Service
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160VW9FB/78

Service Manual

SAFETY NOTICE

ANY PERSON ATTEMPTING TO SERVICE THIS CHASSIS MUST FAMILIARIZE HIMSELF WITH THE CHASSIS AND BE AWARE OF THE NECESSARY SAFETY PRECAUTIONS TO BE USED WHEN SERVICING ELECTRONIC EQUIPMENT CONTAINING HIGH VOLTAGES.

CAUTION: USE A SEPARATE ISOLATION TRANSFOMER FOR THIS UNIT WHEN SERVICING

REFER TO BACK COVER FOR IMPORTANT SAFETY GUIDELINES

飛利浦 PHILIPS

Revision List

Version	Release Date	Revision History
A00	Oct.22.2008	Initial release, Draft Version

Important Safety Notice

Proper service and repair is important to the safe, reliable operation of all Philips Company Equipment. The service procedures recommended by Philips and described in this service manual are effective methods of performing service operations. Some of these service operations require the use of tools specially designed for the purpose. The special tools should be used when and as recommended.

It is important to note that this manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It is also important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Philips could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Philips has not undertaken any such broad evaluation. Accordingly, a customer who uses a service procedure or tool which is not recommended by Philips must first satisfy himself thoroughly that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

Hereafter throughout this manual, Philips Company will be referred to as Philips.

WARNING

Use of substitute replacement parts, which do not have the same, specified safety characteristics, may create shock, fire, or other hazards.

Under no circumstances should the original design be modified or altered without written permission from Philips. Philips assumes no liability, express or implied, arising out of any unauthorized modification of design.

Customer assumes all liability.

FOR PRODUCTS CONTAINING LASER:

DANGER- There is invisible laser radiation when open. AVOID DIRECT EXPOSURE TO BEAM.

CAUTION-Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

CAUTION -The use of optical instruments with this product will increase eye hazard.

TO ENSURE THE CONTINUED RELIABILITY OF THIS PRODUCT, USE ONLY ORIGINAL MANUFACTURER'S REPLACEMENT PARTS, WHICH ARE LISTED WITH THEIR PART NUMBERS IN THE PARTS LIST SECTION OF THIS SERVICE MANUAL.

Take care during handling the LCD module with backlight unit

-Must mount the module using mounting holes arranged in four corners.

-Do not press on the panel, edge of the frame strongly or electric shock as this will result in damage to the screen.

-Do not scratch or press on the panel with any sharp objects, such as pencil or pen as this may result in damage to the panel.

-Protect the module from the ESD as it may damage the electronic circuit (C-MOS).

-Make certain that treatment person’s body is grounded through wristband.

-Do not leave the module in high temperature and in areas of high humidity for a long time.

-Avoid contact with water as it may a short circuit within the module.

-If the surface of panel becomes dirty, please wipe it off with a soft material. (Cleaning with a dirty or rough cloth may damage the panel.)

1. Monitor Specifications

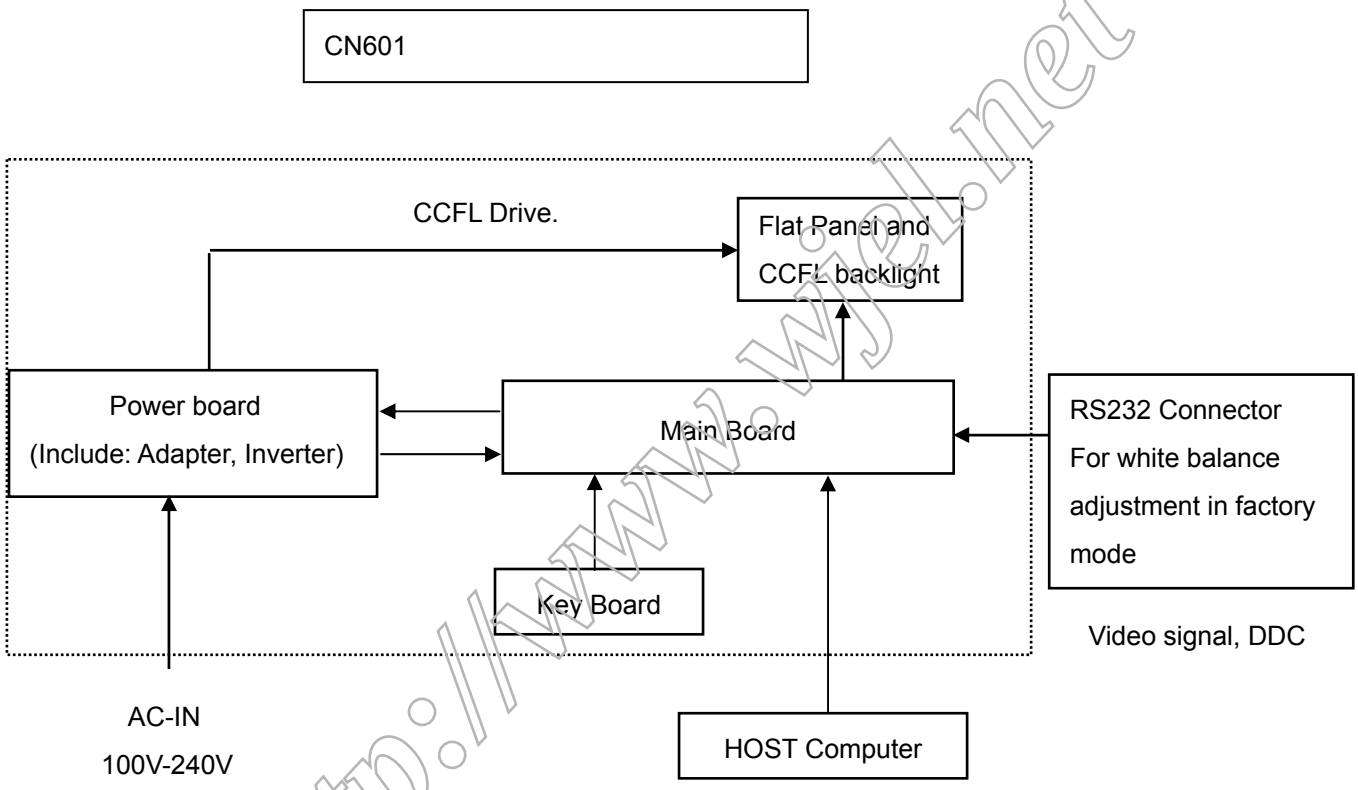
LCD Panel	Model number	160VW
	Driving system	TFT Color LCD
	Viewable Image Size	395mm diagonal
	Pixel pitch	0.252mm(H) x 0.252mm(V)
	Video	R, G, B Analog Interface
	Separate Sync.	H/V TTL
	Display Color	16.7M Colors
	Dot Clock	85.5 MHz
Resolution	Horizontal scan range	30 kHz - 60 kHz
	Horizontal scan Size(Maximum)	344.232mm
	Vertical scan range	55 Hz - 75 Hz
	Vertical scan Size(Maximum)	193.536mm
	Highest preset resolution	1366 x 768 (60 Hz)
	Plug & Play	VESA DDC2B/CI
	Input Connector	D-Sub 15pin
	Input Video Signal	Analog: 0.7Vp-p(standard), 75 OHM, Positive
	Power Source	100~240VAC, 50/60Hz
	Power Consumption	Active < 28 W
		Standby < 1 W
	Speakers	2 x 1W
Physical Characteristics	Connector Type	15-pin Mini D-Sub
	Signal Cable Type	Detachable
	Dimensions & Weight:	
	Height (with base)	292 mm
	Width	361 mm
	Depth	190 mm
	Weight (monitor only)	2.7 kg
	Weight (with packaging)	3.7kg
Environmental	Temperature:	
	Operating	0° to 40°
	Non-Operating	-20°to 60°
	Humidity:	
	Operating	10% to 85% (non-condensing)
	Non-Operating	5% to 80% (non-condensing)
	Altitude:	

	Operating	0~ 3000m (0~ 10000 ft)
	Non-Operating	0~ 5000m (0~ 15000 ft)

2. LCD Monitor Description

The LCD monitor will contain a main board, a power board and a key board which house the flat panel control logic, brightness control logic and DDC.

The power board will provide AC to DC Inverter voltage to drive the backlight of panel and the main board chips each voltage.



3. Operating Instructions

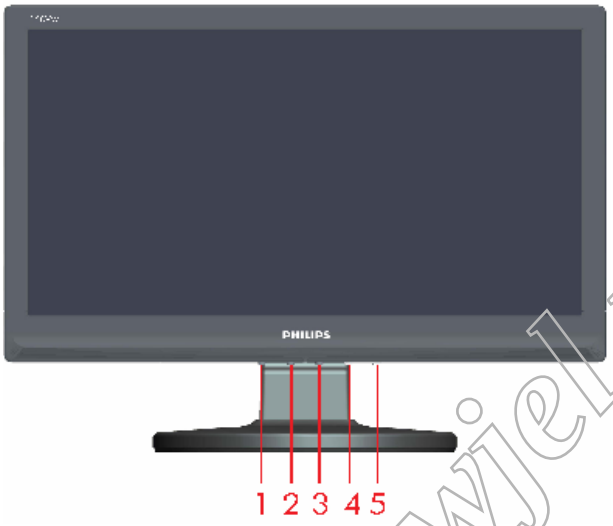
3.1 General Instructions

Press the power button to turn the monitor on or off. The other control knobs are located at front panel of the monitor (see figure). By changing these setting, the picture can be adjusted to your personal preference.

* The power cord should be connected.
* Press the power button to turn on the monitor. The power indicator will light up.

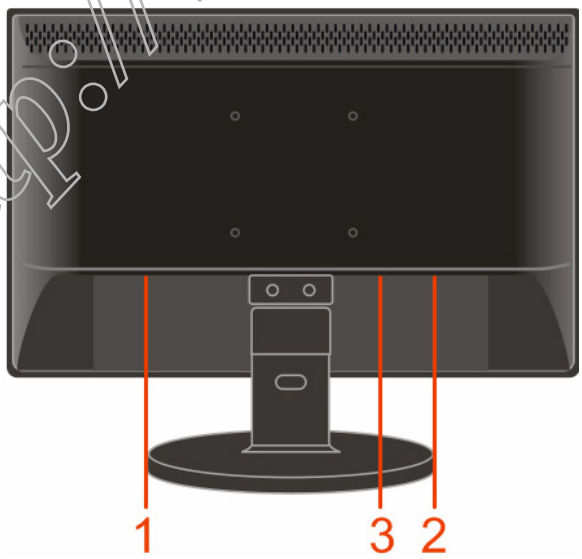
3.2 Control Buttons

Front View



1. Auto/Exit
2. Volume/-
3. Volume/+
4. Menu
5. Power

Rear View

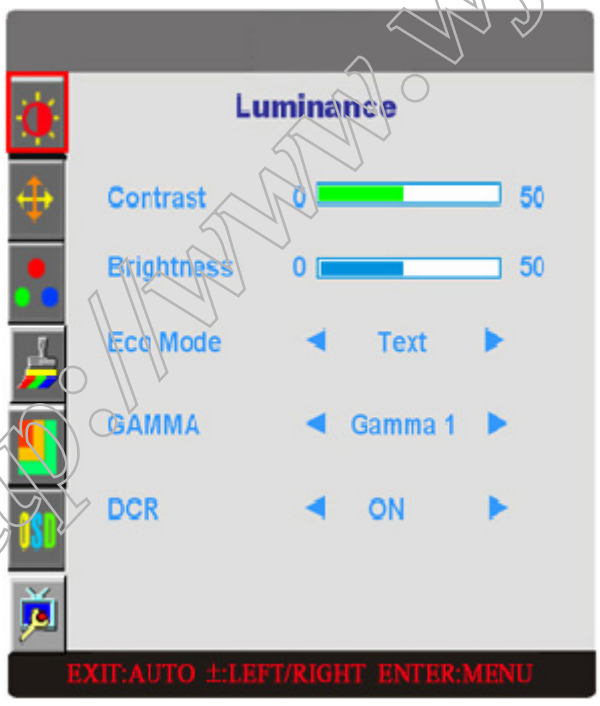


1. Power
2. Analog
3.Audio

3.3 OSD Menu

OSD Setting

1) Press the MENU-button to activate the OSD window.
2) Press – or + to navigate through the functions. Once the desired function is highlighted, press the MENU-button to activate sub-menu. Once the desired function is highlighted, press MENU-button to activate it.
3) Press – or + to change the settings of the selected function. Press – or + to select another function in sub-menu. Press AUTO to exit. If you want to adjust any other function, repeat steps 2-3.
4) OSD Lock Function: to lock the OSD, press and hold the MENU button while the monitor is off and then press power button to turn the monitor on. To un-lock the OSD: press and hold the MENU button while the monitor is off and then press the power button to turn the monitor on.
5) Eco Mode hot key: press the Eco key continuously to select the Eco mode of brightness when there is on OSD (Eco mode hot key may not be available in all modes).
6) Volume adjustment hot key: when there is no OSD, press volume (+) to active volume adjustment bar, press – or + to adjustment volume (only for the modes with speaker).
7) DCR hot key (►): only to press DCR key continuously is able to activate or disable DCR function when there is no OSD.
8) Auto configure hot key: when the OSD is closed, press Auto button will be auto configure hot key function.



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Function Control Illustration

	Luminance	**Adjust Range**	**Description**
	Brightness	0-100	Backlight Adjustment
	Contrast	0-100	Contrast from Digital-register.
	Eco mode	Standard	Standard Mode
		Text	Text Mode
		Internet	Internet Mode
		Game	Game Mode
		Movie	Movie Mode
		Sports	Sports Mode
	Gamma	Gamma1	Adjust to Gamma1
		Gamma2	Adjust to Gamma 2
		Gamma3	Adjust to Gamma 3
	DCR	Off	Disable dynamic contrast ratio
		On	Enable dynamic contrast ratio
	Image Setup		
	Clock	0-100	Adjust picture Clock to reduce Vertical-Line noise.
	Focus	0-100	Adjust Picture Phase to reduce Horizontal-Line noise
	H-Position	0-100	Adjust the vertical position of the picture.
	V-Position	0-100	Adjust the horizontal position of the picture.
	Color Temp.		
	Warm		Recall Warm Color Temperature from EEPROM.
	Normal		Recall Normal Color Temperature from EEPROM.
	Cool		Recall Cool Color Temperature from EEPROM.
	sRGB		Recall SRGB Color Temperature from EEPROM.
	User	User-B	Blue Gain from Digital-register
		User-G	Green Gain Digital-register.
		User-R	Red Gain from Digital-register
		User-Y	Yellow Gain from Digital-register
		User-C	Cyan Gain from Digital-register
		User-M	Magenta Gain from Digital-register
	**Color Boost**		
	Full Enhance	on or off	Disable or Enable Full Enhance Mode
	Nature Skin	on or off	Disable or Enable Nature Skin Mode
	Green Field	on or off	Disable or Enable Green Field Mode
	Sky-blue	on or off	Disable or Enable Sky-blue Mode
	AutoDetect	on or off	Disable or Enable AutoDetect Mode

	Demo	on or off	Disable or Enable Demo
	Picture Boost		
	Frame Size	0-14	Adjust Frame Size
	Brightness	0-100	Adjust Frame Brightness
	Contrast	0-100	Adjust Frame Contrast
	Hue	0-100	Adjust Frame Hue
	Saturation	0-100	Adjust Frame Saturation
	Position	H. position	Adjust Frame horizontal Position
		V-position	Adjust Frame vertical Position
	Bright Frame	on or off	Disable or Enable Bright Frame
	**OSD Setup**		
	H-Position	0-100	Adjust the vertical position of OSD
	V-Position	0-100	Adjust the horizontal position of OSD
	Timeout	0-100	Adjust the OSD Timeout
	Language		Select the OSD language
	**Extra**		
	Auto Configure	yes or no	Auto adjust the picture to default
	Reset	yes or no	Reset the menu to default
	EXIT/DDC-CI		Turn ON/OFF DDC-CI Support
	Information		Show the information of the main image and sub-image source

Notes:

1) If the product has only one signal input, the item of “input Select” is disabling to adjust.
2) If the product screen size is 4:3 or input signal resolution is wide format, the item of “Image Radio” is disabling to adjust.
3) One of DCR, Color Boost and Picture Boost function is active; the other two functions are turned off accordingly.

LED Indicators

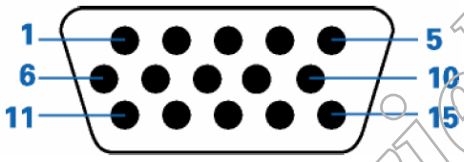
Status	**LED Color**
Full Power Mode	Green or Blue
Active-off Mode	Orange or Red

4. Input/ Output Specification

4.1 Input Signal Connector

Analog connectors

Pin No.	Description	Pin No.	Description
1	Video-Red	9	+5V
2	Video-Green	10	Detect Cable
3	Video-Blue	11	Ground
4	Ground	12	DDC-Serial data
5	Ground	13	H-sync
6	GND-R	14	V-sync
7	GND-G	15	DDC-Serial clock
8	GND-B		



4.2 Factory Preset Display Modes

Stand	Resolution	Horizontal frequency(kHz)	Vertical frequency(Hz)
VGA	640×480 @60Hz	31.469	59.940
VGA	640×480 @67Hz	35.000	66.667
VGA	640×480 @72Hz	37.861	72.809
VGA	640×480 @75Hz	37.500	75.000
Dos-mode	720×400 @70Hz	31.469	70.087
SVGA	800×600 @56Hz	35.156	56.250
SVGA	800×600 @60Hz	37.879	60.317
SVGA	800×600 @72Hz	48.077	72.188
SVGA	832×624 @75Hz	46.875	75.000
Mac-mode	832×624 @75Hz	49.725	74.500
XGA	1024×768 @60Hz	48.363	60.004
XGA	1024×768 @70Hz	56.476	70.069
XGA	1024×768 @72Hz	57.500	72.074
XGA	1024×768 @75Hz	60.023	75.029
XGA	1024×768 @75Hz	60.241	74.927
WXGA	1360×768 @60Hz	47.712	60.015
WXGA	1366×768 @60Hz	47.712	59.790

4.3 Pixel Defect Policy

Bright Dot Defects

1) Max. 5 red, green or blue bright dots (sub-pixels)
2) Max. 3 green dots
3) Max. 1 joined bright dots
4) Min. distance between 2 bright dots: 10 mm.
5) Bright dots are tested with full screen black pattern (R.G.B. = 0, 0, 0)

Black Dot Defects

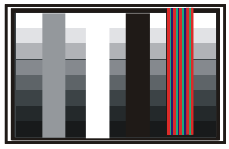
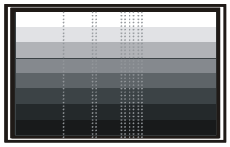
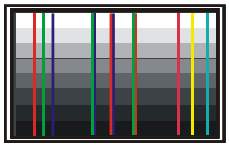
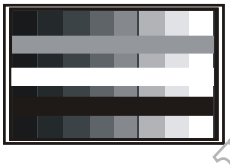
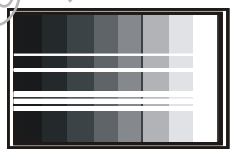
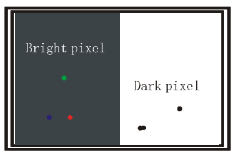
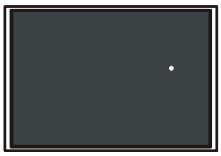
1) Max. 5 black dots.
2) Max. 2 joined (2 adjacent) black dots
3) no defect with 3 adjacent black dots
4) Min. distance between 2 black dots: 10mm
5) Black dots are tested with full screen white (R.G.B. = 255,255,255)/ red (R.G.B. = 255, 0, 0)/green (R.G.B. = 0, 255, 0)/blue (R.G.B. = 0, 0,255) pattern

Total amount of Dot Defects are 5 Max. (Including bright and dark dot defects)

4.4 Failure Mode Of Panel

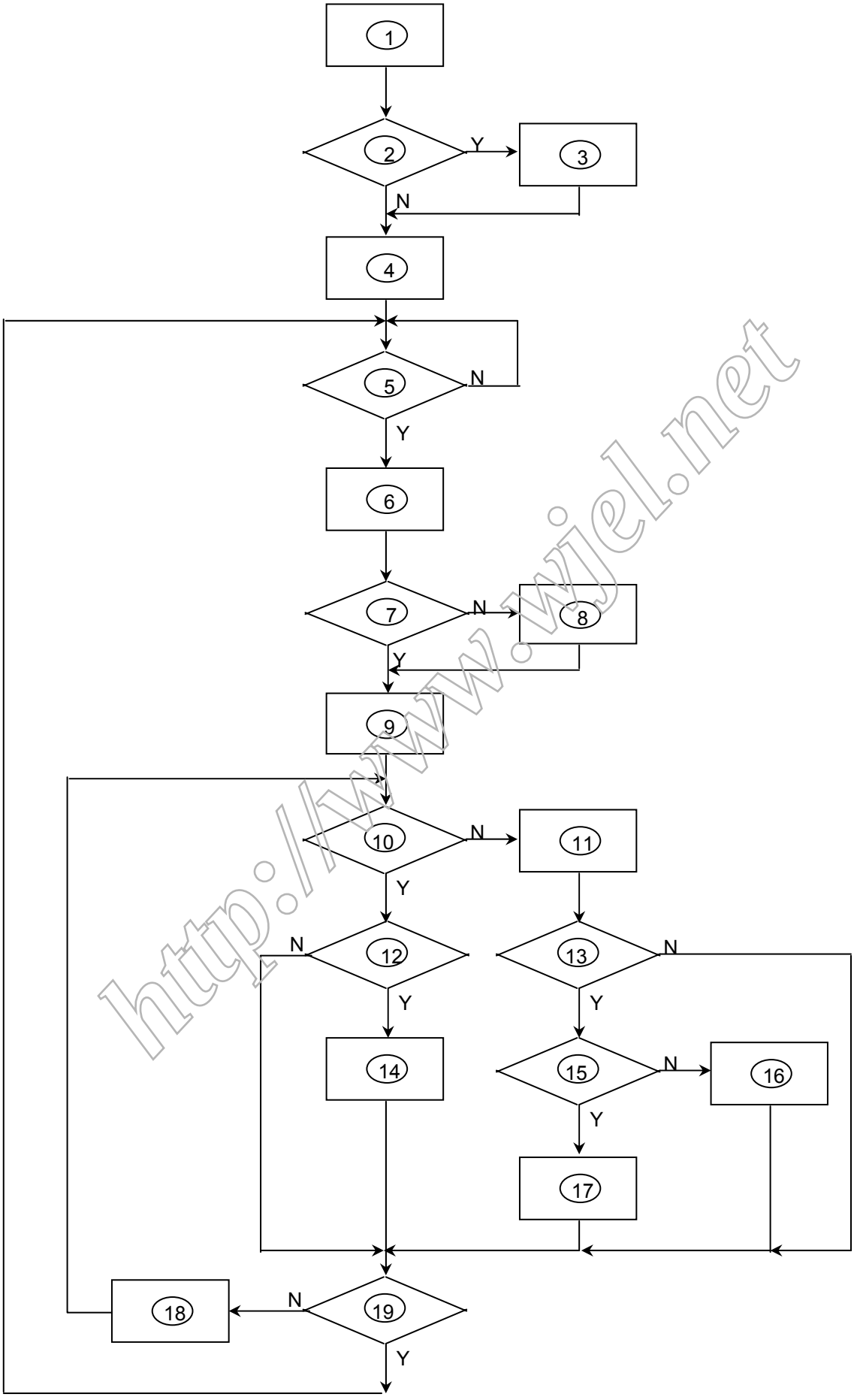
Quick reference for failure mode of LCD panel

this page presents problems that could be made by LCD panel.
It is not necessary to repair circuit board. Simply follow the mechanical instruction on this manual to eliminate failure by replace LCD panel.

Failure description	Phenomenon
Vertical block defect	
Vertical dim lines	
Vertical lines defect (Always bright or dark)	
Horizontal block defect	
Horizontal dim lines	
Horizontal lines defect (Always bright or dark)	
Has bright or dark pixel	
Polarizer has bubbles	
Polarizer has bubbles	
Foreign material inside polarizer. It shows liner or dot shape.	
Concentric circle formed	
Bottom back light of LCD is brighter than normal	
Back light un-uniformity	
Backlight has foreign material. Black or white color, liner or circular type	

5. Block Diagram

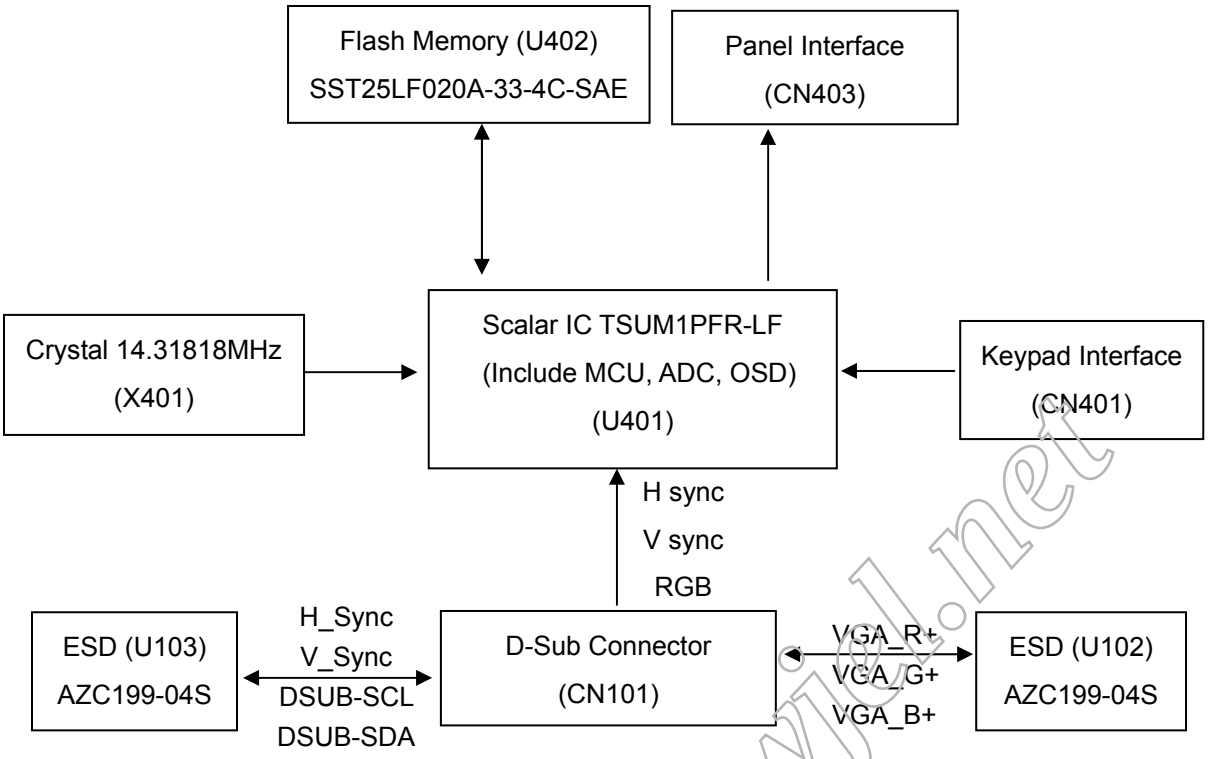
5.1 Software Flow Chat



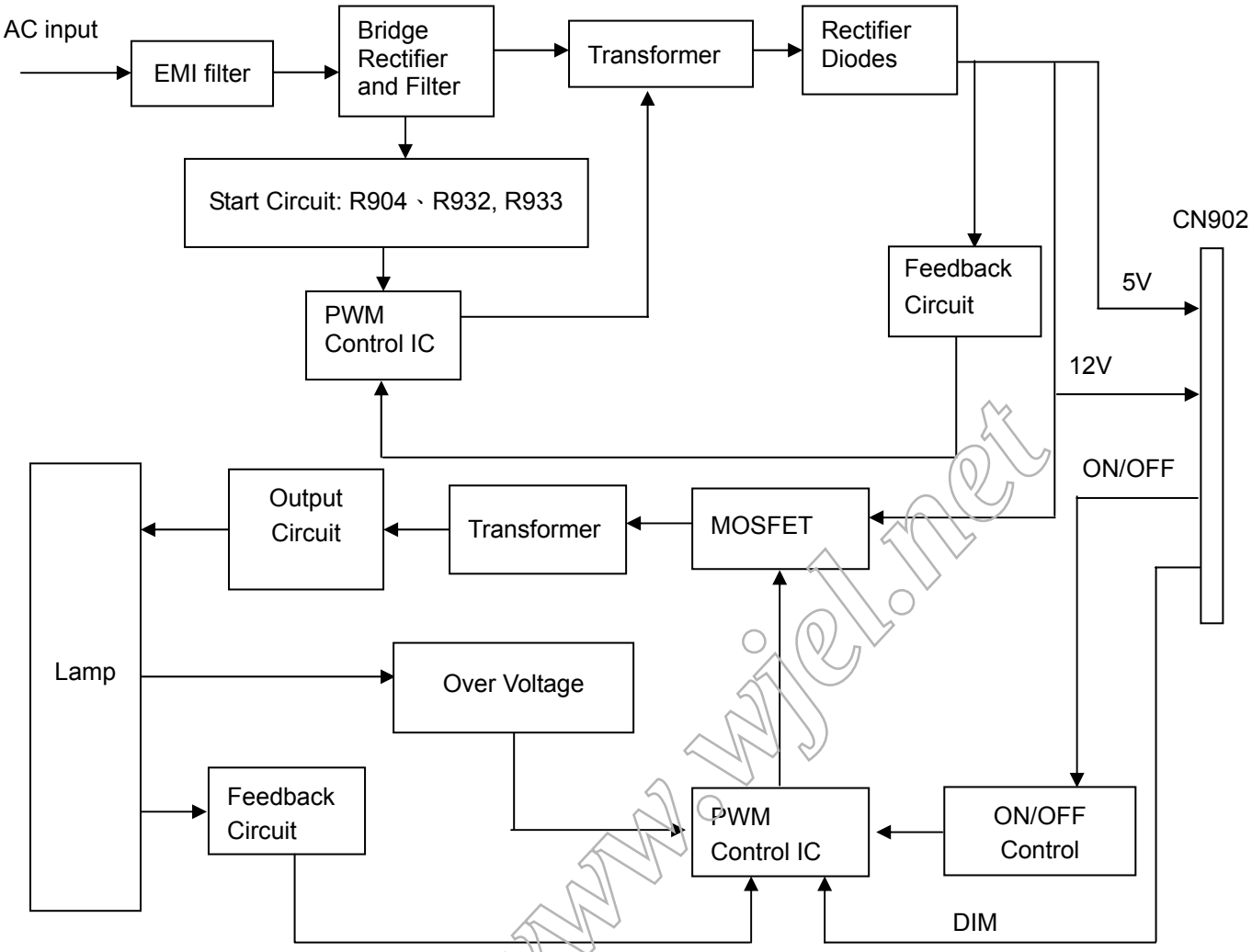
1) MCU initializes.
2) Is the EPROM blank?
3) Program the EPROM by default values.
4) Get the PWM value of brightness from EPROM.
5) Is the power key pressed?
6) Clear all global flags.
7) Are the AUTO and SELECT keys pressed?
8) Enter factory mode.
9) Save the power key status into EPROM. Turn on the LED and set it to green color. Scalar initializes
10) In standby mode?
11) Update the lifetime of back light.
12) Check the analog port, are there any signals coming?
13) Does the scalar send out an interrupt request?
14) Wake up the scalar.
15) Are there any signals coming from analog port?
16) Display "No connection Check Signal Cable" message. And go into standby mode after the message disappears.
17) Program the scalar to be able to show the coming mode.
18) Process the OSD display.
19) Read the keyboard. Is the power key pressed?

5.2 Electrical Block Diagram

5.2.1 Main Board



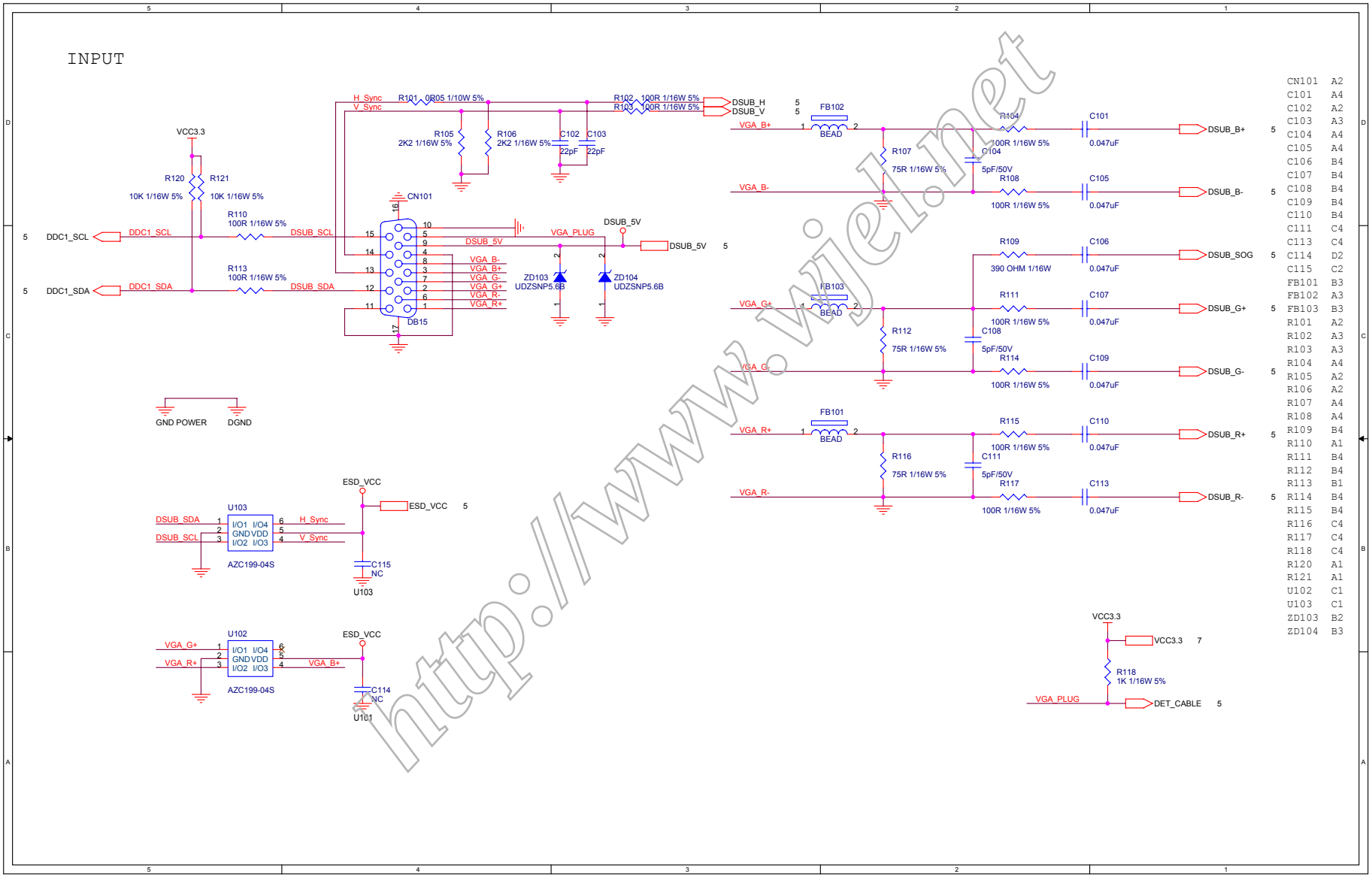
5.2.2 Inverter/Power Board



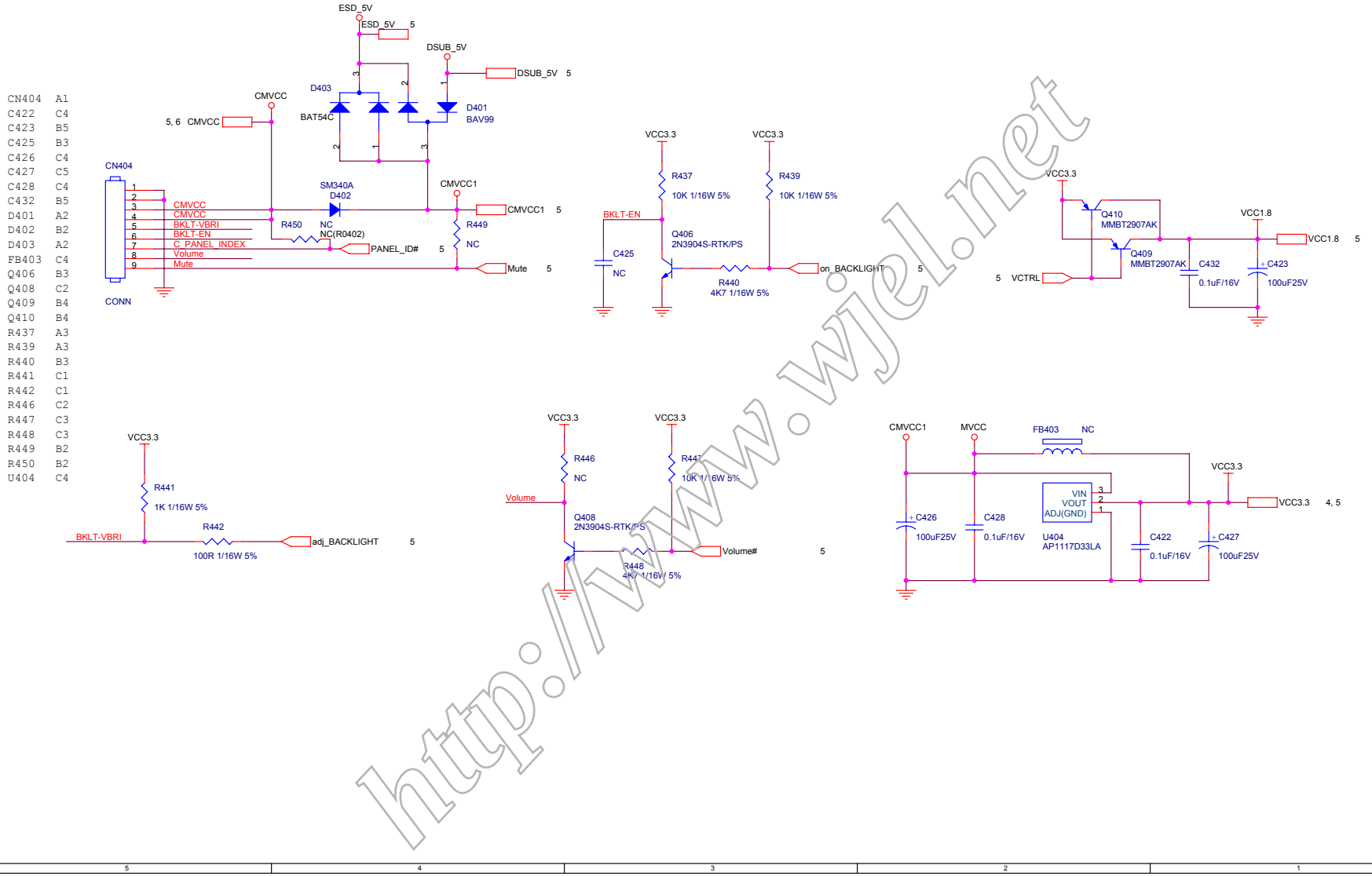
6. Schematic

6.1 Main Board

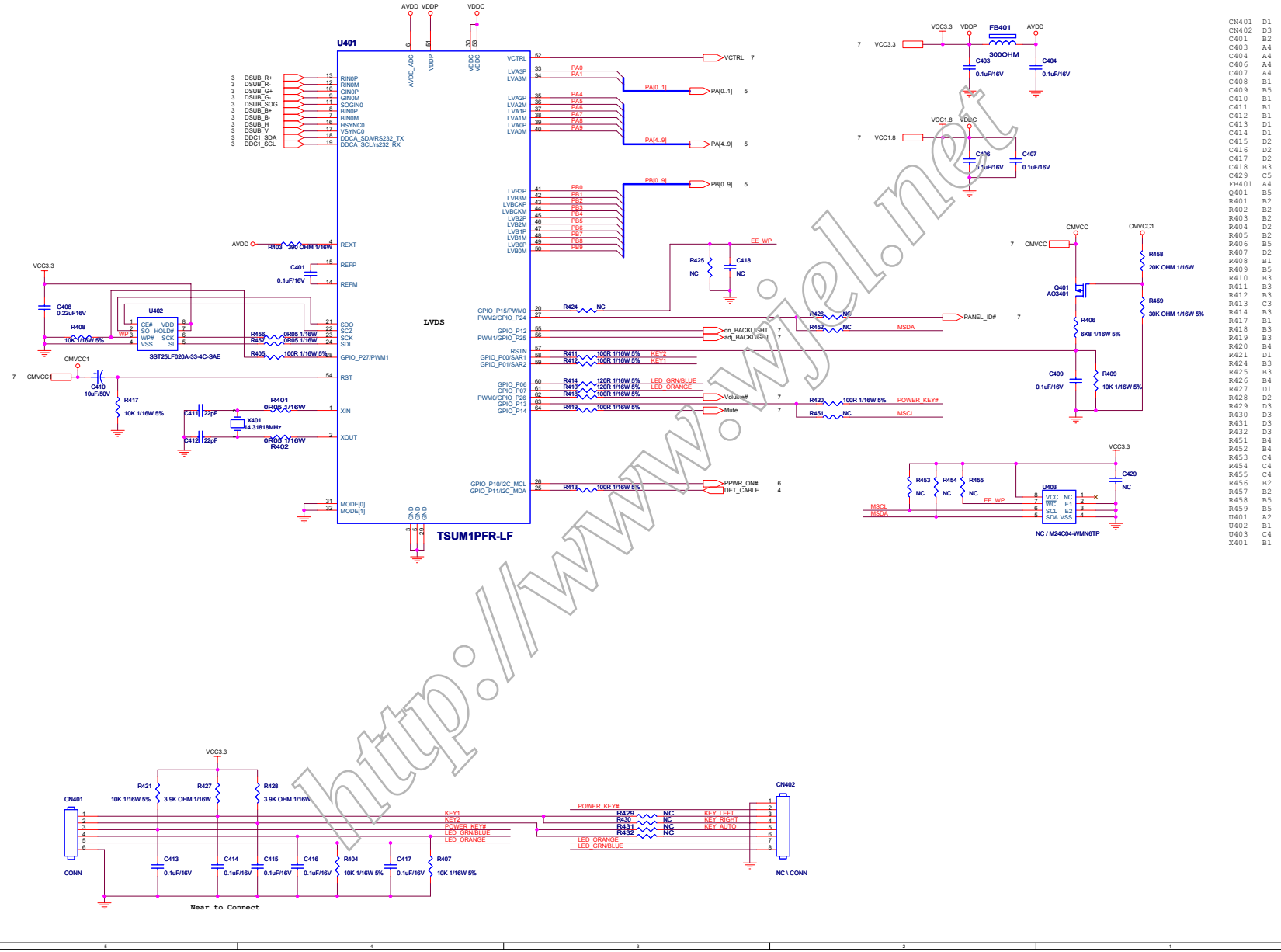
715G2904-1-2



POWER



SCALAR



CN401 D1
CN402 D3
C401 B2
C403 A4
C404 A4
C406 A4
C407 A4
C408 B1
C409 B5
C410 B1
C411 B1
C412 B1
C413 D1
C414 D1
C415 D2
C416 D2
C417 D2
C418 B3
C429 C5
FB401 A4
Q401 B5
R401 B2
R402 B2
R403 B2
R404 D2
R405 B2
R406 B5
R407 D2
R408 B1
R409 B5
R410 B3
R411 B3
R412 B3
R413 C3
R414 B3
R417 B1
R418 B3
R419 B3
R420 B4
R421 D1
R424 B3
R425 B3
R426 B4
R427 D1
R428 D2
R429 D3
R430 D3
R431 D3
R432 D3
R451 B4
R452 B4
R453 C4
R454 C4
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R456 B2
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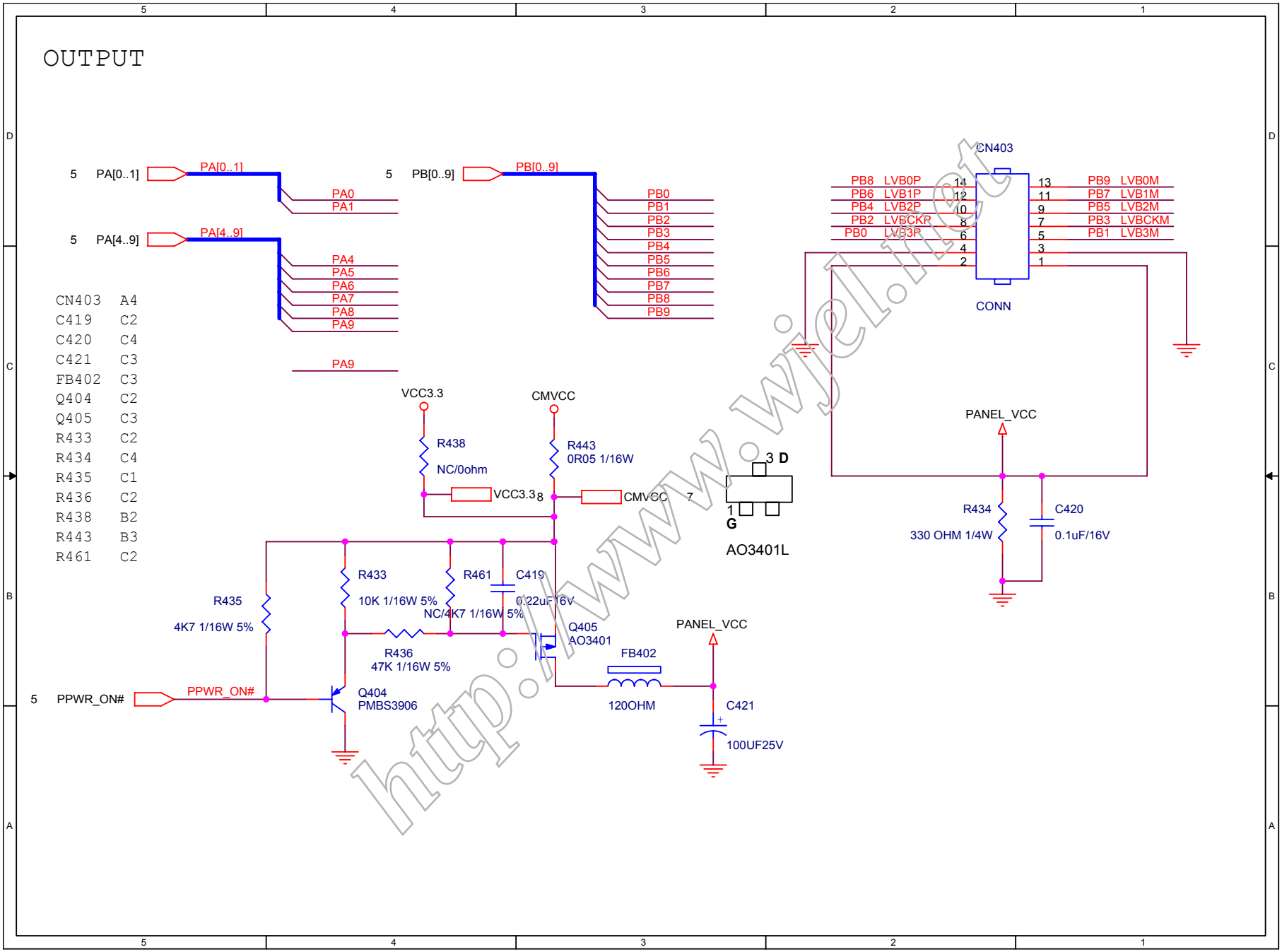
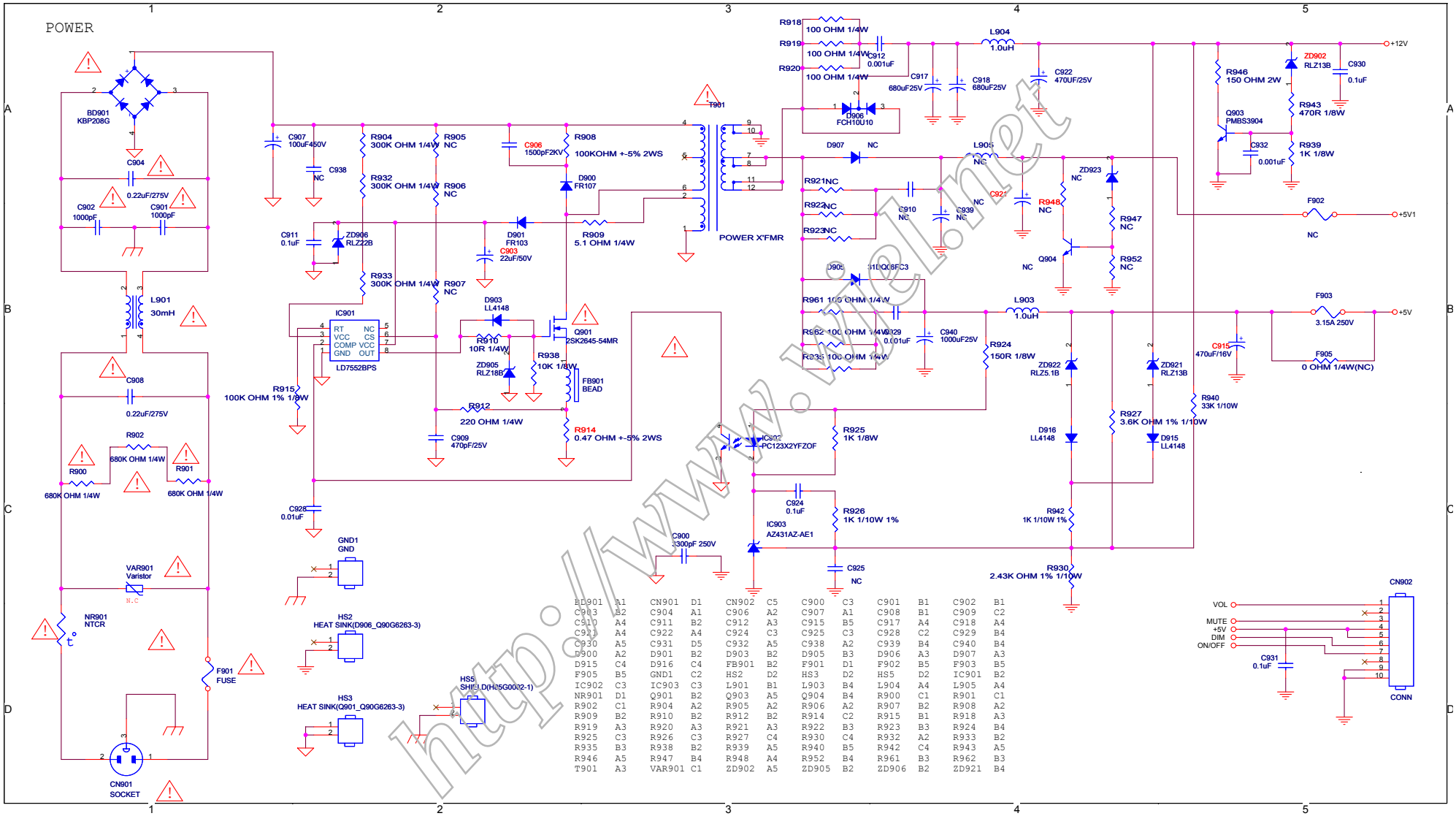
R458 B5
R459 B5
U401 A2
U402 B1
U403 C4
X401 B1

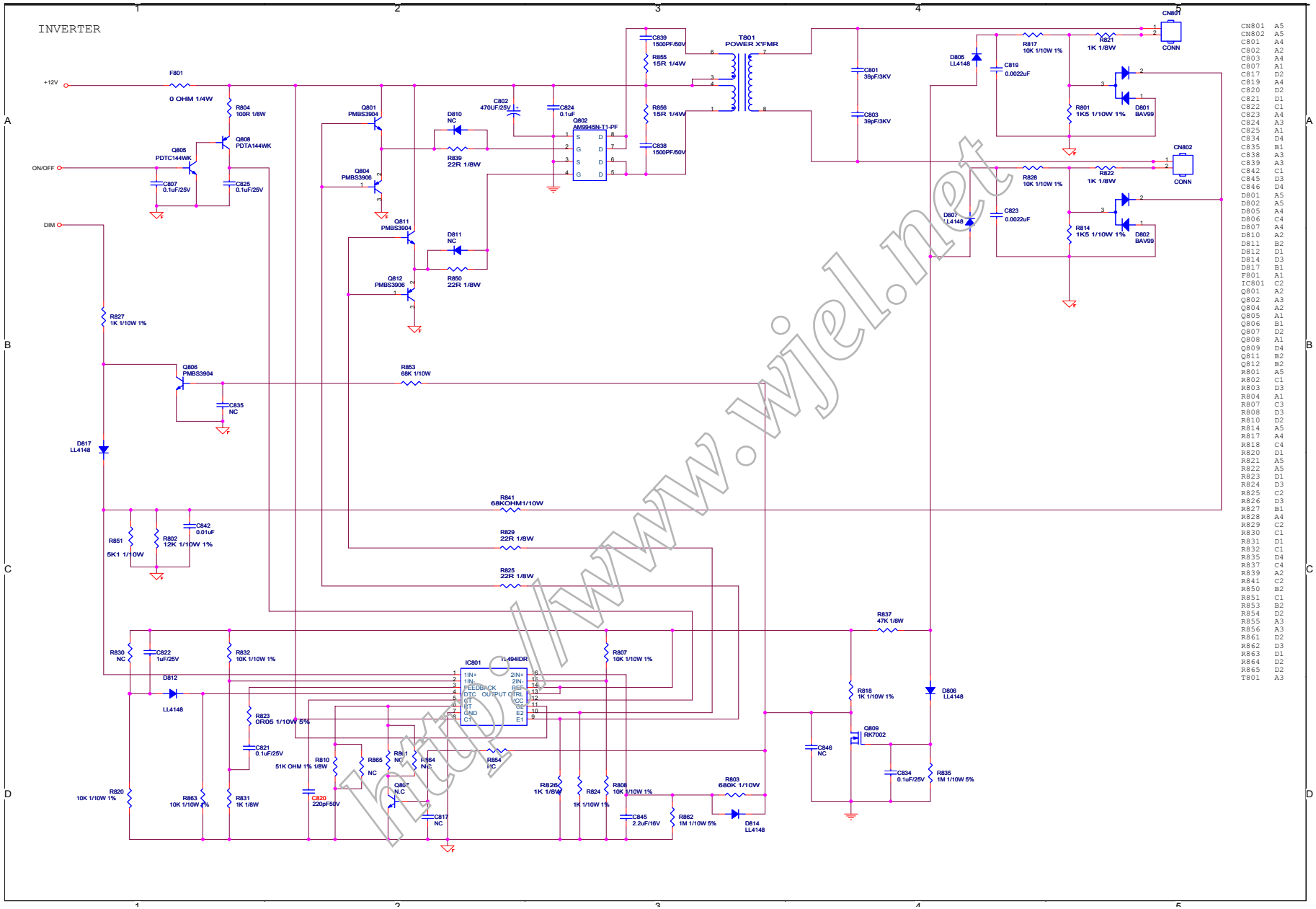


6.2 Power Board

715G2852-2

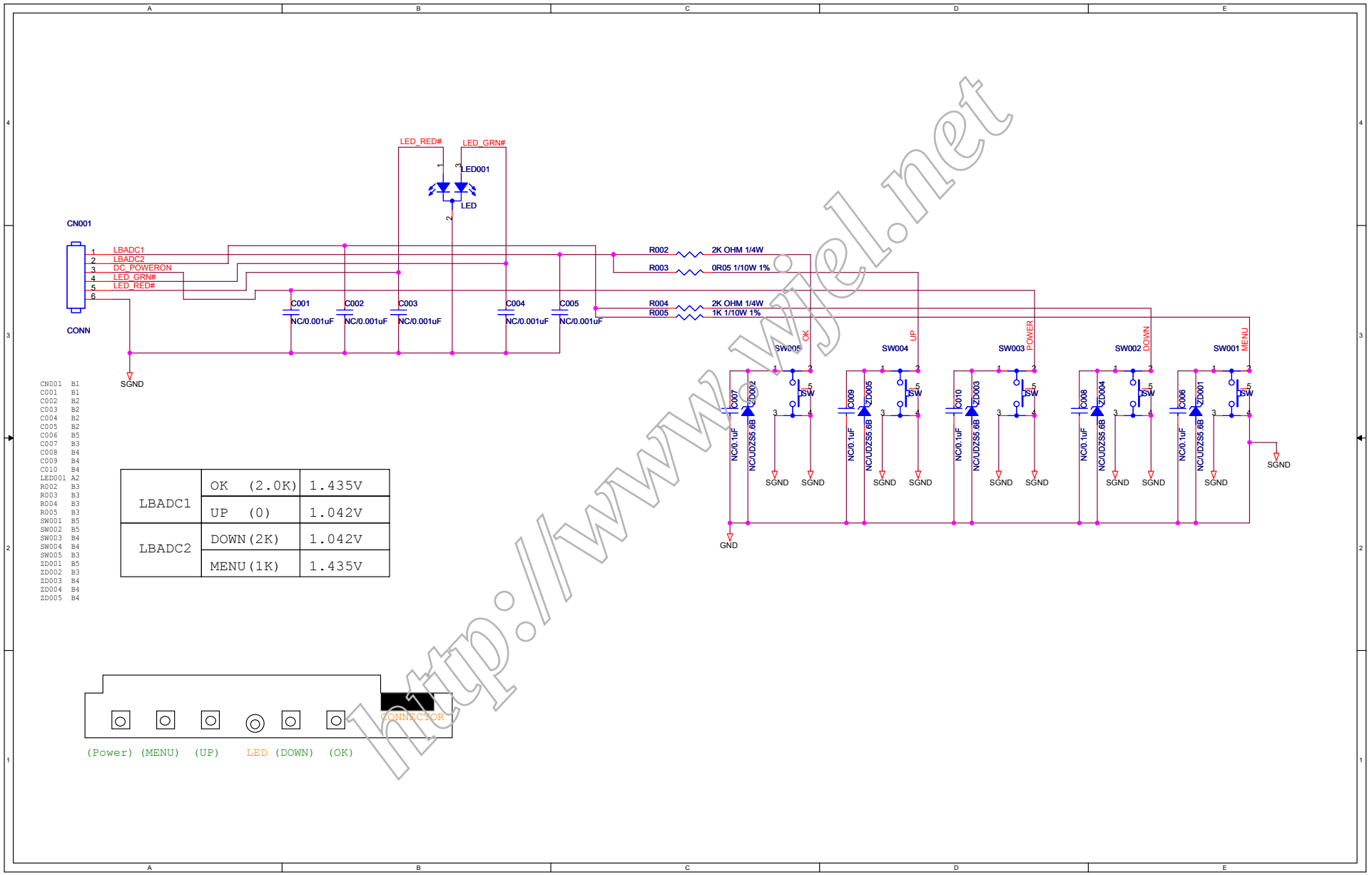


BD901	A1	CN901	D1	CN902	C5	C900	C3	C901	B1	C902	B1
C903	B2	C904	A1	C906	A2	C907	A1	C908	B1	C909	C2
C910	A4	C911	B2	C912	A3	C915	B5	C917	A4	C918	A4
C921	A4	C922	A4	C924	C3	C925	C3	C928	C2	C929	B4
C930	A5	C931	D5	C932	A5	C938	A2	C939	B4	C940	B4
D900	A2	D901	B2	D903	B2	D905	B3	D906	A3	D907	A3
D915	C4	D916	C4	FB901	B2	F901	D1	F902	B5	F903	B5
F905	B5	GND1	C2	HS2	D2	HS3	D2	HS5	D2	IC901	B2
IC902	C3	IC903	C3	L901	B1	L903	B4	L904	A4	L905	A4
NR901	D1	Q901	B2	Q903	A5	Q904	B4	R900	C1	R901	C1
R902	C1	R904	A2	R905	A2	R906	A2	R907	B2	R908	A2
R909	B2	R910	B2	R912	B2	R914	C2	R915	B1	R918	A3
R919	A3	R920	A3	R921	A3	R922	B3	R923	B3	R924	B4
R925	C3	R926	C3	R927	C4	R930	C4	R932	A2	R933	B2
R935	B3	R938	B2	R939	A5	R940	B5	R942	C4	R943	A5
R946	A5	R947	B4	R948	A4	R952	B4	R961	B3	R962	B3
T901	A3	VAR901	C1	ZD902	A5	ZD905	B2	ZD906	B2	ZD921	B4



6.3 Key Board

715G2835-1

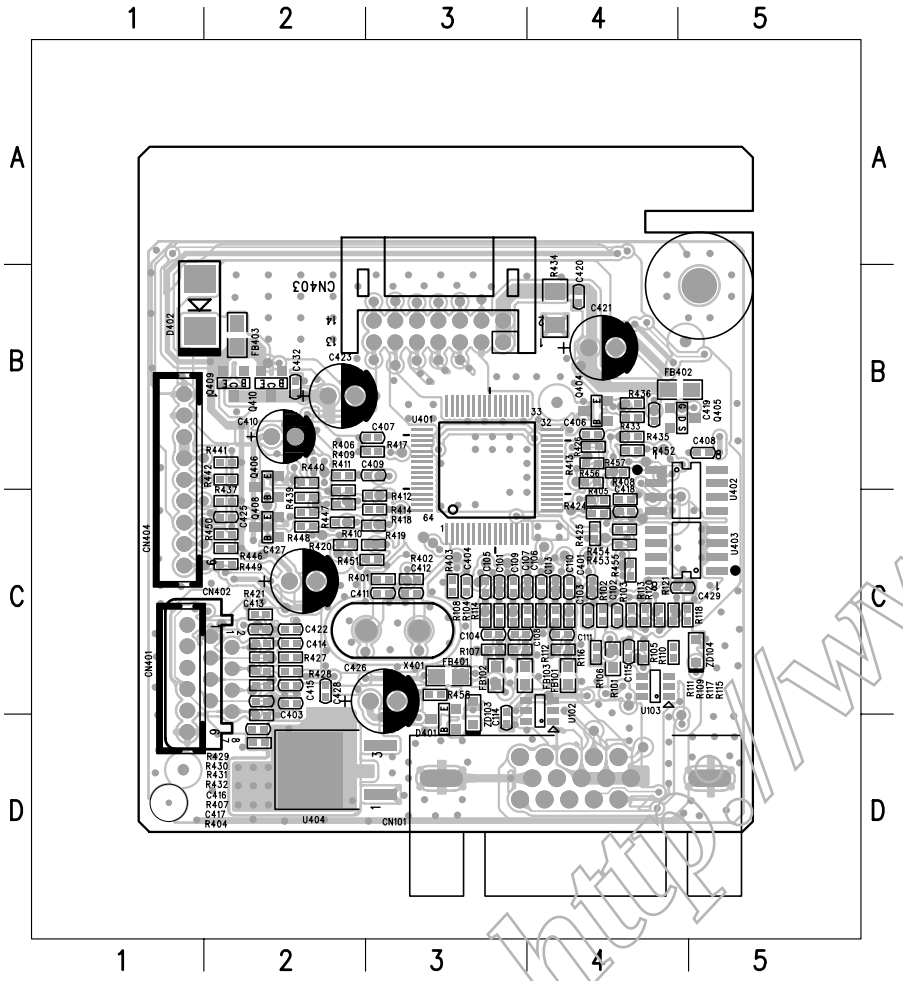


LBADC1	OK (2.0K)	1.435V
	UP (0)	1.042V
LBADC2	DOWN(2K)	1.042V
	MENU(1K)	1.435V

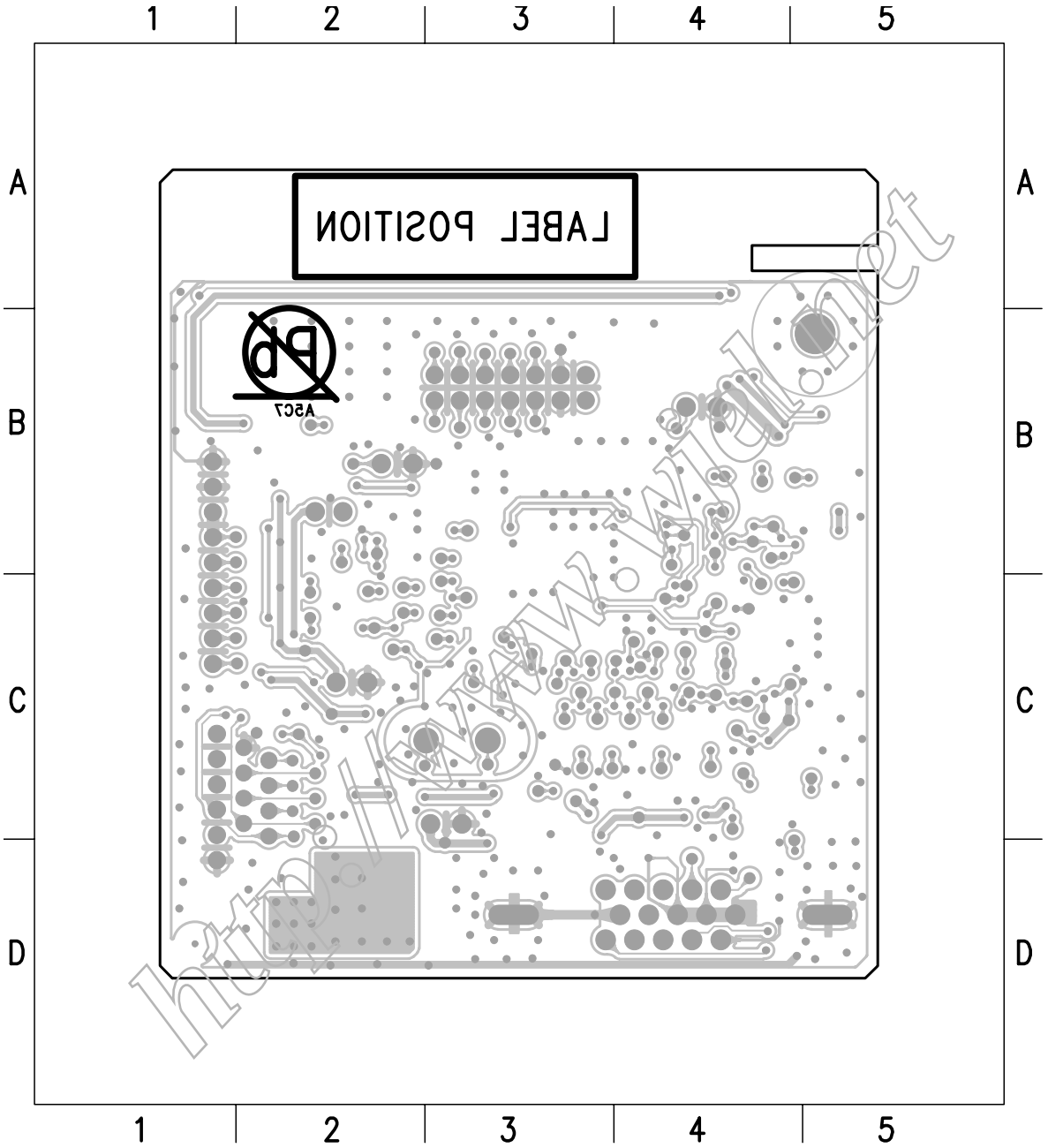
7. PCB Layout

7.1 Main Board

715G2904-1-2

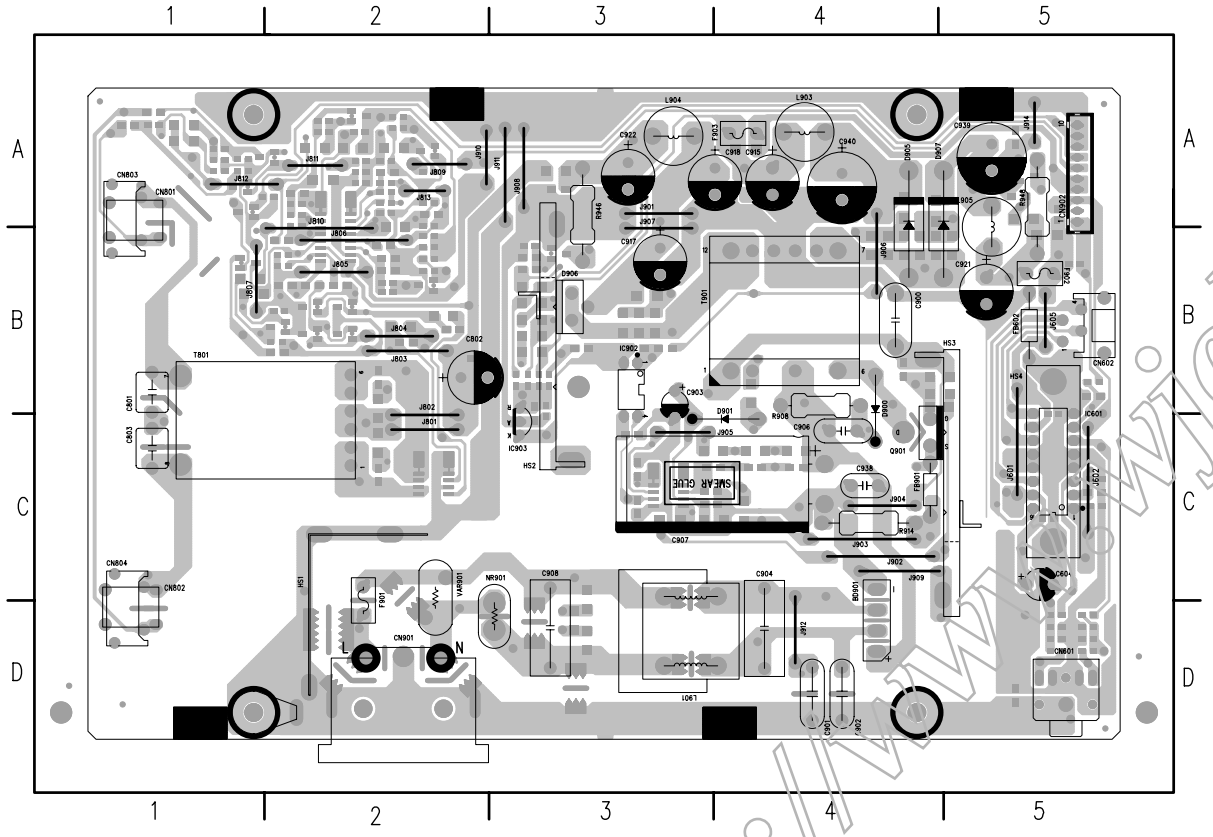


C101	C3	C413	C2	FB101	C4	R113	C4	R419	C3	R449	C2
C102	C4	C414	C2	FB102	C3	R114	C3	R420	C2	R450	C2
C103	C4	C415	C2	FB103	C3	R115	C4	R421	C2	R451	C3
C104	C3	C416	C2	FB401	C3	R116	C4	R424	C4	R452	B4
C105	C3	C417	D2	FB402	B4	R117	C4	R425	C4	R453	C4
C106	C4	C418	C4	FB403	B2	R118	C4	R426	B4	R454	C4
C107	C3	C419	B4	Q404	B4	R120	C4	R427	C2	R455	C4
C108	C3	C420	B4	Q405	B4	R121	C4	R428	C2	R456	B4
C109	C3	C421	B4	Q406	C2	R401	C3	R429	C2	R457	B4
C110	C4	C422	C2	Q408	C2	R402	C3	R430	C2	R458	C3
C111	C4	C423	B2	Q409	B2	R403	C3	R431	C2	U102	C4
C113	C4	C425	C2	Q410	B2	R404	D2	R432	C2	U103	C4
C114	C3	C426	C3	R101	C4	R405	C4	R433	B4	U401	B3
C115	C4	C427	C2	R102	C4	R406	B2	R434	B4	U402	B4
C401	C4	C428	C2	R103	C4	R407	D2	R435	B4	U403	C5
C403	C2	C429	C4	R104	C3	R408	C4	R436	B4	U404	D3
C404	C3	C432	B2	R105	C4	R409	C2	R437	C2	X401	C3
C406	B4	CN101	D4	R106	C4	R410	C2	R439	C2	ZD103	C3
C407	B3	CN401	C1	R107	C3	R411	C2	R440	B2	ZD104	C5
C408	B5	CN402	C2	R108	C3	R412	C3	R441	B2		
C409	B3	CN403	B3	R109	C4	R413	B4	R442	B2		
C410	B2	CN404	B1	R110	C4	R414	C3	R446	C2		
C411	C3	D401	D3	R111	C3	R417	B3	R447	C2		
C412	C3	D402	B2	R112	C3	R418	C3	R448	C2		

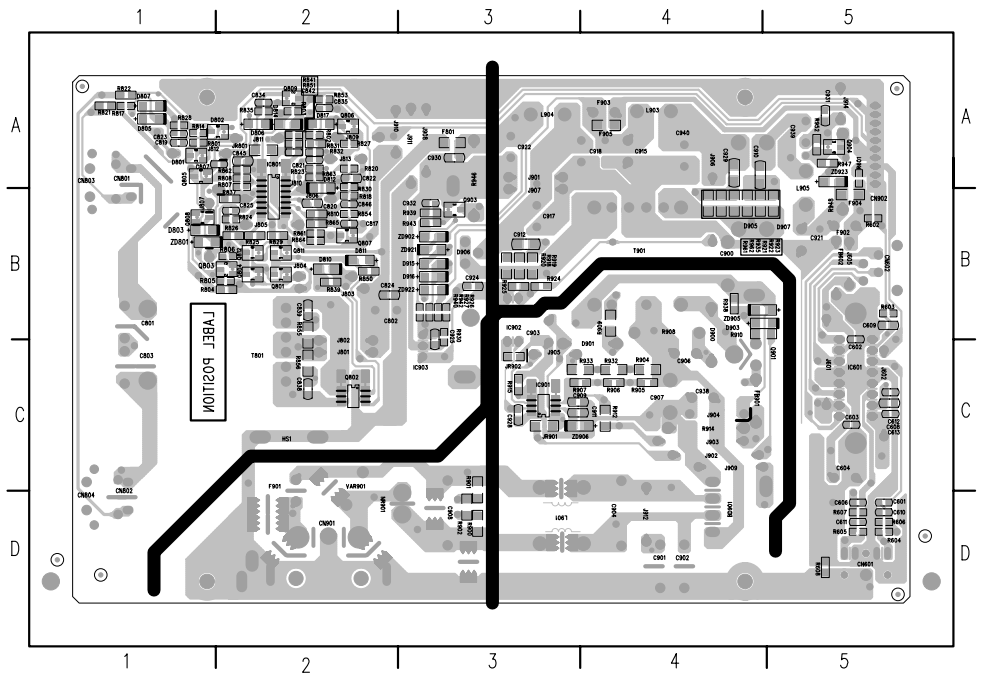


7.2 Power Board

715G2852-2



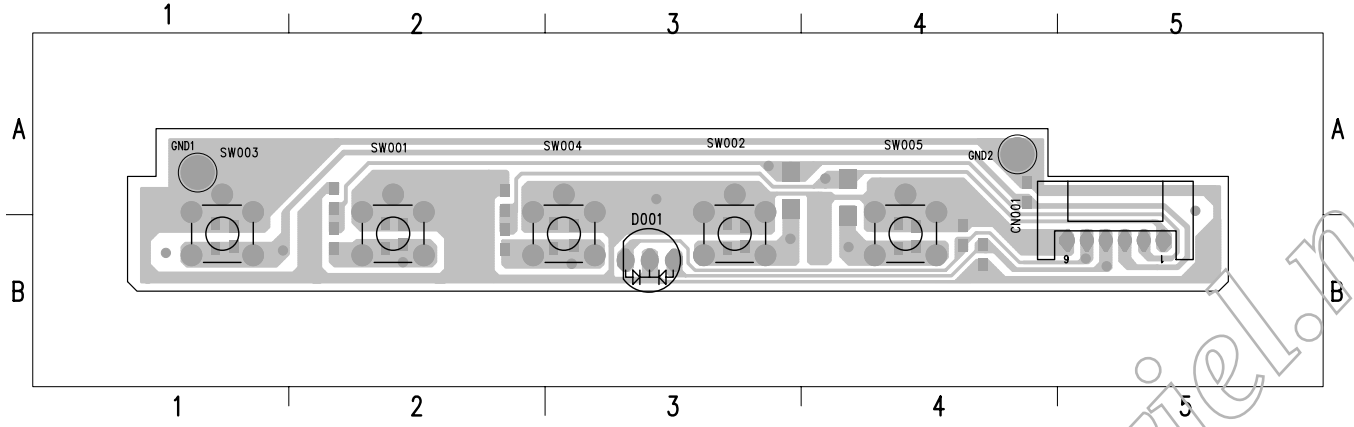
BD901	D4	CN601	D5	IC903	C3	J906	B4
C604	C5	CN602	B5	J601	C5	J907	B3
C801	B1	CN801	A1	J602	C5	J908	A3
C802	B2	CN802	D1	J605	B5	J909	C4
C803	C1	CN803	A1	J801	C2	J910	A2
C900	B4	CN804	D1	J802	C2	J911	A3
C901	D4	CN901	D2	J803	B2	J912	D4
C902	D4	CN902	A5	J804	B2	J914	A5
C903	B3	D900	C4	J805	B2	L901	D3
C904	D4	D901	C3	J806	B2	L903	A4
C906	C4	D905	A4	J807	B1	L904	A3
C907	C4	D906	B3	J809	A2	L905	B5
C908	D3	D907	A4	J810	B2	NR901	D3
C915	A4	F901	C2	J811	A2	Q901	C4
C917	B3	F902	B5	J812	A2	R908	B4
C918	A3	F903	A4	J813	A2	R914	C4
C921	B5	FB602	B5	J901	A3	R946	B3
C922	A3	FB901	C4	J902	C4	R948	A5
C938	C4	GND1	D1	J903	C4	T801	C2
C939	A5	IC601	C5	J904	C4	T901	B4
C940	A4	IC902	B3	J905	C3	VAR901	C2



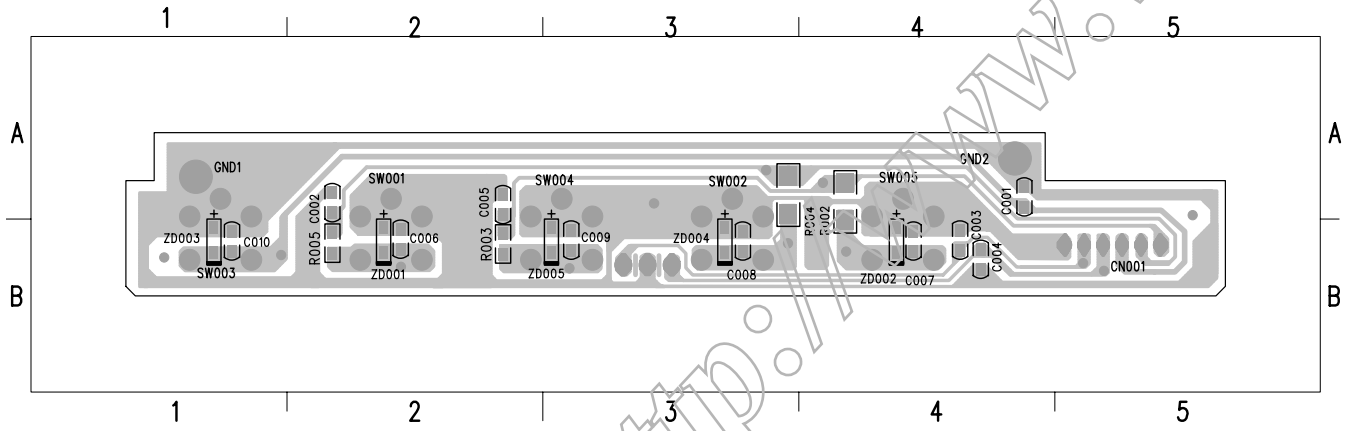
C601	D5	C910	A4	IC801	A2	R802	A2	R841	A2	R922	B4
C602	B5	C911	C3	IC901	C3	R803	A2	R850	B2	R923	B5
C603	C5	C912	B3	JR801	A2	R804	B2	R851	A2	R924	B3
C606	D5	C924	B3	JR901	C3	R805	B2	R853	A2	R925	B3
C608	C5	C925	B3	JR902	C3	R806	B2	R854	B2	R926	B3
C609	B5	C928	C3	Q801	B2	R807	B2	R855	B2	R927	B3
C610	D5	C929	A4	Q802	C2	R808	A2	R856	C2	R930	B3
C611	D5	C930	A3	Q803	B2	R810	B2	R861	B2	R932	C4
C612	C5	C931	A5	Q804	B2	R814	A1	R862	A2	R933	C3
C613	C5	C932	B3	Q805	A1	R817	A1	R863	A2	R935	B4
C807	A2	D801	A1	Q806	A2	R818	B2	R864	B2	R938	B4
C817	B2	D802	A2	Q807	B2	R820	A2	R865	B2	R939	B3
C819	A1	D803	B1	Q808	B1	R821	A1	R900	D3	R940	B3
C820	B2	D805	A1	Q809	A2	R822	A1	R901	C3	R942	B3
C821	A2	D806	A2	Q811	B2	R823	A2	R902	D3	R943	B3
C822	A2	D807	A1	Q812	B2	R824	B2	R904	C4	R947	A5
C823	A1	D810	B2	Q903	B3	R825	B2	R905	C4	R952	A5
C824	B2	D811	B2	Q904	A5	R826	B2	R906	C4	R961	B4
C825	B2	D812	B2	R601	A5	R827	A2	R907	C3	R962	B4
C834	A2	D814	A2	R602	B5	R828	A1	R909	B4	ZD801	B1
C835	A2	D817	A2	R603	B5	R829	B2	R910	B4	ZD902	B3
C838	C2	D903	B4	R604	D5	R830	B2	R912	C4	ZD905	B4
C839	B2	D915	B3	R605	D5	R831	A2	R915	C3	ZD906	C3
C842	A2	D916	B3	R606	D5	R832	A2	R918	B3	ZD921	B3
C845	A2	F801	A3	R607	D5	R835	A2	R919	B3	ZD922	B3
C846	B2	F904	B5	R608	D5	R837	B2	R920	B3	ZD923	A5
C909	C3	F905	A4	R801	A1	R839	B2	R921	B4		

7.3 Key Board

715G2835-1

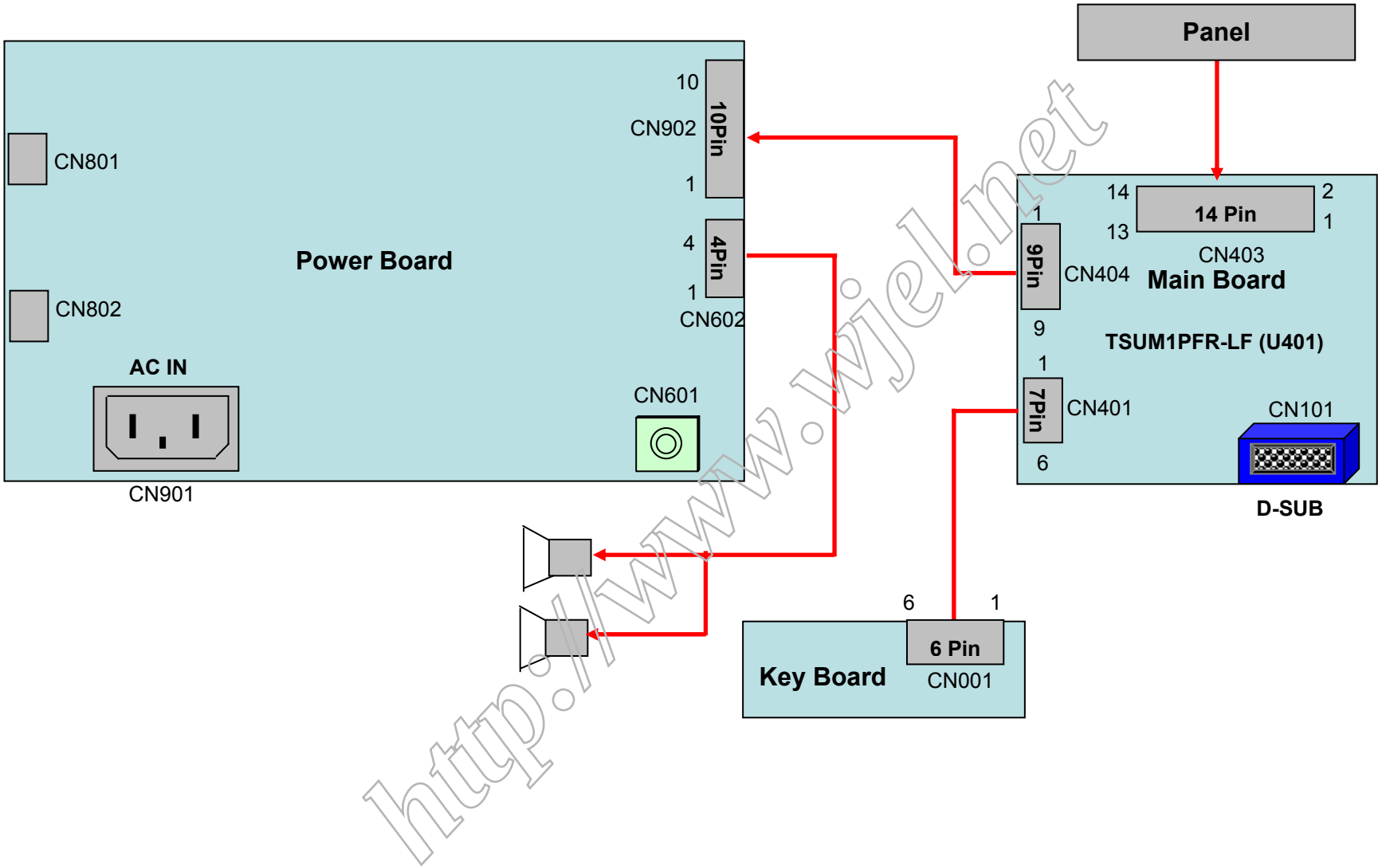


CN001	B5		
D001	B3		
GND1	A1		
GND2	A4		
SW001	B2		
SW002	B3		
SW003	B1		
SW004	B3		
SW005	B4		

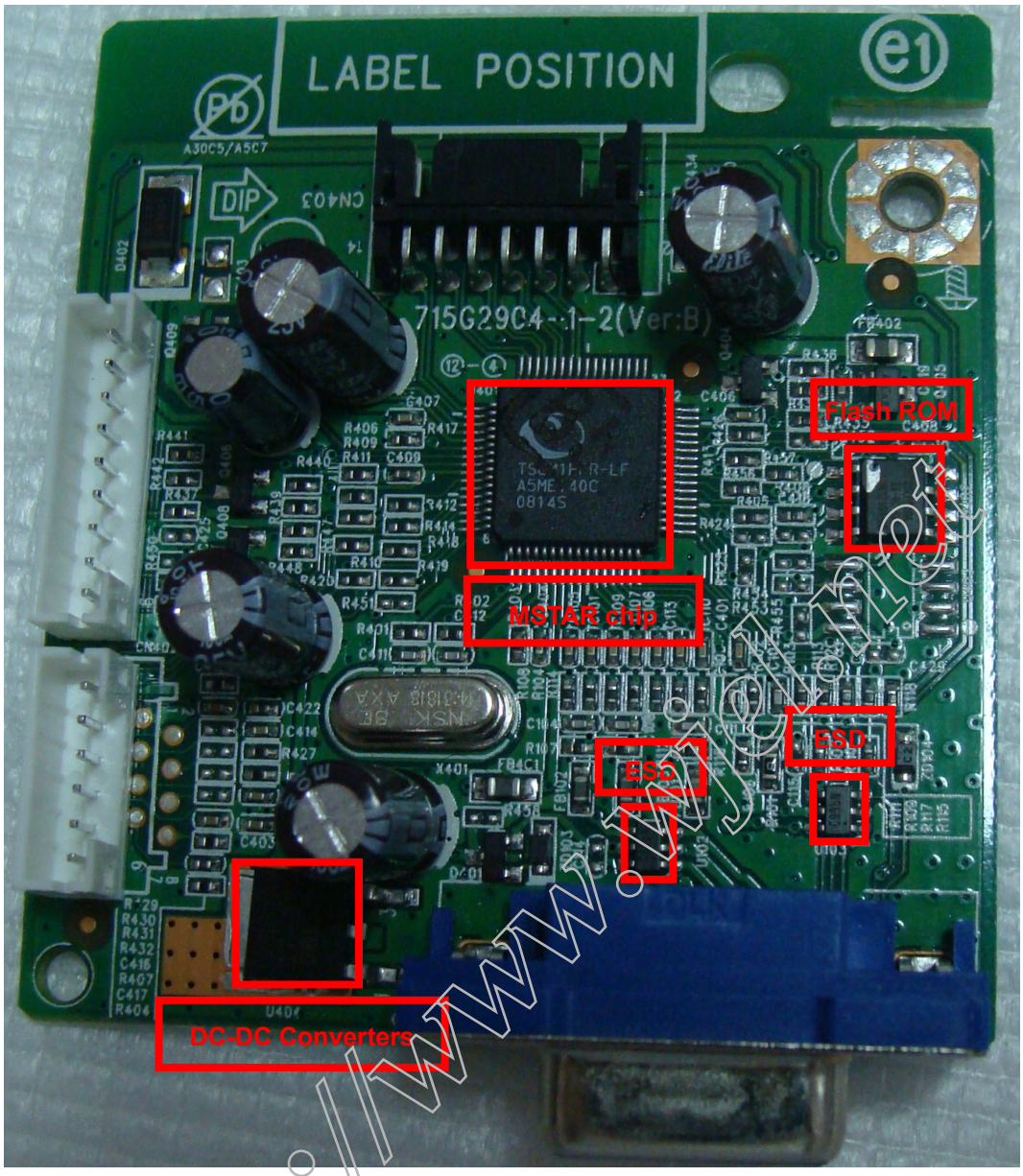


C001	A4	R002	A4
C002	A2	R003	B2
C003	B4	R004	A3
C004	B4	R005	B2
C005	A2	ZD001	B2
C006	B2	ZD002	B4
C007	B4	ZD003	B1
C008	B3	ZD004	B3
C009	B3	ZD005	B3
C010	B1		

8. Wiring Diagram



9. Scalar Board Overview

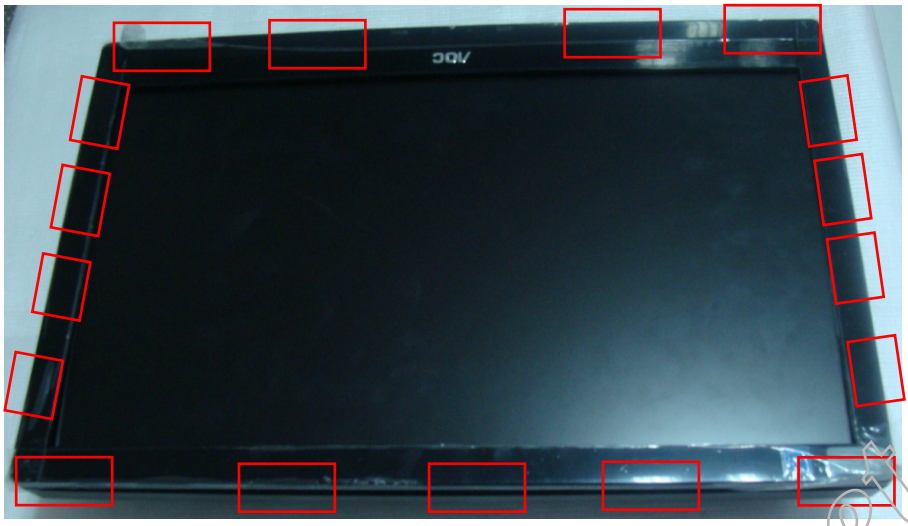


10. Mechanical Instructions

1. Place the monitor face down on a smooth surface .Be careful to avoid scratch and injury during the process of uninstall.

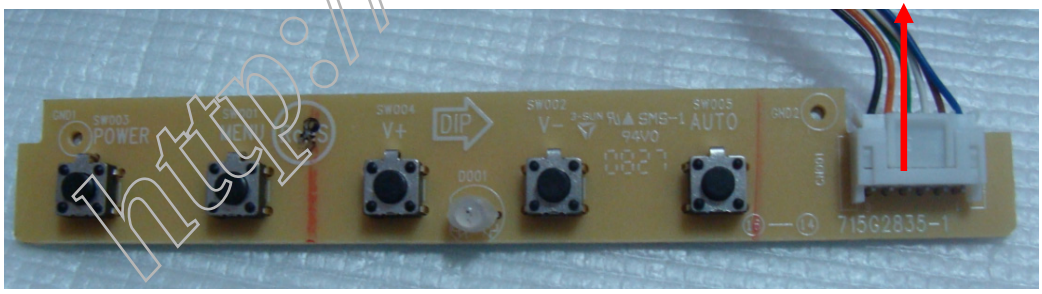
2. Remove three screws remarked in red to remove the Stand-Base ASS'Y.

3. Use disassembly tool to open 5 latches at the bottom of BACK COVER as below, and open the other latches along the edge of the BACK COVER, then lift dismounts BACK COVER.

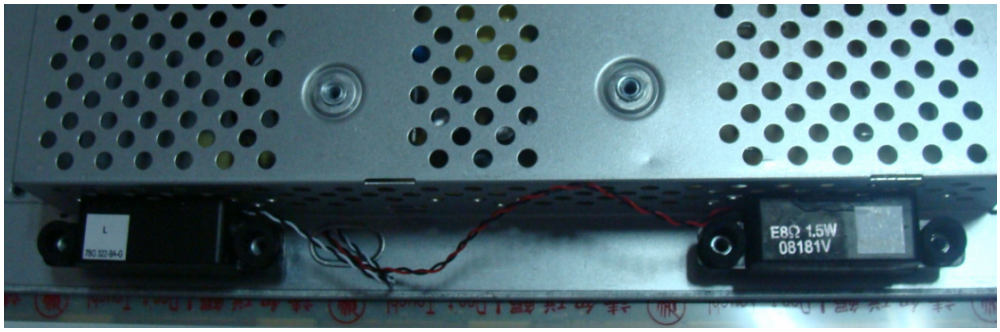


4. Remove Bezel.

5. Disconnect KEY BOARD CABLE

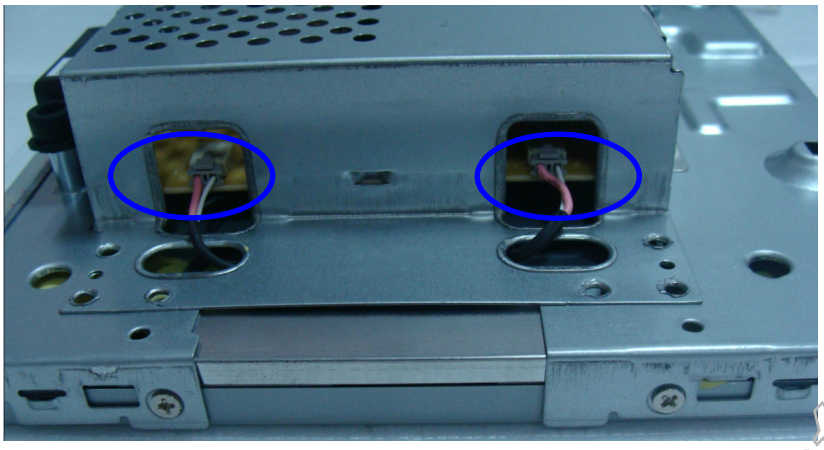


6. Remove two speakers from Main Frame.



7. Remove main frame cover

A. Disconnect the two connectors marked in blue

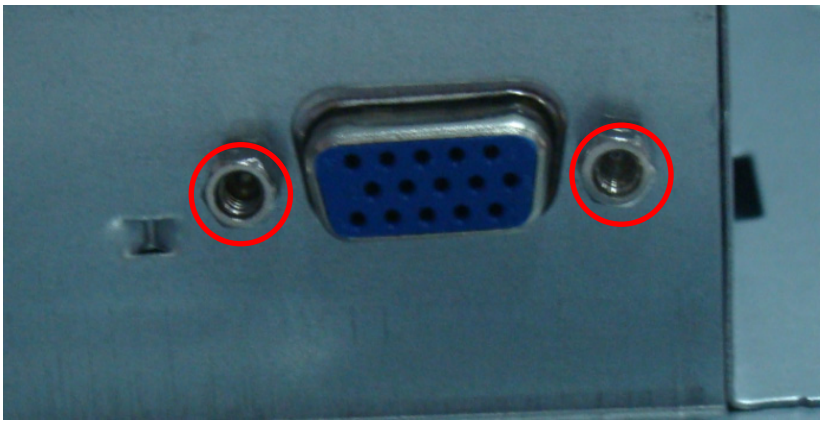


B. Remove the four screws marked in red.

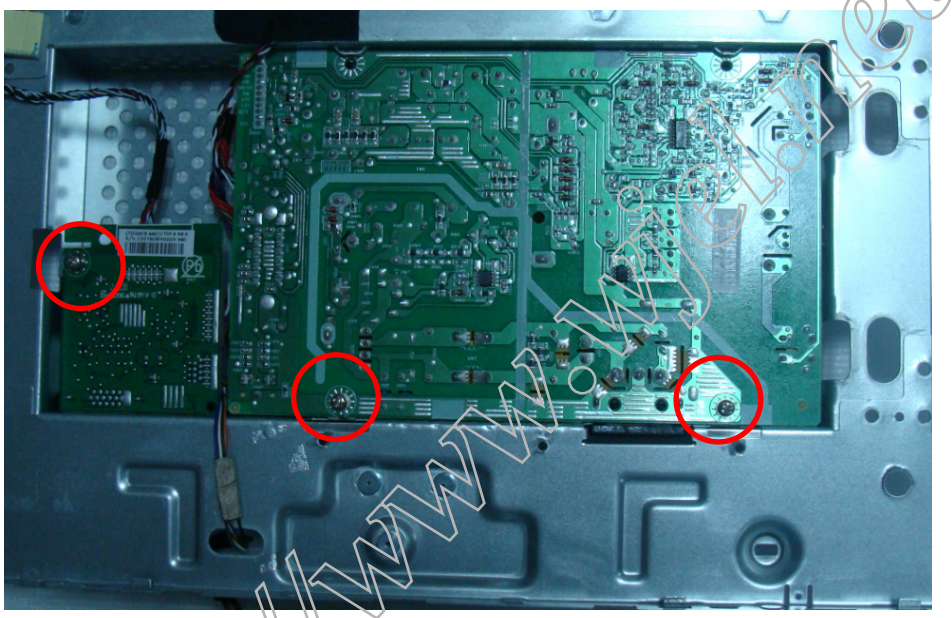
C. Press to release left and right latches of LVDS CABLE, and then disconnect it.

8. Remove power board and main board

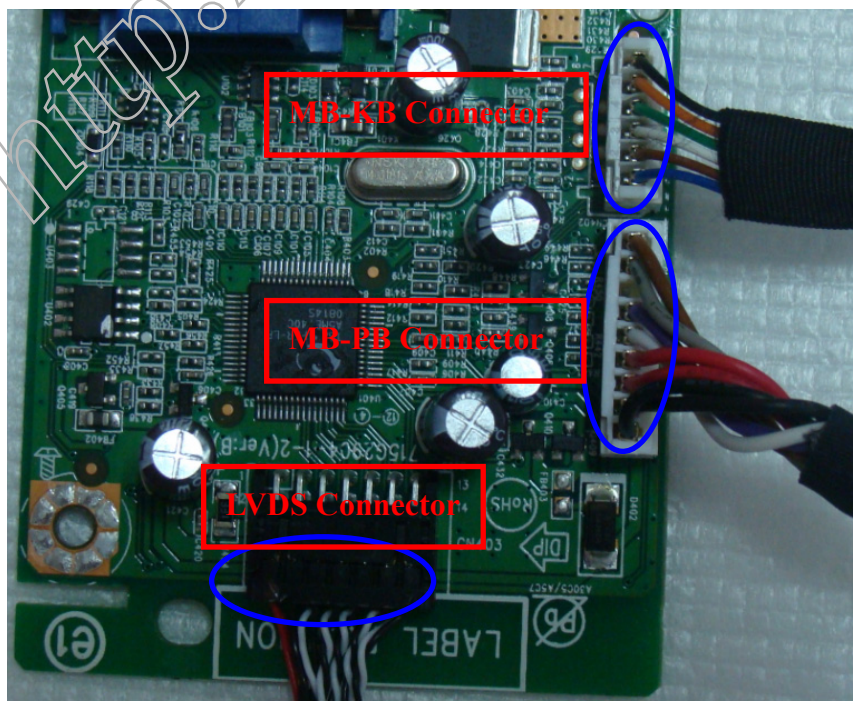
A. Remove the two screws marked in red.



B. Remove three screws marked in red to remove the Power Board and Main Board from Main Frame.



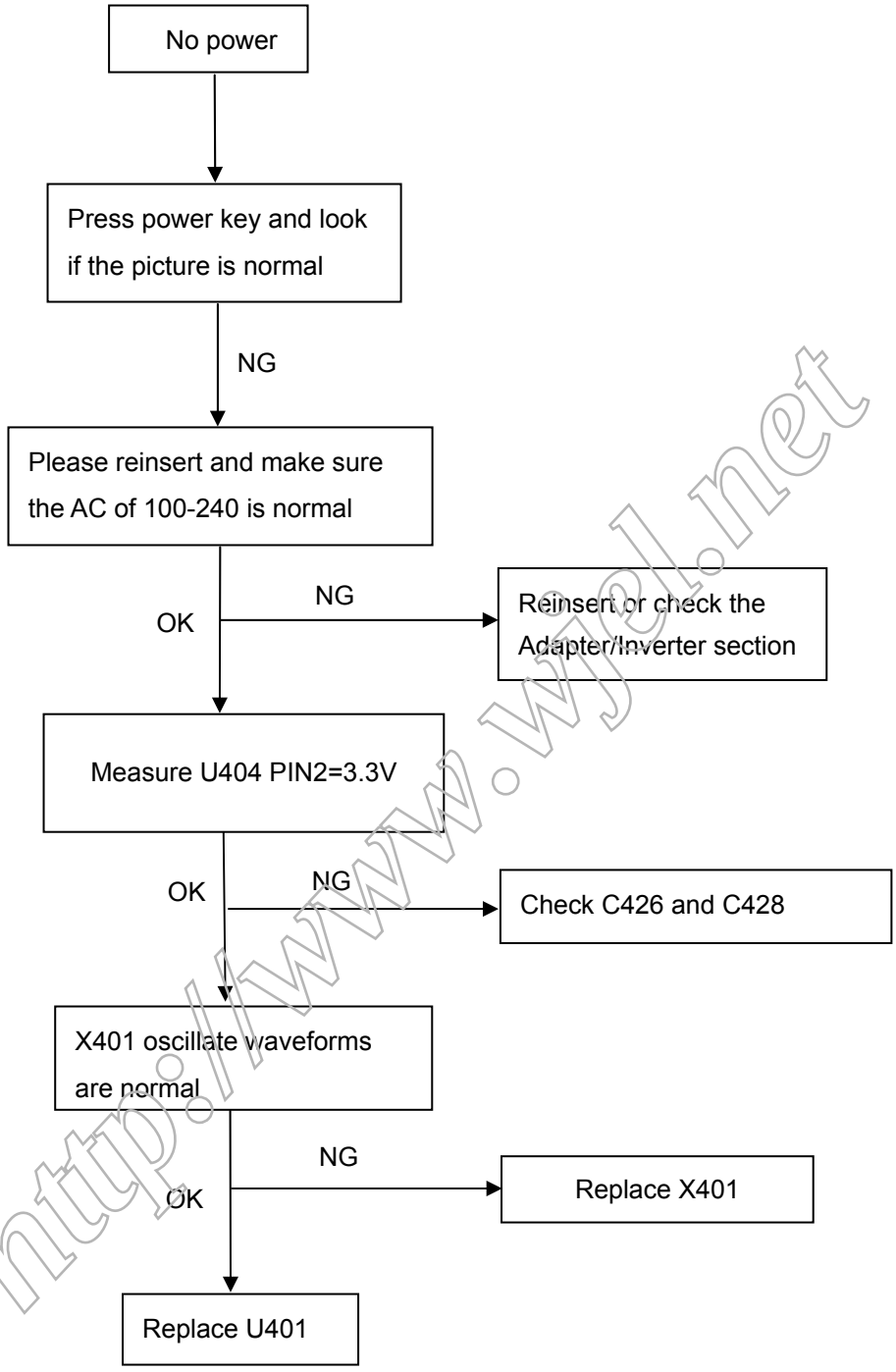
C. Disconnect the connector marked in blue



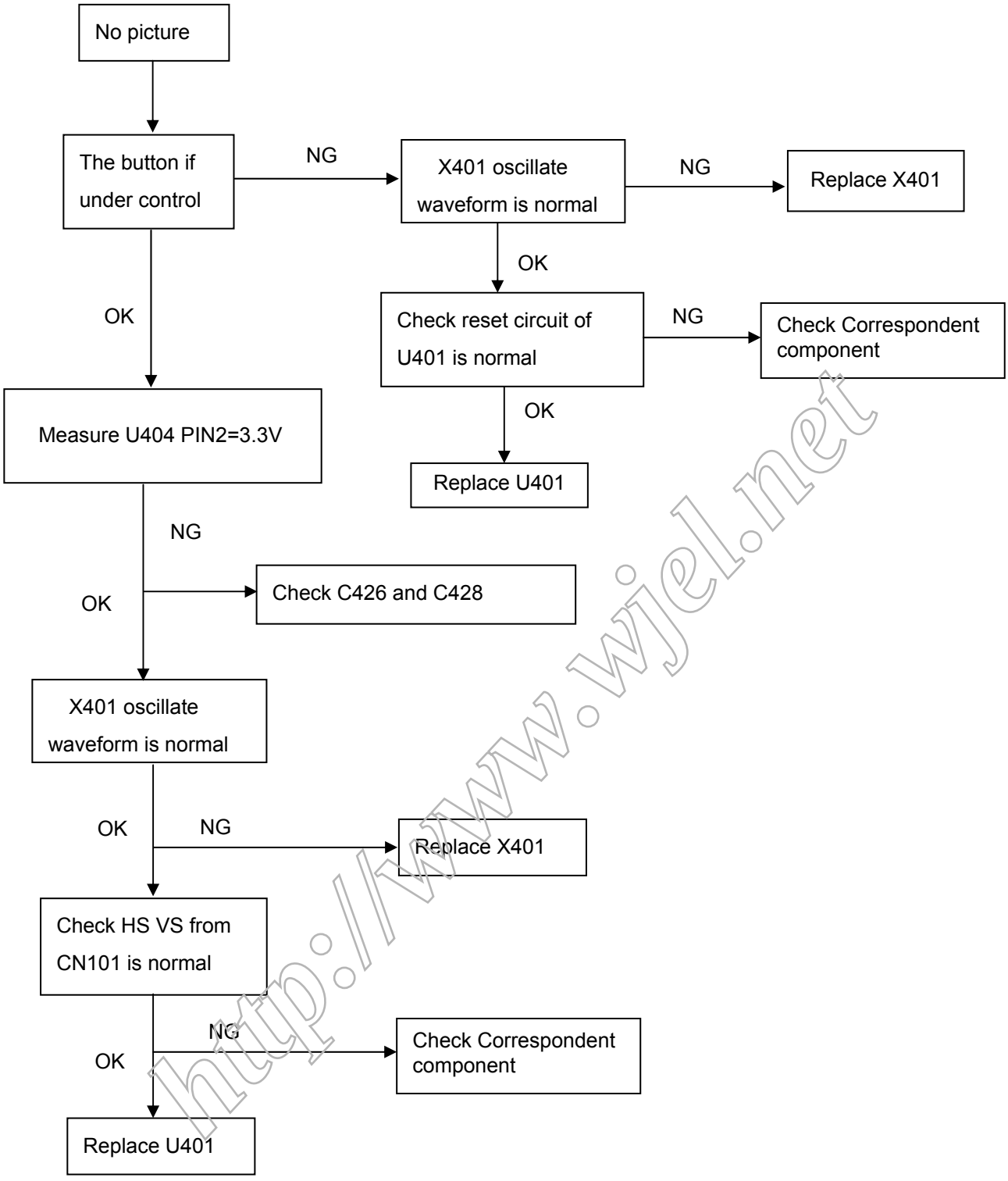
11. Repair Flow Chart

11.1 Main Board

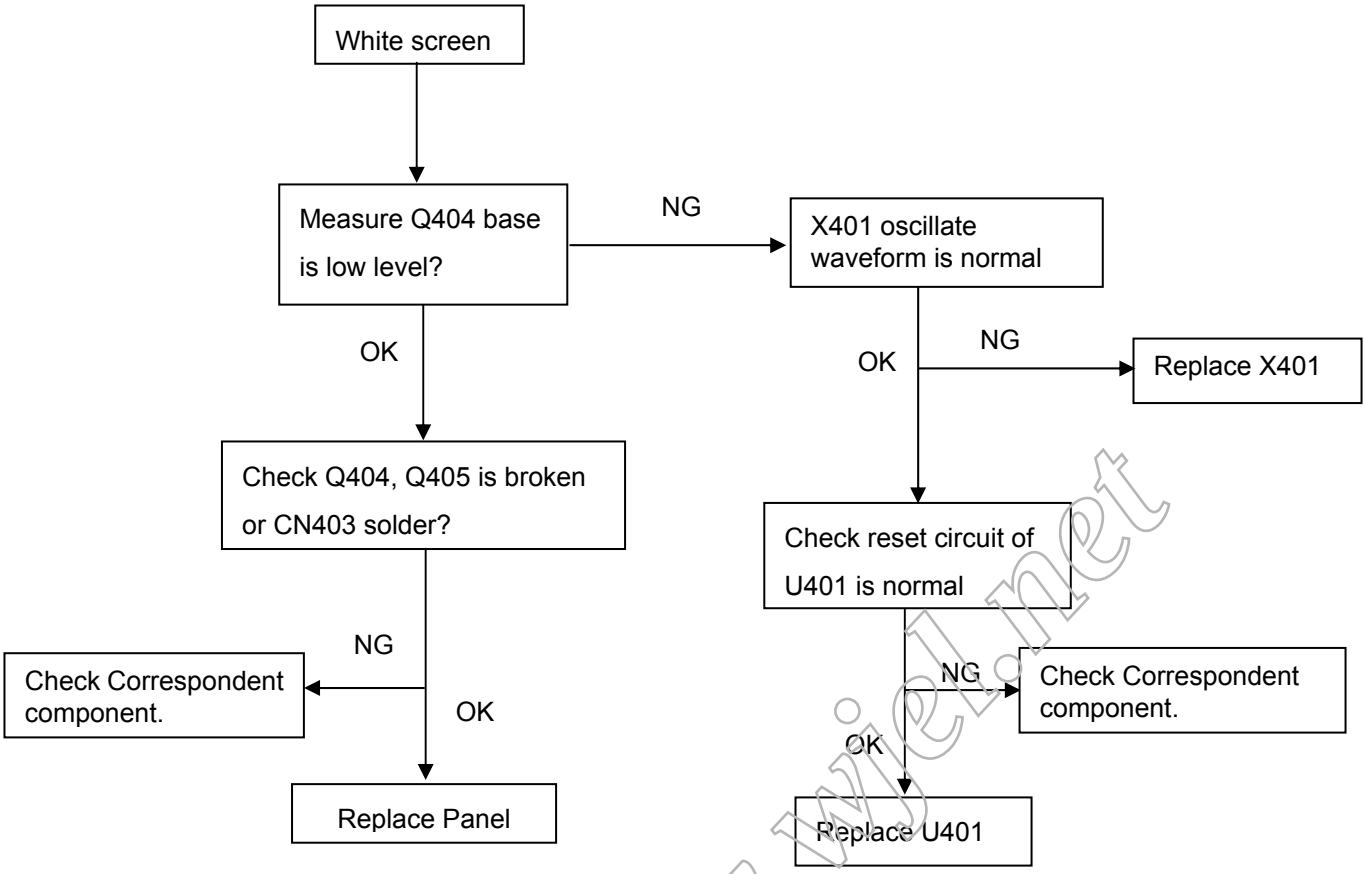
(1). No Power



(2). No Picture

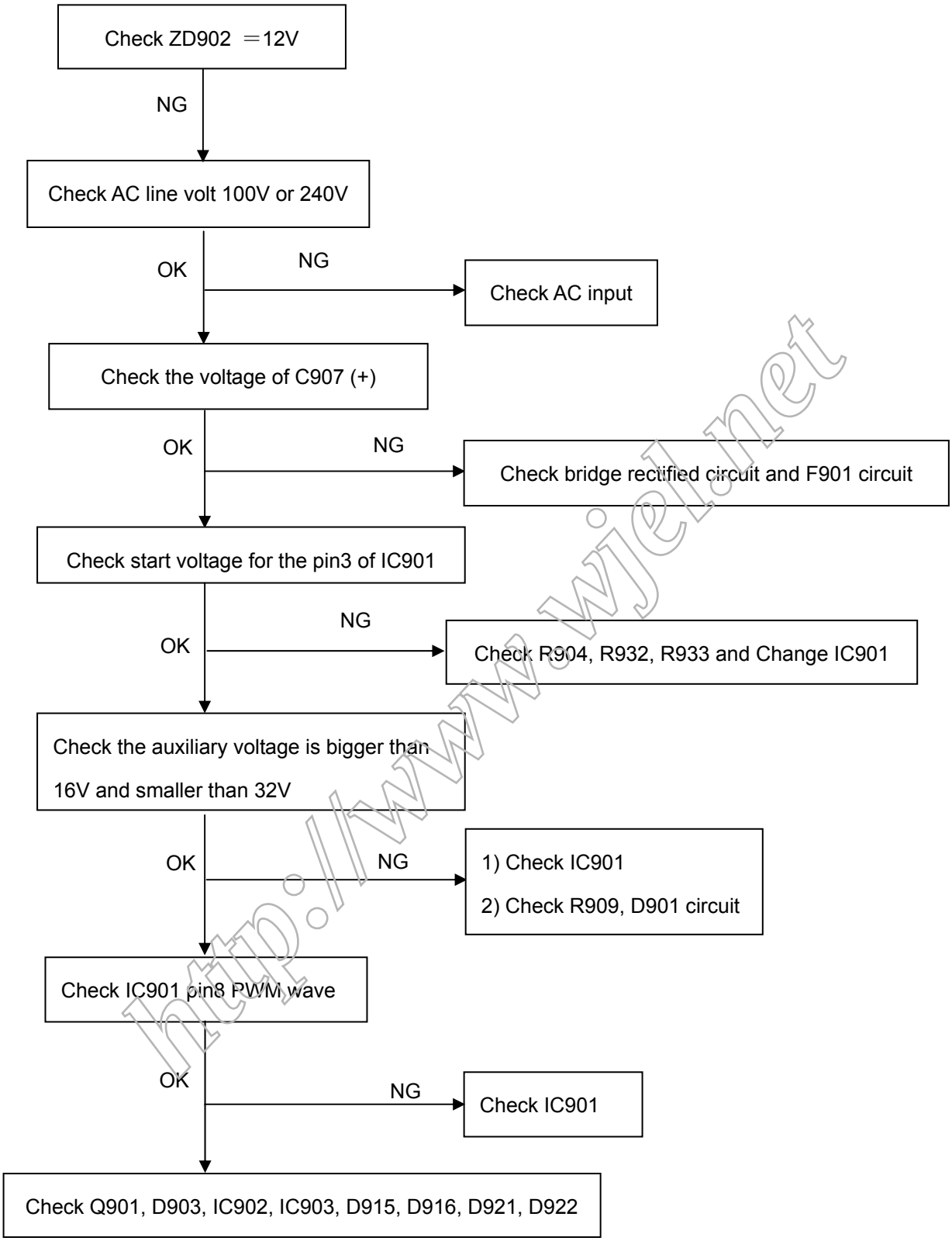


(3). White screen

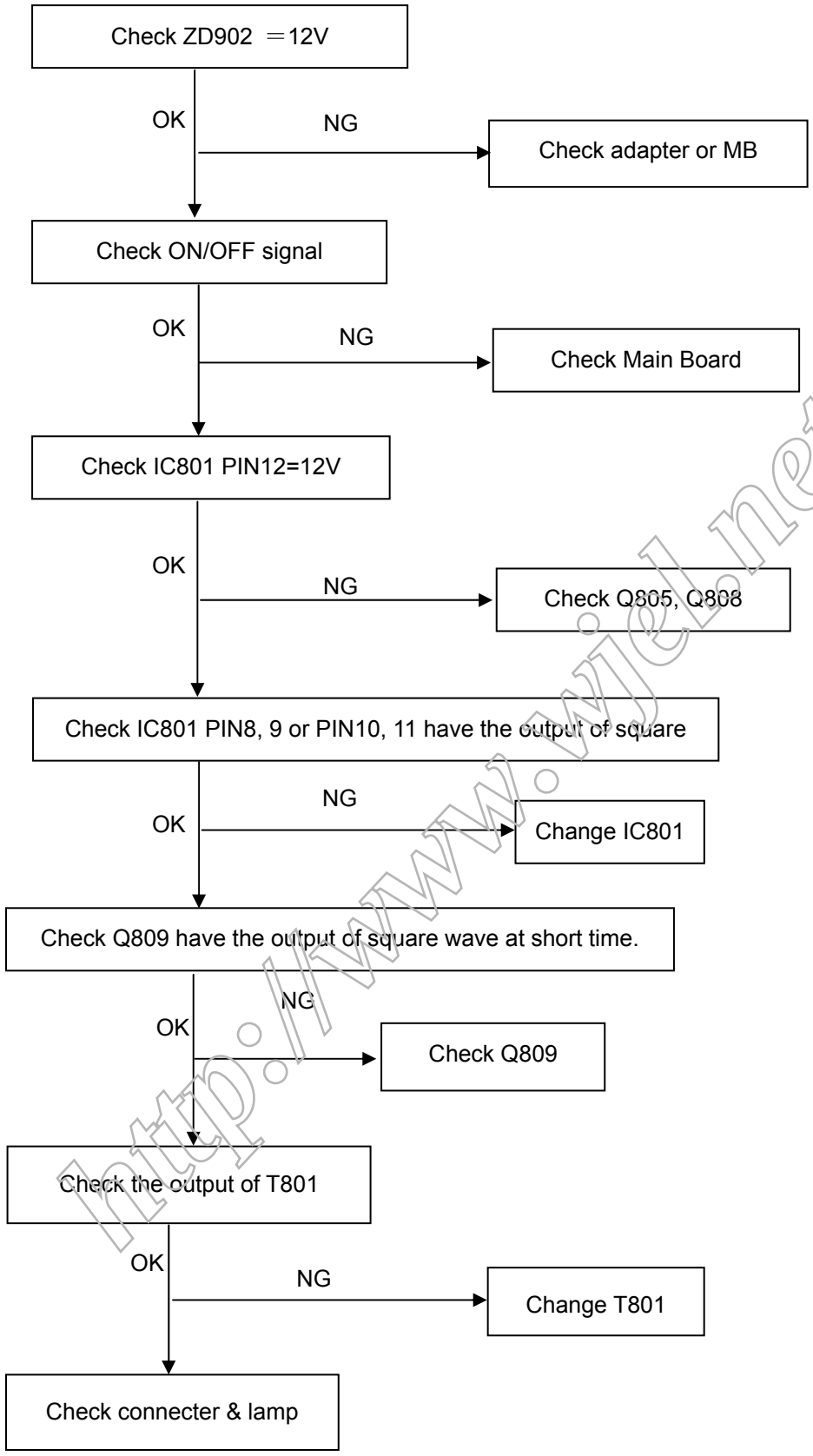


11.2. Power/Inverter Board

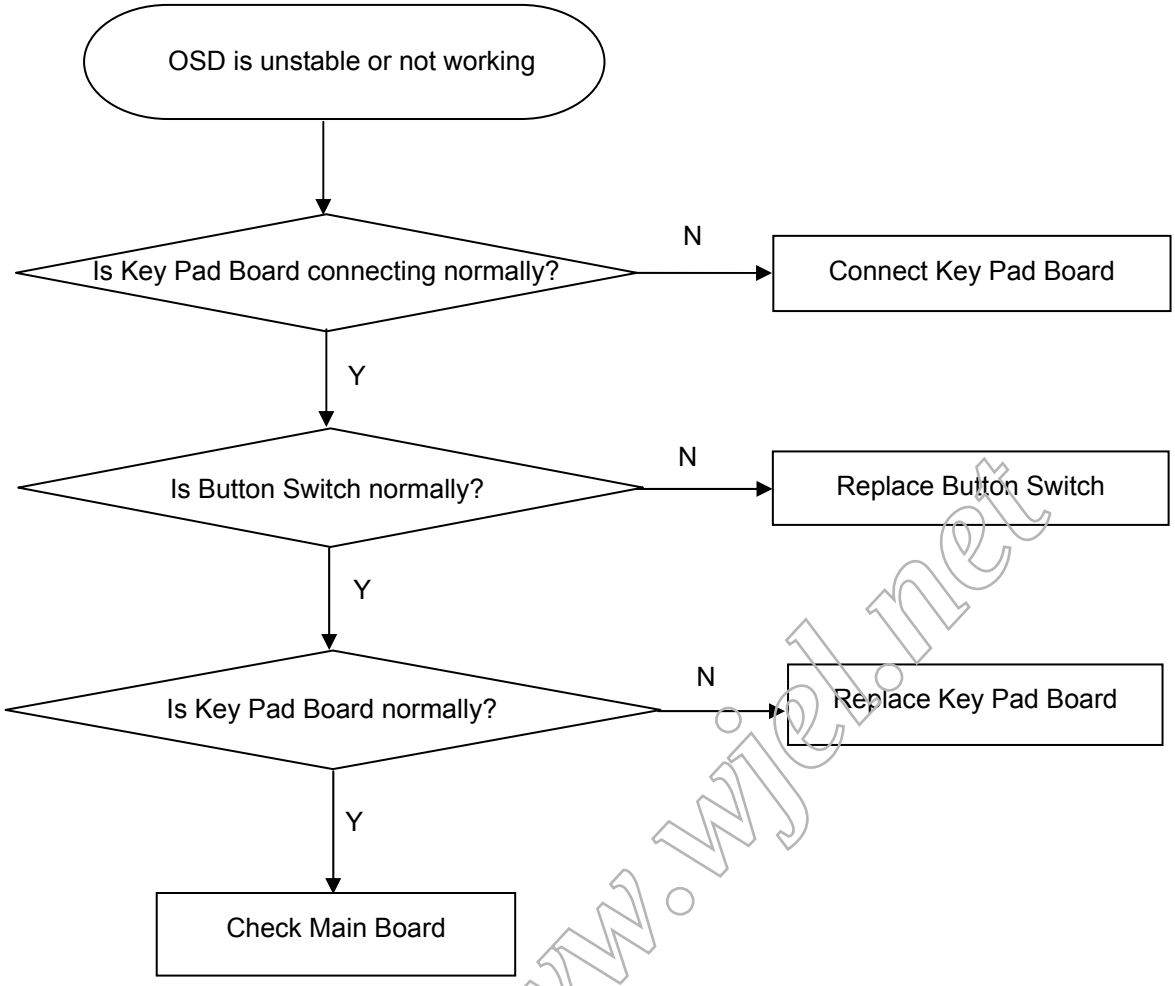
(1) No power



(2) W / LED, No Backlight



11.3 Key Board



12. ISP Instruction

When do the parts, need the tools as follow:

A. An i486 (or above) personal computer or compatible.

B. Microsoft operation system Windows 95/98/2000/XP.

C. “PORT95NT.exe” program.

D. Software ISP SN Alignment kits

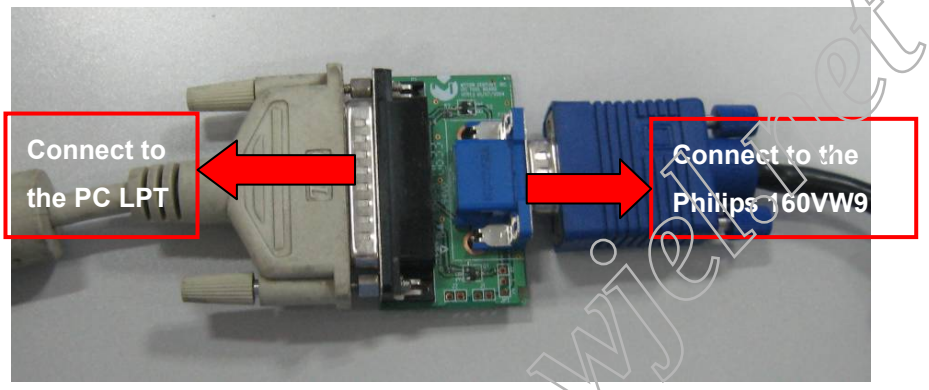
The kit contents:

a. ISP BOARD x1

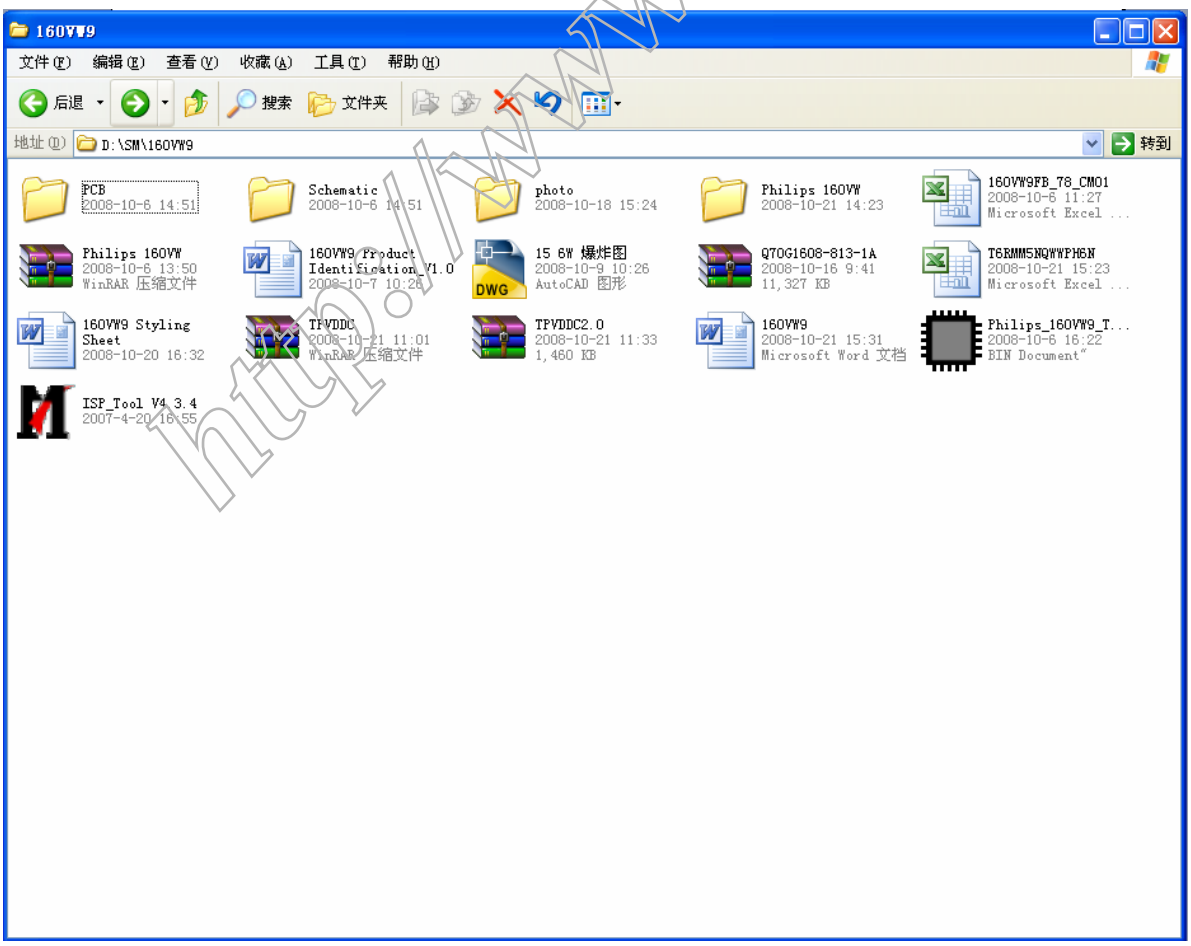
b. Printer cablex1

c. VGA cable x1

Connect the ISP board as follow:

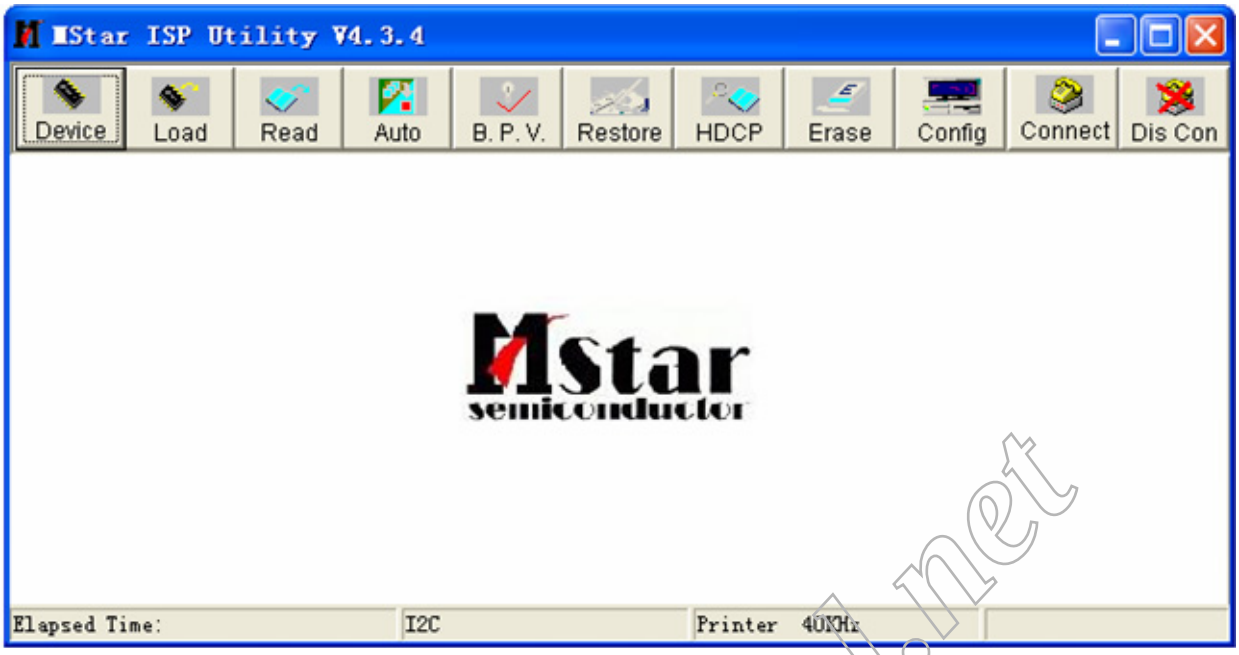


The process of ISP write is as follows.



a) Double-click 

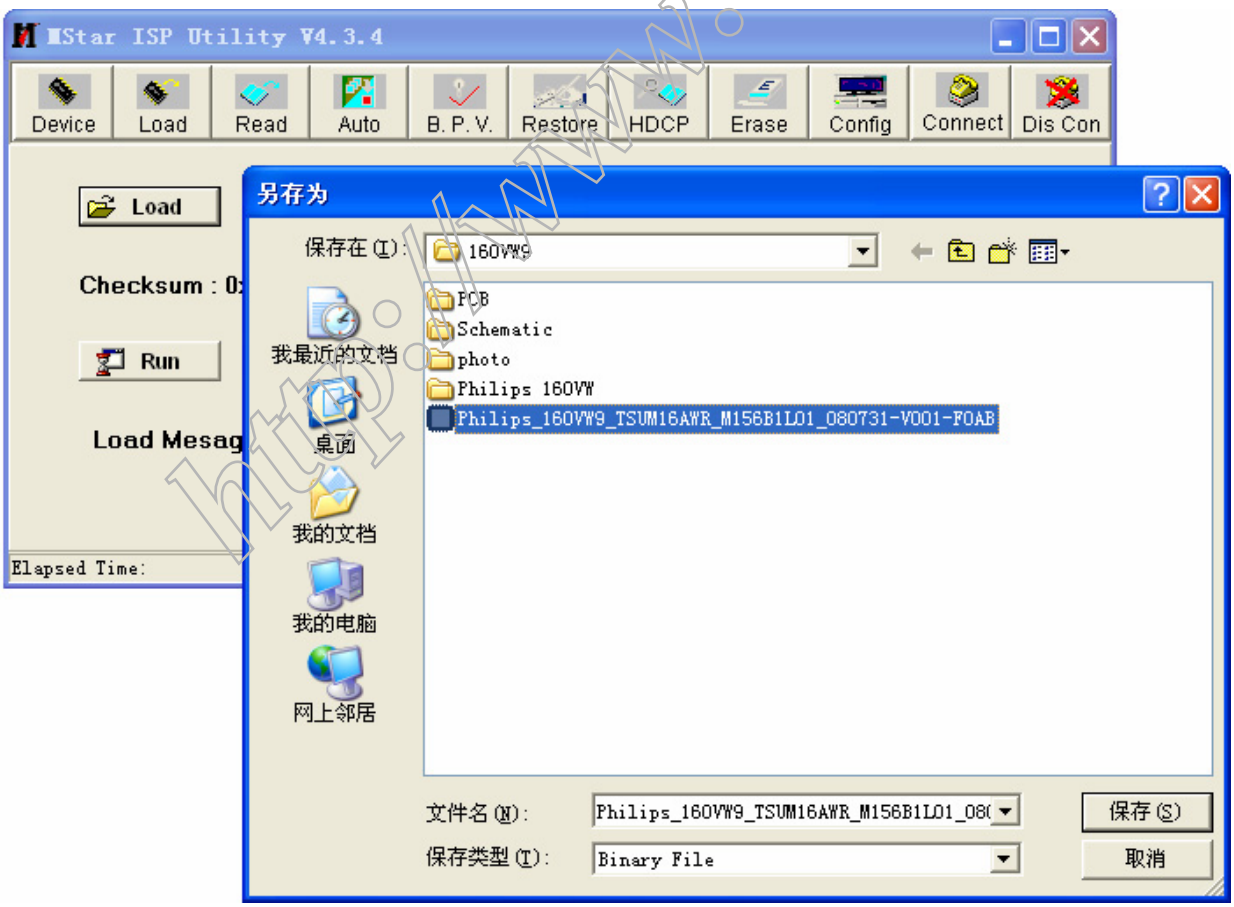
, running the program as follows:



b) Click 

icon, and click 

to search the program "Philips_160VW9_TSUM16AWR_M156B1L01_080731-V001-F0AB", and click save:



c) Click  icon, it will show “Load Message: Loading OK.”

d) Click  icon, then click  . If it burns successfully, it will show as the follow picture:

13. DDC Instruction

General

DDC Data Re-programming

In case the main EEPROM with Software DDC which store all factory settings were replaced because a defect, repaired monitor' the serial numbers have to be re-programmed.

It is advised to re- soldered the main EEPROM with Software DDC from the old board onto the new board if circuit board have been replaced, in this case the DDC data does not need to be re-programmed.

Additional information about DDC (Display Data Channel) may be obtained from Video Electronics Standards Association (VESA). Extended Display Identification Data (EDID) information may be also obtained from VESA.

1. An i486 (or above) personal computer or compatible.
2. Microsoft operation system Windows 95/98/2000/XP.
3. "PORT95NT.exe, TPVDDC2.0" program.
4. Software OSD SN Alignment kits

The kit contents:

a. OSD SN BOARD x1

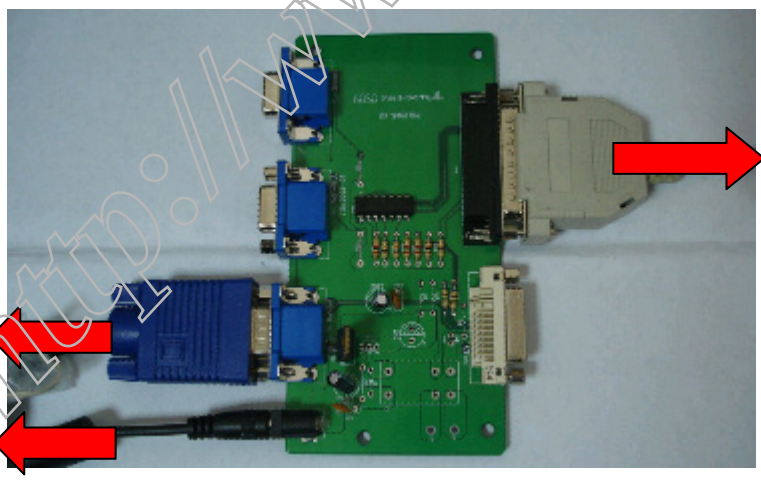
b. Printer cablex1

c. VGA cable x1

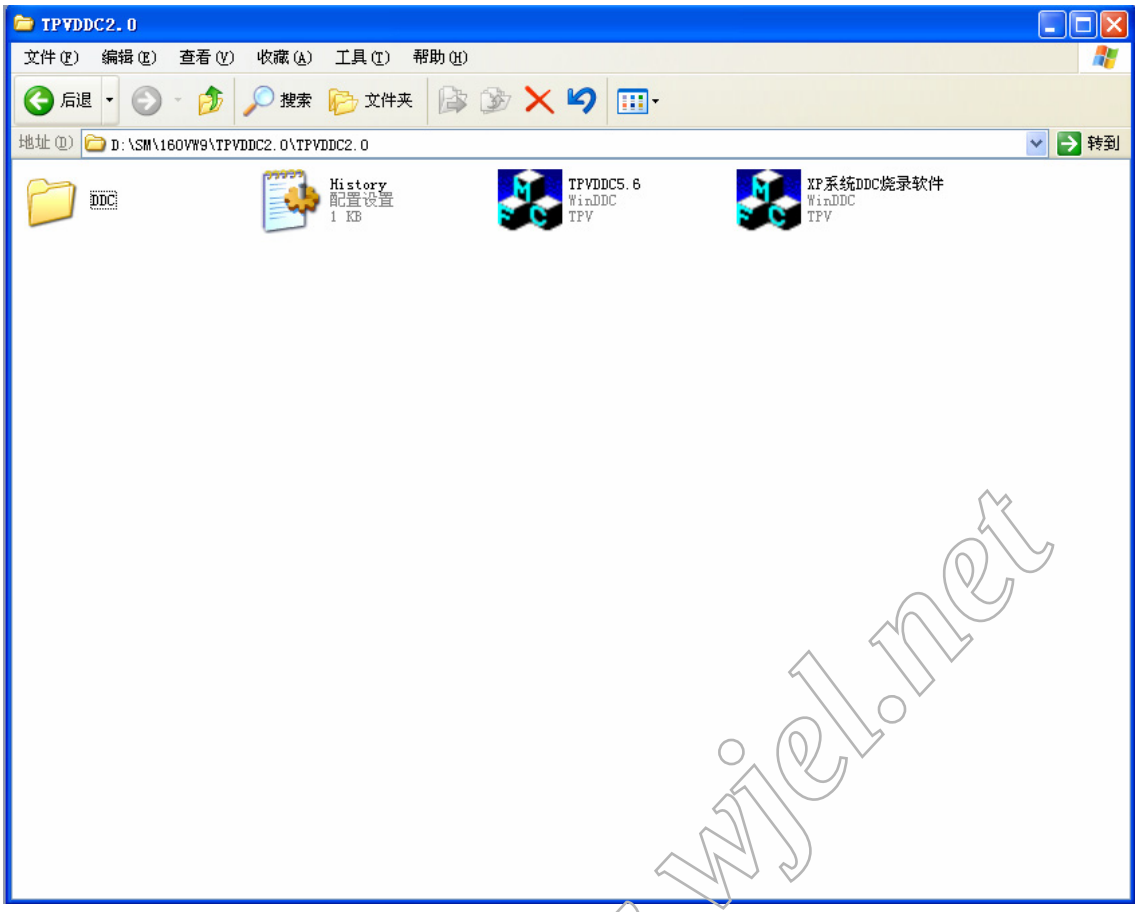
d. Digital cable x1

e. 12V DC power source

Connect the DDC board as follow:

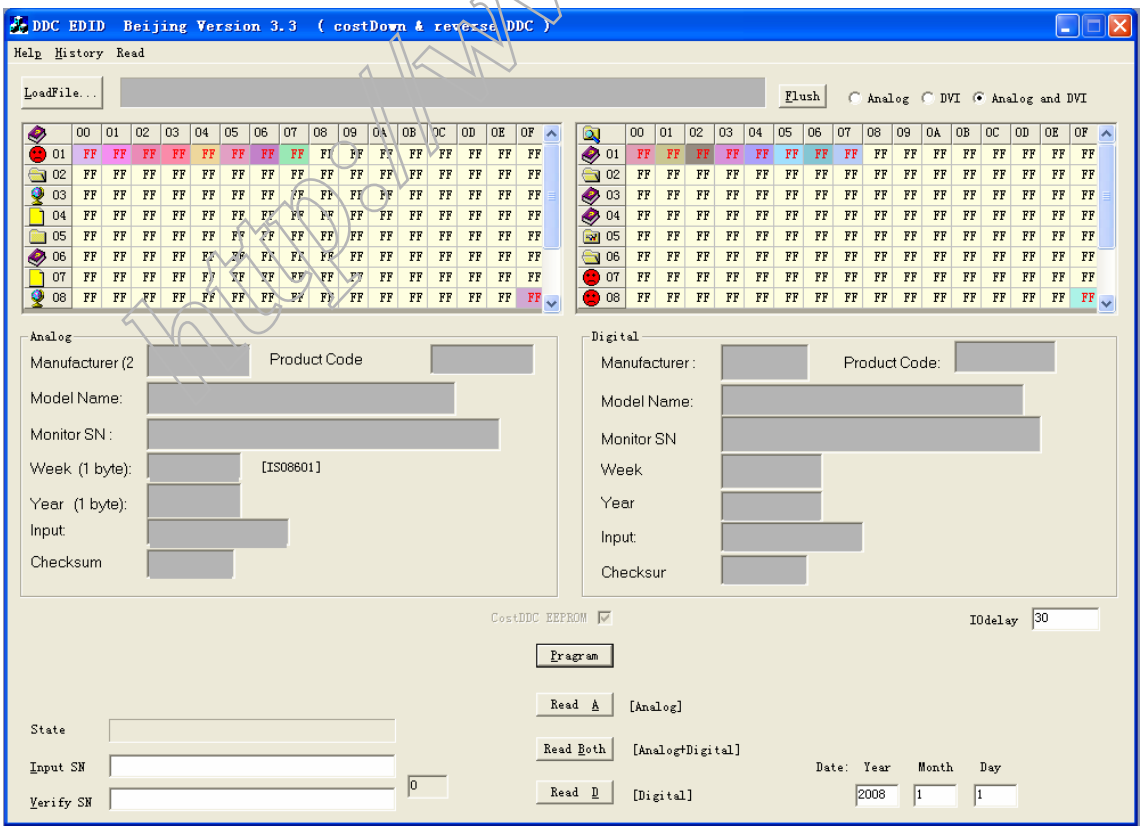


Take analog DDC write for example, as follow

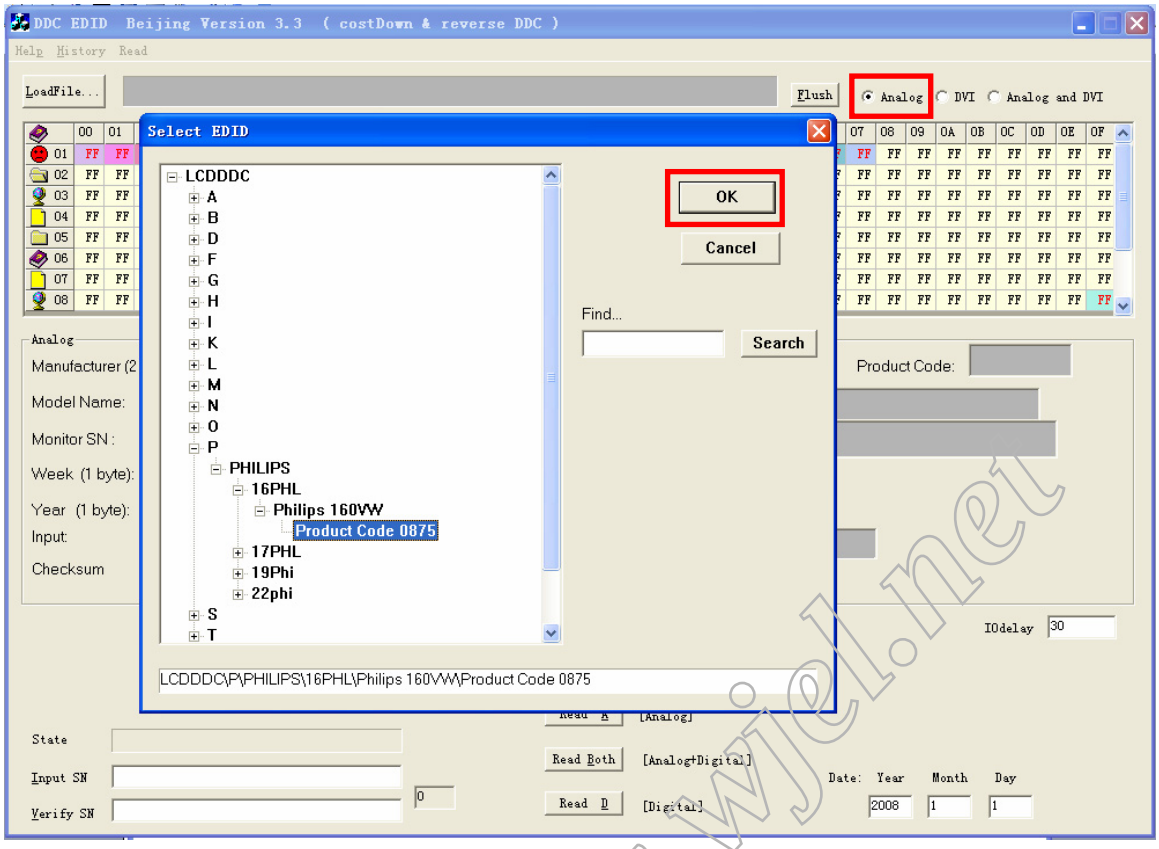


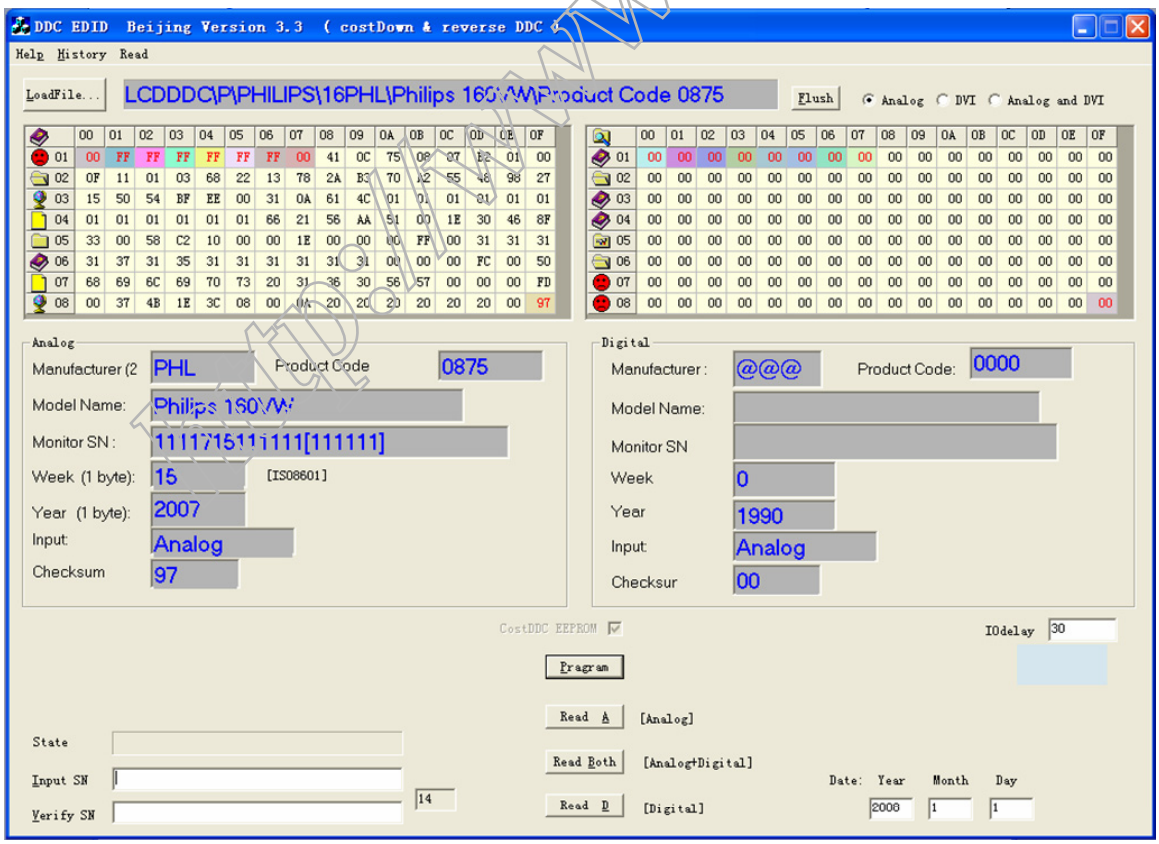
a. Double-click 

，appear as follow Figs：

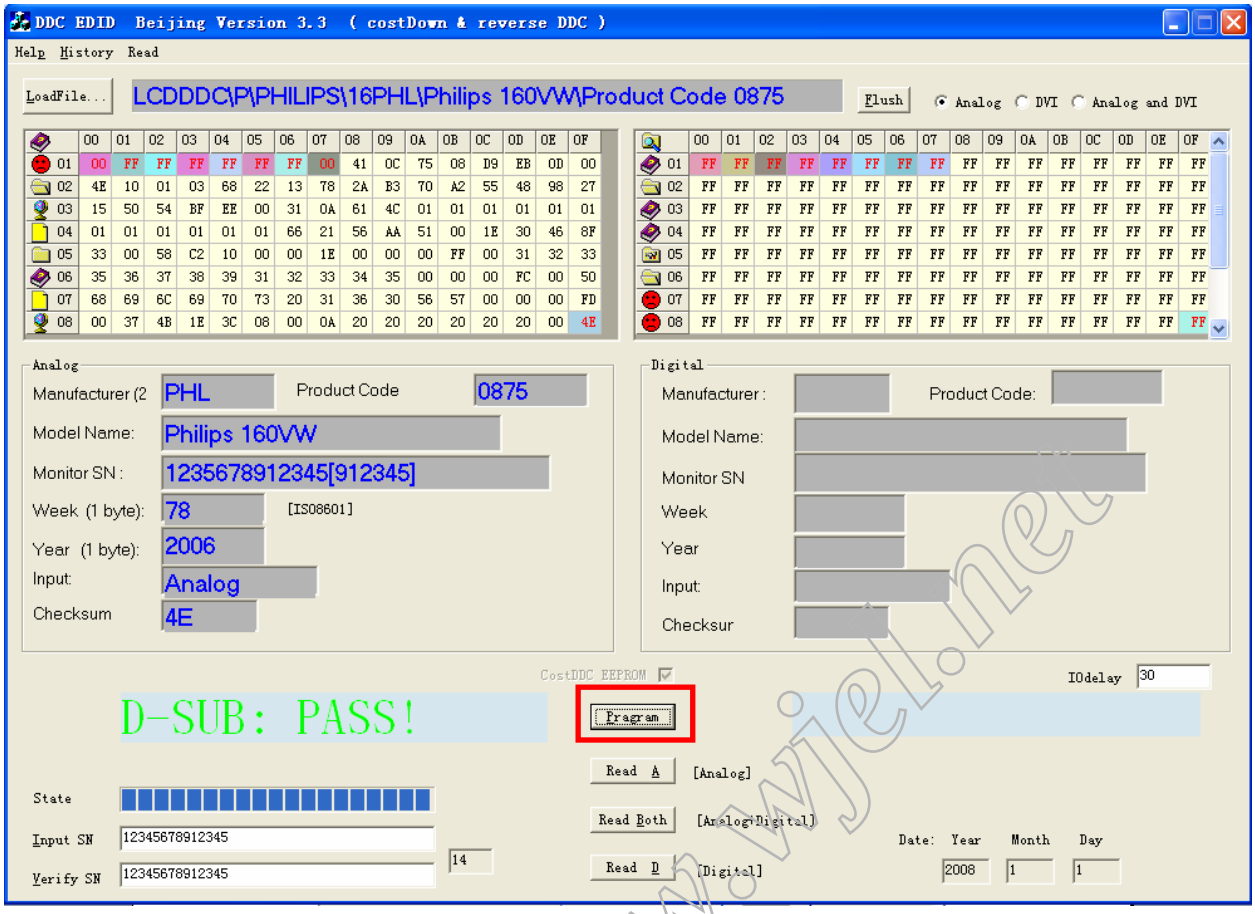


b. Choose “Analog”, click LoadFile... to search the program and click “OK”:





c. Key the same 14 numbers in the Input SN blank and Verify SN blank, then click “Program”. Now analog DDC Write completes, as follow:



160VW9 EDID

128 bytes EDID Data (Hex):

x0 x1 x2 x3 x4 x5 x6 x7 x8 x9 xA xB xC xD xE xF

0: 00 FF FF FF FF FF FF 00 41 0C 75 08 EB D9 01 00
10: 17 0B 01 03 68 22 13 78 2A B3 70 A2 55 48 98 27
20: 15 50 54 BF EE 00 31 0A 61 4C 01 01 01 01 01 01
30: 01 01 01 01 01 01 66 21 56 AA 51 00 1E 30 46 8F
40: 33 00 58 C2 10 00 00 1E 00 00 00 FF 00 33 31 32
50: 33 31 32 33 31 32 31 33 32 33 00 00 00 FC 00 50
60: 68 69 6C 69 70 73 20 31 36 30 56 57 00 00 00 FD
70: 00 37 4B 1E 3C 08 00 0A 20 20 20 20 20 20 00 B3

Decoded EDID data

<---Header--->

Header: 00 FF FF FF FF FF FF 00

<-x-Header-x->

<---Vendor/Product Identification--->
ID Manufacturer Name: PHL
ID Product Code: 0875
ID Serial Number: ebd90100
Week of Manufacture: 23
Year of Manufacture: 2001
<-x-Vendor/Product Identification-x->

<---EDID Structure Version/Revision--->
EDID Version#: 01
EDID Revision#: 03
<-x-EDID Structure Version/Revision-x->

<---Basic Display Parameters/Features--->
Video i/p definition: Analog
Signal Level Standard: 0.700V/0.000V(0.700Vpp)
Setup: Blank-to-Black not expected
Separate Sync Support: Yes

Composite Sync Support: No

Sync. on green video supported:No

Serration of the Vsync.Pulse is not required.

Max. H. Image Size: 34cm.

Max. V. Image Size: 19cm.

Display Gamma: 2.2

DPMS Features, Stand-by: No

DPMS Features, Suspend: No

DPMS Features, Active off: Yes

Display Type: R.G.B color display.

Standard Default Color Space: R.G.B color.

Preferred Timing Mode: In First Detailed Timing

GTF supported: No.

<---Basic Display Parameters/Features--->

<---Color Characteristics--->

Red x: 0.6347656250

Red y: 0.3349609375

Green x: 0.2822265625

Green y: 0.5966796875

Blue x: 0.1533203125

Blue y: 0.0849609375

White x: 0.3125000000

White y: 0.3281250000

<-x-Color Characteristics-x->

<---Established Timings--->

Established Timings 1: BF

-720x400 @70Hz VGA, IBM

-640x480 @60Hz VGA, IBM

-640x480 @67Hz Apple, Mac II

-640x480 @72Hz VESA

-640x480 @75Hz VESA

-800x600 @56Hz VESA

-800x600 @60Hz VESA

Established Timings 2: EE

-800x600 @72Hz VESA

-800x600 @75Hz VESA

-832x624 @75Hz Apple,Mac II

-1024x768 @60Hz VESA

-1024x768 @70Hz VESA

-1024x768 @75Hz VESA

Established Timings 3: 00

<-x-Established Timings-x->

<---Standard Timing Identification--->

-640x400 @70 Hz

-1024x768@72 Hz

<-x-Standard Timing Identification-x->

<---Detailed Timing Descriptions--->

Detailed Timing: 1366x768 @ 60Hz

<-x-Detailed Timing Descriptions-x->

<---Detailed Timing Descriptions--->

Detailed Timing: FF (Monitor SN) '312312312132'

Detailed Timing: FC (Monitor Name) 'Philips 160VW'

Detailed Timing: FD (Monitor limits)

Min. V. rate: 55Hz

Max. V. rate: 75Hz

Min. H. rate: 30 KHz

Max. H. rate: 60 KHz

Max. Pixel Clock: 80MHz

<-x-Detailed Timing Descriptions-x->

Extension Flag: 00

Checksum: B3

14. White Balance, Luminance Adjustment

Approximately 30 minutes should be allowed for warm up before proceeding white balance adjustment.

How to setting MEM channel you can reference to chroma 7120 user guide or simple use " SC" key and " NEXT" Key to modify xyY value and use "ID" key to modify the TEXT description Following is the procedure to do white-balance adjust.

2. Setting the color temp. you want

A. MEM.CHANNEL 3 (Warm color):

Warm color temp. parameter is x = 313 ±30, y = 329 ±30, Y>150cd/ m2(typ)

B. MEM.CHANNEL 4 (Normal color):

Normal color temp. parameter is x = 302 ±30, y = 318 ±30, Y>150cd/ m2 (typ)

C. MEM.CHANNEL 9(Cool color):

Cool color temp. parameter is x = 283 ±30, y = 297 ±30, Y>150cd/m2 (typ)

D. MEM.CHANNEL 10 (sRGB color):

sRGB color temp. parameter is x = 313 ±30, y = 329 ±30, Y>150cd/m2

3. Into Factory mode of Philips 160VW9FB/78:

Press the MENU button, pull out the power cord, and then plug the power cord. Then the factory OSD will be at the left top of the panel.

4. Bias adjustment:

Set the Contrast to 50; Adjust the Brightness to 70

5. Gain adjustment:

Move cursor to "-F-" and press MENU key

A. Adjust Warm (6500K) color-temperature

1. Switch the chroma-7120 to RGB-Mode (with press "MODE" button)
2. Switch the MEM.channel to Channel 3 (with up or down arrow on chroma 7120)
3. The LCD-indicator on chroma 7120 will show x = 313 ±30, y = 329 ±30, Y>150cd/m2 (typ)
4. Adjust the RED on factory window until chroma 7120 indicator reached the value R=100
5. Adjust the GREEN on factory window until chroma 7120 indicator reached the value G=100
6. Adjust the BLUE on factory window until chroma 7120 indicator reached the value B=100
7. Repeat above procedure (item 4, 5, 6) until chroma 7120 RGB value meet the tolerance =100±2

B. Adjust Normal (7300K) color-temperature

1. Switch the chroma-7120 to RGB-Mode (with press "MODE" button)
2. Switch the MEM.channel to Channel 4(with up or down arrow on chroma 7120)
3. The LCD-indicator on chroma 7120 will show x = 302 ± 30, y = 318 ± 30, Y>150cd/m2 (typ)
4. Adjust the RED on factory window until chroma 7120 indicator reached the value R=100
5. Adjust the GREEN on factory window until chroma 7120 indicator reached the value G=100
6. Adjust the BLUE on factory window until chroma 7120 indicator reached the value B=100
7. Repeat above procedure (item 4, 5, 6) until chroma 7120 RGB value meet the tolerance =100±2

C. Adjust Cool (9300K) color-temperature

1. Switch the Chroma-7120 to RGB-Mode (with press "MODE" button)

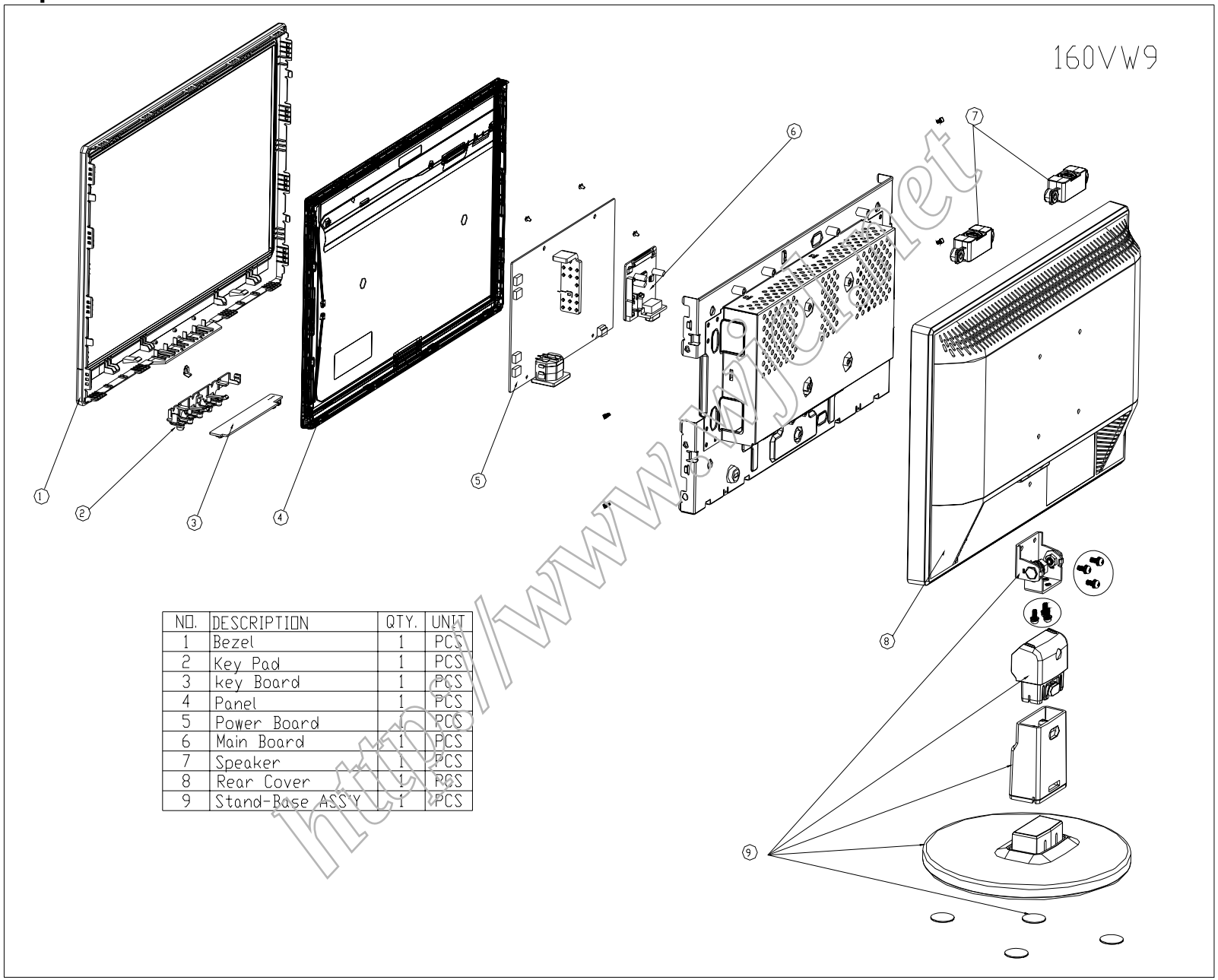
2. Switch the MEM. Channel to Channel 9 (with up or down arrow on chroma 7120)
3. The LCD-indicator on chroma 7120 will show x = 283 ±30, y = 297 ±30, Y>150cd/m2 (typ)
4. Adjust the RED on factory window until chroma 7120 indicator reached the value R=100
5. Adjust the GREEN on factory window until chroma 7120 indicator reached the value G=100
6. Adjust the BLUE on factory window until chroma 7120 indicator reached the value B=100
7. Repeat above procedure (item 4, 5, 6) until chroma 7120 RGB value meet the tolerance =100±2

D. Adjust sRGB color-temperature

1. Switch the chroma-7120 to RGB-Mode (with press “MODE” button)
2. Switch the MEM.channel to Channel 10 (with up or down arrow on chroma 7120)
3. The LCD-indicator on chroma 7120 will show x = 313 ±30, y = 329 ±30, Y>150cd/m2
4. Adjust the RED on factory window until chroma 7120 indicator reached the value R=100
5. Adjust the GREEN on factory window until chroma 7120 indicator reached the value G=100
6. Adjust the BLUE on factory window until chroma 7120 indicator reached the value B=100
7. Repeat above procedure (item 4, 5, 6) until chroma 7120 RGB value meet the tolerance =100±2

E. Turn the Power-button off to quit from factory mode.

15. Monitor Exploded View



NO.	DESCRIPTION	QTY.	UNIT
1	Bezel	1	PCS
2	Key Pad	1	PCS
3	key Board	1	PCS
4	Panel	1	PCS
5	Power Board	1	PCS
6	Main Board	1	PCS
7	Speaker	1	PCS
8	Rear Cover	1	PCS
9	Stand-Base ASSY	1	PCS

16. Recommended & Spare Parts List

160VW9FB/78

Item	Location	Philips 12NC	PCM Codes	Description	Remark
1	FQ101		Q34G0273ABJB2B0130	BEZEL(L156W-8Q2)	
2	FQ405		Q33G0170ABJ 1L0100	KEY PAD	
3	FQ004		KEPC8QAD	KEY BOARD ASSY	
4	FQ001		750GLM56B1112N	PANEL M156B1-L01 NB CMO	
5	FQ003		PWPC8521MQCK	POWER BOARD ASSY	
6	FQ002		756GQ8CB PH003	SCALER BOARD ASSY(CBPCRM5PHQ1)	CMO
7	E07801		078G 322 9A Y	SPK 8OHM 1.5W 145 200mm 43X18mm SUNLINK	
8	FQ102		Q34G0274ABJ 1B0100	REAR COVER15.6"	
9	FQ103		705GQ834333	LCD 15.6"STAND-BASE ASS'Y	
	SMTCR-U402		100GPMM6000Z11	MCU ASS'Y(056G1133 81)	CMO
	FQ305		089G 17356C554	AUDIO CABLE	
	FQ307		089G 725CAA DB	D-SUB CABLE	
	FQ301		089G402A15NIS1	POWER CORD	
	FQ205		705GQ8CS057	CUSHION ASSY	
	IC902		056G 139 3A	IC PC123Y22FZ0F	
	IC601		056G 616 34	IC APA2069JITUL 2.6W*2 PDIP-16	
	T901		080GL19T 26 T	X'FMR 460uH SRW24LQL-T15H016	
	IC801		056G 379 22	IC TL494IDR SOIC-16	
	IC901		056G 379 76	IC LD7552BPS SOP-8	
	IC903		056G 158 10 T	IC AS431AZTR-E1 TO-92	
	F901		084G 56 3 B	FUSE 3.15A 250V	
	X401		093G 22 53 J	14.31818MHZ/32PF/49US	

	U401		056G 562557	IC TSUM1PFR-LF	CMO
	U404		056G 563 52	IC AP1117D33L-13 TO252-3L	
	U102		056G 662 13	IC AZC099-04S SOT23-6L	
	U103		056G 662 13	IC AZC099-04S SOT23-6L	

Service Kit

Description	Part No.	Philips 12NC	Remark
DDC KIT	715L2005C2	9965 000 43197	FOR ALL MODEL
OSD SN KIT	715GT033 C	9965 000 43252	FOR ALL MODEL
NOVATEK ISP KIT	715LT035A	9965 000 43198	FOR ALL HUDSON 7
			FOR 170A8, 190B8, 150S8, 170S8,190S8, 170V8,190V8
NOVATEK ISP KIT	715GT048 1	996510018193	FOR 190S9,190B9,190SW9,190BW9, 191EW9
MSTAR ISP KIT	715GT039 A	996510010027	200CW8, 190VW9, 170V9, 190V9, **160VW9**
REALTEK ISP KIT	715GT039 A	996510010027	170CW8

17. General Product Specification

TABLE OF CONTENTS

1. This short specification describes the electrical, optical and functional performance requirements for a 395mm (15.6") TFT LCD color monitor with VGA compatible interface.

1.1 Product Features

- 395mm(15.6") a-si TFT Active matrix LCD panel, 0.252mm pixel pitch
- Microprocessor controlled scan technology
- 19 factory presets
- Vertical refresh rate 55Hz to 75Hz
- Horizontal frequency 30KHz to 60KHz
- Resolutions: 640X480 up to 1366X768
- Universal power supply designed for worldwide application
- CE mark
- VESA DPMS compliant
- VESA DDC2B compliant

1.2 Main Dimensions/Weight (only for reference, according to final SHT 560)

	Monitor	Packed Monitor
Width:	361mm	442mm
Height:	293mm	328mm
Depth:	190mm	130mm
Weight:	2.7kg	3.7 kg

1.3 Loading Quantity (according to final SHT 560)

2736 sets for 40' container (w. pallet)

2. Electrical Performance

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

2.1 Standard testing conditions

- Warm up time	: ＞ 30 min.
- AC supply voltage	: 230V± 5%, 50± 3 Hz
- Ambient temperature	: 25°C ± 2°C
- Humidity	: 50% ± 10%
- Display mode	: 1366x768, 60 Hz ,all white
- Contrast control	: Set to factory preset value, which allows that the brightest two of 32 linear distributed gray-scales (0～ 700mv) can be distinguished.
- Color temperature	: Warm color
- Brightness control	: Set to Factory preset value (cut off raster)
- Input signal	: 0.7Vpp
- Picture position and size	: Factory preset value,
Viewing angle	Refer to Accessories One about the value, Please.
Viewing distance	40 cm for LCD performance, 20 cm for LCD failures
Ambient illumination	Dark room ＜ ＝1 cd/m2

2.2 Video Signals

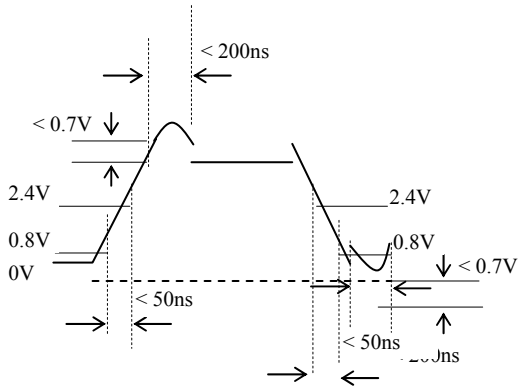
2.2.1 Analog Inputs (R,G,B)

Level	: 0 ~ 0.7Vpp
Polarity	: positive
Impedance	: 75 Ohm
Max. dot clock	:85.5 MHz

2.2.2 TTL Inputs (Sync-Signals)

Level: L = 0V ~ 0.8V H = 2.4V ~ 5V
Separate sync. Polarity: positive or negative

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



2.2.3 H- Sync. And V – Sync. Signals at the monitor input

High logic level	: ≥ 2.4V
Low logic level	: ≤ 0.8V
Rise time	: 0.8V ~ 2.4V: < 50ns
Fall time	: 2.4V ~ 0.8V: < 50ns
Overshoot	: ≤ 0.7V
Undershoot	: ≤ 0.7V

2.3 DDC Signals

DDC Serial Data: Pin 12 of 15 pin D-sub connector, TTL-Level
DDC Serial Clock: Pin 15 of 15 pin D-sub connector, TTL-Level

2.4 Factory Preset Timing

VESA Modes							
			Horizontal		Vertical		
Mode	Resolution	Total	Nominal Frequency +/- 0.5kHz	Sync Polarity	Nominal Freq. +/- 1 Hz	Sync Polarity	Nominal Pixel Clock (MHz)
VGA	640x480@60Hz	800 x 525	31.469	N	59.940	N	25.175
	640x480@72Hz	832 x 520	37.861	N	72.809	N	31.500
	640x480@75Hz	840 x 500	37.500	N	75.00	N	31.500
SVGA	800x600@56Hz	1024 x 625	35.156	N/P	56.250	N/P	36.000
	800x600@60Hz	1056 x 628	37.879	P	60.317	P	40.000
	800x600@72Hz	1040 x 666	48.077	P	72.188	P	50.000
	800x600@75Hz	1056x625	46.875	P	75.000	P	49.500
XGA	1024x768@60Hz	1344x806	48.363	N	60.004	N	65.000
	1024x768@70Hz	1328x806	56.476	N	70.069	N	75.000
	1024x768@75Hz	1312x800	60.023	P	75.029	P	78.750
WXGA	1360x768@60Hz	1792x795	47.712	N	60.015	N	85.5
WXGA	1366x768@60Hz	1792x798	47.712	N	59.790	N	85.5

IBM Modes							
			Horizontal		Vertical		
DOS	720x400@70Hz	900 x 449	31.469	N	70.087	P	28.322
DOS	640x400@70Hz	800 x 449	31.469	N	70.087	P	25.175
XGA	1024x768@72Hz	1304 x 798	57.515	P	72.1	P	75.000
MAC Modes							
VGA	640x480@67Hz	864x525	35.000	N	66.667	N	30.240
SVGA	832x624@75Hz	1152x667	49.725	N	74.551	N	57.2832
XGA	1024x768@60Hz	1312x813	48.780	N	60.001	N	64.000
	1024x768@75Hz	1328x804	60.241	N	74.927	N	80.000

2.5 Factory Pre-set Modes for Analog Input

Starting the “RESET” function in the OSD-MENU will clear all old settings of auto configuration in preset modes & OSD back to center

2.5.1 Protection Circuit

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

2.6 Power Supply

The power supply should be integrated to the monitor housing.

2.6.1 Features

A/C Line voltage range	100 V ~ 240 V
A/C Line frequency range	50 ± 3Hz, 60 ± 3Hz
Current	1.5A max. at 100V, 0.8A max. at 240V
Peak surge current	< 55A peak at 240 VAC and cold starting
Leakage current	< 3.5Ma
Power line surge	No advance effects (no loss of information or defect) with a maximum of 1 half-wave missing per second

2.6.2 Power Consumption

The monitor is equipped with a power-management according to NUTEK (power consumption) and is EPA 4.0 (Tier 2) compliant. There is a delay of 5s---7s before the transition from On-state to any power saving state to avoid unintentionally entering of a power saving stage during display resolution and timing mode changes. Transition from any power saving state to another can be instantaneous. The recovery from Off-state requires no manual power on.

Mode	H-Sync.	V-Sync.	Video	Pw-cons.	Indicator	Rec. time*
Power-On	on	on	active	≦32W (with speaker) ≦28W (with out speaker)	Green LED	--
Power-saving	off	off	blanked	≦ 2 W	Orange LED	< 10s
Switch off	off	off	off	≦ 1W	LED off	
Sync. On means:	Normal operation					
Sync. Off means:	H sync. F < 10KHz duty cycle > 25%					
	V sync. F < 10Hz duty cycle > 25%					

2.7 Connectors/Controls

2.7.1 Connectors (for analog)

Power	: Monitor rear side	: 3-pin IEC
R, G, B, H, V /DDC	: Monitor rear side / Data Cable	: 15-pin D-sub

Pin – Assignment of 15-pin D-sub:

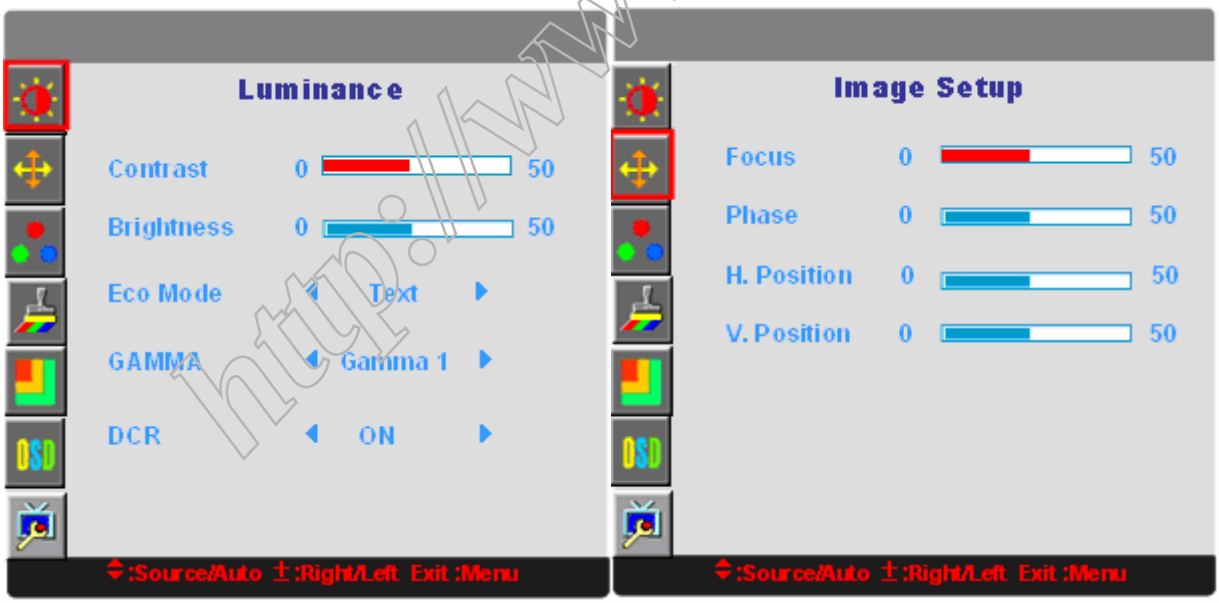
1	Red Video	9	+5V Supply
2	Green Video	10	Logic Ground
3	Blue Video	11	Monitor Ground
4	Monitor Ground	12	DDC-Serial Data
5	DDC-Return	13	H-Sync.
6	Red Ground	14	V-Sync.
7	Green Ground	15	DDC-Serial Clock
8	Blue Ground		

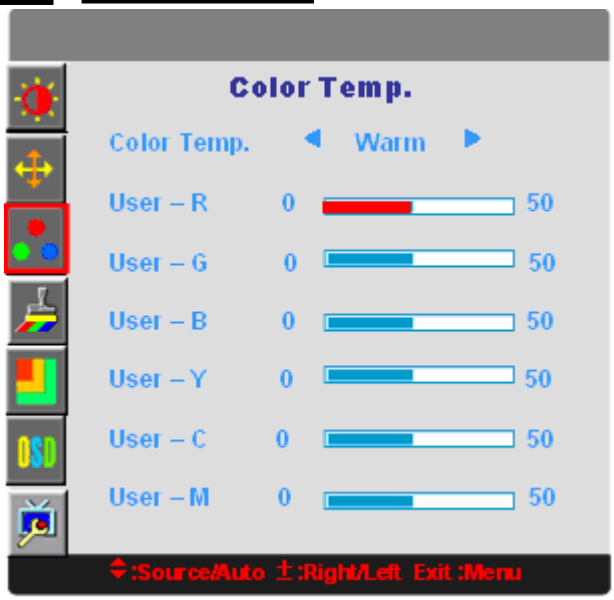
2.7.2 Control Function For Analog Input

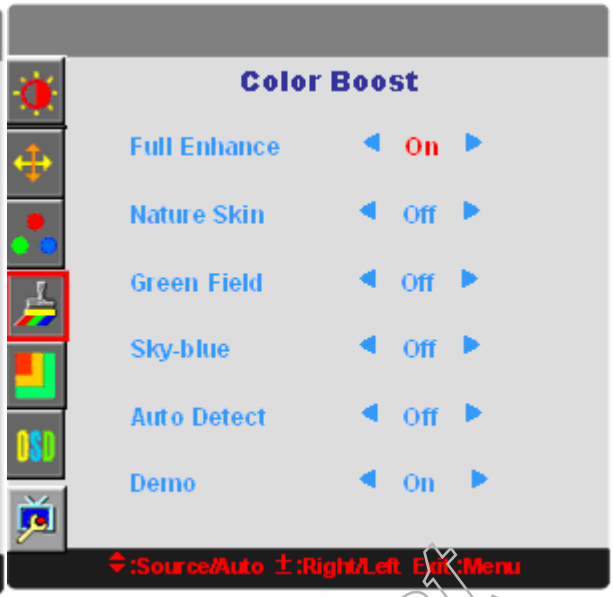
Brightness, Contrast, Eco Mode Gamma (1,2,3), DCR Focus, Clock, H/V Position, Color Temperature (Cool, Warm, Normal, sRGB, RGBYCM), Color Boost (Full Enhance, Nature Skin, Green Field, Sky Blue, Auto Detect, Demo), Picture Boost (Frame Size, Brightness, Contrast, Hue, Saturation, H/V Position, Bright Frame on/off), OSD Setup (H/V Position, Timeout, Language), Extra (Input Select, Auto Config, Reset, Information), 8 Language selected (English, French, Spanish, Portuguese, Russian, Simplified, Chinese, Antiquated orean)

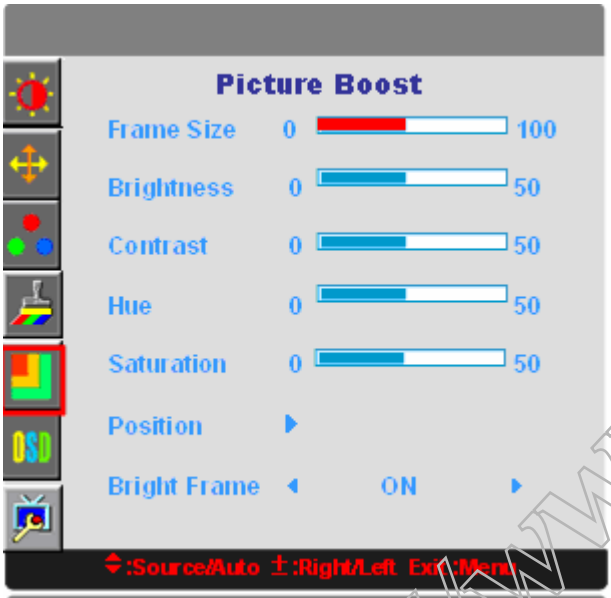
2.7.2.1 Main OSD Menu (no brand OSD ID 2007)

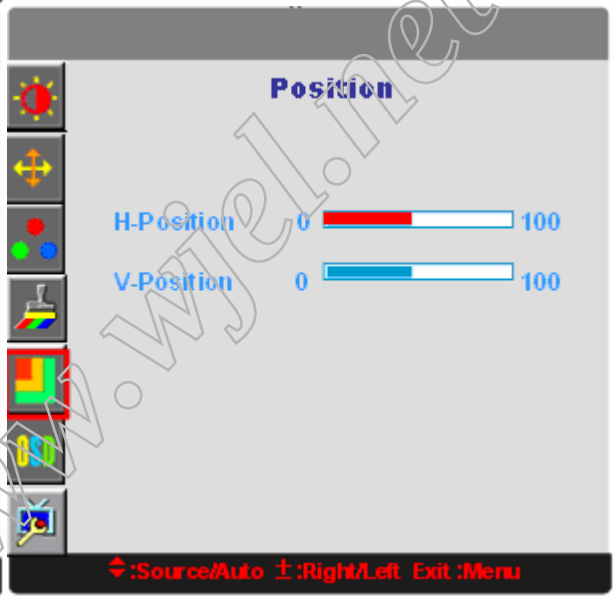
No Brand (D-SUB)

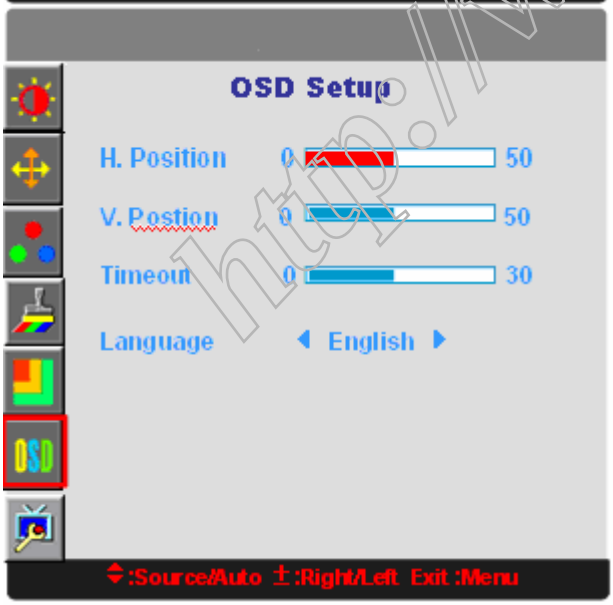


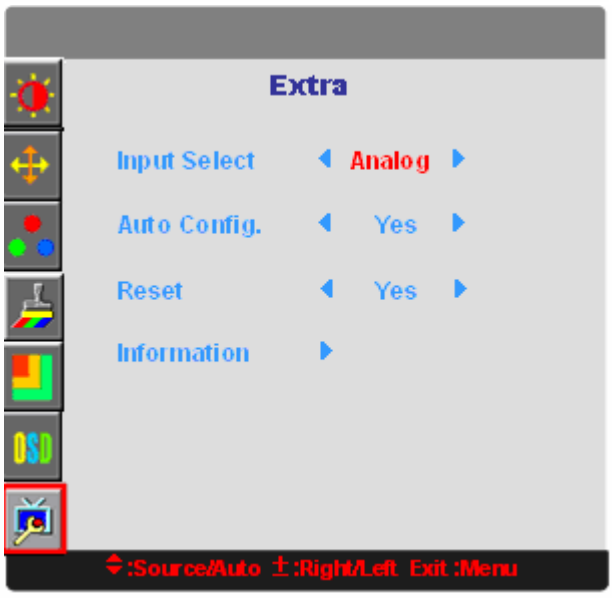












2.7.2.2 The Description for Control Function:

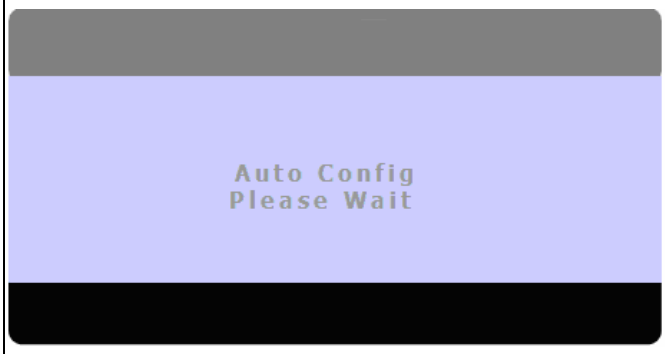
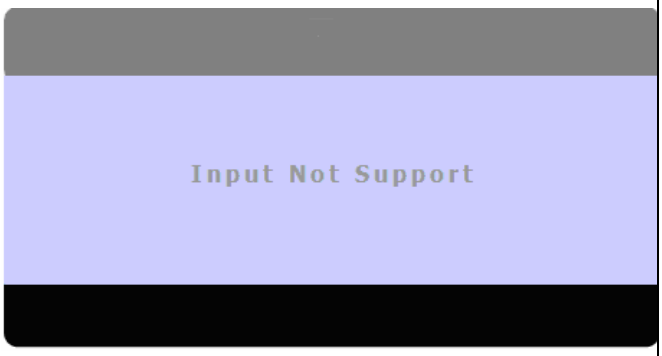
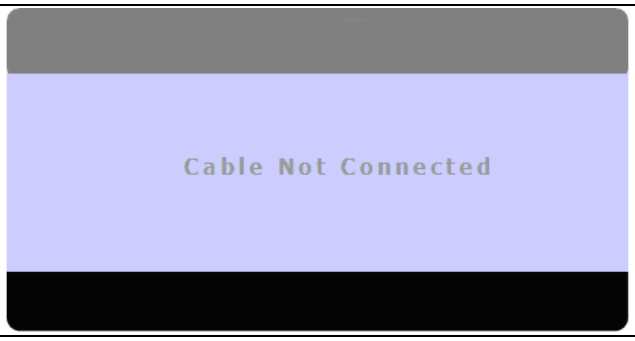
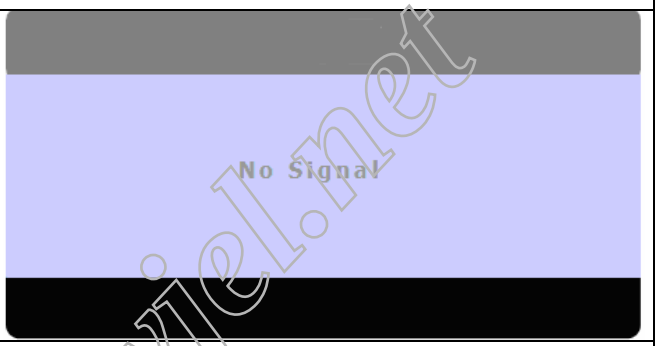
Main Menu Item	Main Menu Icon	1st Sub Menu Item	2nd Sub Menu Item	Description	Adjust Range	Reset Value
Luminance		Contrast	N/A	Contrast from Digital-register. Each step will increase/decrease value by 1	0-100	Recall Warm Contrast Value
		Brightness	N/A	Backlight Adjustment each step will increase/decrease value by 1	0-100	Recall Warm Brightness Value
		ECO	N/A	Picture Adjustment	Standard	Recall Standard Value
					Text	
					Internet	
					Game	
					Movie	
					Sports	
		Gamma	N/A	Gamma Adjustment	Gamma1	Recall Gamma1 Value
					Gamma2	
					Gamma3	
		DCR	N/A	Dynamic contrast ratio	ON/OFF	Recall OFF Value
Image Setup		Clock	N/A	Adjust picture Clock to reduce Vertical-Line noise. Each step will increase/decrease value by 1	0-100	Do Auto Config
		Focus	N/A	Adjust Picture Phase to reduce Horizontal-Line noise each step will increase/decrease value by 1	0-100	Do Auto Config
		H. Position	N/A	Adjust the horizontal position of the picture. Each step will increase/decrease value by 1	0-100	Do Auto Config
		V. Position	N/A	Adjust the vertical position of the picture. Each step will increase/decrease value by 1	0-100	Do Auto Config
Color Temp.		Warm	N/A	Recall Warm Color Temperature from EEPROM.	N/A	The Color Temperature will be set to Warm. The User R/G/B/Y/C/M value (default is 70) will not be Modified by Reset function in user mode.
		Normal	N/A	Recall Normal Color Temperature from EEPROM.	N/A	
		Cool	N/A	Recall Cool Color Temperature from EEPROM.	N/A	
		SRGB (for the model with SRGB function)	N/A	Recall Srgb Color Temperature from EEPROM.	N/A	
		User-R	N/A	Red Gain from Digital-register. Each step will increase/decrease value by 1	0-100	
		User-G	N/A	Green Gain from Digital-register. Each step will increase/decrease value by 1	0-100	
		User-B	N/A	Blue Gain from Digital-register. Each step will increase/decrease value by 1	0-100	
		User-Y	N/A	Red/Green Gain from Digital-register. Each step will increase/decrease value by 1	0-100	
		User-C	N/A	Green/Blue Gain from Digital-register.	0-100	

				Each step will increase/decrease value by 1		
		User-M	N/A	Red/Blue Gain from Digital-register. Each step will increase/decrease value by 1	0-100	
Color Boost		Full Enhance	N/A	Full Enhance	ON/OFF	Recall OFF Value
		Nature Skin	N/A	Red Gain from Digital-register.	ON/OFF	Recall OFF Value
		Green Field	N/A	Green Gain from Digital-register.	ON/OFF	Recall OFF Value
		Sky-blue	N/A	Blue Gain from Digital-register.	ON/OFF	Recall OFF Value
		Auto Detect	N/A	Auto gain for input signal	ON/OFF	Recall OFF Value
		Demo	N/A	Enhance Area in half Picture	ON/OFF	Recall OFF Value
Picture Boost		Frame Size	N/A	Adjust the Size of the Frame	14-100	Recall 50 Value
		Contrast	N/A	Contrast Adjustment for Enhance Area	0-100	Recall 50 Value
		Brightness	N/A	Brightness Adjustment for Enhance Area	0-100	Recall 50 Value
		Hue	N/A	Hue Adjustment for Enhance Area	0-100	Recall 50 Value
		Saturation	N/A	Saturation Adjustment for Enhance Area	0-100	Recall 50 Value
		Position	H. Position	Adjust the horizontal position of the Frame	0-100	Recall 0 Value
			V. Position	Adjust the vertical position of the Frame	0-100	Recall 0 Value
		Bright Frame	N/A	Enhance Area function	ON/OFF	Recall OFF Value
OSD Setup		H. Position	N/A	Adjust the horizontal position of the OSD. Each step will increase/decrease value by 5	0-100	Recall 50 Value
		V. Position	N/A	Adjust the vertical position of the OSD. Each step will increase/decrease value by 5	0-100	Recall 50 Value
		Timeout	N/A	Adjust the OSD timeout. Each step will increase/decrease value by 5	5-100	Recall 10 Value
		Language	N/A	Set OSD display language to English.（English is default setting）	Deutsch Français Español Português 简体中文 Italiano Русский	No need to recall language while press “RESET”. If customer have different request, please refer to customer request
Extra		Input Select	N/A	Select input signal from analog (D-Sub) or digital (DVI)	Analog/ Digital	N/A
		Auto Config	N/A	Auto Adjust the H/V Position, Focus and Clock of picture.	YES	N/A
				Do not execute Auto Config, return to main menu	NO	
Reset		Reset	N/A	Clear each old status of Auto-configuration and set the color temperature to Warm	YES	N/A
				Do not execute reset, return to main menu.	NO	
		Information	N/A	Show the resolution, H/V frequency and input port of current input timing.	N/A	N/A

PS: When “Color Temp.” is setting to SRGB, the “Luminance” item will become not available for all model.

2.7.2.3 OSD Message:

△ **Outline:**

<table>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Auto Config OSD</td><td>Input Not Supported OSD</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Cable Not Connected OSD</td><td>No Signal OSD</td></tr>
</table>

(LOGO color : R=255, G=255, B=255)

△ **The description for OSD Message**

Item	Description
Auto Config Please Wait	When Analog signal input, if User Press Hot-Key “Auto”, will show this message, and the monitor do the auto configuration function. This message location is at the position setting in “OSD Setup” item.
Input Not Supported	When the Hsync Frequency, Vsync Frequency or Resolution is out of the monitor support range, will show this message. This message will be flying.
Cable Not Connected	Analog-Only Model: When the video cable is not connected, will show this message. This message will be flying.
No Signal	Analog-Only Model: When the video cable is connected, but there is no active signal input, will show this message, after 9s the monitor will enter power saving. This message location is at the position setting in “OSD Setup” item.

2.8 VESA DDC2B

This monitor is equipped with VESA DDC2B according to VESA DISPLAY DATA CHANNEL STANDARD V.1.0 Rev.1 (tt.mm.199j).

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

The monitor has installed a 4.7 kΩ pull-up on the SCL-line (pin 15 of 15-pin VGA-connector).

2.8.1 Analog (D-SUB) Input for AOC (only for reference, corresponding EDID has different user demand).

	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	Xa	Xb	Xc	Xd	Xe	Xf
00:	00	FF	FF	FF	FF	FF	FF	00	41	0C	75	08	EB	D9	01	00
10:	17	0B	01	03	68	22	13	78	2ª	B3	70	A2	55	48	98	27
20:	15	50	54	BF	EE	00	31	0A	61	4C	01	01	01	01	01	01
30:	01	01	01	01	01	01	66	21	56	AA	51	00	1E	30	46	8F
40:	33	00	58	C2	10	00	00	1E	00	00	00	FF	00	33	31	32
50:	33	31	32	33	31	32	31	33	32	33	00	00	00	FC	00	50
60:	68	69	6C	69	70	73	20	31	36	30	56	57	00	00	00	FD
70:	00	37	4B	1E	3C	08	00	0A	20	20	20	20	20	20	00	B3

Note: Byte 0C, 0D, 0E, 0F means Serial No. Byte 10, 11 means Manufacture Time. Byte 7F means checksum.

2.8.2 EDID Table

Data for EDID & .inf file

1	User visible strings on .inf file	Philips 160VW (16inch WIDE LCD MONITOR 160VW9)	
2	Manufacturer ID (EDID data)	PHL	
3	Product ID, "xxxx" 4 codes	MSB(byte 12): 08	
		LSB (byte 11): 75	
4	maximum resolution	1366x768	2008.07.28 TPV confirmed
5	Horizontal Frequency Range	30~60 KHz	2008.07.28 TPV confirmed
6	Vertical Frequency Range	55~75Hz	2008.07.28 TPV confirmed
7	Monitor Name (13 characteries max.)	Philips 160VW	

3. Visual Performance

3.1 Measurement Conditions

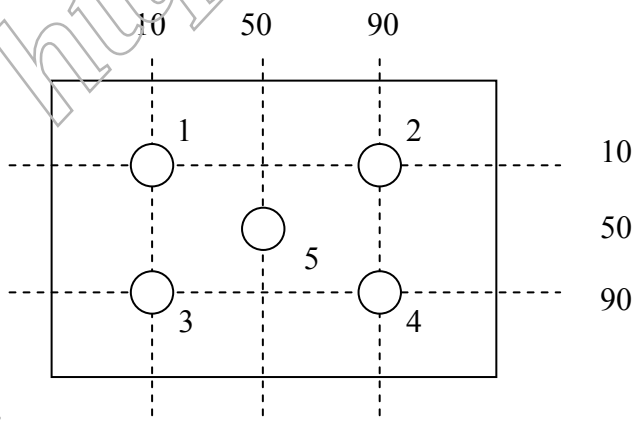
Warm up time: 30min.

Angle for measurement: 90°H and V

Distance: 50cm

Equipment: CHROMA 7120 Color analyzer

Measurement positions:



Grey scale definition:

White means digital value for RGB=255,255,255

50% gray RGB=127,127,127

Black, RGB=0, 0, 0

3.2 Picture Size and Centering

The display is centered with respect to the front bezel opening with a tolerance of 0.5mm.

3.2.1 Position Control Range

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

3.2.2 Max. Brightness

- 210cd/m^2
- Test conditions:
  - Center of display (5)
  - Video Input (RGB) =0.700V for Analog Input
  - Brightness Control is set to Max.
  - Contrast Control is set to Max.

3.2.3 Min. Brightness

< 40% of Max luminance (max luminance = max contrast + max brightness)

Test conditions:
- Center of display (5)
- Video input (RGB) = 0.700V for Analog Input
- Brightness control is set to min.
- Contrast control is set to min.

3.2.4 Contrast Ratio

The contrast ratio (CR) measured at center position (5) of the display should be 350(min) 、500 （typ）and is calculated according to the following formula.

Test conditions:
- Center of display (5)
- Brightness control is reset.
- Contrast control is set to max.

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

3.2.5 DCR：Dynamic Contrast Ratio

To improve Contrast Ratio, Reducing Black Luminance by Backlight Control and Data Stretch the Dynamic Contrast Ratio (DCR) measured at center position (5) of the display should be 1500:1 (typ.) and is calculated according to the following formula.

Test conditions:
- Ambient illumination: Dark room (＜ 1 cd/m2＝DCR is ON)
- Warm up time: 30Min
- When Auto level pass in factory Brightness Control is recall. Contrast Control is max.

Center of display DCR=Brightness of all pixels white/ Brightness of all pixels black.

3.3 Brightness Uniformity

Test conditions:
- Brightness control is reset.
- Contrast control is set to max.

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

$$\triangle Y = \left[\frac{Ymin}{Ymax} \right] \times 100\%$$

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

Please refer to other Panel SPEC about the value.

3.4 White Color Coordinates

	6500	7300	9300	SRGB
x	0.313	0.302	0.283	0.313
y	0.329	0.318	0.297	0.329
Y	>150	>150	>150	>150

The measurement position is the center of the display (5).

Brightness, Contrast set to reset.

The tolerance of the color coordinates should be less than ± 0.030.

3.5 White Color Uniformity

The deviation to the white color coordinates at the 5 position 1….4 should not exceed ± 0.030 with respect to the measurement at the position (5).

3.6 Purity

Purity is defined as the uniformity of the chromaticity of the three primary colors. The deviation of the color coordinates of the primary colors red, green, blue at the 5 positions 1…4 should not exceed =0.030 with respect to the measurement at the center position (5).

3.7 Response Time

The response time of the display depend on the panel specification.

CMO M156B1-L01 Panel: 8ms (typ. ON/OFF)

Refer to accessories one about the value, please.

The response time is measured from 90% to 10% (tr.) and from 10% to 90% (tf.) for a transition from white (100%) to black (0%) to white (100%).

3.8 Viewing angle

The viewing angle should be 90°（Typ） horizontal and 65 °（Typ）vertical for CMO M156B1-L01 Panel.

The display orientation should be in that way that the direction with gray scale inversion (if present) points to the bottom edge (normally 6 o'clock).

The deviation of the white color coordinates with a change of the viewing angle should be less than ± 0.030 with respect to the 90° direction (AT CR>=10).

4. Standard Accessories (only for reference, according to the customer's demand.)

4.1 Power Cable

Type	: Worldwide type	
Length	: 1.5m + 10cm/-0cm	
Color	: Black	
Connectors	: Monitor-side	: IEC 320 female (straight plug)
	: Mains-side	: IEC 320 male (straight plug)

4.2 VGA Cable (D-SUB)

Length	: 1.5m + 10cm/-0cm straight plug	
Color	: Black	
Connectors	: Monitor-side	: 15-pin D-SUB
	: PC side	: 15-pin D-SUB

4.3 Audio Cable

Length	1800+/-30mm
Color	Black
Connectors	3.5-mini jack with color on the both end heads.

4.4 Instruction Manual

Languages	: 8 Language selected (English, Chinese Simplify) (Only for reference, According to the customer's demand!)
Colors	: Black on white only
Size	: DIN A5
Paper	: Recycled paper (inside and outside)
Packed	: Brown or clear paper envelope (PE bag)

4.5 Guarantee Card

Packed	: Together with instruction manual

4.6 Diskette

Diskette with software for easy adjustment of the LCD-monitor by the user is to be free of viruses, no damage to user's Computer system.

- Program for DOS text mode (720 x 400)
- Easy to install

5. Reliability

5.1 MTBF

More than 50,000h calculated according to MIL HDBK 217E at 25℃.

A detailed calculation is required from the vendor.

The demonstrated MTBF will be more than 70,000h. The vendor has to perform appropriate tests and will provide a detailed report.

5.2 Lifetime of Backlight Tubes

After 20,000h the brightness is still more than 50% of the original brightness.

6. Safety Test

Following tests are performed by 100% of all units.

6.1 Production Line Test

A 100% production line test has to be performed according to EN60950 requirements.

6.2 Test for Protective Earthing

6.2.1 Electric Strength Test (EN60950)

Between primary circuit (L N) and protective earth (PE)

Voltage: 1500V AC or 2200V DC Time: min. 1 second

7. Approvals

7.1 Safety

- UL 60950
- Energy Star
- CE-mark (optional)

7.2 EMI

The monitor is designed to reach following qpprovals

- EN 55022 Class B
- FCC class B Part 15

7.2.1 EMC

The model is designed to reach following approvals:

- EN 55022 Class B and E 55024
- FCC Class B part 15

Test procedures	Standards	Requirements Frequency range	Remarks
Conducted emission	EN55022 Class B FCC Part15，Class B	150KHZ～30MHZ	
Radiation emission	EN55022 Class B FCC Part 15，Class B	30MHZ~1GHZ 30MHZ~1GHZ	30MHZ~2GHZ If clock>108MHZ
Electrostatic （ESD）	EN55024 (IEC61000-4-2)	-No functional disturbance： 8kv air discharge	
Immunity to RF field strength	EN55024 (IEC61000-4-3)	80MHZ~1GHZ	3V/m modulation
Electrical fast transient	EN55024 (IEC61000-4-4)	-NO functional disturbance： 1kv power cord	
Surge	EN55024 (IEC61000-4-5)		
Cs	EN55024 (IEC61000-4-6)		
Power frequence magnetic-immunity	EN55024 (IEC61000-4-8)		
Voltage dips/Interruptions	EN55024 (IEC61000-4-11)		
Harmonics current Emission	IEC61000-3-2		
Voltage Fluctuation &Flicker	IEC61000-3-3		

8. Environmental

8.1 Environmental Conditions (Climatic)

Operation (according to IEC 721 / EN 60721 Class 3K3):

Temperature	0°C ~ + 40°C
Humidity	10% ~ 85%
Max. Dew Point Temperature	+27°C
Max. Abs. Air Humidity	25 g/m^3
Max. Change of Temperature	0.5°C/min
Height	3000m
Air pressure	700~1060 mbar (70~10Kpa)
Dewing	Not allowed

Storage (acc. to IEC 721 / EN 60721 Class 1K2): (packed or unpacked for a long time)

Temperature	-20°C ~ + 60°C
Relative Humidity	5% ~ 85%
Absolute Air Humidity	1 ~ 25 g/m^3
Max. Change of Temperature	0.5°C/min. (max. 10°C/30min.)
Air pressure	700~1060 mbar (70~106Kpa)
Radiation Solar heat	700 W/m^2

Transport (according to IEC 721 / EN 60721 Class 2K2): (packed for a short time*)

Temperature	-20°C ~ + 60°C
Relative Humidity	15% ~ 98%
Absolute Air Humidity	1 ~ 32 g/m^3
Max. Change of Temperature Air/Air	-25°C/+25°C
Air Pressure	700mbar (70Kpa) max not relevant
Radiation Solar heat	700 W/m^2
Dewing	Allowed

* Test condition: 16h with –25°C and 72h with +70°C (Ambient tem. + sunshine)

8.2 Environmental Condition (mechanical)

8.2.1 Operating (according to IEC 721/EN60721 Class (3M2))

	Test Procedure IEC 68/EN 60068		
Vibration (random vibration) IEC 68-2-64 EN 60068-2-64	Freq. range	Hz	10~30 30~200 200~500
	Change	db/oct	+12 -6
	Spectral acceleration density	m^2/s^3	0.75
	Accel. RMS	m/s^2	4.3
	Axis	-	3
	Duration/Axis	Minutes	30
Shock IEC 68-2-27 EN 60068-2-27	Pulse		Half-sine
	Acceleration	m/s^2	50
	Duration	ms	6
	Number		50 per relevant direction and function

8.2.2 Storage and Transport (according to IEC 721/EN60721 Class 2Ms)

	Test Procedure IEC 68/EN 60068		
Vibration (random vibration) IEC 68-2-64 EN 60068-2-64	Freq. range	Hz	5~10 10~100 100~500
	Change	db/oct	+12 -6
	Spectral	m^2/s^3	0.75
	Accel. RMS	m/s^2	11.4
	Axis	-	3
	Duration/Axis	Minutes	30
Shock IEC 68-2-29 EN 60068-2-29	Pulse		Half-sine
	Acceleration	m/s^2	250
	Duration	ms	6
	Number		100 shocks in all directions
Free fall ISO 2248 EN 22248	Weight	kg	0~9.1 9.1~18.2 18.2~27.2
	Fall height	m	0.9 0.76 0.61
	Direction and number		1 time on every surface, edge and border
	Underground		concrete
Toppling ISO 8768 EN 28768	Number		Over every edge one time
Bounce	Time		15 min in each transport direction. Or total 45 min. See NSTA Proc.

9. Quality

9.1. Display defect Requirements

Max. 5 red, green or blue bright dots (sub-pixels), max. 3 green dots, max. 1 joined bright dots, min. distance between 2 bright dots: 10 mm. Bright dots are tested with full screen black pattern (R.G.B. = 0, 0, 0)

Max. 5 black dots. Max. 2 joined (2 adjacent) black dots, no defect with 3 adjacent black dots. Min. distance between 2 black dots: 10mm. Black dots are tested with full screen white (R.G.B. = 255,255,255)/ red (R.G.B. = 255, 0, 0)/green (R.G.B. = 0, 255, 0)/blue (R.G.B. = 0, 0,255) pattern.

Total amount of Dot Defects are 5 Max. (Including bright and dark dot defects)

10. Audio Electrical Performance(the item 10 is applicable for LM-720A)

10.1. Standard Testing Conditions:

10.1.1. Test Equipment: Audio Analyzer test equipment

10.1.2. Conditions of Input Signal:

1). Signal Frequency: 1 KHz

2). Input Signal (max): 1Vms

3). Ambient Temperature: 25℃±5℃

10.1.3. Test Distance: 50cm from monitor screen and at the center of left and right speaker

10.1.4. RL (Impedance of load): Refer to the RL in the specification of amplifier IC (80ohm).

10.2. Amplifier Characteristic : Refer to “Specifications of Speaker”

10.2.1. Output: Normal 1.0~1.1 WATT Per speaker

10.2.2. Impedance: 8ohm ± 1.2ohm at 1V (1000 Hz)

Accessories One:

THE COMPARISON FORM OF VARIOUS PANELS' PARAMETER

Parameter / Panel		Luminance of white (Units:Cd/m2)		Contrast ratio		Viewing angle (Units :degree)				Response Time (Units: ms)	
		Typical	Min	Typical	Min	H-left (Typ)	H-Right (Typ)	V-Up (Typ)	V-Down (Typ)	Typical	Max
CMO M156B1-L01	750GLM56B1112N	250	210	500	350	45	45	45	20	8	

Remark: Refer to other Panel SPEC about the parameter, please

TELEVISION/MONITOR SAFFTY GUIDELINES FOR THE PROFESSIONAL SERVICE TECHNICIAN

Safety Checks
After the original service problem has been corrected,a complete safety check should be made. Be sure to check over the entire set, not just the areas where you have worked. Some previous servicer may have left an unsafe condition,which could be unknowingly passed on to your customer. Be sure to check all of the following:

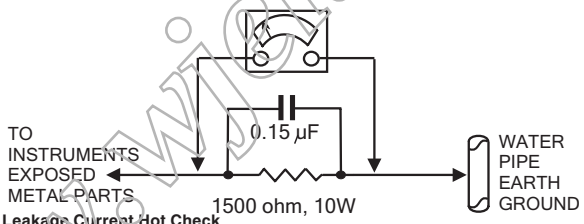
Fire and Shock Hazard
1. Be sure all components are positioned in such a way as to avoid the possibility of adjacent component shorts. This is especially important on those chassis which are transported to and from the service shop.
2. Never release a repaired unit unless all protective devices such as insulators, barries, covers, strain reliefs, and other hardware have been installed in accordance with the original design.
3. Soldering and wiring must be inspected to locate possible cold solder joints,solder splashes,sharp solder points, frayed leads, pinched leads, or damaged insulation (including the ac cord).Be certain to remove loose solder balls and all other loose foreign particles.
4. Check across-the-line components and other components for physical evidence of damage or deterioration and replace if necessary. Follow original layout,lead length, and dress.
5. No lead or component should touch a receiving tube or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces or edges must be avoided.
6. Critical components having special safety characteristics are identified with ans by the Ref. No. in the parts list and enclosed within a broken line * (where several critical components are grouped in one area) along with the safety symbols on the schematic diagrams and/or exploded views.
7. When servicing any unit, always use a separate isolation transformer for the chassis Failure to use a separate isolation transformer may expose you to possible shock hazard, and may cause damage to servicing instruments.
8. Many electronic products use a polarized ac line cord (one wide pin on the plug.) Defeating this safety feature may create a potential hazard to the service and the user. Extension cords which do not incorporate the polarizing feature should never be used.
9. After reassembly of the unit, always perform an leakage test or resistance test from the line cord to all exposed metal parts of the cabinet. Also check all metal control shafts(with knobs removed), antenna terminals, handles, screws, etc. to be sure the unit may be safety operated without danger of electrical shock.

* Broken line

Implosion
1. All picture tubes used in current model receivers are equipped with an integral implosion system. Care should always be used, and safety glasses worn,whenever handling any picture tube. Avoid scratching or otherwise damaging the picture tube during installation.
2. Use only replacement tubes specified by the manufacturer.

X-radiation
1. Be sure procedures and instructions to all your service personnel cover the subject of X-radiation. Potential sources of X-rays in TV receivers are the picture tube and the high voltage circuits. The basic precaution which must be exercised is to keep the high voltage at the factory recommended level.
2. To avoid possible exposure to X-radiation and electrical shock, only the manufacturer's specified anode connectors must be used.
3. It is essential that the service technician has an accurate HV meter available at all times. The calibration of this meter should be checked periodically against a reference standard.
4. When the HV circuitry is operating properly there is no possibility of an x-radiation problem. High voltage should always be kept at the manufacturer's rated value-no higher - for optimum performance. Every time a color set is serviced, the brightness should he run up and down while monitoring the HV with a meter to be certain that the HV is regulated correctly and does not exceed the specified value. We suggest that you and your technicians review test procedures so that HV and HV regulation are always checked as a standard servicing procedure, and the reason for this prudent routine is clearly understood by everyone. It is important to use an accurate and reliable HV meter. It is recommended that the HV recorded on each customer's invoice, which will demonstrate a proper concern for the customer's safety.
5. When troubleshooting and making test measurements in a receiver with a problem of excessive high voltage, reduce the line voltage by means of a Variac to bring the HV into acceptable limits while troubleshooting. Do not operate the chassis longer than necessary to locate the cause of the excessive HV.
6. New picture tubes are specifically designed to withstand higher operathng voltages without creating undesirable X-radiation. It is strongly recommended that any shop test fixture which is to be used with the new higher voltage chassis be equipped with one of the new type tubes designed for this service. Addition of a permanently connected HV meter to the shop test fixture is advisable. The CRT types used in these new sets should never be replaced with any other types, as this may result in excessive X-radiation.
7. It is essential to use the specified picture tube to avoid a possible X-diation problem.
8. Most TV receivers contain some type of emergency "Hold Down" circuit to prevent HV from rising to excessive levels in the presence of a failure mode. These various circuits should be understood by all technicians servicing them, especially since many hold down circuits are inoperative as long as the receiver performs normally.

Leakage Current Cold Check
1. Unplug the ac line cord and connect a jumper between the two prongs of the plug.
2. Turn on the power switch.
3. Measure the resistance value between the jumpered ac plug and all exposed cabinet parts of the receiver, such as screw heads, antennas, and control shafts. When the exposed metallic part has a return path to the chassis, the reading should be between 1 megohm and 5.2 megohms. When the exposed metal does not have a return path to the chassis, the reading must be infinity. Remove the jumper from the ac line cord.



Leakage Current Hot Check
1. Do not use an isolation transformer for this test. Plug the completely reassembled receiver directly into the ac outlet.
2. Connect a 1.5k, 10w resistor paralleled by a 0.15uf. capacitor between each exposed metallic cabinet part and a good earth ground such as a water pipe, as shown above.
3. Use an ac voltmeter with at least 5000 ohms volt sensitivity to measure the potential across the resistor.
4. The potential at any point should not exceed 0.75 volts. A leakage current tester may be used to make this test; leakage current must not exceed 0.5 milliamps. If a measurement is outside of the specified limits, there is a possibility of shock hazard. The receiver should be repaired and rechecked before returning it to the customer.
5. Repeat the above procedure with the ac plug reversed.(Note: An ac adapter is necessary when a polarized plug is used. Do not defeat the polarizing feature of the plug.)

Picture Tube Replacement
The primary source of X-radiation in this television receiver is the picture tube. The picture tube utilized in this chassis is specially constructed to limit X-radiation emissions. For continued X-radiation protection, the replacement tube must be the same type as the original, including suffix letter, or a Philips approved type.

Parts Replacement
Many electrical and mechanical parts in Philips television sets have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. The use of a substitute part which does not have the same safety characteristics as the Philips recommended replacement part shown in this service manual may create shock, fire, or other hazards

WARNING : Before removing the CRT anode cap, turn the unit **OFF** and short the HIGH VOLTAGE to the CRT DAG ground.
SERVICE NOTE : The CRT DAG is not at chassis ground.