

Service Manual

ViewSonic VA902/b

Model No. VS10780

19" Color TFT LCD Display

(VA902/b_SM Rev. 1a Oct. 2005)

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Revision History

Revision	SM Editing Date	ECR Number	Description of Changes	Editor
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TABLE OF CONTENTS

1. Precautions and Safety Notices	1
2. Service Tools & Equipment Required	3
3. Circuit Theory	4
4. Disassembly & Assembly	15
5. Test and Adjustment	19
6. Troubleshooting	24
7. Recommended Parts List	32
8. Schematic Diagrams	42
9. PCB Layout Diagrams	46

1. Precautions and Safety Notices

1. Appropriate Operation

- (1) Turn off the product before cleaning.
- (2) Use only a dry soft cloth when cleaning the LCD panel surface.
- (3) Use a soft cloth soaked with mild detergent to clean the display housing.
- (4) Use only a high quality, safety approved AC/DC power cord.
- (5) Disconnect the power plug from the AC outlet if the product will not be used for a long period of time.
- (6) If smoke, abnormal noise, or strange odor is present, immediately switch the LCD display off.
- (7) Do not touch the LCD panel surface with sharp or hard objects.
- (8) Do not place heavy objects on the LCD display, video cable, or power cord.
- (9) Do not use abrasive cleaners, waxes or solvents for your cleaning.
- (10) Do not operate the product under the following conditions:
 - Extremely hot, cold or humid environment.
 - Areas containing excessive dust and dirt.
 - Near any appliance generating a strong magnetic field.
 - In direct sunlight.

2. Caution

No modification of any circuit should be attempted. Service work should only be performed after you are thoroughly familiar with all of the following safety checks and servicing guidelines.

3. Safety Check

Care should be taken while servicing this LCD display. Because of the high voltage used in the inverter circuit, the voltage is exposed in such areas as the associated transformer circuits.

4. LCD Module Handling Precautions

4.1 Handling Precautions

- (1) Since front polarizer is easily damaged, pay attention not to scratch it.
- (2) Be sure to turn off power supply when connecting or disconnecting input connector.
- (3) Wipe off water drops immediately. Long contact with water may cause discoloration or spots.
- (4) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
- (5) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.
- (6) Since CMOS LSI is used in this module, take care of static electricity and ensure human earth when handling.
- (7) Do not open or modify the Module Assembly.
- (8) Do not press the reflector sheet at the back of the module in any direction.
- (9) In the event that a Module must be put back into the packing container slot after it was taken out of the container, do not press the center of the CCFL Reflector edge. Instead, press at the far ends of the CFL Reflector edge softly. Otherwise the TFT Module may be damaged.
- (10) At the insertion or removal of the Signal Interface Connector, be sure not to rotate or tilt the Interface Connector of the TFT Module.

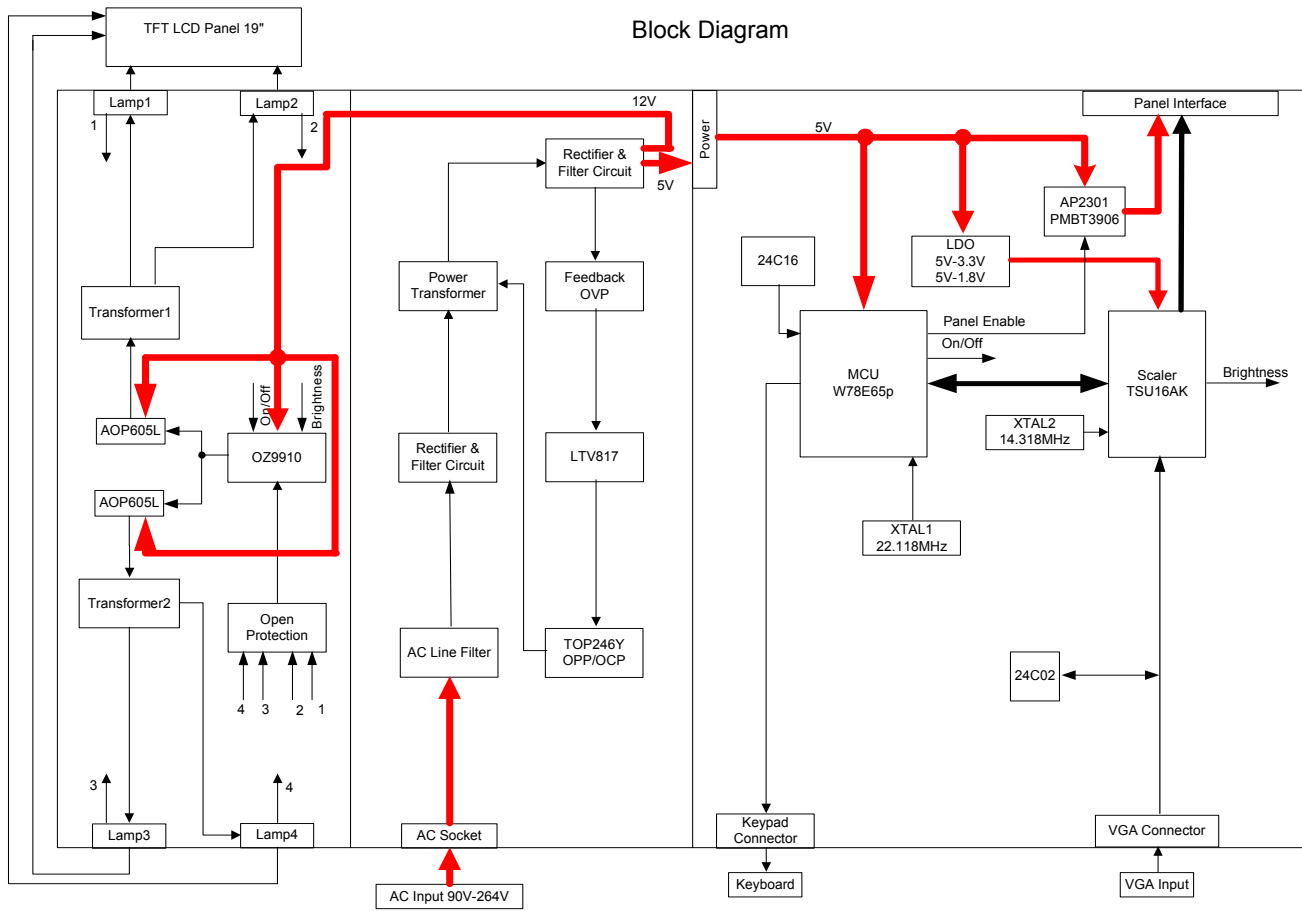
- (11) After installation of the TFT Module into an enclosure (LCD monitor housing, for example), do not twist or bend the TFT Module even momentarily. When designing the enclosure, it should be taken into consideration that no bending/twisting forces may be applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.
- (12) The cold cathode fluorescent lamp in the LCD contains a small amount of mercury. Please follow local ordinances or regulations for disposal.
- (13) The LCD module contains a small amount of materials having no flammability grade. The LCD module should be supplied with power that complies with the requirements of Limited Power Source (IEC60950 or UL1950), or an exemption should be applied for.
- (14) The LCD module is designed so that the CCFL in it is supplied by a Limited Current Circuit (IEC60950 or UL1950). Do not connect the CCFL to a Hazardous Voltage Circuit.

2. SERVICE TOOLS & EQUIPMENT REQUIRED

1. SIGNAL GENERATOR
2. MULTIMETER
3. SCREW DRIVER
4. OSCILLOSCOPE
5. Soldering IRON
6. SOLDER
7. VGA Cable (Black, 15pins point to point)
8. Color Analyzer
9. ISP Board
10. EDID Board
11. FOXISP. EXE file
12. EDID program file
13. Power Adapter output 5V/2A

3. CIRCUIT THEORY

1. Block Diagram



2. Electronic Circuit Theory

2.1 Switching Mode Power Supply

2.1.1 AC Current Input Circuit

P801 is a connector for connecting AC Power. F801 is a fuse to protect all the circuit. AC input voltage is from 100V to 240V. R820 and R821 joined between two inputting main circuit to prevent man from shock. L801 is used to clear up low frequency wave. C801 and C806 are used to discharge the waves that L801 produced. High frequency waves are damped by C801 and C806. D801 is a rectifier which composed of 4 build-in diodes, it inverts AC to DC.

2.1.2 High Voltage to Low Voltage Control Circuit

C805 is used to smooth the wave from rectifier. IC802 is a highly integrated PWM controller, which build-in a power MOSFET. When rectified DC high voltage is applied to the DRAIN pin during start-up, the MOSFET is off initially, and the CONTROL pin capacitor is charged through a switched high voltage current source connected internally between the DRAIN and CONTROL pins. When the CONTROL pin voltage V_c reaches approximately 5.8V, the control circuitry is activated and the soft-start begins. The soft-start circuit gradually increases the duty cycle of the MOSFET from zero to the maximum value over approximately 10ms. If no external feedback/supply current is fed into the CONTROL pin by the end of the soft-start, the high voltage current source is turned off and the CONTROL pin will start discharging in response to the supply current drawn by the control circuitry.

Resistor R803, R807, R824 and R825 are for line over voltage shut-down (OVP) and line under-voltage detection (UVP). Resistors R801, R805, R822, and R823 are for external current limit adjustment, and used to reduce the current limit externally to a value close to the operating peak current of primary about 1.35A. The mean is power will protected when the primary current over about 1.35A.

When PWM is turned off, the main current flow will be consumed through D804 and ZD802, This will prevent MOSFET which built-in IC802 from being damaged under large current impulse and voltage spike.

D806 and C815 provide internal Auxiliary current to CONTROL pin during normal operation. In addition, error amplifier and feedback current to the CONTROL pin are for duty cycle control.

2.1.3 DC_5V and DC_14V Output Circuit

For DC 5V, D805 is used to rectify the inducted current. R806 and C811 are used to store energy when current is reversed. The parts including C812, C814, C822, C821, B801 and L803 are used to smooth the current waves.

For DC 14V, D803 is used to rectify the inducted current. R802 and C802 are used to store energy when current is reversed. The parts including C808, C810 and L802 are used to smooth the current waves.

2.1.4 Feedback and OVP Protect Circuit

Pin R of IC803 is supplied 2.5V stable voltage. It is connected to 5V and 14V output through R811, R810 and R818. R811, R810 and R818 are output sampling resistor. When the sampling voltage more than 2.5V or less than 2.5V, feedback current of IC802 will change, this can change the voltage from transformer T801.

For 5V_{DC} output OVP, ZD803 is a zener diode, when 5V output voltage becomes up to 5.6V, the zener current cause R819 voltage become up to 0.7V, Q801 is triggered and OVP starts. For 14V_{DC} output OVP, ZD804 is a Zener Diode, when 14V output voltage becomes up to 16V, the zener current cause R819 voltage become up to 0.7V, Q801 is triggered and OVP starts. The collector current of Q801 is used to make build-in diode light. FB Current of IC802 will be changed; it can change the voltage from T801.

Q802, R827, R828 and ZD801 make up of dummy loading circuit. For start-up sequence, during 5V output take place high loading first, this dummy loading circuit operated to insure 14V not be increased.

2.2 Inverter circuit

2.2.1 Low voltage to high voltage circuit

14V_{DC} supplies the power to IC501 through F501; the control signals that BRIGHTNESS and ON/OFF come from I/F board. ON/OFF signal connect to pin8 of IC501 and makes IC501 enabled. BRIGHTNESS is connected to pin7 of IC501 to adjust the panel luminance. R524, R529, C505 make up of a delay-time circuit and R528, R523, R524 make up of a voltage divided circuit. C504 is used to filter the high frequency noise. The operation frequency is determined by R522 and C529. For BURST MODE, its

dimming frequency is determined by R527 and C506. C502 is used for soft start and compensation, C502, C528 are used to filter noise.

The output drives, including NDR4, NDRV2, PDRV3, PDRV1 (pins 1, 3, 15, 16 respectively), generate a square pulses to drive MOSFET U501, U502. And U501, U502 works as full-bridge topology, it is high efficient, zero voltage switch.

During start up, VSEN (pin9) detects the voltage at the transformer secondary. When VSEN reaches 3.0V, the output voltage is regulated. If no current is detected for around 1.5 seconds, IC501 will shut down. The current flowing through CCFL is detected and regulated through sense resistor R509, R511. The feedback voltage through R506, R507, and C508 connected to Pin11 (ISEN), and then compared with a reference voltage (1.5V) via a current amplifier, resulting in PWM drive outputs to full-bridge switches.

2.2.2 Protection circuit

Over Voltage Protection: R501 and R502 are connected in high voltage output connector, the divided AC voltage is inverted DC voltage through D508, R505 and C507 are used to rectify wave & dump noise. Then the voltage signal reaches Pin9 VSEN of IC501, when the voltage changes, build-in PWM of IC501 will adjust output voltage.

Open Lamp Protection: In normal operation, the resistors R510, R511, R512, R509 are sensed a high level AC voltage, the AC signal IS1 invert DC voltage through D509, R515, C533, and the high level DC voltage reaches the gate pin of Q502, similarly, the gate pin of Q503, Q504, Q505 has high level DC voltage. So the gate pin of Q501 has a low level voltage, and the IC501 is normal operation. Once one of signal IS1, IS2, IS3, and IS4 is low, the voltages of Q501 gate pin is high level, and make the voltage of ISEN low level, the IC501 will shut down.

2.3 I/F Board Circuit

2.3.1 Power Input

+5V is from the power board and supply for U101(FS8860-18PJ), U102(FS8860-33PJ), U105(MCU:W78E65P) and panel. +3.3V output is generated from +5V through C169 and C102 filtering, and U102 outputs. +3.3V is used for U104 (Scaler: TSU16AK). +1.8V output is generated from +5V through C169, C105 and C102 filtering, and U101 outputs. +1.8V is also used for U104.

2.3.2 MCU (W78E65P)

VDD is +5V and its frequency of XTAL1 is 22.1184MHz. U105 #2 is defined as panel-enable. When the I/O port is low, Q101 and Q102 are conducted. And then after C109 and C110 filtering, obtain the voltage of VLCD, which will be connected to CN103. U105 #3 is defined as CCFL-enable. When the I/O port is low, Q103 is pulled up and the backlights are on; When the I/O port is high, Q103 is conducted and the backlights are off. U105 #4 is defined as DET-VGA, connected with CN102 #5. U105 #14, #36, #37, #38, #39, #40, #41, #42, #43 are the communications with U104 (Scaler), which are connected to #72, #31, #78, #77, #30, #70, #71, #69, #32 of Scaler. U105 #43 outputs reset signal to U104 (Scaler). U106 is EEPROM used for saving EDID data, which is connected by SCL and SDA pins with #16 and #17 of MCU. Connect #12 to #26 of U105 for ISP.

2.3.3 Scaler (TSU16AK)

The frequency of XTAL2 is 14.318MHz. U104 #1, #102-#103, #106-#113, #118-#125, #128 output LVDS digital data of 8 bit to panel control circuit through CN103. U104 #73 generates a PWM waveform by regulating the duty to control the brightness of the backlights. U104 #30-#32, #69-#72, #77-#78 are the communications with U105 (MCU) that are connected to #36-#43 of MCU. These communications include HWRESET, CSZ/ALE, SCL/RDZ, SDA/WRZ, and AD0-AD3.

2.3.4 VGA Input

Signal R, G, B, SOG input through CN102 #1, #2, #3, and C115, C116, C117 and C118 filtering the high frequency noise. Signal HSYNC and VSYNC input through CN102 #13 and #14, and C119, R119, C120, R120 filtering. Then the analog signal enters U104, and then U104 deals with it internally. In addition, TVS101, TVS102, TVS103 (the three are BAV99), TVS104, TVS105, TVS106, TVS107 (they are constant voltage diode of 5V6) are ESD protector. Signal DDC-SCL inputs via CN102 #15, and then passes through TVS107 for ESD protection, goes into EDID EEPROM IC U103. Signal DDC-SDA inputs via CN102 #12, and then passes through TVS106 for ESD protection, goes into EDID EEPROM IC U103. CN102 #5 is defined as cable detect pin, this detector realizes via R107 and U105 #4. The PC-5V of U103 is supplied by PC via CN103 #9 with D103 for ESD protection, or supplied by Monitor self via D104. U103 is an EEPROM IC, which is a kind of memory and used for saving EDID data.

2.3.5 Button Control

Button "Key-Power" is defined as power on/off, which is connected to U105 #24 through CN106 #4.

Button “Key-2” is defined as two functions of selecting and adjustment, which is connected to U105 #25 through CN106 #1.

Button “Key-Up” is defined as plus, which is connected to U105 #26 through CN106 #3.

Button “Key-Down” is defined as minus, which is connected to U105 #27 through CN106 #5.

Button “Key-1” is defined as two functions of menu and exit, which is connected to U105 #28 through CN106 #2.

LED indicator on the front bezel is defined as follows:

- a. When press button “Key-Power”, U105 #6 is pulled down and U105 #7 is pulled high, so Q104 is conducted and the LED indicator is green.
- b. When in power-saving mode, U105 #6 is pulled high and U105 #7 is pulled down, so Q105 is conducted and the LED indicator is orange.

3. FACTORY PRESET TIMING TABLE

Item	Resolution	H-Freq. (KHz)	V-Freq. (Hz)	Dot Clock (MHz)
1	640 x 350	31.5kHz	70Hz	25.2
2	640 x 400	31.5kHz	60Hz	25.2
3	640 x 400	31.5kHz	70Hz	25.2
4	640 x 480	24.7kHz	50Hz	19.8
5		31.5kHz	60Hz	25.2
6		35.0kHz	67Hz	30.2
7		37.9kHz	72Hz,	31.5
8		37.5kHz	75Hz,	31.5
9		43.27kHz	85Hz	36.0
10	720 x 400	31.5kHz	70Hz	28.3
11	800 x 600	35.1kHz	56Hz	36.0
12		37.9kHz	60Hz	40.0
13		48.1kHz	72Hz	50.0
14		46.9kHz	75Hz	49.5
15		53.7kHz	85Hz	56.3
16	832 x 624	49.7kHz	75Hz	57.3
17	1024 x 768	48.4kHz	60Hz	65.0
18		56.5kHz	70Hz	75.0
19		58.1kHz	72Hz	78.5
20		60.0kHz	75Hz	78.8
21		68.67kHz	85Hz	94.5
22	1152 x 870	68.6kHz	75Hz	100
23	1280 x 1024	63.4kHz	60Hz	108
24		79.97kHz	75Hz	135
25	1280 x 720	45kHz	60Hz	74.2

4. Power On/Off Sequence

4.1 Hardware Power ON

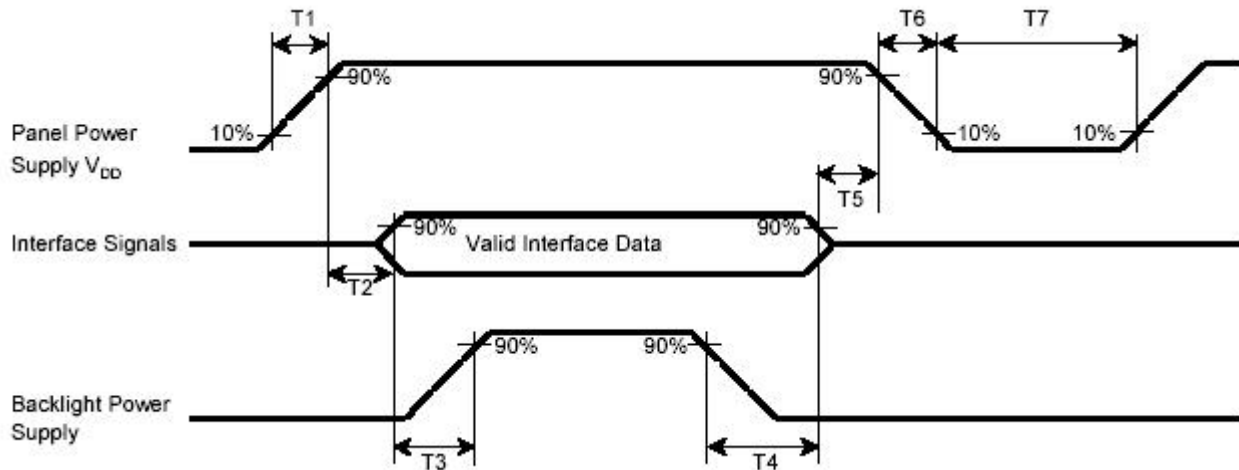
When power cord is plugged into AC socket, SMPS starts work and provides U105 and U106 with VCC5V. When VCPU inputs to U105, U105 resets circuit active, sets U105 all registers to preset modes, and then U105 #43 sends out a HWRESET signal voltage to reset U104, and then monitor goes into stand-by mode. That means hardware power on has been completed.

4.2 Software Power ON/OFF

When press power key, U105 #24 receives low pulse, and sends out “Power on/off” order back to U104, and then U104 will do the power on/off.

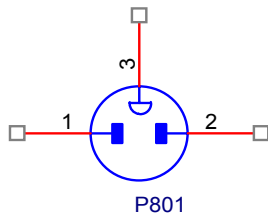
- If Power ON, U105 #6 (LED_Green) will send out High potential, and then LED green on.
- If Power OFF, U105 #7 (LED_Orange) will send out High potential, and then LED Orange on.

The Panel_Vcc, Backlight_En, CLK/DATA output to panel will follow the following sequency.



T1 (ms)	T2 (ms)	T3 (ms)	T4 (ms)	T5 (ms)	T6 (ms)	T7 (ms)
0.1~10	0~10	>200	>100	0~50	0.1~10	>1000

5. AC Outlet Pin Assignment



Pin	Symbol	Description
1	L	Live
2	N	Neutral
3	E	GND

6. Inner Connector Pin Assignment

6.1 CN501, CN502, CN503, CN504 (Connect to Panel Backlight, SM02B-BHSS-1-TB or equivalent)

Pin	Symbol	Description
1	H.V.	High voltage for lamp
2	L.V.	Low voltage for lamp

6.2 CN101 (Power BD to Interface BD)

Pin No.	Symbol	Description
1,2	+5V (VCC5V)	+5.2V output
3,6	GND	Ground
4	BRIGHTNESS	Brightness Control
5	ON/OFF	CCFL on/off Control

6.3 CN106 (Interface BD to Keypad)

Pin No.	Symbol	Description
1	KEY_SELECT/AUTO	Select control and auto adjustment control
2	KEY_MENU/EXIT	OSD page selection and exit
3	KEY_UP	OSD “▲” control to adjust value to increase
4	KEY_POWER	DC power on/off control
5	KEY_DOWN	OSD “▼” control to adjust value to decrease
6	LED_GREEN	Green LED lighting control
7	GND	Ground
8	LED_ORANGE	Orange LED lighting control

6.4 CN103 (Connect I/F BD to panel, FI-X30S-H or Equivalent)

Pin No.	Symbol	Function
1	RXO0-	minus signal of odd channel 0(LVDS)
2	RXO0+	plus signal of odd channel 0(LVDS)
3	RXO1-	minus signal of odd channel 1(LVDS)
4	RXO1+	plus signal of odd channel 1(LVDS)
5	RXO2-	minus signal of odd channel 2(LVDS)
6	RXO2+	plus signal of odd channel 2(LVDS)
7	GND	Ground
8	RXOC-	minus signal of odd clock channel (LVDS)
9	RXOC+	plus signal of odd clock channel (LVDS)
10	RXO3-	minus signal of odd channel 3(LVDS)
11	RXO3+	plus signal of odd channel 3(LVDS)
12	RXE0-	minus signal of even channel 0(LVDS)
13	RXE0+	plus signal of even channel 0(LVDS)
14	GND	Ground
15	RXE1-	minus signal of even channel 1(LVDS)
16	RXE1+	plus signal of even channel 1(LVDS)
17	GND	Ground
18	RXE2-	minus signal of even channel 2(LVDS)
19	RXE2+	plus signal of even channel 2(LVDS)
20	RXEC-	minus signal of even clock channel (LVDS)
21	RXEC+	plus signal of even clock channel (LVDS)
22	RXE3-	minus signal of even channel 3(LVDS)
23	RXE3+	plus signal of even channel 3(LVDS)
24	GND	Ground
25	GND	Ground
26	GND	Ground or Open
27	GND	Ground
28	VCC	Power supply (5.0 V)
29	VCC	Power supply (5.0 V)
30	VCC	Power supply (5.0 V)

6.5 CN102 (D-SUB Connector)

Pin	Symbol	Pin	Symbol	Pin	Symbol
1	Red video input	6	Red GND	11	NC
2	Green video input	7	Green GND	12	Serial data (SDA)
3	Blue video input	8	Blue GND	13	H / H+V SYNC
4	NC	9	+5V(from PC)	14	VSYNC
5	Cable Detect	10	GND	15	Data clock line (SCL)

7. Key Parts Pin Assignment

7.1 IC802 (TOP246Y, Power Control IC)

Pin	Symbol	I/O	Description
1	C	I	Control
2	L	I	Line Sense
3	X	I	External Current Limit
4	S	O	Source of MOSFET(GND)
5	F	I	Frequency
6	D	I	Drain of MOSFET

7.2 IC501 (OZ9910G, CCFL inverter controller IC)

Pin No.	Symbol	I/O	Description
1	NDRV4	O	Bottom MOSFET gate drive output in dual forward converter
2	PGND		High-current power ground
3	NDRV2	O	Bottom MOSFET gate drive output in dual forward converter
4	GND A		Low-current signal ground
5	CT	I	Timing capacitor of high frequency oscillator
6	LCT	I	Timing capacitor of set LPWM frequency
7	ADJ	I	Control command input –DC
8	ENA	I	Enable input
9	VSEN	I	Voltage sense feedback
10	CMP_SST	I	Soft start and loop compensation capacitor
11	ISEN	I	Current sense feedback
12	VREF	O	Reference voltage output
13	VIN	I	Supply voltage for IC
14	HSB	I	High side driver buffer output
15	PDRV3	O	Top MOSFET gate drive output in dual forward converter
16	PDRV1	O	Top MOSFET gate drive output in dual forward converter

7.3 U104 (TSU16AK)

Pin	Symbol	I/O	Description
1	LVBOM	O	B-Link Negative LVDS Differential Data Output
2	GND		Ground
3	BYPASS		For External Bypass Capacitor
4	NC		Not connected
5	NC		Not connected
6	BUSTYPE	IN	Low : Serial bus; High : Direct bus
7	NC		Not connected
8	NC		Not connected
9	NC		Not connected
10	GND		Ground
11	VDDP	O	Digital Output Power
12	NC		Not connected
13	NC		Not connected
14	NC		Not connected
15	NC		Not connected
16	NC		Not connected
17	NC		Not connected
18	VDDC	I	Digital Core Power
19	GND		Ground

Pin	Symbol	I/O	Description
20	GND		Ground
21	VDDP	O	Digital Output Power
22	NC		Not connected
23	NC		Not connected
24	NC		Not connected
25	NC		Not connected
26	NC		Not connected
27	NC		Not connected
28	NC		Not connected
29	NC		Not connected
30	AD0	I/O	DDR direct bus AD0; 4mA driving strength
31	AD3	I/O	DDR direct bus AD3; 4mA driving strength
32	HWRESET	I	Hardware reset; active high
33	XIN	I	Crystal Oscillator Input
34	XOUT	O	Crystal Oscillator Output
35	AVDD_MPLL		MPLL Power
36	GND		Ground
37	HSYNC0	I	Analog HSYNC input
38	VSYNC0	I	Analog VSYNC input
39	GND		Ground
40	NC		Not connected
41	NC		Not connected
42	GND		Ground
43	NC		Not connected
44	NC		Not connected
45	VDD_ADC	I	ADC Power
46	NC		Not connected
47	NC		Not connected
48	GND		Ground
49	NC		Not connected
50	NC		Not connected
51	VDD_ADC	I	ADC Power
52	REXT		External resistor 390 ohm to AVDD_ADC
53	AVDD_PLL	I	PLL Power
54	GND		Ground
55	AVDD_ADC	I	ADC Power
56	GND		Ground
57	BINOM	I	Reference ground for analog blue input
58	BINO	I	Analog blue input
59	GINOM	I	Reference ground for analog green input
60	GINO	I	Analog green input
61	SOGINO	I	Sync-on-green input
62	RINOM	I	Reference ground for analog red input
63	RINO	I	Analog red input
64	GND		Ground
65	AVDD_ADC	I	ADC Power
66	REFP		Internal ADC top de-coupling pin
67	REFM		Internal ADC bottom de-coupling pin
68	GND		Ground
69	ALE/CS	I	DDR direct bus ALE; active high
70	WRZ/SDA	I/O	DDR direct bus WRZ; active low
71	RDZ/SCL	I	DDR direct bus RDZ; active low
72	INT	O	CPU interrupt; 4mA driving strength
73	PWM0	O	PWM0; 4mA driving strength

Pin	Symbol	I/O	Description
74	PWM1	O	PWM1; 4mA driving strength
75	NC		Not connected
76	NC		Not connected
77	AD1	I/O	DDR direct bus AD1; 8mA driving strength
78	AD2	I/O	DDR direct bus AD2; 8mA driving strength
79	NC		Not connected
80	NC		Not connected
81	NC		Not connected
82	NC		Not connected
83	NC		Not connected
84	VDDP	O	Digital Output Power
85	GND		Ground
86	GND		Ground
87	VDDC	I	Digital Core Power
88	NC		Not connected
89	NC		Not connected
90	NC		Not connected
91	NC		Not connected
92	NC		Not connected
93	NC		Not connected
94	VDDP	O	Digital Output Power
95	GND		Ground
96	GND		Ground
97	VDDC	I	Digital Core Power
98	NC		Not connected
99	NC		Not connected
100	NC		Not connected
101	NC		Not connected
102	LVA3P	O	A-Link Positive LVDS Differential Data Output
103	LVA3M	O	A-Link Negative LVDS Differential Data Output
104	VDDP	O	Digital Output Power
105	GND		Ground
106	LVACKP	O	A-Link Positive LVDS Differential Clock Output
107	LVACKM	O	A-Link Negative LVDS Differential Clock Output
108	LVA2P	O	A-Link Positive LVDS Differential Data Output
109	LVA2M	O	A-Link Negative LVDS Differential Data Output
110	LVA1P	O	A-Link Positive LVDS Differential Data Output
111	LVA1M	O	A-Link Negative LVDS Differential Data Output
112	LVA0P	O	A-Link Positive LVDS Differential Data Output
113	LVA0M	O	A-Link Negative LVDS Differential Data Output
114	VDDP	O	Digital Output Power
115	GND		Ground
116	GND		Ground
117	VDDC		Digital Core Power
118	LVB3P	O	B-Link Positive LVDS Differential Data Output

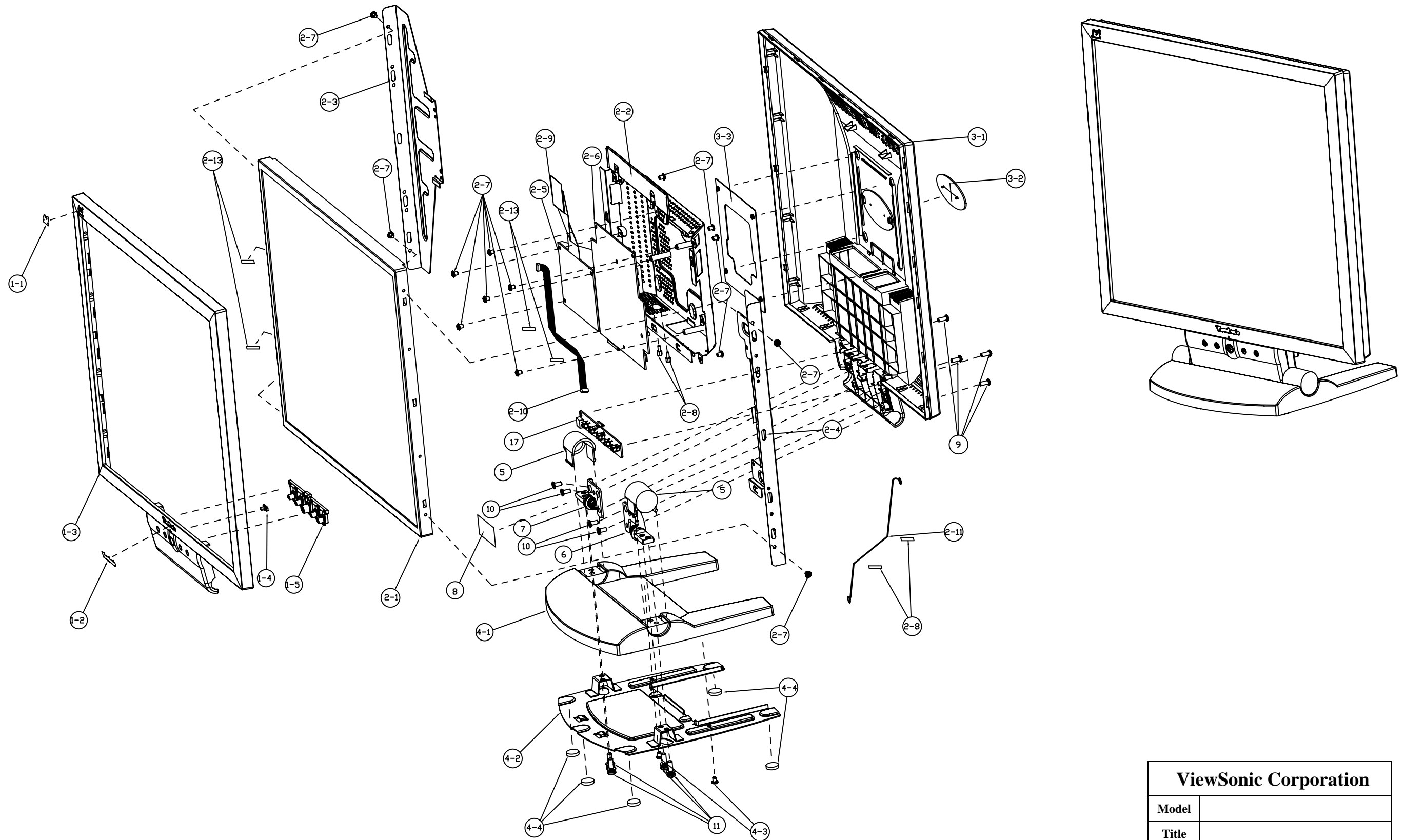
Pin	Symbol	I/O	Description
119	LVB3M	O	B-Link Negative LVDS Differential Data Output
120	LVBCKP	O	B-Link Positive LVDS Differential Clock Output
121	LVBCKM	O	B-Link Negative LVDS Differential Clock Output
122	LVB2P	O	B-Link Positive LVDS Differential Data Output
123	LVB2M	O	B-Link Negative LVDS Differential Data Output
124	LVB1P	O	B-Link Positive LVDS Differential Data Output
125	LVB1M	O	B-Link Negative LVDS Differential Data Output
126	VDDP	O	Digital Output Power
127	GND		Ground
128	LVBOP	O	B-Link Positive LVDS Differential Data Output

7.4 U105 (Micro-controller: W78E65P-40)

Pin	Symbol	I/O	Description
1	P4.2/INT3		A bi-directional I/O port with alternate function.
2	P1.0/T2	O	Enable panel power on
3	P1.1/T2EX	O	Enable CCFL work
4	P1.2	I	VGA cable detection
5	P1.3/PWM0	O	provide alternated function of PWM Volume
6	P1.4/PWM1	O	provide alternated function of PWM Green LED
7	P1.5/PWM2	O	provide alternated function of PWM Orange LED
8	P1.6/PWM3		Function is the same as that of standard 8052
9	P1.7/PWM4		Function is the same as that of standard 8052
10	RST	I	Reset control pin
11	P3.0/RXD		SCL line of I2C for EDID, debug function
12	P4.3/INT2		PORT 4: A bi-directional I/O port with alternate
13	P3.1/TXD		SDA line of I2C for EDID, debug function
14	P3.2/INT0	I	Interrupt request control pin
15	P3.3/INT1	O	Shut Down Volume Mute
16	P3.4/T0	O	SCL line of I2C communication with EEPROM
17	P3.5/T1	I/O	SDA line of I2C communication with EEPROM
18	P3.6/WR	I	DVI cable detection
19	P3.7/RD	O	EEPROM write protection control for DVI EDID
20	XTAL2		Crystal 22.1184MHz In
21	XTAL1		Crystal 22.1184MHz out
22	GND		Sink voltage ground
23	P4.0		A bi-directional I/O port with alternate function.
24	P2.0/A8		DC power on/off control
25	P2.1/A9		OSD “▶” control to adjust value to increase
26	P2.2/A10		OSD “◀” control to adjust value to decrease
27	P2.3/A11		Selection of menu command listed
28	P2.4/A12		OSD page selection
29	P2.5/A13		Auto adjustment control
30	P2.6/A14		A bi-directional I/O port with internal pull-ups
31	P2.7/A15		A bi-directional I/O port with internal pull-ups
32	PSEN		Program Store Enable
33	ALE		Address Latch Enable
34	P4.1		A bi-directional I/O port with alternate function
35	EA	I	External Access Enable
36	P0.7/AD7	I/O	DDR Direct Bus Communication with Scaler
37	P0.6/AD6	I/O	DDR Direct Bus Communication with Scaler
38	P0.5/AD5	I/O	DDR Direct Bus Communication with Scaler
39	P0.4/AD4	I/O	DDR Direct Bus Communication with Scaler
40	P0.3/AD3	I/O	WRZ line of DDR Direct Bus
41	P0.2/AD2	I/O	RDZ line of DDR Direct Bus
42	P0.1/AD1	I/O	ALE line of DDR Direct Bus
43	P0.0/AD0	O	Hardware reset to Scaler
44	+5V	I	+5V for MCU working voltage

4. Disassembly & Assembly

1. Exploded Diagram and Spare Parts List



ViewSonic Corporation	
Model	
Title	
Date	Rev:

EXPLODED PARTS LIST (VA902/b-1)

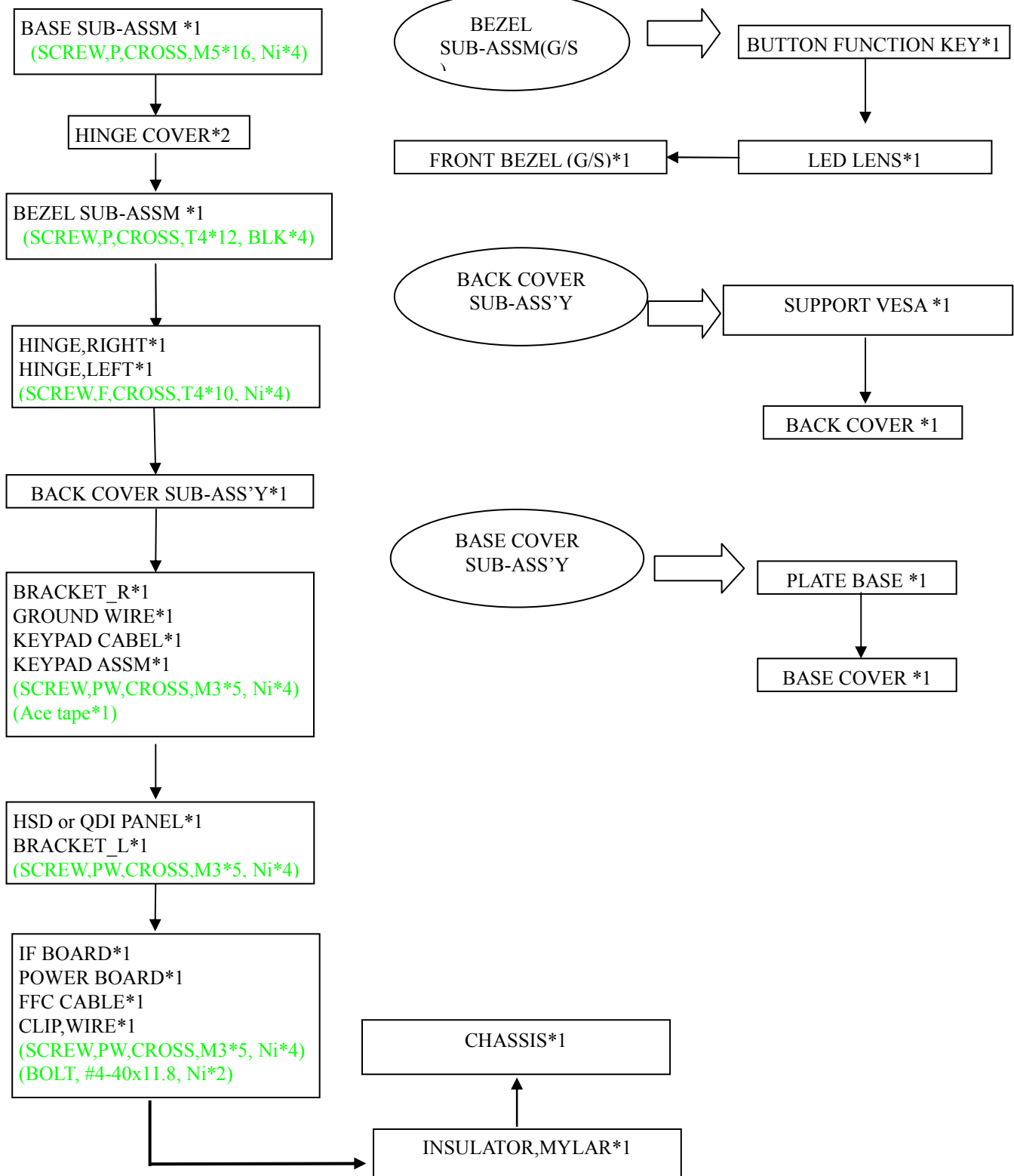
ViewSonic Model Number: VS10780-1W

Rev: 1a

Serial No. Prefix: PSS / PSW

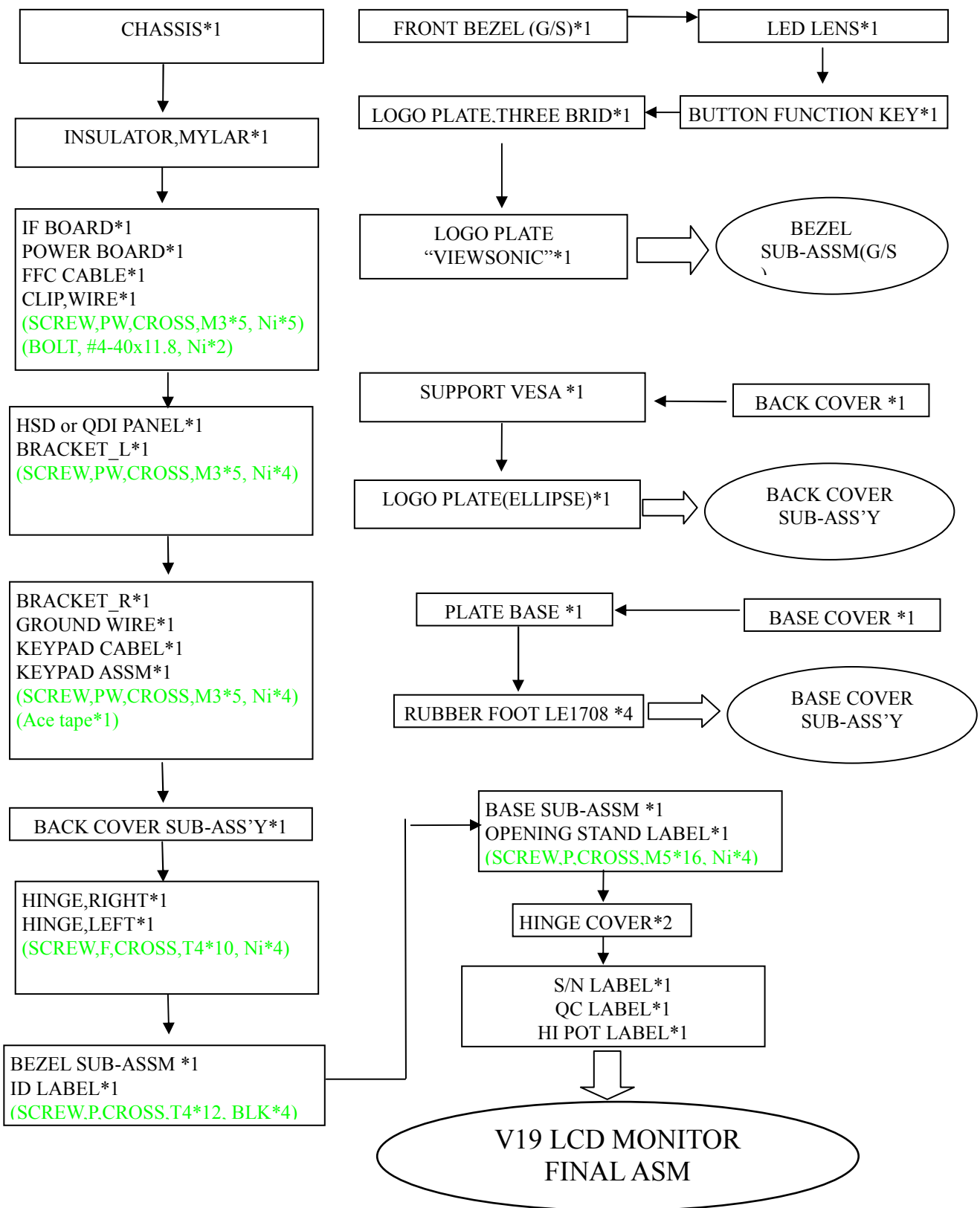
Item	ViewSonic P/N	Ref. P/N	Description	Q'ty
1	C-00003659/C-00003677	714030002500/10	Bezel Sub-asm,VA902/b	1
1-1	#N/A	506102000400	LOGO PLATE,VIEWSONIC,LE1709(THREE BIRDS)	1
1-2	#N/A	506102000300	LOGO PLATE, VIEWSONIC,LE1709	1
1-3	#N/A	501010202900/10	BEZEL,FORNT,LE1909(Silver877C)/(Midnight Gray)	1
1-4	#N/A	501120101500	LENS,LE1909	1
1-5	#N/A	501030202200	BUTTON,FUNCTION KEY,LE1909	1
2	#N/A	714072841100	Panel Sub-Ass'y VA902/b HST	1
2-1			Panel HST	1
2-2	B-00003172	502090301300	CHASSIS,LE1709	1
2-3	#N/A	502020101700	BRACKET,LEFT,LE1909	1
2-4	#N/A	502020101710	BRACKET,RIGHT,LE1909	1
2-5			IF BOARD ASS'Y	1
2-6			POWER BOARD ASS'Y	1
2-7	HW-00003169	509146305300	SCREW,PW,CROSS,W/WAS,M3*5,NI	14
2-8	HW-00003171	509000000700	BOLT,#4-40x11.8,NI	2
2-9			LVDS CABLE LE1909	1
2-10			KEYPAD CABLE LE1909	1
2-11			HRN ASS'Y 1P 157MM BLACK,UL 1007#20	1
2-12	#N/A	511100001500	SADDLE FOR CABLE	1
2-13	#N/A	506381000700	ACE TAPE,30000*45MM,3000PCS/FOIL	1/3000
2-14	M-00003165	505040202000	INSULATOR,MYLAR,L79.9xW62.7MM,CHASSIS,LE17	1
3	C-00003660	714050002500	BACK SUB-ASS'Y	1
3-1	#N/A	501020203500	COVER,BACK,LE1909(MIDNIGHT GRAY)	1
3-2	#N/A	506102000500	LOGO PLATE,VIEWSONIC,LE1709(ELLIPSE)	1
3-3	#N/A	502080300300	SUPPORT VESA LE1709	1
4	C-00003658	714020002500	BASE SUB-ASS'Y	1
4-1	#N/A	501240201200	BASE,LE1909(MIDNIGHT GRAY)	1
4-2	#N/A	502170100500	PLATE,BASE,LE1909	1
4-3	HW-00003667	509112605300	SCREW,P,CROSS,P.T-4*5,NI	2
4-4	PL-00003053	503020002600	RUBBER,FOOT,OD14xT2.5MM,3M,LE1909	5
5	C-00003657	501020203400	COVER,HINGE,LE1909	2
6	HW-00003664	502060000110	HINGE,RIGHT,LE1909	1
7	HW-00003663	502060000100	HINGE,LEFT,LE1909	1
8	#N/A	505040202100	INSULATOR,MYLAR,L35xW16MM,HINGE LEFT,LE19	1
9	HW-00003665	509112612501	SCREW,P,CROSS,T.T-4*12,BLK(HEAD 7.8MM)	4
10	HW-00003167	509212610300	SCREW,F,CROSS,T.T-4*10,NI	4
11	HW-00003666	509142716500	SCREW,P,CROSS W/WAS,T.T-5*16,BLACK	4
12			KEYPAD ASSM	1

2. Disassembly Block



NOTE: The arrow is the direction of disassembly.

3. Assembly Block



NOTE: The arrow is the direction of assembly.

5. TEST AND ADJUSTMENT

1. Key Function Description

CONTROL KEY	KEYS FUNCTION
[AUTO] [2]	By pressing [AUTO] key, "Auto Image Adjust" is performed
[MENU] [1]	By pressing [MENU] key, Main menu display
[▼] [▲]	A. When "MENU OSD" display, press these keys to change the contents of an adjustment item, or change an adjustment value B. When "MENU OSD" is un-display, press these keys to change brightness and contrast
[POWER]	Power on or power off the monitor

2. Hot Key Operation

CONTROL KEY	KEYS FUNCTION
[▼] + [▲]	Recall Contrast or Brightness while in the Contrast or Brightness adjustment, or recall both of Contrast and Brightness when the OSD is not open.
[1] + [2]	Toggle 720x400 and 640x400 mode when input 720x400 or 640x400 mode.
[1] + [▼] + [▲]	White Balance (Not shown on user's guide)
[1] + [▼]	Power Lock
[1] + [▲]	OSD Lock
Remark : All the short cuts function are only available while OSD off	

3. OSD Control

3.1 OSD table

Layer 1	Layer 2	Layer 3
Auto Image Adjust		
Contrast/Brightness	Contrast (+ / -)	
	Brightness (+ / -)	
Color Adjust	Srgb	
	9300K	
	6500K	
	5400K	
	User Color	Red (+ / -) Green (+ / -) Blue (+ / -)
Information		
Manual Image Adjust	H/V Position	H Position (+ / -) V Position (+ / -)
	H Size	+ / -
	Fine Tune	+ / -
	Sharpness	+ / -
Setup Menu	Language Select	English
		French
		German
		Italian
		Spanish
		Finnish
		Japanese
		Simplified Chinese
	Traditional Chinese	
	Resolution Notice	On/Off
OSD Position		H Position (+ / -) V Position (+ / -)
	OSD Time Out	
OSD Background		On/Off
Memory Recall		

3.2 OSD lock Menu function

OSD Lock Menu Function Check		
Item	Method	Phenomenon
Activate OSD lock	[1] + [▲] 10S	Press any of buttons "1", "▼", "▲", "2" will appear "OSD Locked" 3s
Deactivate OSD lock:	[1] + [▲] 10S(again)	
NOTICE: When the OSD is locked will lock all functions. Status bar indicating OSD Lock or Unlock is in progress and when complete it will indicate "OSD Locked" OSD Lock should not lock Power Button and Power Lock function		

3.3 Power lock Menu function

Power Lock Menu Function Check		
Item	Method	Phenomenon
Activate Power Lock	[1] + [▼] 10S	Can not turn off the LCD; Press the power button will appear "Power Button Locked" OSD 3s; LCD would automatically turn back "On" when power is restored after a power failure
Deactivate Power Lock	[1] + [▼] 10S(again)	
NOTICE: Status bar indicating Power Button lock or unlock is in progress and when complete it will indicate "Power Button Locked" Power should only be lockable in the "On State"		

3.4 Resolution notice function

Resolution Notice Menu		
Item	Method	Phenomenon
Activate Resolution Notice Menu	Resolution Notice OSD should show on screen after changing to non-native mode for 30 sec, And it should disappear after 10s or by pushing button [1] or [2]	-----
Deactivate Resolution Notice Menu	Push button [2] under Resolution Notice OSD, select Disable	-----

3.5 Factory Mode Introduction

When input the signal, press "power key" to turn off the monitor. Press" [▼] +[▲] +[⏻] "at the same time so as to enter factory mode. After power on, press "Menu[1]" key, you can see the Factory menu.

- INL : Currently using panel model name
- V2 050526 : Currently using firmware version information.
- Auto Color : Automatically calibrate chip ADC parameter by using chip internal DAC
- Color Temperature : The R, G, B of 9300K and 6500K and 5400K and User Mode
Colors are all generated from scaling back end.

4. Burn-in pattern

If it is a new monitor, and in factory mode, if no VGA signal input, Burn-in pattern will self generate automatically. Burn in patterns are: full Red, Green, Blue, White and Black. You can not escape from Burn-in pattern until plug in VGA Cable, and then press the power key. Turn the monitor off and then turn it on.

5. Auto Color (Automatically calibrate chip ADC parameter by using chip internal DAC)

- If it is a new-built set and it is first time to do the "auto color", please confirm the following steps:
- Connect the VGA cable with the standard video pattern generator and display 16-gray pattern on the monitor.
 - Press "Power" to power off the monitor.
 - Press" [▼] +[▲] +[⏻] "simultaneously to enter factory mode.
 - Press "Menu[1]", then press "Auto[2]" to execute Auto color item.
 - After the "Auto Color" process finished, please press "Power" to restart monitor.

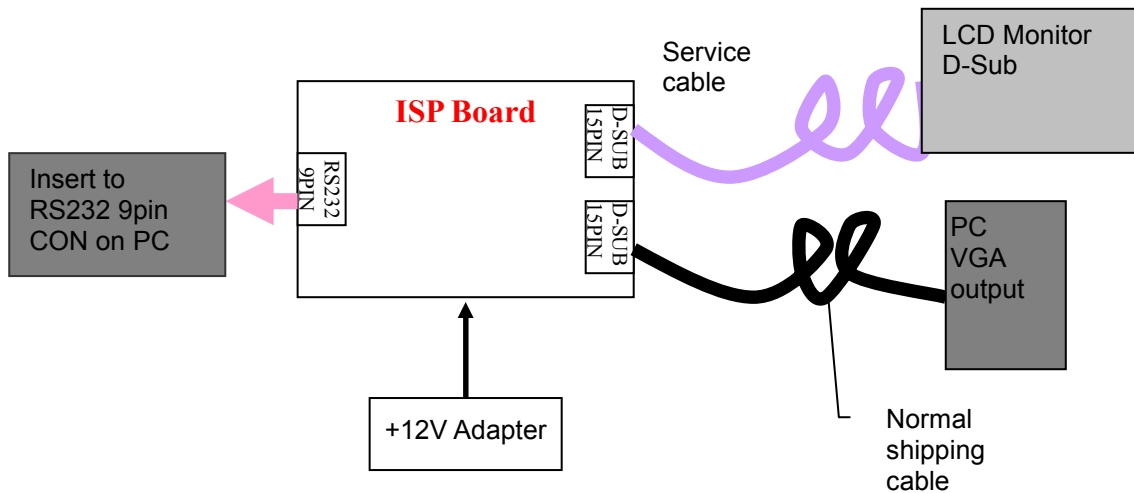
6. EDID (Rewrite EDID data to EEPROM)

If we need to rewrite the EEPROM data, please confirm the following steps.

1. Plug in VGA Cable; we can rewrite the EDID data to EEPROM by using “EDID Rewrite” program.
2. If the “EDID Rewrite” process finished, please pull out VGA cable and press ‘2’+’▲’ at the same time.
3. Pull out AC power cable or press power key to restart.

7. Upload firmware to MCU via VGA Cable

7.1 Connect ISP board between monitor and PC as below configure



- 7.2 Before plug in the power cord, make sure keep “▲” key to be pressed, when power on you can enter ISP mode.
- 7.3 8051ispwriter.exe will detect automatically which MCU used in this monitor. Do it as the order shown on the screen, choose the corresponding firmware version, and load to MCU.
- 7.4 After finish, please plug out power cable and re-start monitor again.

8 After repair, to ensure the quality you should do the following test and adjustment

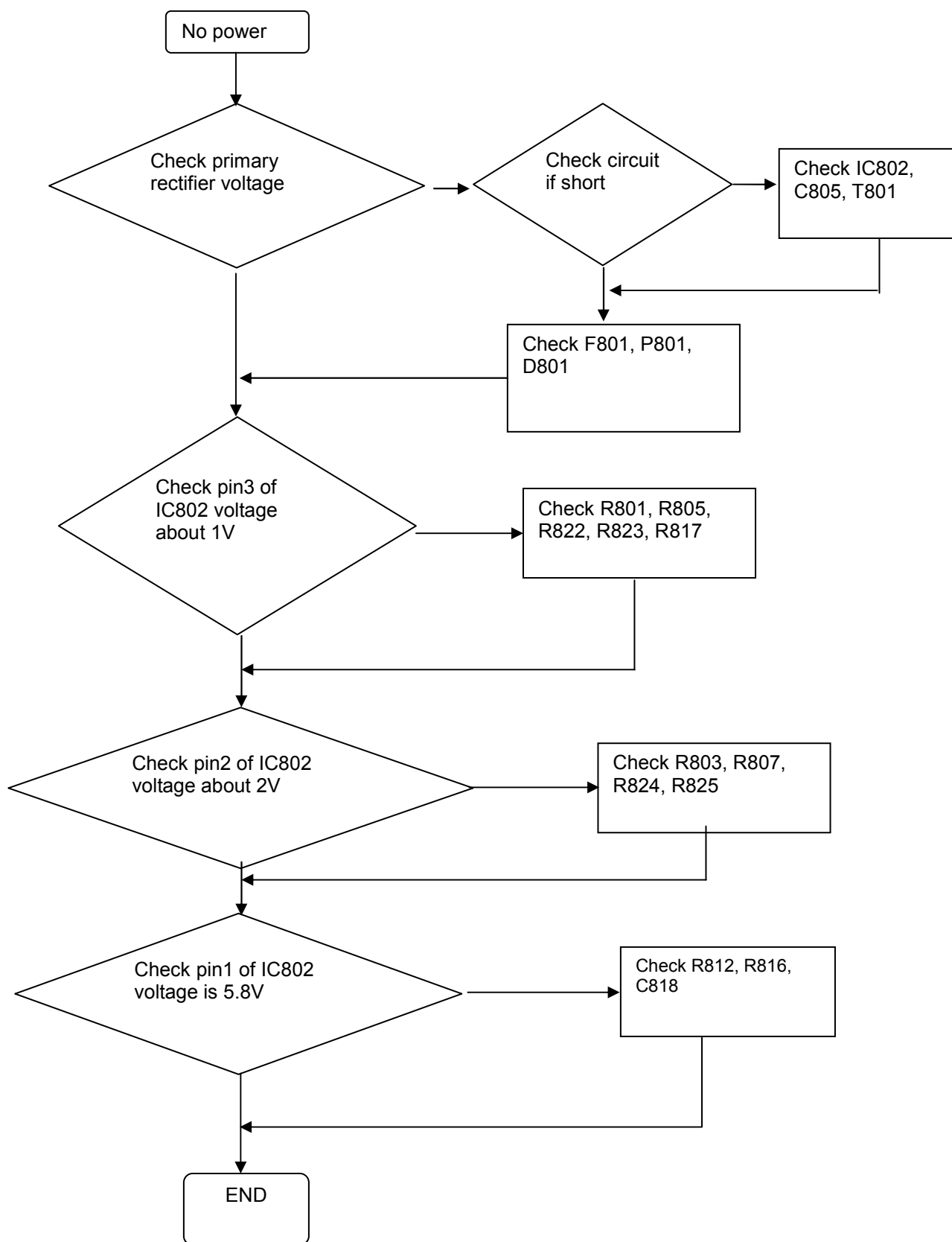
Item	Content	Equipment												
Test OSD function	<ol style="list-style-type: none"> Signal is set as 1280x1024@60Hz LCM button are from left to right, checking whether each single function key and compound function key can be worked. 	Chroma Signal Generator												
Contrast Check	<ol style="list-style-type: none"> Set input mode to 1280x1024@60Hz Set Pattern to 32 gray shades Set contrast to the max. The brightest 5~6 shades brightness cannot be distinguished. 	Chroma Signal Generator												
Color Temperature	<ol style="list-style-type: none"> Do "Auto color" at 1280 x 1024@60Hz, 32gray shades Measure color temperature, check it complies with the following temperature: 5400K $x=0.335 \pm 0.02, y=0.350 \pm 0.02$ 6500K $x=0.313 \pm 0.02, y=0.329 \pm 0.02$ 9300K $x=0.283 \pm 0.02, y=0.298 \pm 0.02$ 	Chroma Signal Generator and color analyzer												
Modes switching check	<ol style="list-style-type: none"> Use Chroma Pattern Generator to make sequence. VESA (640x480 800x600 1024x768 1280x1024), MAC 832x624 DOS (640x350 720x400), the detail supported modes and power saving signal. Confirm the above timing modes must be full screen and the picture must be normal. LED is Orange at power saving mode. 	Chroma Signal Generator												
Y measurement at default setting	<ol style="list-style-type: none"> Set brightness to default value 100 and contrast to default value 70 at 6500K At full white patter, Measure Y, which should be $\geq 200\text{cd/m}^2$ 	Chroma Signal Generator and Color Analyzer												
Panel Flicker check	<ol style="list-style-type: none"> Mode: 1280x1024@60Hz Set Brightness& contrast to default value Do "Auto Image Adjust" Shut down PC to check whether there's glitter on the center of the picture. 	Equipment:: Chroma Signal Generator & PC												
Power saving	<ol style="list-style-type: none"> Mode: 1280x1024@60Hz Pattern: full white Brightness: Max. Contrast: Default Check power consumption at each modes <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>State</th> <th>Power Consumption</th> <th>LED color</th> </tr> </thead> <tbody> <tr> <td>Normal</td> <td>< 40W</td> <td>Green</td> </tr> <tr> <td>Stand By</td> <td>< 1W</td> <td>Orange</td> </tr> <tr> <td>Power Key Off</td> <td>< 1W</td> <td>No</td> </tr> </tbody> </table>	State	Power Consumption	LED color	Normal	< 40W	Green	Stand By	< 1W	Orange	Power Key Off	< 1W	No	Chroma signal generator and Power meter AC input: 230V/50Hz
State	Power Consumption	LED color												
Normal	< 40W	Green												
Stand By	< 1W	Orange												
Power Key Off	< 1W	No												

6. TROUBLE SHOOTING

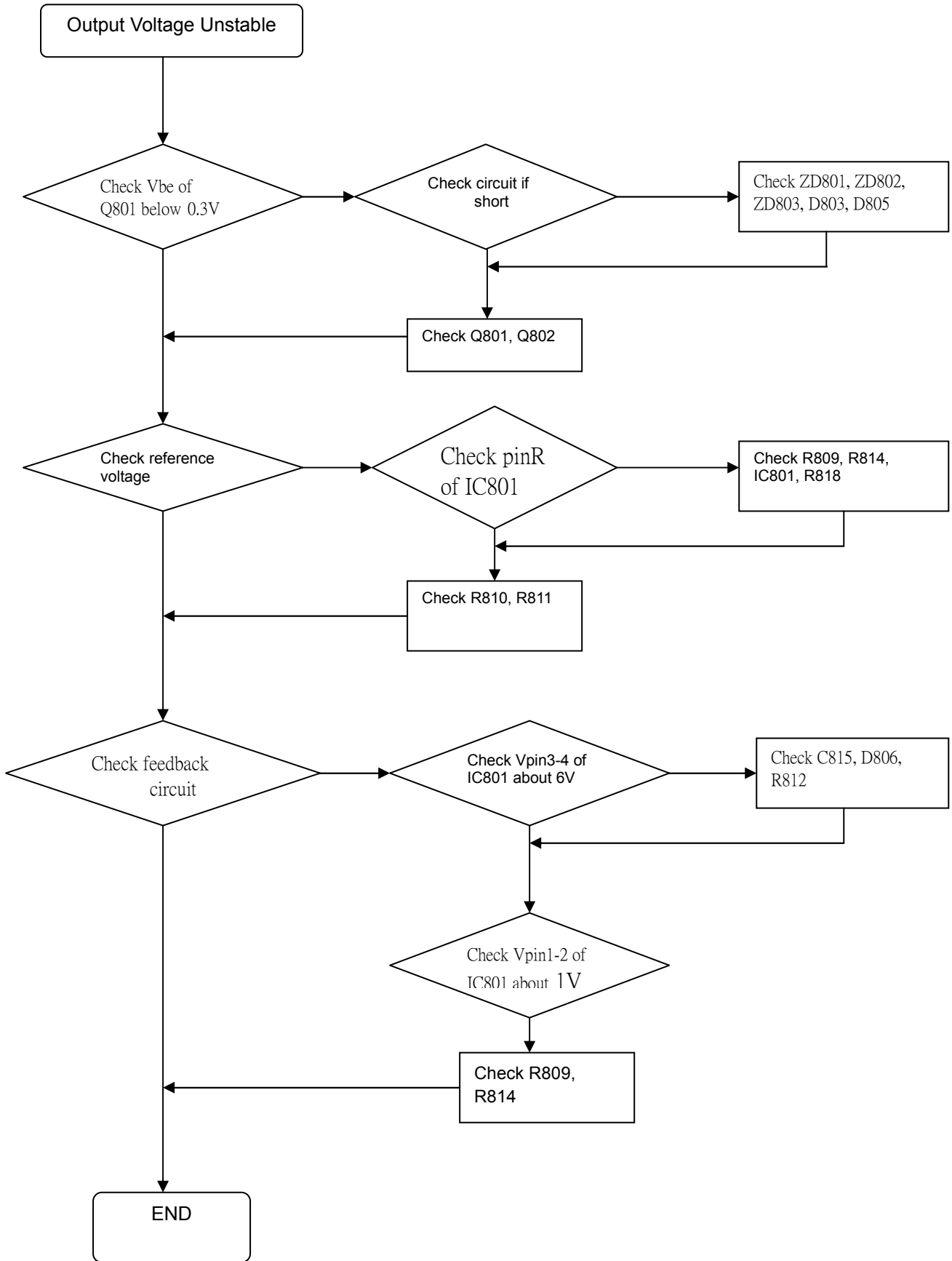
1. Common Acknowledge

- If you change the interface board, be sure that the U105, U106 and U103 these three components also changed to the new I/F board because there was program inside. If not, please re-write EDID or upload firmware into MCU via VGA Cable.
- If you adjust clock and phase, please do it at the condition of Windows shut down pattern.
- If you confirm the R.G.B. color is normal or not, please do it under 16-grey scalar pattern.
- This LCM is analog interface. So if the entire screen is an abnormal color that means the problem happen in the analog circuit part, if only some scale appears abnormal color that stand the problem happen in the digital circuit part.
- If you check the H/V position, please use the crosshatch pattern.
- This LCM support more than 30 timing modes, if the input timing mode is out of specification, the picture may appears abnormally.
- If brightness uneven, repairs Inverter circuit or change a new panel.
- If you find the vertical line or horizontal line lost on the screen, please change panel.

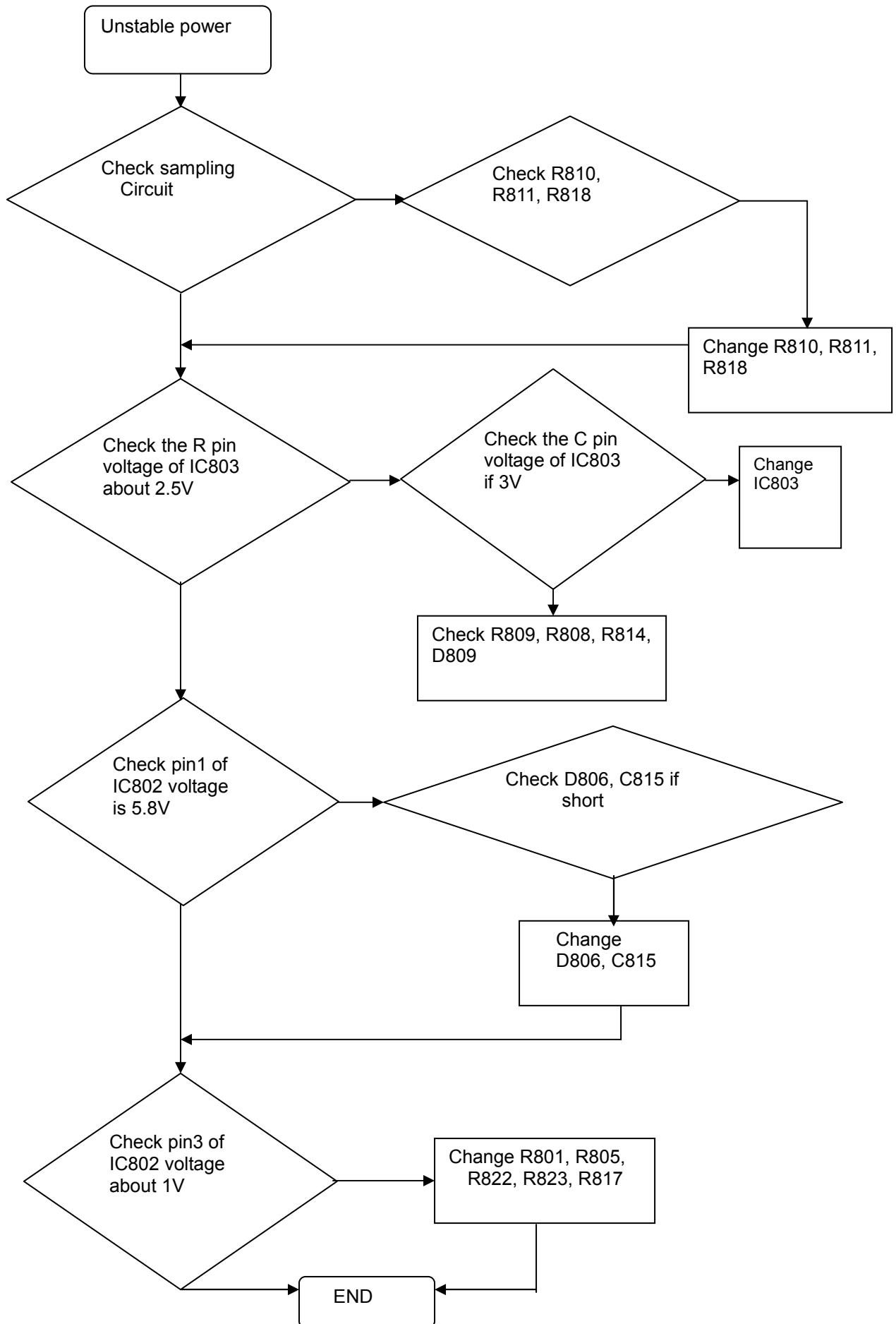
2. No Power & Power LED Off



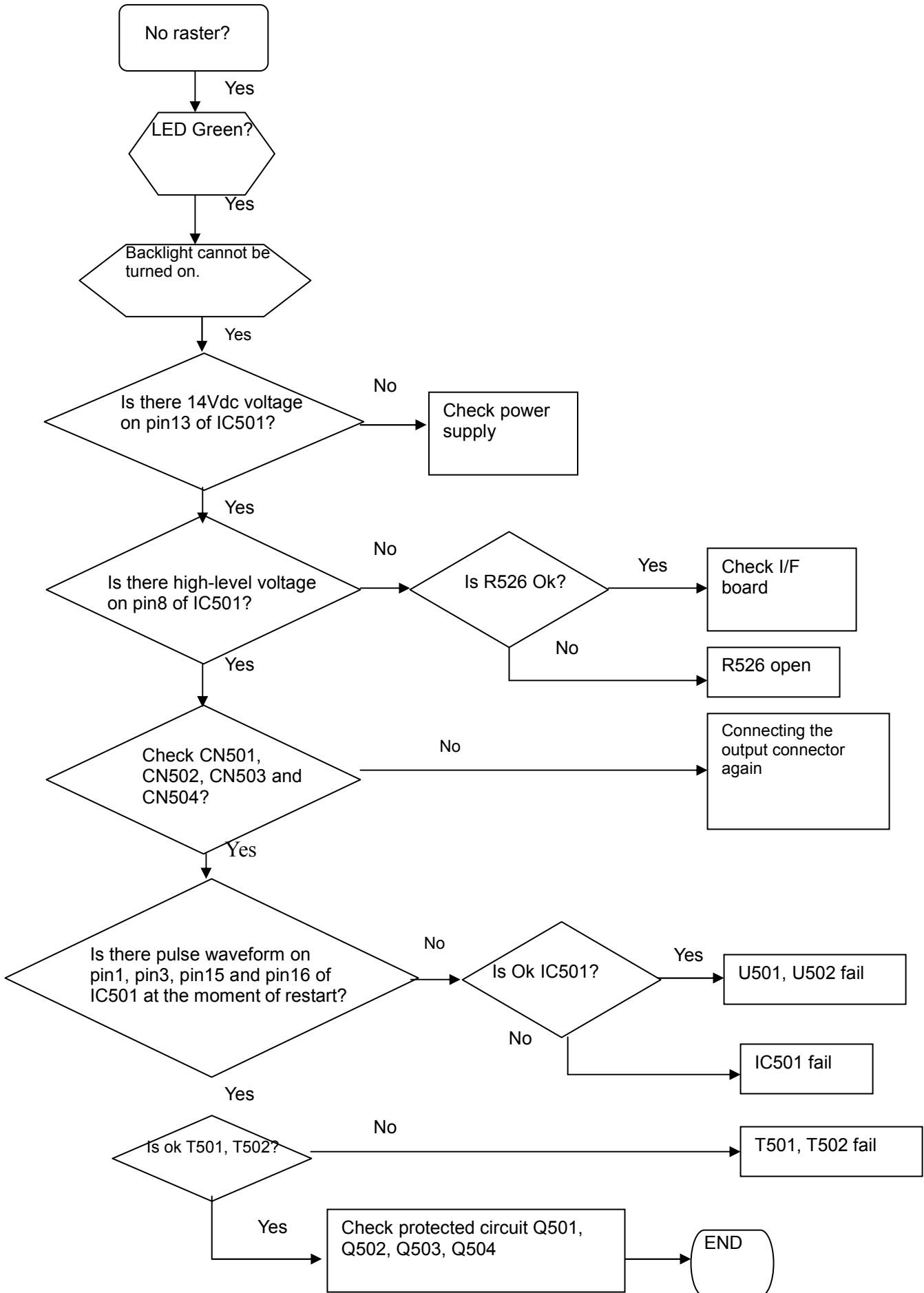
3. DC output voltage is unstable



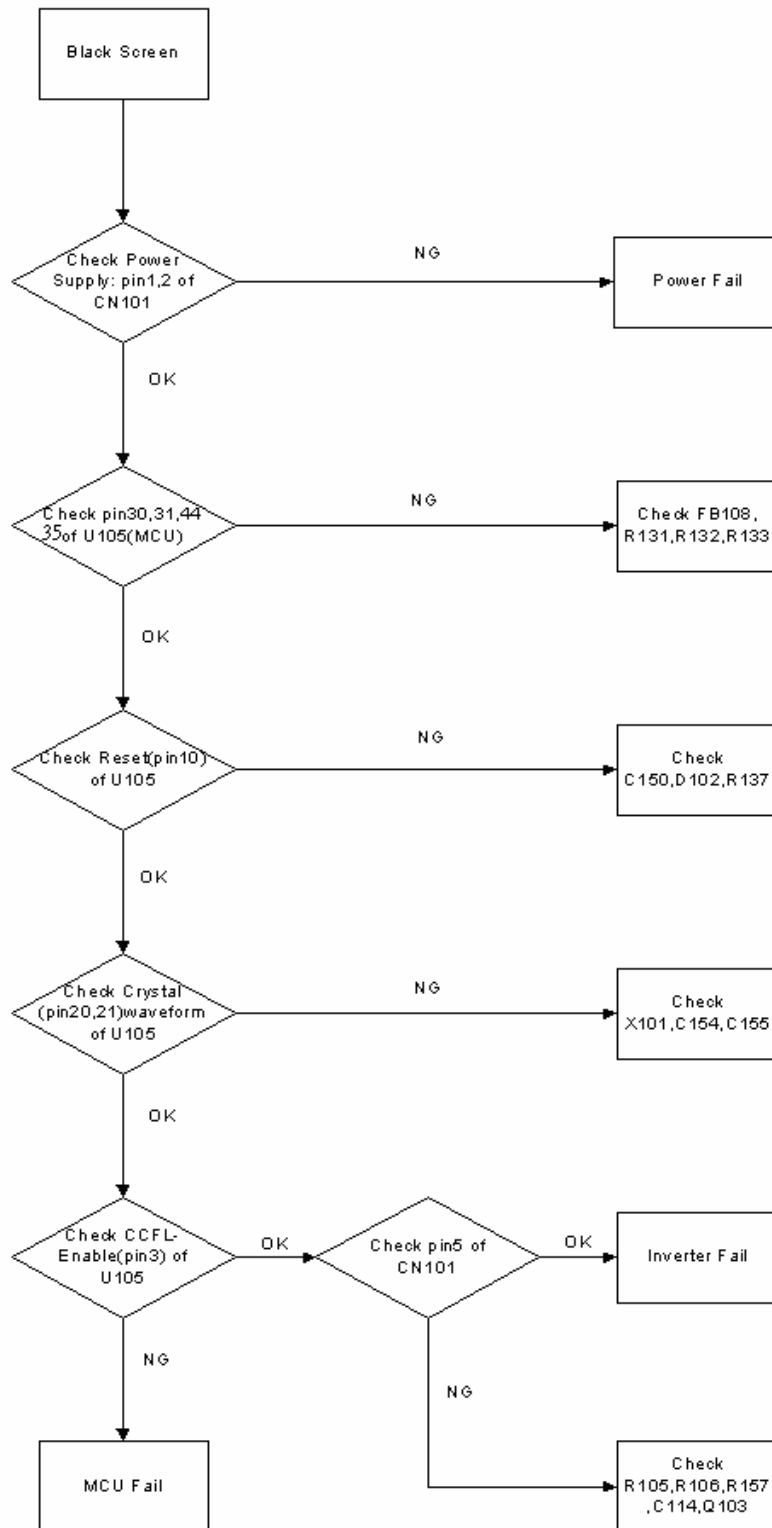
4. Output power is unstable



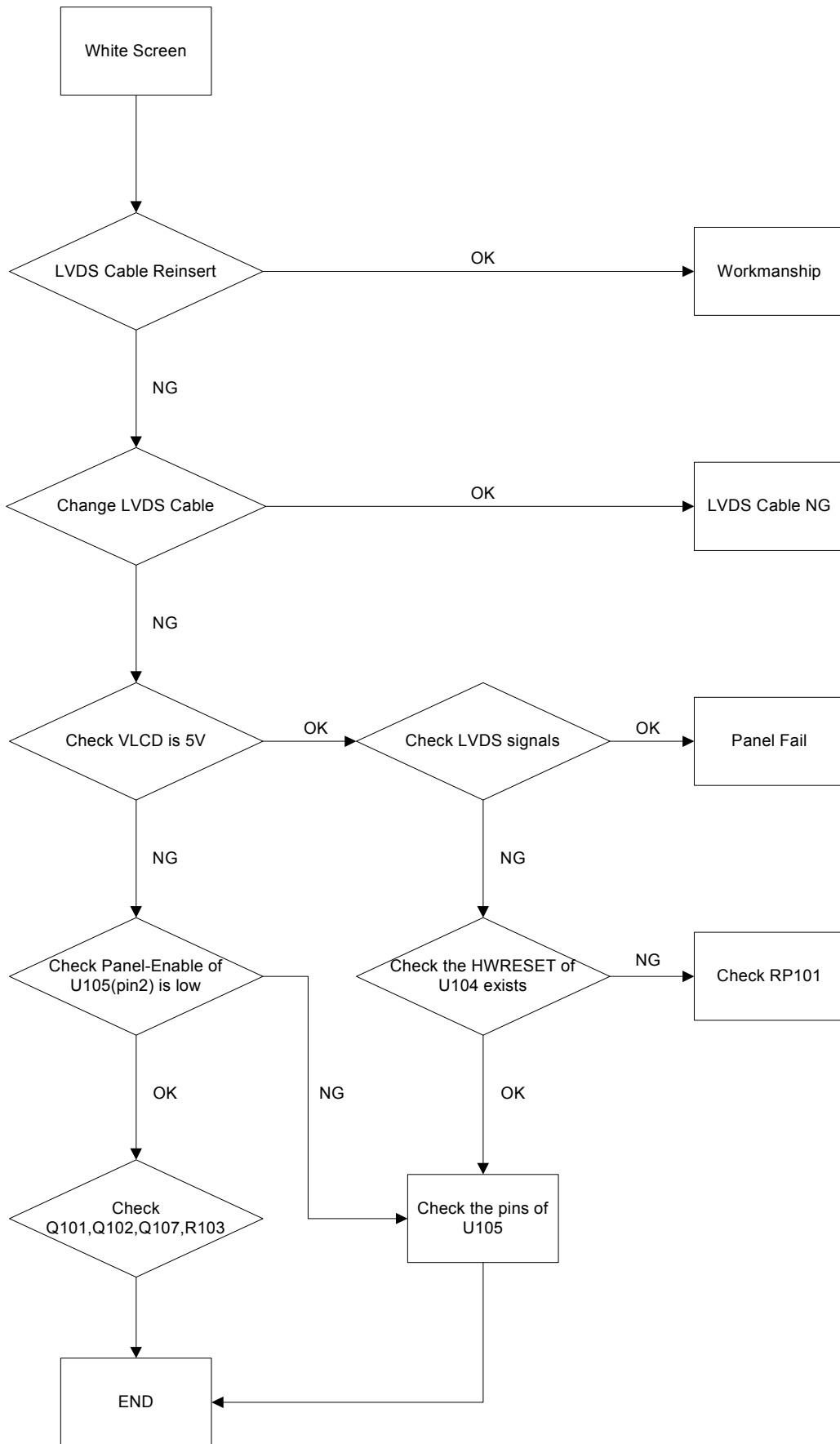
5. Backlight can't be turned on



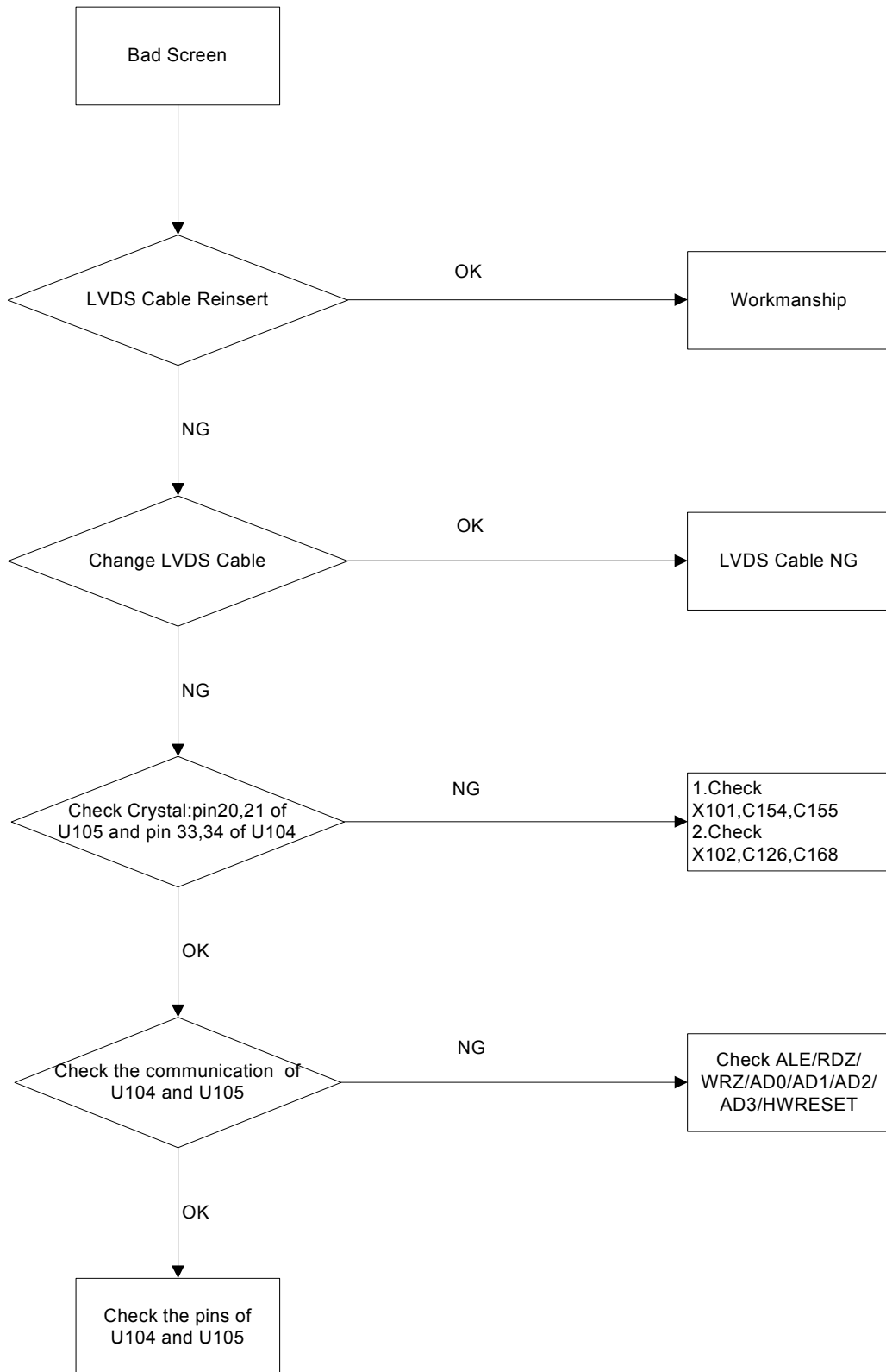
6. Black Screen and backlight turn on



7. White Screen



8. Bad Screen



7. RECOMMENDED PART LIST

RECOMMENDED SPARE PARTS LIST (VA902-1)

ViewSonic Model Number: VS10780-1W

Rev: 1a

Serial No. Prefix: PSS

Item	Description	ECR/ECN	ViewSonic P/N	Ref. P/N	Location	Universal number#	Q'ty
1	Accessories:		Power Cord (Australia)	A-00003671	453070800420R		50
2			Power Cord (British)	A-00003675	453070800230R		50
3			Power Cord (CCC)	A-00003676	453070800170		50
4			Power Cord (CNS)	A-00003672	453070800480		50
5			Power Cord (EUROPE)	A-00003674	453070800210R		50
6			Power Cord (PSE)	A-00003673	453070800380R		50
7			Power Cord 10A/125V BLK 6FT UL/CSA	A-00003040	453070800250		50
8	Board Assembly:		IF Board	B-00003654	790411301400		50
9			Power & Inverter Board	B-00003655	790411401400		50
10			Control Board	B-00003656	790411501000		50
11	Cabinets:		Cover, Hinge, VA902	C-00003657	501020203400		50
12			Base Assembly	C-00003658	714020002500		50
13			Bezel Assembly	C-00003659	714030002500		50
14			Back Cover Assembly	C-00003660	714050002500		50
15	Cables:		HRN ASS'Y 1P 157mm	CB-00003661	430300100200		100
16			HRN LVDS FFC 30P 185mm	CB-00003662	430303000180		100
17			D-Sub cable	CB-00003047	453010100100		50
18	Hardware:		Hinge, Left.	HW-00003663	502060000100		50
19			Hinge, Right.	HW-00003664	502060000110		50
20			Bolt,#4-40X11.8, NiFPR D-sub Conn.	HW-00003171	509000000700		100
21			Screw, P, Cross, T.T-4*12, BLK	HW-00003665	509112612501		100
22			Screw, F, Cross, T.T-4*10 Ni	HW-00003167	509212610300		100
23			Screw, P, Cross, W/WAS, T.T-5*16,Black	HW-00003666	509142716500		100
24			Screw, P, Cross, T.T-4*5 Ni	HW-00003667	509112605300		100
25			Screw, PW, Cross, W/WAS,M3*5,Ni	HW-00003169	509146305300		100
26	Packing Material:		Carton, VA902,	P-00003668	506020007100		50
27			Cusion, EPS-L	P-00003669	506040005800		50
28			Cusion, EPS-R	P-00003670	506040005810		50

RECOMMENDED SPARE PARTS LIST (VA902b-1)

ViewSonic Model Number: VS10780-1W

Rev: 1a

Serial No. Prefix: PSW

Item	Description	ECR/ECN	ViewSonic P/N	Ref.P/N	Location	Universal number#	Q'ty
1	Accessories:		A-00003671	453070800420R			50
2			A-00003675	453070800230R			50
3			A-00003676	453070800170			50
4			A-00003672	453070800480			50
5			A-00003674	453070800210R			50
6			A-00003673	453070800380R			50
7			A-00003040	453070800250			50
8	Board Assembly:		B-00003654	790411301400			50
9			B-00003655	790411401400			50
10			B-00003656	790411501000			50
11	Cabinets:		C-00003657	501020203400			50
12			C-00003658	714020002500			50
13			C-00003677	714030002510			50
14			C-00003660	714050002500			50
15	Cables:		CB-00003661	430300100200			100
16			CB-00003662	430303000180			100
17			CB-00003047	453010100100			50
18	Hardware:		HW-00003663	502060000100			50
19			HW-00003664	502060000110			50
20			HW-00003171	509000000700			100
21			HW-00003665	509112612501			100
22			HW-00003167	509212610300			100
23			HW-00003666	509142716500			100
24			HW-00003667	509112605300			100
25			HW-00003169	509146305300			100
26	Packing Material:		P-00003678	506020007110			50
27			P-00003669	506040005800			50
28			P-00003670	506040005810			50

BOM LIST (VA902-1 for "Hannstar (8ms) Panel")

ViewSonic Model Number: VS10780-1

Rev: 1a

Serial No. Prefix: PSS

Item	ViewSonic P/N	Ref. P/N	Description	Location	Qty.
1	#N/A	506250005001	LBL,AGENCY(VA902), LE1909.CCC MARK	For VSCN &VSI & VSE &VSE-UK	1 PC
2	#N/A	506440002300	LABEL,BLANK,76.2x76.2mm,LE1709(UPC)	For VSCN &VSI & VSE &VSE-UK	1 PC
3	#N/A	506390000500	LABEL,QC-PASS,OD=15mm, LE1709	For VSCN &VSI & VSE &VSE-UK	1 PC
4	#N/A	506390000600	LABEL,HI-POT PASS, LE1709	For VSCN &VSI & VSE &VSE-UK	1 PC
5	#N/A	506390000400	LABEL,OPENING STAND, LE1709	For VSCN &VSI & VSE &VSE-UK	1 PC
6	#N/A	506440002400	LABEL,BLANK,50x25mm,LE1709(S/N)	For VSCN &VSI & VSE &VSE-UK	1 PC
7	P-00003670	506040005810	CUSHION,EPS-R, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
8	P-00003669	506040005800	CUSHION,EPS-L, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
9	P-00003668	506020007100	CARTON,VIEWSONIC(VA902),LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
10	P-00003943	506120300400	BAG,PE+EPE,L590xW480xT0.6mm (PRINTED)LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
11	#N/A	506380001800	TAPE,WRAPPING TYPE,48mmx50M LE1X04/05	For VSCN &VSI & VSE &VSE-UK	0.024 ROL
12	#N/A	506431000300	FILM,PE 500mmx900M	For VSCN &VSI & VSE &VSE-UK	0.0025 ROL
13	#N/A	506440002600	LABEL,BLANK,210x65mm,LE1709(PALLET)	For VSCN &VSI & VSE &VSE-UK	0.0357 PC
14	#N/A	506039000900	CORNER PAPER,1900x50x50mm,LE1701	For VSCN &VSI & VSE &VSE-UK	0.0714 PC
15	#N/A	506039001200	CORNER PAPER,820x50x50mm	For VSCN &VSI & VSE &VSE-UK	0.0714 PC
16	#N/A	506150001900	PALLET,1100x1100x120mm,LE1705	For VSCN &VSI & VSE &VSE-UK	0.0178 PC
17	#N/A	506037001610	CARDBOARD,COVER,1100x1100x120xT5mm, LE1909	For VSCN &VSI & VSE &VSE-UK	0.0357 PC
18	#N/A	453070800170R	PWRCORD 10A/250V BLK 6FT CHINA.RVV 3Gx0.	Only for VSCN	1 PC
19	A-00003674	453070800210R	PWR CORD 6A/250V BLK 6FT VDE H05VV-F 3Gx	Only for VSE & VSE-UK	1 PC
20	A-00003675	453070800230R	PWRCORD 6A/250V BLK 6FT UK3Gx.75mm(SP60/	Only for VSE-UK	1 PC
21	#N/A	453070800480R	PWRCORD 7A/125V BLK 6FT CNS,VCTF 3Gx0.75	Only for VSI	1 PC
22	CB-00003047	453010100100	CABLE,D-SUB 15P MALE 6FT BLACK/BLUE,SZ40	For VSCN &VSI & VSE &VSE-UK	1 PC
23	#N/A	703000000703	KIT,ACCESSORY,VA902-HSD,LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
24	#N/A	714072840100	ASSY,FIANL(S), LE1909-4A0	For VSCN &VSI & VSE &VSE-UK	1 PC
25	C-00003657	501020203400	COVER,HINGE, LE1909	For VSCN &VSI & VSE &VSE-UK	2 PC
26	HW-00003664	502060000110	HINGE,RIGHT, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
27	HW-00003663	502060000100	HINGE,LIFT, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
28	#N/A	505040202100	INSULATOR,MYLAR,L35xW16mm,HINGE LEFT, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
29	HW-00003665	509112612501	SCREW,P,CROSS,T.T-4*12,BLK(HEAD ? 7.8mm)	For VSCN &VSI & VSE &VSE-UK	4 PC
30	HW-00003167	509212610300	SCREW,F,CROSS,T.T-4*10,Ni	For VSCN &VSI & VSE &VSE-UK	4 PC
31	HW-00003666	509142716500	SCREW,P,CROSS W/WAS,T.T-5*16,BLACK	For VSCN &VSI & VSE &VSE-UK	4 PC
32	#N/A	430300800370	HRN ASS'Y 4x2P 220mm UL2651#28	For VSCN &VSI & VSE &VSE-UK	1 PC
33	C-00003659	714030002500	ASSY,BEZEL(SILVER),LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
34	#N/A	501010202900	BEZEL,FRONT(SILVER), LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
35	#N/A	501030202200	BUTTON,FUNCTION KEY, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
36	#N/A	501120101500	LENS, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
37	C-00003660	714050002500	ASSY,BACK COVER, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
38	#N/A	501020203500	COVER,BACK, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
39	#N/A	502080300300	SUPPORT,VESA, LE1709	For VSCN &VSI & VSE &VSE-UK	1 PC
40	C-00003658	714020002500	ASSY,BASE, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
41	#N/A	501240201200	BASE, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
42	#N/A	502170100500	PLATE,BASE, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
43	HW-00003667	509112605300	SCREW,P,CROSS,T.T-4*5,Ni	For VSCN &VSI & VSE &VSE-UK	2 PC
44	PL-00003053	503020002600	RUBBER,FOOT,OD14.1xT2.5mm,3M, LE1708	For VSCN &VSI & VSE &VSE-UK	5 PC
45	#N/A	714072841100	ASSY,PANEL(S), LE1909-4A0	For VSCN &VSI & VSE &VSE-UK	1 PC
46	E-00003942	631102090110	LCD PANEL 19" HSD190ME13- A02(HANNSTAR)	For VSCN &VSI & VSE &VSE-UK	1 PC
47	B-00003172	502090301300	CHASSIS, LE1709	For VSCN &VSI & VSE &VSE-UK	1 PC
48	#N/A	502020101700	BRACKET,LEFT, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
49	#N/A	502020101710	BRACKET,RIGHT, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
50	B-00003654	790411301400	PCBA,IF BOARD, LE1909-4A0	For VSCN &VSI & VSE &VSE-UK	1 PC
51	B-00003655	790411401400	PCBA,PWR&INV./B, LE1909-4A0	For VSCN &VSI & VSE &VSE-UK	1 PC
52	HW-00003169	509146305300	SCREW,PW,CROSS W/WAS,M3*5,Ni	For VSCN &VSI & VSE &VSE-UK	13 PC
53	HW-00003171	509000000700	BOLT,#4-40x11.8,NiFOR D-SUB/DVI CONN.	For VSCN &VSI & VSE &VSE-UK	2 PC
54	CB-00003662	430303000180	HRN LVDS FFC 30P 185mm,ACCX30185KU28MY	For VSCN &VSI & VSE &VSE-UK	1 PC
55	B-00003656	790411501000	PCBA,KEYPAD BOARD, LE1909	For VSCN &VSI & VSE &VSE-UK	1 PC
56	CB-00003661	430300100200	HRN ASS'Y 1P 157mm GREEN,UL1007 #20	For VSCN &VSI & VSE &VSE-UK	1 PC
57	#N/A	511100001500	CLIP,WIRE.CH-01P(PG), LE1709	For VSCN &VSI & VSE &VSE-UK	1 PC
58	#N/A	506381000700	TAPE,ACE,45mmx30M(PC=10x45mm),LE1709	For VSCN &VSI & VSE &VSE-UK	0.001 ROL
59	M-00003165	505040202000	INSULATOR,MYLAR,L79.7xW62.7mm,CHASS IS, LE1709	For VSCN &VSI & VSE &VSE-UK	1 PC

Item	ViewSonic P/N	Ref. P/N	Description	Location	Qty.
60	#N/A	506102000400	LOGO PLATE,VIEWSONIC, LE1709(THREE BIRDS)	For VSCN &VSI & VSE &VSE-UK	1 PC
61	#N/A	506102000300	LOGO PLATE,VIEWSONIC, LE1709	For VSCN &VSI & VSE &VSE-UK	1 PC
62	#N/A	506102000500	LOGO PLATE,VIEWSONIC, LE1709(ELLIPSE)	For VSCN &VSI & VSE &VSE-UK	1 PC
63	#N/A	506390210100	LABEL,CARTON(8ms),LE1709,L89xW58mm	For VSCN &VSI & VSE &VSE-UK	1 PC
64	#N/A	506380002100	TAPE,WRAPPING TYPE(VIEWSONIC),50mmx75M,LE1709	For VSCN &VSI & VSE &VSE-UK	0.0083 ROL
65	#N/A	506431002050	FILM,PROTECTION,UNPRINTED,LE1909/18	For VSCN &VSI & VSE &VSE-UK	0.1 PC
66	#N/A	506091000500	LABEL,WARRANTY, LE1709	Only for VSCN	1 PC
67	#N/A	506092001400	CARD,WARRANTY, LE1709	Only for VSCN	1 PC
68	#N/A	506030200200	CARD,AFTER SERVICE, LE1709.L130xW80	Only for VSCN	1 PC
69	#N/A	506120004600	BAG,PLASTIC,L700xW505xH160xT0.05mm,LE 1909	Only for VSCN	1 PC
70	#N/A	506500003100	LABEL,"U" MARK(20x20mm),LE1709	Only for VSE-UK	1 PC

BOM LIST (VA902b-1 for "Hannstar (8ms) Panel")

ViewSonic Model Number: VS10780-1

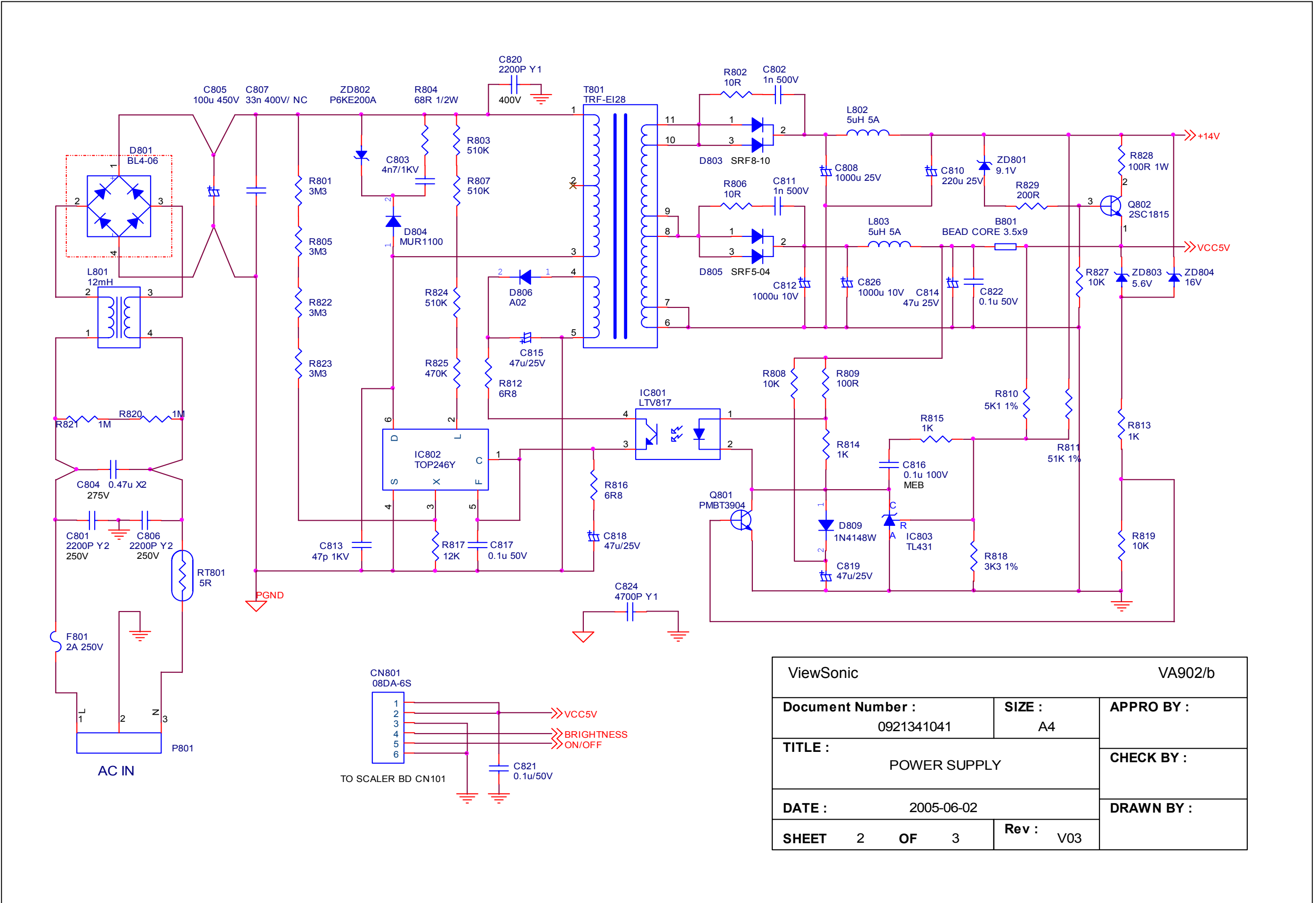
Rev: 1a

Serial No. Prefix: PSW

Item	ViewSonic P/N	Ref. P/N	Description	Location	Qty.
1	#N/A	506250005001	LBL,AGENCY(VA902), LE1909.CCC MARK	For VSA	1 PC
2	#N/A	506440002300	LABEL,BLANK,76.2x76.2mm,LE1709(UPC)	For VSA	1 PC
3	#N/A	506390000500	LABEL,QC-PASS,OD=15mm, LE1709	For VSA	1 PC
4	#N/A	506390000600	LABEL,HI-POT PASS, LE1709	For VSA	1 PC
5	#N/A	506390000400	LABEL,OPENING STAND, LE1709	For VSA	1 PC
6	#N/A	506440002400	LABEL,BLANK,50x25mm,LE1709(S/N)	For VSA	1 PC
7	P-00003670	506040005810	CUSHION,EPS-R, LE1909	For VSA	1 PC
8	P-00003669	506040005800	CUSHION,EPS-L, LE1909	For VSA	1 PC
9	P-00003668	506020007100	CARTON,VIEWSONIC(VA902),LE1909	For VSA	1 PC
10	P-00003943	506120300400	BAG,PE+EPE,L590xW480xT0.6mm (PRINTED)LE1909	For VSA	1 PC
11	#N/A	506380001800	TAPE,WRAPPING TYPE,48mmx50M LE1X04/05	For VSA	0.024 ROL
12	#N/A	506431000300	FILM,PE 500mmx900M	For VSA	0.0025 ROL
13	#N/A	506440002600	LABEL,BLANK,210x65mm,LE1709(PALLET)	For VSA	0.0357 PC
14	#N/A	506039000900	CORNER PAPER,1900x50x50mm,LE1701	For VSA	0.0714 PC
15	#N/A	506039001200	CORNER PAPER,820x50x50mm	For VSA	0.0714 PC
16	#N/A	506150001900	PALLET,1100x1100x120mm,LE1705	For VSA	0.0178 PC
17	#N/A	506037001610	CARDBOARD,COVER,1100x1100x120xT5mm, LE1909	For VSA	0.0357 PC
18	A-00003040	453070800250	PWR CORD 10A/125V BLK 6FT UL/CSA,SVT 18x	For VSA	1 PC
19	CB-00003047	453010100100	CABLE,D-SUB 15P MALE 6FT BLACK/BLUE,SZ40	For VSA	1 PC
20	#N/A	703000000713	KIT,ACCESSORY,VA902B-HSD,LE1909	For VSA	1 PC
21	#N/A	714072840101	ASSY,FIANL(G), LE1909-4A0	For VSA	1 PC
22	C-00003657	501020203400	COVER,HINGE, LE1909	For VSA	2 PC
23	HW-00003664	502060000110	HINGE,RIGHT, LE1909	For VSA	1 PC
24	HW-00003663	502060000100	HINGE,LIFT, LE1909	For VSA	1 PC
25	#N/A	505040202100	INSULATOR,MYLAR,L35xW16mm,HINGE LEFT, LE909	For VSA	1 PC
26	HW-00003665	509112612501	SCREW,P,CROSS,T.T-4*12,BLK(HEAD ? 7.8mm)	For VSA	4 PC
27	HW-00003167	509212610300	SCREW,F,CROSS,T.T-4*10,Ni	For VSA	4 PC
28	HW-00003666	509142716500	SCREW,P,CROSS W/WAS,T.T-5*16,BLACK	For VSA	4 PC
29	#N/A	430300800370	HRN ASS'Y 4x2P 220mm UL2651#28	For VSA	1 PC
30	C-00003677	714030002510	ASSY,BEZEL(GRAY),LE1909	For VSA	1 PC
31	#N/A	501010202910	BEZEL,FRONT(GRAY), LE1909	For VSA	1 PC
32	#N/A	501030202200	BUTTON,FUNCTION KEY, LE1909	For VSA	1 PC
33	#N/A	501120101500	LENS, LE1909	For VSA	1 PC
34	C-00003660	714050002500	ASSY,BACK COVER, LE1909	For VSA	1 PC
35	#N/A	501020203500	COVER,BACK, LE1909	For VSA	1 PC
36	#N/A	502080300300	SUPPORT,VESA, LE1709	For VSA	1 PC
37	C-00003658	714020002500	ASSY,BASE, LE1909	For VSA	1 PC
38	#N/A	501240201200	BASE, LE1909	For VSA	1 PC
39	#N/A	502170100500	PLATE,BASE, LE1909	For VSA	1 PC
40	HW-00003667	509112605300	SCREW,P,CROSS,T.T-4*5,Ni	For VSA	2 PC
41	PL-00003053	503020002600	RUBBER,FOOT,OD14.1xT2.5mm,3M, LE1708	For VSA	5 PC
42	#N/A	714072841100	ASSY,PANEL(S), LE1909-4A0	For VSA	1 PC
43	E-00003942	631102090110	LCD PANEL 19" HSD190ME13- A02(HANNSTAR)	For VSA	1 PC
44	B-00003172	502090301300	CHASSIS, LE1709	For VSA	1 PC
45	#N/A	502020101700	BRACKET,LEFT, LE1909	For VSA	1 PC
46	#N/A	502020101710	BRACKET,RIGHT, LE1909	For VSA	1 PC
47	B-00003654	790411301400	PCBA,IF BOARD, LE1909-4A0	For VSA	1 PC
48	B-00003655	790411401400	PCBA,PWR&INV./B, LE1909-4A0	For VSA	1 PC
49	HW-00003169	509146305300	SCREW,PW,CROSS W/WAS,M3*5,Ni	For VSA	13 PC
50	HW-00003171	509000000700	BOLT,#4-40x11.8,NiFOR D-SUB/DVI CONN.	For VSA	2 PC
51	CB-00003662	430303000180	HRN LVDS FFC 30P 185mm,ACCX30185KU28MY	For VSA	1 PC
52	B-00003656	790411501000	PCBA,KEYPAD BOARD, LE1909	For VSA	1 PC
53	CB-00003661	430300100200	HRN ASS'Y 1P 157mm GREEN,UL1007 #20	For VSA	1 PC
54	#N/A	511100001500	CLIP,WIRE.CH-01P(PG), LE1709	For VSA	1 PC
55	#N/A	506381000700	TAPE,ACE,45mmx30M(PC=10x45mm),LE1709	For VSA	0.001 ROL
56	M-00003165	505040202000	INSULATOR,MYLAR,L79.7xW62.7mm,CHASS IS, LE1709	For VSA	1 PC
57	#N/A	506102000400	LOGO PLATE,VIEWSONIC, LE1709(THREE BIRDS	For VSA	1 PC
58	#N/A	506102000300	LOGO PLATE,VIEWSONIC, LE1709	For VSA	1 PC
59	#N/A	506102000500	LOGO PLATE,VIEWSONIC, LE1709(ELLIPSE)	For VSA	1 PC
60	#N/A	506390210100	LABEL,CARTON(8ms),LE1709,L89xW58mm	For VSA	1 PC

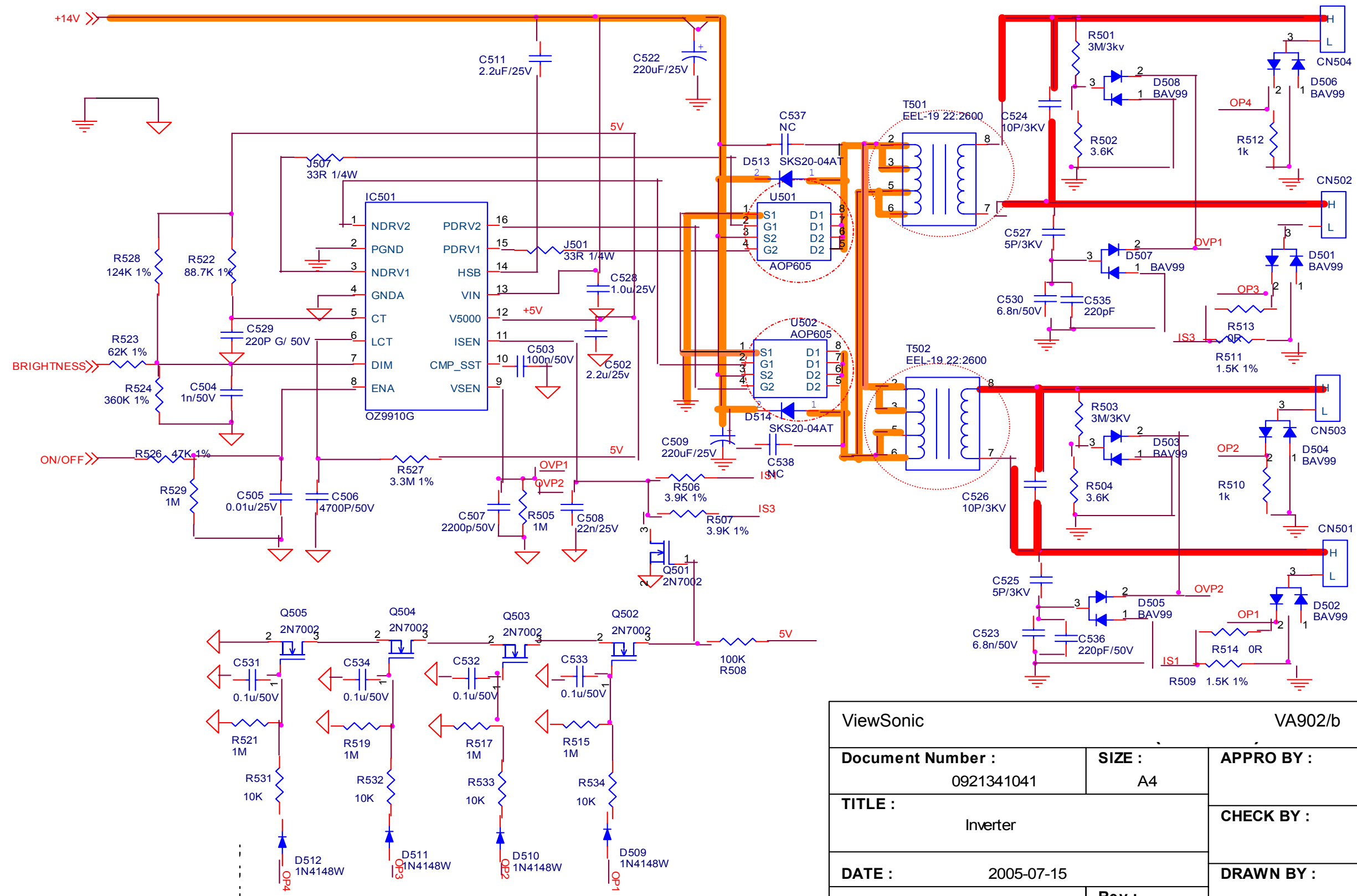
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61	#N/A	506380002100	TAPE,WRAPPING TYPE(VIEWSONIC),50mmx75M,LE1709	For VSA	0.0083	ROL
62	#N/A	506431002050	FILM,PROTECTION,UNPRINTED,LE1909/18	For VSA	0.1	PC

8. SCHEMATIC DIAGRAM
Power Supply



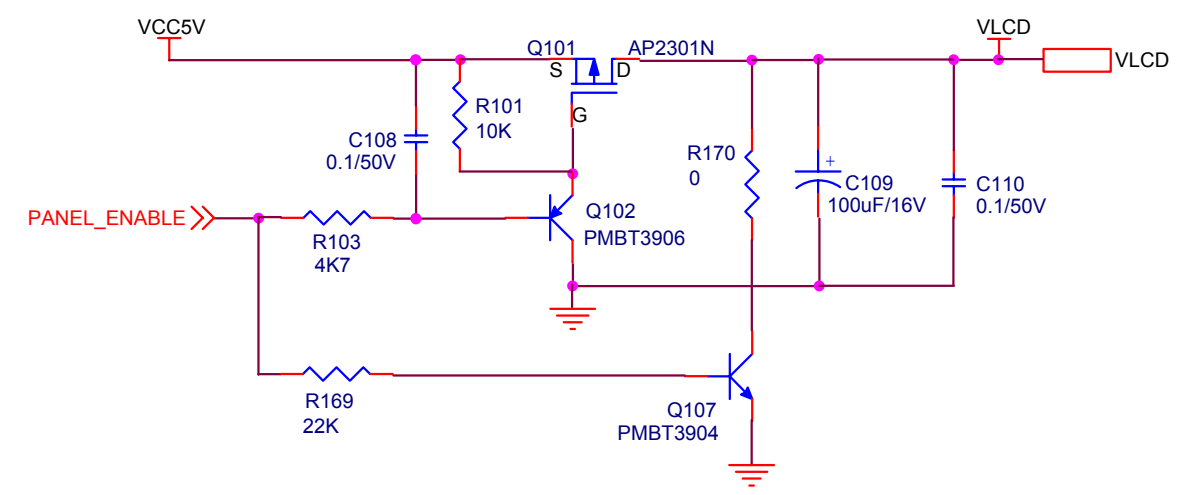
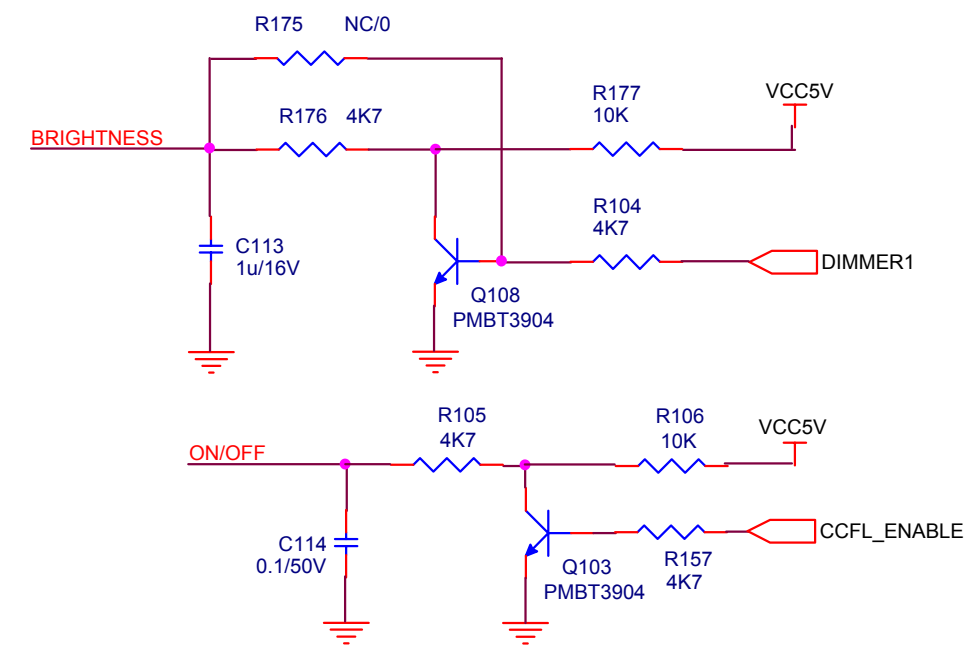
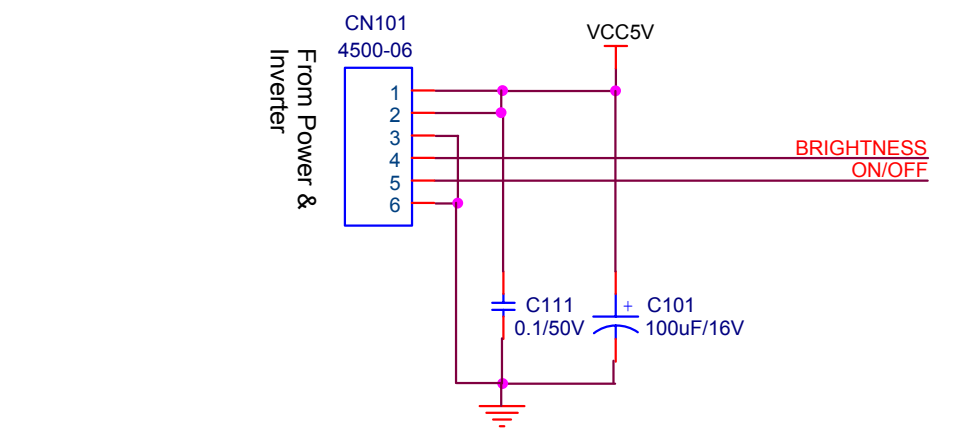
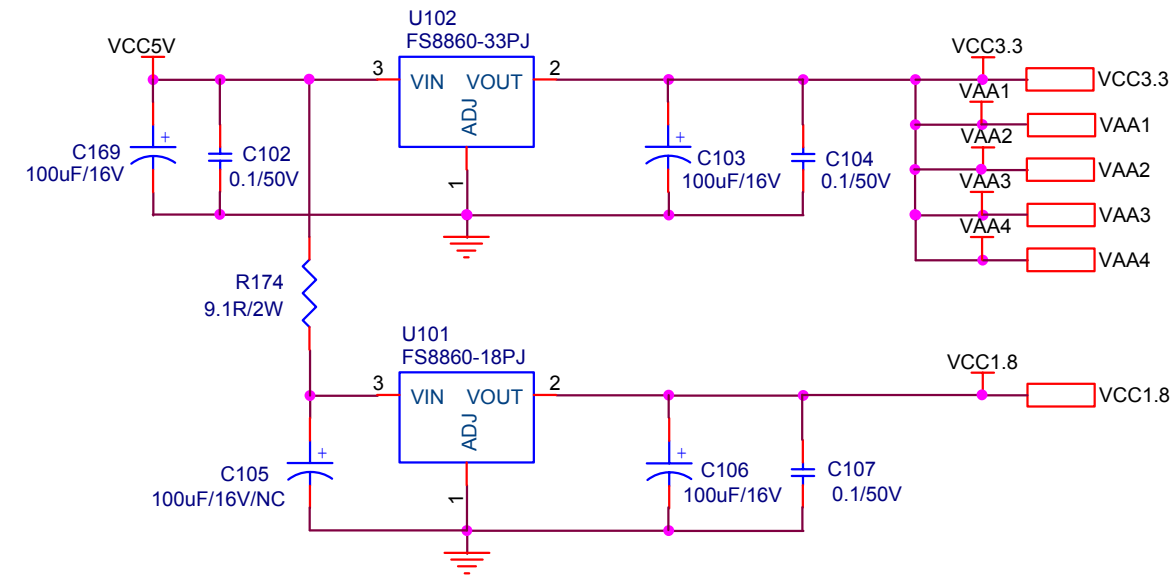
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SHEET 2	OF 3	Rev : V03	

Inverter



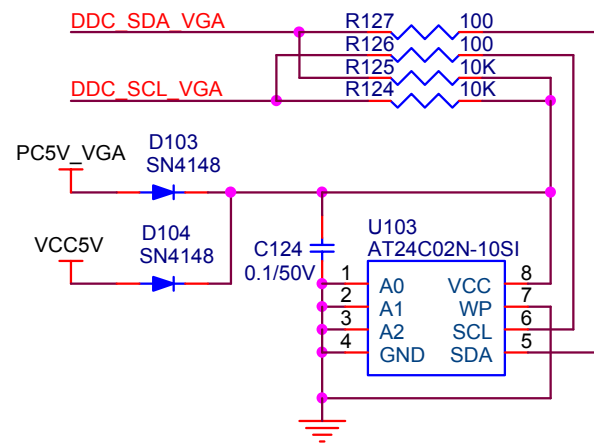
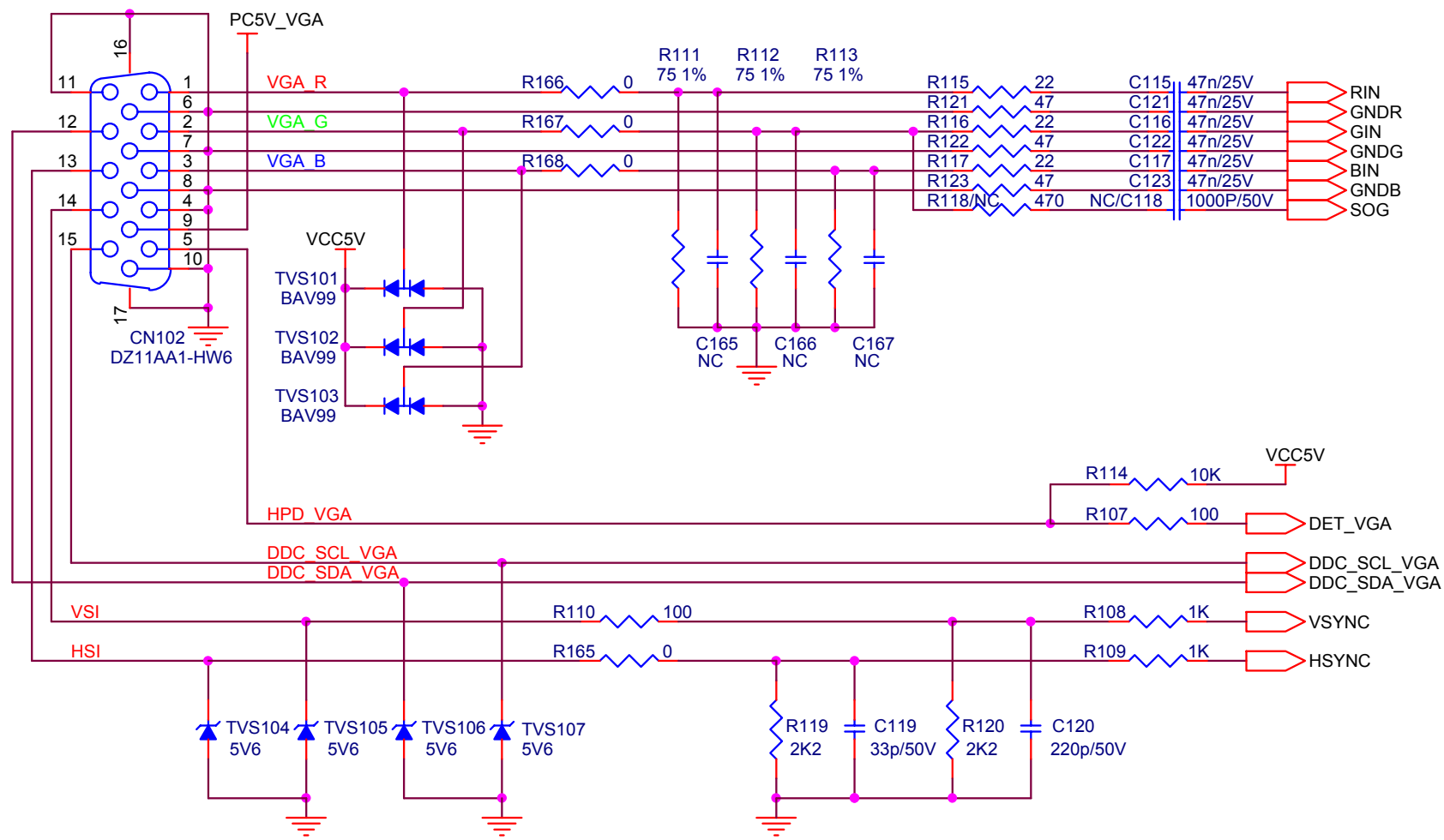
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DC Input

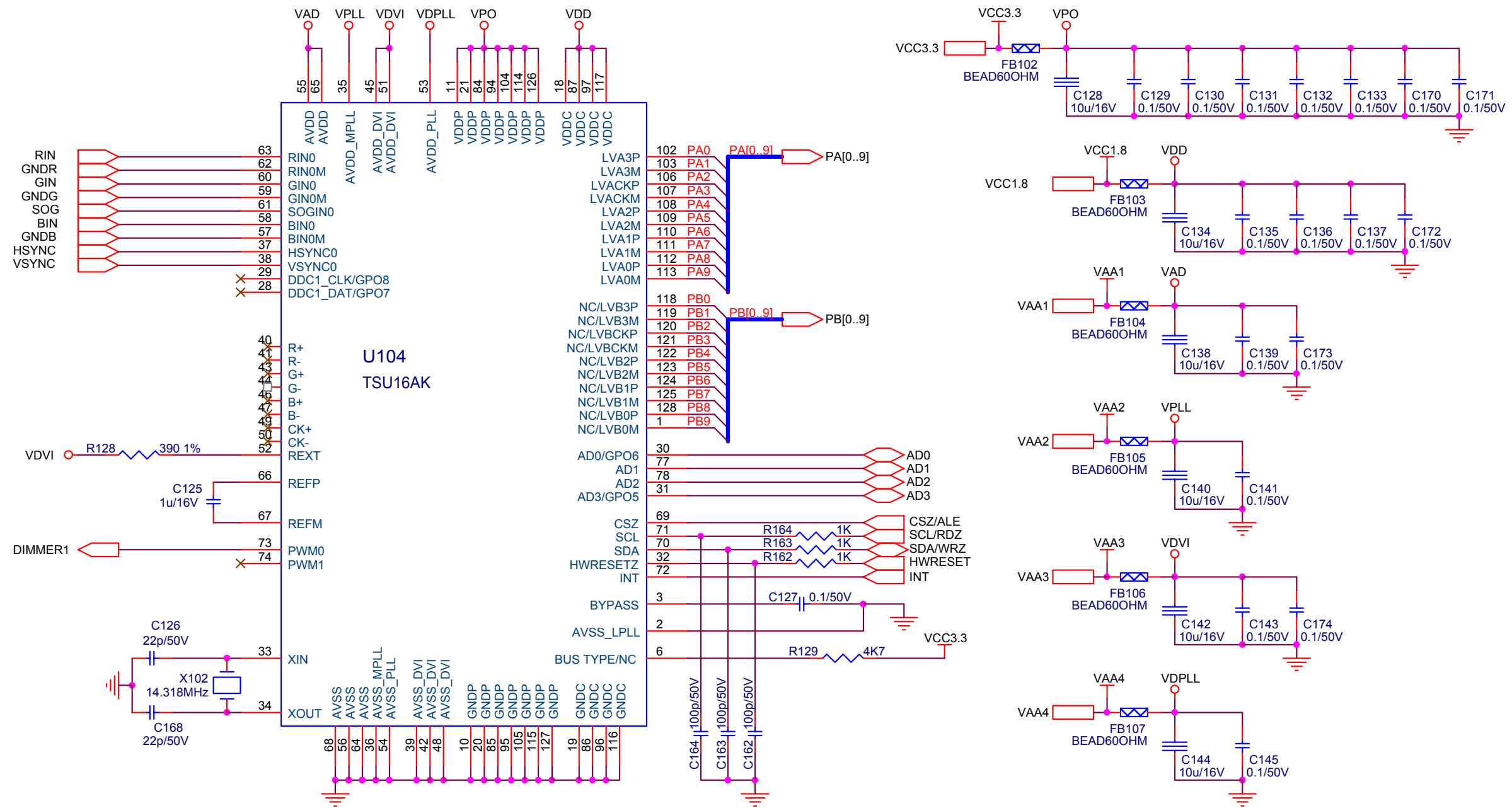


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Rev :		V01	
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VGA Input



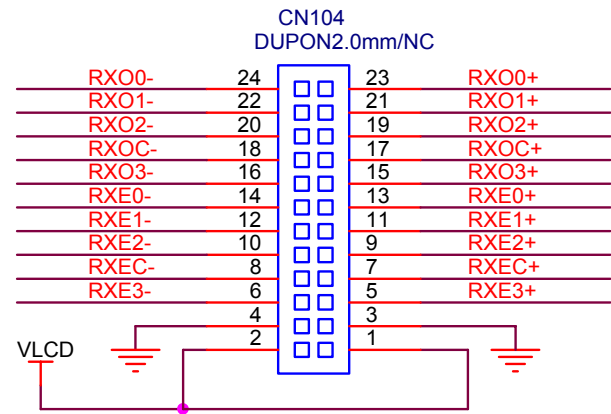
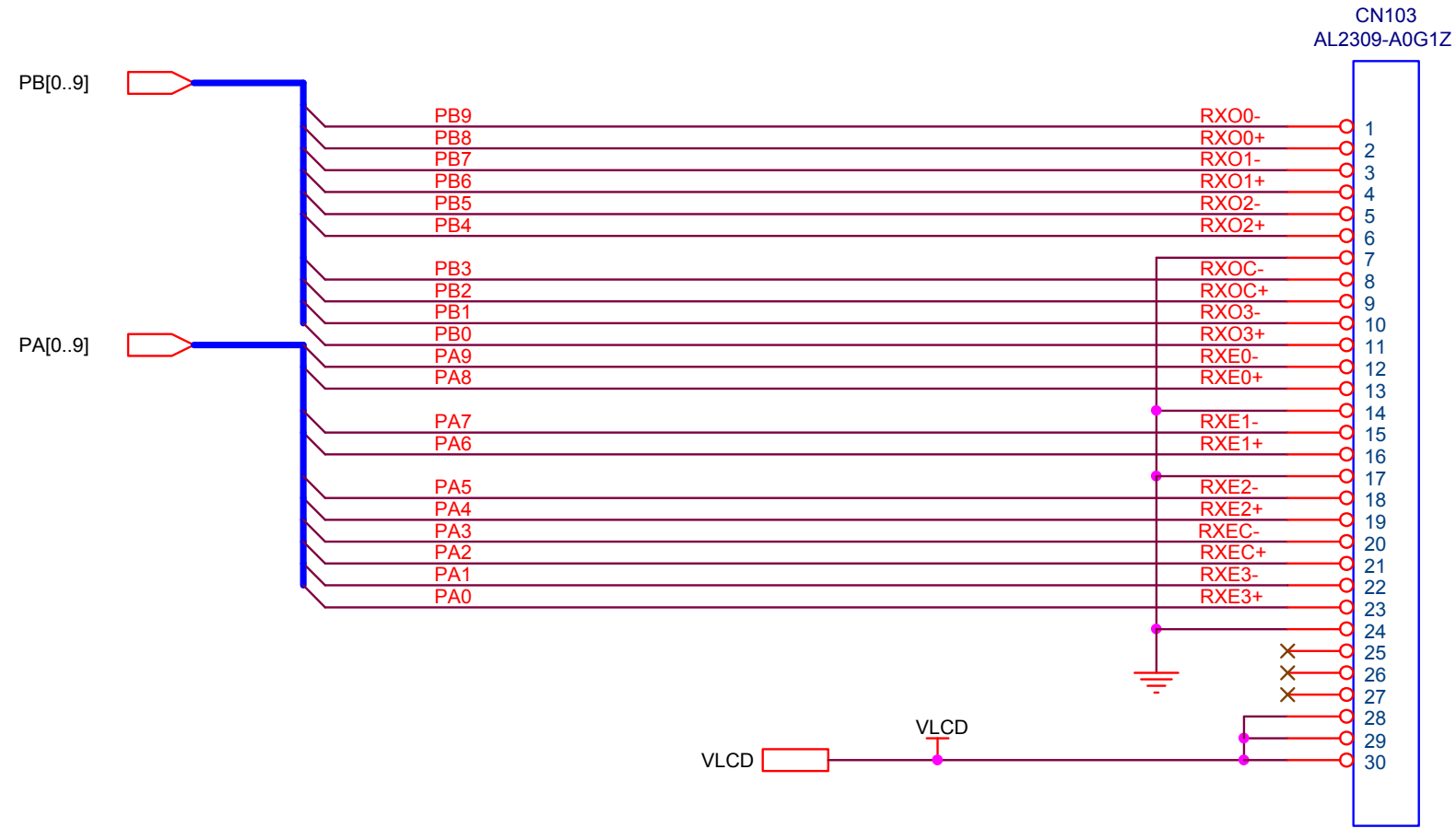
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SHEET 3 OF 6	Rev : V01	



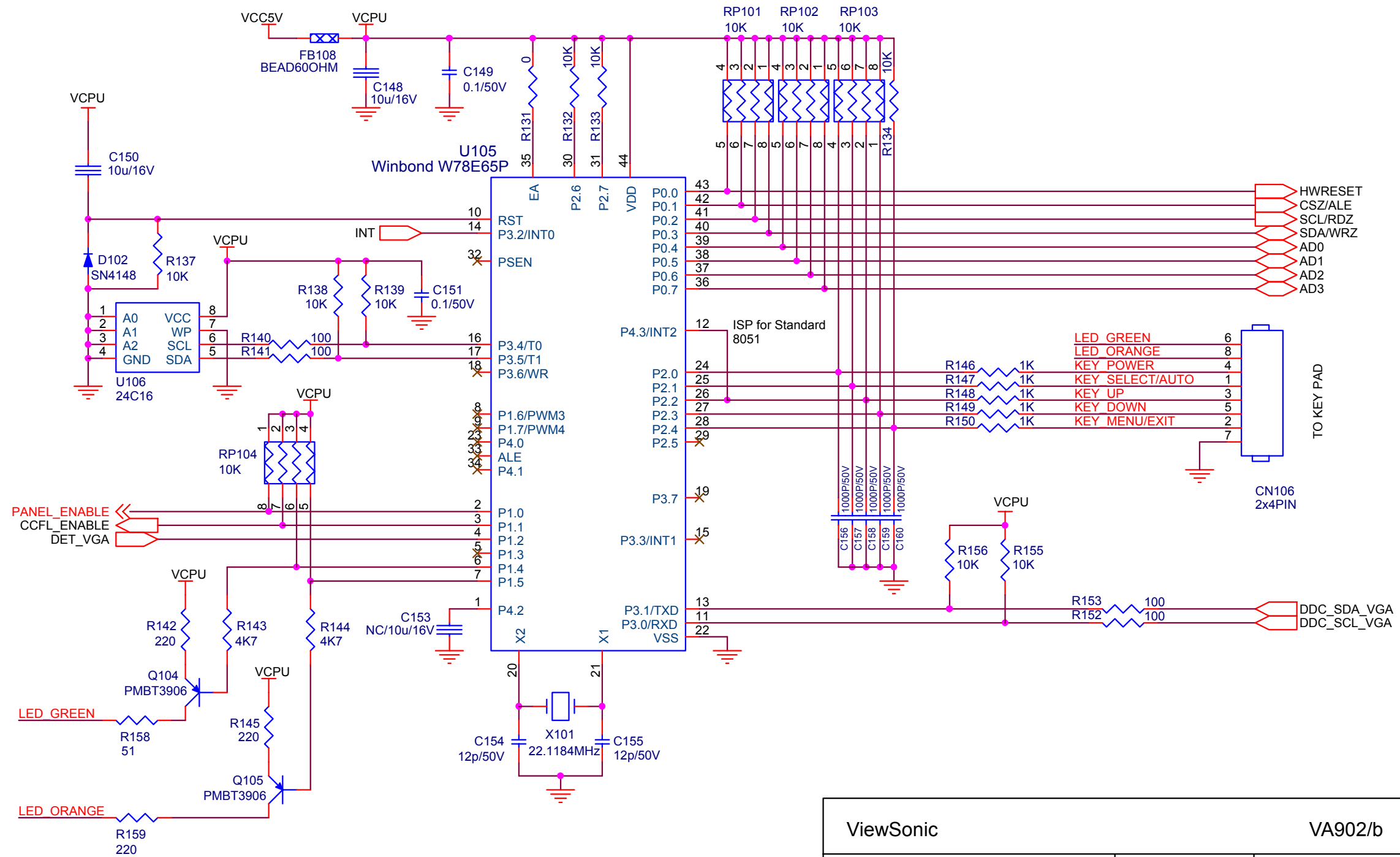
Note: U104 pin4,5,7~9,12~17,22~27,75,76,79~83,88~93,98~101 are all NC (open)

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SHEET	4	OF	6
		Rev :	V01

Panel Interface

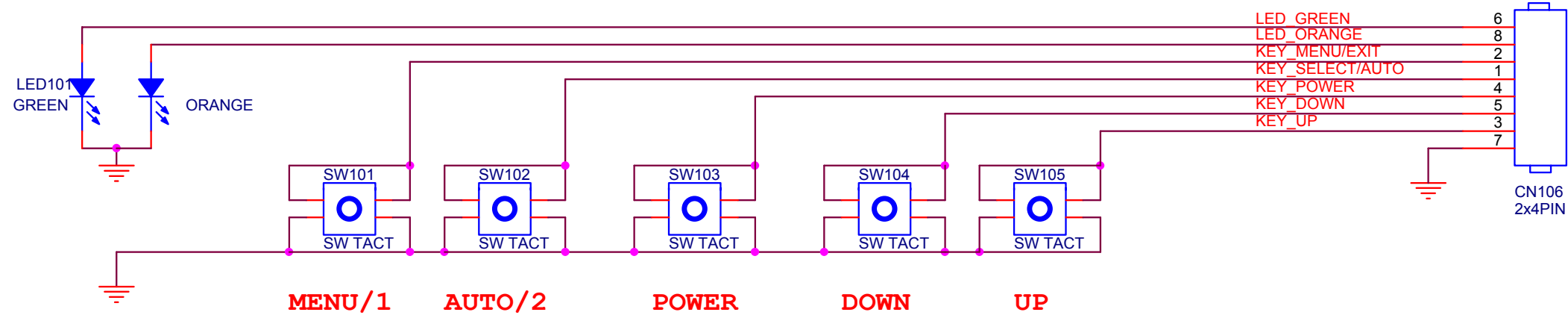


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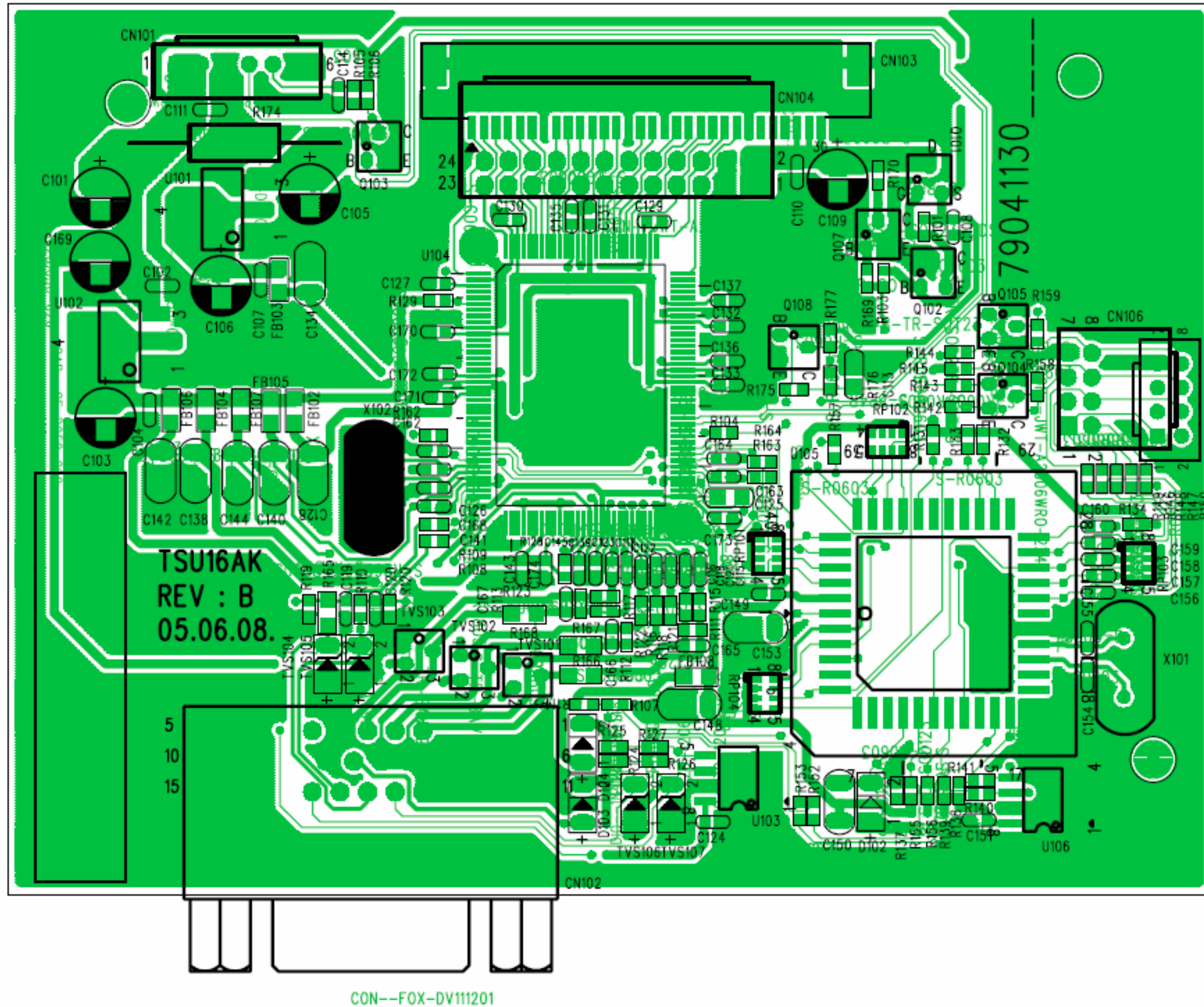
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		Rev :	V01

Key Pad

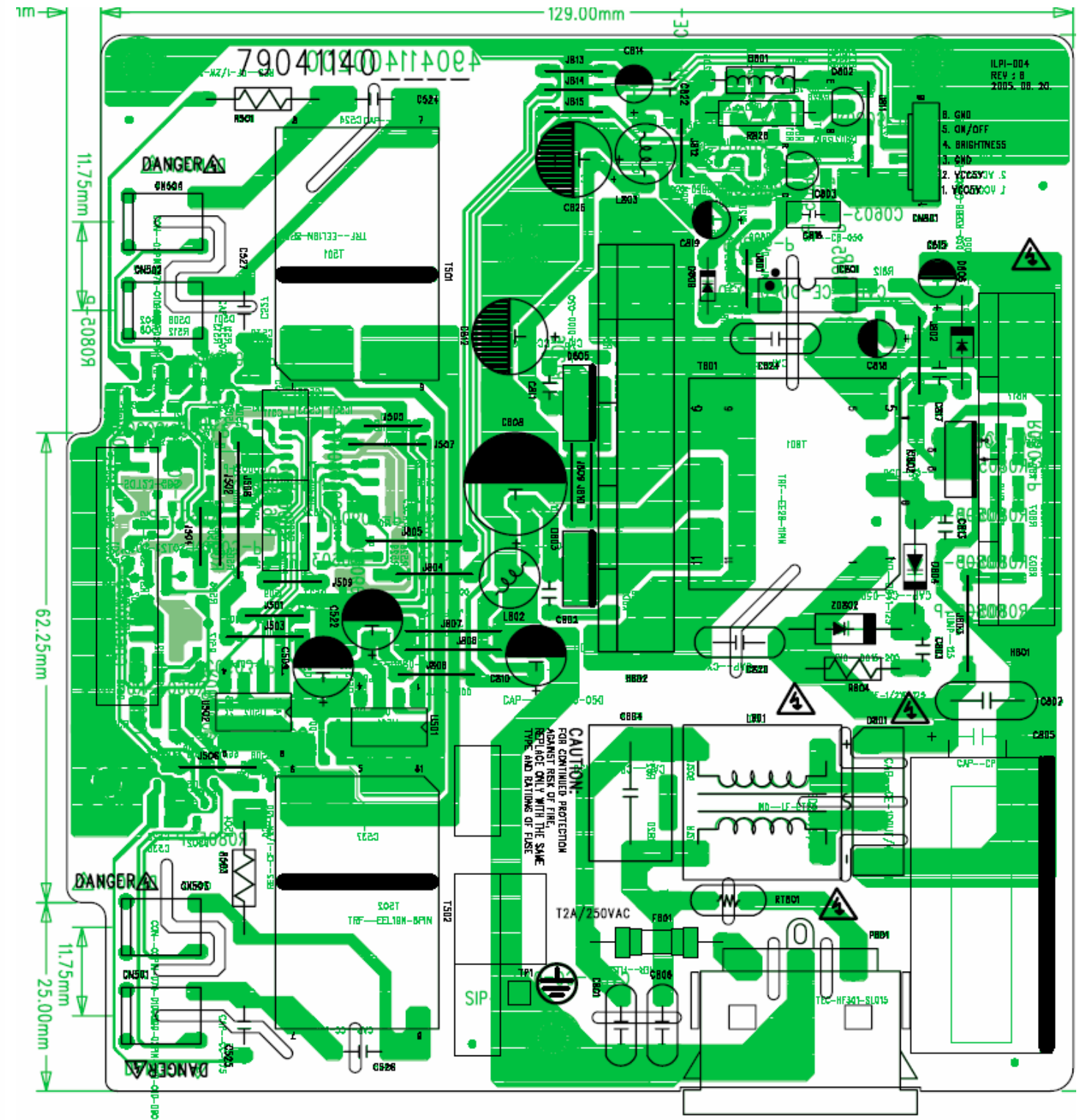
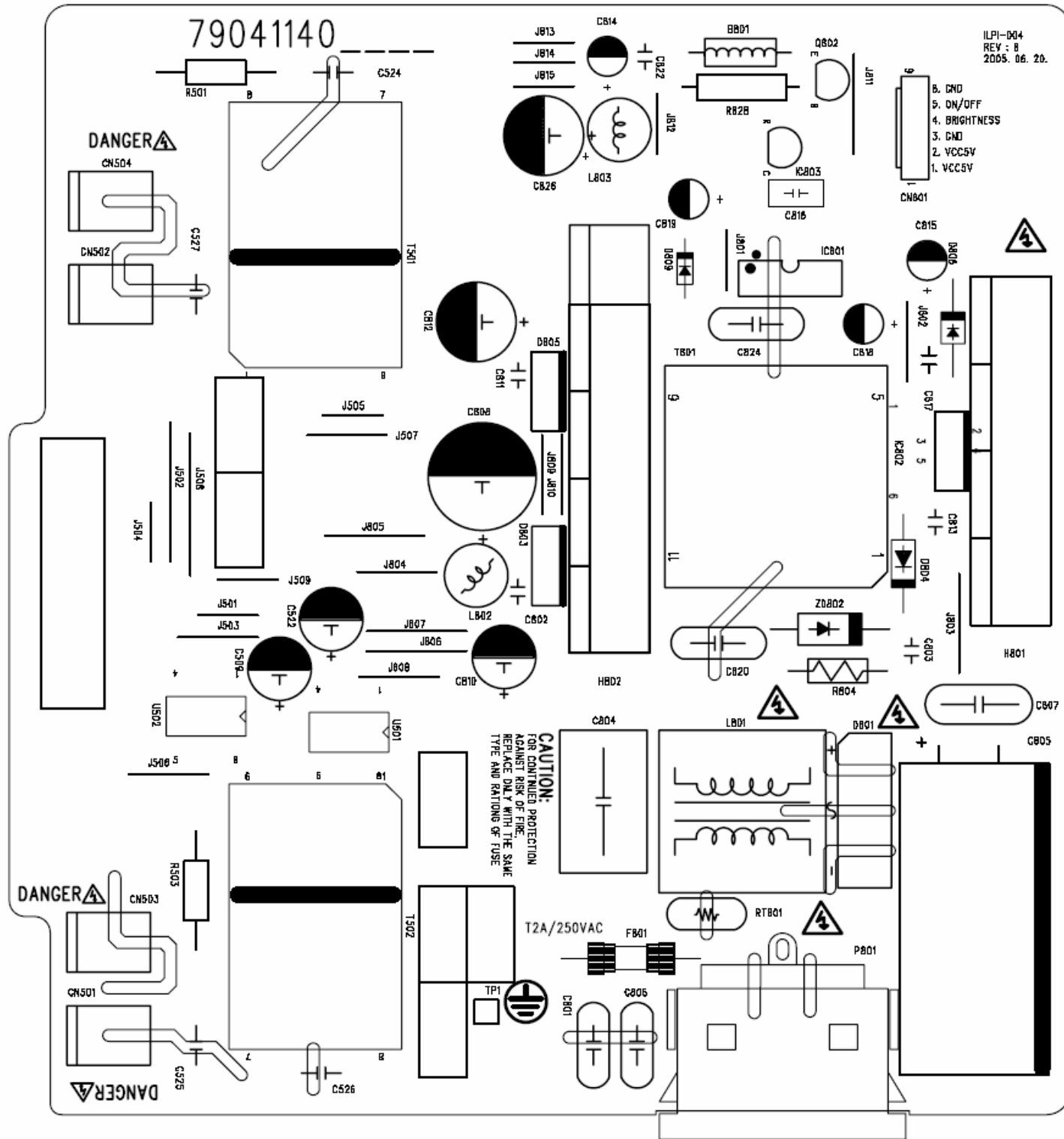


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KEYPAD		
DATE :	2005-06-02	DRAWN BY :
SHEET	2 OF 2	Rev : V01

9. PCB Layout
Main board Top layout



POWER board



Reader's Response

Dear Readers:

Thank you in advance for your feedback on our Service Manual, which allows continuous improvement of our products. We would appreciate your completion of the Assessment Matrix below, for return to ViewSonic Corporation.

Assessment

A. What do you think about the content of this Service Manual?

<i>Unit</i>	<i>Excellent</i>	<i>Good</i>	<i>Fair</i>	<i>Bad</i>
1. Precautions and Safety Notices				
2. Specification				
3. Front Panel Function Control Description				
4. Circuit Description				
5. Adjustment Procedure				
6. Troubleshooting Flow Chart				
7. Recommended Spare Parts List				
8. Exploded Diagram and Exploded Parts List				
9. Block Diagram				
10. Schematic Diagrams				
11. PCB Layout Diagrams				

B. Are you satisfied with this Service Manual?

<i>Item</i>	<i>Excellent</i>	<i>Good</i>	<i>Fair</i>	<i>Bad</i>
1. Service Manual Content				
2. Service Manual Layout				
3. The form and listing				

C. Do you have any other opinions or suggestions regarding this service manual?

Reader's basic data:

Name:		Title:	
Company:			
Add.:			
Tel:		Fax:	
E-mail:			

After completing this form, please return it to ViewSonic Quality Assurance in the USA at facsimile 1-909-839-7943. You may also e-mail any suggestions to the Director, Quality Systems & Processes (marc.maupin@viewsonic.com)