

# Service Service Service



MODEL : 170W4P/74

# Service Manual

Horizontal frequencies  
30 - 64 KHz

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## 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 TRANSFORMER FOR THIS UNIT WHEN SERVICING.

REFER TO BACK COVER FOR IMPORTANT SAFETY GUIDELINES

Go to cover page

Proper service and repair is important to the safe, reliable operation of all PHILIPS Consumer Electronics 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 servicer 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 Consumer Electronics Company will be referred to as PHILIPS.

WARNING

Critical components having special safety characteristics are identified with a ▲ 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 symbol ▲ on the schematics or exploded views.

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. Servicer assumes all liability.

\* Broken Line

FOR PRODUCTS CONTAINING LASER :

DANGER-

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 are grounded through wrist band.
- 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 become dirty, please wipe it off with a soft material. (Cleaning with a dirty or rough cloth may damage the panel.)

## Technical Specification\*

### LCD

Type NR.	: LM171W01-B3C1 (LG-Philips)
Outside dimensions	: 400(w)258(h)16.8(d) (Typ)mm
Pitch ( mm )	: 0.291 (per one triad) x 0.291mm
Color pixel arrangement	: RGB vertical stripes
Display surface	: Hard coating, antiglare treatment of the front polarizer
Number of color	: 256 gray levels(6 bits + FRC)
Backlight	: CCFL edge light system
Active area (WxH)	: 372.48x223.49mm (17"W diagonal)
View angle	: Horizontal 120 degree ,Vertical 90 degree (CR>=10)
Contrast ratio	: 350:1 (Typ)
White luminance	: 450 nits ( Center 1 point Typ)

### Scanning frequencies

Hor.	: 30 64 K Hz
Ver.	: 56 - 75 Hz
Video dot rate	: < 110 Mhz
Power input	: 90-264 V AC, 50/60 2 Hz
Power consumption	: <45Wmaximum( exclude USB option)
Dimensions	: 417 * 374 * 180 mm
Weight	: 5.4 KGS

### Functions :

(1)D-shell analog R/G/B separate inputs, H/V sync separated, Composite (H+V) TTL level, SOG sync

(2)DVI digital Panel Link TMDS input

Ambient temperature : 5°C - 35°C

### Interface signals

The input signals can be applied in three different modes :

1). D-shell Analog

Input signal : Video, Hsync., Vsync

Video : 0.7 Vp-p, input impedance, 75 ohm @DC

Sync. :Separate syncTTL level , input impedance 2k2 ohm terminate

Hor. sync Positive/Negative

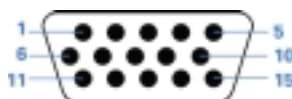
Ver. sync Positive/Negative

Composite sync TTL level, input impedance 2k2 ohm terminate (Positive/Negative)

Sync on green video 0.3 Vp-p Negative (Video 0.7 Vp-p Positive)

D-sub male with DDC2B pin assignments.blue connector thumb-operated jack screws

Pin assignment :



PIN No.	SIGNAL
1	Red
2	Green/ <u>SOG</u>
3	Blue
4	Sense (GND)
5	Not connected
6	Red GND
7	Green GND
8	Blue GND
9	+5V
10	Sync GND
11	Sense (GND)
12	Bi-directional data
13	H/H+V sync
14	V-sync
15	Data clock

### 2). Intel DVI Digital

Input signal : Single channel TMDS signal

The input signals are applied to the display through DVI-D cable.

Length : 1.8 M +/- 50 mm (fixed)

Connector type : DVI-D male with DDC2B pin assignments

White connector thumb-operated jack screws



Pin No.	Description
1	TMDS data2-
2	TMDS data2+
3	TMDS data2 shield
4	NC
5	NC
6	DDC clock
7	DDC data
8	Not Connected
9	TMDS data1-
10	TMDS data1+
11	TMDS data1 shield
12	NC
13	NC
14	+5V
15	Ground(return for +5V and H/Vsync)
16	Hot plug detect
17	TMDS data0-
18	TMDS data0+
19	TMDS data0 shield
20	NC
21	NC
22	TMDS clock shield
23	TMDS clock+
24	TMDS clock-

### Unit dimension / Weight

Set dimension (incl. pedestal): 417(W) \* 374(H) \* 180(D) mm

Net weight : 5.4 KGS

Susceptibility of display to external environment

### Operating

- Temperature : 5 to 35 degree C

- Humidity : 80% max

- Altitude : 0-3658m

- Air pressure : 600-1100 mBAR

### Storage

- Temperature : -20 to 60 degree C

- Humidity : 85% max ( < 40℃J )

- Altitude : 0-12192m

- Air pressure : 300-1100 mBAR

Note: recommend at 5 to 35C, Humidity less than 60 %

◀◀ [Go to cover page](#)

Data Storage

Factory preset modes:

This monitor has 14 factory-preset modes as indicated in the following table :

	Resolution	Frequency	Pixel rate	Sync	Comment
1	640X350	31.5K/70HZ	25.175	(+/-)	IBM VGA 10h
2	720X400	31.5K/70HZ	28.322	(-/+)	IBM VGA 3h
3	640X480	35.0K/67HZ	30.24	(-/-)	
4	640X480	31.5K/60HZ	25.175	(-/-)	
5	640X480	37.5K/75HZ	31.501	(-/-)	
6	800X600	35.2K/56HZ	36	(+/+)	
7	800X600	37.9K/60HZ	40	(+/+)	
8	800X600	46.9K/75HZ	49.498	(+/+)	
9	832X624	49.7K/75HZ	57.28	(+/+)	MAC
10	1024X768	48.4K/60HZ	65	(-/-)	
11	1024X768	60.0K/75HZ	78.75	(+/+)	
12	1280X720	/70Hz		(-/+)	
13	1280X768	/56Hz		(-/+)	
14	1280X768	47.7K/60HZ	80.136	(-/+)	
15	1280X768	60.2K/75HZ	102.977	(-/+)	

Power management

The power consumption and the status indication of the set with power management function are as follows,  
Note : Disconnect DVI signal cable and audio module

VESA Mode	Video	H-sync	V-sync	Power Used	LED color
ON	Active	Yes	Yes	< 40 W	Blue
OFF	Blanked	No	No	< 1W	Amber

This monitor is ENERGY STAR® compliant.

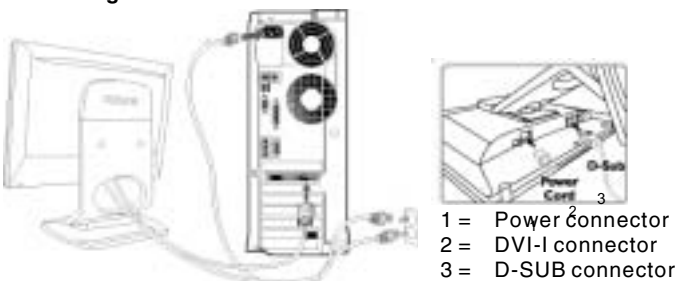
As an ENERGY STAR® Partner, PHILIPS has determined that this product meets the ENERGY STAR® guidelines for energy efficiency



ENERGY STAR is a U.S. registered mark. AS AN ENERGY STAR PARTNER, DELL Computer Corporation HAS DETERMINED THAT THIS PRODUCT MEETS THE ENERGY STAR GUIDELINES FOR ENERGY EFFICIENCY.

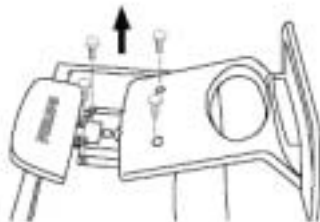


## Connecting to Your PC



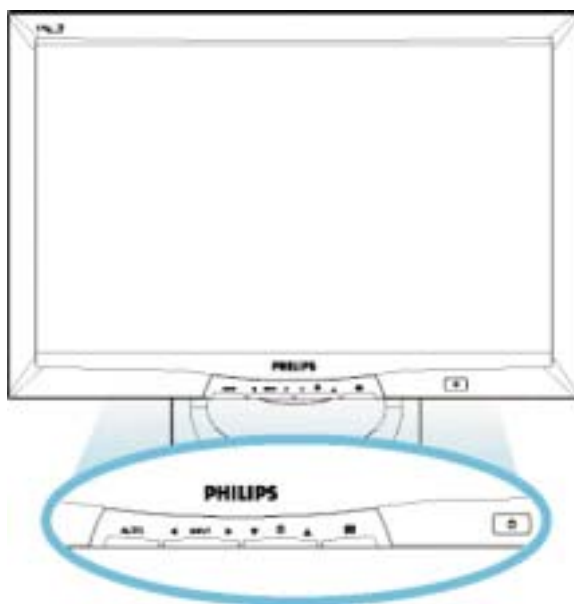
- 1) Thread power cord through the hole at the bottom of the base, and plug onto monitor firmly.
- 2) Double check all cables' connection closely. Make sure they are all connected well.  
Note: If you use an Apple Macintosh™, you need to connect the special Mac adapter to one end of the monitor signal cable.
- 3) Connect to PC
  - (A) Turn off your computer and unplug its power cable.
  - (B) Connect the monitor signal cable to the video connector on the back of your computer.
  - (C) Plug the power cord of your computer and your monitor into a nearby outlet.
  - (D) Turn on your computer and monitor. If the monitor Displays an image, installation is complete.

## Remove the Base



- 1) (a) Tilt monitor on certain angle.  
(b) Pull cables out of the hole at the bottom of base.
- 2) (a) Put monitor face down on the safe surface.  
(b) Take off the cap of base
- 3) Unscrew the four screws of the base

## Front View Product Description



UP and DOWN buttons are used when adjusting the OSD of your monitor



LEFT and RIGHT buttons, like the UP and DOWN buttons, are also used in adjusting the OSD of your monitor.



BRIGHTNESS hotkey. When the UP and DOWN arrow buttons are pressed, the adjustment controls for the BRIGHTNESS will show up.



OK button which when pressed will take you to the OSD controls



POWER button switches your monitor on



Automatically adjust the horizontal position, vertical position, phase and clock setting.



Signal inputs selective hotkeys. Allows user to switch between two video connectors (D-Sub & DVI-D), e.g. D-Sub <-> DVI-D digital inputs.

## Performing auto-adjustment of the monitor

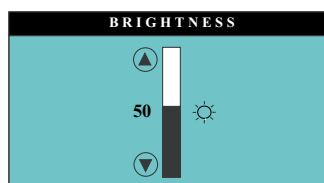
Press the AUTO button.  
The picture quality (*PHASE*, *CLOCK*) and picture position will be optimally adjusted for your system.  
Press the MENU button to save the settings.

## Adjusting the brightness

The brightness of the monitor is adjusted directly with the arrow buttons.

Press the button (▲) or (▼).

The window *BRIGHTNESS* with a setting scale is visualised.



Press the (▲) or (▼) button to adjust the brightness.

The setting window disappears after approximately 60 seconds if no further setting is made.

All changes are stored automatically.

## Installation (Continued)

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### Accessory Pack

Unpack all the parts.



1) Power Cord (socket may differ for different countries)



2) Macintosh Adapter (optional)



3) VGA Signal Cable

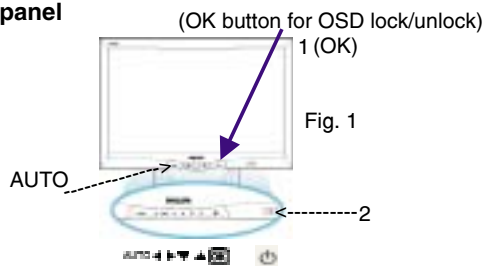


4) E-DFU package with Quick Setup Guide, Using Your Monitor Manual, and CD-ROM.



5) Pivot CD-ROM

## Front control panel



- 1 = Buttons for the OSD menu (On-Screen-Display)  
2 = Power button

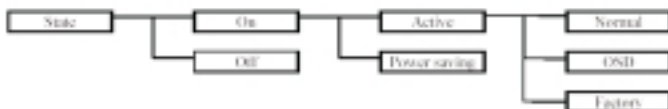
## Basic and simple instruction on the control keys.

When you press the button on the front control of your monitor, the On-Screen Display (OSD) Main Controls window will pop up and you can then start making adjustments to your monitor's various features. Use the or the keys to make your adjustments



## State Tree

The overall behavior of monitor is depicted in the subjoined figure identifying the states in which the product may operate, as can be observed by the user.



## The meaning of these states is as below:

- Off:** monitor set not powered.  
**On:** monitor set powered.  
**Power saving:** monitor set in power saving.  
**Active:** monitor set powered and not in power saving.  
**Normal:** normal video displaying.  
**OSD:** interaction with On Screen Display menu.  
**Factory:** factory programming.

## State Transition Table

The required system state transitions are depicted in the table below where each position describes the condition for moving the state labeling its row to the state labeling its column.

Start->End	Off	Power saving	Normal	OSD	Factory
Off		x	(5)	(5)&(7)	(1)&(9)
Power saving	(1)		(6)	x	(2)
Normal	(1)	(2)		(7)	(8)
OSD	(1)	(2)	(3)		(3)&(8)
Factory	(1)	(2)	(4)	(4)&(7)	

## State transition conditionsx

x. Not Allow

- Power Off
- No Video Signal Over 5 Seconds
- OSD Menu Turn Off
- Command: Leave Factory Control
- Power On
- Video Signal Exist
- OSD Menu Turn On
- Command: Enter Factory Control
- Press key (OK & AUTO) until picture appear

## OSD (Continued)

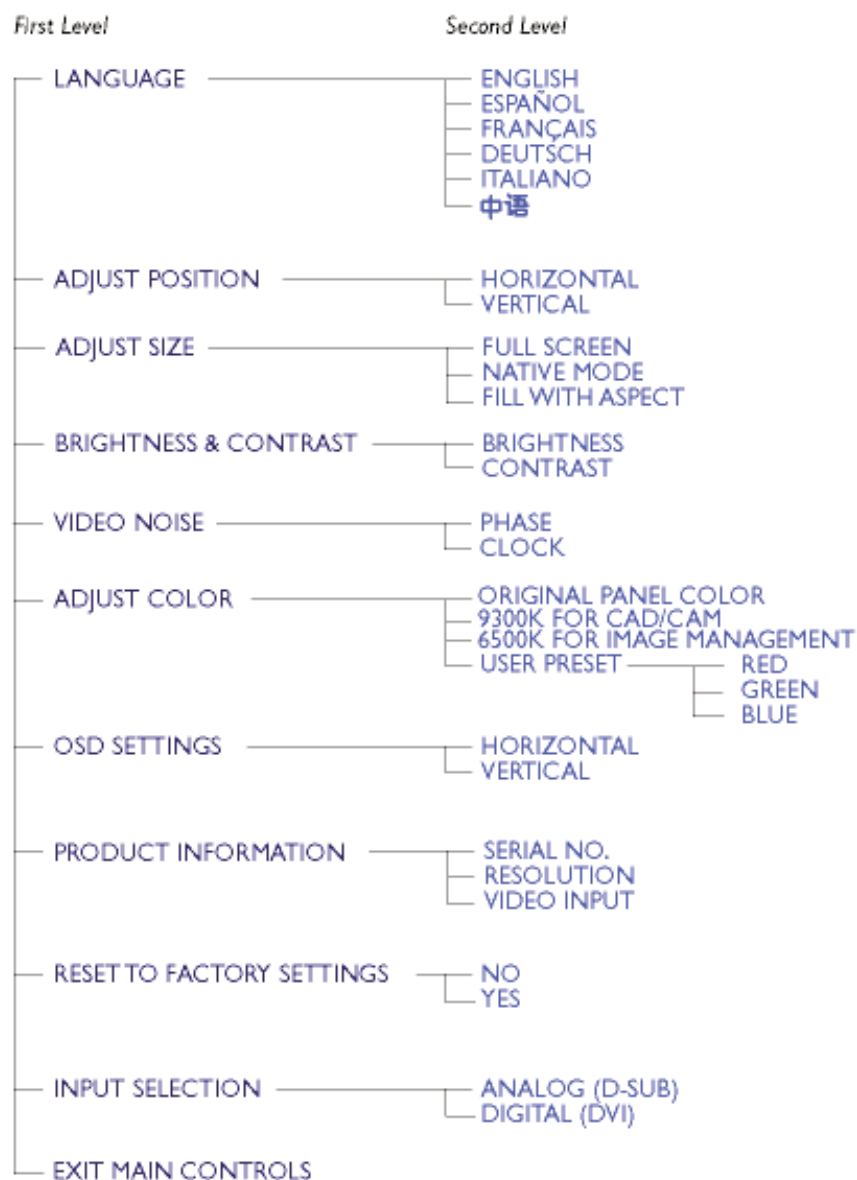
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### OSD menu tree-Analog

#### The OSD Tree

Below is an overall view of the structure of the On-Screen Display.

You can use this as reference when you want to later on work your way around the different adjustments.



OSD menu tree-Analog

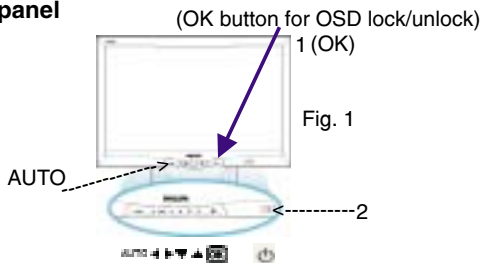
The OSD Tree

Below is an overall view of the structure of the On-Screen Display.  
You can use this as reference when you want to later on work your way around the different adjustments.



# OSD Lock/Unlock, Aging & Service Mode, Enable/Disable "warning message"

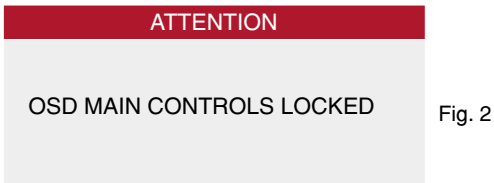
## Front control panel



1 = Buttons for the OSD menu (On-Screen-Display)  
2 = Power button

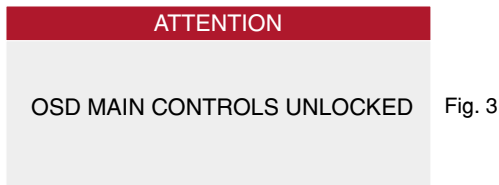
## To Lock/Unlock OSD function (User Mode)

The OSD function can be locked by pressing "OK" button(1) for more than 10 seconds, the screen shows following windows for 3 seconds. Everytime when you press "AUTO" or "OK" button, this message appears on the screen automatically.



## Unlock OSD function:

Locked OSD function can be released by pressing"OK" button for more than 10 seconds again.

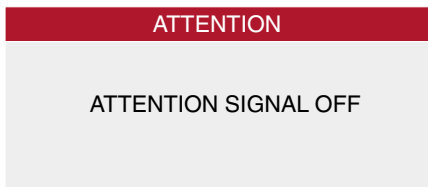


## To Enable/Disable "Warning message" on screen (in User Mode)

**Step 1:** Turn on LCD monitor, and disconnect Interface Cable between Monitor and PC.

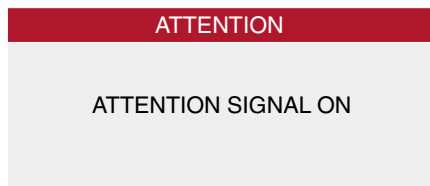
### Step 2 :

Push AUTO "AUTO" button for more than 10 seconds to disable "warning message", bring up



### Step 3 :

Push AUTO "AUTO" button for more than 10 seconds again to enable "warning message", bring up



Status 1.: Turn off monitor, then turn on monitor again  
=> go back to last display.

Status 2. Connect signal cable again  
=> go back to Windows screen.

## Access Aging.. Mode

**Step 1:** Turn off LCD monitor, and disconnect Interface Cable between Monitor and PC.

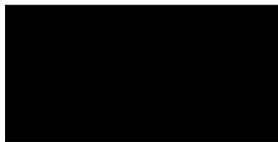
### Step 2 :

[Push AUTO "AUTO" & OK "OK" buttons at the same time and hold it] + [Press power "POWER" button untill comes out "AGING screen"] => then release all buttons.

Bring up :



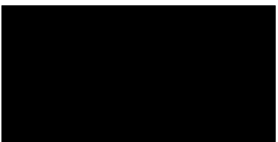
After 15 seconds, bring up :



After 15 seconds, bring up :



After 15 seconds, bring up :



-----  
-----

repeatly

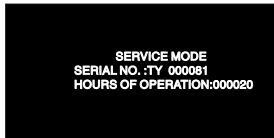
**Connect signal cable again => go back to normal display.**

## Access "SERVICE MODE" (in USER Mode)

**Step 1:** Turn on LCD monitor, and disconnect Interface Cable between Monitor and PC.

### Step 2 :

Push OK "OK" button for more than 10 seconds, bring up "SERVICE MODE".

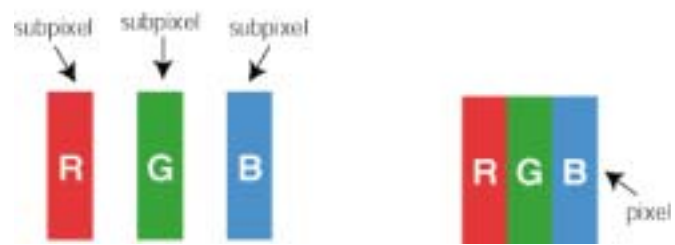


Status 1.: Turn off monitor, then turn on monitor again  
=> go back to last display.

Status 2. Connect signal cable again  
=> go back to Windows screen.

Philips' Flat Panel Monitors Pixel Defect Policy

Philips strives to deliver the highest quality products. We use some of the industry's most advanced manufacturing processes and practice stringent quality control. However, pixel or subpixel defects on the TFT LCD panels used in flat panel monitors are sometimes unavoidable. No manufacturer can guarantee that all panels will be free from pixel defects, but Philips guarantees that any monitor with an unacceptable number of defects will be repaired or replaced under warranty. This notice explains the different types of pixel defects and defines acceptable defect levels for each type. In order to qualify for repair or replacement under warranty, the number of pixel defects on a TFT LCD panel must exceed these acceptable levels. For example, no more than 0.0004% of the subpixels on a 15" XGA monitor may be defective. Additionally, because some types or combinations of pixel defects are more noticeable than others, Philips sets even higher quality standards for those.



Pixels and Subpixels

A pixel, or picture element, is composed of three subpixels in the primary colors of red, green and blue. Many pixels together form an image. When all subpixels of a pixel are lit, the three colored subpixels together appear as a single white pixel. When all are dark, the three colored subpixels together appear as a single black pixel. Other combinations of lit and dark subpixels appear as single pixels of other colors.

Types of Pixel Defects

Pixel and subpixel defects appear on the screen in different ways. There are two categories of pixel defects and several types of subpixel defects within each category.

**Bright Dot Defects** Bright dot defects appear as pixels or subpixels that are always lit or "on".

These are the types of bright dot defects:



One lit red, green or blue subpixel



Two adjacent lit subpixels:  
- Red + Blue = Purple  
- Red + Green = Yellow  
- Green + Blue = Cyan (Light Blue)



Three adjacent lit subpixels

Black Dot Defects

Black dot defects appear as pixels or subpixels that are always dark or "off".

These are the types of black dot defects:



One dark subpixel



Two or three adjacent dark subpixels

Proximity of Pixel Defects

Because pixel and subpixels defects of the same type that are nearby one another may be more noticeable, Philips also specifies tolerances for the proximity of pixel defects.

Pixel Defect Tolerances

In order to qualify for repair or replacement due to pixel defects during the warranty period, a TFT LCD panel in a Philips flat panel monitor must have pixel or subpixel defects exceeding the tolerances listed in the following tables.

BRIGHT DOT DEFECTS		ACCEPTABLE LEVEL
MODEL		170W4
1 lit subpixel		3 or fewer
2 adjacent lit subpixels		1 or fewer
3 adjacent lit subpixels (one white pixel)		0
Distance between two bright dot defects*		15 mm or more
Bright dot defects within 20 mm circle		-
Total bright dot defects of all types		3 or fewer
BLACK DOT DEFECTS		ACCEPTABLE LEVEL
MODEL		170W4
1 dark subpixel		4 or fewer
2 adjacent dark subpixels		2 or fewer
3 adjacent dark subpixels		1 or fewer
Distance between two black dot defects*		15 mm or more
Black dot defects within 20 mm circle*		-
Total black dot defects of all types		4 or fewer
TOTAL DOT DEFECTS		ACCEPTABLE LEVEL
MODEL		170W4
Total bright or black dot defects of all types		4 or fewer
Note: 1 or 2 adjacent subpixel defects = 1 dot defect		



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General

DDC Data Re-programming

In case the DDC data memory IC or main EEPROM which storage all factory settings were replaced due to a defect, the serial numbers have to be re-programmed"Analog DDC IC, Digital DDC IC & EEPROM". It is advised to re-soldered DDC IC and main EEPROM 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

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.

DDC EDID structure

- For Analog interface:
- Standard Version 3.0
- Structure Version 1.2
- For Digital interface:
- Standard Version 3.0
- Structure Version 1.3

System and equipment requirements

1. An i486 (or above) personal computer or compatible.
2. Microsoft operation system Windows 95/98.
3. EDID301.EXE program (3138 106 10103) as shown in Fig. 1
4. A/D Alignment kits (3138 106 10079):

inclusion : a. Alignment box x1 (as Fig. 2)



Fig. 2

- b. Printer cable x1
- c. (D-Sub) to (D-Sub) cable x1
- d. (DVI-D) to (D-Sub) cable x1 (as Fig. 3)

Note: The EDID301.EXE (Release Version 1.58 20000818)is a windows-based program, which cannot be run in MS-DOS.



Diskette with EDID301.EXE

Fig. 1



Fig. 3

(DVI-D) to (D-Sub) cable

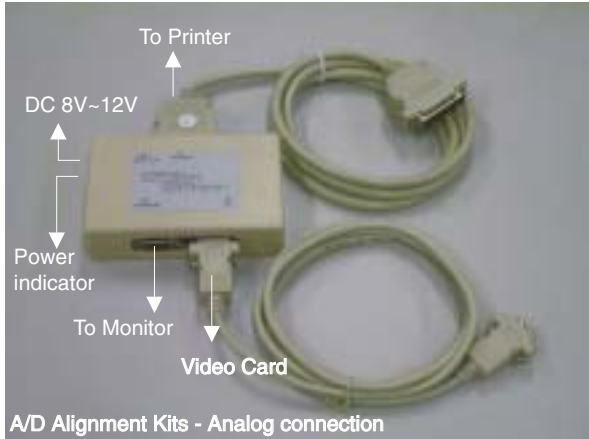


Fig. 4

A/D Alignment Kits - Analog connection

Note: The alignment box has already build-in a batteries socket for using **batteries (9V)** as power source. Pull out the socket by remove four screws at the rear of box. Please do not forget that remove batteries after programming. The energy of batteries can only drive circuits for a short period of time.

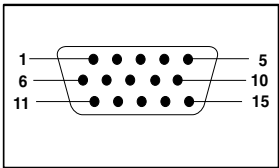


A/D Alignment Kits - Digital connection

Fig. 5

Pin assignment

A. 15-pin D-Sub Connector



Pin No.	Assignment	Pin No.	Assignment
1	Red video input	9	+5V
2	Green video input	10	Ground
3	Blue video input	11	Ground
4	Ground	12	Serial data line(SDA)
5	No Connected	13	H.Sync
6	Red video ground	14	V.Sync(VCLK for DDC)
7	Green video ground	15	Data clock line(SCL)
8	Blue video ground		

Configuration and procedure

There are 2 chips contained OSD string, serial number..etc on the circuit board, main EEPROM which storage all factory settings, OSD string. DDC IC which storage 128byte EDID data(serial number ..etc.). Following descriptions are the connection and procedure for Analog and Digital DDC application, the main EEPROM can be re-programmed along with Analog/Digital IC by enable "factory memory data write" function on the DDC program (EDID301.EXE).

Initialize alignment box

In order to avoid that monitor entering power saving mode due to sync will cut off by alignment box, it is necessary to initialize alignment box before running programming software (EDID301.EXE). Following steps show you the procedures and connection.

- Step 1: Supply 8~12V DC power source to the Alignment box by plugging a DC power cord or using batteries.
- Step 2: Connecting printer cable and video cable of monitor as Fig. 6

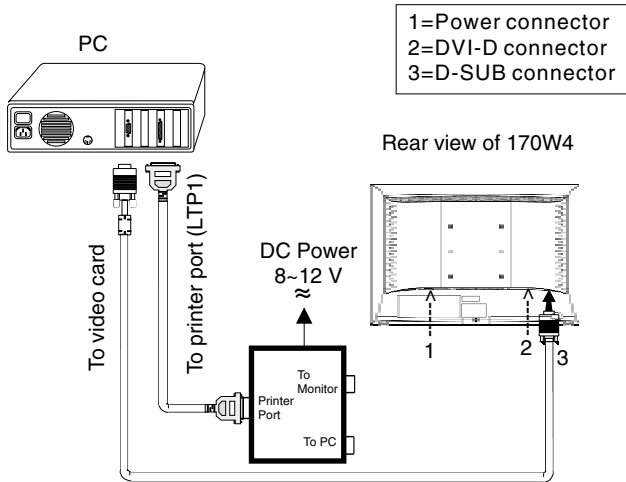


Fig. 6

Step 3: Installation of EDID301.EXE

Method 1: Start on DDC program

- Start Microsoft Windows.
- 1. Insert the disk containing EDID301.EXE program into floppy disk drive.
- 2. Click **Start**, choose Run at start menu of Windows 95/98 as shown in Fig. 7.



Fig. 7

- 3. At the submenu, type the letter of your computer's floppy disk drive followed by :EDID301 (for example, A:\EDID301, as shown in Fig. 8).

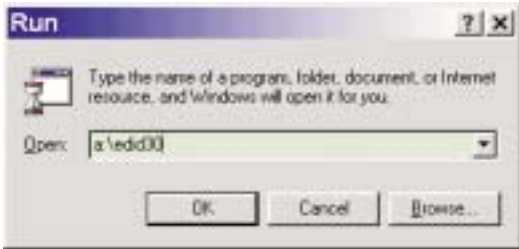


Fig. 8

- 4. Click **OK** button. The main menu appears (as shown in Fig. 9). This is for initialize alignment box.

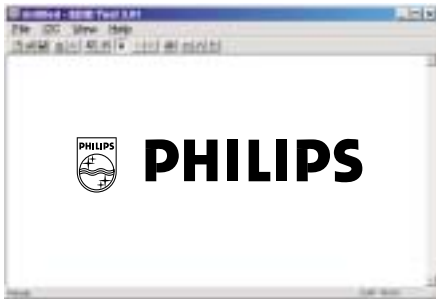


Fig. 9

Note 1: If the connection is improper, you will see the following error message (as shown in Fig. 10) before entering the main menu. Meanwhile, the (read EDID) function will be disable. At this time, please make sure all cables are connected correctly and fixedly, and the procedure has been performed properly.



Fig. 10

Method 2: After create a shortcut of EDID301.EXE

- : Double click EDID301 icon (as shown in Fig. 11) which is on the screen of Windows Wallpaper. Bring up main menu of EDID301 as shown in Fig. 12. This is for initialize alignment box.



Fig. 11



Fig. 12

Note 2: During the loading, EDID301 will verify the EDID data which just loaded from monitor before proceed any further function, once the data structure of EDID can not be recognized, the following error message will appear on the screen as below. Please confirm following steps to avoid this message.

- 1. The data structure of EDID was incorrect.
- 2. DDC IC that you are trying to load data is empty.
- 3. Wrong communication channel has set at configuration setup windows.
- 4. Cables loosed or poor contact of connection.

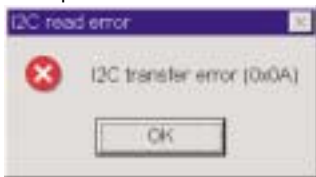


Fig. 13

Go to cover page

Re-programming Analog DDC IC

Step 1: After initialize alignment box, connecting all cables and box as shown in Fig. 14

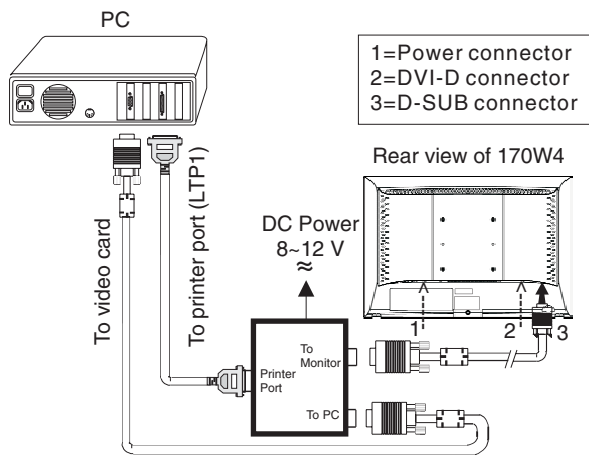


Fig. 14

Step 2: Read DDC data from monitor

1. Click  icon as shown in Fig. 15 from the tool bar to bring up the Channels "Configuration Setup" windows as shown in Fig. 12.

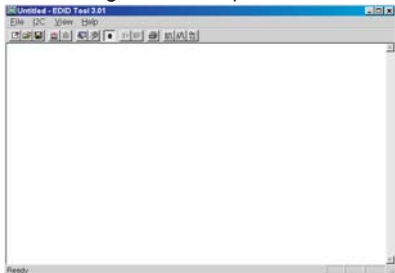



Fig. 15

2. Select the DDC2B as the communication channel. (Disable "Factory memory data write") as shown in Fig. 16.



Fig. 16

3. Click OK button to confirm your selection.
4. Click  icon (Read EDID function) to read DDC EDID data from monitor. The EDID codes will display on screen as shown in Fig. 17.

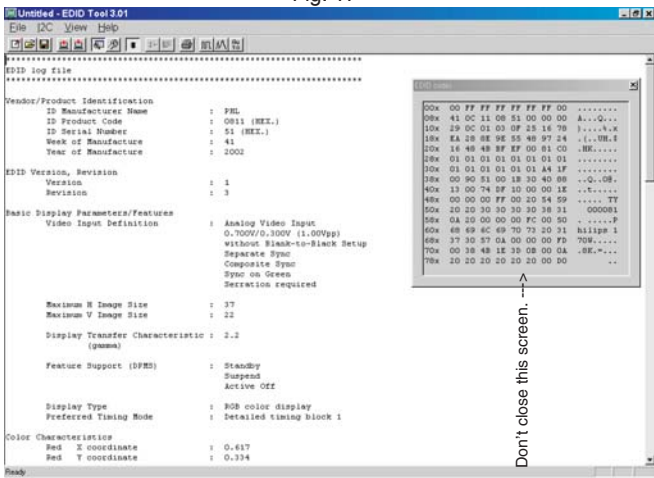


Fig. 17

Step 3: Modify DDC data (verify EDID version, week, year)


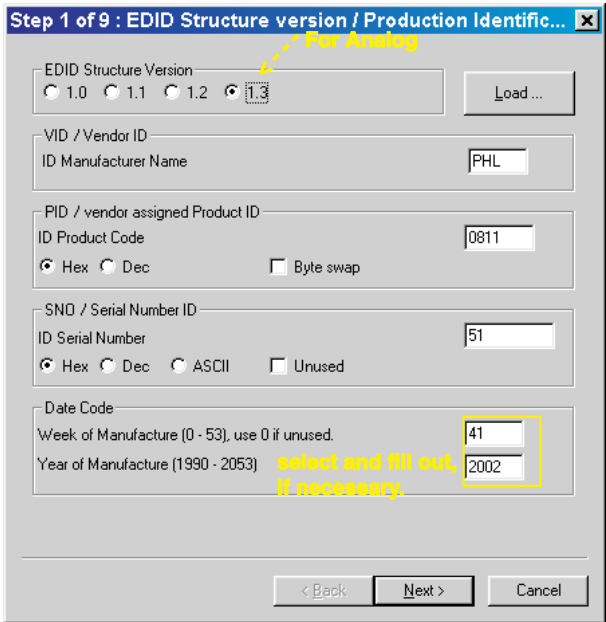
1. Click  (new function) icon from the tool bar, bring up Step 1 of 9 as shown in Fig. 18 . EDID301 DDC application provides the function selection and text change (select & fill out) from Step 1 to Step 9.

Fig. 18



Step 4: Modify DDC data (Monitor Serial No.)

1. Click Next , bring up Fig. 19.

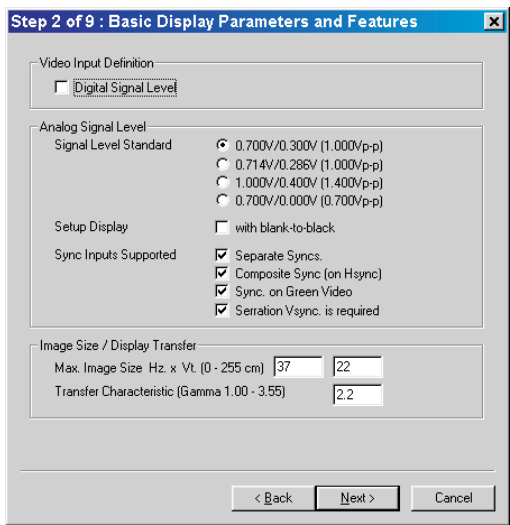


Fig. 19

2. Click Next , bring up Fig. 20.

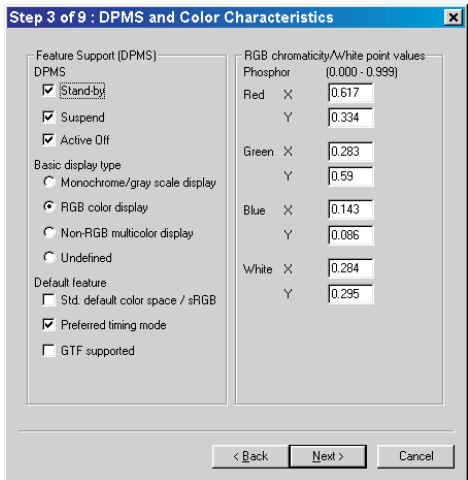


Fig. 20

3. Click **Next** , bring up Fig. 21.

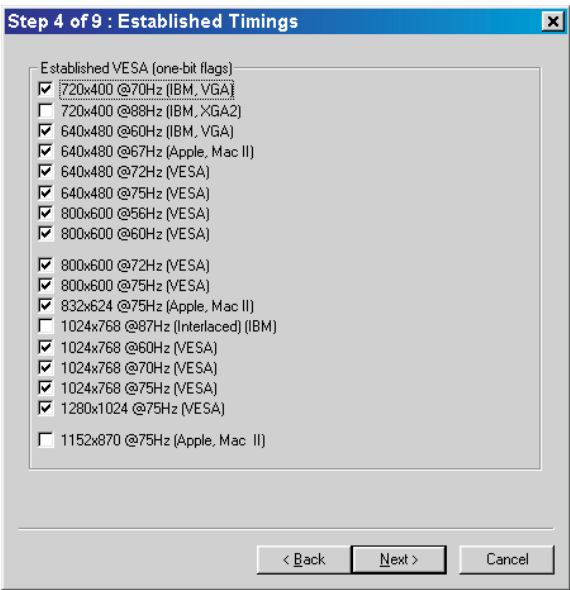


Fig. 21

6. Click **Next** , bring up Fig. 24.  
(Serial number can be filled up or be changed at this moment.)

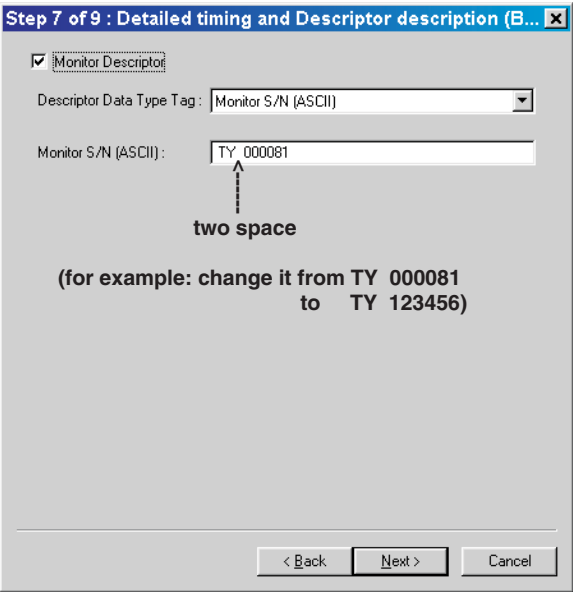


Fig. 24

4. Click **Next** , bring up Fig. 22.

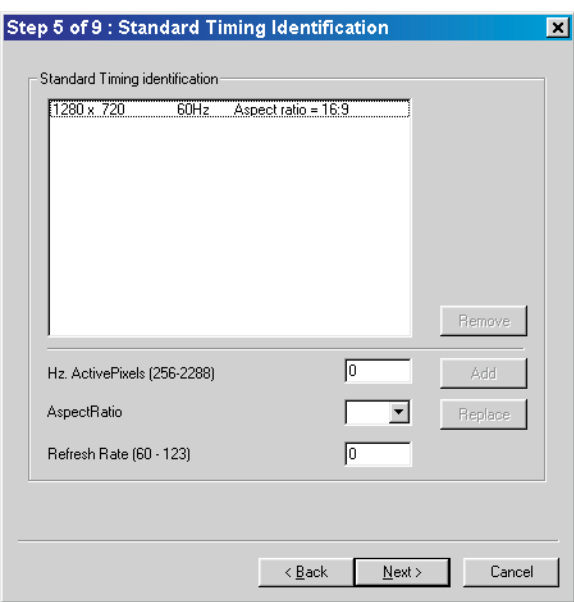
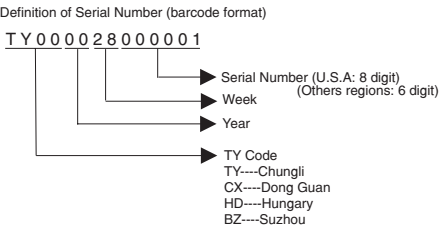


Fig. 22



7. Click **Next** , bring up Fig. 25.



Fig. 25

5. Click **Next** , bring up Fig. 23.

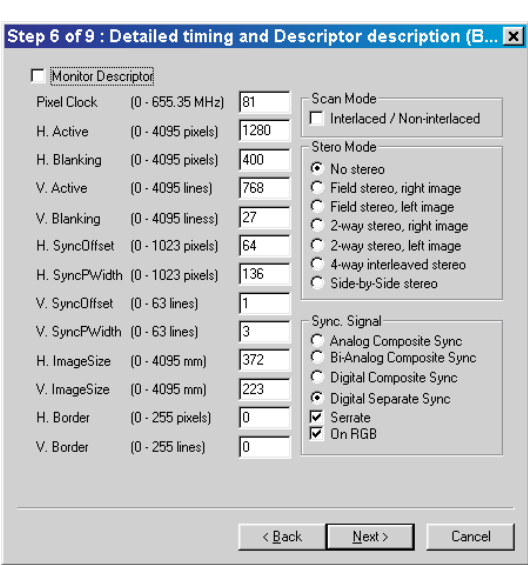


Fig. 23

8. Click **Next** , bring up Fig. 26.  
- Click **Finish** to exit the Step window.

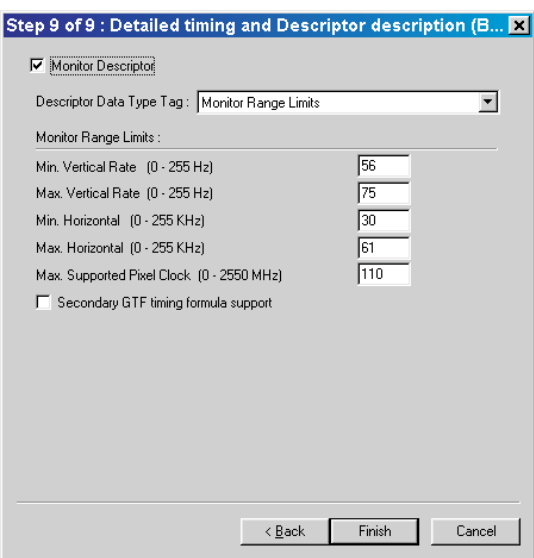


Fig. 26

Go to cover page

Step 6: Write DDC data

1. Configuration should be as Fig. 27.

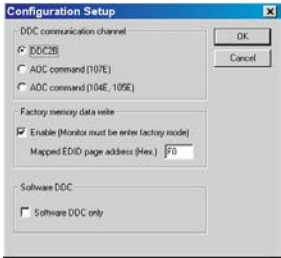


Fig. 27

2. Access Factory mode

Access Factory Mode

How to Get into Factory Mode Menu

Step 1 :

Turn off monitor.

Step 2 :

[Push AUTO " AUTO " & OK " OK " buttons at the same time and hold it ] + [Press power " " button untill comes out "Windows screen" ] => then release all buttons.

Step 3 :

Press OK " OK " button, bring up Factory mode indication as shown in Fig 28.

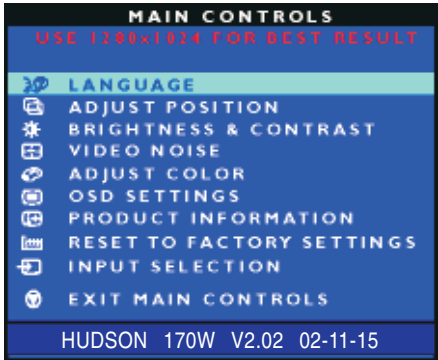


Fig. 28

3. Click (Write EDID) icon from the tool bar to write DDC data. Bring up "Writing 0%~100%, ready" a progressing bar on the left down corner.
4. Click (Read EDID) to confirm it.

Step 7: Confirm Serial Number in User Mode

1. Press the POWER button to turn off the monitor. Press the button again to turn on the monitor.
2. Press the OK button to bring up the OSD Main Menu.
3. Press the DOWN button to select PRODUCTION INFORMATION, press the OK button to confirm your selection.
4. Re-confirm the Serial Number "123456" (example only) is updated as shown in Fig. 29.



Fig. 29

Step 8: Save DDC data

Sometimes, you may need to save DDC data as a text file for using in other IC chip. To save DDC data, follow the steps below:

1. Click (Save) icon (or click "file"-> "save as") from the tool bar and give a file name as shown in Fig. 30.
- The file type is EDID301 file (\*.ddc) which can be open in WordPad. By using WordPad, the texts of DDC data & table (128 bytes, hex code) can be modified. If DDC TEXTS & HEX Table are completely correct, it can be saved as .ddc file to re-load it into DDC IC for DDC Data application.

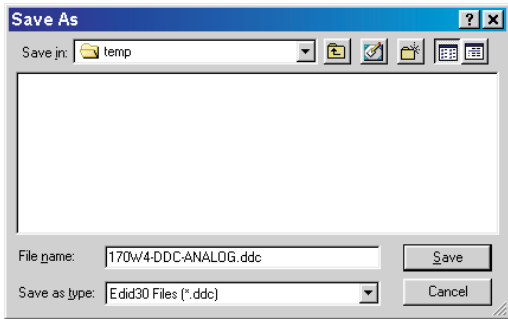


Fig. 30

2. Click **Save**.

Step 9: Load DDC data

1. Click (Open) icon from the tool bar.
2. Select the file you want to open as shown in Fig. 31.
3. Click **Open**.

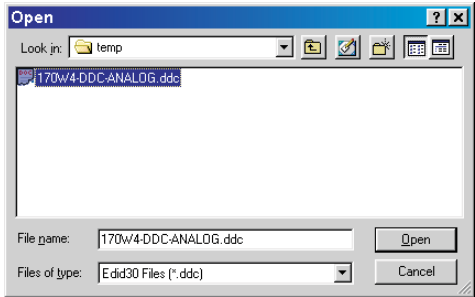


Fig. 31

Step 10: Exit DDC program

Pull down the File menu and select Exit as shown in Fig. 32.

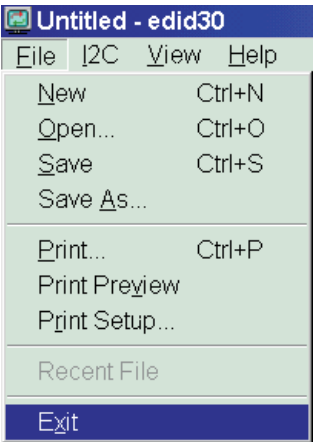


Fig. 32



Re-programming Digital DDC IC

Step 1: Connecting all cables and alignment box as shown in Fig. 33.

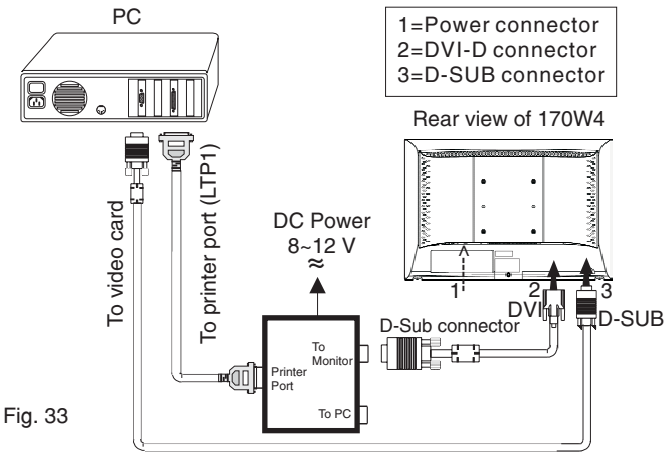


Fig. 33

After connection for Digital DDC application, if it is still in Analog DDC application of EDID301.  
Exit EDID301 program before Digital DDC application.

Step 2: Initialize alignment box  
(Shortcut of EDID301.EXE on Windows Wallpaper already.)

Double click EDID301 icon (as shown in Fig. 34) which is on the screen of Windows Wallpaper.  
Bring up main menu of EDID301 as shown in Fig. 35.



Fig. 34

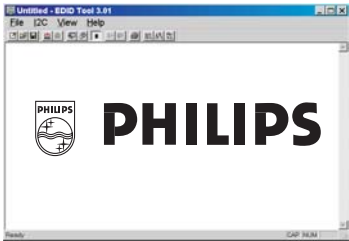
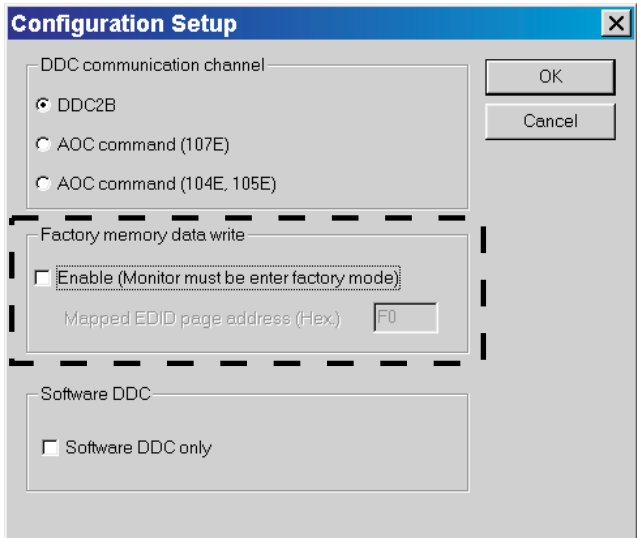


Fig. 35

Step 3: Read DDC data from monitor

- Click icon from the tool bar to bring up the Channels Configuration Setup windows as shown in Fig. 35.
- Select the DDC2B as the communication channel.  
**Disable "Factory memory data write" for Digital DDC application as shown in Fig. 36.**
- Click OK button to confirm your selection.

Fig. 36



- Click icon (Read EDID function) to read DDC EDID data from monitor. The EDID codes will display on screen as shown in Fig. 37.

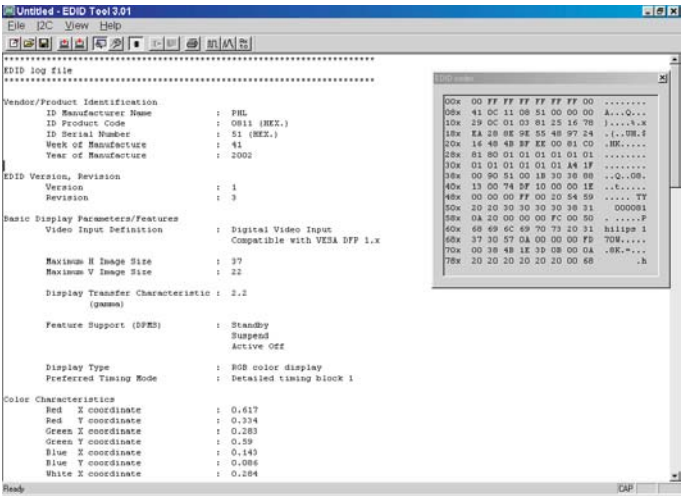


Fig. 37

Step 4: Modify DDC data (verify EDID version, week, year)

- Click icon (new function) from the tool bar, bring up Step 1 of 9 (Digital) as shown in Fig. 38 .  
EDID301 DDC application provides the function selection and text change (select & fill out) from Step 1 to Step 9.

Fig. 38

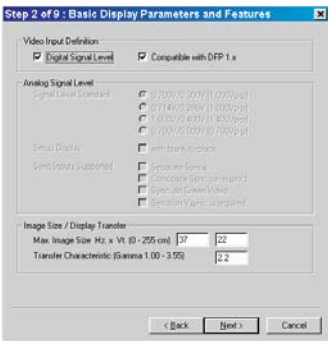
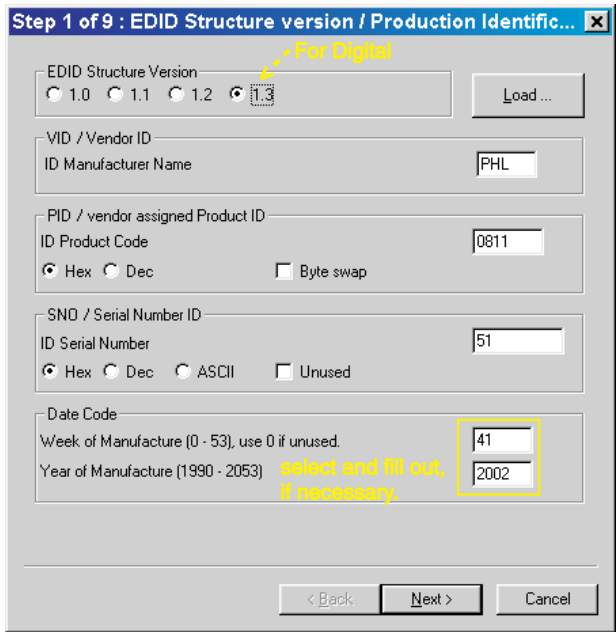


Fig. 39

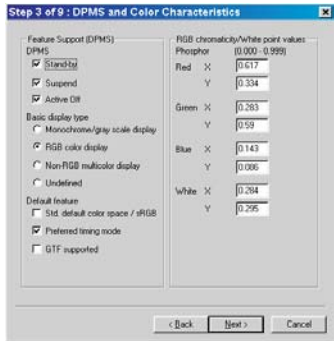


Fig. 40

# DDC Instructions (Continued)



Fig. 41



Fig. 42

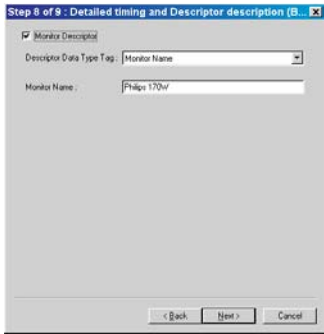


Fig. 45

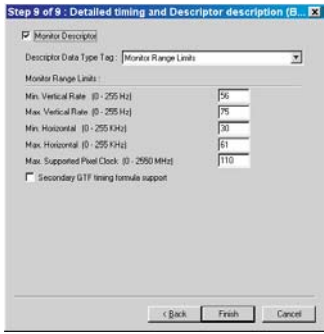


Fig. 46

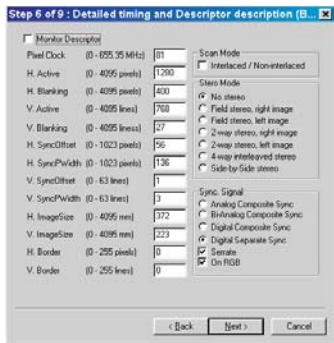




Fig. 43

Click **Finish** to exit the Step window as shown in Fig. 46.


## Step 6: Write DDC data

- Click  (Write EDID) icon from the tool bar to write DDC data.
- Click  (Read EDID) to re-confirm (check contents) it.

The 128bytes DDC data which had been written into DDC IC of Digital Mode.

## Step 7: Save DDC data

Sometimes, you may need to save DDC data as a text file for using in other IC chip. To save DDC data, follow the steps below:

- Click  (Save) icon (or click "file"-> "save as") from the tool bar and give a file name as shown in Fig. 47.
- Click **Save**.

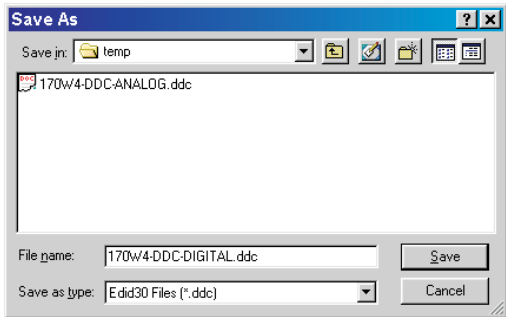
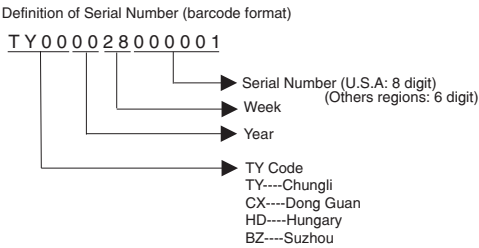
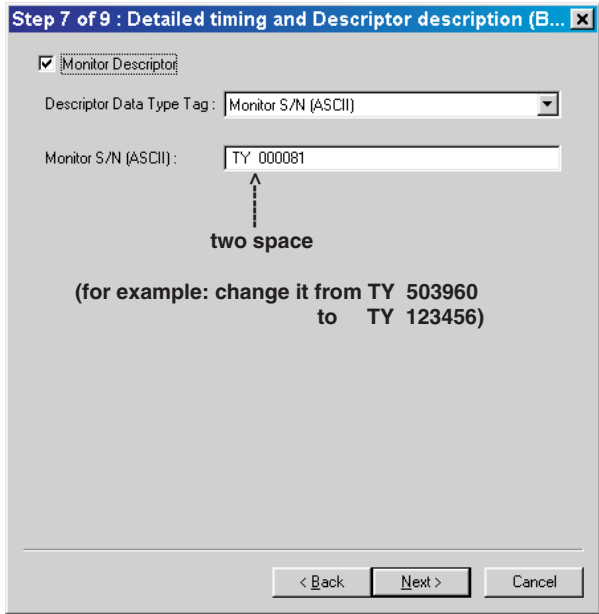


Fig. 47


## Step 5: Modify DDC data (Monitor Serial No.)

Monitor Serial No. can be filled up or be changed (for example, TY 123456) as shown in Fig. 44.

Fig. 44



## Step 8: Load DDC data

- Click  from the tool bar.
- Select the file you want to open as shown in Fig 48.
- Click **Open**.

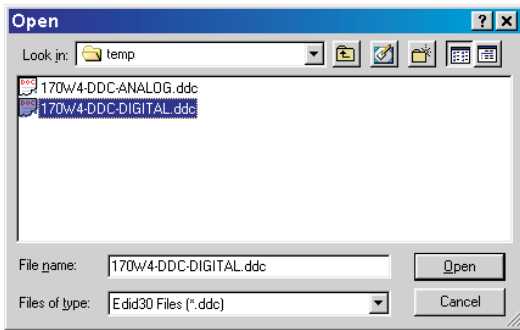


Fig. 48

## Step 9: Exit DDC program

Pull down the File menu and select Exit as shown in Fig. 32.



\*\*\*\*\*  
EDID log file  
\*\*\*\*\*

Vendor/Product Identification  
ID Manufacturer Name : PHL  
ID Product Code : 0811 (HEX.)  
ID Serial Number : 51 (HEX.)  
Week of Manufacture : 41  
Year of Manufacture : 2002

EDID Version, Revision  
Version : 1  
Revision : 3

Basic Display Parameters/Features  
Video Input Definition : Analog Video Input  
0.700V/0.300V (1.00Vpp)  
without Blank-to-Black Setup  
Separate Sync  
Composite Sync  
Sync on Green  
Serration required  
  
Maximum H Image Size : 37  
Maximum V Image Size : 22  
  
Display Transfer Characteristic : 2.2  
(gamma)  
  
Feature Support (DPMS) : Standby  
Suspend  
Active Off  
  
Display Type : RGB color display  
Preferred Timing Mode : Detailed timing block 1

Color Characteristics  
Red X coordinate : 0.617  
Red Y coordinate : 0.334  
Green X coordinate : 0.283  
Green Y coordinate : 0.59  
Blue X coordinate : 0.143  
Blue Y coordinate : 0.086  
White X coordinate : 0.284  
White Y coordinate : 0.295

Established Timings  
Established Timings I : 720 x 400 @70Hz (IBM,VGA)  
640 x 480 @60Hz (IBM,VGA)  
640 x 480 @67Hz (Apple,Mac II)  
640 x 480 @72Hz (VESA)  
640 x 480 @75Hz (VESA)  
800 x 600 @56Hz (VESA)  
800 x 600 @60Hz (VESA)  
  
Established Timings II : 800 x 600 @72Hz (VESA)  
800 x 600 @75Hz (VESA)  
832 x 624 @75Hz (Apple,Mac II)  
1024 x 768 @60Hz (VESA)  
1024 x 768 @70Hz (VESA)  
1024 x 768 @75Hz (VESA)  
1280 x 1024 @75Hz (VESA)

Manufacturer's timings :

Standard Timing Identification #1  
Horizontal active pixels : 1280  
Aspect Ratio : 16:9  
Refresh Rate : 60

Detailed Timing #1  
Pixel Clock (MHz) : 81  
H Active (pixels) : 1280  
H Blanking (pixels) : 400  
V Active (lines) : 768  
V Blanking (lines) : 27  
H Sync Offset (F Porch) (pixels): 64  
H Sync Pulse Width (pixels) : 136  
V Sync Offset (F Porch) (lines) : 1  
V Sync Pulse Width (lines) : 3  
H Image Size (mm) : 372  
V Image Size (mm) : 223  
H Border (pixels) : 0  
V Border (lines) : 0  
Flags : Non-interlaced  
Normal Display, No stereo  
Digital Separate sync.  
Positive Vertical Sync.  
Positive Horizontal Sync.

Monitor Descriptor #2  
Serial Number : TY 000081

Monitor Descriptor #3  
Monitor Name : Philips 170W

Monitor Descriptor #4  
Monitor Range Limits  
Min. Vt rate Hz : 56  
Max. Vt rate Hz : 75  
Min. Horiz. rate kHz : 30  
Max. Horiz. rate kHz : 61  
Max. Supported Pixel : 110

No secondary GTF timing formula supported.

Extension Flag : 0

Check sum : D0 (HEX.)

\*\*\*\*\*  
EDID data (128 bytes)  
\*\*\*\*\*  
0: 00 1: ff 2: ff 3: ff 4: ff 5: ff 6: ff 7: 00  
8: 41 9: 0c 10: 11 11: 08 12: 51 13: 00 14: 00 15: 00  
16: 29 17: 0c 18: 01 19: 03 20: 0f 21: 25 22: 16 23: 78  
24: ea 25: 28 26: 8e 27: 9e 28: 55 29: 48 30: 97 31: 24  
32: 16 33: 48 34: 4b 35: bf 36: ef 37: 00 38: 81 39: c0  
40: 01 41: 01 42: 01 43: 01 44: 01 45: 01 46: 01 47: 01  
48: 01 49: 01 50: 01 51: 01 52: 01 53: 01 54: a4 55: 1f  
56: 00 57: 90 58: 51 59: 00 60: 1b 61: 30 62: 40 63: 88  
64: 13 65: 00 66: 74 67: df 68: 10 69: 00 70: 00 71: 1e  
72: 00 73: 00 74: 00 75: ff 76: 00 77: 20 78: 54 79: 59  
80: 20 81: 20 82: 30 83: 30 84: 30 85: 30 86: 38 87: 31  
88: 0a 89: 20 90: 00 91: 00 92: 00 93: fc 94: 00 95: 50  
96: 68 97: 69 98: 6c 99: 69 100: 70 101: 73 102: 20 103: 31  
104: 37 105: 30 106: 57 107: 0a 108: 00 109: 00 110: 00 111: fd  
112: 00 113: 38 114: 4b 115: 1e 116: 3d 117: 0b 118: 00 119: 0a  
120: 20 121: 20 122: 20 123: 20 124: 20 125: 20 126: 00 127: d0

\*\*\*\*\*  
EDID log file  
\*\*\*\*\*

Vendor/Product Identification  
ID Manufacturer Name : PHL  
ID Product Code : 0811 (HEX.)  
ID Serial Number : 51 (HEX.)  
Week of Manufacture : 41  
Year of Manufacture : 2002

EDID Version, Revision  
Version : 1  
Revision : 3

Basic Display Parameters/Features  
Video Input Definition : Digital Video Input  
Compatible with VESA DFP 1.x

Maximum H Image Size : 37  
Maximum V Image Size : 22

Display Transfer Characteristic : 2.2  
(gamma)

Feature Support (DPMS) : Standby  
Suspend  
Active Off

Display Type : RGB color display  
Preferred Timing Mode : Detailed timing block 1

Color Characteristics  
Red X coordinate : 0.617  
Red Y coordinate : 0.334  
Green X coordinate : 0.283  
Green Y coordinate : 0.59  
Blue X coordinate : 0.143  
Blue Y coordinate : 0.086  
White X coordinate : 0.284  
White Y coordinate : 0.295

Established Timings  
Established Timings I :720 x 400 @70Hz (IBM,VGA)  
640 x 480 @60Hz (IBM,VGA)  
640 x 480 @67Hz (Apple,Mac II)  
640 x 480 @72Hz (VESA)  
640 x 480 @75Hz (VESA)  
800 x 600 @56Hz (VESA)  
800 x 600 @60Hz (VESA)

Established Timings II :800 x 600 @72Hz (VESA)  
800 x 600 @75Hz (VESA)  
832 x 624 @75Hz (Apple,Mac II)  
1024 x 768 @60Hz (VESA)  
1024 x 768 @70Hz (VESA)  
1024 x 768 @75Hz (VESA)

Manufacturer's timings :

Standard Timing Identification #1  
Horizontal active pixels : 1280  
Aspect Ratio : 16:9  
Refresh Rate : 60

Standard Timing Identification #2  
Horizontal active pixels : 1280  
Aspect Ratio : 5:4  
Refresh Rate : 60

Detailed Timing #1  
Pixel Clock (MHz) : 81  
H Active (pixels) : 1280  
H Blanking (pixels) : 400  
V Active (lines) : 768  
V Blanking (lines) : 27  
H Sync Offset (F Porch) (pixels): 56  
H Sync Pulse Width (pixels) : 136  
V Sync Offset (F Porch) (lines) : 1  
V Sync Pulse Width (lines) : 3  
H Image Size (mm) : 372  
V Image Size (mm) : 223  
H Border (pixels) : 0  
V Border (lines) : 0  
Flags : Non-interlaced  
: Normal Display, No stereo  
: Digital Separate sync.  
: Positive Vertical Sync.  
: Positive Horizontal Sync.

Monitor Descriptor #2  
Serial Number : TY 000081

Monitor Descriptor #3  
Monitor Name : Philips 170W

Monitor Descriptor #4  
Monitor Range Limits  
Min. Vt rate Hz : 56  
Max. Vt rate Hz : 75  
Min. Horiz. rate kHz : 30  
Max. Horiz. rate kHz : 61  
Max. Supported Pixel : 110

No secondary GTF timing formula supported.

Extension Flag : 0

Check sum : 68 (HEX.)

\*\*\*\*\*  
EDID data (128 bytes)  
\*\*\*\*\*  
0: 00 1: ff 2: ff 3: ff 4: ff 5: ff 6: ff 7: 00  
8: 41 9: 0c 10: 11 11: 08 12: 51 13: 00 14: 00 15: 00  
16: 29 17: 0c 18: 01 19: 03 20: 81 21: 25 22: 16 23: 78  
24: ea 25: 28 26: 8e 27: 9e 28: 55 29: 48 30: 97 31: 24  
32: 16 33: 48 34: 4b 35: bf 36: ee 37: 00 38: 81 39: c0  
40: 81 41: 80 42: 01 43: 01 44: 01 45: 01 46: 01 47: 01  
48: 01 49: 01 50: 01 51: 01 52: 01 53: 01 54: a4 55: 1f  
56: 00 57: 90 58: 51 59: 00 60: 1b 61: 30 62: 38 63: 88  
64: 13 65: 00 66: 74 67: df 68: 10 69: 00 70: 00 71: 1e  
72: 00 73: 00 74: 00 75: ff 76: 00 77: 20 78: 54 79: 59  
80: 20 81: 20 82: 30 83: 30 84: 30 85: 30 86: 38 87: 31  
88: 0a 89: 20 90: 00 91: 00 92: 00 93: fc 94: 00 95: 50  
96: 68 97: 69 98: 6c 99: 69 100: 70 101: 73 102: 20 103: 31  
104: 37 105: 30 106: 57 107: 0a 108: 00 109: 00 110: 00 111: fd  
112: 00 113: 38 114: 4b 115: 1e 116: 3d 117: 0b 118: 00 119: 0a  
120: 20 121: 20 122: 20 123: 20 124: 20 125: 20 126: 00 127: 68

Configuration and procedure

ISP (In System Program) software is provided by Motorola to upgrade the firmware of CPU. It is a DOS-based program, which cannot be run in MS-Windows.

ISP cable is for the interface between "Parallel Port of PC" and "15 pin-D-SUB connector of Monitor".

System and equipment requirements

- 1. An i486 (or above) personal computer or compatible.
- 2. Microsoft operation system Windows 95/98  
=> DOS environment.
- 3. ISP Software
- 4. ISP Cable (3138 106 10148) as shown in Fig. 1



Fig. 1 => ISP CABLE : 12nc is "3138 106 10148".

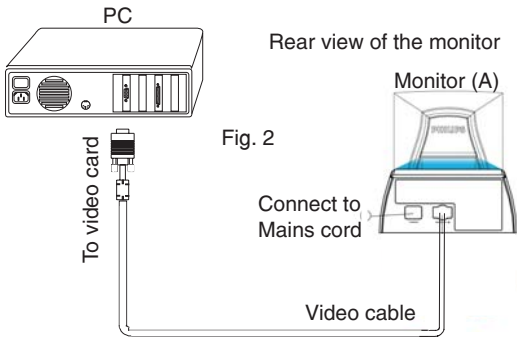


Fig. 2

Step 1 : Make a folder in your PC as shown in Fig. 3.  
For example : C:\ISP\_PC

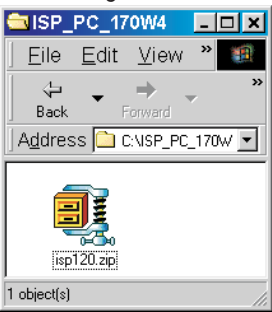
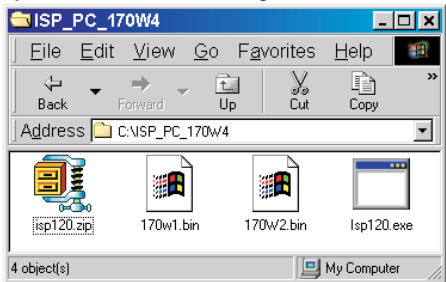


Fig. 3

Step 2 : Copy ISP Software (isp120.zip) into your folder as shown in Fig.3.

Step 3 : Unzip isp.zip into your folder as shown in Fig. 4.



170w1.bin & 170W2.bin are updated firmware of CPU.  
Isp120.exe is execution file.

Fig. 4

Step 4 : Connect ISP cable and Mains cord to Monitor (B, 170W4) as shown in Fig. 5.

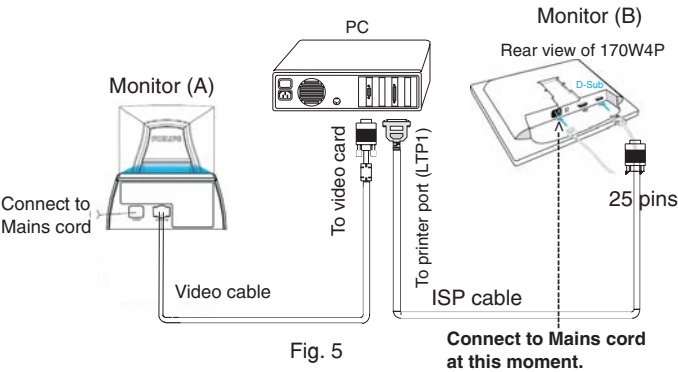


Fig. 5

Step 5 : Execute ISP Software in Monitor (A) as shown in Fig. 6 & 7.  
Step 5-1.=> C:\ISP\_PC\_170W4>ISP120 170W1.BIN 170W2.BIN  
(fill out "SP\_PC\_170W4>ISP120 170W1.BIN 170W2.BIN" as shown in Fig. 6)

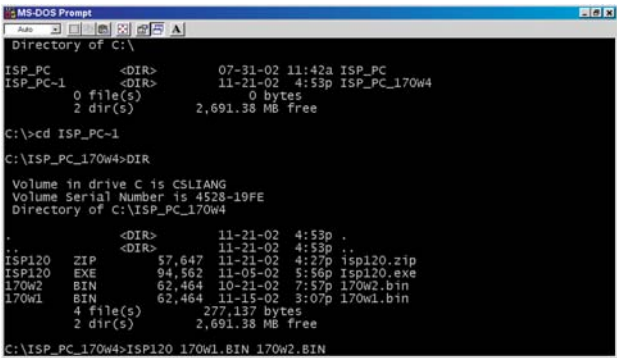


Fig. 6

Step 5-2.=> Press "Enter" key on keyboard, bring up Fig. 7.

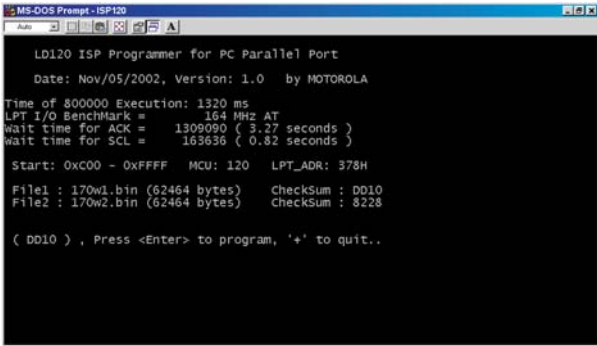


Fig. 7

(Remark: If it is necessary, press " + " to quit execution.)  
Step 5-3.=> Press "Enter" key on keyboard again, bring up Fig.8.

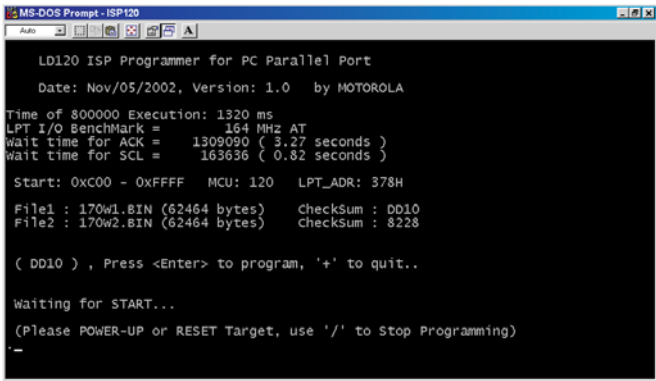


Fig. 8

Go to cover page

Step 6 : Disconnect mains cord between Electrical outlet (power source) and Monitor (B) at this moment as shown in Fig. 9.

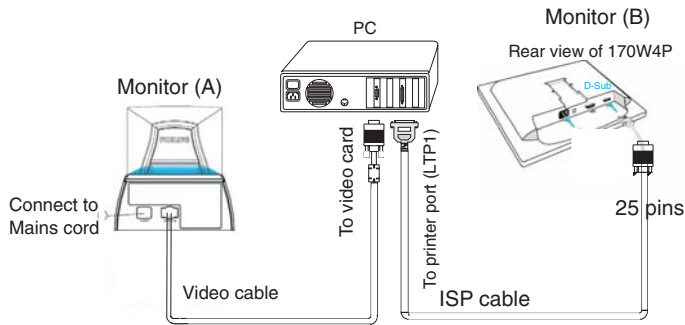


Fig. 9

Step 6-1 : reconnect mains cord between Electrical outlet (power source) and Monitor (B) again as shown in Fig. 10.

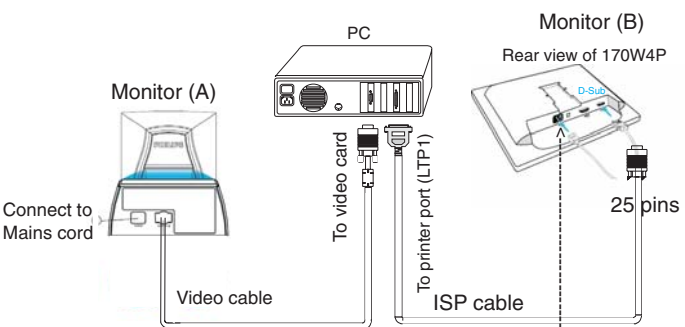


Fig. 10

In System Program (ISP) will be executed to upgrade the firmware to **Monitor (B)**.

When finished, Bring up Fig. 11=>12 on the screen of Monitor (A).

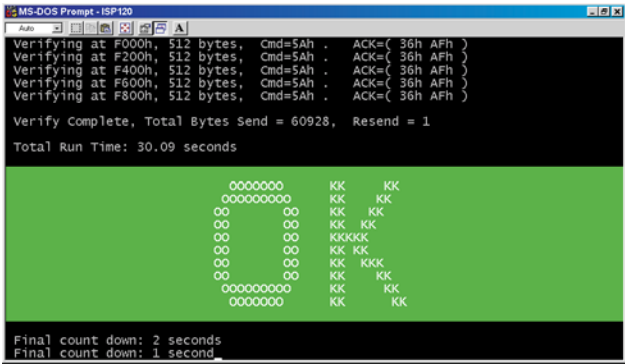


Fig. 11

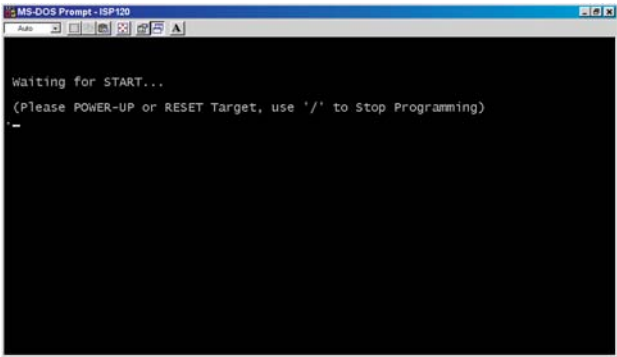


Fig. 12

Step 7 : Press "/" on keyboard, bring up Fig. 13.

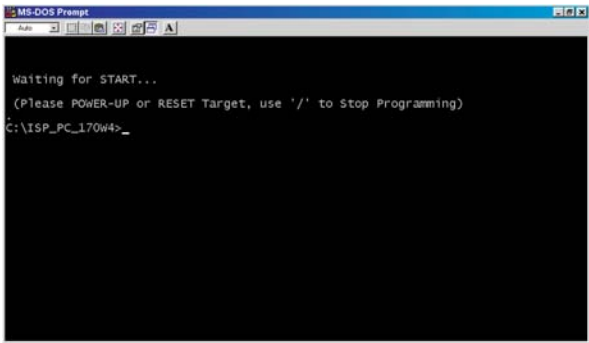


Fig. 13

Step 8 : Disconnect Mains cord from Monitor (B), 10 seconds at least.

Now, Monitor (B) can be used for display again.  
(Press "AUTO" and "OK" and "POWER KNOB" at the same time to access Factory mode.)  
After finished,entering factory mode to check CPU version as shown in Fig. 14.

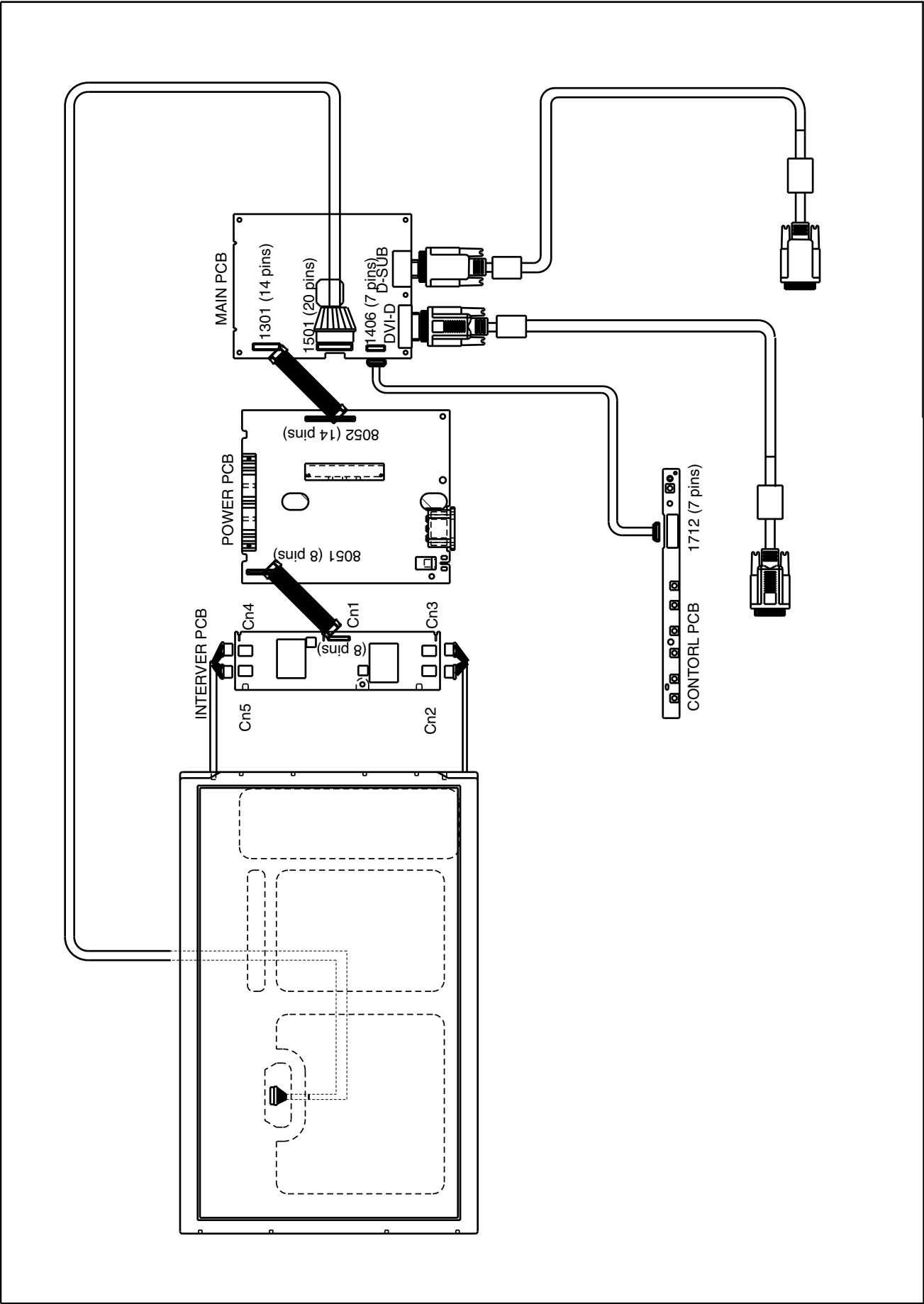


Fig. 14

Troubleshooting :

Monitor (B) : Monitor is on (LED is green.), or off, but no display (black)

1. Make sure to disconnect the mains cord at Monitor (B), then connect it again.
2. EEPROM size may be not correct.



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Front view as shown in Fig. 1.

Fig. 1



Rear view as shown in Fig. 2.

Fig. 2



Step 1 :  
Disconnect and remove the signal and power cables from the back of the monitor as shown in Fig. 2.

Step 2 :  
1.Lay the front bezel down on a soft area to prevent it from getting scratched, defaced, or broken.  
2.Remove the 4 screws as shown in Fig. 3.  
3.Remove the monitor base from the monitor as shown in Fig. 3.&4.  
4. Remove 4 screws (for connector) as shown in Fig. 5.  
Remove another screw as shown in Fig. 5.

Fig. 3

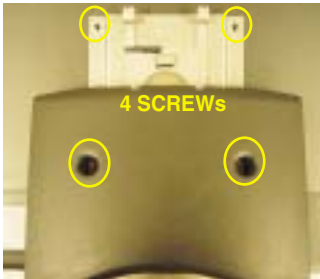
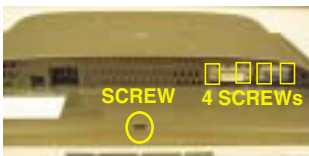


Fig. 4



Fig. 5



Step 3 :  
Turn the set over and remove Front Bezel by hands as shown in Fig. 6 .  
Plastic clip (left & right) can be released by hands.

Fig. 6



Step 4 :  
Remove front bezel as shown in Fig. 7.

Front Bezel=>



Fig. 7

Control panel=>  
SCREWS

Step 5 :  
Remove one screws as shown in Fig. 7.&8..

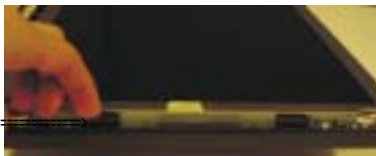
Fig. 8



Step 6 :  
1.Remove rear cover.  
As shown in Fig.9.&10.

Plastic clip (left & right) can be released by hands.

Fig. 9(Left side view)



Rear cover=>

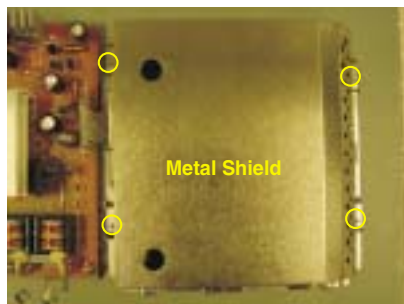
Fig. 10





Step 7 :  
Remove five screws  
as shown in Fig. 11.&12..

Fig. 11



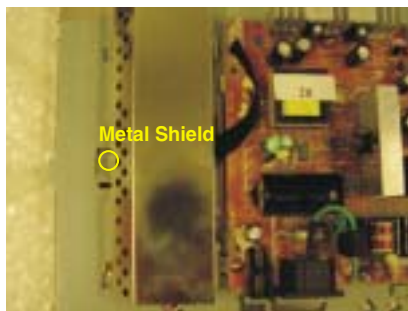
Step 12 :  
After remove two screws,  
PCB assembly of LCD panel  
as shown in Fig.16.

Fig. 16



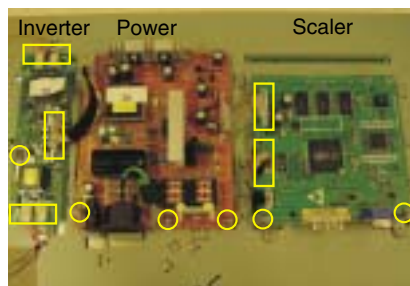
Step 8 :  
Remove metal shield  
as shown in Fig. 11.&12..

Fig. 12



Step 9 :  
After remove metal shield,  
inverter,power & scaler  
board are as shown  
in Fig.13

Fig. 13



Step 10 :  
Remove six screws and  
disconnct the five  
connectors,the inverter,  
power & scaler board  
can be taken out as  
shown in Fig.13. & 14.

Fig. 14



Step 11 :  
Remove two screws as  
shown in Fig.15.

Fig. 15



\*\*\*\*\*

In warranty, it is not allowed to disassembly the LCD Panel,  
even the "Backlight unit" defect.

Out of warranty, the replacemtn of Backlight Unit is a correct way  
when the defect is caused by Backlight(CCFL,Lamp).



\*\*\*\*\*



## Warning and Notes

◀◀ Go to cover page

### Warnings

1. Safety regulations require that the unit should be returned in its original condition and that components identical to the original components are used. The safety components are indicated by the symbol .
2. In order to prevent damage to ICs and transistors, all high-voltage flash-overs must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 1 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position DC-V). Discharge until the meter reading is **0 V** (after approximately 30 seconds).
3. **ESD**   
All ICs and many other semiconductors are sensitive to electrostatic discharges (ESD). Careless handling during repair can drastically shorten their life. Make sure that during repair you are connected by a pulse band with resistance to the same potential as the ground of the unit. Keep components and tools also at this same potential.
4. When repairing a unit, always connect it to the AC Power voltage via an isolating transformer.
5. Be careful when taking measurements in the high-voltage section and on the picture tube panel.
6. It is recommended that safety goggles be worn when replacing the picture tube.
7. When making adjustments, use plastic rather than metal tools. This will prevent any short-circuit or the danger of a circuit becoming unstable.
8. Never replace modules or other components while the unit is switched on.
9. Together with the deflection unit, the picture tube is used as an integrated unit. Adjustment of this unit during repair is not recommended.
10. After repair, the wiring should be fastened in place with the cable clamps.
11. All units that are returned for service or repair must pass the original manufacturer's safety tests.

### Notes

1. The direct voltages and waveforms are average voltages. They have been measured using the Service test software and under the following conditions :
  - Mode : 640 \* 480 (31.5kHz / 60Hz)
  - Signal pattern : grey scale
  - Adjust brightness and contrast control for the mechanical mid-position (click position)
2. The picture tube panel has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.
3. The semiconductors indicated in the circuit diagram(s) and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

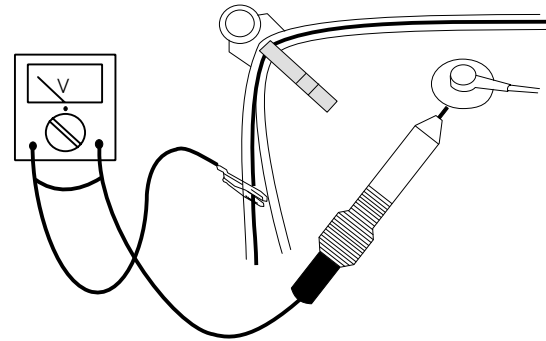


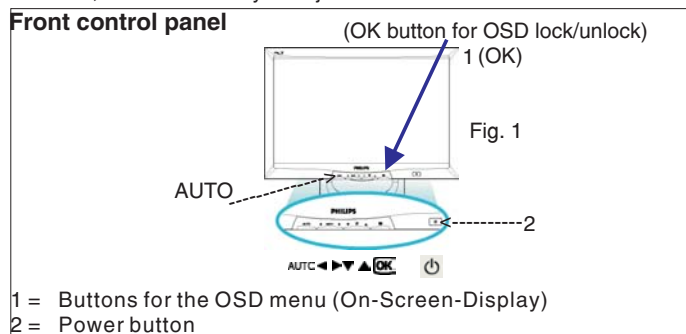
Fig.1 (CRT only)

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The monitor has build-in a auto adjustment hotkey on the front panel, you may obtained a optimal video display by simply press the **AUTO** button and save the settings. CLOCK, PHASE, Vertical position, and Horizontal position are adjusted automatically.

Due to the different quality of video signal generated from graphics cards. By press AUTO button for CLOCK and PHASE adjustment automatically. Sometimes, the deviation of video signal which generated from graphics cards is out of control, then it is necessary to adjust CLOCK and PHASE functions for the optimal video display of LCD monitor by manual. Following steps will guide you to make correct adjustment of CLOCK and PHASE.

However, CLOCK and PHASE functions are only available while analog video signal is supplied. Operating unit under digital signal state, the video clock information can be obtained from graphics cards directly. Therefore, it is unnecessary to adjust these functions.



### Manual adjustment

If the quality of display still poor or flicker, you may also improve it by manual adjust **CLOCK** and **PHASE** functions to eliminate the flicker.

Step 1 : Click on the Start button (Win95, Win98 or Win NT) and choose " Shut Down...". as shown in Fig. 2.

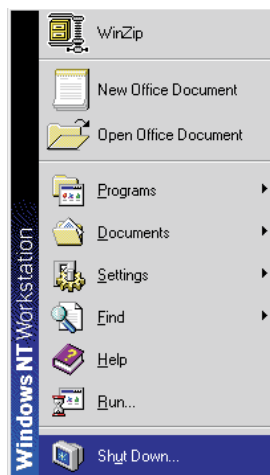


Fig. 2

Step 2 : The menu of " Shut Down Windows " is as shown in Fig. 3

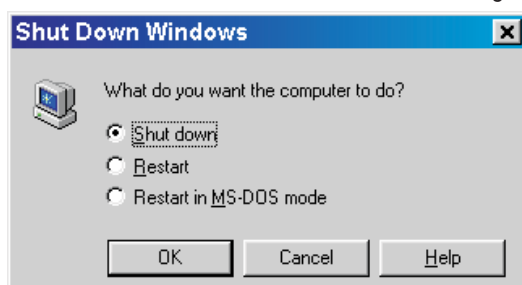



Fig. 3 (Win 98)

**Step 3 :** Retain Shut Down Window on the screen , follow the CLOCK and PHASE adjustment instructions for the optimal video display.

Step 4 : Press the OK  button to bring up MAIN CONTROLS (OSD menu).

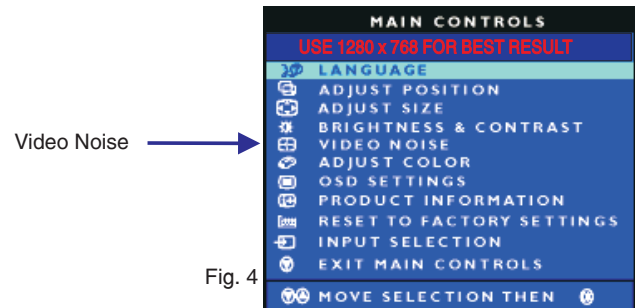
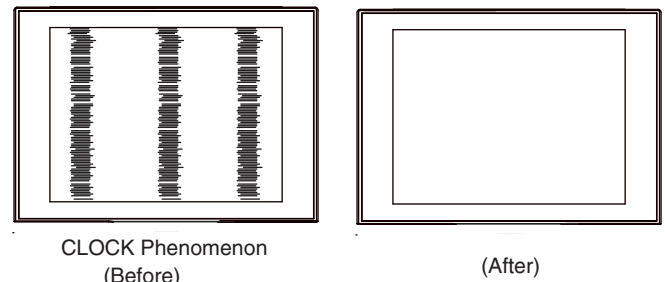


Fig. 4

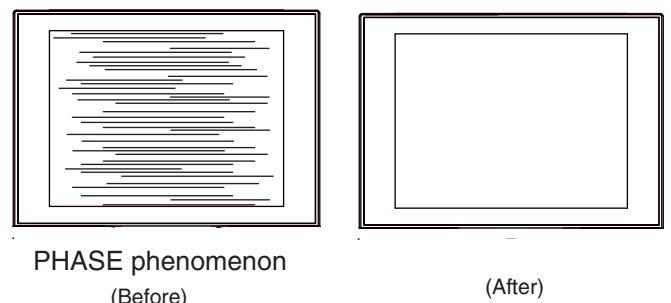
Step 5 : Select Video Noise by press **OK** button, bring up it's submenu.

Step 6 : Using UP or DOWN button to select "CLOCK" or "PHASE".

Step 7 : Press Left or Right button to adjust CLOCK. The picture will be adjusted as following figure, adjust CLOCK to fine-tune the video until optimal display is obtained.



Step 8 : Press Left ◀ or Right ▶ button to adjust PHASE.  
The picture will be adjusted as following figure, adjust PHASE and check the picture, stop at the point that without any vertical jitter bar remaining on the screen.



Step 9 : Quit OSD menu by press OK  button to save the settings.

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0. General

When carry-out the electrical settings in many cases a video signal must be applied to the monitor. A computer with :

- ATI VGA 1024 V6-1.04/PH BETA4 interface card
- PGA 1024 (4822 212 30916), Mach 8.
- PGA 1280 (4822 212 30917), Mach 32.
- ATI GPT-1600 (4822 397 10065), Mach 64 (up to 107kHz)

are used as the video signal source. The signal patterns are selected from the "service test software" package, see user guide 4822 727 19896 (ATI1024), or 4822 727 20273 (PGA 1280), or 4822 727 21046 (GPT-1600).

0.1 With normal VGA card:

If not using the ATI card during repair or alignment, The service engineer also can use this service test software adapting with normal standard VGA adaptor and using standard VGA mode 640 x 480, 31.5 kHz/60 Hz (only) as signal source.

0.2 AC/DC Measurement:

The measurements for AC waveform and DC figure is based on 640 x 480 31.5 kHz/60 Hz resolution mode with test pattern "16 gray scale".

Power input: 110V AC

General points

- 1.1 During the test and measuring, supply a distortion free AC mains voltage to the apparatus via an isolated transformer with low internal resistance.
- 1.2 All measurements mentioned hereafter are carried out at a normal mains voltage (90 - 132 VAC for USA version, 195 -264 VAC for EUROPEAN version, or 90 - 264 VAC for the model with full range power supply, unless otherwise stated.)
- 1.3 All voltages are to be measured or applied with respect to ground, unless otherwise stated.  
Note: don't use heat-sink as ground.
- 1.4 The test has to be done on a complete set including LCD panel in a room with temperature of 25 +/- 5 degree C.
- 1.5 All values mentioned in these test instruction are only applicable of a well aligned apparatus, with correct signal.
- 1.6 The letters symbols (B) and (S) placed behind the test instruction denotes  
(B): carried out 100% inspection at assembly line  
(S): carried out test by sampling
- 1.7 The white balance (color temperature), has to be tested in subdued lighted room.
- 1.8 Repetitive power on/off cycle are allowed.

2. Input signal

Signal type

2.1.1 Analog Video : 0.7 Vp-p linear, positive polarity

Sync. : TTL level, separate, positive or negative polarity

Signal source: pattern generator format as attachment.

(table 1 to 29) Reference generator : QuantumData 802G

2.2 Input signal mode

(1) Preset Modes (29 modes)

#	Resolution	Frequency	Pixel rate	Sync	Comment
1	640X350	31.5K/70Hz	25.175	(+/-)	IBM VGA 10h
2	720X400	31.5K/70Hz	28.322	(-/+)	IBM VGA 3h
3	640X480	31.5K/60Hz	25.175	(-/-)	
4	640X480	35.0K/67Hz	30.24	(-/-)	
5	640X480	37.9K/72Hz	31.5	(-/-)	
6	640X480	37.5K/75Hz	31.501	(-/-)	
7	640X480	43.3K/85Hz	36	(-/-)	
8	800X600	35.2K/56Hz	36	(+/+)	
9	800X600	37.9K/60Hz	40	(+/+)	
10	800X600	48.1K/72Hz	50	(+/+)	
11	800X600	46.9K/75Hz	49.498	(+/+)	
12	800X600	53.7K/85Hz	56.251	(+/+)	
13	832X624	49.7K/75Hz	57.28	(+/+)	MAC
14	960 X 680	78.2K/108Hz	101.34	(-/+)	
15	1024X768	48.4K/60Hz	65	(-/-)	
16	1024X768	56.5K/70Hz	75	(-/-)	
17	1024X768	60.0K/75Hz	78.75	(+/+)	
18	1024X768	61.1K/76Hz	83.096	(+/+)	IBM XGA-2
19	1024X768	68.7K/85Hz	94.5	(+/+)	
20	1280X720	41.7K /56Hz	69.329	(-/+)	
21	1280X720	44.8K/60Hz	74.481	(-/+)	
22	1280X720	52.5K/70Hz	89.040	(-/+)	
23	1280X768	44.4K/56Hz	73.895	(-/+)	
24	1280X768	47.7K/60Hz	80.136	(-/+)	
25	1280X768	56.0K/70Hz	94.976	(-/+)	
26	1280X768	57.7K/72Hz	97.812	(-/+)	
27	1280X768	60.2K/75Hz	102.98	(-/+)	
28	1280X960	60.0K/60Hz	108	(+/+)	
29	1280X1024	64.0K/60Hz	108	(+/+)	

(2) Factory Preset Modes (15 modes)

#	Resolution	Frequency	Pixel rate	Sync	Comment
1	640X350	31.5K/70HZ	25.175	(+/-)	IBM VGA 10h
2	720X400	31.5K/70HZ	28.322	(-/+)	IBM VGA 3h
3	640X480	35.0K/67HZ	30.24	(-/-)	
4	640X480	31.5K/60HZ	25.175	(-/-)	
5	640X480	37.5K/75HZ	31.501	(-/-)	
6	800X600	35.2K/56HZ	36	(+/+)	
7	800X600	37.9K/60HZ	40	(+/+)	
8	800X600	46.9K/75HZ	49.498	(+/+)	
9	832X624	49.7K/75HZ	57.28	(+/+)	MAC
10	1024X768	48.4K/60HZ	65	(-/-)	
11	1024X768	60.0K/75HZ	78.75	(+/+)	
12	1280X720	52.5K/70Hz	89.040	(-/+)	
13	1280X768	44.4k/56Hz	73.895	(-/+)	
14	1280X768	47.7K/60HZ	80.136	(-/+)	
15	1280X768	60.2K/75HZ	117	(-/+)	

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2.3 Allowed 85 Hz overscan signal mode specified

Once the signal input of PC is 85Hz, this monitor is able to display at least for 10 minutes . An attention signal appears and shows “This is 85Hz overscan for 5 seconds, change computer display input to 1280\*768 @ 60 Hz “

Dot rate (MHz)	H.freq (KHz)	Mode	Resolution	V.freq (Hz)
36.000	43.269	VESA	640 * 480	85.008
56.250	53.674	VESA	800 * 600	85.061
94.500	68.677	VESA	1024 * 768	84.997

3. Power Supply

3.1 Setup the AC I/P at 90VAC, add 2.6A loading to C2117 and DC output voltage is 3.3V ± 0.165V DC.  
1A loading to C2119 and DC output voltage is 5V ± 0.5V. (B).

3.2 DC setting

3.01 Detach 8052 to the scaler board before testing the function.

3.02 Apply 12V DC voltage to 1105. (B)

3.03 Connect inverter board to 8051 (B)

3.04 Check voltage at C2003 should be within the range  
3.3V ± 0.165V DC.(B)

4. Display Adjustment

4.1Input signals check

In factory mode, use 64 gray level and set the R,G,B gain to 100%.

4.2 Display quality test

Use timing mode as describe in 2.2, and use the pixel on / off pattern to adjust the clock until no stripe and adjust the phase until clear picture.

Check all pre-setting 29 modes.

4.2.1 SOG mode test : Use following timing for SOG test

47.7 KHz/60Hz, 1280 X 768, pixel=80.136 MHz

Horizontal		Vertical	
Frame border =	0	Frame border =	0
Total size =	20.964 s	Total size =	16.667 ms
Display size =	15.973 s	Display size =	16.101 ms
Rear porch =	2.496 s	Rear porch =	482.18 s
Sync width =	1.697 s	Sync width =	62.893 s
Sync polarity =	-	Sync pdarity =	+

4.3 Check of WHITE-D (B)

Apply a 1024\*768 / 60Hz signal with white pattern, set brightness control at 100%, and contrast control at 70%. Adjust the R,G,B sub\_gain, for the screen center, the 1931 CIE chromaticity (X, Y) co-ordinates shall be;

	9300 K		6500 K	
x (center)	0.281	0.020	0.312	0.020
y (center)	0.311	0.020	0.338	0.020

Use Minolta CA-110 for color coordinates and luminance check.  
Luminance : 380 Nits in the center of the screen when brightness at 100% and contrast set to 100%.

4.4 Check the digital interface

Check the 64 gray level color poor & noise condition.

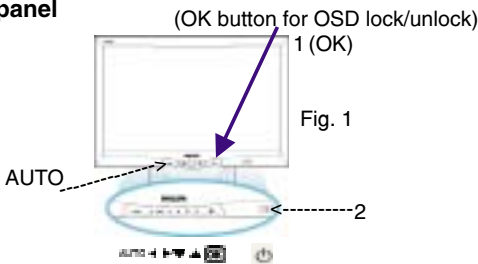
TIMING FOR 170W4 TFT SXGA COLOR LCD MONITOR  
(VESA monitor timing standard Version 1.0 Release 0.7)

REFERENCE PATTERN GENERATOR : QuantumData 802G

Please refer to General product specification for detail timings.

# Factory mode

## Front control panel



- 1 = Buttons for the OSD menu (On-Screen-Display)
- 2 = Power button

## Basic and simple instruction on the control keys.

When you press the button on the front control of your monitor, the On-Screen Display (OSD) Main Controls window will pop up and you can then start making adjustments to your monitor's various features.




## Access Factory Mode

How to Get into Factory Mode Menu


### Step 1 :

Turn off monitor.

### Step 2 :

[Push AUTO "  " & OK "  " buttons at the same time and hold it ] + [Press power "  " button untill comes out "Windows screen" ] => then release all buttons.

### Step 3 :

Press OK "  " button, bring up Factory mode indication as shown in Fig 2.

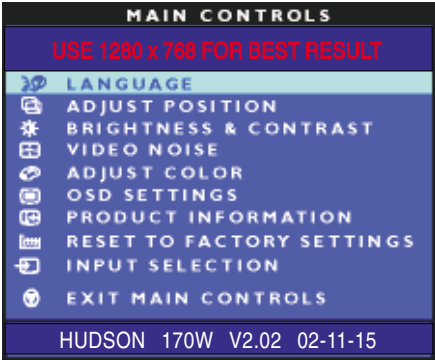


Fig. 2

Factory mode indicator

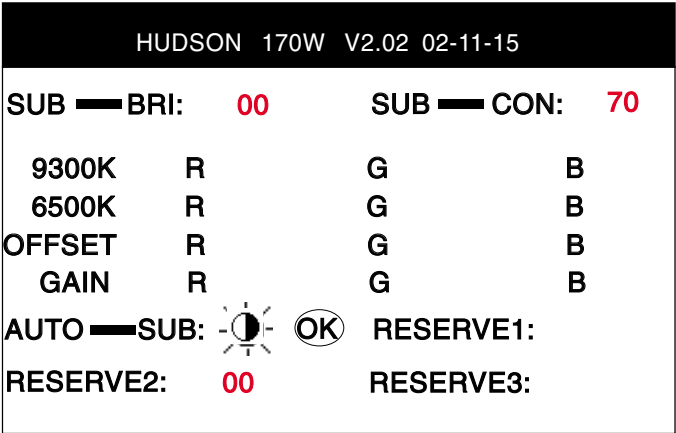


Fig. 3

SUB — BRI:  
NO FUNCTION.

SUB — CON:  
Contrast adjustment (Sub-Contrast). Use this menu item to adjust the contrast gain of pre-amp ranges from 0 to 255.

9300K R G B  
6500K R G B  
Color temperature gain adjustment. Use these menu items to adjust the RGB gains of pre-amp for different color temperatures, ranges from 0 to 255.

OFFSET R G B  
Sub-Brightness adjustment. Use this menu item to adjust the brightness level (DC-level) of pre-amp range from 0 to 255.(R/G/B ANALOG DC -level).

GAIN R G B  
R/G/B GAIN adjustment. Use this menu item to adjust the R/G/B (GAIN) of Amp. range from 0 to 255.(R/G/B ANALOG GAIN Values).

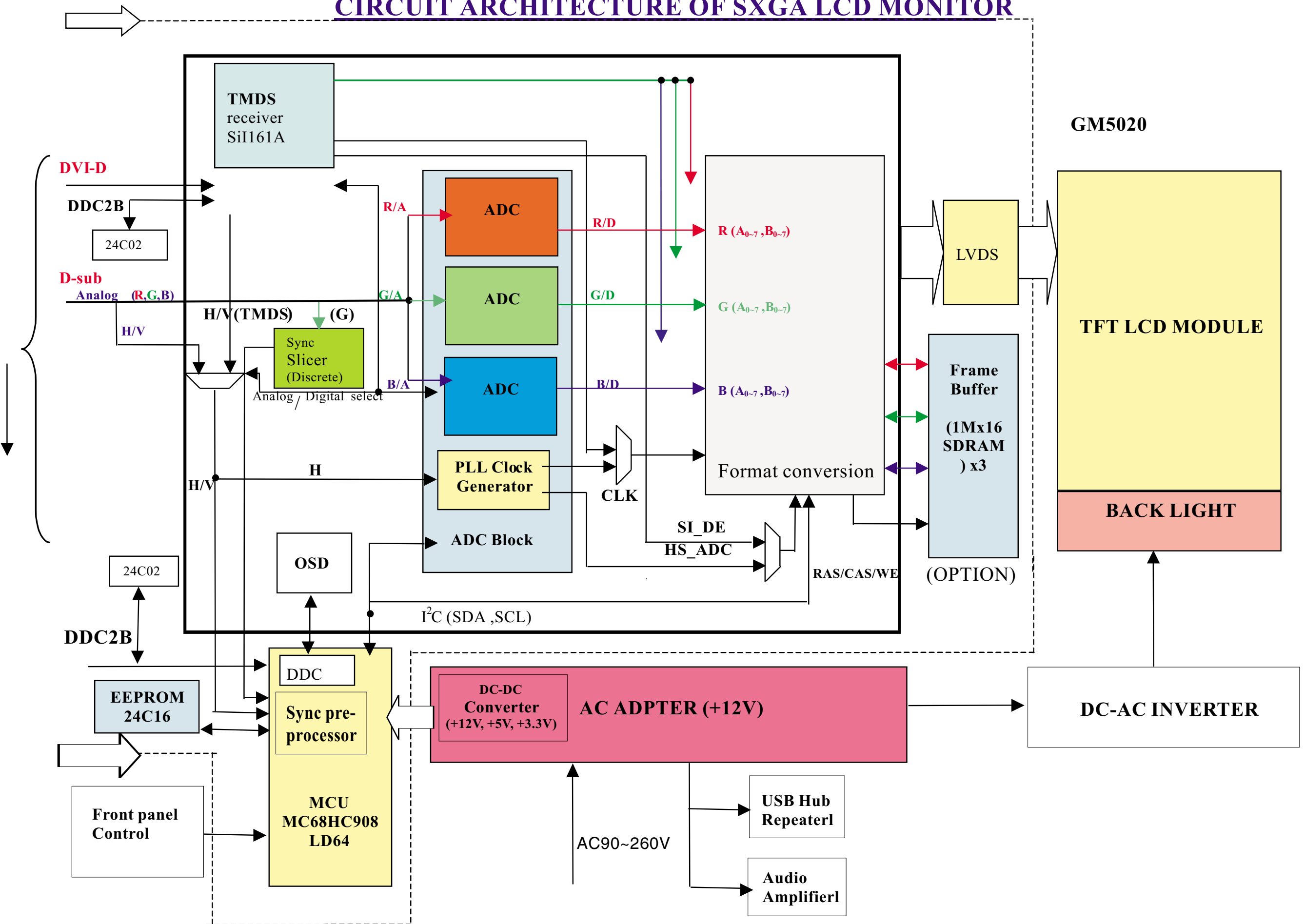
AUTO — SUB:    
**Do not use this function here.**  
It is for 1024x768/60Hz with special pattern only.

RESERVE1: NO FUNCTIONED, RESERVED ONLY.  
RESERVE2: Default is "00". The others "01", "02" & "03".  
RESERVE3: NO FUNCTIONED, RESERVED ONLY.

RESERVE2:  
00 : Stands for 1280x768/72Hz & 1280x768/75Hz  
01 : Stands for 1024x768/72Hz & 1280x768/75Hz  
02 : Stands for 1024x768/75Hz & 1280x768/72Hz  
03 : Stands for 1024x768/72Hz & 1024x768/75Hz

Hot key function: by pressing "LEFT" and "DOWN" key simultaneously at User mode (or Factory mode), 4 kinds (00, 01, 02, 03) of resolution can be switched on screen.

(PS: The "Offset R G B" function can be used on reduce or eliminate snowy noise on the background when the resolution of video signal is 1280 X 1024 vertical 60Hz. Slightly increase or decrease the value until snowy noise completely disappear.)

**CIRCUIT ARCHITECTURE OF SXGA LCD MONITOR**

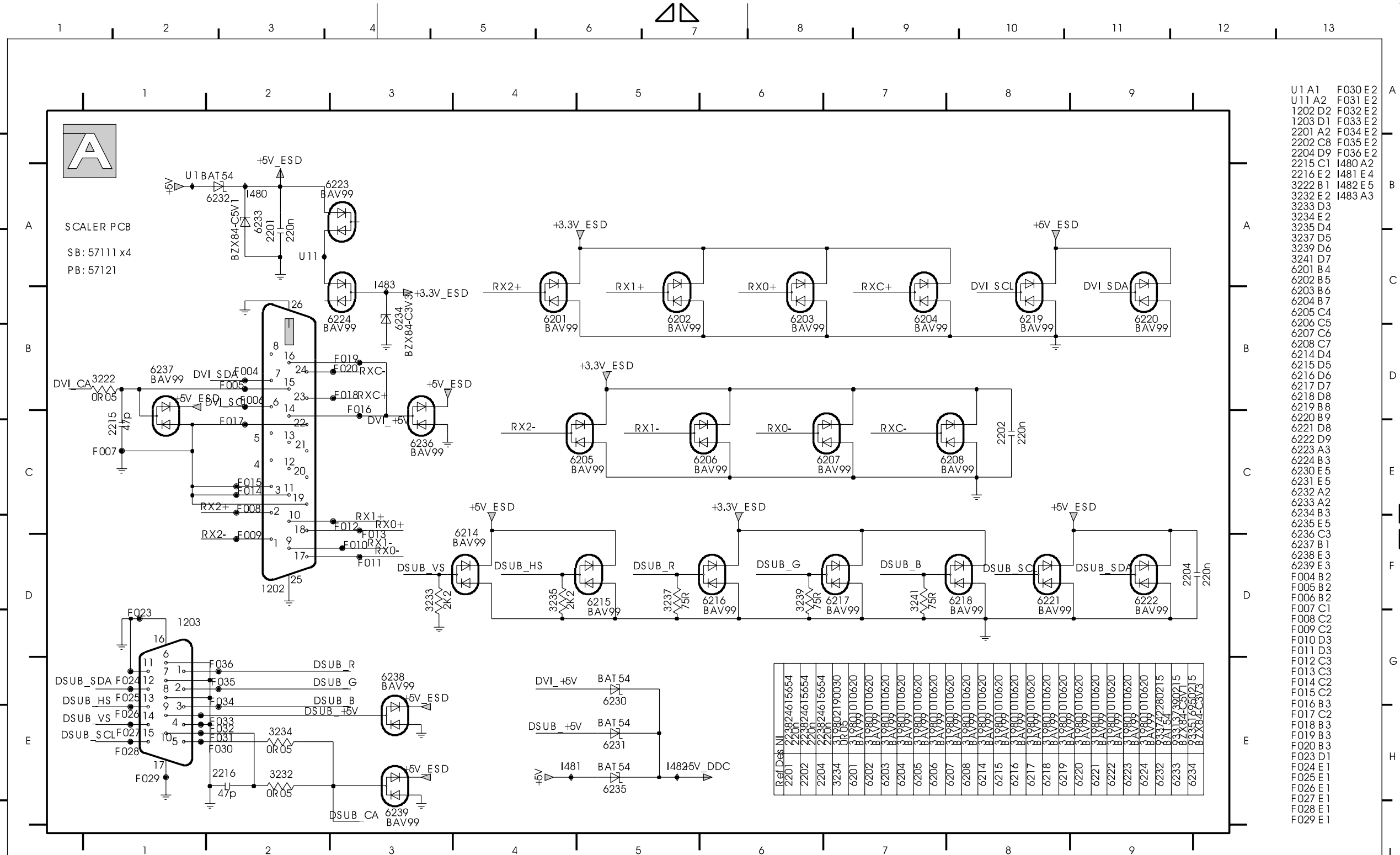


Video\_In schematic diagram

PHILIPS

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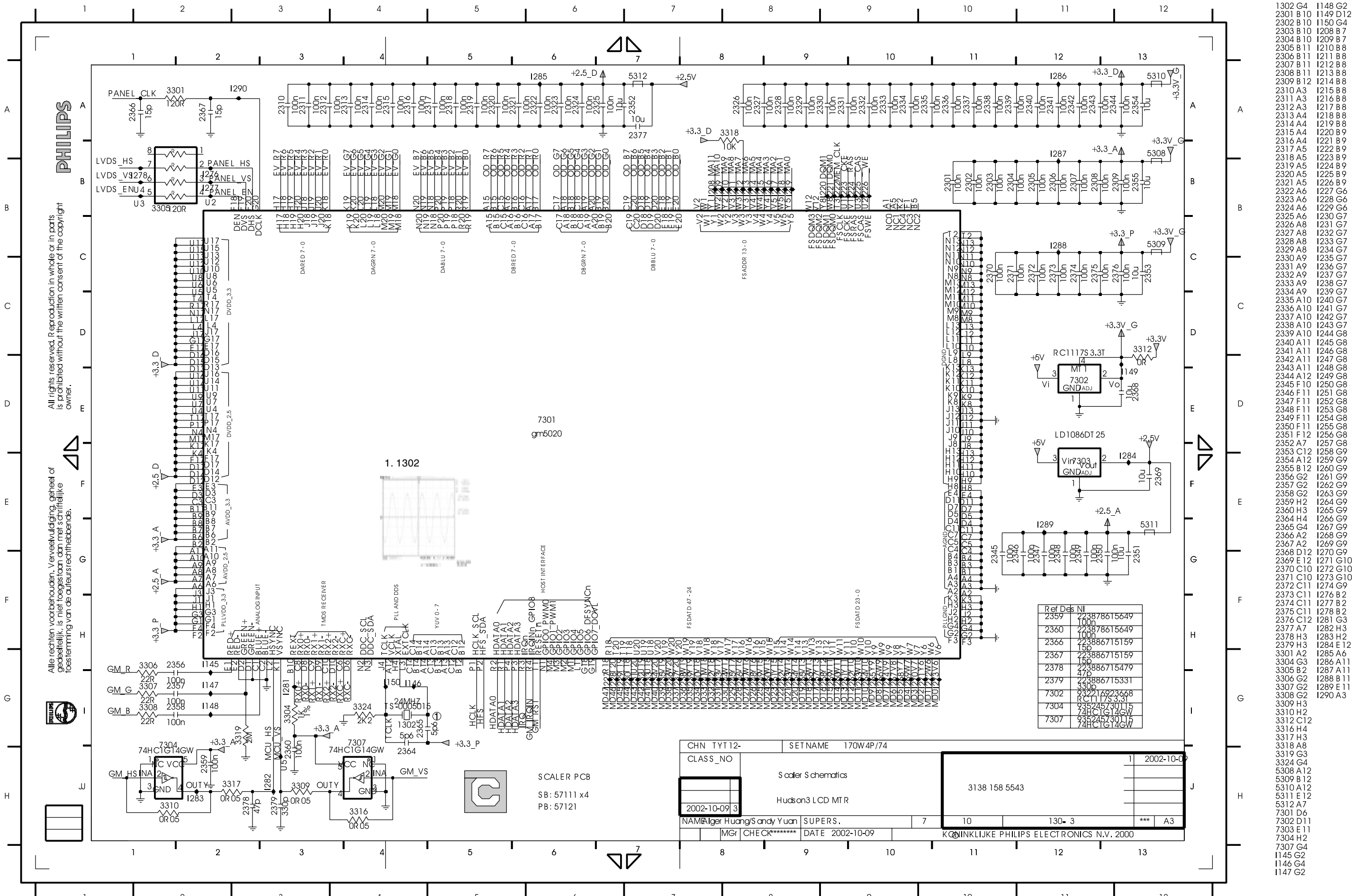
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NOTES:		EXCEPT 1202,1203 WERE CHIP COMPONENTS.	
CHN	TYT 12-	SETNAME	170W4P/74
CLASS_NO		Video-In Schematics	
		Hudson3 LCD MTR	
2002-10-09	3		
NAME	Alger Huang/Sandy Yuan	SUPERS.	7
	MGr	CHECK	*****
		DATE	2002-10-09
		KONINKLIJKE PHILIPS ELECTRONICS N.V. 2000	





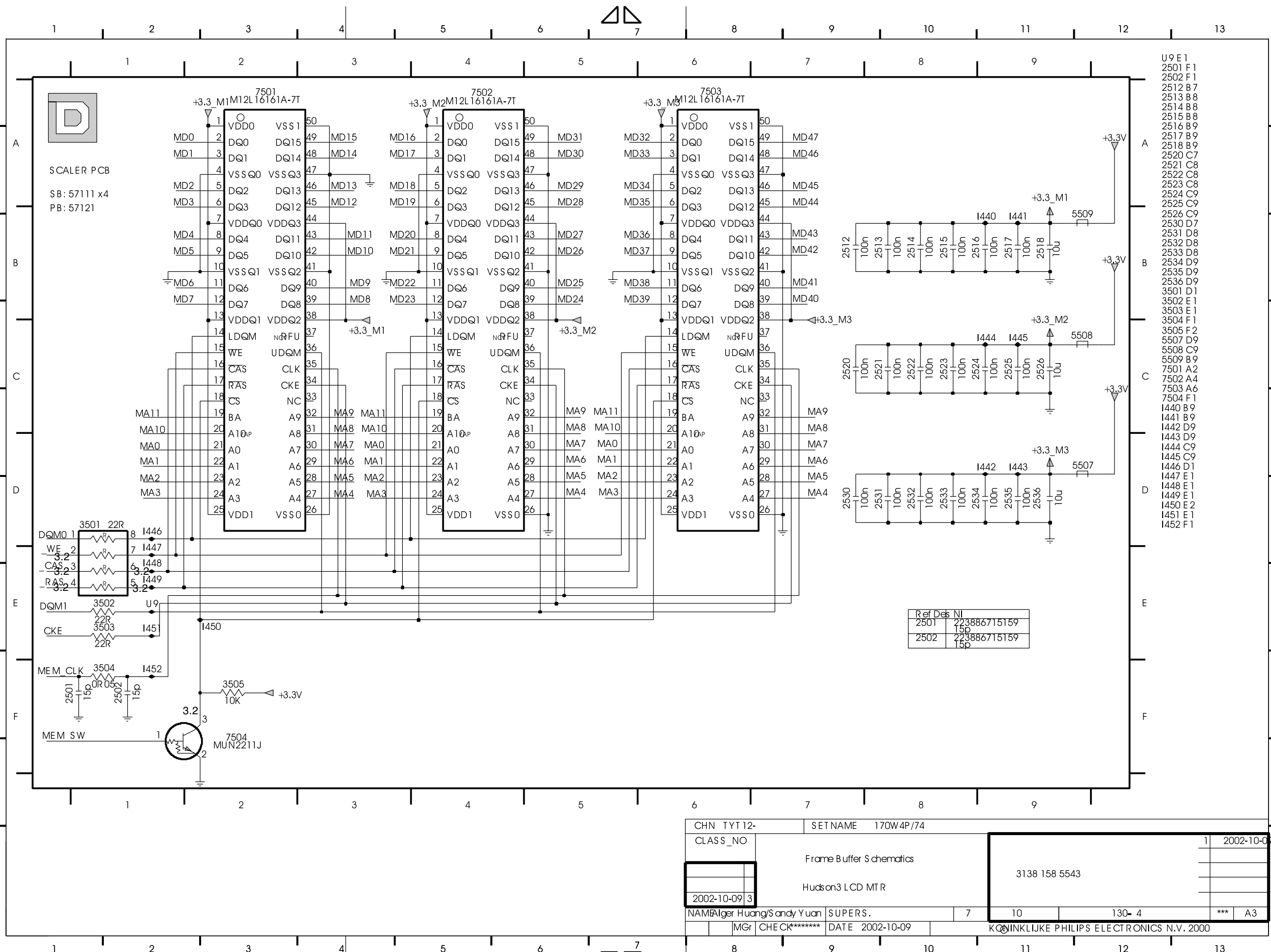


## Frame Buffer schematic Diagram

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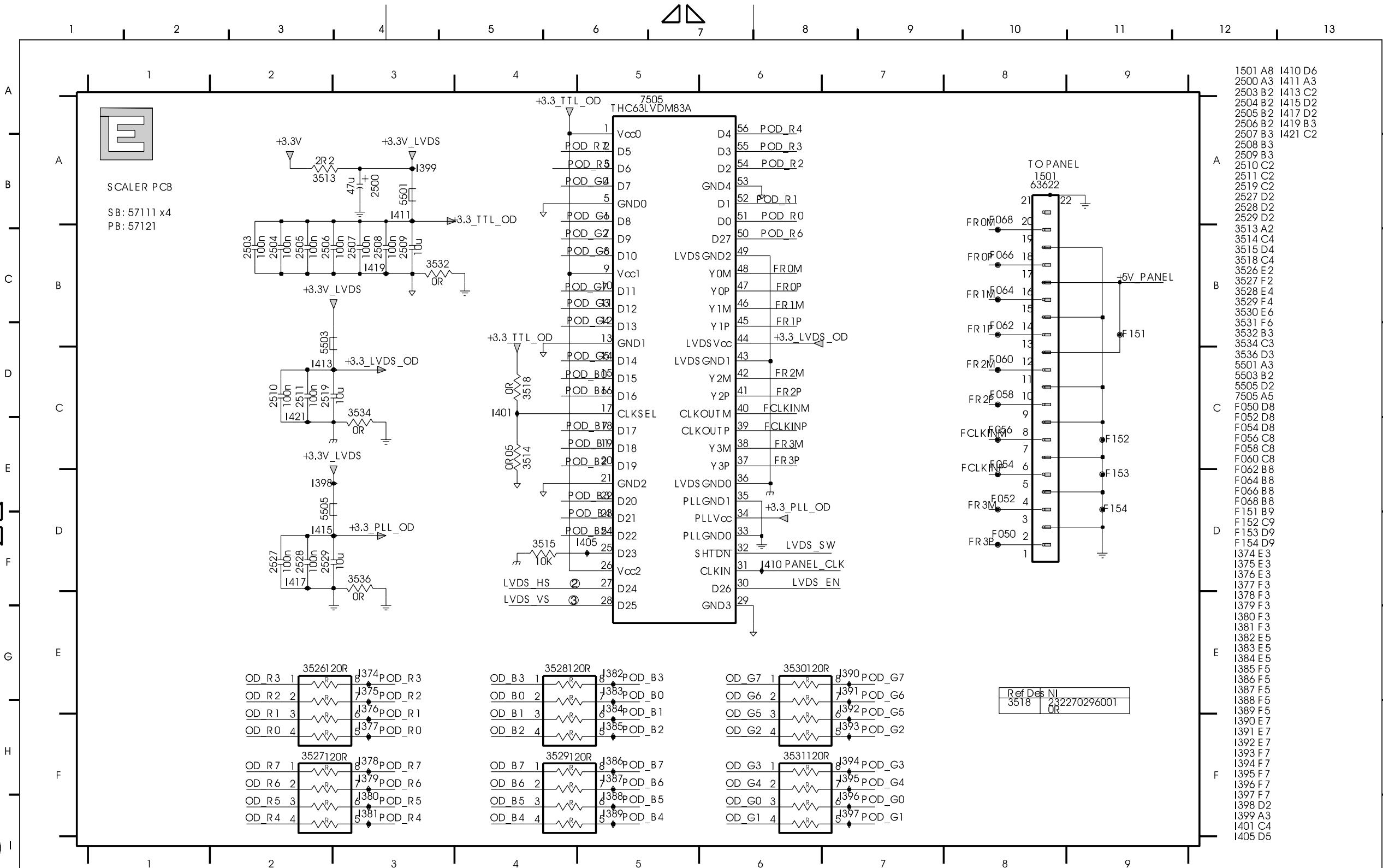
LVDS schematic Diagram

Go to cover page

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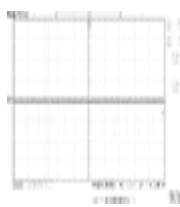
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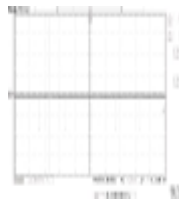


- 1501 A8 I410 D6
- 2500 A3 I411 A3
- 2503 B2 I413 C2
- 2504 B2 I415 D2
- 2505 B2 I417 D2
- 2506 B2 I419 B3
- 2507 B3 I421 C2
- 2508 B3
- 2509 B3
- 2510 C2
- 2511 C2
- 2519 C2
- 2527 D2
- 2528 D2
- 2529 D2
- 3513 A2
- 3514 C4
- 3515 D4
- 3518 C4
- 3526 E2
- 3527 F2
- 3528 E4
- 3529 F4
- 3530 E6
- 3531 F6
- 3532 B3
- 3534 C3
- 3536 D3
- 5501 A3
- 5503 B2
- 5505 D2
- 7505 A5
- F050 D8
- F052 D8
- F054 D8
- F056 C8
- F058 C8
- F060 C8
- F062 B8
- F064 B8
- F066 B8
- F068 B8
- F151 B9
- F152 C9
- F153 D9
- F154 D9
- I374 E3
- I375 E3
- I376 E3
- I377 F3
- I378 F3
- I379 F3
- I380 F3
- I381 F3
- I382 E5
- I383 E5
- I384 E5
- I385 F5
- I386 F5
- I387 F5
- I388 F5
- I389 F5
- I390 E7
- I391 E7
- I392 E7
- I393 F7
- I394 F7
- I395 F7
- I396 F7
- I397 F7
- I398 D2
- I399 A3
- I401 C4
- I405 D5

2. 7505-27



3. 7505-28



CHN TYT12-		SETNAME 170W4P/74	
CLASS_NO		LVDS Schematics	
2002-10-09 3		Hudson3 LCD MTR	
NAME Agler Huang/Sandy Yuan		SUPERS.	
MGr CHECK*****		DATE 2002-10-09	
		KONINKLIJKE PHILIPS ELECTRONICS N.V. 2000	





DC Power schematic Diagram

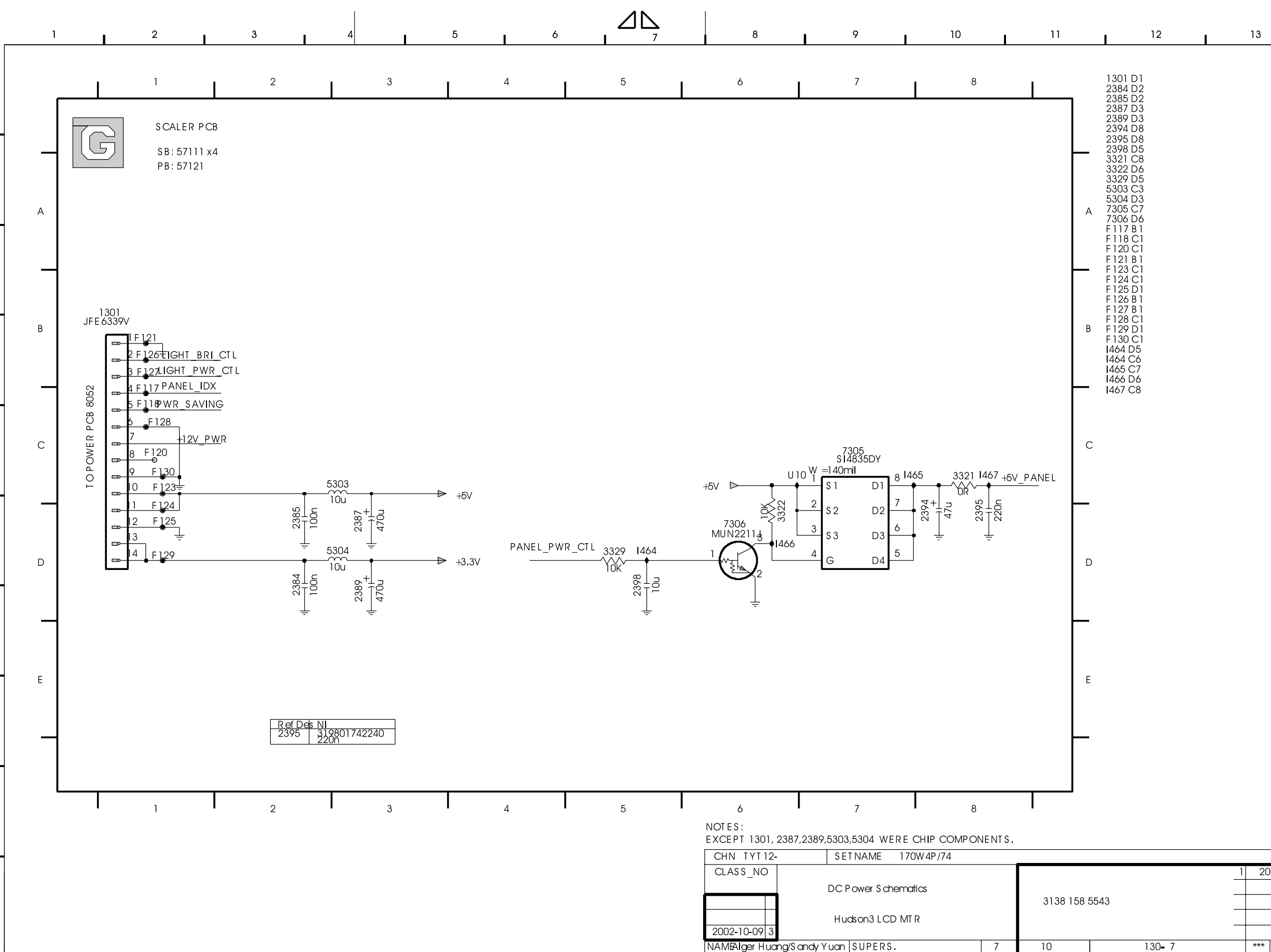
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Control schematic Diagram

Control board C.B.A.

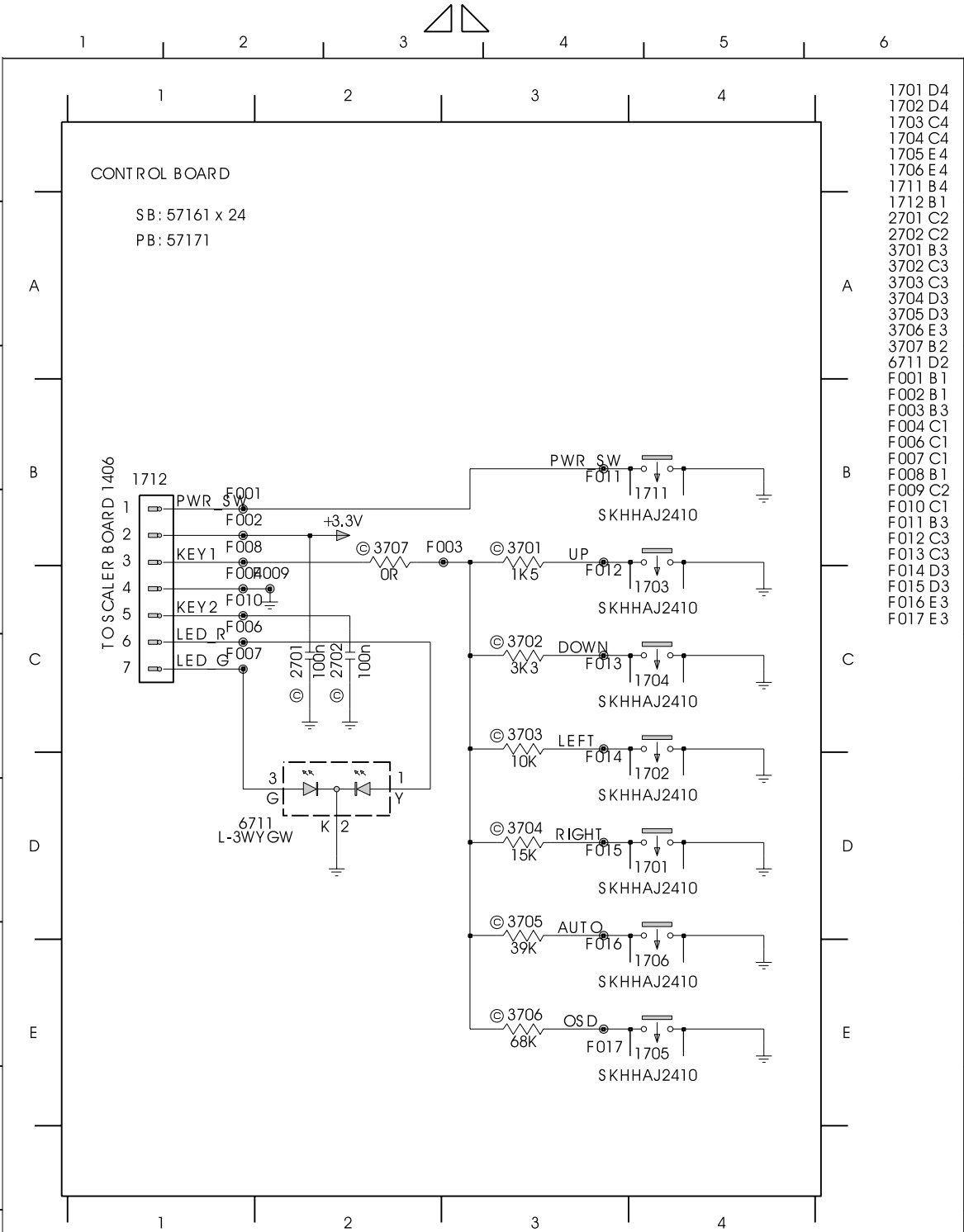
170W4P

39

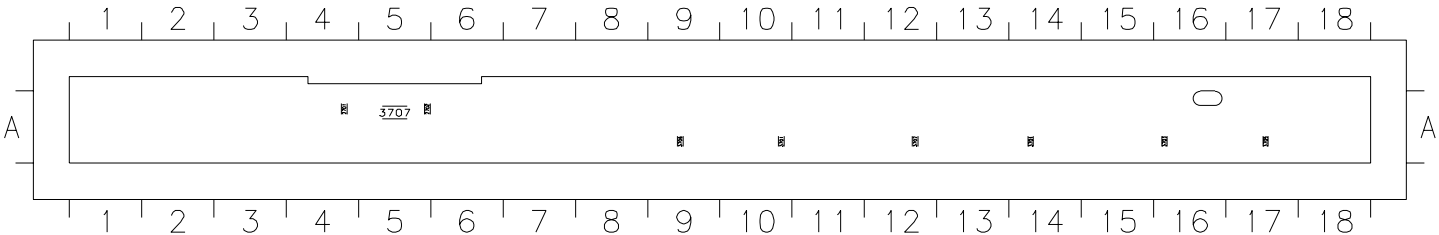
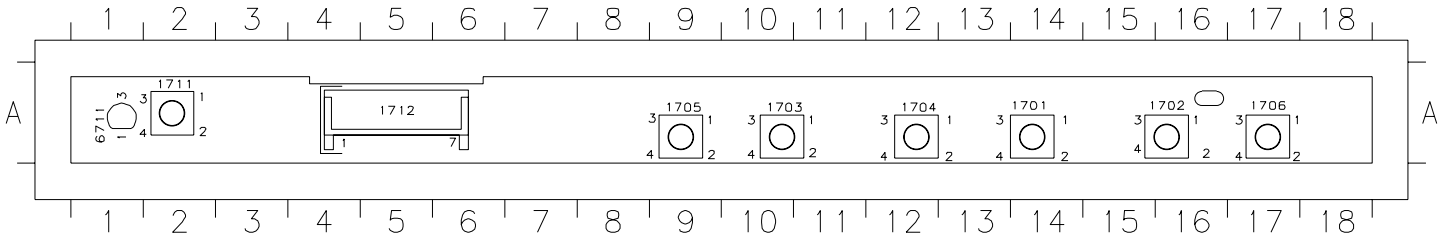
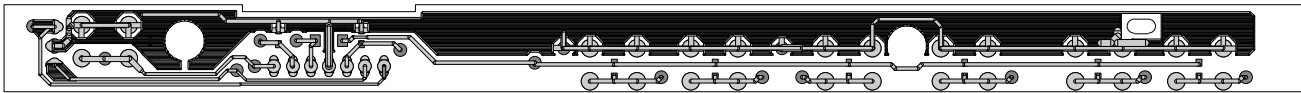
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- 1701 D4
- 1702 D4
- 1703 C4
- 1704 C4
- 1705 E4
- 1706 E4
- 1711 B4
- 1712 B1
- 2701 C2
- 2702 C2
- 3701 B3
- 3702 C3
- 3703 C3
- 3704 D3
- 3705 D3
- 3706 E3
- 3707 B2
- 6711 D2
- F001 B1
- F002 B1
- F003 B3
- F004 C1
- F006 C1
- F007 C1
- F008 B1
- F009 C2
- F010 C1
- F011 B3
- F012 C3
- F013 C3
- F014 D3
- F015 D3
- F016 E3
- F017 E3



#	GRID BOARD	
#	REF	LABEL SIDE
1701	A14	B
1702	A16	B
1703	A10	B
1704	A12	B
1705	A9	B
1706	A17	B
1711	A2	B
1712	A5	B
6711	A1	B

#	GRID BOARD	
#	REF	LABEL SIDE
2701	A4	A
2702	A5	A
3701	A10	A
3702	A12	A
3703	A16	A
3704	A14	A
3705	A17	A
3706	A9	A
3707	A5	A

NOTES:  
© STAND FOR CHIP COMPONENTS.

CHN	TYT 12-	SETNAME	170W4P/74
CLASS_NO			
		Control S chematics	1 2002-10-09
		Hudson 3 LCD Monitors	3138 158 5566
2002-10-09	3		
NAME	Hilton Lai/MC Chang	SUPERS.	1 10 130- 1 *** A4
	MGr	CHECK*****	DATE 2002-10-07 KONINKLIJKE PHILIPS ELECTRONICS N.V. 2000



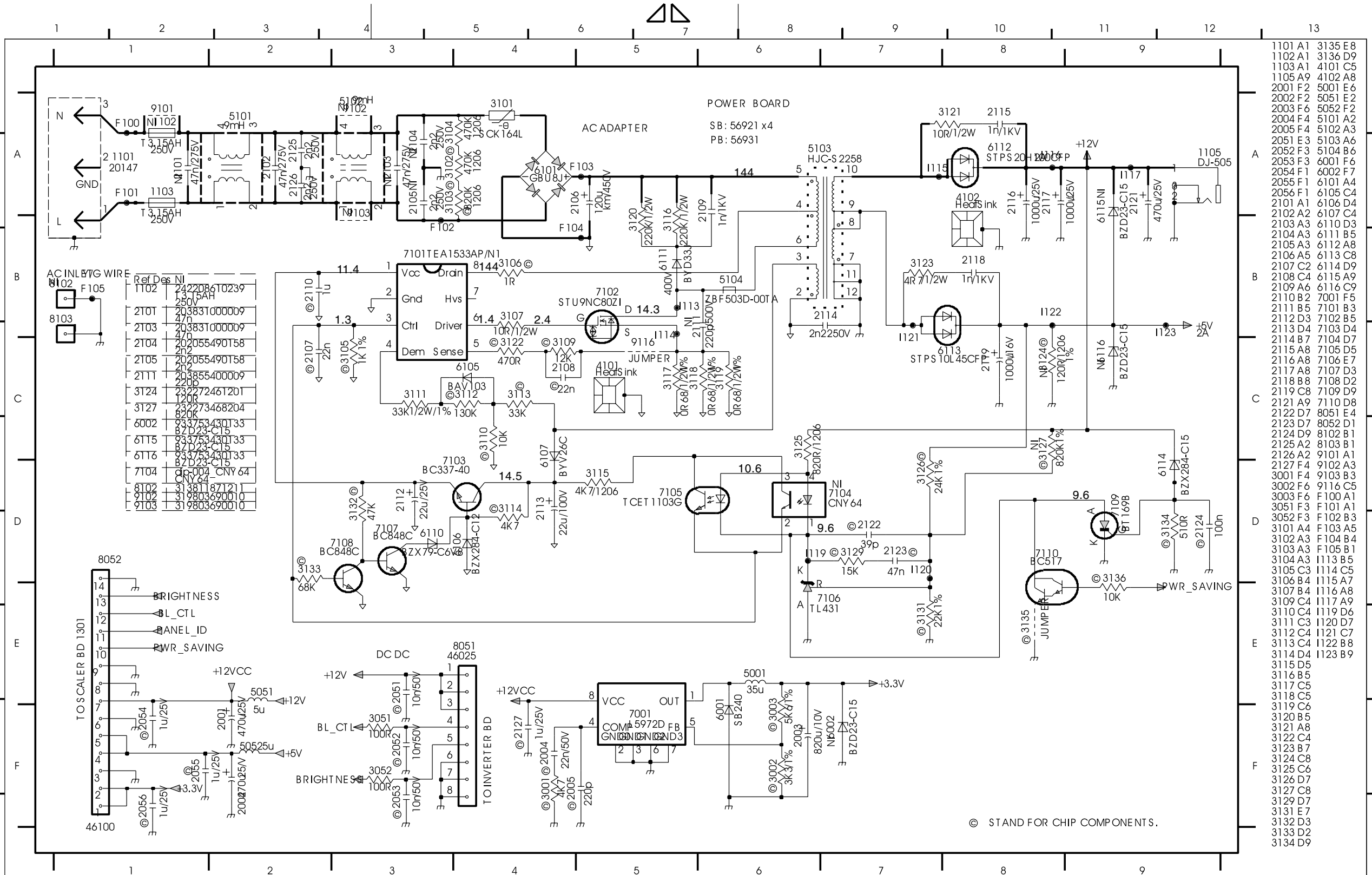
# Power schematic Diagram

Go to cover page

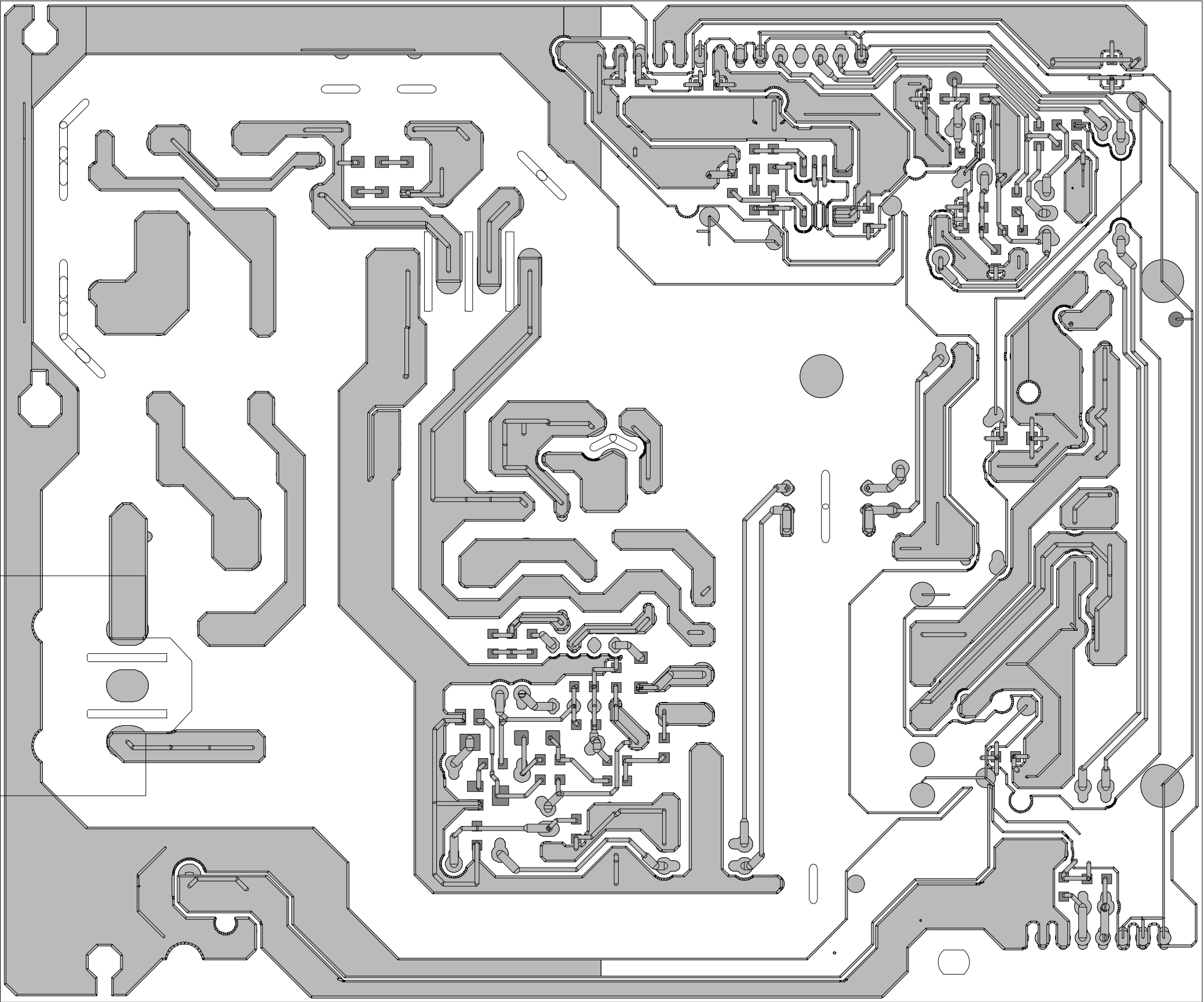
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CHN TYT12-	SETNAME 170W4P/74	
CLASS_NO	Power Schematics	
	Hudson3 LCD MTR	
2002-10-09 3		3138 158 5571
NAME Jack Hu/YS Tseng	SUPERS. 1	130- 1
CHECK	DATE 2002-10-09	KONINKLIJKE PHILIPS ELECTRONICS N.V. 2000



Power Board C.B.A. (copper track side view)

170W4P

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GRID REF	BOARD LABEL	SIDE
1101	B1	B
1102	A1	B
1103	B1	B
1105	B1	B
2001	A3	B
2002	A3	B
2003	A2	B
2101	A1	B
2102	A1	B
2103	A1	B
2104	A2	B
2105	A1	B
2106	A1	B
2109	A2	B
2111	A2	B
2112	B2	B
2113	B2	B
2114	B3	B
2115	A3	B
2116	B3	B
2117	B3	B
2118	A3	B
2119	A3	B
2121	B1	B
2125	A1	B
2126	A1	B
3051	B3	B
3052	B3	B
3101	A2	B
3107	A2	B
3111	B2	B
3115	B2	B
3116	A2	B
3117	A2	B
3118	A2	B
3119	A2	B
3120	A2	B
3121	A3	B
3123	A3	B
3125	A3	B
4101	A2	B
4102	A3	B
5001	A2	B
5051	A3	B
5052	A3	B
5101	A1	B
5102	A1	B
5103	B3	B
5104	A2	B
6001	A2	B
6002	A2	B
6101	A2	B
6107	B2	B
6110	B2	B
6111	A2	B
6112	B3	B
6113	A3	B
6115	A3	B
6116	A3	B
7101	B2	B
7102	A2	B
7103	B2	B
7104	A3	B
7105	A3	B
7106	A3	B
7109	A3	B
7110	A3	B
8051	B3	B
8052	A2	B
8102	A1	B
8103	B1	B
9051	A3	B
9101	A1	B

9102	A1	B
9103	A1	B
9106	A1	B
9107	A3	B
9108	B2	B
9109	A3	B
9110	B2	B
9111	B3	B
9112	B3	B
9113	A3	B
9114	A3	B
9115	A3	B
9116	A2	B

A

A

B

B

Power Board C.B.A. (copper track side view)

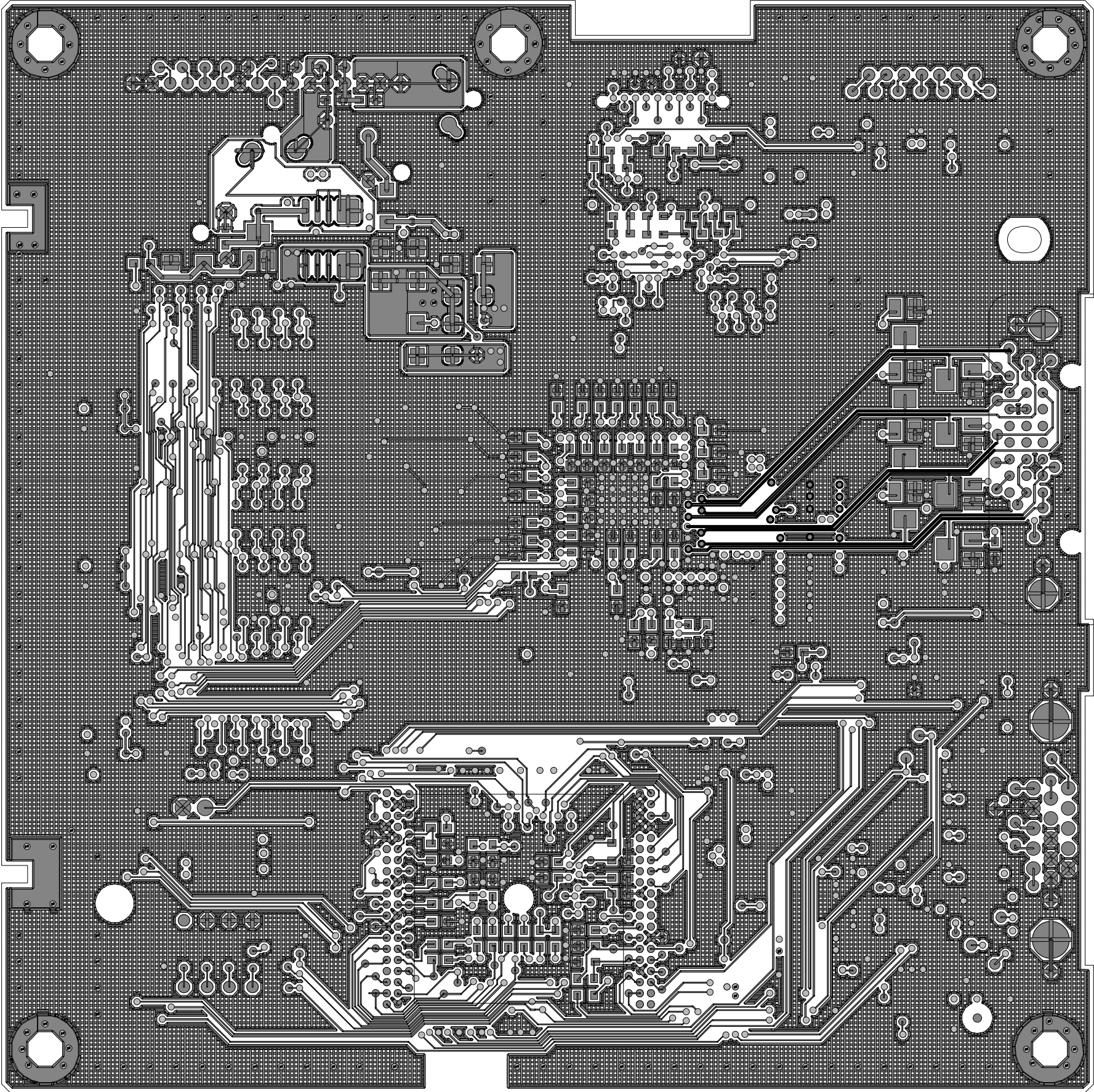
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GRID BOARD  
REF LABEL SIDE

2004	A2	A
2005	A2	A
2051	B3	A
2052	B3	A
2053	B3	A
2054	A2	A
2055	A3	A
2056	A2	A
2107	B2	A
2108	B2	A
2110	B2	A
2122	A3	A
2123	A3	A
2124	A3	A
2127	A3	A
3001	A2	A
3002	A2	A
3003	A2	A
3102	A1	A
3103	A1	A
3104	A2	A
3105	B2	A
3106	B2	A
3109	B2	A
3110	B2	A
3112	B2	A
3113	B2	A
3114	B2	A
3122	B2	A
3124	A3	A
3126	A3	A
3127	A3	A
3129	A3	A
3131	A3	A
3132	B2	A
3133	B2	A
3134	A3	A
3135	A3	A
3136	A3	A
3141	B2	A
6105	B2	A
6106	B2	A
6114	A3	A
7001	A3	A
7107	B2	A
7108	B2	A



Scaler Board C.B.A. (copper track side view)



## 2



GRID BOARD		
REF	LABEL	SIDE
1202	A1	B
1203	B1	B
1301	A2	B
1403	B2	B
1404	B2	B
1405	B2	B
1406	A1	B
2387	A2	B
2389	A2	B
5303	A2	B
5304	A2	B
7402	B2	B



Scaler Board C.B.A. (copper track side view)

2

A

B

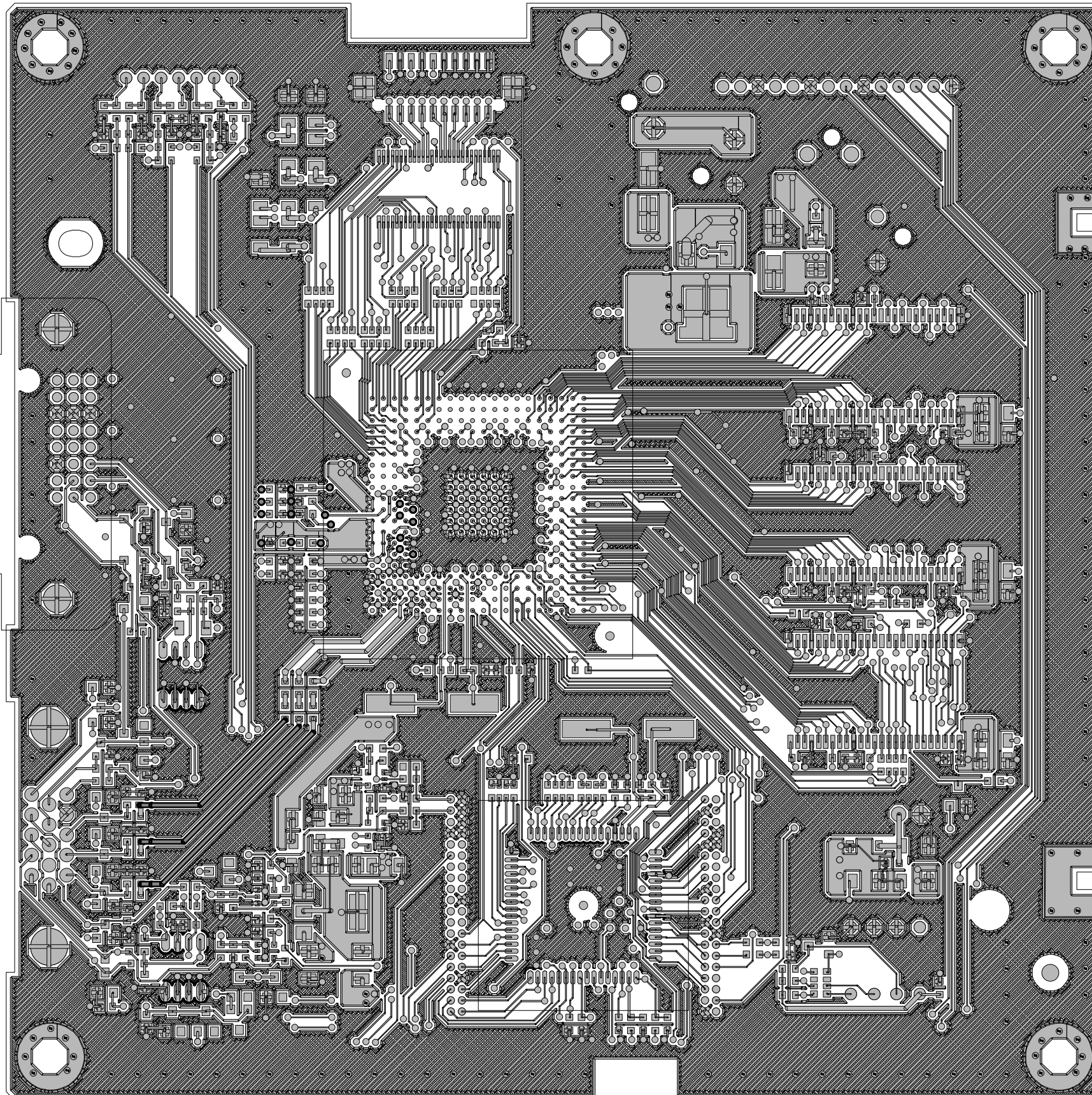
A

B

GRID BOARD			3406 B1	A
REF LABEL SIDE			3419 B1	A
			3426 B1	A
			3428 B1	A
			3429 B1	A
			3430 B1	A
			3431 B1	A
			3436 B1	A
			3437 B1	A
			3438 B1	A
			3442 B1	A
			3444 B1	A
			3446 B1	A
			3451 B1	A
			3452 B1	A
			3453 B1	A
			3454 B1	A
			3457 B1	A
			3458 B1	A
			3459 B1	A
			3475 B1	A
			3513 A1	A
			3514 A1	A
			3515 A1	A
			3518 A1	A
			5311 A1	A
			5312 A1	A
			6201 A2	A
			6202 A2	A
			6203 A2	A
			6204 A2	A
			6205 A2	A
			6206 A2	A
			6207 A2	A
			6208 A2	A
			7305 A1	A
			7306 A1	A
			2202 A2	A
			2310 A1	A
			2311 A1	A
			2312 A1	A
			2313 A1	A
			2314 A1	A
			2315 A1	A
			2316 A1	A
			2317 A1	A
			2318 A2	A
			2319 A1	A
			2320 A1	A
			2321 A1	A
			2322 A1	A
			2323 A1	A
			2324 A2	A
			2325 A1	A
			2326 A2	A
			2327 A1	A
			2328 A1	A
			2329 A1	A
			2330 A1	A
			2331 A1	A
			2332 A1	A
			2333 A1	A
			2334 A1	A
			2335 A1	A
			2336 A2	A
			2337 A1	A
			2338 A1	A
			2339 A1	A
			2340 A1	A
			2341 A1	A
			2342 A1	A
			2343 A2	A
			2344 A2	A
			2351 A1	A
			2352 A1	A
			2369 A1	A
			2370 A2	A
			2371 A2	A
			2372 A1	A
			2373 A1	A
			2374 A1	A
			2375 A2	A
			2376 A2	A
			2377 A1	A
			2384 A1	A
			2385 A1	A
			2398 A1	A
			2401 B1	A
			2402 B1	A
			2403 B1	A
			2404 B1	A
			2409 B1	A
			2410 B1	A
			2503 A1	A
			2504 A2	A
			2505 A2	A
			2506 A2	A
			2507 A2	A
			2508 A1	A
			2510 A2	A
			2511 A2	A
			2527 A1	A
			2528 A1	A
			3318 A1	A
			3319 A2	A
			3322 A1	A
			3329 A1	A
			3404 B1	A
			3405 B1	A

3406 B1	A
3419 B1	A
3426 B1	A
3428 B1	A
3429 B1	A
3430 B1	A
3431 B1	A
3436 B1	A
3437 B1	A
3438 B1	A
3442 B1	A
3444 B1	A
3446 B1	A
3451 B1	A
3452 B1	A
3453 B1	A
3454 B1	A
3457 B1	A
3458 B1	A
3459 B1	A
3475 B1	A
3513 A1	A
3514 A1	A
3515 A1	A
3518 A1	A
5311 A1	A
5312 A1	A
6201 A2	A
6202 A2	A
6203 A2	A
6204 A2	A
6205 A2	A
6206 A2	A
6207 A2	A
6208 A2	A
7305 A1	A
7306 A1	A







Scaler Board C.B.A. (components side view)

170W4P

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Go to cover page

A

A

B

B

GRID BOARD  
REF LABEL SIDE

1202	A2	B
1203	B2	B
1301	A1	B
1403	B1	B
1404	B1	B
1405	B1	B
1406	A2	B
2387	A1	B
2389	A1	B
5303	A1	B
5304	A1	B
7402	B1	B

Scaler Board C.B.A. (components side view)

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GRID BOARD  
REF LABEL SIDE

1302 B1	B	2501 A2	B	3427 B1	B	6239 B1	B
1407 B2	B	2502 A2	B	3432 B2	B	6401 B2	B
1501 A1	B	2509 A1	B	3433 B2	B	7201 B1	B
2201 B1	B	2512 B2	B	3434 B2	B	7202 B1	B
2204 B1	B	2513 B2	B	3435 B2	B	7209 B1	B
2208 B1	B	2514 B2	B	3439 B2	B	7211 B1	B
2209 B1	B	2515 B2	B	3440 B2	B	7301 A2	B
2210 B1	B	2516 A2	B	3441 B2	B	7302 B1	B
2213 B1	B	2517 A2	B	3443 A1	B	7303 A2	B
2214 B1	B	2518 B2	B	3445 A1	B	7304 B1	B
2215 A1	B	2519 A1	B	3447 B2	B	7307 B1	B
2216 B1	B	2520 A2	B	3448 B2	B	7401 B2	B
2221 B1	B	2521 A2	B	3449 B2	B	7403 B2	B
2222 B1	B	2522 A2	B	3450 B2	B	7501 B2	B
2223 A1	B	2523 A2	B	3455 B2	B	7502 A2	B
2224 B1	B	2524 A2	B	3456 B2	B	7503 A2	B
2228 B1	B	2525 A2	B	3462 A1	B	7504 B2	B
2251 A1	B	2526 A2	B	3463 A1	B	7505 A1	B
2252 A1	B	2529 A1	B	3464 A1	B		
2253 B1	B	2530 A2	B	3465 A1	B		
2254 B1	B	2531 A2	B	3466 A1	B		
2257 B1	B	2532 A2	B	3467 A1	B		
2258 B1	B	2533 A2	B	3468 A1	B		
2301 A1	B	2534 A2	B	3469 A1	B		
2302 A1	B	2535 A2	B	3470 A1	B		
2303 A1	B	2536 A2	B	3471 A1	B		
2304 A1	B	3222 A1	B	3472 A1	B		
2305 A1	B	3232 B1	B	3473 A1	B		
2306 A1	B	3233 B1	B	3474 A1	B		
2307 A1	B	3234 B1	B	3476 B2	B		
2308 A1	B	3235 B1	B	3478 B2	B		
2309 A1	B	3236 B1	B	3501 B2	B		
2345 A1	B	3237 B1	B	3502 A2	B		
2346 A1	B	3238 B1	B	3503 A2	B		
2347 A1	B	3239 B1	B	3504 A2	B		
2348 A1	B	3240 B1	B	3505 B2	B		
2349 A1	B	3241 B1	B	3526 A1	B		
2350 A1	B	3243 B1	B	3527 A1	B		
2353 B1	B	3244 B1	B	3528 A2	B		
2354 B1	B	3246 A1	B	3529 A1	B		
2355 B1	B	3247 A1	B	3530 A1	B		
2356 B1	B	3248 A1	B	3531 A1	B		
2357 B1	B	3249 B1	B	3532 A1	B		
2358 B1	B	3250 B1	B	3534 A1	B		
2359 B1	B	3253 A1	B	3536 A1	B		
2360 B1	B	3254 A1	B	5308 B1	B		
2364 B2	B	3263 B1	B	5309 B1	B		
2365 B1	B	3264 B1	B	5310 B1	B		
2366 A2	B	3273 B1	B	5401 B2	B		
2367 A2	B	3274 B1	B	5501 A1	B		
2368 B1	B	3276 B1	B	5503 A1	B		
2378 B2	B	3279 B1	B	5505 A1	B		
2379 B2	B	3301 A2	B	5507 A2	B		
2394 A2	B	3304 A1	B	5508 A2	B		
2395 A2	B	3305 A2	B	5509 B2	B		
2405 B2	B	3306 B1	B	6214 B1	B		
2406 B2	B	3307 B1	B	6215 B1	B		
2407 B2	B	3308 B1	B	6216 B1	B		
2408 B2	B	3309 B1	B	6217 B1	B		
2412 B2	B	3310 B1	B	6218 B1	B		
2413 B2	B	3312 B1	B	6219 A1	B		
2414 B2	B	3316 B1	B	6220 A1	B		
2416 B2	B	3317 B1	B	6221 B1	B		
2423 A1	B	3321 A2	B	6222 B1	B		
2425 A1	B	3324 B2	B	6223 B1	B		
2427 A1	B	3401 B2	B	6224 B1	B		
2428 A1	B	3402 B2	B	6230 A1	B		
2429 A1	B	3403 B2	B	6231 B1	B		
2430 A1	B	3417 B2	B	6232 B1	B		
2431 A1	B	3418 B2	B	6233 B1	B		
2480 A1	B	3420 B1	B	6234 B1	B		
2500 A2	B	3421 B1	B	6235 B1	B		
		3422 B1	B	6236 A1	B		
		3423 B1	B	6237 A1	B		
		3425 B2	B	6238 B1	B		

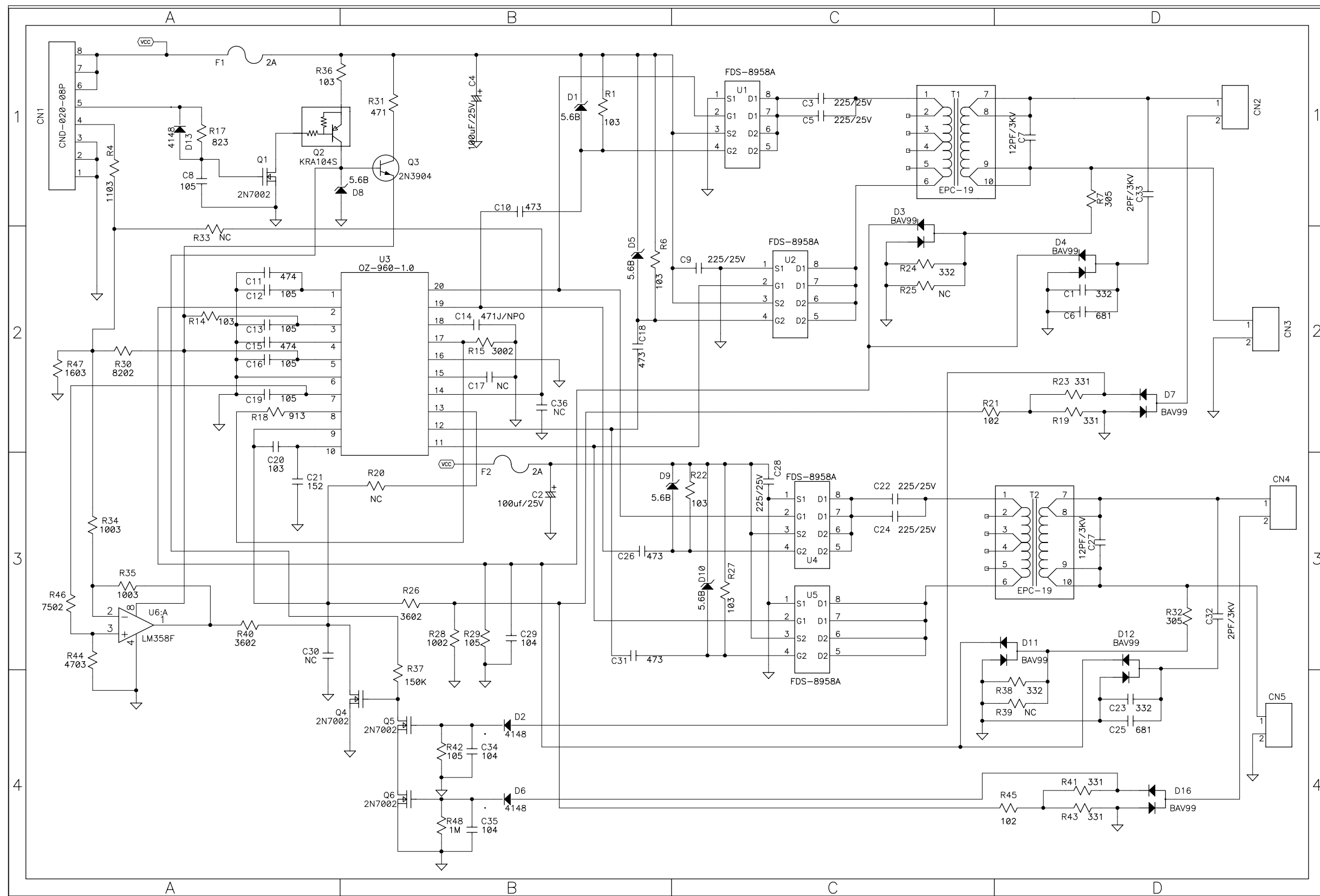
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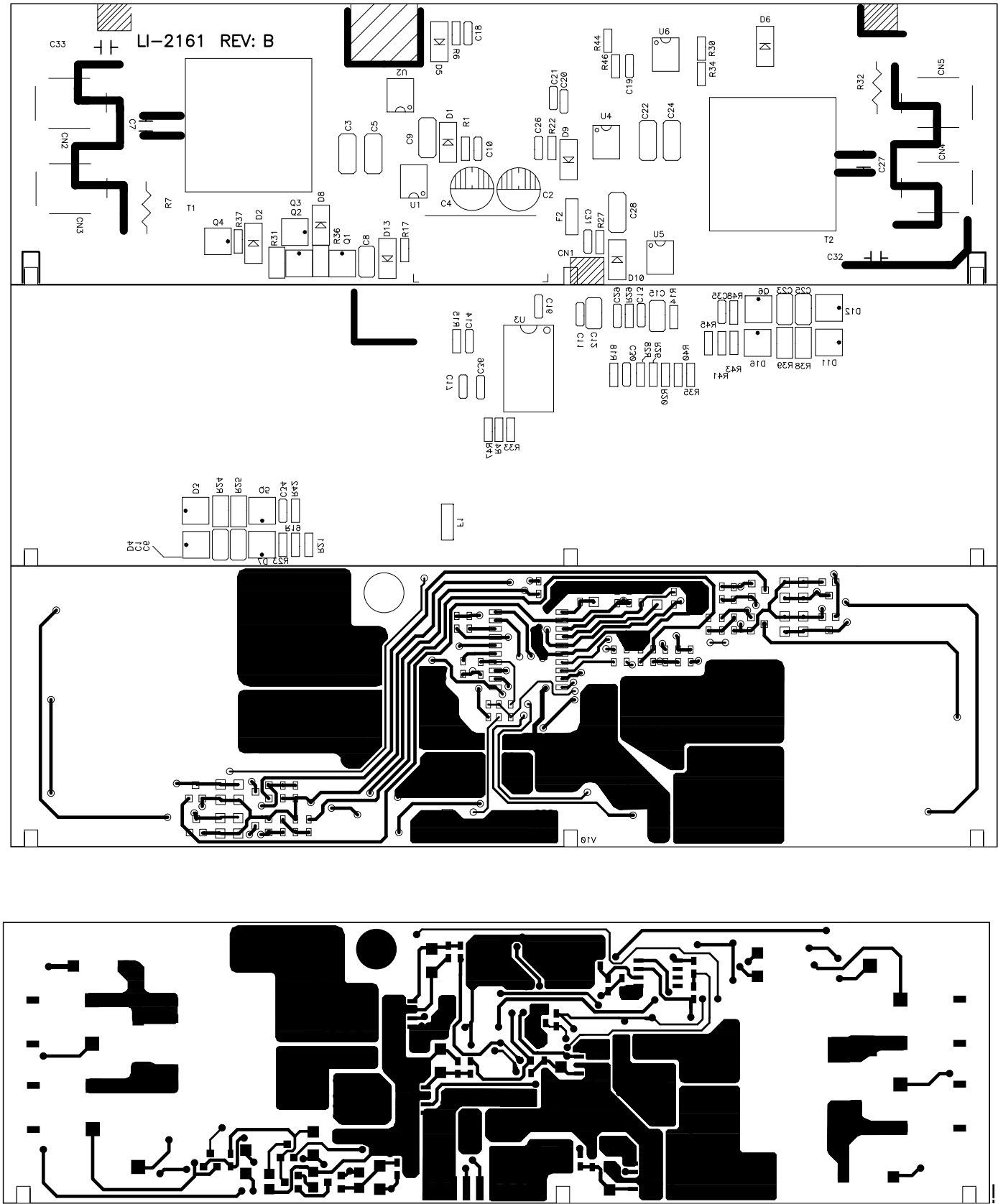
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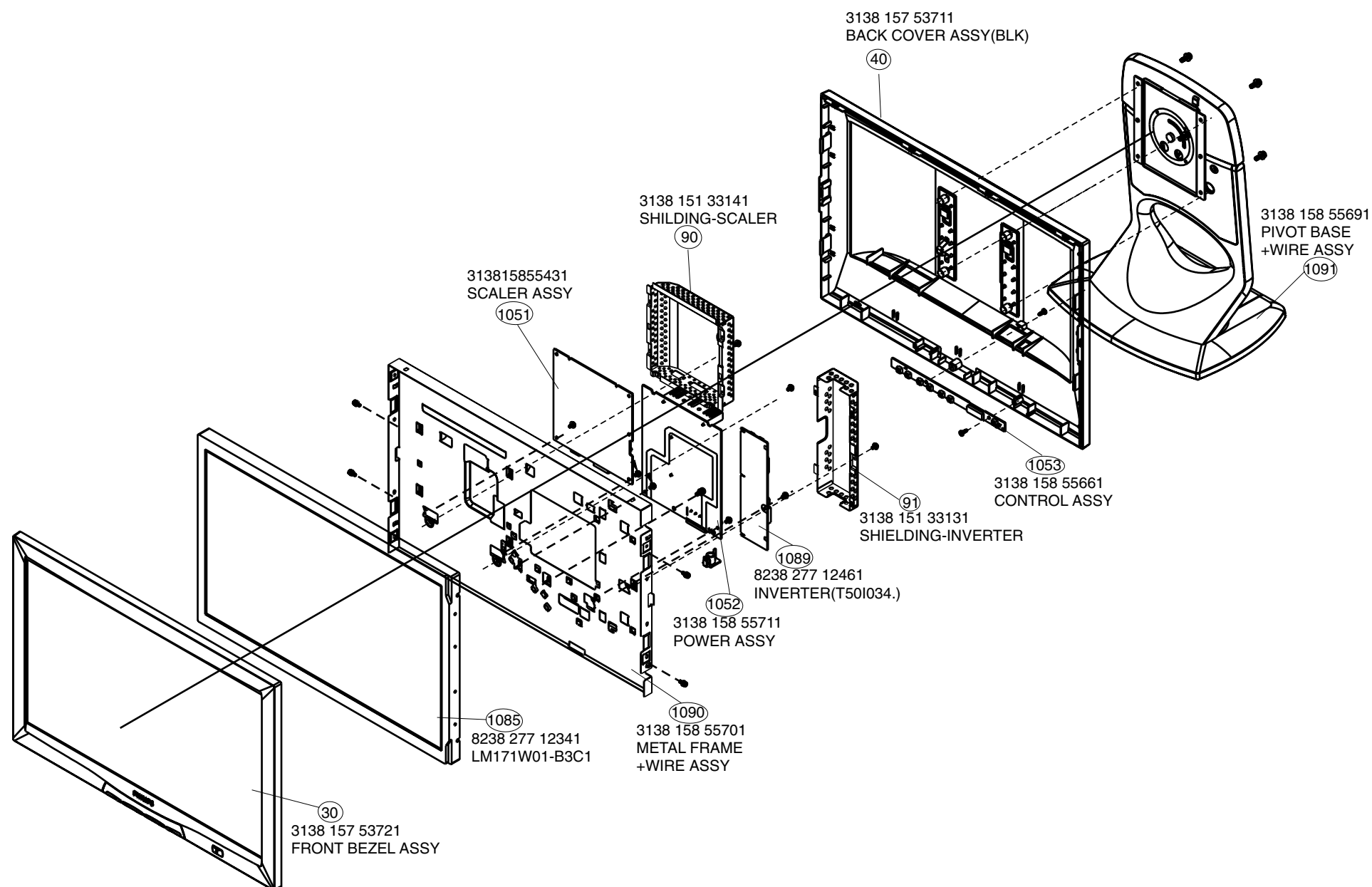
# Inverter Schematic Diagram







# Exploded View



# Recommended Parts List

170W4P

47

Go to cover page

Model: 170W4P/00

Item	Code number	Description
30	313815753721	FRONT BEZEL ASSY-SILVE
40	313815753711	BACK COVER ASSY-BLK
1086	313818875581	CABLE (20 pins, scaler to Panel)
1087▲	313812874931	MAINS CORD
1088	313818872261	CORD SUB-D 15/2M0/15 SUB-D(I/F cable)
1090	313815855701	METAL FRAME+7P WIRE ASSY
1091	313815855691	PIVOT BASE+WIRE ASSY
450	313815633831	CARTON
451	313815633851	SUSHION-R
452	313815633841	SUSHION-L
601	313811704741	E-D.F.U. ASSY-170W4
1103▲	242208610239	FUSE 5X20 HT 3A15 250V IEC B
5103▲	823827712501	POWER TRANSFORMER
7001	932219076668	IC SM L5972D (ST ) R
7101	935270037112	IC TEA1533AP/N1 (PHSE) L
7201	932214526668	IC SM M24C02-WMN6 (ST ) R (Digital DDC IC)
7202	932214526668	IC SM M24C02-WMN6 (ST ) R (Analog DDC IC)
7209	935245720115	IC SM 74HCT1G14GW (PHSE) R
7211	935245720115	IC SM 74HCT1G14GW (PHSE) R
7301	932216881671	IC SM GM5020 (GEMI) Y
7303	932217704668	IC SM LD1086DT25 (ST ) R
7401	932219162671	IC SM MCHC98LD120CFU (MOTA) Y (empty CPU, firmware can be upgraded by ISP application)
7402	313810610243	IC EEPROM ASSY (ST ) (with Factory alignment data)
7501	932216677682	IC SM M12L16161A-7T (ESMT) L
7502	932216677682	IC SM M12L16161A-7T (ESMT) L
7503	932216677682	IC SM M12L16161A-7T (ESMT) L
7505	932219072682	IC SM NT7181C (NOVA) L

Model: 170W4P/00

Item	Code number	Description
1087▲	313812874901	MAINS CORD

Remark : item 1087 is the difference between 170W4P/00 and 170W4P/74.

## Recommended Parts List of Inverter board of 8238 277 12451 (LI-2161)

Item	service code	Description	supplier code
R7	9965 000 16598	HV RES. 1/2W 3MR 3KV	21E250305H
R32	9965 000 16598	HV RES. 1/2W 3MR 3KV	21E250305H
C2	9965 000 16599	100UF 25V	221I31013
C4	9965 000 16599	100UF 25V	221I31013
C3	9965 000 16600	SMD 2.2UF 25V X7R	226F42253
C5	9965 000 16600	SMD 2.2UF 25V X7R	226F42253
C22	9965 000 16600	SMD 2.2UF 25V X7R	226F42253
C24	9965 000 16600	SMD 2.2UF 25V X7R	226F42253
C9	9965 000 16600	SMD 2.2UF 25V X7R	226F42253
C28	9965 000 16600	SMD 2.2UF 25V X7R	226F42253
C32	9965 000 16601	2PF 3KV	222QB0201
C33	9965 000 16601	2PF 3KV	222QB0201
C7	9965 000 16602	12PF 3KV	22MB0120
C27	9965 000 16602	12PF 3KV	22MB0120
U1	9965 000 16603	TPC8401/SI4532ADY/FDS8985A	2431W0011
U2	9965 000 16603	TPC8401/SI4532ADY/FDS8985A	2431W0011
U4	9965 000 16603	TPC8401/SI4532ADY/FDS8985A	2431W0011
U5	9965 000 16603	TPC8401/SI4532ADY/FDS8985A	2431W0011
U6	9965 000 16604	LA6358NM	2545K0008
Q1	9965 000 12650	MOSFET , SMD MOS FET KR7002	242007002
Q4	9965 000 12650	MOSFET , SMD MOS FET KR7002	242007002
Q5	9965 000 12650	MOSFET , SMD MOS FET KR7002	242007002
Q6	9965 000 12650	MOSFET , SMD MOS FET KR7002	242007002
U3	9965 000 16605	IC OZ960G	2511Y0018
F1	9965 000 16606	FUSE 120602A	2770I0008
F2	9965 000 16606	FUSE 120602A	2770I0008
T1	9965 000 16607	TRANSFORMER IT-0171	IT0171LC1010
T2	9965 000 16607	TRANSFORMER IT-0171	IT0171LC1010

Spare Parts List















<b>Parts indicated on exploded view : CTVs : 170W4P/00</b>								
30	313815753721	FRONT BEZEL ASSY-SILVE	2326	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2513	223878615649	CER2 0603 X7R 16V 1 N PM10 R
40	313815753711	BACK COVER ASSY-BLK	2327	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2514	223878615649	CER2 0603 X7R 16V 1 N PM10 R
90	313815133141	SHIELDING-SCALER	2328	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2515	223878615649	CER2 0603 X7R 16V 1 N PM10 R
91	313815133131	SHIELDING-INVERT	2329	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2516	223878615649	CER2 0603 X7R 16V 1 N PM10 R
98	313810440571	HOUSING COVER	2330	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2517	223878615649	CER2 0603 X7R 16V 1 N PM10 R
99	313815557451	PLASTIC COVER-170W4	2331	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2518	222224119876	CER2 1206 Y5V 10V 10U P8020 R
109	313815405691	CAP-BASE (BLK)	2332	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2519	222224119876	CER2 1206 Y5V 10V 10U P8020 R
1085	823827712341	TFT-LCD MOD LM171W01-B3C1	2333	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2520	223878615649	CER2 0603 X7R 16V 1 N PM10 R
1086	313818875581	CABLE (20 pins, scaler to Panel)	2334	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2521	223878615649	CER2 0603 X7R 16V 1 N PM10 R
1088	313818872261	CORD SUB-D 15/2M0/15 SUB-D F B (I/F Cable)	2335	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2522	223878615649	CER2 0603 X7R 16V 1 N PM10 R
1090	313815855701	METAL FRAME+7P WIRE ASSY	2336	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2523	223878615649	CER2 0603 X7R 16V 1 N PM10 R
1091	313815855691	PIVOT BASE+WIRE ASSY	2337	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2524	223878615649	CER2 0603 X7R 16V 1 N PM10 R
<b>Various</b>			2338	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2525	223878615649	CER2 0603 X7R 16V 1 N PM10 R
450	313815633831	CARTON	2339	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2526	222224119876	CER2 1206 Y5V 10V 10U P8020 R
451	313815633851	SUSHION-R	2340	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2527	223878615649	CER2 0603 X7R 16V 1 N PM10 R
452	313815633841	SUSHION-L	2341	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2528	223878615649	CER2 0603 X7R 16V 1 N PM10 R
453	313815620801	P.E.BAG-STAT.	2342	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2529	222224119876	CER2 1206 Y5V 10V 10U P8020 R
<b>Accessories</b>			2343	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2530	223878615649	CER2 0603 X7R 16V 1 N PM10 R
1087▲	313812874931	MAINS CORD	2344	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2531	223878615649	CER2 0603 X7R 16V 1 N PM10 R
601	313811704741	E-D.F.U. ASSY-170W4	2345	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2532	223878615649	CER2 0603 X7R 16V 1 N PM10 R
<b>Main Panel</b>			2346	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2533	223878615649	CER2 0603 X7R 16V 1 N PM10 R
1051	313815855431	SCALER ASSY	2347	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2534	223878615649	CER2 0603 X7R 16V 1 N PM10 R
1052	313815855711	POWER ASSY	2348	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2535	223878615649	CER2 0603 X7R 16V 1 N PM10 R
1053	313815855661	CONTROL ASSY	2349	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2536	222224119876	CER2 1206 Y5V 10V 10U P8020 R
1089	8238277112461	DC-AC INVERTER9T50I034. )	2350	223878615649	CER2 0603 X7R 16V 1 N PM10 R			
<b>Scaler Panel</b>			2351	222224119876	CER2 1206 Y5V 10V 10U P8020 R			
1051	313815855431	SCALER ASSY	2352	222224119876	CER2 1206 Y5V 10V 10U P8020 R	3222	319802190030	RST SM 0603 JUMP. 0R05 COL
<b>→→→</b>			2353	222224119876	CER2 1206 Y5V 10V 10U P8020 R	3232	319802190030	RST SM 0603 JUMP. 0R05 COL
2213	223886715331	CER1 0603 NP0 50V 330P PM5 R	2354	222224119876	CER2 1206 Y5V 10V 10U P8020 R	3233	319802132220	RST SM 0603 2K2 PM5 COL
2214	223886715159	CER1 0603 NP0 50V 15P PM5 R	2355	222224119876	CER2 1206 Y5V 10V 10U P8020 R	3235	319802132220	RST SM 0603 2K2 PM5 COL
2215	223886715479	CER1 0603 NP0 50V 47P PM5 R	2356	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3236	319802190030	RST SM 0603 JUMP. 0R05 COL
2216	223886715479	CER1 0603 NP0 50V 47P PM5 R	2357	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3237	319802137590	RST SM 0603 75R PM5 COL
2221	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2358	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3238	319802190030	RST SM 0603 JUMP. 0R05 COL
2222	222224119876	CER2 1206 Y5V 10V 10U P8020 R	2364	223886715568	CER1 0603 NP0 50V 5P6 PMOP5 R	3239	319802137590	RST SM 0603 75R PM5 COL
2223	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2365	223886715568	CER1 0603 NP0 50V 5P6 PMOP5 R	3240	319802190030	RST SM 0603 JUMP. 0R05 COL
2228	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2368	222224119876	CER2 1206 Y5V 10V 10U P8020 R	3241	319802137590	RST SM 0603 75R PM5 COL
2251	223886715159	CER1 0603 NP0 50V 15P PM5 R	2369	222224119876	CER2 1206 Y5V 10V 10U P8020 R	3244	319802131010	RST SM 0603 1 R PM5 COL
2252	223886715159	CER1 0603 NP0 50V 15P PM5 R	2370	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3246	319802131010	RST SM 0603 1 R PM5 COL
2253	223886715159	CER1 0603 NP0 50V 15P PM5 R	2371	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3247	319802131530	RST SM 0603 15K PM5 COL
2254	223886715159	CER1 0603 NP0 50V 15P PM5 R	2372	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3248	319802131530	RST SM 0603 15K PM5 COL
2258	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2373	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3250	319802131010	RST SM 0603 1 R PM5 COL
2301	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2374	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3253	319802131010	RST SM 0603 1 R PM5 COL
2302	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2375	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3254	232271191032	RST SM 1206 JUMP. MAX 0R05 R
2303	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2376	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3263	319802131010	RST SM 0603 1 R PM5 COL
2304	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2377	222224119876	CER2 1206 Y5V 10V 10U P8020 R	3264	319802131010	RST SM 0603 1 R PM5 COL
2305	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2384	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3273	319802131530	RST SM 0603 15K PM5 COL
2306	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2385	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3274	319802131530	RST SM 0603 15K PM5 COL
2307	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2387	203803516304	ELCAP RXJ 25V S 470U PM20 B	3276	319802131010	RST SM 0603 1 R PM5 COL
2308	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2389	203803516304	ELCAP RXJ 25V S 470U PM20 B	3279	319802131010	RST SM 0603 1 R PM5 COL
2309	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2394	202002191726	ELCAP SM RVS 16V 47U PM20 R	3301	319802131210	RST SM 0603 120R PM5 COL
2310	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2398	222224119876	CER2 1206 Y5V 10V 10U P8020 R	3304	319802131020	RST SM 0603 1K PM5 COL
2311	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2401	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3305	235003510121	RST NETW SM ARV24 4X120R PM5 R
2312	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2402	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3306	319802132290	RST SM 0603 22R PM5 COL
2313	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2403	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3307	319802132290	RST SM 0603 22R PM5 COL
2314	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2404	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3308	319802132290	RST SM 0603 22R PM5 COL
2315	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2405	222224119876	CER2 1206 Y5V 10V 10U P8020 R	3309	319802190030	RST SM 0603 JUMP. 0R05 COL
2316	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2406	223886715159	CER1 0603 NP0 50V 15P PM5 R	3310	319802190030	RST SM 0603 JUMP. 0R05 COL
2317	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2407	223886715159	CER1 0603 NP0 50V 15P PM5 R	3312	232271191032	RST SM 1206 JUMP. MAX 0R05 R
2318	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2408	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3316	319802190030	RST SM 0603 JUMP. 0R05 COL
2319	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2412	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3317	319802190030	RST SM 0603 JUMP. 0R05 COL
2320	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2413	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3318	319802131030	RST SM 0603 10K PM5 COL
2321	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2414	223858115649	CER2 1206 X7R 50V 1 N PM10 R	3319	232270260205	RST SM 0603 RC21 2M PM5 R
2322	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2416	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3321	232271191032	RST SM 1206 JUMP. MAX 0R05 R
2323	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2480	223824619863	CER2 0603 Y5V 10V 1U P8020 R	3322	319802131030	RST SM 0603 10K PM5 COL
2324	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2500	202002191726	ELCAP SM RVS 16V 47U PM20 R	3324	319802132220	RST SM 0603 2K2 PM5 COL
2325	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2503	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3329	319802131030	RST SM 0603 10K PM5 COL
2326	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2504	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3401	232270260205	RST SM 0603 RC21 2M PM5 R
2327	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2505	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3404	319802131030	RST SM 0603 10K PM5 COL
2328	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2506	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3405	319802131030	RST SM 0603 10K PM5 COL
2329	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2507	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3406	319802131030	RST SM 0603 10K PM5 COL
2330	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2508	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3417	235003510222	RST NETW SM ARV24 4X 2K2 PM5 R
2331	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2509	222224119876	CER2 1206 Y5V 10V 10U P8020 R	3418	235003510222	RST NETW SM ARV24 4X 2K2 PM5 R
2332	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2510	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3419	319802131030	RST SM 0603 10K PM5 COL
2333	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2511	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3420	319802190030	RST SM 0603 JUMP. 0R05 COL
2334	223878615649	CER2 0603 X7R 16V 1 N PM10 R	2512	223878615649	CER2 0603 X7R 16V 1 N PM10 R	3425	235003510103	RST NETW SM ARV24 4X 10K PM5 R
2335	223878615649	CER2 0603 X7R 16V 1 N PM10 R				3426	319802131030	RST SM 0603 10K PM5 COL

Spare Parts List(Continued)

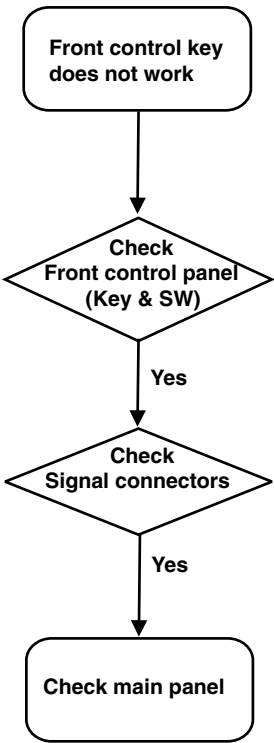
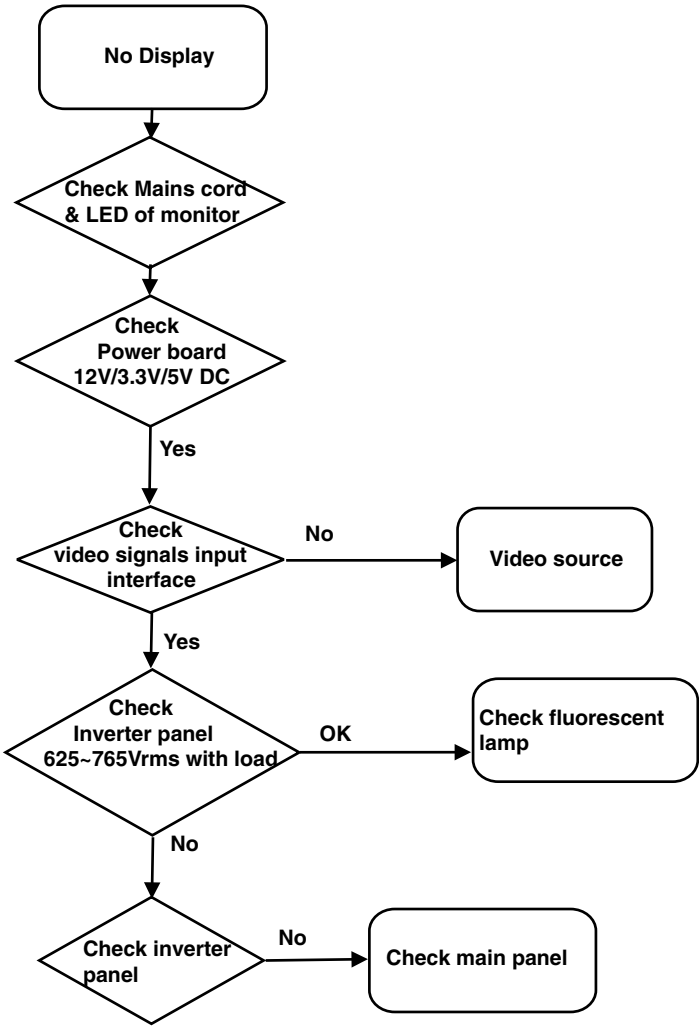
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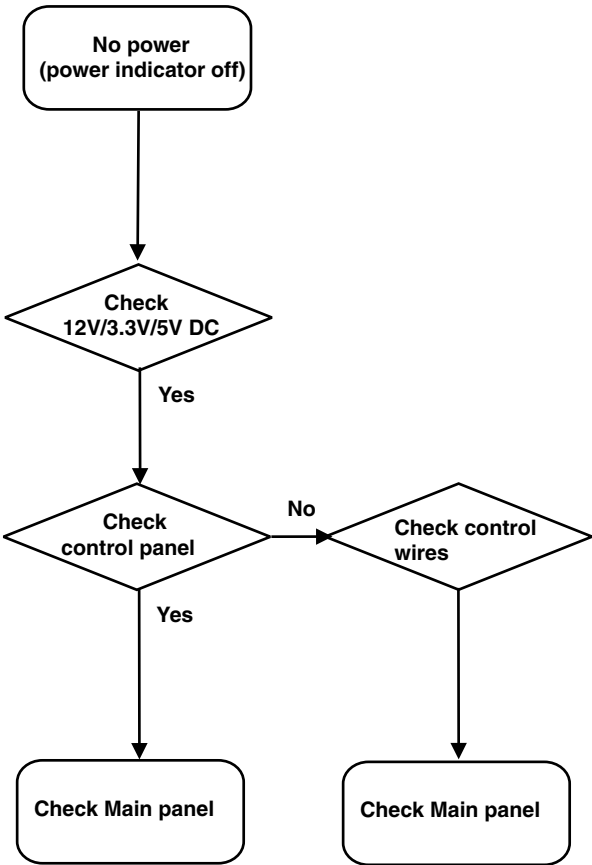
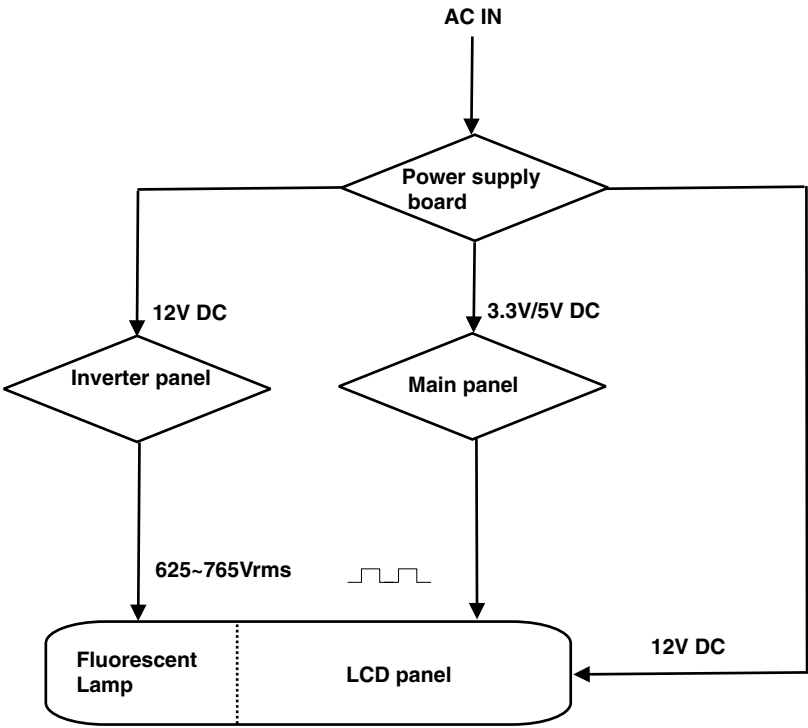
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3427	319802190030	RST SM 0603 JUMP. 0R05 COL	7209	935245720115	IC SM 74HCT1G14GW (PHSE) R	3117	823827712541	RST MFLM UF1/2WS A R68 PM1 A
3428	319802131030	RST SM 0603 10K PM5 COL	7211	935245720115	IC SM 74HCT1G14GW (PHSE) R	3118	823827712541	RST MFLM UF1/2WS A R68 PM1 A
3430	319802131030	RST SM 0603 10K PM5 COL	7301	932216881671	IC SM GM5020 (GEMI) Y	3119	823827712541	RST MFLM UF1/2WS A R68 PM1 A
3432	319802131030	RST SM 0603 10K PM5 COL	7303	932217704668	IC SM LD1086DT25 (ST ) R	3120	212211000048	RST MFLM MF1/2WS A 220K PM1 A
3433	319802131030	RST SM 0603 10K PM5 COL	7305	932202899668	FET POW SM SI4835DY (VISH) R	3121	2122110000315	RST MFLM MF1/2WS A 10R PM1 A
3434	235003510101	RST NETW SM ARV24 4X1 R PM5 R	7306	932209265685	TRA SIG SM MUN2211J (ONSE) R	3122	319802154710	RST SM 0805 470R PM5 COL R
3435	319802131030	RST SM 0603 10K PM5 COL	7401	932219162671	(empty CPU, firmware by ISP)(MOTA) Y	3123	2122110000311	RST MFLM MF1/2WS A 4R7 PM1 A
3440	319802131030	RST SM 0603 10K PM5 COL	7402	313810610243	IC EEPROM ASSY (ST ) L	3125	213811273821	RST CRB CFR-25 A 820R PM5 A
3441	319802131030	RST SM 0603 10K PM5 COL	7403	932209265685	TRA SIG SM MUN2211J (ONSE) R	3126	232273462403	RST SM 0805 RC12H 24K PM1 R
3443	319802190030	RST SM 0603 JUMP. 0R05 COL	7501	932216677682	IC SM M12L16161A-7T (ESMT) L	3127	232273468204	RST SM 0805 RC12H 820K PM1 R
3444	319802131030	RST SM 0603 10K PM5 COL	7502	932216677682	IC SM M12L16161A-7T (ESMT) L	3129	319802151530	RST SM 0805 15K PM5 COL R
3445	319802190030	RST SM 0603 JUMP. 0R05 COL	7503	932216677682	IC SM M12L16161A-7T (ESMT) L	3131	319802152230	RST SM 0805 22K PM5 COL R
3448	232270260184	RST SM 0603 RC21 180K PM5 R	7504	932209265685	TRA SIG SM MUN2211J (ONSE) R	3132	319802154730	RST SM 0805 47K PM5 COL R
3450	232270260184	RST SM 0603 RC21 180K PM5 R	7505	932219072682	IC SM NT7181C (NOVA) L	3133	319802156830	RST SM 0805 68K PM5 COL R
3451	319802131040	RST SM 0603 1 K PM5 COL	Power Panel			3134	232273061511	RST SM 0805 RC11 510R PM5 R
3452	319802131040	RST SM 0603 1 K PM5 COL				3135	319802190020	RST SM 0805 JUMP. 0R05 COL R
3453	319802131030	RST SM 0603 10K PM5 COL	1052	313815855711	POWER ASSY	3136	319802151030	RST SM 0805 10K PM5 COL R
3455	319802131030	RST SM 0603 10K PM5 COL	1103▲	242208610239	FUSE 5X20 HT 3A15 250V IEC B	3141	319802190020	RST SM 0805 JUMP. 0R05 COL R
3456	319802131030	RST SM 0603 10K PM5 COL	1105	243803100404	SOC SUPP H 1P F DC 2.5MM B			
3457	319802131030	RST SM 0603 10K PM5 COL						
3458	319802131030	RST SM 0603 10K PM5 COL	2001	202203100068	ELCAP GL 25V S 470U PM20 B	5001	823827712471	CHOKE COIL 35UH
3459	319802131030	RST SM 0603 10K PM5 COL	2002	202203100068	ELCAP GL 25V S 470U PM20 B	5051	313810874951	CHOKE COIL 5.0UH PM10
3463	319802190030	RST SM 0603 JUMP. 0R05 COL	2003	823827712681	ELCAP LZ 10V S 820U PM20 B	5052	313810874951	CHOKE COIL 5.0UH PM10
3464	319802131530	RST SM 0603 15K PM5 COL	2004	223858015641	CER1 0805 X7R 50V 22N PM10 R	5101	313818870151	LINE FILTER 9MH
3465	319802131010	RST SM 0603 1 R PM5 COL	2005	223886115221	CER1 0805 NP0 50V 22P PM5 R	5102	313818870151	LINE FILTER 9MH
3469	319802133310	RST SM 0603 330R PM5 COL	2051	223858016627	CER2 0805 X7R 50V 10N PM10 R	5103▲	823827712501	POWER TRANSFORMER
3471	319802133310	RST SM 0603 330R PM5 COL	2052	223858016627	CER2 0805 X7R 50V 10N PM10 R	5104	242254942026	IND FXD BEAD EMI 1 MHZ 50R A
3473	319802190030	RST SM 0603 JUMP. 0R05 COL	2053	223858016627	CER2 0805 X7R 50V 10N PM10 R			
3474	319802190030	RST SM 0603 JUMP. 0R05 COL	2054	222278019763	CER2 0805 Y5V 16V 1U PM20 R			
3501	235003510229	RST NETW SM ARV24 4X 22R PM5 R	2055	222278019763	CER2 0805 Y5V 16V 1U PM20 R	6101	932213176671	BRIDGE GBU8J (GI ) Y
3502	319802132290	RST SM 0603 22R PM5 COL	2056	222278019763	CER2 0805 Y5V 16V 1U PM20 R	6105	933952580685	DIO SIG SM BAV103 (TEG0) R
3503	319802132290	RST SM 0603 22R PM5 COL	2102	203831000009	CAP MPP 275V S 47N PM10 B	6106	934038700115	DIO REG SM BZX284-C12 (PHSE) R
3504	319802190030	RST SM 0603 JUMP. 0R05 COL	2106	202203100052	ELCAP KM 450V S 120U PM20 B	6107	933653500113	DIO REC BYV26C A (PHSE) R
3505	319802131030	RST SM 0603 10K PM5 COL	2107	223858015641	CER2 0805 X7R 50V 22N PM10 R	6110	933117750133	DIO REG BZX79-C6V8 A (PHSE) A
3513	232271161228	RST SM 1206 RC01 2R2 PM5 R	2108	223858015641	CER2 0805 X7R 50V 22N PM10 R	6111	933723420133	DIO REC BYD33J A (PHSE) A
3514	319802190030	RST SM 0603 JUMP. 0R05 COL	2109	225260108026	CER2 DC X7R 1KV S 1N PM10 A	6114	934038720115	DIO REG SM BZX284-C15 (PHSE) R
3515	319802131030	RST SM 0603 10K PM5 COL	2110	222278019763	CER2 0805 Y5V 16V 1U PM20 R			
3526	235003510121	RST NETW SM ARV24 4X120R PM5 R	2112	203803513304	ELCAP RGA 25V S 1 U PM20 A			
3527	235003510121	RST NETW SM ARV24 4X120R PM5 R	2113	203803513704	ELCAP RGA 1 V S 22U PM20 A	7001	932219076668	IC SM L5972D (ST ) R
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3529	235003510121	RST NETW SM ARV24 4X120R PM5 R	2115	225260108026	CER2 DC X7R 1KV S 1N PM10 A	7103	933179600126	TRA SIG BC337-40 (PHSE) A
3530	235003510121	RST NETW SM ARV24 4X120R PM5 R	2116	823827712671	ELCAP LZ 25V S 1 0U PM20 B	7105	932214014667	OPT CP TCET1103(G) (VISH) L
3531	235003510121	RST NETW SM ARV24 4X120R PM5 R	2117	823827712671	ELCAP LZ 25V S 1 0U PM20 B	7106	933771100686	IC TL431CLP S (MOTA) R
3532	232271191032	RST SM 1206 JUMP. MAX 0R05 R	2118	225260108026	CER2 DC X7R 1KV S 1N PM10 A	7107	933967310685	TRA SIG SM BC848C (ONSE) R
3534	232271191032	RST SM 1206 JUMP. MAX 0R05 R	2119	202203100128	ELCAP LZ 16V S 1 0U PM20 A	7108	933967310685	TRA SIG SM BC848C (ONSE) R
3536	232271191032	RST SM 1206 JUMP. MAX 0R05 R	2121	202203100068	ELCAP GL 25V S 470U PM20 B	7109	933826850126	THYRIS BT169B (PHSE) A
			2122	223886115399	CER1 0805 NP0 50V 39P PM5 R	7110	933567130126	TRA SIG BC517 (PHSE) A
			2123	223858015645	CER2 0805 X7R 50V 47N PM10 R	Control Panel		
5303	242254942026	IND FXD BEAD EMI 1 MHZ 50R A	2124	223891015649	CER2 0805 X7R 25V 1 N PM10 R	1053	313815855661	CONTROL ASSY
5304	242254942026	IND FXD BEAD EMI 1 MHZ 50R A	2125	202055490158	CERSAF CD 250V S 2N2 PM20 B	1701	243812900043	SWI TACT H=4.3 BK 1 G SKHH B
5308	242254943409	IND FXD 1206 EMI 1 MHZ 50R R	2126	202055490158	CERSAF CD 250V S 2N2 PM20 B	1702	243812900043	SWI TACT H=4.3 BK 1 G SKHH B
5309	242254943409	IND FXD 1206 EMI 1 MHZ 50R R	2127	222278019763	CER2 0805 Y5V 16V 1U PM20 R	1703	243812900043	SWI TACT H=4.3 BK 1 G SKHH B
5310	242254943409	IND FXD 1206 EMI 1 MHZ 50R R				1704	243812900043	SWI TACT H=4.3 BK 1 G SKHH B
5311	242254943409	IND FXD 1206 EMI 1 MHZ 50R R						
5312	242254943409	IND FXD 1206 EMI 1 MHZ 50R R	3001	319802154720	RST SM 0805 4K7 PM5 COL R	1705	243812900043	SWI TACT H=4.3 BK 1 G SKHH B
5401	242254943409	IND FXD 1206 EMI 1 MHZ 50R R	3002	232273463302	RST SM 0805 RC12H 3K3 PM1 R	1706	243812900043	SWI TACT H=4.3 BK 1 G SKHH B
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5505	242254943409	IND FXD 1206 EMI 1 MHZ 50R R	3052	212211000329	RST MFLM MF1/2WS A 1 R PM1 A			
5507	242254943409	IND FXD 1206 EMI 1 MHZ 50R R	3101	212261200061	NTC DC SCK-164 S 16R PM15 B	2701	223878615649	CER2 0603 X7R 16V 1 N PM10 R
5508	242254943409	IND FXD 1206 EMI 1 MHZ 50R R	3102	232271161474	RST SM 1206 RC01 470K PM5 R	2702	223878615649	CER2 0603 X7R 16V 1 N PM10 R
5509	242254943409	IND FXD 1206 EMI 1 MHZ 50R R	3103	232271161824	RST SM 1206 RC01 820K PM5 R			
			3104	232271161474	RST SM 1206 RC01 470K PM5 R			
			3105	232273461002	RST SM 0805 RC12H 1K PM1 R	3701	319802131520	RST SM 0603 1K5 PM5 COL
6230	933742280215	DIO SIG SM BAT54 (PHSE) R	3106	232271161108	RST SM 1206 RC01 1R PM5 R	3702	319802133320	RST SM 0603 3K3 PM5 COL
6231	933742280215	DIO SIG SM BAT54 (PHSE) R	3107	212211000315	RST MFLM MF1/2WS A 10R PM1 A	3703	319802131030	RST SM 0603 10K PM5 COL
6235	933742280215	DIO SIG SM BAT54 (PHSE) R	3109	319802151230	RST SM 0805 12K PM5 COL R	3704	319802131530	RST SM 0603 15K PM5 COL
6236	319801010620	DIO SIG SM BAV99 (COL) R	3110	319802151030	RST SM 0805 10K PM5 COL R	3705	319802133930	RST SM 0603 39K PM5 COL
6237	319801010620	DIO SIG SM BAV99 (COL) R	3111	212211000396	RST MFLM MF1/2WS A 33K PM1 A	3706	319802136830	RST SM 0603 68K PM5 COL
6238	319801010620	DIO SIG SM BAV99 (COL) R	3112	213811201134	RST SM 0805 RC05 130K PM5 R	3707	232271191032	RST SM 1206 JUMP. MAX 0R05 R
6239	319801010620	DIO SIG SM BAV99 (COL) R						
6401	933913910115	DIO SIG SM BAS32L (PHSE) R						
			3113	232273061333	RST SM 0805 RC11 33K PM5 R			
			3114	319802154720	RST SM 0805 4K7 PM5 COL R			
7201	932214526668	IC (Digital DDC IC)	3115	213811273472	RST CRB CFR-25 A 4K7 PM5 A	6711	932214603682	LED VS L-3WYGW (KIEL) B
7202	932214526668	IC (Analog DDC IC)	3116	212211000418	RST MFLM MF1/2WS A 220K PM1 A			

Repair Flow Chart

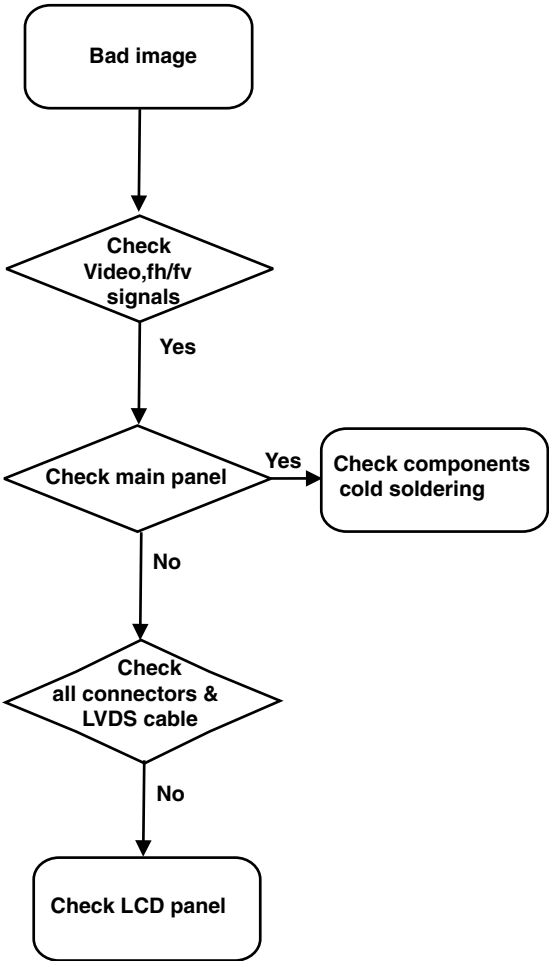
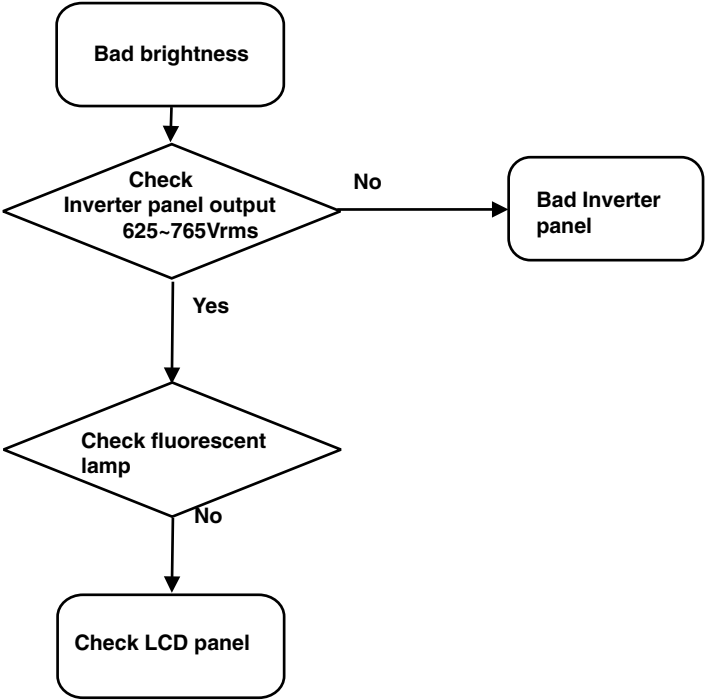






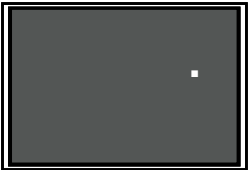
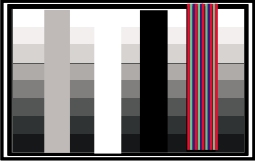

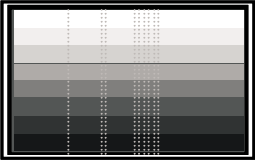

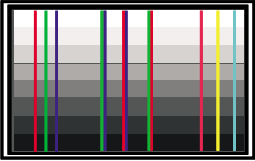



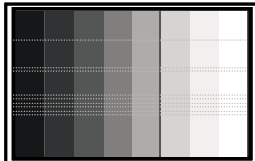
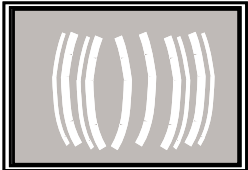
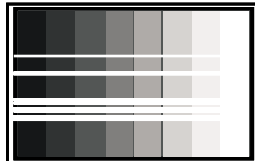




Repair Flow Chart



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 or backlight tubes.

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

◀◀ Go to cover page

## 0. Warning

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the unit via a wrist wrap with resistance. Keep components and tools also at the same potential !

## 1. Servicing of SMDs (Surface Mounted Devices)

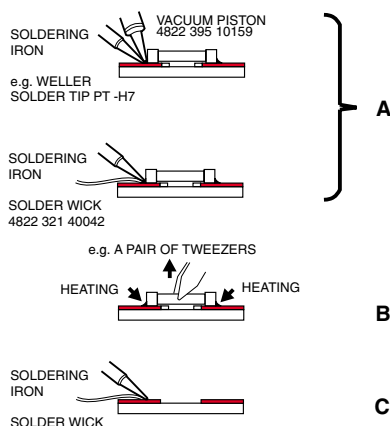
### 1.1 General cautions on handling and storage

- Oxidation on the terminals of SMDs results in poor soldering. Do not handle SMDs with bare hands.
- Avoid using storage places that are sensitive to oxidation such as places with sulphur or chlorine gas, direct sunlight, high temperatures or a high degree of humidity. The capacitance or resistance value of the SMDs may be affected by this.
- Rough handling of circuit boards containing SMDs may cause damage to the components as well as the circuit boards. Circuit boards containing SMDs should never be bent or flexed. Different circuit board materials expand and contract at different rates when heated or cooled and the components and/or solder connections may be damaged due to the stress. Never rub or scrape chip components as this may cause the value of the component to change. Similarly, do not slide the circuit board across any surface.

### 1.2 Removal of SMDs

- Heat the solder (for 2-3 seconds) at each terminal of the chip. By means of litz wire and a slight horizontal force, small components can be removed with the soldering iron. They can also be removed with a solder sucker (see Fig. 1A)

Fig. 1 DISMOUNTING



- While holding the SMD with a pair of tweezers, take it off gently using the soldering iron's heat applied to each terminal (see Fig. 1 B).
- Remove the excess solder on the solder lands by means of litz wire or a solder sucker (see Fig. 1C).

### 1.3 Caution on removal

- When handling the soldering iron, use suitable pressure and be careful.
- When removing the chip, do not use undue force with the pair of tweezers.
- The soldering iron to be used (approx. 30 W) should

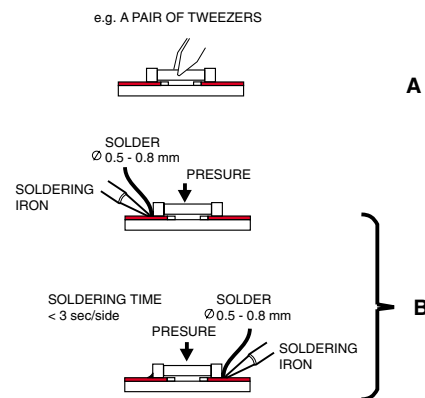
preferably be equipped with a thermal control (soldering temperature: 225 to 250 °C).

- The chip, once removed, must never be reused.

### 1.4 Attachment of SMDs

- Locate the SMD on the solder lands by means of tweezers and solder the component on one side. Ensure that the component is positioned correctly on the solder lands (see Fig.2A).
- Next complete the soldering of the terminals of the component (see Fig. 2B).

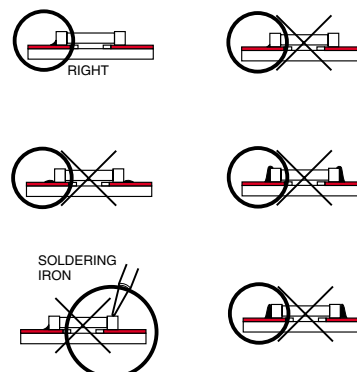
Fig. 2 MOUNTING



## 2. Caution when attaching SMDs

- When soldering the SMD terminals, do not touch them directly with the soldering iron. The soldering should be done as quickly as possible, care must be taken to avoid damage to the terminals of the SMDs themselves.
- Keep the SMD's body in contact with the printed board when soldering.
- The soldering iron to be used (approx. 30 W) should preferably be equipped with a thermal control (soldering temperature: 225 to 250 °C).
- Soldering should not be done outside the solder land.
- Soldering flux (of rosin) may be used, but should not be acidic.
- After soldering, let the SMD cool down gradually at room temperature.
- The quantity of solder must be proportional to the size of the solder land. If the quantity is too great, the SMD might crack or the solder lands might be torn loose from the printed board (see Fig. 3).

Fig. 3 Examples



## LCD COLOUR ANALYZER - CA110

### 1. SUMMARY

The LCD Colour Analyzer CA-110 was designed to upgrade the white-balance process on production lines for colour LCD televisions and computer colour LCD panels in the colour LCD industry. The CA-110 consists of a main unit and a measuring probe.

The measuring probe utilizes an optical system suitable for measurement of colour LCDs and is equipped with a viewfinder to verify the area to be measured.

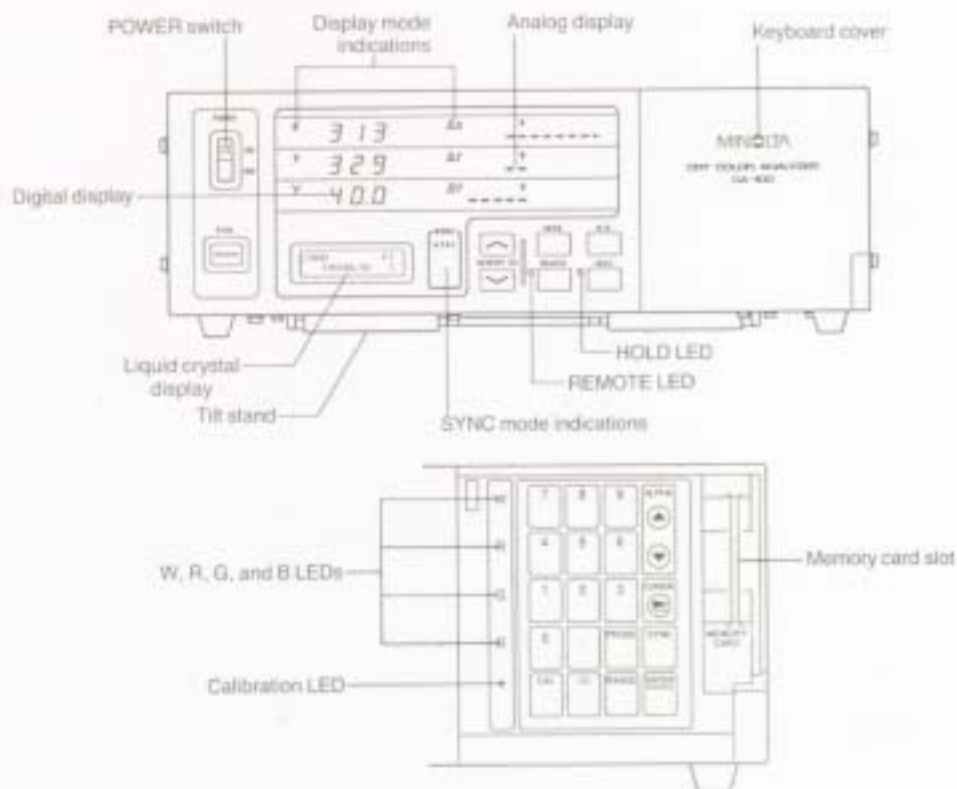
### 2. APPLICATIONS

- \* White-balance adjustment and inspection on LCD production lines.
- \* Quality control and shipping inspection by LCD manufacturers.
- \* Inspection of LCDs upon receipt by computer manufacturers.

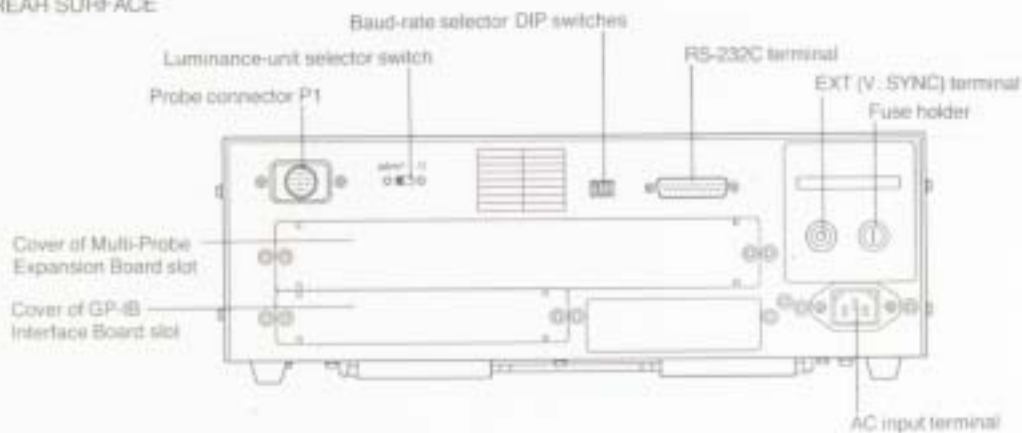
#### NAMES OF PARTS

##### Main Unit

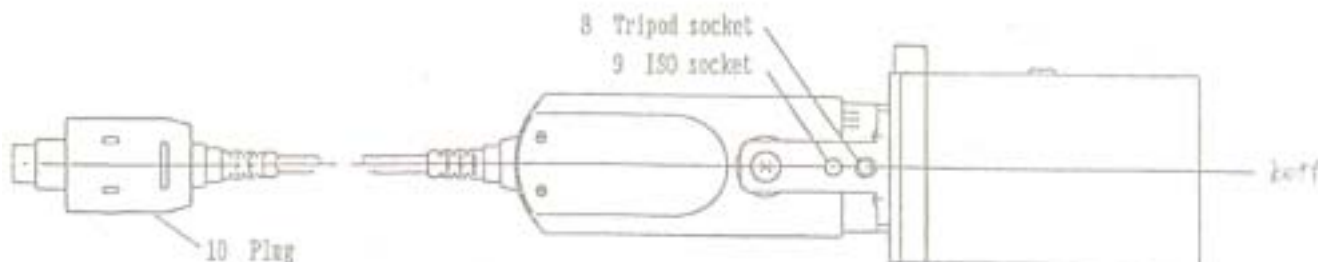
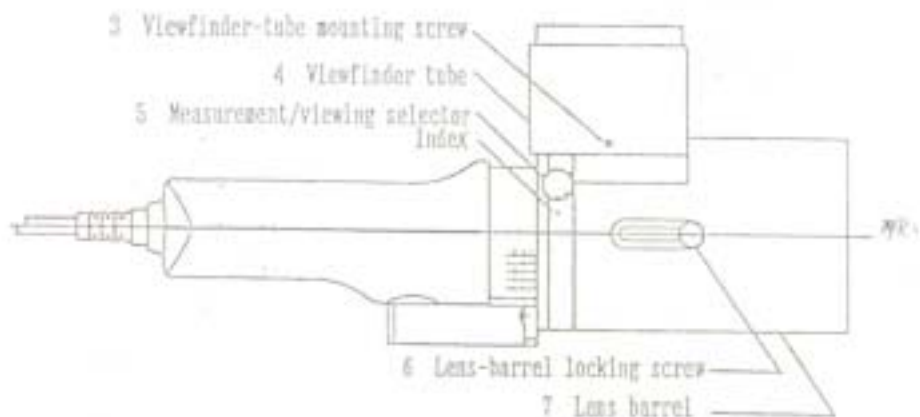
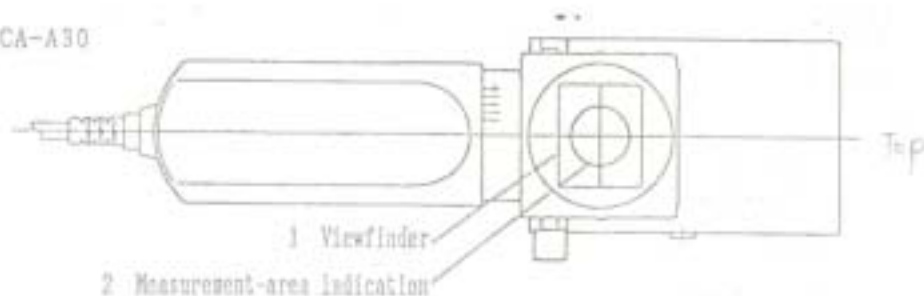
##### FRONT SURFACE



##### REAR SURFACE



Probe CA-A30



- |                                   |   |
|-----------------------------------|---|
| 1. Viewfinder                     | Shows image seen by measuring probe.  |
| 2. Measurement-area indication    | Indicates area to be measured.  |
| 3. Viewfinder-tube mounting screw | Removing these two screws (one on each side) allows the viewfinder tube to be removed to clean viewfinder, etc. |
| 4. Viewfinder tube                | Can be moved to minimize the effects of surrounding light and provide the best view of the viewfinder image.    |
| 5. Measurement/viewing selector   | Moves internal mirror: set to $\bigcirc$ for measurement and to $\bullet$ for viewing or for zero calibration.  |
| 6. Lens-barrel locking screw      | Locks lens barrel at a fixed position.  |
| 7. Lens barrel                    | Can be moved back and forth to set measurement angle.   |
| 8. Tripod socket                  | Can be used to mount measurement probe on a tripod. Depth: 5mm.   |
| 9. ISO socket                     | Can be used to mount measurement probe. ISO $\varnothing$ 5mm, depth: 5mm                                       |
| 10. Plug                          | Used to connect measuring probe to main unit or optional Multi-Probe Expansion Board.                           |

## ZERO CALIBRATION

Zero calibration is performed to determine the output of the measuring probe when no light reaches the sensor and to set this as the zero point to which all other measurements are referenced. Zero calibration must be performed after the POWER switch has been set ON before taking any measurements.

To perform zero calibration :

- \* Before performing zero calibration, check that the measuring probe has been connected to probe connector P1.

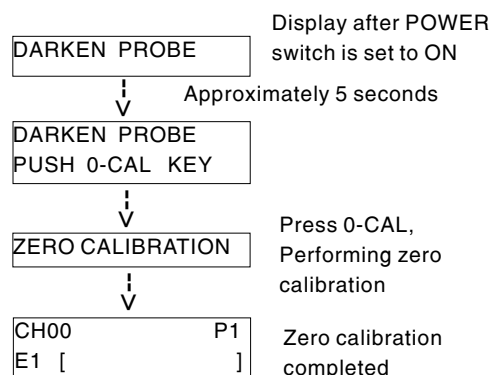
1. Check that the POWER switch is set to ON.

2. Set the measuring/viewing selector to the (viewing) position. (An image can be seen in the viewfinder, but no light will reach the sensor.)

3. Press 0-CAL.

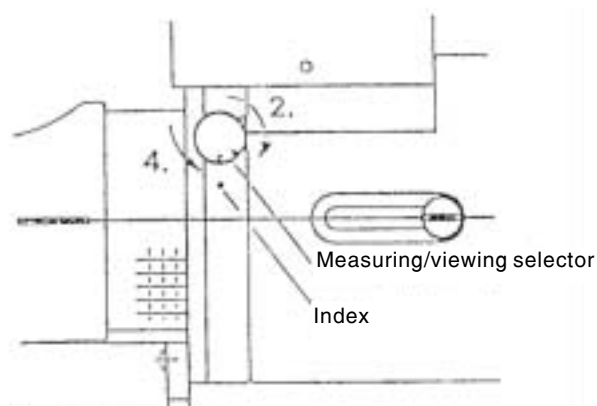
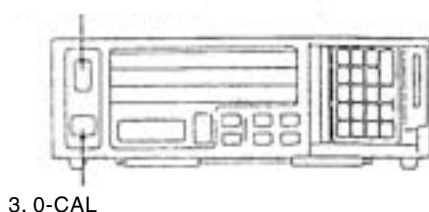
- \* If zero calibration is being performed immediately after the POWER switch has been set to ON, press 0-CAL after "PUSH 0-CAL KEY" appears in the liquid crystal display.

4. Set the measuring/viewing selector to the position. Measurements will be started immediately.



"E1" will appear in the liquid crystal display the first time the CA-110 is used after shipment because no standard color has been set.

1. POWER switch



- "E1" will appear in the liquid crystal display the first time the CA-110 is used after shipment because no standard color has been set.
- Zero calibration can be performed at any time, even if "PUSH 0-CAL KEY" is not shown in the liquid crystal display.

### Note:

- If the luminance of the LCD to be measured is 5.00cd/m<sup>2</sup> (1.46 fL) or less, wait at least five minutes after setting POWER switch to ON before performing zero calibration. Also, when measuring LCDs of low luminance, zero calibration should be performed approximately once an hour to ensure accuracy.
- If the ambient temperature changes after zero calibration has been performed, perform zero calibration again.
- Do not press any key while zero calibration is being performed. If a key is pressed, the time required for zero calibration will become longer.

To check if zero calibration was performed correctly, place the receptor area of the probe face down on a flat surface so that no light reaches the receptor area.

If the display shown at right appears in the liquid crystal display, perform zero calibration again.

- Even when "OFFSET ERROR" appears in the liquid crystal display, if light reaches the receptor area of the measuring probe, measured values will appear in the digital and analog displays. However, these values will not be accurate.

If any other display is shown, zero calibration was performed correctly.

OFFSET ERROR  
PUSH 0-CAL KEY



**SETTING MEASUREMENT AREA**

Measurement areas of  $\varnothing 25\text{mm}$  and  $\varnothing 50\text{mm}$  can be selected by extending or retracting the lens barrel. The  $\varnothing 25\text{mm}$  measurement area can be used for measuring LCDs with 2 - inch or greater diagonals; the  $\varnothing 50\text{mm}$  measurement area can be used for measuring LCDs with 4 - inch or greater diagonals.

**Set the measurement area :**

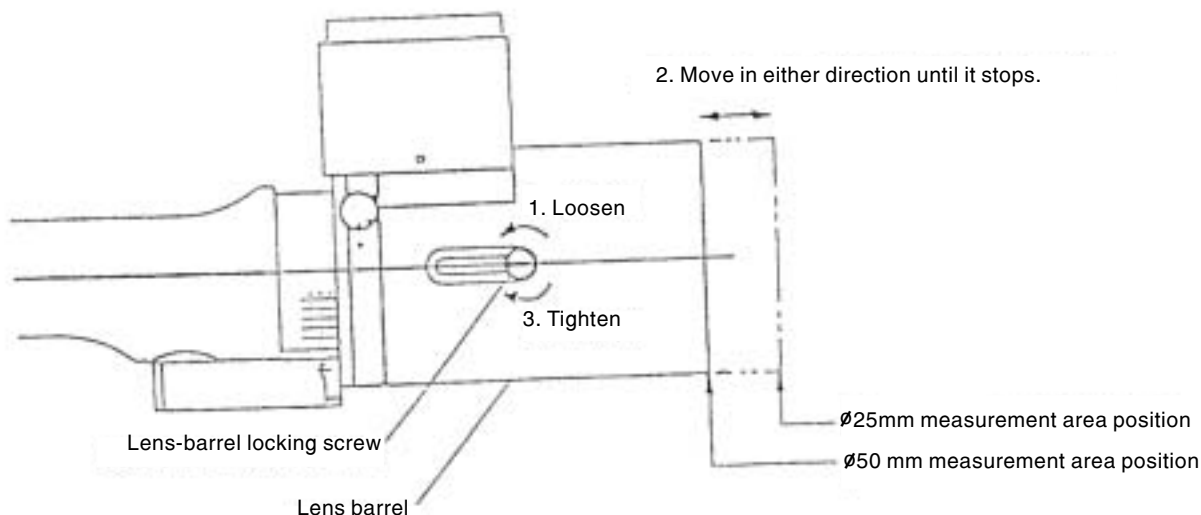
Using a slotted screwdriver, loosen the lens - barrel locking screw.

Slide the lens barrel to the position corresponding to the desired measurement area. The lens barrel should be slid in the desired direction until it stops.

Extending the lens barrel fully sets the  $\varnothing 25\text{mm}$  measurement area: retracting the lens barrel fully sets the  $\varnothing 50\text{mm}$  measurement area.

Use the screwdriver to tighten the lens - barrel locking screw and lock the lens barrel in position.

Changing the measurement area also changes the measurement angle. this may result in differences between values measured with the  $\varnothing 25\text{mm}$  measurement area and those measured with the  $\varnothing 50\text{mm}$  measurement area to the viewing - angle characteristics of the LCD. For this reason. it is recommended that the measurement area be constant for all measurements.



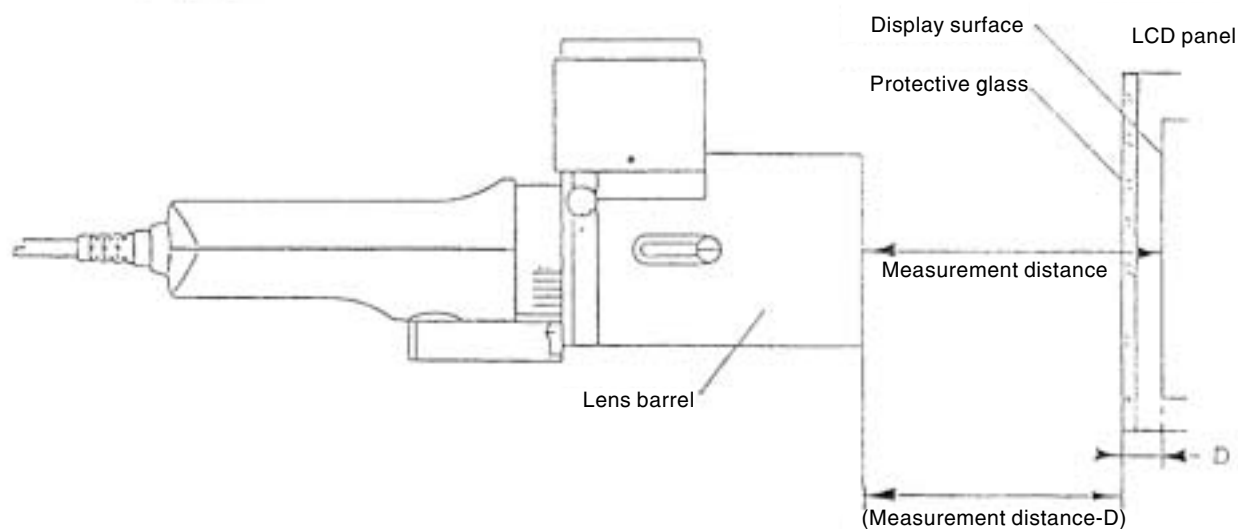
### SETTING MEASUREMENT DISTANCE

The measurement distance (the distance from the front of the measuring probe's lens barrel to the display surface of the LCD ) should be set using a ruler according to the procedure below.

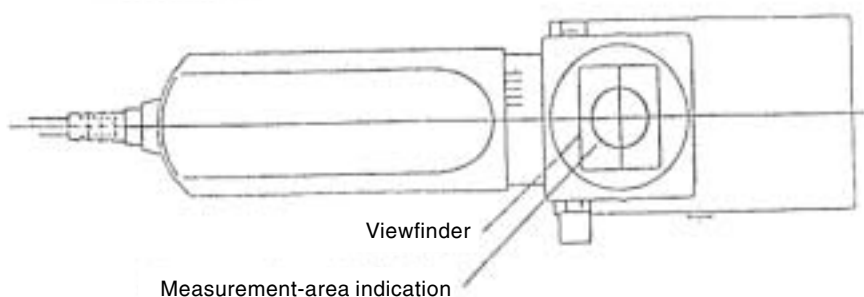
1. Mount the measuring probe on a tripod or other stand and mount the LCD on a suitable stand.
2. While using a ruler to measure the distance from the front of the measuring probe's lens barrel to the LCD's display surface, move the measuring probe or the LCD until the distance is the correct distance for the measurement area in use.

measurement area	∅ 25mm	∅ 50mm
measurement distance*	135mm+/-5mm	210mm+/-10mm

\* Distance from the tip of the measuring probe's lens barrel to the LCD's display surface.



3. While looking through the viewfinder, move the measuring probe or LCD until the LCD section to be measured is inside the measurement-area indication in the viewfinder.



# CA110 Application (Continued)

◀◀ Go to cover page

After installation of Chroma 2250, CA110 and LCD monitor.

## LCD monitor & Chroma 2250 :

- Turn on LCD monitor.
- Turn on Chroma 2250 as shown in Fig. 3.
- Provide CROSS-Hatch pattern at timing  $H=60.023\text{KHz}/1024$  pixels  
 $V=75.029\text{Hz}/768$  lines

by Chroma 2250 (as shown in Fig.3 & Fig. 4.).

## LCD Colour Analyzer CA-110 :

- Put on the cover (black) of Probe CA-A30 as shown in Fig.5.
- Set "Measurement/viewing selector" to ● for zero calibration of CA-110.
- Turn on CA-110 as shown in Fig. 6.
- Press "0-CAL" button as shown in Fig. 7.

## Step A: Access Factory Mode

### Access Factory Mode

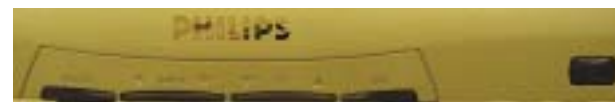


Fig. 1

### Factory Mode:

How to Get into Factory Mode Menu

Turn off LCD monitor.

Push AUTO "AUTO" & Top "▲" & Power "●" buttons simultaneously, then release Power button only, until picture comes on the screen. Press OK "OK" button, bring up Factory mode indication as shown in Fig 2.

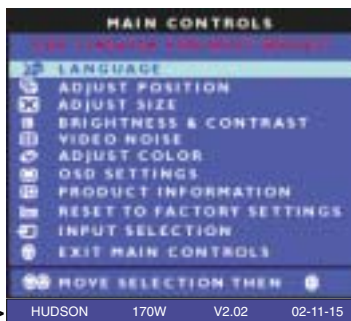


Fig. 2

Factory Mode indication==>

HUDSON 170W V2.02 02-11-15

Use ▼▲ button to select factory adjustment indication (for example: Hudson 170W V2.02 02-11-15), which is the entrance of the factory adjustment menu, press OK "OK" button to access it. The window shows as below.

Fig. 3

Chroma MODEL 2250



Fig.4

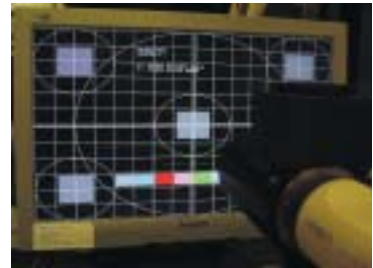


Fig. 5

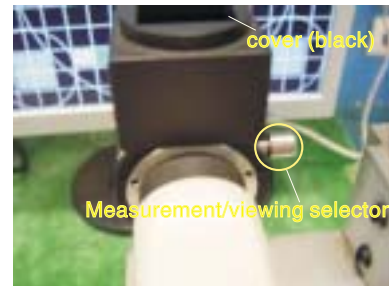


Fig. 6  
(TURN ON)



Fig. 7

(Press  
0-CAL)



## Step B: Brightness & Contrast setting (pre-setting)

Brightness : at 100%  
Contrast : at 100%

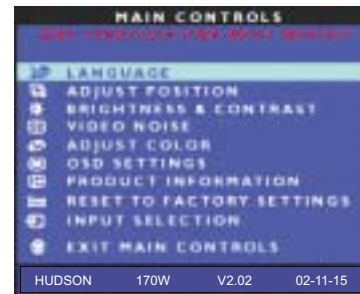


Fig. 8

## Probe CA-A30 :

- Remove the cover (black) of CA-A30 as shown in Fig.9.
- Move the "Lens barrel" back and forth to get the optimal image as shown in Fig. 10 & Fig. 11.
- Then, turn the "Measurement/viewing selector" counterclockwise as shown in Fig. 11.
- At this moment the indicator on CA-110 as shown in Fig. 12. (example only)

Fig. 9



Fig. 10



unclear image

Fig. 11



clear image



Fig. 12



## Step C: Colour Temperature : Original Panel & 9300K & 6500K

### White pattern & OSD position :

- Provide the "Full White" pattern by Chroma 2250 as shown in Fig. 13.



Fig. 13



### OSD position : Move to optimal position as shown in Fig. 14.



Fig. 14





Fig. 15



Y value > 380 is OK

**Luminance (Y) :**  
Above 380 NITs in the center of the screen as shown in Fig. 15.

Fig. 16

**FACTORY :**  
- Select "HUDSON..." as shown in Fig. 16.  
- Press OK button, bring up Fig. 18.

Factory Mode == >



ORIGINAL PANEL COLOR :

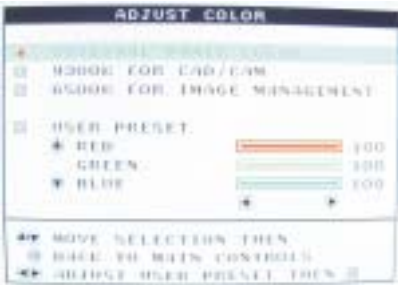
- Select "ORIGINAL PANEL COLOR" by OSD as shown in Fig. 17.
- Measure Luminance (Y) as shown in Fig. 15.

If the Luminance (Y) is below 380 Nits in the center of the screen, then adjust R,G,B Gain till the Luminance (Y) over 380Nits.

Panel color == >



Fig. 17



After that, check the 64 Gray Scale pattern, all the black and white scale should be visible on the screen as shown in Fig. 19.

**9300K : As shown in Fig. 18 & 19.**

- select 9300K R G B.
- Value of 9300K R G B.**
- select value of R or G or B
- decrease or increase the value of 9300K R G B.
- confirm/save the value change.
- Adjust the colour temperature of 9300K of R,G,B to x,y value as below.

R (as shown in Fig. 18), (for example, production value of R is 241)  
G (as shown in Fig. 18), (for example, production value of G is 252)  
B (as shown in Fig. 18), (for example, production value of B is 255)

x (center) = 0.281 +/- 0.005  
y (center) = 0.311 +/- 0.005



Fig. 19

Luminance (Y) : above 380 Nits in the center of the screen.  
(experience: the value of "Y" too low, increase the value of "y" firstly.)

(experience: the value of "y" too high, decrease the value of "G".  
the value of "x" too low, decrease the value of "R".)

HUDSON 170W V2.02 02-11-15			
SUB — BRI: 00		SUB — CON: 50	
9300K	R 241	G 252	B 255
6500K	R 255	G 249	B 225
OFFSET	R 91	G 91	B 89
GAIN	R 191	G 181	B 191
AUTO — SUB:	RESERVE1: 205		
RESERVE2: 255	RESERVE3: 255		

Fig. 18





**6500K : As shown in Fig. 18 & 20.**

- select 6500K R G B.

**Value of 6500K R G B.**

- select value of R or G or B
- decrease or increase the value of 6500K R G B.
- confirm/save the value change.
- Adjust the colour temperature of 6500K of R,G,B to x,y value as below.

R (as shown in Fig. 18), (for example, production value of R is 255)  
 G (as shown in Fig. 18), (for example, production value of G is 249)  
 B (as shown in Fig. 18), (for example, production value of B is 225)



x (center) = 0.312 +/- 0.005  
 y (center) = 0.338 +/- 0.005

Luminance (Y) : above 380 Nits in the center of the screen.

(experience: the value of "Y" too low, increase the value of "y" firstly.)

(experience: the value of "y" too high, decrease the value of "G".  
 the value of "x" too low, decrease the value of "R".)

Fig. 20

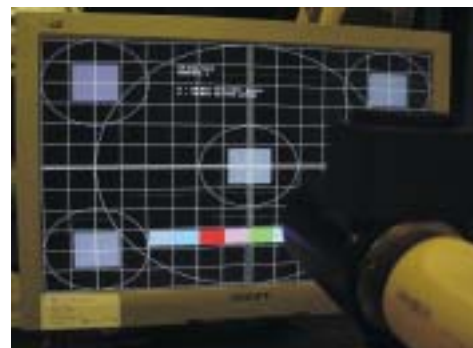


Fig. 21

**Full white, Geometry, 64 Gray scale & Pixel on/off pattern check****Full White pattern check by eye :**

- Provides the full white pattern by Chroma 2250.
- Check the image of each timing (total: 29 timings) to see if there is any colour's difference on the screen.

For instance :  
 at timing 60K/64Hz 1024x768 --> as shown in Fig. 20.

**Geometry check and setting by eye :**

- Provides the cross-hatch pattern by Chroma 2250.
- Check the geometry of each timing (total: 29 timings) to adjust the geometry of image to optimal position.

For instance :  
 at timing 60K/64Hz 1024x768 --> as shown in Fig. 21.

Fig. 22

**32 Gray Scale pattern check by eye :**

- Provides the 64 gray scale pattern by Chroma 2250.
- Check the image of each timing (total: 29 timings) to see if all the black and white scale are visible on the screen or not.

For instance :  
 at timing 60K/64Hz 1024x768 --> as shown in Fig. 22.

**Pixel on/off pattern check by eye :**

- Provides the cross talk pattern by Chroma 2250.
- Check the image of each timing (total: 29 timings) to see if there is any Clock or/and Phase phenomenon on the screen.

For instance :  
 at timing 60K/64Hz 1024x768 --> as shown in Fig. 23.

Fig. 23





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HUDSON-3 17 Wide  
GENERAL PRODUCT  
SPECIFICATION

- . ANALOG AND DIGITAL DUAL INPUT
- . AUTO PICTURE ADJUSTMENT
- . 15 FACTORY PRESET MODES AND 29 PRESET MODES WHICH CAN BE RECOVERED TO PRESET MODES
- . USER FRIENDLY OSD DISPLAY FOR MODE IDENTIFICATION /ADJUSTMENT
- . DDC 2B COMMUNICATION CAPABILITY
- . MAX. RESOLUTION 1280\*768 NON-INTERLACED AT 75 HZ
- . 17 Wide COLOR TFT LCD FLAT PANEL
- . EASY TILT & SWIVEL BASE
- . FULL RANGE POWER SUPPLY 90 264 VAC
- . CE ENVIRONMENTAL POLICY
- . ANTI-GLARE TO REDUCE LIGHT REFLECTION
- . POWER MANAGEMENT CAPABILITY
- . SOG SUPPORT
- . TCO 95
- . PROVIDE USB HUB (OPTION)
- . WALL MOUNT KIT (OPTION)
- . PROTECTIVE COVER (OPTION)

CLASS NO.		17" WIDE TFT LCD CMTR-170W4P		8639 000 13446	
02-10-09		TYPE : 170W4P/74 BRAND : PHILIPS			
NAME	EDWARD CHANG	SUPERS.	24	590 — 1	10 A4
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1.0	FOREWORD	This specification describes a 18" SXGA multi-scan color TFT LCD monitor with max. resolution up to 1280*768 /75 Hz non-interlaced.				
2.0	PRODUCT PROFILE	This display monitor unit is a color display monitor enclosed in PHILIPS global styling cabinet which has an integrated tilt and swivel base.				
2.1	LCD	Type NR.	:	LM171W01-B3C1 (LG-Philips)		
		Outside dimensions	:	400(w)258(h)16.8(d) (Typ)mm		
		Pitch ( mm )	:	0.291 (per one triad) x 0.291mm		
		Color pixel arrangement	:	RGB vertical stripes		
		Display surface	:	Hard coating, antiglare treatment of the front polarizer		
		Number of color	:	256 gray levels(6 bits + FRC)		
		Backlight	:	CCFL edge light system		
		Active area (WxH)	:	372.48x223.49mm (17 W diagonal)		
		View angle	:	Horizontal 120 degree ,Vertical 90 degree (CR>=10)		
		Contrast ratio	:	350:1 (Typ)		
		White luminance	:	450 nits ( Center 1 point Typ)		
2.2	Scanning frequencies	Hor.	:	30 64 K Hz		
		Ver.	:	56 - 75 Hz		
2.3	Video dot rate	:	< 110 MHz			
2.4	Power input	:	90-264 V AC, 50/60 2 Hz			
2.5	Power consumption	:	< 45 W maximum ( exclude USB option )			
2.6	Dimensions	:	417 * 374 * 180 mm			
2.7	Weight	:	5.4 KGS			
2.8	Functions :	(1) D-shell analog R/G/B separate inputs, H/V sync separated, Composite (H+V) TTL level, SOG sync (2) DVI digital Panel Link TMDS input				
2.9	Ambient temperature :	5°C - 35°C				

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2.10 Regulatory compliance :

- (1) Safety : B-mark, CCIB/CCEE(China), CE(Europe), CSA(Canada), DEMKO(Nordic), EZU(Czech), FIMKO(Nordic), Gost(Russia), IEC 950 CB Report, NOM NYCE(Mexico), PSB(Singapore), SEMKO(Nordic), SISIR CPA(Singapore), TUV(Germany), UL(USA)  
The medical standard: **IEC 60601-1, UL 2601-1**
- (2) EMI : C-tick, CE(Europe), FCC(USA), IC(Canada), VCCI(Japan), BSMI
- (3) Environmental Issue : TCO95
- (4) Ergonomic Requirements : E2000, MPRII(Sweden), Nutek(Sweden), TCO95 , TUV/GS

3.0 Electrical characteristics

3.1 Interface signals

The input signals can be applied in three different modes :

1). D-shell Analog

Input signal : Video, Hsync., Vsync

Video : 0.7 Vp-p, input impedance, 75 ohm @DC

Sync. : Separate sync      TTL level , input impedance 2k2 ohm terminate  
                                 Hor. sync      Positive/Negative  
                                 Ver. sync      Positive/Negative  
                         Composite sync TTL level, input impedance 2k2 ohm terminate  
                         (Positive/Negative)  
                         Sync on green video 0.3 Vp-p Negative (Video 0.7 Vp-p Positive)

2). Intel DVI Digital

Input signal : Single channel TMDS signal

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## 3.2 Interface

## 3.2.1 D-Sub Cable

Length : 1.8 M +/- 50 mm (fixed)  
 Connector type : D-sub male with DDC2B pin assignments.  
 Blue connector thumb-operated jack screws

pin assignment :

PIN No.	SIGNAL
1	Red
2	Green/SOG
3	Blue
4	Sense (GND)
5	Not connected
6	Red GND
7	Green GND
8	Blue GND
9	+5V
10	Sync GND
11	Sense (GND)
12	Bi-directional data
13	H/H+V sync
14	V-sync
15	Data clock

## 3.2.2 DVI Cable

The input signals are applied to the display through DVI-D cable.

Length : 1.8 M +/- 50 mm (fixed)  
 Connector type : DVI-D male with DDC2B pin assignments  
 White connector thumb-operated jack screws

pin assignment :

Pin No.	Description
1	TMDS data2-
2	TMDS data2+
3	TMDS data2 shield
4	NC
5	NC
6	DDC clock
7	DDC data
8	Not Connected
9	TMDS data1-
10	TMDS data1+

CLASS NO.

17" WIDE TFT LCD CMTR-170W4P

TYPE : 170W4P/74

BRAND : PHILIPS

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11	TMDS data1 shield
12	NC
13	NC
14	+5V
15	Ground(return for +5V and H/Vsync)
16	Hot plug detect
17	TMDS data0-
18	TMDS data0+
19	TMDS data0 shield
20	NC
21	NC
22	TMDS clock shield
23	TMDS clock+
24	TMDS clock-

3.2.3 Software control functions via OSD/control

OSD (On Screen Display) function  
(1) Analog interface OSD :  
Adjustable functions:

MAIN CONTROLS
LANGUAGE
ADJUST POSITION
BRIGHTNESS & CONTRAST
VIDEO NOISE
ADJUST COLOR
OSD SETTINGS
PRODUCT INFORMATION
RESET TO FACTORY SETTINGS
INPUT SELECTION
EXIT MAIN CONTROLS
MOVE SELECTION THEN <input type="button" value="OK"/>

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LANGUAGE		: ENGLISH , ESPANOL , FRANCAIS , DEUTSCH , ITALIANO CHINESE (S)	
ADJUST POSITION		: HORIZONTAL VERTICAL	
BRIGHTNESS & CONTRAST		: brightness and contrast adjustment.	
VIDEO NOISE		: Phase adjustment, Clock adjustment	
ADJUST COLOR		: Original panel color , 9300K for CAD/CAM , 6500K for image management, User preset red green blue adjust.	
OSD POSITION		: OSD H-position, OSD V-position	
PRODUCT INFORMATION		: Show Serial No./ Resolution / Video input.	
RESET TO FACTORY SETTING: recall to Factory preset settings.			
INPUT SELECTION		: select Analog D-sub, Digital DVI-D .	

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(2) Digital interface OSD :  
Adjustable functions:

MAIN CONTROLS
LANGUAGE
ADJUST POSITION
BRIGHTNESS & CONTRAST
OSD SETTINGS
PRODUCT INFORMATION
RESET TO FACTORY SETTINGS
INPUT SELECTION
EXIT MAIN CONTROLS
MOVE SELECTION THEN <input type="button" value="OK"/>

- LANGUAGE : ENGLISH , ESPANOL , FRANCAIS ,  
DEUTSCH , ITALIANO, CHINESE (S)
- ADJUST POSITION : HORIZONTAL  
VERTICAL
- BRIGHTNESS & CONTRAST : brightness and contrast adjustment.
- OSD POSITION : OSD H-position, OSD V-position
- PRODUCT INFORMATION : Show Serial No./ Resolution / Video input.
- RESET TO FACTORY SETTING : return to Factory preset timings and settings.
- INPUT SELECTION : select Analog D-sub, Digital DVI-D.

- 3.3 Timing requirement
- 3.3.1 Mode storing capacity
- (1) Factory preset modes : 15
- (2) Preset modes : 29

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		TYPE : 170W4P/74		8639 000 13446	
02-10-09		BRAND : PHILIPS			
NAME EDWARD CHANG		SUPERS.		24	590 — 9
TY		CHECK	DATE 02-10-09	10	A4
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## 3.3.2 Factory preset timings

The factory settings of size and centering are according to the reference timing charts  
( see fig -4, fig-5 )

MODE NO.	1	2	3	4
RESOLUTION	640 x 350	720 x 400	640 x 480	640 x 480
Dot clock(MHz)	25.175	28.321	25.175	30.24
f h	31.469kHz	31.468kHz	31.5kHz	35 kHz
A ( us )	31.778(800 dots)	31.78(900dots)	31.778(800 dots)	28.571 ( 864 dots)
B ( us )	3.813(96 dots)	3.813(108dots)	3.813( 96 dots)	2.116 ( 64 dots)
C ( us )	1.907(48 dots)	1.907(54dots)	1.907( 48 dots)	3.175( 96 dots)
D ( us )	25.422(640 dots)	25.42(720dots)	25.422( 640 dots)	21.164( 640 dots)
E ( us )	0.636(16 dots)	0.636(18dots)	0.636( 16 dots)	2.116( 64 dots)
f v	70Hz(70.09)	70Hz(70.085)	60Hz	67Hz
O (ms )	14.27(449 lines)	14.27(449 lines)	16.683 (525 lines)	15 (525 lines)
P ( ms )	0.064(2 lines)	0.064(2 lines)	0.064 ( 2 lines)	0.086( 3 lines)
Q (ms )	1.907(60 lines)	1.112(34 lines)	1.049 ( 33 lines)	1.114( 39 lines)
R ( ms )	11.12(350 lines)	12.71(400 lines)	15.253 (480 lines)	13.714(480 lines)
S ( ms )	1.175(37 lines)	0.381(13 lines)	0.317 ( 10 line )	0.086( 3 line )
SYNC. H/V	+/-	-/+	- / -	- / -
POLARITY				
SEP . SYNC	Y	Y	Y	Y

MODE NO.	5	6	7	8
RESOLUTION	640 x 480	640 x 480	640x480	800 x 600
Dot clock(MHz)	31.500	31.501	36	36
f h	37.861kHz	37.5kHz	36kHz	35.2kHz
A ( us )	26.413(832 dots)	26.667 (840 dots)	23.111 (832 dots)	28.444(1024 dots)
B ( us )	1.270(40 dots)	2.032 ( 54 dots)	1.556 (56 dots)	2.000 ( 72 dots)
C ( us )	3.810(120 dots)	3.81 ( 120 dots)	2.222 ( 80 dots)	3.556 ( 128 dots)
D ( us )	20.317(640 dots)	20.317 (640 dots)	17.778 (640 dots)	22.222( 800 dots)
E ( us )	1.016(32 dots)	0.508 ( 26 dots)	1.555 (56 dots)	0.666 ( 24 dots)
f v	72.809Hz	75Hz	85Hz	56Hz
O (ms )	13.735(520 lines)	13.333 (500 lines )	11.763 (509 lines )	17.778 (625 lines)
P ( ms )	0.079(3 lines)	0.08 ( 3 lines )	0.069 ( 3 lines )	0.057 ( 2 lines)
Q (ms )	0.528(20 lines)	0.427 ( 16 lines )	0.578 ( 25 lines )	0.626 ( 22 lines)
R ( ms )	12.678(480 lines)	12.8 (480 lines )	11.093 (480 lines )	17.066 (600 lines)
S ( ms )	0.45(17 lines)	0.026 ( 1 lines)	0.023 ( 1 lines)	0.029 ( 1 line )
SYNC. H/V	-/-	- / -	-/-	+ / +
POLARITY				
SEP . SYNC	Y	Y	Y	Y

CLASS NO.		17" WIDE TFT LCD CMTR-170W4P			
		TYPE : 170W4P/74		8639 000 13446	
02-10-09		BRAND : PHILIPS			
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MODE NO.	9	10	11	12
RESOLUTION	800 x 600	800 x 600	800 x 600	800 x 6 00
Dot clock(MHz)	40	50	49.498	56.251
f h	37.9kHz	48.077kHz	46.9kHz	53.7kHz
A ( us )	26.4 (1056 dots)	20.80 (1040dots)	21.333 (1056 dots)	18.631 (1048 dots)
B ( us )	3.2 ( 128 dots)	2.400 ( 120 dots)	1.616 ( 80 dots)	1.138 ( 64 dots)
C ( us )	2.2 ( 88 dots)	1.280 ( 64 dots)	3.232 ( 160 dots)	2.702 ( 152 dots)
D ( us )	20 ( 800 dots)	16.00 ( 800 dots)	16.162 ( 800 dots)	14.222 ( 800 dots)
E ( us )	1 ( 40 dots)	1.120 ( 56 dots)	0.323 ( 16 dots)	0.569 ( 32 dots)
f v	60Hz	72Hz ( 72.188)	75Hz	85Hz
O (ms )	16.579 (628 lines)	13.85 (666 lines)	13.333 (625 lines)	11.756(631 lines)
P ( ms )	0.106 ( 4 lines)	0.125 ( 6 lines)	0.064 ( 3 lines)	0.056 ( 3 lines)
Q (ms )	0.607 ( 23 lines)	0.478 ( 23 lines)	0.448 ( 21 lines)	0.503 ( 27 lines)
R ( ms )	15.84 (600lines)	12.48 (600 lines)	12.8 (600 lines)	11.179 (600 lines)
S ( ms )	0.026 ( 1 line )	0.770 ( 37 line )	0.021 ( 1 line )	0.018 ( 1 lines)
SYNC. H/V	+ / +	+ / +	+ / +	+ / +
POLARITY				
SEP . SYNC	Y	Y	Y	Y

MODE NO.	13	14	15	16
RESOLUTION	832 x 624	960 x 680	1024 x 768	1024 x 768
Dot clock(MHz)	57.28	101.336	65	75
f h	49.7kHz	78.192kHz	48.363kHz	56.5kHz
A ( us )	20.11(1152 dots)	12.789(1296 dots)	20.677(1344 dots)	17.707(1328 dots)
B ( us )	1.117(64 dots)	1.026(104 dots)	2.092(136 dots)	1.813(136 dots)
C ( us )	3.91(224 dots)	1.658(168 dots)	2.462(160 dots)	1.920(144 dots)
D ( us )	14.52(832 dots)	9.473(960 dots)	15.754(1024 dots)	13.653(1024 dots)
E ( us )	0.563(32 dots)	0.632(64 dots)	0.369(24 dots)	0.321 (24 dots)
f v	75Hz	108Hz	60.004Hz	70.004Hz
O (ms )	13.41(667 lines)	9.259(724 lines)	16.666(806 lines)	14.272(806 lines)
P ( ms )	0.06(3 lines)	0.038(3 lines)	0.124(6 lines)	0.106(6 lines)
Q (ms )	0.784(39 lines)	0.511 (40 lines)	0.600(29 lines)	0.514(29 lines)
R ( ms )	12.55(624 lines)	8.697 (680 lines)	15.880(768 lines)	13.599(768 lines)
S ( ms )	0.016(1 lines)	0.012 (1 lines)	0.062(3 lines)	0.053(3 lines)
SYNC. H/V	+ / +	- / +	- / -	- / -
POLARITY				
SEP . SYNC	Y	Y	Y	Y

CLASS NO.		17" WIDE TFT LCD CMTR-170W4P			
		TYPE : 170W4P/74		8639 000 13446	
02-10-09		BRAND : PHILIPS			
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17	18	19	20	21
1024 x 768	1024 x 768	1024 x 768	1280 x 720	1280 x 720
78.75	83.096	94.5	69.329	74.48
60kHz 16.66 (1312dots) 1.219 ( 96 dots) 2.235 ( 176 dots) 13.003 ( 1024 dots) 0.203 ( 16 dots) 75Hz ( 75.000) 13.328 (800 lines) 0.05( 3 lines) 0.446 ( 28 lines) 12.80 (768 lines) 0.017 ( 1 line )	61.1kHz 16.367 (1360dots) 1.348 ( 112 dots) 2.022 ( 168 dots) 12.323 ( 1024 dots) 0.674 ( 56 dots) 76Hz 13.142 (803 lines) 0.049 ( 3 lines) 0.507 ( 31 lines) 12.57 (768 lines) 0.016 ( 1 line )	68.7kHz 14.561 (1376 dots) 1.016 ( 96 dots) 2.201 ( 208 dots) 10.836 ( 1024 dots) 0.508 ( 48 dots) 85Hz 11.765 (808 lines) 0.044 ( 3 lines) 0.524 ( 36 lines) 11.183 (768lines) 0.014 ( 1 line )	41.664 24.002 (1664 dots) 1.962(136 dots) 2. 769(192 dots) 18.463(1280 dots) 0.808(56 dots) 56Hz 16.667 (744 lines) 0.072(3 lines) 0.48(20 lines) 11.183(720 lines) 0.02400(1 lines)	44.76 22.341(1664) 1.826(136) 2.578(192) 17.186(1280) 0.752(56) 60Hz 16.667(746) 0.06702(3) 0.491(22) 16.086(720) 0.022341(1)
+ / +	+ / +	+ / +	/ +	/ +
Y	Y	Y	Y	Y

MODE NO.	22	23	24	25
RESOLUTION	1280 x 720	1280 x 768	1280 x 768	1280 x 768
Dot clock(MHz)	89.040	73.895	80.136	94.976
f h	52.5	44.408	47.7	56
A ( us )	19.048 us(1696dots)	22.518 us(1664)	20.964 us(1680)	17.857 us(1696)
B ( us )	1.527 us(136)	1.840 us(136)	1.697 us(136)	1.432 us(136)
C ( us )	2.336 us(208)	2.598 us(192)	2.496 us(200)	2.190 us(208)
D ( us )	14.376 us(1280)	17.322 us(1280)	15.973 us(1280)	13.477 us(1280)
E ( us )	0.809 us(72)	0.758 us(56)	0.799 us(64)	0.758 us(72)
f v	70	56	60	70
O ( ms )	14.286 ms(750)	17.857 ms(893)	16.667 ms(795)	14.286 ms(800)
P ( ms )	0.057143 ms(3)	0.06755 ms(3)	0.06289 ms(3)	0.053571 ms(3)
Q ( ms )	0.495238 ms(26)	0.4728 ms(21)	0.482 ms(23)	0.500 ms(28)
R ( ms )	13.714 ms(720)	17.294 ms (768)	16.101 ms(768)	13.714 ms(768)
S ( ms )	0.019 ms(3 lines)	0.0225 ms(1 lines)	0.0209 ms(1 lines)	0.017857(1 lines)
SYNC. H/V	-/+	-/+	-/+	-/+
POLARITY				
SEP. SYNC	Y	Y	Y	Y

CLASS NO.		17" WIDE TFT LCD CMTR-170W4P			
02-10-09		TYPE : 170W4P/74		8639 000 13446	
		BRAND : PHILIPS			
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MODE NO.	26	27	25	29
RESOLUTION	1280 x 768	1280 x 768	1280 x 960	1280 x 1024
Dot clock(MHz)	97.812	97.812	108	108
f h	57.7	60.15	60kHz	64kHz
A ( us )	17.339 (1696 dots)	16.625 (1712 dots)	16.667(1800 dots)	15.63 (1688 dots)
B ( us )	1.390 (136 dots)	1.321 (136 dots)	1.037(112 dots)	1.037 ( 112 dots)
C ( us )	2.127 (208 dots)	2.098 (216 dots)	2.889(312 dots)	2.296 ( 248 dots)
D ( us )	13.086 (1280dots)	12.430 (1280dots)	11.852(1280 dots)	11.852 ( 1280 dots)
E ( us )	0.736 (72 dots)	0.777 (80 dots)	0.889(96 dots)	0.445 ( 48 dots)
f v	72	75	60Hz	60Hz
O (ms )	13.889 (801 lines)	13.333 (802 lines)	16.667(1000 lines)	16.661 (1066 lines)
P ( ms )	0.052018(3 lines)	0.049875(3 lines)	0.05(3 lines)	0.047 ( 3 lines)
Q (ms )	0.502 (29 lines)	0.498 (30 lines)	0.600(36 lines)	0.594 ( 38 lines)
R ( ms )	13.317 (768 lines)	12.768 (768 lines)	16(960 lines)	16.005 (1024 lines)
S ( ms )	0.017(1 lines)	0.016(1 lines)	0.017(1 lines)	0.015 ( 1 line)
SYNC. H/V	-/+	-/+	+/+	+ / +
POLARITY				
SEP . SYNC	Y	Y	Y	Y

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		TYPE : 170W4P/74		8639 000 13446	
02-10-09		BRAND : PHILIPS			
NAME EDWARD CHANG		SUPERS.		24	590 — 13
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3.3.3 Horizontal scanning

Sync polarity : Positive or Negative  
Scanning frequency : 30 - 64 K Hz

3.3.4 Vertical scanning

Sync polarity : Positive or Negative  
Scanning frequency : 56 - 75 Hz

3.4 Power input connection

Power cord length : 1.8 M  
Power cord type : 3 leads power cord with protective earth plug.

3.5 Power management

The power consumption and the status indication of the set with power management function are as follows,  
Note : Disconnect DVI signal cable and audio module

STATUS	Horizontal	Vertical	Power Spec	LED
On	Pulse	Pulse	as normal on	Blue
Stand-by	No Pulse	Pulse	< 1 W	Amber
Suspend	Pulse	No Pulse	< 1 W	Amber
off	No Pulse	No Pulse	< 1 W	Amber

According to VESA power saving signalling.  
TCO95 power saving requirement  
EPA energy star requirement

(Power Switch Off)  
for Digital input power consumption is less 1W  
( In non-DMPM recoverable off mode)

3.6 Display identification

- 3.6.1 In accordance with VESA Display Channel Standard V1.0 and having DDC 2B capability  
3.6.2 In accordance with DVI requirement (DDWG digital Visual Interface revision 1.0) use DDC 2B and EDID 3.0 structure 2.0

CLASS NO.		17" WIDE TFT LCD CMTR-170W4P			
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4.0

Visual characteristics

4.1

Test conditions

Unless otherwise specified, this specification is defined under the following conditions.

(1) Input signal : As defined in 3.3, 1280 x 768  
non-interlaced mode (61K/75Hz), signal  
sources must have 75 ohm output impedance.

(2) Luminance setting : controls to be set to 380 nits with  
full screen 70 % duty cycle white signal

(3) Warm up: more than 30 minutes after power on with signal supplied.

(4) Ambient light: 400 -- 600 lux.

(5) Ambient temperature: 20+/- 5 °C

4.2

Resolution

Factory preset modes ( 15 modes )

#	Resolution	Frequency	Pixel rate	Sync	Comment
1	640X350	31.5K/70HZ	25.175	(+/-)	IBM VGA 10h
2	720X400	31.5K/70HZ	28.322	(-/+)	IBM VGA 3h
3	640X480	35.0K/67HZ	30.24	(-/-)	
4	640X480	31.5K/60HZ	25.175	(-/-)	
5	640X480	37.5K/75HZ	31.501	(-/-)	
6	800X600	35.2K/56HZ	36	(+/+)	
7	800X600	37.9K/60HZ	40	(+/+)	
8	800X600	46.9K/75HZ	49.498	(+/+)	
9	832X624	49.7K/75HZ	57.28	(+/+)	MAC
10	1024X768	48.4K/60HZ	65	(-/-)	
11	1024X768	60.0K/75HZ	78.75	(+/+)	
12	1280X720	/70Hz		(-/+)	
13	1280X768	/56Hz		(-/+)	
14	1280X768	47.7K/60HZ	80.136	(-/+)	
15	1280X768	60.2K/75HZ	102.977	(-/+)	

- Note: 1. Screen displays perfect picture at 15 factory preset modes
2. Screen displays visible picture with OSD warning when input modes are other than 29 preset modes

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		TYPE : 170W4P/74			
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4.3 Brightness : 380 nits (at panel color temperature, 9 points averaged, Fig. 1 )

4.4 Image size

4.4.1 Actual display size

359x287mm

4.5 Brightness uniformity

Set contrast at 70% and turn the brightness to get average above 380 nits at center of the screen.  
Apply the Fig 1, it should comply with the following formula:

$$\frac{B\_max}{B\_min} \times 100\% < 1.45$$

Where B\_max =Average of 9 points maximum brightness  
B\_min = Average of 9 points minimum brightness

4.6 Check Cross talk (S)

Apply Pattern 2(A). Set contrast and brightness at 100 %.  
Measure YA. Then output Pattern 2(B) and measure YB.  
the cross talk value :

$$\frac{ABS( YA - YB )}{YA} \times 100\% < 2.5 \%$$

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		BRAND : PHILIPS					
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4.7 White color adjustment

There are two factory preset white color 9300K, 6500K.

Apply full white pattern, with brightness in 100 % position and the contrast control at 70 % position.  
The 1931 CIE Chromaticity (color triangle) diagram (x,y) coordinate for the screen center should be:

9300K CIE coordinates	X = 0.281+/- 0.020 Y = 0.311+/- 0.020
6500K CIE coordinates	X = 0.312 +/- 0.020 Y = 0.338 +/- 0.020

5.0 Mechanical characteristics

5.1 Controls

- Front side:
- DC power switch
  - OSD function key
  - Auto key
  - Volume & off control
  - Bass on/off
  - Mute on/off
- Rear :
- Video signal cable
  - DVI connector.
  - Power cord socket
  - DC 12V fly-in
  - Audio in jack
  - Microphone out jack
- Side :
- Earphone jack
  - External Mic. in jack

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		TYPE : 170W4P/74		8639 000 13446	
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5.2 Unit dimension / Weight  
Set dimension (incl. pedestal) : 417(W) \* 374(H) \* 180(D) mm  
Net weight : : 5.4 KGS

5.3 Tilt and swivel base  
tilt angle : -5°to +35°  
swivel rotation : 175°

5.4 Transportation packages

5.4.1 Shipping dimension/Weight  
Carton dimension : 487(W) X 433(H) X 232(D) mm  
Gross weight : 7 KGS

5.4.2 Block unit / Palletization

<u>layers/block</u>	<u>sets/layer</u>	<u>sets/block unit</u>
8	4	32
<u>blocks/container</u>		
<u>20 feet</u>	<u>40 feet</u>	
10	21	

6.0 Environmental characteristics  
The following sections define the interference and susceptibility condition limits that might occur between external environment and the display device.

6.1 Susceptibility of display to external environment

Operating

- Temperature : 5 to 35 degree C
- Humidity : 80% max
- Altitude : 0-3658m
- Air pressure : 600-1100 mBAR

Storage

- Temperature : -20 to 60 degree C
- Humidity : 85% max ( < 40 )
- Altitude : 0-12192m
- Air pressure : 300-1100 mBAR

Note: recommend at 5 to 35°C, Humidity less than 60 %

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		TYPE : 170W4P/74		8639 000 13446	
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## 6.2 Transportation tests

Standard		Philips UAN-D1400	NSTA
Drop Test	Height	76.0 cm	76.0 cm
	Sequence	1 corner 3 faces (-10deg C x 16 hrs)	1 corner 3 edge (Room temp) 6 face
	Test Result	Electrical function ok Mechanical function ok No serious damage on set appearance (Room temp -10 C, humidity 70 %)	
Vibration Test	Sequence	(1) PACKAGING 5 -200 Hz, 0.73 GRMS, 30 min. for Each axis, 3axis	
		(2) OPERATING 10 -50-10 Hz, 0.35 mm, 30 min. for Each axis	
	Test Result	Electrical function ok Mechanical function ok No serious damage on set appearance	
Shock Test	For design evaluation only Operating 1 20 G, < 3 msec, 6 shocks		

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6.3 Display disturbances from external environment  
According to IEC 801-2 for ESD disturbances

#### 6.4 Display disturbances to external environment

6.4.1 EMI  
EMI : C-tick, CE(Europe), FCC(USA), IC(Canada), VCCI(Japan), BSMI

CLASS NO.		<b>17" WIDE TFT LCD CMTR-170W4P</b> <b>TYPE : 170W4P/74</b> <b>BRAND : PHILIPS</b>		<b>8639 000 13446</b>						
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NAME	EDWARD CHANG	SUPERS.		24	590	—	19	10		A4
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- 7.0 Reliability
- 7.1 Mean Time Between Failures  
System MTBF (Excluding the LCD panel and CCFL) : 50,000 hrs  
CCFL MTBF : 50,000 hrs
- 8.0 Quality assurance requirements
- 8.1 Acceptance test  
according to MIL-STD-105D Control II level  

AQL : 0.65 (major)  
2.50 (minor)  
(please also refer to annual quality agreement)  
Customer acceptance criteria : UAW0377/00
- 9.0 Serviceability  
The serviceability of this monitor should fulfill the requirements which are prescribed in UAW-0346 and must be checked with the check list UAT-0361.

CLASS NO.		17" WIDE TFT LCD CMTR-170W4P			
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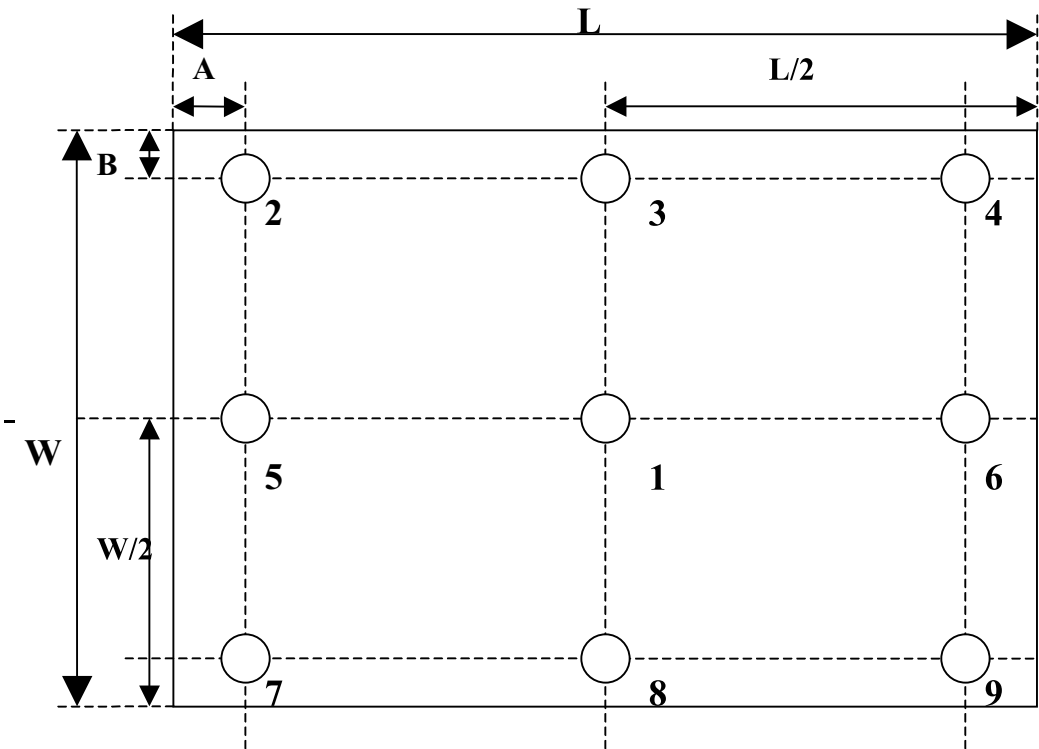
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Fig 1: Brightness and Uniformity



A: L/10 mm  
B: W/10 mm  
L: 359.040 mm  
W: 287.232 mm

Average= 9 points average

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		TYPE : 170W4P/74		8639 000 13446	
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Fig 2: Cross talk pattern  
Gray level 46 (64 Gray level)

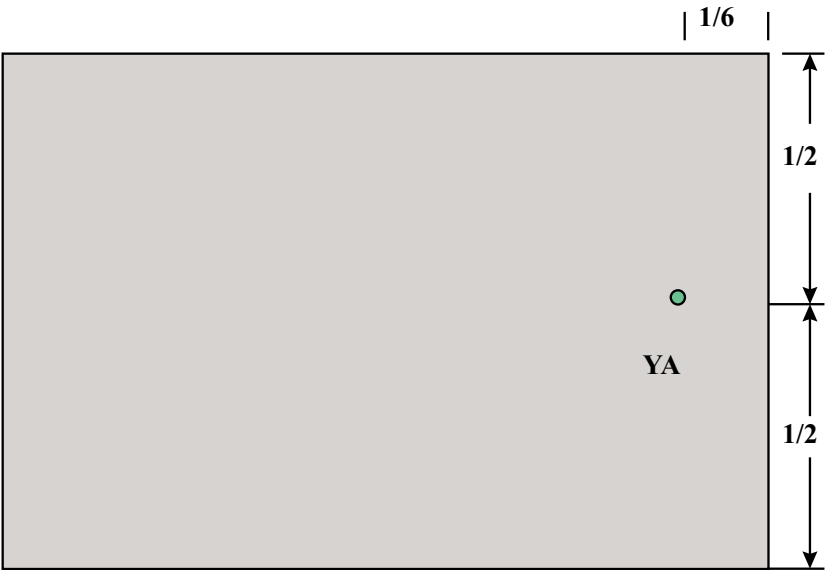
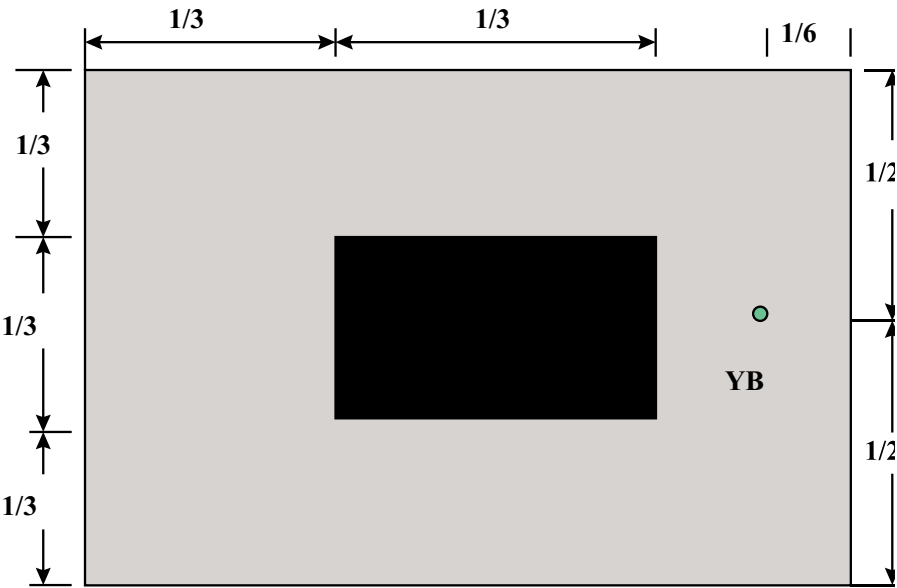


Fig 3: Cross talk Pattern  
Center at Gray level 0 (Black)

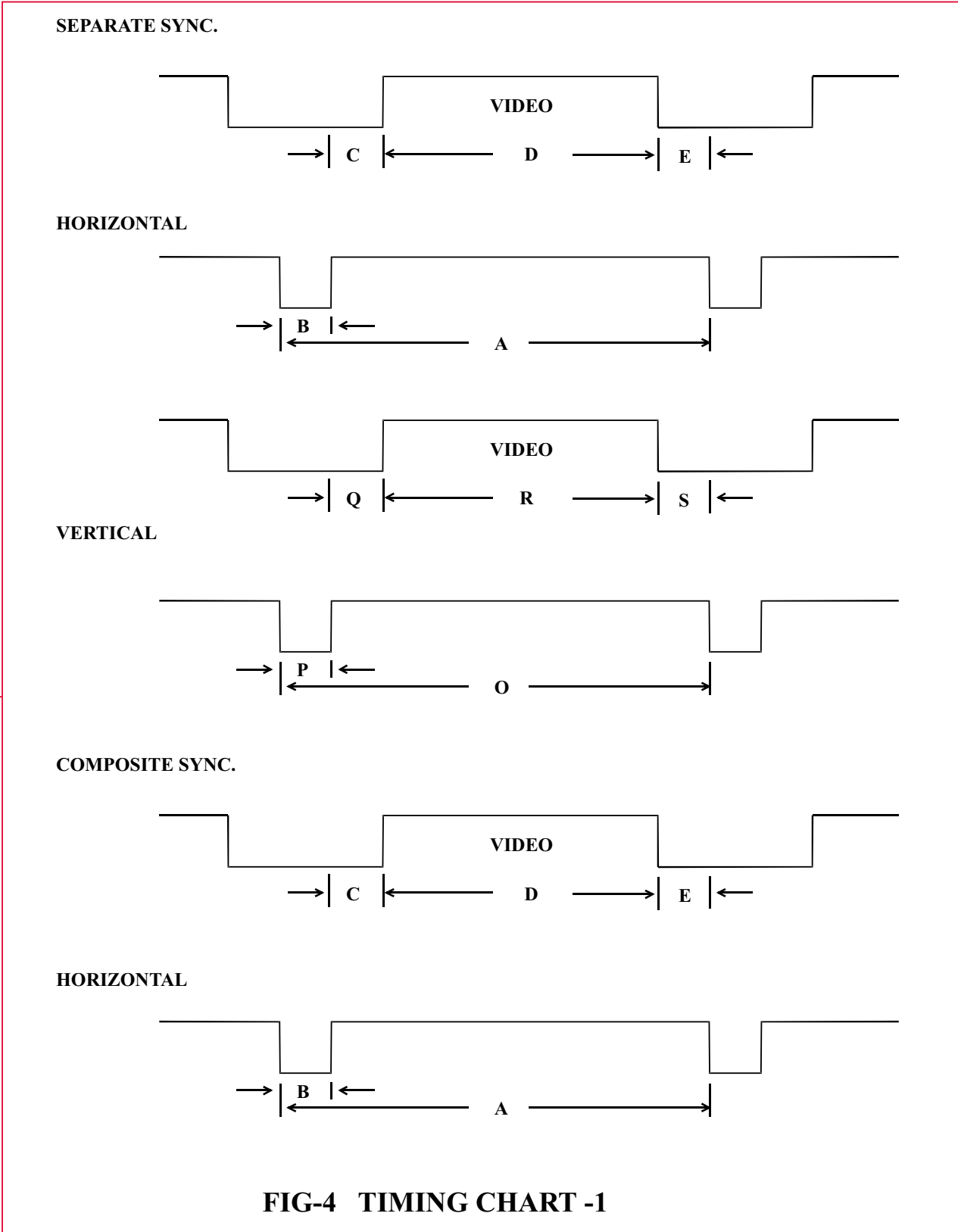


CLASS NO.		17" WIDE TFT LCD CMTR-170W4P			
02-10-09		TYPE : 170W4P/74		8639 000 13446	
		BRAND : PHILIPS			
NAME EDWARD CHANG		SUPERS.		24	590 — 22
TY		CHECK	DATE 02-10-09	10 A4	
Property of PHILIPS ELECTRONICS INDUSTRIES (TAIWAN) LTD.-B.E.					

PHILIPS



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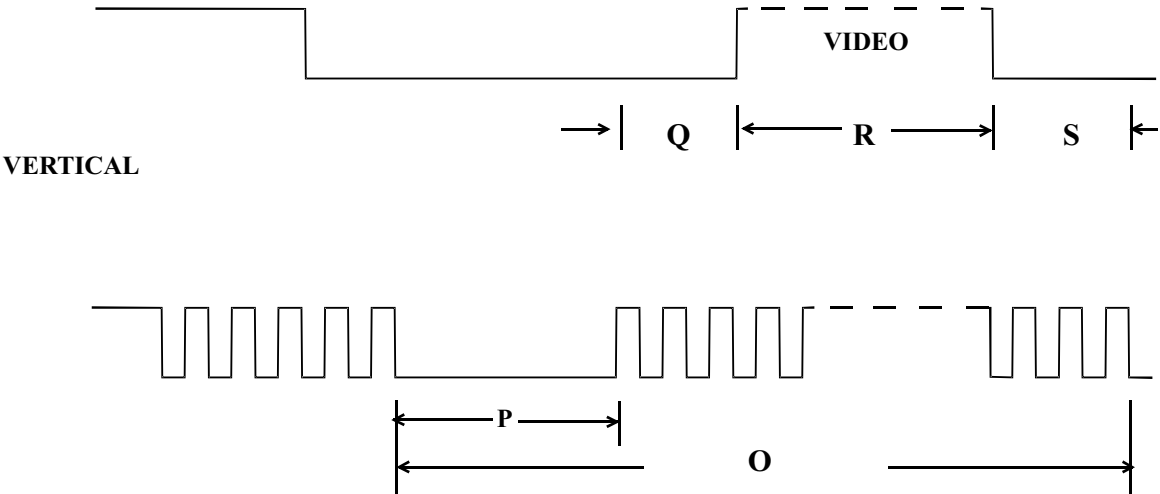


CLASS NO.		17" WIDE TFT LCD CMTR-170W4P TYPE : 170W4P/74 BRAND : PHILIPS			8639 000 13446					
02-10-09										
NAME EDWARD CHANG		SUPERS.		24	590	—	23	10		A4
TY		CHECK	DATE 02-10-09	Property of PHILIPS ELECTRONICS INDUSTRIES (TAIWAN) LTD.-B.E.						

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COMPOSITE SYNC. & VIDEO  
( SYNC. ON GREEN )

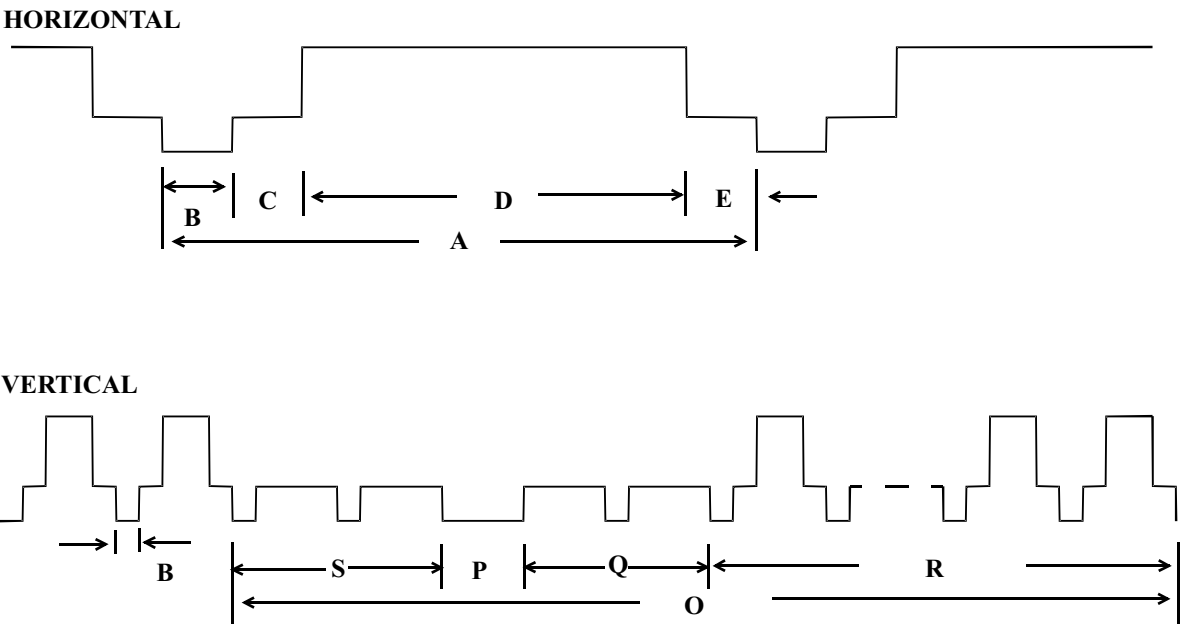


FIG-5 TIMING CHART -2

CLASS NO.		17" WIDE TFT LCD CMTR-170W4P		8639 000 13446	
02-10-09		TYPE : 170W4P/74			
		BRAND : PHILIPS			
NAME	EDWARD CHANG	SUPERS.	24	590	24
TY	CHECK	DATE	02-10-09	10	A4
Property of PHILIPS ELECTRONICS INDUSTRIES (TAIWAN) LTD.-B.E.					

General Troubleshooting Guide

1

No display, but LED is ON or LED is amber ( yellow)

2

Monitor drivers ( inf file )

3


Screen size not correct

4

Picture too large or small

5

USB



6

Unstable picture/ Picture flickers

7

Out of H/ V Sync.

8

Picture too bright

9

Picture too dim

10

No power/ LED is off

11

Missing color

12

OSD main menu locked

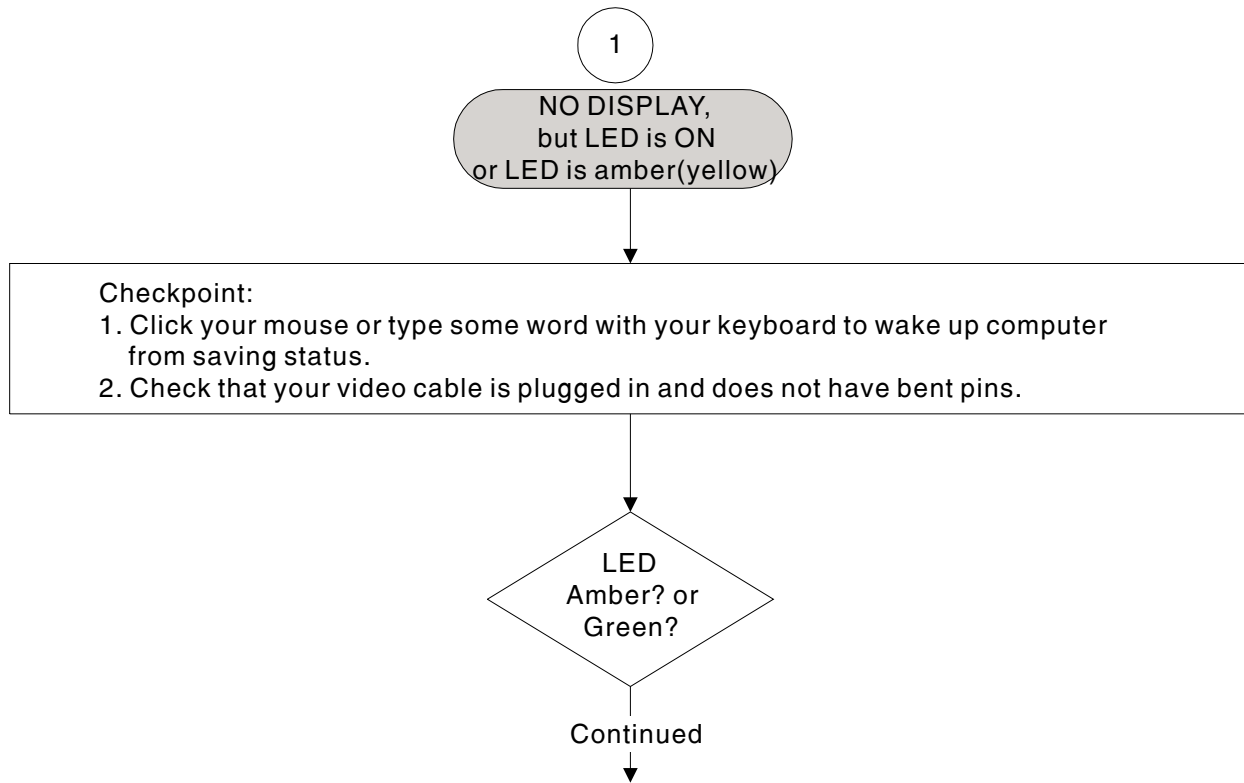


13

Jitter/Video Noise

14

Power management function is not active

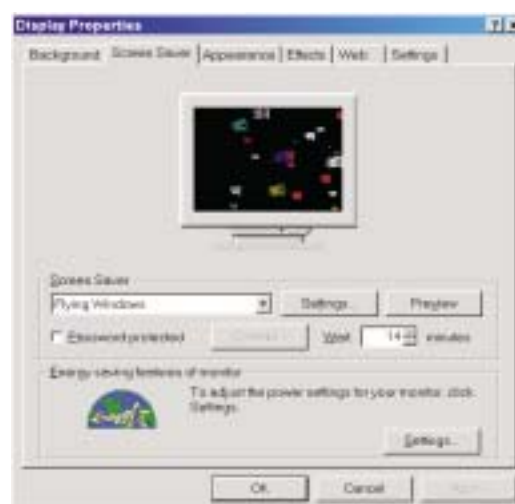


If your PC in MS Win 98 and with lots of application software.

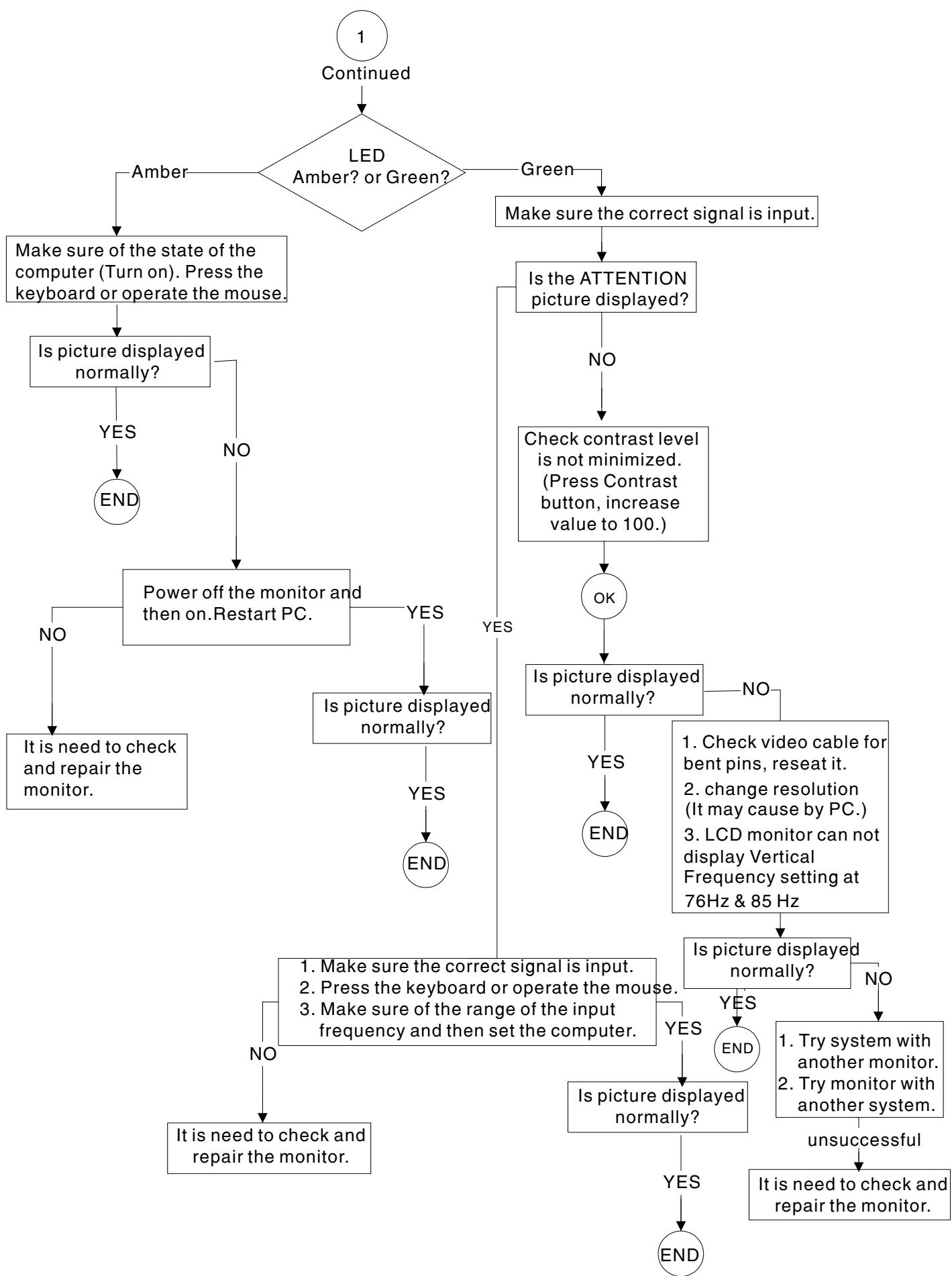
Do not set screen saver ->Wait -> at "14" minutes.

It will cause "no display" problem as above mentioned.

Action : Restart PC and change timer setting of screen saver.







2

## Monitor drivers (inf file)

### for Windows 95/98/2000/Me or later

Philips' monitors build in VESA DDC2B feature to support Plug & Play requirement for Windows 95/98/2000/Me . You can install the information file (.inf) in order to select your Philips monitor from "Monitor" dialog box in Windows 95/98/2000/Me to activate Plug & Play application. The installation procedure based on Windows '95 OEM Release 2 , 98 , Me and 2000 is specified as follows, (In case of connecting the monitor to the PC compliant with VESA standard with the designated signal cable, the PC reads display pixels, frequency, and color feature of this monitor to optimise the picture for the monitor automatically.)  
DDC : Abbreviation for Display Data Channel

**\*\* Windows NT 4.0 does not require driver (inf file) for monitors.\*\***

### For Windows 95

For Windows95 drivers , your monitor is listed under manufacture name "Philips Business Electronics Co.".

1. Start Windows '95
2. Click the 'Start' button, point to 'Setting', and then click 'Control Panel'.
3. Double Click the 'Display' Icon.
4. Choose the 'Settings' tab then click 'Advanced...'. .
5. Choose 'Monitor' button, point to 'Change...' then click 'Have Disk...'. .
6. Click 'Browse...' button then choose the appropriate drive F: ( CD-ROM Drive) then click 'OK' button.
7. Click the 'OK' button then choose your monitor model and click the 'OK'.
8. Click 'Close' button.

### For Windows 98

For Windows98 drivers, our monitors are listed under 2 manufactures name "Philips", and "Philips Consumer Electronics Co". Please select "Philips" when you would like to set up your monitor in Windows setting , if you can not find the right model name just as the label indication on the back of set. For those set that have been issued since the release of Win98 , drivers can be found in CDROM under the directory path of " \ pc\ driver \" or it may be downloaded at "http: \www.philips.com". Once you have installed the new driver , Windows will add a new manufacture name "Philips Business Electronics" in your system.

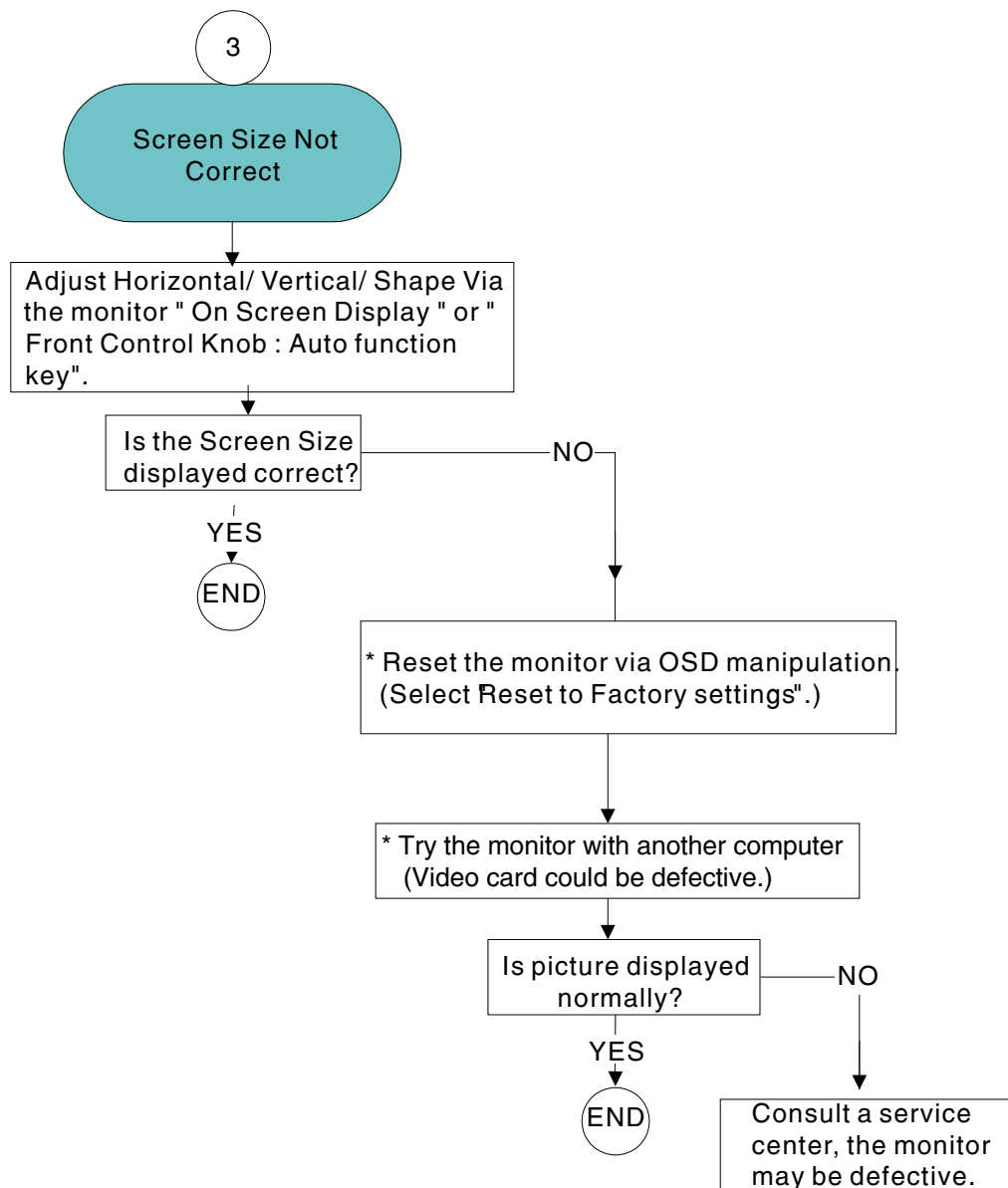
1. Start Windows 98
2. Click the 'Start' button, point to 'Setting', and then click 'Control Panel'.
3. Double Click the 'Display' Icon.
4. Choose the 'Settings' tab then click 'Advanced...'. .
5. Choose 'Monitor' button, point to 'Change...' then click 'Next'
6. Choose "Display a list of all the drivers in a specific location, so you can elect the driver you want. " then click 'Next' and then click 'Have Disk...'. .
7. Click 'Browse...' button then choose the appropriate drive F: ( CD-ROM Drive) then click 'OK' button.
8. Click the 'OK' button then choose your monitor model and click the 'Next' button then click 'Next' button.
9. Click 'Finish' button then the 'Close' button.

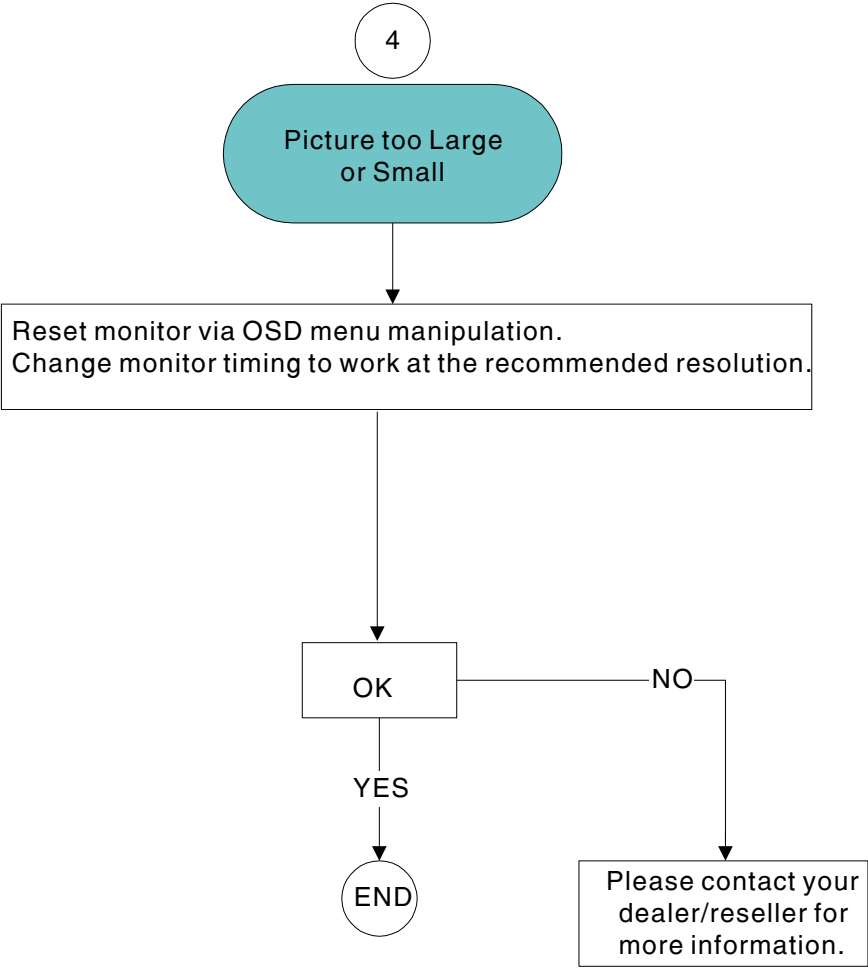
### For Windows Me

1. Start Windows Me
2. Click the 'Start' button, point to 'Setting', and then click 'Control Panel'.
3. Double Click the 'Display' Icon.
4. Choose the 'Settings' tab then click 'Advanced...'. .
5. Choose 'Monitor' button, then click 'Change...' button.
6. Choose "Specify the location of the driver (Advanced)" and click the 'Next' button.
7. Choose "Display a list of all the drivers in a specific location, so you can select the driver you want." then click 'Next' and then click 'Have Disk...'. .
8. Click 'Browse...' button then choose the appropriate drive F: ( CD-ROM Drive) then click 'OK' button.
9. Click the 'OK' button then choose your monitor model and click the 'Next' button then click 'Next' button.
10. Click 'Finish' button then the 'Close' button.

### For Windows 2000

1. Start Windows 2000
2. Click the 'Start' button, point to 'Setting', and then click 'Control Panel'.
3. Double Click the 'Display' Icon.
4. Choose the 'Settings' tab then click 'Advanced...'. .
5. Choose 'Monitor' - If the 'Properties' button is inactive, it means your monitor is properly configured. Please stop installation. - If the 'Properties' button is active. Click 'Properties' button. Please follow next step continually.
6. Click 'Driver' and then click on 'Update Driver...' then click on the 'Next' button.
7. Choose "Display a list of the known drivers for this device so that I can choose a specific driver" then click 'Next' and then click 'Have disk...'. .
8. Click 'Browse...' button then choose the appropriate drive F: ( CD-ROM Drive).
9. Click the 'Open' button, then click the 'OK' button.
10. Choose your monitor model and click the 'Next' button then click 'Next' button.
11. Click 'Finish' button then the 'Close' button. If you can see the "Digital Signature Not Found" window then click the 'Yes' button.





5

**USB**

USB = Universal Serial Bus

USB is the simple way to connect peripherals to your computer. It can be used to attach a wide variety of devices like scanners, cameras, keyboards, mice, speakers, printer ..etc.

Using USB devices (Operating Systems support USB) :

It depends on two things: hardware and software.

**Hardware** : You need a USB port in your computer. This can either be built in (most PC's build in 1999 and Apple's iMac) or from a plug in card. A number of vendors sell PCI and CardBus USB adapters which can add USB capabilities to your older computer.

**Software-wise** for Wintel computers, you need either **Windows 98, Windows 95 OSR 2.1** (although Windows 98 has better USB support than Windows 95), **Windows 2000**. For Apple Macintosh computers you need **MacOS 8.1 or later**.

USB automatically determines resources (like driver software and bus bandwidth) required by peripherals.

USB makes necessary resources available without user intervention.

It is designed to meet Microsoft Plug and Play (PnP) specification, meaning users can install, and hot-swap devices without long installation procedures and reboots.

It allows 127 devices to run at the same time on the bus.

USB bus provides two types of data transfer speed -- 1.5Mbps and 12Mbps and it can provide a maximum of 500mA of current to devices attached on the bus.

Universal means all peripherals share the same connector.

Serial simply defines devices can daisy chain together.

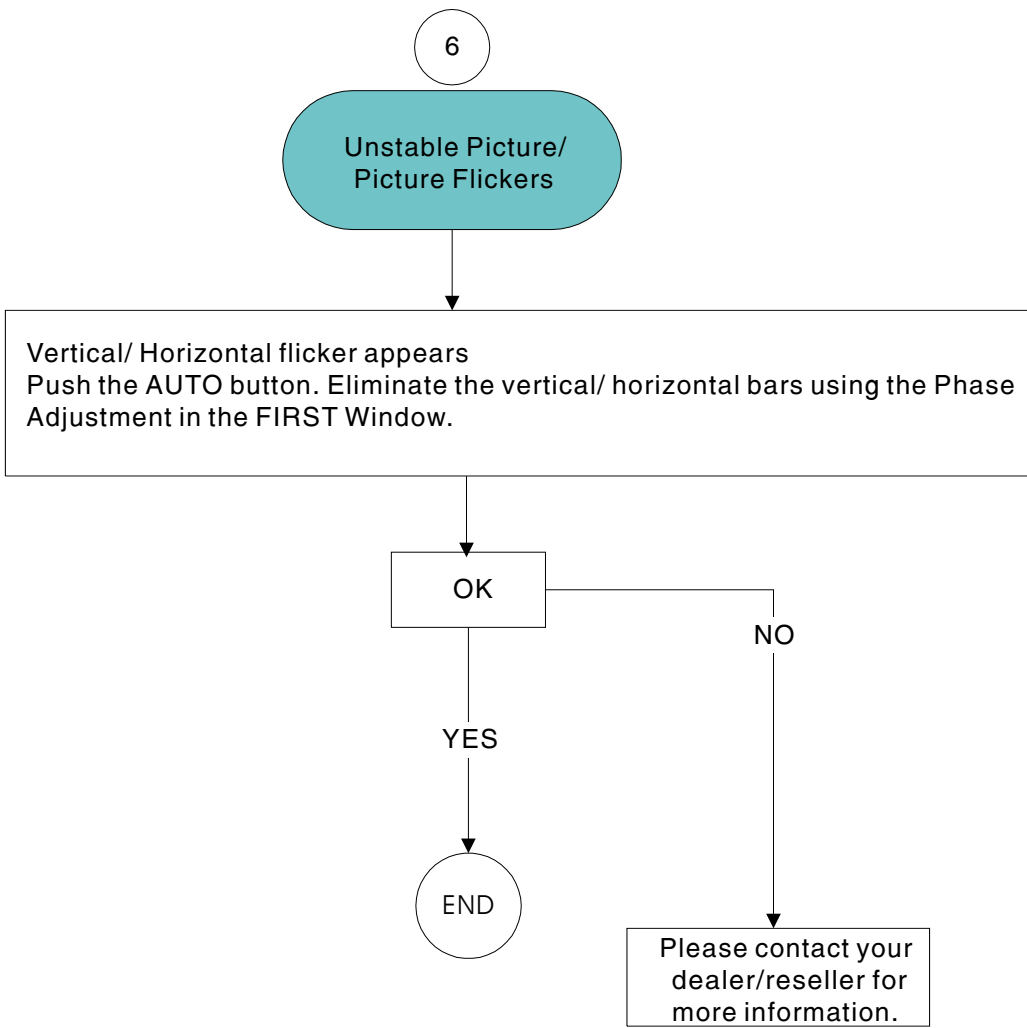
Universal Serial Bus 1.1, the de facto external connectivity standard for Mac and PC, has picked up the speed after its slow adoption by peripheral manufacturers, users and PC OEMs.

USB 2.0 :

Drafted by Compaq, Hewlett Packard, Intel, Lucent, Microsoft, NEC and Philips,

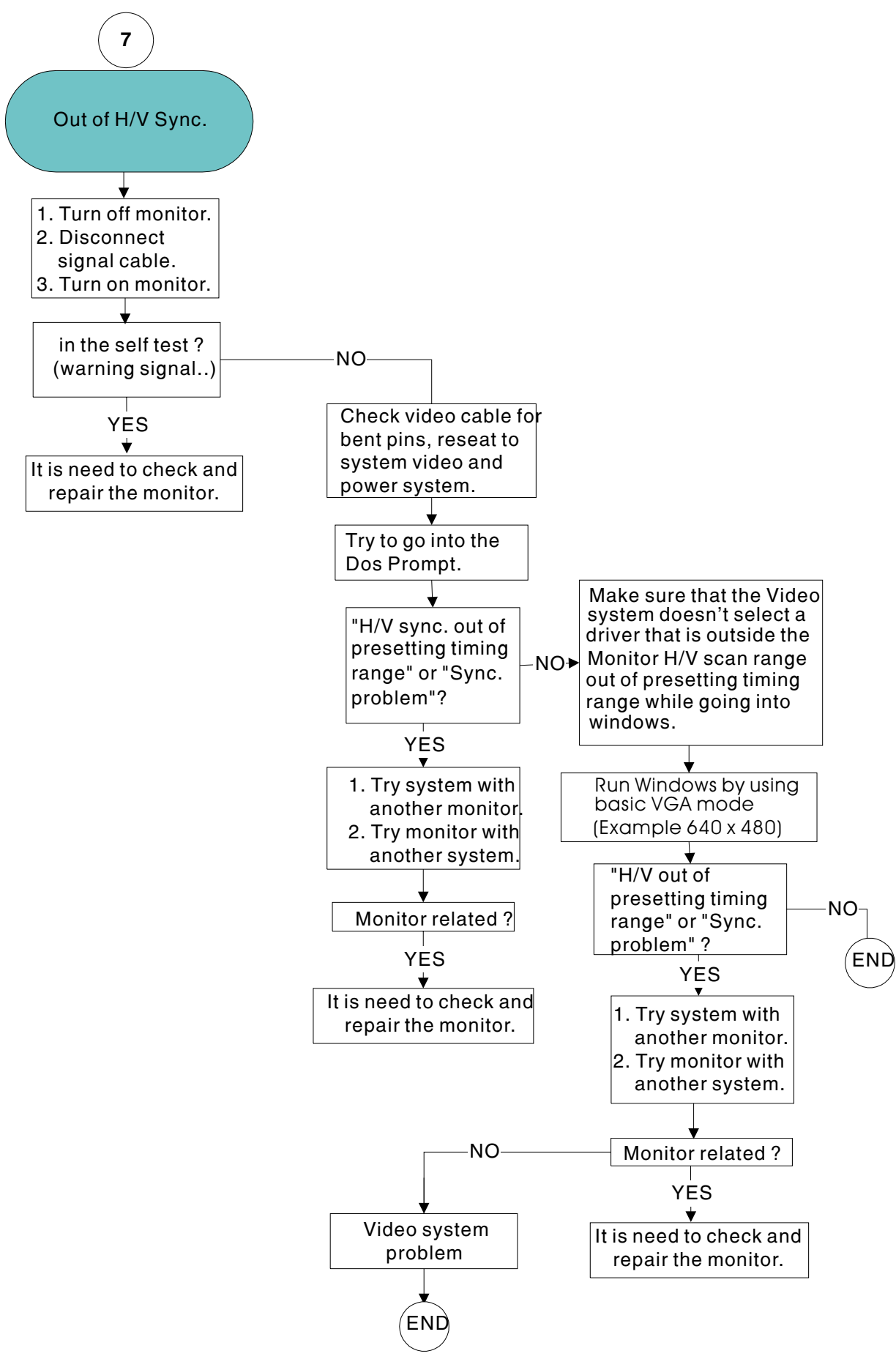
USB Specification version 2.0 will increase device data throughput

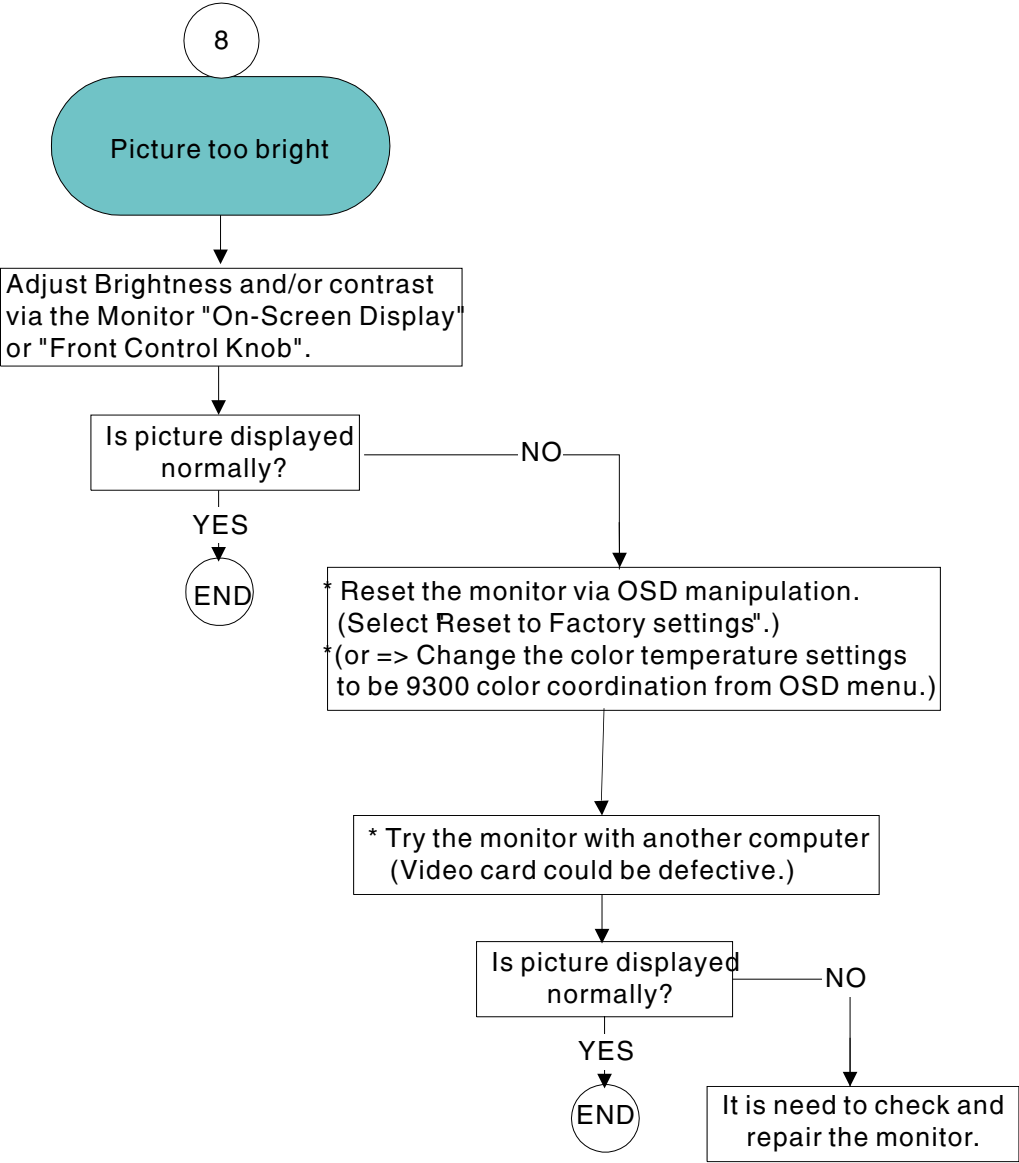
up to 480Mbps, 40 times faster than USB 1.1 devices.

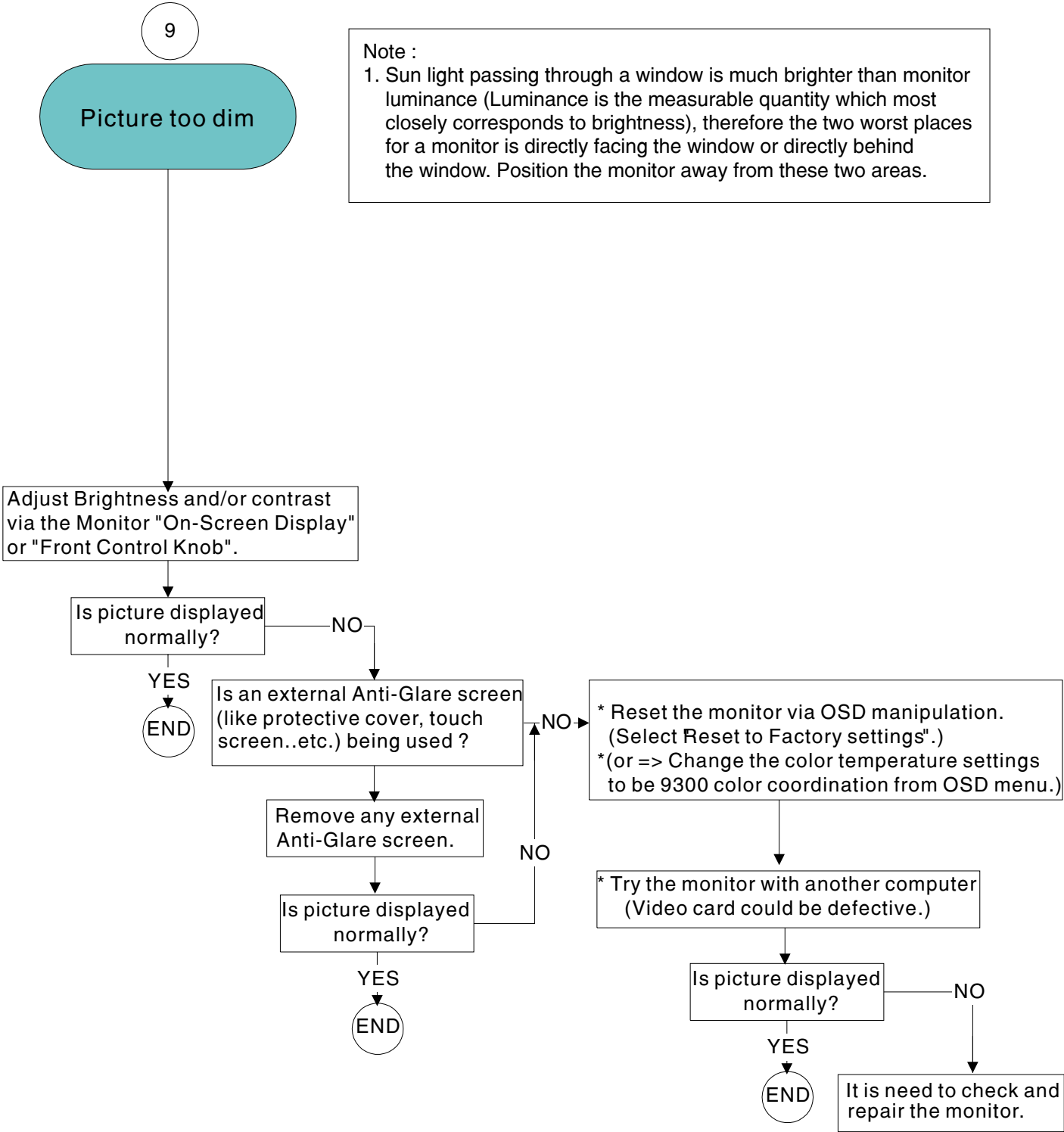


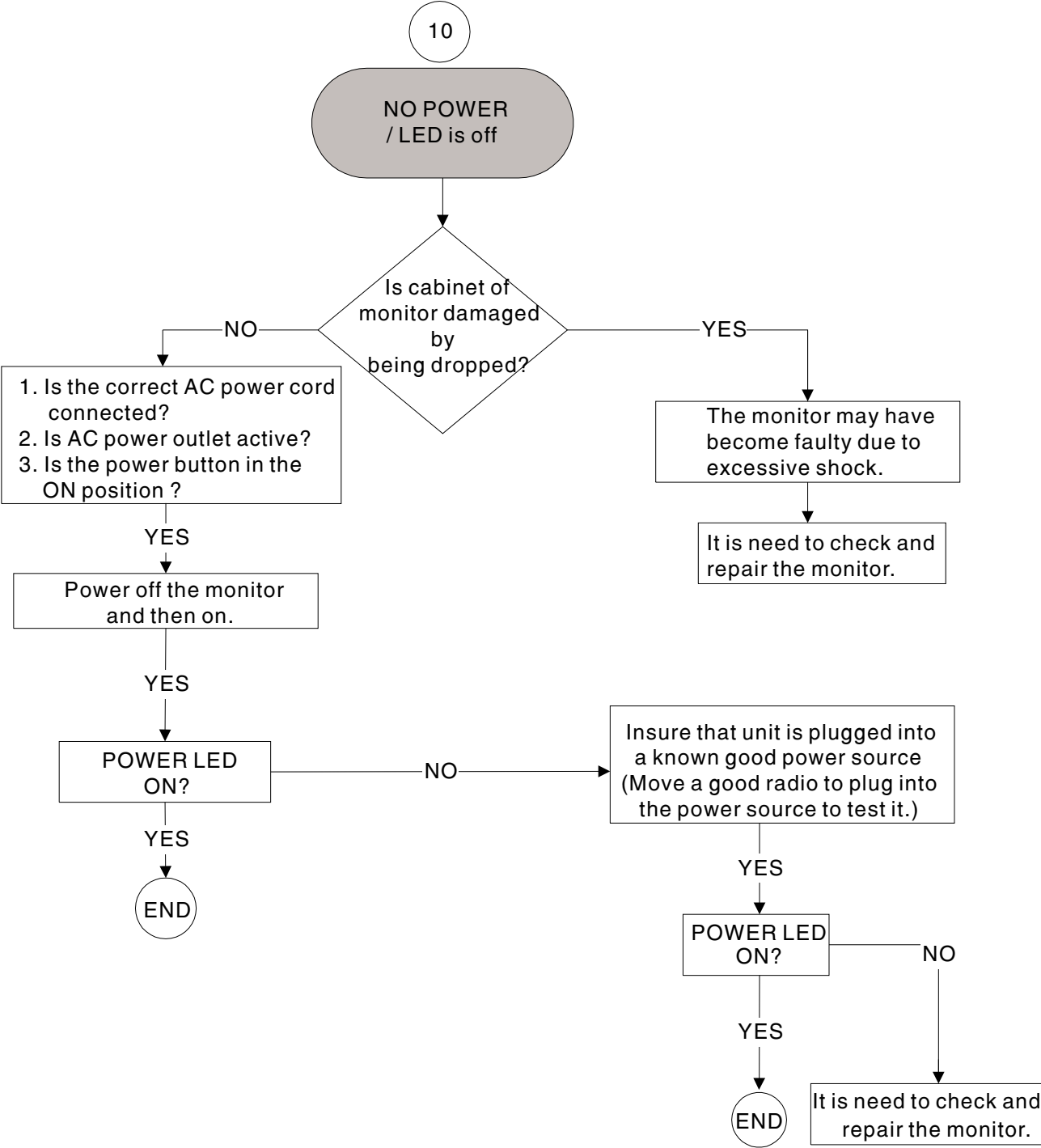


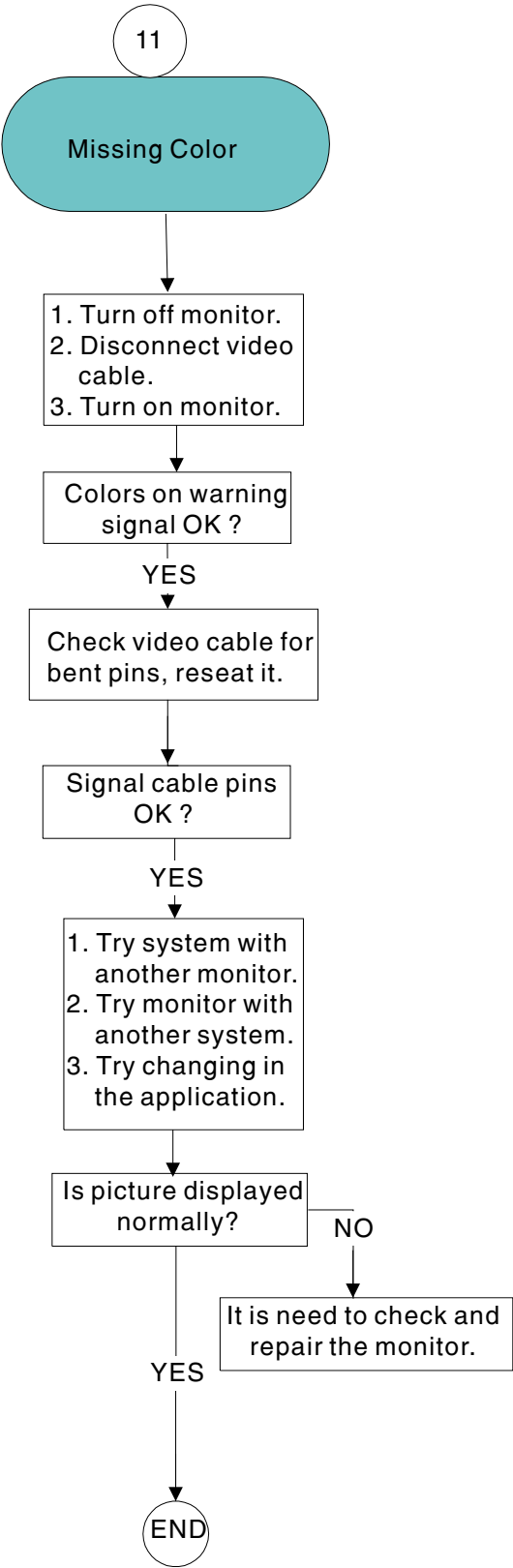
Go to cover page







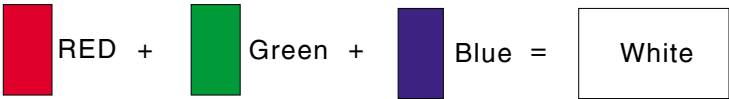




- There are 2 easy ways to determine the Missing color problem.
1. View an image that is supposed to be "White".  
If one of the colors (RGB) is not functioning.  
White can not be produced.
  2. View an image that supposed to contain Red, Green and Blue.  
Color problems will be apparent when one or more of these colors can not be displayed.



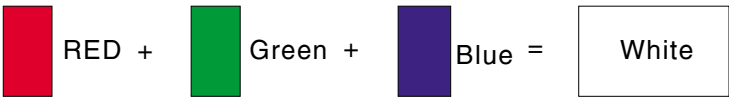
Cyan Color means that the red subpixel is missing.

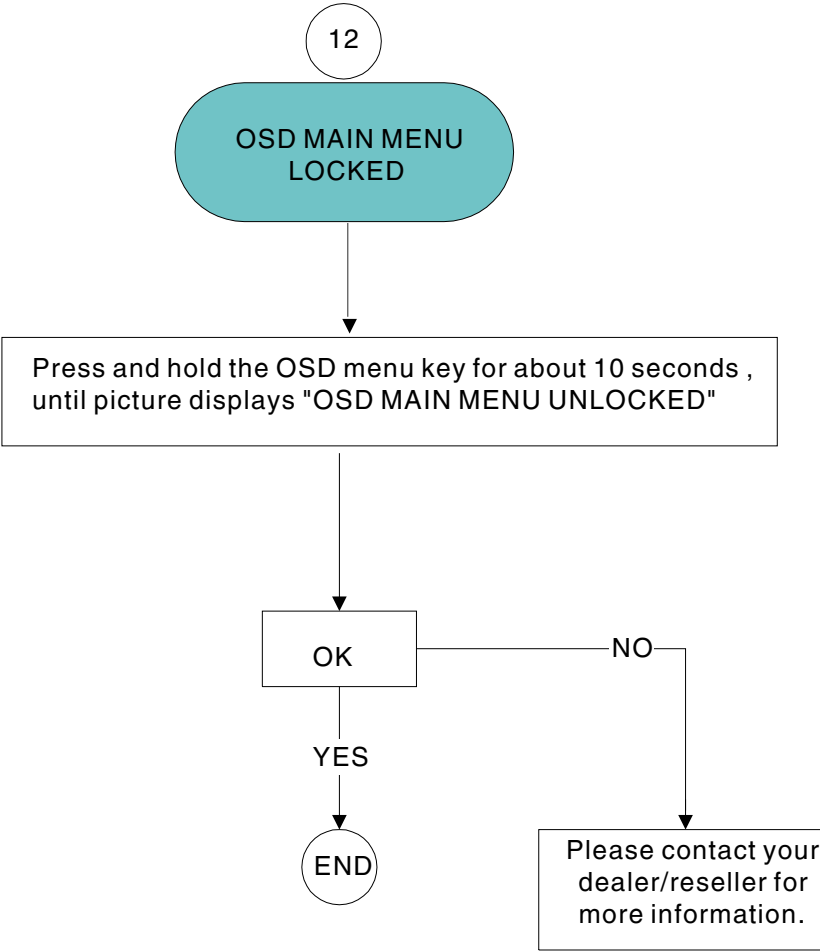


Magenta or Purple Color means that the green subpixel is missing.



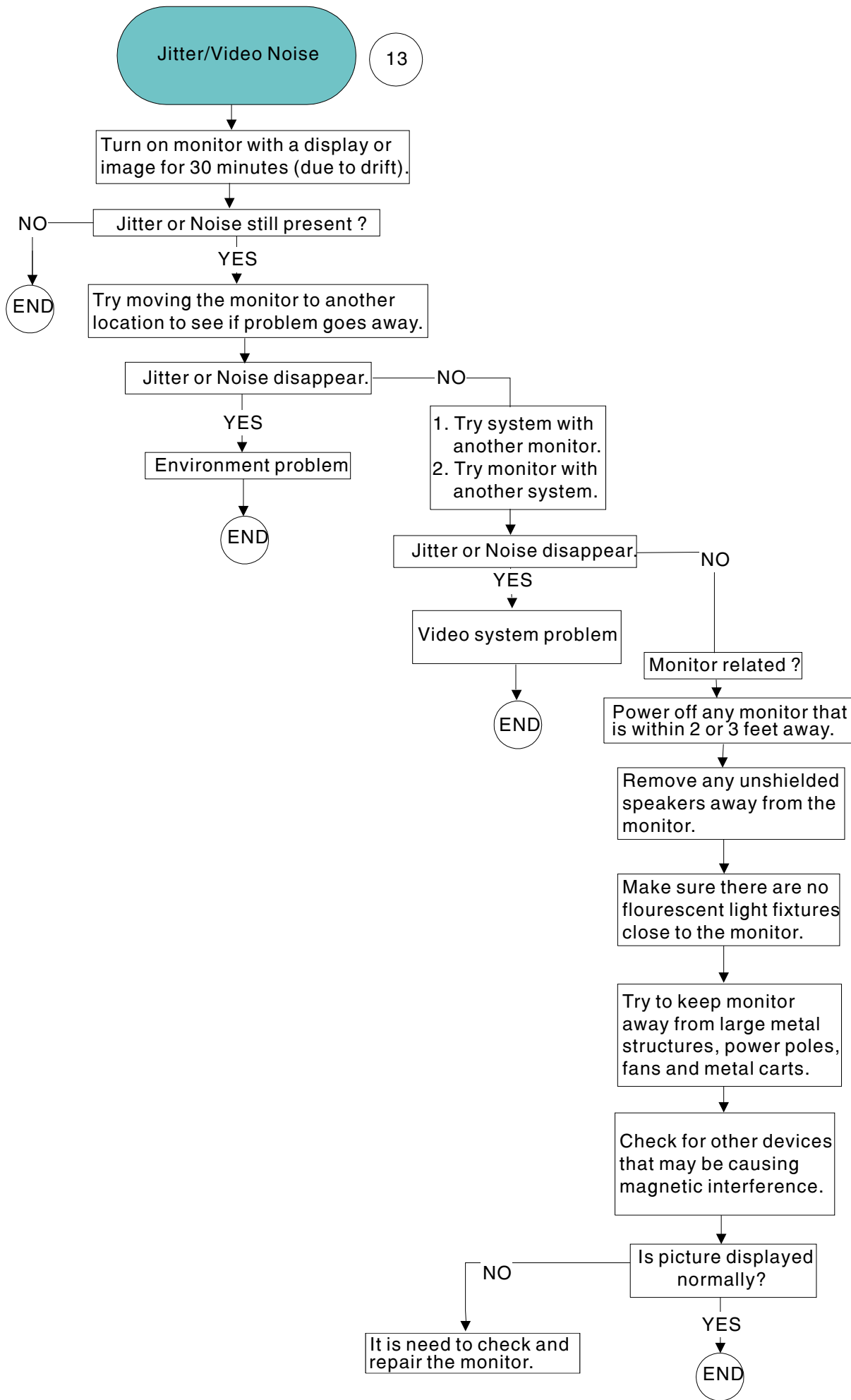
Yellow Color means that the blue subpixel is missing.

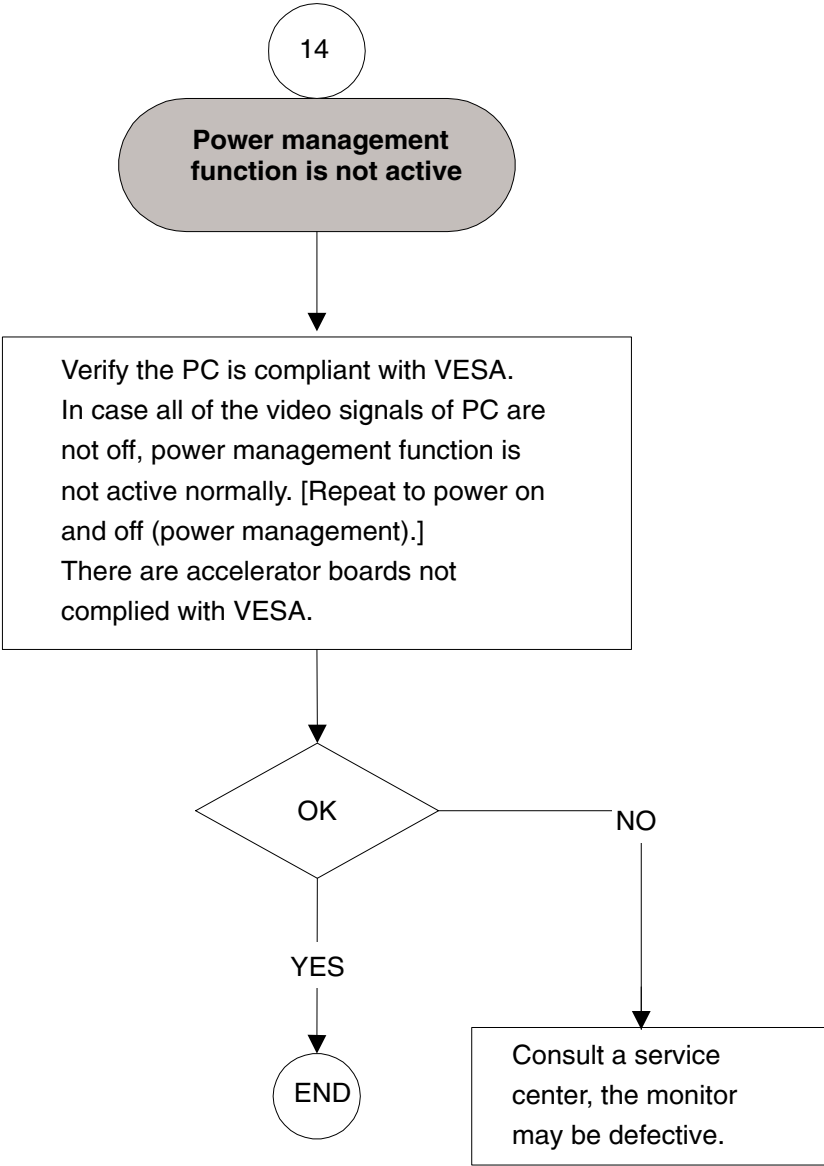






Go to cover page





## Safety Test Requirements

◀◀ Go to cover page

All units that are returned for service or repair must pass the original manufactures safety tests. Safety testing requires both *Hipot* and *Ground Continuity* testing.

### HI-POT TEST INSTRUCTION

#### 1. Application requirements

- 1.1 All mains operated products must pass the Hi-Pot test as described in this instruction.
- 1.2 This test must be performed again after the covers have been refitted following the repair, inspection or modification of the product.

#### 2. Test method

##### 2.1 Connecting conditions

- 2.1.1 The test specified must be applied between the parallel-blade plug of the mainscord and all accessible metal parts of the product.
- 2.1.2 Before carrying out the test, reliable conductive connections must be ensured and thereafter be maintained throughout the test period.
- 2.1.3 The mains switch(es) must be in the "ON" position.

##### 2.2 Test Requirements

All products should be HiPot and Ground Continuity tested as follows:

Condition	HiPot Test for products where the mains input range is Full range(or 220V AC)	HiPot Test for products where the mains input is 110V AC(USA type)	Ground Continuity Test requirement
Test voltage	2820VDC (2000VAC)	1700VDC (1200VAC)	Test current: 25A,AC Test time: 3 seconds(min.) Resistance required: $\leq 0.09 + R$ ohm, R is the resistance of the mains cord.
Test time (min.)	3 seconds	1 second	
Trip current (Tester)	set at 100 uA for Max. limitation; set at 0.1 uA for Min. limitation	5 mA	
Ramp time	set at 2 seconds		

- 2.2.1 The test with AC voltage is only for production purpose, **Service center shall use DC voltage.**
- 2.2.2 The minimum test duration for Quality Control Inspector must be 1 minute. No breakdown during the test.
- 2.2.3 The test voltage must be maintained within the specified voltage + 5%.
- 2.2.4 The grounding blade or pin of mains plug must be conducted with accessible metal parts.

### 3. Equipments and Connection

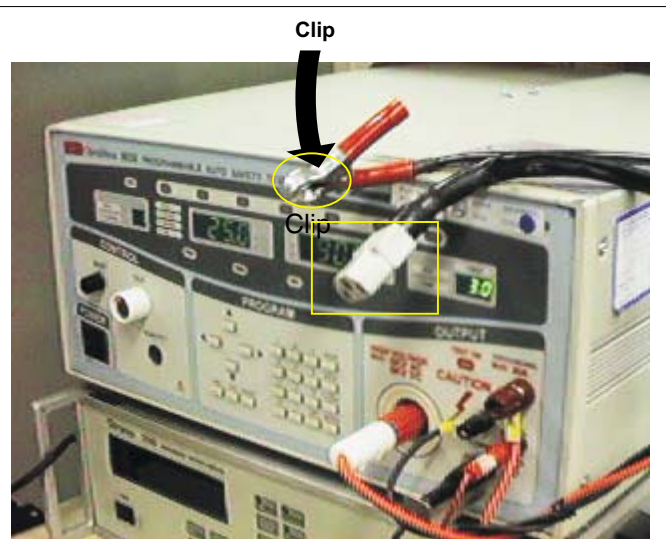
#### 3.1. Equipments

For example :

- ChenHwa 9032 PROGRAMMABLE AUTO SAFETY TESTER
- ChenHwa 510B Digital Grounding Continuity Tester
- ChenHwa 901 (AC Hi-pot test), 902 (AC, DC Hi-pot test) Withstanding Tester

#### 3.2. Connection

- \* Turn on the power switch of monitor before Hipot and Ground Continuity testing.



(ChenHwa 9032 tester)

Video cable



Grounding screw



Power outlet

(Rear view of monitor)

### 4. Recording

Hipot and Ground Continuity testing records have to be kept for a period of 10 years.

## TELEVISION/MONITOR SAFETY 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 service 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, barriers, 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 an asterisk 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 a 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 safely 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.

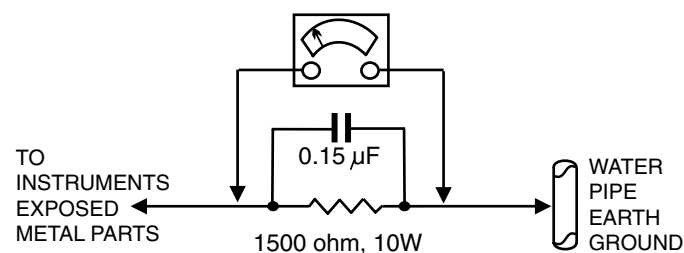
### X-radiation

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 be 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 operating 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-radiation 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.