



# Promate Electronic Co., Ltd

4f, 32, Sec. 2, No. 111, Keelung Rd., Taipei, R.O.C.  
Tel: 886-2-2659-0303 FAX: 886-2-2658-0988

液晶之友 电话: 020-33819057  
[Http://www.lcdfriends.com](http://www.lcdfriends.com)

## APPROVAL SHEET

Model No. : PMLCM140RM  
Description : 4.0 inch TFT LCD+ Driving Board mock-up  
Customer P/N :

**Revision:** 0.2  
**Date:** March 14TH, 2000  
**Company(English/Chinese) :** /  
**Vandor Source:** Unipac Optoelectronics Corporation/ Promate Electronics Co., Ltd.  
**Project Leader approved Sign:** \_\_\_\_\_

Prepared By Design Engineer	Reviewed By Project Leader	Issued By D.C.C.

ALL RIGHTS STRICTLY RESERVED. ANY PORTION OF THIS PAPER SHALL NOT BE REPRODUCED, COPIED, OR TRANSFORMED TO ANY OTHER FORMS WITHOUT PERMISSION FROM PROMATE ELECTRONIC CO., LTD.



# Promate Electronic Co., Ltd

4f, 32, Sec. 1, Huan Shan RD., Nei Hu, 104, Taipei, R.O.C.  
Tel: 886-2-2659-0303 FAX: 886-2-2658-0988

## Contents:

<b>A. General Description.....</b>	<b>2/10</b>
<b>B. Applications .....</b>	<b>2/10</b>
<b>C. Totally LCD module general specification.....</b>	<b>3/10</b>
<b>C-1. LCD specification.....</b>	<b>3/10</b>
<b>C-2. Driving board Electrical specification.....</b>	<b>6/10</b>
<b>C-3. Driving board function block.....</b>	<b>7/10</b>
<b>D. Pin Assignment &amp; Interface description.....</b>	<b>8/10</b>
<b>D-1. LCD panel driving selection(FPC 26pin) .....</b>	<b>8/10</b>
<b>D-2. CCFL High Voltage.....</b>	<b>9/10</b>
<b>D-3. Driving board .....</b>	<b>9/10</b>
<b>D-3-1. Pin assignment of User Control Interface on driving board.....</b>	<b>9/10</b>
<b>D-3-2. User' s control function.....</b>	<b>10/10</b>
<b>D-3-3. Updated Information of“ PMPCB015-Ver0.5’ .....</b>	<b>10/10</b>
<b>Appendix I: Mock-up molding drawing</b>	
<b>Appendix II(Optional): UP040D01 COLOR TFT-LCD Preliminary Specification(Spec. No. 233-220-075)</b>	
<b>Appendix III(Optional): Incoming Inspection Standard for 4” A-grade TFT-LCD module(Spec. No. 251-160-002)</b>	



# Promate Electronic Co., Ltd

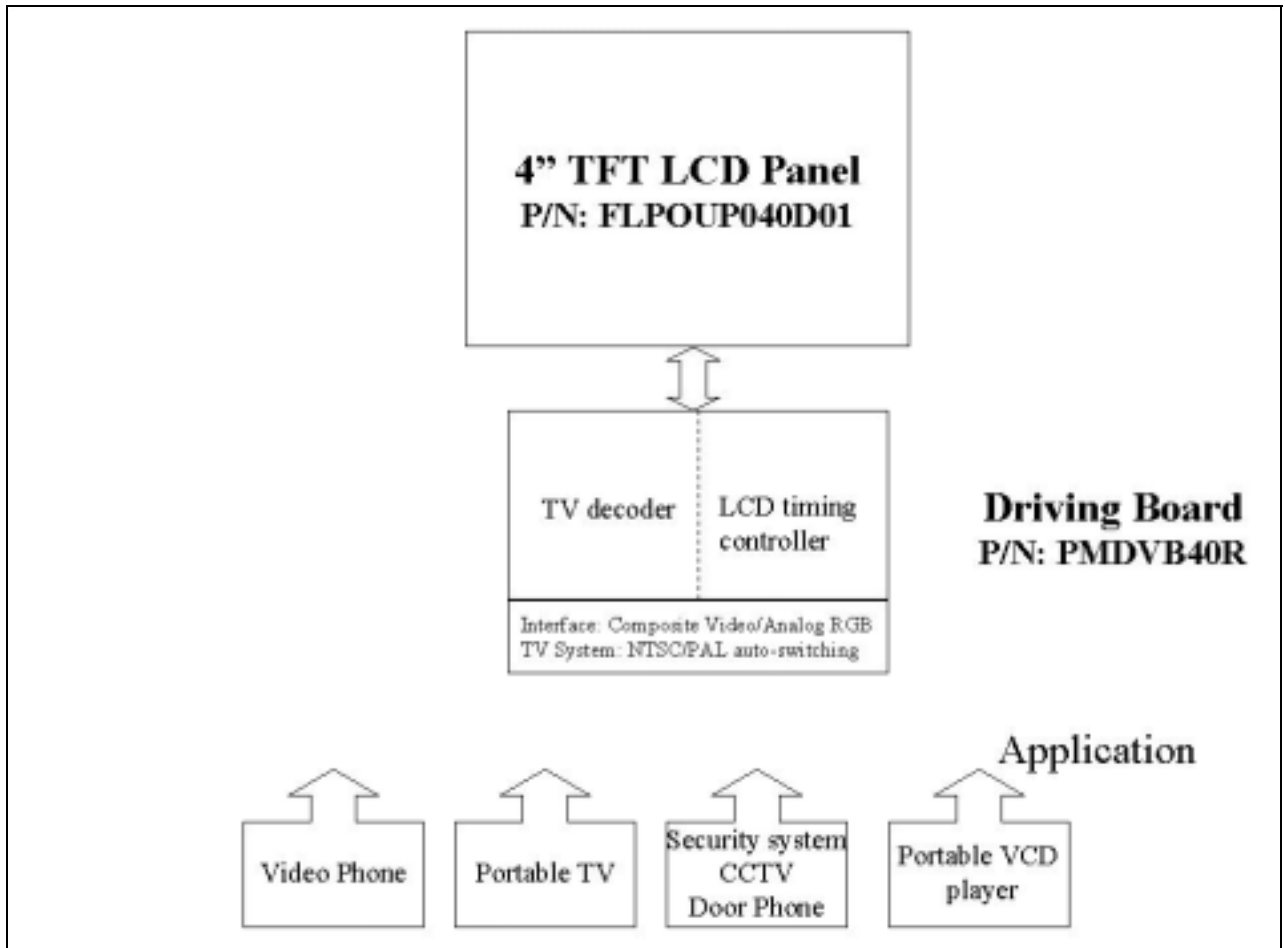
4f, 32, Sec. 1, Huan Shan RD., Nei Hu, 104, Taipei, R.O.C.  
Tel: 886-2-2659-0303 FAX: 886-2-2658-0988

## A. General Description:

The model "PMLCM40R" is designed to replace the traditional CRT terminals via the TFT LCD panels. The model provides the easy selection of the standard composite video input or the specific R/G/B signals input. Besides, it also provides the most friendly fixed position molding for all customers in the worldwide.

## B. Applications:

- \* Videophone system
- \* Door phone system
- \* Portable TV
- \* Security system





# Promate Electronic Co., Ltd

4f, 32, Sec. 1, Huan Shan RD., Nei Hu, 104, Taipei, R.O.C.  
Tel: 886-2-2659-0303 FAX: 886-2-2658-0988

## C. Totally LCD module general specification

### C-1. LCD specification

Items	Specification					Remark
Display resolution(dot)	480 x 234					
Active area(mm)	82.1(W) x 61.8(H)					
Screen size(inch)	4.05(Diagonal)					
Dot pitch(mm)	0.171(W) x 0.264(H)					
Color Configuration	R.G.B. Delta					
Display Mode	Normally white					
Overall dimension(Panel only)	96.0(W) x 76.0(H) x 6.5(D)					
Back light technology	CCFL x 1					
Brightness(Luminance)	250 nit					Note 1
Front surface	Anti-glare hard coating					
View Angle	Top	CR $\geq$ 10	10°			Note 2
	Bottom		30°			
	Left		45°			
	Right		45°			
CR(Contrast Ratio)	150					Note 3
White chromaticity	x	$\theta = 0^\circ$	Min.	Typ.	Max.	Note 4
	y		0.25	0.30	0.35	
Response time	Rise	$\theta = 0^\circ$	-	25ms	50ms	Note 2
	Fall		-	30ms	60ms	
Storage Temperature	- 25°C ~ 80°C					
Operating Temperature	0°C ~ 60°C					
Reliability test						Note 5
Back light electrical characteristics						Note 5
LCD electrical characteristics						Note 5

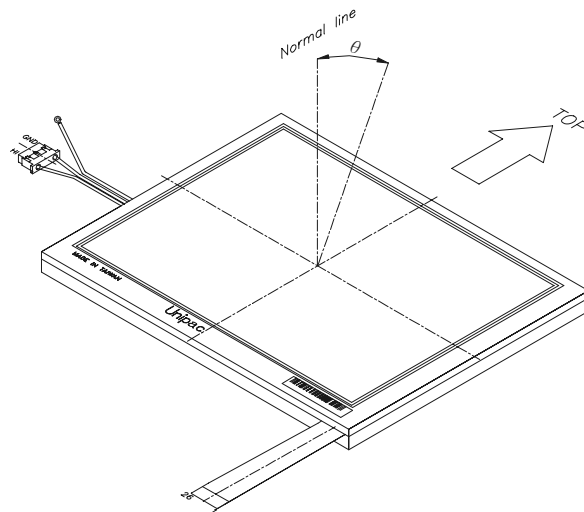


# Promate Electronic Co., Ltd

4f, 32, Sec. 1, Huan Shan RD., Nei Hu, 104, Taipei, R.O.C.  
Tel: 886-2-2659-0303 FAX: 886-2-2658-0988

Note 1. Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

Note 2. Definition of “**Viewing Angle**” (This example panel is UP068D01.):



Note 3: Definition of “**Contrast Ratio**” :

Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Photodetector output when LCD is at "White" state}}{\text{Photodetector output when LCD is at "Black" state}}$$



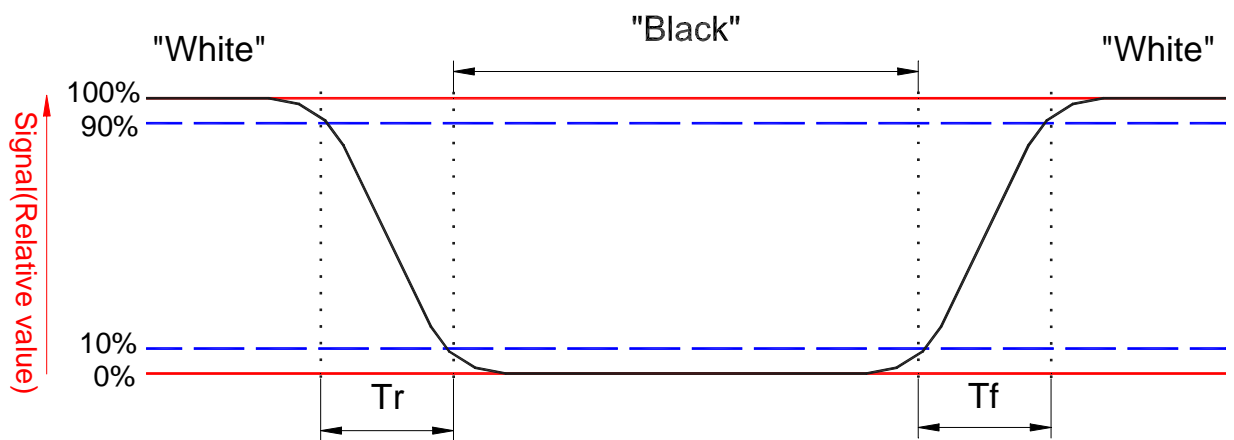
# Promate Electronic Co., Ltd

4f, 32, Sec. 1, Huan Shan RD., Nei Hu, 104, Taipei, R.O.C.  
Tel: 886-2-2659-0303 FAX: 886-2-2658-0988

## Note 4: Definition of “Response Time” :

The output signals of photodetector are measured when the input signals are changed from “black” to “white” (falling time) and from “white” to “black” (rising time), respectively.

The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



Note 5: Please check the Appendix II-UP040D01 COLOR TFT-LCD PRELIMINARY SPECIFICATION (SPEC. NO. 233-220-075)



# Promate Electronic Co., Ltd

4f, 32, Sec. 1, Huan Shan RD., Nei Hu, 104, Taipei, R.O.C.  
Tel: 886-2-2659-0303 FAX: 886-2-2658-0988

## C-2. Driving board Electrical Specification

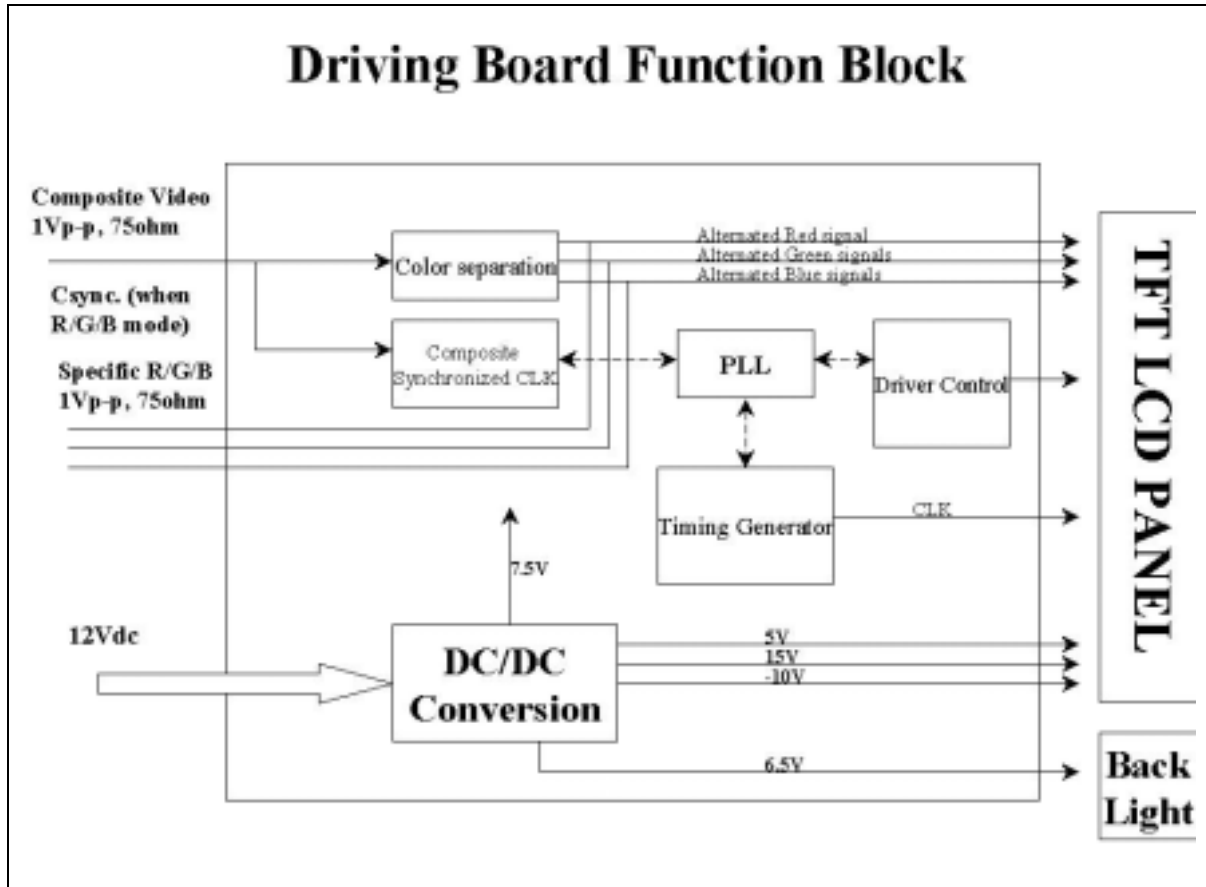
Item	Specification	Remark
Decoding TV system	NTSC/PAL auto-switching	
Video Input	1Vp-p, 75Ω	
Video Interface	Standard Composite Video, Analog R/G/B	
Video Direct Selection	Up/Down scanning, Left/Right scanning	
OSD(On Screen Display) Functions	Brightness/Contrast/Color/Tint/Sharpness	
DC Voltage Input	12 V ± 2V	
Power Consumption	< 3 Watt	Including 4' panel
Operating Temperature	0°C ~ 60°C	
Storage Temperature	- 20°C ~ 80°C	



# Promate Electronic Co., Ltd

4f, 32, Sec. 1, Huan Shan RD., Nei Hu, 104, Taipei, R.O.C.  
Tel: 886-2-2659-0303 FAX: 886-2-2658-0988

## C-3. Driving board function block



ALL RIGHTS STRICTLY RESERVED. ANY PORTION OF THIS PAPER SHALL NOT BE REPRODUCED, COPIED, OR TRANSFORMED TO ANY OTHER FORMS WITHOUT PERMISSION FROM PROMATE ELECTRONIC CO., LTD.





# Promate Electronic Co., Ltd

4f, 32, Sec. 1, Huan Shan RD., Nei Hu, 104, Taipei, R.O.C.  
Tel: 886-2-2659-0303 FAX: 886-2-2658-0988

## D. Pin Assignment & Interface description

### D-1. LCD panel driving section (FPC 26pin)

Pin no.	Symbol	i/o	Description	Remark
1	GND	-	Ground for logic circuit	
2	VCC	I	Supply voltage for control circuit of scan driver	
3	VGL	I	Negative power for scan driver	
4	VGH	I	Positive power for scan driver	
5	STVR	I/O	Vertical start pulse	Note 1
6	STVL	I/O	Vertical start pulse	Note 1
7	CKV	I	Shift clock input for scan driver	
8	U/D	I	UP/DOWN scan control input	Note 1, 2
9	OEV	I	Output enable input for scan driver	
10	VCOM	I	Common electrode driving signal	
11	VCOM	I	Common electrode driving signal	
12	L/R	I	LEFT/RIGHT scan control input	Note 1,2
13	Q1H	I	Analog signal rotate input	
14	OEH	I	Output enabler input for data driver	
15	STHL	I/O	Start pulse for horizontal scan line	Note 1
16	STHR	I/O	Start pulse for horizontal scan line	Note 1
17	CPH3	I	Sampling and shifting clock pulse for data driver	
18	CPH2	I	Sampling and shifting clock pulse for data driver	
19	CPH1	I	Sampling and shifting clock pulse for data driver	
20	VCC	I	Supply voltage of control circuit for data driver	
21	GND	-	Ground for logic circuit	
22	VR	I	Alternated video signal input (Red)	
23	VG	I	Alternated video signal input (Green)	
24	VB	I	Alternated video signal input (Blue)	
25	AVDD	I	Supply voltage for analog circuit	
26	AVSS	-	Ground for analog circuit	

Note 1 : Selection of scanning mode– refer to page 5 of UP040D01 spec.

Note 2 : Definition of scanning direction– refer to page 5 of UP040D01 spec.



# Promate Electronic Co., Ltd

4f, 32, Sec. 1, Huan Shan RD., Nei Hu, 104, Taipei, R.O.C.  
Tel: 886-2-2659-0303 FAX: 886-2-2658-0988

## D-2. CCFL High Voltage

Pink	High Voltage Line
White	Ground Line

## D-3. Driving board

### D-3-1. Pin assignment of User Control Interface on driving board :

Pin No.	Pin Assignment	I/O	Pin Description	Remark
1	<b>/Hsync</b>	O	Horizontal Sync. Output for specific Application.	
2	<b>/Vsync</b>	O	Vertical Sync. Output for specific Application.	
3	<b>NPC</b>	I/O	NTSC/PAL mode selection.	Note 1
4	<b>SW</b>	I	Composite/Analog RGB Signal Selection.	Note 2
5	<b>CVS</b>	I	Composite Video Signal Input.	
6	<b>Bin</b>	I	Separated Blue Video Signal Input.	
7	<b>Rin</b>	I	Separated Red Video Signal Input.	
8	<b>Gin</b>	I	Separated Green Video Signal Input.	
9	<b>GND</b>	-	Ground	
10	<b>GNDS</b>	-	Ground	
11	<b>Vin</b>	I	12 Voltage DC Input	
12	<b>GNDS</b>	-	Ground	
13	<b>COL</b>	I	Color terminal adjustment	
14	<b>LR</b>	I	Left/Right scan selection	Note 3
15	<b>UD</b>	I	Up/Down scan selection	Note 4

Default means Factory Setting.

Note 1: Default is auto detect for NTSC and PAL system.

(Controlled by internal UPS015)

High for NTSC mode and Low for PAL mode.

Note 2: Default is Composite Signal (Low);

High is for separated Analog RGB signals.

Note 3: Default is reversed scanning (High) and Low is for normal scanning (L → R)

Please do force this pin to ground for normal scan, from left to right.

Note 4: Default is reversed scanning (High) and Low is for normal scanning (U → D)

Please do force this pin to ground for normal scan from up to down.



# Promate Electronic Co., Ltd

4f, 32, Sec. 1, Huan Shan RD., Nei Hu, 104, Taipei, R.O.C.  
Tel: 886-2-2659-0303 FAX: 886-2-2658-0988

## D-3-2. User' s control function:

VR	Description
BRT	Brightness
COL	Hue
TIN	Tint
CNT	Contrast
PIC	Sharpness

## D-3-3. Updated Information of“ PMPCB015-Ver0. 5”

The Ver 0.5 increases many useful interfaces for **OSD control function** to all customers!

Described as below:

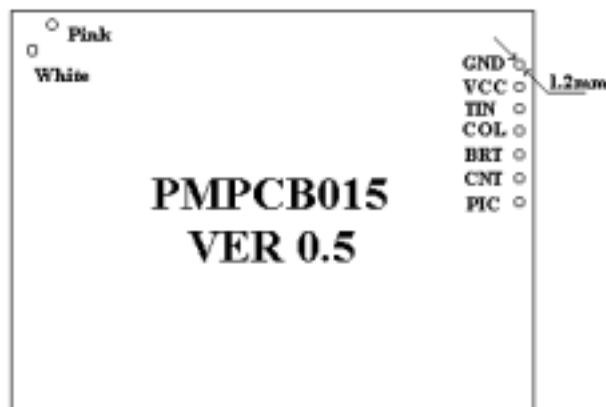
Pin Assignment	Minimum	Typical	Maximum	Remark
<b>TIN</b>	3V	3.3V	4V	Note 1
<b>COL</b>	2.6V	3.2V	4V	
<b>BRT</b>	2.05V	2.11V	2.16V	
<b>CNT</b>	2.13V	3.03V	3.13V	Note 2
<b>PIC</b>	1.0V	1.5V	2.5V	

**Note 1:** The TIN is only operating in NTSC system.

**Note 2:** We don' t suggest to adjust“ CNT” from Variable resistor on the driving board.

**Note:** VCC Spec. → +5V(± 3%)/20mA

**Location as below:**

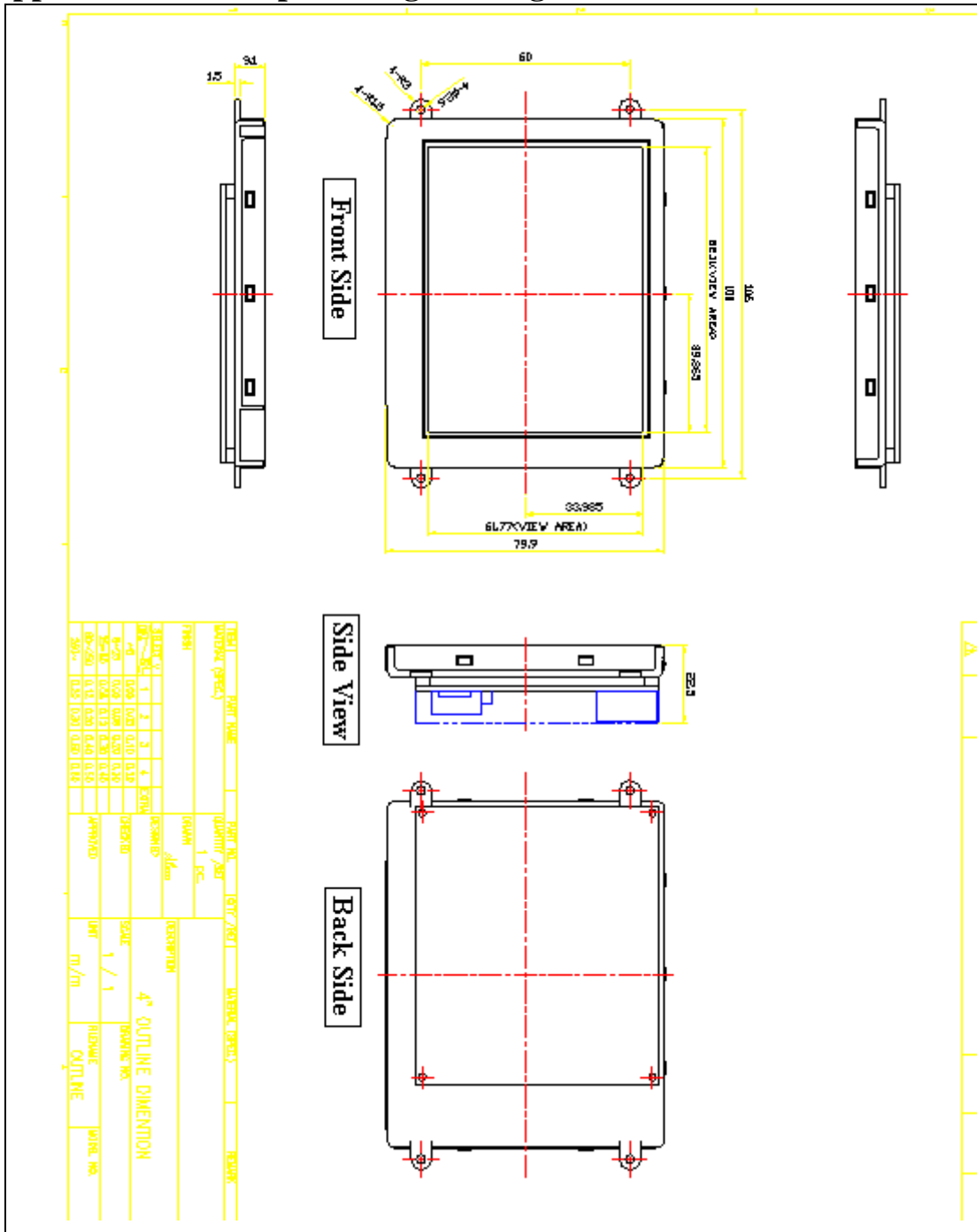




# Promate Electronic Co., Ltd

4f, 32, Sec. 1, Huan Shan RD., Nei Hu, 104, Taipei, R.O.C.  
 Tel: 886-2-2659-0303 FAX: 886-2-2658-0988

## Appendix I: Mock-up molding drawing



ALL RIGHTS STRICTLY RESERVED. ANY PORTION OF THIS PAPER SHALL NOT BE REPRODUCED, COPIED, OR TRANSFORMED TO ANY OTHER FORMS WITHOUT PERMISSION FROM PROMATE ELECTRONIC CO., LTD.