF
R513 2.7KF
C202 35V 47uF
R216 100KF
C203 1uF
C204 0.001uF
R218 4.7KF
C206 0.22uF
R220 1/4W 100R
IC200 KA7552A
CS CT RT FB VCC OUT IS+ GND
Q202 KRC103M
R219 10K
PC201 PC-17K1C
R217 10KF
C201 0.01uF
R262 1KF
PC202 PC-17K1C
C262 4.7uF
C227 0.001uF
C208 470pF
C519 R531
D502 31GF6
IC501 KIA278R12PI
Vin GND ON/OFF Vo
+12V /1.0A
+12V DET
GND
C610 35V 470uF
R532 1W 2.7K
C511 35V 47uF
R514 2KF
R515 1.8KF
R516 1KF
C520 R526
D503 D10L20U
IC502 KIA378R09PI
9VSC
+9V DET
GND
C516 35V 1000uF
C514 35V 47uF
J2 0
R519 1.5KF
CN801
ACD
RLY_ON
SB5V
VS_ON
5VD
171825-7
CN802
24V/30V
171825-4
CN803
5VSC
12VSC
1-171825-2
CN804
9VSC
5VSC
171825-9
CN805
5VCTRL
1-1123723-4
CN806
60VA
190VS
1-1123723-0
CN807
190VS
60VA
5VCTRL
1-1123723-8
CN808
5VCTRL
9VSC
171825-8
CN809
9VSC
171825-2
T204,205 VS EER4042
D600 FSF10A60
R600 1W4R7
C600 1KV 220pF
D601 FSF10A60
R603 1W4R7
C601 1KV 220pF
C222 630V 0.1uF
C221 630V 0.1uF
C602 250V 820uF
R609 300KF
R610 300KF
R611 300KF
R612 12KF
190VS
VS DET
GND
PFC +
R221 2.2M
R222 2.2M
R223 2.2M
R224 2.2M
R225 1M
R226 2W 240K
D205 BYV26EGP
C206 630V 0.047uF
VA VCC
D204 LL4148
Q203,204 SPW11N80C3*2
R227 1W 4.7
R228 1W 4.7
D213 LL4148
Q206 KTA1281
R230 4.7KF
R232 1K
R231 5W 0.05
C220 35V 47uF
R233 100KF
C209 1uF
C210 0.001uF
R235 4.7KF
C211 0.001uF
R236 10KF
Q207 KRC103M
IC201 KA7552A
CS CT RT FB VCC OUT IS+ GND
R243 1W 47R
C212 0.0047uF
R620 2W 100K
R602 2W 100K
R604 120KF
R606 270KF
R613 120KF
R627 120KF
R628 120KF
R607 130KF
R608 120KF
R601 5K
R615 16KF
PC204
Q702 KTC3207
D211 1N5234B
T206 VA EER4042
D700 FSF10A60
R700 1W 10
C700 1KV 100pF
C701,702,704 100V 330uF
60VA
VA DET
GND
R704 22KF
R705 20KF
R706 20KF
R707 2.7KF
PFC +
R263 2W 240K
D208 BYV26EGP
C213 630V 0.01uF
VA VCC
D226 LL4148
Q209 SPW11N80C3
D209 LL4148
R229 1W 4.7F
Q208 KTA1281
R245 10KF
R247 1.2K
R246 5W 0.2
C215 35V 47uF
R248 100KF
C216 1uF
C217 0.001uF
R250 4.7KF
C218 0.047uF
R251 10KF
Q210 KRC103M
IC202 KA7552A
CS CT RT FB VCC OUT IS+ GND
R252 1W 100R
C219 0.01uF
R249 10KF
C214 0.01uF
R261 1KF
PC206 PC-17K1C
C261 4.7uF
C226 0.001uF
PC205 PC-17K1C
R715 45.3KF
R716 45.3KF
R720 45.3KF
R710 18KF
R701 18KF
R708 18KF
R702 33KF
R718 45.3KF
R717 45.3KF
R721 45.3KF
R712 18KF
R714 18KF
R719 18KF
R703 36KF
R709 36KF
VR700 5K
R711 11KF
PC206
Q701 KTC3207
D212 1N5234B
PC205
VA ON/OFF
R400 1KF
LED401 RED
R401 1KF
R402 4.7KF
IC400 KIA7045AP
VCC GND OUT
LED400 GREEN
CRST400 4MHZ
Xin Xout GND
C400 50V 0.1uF
C401 50V 0.1uF
IC401 HMS87C1304A
R421 10KF
C410 50V0.01uF
R422 10KF
C411 50V0.01uF
C403 50V 0.68uF
C404 50V 0.1uF
C405 50V 0.1uF
C406 50V 0.1uF
C407 50V 0.1uF
C408 50V 0.1uF
C409 50V 0.1uF
R403 1KF
R404 1KF
R405 1KF
R406 1KF
R407 1KF
R408 1KF
R409 0KF
R411 330F
R410 330F
R423 1KF
R412 1KF
R414 0KF
R417 1KF
R418 1KF
R420 4.7KF
R416 100F
R419 1KF
SW400 JSS 2209
+5VSTBY
GND
GND
VS DET
VA DET
+6V DET
+12V DET
+9V DET
+30V DET
PFC ON/OFF
VA,VS ON/OFF
MULTI ON/OFF
ACD OUT
5VD OUT
VS ON
RLY ON
RY ON/OFF
HIC_MICOM

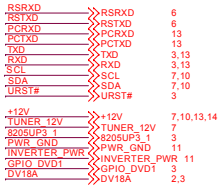
DGP-420WXGA

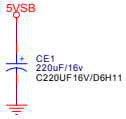


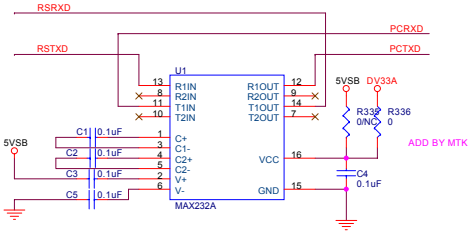
USP490M-42LP

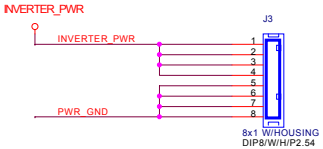
MT8205E (PBGA388) LCDTV BOARD 4 LAYERS

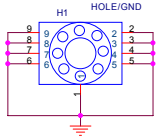


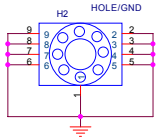


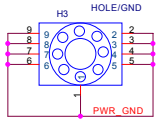


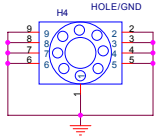




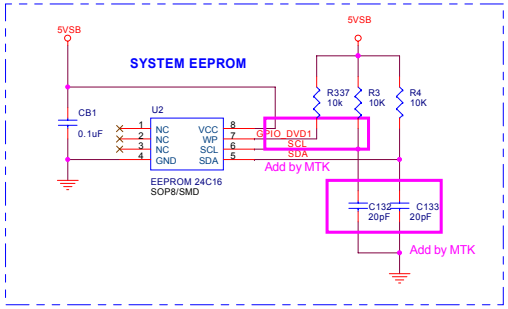


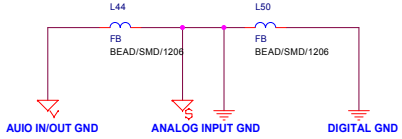


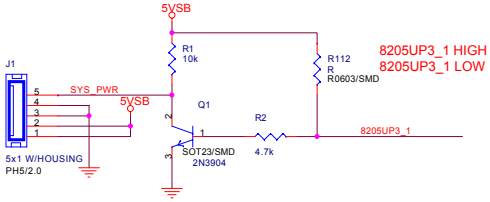


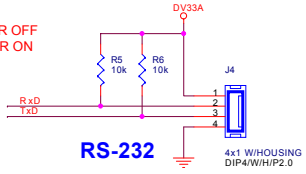


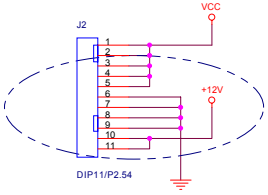
M1 M2 M3
V1 V2 V3 V4

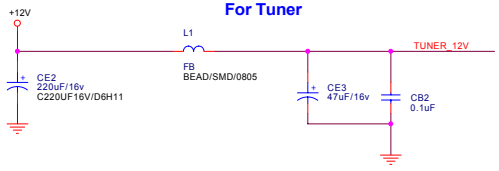


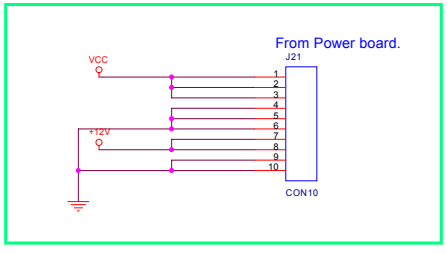












Title

Size	Doc Number	Rev
C	INDEX	V1.2

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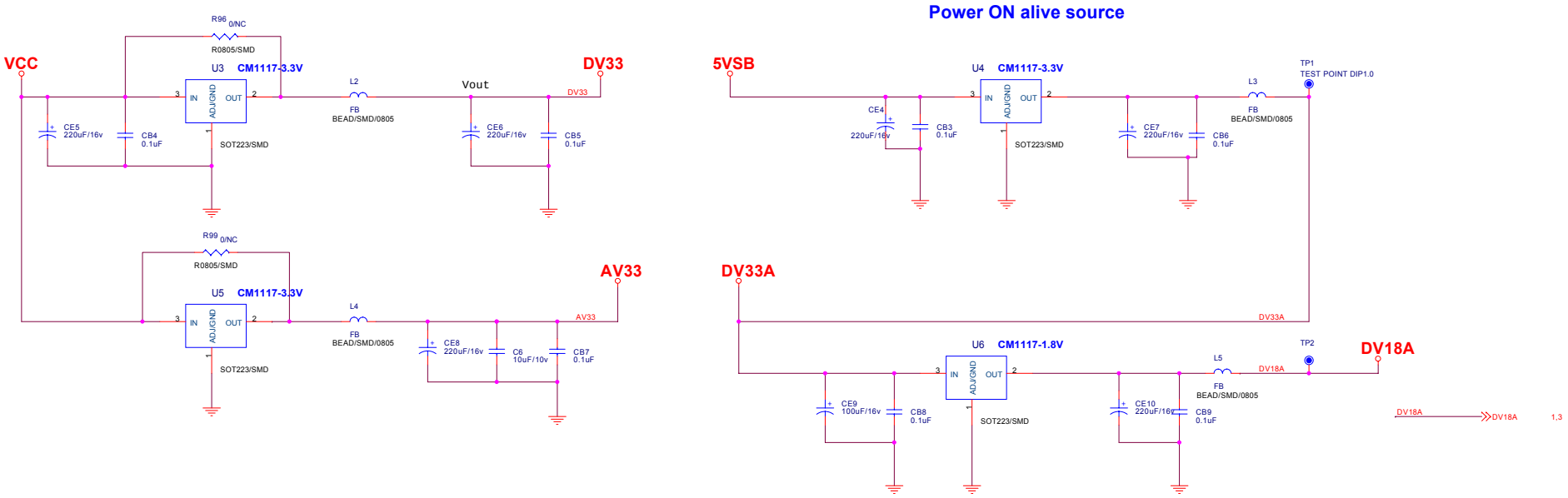

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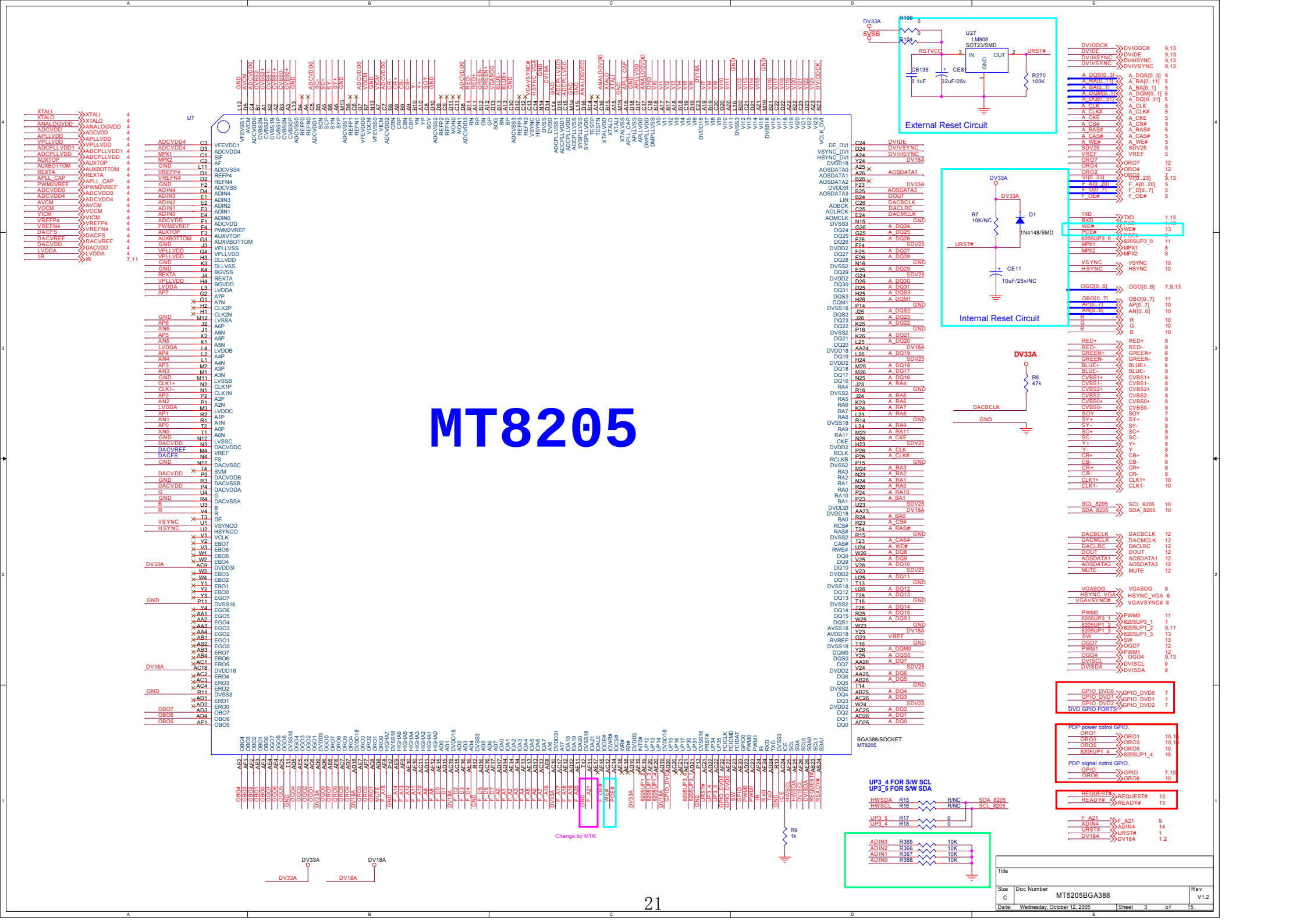

Title

Size	Doc Number	Rev
C	MT5205BGA388	V1.2

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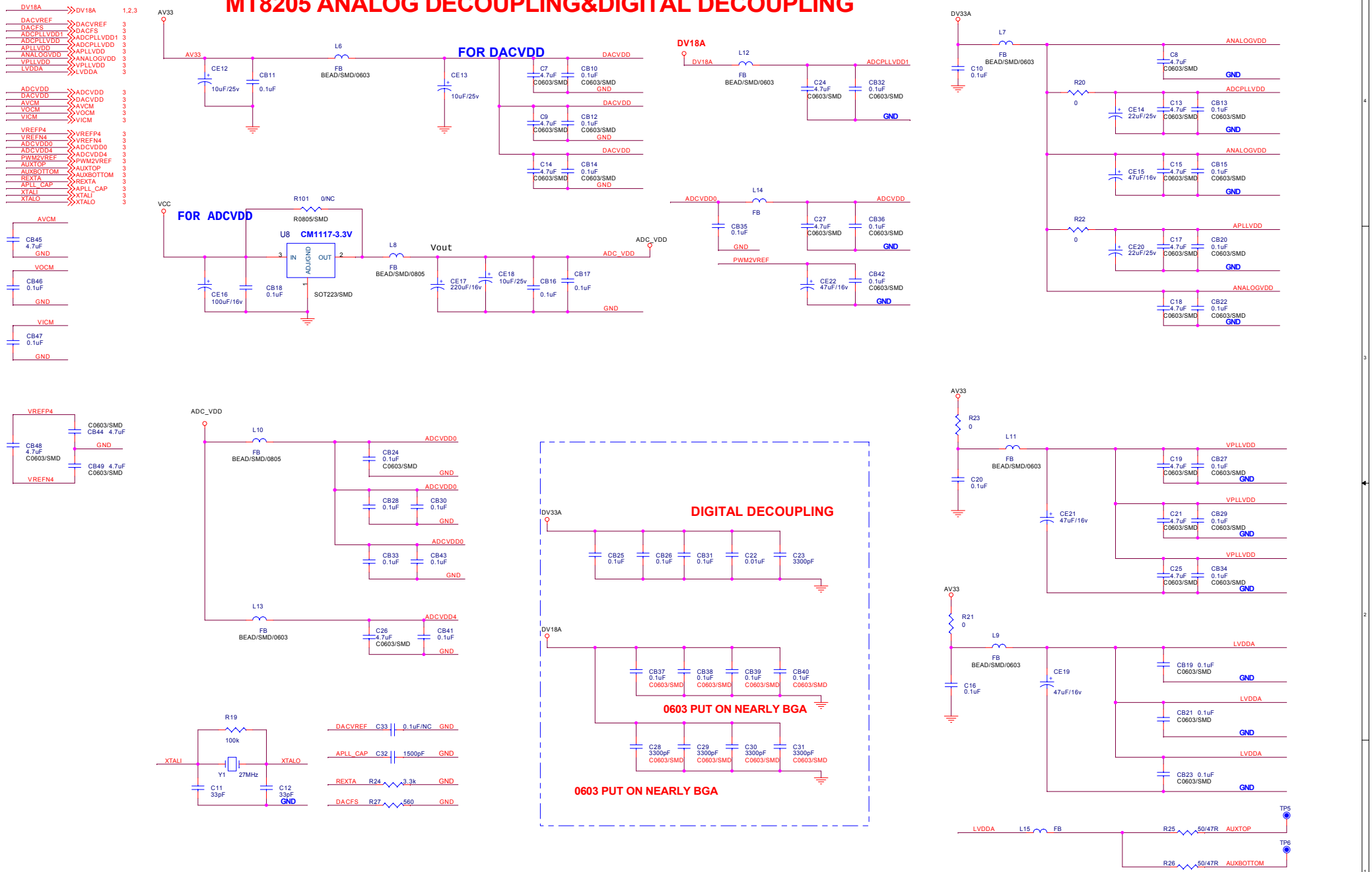
MT8205 ANALOG DECOUPLING&DIGITAL DECOUPLING



Title		
Size C	Doc Number MT8205 DECOUPOMG--ANALOG	Rev V1.2
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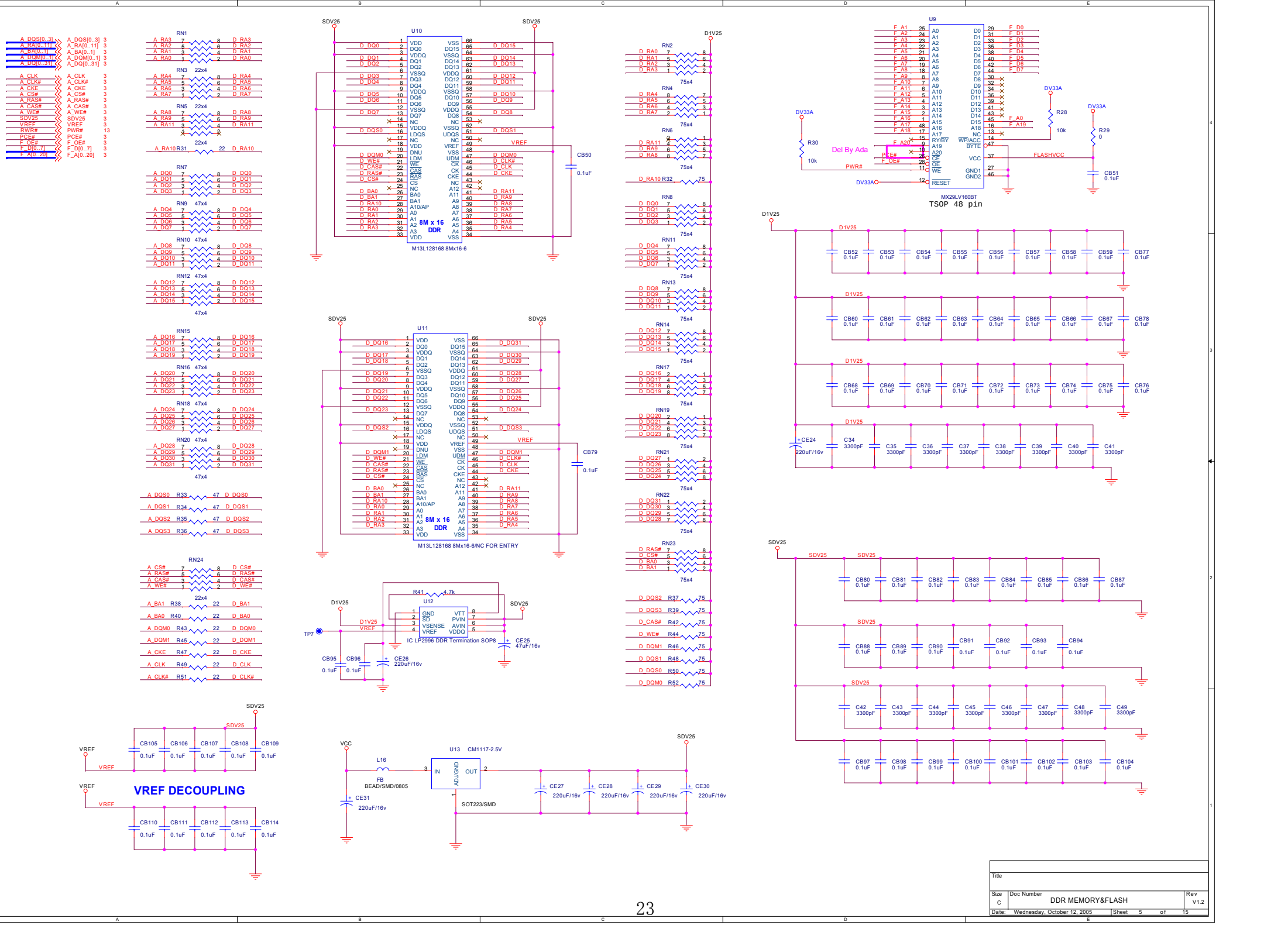
A_DQS[0..3] 3
A_RA[0..11] 3
A_BA[0..1] 3
A_DQM[0..1] 3
A_DQ[0..31] 3
A_CLK 3
A_CLK# 3
A_CKE 3
A_CS# 3
A_RAS# 3
A_CAS# 3
A_WE# 3
SDV25 3
VREF 3
PWR# 13
PCE# 3
F_OE# 3
F_D[0..7] 3
F_A[0..20] 3
RN1
RN3 22x4
RN5 22x4
22x4
RN7
RN9 47x4
RN10 47x4
RN12 47x4
47x4
RN15
RN16 47x4
RN18 47x4
RN20 47x4
47x4
RN24
22x4
U10
M13L128168 8Mx16-6
8M x 16 DDR
U11
M13L128168 8Mx16-6/NC FOR ENTRY
8M x 16 DDR
RN2
RN4
RN6
RN8
RN11
RN13
RN14
RN17
RN19
RN21
RN22
RN23
75x4
R41 4.7k
U12
IC LP2996 DDR Termination SOP8
TP7
U9
MX29LV160BT
TSOP 48 pin
Del By Ada
R30 10k
R28 10k
R29 0
FLASHVCC
CB50 0.1uF
CB51 0.1uF
CB79 0.1uF
CE24 220uF/16v
CE25 47uF/16v
CE26 220uF/16v
CE27 220uF/16v
CE28 220uF/16v
CE29 220uF/16v
CE30 220uF/16v
CE31 220uF/16v
L16 FB BEAD/SMD/0805
U13 CM1117-2.5V
SOT223/SMD
VREF DECOUPLING
CB105 CB106 CB107 CB108 CB109
CB110 CB111 CB112 CB113 CB114
CB52 CB53 CB54 CB55 CB56 CB57 CB58 CB59 CB77
CB60 CB61 CB62 CB63 CB64 CB65 CB66 CB67 CB78
CB68 CB69 CB70 CB71 CB72 CB73 CB74 CB75 CB76
C34 C35 C36 C37 C38 C39 C40 C41
CB80 CB81 CB82 CB83 CB84 CB85 CB86 CB87
CB88 CB89 CB90 CB91 CB92 CB93 CB94
C42 C43 C44 C45 C46 C47 C48 C49
CB97 CB98 CB99 CB100 CB101 CB102 CB103 CB104
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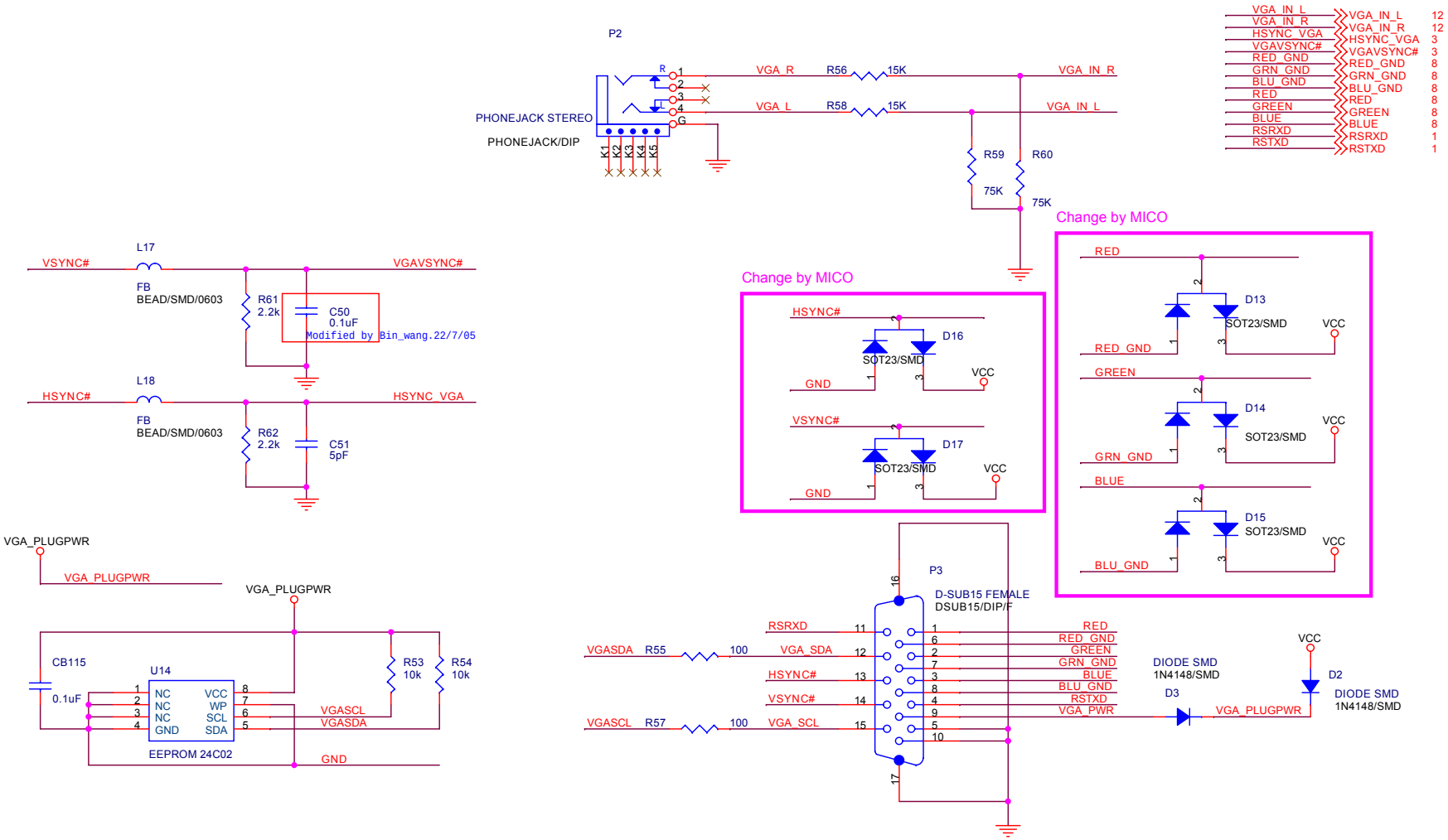

Title		
Size B	Doc Number VGA IN&PC AUDIO IN	Rev V1.2
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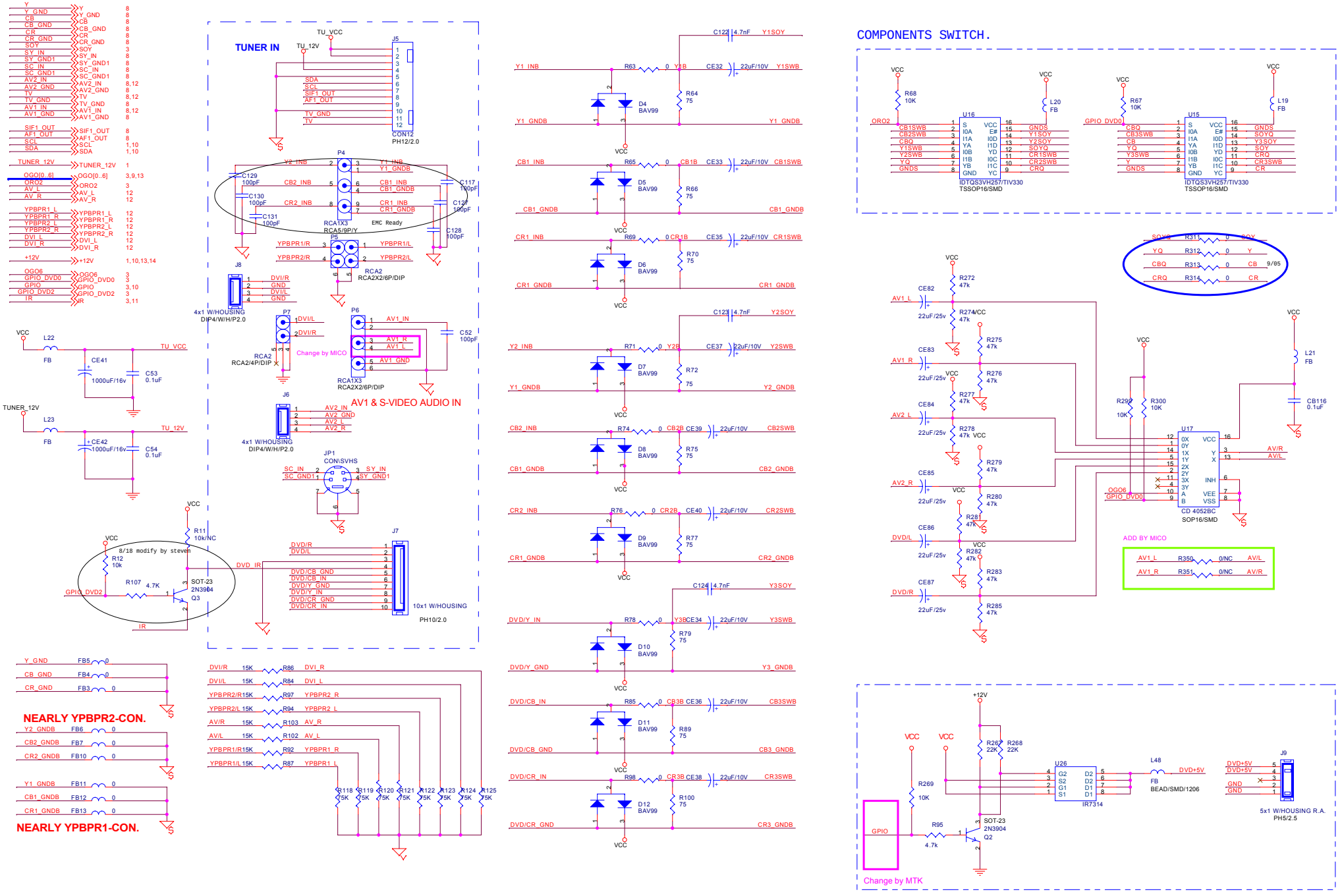

Title			
Size C	Doc Number VIDEO IN & TUNER IO		Rev V1.2
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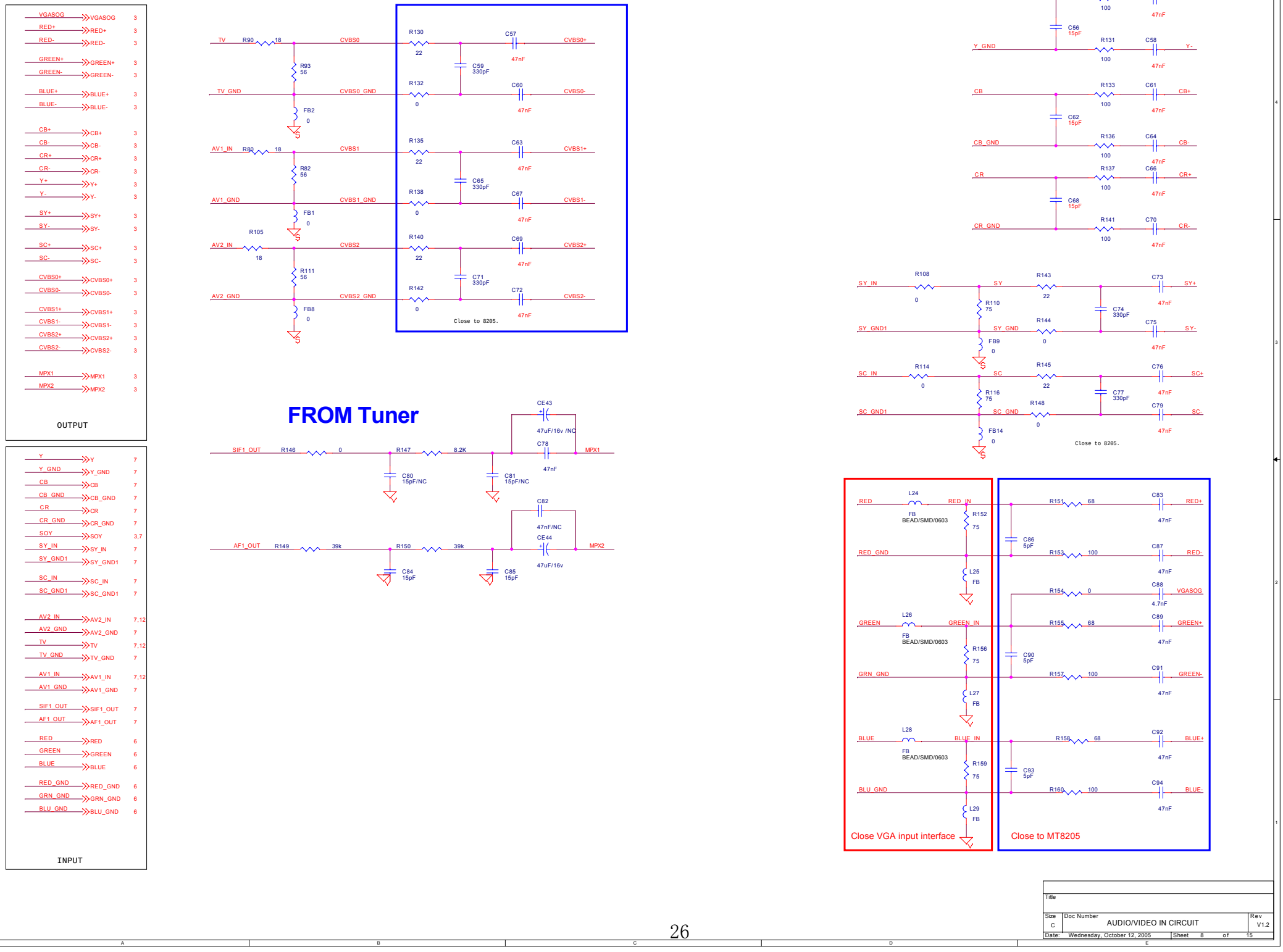

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Size C	Doc Number AUDIO/VIDEO IN CIRCUIT		Rev V1.2
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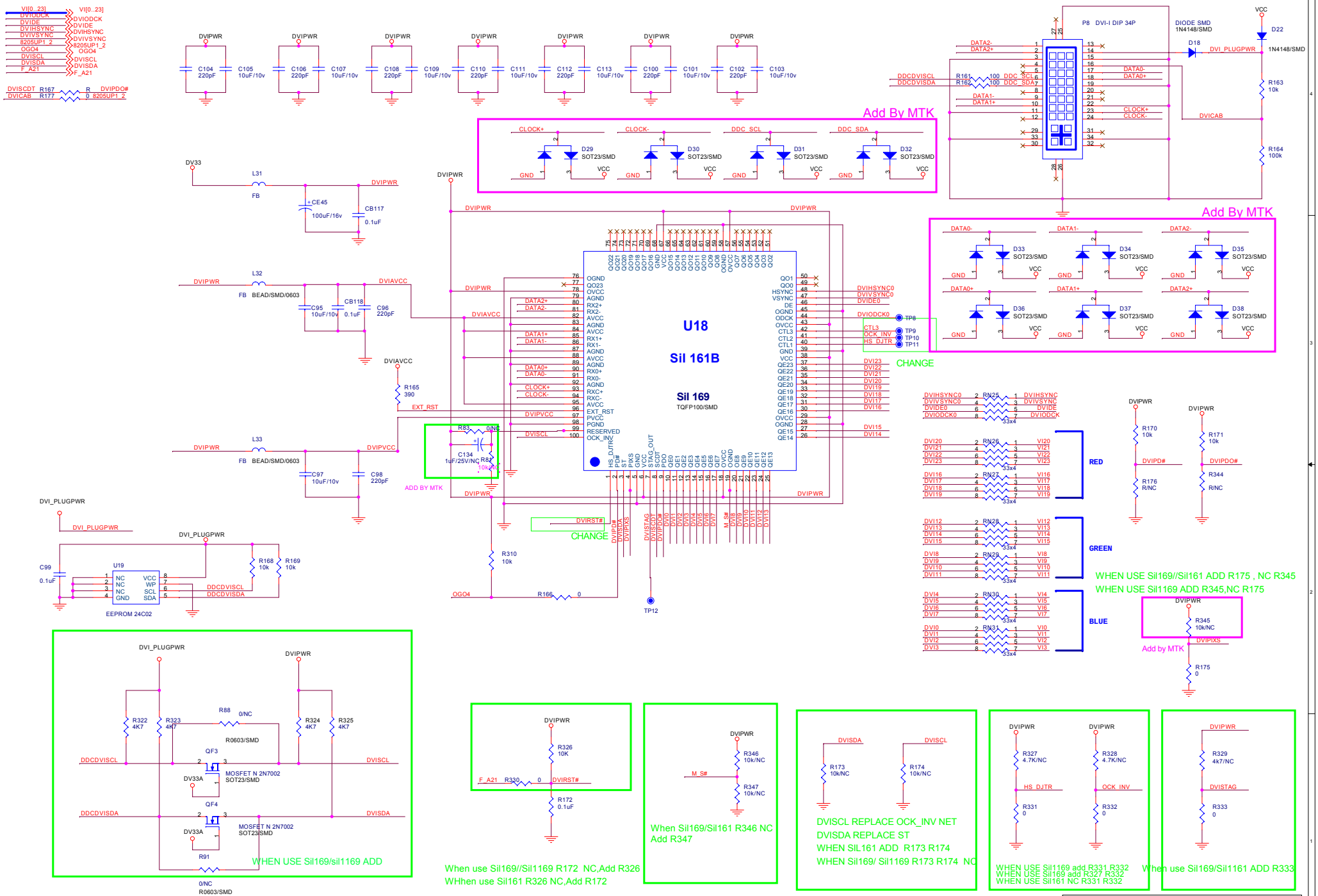

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Size C	Doc Number DVI INPUT		Rev V1.2
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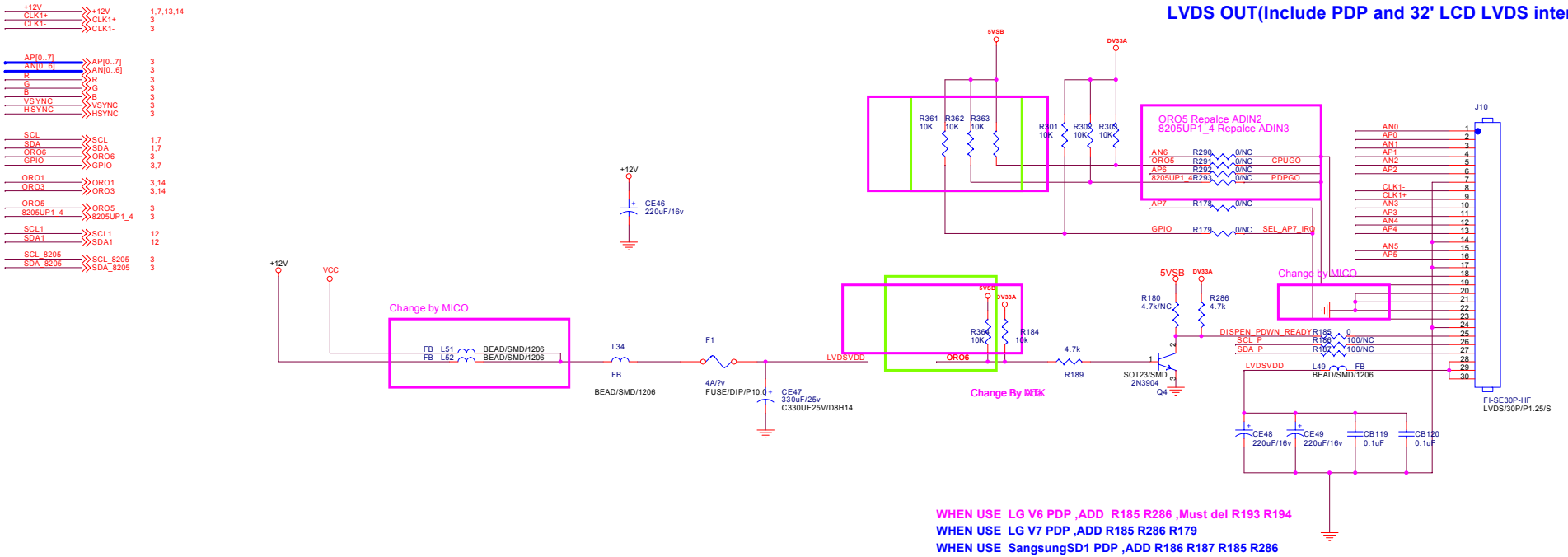
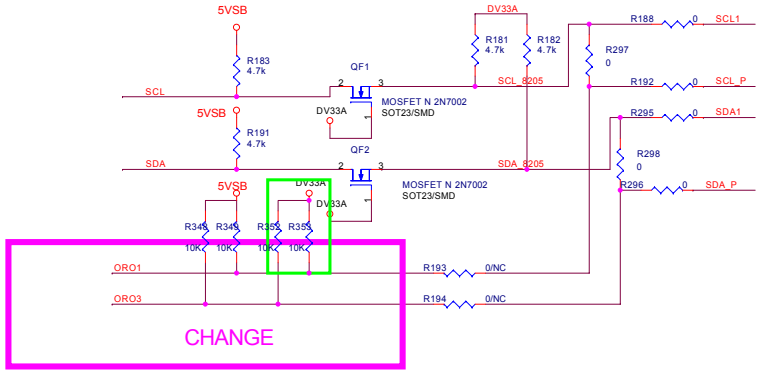
LVDS OUT(Include PDP and 32' LCD LVDS interface)

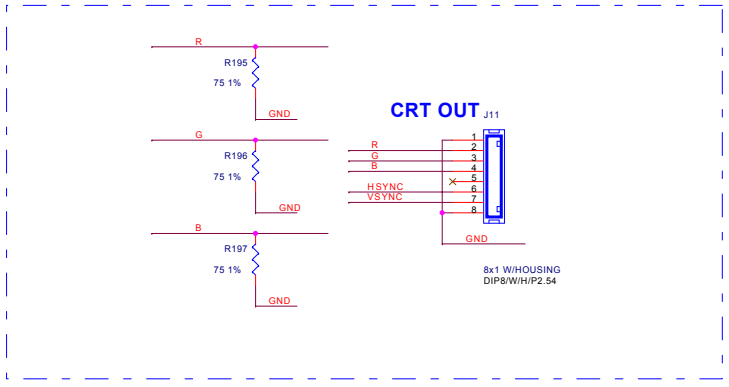


WHEN USE LG V6 PDP ,ADD R185 R286 ,Must del R193 R194
WHEN USE LG V7 PDP ,ADD R185 R286 R179
WHEN USE SangsungSD1 PDP ,ADD R186 R187 R185 R286
WHEN USE Fujitsu 42 PDP ,ADD R179 R186 R187 R185 R286 R291 R293.REMOVE R178 R290 R292

WHEN NOT USE PDP ADD L49 R178 R290 R292
REMOVE R179 R185 R186 R187 R291 R293

4.7K REPALAC 47K





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Size C	Doc Number LVDS/CRT OUT Rev V1.2
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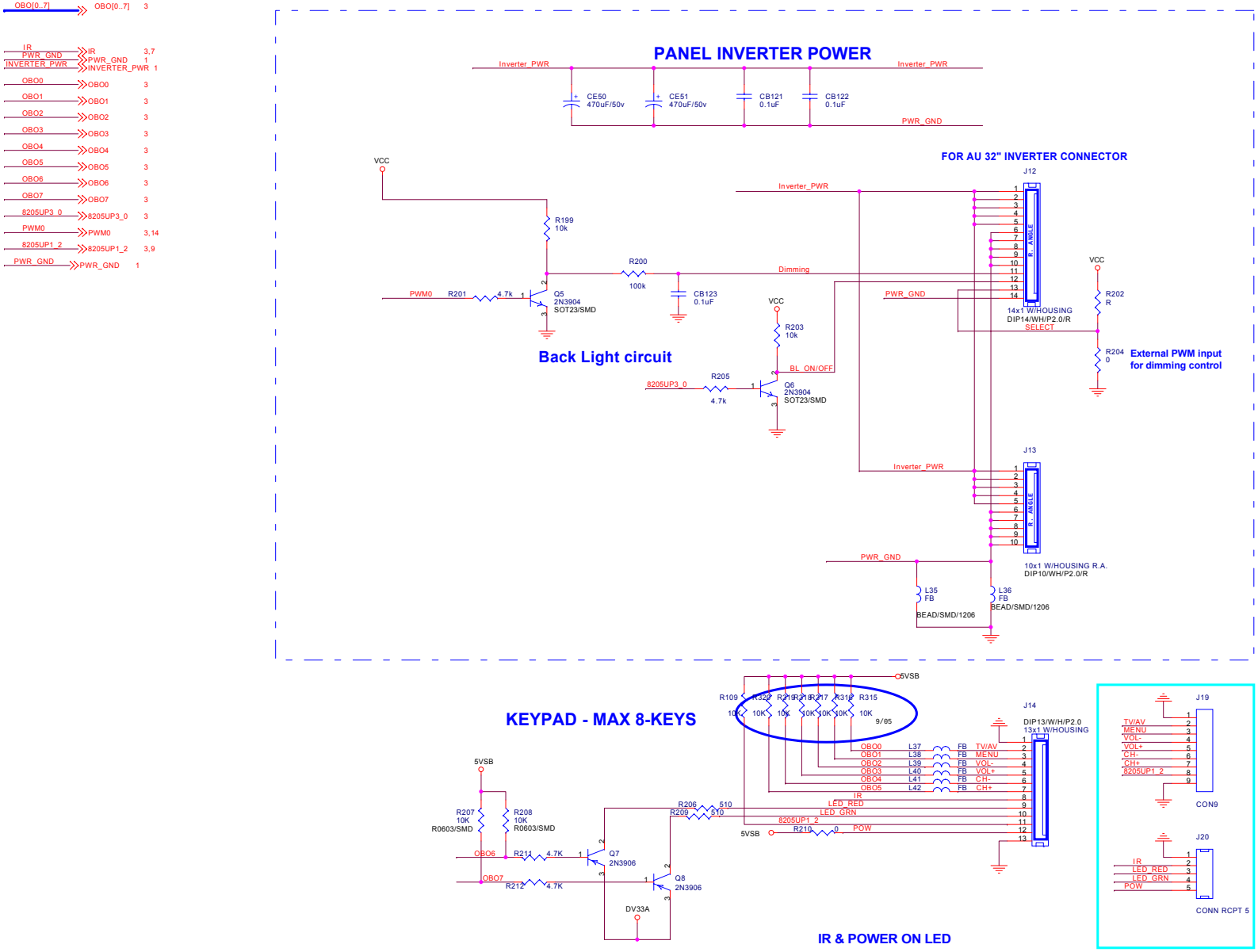

Title		
Size C	Doc Number BACK_LIGHT/KEYPAD	Rev V1.2
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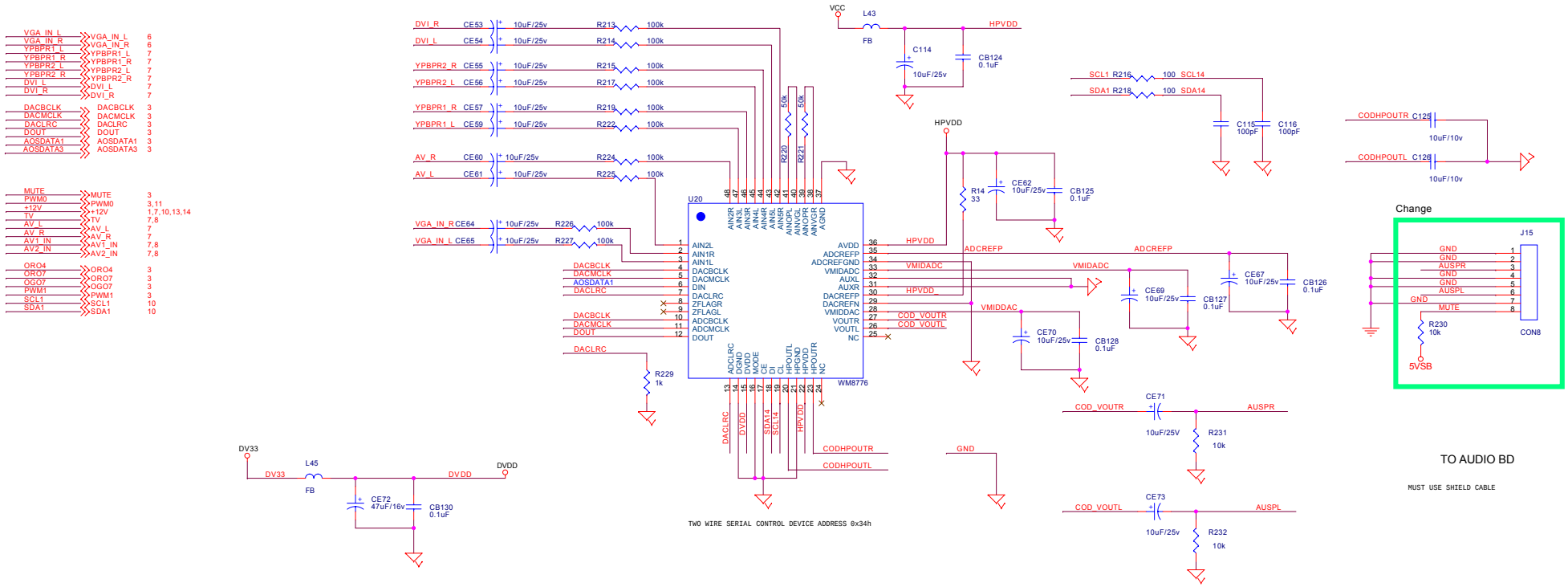
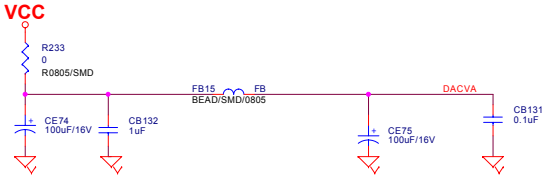
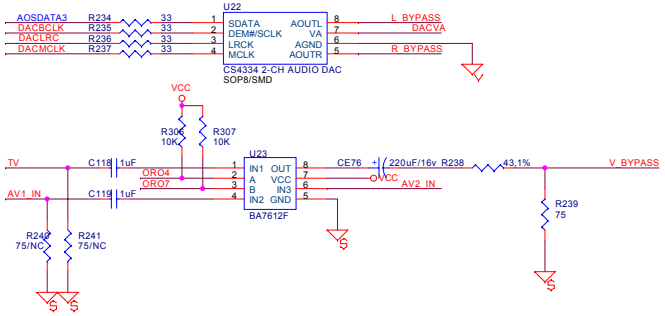
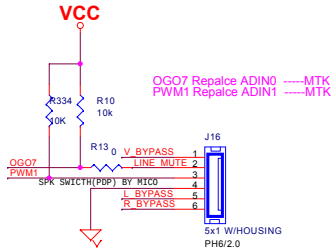


A/V Bypass



AUDIO BYPASS.





Title			
Size C	Doc Number WM8776/WM8766/AUDIO CODEC		Rev V1.2
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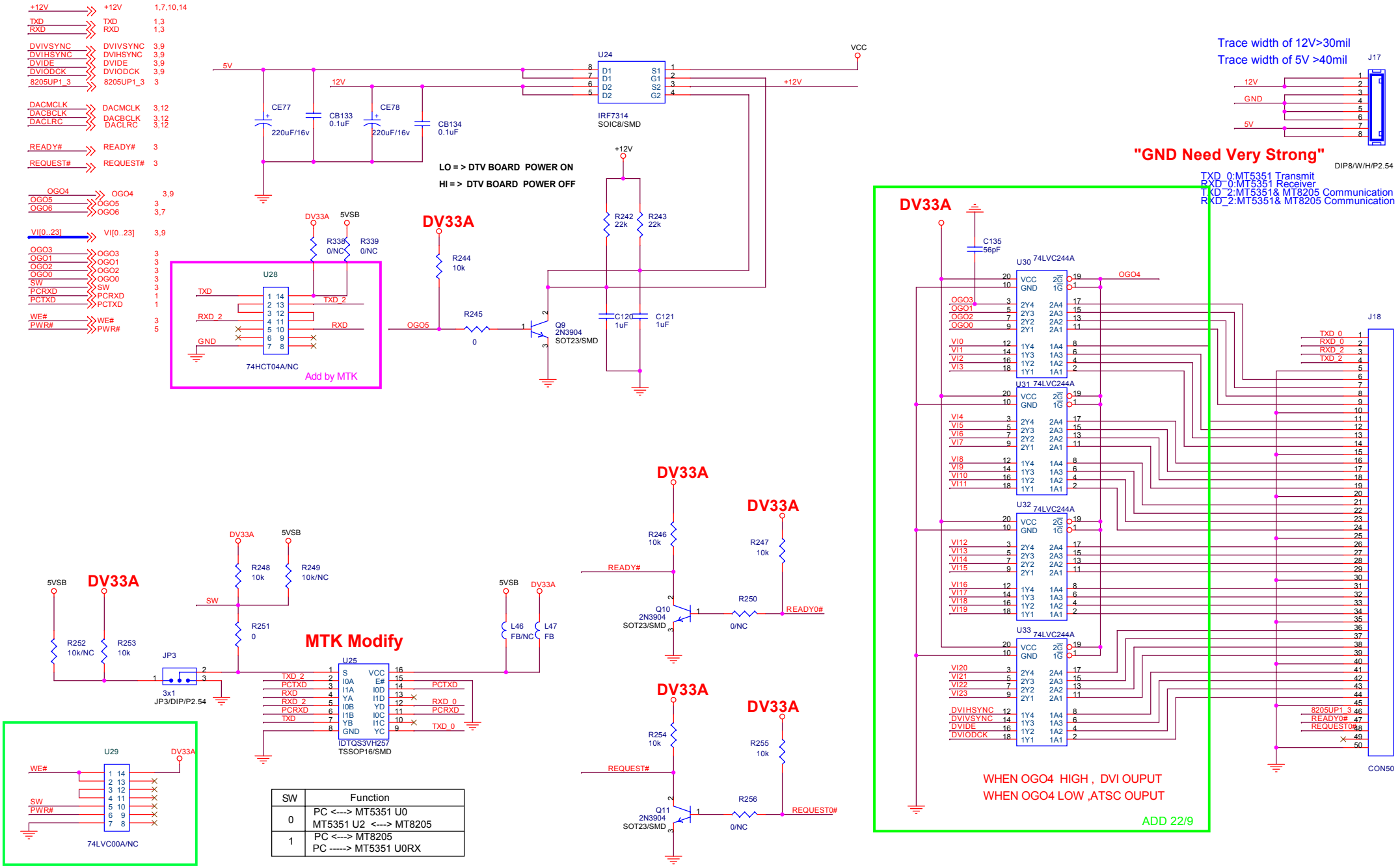
+12V +12V 1,7,10,14
TXD TXD 1,3
RXD RXD 1,3
DVIVSYNC DVIVSYNC 3,9
DVIHSYNC DVIHSYNC 3,9
DVIDE DVIDE 3,9
DVIODCK DVIODCK 3,9
8205UP1_3 8205UP1_3 3
DACMCLK DACMCLK 3,12
DACBCLK DACBCLK 3,12
DACLRC DACLRC 3,12
READY# READY# 3
REQUEST# REQUEST# 3
OGO4 OGO4 3,9
OGO5 OGO5 3
OGO6 OGO6 3,7
VI[0..23] VI[0..23] 3,9
OGO3 OGO3 3
OGO1 OGO1 3
OGO2 OGO2 3
OGO0 OGO0 3
SW SW 3
PCRXD PCRXD 1
PCTXD PCTXD 1
WE# WE# 3
PWR# PWR# 5
5V
12V
VCC
U24
IRF7314
SOIC8/SMD
CE77
220uF/16v
CB133
0.1uF
CE78
220uF/16v
CB134
0.1uF
LO = > DTV BOARD POWER ON
HI = > DTV BOARD POWER OFF
DV33A
5VSB
R338
0/NC
R339
0/NC
U28
74HCT04A/NC
Add by MTK
TXD
RXD_2
RXD
GND
R244
10k
R245
0
OGO5
Q9
2N3904
SOT23/SMD
R242
22k
R243
22k
C120
1uF
C121
1uF
Trace width of 12V>30mil
Trace width of 5V >40mil
J17
DIP8/W/H/P2.54
"GND Need Very Strong"
TXD_0:MT5351 Transmit
RXD_0:MT5351 Receiver
TXD_2:MT5351& MT8205 Communication
RXD_2:MT5351& MT8205 Communication
C135
56pF
U30 74LVC244A
U31 74LVC244A
U32 74LVC244A
U33 74LVC244A
VCC
GND
OGO4
J18
CON50
WHEN OGO4 HIGH , DVI OUPUT
WHEN OGO4 LOW ,ATSC OUPUT
ADD 22/9
R248
10k
R249
10k/NC
R251
0
R252
10k/NC
R253
10k
JP3
3x1
JP3/DIP/P2.54
MTK Modify
U25
IDTQS3VH257
TSSOP16/SMD
L46
FB/NC
L47
FB
R246
10k
R247
10k
R250
0/NC
Q10
2N3904
SOT23/SMD
READY0#
R254
10k
R255
10k
R256
0/NC
Q11
2N3904
SOT23/SMD
REQUEST0#
U29
74LVC00A/NC
SW Function
0 PC <---> MT5351 U0
MT5351 U2 <---> MT8205
1 PC <---> MT8205
PC -----> MT5351 U0RX
Title
Size Custom
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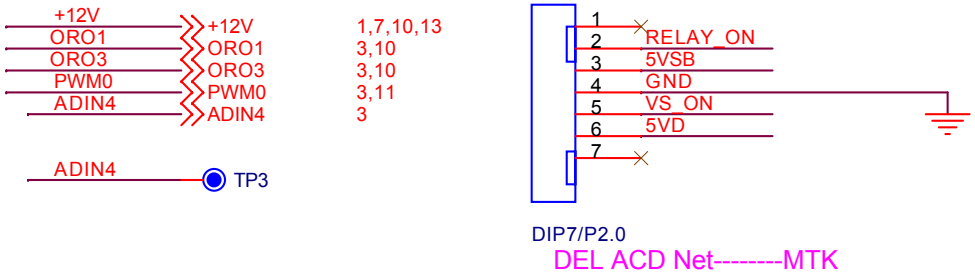
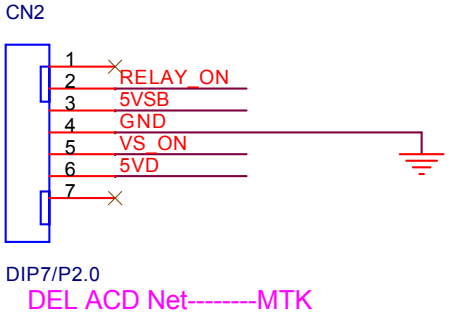
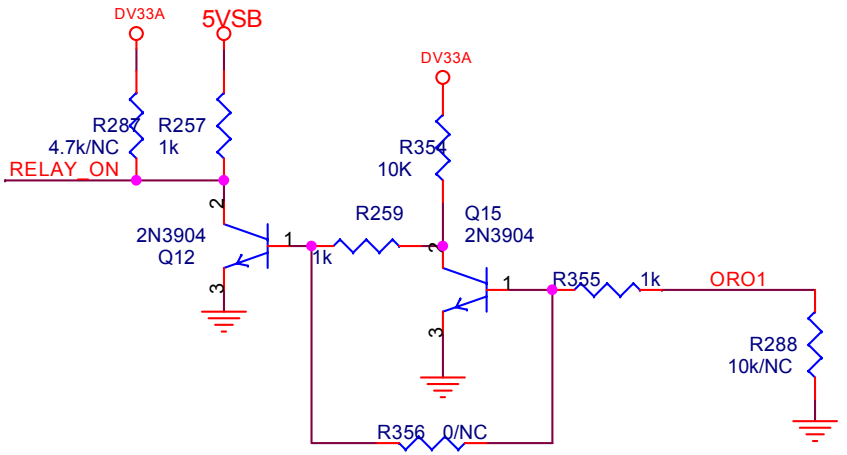


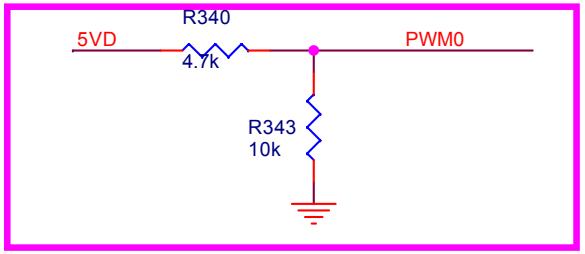


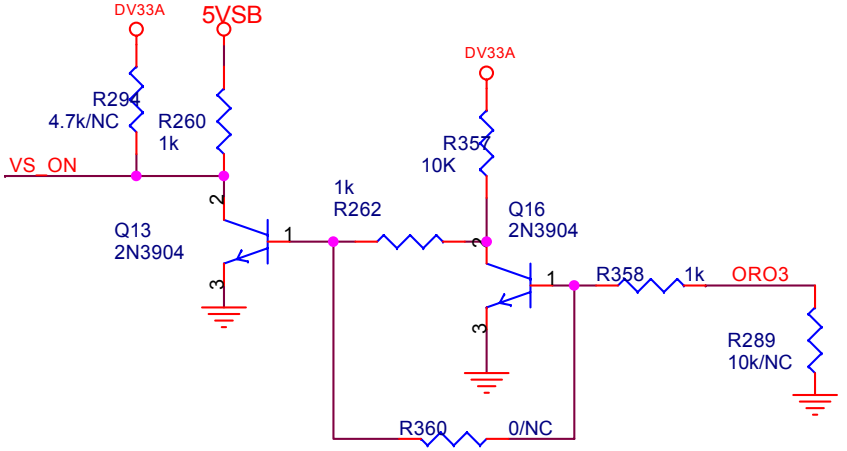
DEL ACD Net--------MTK



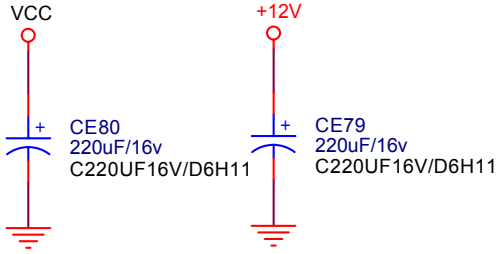
USE WHEN LG V6

Change--------MTK





USE WHEN LG V6



Title			
Size A	Doc Number PDP interface		Rev V1.2
Date: Wednesday, October 12, 2005		Sheet 14 of 15	

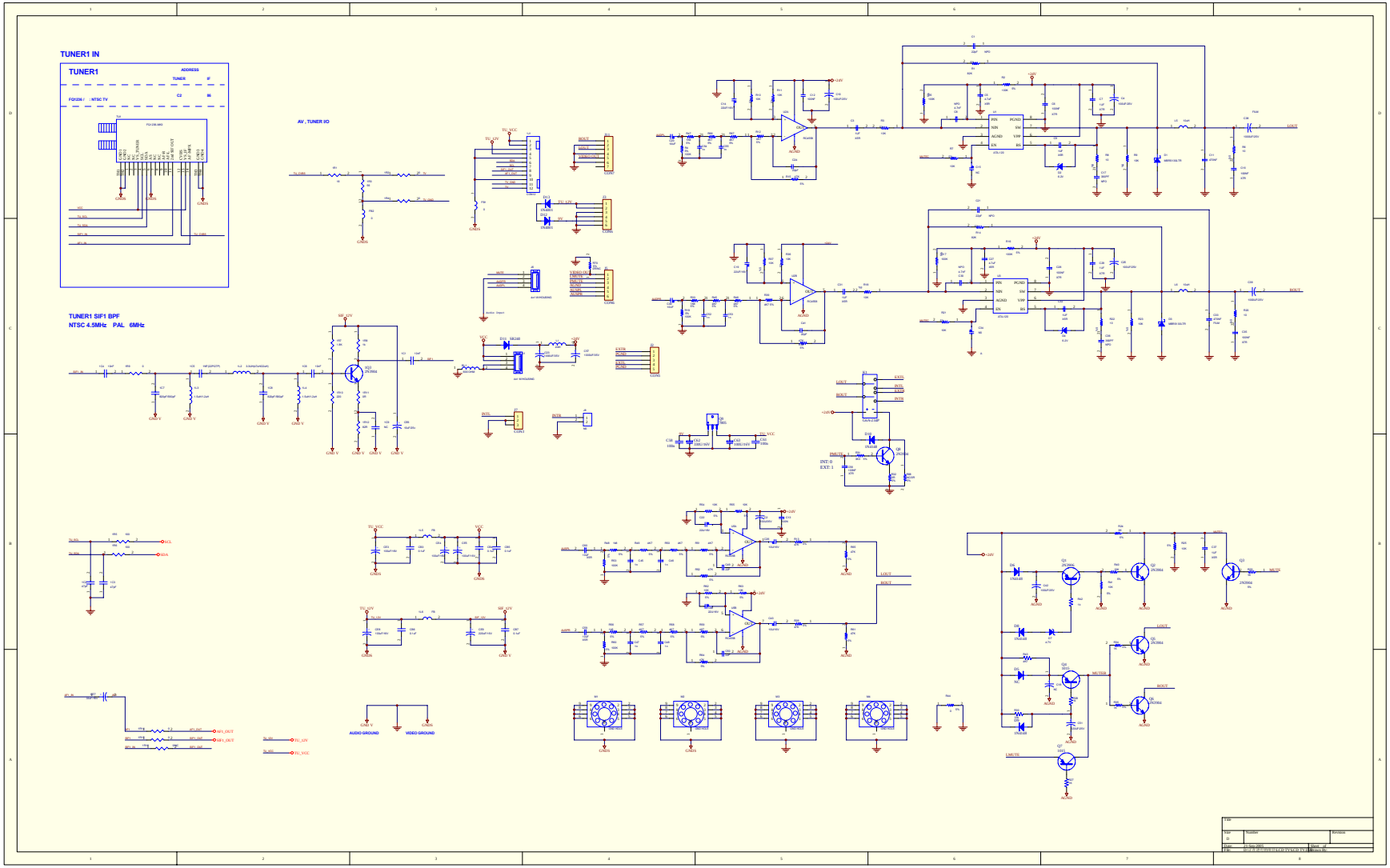
From V0.1 To V1.2 change item:

1,Add R109-10K;R107-4.7K;C135-56pF;0603-R88,R91,R104,R106-0欧姆.0805-R96,R99,R101-0欧姆

2,Reset IC 增加5V Supply;DVI AUDIO ADD CONNECTOR J8.

3,ADIN4 CHANGE TO PWM0

Title		
Size A	Doc Number History	Rev V1.2
Date: Wednesday, October 12, 2005	Sheet 15 of 15	


TUNER1 IN
TUNER1
ADDRESS
TUNER
IF
FQ1256 / ... NTSC TV
C2
I6
AV_TUNER I/O
TUNER1 SIF1 BPF
NTSC 4.5MHz PAL 6MHz
AUDIO GROUND
VIDEO GROUND

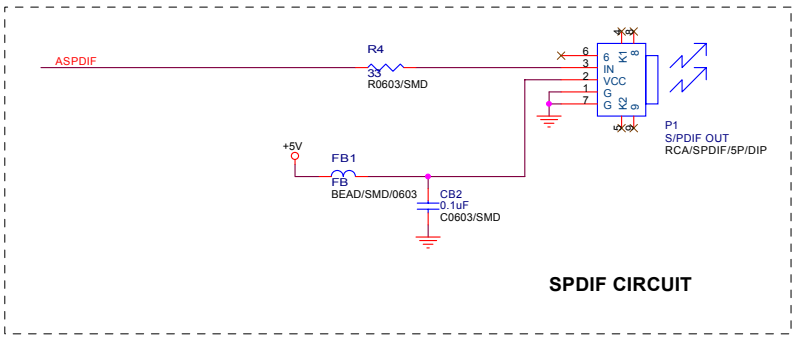
MT5351RA-V2

MT5111 / MT5351 REFERENCE DESIGN - 4 LAYERS

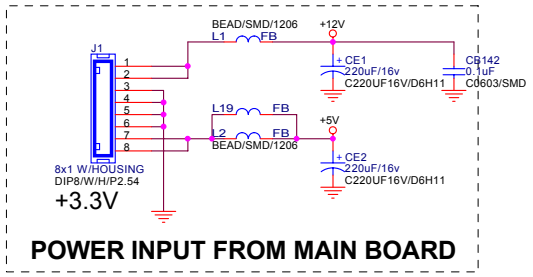
Rev	History	P#	DATE
RA-V1	INITIAL VERSION		2005/06/15
RA-V2	ADDED AUDIO SWITCH / REFINE POWER CIRCUIT		2005/07/14

NS : NON-STUFF

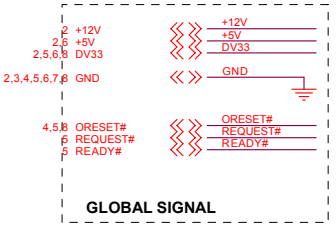
NAME	TYPE	DEVICE
+12V	POWER +12V	POWER SUPPLY
+5V	POWER +5V	POWER SUPPLY
+5V_tuner	POWER +5V	TUNER POWER
DV33_DM	POWER +3V3	MT5111 POWER
DV18	POWER +1V8	MT5111 POWER
DV33	POWER +3V3	MT5351 POWER
AV33	POWER +3V3	MT5351 ANALOG POWER
DV25	POWER +2V5	MT5351 DDR POWER
DV12	POWER +1V2	MT5351 POWER
GND	GROUND	GROUND



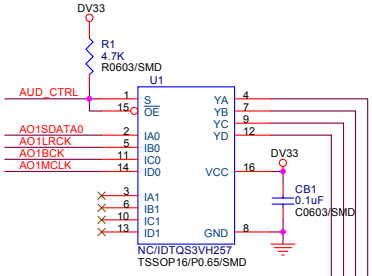
SPDIF CIRCUIT

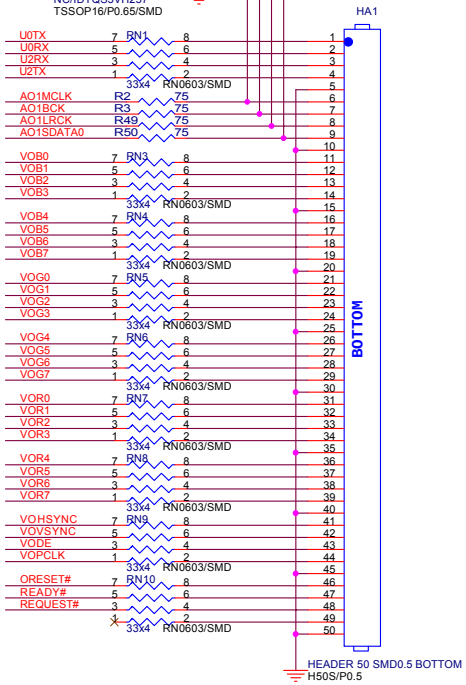


POWER INPUT FROM MAIN BOARD

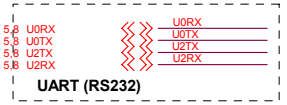


GLOBAL SIGNAL

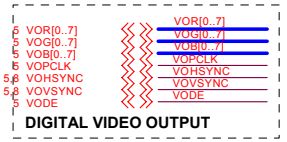




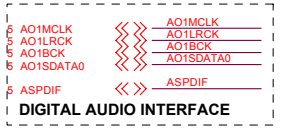
DIGITAL OUTPUT



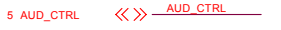
UART (RS232)



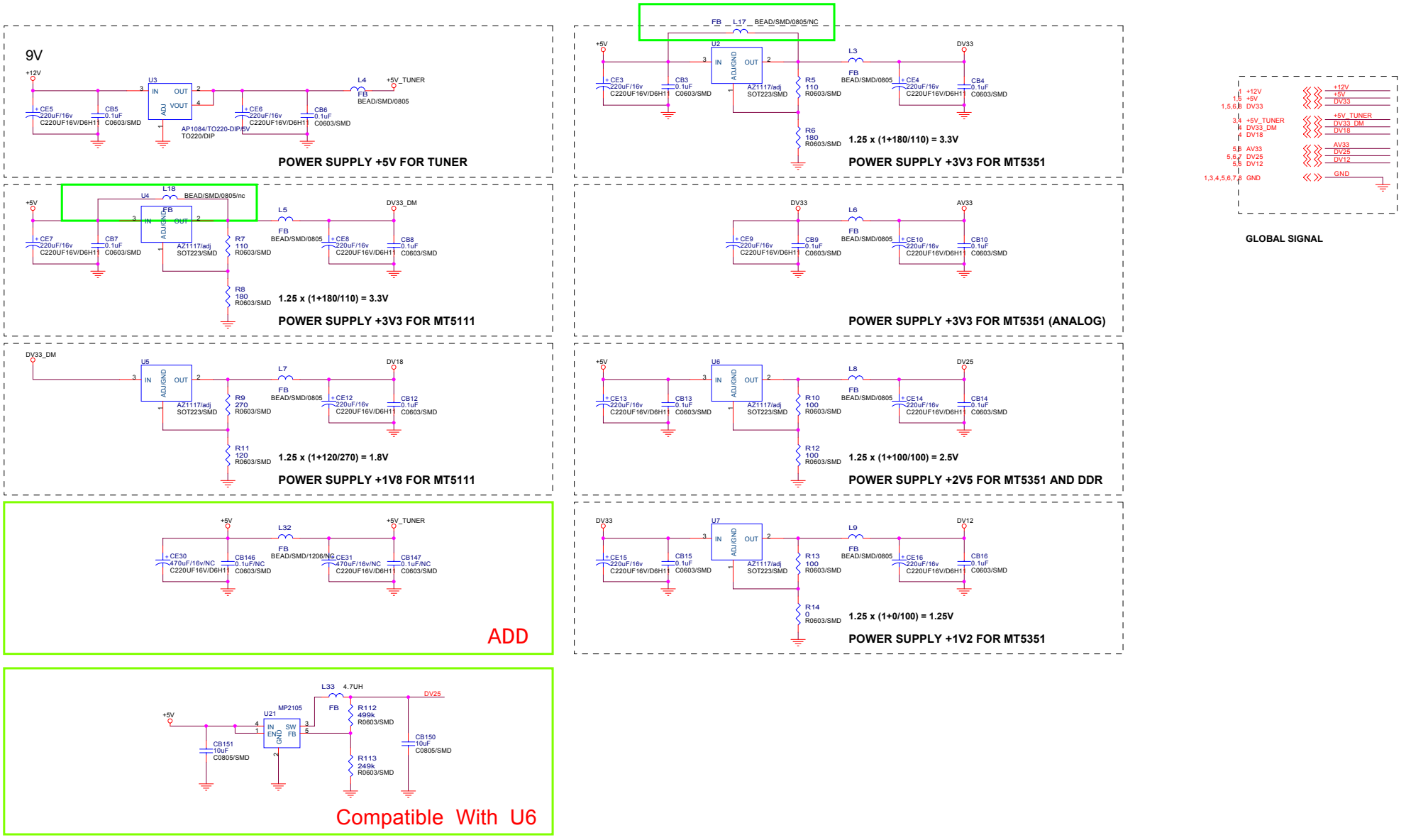
DIGITAL VIDEO OUTPUT

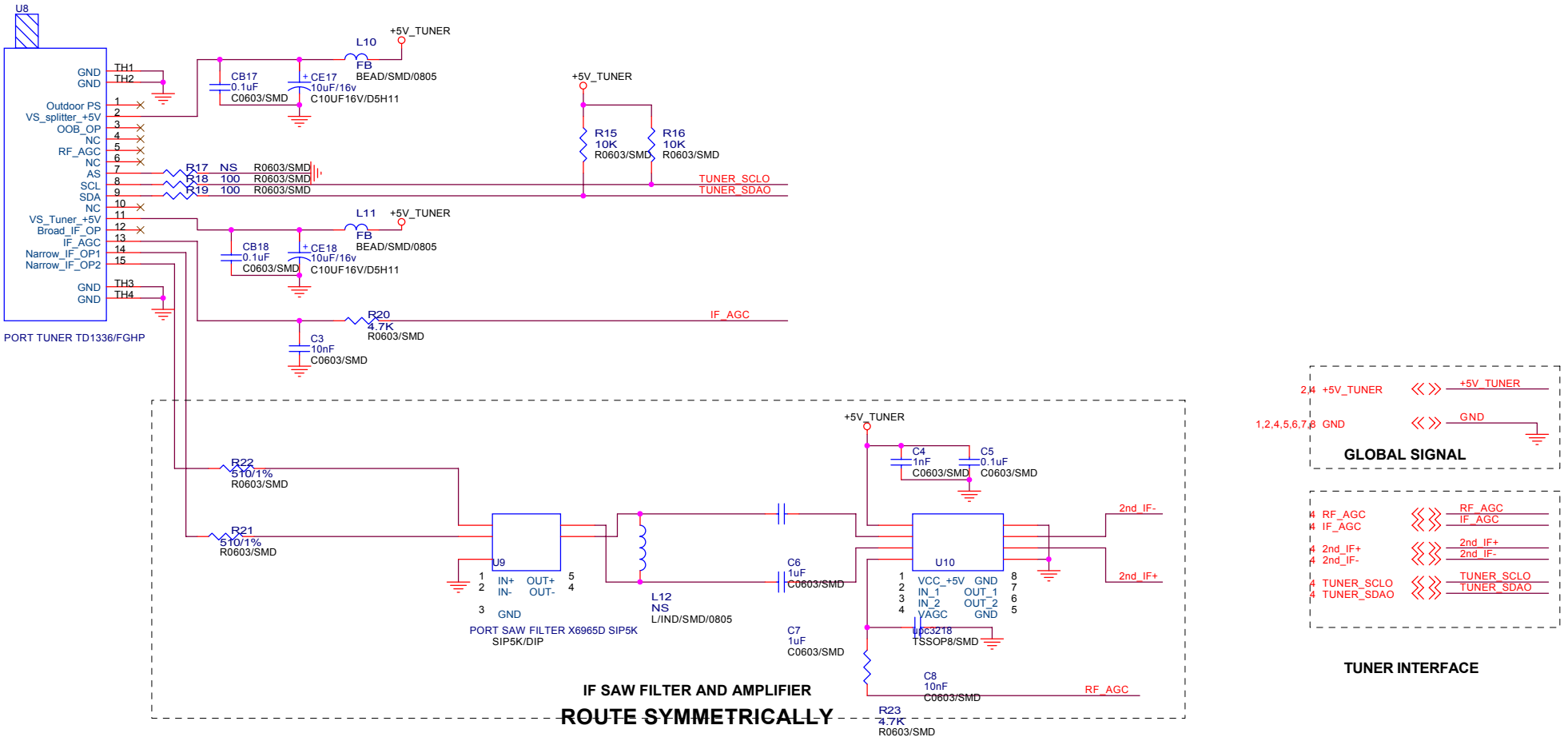


DIGITAL AUDIO INTERFACE



Title POWER		
Size	Document Number	Rev
Date:		Sheet of

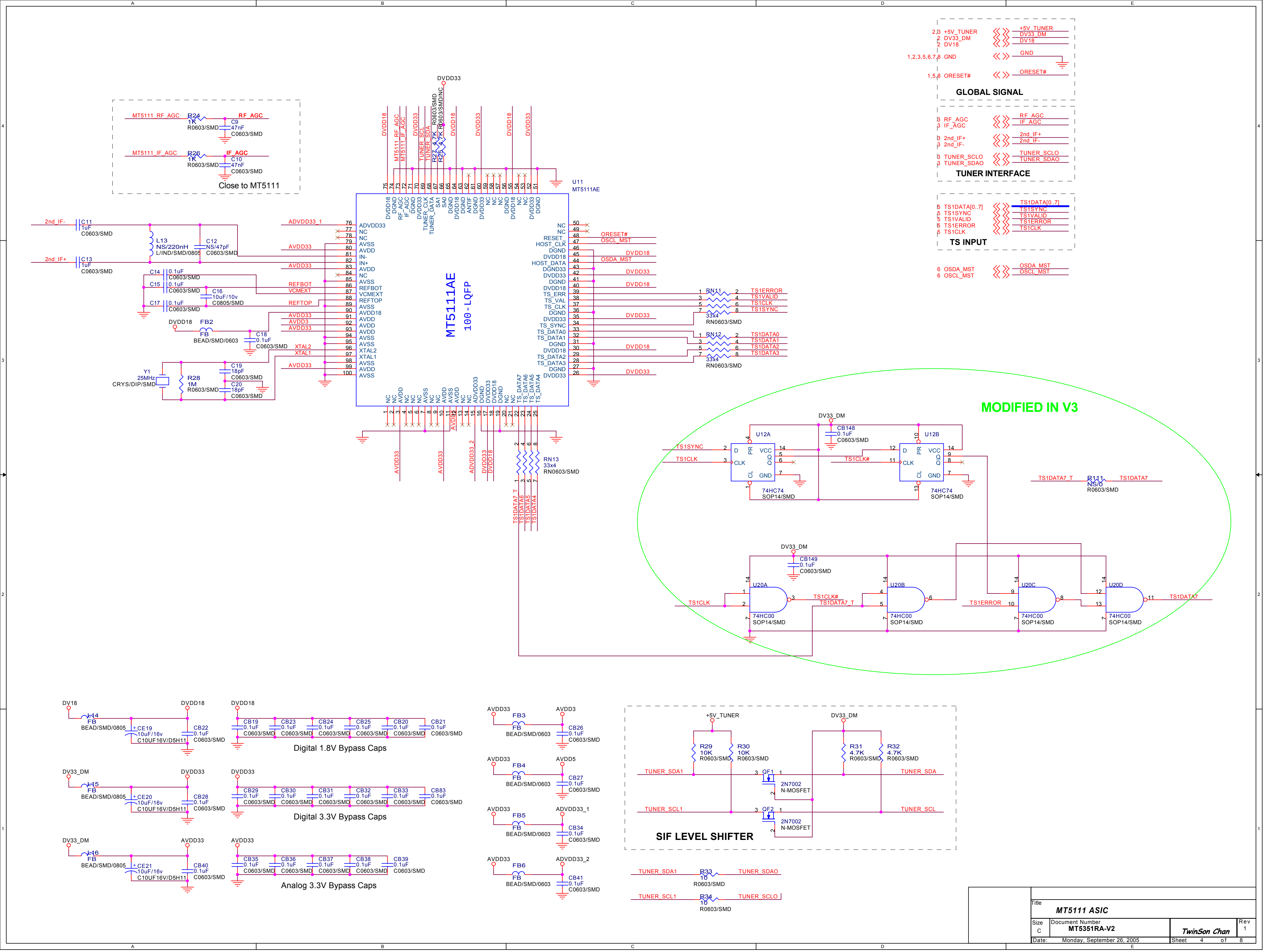

9V
+12V
U3
IN
OUT
ADJ
VOUT
AP1084/TO220-DIP/5V
TO220/DIP
+CE5 220uF/16v C220UF16V/D6H11
CB5 0.1uF C0603/SMD
+CE6 220uF/16v C220UF16V/D6H11
CB6 0.1uF C0603/SMD
L4 FB BEAD/SMD/0805
+5V_TUNER
POWER SUPPLY +5V FOR TUNER
FB L17 BEAD/SMD/0805/NC
+5V
U2
ADJ/GND
AZ1117/adj SOT223/SMD
+CE3 220uF/16v C220UF16V/D6H11
CB3 0.1uF C0603/SMD
L3 FB BEAD/SMD/0805
DV33
+CE4 220uF/16v C220UF16V/D6H11
CB4 0.1uF C0603/SMD
R5 110 R0603/SMD
R6 180 R0603/SMD
1.25 x (1+180/110) = 3.3V
POWER SUPPLY +3V3 FOR MT5351
GLOBAL SIGNAL
+12V
+5V
DV33
+5V_TUNER
DV33_DM
DV18
AV33
DV25
DV12
GND
L18 BEAD/SMD/0805/nc
U4
DV33_DM
+CE7 220uF/16v C220UF16V/D6H11
CB7 0.1uF C0603/SMD
L5 FB BEAD/SMD/0805
+CE8 220uF/16v C220UF16V/D6H11
CB8 0.1uF C0603/SMD
R7 110 R0603/SMD
R8 180 R0603/SMD
1.25 x (1+180/110) = 3.3V
POWER SUPPLY +3V3 FOR MT5111
L6 FB BEAD/SMD/0805
AV33
+CE9 220uF/16v C220UF16V/D6H11
CB9 0.1uF C0603/SMD
+CE10 220uF/16v C220UF16V/D6H11
CB10 0.1uF C0603/SMD
POWER SUPPLY +3V3 FOR MT5351 (ANALOG)
U5
L7 FB BEAD/SMD/0805
DV18
+CE12 220uF/16v C220UF16V/D6H11
CB12 0.1uF C0603/SMD
R9 270 R0603/SMD
R11 120 R0603/SMD
1.25 x (1+120/270) = 1.8V
POWER SUPPLY +1V8 FOR MT5111
U6
L8 FB BEAD/SMD/0805
DV25
+CE13 220uF/16v C220UF16V/D6H11
CB13 0.1uF C0603/SMD
+CE14 220uF/16v C220UF16V/D6H11
CB14 0.1uF C0603/SMD
R10 100 R0603/SMD
R12 100 R0603/SMD
1.25 x (1+100/100) = 2.5V
POWER SUPPLY +2V5 FOR MT5351 AND DDR
L32 FB BEAD/SMD/1206/NG
+5V_TUNER
+CE30 470uF/16v/NC C220UF16V/D6H11
CB146 0.1uF/NC C0603/SMD
+CE31 470uF/16v/NC C220UF16V/D6H11
CB147 0.1uF/NC C0603/SMD
ADD
U7
L9 FB BEAD/SMD/0805
DV12
+CE15 220uF/16v C220UF16V/D6H11
CB15 0.1uF C0603/SMD
+CE16 220uF/16v C220UF16V/D6H11
CB16 0.1uF C0603/SMD
R13 100 R0603/SMD
R14 0 R0603/SMD
1.25 x (1+0/100) = 1.25V
POWER SUPPLY +1V2 FOR MT5351
L33 4.7UH
U21
MP2105
IN
SW
EN
GND
FB
R112 499k R0603/SMD
R113 249k R0603/SMD
CB150 10uF C0805/SMD
CB151 10uF C0805/SMD
Compatible With U6
Title
POWER
Size
Custom
Document Number
MT5351RA-V2
Rev
1
Date:
Monday, September 26, 2005
Sheet
2
of
8
TwinSon Chan

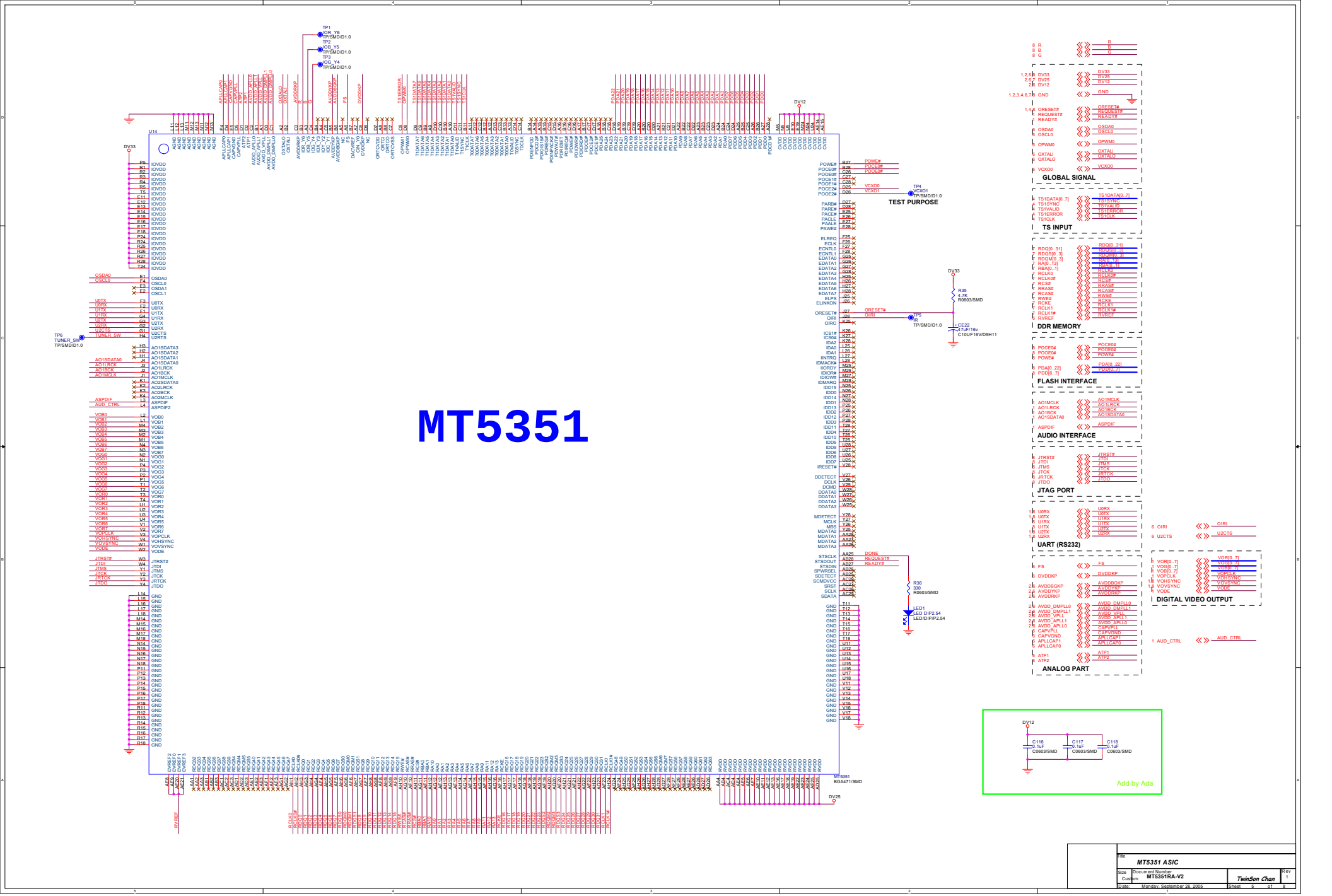


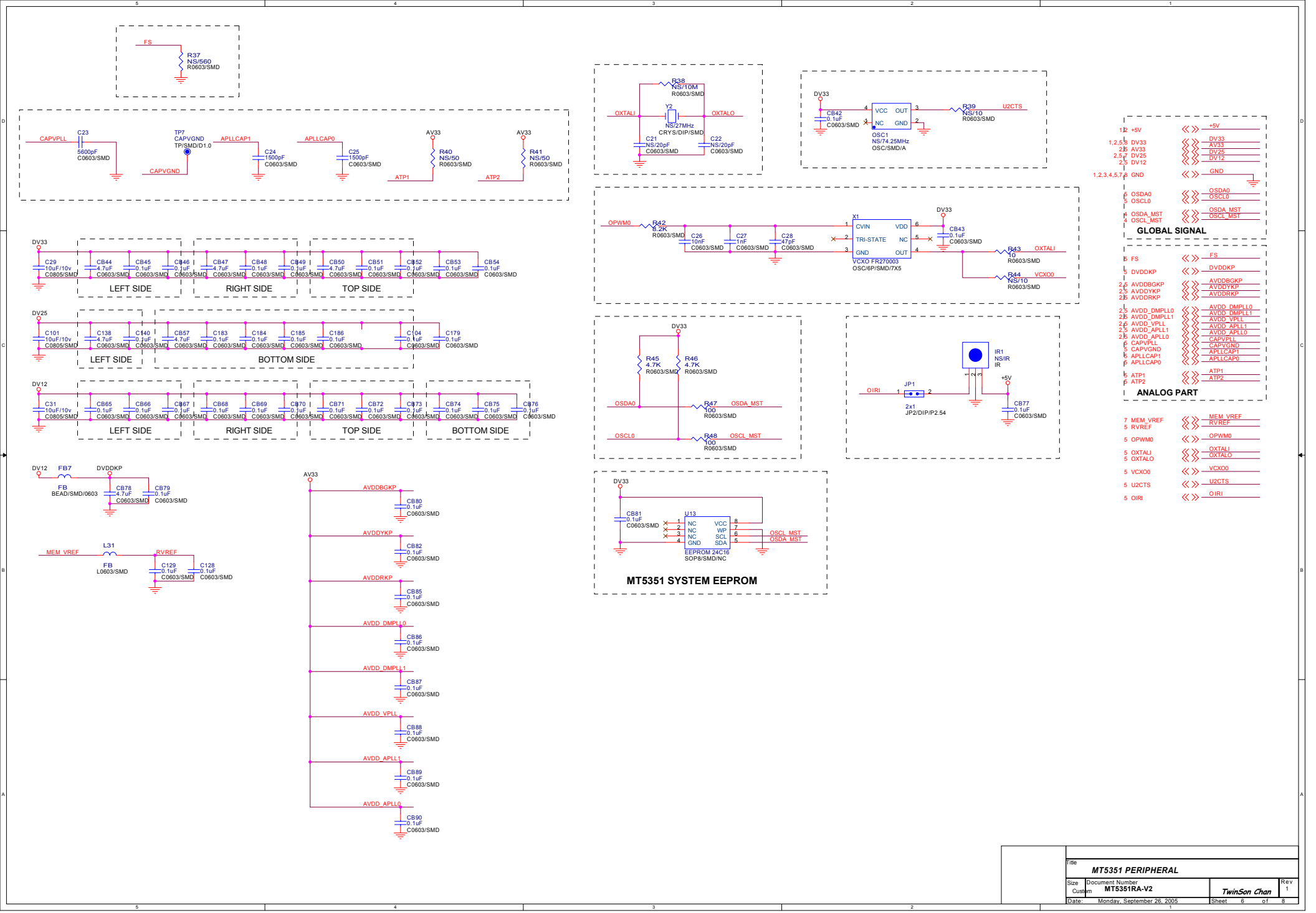
TUNER INTERFACE

Title: TUNER		
Size: Custom	Document Number: MT5351RA-V2	Rev: 1
Date: Monday, September 26, 2005		Sheet 3 of 8

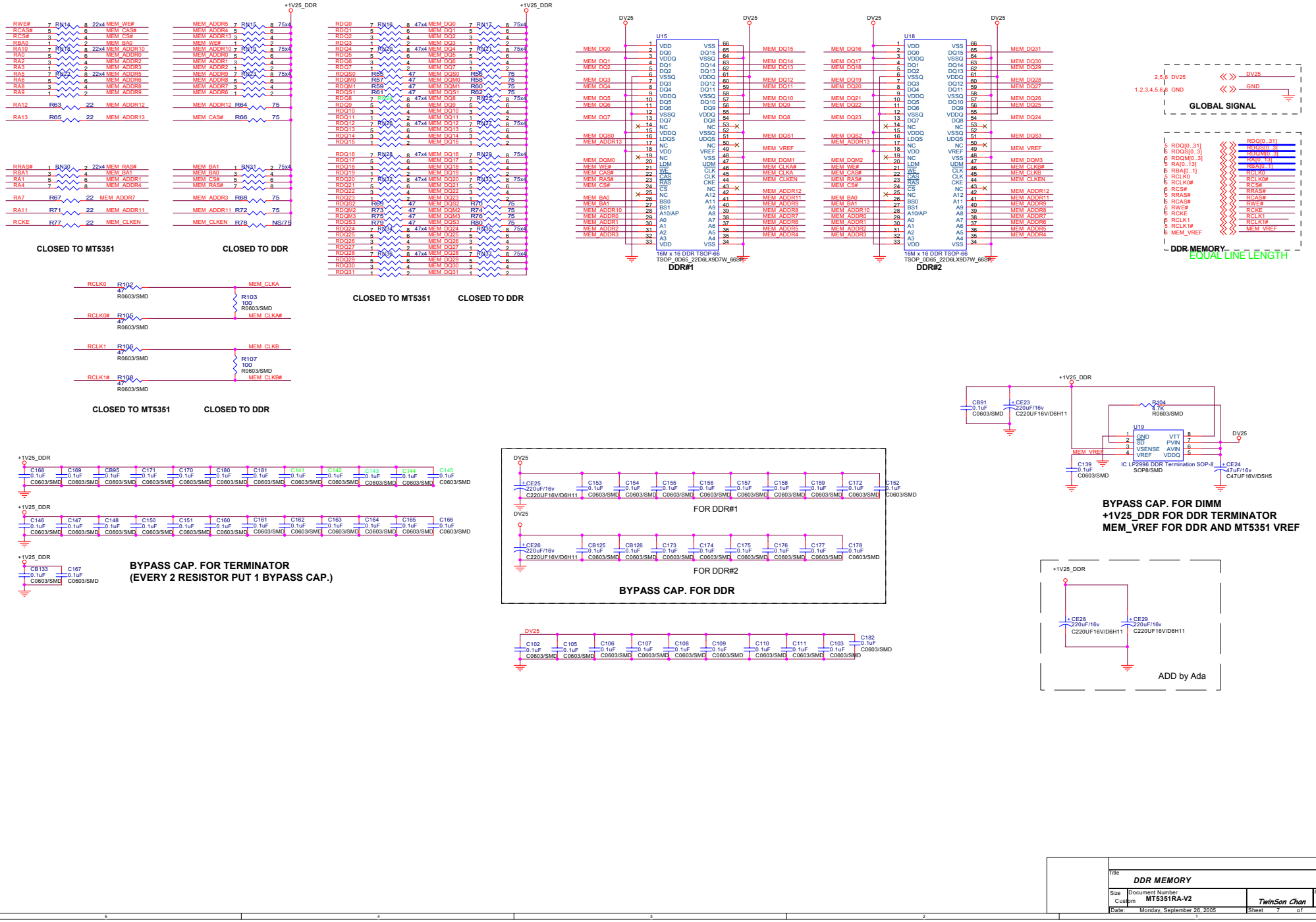
TwinSon Chan

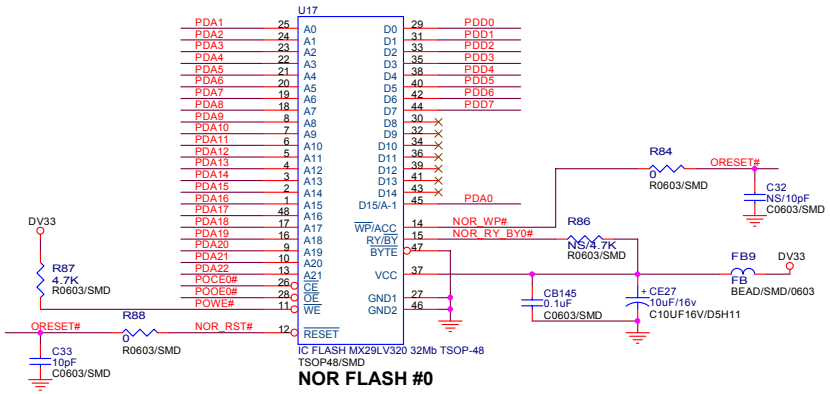

GLOBAL SIGNAL
TUNER INTERFACE
TS INPUT
Close to MT5111
MT5111AE
100-LQFP
U11
MT5111AE
MODIFIED IN V3
Digital 1.8V Bypass Caps
Digital 3.3V Bypass Caps
Analog 3.3V Bypass Caps
SIF LEVEL SHIFTER
MT5111 ASIC
MT5351RA-V2
TwinSon Chan
Monday, September 26, 2005
Sheet 4 of 8

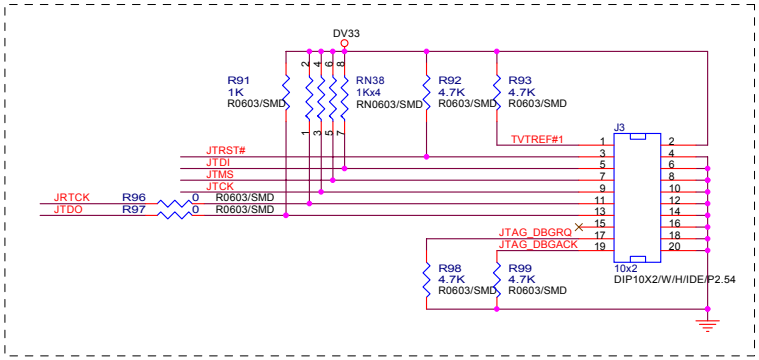

MT5351
U14
MT5351
BGA471/SMD
TEST PURPOSE
GLOBAL SIGNAL
TS INPUT
DDR MEMORY
FLASH INTERFACE
AUDIO INTERFACE
JTAG PORT
UART (RS232)
ANALOG PART
DIGITAL VIDEO OUTPUT
Add by Ada

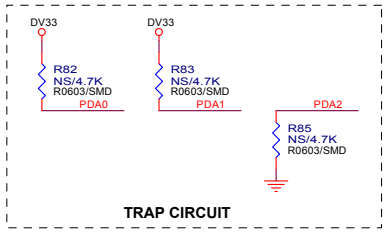


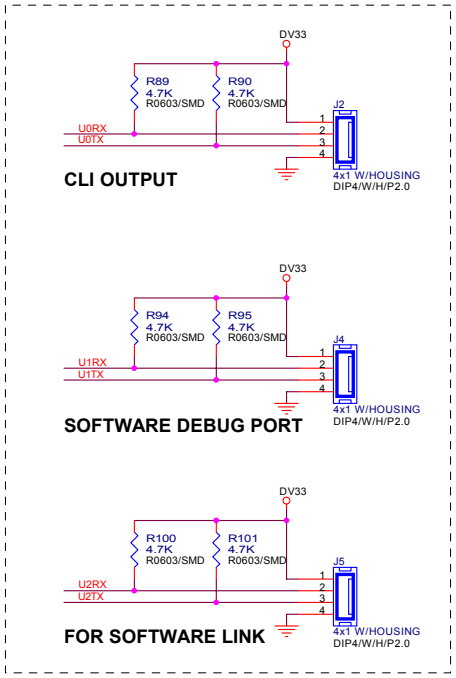
Title	MT5351 PERIPHERAL	
Size: Custom	Document Number: MT5351RA-V2	Rev: 1
Date: Monday, September 26, 2005	Sheet 6 of 8	TwinSon Chan

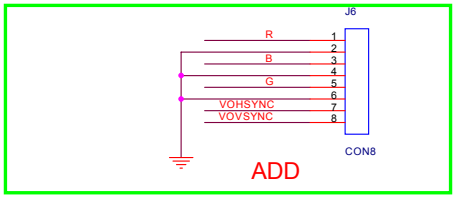

CLOSED TO MT5351
CLOSED TO DDR
CLOSED TO MT5351
CLOSED TO DDR
CLOSED TO MT5351
CLOSED TO DDR
DDR#1
DDR#2
GLOBAL SIGNAL
DDR MEMORY
EQUAL LINE LENGTH
FOR DDR#1
FOR DDR#2
BYPASS CAP. FOR DDR
BYPASS CAP. FOR TERMINATOR
(EVERY 2 RESISTOR PUT 1 BYPASS CAP.)
BYPASS CAP. FOR DIMM
+1V25_DDR FOR DDR TERMINATOR
MEM_VREF FOR DDR AND MT5351 VREF
ADD by Ada
DDR MEMORY
MT5351RA-V2
TwinSon Chan
Monday, September 26, 2005

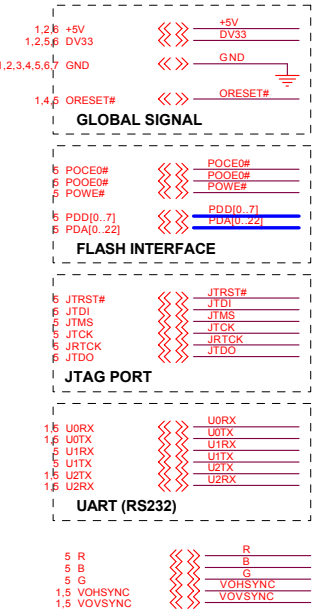












Title	NOR FLASH / JTAG / UART		
Size: Custom	Document Number: MT5351RA-V2	TwinSon Chan	Rev: 1
Date: Monday, September 26, 2005		Sheet 8 of 8	

Basic Operations & Circuit Description

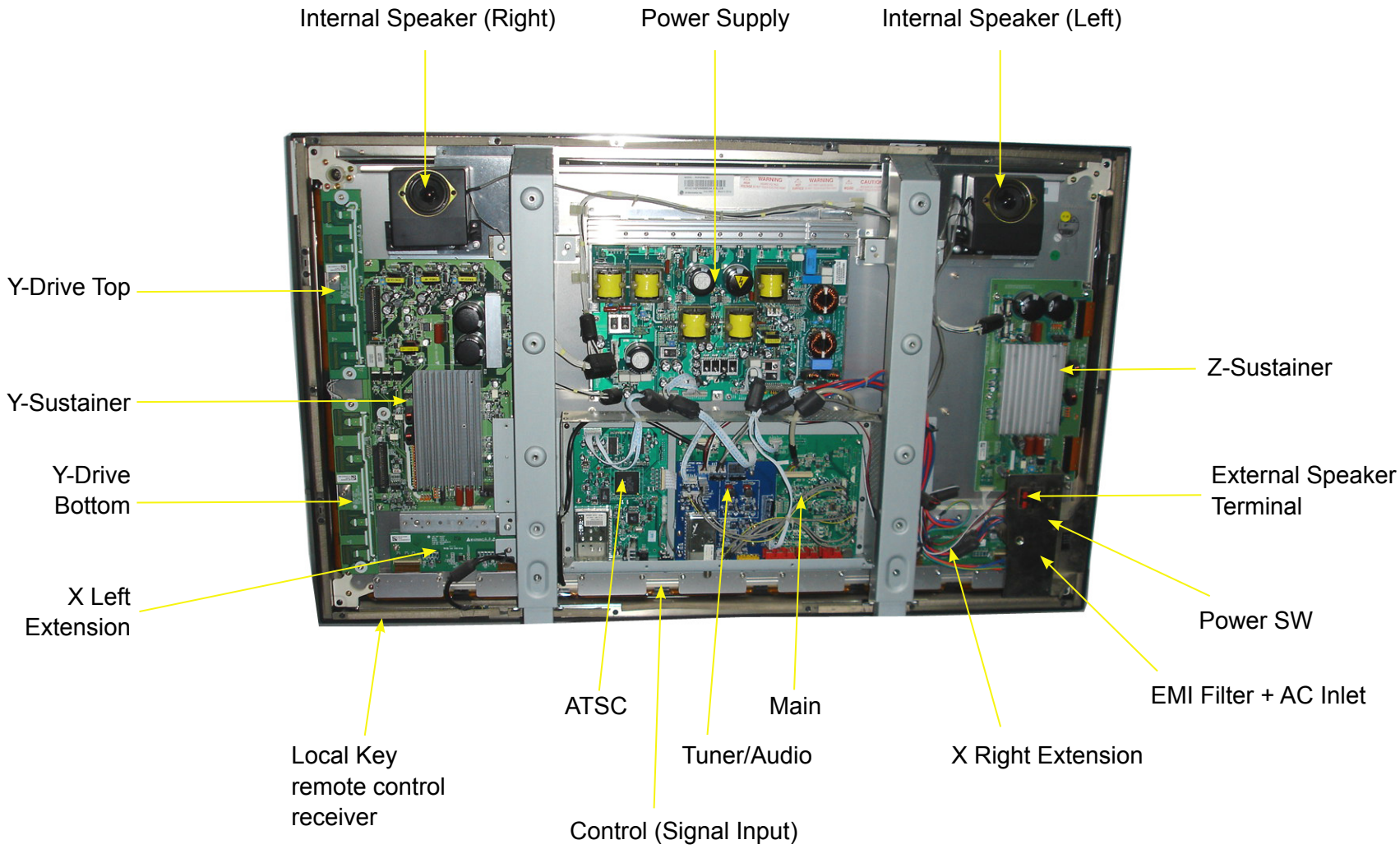
MODULE

There are 1 pcs panel and 8 pcs PCB including 2 pcs Y/Z Sustainer board, 2 pcs Y Drive board, 2 pcs X (left and right) Extension PCB, 1 pcs Control (Signal Input) and 1 pcs Power board in the Module.

SET

There are 6 pcs PCBs including 1 pcs Tuner/Audio board, 1 pcs Keypad board, 1 pcs Remote Control Receiver board, 1 pcs L/R Speakers and 1 pcs Main (Video) board, 1 pcs ATSC 1 pcs ATSC board in the SET.

Parts position



PCB function

1. Power:
   (1). Input voltage: AC 110V~240V, 47Hz~63Hz.
   Input range: AC 90V(Min)~265V(Max) auto regulation.
   (2). To provide power for PCBs.
2. Main board: To converter TV signals, S signals, AV signals, Y Pb/ Cb Pr/Cr signals, DVI signals and D-SUB signals to digital ones and to transmit to Control board.
3. Control board: Dealing with the digital signal for output to panel.
4. Y-Sustainer / Z-Sustainer board:
   (1). Receiving the signals from Control and high voltage supply.
   (2). Output scanning waveform for Module.
5. Y-Drive board: Receive signal from Y sustainer, output horizontal scanning wave-form to the panel.
6. X (left and right) extension board: Output addressing signals.
7. Tuner/Audio Board：Amplifying the audio signal to the internal or external speakers of which selected.
   To convert TV RF signal to video and SIF audio signal to Main board.
8. ATSC Board: Receiver and converter ATSC TV signal to transmit to main board.

PCB failure analysis

1. CONTROL: a. Abnormal noise on screen. b. No picture.
2. MAIN : 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.
4. Z - Sustainer: a. No picture.
   b. Color not enough.
   c. Flash on screen.
5. Y - Sustainer: Darker picture with signals.

6. Tuner/Audio : a. No voice. (Make sure status: Mute / Internal, External speaker)
   b. Noise
   c. No ATV signals
7. Y/Z - Sustainer: The component working temperature is about 55^{o}C.
   If the temperature rises abnormal, this may be a error point.

8. ATSC: a. No ATSC TV signal

Basic operation of Plasma Display

1. After turning on power switch, power board sends 5Vst-by Volt to Main IC MT8205 waiting for ON signals from Key Switch or Remote Receiver.

2. When the ON signal from Key Switch or Remote Receiver is detected, MT8205 will send ON Control signals to Power. Then Power sends (5Vsc, 9Vsc, 12Vsc, 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.

Main IC Specifications

- MT8205
- Sil169
- M13S128168A
- MP7720

History

2004/09/12	Runma Chen	for customer design-in	V1.0
2004/09/30	Dragon Chen	Add feature list	V1.1
2004/09/30	Runma Chen	Modify for PIP/POP 444 support	V1.2
2004/10/01	Runma Chen	PIP/POP hardware limitation-I	V1.3
2004/10/18	Dragon Chen & Wen Hsu	PIP/POP hardware limitation-II & video front end component	V1.4
2004/10/20	Dragon Chen	Update functional block	V1.5
2004/10/21	Dragon Chen	Correct function block fault to V1.4	V1.6
2004/11/04	Dragon Chen	1. Delete power spec. (About power spec, please reference another document) 2. Add AC & DC characteristics 3. Add pin description 4. Add audio out mapping rule	V1.7
2004/11/05	Dragon Chen	Descript more detail for pin power initial state & remove some description to another document (MT8205 product brief)	V1.8

MT8205/8203 Application Notes

MT8205/8203 is a highly integrated single chip for LCD TV supporting video input and output format up to HDTV. It includes 3D comb filter TV Decoder to retrieve the best image from popular composite signals. On-chip advanced motion adaptive de-interlacer converts accordingly the interlace video into progressive one with overlay of a 2D Graphic processor. Optional 2nd HDTV or SDTV inputs allows user to see multi-programs on same screen. Flexible scalar provides wide adoption to various LCD panel for different video sources. Its on-chip audio processor decodes analog signals from Tuner with lip sync control, delivering high quality post-processed sound effect to customers. On-chip microprocessor reduces the system BOM and shortens the schedule of UI design by high level C program. MT8205/8203 is a cost-effective and high performance HDTV-ready solution to TV manufactures.

FEATURES

- Video Input

  Input Multiplexing:
  - Without external switch, it supports
  - 1x Component,
  - 1x S-video,
  - 1x VGA/Component, (dual function ports)
  - 1x Digital and
  - 3x Composite inputs
  - All the input sources can be flexibly routed to Main/PIP internally

  Input Formats:
  - Support VGA input up to SXGA (1280x1024@60Hz) including SOG VGA
  - Support HDTV 480p/720p/1080i input
  - Support DVI 24-bit RGB digital input
  - Support CCIR-656/601 digital input

- TV decoder

  For PIP/POP:
  - Dual identical TVD on chip (Single on MT8203)
  - 3D-Comb for both path.
  - Dual VBI decoders for the application of V-Chip

  Supporting formats:
  - Support PAL (B,G,D,H,M,N,I,Nc), PAL(Nc), PAL, NTSC, NTSC-4.43, SECAM
  - Automatic Luma/Chroma gain control
  - Automatic TV standard detection
  - NTSC/PAL Motion Adaptive 3D comb filter
  - Motion Adaptive 3D Noise Reduction
  - VBI decoder for Closed-Caption/XDS/ Teletext/WSS/VPS
  - Macrovision detection

- 2D-Graphic/OSD processor
  - Two OSD planes. (For example, Teletext and V-Chip will occupy one planes)
  - Support alpha blending among these two planes and video
  - Support Text/Bitmap decoder
  - Support line/rectangle/gradient fill
  - Support bitblt
  - Support color Key function
  - Support Clip Mask
  - 65535/256/16/4/2-color bitmap format OSD,
  - Automatic vertical scrolling of OSD image
  - Support OSD mirror and upside down

- Host Micro controller
  - Turbo 8032 micro controller
  - Built-in internal 373 and 8-bit programmable lower address port
  - 2048-bytes on-chip RAM
  - Up to 4M bytes FLASH-programming interface
  - Supports 5/3.3-Volt. FLASH interface
  - Supports power-down mode
  - Supports additional serial interface
  - IR control serial input
  - Support RS232 interface
  - Support single interface directly supporting SD/MS/MMC memory card
  - Support 2 PWM output
  - Support DDC2Bi/DDC2B/DDC1/DDCCI
  - Maximum 48 programmable GPIO pins
  - DRAM Controller
  - Supports up to 32M-byte SDR/DDR DRAM
  - Supports 16 bit DDR or 32 bit SDR/DDR bus interface
  - Build in a DRAM interface programmable clock to optimize the DRAM performance
  - Programmable DRAM access cycle and refresh cycle timings
  - Maximum DRAM clock rate is 166MHz
  - Support 3.3/2.5-Volt SDR/DDR Interface

- Video Processor

  Color Management
  - Flesh tone and multiple-color enhancement. (For skin, sky, and grass…)
  - Gamma/anti-Gamma correction
  - Color Transient Improvement (CTI)
  - Saturation/hue adjustment

  Contrast/Brightness/Sharpness Management
  - Sharpness and DLTI/DCTI
  - Brightness and contrast adjustment
  - Black level extender
  - White peak level limiter
  - Adaptive Luma/Chroma management

  De-interlacing
  - Automatic detect film or video source

- 3:2/2:2 pull down source detection
- Advanced Motion adaptive de-interlacing

Scaling

- Arbitrary ratio vertical/horizontal scaling of video, from 1/32X to 32X
- Advanced linear and non-linear Panorama scaling.
- Programmable Zoom viewer
- Picture-in-Picture (PIP)
- Picture-Out-Picture (POP)

Display

- 12/10, 10/8, 8/6 Dithering processing for LCD display
- 10bit gamma correction
- Support Alpha blending for Video and two OSD planes
- Frame rate conversion

Audio Input/Output

- 2 path TV audio in.
- Support AF/SIF decode from Tuner.
- 2 channel audio L/R digital line in.
- Total support 12 channel digital outputs optional for general stereo, 2.1 channel with subwoofer, 5.1 channel, and headphone out.

Audio Features

- Support BTSC/EIAJ/A2/NICAM decode
- Stereo demodulation, SAP demodulation
- Mode selection (Main/SAP/Stereo)
- Equalizer
- Sub-woofer/Bass enhancement
- MTK proprietary 3D surround processing (Virtual surround)
- Audio and video lip synchronization
- Support Reverberation

JPEG Decoder

- Decode base-line/progressive JPEG file thru memory card i/f
- SD/MS/MMC, Maximum 1000 files (depend on DRAM size), FW is not finished yet. (10/E will be ready)

Video Output

- 480i/576i/480p/576p/720p/1080i
- Up to (1280x1024@75Hz) (1366x768@60Hz)
- Dual-channel 6/8-bit LVDS/TTL output
- Support video output mirror and upside down

DRAM Usage

- For features of 8205, 2pcs of 8x16 DDR166 is necessary
- For features of 8203, 2/1pcs of 8x16 DDR (limited PIP/POP features)
- Here is a comparison chart between (2xDDR) and (1xDDR)

	DDR*1(16Mb)	DDR*2(32Mb)
NR	Y	Y
3D-Comb	Y	Y
MDDi	480i/576i	1080i
PIP	*Y	Y
POP	*Y	Y
Display	1024x768	1920x1080

- For 1080i input, 8203 only support bob mode de-interlacing.
- With single DDR, we could support very limited PIP/POP mode.

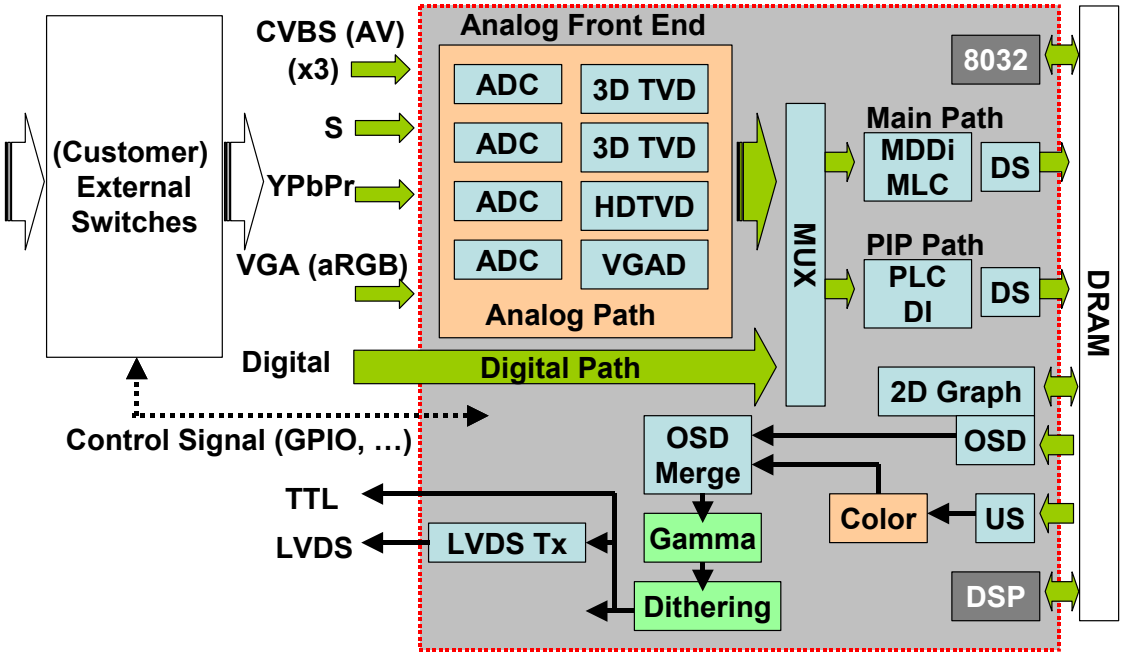
Flash Usage

- Flash is used to store FW code, fonts, bitmaps, big tables for VGA, Video, Gamma..
- In our demo system, we can support 2-4 languages within 1MB flash.
- For single country, we need around 20KB to store font data.
- For more bitmaps, we need more flash space to store them.
- 2Mbytes is recommended to build a general TV model.

Outline

- 388-pin BGA package
- 3.3/1.8-Volt. Dual operating voltages
- 0.18um UMC process

BLOCK DIAGRAM



Silicon Image

PanelLink®
Technology

SiI 169
HDCP PanelLink Receiver

Data Sheet

Document # SiI-DS-0049-B

Silicon Image, Inc.

SiI-DS-0049-B
August 2002

Application Information

To obtain the most updated Application Notes and other useful information for your design, contact your local Silicon Image sales office. Please also visit the Silicon Image web site at www.siliconimage.com.

Copyright Notice

Trademark Acknowledgment

Disclaimer

Revision History

Revision	Date	Comment
A	07/18/2002	Release to Production with complete parametric information.
B	08/14/2002	Correction to DDC bus voltage level-shifting diagram; add Pb-free part number.

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General Description

The SiI 169 Receiver uses PanelLink Digital technology to support HDTV and high-resolution digital displays for DTV and PC applications. It features High-bandwidth Digital Content Protection (HDCP) for secure delivery of high-definition video in consumer electronics products.

The SiI 169 comes with integrated, pre-programmed HDCP keys, greatly simplifying manufacturing and providing the highest level of security. For improved ease of use, the SiI 169 has enhanced jitter tolerance and a low-power standby mode.

PanelLink Digital technology is the world's leading DVI solution, providing a digital interface solution that is easy to implement and cost-effective. PanelLink further simplifies the display interface design by resolving many of the system level issues associated with high-speed mixed signal circuits.

Features

- Integrated 25-165MHz PanelLink core to support VGA to UXGA resolutions
- Supports HDTV resolutions (720p/1080i)
- Integrated HDCP decryption engine for viewing protected content
- Pre-programmed HDCP keys provide highest level of key security, simplify manufacturing
- Enhanced jitter tolerance
- Time staggered data output for reduced ground bounce
- High Skew Tolerance: 1 full input clock cycle (6ns at 165MHz)
- Backwards compatible with SiI 161B
- Sync Detect for "Hot Plugging"
- Flexible low power modes with automatic power down when input clock is inactive
- Low power 3.3V core operation
- Compliant with DVI 1.0
- Standard and Pb-free packages (see page 38).

SiI 169 Pin Diagram

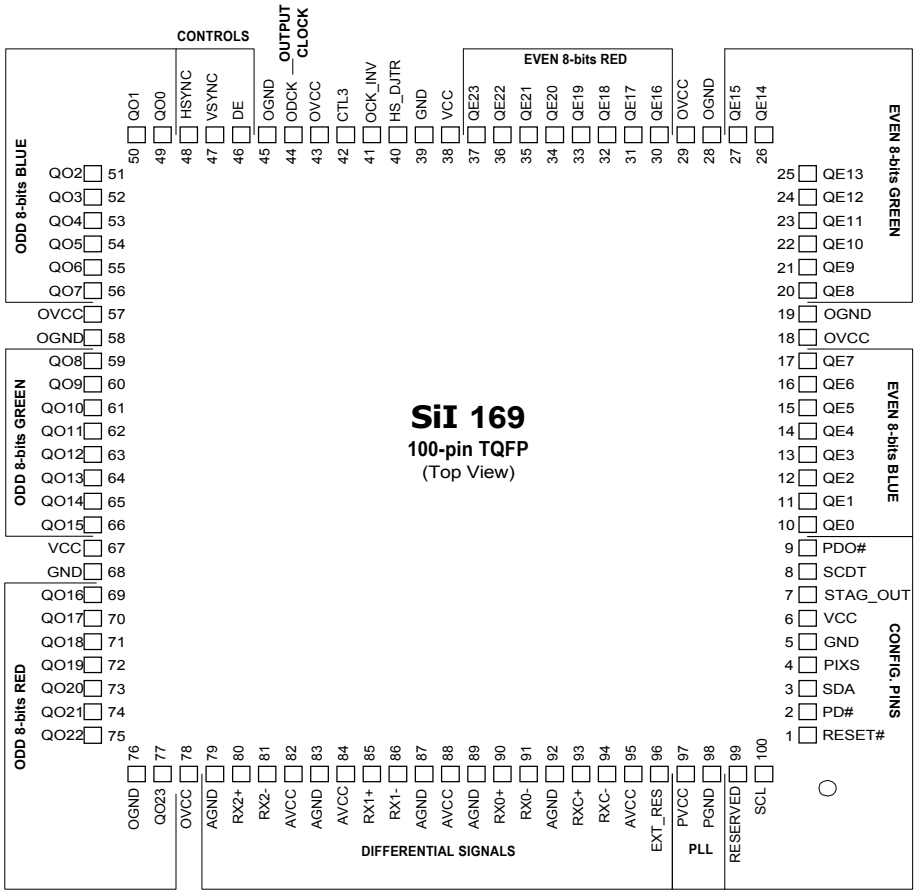


Figure 1. SiI 169 Pin Diagram

Functional Description

The SiI 169 is a DVI 1.0 compliant digital-output receiver with built-in High-bandwidth Digital Content Protection (HDCP). It provides a simple, cost effective solution for DTVs implementing DVI-HDCP. Pre-programmed HDCP keys simplify manufacturing while providing the highest level of security. There is no need to use encrypted keys, program EEPROMs, or cure epoxy coating.

Figure 2 shows the functional blocks of the chip.

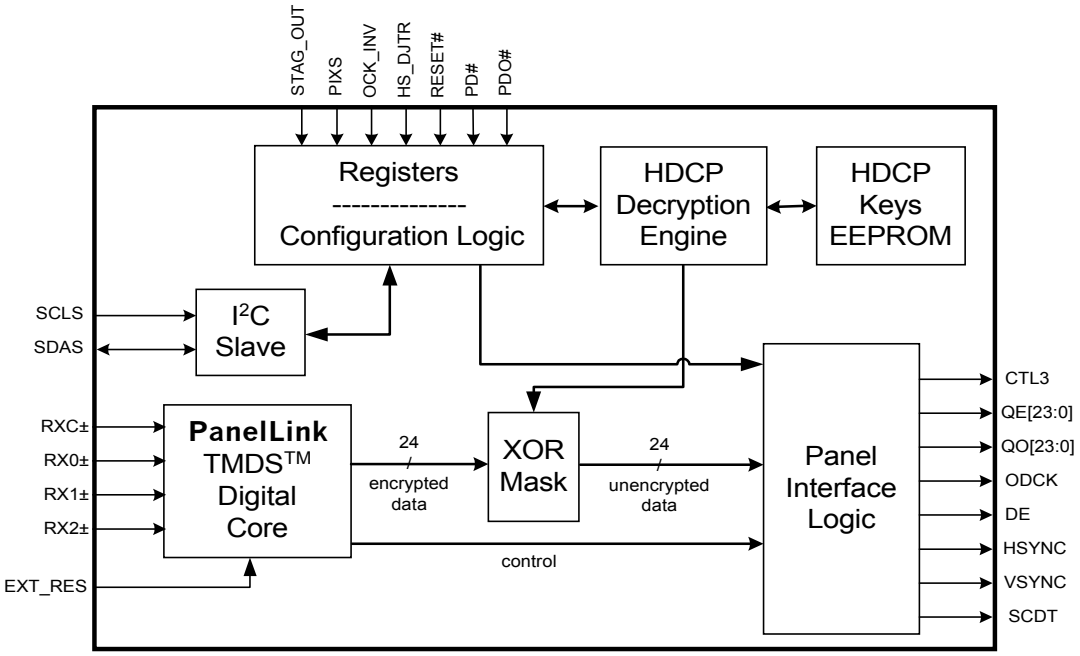


Figure 2. Functional Block Diagram

PanelLink TMDS Core

The PanelLink TMDS core accepts as inputs the three TMDS differential data lines and the differential clock. The core senses the signals on the link and properly decodes them providing accurate pixel data. The core outputs the necessary sync signals (HSYNC, VSYNC), clock (ODCK), and a display enable (DE) signal that drives high when video pixel data is present. The SCDT signal is output when there is active video on the DVI link and the PLL has locked on to the video. SCDT can be used to trigger external circuitry, indicating that an active video signal is present; or used to place the device outputs in power down when no signal is present (by tying SCDT to PDO#). A resistor tied to the EXT_RES pin is used for impedance matching.

I²C Interface and Registers

The SiI 169 uses a slave I²C interface, capable of running at 400kHz, for communication with the host. HDCP authentication is managed by reading and writing to registers through the I²C interface. This bus, called DDC in the DVI specification, is also tied to the EDID EEPROM that contains information about the display's capabilities (resolution, aspect ratio, etc.). The I²C address of the SiI 169 is 74h as specified by HDCP. This interface is not 5V tolerant and it is recommended that a voltage level shifter be used between the SiI 169 and the DVI connector as the DDC bus is specified to support 5V signaling.

HDCP Decryption Engine and XOR Mask

The HDCP decryption engine contains all the necessary logic to decrypt an incoming video signal on a pixel-by-pixel basis. The host system microcontroller initiates an authentication sequence with the receiver to initialize the SiI 169 HDCP decryption engine. Upon successful completion of the authentication process, the SiI 169 is ready to decrypt the incoming video via the XOR mask.

Encrypted and unencrypted video will be sent at different times. Therefore the host HDCP transmitter uses the CTL3 signal to indicate to the SiI 169 receiver whether the incoming video is encrypted or not.

HDCP Keys EEPROM

The SiI 169 comes pre-programmed with a production set of HDCP keys in its internal EEPROM. In this way the keys are provided the highest level of protection as required by the HDCP specification. Silicon Image manages all aspects of the key purchasing and programming. There is no need for the customer to purchase HDCP keys from the licensing authority. For security reasons, the keys cannot be read out of the device.

Samples of the SiI 169 are available with the B1 public keys as listed in the back of the HDCP specification. These are marked with a -PUB part number as noted in the Ordering Information section. Make sure to request either “Public” or “Production” keys when requesting samples. Before receiving samples of the SiI 169 with production keys a customer must have signed the HDCP license agreement.

Panel Interface Logic and Configuration Logic

Unencrypted video data is sent to the display logic by way of a 48-bit output interface. The functionality of this interface is affected by several of the externally strapped configuration logic options as follows.

- The data output can be presented in either one pixel per clock or two pixels per clock format, depending on the PIXS configuration setting.
- The polarity of the output clock ODCK can be inverted to accommodate both rising- and falling-edge clocking through the OCK_INV configuration setting.
- Using the STAG_OUT configuration setting, the odd and even data output groups can be staggered in time to reduce EMI.
- The HS_DJTR configuration setting can compensate for host-side jitter on the HSYNC input to the transmitter.
- The PD# and PDO# inputs select chip power down modes and allow for disabling of the outputs to the panel.

The RESET# input must be in the HIGH state during normal operation, in both HDCP and non-HDCP modes. Its primary purpose is to reset the digital block circuitries, including the HDCP engine, and registers at initial chip power-up time. The VSYNC, HSYNC, DE, and CTL3 signals will be driven low while RESET# is asserted. If it is necessary to disable the HDCP engine while leaving the chip fully operational for reception of unencrypted video, use the software reset feature located at bit 0 of register 0xFF by setting it to “1”.

Revision History

Revision 0.1 (15 Jan. 2002)

- Original

Revision 0.2 (19 Nov. 2002)

-changed ordering information & DC/AC characteristics

Revision 0.1	Revision 0.2
M13S128168A - 5T	M13S128168A - 6T
M13S128168A - 6T	M13S128168A - 7.5AB

Revision 0.3 (8 Aug. 2003)

-Change IDD6 from 3mA to 5mA.

Revision 0.4 (27 Aug. 2003)

-Change ordering information & DC / AC characteristics.

Revision 1.0 (21 Oct. 2003)

-Modify tWTR from 2tck to 1tck.

Revision 1.1 (10 Nov. 2003)

-Correct some refresh interval that is not revised.

-Correct some CAS Lantency that is not revised.

Revision 1.2 (12 Jan. 2004)

-Correct IDD1; IDD4R and IDD4W test condition.

-Correct tRCD; tRP unit

-Add tCCD spec.

-Add tDAL spec.

Revision 1.3 (12 Mar. 2004)

-Add Cas Latency=2; 2.5

DDR SDRAM

2M x 16 Bit x 4 Banks Double Data Rate SDRAM

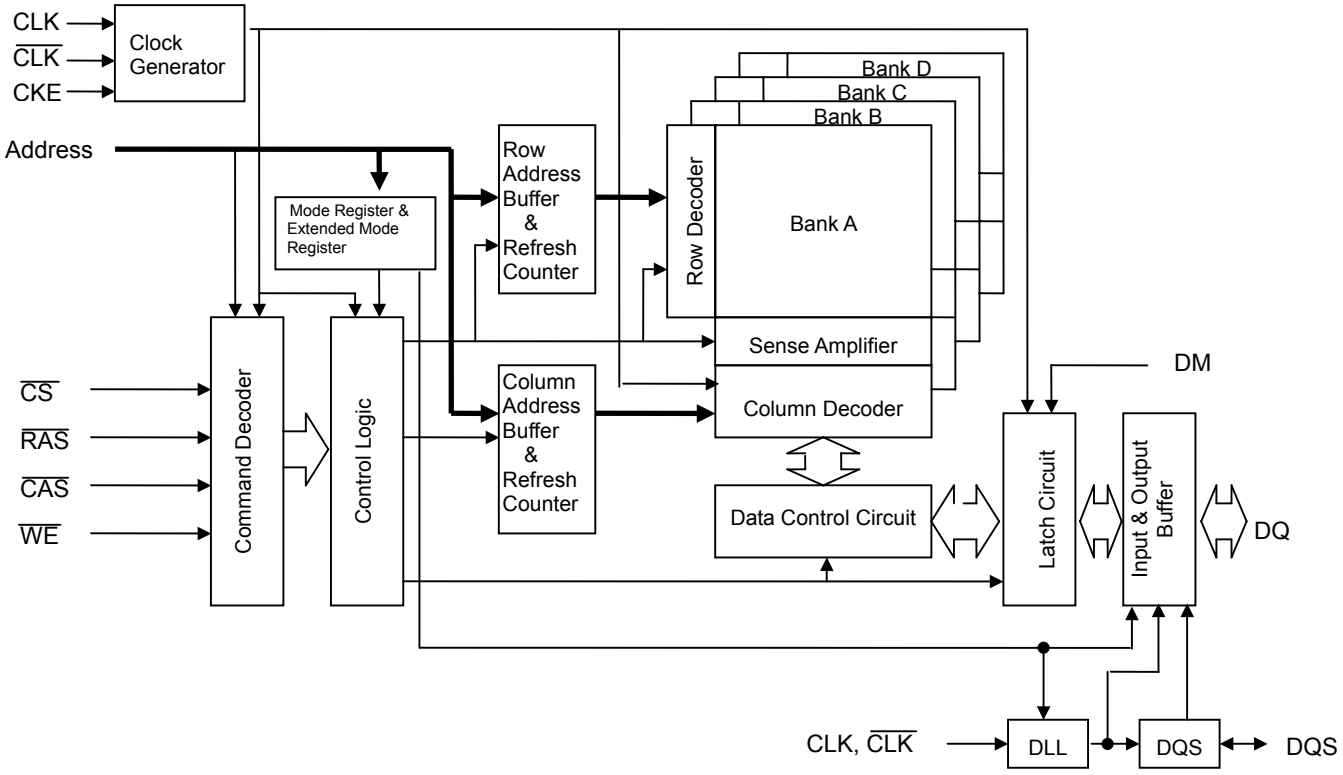
Features

- JEDEC Standard
- Internal pipelined double-data-rate architecture, two data access per clock cycle
- Bi-directional data strobe (DQS)
- On-chip DLL
- Differential clock inputs (CLK and $\overline{CLK}$)
- DLL aligns DQ and DQS transition with CLK transition
- Quad bank operation
- CAS Latency : 2; 2.5; 3
- Burst Type : Sequential and Interleave
- Burst Length : 2, 4, 8
- All inputs except data & DM are sampled at the rising edge of the system clock(CLK)
- Data I/O transitions on both edges of data strobe (DQS)
- DQS is edge-aligned with data for reads; center-aligned with data for WRITE
- Data mask (DM) for write masking only
- V_{DD} = 2.375V ~ 2.75V, V_{DDQ} = 2.375V ~ 2.75V
- Auto & Self refresh
- 7.8us refresh interval
- SSTL-2 I/O interface
- 66pin TSOPII package

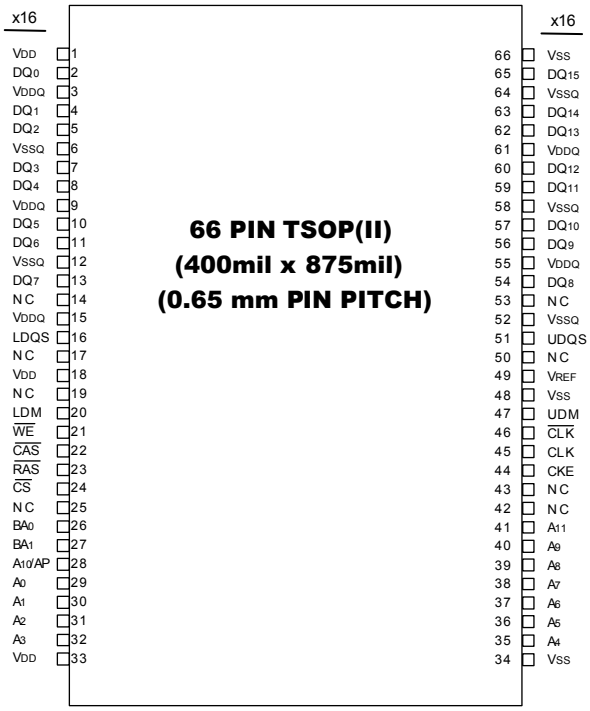
Operating Frequencies :

PRODUCT NO.	MAX FREQ	VDD	PACKAGE
M13S128168A -5T	200MHz	2.5V	TSOPII
M13S128168A -6T	166MHz		

Functional Block Diagram



Pin Arrangement



MP7720

20W Class D Mono Single Ended Audio Amplifier

PRELIMINARY INFORMATION

General Description

The MP7720 is a mono 20W Class-D Audio Amplifier. It is one of MPS' second generation of fully integrated audio amplifiers which dramatically reduces solution size by integrating the following:

- **180mΩ power MOSFETs**
- **Start up / shut down pop elimination**
- **Short circuit protection circuits**
- **Mute / Stand By**

The MP7720 utilizes a single ended output structure capable of delivering 20W into 4Ω speakers. MPS Class-D Audio Amplifiers exhibit the high fidelity of a Class A/B amplifier at efficiencies greater than 90%. The circuit is based on the MPS' proprietary variable frequency topology that delivers excellent PSRR, fast response time and operates on a single power supply.

Ordering Information

Part Number *	Package	Temperature
MP7720DS	SOIC8	-40°C to + 85°C
MP7720DP	PDIP8	-40°C to + 85°C
EV0030	Evaluation Board	

* For Tape & Reel use suffix - Z (e.g. MP7720DS-Z)

* For Lead Free use suffix - LF (e.g. MP7720DS-LF)

Features

- 20W output at V_{DD}=24V into a 4Ω load
- THD+N = 0.04% @ 1W, 8Ω
- 93% efficiency at 20W
- Low noise (190μV typical)
- Switching Frequency to 1MHz
- 9.5V to 24V operation from single supply
- Integrated Start Up and Shut Down Pop Elimination Circuit
- Thermal protection
- Integrated 180mΩ switches
- Mute / Standby-mode (Sleep)
- Tiny 8 Pin SOIC or PDIP Package
- Evaluation Board Available

Applications

- Surround Sound DVD Systems
- Televisions
- Flat Panel Monitors
- Multimedia computers
- Home stereo

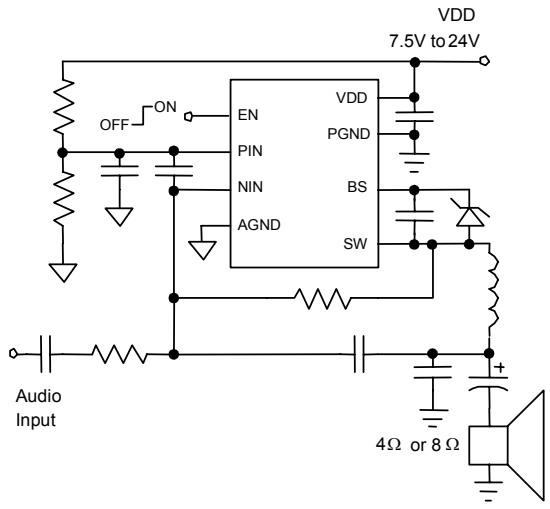


Figure 1: Typical Application Circuit

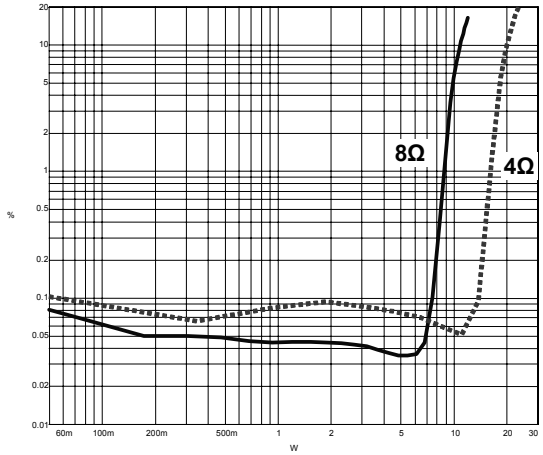


Figure 2: THD+N vs. Power (24V, 1KHz)

Absolute Maximum Ratings (Note 1)

Supply Voltage V_{DD}	26V
BS Voltage	V_{SW}-0.3V to V_{SW}+6.5V
Enable Voltage V_{EN}	-0.3V to 6V
V_{SW}, V_{PIN}, V_{NIN}	-1V to V_{DD}+1V
AGND to PGND	-0.3V to 0.3V
Junction Temperature	150°C
Lead Temperature	260°C
Storage Temperature	-65°C to 150°C

Recommended Operating Conditions (Note 2)

Supply Voltage V_{DD}	9.5V to 24V
Operating Temperature T_A	-40°C to 85°C

Package Thermal Characteristics

Thermal Resistance Θ_{JA} (SOIC8)	105°C/W
Thermal Resistance Θ_{JC} (SOIC8)	50°C/W
Thermal Resistance Θ_{JA} (PDIP8)	95°C/W
Thermal Resistance Θ_{JC} (PDIP8)	55°C/W

Table 1: Electrical Characteristics (V_{DD}=24V, V_{EN}=5V, T_A=25°C)

Parameters	Condition		Typ	Max	Units
Supply Current					
Standby Current	V_{EN} = 0V		1	5	μA
Quiescent Current			1.5	3.0	mA
Output Drivers					
SW On Resistance	Sourcing and Sinking		0.18		Ω
Short Circuit Current	Sourcing and Sinking		5.0		A
Inputs					
PIN, NIN Input Common Mode Voltage Range		0	$\frac{V_{DD}}{2}$	V_{DD}-1.5	V
PIN, NIN Input Current	V_{PIN}=V_{NIN}=12V		1	5	μA
EN Enable Threshold Voltage	V_{EN} Rising		1.4	2.0	V
	V_{EN} Falling	0.4	1.2		V
EN Enable Input Current	V_{EN} = 5V		1		μA
Thermal Shutdown					
Thermal Shutdown Trip Point	T_J Rising		150		°C
Thermal Shutdown Hysteresis			30		°C

Table 2: Operating Specifications (Circuit of Figure 3, V_{DD}=24V, V_{EN}=5V, T_A=25°C)

Standby Current	V_{EN} = 0V		130		μA
Quiescent Current			13		mA
Power Output	f=1KHz, THD+N = 10% , 4Ω Load		20		W
	f=1KHz, THD+N = 10% , 8Ω Load		10		W
THD+ Noise	P_{OUT}=1W, f=1KHz, 4Ω Load		0.08		%
	P_{OUT}=1W, f=1KHz, 8Ω Load		0.04		%
Efficiency	f =1KHz, P_{OUT}=1W, 4Ω Load		90		%
	f =1KHz, P_{OUT}=1W, 8Ω Load		95		%
Maximum Power Bandwidth			20		KHz
Dynamic Range			93		dB
Noise Floor	A-Weighted		190		μV
Power Supply Rejection	f=1KHz		60		dB

Note 1. Exceeding these ratings may damage the device.
Note 2. The device is not guaranteed to function outside its operating rating.

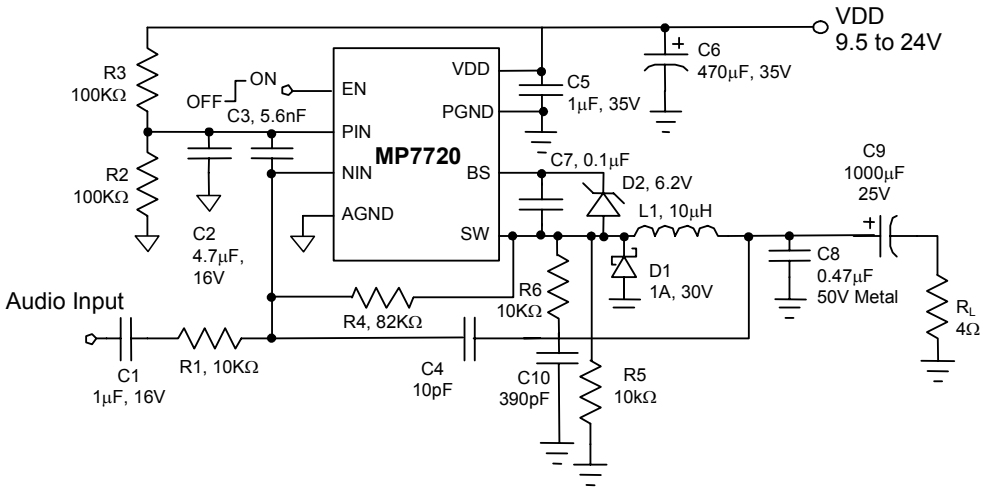


Figure 3: 20W Mono Typical Application Circuit

0. Warnings and Cautions

- ✓ WARNING indicates hazards that may lead to death or injury if ignored.
- ✓ CAUTION indicates hazards that may lead to injury or damage to property if ignored.

1) This product uses a high voltage (450 V max.). Do not touch the circuitry of this product with your hands when power is supplied to the product or immediately after turning off the power. Be sure to confirm that the voltage is dropped to a sufficiently low level.

2) Do not supply a voltage higher than that specified to this product. This may damage the product and may cause a fire.

3) Do not use this product in locations where the humidity is extremely high, where it may be splashed with water, or where flammable materials surround it. Do not install or use the product in a location that does no satisfy the specified environmental conditions. This may damage the product and may cause a fire.

4) If a foreign substance (such as water, metal, or liquid) gets inside the product, immediately turn off the power. Continuing to use the products it may cause fire or electric shock.

5) If the product emits smoke, an abnormal smell, or makes an abnormal sound, immediately turn off the power. If noting is displayed or if the display goes out during use, immediately turn off the power. Continuing to use the product as it is may cause fire or electric shock.

6) Do not disconnect or connect the connector while power to the product is on. It takes some time for the voltage to drop to a sufficiently low level after the power has been turned off. Confirm that the voltage has dropped to a safe level before disconnecting or connecting the connector. Otherwise, this may cause fire, electric shock, or malfunction.

7) Do not pull out or insert the power cable from/to an outlet with wet hands. It may cause electric shock.

8) Do not damage or modify the power cable. It may cause fire or electric shock.

9) If the power cable is damaged, or if the connector is loose, do not use the product; otherwise, this can lead to fire or electric shock.

10) If the power connector or the connector of the power cable becomes dirty or dusty, wipe it with a dry cloth. Otherwise, this can lead to fire.

❑ USE

1) Because this product uses a high voltage, connecting or disconnecting the connectors while power is supplied to the product may cause malfunctioning. Never connect or disconnect the connectors while the power is on. Immediately after power has been turned off, a residual voltage remains in the product. Be sure to confirm that the voltage has dropped to a sufficiently low level.

2) Watching the display for a long time can tire the eyes. Take a break at appropriate intervals.

3) PDP 's brightness and contrast ratio is lower than that of the CRT. The picture is dimmer with surrounding light and better for viewing in dark condition.

4) Do not cover or wrap the product with a cloth or other covering while power is supplied to the product.

5) Before turning on power to the product, check the wiring of the product and confirm that the supply voltage is within the rated voltage range. If the wiring is wrong or if a voltage outside the rated range is applied, the product may malfunction or be damaged.

6) Do not store this product in a location where temperature and humidity are high. This may cause the product to malfunction. Because this product uses a discharge phenomenon, it may take time to light (operation may be delayed) when the product is used after it has been stored for a long time. In this case, it is recommended to light all cells for about 2hours (aging).

7) If the glass surface of the display becomes dirty, wipe it with a soft cloth moistened with a neutral detergent. Do not use acidic or alkaline liquids, or organic solvents.

8) Do not tilt or turn upside down while the module package is carried, the product may be damaged.

9) This product is made from various materials such as glass, metal, and plastic. When discarding it, be sure to contact a professional waste disposal operator.

❑ Repair and Maintenance

Because this product combines the display panel and driver circuits in a single module, it cannot be repaired or maintained at user's office or plant. Arrangements for maintenance and repair will be determined later

1. GENERAL DESCRIPTION

❑ DESCRIPTION

The PDP42V6#### is a 42-inch 16:9 color plasma display module with resolution of 852(H) × 480(V) pixels. This is the display device which offers vivid colors with adopting AC plasma technology by LG Electronics Inc.

❑ FEARURES

High peak brightness (1000cd/m^2 Typical) and high contrast ratio (3000:1 Typical) enables user to create high performance PDP SETs.

❑ APPLICATIONS

- ✓ Public information display
- ✓ Video conference systems
- ✓ Education and training systems

❑ ELECTRICAL INTERFACE OF PLASMA DISPLAY

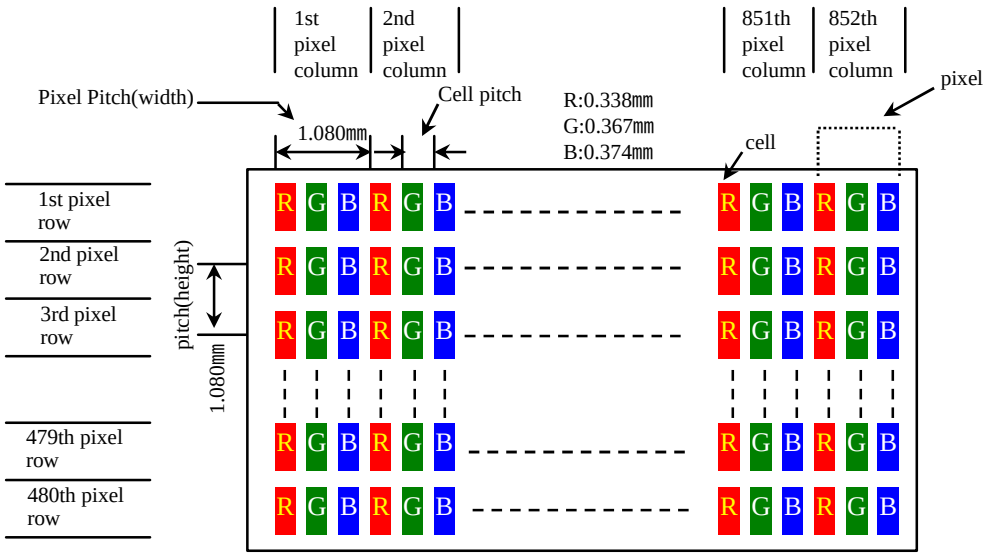
The PDP42V6#### requires only 8bits of digital video signals for each RGB color.
In addition to the video signals, six different DC voltages are required to operate the display.
The PDP42V6#### is equipped with P-CUBE function which analyzes display signals to optimize system control factor for showing the best display performance.

❑ GENERAL SPECFICATIONS

✓ Model Name	: PDP42V6#### (42V6#### Model)
✓ Number of Pixels	: 852(H) × 480(V) (1pixel=3 RGB cells)
✓ Pixel Pitch	: 1080㎛ (H) × 1080㎛ (V)
✓ Cell Pitch	: 367㎛ (H) × 1080㎛ (V) (Green Cell basis)
✓ Display Area	: 920.1(H) × 518.4(V) ±0.5mm
✓ Outline Dimension	: 1005(H) × 597(V) × 61(D)±1mm
✓ Pixel Type	: RGB Closed type
✓ Number of Gradations	: (R)256 × (G)256 × (B)256 (16.7 Mega colors)
✓ Weight	: 14.8 Kg ± 0.5 Kg (Net 1EA)
	111 Kg ± 5 Kg (5EA/1BOX)
✓ Aspect Ratio	: 16:9
✓ Peak Brightness	: Typical 1000cd/㎡ (1/25 White Window)
✓ Contrast Ratio	: Average 60:1 (In a bright room with 150Lux at center)
	: Typical 3000:1 (In a dark room 1/25 White Window pattern at center)
✓ Power Consumption	: Typical 220 W (Full White)
✓ Life-time	: more than 60,000 Hours of continuous operation

☞ Life-time is defined as the time when the brightness level becomes half of its initial value.

✓ Display Dot Diagram

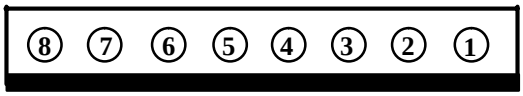


7. CONNECTORS and CONNECTIONS

❑ Power Input Connector

➢ Connector P3001 Pin Assignment

Pin No.	Symbol	Pin No.	Symbol
1	Vs	5	GND
2	Vs	6	Va
3	nc	7	GND
4	GND	8	+5V



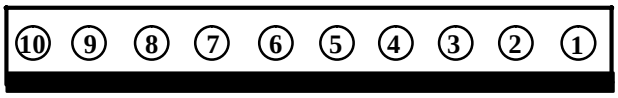
1-1123723-8 Pin numbers
(Top View, viewed from the pin connection side)

✓ Module side connector : 1-1123723-8 (Header)
✓ Mating Connector : 1-1123722-8 (Housing)
✓ Connector Supplier : AMP

➢ Connector P2005 Pin Assignment

Pin No.	Symbol	Pin No.	Symbol
1	VS	6	GND
2	VS	7	GND
3	VS	8	GND
4	nc	9	nc
5	GND	10	nc

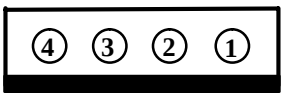
✓ Module side connector : 1-1123723-10 (Header)
✓ Mating Connector : 1-1123722 –10 (Housing)
✓ Connector Supplier : AMP



1-1123723-10 Pin numbers
(Top View, viewed from the pin connection side)

➢ Connector P2006 Pin Assignment

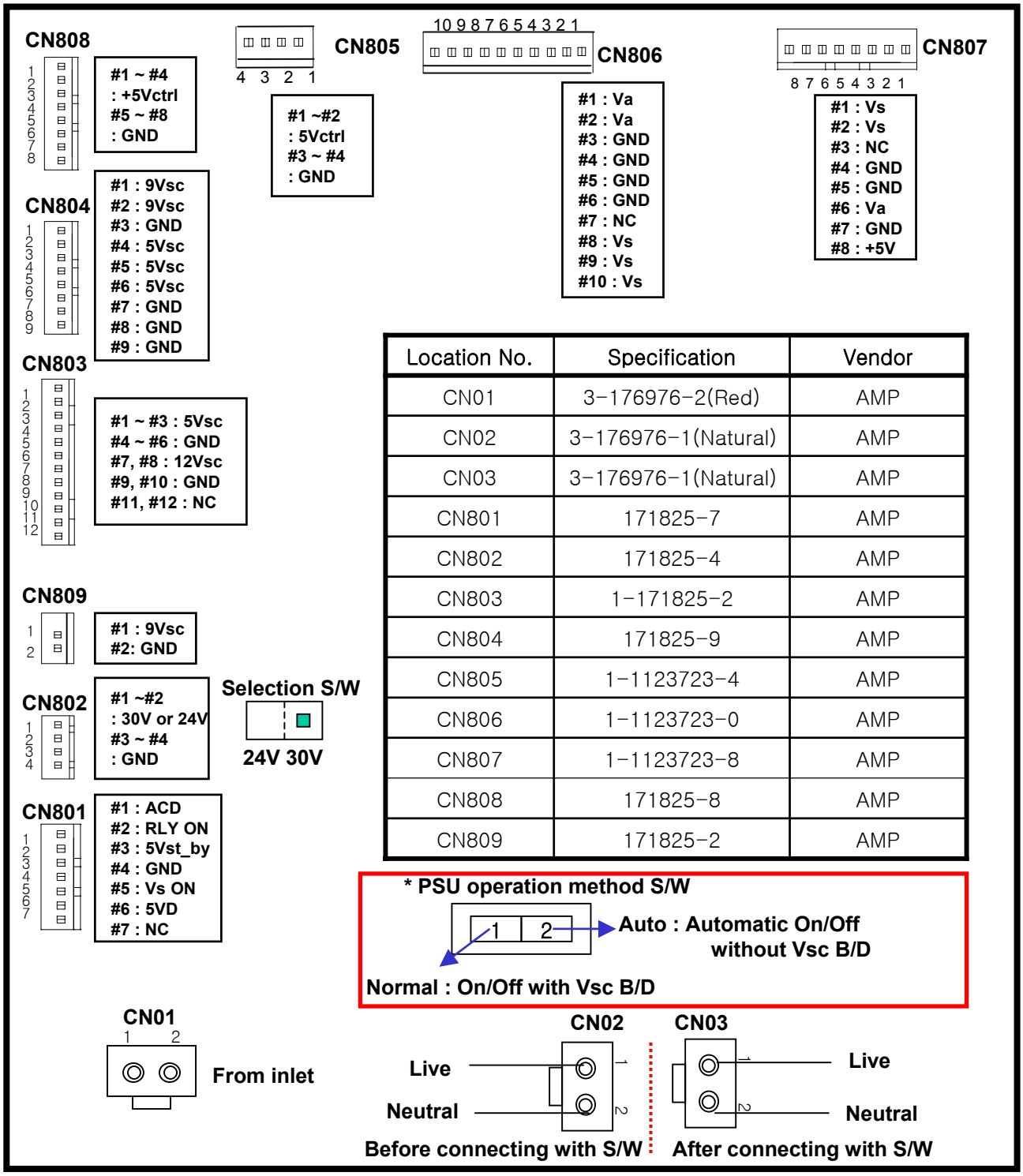
Pin No.	Symbol	Pin No.	Symbol
1	GND	3	5V
2	GND	4	5V



1-1123723-4 Pin numbers
(Top View, viewed from the pin connection side)

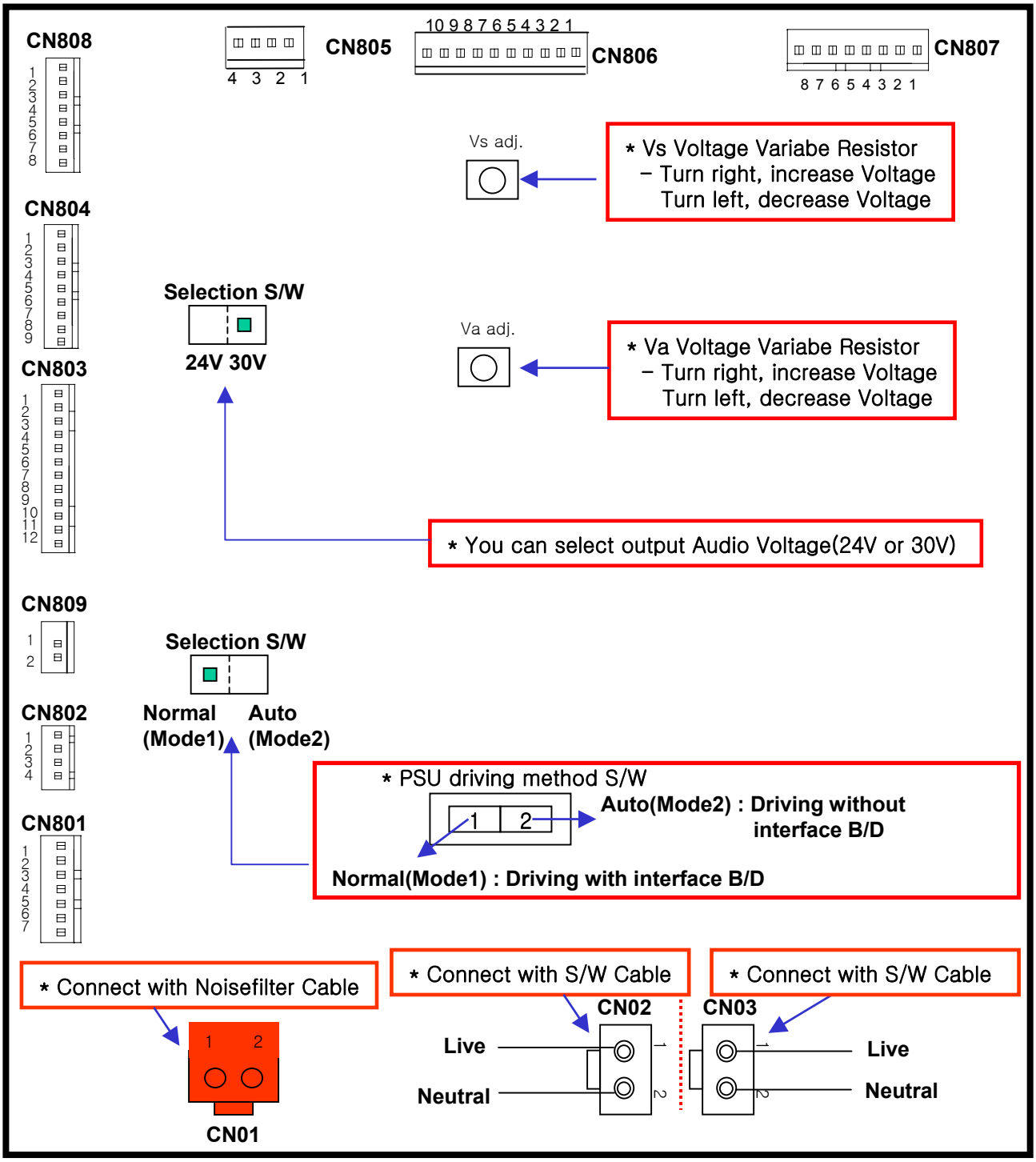
✓ Module side connector : 1-1123723-4 (Header)
✓ Mating Connector : 1-1123722-4 (Housing)
✓ Connector Supplier : AMP

8. Input/Output pin assignment & specification



Location No.	Specification	Vendor
CN01	3-176976-2(Red)	AMP
CN02	3-176976-1(Natural)	AMP
CN03	3-176976-1(Natural)	AMP
CN801	171825-7	AMP
CN802	171825-4	AMP
CN803	1-171825-2	AMP
CN804	171825-9	AMP
CN805	1-1123723-4	AMP
CN806	1-1123723-0	AMP
CN807	1-1123723-8	AMP
CN808	171825-8	AMP
CN809	171825-2	AMP

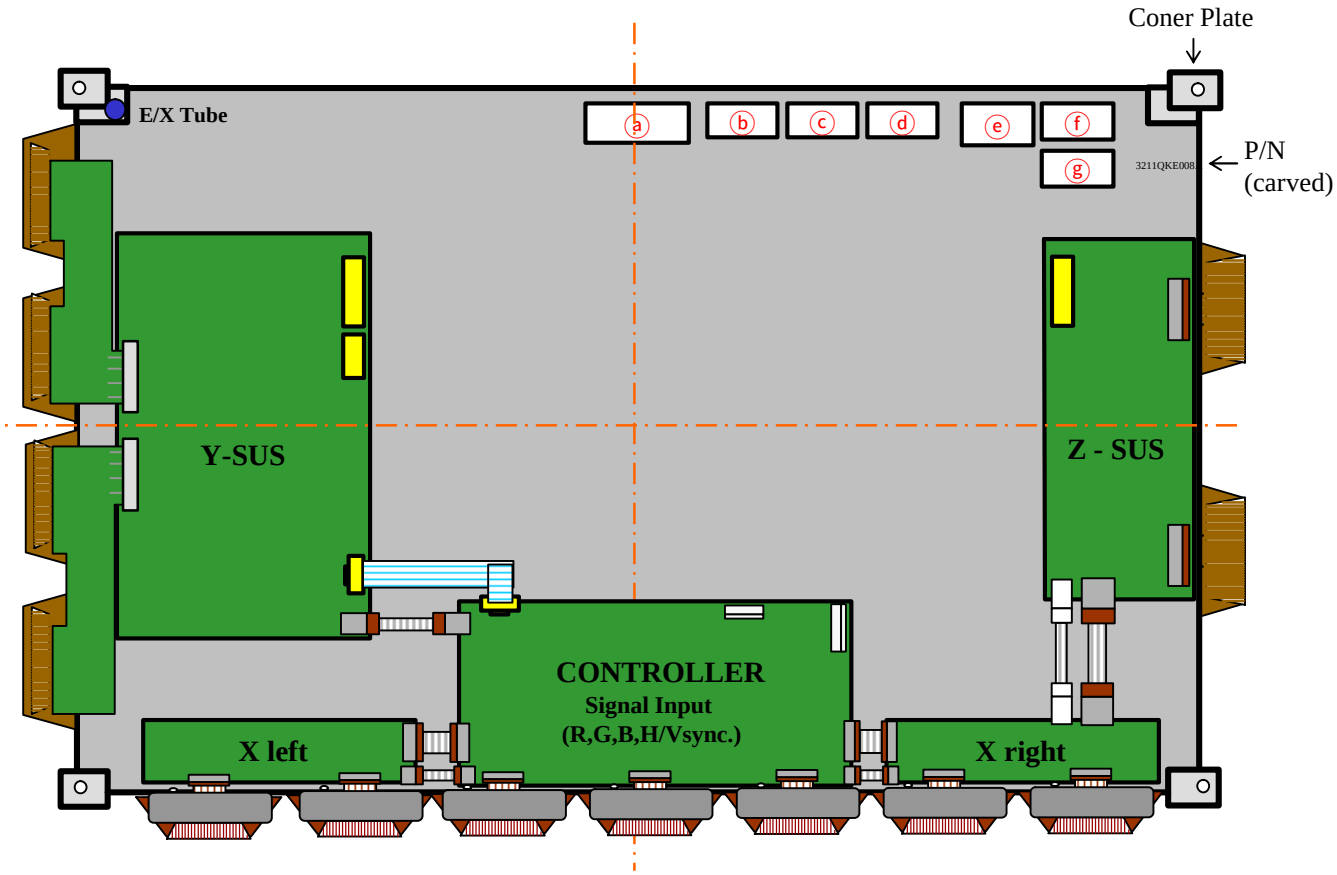
9. Adjustment detail



※ The color of CN01 is red.(The color of CN02, CN03 are natural.)

8. LABEL

❑ LABEL Sticking Position



❑ Identification Label : LABEL ⓐ

① Model Name
② Bar Code (Code 128, Contains the manufacture No.)
③ Manufacture No.
④ The trade name of LG Electronics
⑤ Manufactured date (Year & Month)
⑥ Manufactured place

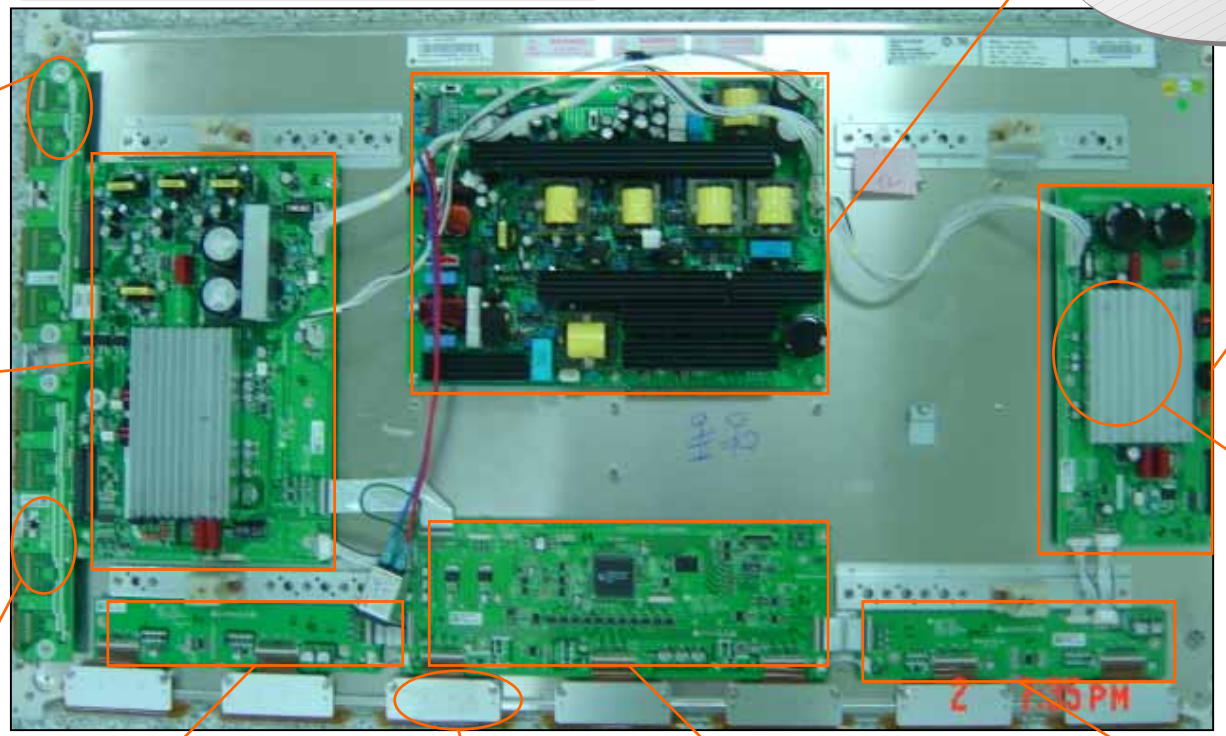
Trouble Shooting Manual of PDP Module

- Introduction
- Precautions
- Basic
- Trouble shooting

1. Introduction

COMPOSITION OF PDP BOARDS

- ***42" V6 MODEL.***



PSU

Z-SUS B/D

IPM

X-RIGHT B/D

CONTROL B/D

COF

X-LEFT B/D

Y-DRIVE BOTTOM

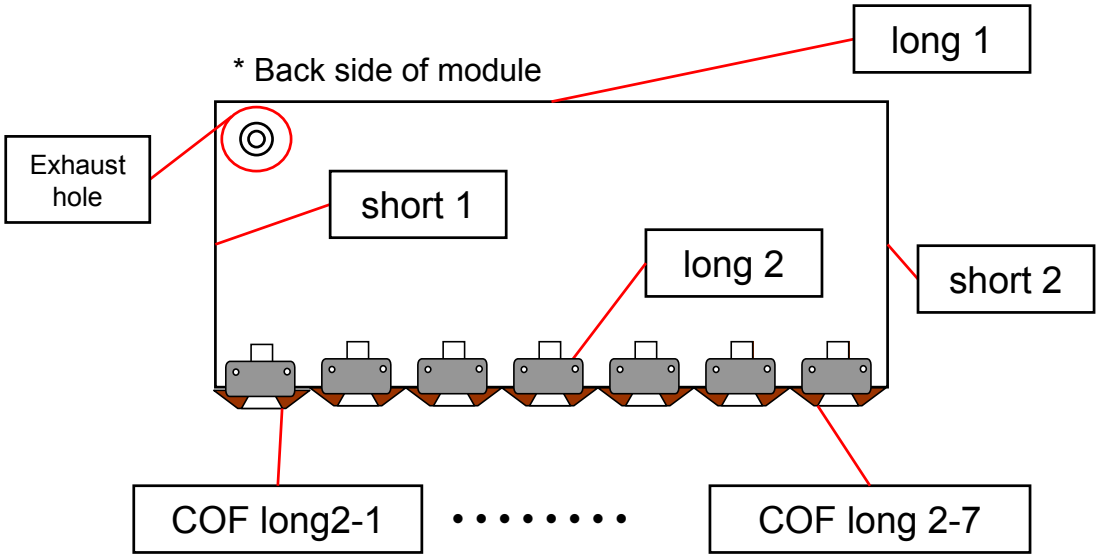
Y-SUS B/D

Y-DRIVE TOP

1. Introduction

Definitions

■ Definition of MODULE position

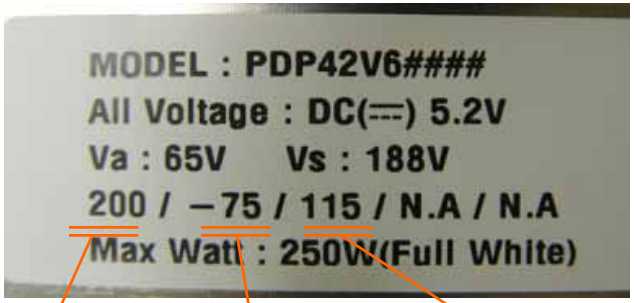


■ Identification label

① Model Name
② Bar Code (Code 128, Contains the manufacture No.)
③ Manufacture No.
④ The trade name of LG Electronics
⑤ Manufactured date (Year & Month)
⑥ The place Origin
⑦ Model Suffix

1. Introduction

■ **Voltage label (Attached on back side of module)**



■ **Part No. label (Attached on board)**

■ **COF serial No. label (attached on COF)**

1. Introduction

■ **Terms of defect**

Term	Appearance
Add short (line on)	
Add open (line off)	
Sus short (line on)	
Sus open (line off)	

2. Precaution

Safety precautions

Be sure to read this before service. When using/ handling this PDP module, Please pay attention to the below warning and cautions.

1. Before repairing there must be a preparation for 10 min.
2. Do not impress a voltage that higher than represented on the product.
3. Since PDP module uses high voltages, Be careful a electric shock
   and after removing power some current remains in drive circuit.
   so you can touch circuit after 1 min.
4. Drive circuits must be protected from static electricity.
5. The PDP module must be Moved by two man.
6. Be careful with short circuit of PDP boards when measuring any voltages.

Before request service

1. Check panel surface and appearance of B/D.
2. Check the model label. Whether it is boards of same model with label.
3. Before requesting Service, please inform us a detail defect phenomenon and history of module.
   it can be helpful to us for a smooth sevice.

Ex) COF long 2-1 fail ,address 1 line open, Y b/d problem , mis-discharge.

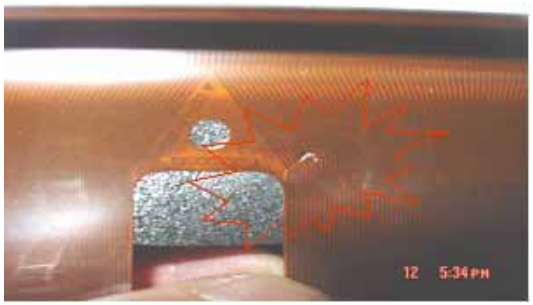
2. Precaution

Handle with care (COF)

COF is the most important component in the PDP module.

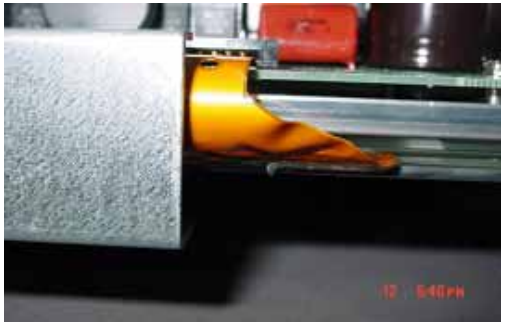
Even a little imperfection of COF can make a serious screen problem.

SCRATCHING

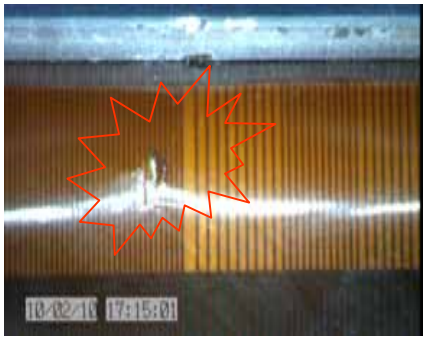


TEARING

BEING PUSHED



BENDING

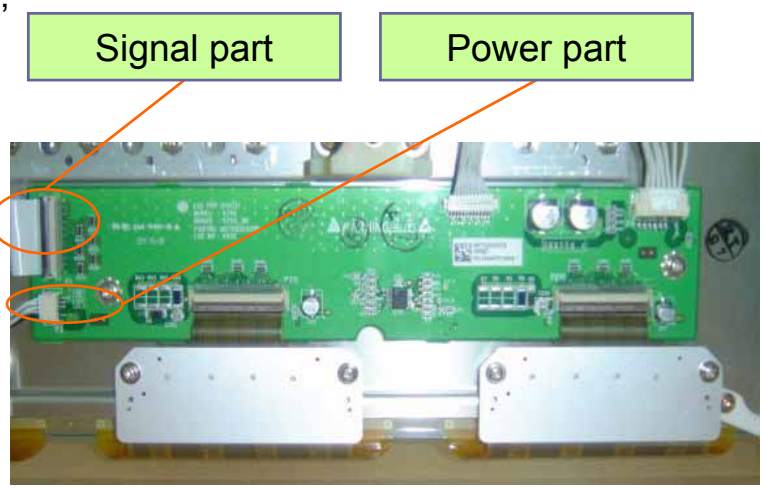


CHOPING

1. X B/D

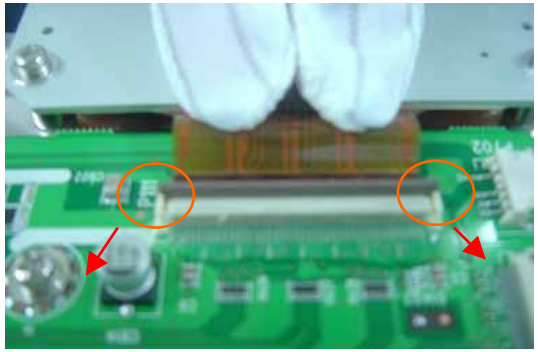
: receiving LOGIC signal from CONTROL B/D and make ADDRESS PULSE(generates Address discharge)by ON/OFF operation, and supplies this waveform to COF(data)

X LEFT B/D

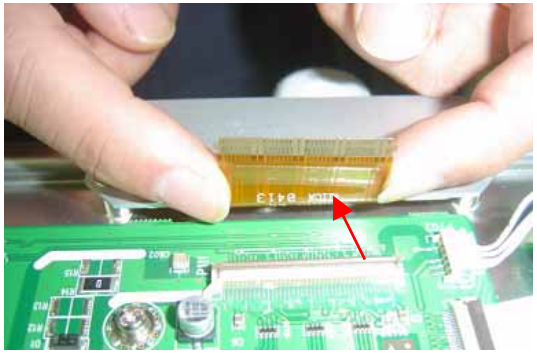


X RIGHT B/D

<COF Separating>



Lift up lock as shown in narrow.



Pull COF as shown in narrow.

2. Z sustain B/D

: make SUSTAIN PULSE and ERASE PULSE that generates SUSTAIN discharge in panel by receiving LOGIC signal from CONTROL B/D.

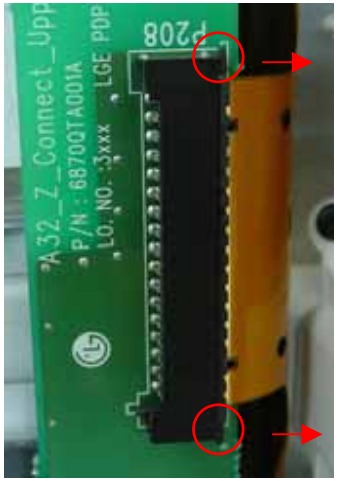
this waveform is supplied to panel through FPC(Z).

*composed with IPM,FET,DIODE, electrolytic capacitor ,E/R coil.

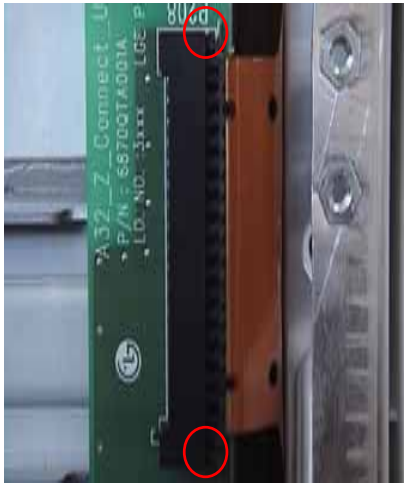
* IPM (Intelligent Power Module)

E/R(Energy recovery)

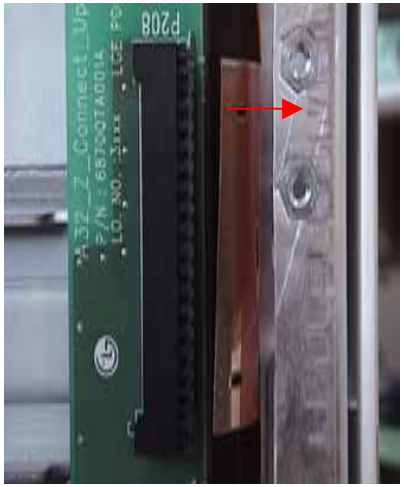
<FPC Separating>



Separate the fixed Screw of Z-Board.
Pull out Lock as shown in arrow.



Condition in Lock part is pulled



Pull FPC Connector
as shown in arrow.

3. Y drive B/D

1) This is a path to supply SUSTAIN ,RESET waveform which made from Y SUSTAIN B/D to panel through SCAN DRIVER IC.

2) Supply a wave form that select Horizontal electrode (Y SUSTAIN electrode) sequentially.

- potential difference is 0V between GND and Vpp of DRIVER IC in SUSTAIN period.
- being generated potential difference between GND and Vpp only in SCAN period.

* In case of 42” V6 use DRIVER IC IC 8 EA (TOP, BOTTOM: each 4EA)

4. Y sustain B/D

: generates SUSTAIN,RESET waveform, Vsc(SCAN)voltage.
and supplies it Y DRIVER B/D.

* Composed with IPM,DIODE, electrolytic capacitor ,FET.

5. Control Board

: creates signal processing (Contour noise,reduction ISM,..)
and an order of many FET on/off of each DRIVER B/D with
R,G,B each 8bit input.

* Use 3.3V/5V 2 kinds of power .

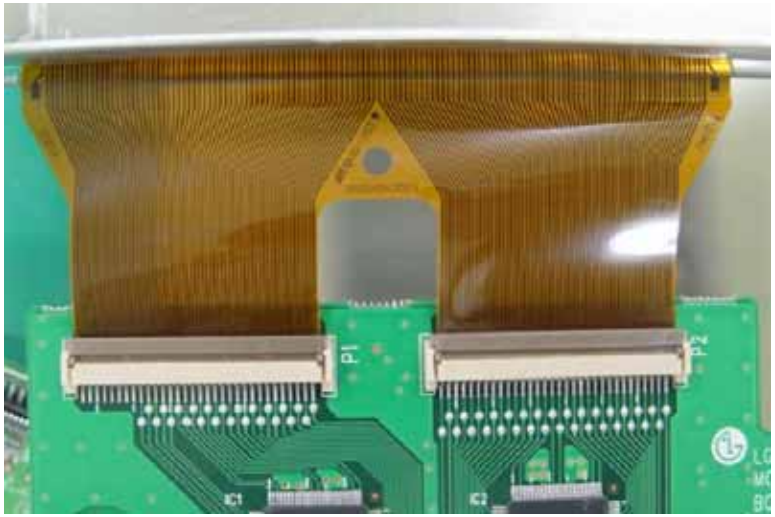
6. DC/DC Converter part

: Being impressed 5V, Va ,Vs,
DC/DC converter makes
5V,Va,Vs,Vset_up,Vsc
which is essential for each B/D.
There is no DC/DC B/D in
model 40〃 /42〃 (1 POWER B/D).
* 50〃 60〃 embedded DC/DC B/D
separately because of high power
consumption.

7. FPC (Flexible Printed Circuit)

: supply a driving waveform to PANEL by connecting a PAD electrode of PANEL with PCB(Y and Z).

* there is two type of this for Y B/D. One is single-sided, another is double-side. These are having pattern on it
* for Z B/D, there is no pattern , single-sided, and Beta type(all of copper surface).



8. FFC (Flat Flexible Cable)

: for connecting a Logic signal between B/D and B/D.

*There is 0.5mm pitch,50pin type
1mm pitch ,30pin type.

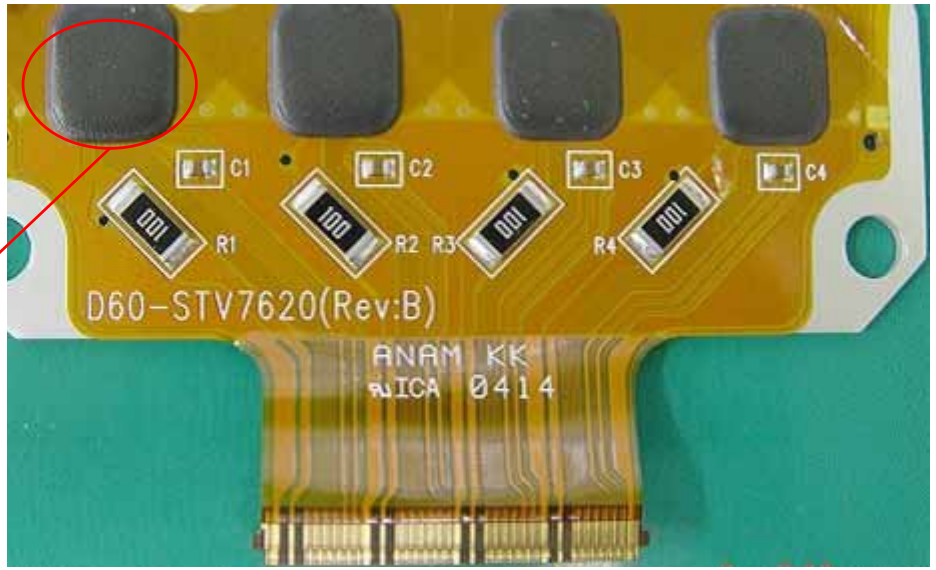
9. COF (Chip On Film)

: supply a waveform which made from X B/D to panel and select a output pin that is controlled by COF when be on or off.

96 output pin per IC.

— the more the resolution higher, the less spare space where can set IC on it in B/D. without using IC PACKAGE, we can use a BARE IC , so we can get IC with LOW COST

— because we do not solder IC on PCB directly, a soldering defect rate decrease.



Bare IC

* composition

1) FPC + Heat /Sink

⇒ FPC for COF must have a Low Spec decline with getting damp

2) CHIP resistor + CHIP CAPACITOR

3) BARE IC (STV7610A/WAF) + GOLD WIRE/AL WIRE

4) EPOXY MOLDING

* 42 V6 COF is the same as 42V5.

10. IPM(Intelligent Power Module)

: composition

HEATSINK,CAPACITOR

DIODE

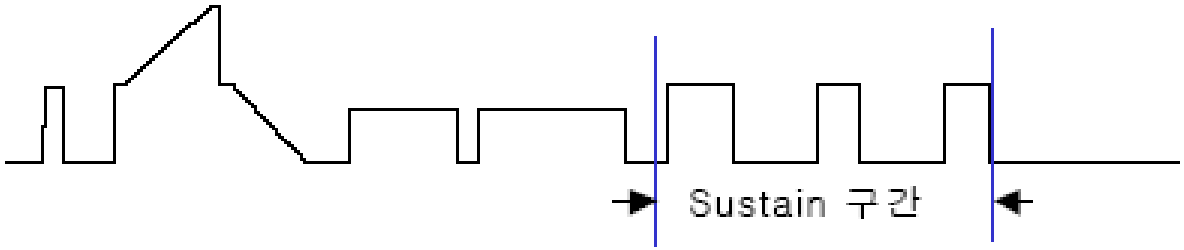
IC LINEAR

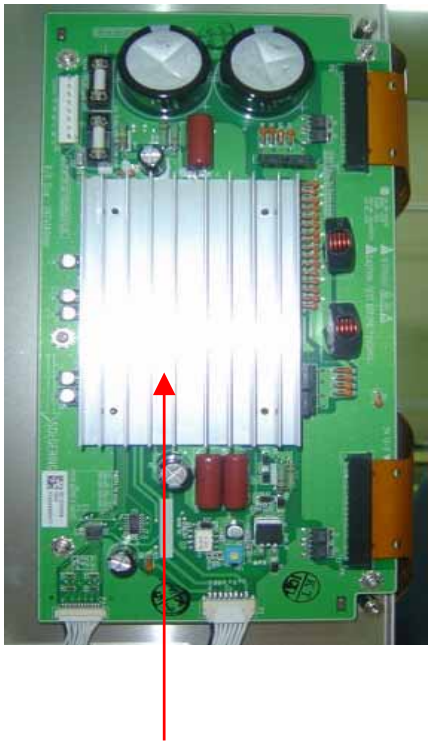
RESISTORTANSISTOR,FETS.

: description

Attached at Z B/D and Y B/D, make Sustain waveform.

Sustainer : supply a square wave to panel to make a video.

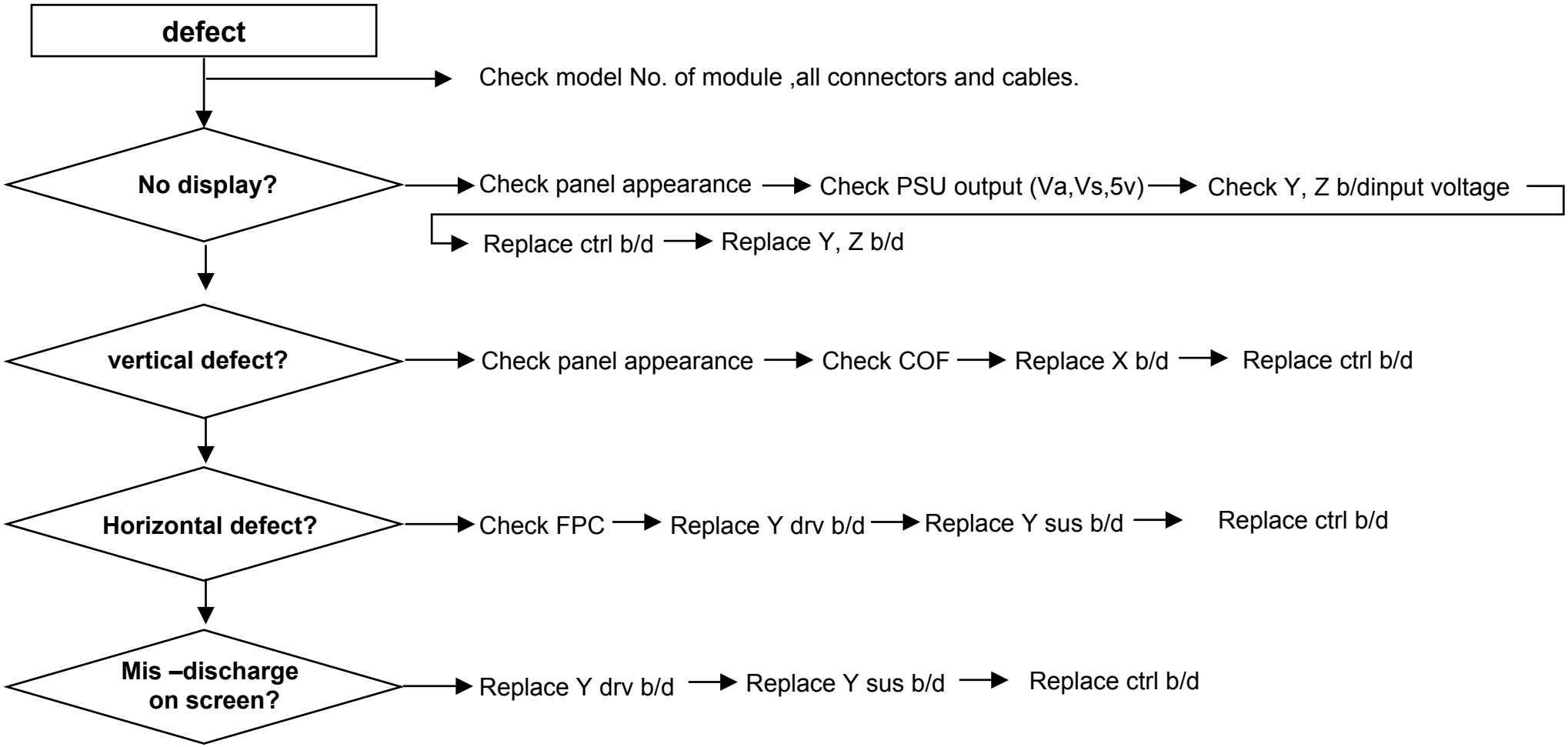




IPM

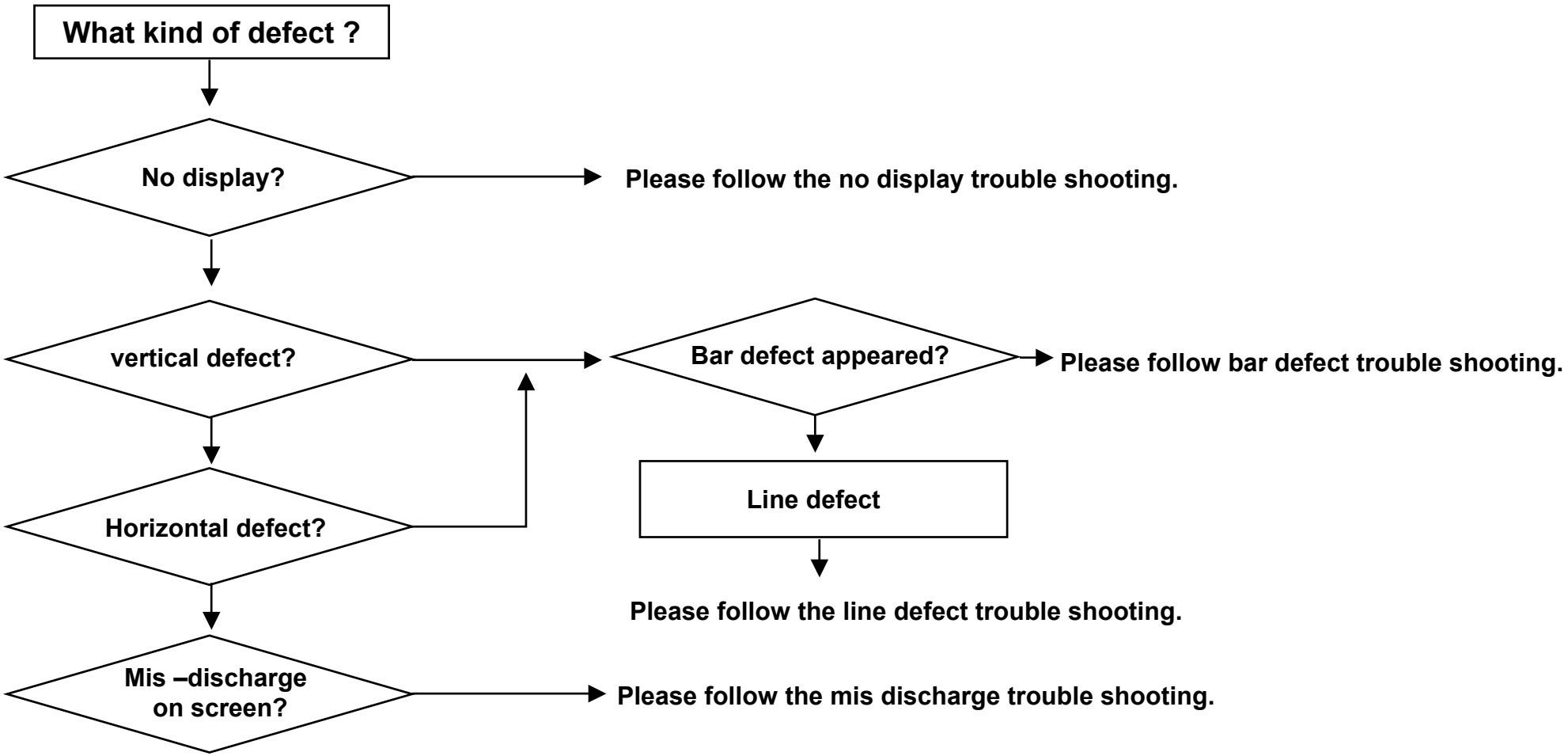
4. Trouble shooting.

Fast check up



4. Trouble shooting.

Logical judgment



4. Trouble shooting.

No display

Check each section with following method if there is problem, replace or repair that part.

If not go to the next section.

1. Connector

Confirm every Connector (PSU, Y-SUS, CTRL, Z-SUS)

⇒ module may not be normal by mis-connection which can not send signal and power.

Also Mis connection for a long time has a specific b/d failed.

CTRL B/D + Y-SUS

CTRL B/D + Z-SUS

CTRL B/D + X-B/D

Signal input(LVDS)

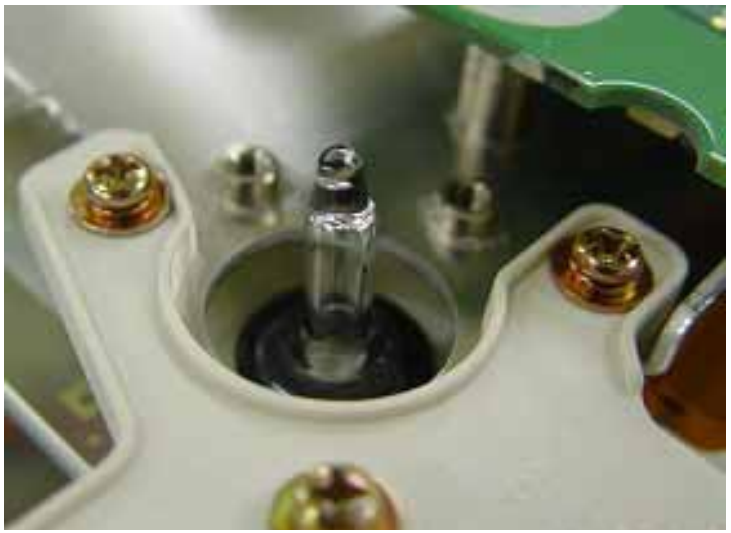
2. Exhaust tip Crack

Confirm exhausting Tip and find Crack with naked eyes to check vacuum state.

If there is problem replace the module .

⇒ in case of vacuum breakdown, module makes a shaking noise because of inside gas ventilation.

(there may be a small crack which could not see with naked eyes. And this noise is different from Capacitor noise.)



NORMAL

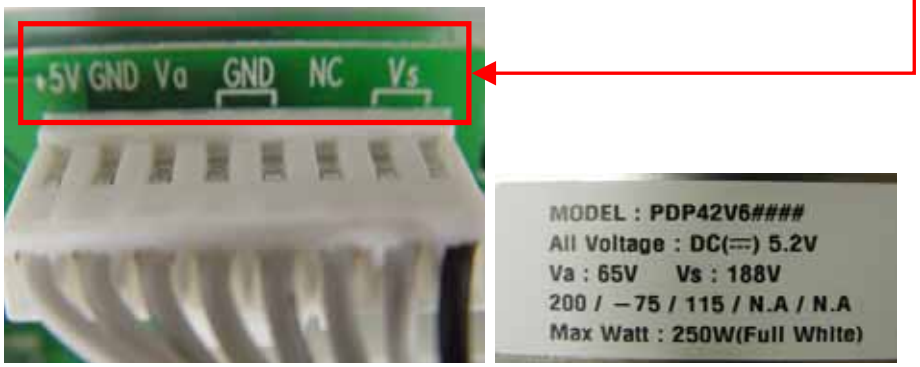
CRACKED

3. PSU(Power Supply Unit)

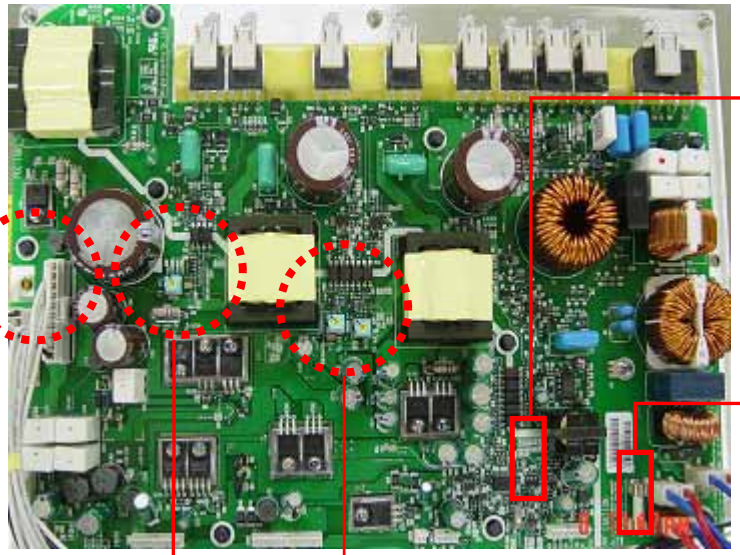
1. Check each unit part of PSU inside with naked eyes.
   (capacitor, FET, a kind of IC, resistor)
2. Check FUSE and SW1 (on Normal).
3. Check Output voltage which is converted from AC V to DC V.
   voltage Check (5V, Va, Vs)

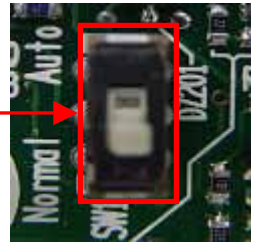
※ When PSU Protection occurred. Check Short between Y-SUS, Z-SUS B/D .

Confirm input voltage → if not same → **Adjust voltages**

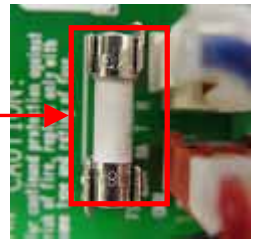


Multi-meter Touch point
(5V, Va ,Vs must accord with Module Label)

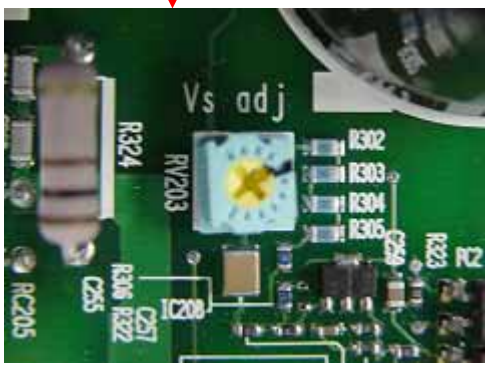




SW1 Normal



Fuse open check



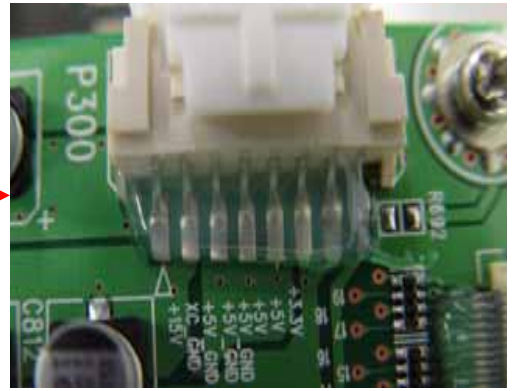
Vs Voltage ADJ
(Vs : About 180 ~195 V)

Va, 5V(VCC) Voltage ADJ
■ Va : About 55 ~65 V
■ 5V(VCC) : 5V~5.5V)

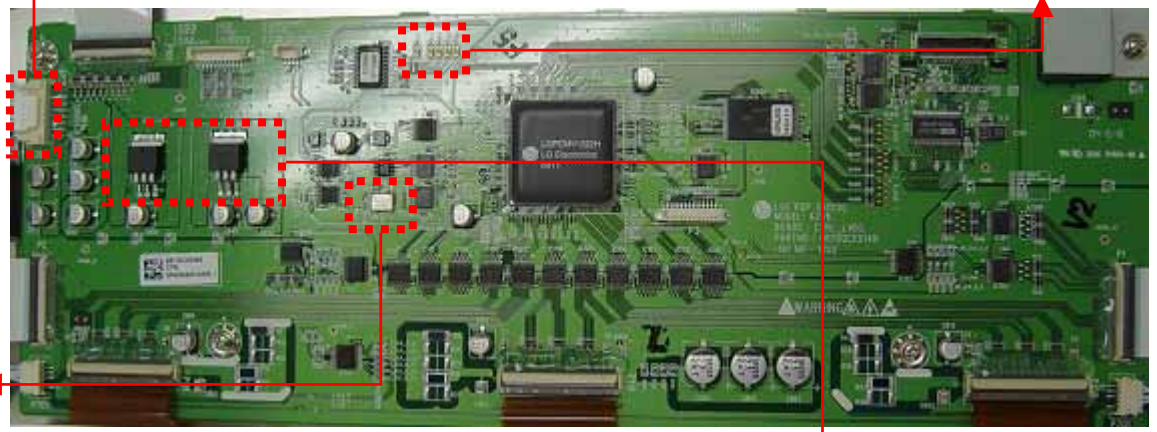
4. Ctrl B/D

1. Confirm LED D17(flashing) ,13 lighting
2. If not CHECK OSC X1 output.
3. Check CTRL input voltage
   (CONNECTOR P300)
4. CHECK 3.3V, 5V,15V.
5. Check IC 11 3.3V
   IC 3 2.5V

Input voltage



Diode



OSC(X1)

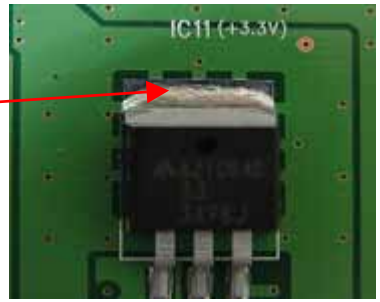
Probe
Touching
point

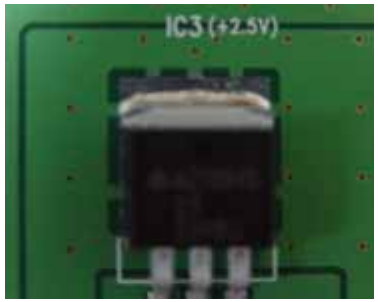
Check oscillating state.
(normal 100 MHZ)
Be careful with physical shock.

Check IC 11,13

DMM +

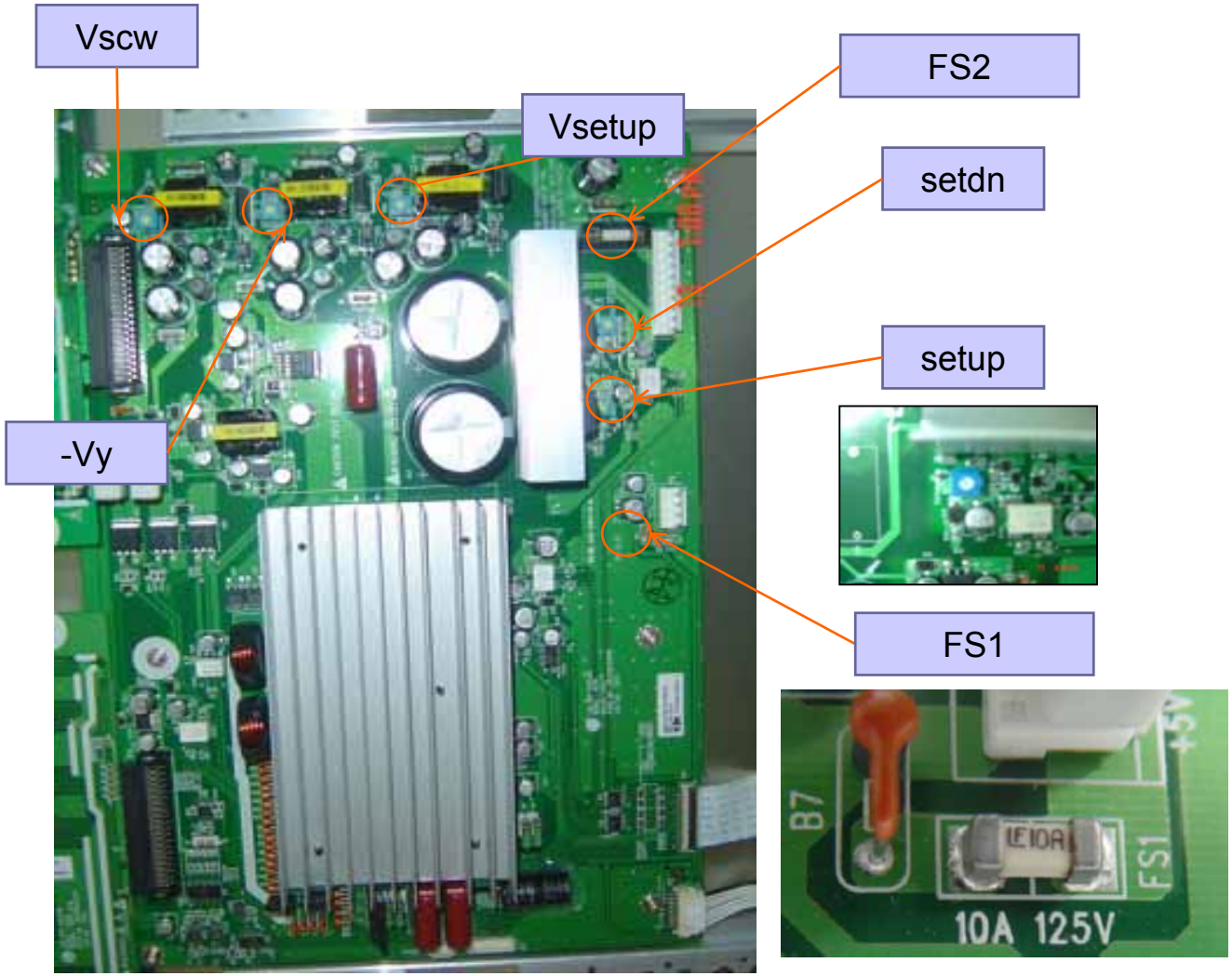
DMM – (GND)





5. Y-sus B/D

1. Check FUSE [FS1(5v) ,FS2(Vs)].
2. Check voltages(Vsetup,-Vy, Vscw)
3. Check DIODE between GND and Y SUS output.
   [SUSUP(OC2) SUSDN(OC1)].
   forward=0.4 ,reverse=OVERLOAD.
4. Check whether output voltages agrees
   with voltage that represented in label.

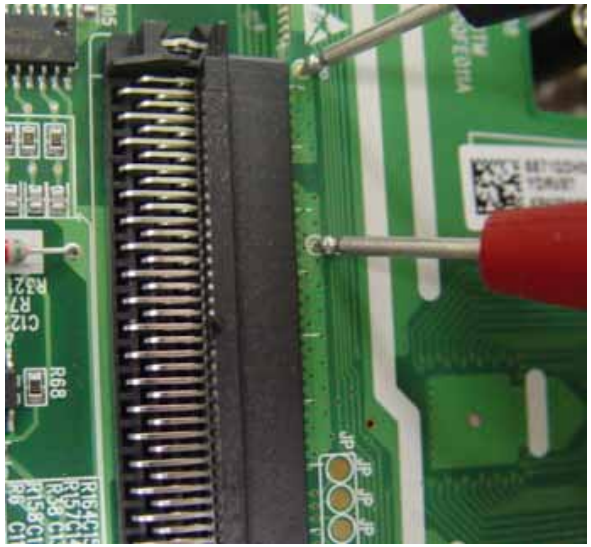


4. Trouble shooting.

■ Check whether output voltages agrees with voltage that represented in label.

■ Check diode value GND between Y-SUS output.

Normal diode value= 0.4 (forward)

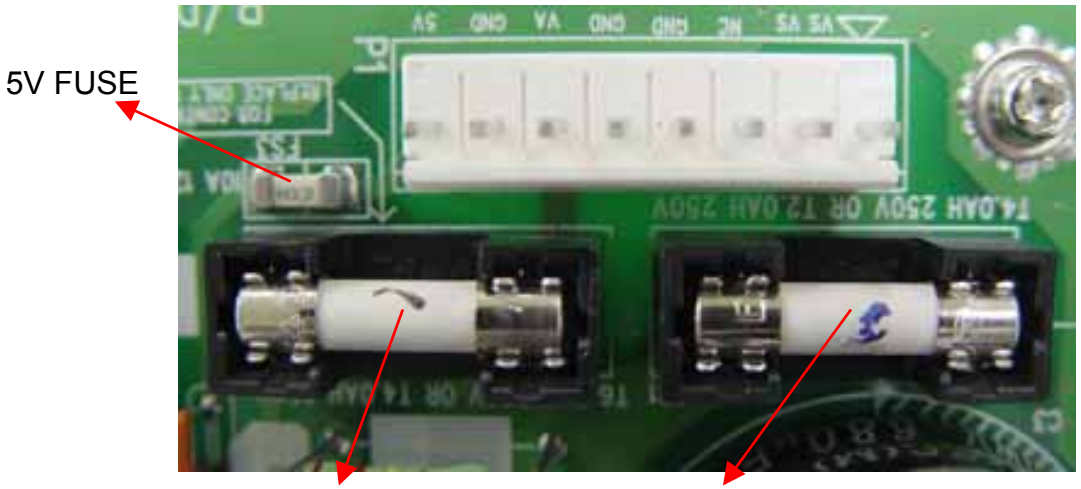


Normal diode value = OL (reverse)

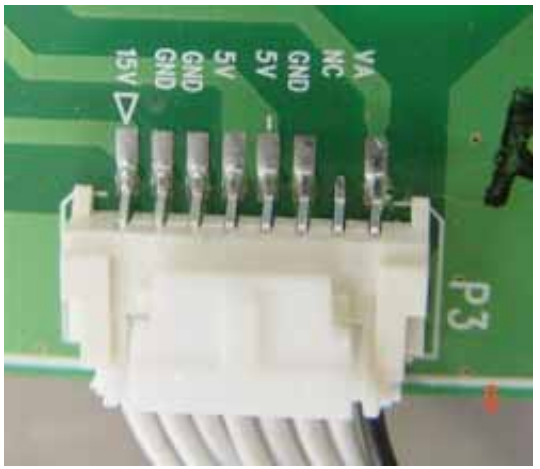
6. Z-sus B/D

1. Check the FUSE.
2. Check input voltages.(Va, 5V,15V)
3. Check FPC out put diode value.
4. Check ramp waveform.

■ Check the FUSE



■ Check input voltages



4. Trouble shooting.

■ Variable resistance of Z RAMP

waveform slope.

■ Check FPC output diode value.

caution: check certainly after removing FPC.

Normal diode value=0.375(forward)

Normal diode value=OVER LOAD(reverse)

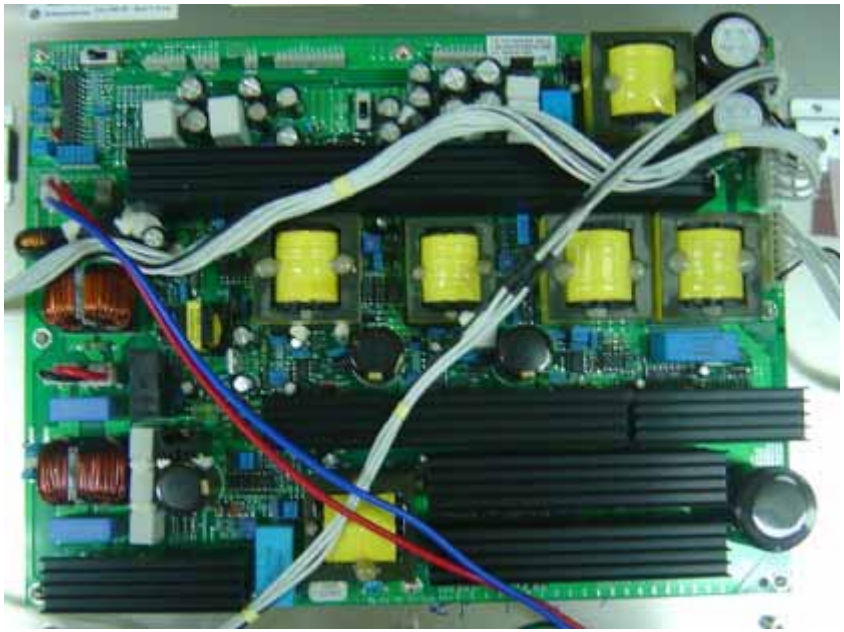
◎ Power protection

It is power protection when power is off automatically within 2~3 min. from power on.

Power protection function protect the boards when occurred short on circuits of PDP module or power problem.

If can not impress power even after replacing PSU, find out where the short occurred.

*** PSU makers.**



DAEGIL PSU

UNICON PSU

4. Trouble shooting.

Vertical defect (bar)

Check each section with following method if there is problem, replace or repair that part.

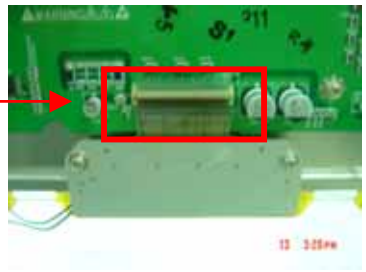
If not go to the next section.

1. Connector

Check COF connector.

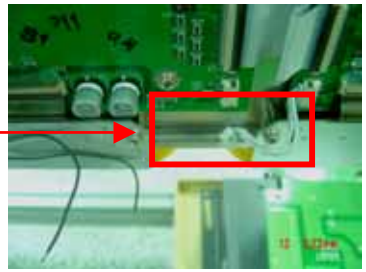
If not connected well,it will Make a bar defect .

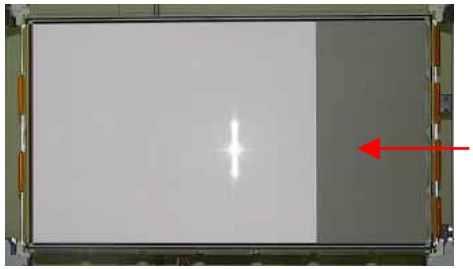
Check here



Bar

Check here



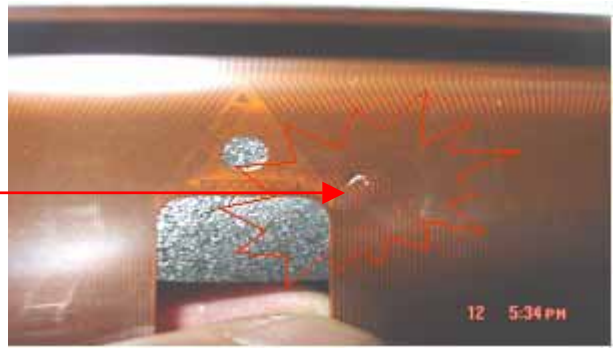


Off

2. Checking COF

Confirm whether COF was torn. And then check input of COF resistor and IC.

Tearing



COF 6 is torn partly

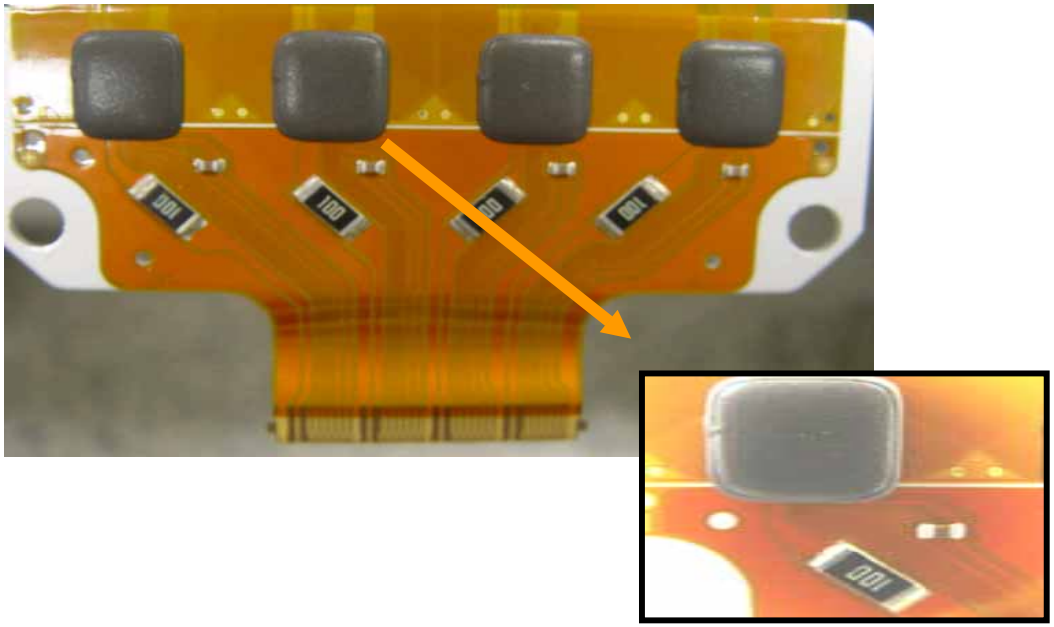
◎ Checking address COF input of resistor and IC

■ COF resistor checking

Check the both side of resistor With Digital multi meter(DMM) .

If the resistor is normal, the resistor value will be 10.2 ~ 10.8 Ω

But if not, the value will be 0 or infinity and replace the resistor.



◎ Checking address COF input of resistor and IC

■ IC input checking

Inside of IC , there is 4 ea diodes which separated in 2 series .

(input 2, output 2)

*how to check

1.contact DMM - terminal to a right terminal of condenser(GND)

and DMM + terminal to a right terminal of IC, normal value 0.66 (fig.1)

2.contact DMM - terminal to Output terminal of resistor, and

DMM + terminal to a right terminal of IC , normal value 0.73 (fig.2)

Fig. 1

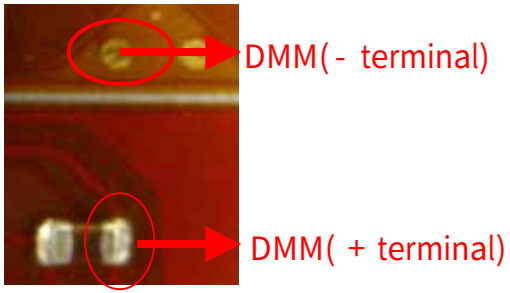
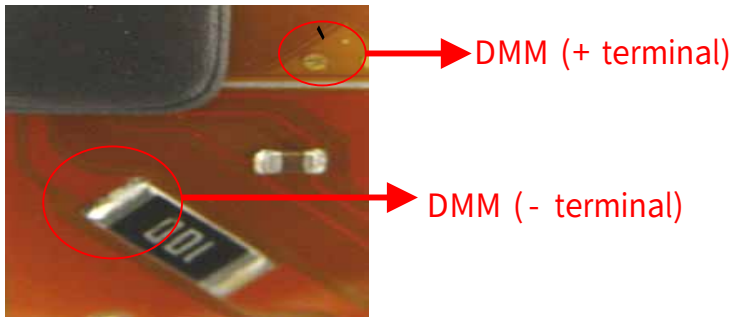


Fig. 2



3. Ctrl B/D

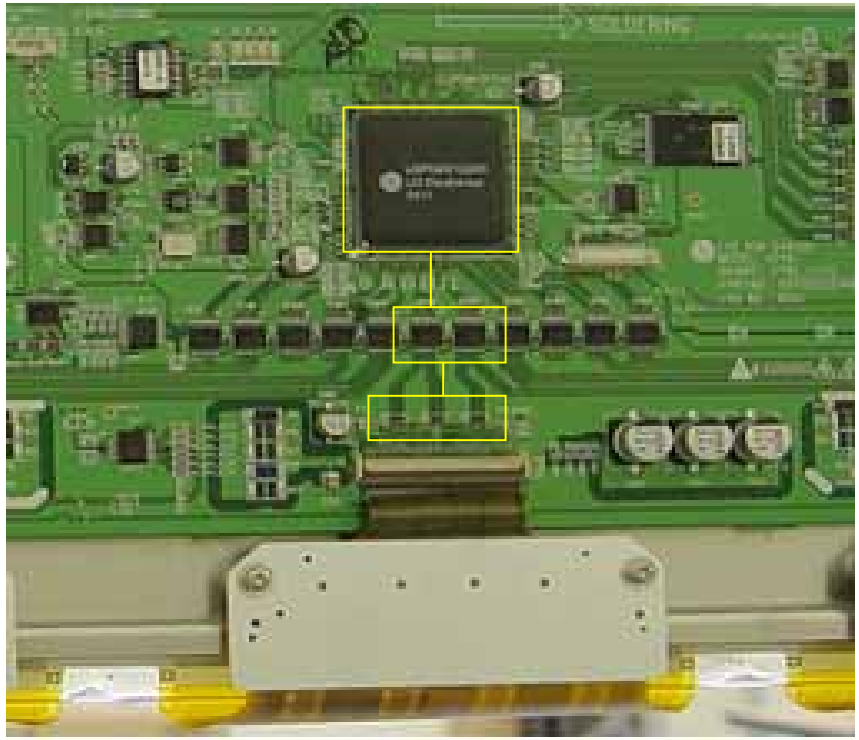
CTRL B/D supplies video signal to COF. So if there is a bar defect on screen,

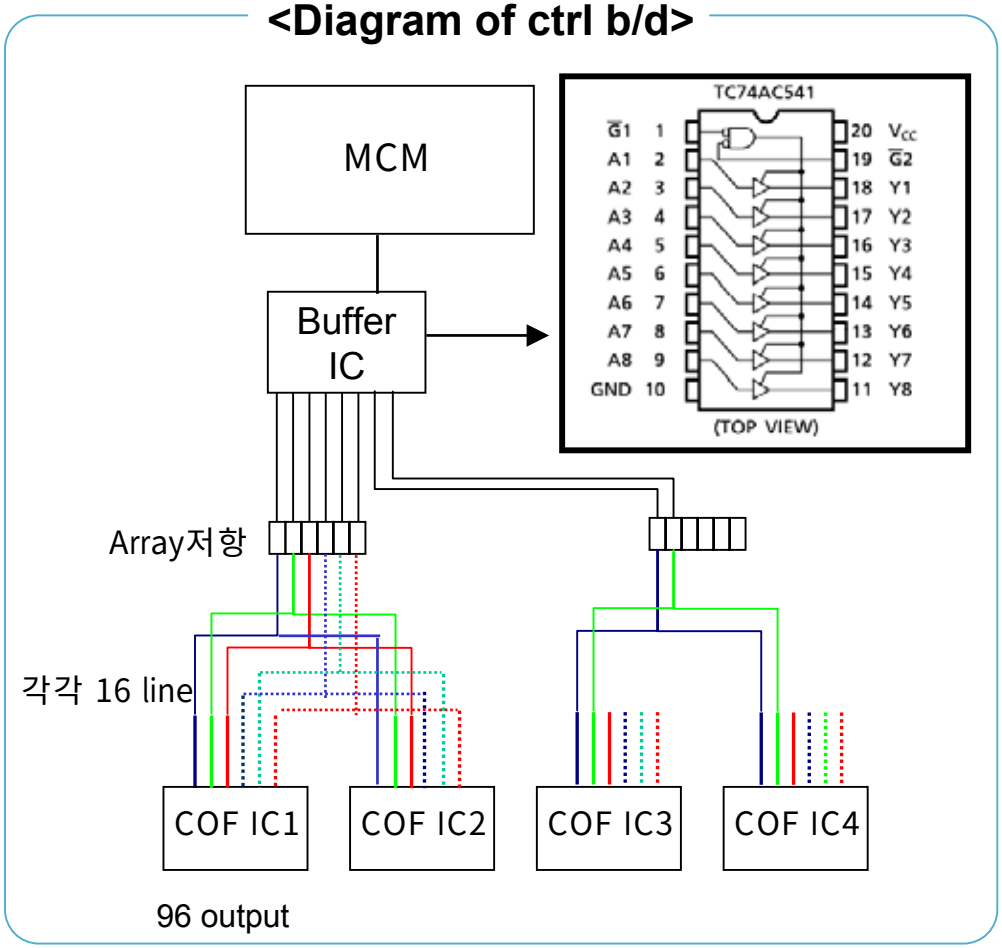
It may be the ctrl b/d problem.

A flow of address signal

In this figure, we can easily suppose

what will be appeared on screen when a specific part failed.





4. Trouble shooting.

Vertical defect (line)

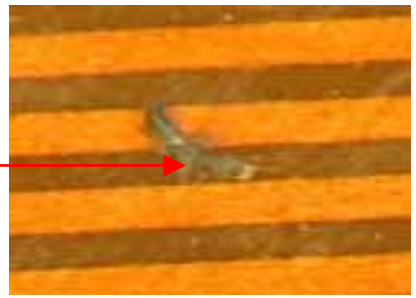
In case of 1 line open or short , check foreign substances in COF connector.

First blow up foreign substances with your mouth. And then if the same line appears, replace the panel.

1 line open or short

This phenomenon is due to COF IC inside short or adherence part of the Film and rear panel electrode problem.
In this case, replace the panel.

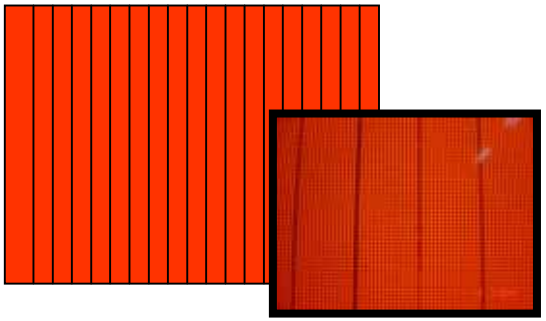
1 electrode open



1 line open

Line open or short with same distance.

This is MCM of Ctrl b/d defect. MCM can not be replaced separately. So replace the ctrl b/d.



MCM (Multi Chip Module)

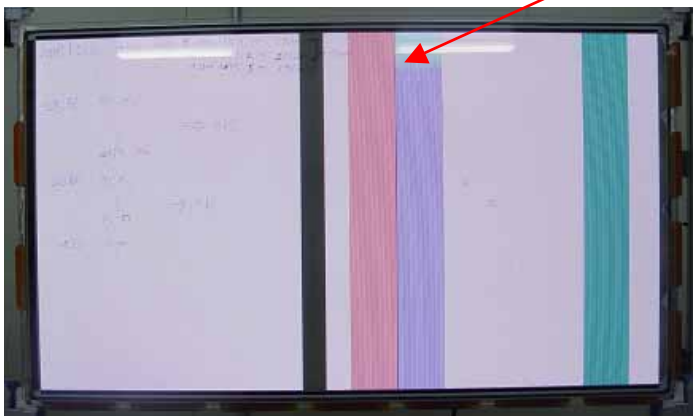
line defect from each parts

- **Case 1: Buffer IC fail**

COF IC 1,2 ⇒ 192 line(96+96) open.

COF IC 3,4 ⇒ 64 line open (with fixed interval there is on,off ……. Repetition)

16 line open



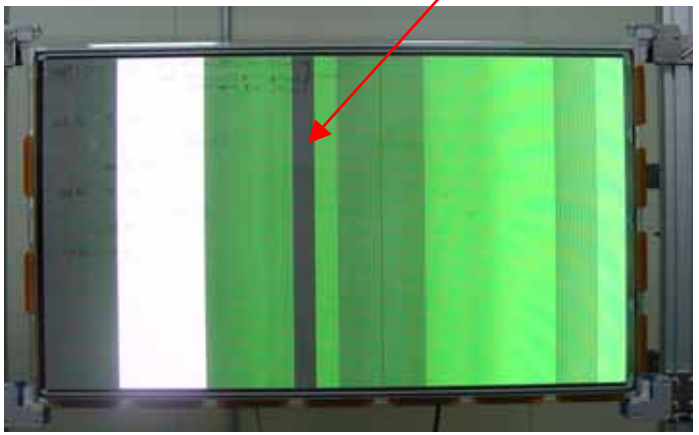
- **case 2 : Array resistor fail**

COF IC1 ⇒ 16 line , COF IC2 ⇒ 16 line open

- **case3 : COF IC fail**

96 line open.

96 line open



4. Trouble shooting.

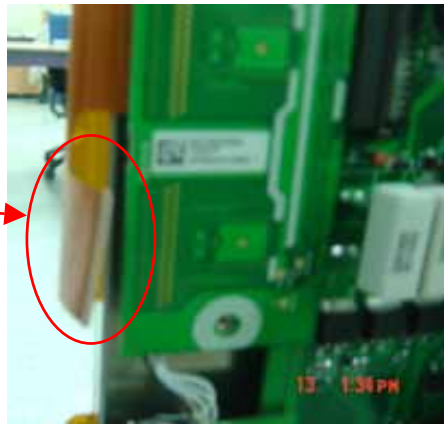
Horizontal (bar)

Most horizontal defects can be repaired. In case of adherence part of the Film and rear panel electrode defect or panel electrode open,short , replace the panel.

1. Connector

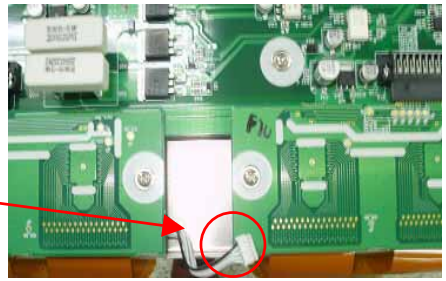
It can make a horizontal bar that connector on Y b/d and Z b/d did not plugged well. Because sustain voltage can not be supplied to panel. So check connectors (FPC, Y drv –Y drv) first.

Disconnected



Horizontal bar

Disconnected

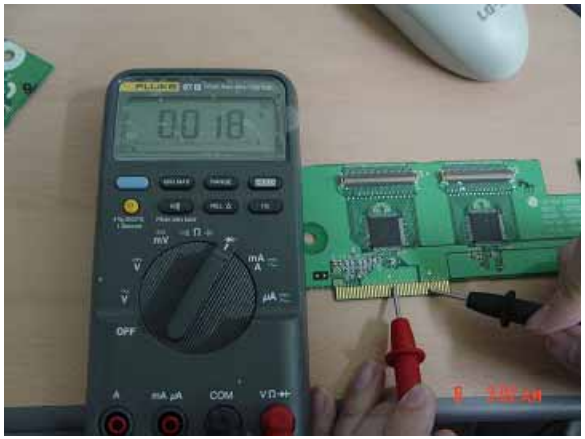


Screen off

2. Scan IC check

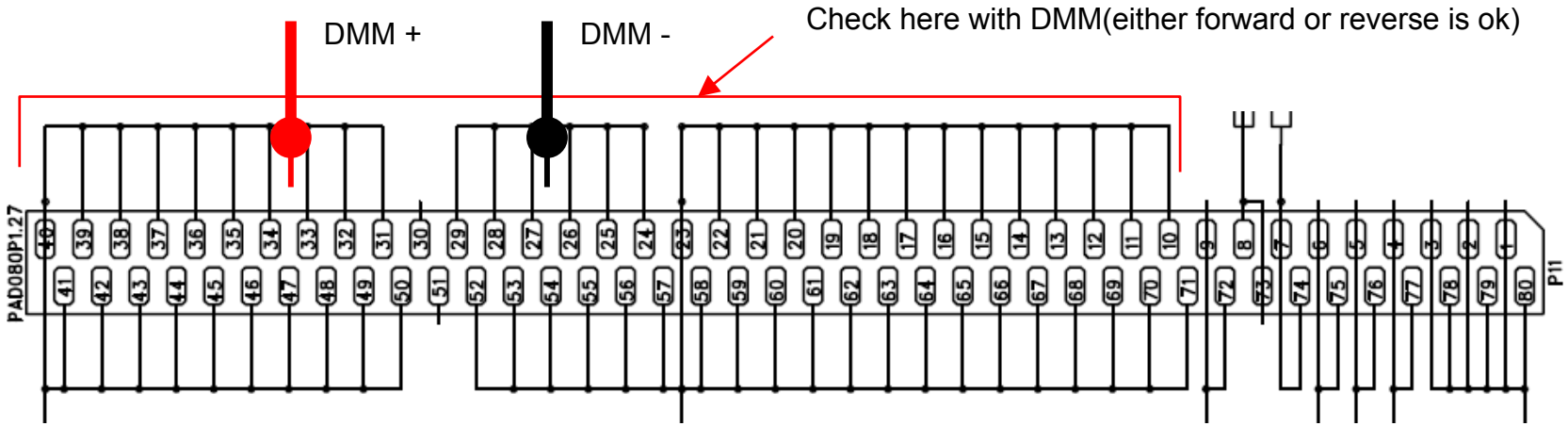
Check diode value of the right side part of output pin.

Normal diode value. (in case of Panasonic IC=1.035)



Defect diode value= 0.018

* It can be different from each IC Maker. (in case of TI IC= 0.6~0.7)



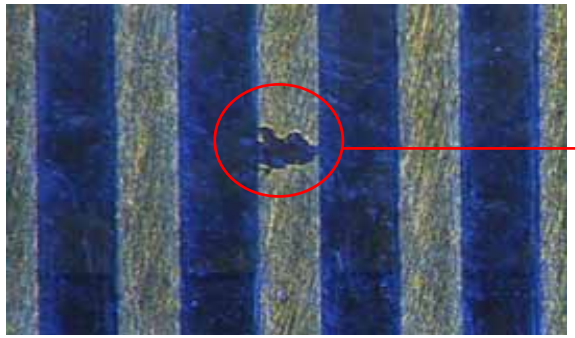
4. Trouble shooting.

Horizontal (line)

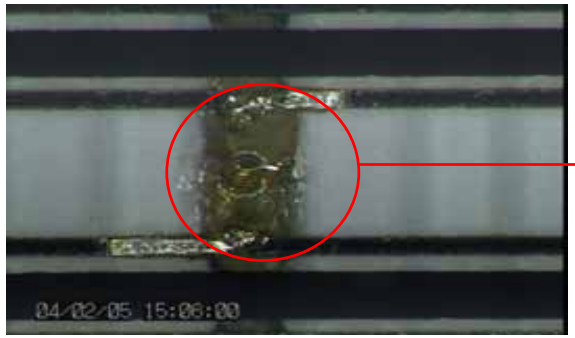
1. Check FPC

In case of horizontal 1 or more line, it is due to FPC or panel inside .

ctrl b/d, Y b/d is just normal.

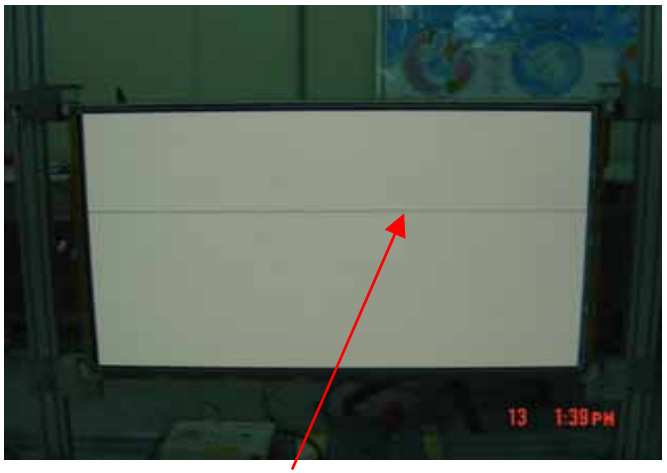


FPC electrode open



Panel electrode

Insulation break down

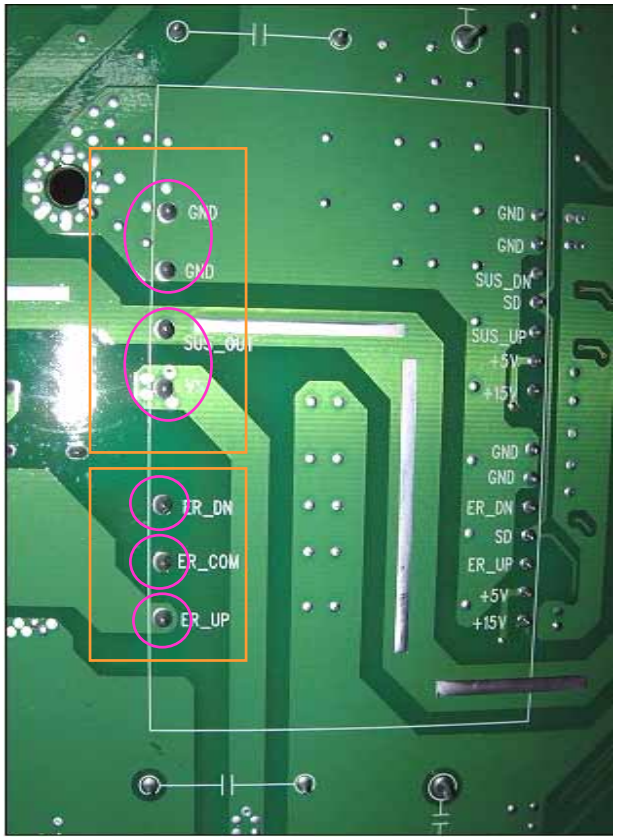


Horizontal 1 line.

2. Check scan IC

Check with same method that presented in Horizontal (bar).

◎ How to check IPM



Forward : test 1 GND(＋) , Sus-out(－)
2 Sus-out(＋),Vs(－)
3 ER-DN(－),ER-COM(＋)
4 ER-COM(－),ER-UP(＋)

when each 4 TEST Diode value is over 0.4V => **OK**

Reverse : test 1 GND(－) , Sus-out(＋)
2 Sus-out(－),Vs(＋)
3 ER-DN(＋),ER-COM(－)
4 ER-COM(＋),ER-UP(－)

when each 4 nodes TEST Diode value is infinity => **OK**

※ Specially, the value of ER-UP,COM,DN in the Y/Z board, should be checked all of them. but, the terminal of Vs,Sus-out,GND, we must aware to know after check one of IPM because it is parallel.

→ **if no problems, check 15V(Y,Z B/D) with GND, ➔ Forward value 0.3V, Reverse value infinite. If no problems,**

❑ General

1) Do not place this product in a location that is subject to heavy vibration, or on an unstable surface such as an inclined surface. The product may fall off or fall over, causing injuries.

2) When moving the product, be sure to turn off the power and disconnect all the cables. While moving the product, watch your step. The product may be dropped or fall, leading to injuries of electric shock.

3) Do not place this product in a location that is subject to heavy vibration, or on an unstable surface such as an inclined surface. The product may fall off or fall over, causing injuries.

4) Before disconnecting cable from the product, be sure to turn off the power. Be sure to hold the connector when disconnecting cables. Pulling a cable with excessive force may cause the core of the cable to be exposed or break the cable, and this can lead to fire or electric shock.

5) This product should be moved by two or more persons. If one person attempts to carry this product alone, he/she may be injured.

6) This product contains glass. The glass may break, causing injuries, if shock, vibration, heat, or distortion is applied to the product.

7) The temperature of the glass surface of the display may rise to 80°C or more depending on the conditions of use. If you touch the glass inadvertently, you may be burned.

8) Do not poke or strike the glass surface of the display with a hard object. The glass may break or be scratched. If the glass breaks, you may be injured.

9) If you glass surface of the display breaks or is scratched, do not touch the broken pieces or the scratches with bare hands. You may be injured.

10) Do not place an object on the glass surface of the display. The glass may break or be scratched.

Spare Part List for PDP4206EA

Item	Part Number	Part Description	Usage / unit	Unit
1	E6205-001003	42” ED PDP Module	1	piece
2	900-420103-01B	42” Glass Filter	1	piece
3	E7801-100001	Main PCBA	1	set
4	E7801-100002	Audio PCBA	1	set
5	771S42D101-01	ATSC PCBA	1	set
6	771-42D111-01	Control PCBA	1	set
7	771-42D111-02	IR PCBA	1	piece
8	E4101-027001	Power Switch	1	piece
9	E4801-116002	Speaker	2	piece
10	208-SPA101-01R	Speaker box top cabinet	2	piece
11	209-SPA101-01R	Speaker box bottom cabinet	2	piece
12	E3301-028005	Speaker Terminal	1	piece
13	E3404-157004	AC Power Cord	1	piece
14	E3421-926080	LVDB Cable	1	piece
15	E3421-925049	Connection Cable 1	1	piece
16	E3421-926083	Connection Cable 3	1	piece
17	E3421-926084	Connection Cable 4	1	piece
18	E3421-927001	Power Switch Cable 1	1	piece
19	E3421-927002	Power Switch Cable 2	1	piece
20	E3421-925050	12P Wire Assembly	1	piece
21	E3421-925051	4P Wire Assembly	1	piece
22	E3421-925052	6P Wire Assembly	1	piece
23	E3421-926081	Control PCBA Cable	1	piece

Spare Part List for PDP4206EA

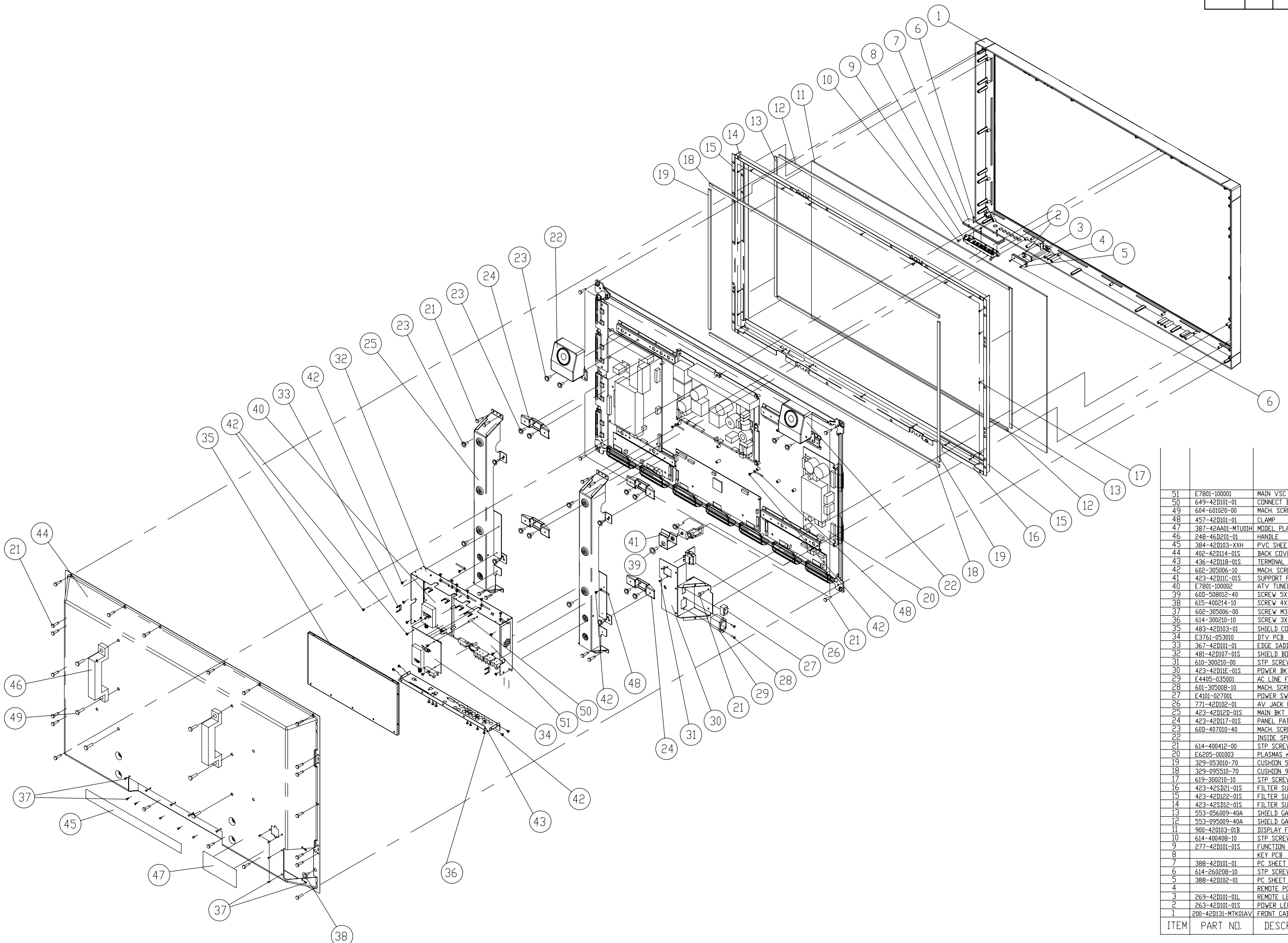
Item	Part Number	Part Description	Usage / unit	Unit
24	E3421-926094	IR PCBA Cable	1	piece
25	E7501-051006	Remote Control	1	piece
26	E7301-010002	AAA size Battery	1	pair
27	200-42D131-MTK01AV	Front Plastic Frame	1	piece
28	277-42D101-01S	Function Knob	1	piece
29	263-42D101-01S	Power Lens	1	piece
30	269-42D101-01L	IR Lens	1	piece
31	481-42D107-01S	PCBA Shield Box	1	piece
32	483-42D103-01	PCBA Shield Top Cover	1	piece
33	436-42D118-01S	Terminal Frame	1	piece
34	402-42D114-01S	Metal Back Cover	1	piece
35	423-42D11E-01S	Power Frame	1	piece
36	510-42D101-MTU01K	Top Carton Box	1	piece
37	511-42D111-01K	Bottom Carton Box	1	piece
38	300-42D106-02C	Top Cushion	1	piece
39	300-42D105-02C	Bottom Cushion	1	piece
40	244-34B811-01	Carton Box handle	2	piece
41	310-504004-01	Main unit Plastic Bag	1	piece
42	310-151404-01T	Instruction Manual Plastic Bag	1	piece
43	580-P42AAEM-TU01L	Instruction Manual	1	piece
44	388-42SB04-01H	Power Socket Label	1	piece
45	388-42D103-01H	Caution Label	1	piece
46	387-42AA01-MTU01H	Model Plate Label	1	piece

Spare Part List for PDP4206EA

Item	Part Number	Part Description	Usage / unit	Unit
47	388-42SB02-01H	Speaker Terminal Label	1	piece
48	384-42D103-MTU01H	Terminal Label	1	piece
49	590-42AA01-03	Warranty Sheet	1	piece
50	593-42AA01-02	Insertion card	1	piece
51	579-42D102-09	Model Plate Serial Number	1	piece
52	579-42AA01-04	Bar Code Label	2	piece
53	579-42D103-02	Power Switch Label	1	piece
54	568-P46T02-02	Warning Label	1	piece
55	734-BP0302-01	Duck Feet Stand	1	pair

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

DWG. REV.	ZONE	DESCRIPTION	DATE	REVISOR



ITEM	PART NO.	DESCRIPTION	QTY	REMARK
51	E7801-100001	MAIN VSC PCB	1	
50	649-42D101-01	CONNECT BOSS	1	
49	604-601020-00	MACH. SCREW M6X20	6	
48	457-42D101-01	CLAMP	11	
47	387-42AA01-MTU01H	MODEL PLATE	1	
46	248-46D201-01	HANDLE	2	
45	384-42D103-XXH	PVC SHEET FOR MAIN BOARD	1	
44	402-42D114-01S	BACK COVER	1	
43	436-42D118-01S	TERMINAL SHEET	1	
42	602-305006-10	MACH. SCREW 3X6	41	
41	423-42D11C-01S	SUPPORT FOR PW BKT	1	
40	E7801-100002	ATV TUNER PCB	1	
39	60D-508012-40	SCREW 5X12	1	
38	615-400214-10	SCREW 4X14	1	
37	602-305006-00	SCREW M3X5	16	
36	614-300210-10	SCREW 3X10	5	
35	483-42D103-01	SHIELD COVER e-room	1	
34	E3761-053010	DTV PCB	1	
33	367-42D101-01	EDGE SADDLE 14MM	6	
32	481-42D107-01S	SHIELD BOX SANAUI	1	
31	610-300210-00	STP SCREW 3X10	2	
30	423-42D11E-01S	POWER BKT FOR V5/V6	1	
29	E4405-035001	AC LINE FILTER	1	
28	601-305008-10	MACH. SCREW 3X8	2	
27	E4101-027001	POWER SWITCH	1	
26	771-42D102-01	AV JACK PCB	1	
25	423-42D12D-01S	MAIN BKT FOR V6/FORMOSA	2	
24	423-42D117-01S	PANEL PATCH FOR V6	4	
23	60D-407010-40	MACH. SCREW W/SP WASHER 4X10	21	
22		INSIDE SPK BOX	1	
21	614-400412-00	STP SCREW 4X12	34	
20	E6205-001003	PLASMAS module LG 42X2	1	
19	329-053010-70	CUSHION 530X10X7MM	2	
18	329-095510-70	CUSHION 955X10X7MM	2	
17	619-300210-10	STP SCREW 3X10	22	
16	423-42SD21-01S	FILTER SUPPORT BTM	1	
15	423-42D122-01S	FILTER SUPPORT L&R	2	
14	423-42SD12-01S	FILTER SUPPORT TOP	1	
13	553-056009-40A	SHIELD GASKET 500X9X2.5MM	2	
12	553-095009-40A	SHIELD GASKET 950X9X2.5MM	2	
11	900-42D103-01B	DISPLAY FILTER GLASS	1	
10	614-400408-10	STP SCREW 4X8	2	
9	277-42D101-01S	FUNCTION KNOB	1	
8		KEY PCB	1	
7	388-42D101-01	PC SHEET FOR KEY PCB	1	
6	614-260208-10	STP SCREW 2.6X8	5	
5	388-42D102-01	PC SHEET FOR REMOTE PCB	1	
4		REMOTE PCB	1	
3	269-42D101-01L	REMOTE LENS	1	
2	263-42D101-01S	POWER LEN	1	
1	200-42D131-MTK01AV	FRONT CABINET	1	

116

Exploded View

DRAWN.						
CHECKED						
APPRD.						

3rd ANGLE PROJECTION

TOLERENCE UNLESS OTHERWISE SPECIFIED
0 MM~8 MM ± 0.1
8 MM~25MM ± 0.15
25MM~80MM ± 0.2
80MM~250MM ± 0.3
250MM~ABOVE ± 0.6
ANGULAR: ± 1°

KAWA ELECTRONIC R & D CENTRE

MATL.

FINISH

TITLE PD42EAALUSXM1-A01

MODEL NO. PDP42EA06

A2 | PART NO. | DWG. NO.

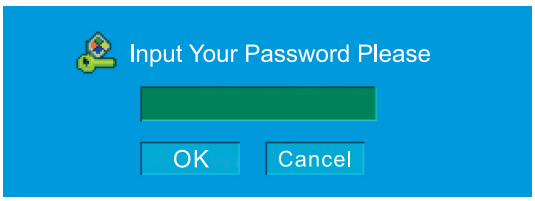
SCALE NIL | QTY. | SHEET 1 OF 1

If you forget your V-Chip Password

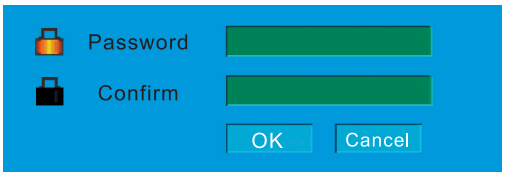
- Omnipotence V-Chip Password: 8205.

Using the “Change Password” item

1. When enter the “Parental” menu, select “Change Password”.
2. Press ▲ or ▼ button to highlight the “Change Password” item.
3. Press **Enter** button to confirm and pop up a menu.



4. Use 0~9 buttons input the omnipotence password(8205), then Press **Enter** button to enter and pop up a menu.



5. Use 0~9 buttons input your new password.
6. Press ▼ button to move to confirm blank.
7. Use 0~9 buttons input your new password again.
8. Press **Enter** button to confirm

-Suggest: Change to your familiar Password again.

Software upgrade

Process of update MT8205AE

Preparing :

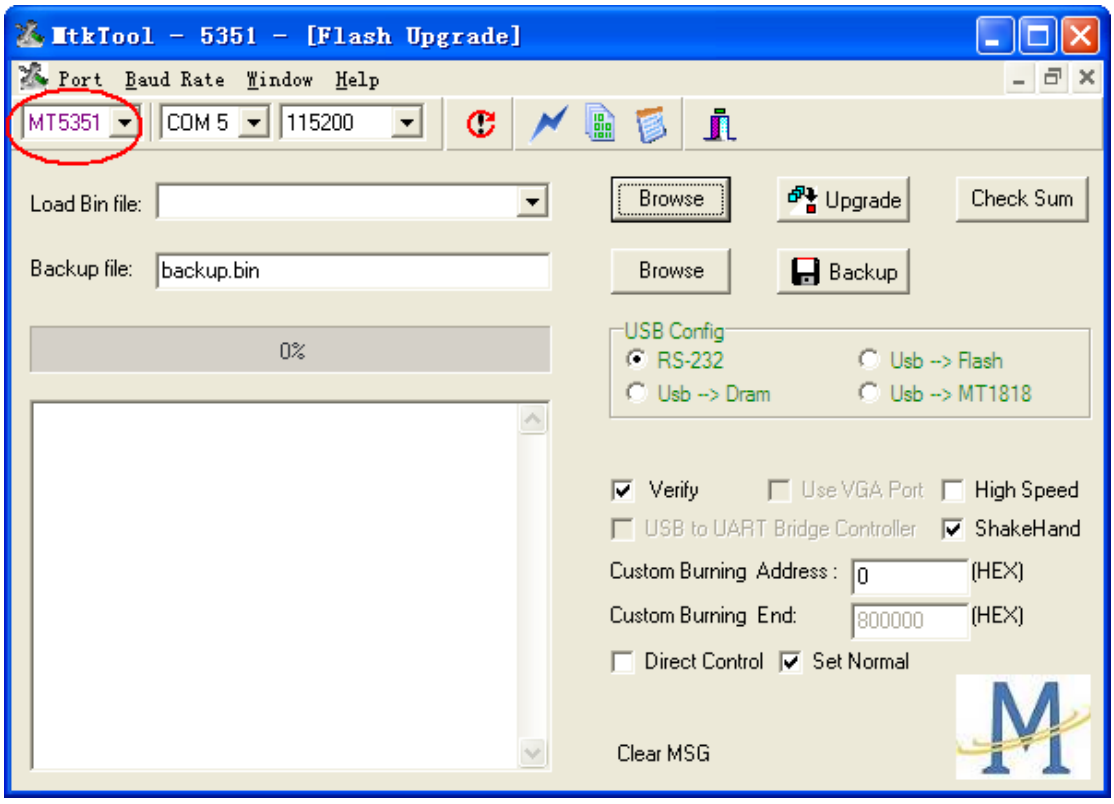
1) Connect RS232-VGA download line, One connector is connected to VGA connect port of Plasma TV while another side is connected to PC COM port.

2) Store the MtkTool into the PC .

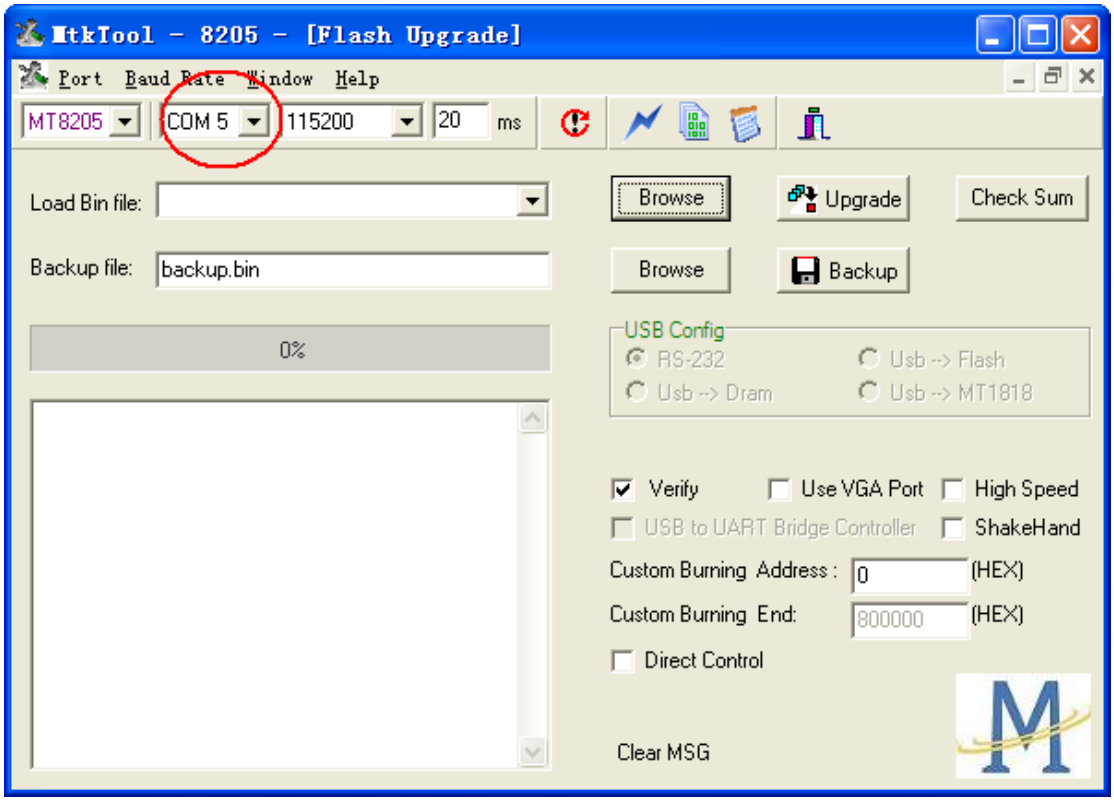
Downloading :

3) Turn on AC power and wait TV entering standby mode, while the color of the power indicator is Red.

4) Execute MTKtool and select the chipset as MT8205. (the software of MTKtool will be sent to your side)

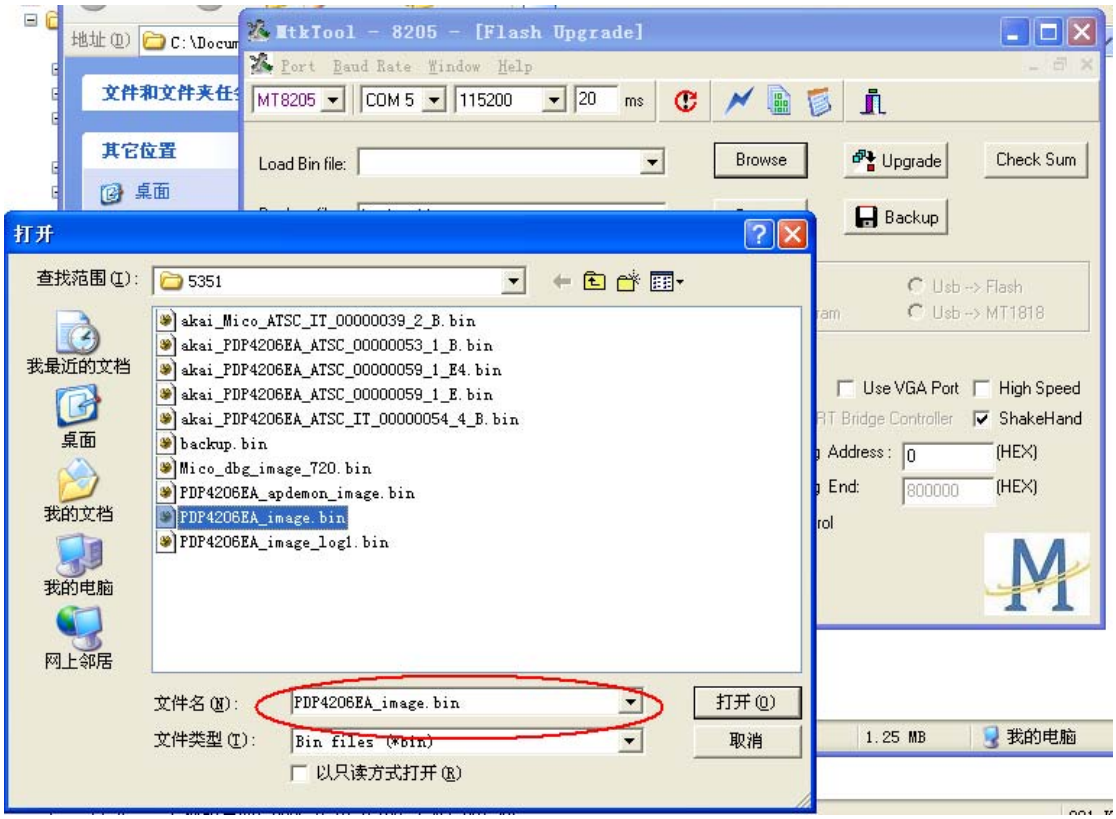


5) Select current COM port. (please try to check the COM port of your PC).

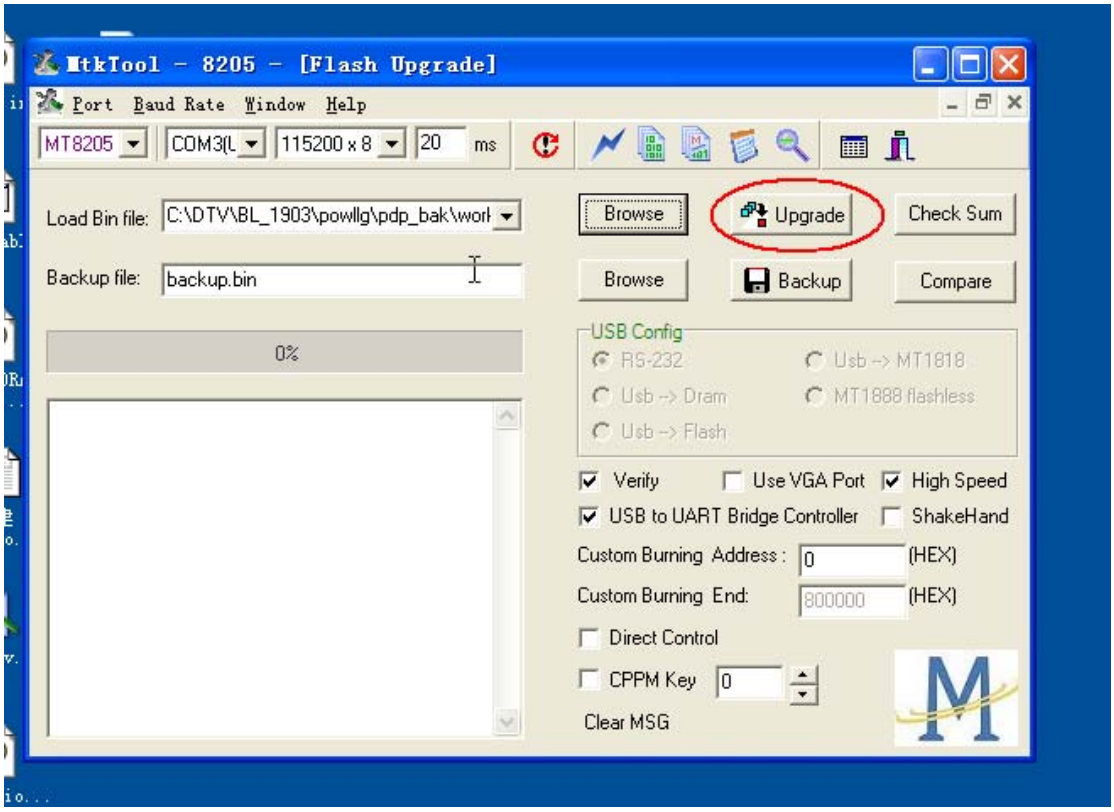


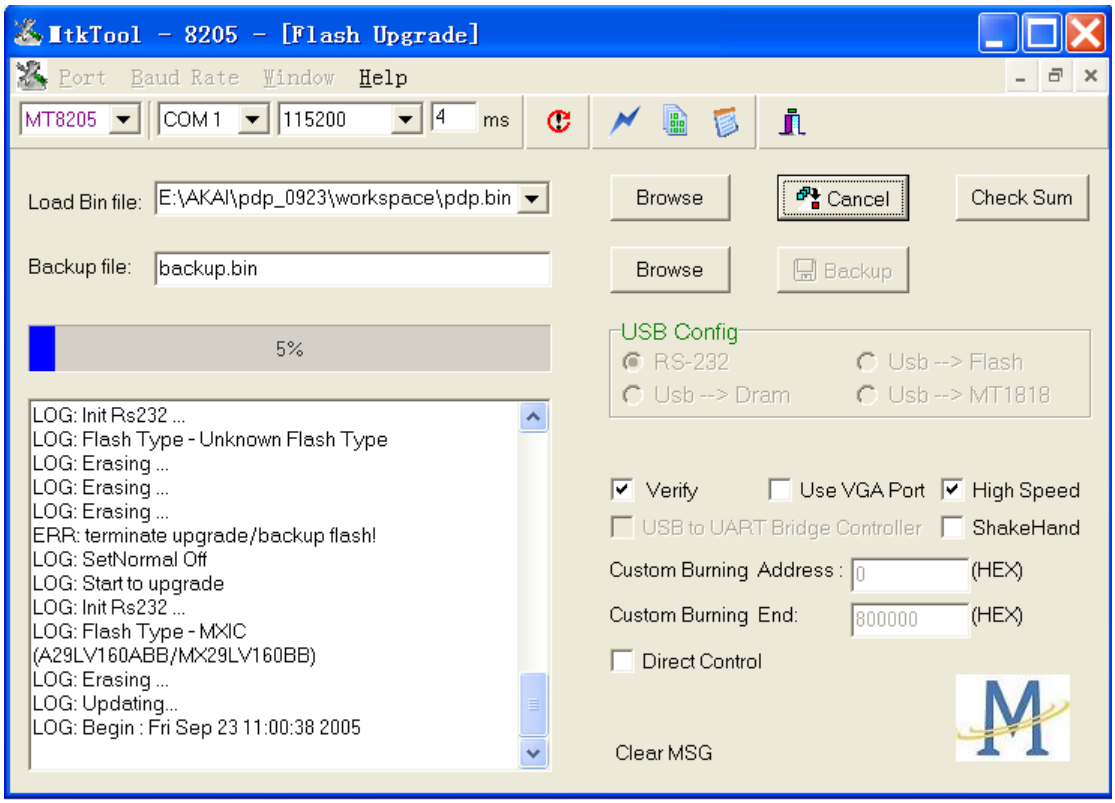
6) Choose the bit rate as 115200.

7) Select the update binary by pressing browse button. For exemple,the binary file name is PDP4206EA_AKAI_XXXXXX_XXXX_VXX.bin. (this update firmware will be sent to your side)



8) Press Upgrade button and start update process.





9) The update process is successful as the progress bar is 100%. After the update process is ok, turn off power and wait indicator light is off. Turn on power and TV can work.

Checking

It is needed to check the version of the firmware for MT8205AE which has been download into the Plasma TV .

Press Menu button of the remote control for a little long time and the OSD menu for Factory Setting is appeared on the screen .

Use the remote control and select the mode of the Factory Setting then enter the mode of the Factory Setting .

Use the remote control and select the mode of Firmware Version and then enter the mode of Firmware Version . It is easy to be found the version of the current firmware for MT8205AE is as the following : “Firmware Version : VXX ”

Process of update MT5351AG

Preparing :

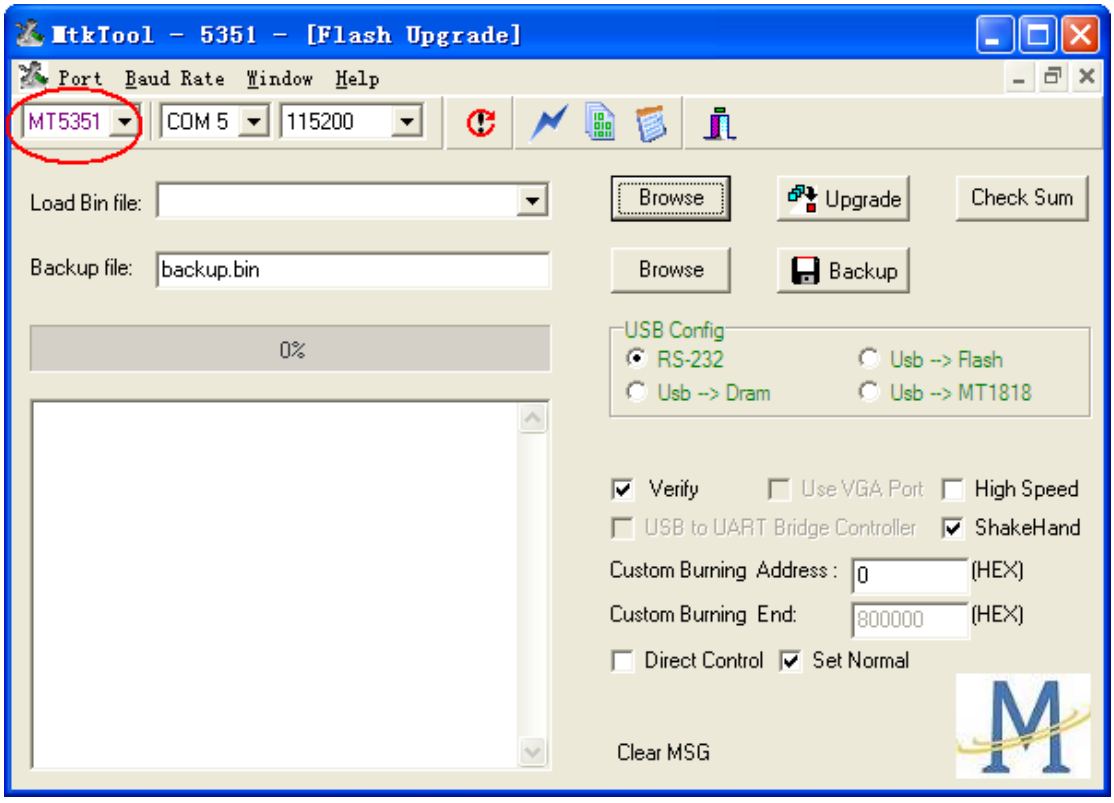
1) Connect RS232-VGA download line, One connector is connected to VGA connect port of Plasma TV while another side is connected to PC COM port.

2) Store the MtkTool into the PC

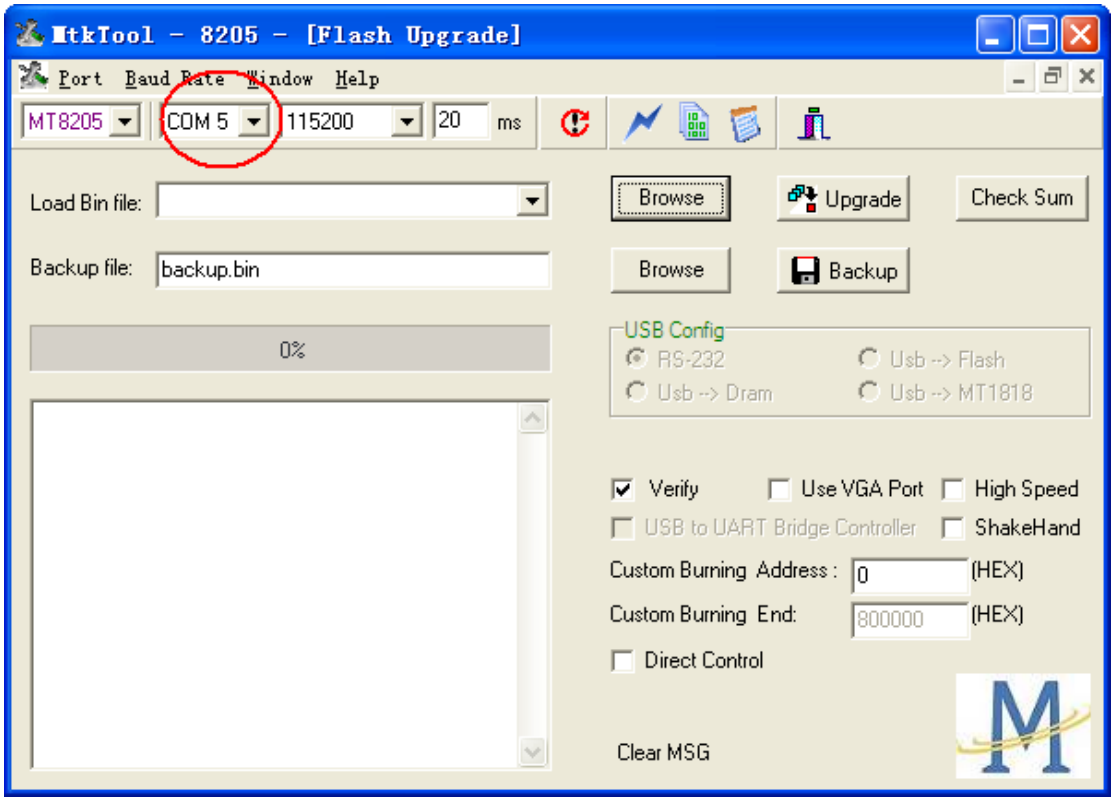
Downloading :

3) Turn on AC power switch of the Plasma TV and then press the button “standby” of the remote control . The image could be found on the screen of the Plasma TV while the color of the power indicator is green . (the mode of the Plasma TV will be standby mode if after turn on the main power switch only .)

4) Execute MTKtool and select the chipset as MT5351AG. (the software of MTKtool will be sent to your side)



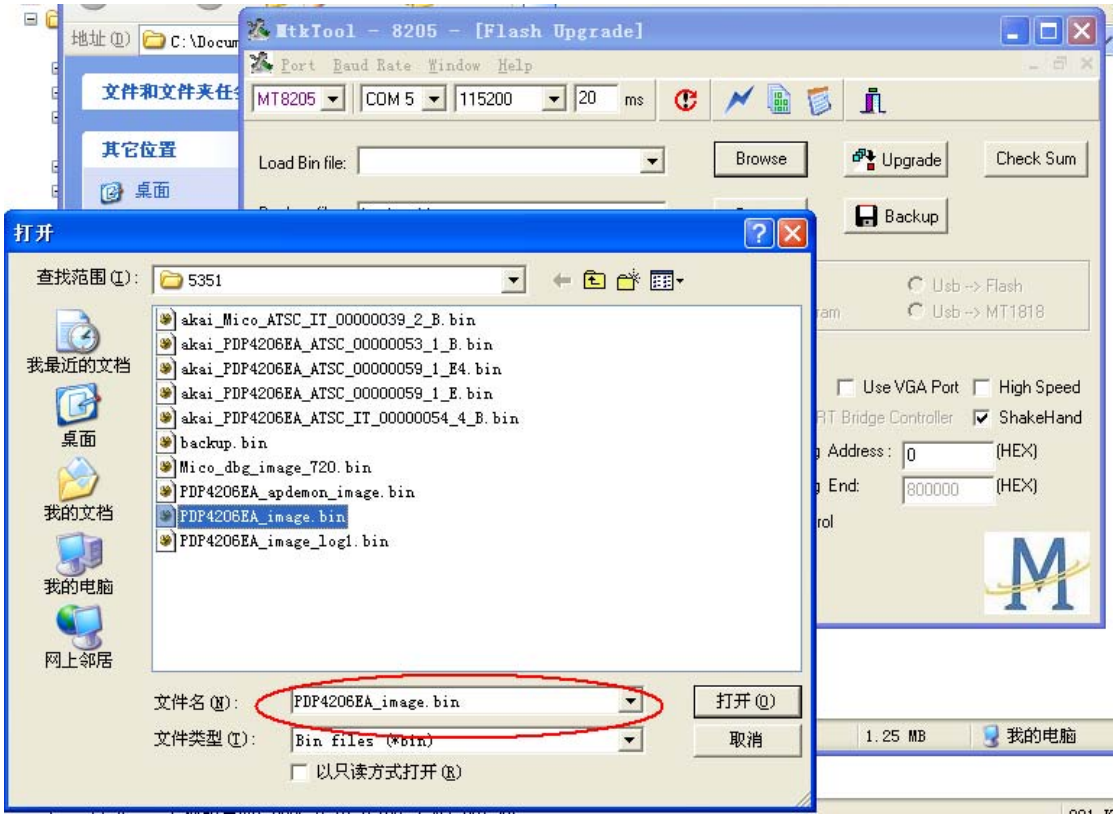
5) Select current COM port. (please try to check the COM port of your PC).



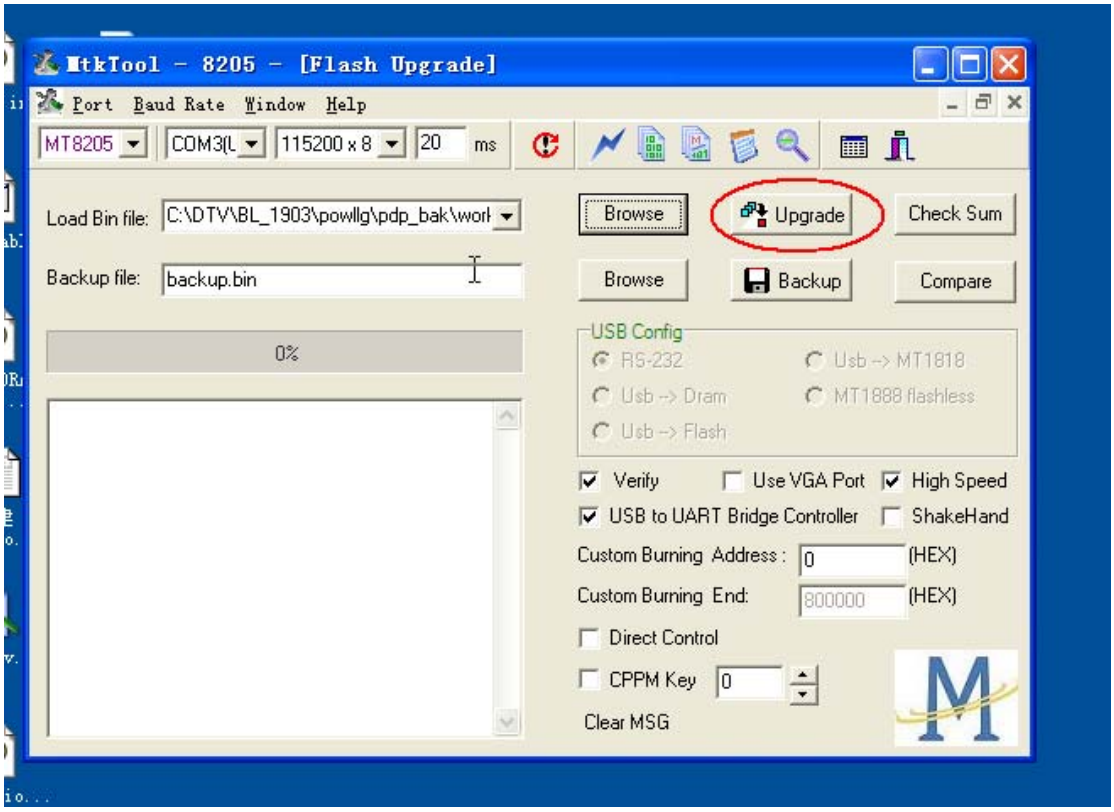
6) Choose the bit rate as 115200.

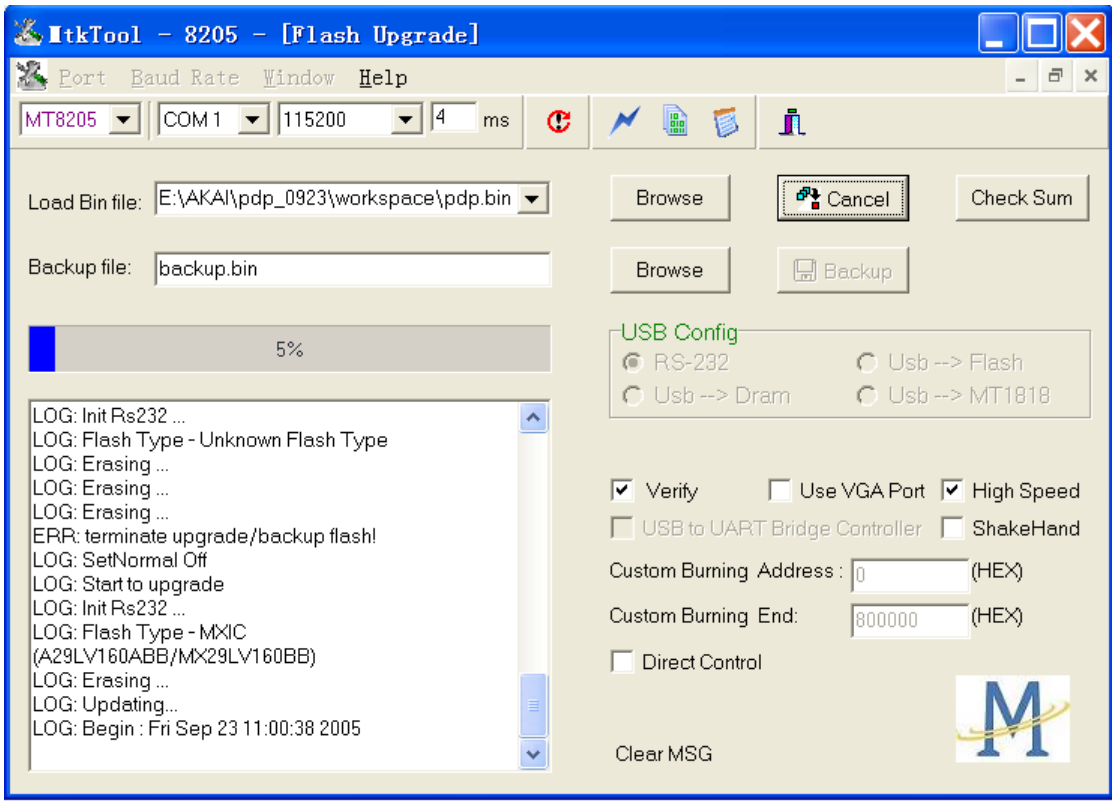
7) Select the update binary by pressing browse button. For exemple,the binary file name is

XXXX_PDP4206EA_ATSC_IT_000000XX_X_P.bin. (this update firmware will be sent to your side)



8) Press Upgrade button and start update process.





9) The update process is successful as the progress bar is 100%. After the update process is ok, turn off power and wait indicator light is off. Turn on power and TV can work.

Checking :

It is needed to check the version of the firmware for MT5351AG which has been download into the Plasma TV .

Press Menu button of the remote control and the main OSD menu is appeared on the screen .

Use the remote control and select the mode of the adjustment .

Use the remote control and select the mode of DTV

Entry the mode of DTV

Input “0000” (zero , zero , zero , zero) of the remote control while the Plsama TV is under the above condition . Then enter the mode of factory after input the digits .

It is easy to be found the version of the current firmware for MT5351AG is “XXXX_PDP4206EA_ATSC_IT_000000XX_X_P”under the mode of factory .