

Service Menu for the EN7410

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Reversion	Date	Remark
1A	8/23/2004	1 ST Released.

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WARNING

This service information is designed for experienced repair technicians only and is not designed for user by the general public

It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.

Products powered by electricity should be serviced or repaired only by experienced professional technicians.

Any attempt to service or repair the product or products dealt within this service information by anyone else could result in serious injury or death.

SAFETY PRECAUTIONS

1. CAUTION:

No modification of any circuit should be attempted. Service worker should only be performed after going through to familiar with all of the following safety checks and servicing guidelines.

2. SAFETY CHECK

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

3. POWER SUPPLY REQUIREMENTS

The internal power converter with the attached AC power cord is necessary for the LCD monitor. Any attempt to replace another power converter could result in serious of problems on the display.

4. LEAKAGE CURRENT HOT CHECK

4-1 Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during this check.

4-2 Connect a 1500 ohm, 10 watt resistor, paralleled by a 0.15uF capacitor between each metallic part and a good earth ground.

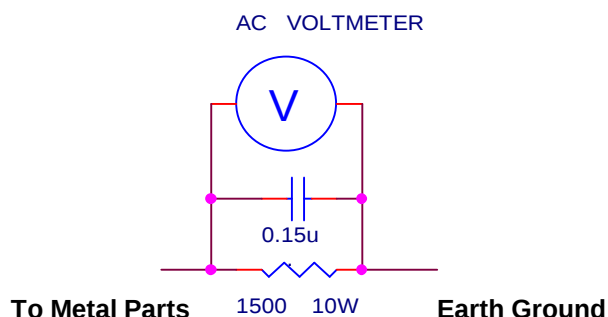
4-3 Use an AC voltmeter with 1000 ohm / volt or more sensitivity and measure the AC voltage across the combination 1500 ohm resistor and 0.15uF capacitor.

4-4 Move the resistor connection to each exposed metallic part and measure the voltage.

4-5 Reverse the polarity of the AC plug in the AC outlet and repeat the above measurement.

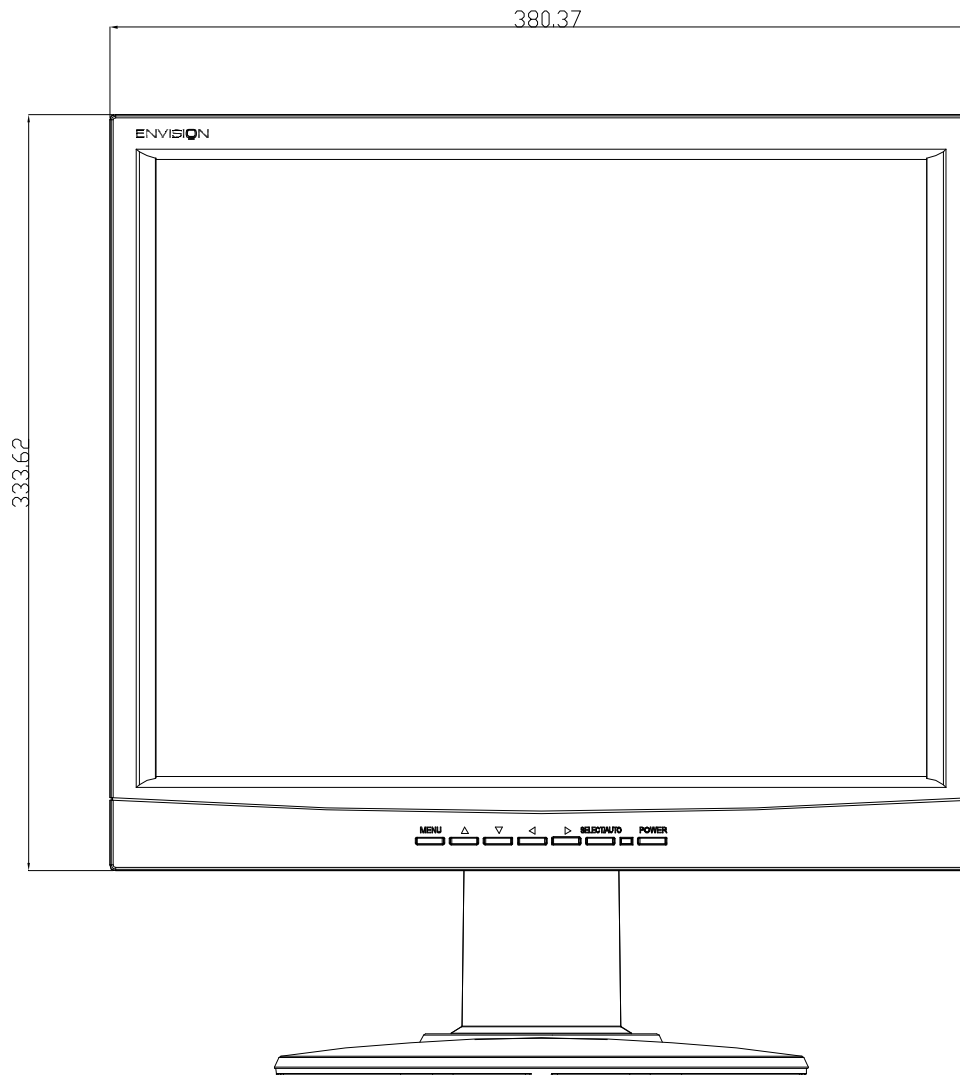
4-6 Voltage measured must not exceed 1.5 volt RMS, from any exposed metallic part to the ground.

A leakage current tester may be used in the above hot check, in which case any circuit measured must not exceed 1 milliamp. In the case of a measurement exceeding the 1 milliamp value, the rework is required to eliminate the chance of a shock hazard.

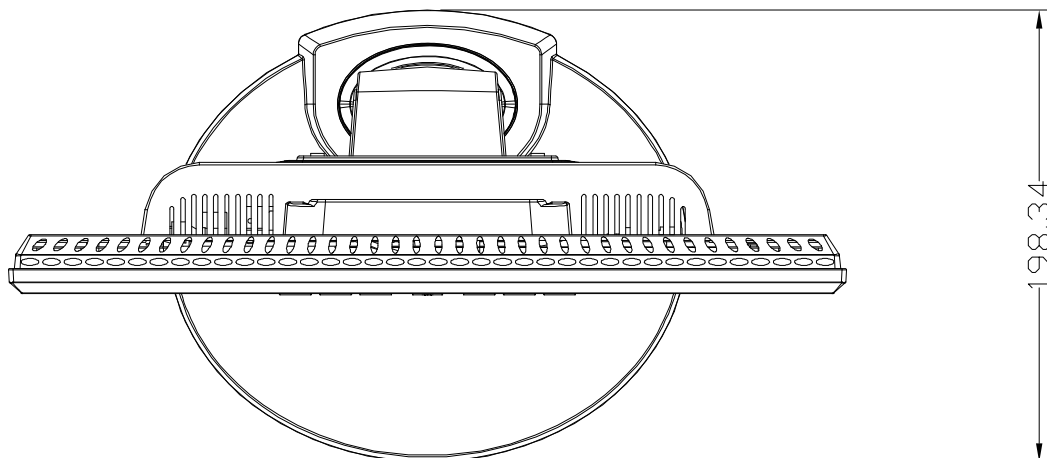


1. DIMENSIONS (Unit:mm)

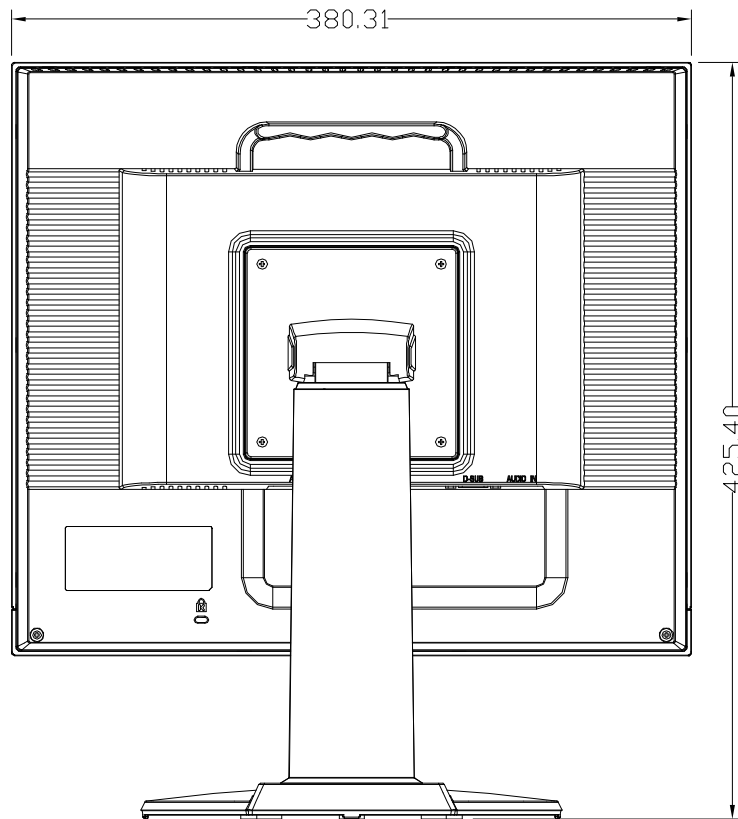
1.1 Front View



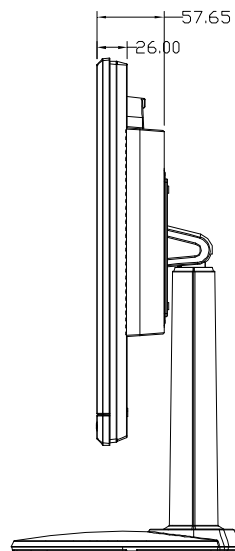
1.2 Top View



1.3 Rear View



1.4 Side View



2. GENERAL INFORMATION

2.1. OUTLINE

This monitor is 17" multi-scan color LCD display with the following features. OSD (on screen display) control allows easy user adjustment . Power saving function, which helps saving energy, is also one of the highlights of this model.

2.2. FEATURES

2.2.1 Power Saving

Built in Power Saving function based on VESA-DMPS standard. Power energy shall be saved by controlling the circuit in accordance with power save signal from computer.

2.2.2 OSD (on screen display) function

OSD (3 Languages) function is excellent and new man-machine interface.

Anyone is able to set up the picture as the like through OSD menu.

2.2.3 Self Test function

Self-Testing picture comes out by pushing any key in the case of no-connection with computer or power saving operation. This function shows if monitor is alive or not and can be used for self aging test.

2.2.4 Ergonomic design

Low emission design to meet MPR II and Energy Star.

2.2.5 Multi scan with digital technology

8 bits micro controller controls the circuit operation to meet with wide range signal of

Fh=31~83 kHz and Fv= 56~75 Hz. So VGA720x400, VGA640x480, SVGA800x60, XGA 1024x768 and SXGA 1280x1024.

2.2.6 Factory preset

The product has 25 memory modes in total. 16 modes are preset and 9 modes are user definable.

2.2.7 Fine dot pitch

LCD panel with a fine dot pitch (Horizontal: 0.264 mm / Vertical: 0.264 mm)

2.2.8 Superior display performance

High contrast Ratio: 450 : 1 (typ.) and 300:1 (min.)

High brightness : 300 cd / m² (typ.) and 240 cd/m²

Wide view angle : 140 / 120 degrees (H/V)

2.2.9 Special function

VESA DDC2B (Display Data Channel) Compatible

3. SPECIFICATION

3.1. Outline

3.1.1 Front Indication: MENU , UP, Down, POWER SW, LED (Green/Amber) LEFT, RIGHT, SELECT/AUTO are located on the front panel.

3.1.2 VGA D-SUB and AC inlet are located on the back side cabinet.

3.1.3 OSD menu includes the following function. CONTRAST, BRIGHTNESS, H.POSITION, V.POSITION COLOR-TEMPERATURE, CLOCK, PHASE, LANGUAGE, POWER-ON-RECALL, OSD POSITION AND INFORMATION ON/OFF.

3.1.4 CONTRAST and BRIGHTNESS can be directly controlled with UP / Down key.

3.2. MECHANICAL SPECIFICATIONS

3.2.1 Dimension Height : 381mm (15")
Width : 426 mm (16.8")
Depth : 199 mm (7.8")

3.2.2 Net Weight :4.0 kg (8.8 lbs)

3.2.3 Maximum Viewable Area: Diagonal 431.8mm(17")

3.3. PANEL SPECIFICATIONS

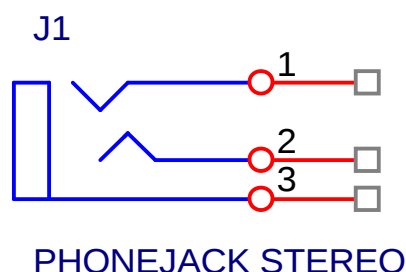
Manufacturer	Sharp
Manufacturing country	Japan
ID no	LQ170E1LG11
Resolution	1280 x 1024
Display surface	Anti-glare
Pixel pitch in mm	0.264 x 0.264
Chipset	Realtek RTD2023
Number of colors	6 bit data + FRC
Inverter/Power board	FSP
Backlight	4 CCFL

-

3.4. CONNECTORS

3.4.1 AC inlet : CEE22 typed connector

3.4.2 Audio : Line-in receptacle (optional)



3.4.3 Attached video signal receptacle

15 pin standard D-Sub connector

The PIN assignment of the 15 pin mini D-SUB connector / cable is as follows:

PIN	Signal
1	Red
2	Green
3	Blue
4	No Pin
5	Ground
6	Ground Red
7	Ground Green
8	Ground Blue
9	+5 V for DDC
10	Ground
11	No Pin
12	SDA (DDC Data)
13	H – Sync
14	V – Sync
15	SCL (DDC Clock)

3.5. ELECTRICAL SPECIFICATIONS

3.5.1 Standard conditions

Display area (HxV)	338 x 270 mm
Video signal level	0.7 Vpp
Contrast	Max.
Brightness	Max.
Ambient	25 +/- 5 C degrees
Input voltage	AC 220,50Hz
Warming up time	More than 30
Display mode	1280 x 1024

3.5.2 POWER

3.5.2.1 Power supply

AC-DC adapter

Input voltage	100 - 240 V
Input current	max. 2 Arms
Frequency range	50Hz +/- 3Hz, 60Hz +/- 3Hz
Inrush current	Shall be less than the ratings of critical components (including fuse, rectifiers and surge limiting device) for all conditions of line in voltage.
Maximum power consumption:	50 Watts
Power Line Surge	No loss of information or defect with a minimum of 1 half wave missing per second

3.5.2.2 Power Management

The Power Management System complies to Energy Star standards.

MODE	H-SYNC	V-SYNC	COLOR OF POWER LED	POWER CONSUMPTION	RECOVERY TIME
On	Active	Active	Green	< 40 Watts	-
Off	Inactive	Inactive	Amber	< 1.0 Watts	< 5 seconds

Remark: In case of "no signal" Power LED must be amber.

At first power on w/o signal LED will be green + message on screen.

3.5.3 Signal level and input impedance

3.5.3.1 Video Signal level

This LCD display is adjusted at the factory using 0,7 Vp-p Video signal.

3.5.3.2 Sync Signal level

H/V Separate, composite sync ,TTL level

3.5.3.3 Input impedance

Video input : 75 ohms

Sync input : > 1 k ohms

3.5.4 Display Area

Display area : 338 x 270 mm

3.5.5 Preset Timings

The product has 25memory modes in total. 16 modes are preset-and 9 modes are user definable.

MODE NO.	1	2	3	4
RESOLUTION	720 x 400	640 x 480	640x480	640 x 480
Dot clock(MHz)	28.321	25.175	30.240	31.500
f h	31.469kHz	31.469kHz	35.0kHz	37.861kHz
A (us)	31.78(900dots)	31.778 (800 dots)	28.571(864 dots)	26.413 (832 dots)
B (us)	3.813(108dots)	3.813 (96 dots)	2.116 (64 dots)	1.270(40 dots)
C (us)	1.907(54dots)	1.907 (48 dots)	3.175 (96 dots)	4.064(128 dots)
D (us)	25.42(720dots)	25.422 (640 dots)	21.164 (640 dots)	20.317(640 dots)
E (us)	0.636(18dots)	0.636 (16 dots)	2.116 (64 dots)	0.762(24 dots)
f v	70Hz(70.087)	60Hz (59.940)	66.7 HZ (66.667)	72.809Hz
O (ms)	14.27(449 lines)	16.683 (525 lines)	15.000 (525 lines)	13.735(520 lines)
P (ms)	0.064(2 lines)	0.064 (2 lines)	0.086 (3 lines)	0.079(3 lines)
Q (ms)	1.112(35 lines)	1.049 (33 lines)	1.114 (39 lines)	0.739(28 lines)
R (ms)	12.71(400 lines)	15.253 (480 lines)	13.714 (480 lines)	12.678(480 lines)
S (ms)	0.384(12 lines)	0.317 (10 lines)	0.086 (3 lines)	0.237(9 lines)
SYNC. H/V	-/+	- / -	+ / +	- / -
POLARITY			Or - / -	
SEP . SYNC	Y	Y	Y	Y

MODE NO.	5	6	7	8
RESOLUTION	640 x 480	800 x 600	800 x 600	800 x 600
Dot clock(MHz)	31.500	36.000	40.000	49.500
f h	37.500kHz	35.16kHz	37.879kHz	46.875kHz
A (us)	26.667(840 dots)	28.44(1024 dots)	26.40 (1056 dots)	21.333 (1056dots)
B (us)	2.032 (64 dots)	2.00(72 dots)	3.200 (128 dots)	1.616 (80 dots)
C (us)	3.810 (120 dots)	3.56(128 dots)	2.200 (88 dots)	3.232 (160 dots)
D (us)	20.317 (640 dots)	22.22(800 dots)	20.00 (800 dots)	16.162 (800 dots)
E (us)	0.508 (16 dots)	0.67(24 dots)	1.000 (40 dots)	0.323 (16 dots)
f v	75Hz (75)	56.25	60Hz (60.316)	75Hz (75.000)
O (ms)	13.333 (500 lines)	17.78(625 lines)	16.58 (628 lines)	13.333 (625lines)
P (ms)	0.080 (3 lines)	0.06(2 lines)	0.106 (4 lines)	0.064 (3 lines)
Q (ms)	0.427 (16 lines)	0.63(22 lines)	0.607 (23 lines)	0.448 (21 lines)
R (ms)	12.80 (480 lines)	17.07(600 lines)	15.84 (600 lines)	12.80 (600lines)
S (ms)	0.027 (1 line)	0.03(1 line)	0.026 (1 line)	0.021 (1 line)
SYNC. H/V	- / -	+ / +	+ / +	+ / +
POLARITY				
SEP . SYNC	Y	Y	Y	Y

MODE NO.	9	10	11	12
RESOLUTION	800 x 600	832 x 624	1024 x 768	1024 x 768
Dot clock(MHz)	50.000	57.283	65.000	75.000
f h	48.077kHz	49.72kHz	48.363kHz	56.48kHz
A (us)	20.80 (1040dots)	20.11(1152 dots)	20.677(1344 dots)	17.71(1328 dots)
B (us)	2.400 (120 dots)	1.12(64 dots)	2.092(136 dots)	1.81(136 dots)
C (us)	1.280 (64)	3.91(224 dots)	2.462(160 dots)	1.92(144 dots)
D (us)	16.00 (800 dots)	14.52(832 dots)	15.754(1024 dots)	13.65(1024 dots)
E (us)	1.120 (56 dots)	0.56(32 dots)	0.369(24 dots)	0.32(24 dots)
f v	72Hz (72.188)	74.55Hz	60.004Hz	70.07Hz

O (ms)	13.85 (666 lines)	13.41(667 lines)	16.666(806 lines)	14.27(806 lines)
P (ms)	0.125 (6 lines)	0.06(3 lines)	0.124(6 lines)	0.11(6 lines)
Q (ms)	0.478 (23 lines)	0.78(39 lines)	0.600(29 lines)	0.51(29 lines)
R (ms)	12.48 (600 lines)	12.55 (624 lines)	15.880(768 lines)	13.60(768 lines)
S (ms)	0.770 (37 line)	0.02(1 line)	0.062(3 lines)	0.05(3 lines)
SYNC. H/V	+ / +	+/+	-/-	-/-
POLARITY				
SEP . SYNC	Y	Y	Y	Y

MODE NO.	13	14	15	16
RESOLUTION	1024 x 768	1280 x 1024	1280 x 1024	1152 x 864
Dot clock(MHz)	78.750	108.000	135	108.00
f h	60.02kHz	63.981kHz	79.976KHz	67.5 KHz
A (us)	16.66(1312 dots)	15.630 (1688 dots)	12.504 (1688 dots)	14.815(1600 dots)
B (us)	1.22 (96 dots)	1.037 (112 dots)	1.067 (144 dots)	1.185(128 dots)
C (us)	2.23 (176 dots)	2.296 (248 dots)	1.837 (248 dots)	2.370(256 dots)
D (us)	13.00 (1024 dots)	11.852 (1280 dots)	9.481 (1280dots)	10.667(1152 dots)
E (us)	0.20 (16 dots)	0.444 (48 dots)	0.119 (16 dots)	0.593(64 dots)
f v	75.03Hz	60.020Hz	75.025 Hz	75.06 Hz
O (ms)	13.33 (800 lines)	16.661 (1066 lines)	13.329 (1066 lines)	13.333(900 lines)
P (ms)	0.05 (3 lines)	0.047 (3 lines)	0.038 (3 lines)	0.044(3 lines)
Q (ms)	0.47 (28 lines)	0.594 (38 lines)	0.475 (38 lines)	0.474(32 lines)
R (ms)	12.80 (768 lines)	16.005 (1024 lines)	12.804(1024 lines)	12.800(864 lines)
S (ms)	0.02 (1 lines)	0.016 (1 line)	0.013 (1 lines)	0.015(1 lines)
SYNC. H/V	-/-	+/+	+/+	+/+
POLARITY				
SEP . SYNC	Y	Y	Y	Y

A	: H-Total	O	: V-Total
B	: H- Sync width	P	: V- Sync width
C	: H- Back porch	Q	: V- Back porch
D	: H- Video width	R	: V- Video width
E	: H- Front porch	S	: V- Front porch

3.5.6 General performance

3.5.6.1 Maximum pixel clock

135 MHz

3.5.6.2 Maximum luminance

Test conditions: 100 % all white pattern, brightness and contrast set to maximum.

typical: 300 cd/m²

min.: 240 cd/m²

3.5.6.3 Brightness variation

Value	75 % Variation (C / A x 100)
Conditions	Display image: Full white Brightness : Maximum Contrast : Maximum A: Luminance at center

3.5.6.4 Contrast ratio (CR)

Value	CR= B / A
Conditions	Contrast : Maximum Brightness : max B: Full white pattern A: Full black pattern

3.6. ENVIRONMENTS

The environmental conditions are in accordance to IEC 721

Operating:

Temperature: 5°C - +40° C

Humidity: 20% - 80% non-condensing and less than 39°C

Height: 3000 m

Air pressure: 700 - 1060 mbar

Storage (unpacked)

Temperature: -20°C - +60° C

Humidity: 10% - 85% non-condensing and less than 39°C

Height:	3000 m
Air pressure:	700 - 1060 mbar
Transport (packed)	
Temperature:	-20°C - +60° C
Humidity:	10% - 85% non-condensing and less than 39°C
Height:	12000 m

3.7. REGULATORY STANDARDS

3.7.1 Safety standards

This monitor applies to various safety & EMI standards May refer to the logo label

3.7.2 EMC standards

FCC class B part 15 (USA)

3.8. OTHERS

UL, TUV/GS Certificate, CE Report,CSA

3.9. POWER CORD

- q** North America NEMA 5-15
- q** Detachable type
- q** Length: 6ft
- q** Color: Black
- q** Non shielded type

3.10. SIGNAL CABLE

Signal cable with Mini D-Sub 15P connectors. Length : 1.8 meter.

3.11. RELIABILITY

> 70000hrs (demonstrated MTBF)

4. THEORY OF OPERATION

This section describes the function of the LCD monitor per functional block. This model includes MB board(including audio board function inside), inverter board, adapter and button board.

4.1 MB BOARD

The MB board is a two-layer, single-landed design with ground and ground planes provided.

The VGA cable is a signal cable that contains video signal, sync signal and DDC signal from PC VGA adapter. This system board consists of 3 functional areas : flat panel controller, Micro controller and audio controller.

4.1.1 Flat panel controller..... RTD2023 (U6)

The heart of the system board is RTD2023. The RTD2023 is a graphics processing IC for LCD monitor. It provides some control functions required for LCD panel. On-chip functions include a high-speed triple-ADC , PLL, high sampling engine and OSD controller.

a) Clock Generation :

Crystal Input Clock (XTALI and XTAL). This is the input pair to an internal crystal oscillator and corresponding logic. Scalar 24.576 MHz and MCU 14.318MHz crystal are recommended.

b) Hardware Reset

Hardware Reset signal is generated by RTD2023 self. It is built-in power reset circuit and send LOW reset signal(U6,P56)) to MCU(P7).

c) Analog to Digital Converter

The RTD2023 chip has three ADC's (analog-to-digital converters), one for each color (red, green and blue) . The analog RGB signals are connected to RTD2023 as described below

Pin Name	Pin Number
Red +	30
Red -	31
Green +	34
Green -	35
Blue +	30
Blue -	31
SOGIN	33

d) OSD :

The RTD2023 has a fully programmable, high-quality OSD controller. The on-chip 11.25K static RAM stores the cell map and the cell definitions.

e) Panel Power Sequencing (PANEL_PW12, VRMT) (Pin 16~17)

The MYSON MTV312 has two dedicated outputs PANEL_PW12 and VRMT (Pin16 and Pin17) to control LCD power sequencing once data and control signals are stable.

f) Inverter Brightness control (VBRI) (Pin 113)

The RTD2023 has one PWM output VBRI (Pin113) to control Inverter Brightness Range.

g) Panel LVDS interface (Pin 73~82,Pin85~94)

The RTD2023 driver interface is highly programmable. It supports LVDS port for panel.

4.1.2 Micro controller.....MTV312 (I1)

The MYSON MTV312 microcontroller serves as the system microcontroller. That is , it programs the RTD2023 and manages other devices in the system such as the keypad, the backlight, LED and audio general purpose input/output pins.

Pin number	Pin name	Pin function
21	P1.3	SDIO2
22	P1.4	SDIO3
23	P1.5	RTD_SDO/SDI
24	P1.6	RTD_SCLK
25	P1.7	RTD_SCSB
16	P6.2/AD2	PANEL_PW12
29	P3.0/RXD/HSC_L	DDC_SCL/TXD(DEBUG)
28	P3.1/TXD/HSDA	DDC_SDA/RXD(Debug)
19	P3.2/INT0	NC
13	P3.4/T0/ISDA	IICSDA
14	P3.5/T1/ISCL	IIC_SCL
1	P5.2/DA2	PWR(Soft power)
42	P5.3/DA3	UP
41	P5.4/DA4	DOWN
40	P5.5/DA5	RIGHT
26	P6.1/AD1	LED_G
9	P6.3/AD3	MUTE(OPTIONAL)
27	P6.0/AD0	LED_R
2	DA1/P5.0	SEL
3	DA0/P5.0	MENU
34	DA6/P5.6	LEFT

4.1.3 Audio controller TDA7496L (U9)

(optional)

The TDA7496L is a stereo 2W+2W class AB power amplifier. Features of the TDA7496L include linear volume(pin6), Stand-by(pin11) and mute(pin12) functions.

Audio output characteristics

Audio amplifier	ST TDA7496
Maximum Audio Output Power	1W 2 @<3% Distortion , Speaker 1W2
Line Input Impedance	10K ohm

4.2 Power Module

The power module includes a Inverter and Power regulator. The electrical specification described as followings:

4.2.1 Power characteristics.

Input	Rated Input Voltage	100~240 Vac,50/60Hz
	Operation Input Voltage Range	90~264 Vac,47~63Hz
	Max Input AC Current	< 2.0A
	Efficiency	12Vdc load 3.25A Brightness Voltage from 0~3.3Vdc ON/OFF Voltage : High(3.3Vdc)/Low(0Vdc)
	Brightness Voltage(Vadj)	0.3Vdc(Max) ~ 3.0Vdc(Min)
	On/Off Voltage	High(1.2~5.5Vdc)/Low(<1.2Vdc)
Output	Static Output Characteristics	12V/3.25A Output : 11.4Vdc ~ 12.6Vdc

4.2.2 Inverter output characteristics.

Rated Output Kick-off Voltage	1500 Vrms
Rated output Voltage	725Vrms
Rated Output Frequency	40 ~ 60 Khz
Rated Output Current per tube	7mArms

4.2.4 Power module of connector definition ;

CN110 ; Pin 1 & 2 ----> Vdc Output (12V +/- 5%)

Pin 3 & 4 -----> GND

Pin 5 -----> Brightness Control Voltage

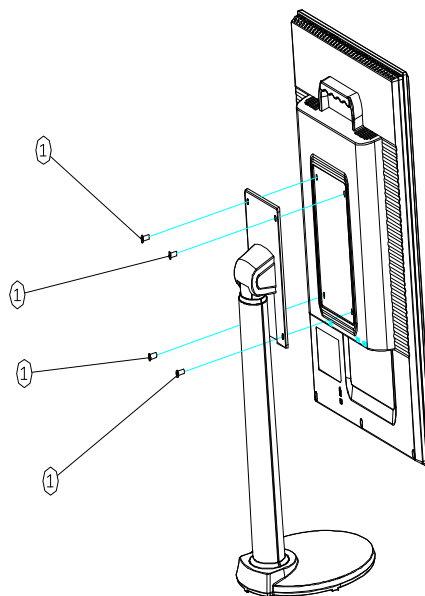
Pin 6 -----> On /Off ("High" set Lamp on)

CN1 ~ CN4 ; Pin 1 -----> HV (High Voltage for CCFL)
Pin 2 -----> Return (Low Voltage for CCFL)

5. DISASSEMBLY INSTRUCTIONS

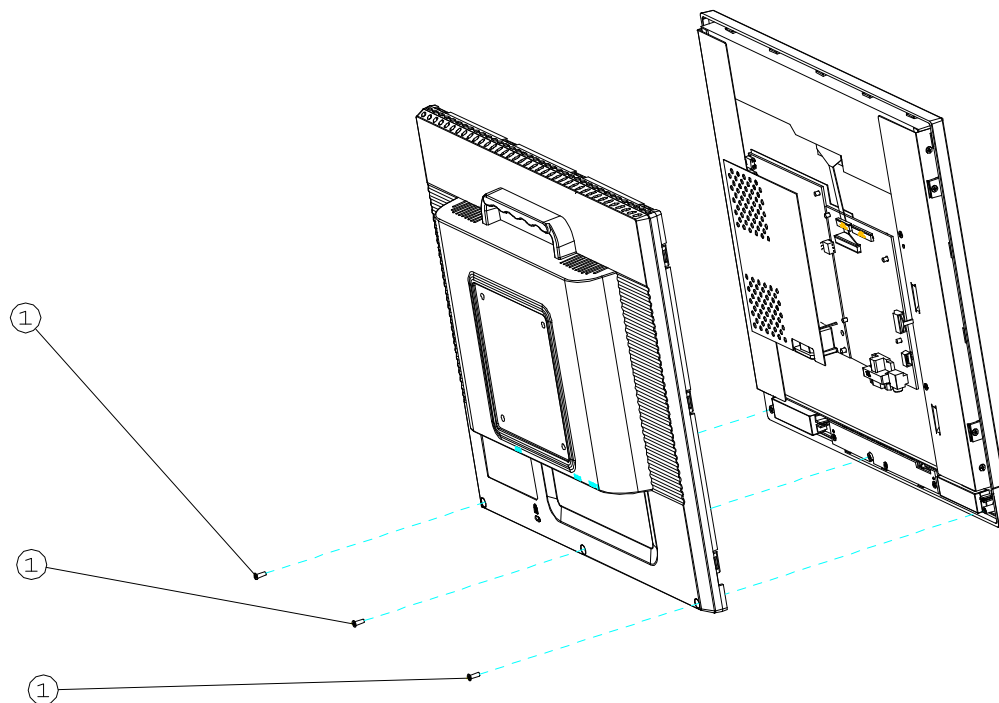
1. Stand removal

- 1) remove 4 pcs screws as shown "1" from the hinge cover
- 2) remove the stand



2.Rear cover **removal**

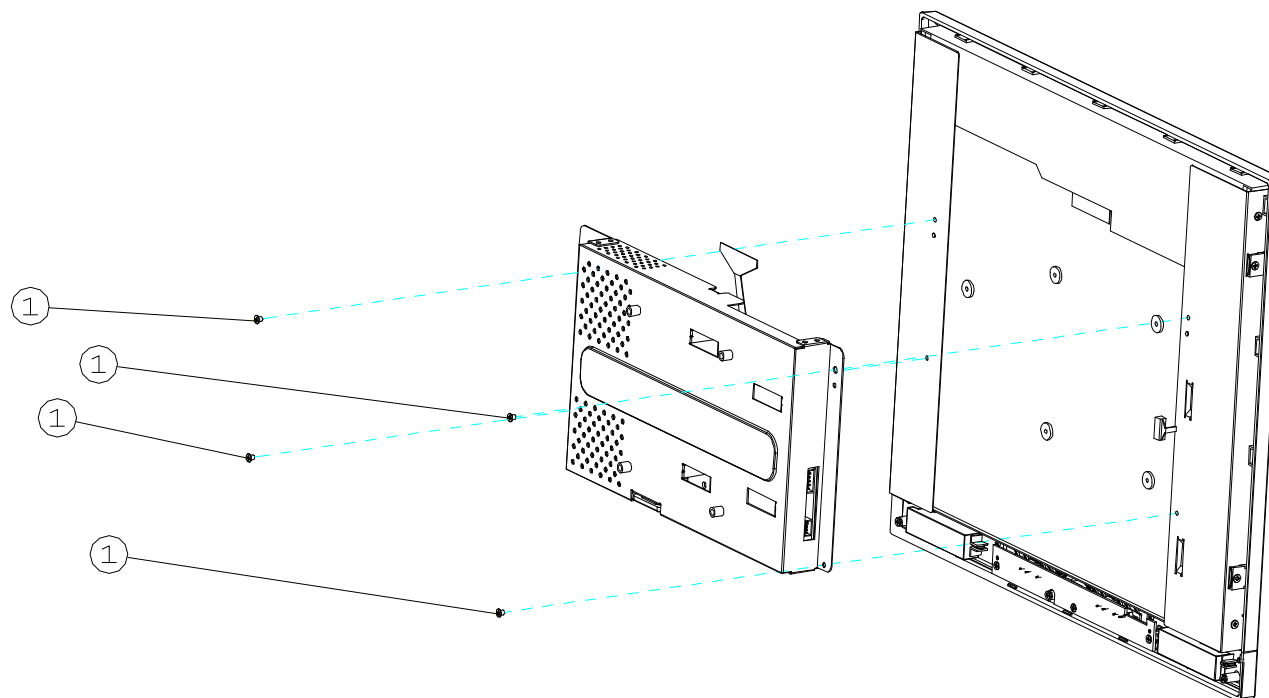
- 1) remove 3 pcs screws as shown "1" from the rear cover
- 2) remove the rear cover



3.PCB shielding removal

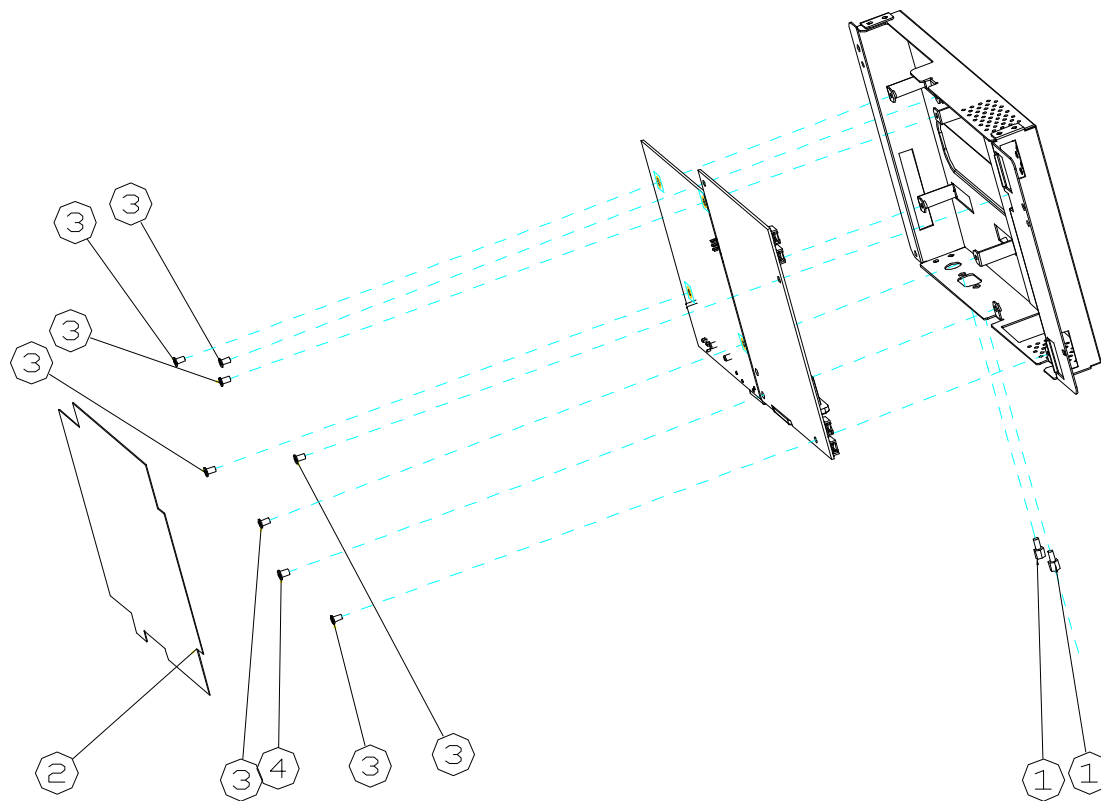
1) to remove 4 screws between
PCB shielding and
left/right brackets,as shown
"1"

2)to mover LCD-MB cable and
button BD cable



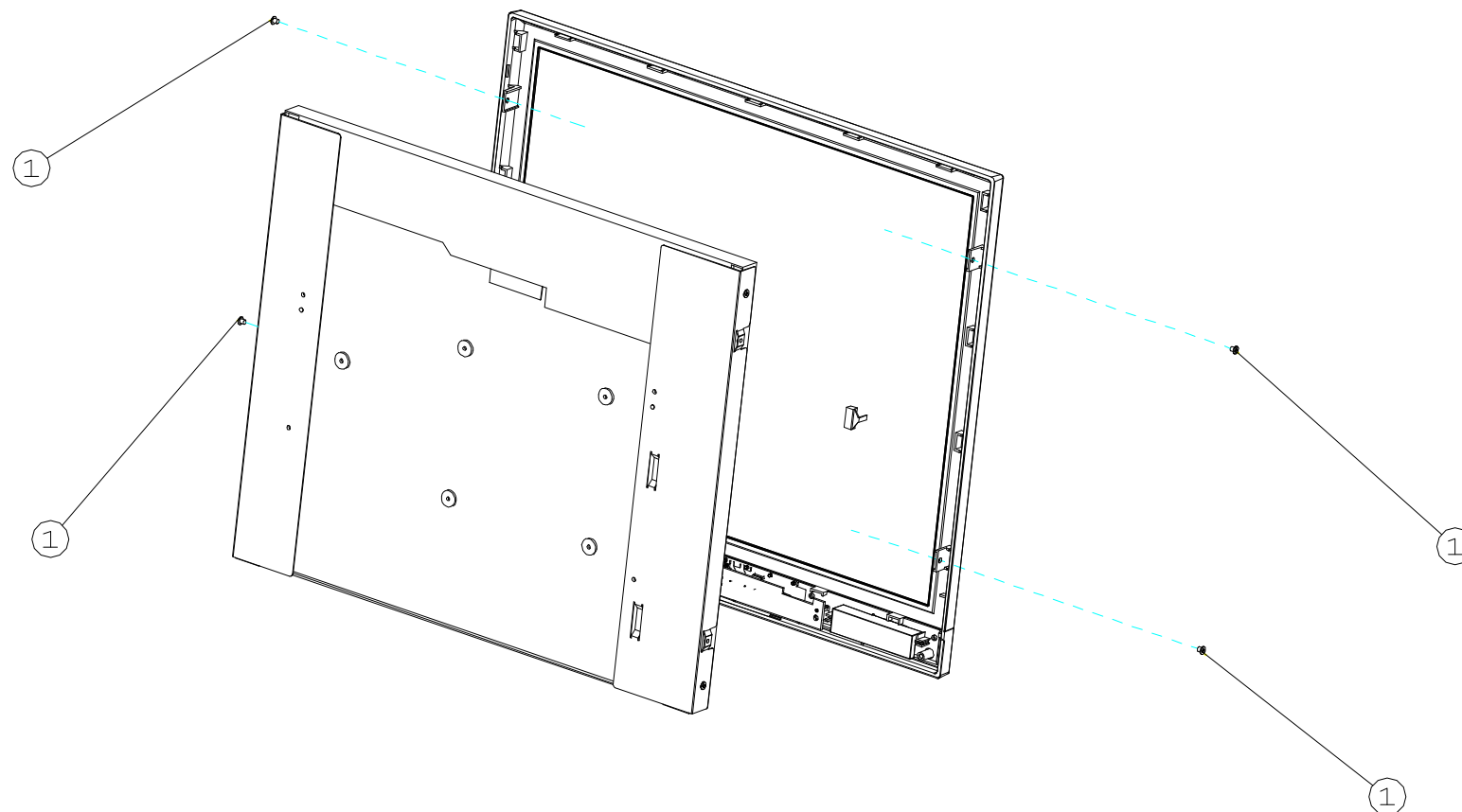
4. Scaler board and power board removal

- 1) to remove Standoff, as shown “1”
- 2) to remove power mylar, as shown “2”.
- 3) to remove 7 screws, as shown “3”.
- 4) to remove screw, as shown “4”.

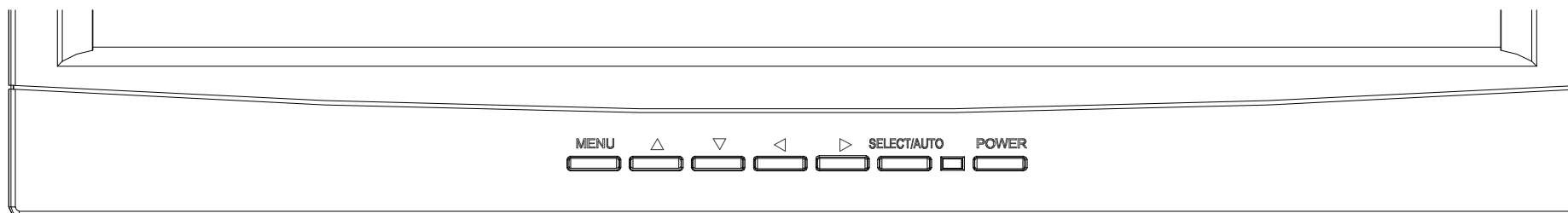


5. Front bezel removal

1) to remove 4 screws as shown
“1”.



6. CONTROL LOCATION



Button Define

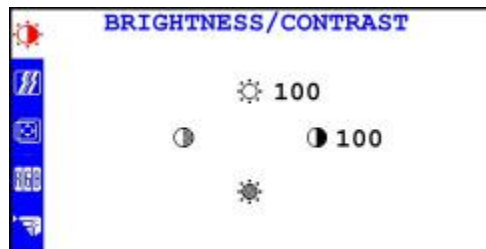
1	MENU	OSD Menu	Trigger OSD Main Menu / Clear OSD
2	△	UP	1. Select OSD Main Menu Item 2. Trigger Brightness/Contrast Menu.
3	▽	DOWN	1. Select OSD Main Menu Item 2. Trigger Brightness/Contrast Menu.
4	◀	LEFT	1. Decrease Menu Item value
5	▶	RIGHT	1. Increase Menu Item value
6	SELECT/AUTO	SELECT/ AUTO	1. Switch OSD Main Menu focus status. 2. Perform Auto configuration.
7	POWER	POWER	Switch Power ON/OFF

LED Status

<i>Color</i>	<i>Status Description</i>
Green	Normal status
Amber	Enter Sleep Mode status or use “Power + Auto” key enter factory mode

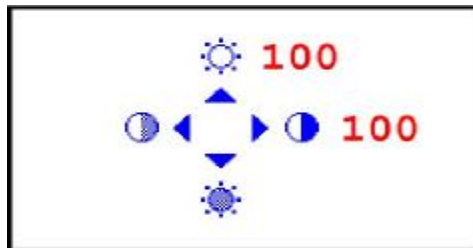
Dialog Overview

I OSD Main Menu



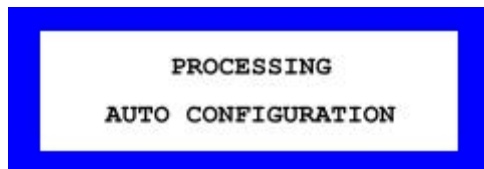
When user press the **Menu** key under none OSD status will trigger this menu appear for detail parameters adjust. This menu will display about 45 seconds if no one press other key, otherwise will refresh display time

I Brightness/Contrast Menu



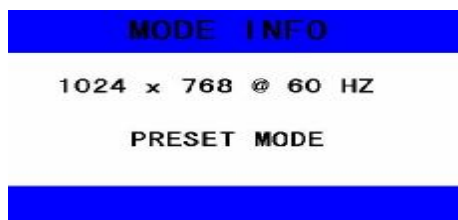
When user press the **Up** or **Down** keys under none OSD status will trigger this menu appear for Brightness and Contrast adjust. This menu will display about 45 seconds.

Auto Configuration



When user press the **select/Auto** key under none OSD status will trigger this dialog appear and perform Auto Configuration procedure.

I Mode Information



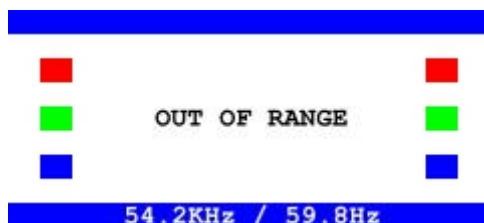
When Display timing changed this dialog will appear about 5 seconds. And this feature only enable when “Information” indicate On in OSD’s other page of main menu.

I No Signal



When user not support the video signal from the cable this dialog will appear about 20 seconds. And then enter the Sleep mode. One special case was in factory mode, the display time length will become 5 seconds for testing the power consumer.

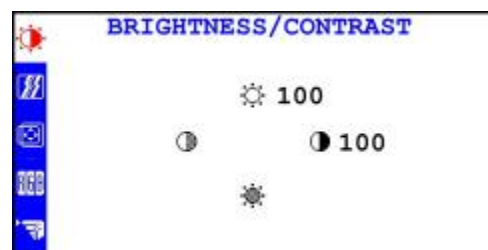
I Out Of Range



When user input the video signal out of spec this dialog will appear about 20 seconds. And then enter the Sleep mode.

OSD Main Menu

I Brightness & Contrast Adjustment



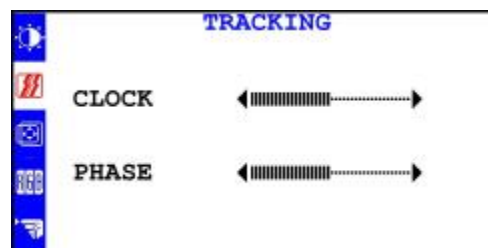
Brightness (Up&Down):

Adjust the brightness of the display.

Contrast (Left&Right):

Adjust the difference between

I Tracking Adjustment



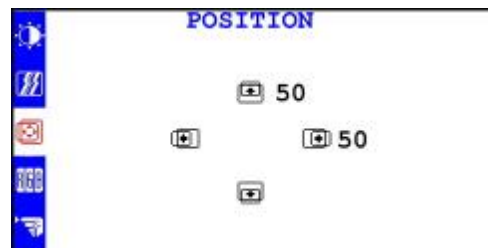
CLOCK:

Adjust to minimize any vertical bars or stripes visible on the screen background. The horizontal screen size will also change.

PHASE:

Adjust to remove any horizontal distortion, and clear or sharpen the image of characters.

I Position Adjustment



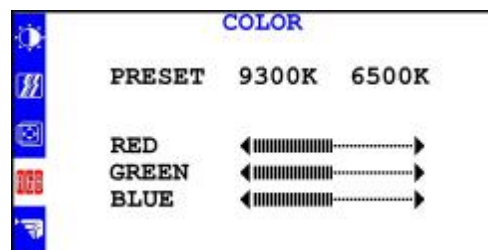
V-Position:

Adjust the vertical position of the picture.

H-Position:

Adjust the horizontal position of the picture.

I Color Adjustment



There are four items for color adjustment:

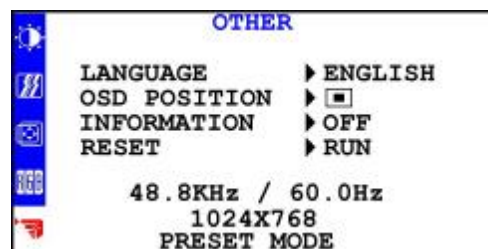
9300K: Bluish white

6500K: Reddish white

User defined:

Red, Green, Blue. Adjust to set your own color level.

I Other



LANGUAGE:

Multi- Language selection

OSD POSITION:

Adjust the OSD window position on the screen.

INFORMATION:

Display Information Dialog or not when input timing changed.

I Factory Adjustment

This page only visible in factory mode

AUTO BURN :

Use the chip set internal pattern for hot running monitor panel and inverter. And display a Timer dialog for count.

AUTO COLOR

Perform Auto Balance measurement by chip set internal signal. And copy the offsets parameters to other color temp parameters. Then force point to Native color temperature and reset contrast & brightness to default value.

COLOR UPDATE :

Force presently R,G,B offset and gain parameters update to currently temperature memory address.

FACTORY RESET :

Recall to factory setting and power off immediately.

R,G,B OFFSET :

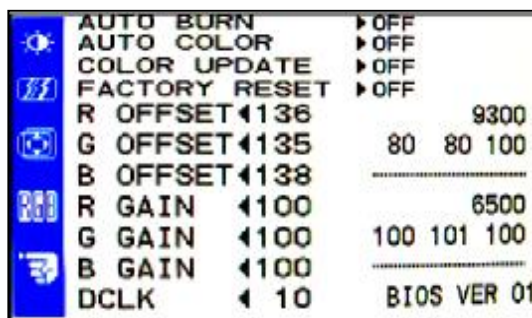
Adjust current RGB cut off level

R,G,B GAIN :

Adjust current RGB Driver value.

DCLK:

Adjust chip set internal frequency spread effect for EMI testing.



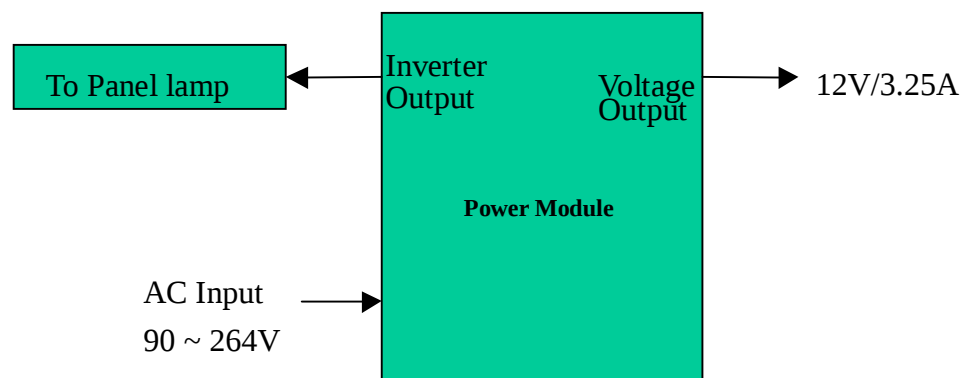
7. NECESSARY EQUIPMENT LIST

Item

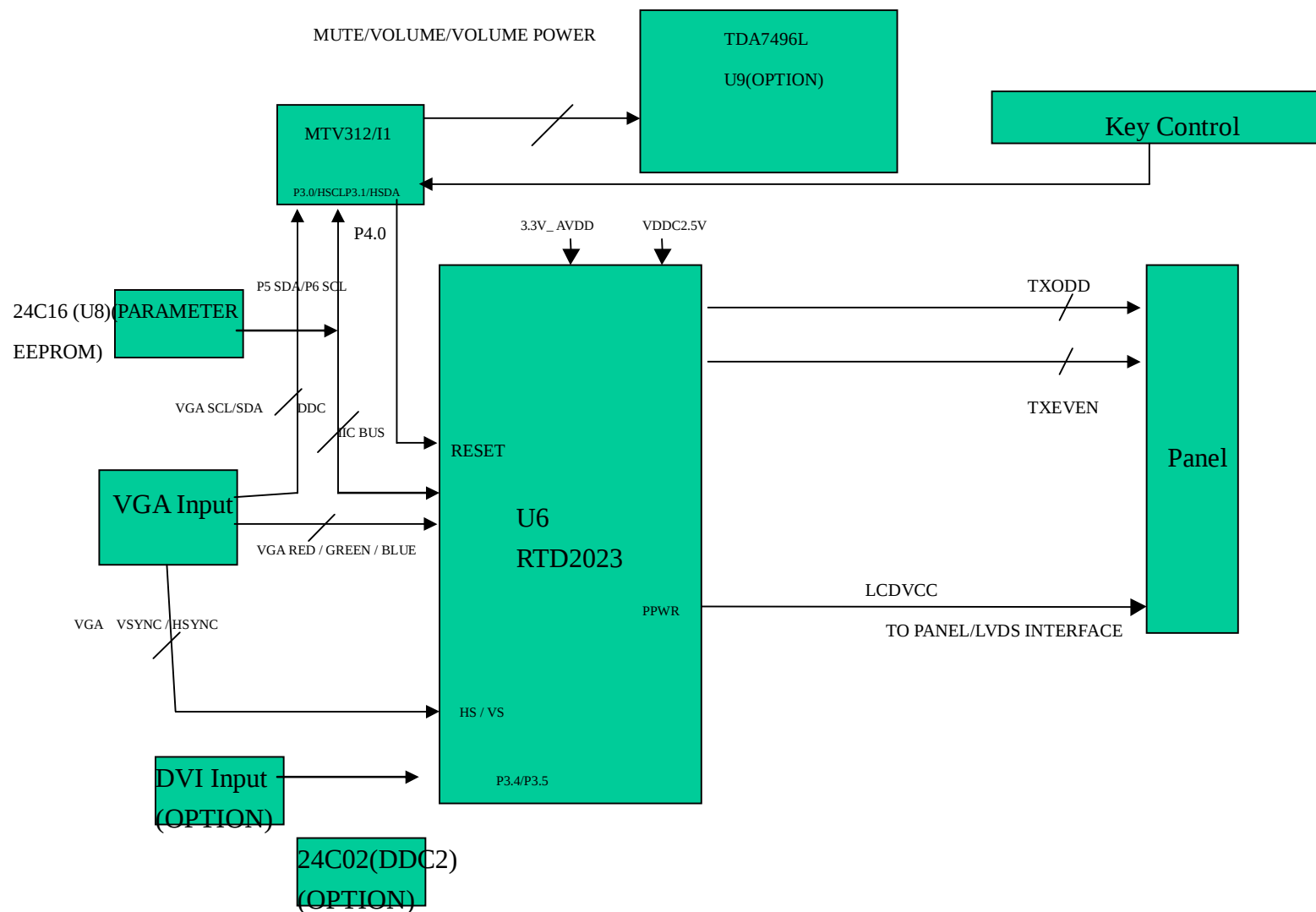
- 1 Personal Computer with Windows 98/Me/XP**
- 2 Luminance Meter Minolta CA 210**
- 3 Video Generator : Chroma 2000,2135,2250 or equivalent**
- 4 like test program(Display Mate)**
- 5 Color Analyzer : Minolta CA210 , Chroma or equivalent**
- 5 Watt / Power Meter**
- 7 10 Times Magnifier**
- 8 Multimeter**
- 9 Oscilloscope**

8. BLOCK DIAGRAM

8.1 Power module

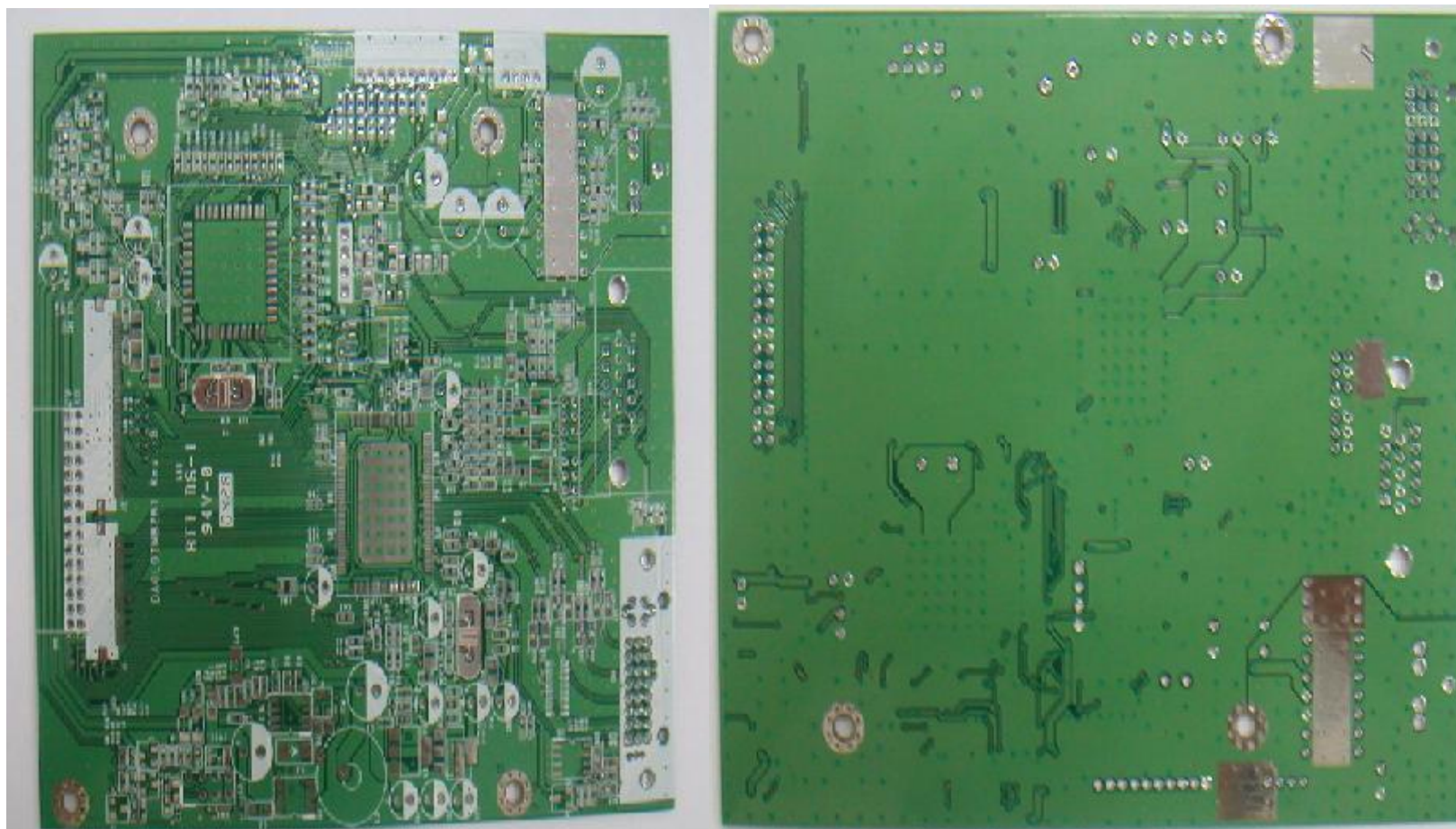


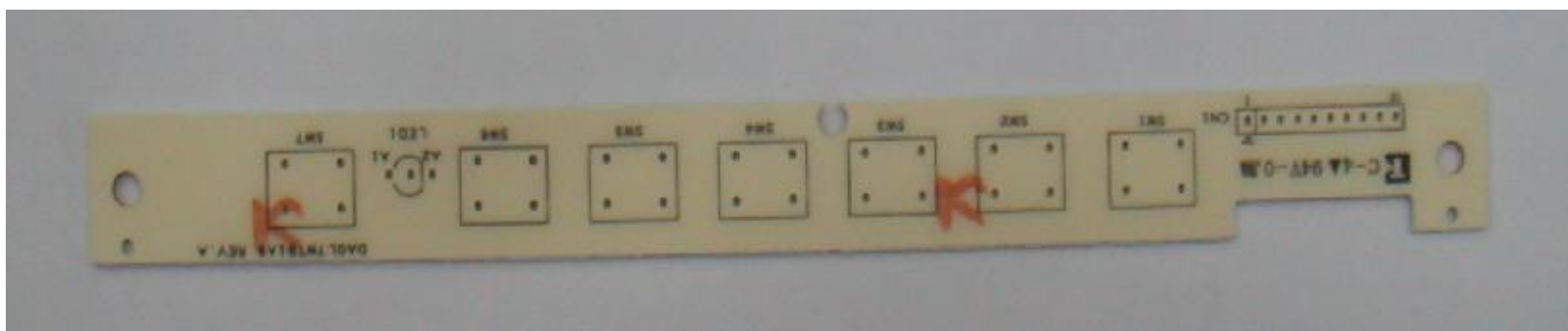
8.2 Main Board



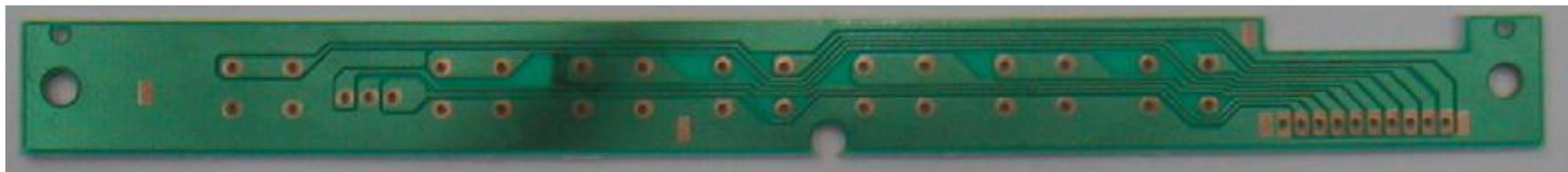
9. CONDUCTOR VIEW

Main Board Silkscreen



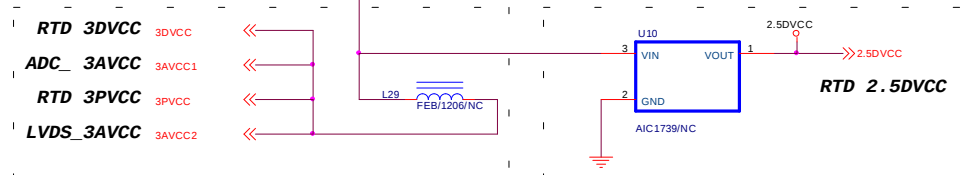
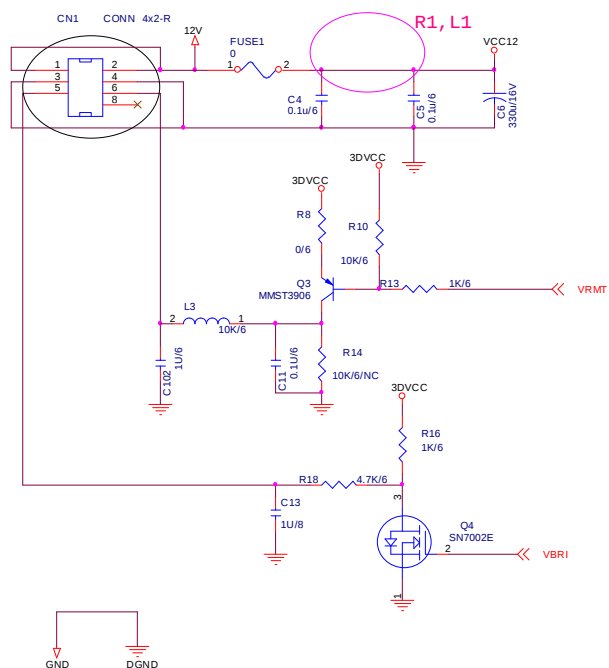
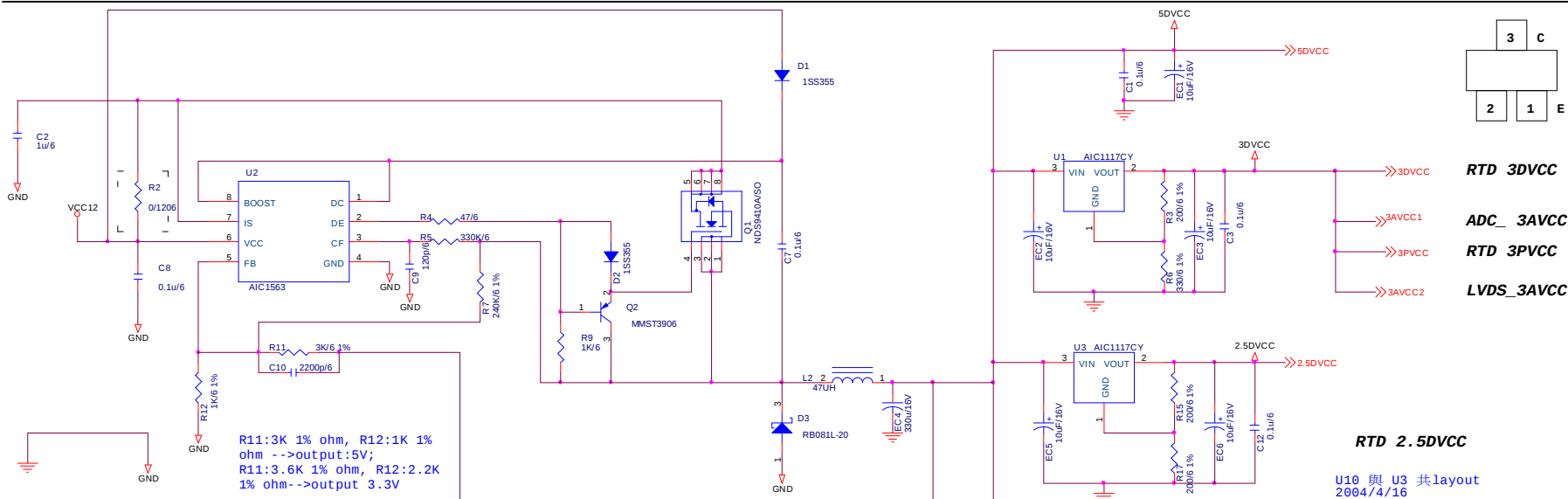


L7c service manual-1A-final1006.doc
Page40 of 56

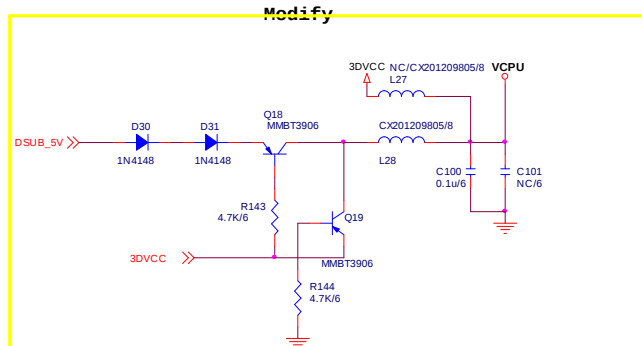


Button Board Silkscreen

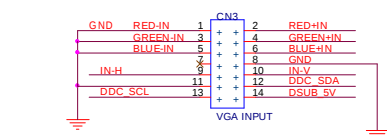
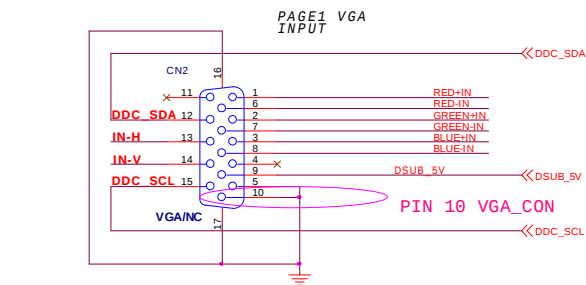
10. SCHEMATIC DIAGRAM Main Board



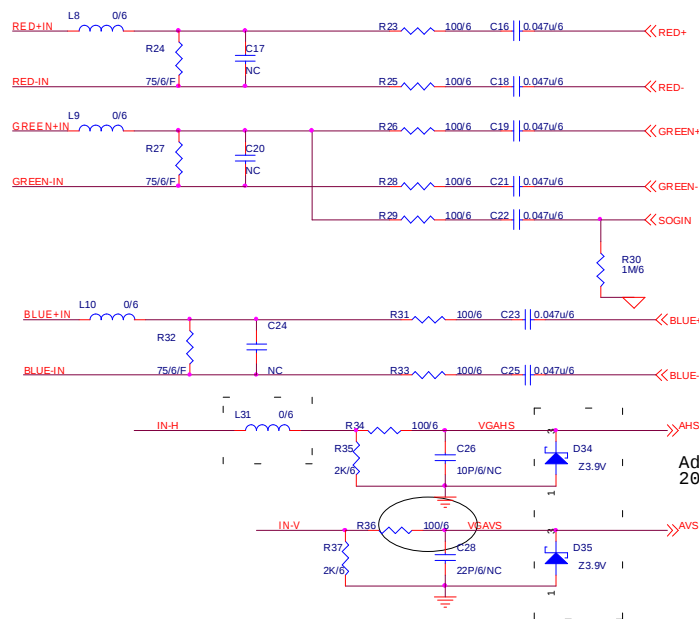
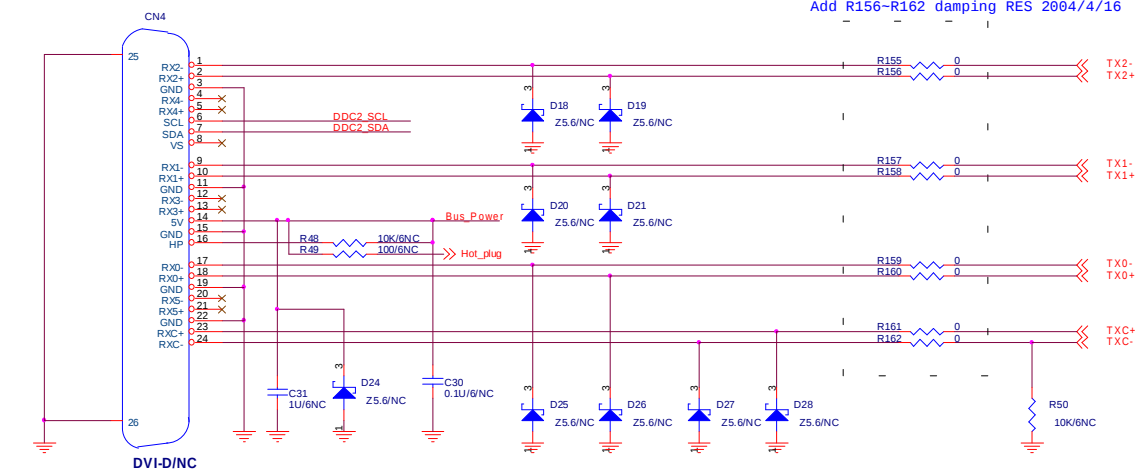
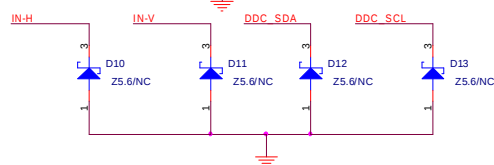
3.3V-->2.5V regulator for 3.3V system power, no 5V 2004/4/14



TECHVIEW			
PROJECT : L7C/L5TL-C			
Title			
POWER			
Size	Document Number	Rev	
	DISPLAY	B	
Date:	Monday, September 06, 2004	Sheet	1 of 5

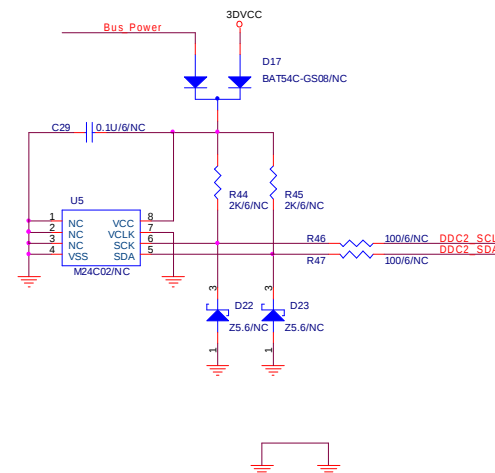


DEL D29 2004/6/17

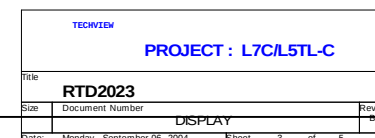


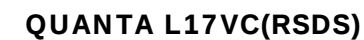
DEL L11, C32, U6, R51, R52 2004/6/17

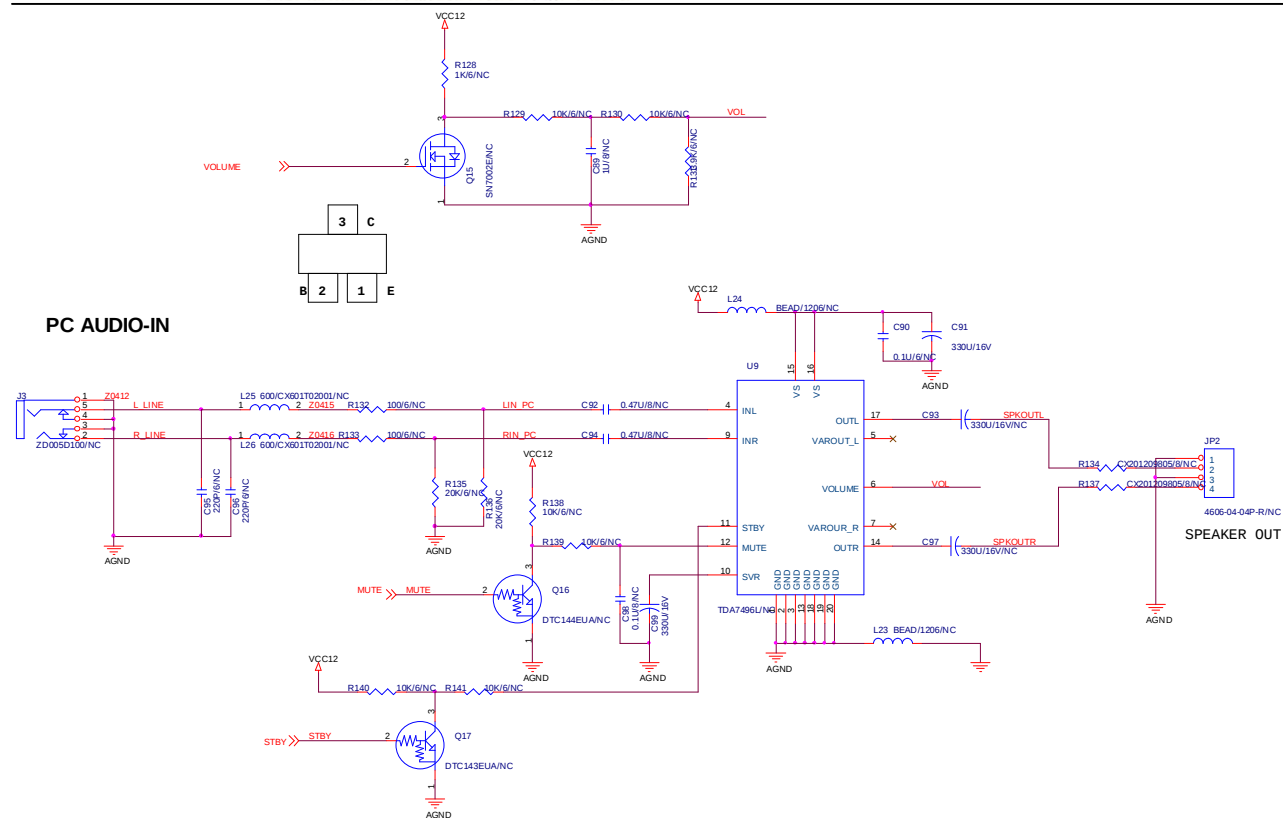
Add D34, D35, L31 2004/6/17



TECHVIEW			
PROJECT : L7C/L5TL-C			
Title	VGA AND DVI INPUT		
Size	Document Number	DISPLAY	Rev B
Date:	Monday, September 06, 2004	Sheet	2 of 5

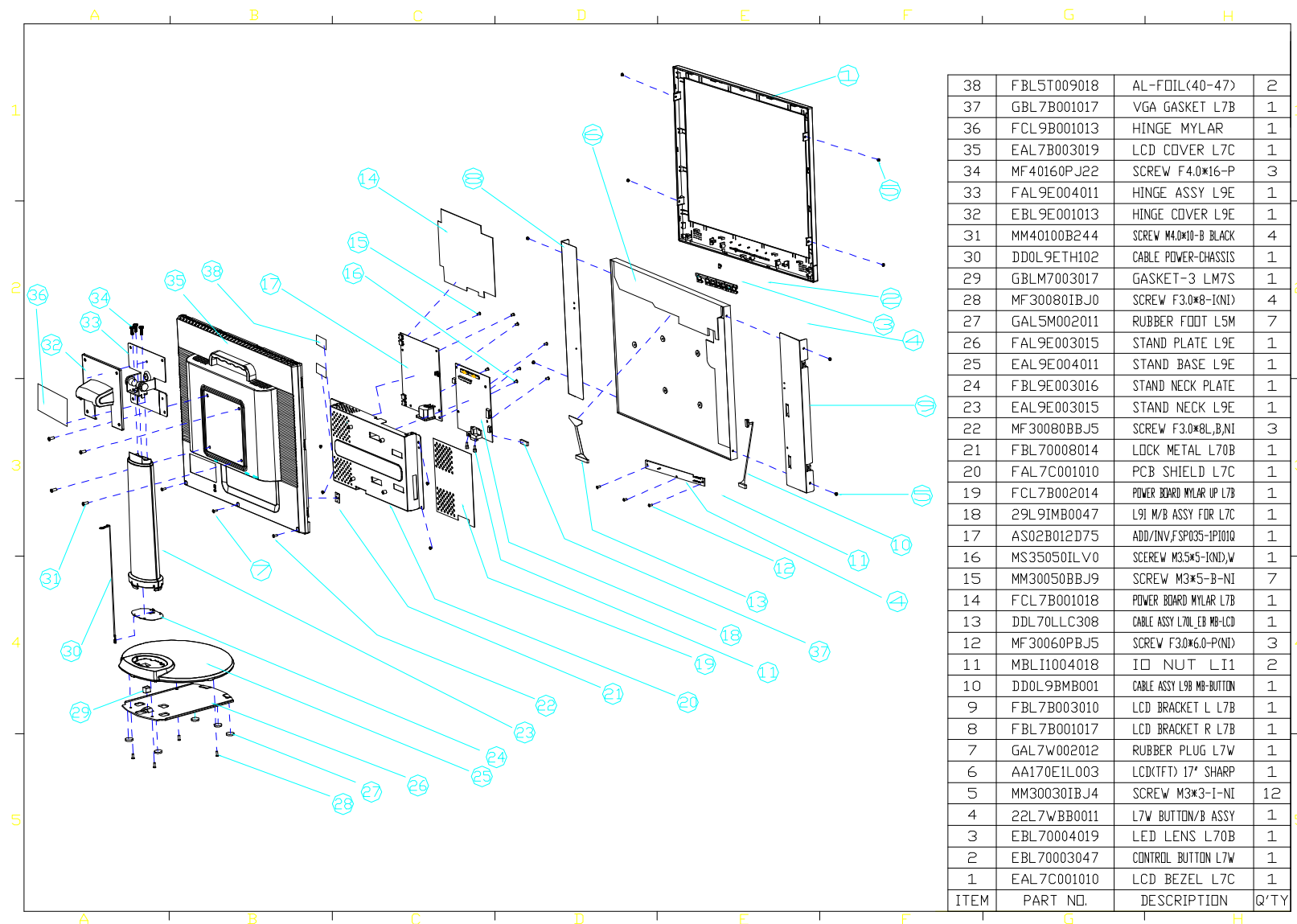






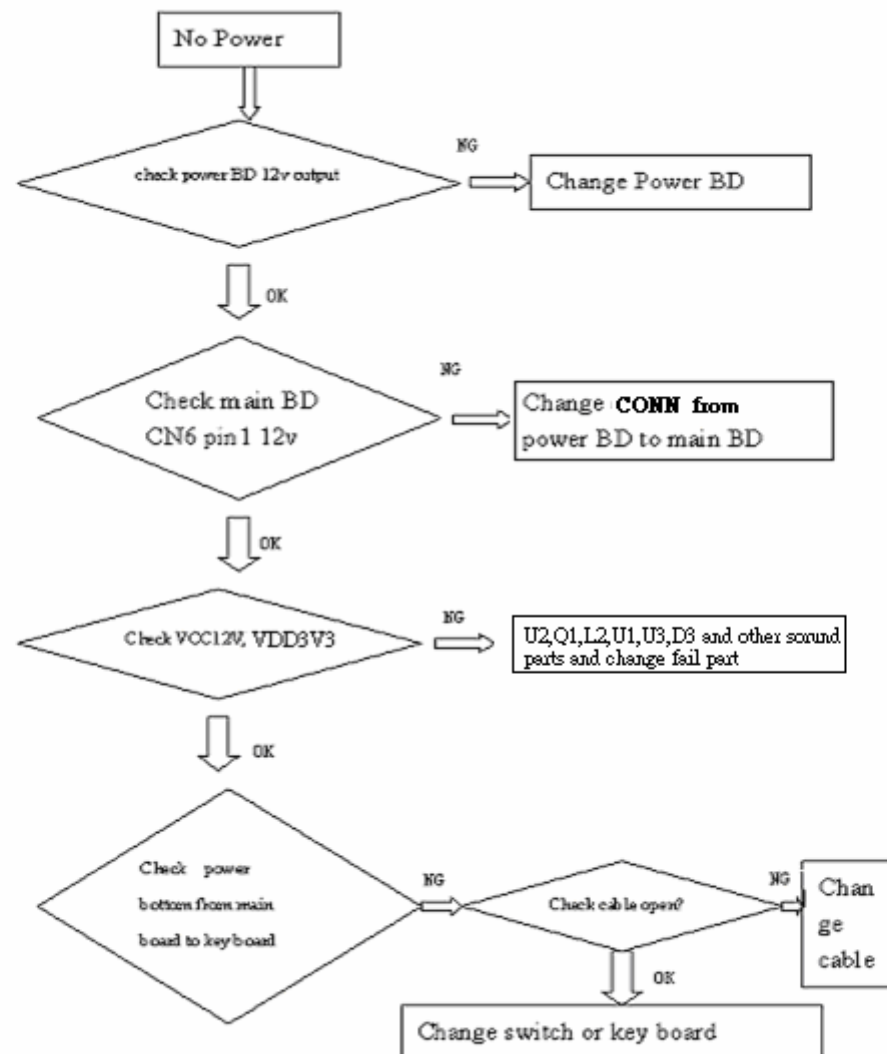
TECHVIEW		
PROJECT : L7C/L5TL-C		
Title		
AUDIO(OPTION)		
Size	Document Number	Rev
	DISPLAY	B
Date:	Monday, September 06, 2004	Sheet 5 of 5

11. EXPLODED VIEW

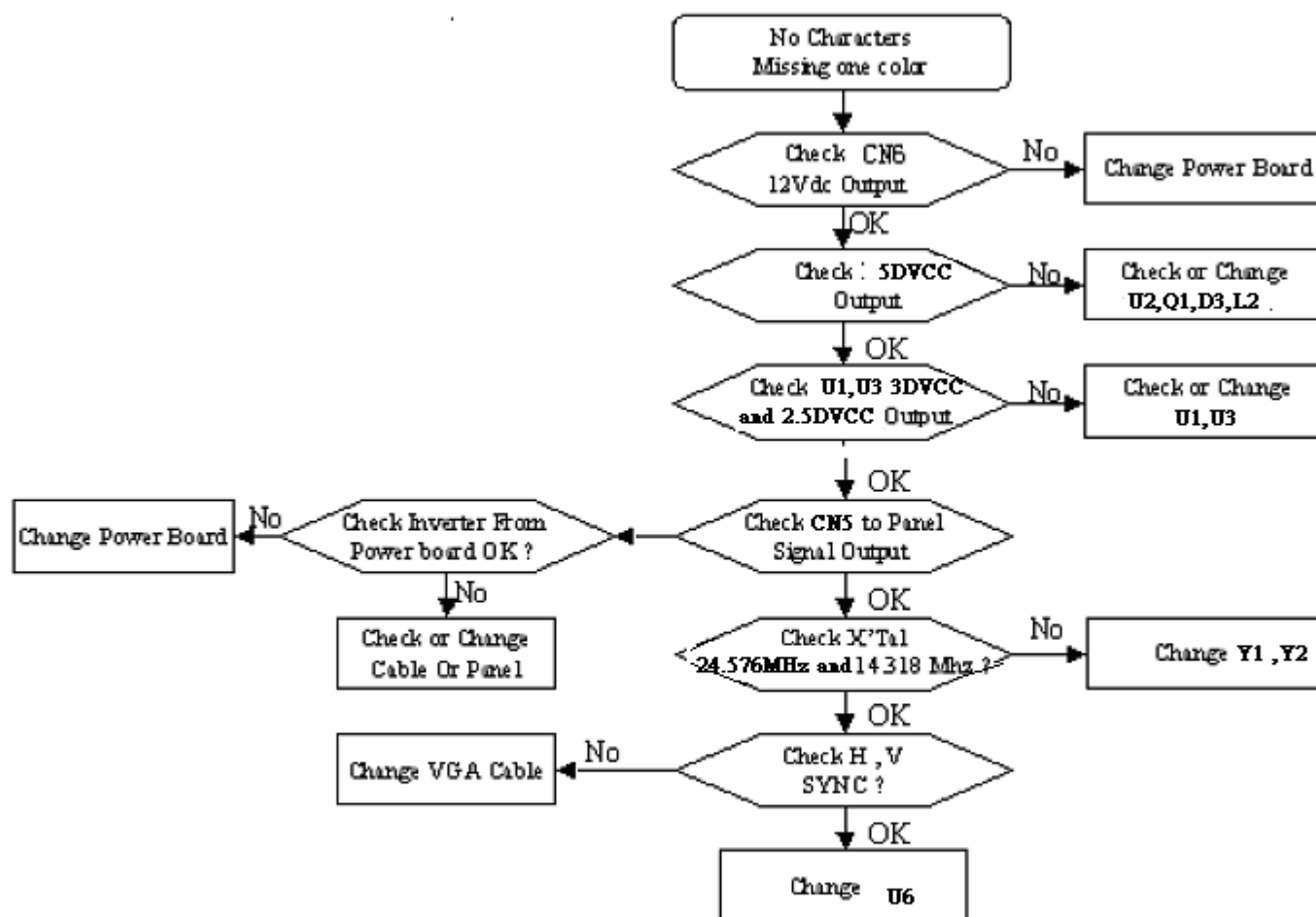


12. TROUBLE SHOOTING HINTS

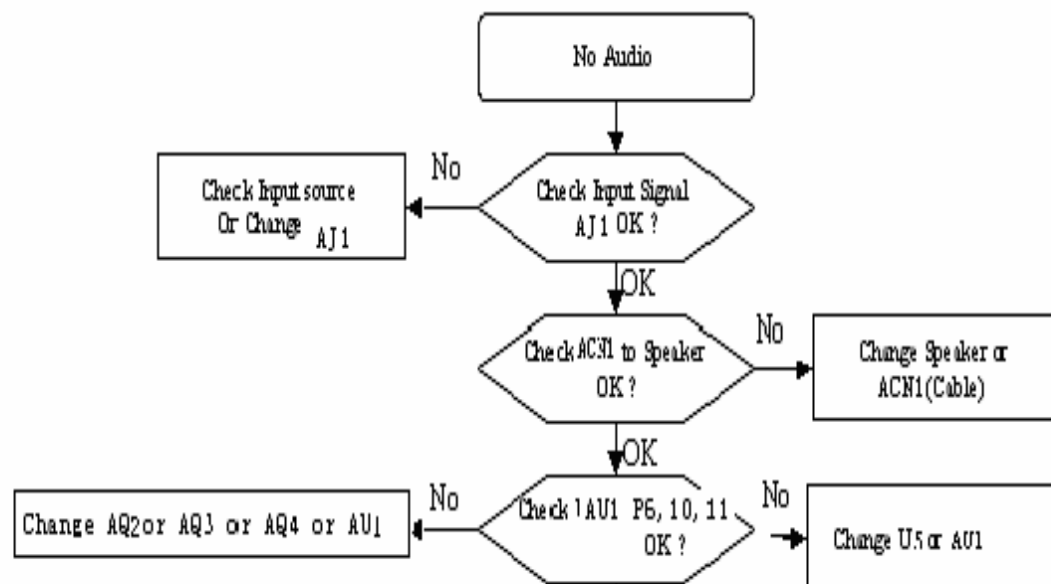
1.No Power



2. No Characters , Missing one color



3. No Audio



(optional)

13. REPLACEMENT PARTS LIST

KEY SWITCH BOARD PART LIST					
Level	Part Number	Part Description	Qty	UOM	Location
1	22L7WBB0011	L7W BUTTON/B ASSY(NEW)	1	KT	
2	DA0L7WTB1A9	PCB(BUTTON) L7W TB(1L,165*18,REVA)	1	PC	
2	BEYG0013DA3	LED(DIP) YELLOW/GREEN(L-3WYGW)	1	PC	LED1
2	DFHD10MR316	CONN DIP HEADER 10P 1R MR(P2.0,H4.1)	1	PC	CN1
2	DHP00TSAQ01	SWITCH PUSH BUTTON(TSAQ-2 ,50MA,12V)	7	PC	SW1,SW2,SW3,SW4,SW5,SW6,SW7

Level	Part Number	Part Description	Qty	UOM	Location
1	29L9IMB0047	L9I M/B ASSY(SHARP,RT2023)FOR L7C	1	KT	
2	39L9IDP0030	L9I M/B DIP ASSY(SHARP,RT2023)FOR L7C	1	KT	
3	41L9ISS0037	L9I M/B S/S ASSY(SHARP,RT2023)FOR L7C	1	KT	
4	DA0L9IMB2B1	PCB(M/B) L9I MB(2L,12.5*12 REVB)	1	PC	

4	AJD2023CF01	IC(128P) RTD2023(140MHZ,QFP)	1	PC	U7
4	AKE3A8S0Y01	IC,EEPROM(8P) 24LC16B/SN(2K*8,100KHZ)	1	PC	U8
4	AJ00312VP18	IC(44P) MTV312MV64AJ(12MHZ,PLCC)	1	PC	I1
4	AL001117078	IC(3P) AIC1117CY(SOT-223)	2	PC	U1,U3
4	AL001563001	IC(8P) AIC1563CS(SOP8)	1	PC	U2
4	BA039060Z01	TRANSISTOR,SMD MMBT3906(40V,200MA)	6	PC	Q2,Q3,Q12,Q13,Q18,Q19
4	BAN70020Z13	TRANSISTOR MOSFET 2N7002E(60V,250MA)	1	PC	Q4
4	BAM23010Z05	TRANSISTOR MOSFET SI2301DS(-12V,-2.3A)	1	PC	Q8
4	BA001440Z87	TRANSISTOR SMD PDTC144EU (50V,30MA)	1	PC	Q9
4	BA144EUAZ04	TRANSISTOR SMD DTC144EUA(50V,30MA)	1	PC	Q9
4	BAM9410YZ02	TRANSISTOR MOSFET SI9410DY(30V,7A)	1	PC	Q1
4	BC1SS355Z05	DIODE SMD 1SS355(80V,100MA)	2	PC	D1,D2
4	BCRB081LZ02	DIODE SMD RB081L-20(20V,5.0A,VF:0.45V)	1	PC	D3
4	BCLS4148AZ9	DIODE,SMD RLS4148	2	PC	D30,D31
4	BDGZ5226Z03	DIODE ZENER SMD	2	PC	D34,D35

		MMGZ5226B(3.3V)			
4	CH41004Z931	CAP CHIP 0.1U,25V(+80-20%,Y5V,0603)	44	PC	C1,C3,C4,C5,C7,C8,C11,C12,C35,C36,C37,C38,C39,C40,C41,C42,C43,C44,C45,C47,C49,C!

4	CH51004MA32	CAPACITOR CHIP 1UF 25V(+/-20%,Y5V,0805)	1	PC	C13
4	CH51001K991	CAP CHIP 1U 6.3V(+/-10%,X5R,0603)	2	PC	C2,C102
4	CH02206J909	CAPACITOR CHIP 22P 50V(+/-5%,NPO,0603)	4	PC	C26,C28,C33,C48
4	CH11206J908	CAPACITOR CHIP 120P 50V(+/-5%,NPO,0603)	1	PC	C9
4	CH22206K917	CAP CHIP 2200P 50V(+/-10%,X7R,0603)	3	PC	C10,C67,C68
4	CH34703K916	CAP CHIP 0.047UF 16V(+/-10%,X7R,0603)	7	PC	C16,C18,C19,C21,C22,C23,C25
4	CH01006J909	CAPACITOR CHIP 10P 50V(+/-5%,NPO,0603)	2	PC	C87,C88
4	CS00003J900	RESISTOR CHIP 0 1/10W+/-5%(0603)	6	PC	L8,L9,L10,L31,R8,R166
4	CS02203J902	RES CHIP 22 1/10W +/-5%(0603)	1	PC	R164
4	CS07503F905	RESISTOR CHIP 75 1/10W +/-1%(1608)	3	PC	R24,R27,R32
4	CS11003J904	RESISTOR CHIP 100 1/10W +/-5%(0603)	14	PC	R23,R25,R26,R28,R29,R31,R33,R34,R36,R66,R83,R92,R124,R125

4	CS21003F904	RESISTOR CHIP 1K,1/10W,+ -1%(0603)	1	PC	R12
4	CS21003J906	RES CHIP 1K 1/10W + -5%(0603)	11	PC	R9,R13,R16,R56,R95,R96,R97,R98,R99,R100,R101
4	CS24703J900	RES CHIP 4.7K 1/10W + -5%(0603)	18	PC	R18,R39,R40,R54,R58,R82,R93,R108,R109,R110,R111,R114,R115,R116,R143,R144,R147,R163
4	CS31003J908	RES CHIP 10K 1/10W + -5%(0603)	6	PC	L3,R10,R14,R68,R78,R79
4	CS33303J904	RESISTOR CHIP 33K 1/10W + -5%(0603)	7	PC	R84,R85,R87,R88,R89,R90,R91
4	CS38203J904	RES CHIP 82K 1/10W + -5%(0603)	2	PC	R67,R70
4	CX0P121R000	EMI FILTER CHIP HI1206P121R-00(1206A)	1	PC	L22
4	CS00006J205	RESISTOR CHIP 0 1/4W+ -5%(3216)	2	PC	FUSE1,R2
4	CS04703J906	RES CHIP 47 1/10W + -5%(0603)	1	PC	R4
4	CS12003F905	RESISTOR CHIP 200 1/10W+ -1%(0603)	3	PC	R3,R15,R17
4	CS12203J904	RES CHIP 220 1/10W + -5%(0603)	2	PC	R102,R103
4	CS13303F909	RESISTOR CHIP 330 1/10W + -1%(0603)	1	PC	R6
4	CS23003F900	RES CHIP 3K 1/10W + -1%(0603)	1	PC	R11

4	CS42403F905	RESISTOR CHIP 240K 1/10W,+ -1%(0603)	1	PC	R7
4	CS43303J906	RES CHIP 330K 1/10W + -5%(0603)	1	PC	R5
4	CX0E601R009	EMI FILTER CHIP HZ0805E601R(600,500MA)	5	PC	L12,L13,L14,L15,L19
4	CX201209805	EMI FILTER CHIP FBM-11-201209-121A40	1	PC	L28
4	CS22003J909	RES CHIP 2K 1/10W + -5%(0603)	5	PC	R35,R37,R38,R80,R81
4	CS26803J909	RESISTOR CHIP 6.8K 1/10W + -5%(1608)	1	PC	R41
4	CS51003F900	RESISTOR CHIP 1M 1/10W+ -1%(0603)	1	PC	R30
3	BG624576031	CRYSTAL DIP 24.576MHZ(30PPM,20PF,49/US)	1	PC	Y1
3	BG611059319	CRYSTAL DIP 11.0592MHZ(+ -30PPM,49/US)	1	PC	Y2

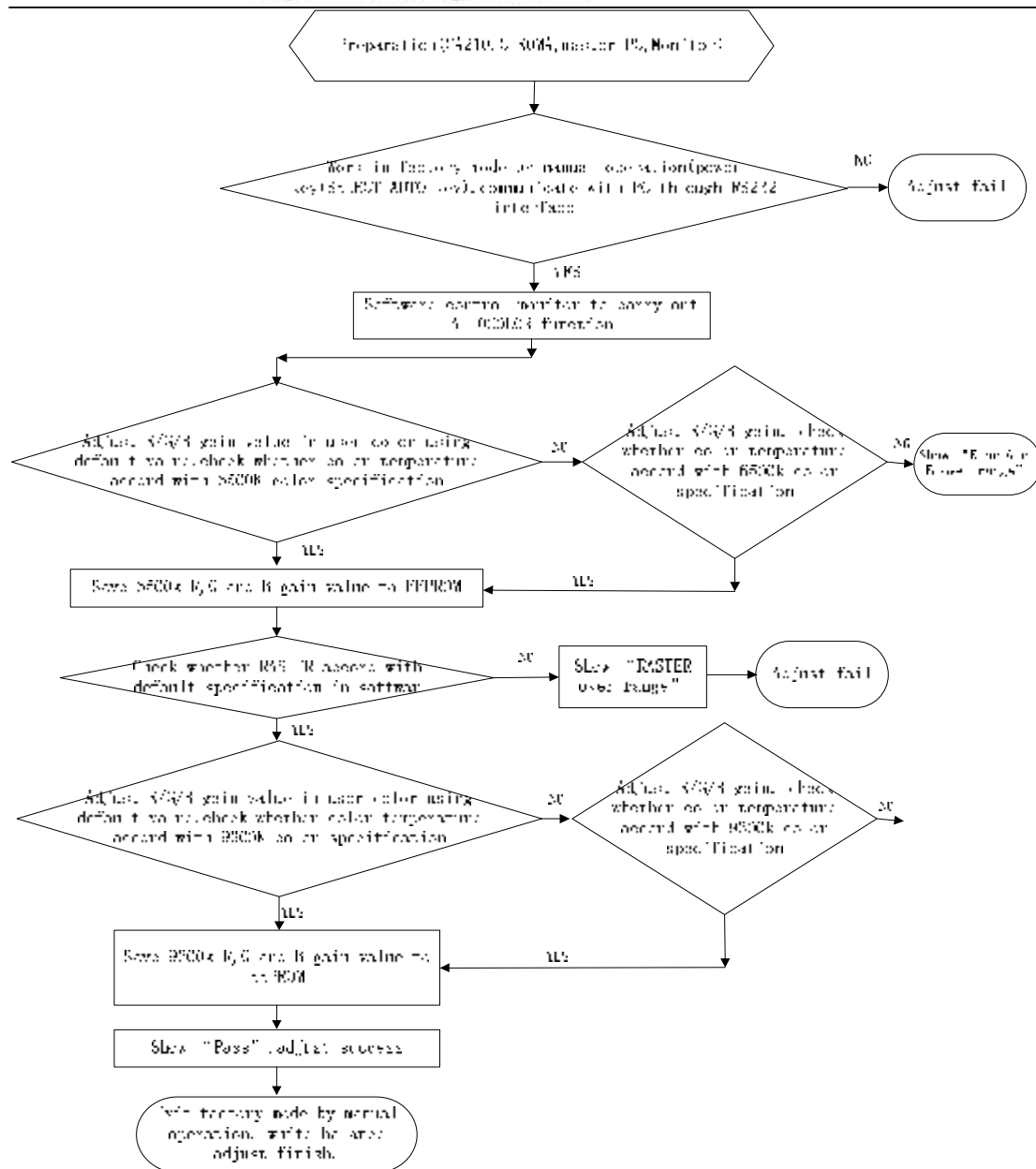
3	CC61005MD02	CAP ELEC 10U 35V(+/-20%,105C,5*11,2000HR)	8	PC	C34,C46,C50,EC1,EC2,EC3,EC5,EC6
3	CC62204MD23	CAP ELEC 22U 25V(+/-20%,105C,5*11,2000HR)	3	PC	C53,C59,C84
3	CC71004MD68	CAP ELEC 100U 25V +/-20%,105C,6*11,LESR	1	PC	C70
3	CC73303MD51	CAP ELEC 330U 16V(+/-20%,105C,8*11,2000HR)	2	PC	C6,EC4
3	DC04725K002	CHOKE COIL 47UH(2.5A,+/-10%,T07473)	1	PC	L2
3	DFHD06MR247	CONN DIP HEADER 6P 2R MR(P2.5,H6.0)	1	PC	CN1
3	DFDS15FR050	CONN D-SUB 15P 3R FR,P1.15,H12.55,NO SRW	1	PC	CN2
3	DFHD30MR259	CONN DIP HEADER 30P 2R MR(P2.0,H4.0)	1	PC	CN5
3	DFHD10MR316	CONN DIP HEADER 10P 1R MR(P2.0,H4.1)	1	PC	CN6

14. Some parameters will be update after repair

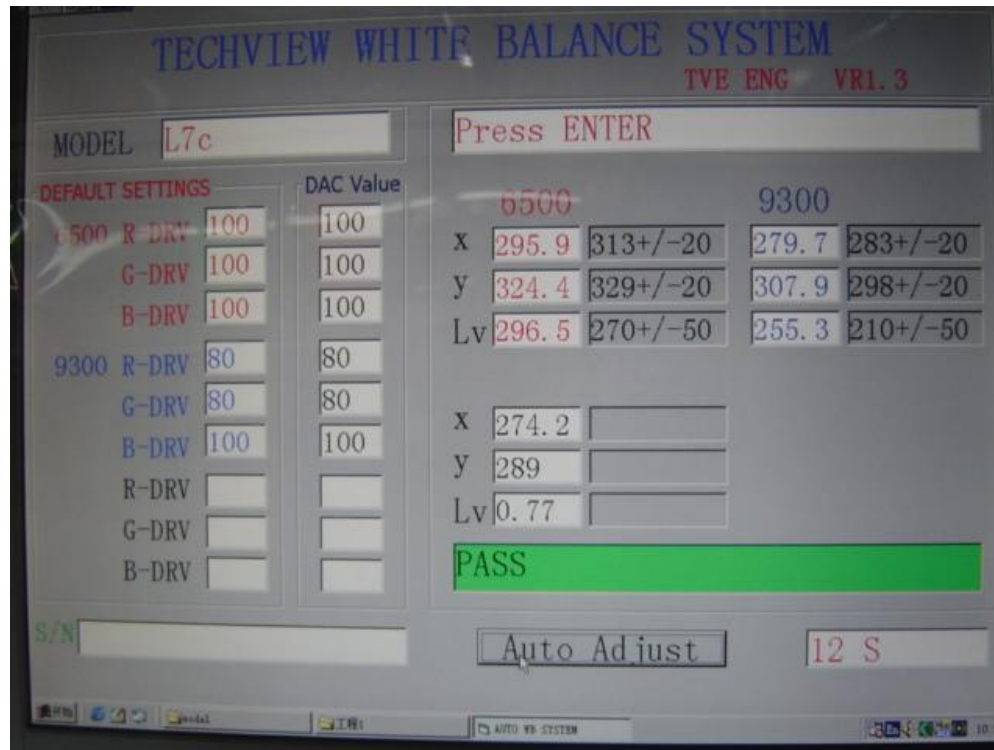
The white balance and DDC or BIOS maybe update after repair, the operation method is below:

1) White balance adjust:

Factory D8000 AUTO white balance adjust flow:



Factory D8000 software interface as following:



Manual white balance adjust flow:

- I Instruments:
 - n Color analyzer CA210
 - n Pattern generator or PC
- I Software
 - n CA210 SDK
 - n Chkdisk for IBM PC and DMW

Adjustment process (maximum brightness and contrast at “Default”)

Step1: press power key+SELECT/AUTO key at the same time and go into factory mode

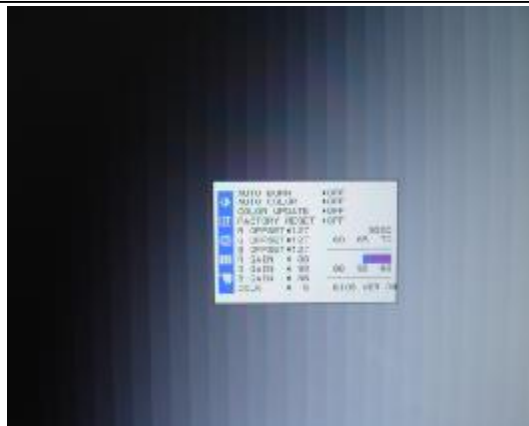
Step2: “Auto color” With standard pattern generator in “32 gray” picture



Step3: change pattern to white picture and measure center area for color temperature



step4: Adjust output gain to achieve the color temperature and smooth the gray level



Note: When finish adjust gain. Don't forget do color update avoid to lost gain value.

DDC & ISP operation:

This monitor can be programmed BIOS and DDC file through this tooling, you can use the software (Myson-Century ISP) on PC to control

the ISP board (Fig.1) and use the software LM5ISP to program DDC and use software QEDID to read DDC



Fig.1

Write and Read DDC (EDID)

Write DDC:

Step1:

Connect the VGA cable with the Parallel Port using the tool signed DDC. use DDC programm board. One port connect to PC print port, the other connect to Monitor signal port.

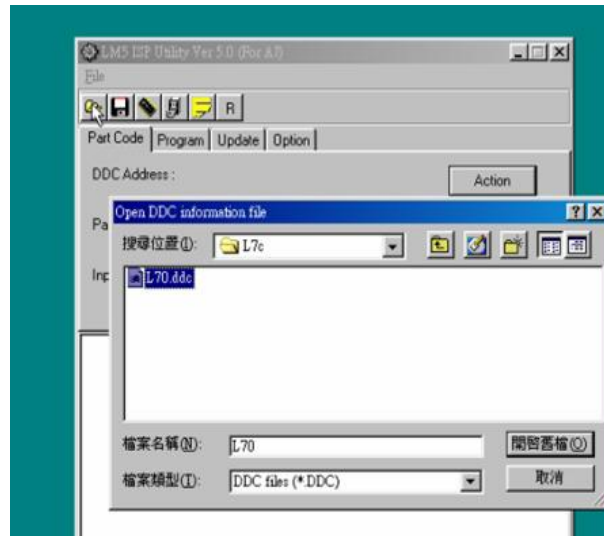


Step2:

Press the power key, and enter the user mode(green led)

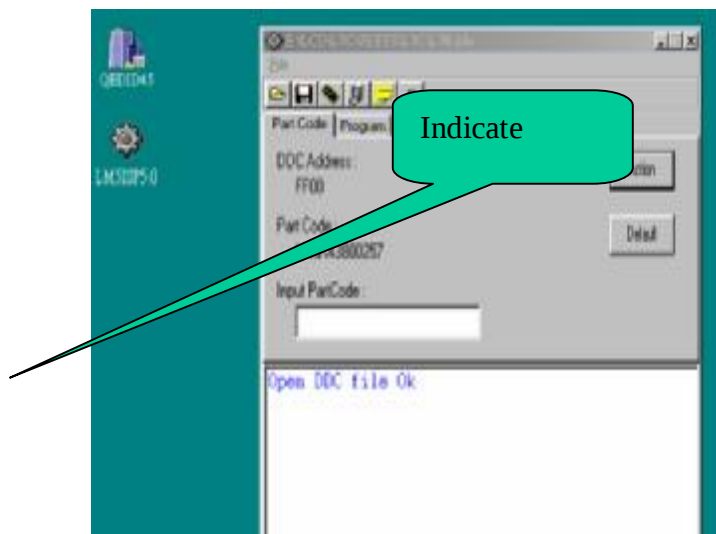
Step3:

Open the LM5ISP tool on windows98, Select the file ->load, then loading the DDC file



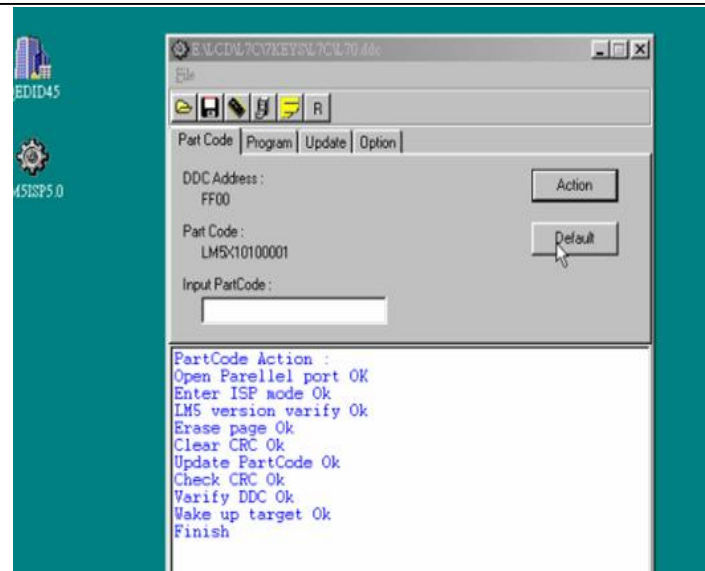
Step4:

check whether loading DDC file success.



Step5:

Press Default button or input the monitor serial number.



Read DDC:

Step1:

Connect the VGA cable with the Parallel Port using the tool signed DDC. use DDC program board. One port connect to PC print port, the other connect to Monitor signal port.

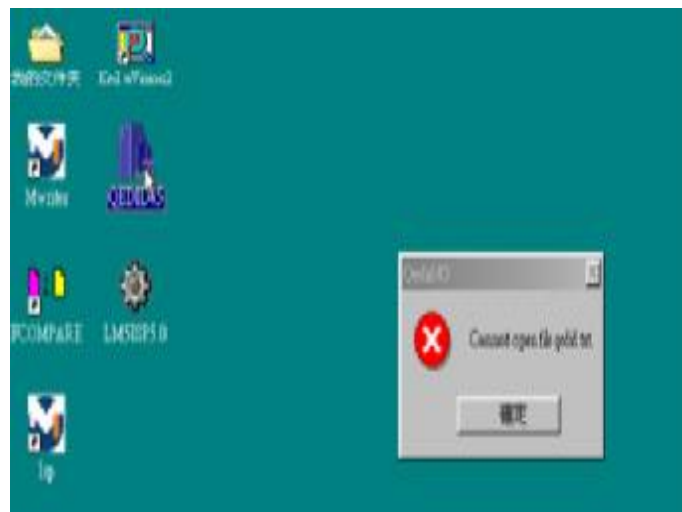


Step2:

Press the power key, and enter the user mode(green led)

Step3:

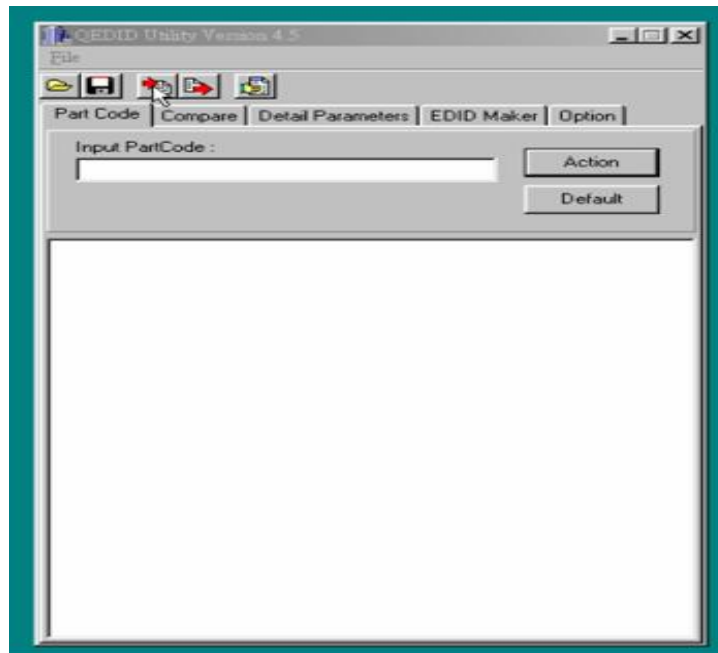
Double press the QEDID tool on **windows98**



Step4:

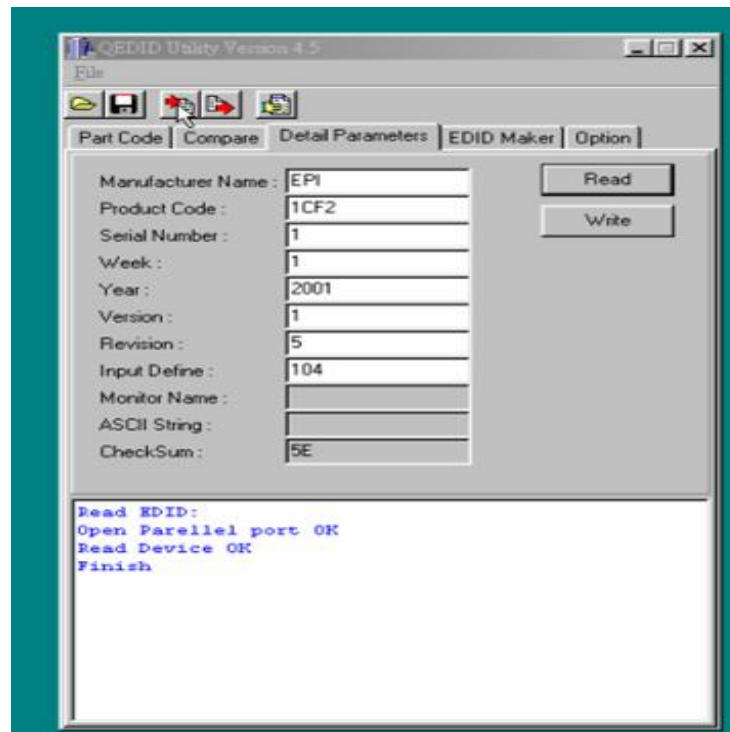
read DDC from device

Single press button



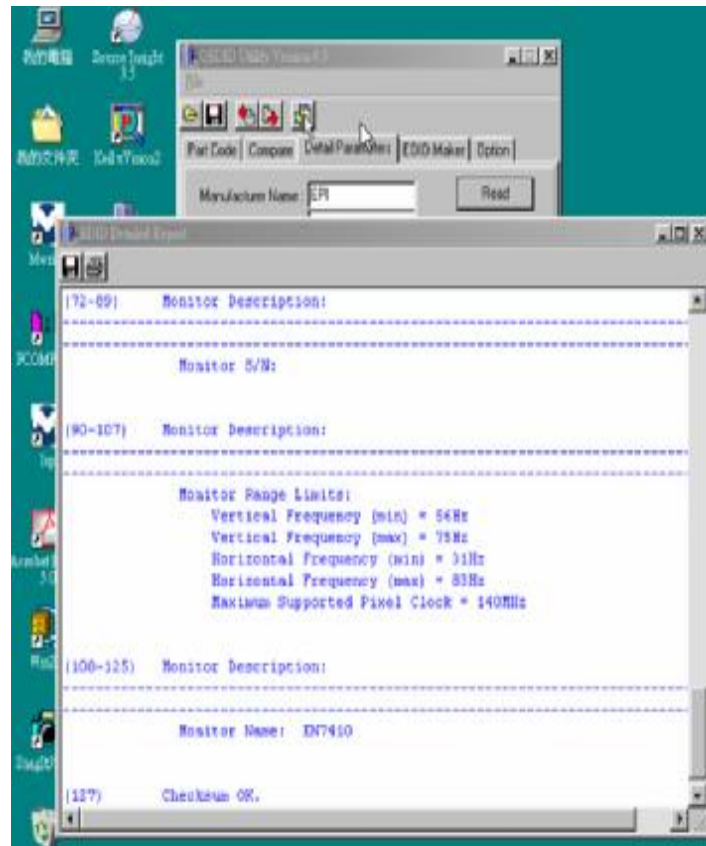
step5:
check whether read DDC success

Indicate success



step6:
see detailed DDC information

Single press button



Update BIOS (ISP):

Step1:

Connect the VGA cable with the Parallel Port using the tool signed ISP(Fig.2)



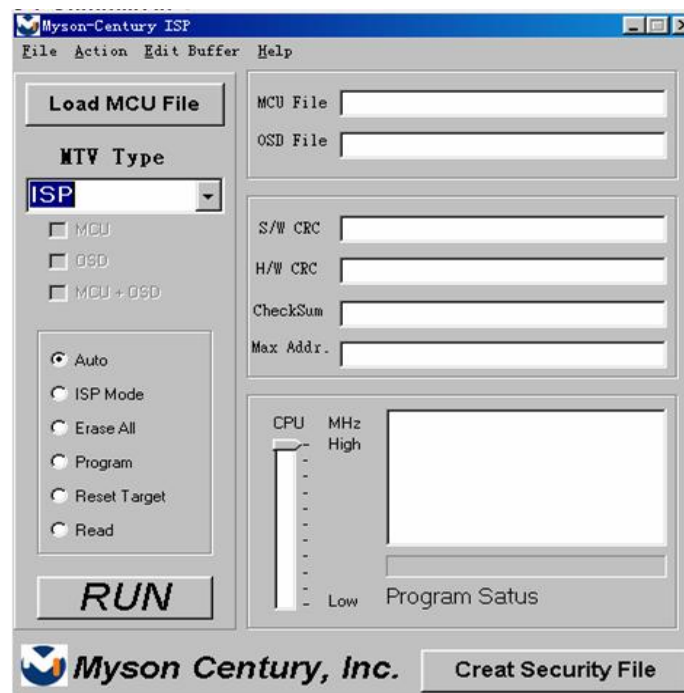
Fig.2

Step2:

Press the monitor power key, and enter the user mode (green led)

Step3:

Open the myson-century ISP tool on **windows98**



step4:

Select the **MTV type item** in MTV32M64. Load current BIOS file into **LOAD MCU FILE**



Note: ISP and DDC software should be run under Windows 98 system

Step5:

Press **Create Security File** button.

Set **Isp slave address** is 7C.

Slave B address is 4C

Command 1 address is 77

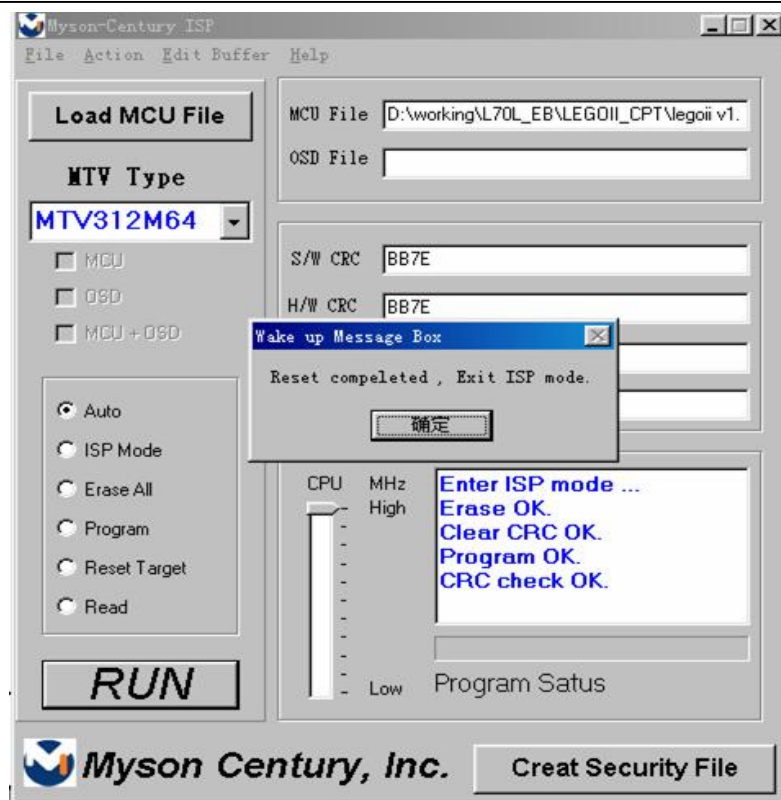
Field	Value	Range
ISP Slave Add.	7C	0x00 - 0xFF
SlaveB Add.	4C	0x00 - 0xFF
Command 1	77	0x00 - 0xFF
Command 2		0x00 - 0xFF
Command 3		0x00 - 0xFF
Command 4		0x00 - 0xFF
Command 5		0x00 - 0xFF
Command 6		0x00 - 0xFF
Command 7		0x00 - 0xFF
Command 8		0x00 - 0xFF
Command 9		0x00 - 0xFF
Command 10		0x00 - 0xFF
Command 11		0x00 - 0xFF
Command 12		0x00 - 0xFF
Command 13		0x00 - 0xFF
Command 14		0x00 - 0xFF
Command 15		0x00 - 0xFF

Command No: 2

Buttons: OK, CLEAR

Step6:

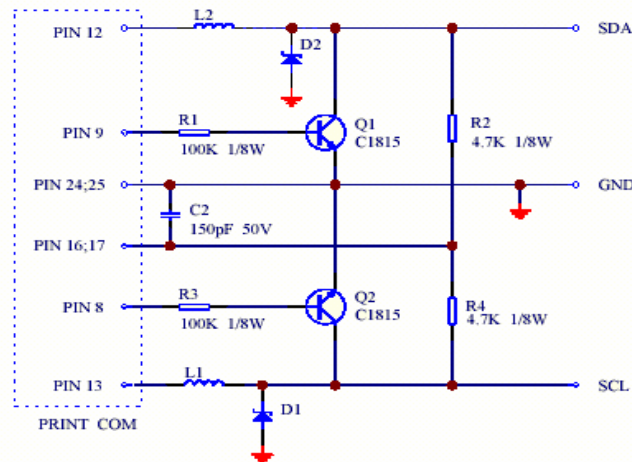
Check all information is ok, then Press Run button.



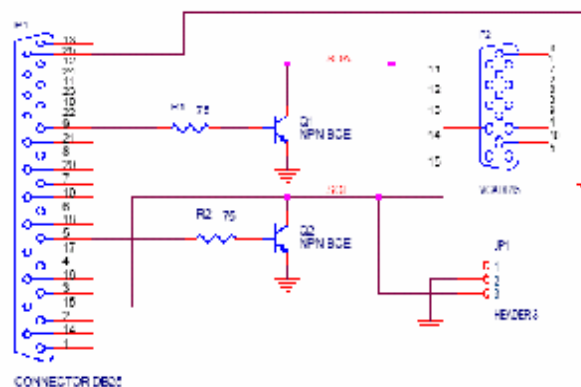
Step 7:

When update BIOS finish. Please enter factory mode to execute factory reset to make sure monitor would be working properly.

3 DDC board and ISP board schematic



DDC board schematic



ISP board schematic