



**CLOVER DISPLAY LTD.**

## LCD MODULE SPECIFICATION

**Model : CV640480A - \_ \_ \_ - \_ \_ \_ - \_ \_ \_ - \_ \_**

Revision	02
Engineering	TIMMY KWAN
Date	02 September 2010
Our Reference	X4950

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**MODE OF DISPLAY****Display mode**

- STN :  Yellow green  
 Grey  
 Blue (negative)  
 FSTN positive  
 FSTN negative

**Display condition**

- Reflective type  
 Transflective type  
 Transmissive type  
 Others

**Viewing direction**

- 6 O' clock  
 12 O' clock  
 3 O' clock  
 9 O' clock

**LCD MODULE NUMBER NOTATION:**

CV640480A- LW - FF - N6 - T

|            | | | | | | |  
(1)            (2) (3) (4) (5) (6) (7) (8)

\* (1)---Model number of standard LCD Modules

\* (2)---Backlight type

- N – No backlight  
E – EL backlight  
L – Side-lited LED backlight  
M – Array LED backlight  
C – CCFL

\* (3)---Backlight color

- N – No backlight  
A – Amber  
B – Blue  
O – Orange  
W – White  
Y – Yellow green

\* (4)---Display mode

- T – TN  
V – TN (Negative)  
S – STN Yellow green  
G – STN Grey  
B – STN Blue (Negative)  
F – FSTN  
N – FSTN (Negative)

\* (5)---Rear polarizer type

- R – Reflective  
F – Transflective  
T – Transmissive

\* (6)---Temperature range

- N – Normal  
W – Extended

\* (7)---Viewing direction

- 6 – 6 O'clock  
2 – 12 O'clock  
3 – 3 O'clock  
9 – 9 O'clock

\* (8)---Special code for other requirements  
(Can be omitted if not used)

- T – Touch panel (Analog)  
P – Touch panel (Digital)

**GENERAL DESCRIPTION**

Display mode : 640 x 480 dots, graphic COB LCD module  
 Interface : 4 bit x 2 parallel  
 Driving method : 1/240 duty, 1/15 bias  
 Driver IC : AVANT SDN8080G or equivalent  
 For the detailed information, please refer to the IC specifications.

**MECHANICAL DIMENSIONS**

Item	Dimension	Unit	Item	Dimension	Unit
Outline Dimension	256.3(L)x174.0(W)x12.5(MAX.)(H)	mm	Viewing Area	198.0 (L)x150.0(W)	mm
			Dot Pitch	0.3(L)x0.3(W)	mm
			Dot Size	0.27(L)x0.27(W)	mm

**CONNECTOR PIN ASSIGNMENT(CN1)**

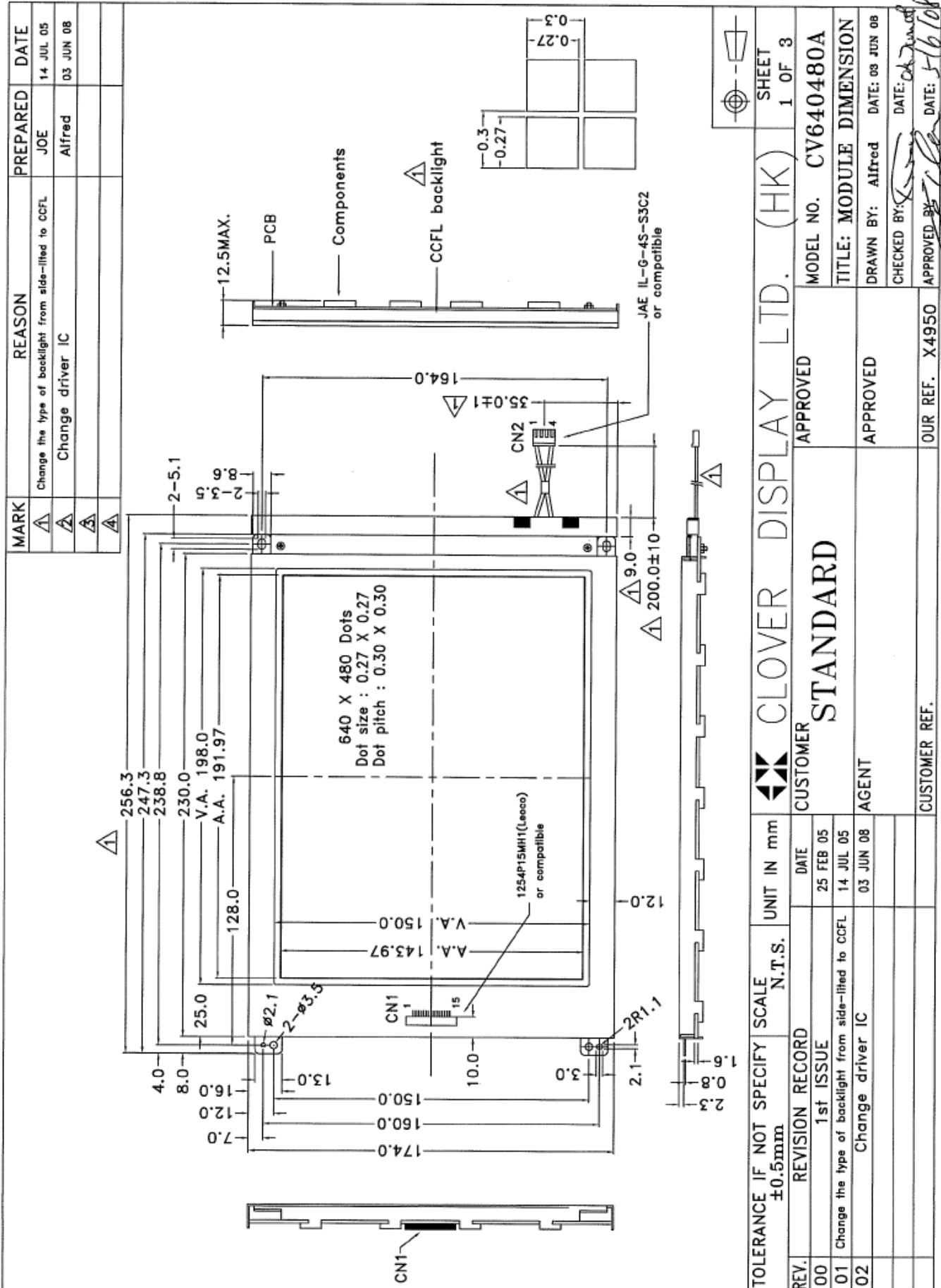
Pin No.	Symbol	Function
1	FLM	First Line Marker
2	LP	Data Latch Signal
3	CP	Data Input Clock Signal
4	/DISPOFF	Display Off
5	VDD	Supply Voltage for Logic
6	VSS	Ground
7	VO	Input Voltage for LCD
8	DU0	Upper Part Display Data
9	DU1	
10	DU2	
11	DU3	
12	DL0	Lower Part Display Data
13	DL1	
14	DL2	
15	DL3	

**CN2**

Pin No.	Symbol	Function
1	CCFL GND	Supply Voltage for Backlight(CCFL GND)
2	NC	No Connection
3	NC	No Connection
4	CCFL HV	Supply Voltage for Backlight(CCFL HV)

**Note : CN2 is used for Backlight version only.**

COUNTER DRAWING OF MODULE DIMENSION



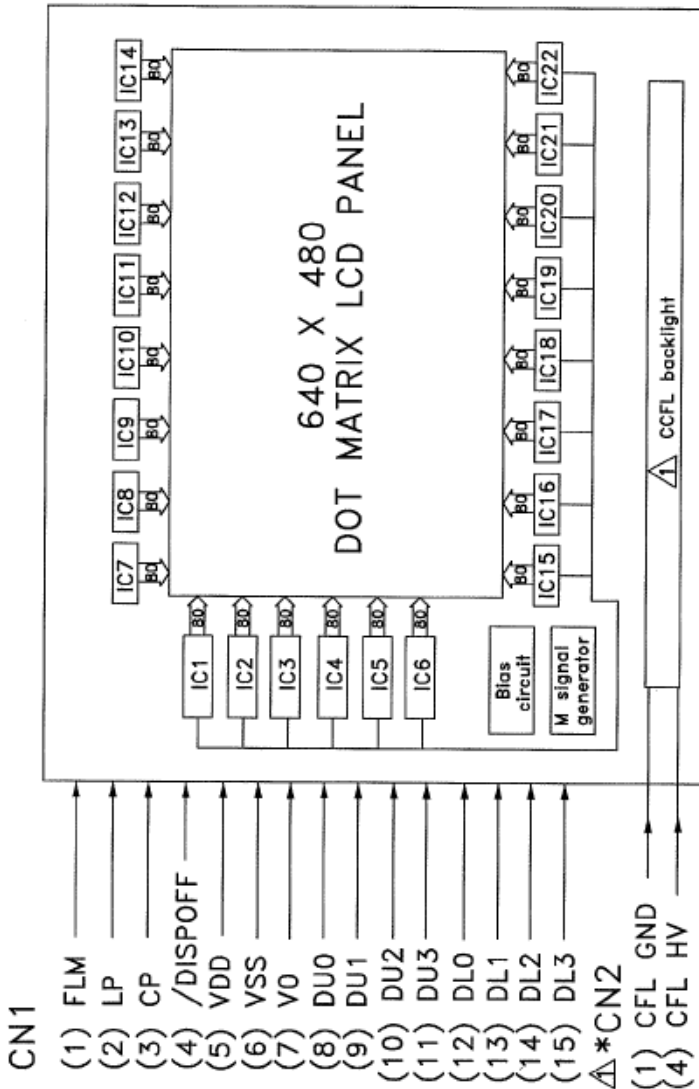
COUNTER DRAWING OF PINOUT & BLOCK DIAGRAM

CN1

PIN NO.	SYMBOL	FUNCTION
1	FLM	First line marker
2	LP	Data latch signal
3	CP	Data input clock signal
4	/DISPOFF	Display off
5	VDD	Supply voltage for logic
6	VSS	Ground
7	V0	Input voltage for LCD
8	DU0	Upper part display data
9	DU1	
10	DU2	
11	DU3	Lower part display data
12	DL0	
13	DL1	
14	DL2	
15	DL3	

\*CN2  $\Delta$

PIN NO.	SYMBOL	FUNCTION
1	CCFL GND	Supply voltage for backlight (CCFL GND)
2	NC	No connection
3	NC	No connection
4	CCFL HV	Supply voltage for backlight (CCFL HV)



$\Delta$  Note: IC1~IC22 (SDN8080G or equivalence)  
 (\*)CN2 is used for CCFL backlight version.

TOLERANCE IF NOT SPECIFY SCALE $\pm 0.5mm$		UNIT IN mm		CLOVER DISPLAY LTD. (HK)		SHEET 2 OF 3	
REV.	REVISION RECORD	DATE	DATE	CUSTOMER APPROVED		MODEL NO. CV640480A	
00	1st ISSUE	25 FEB 05	14 JUL 05	STANDARD		TITLE: PIN OUT & BLOCK DIAGRAM	
01	Change the type of backlight from side-lit to CCFL			AGENT		DRAWN BY: Alfred DATE: 03 JUN 08	
02	Change driver IC			APPROVED		CHECKED BY: <i>[Signature]</i> DATE: 04 JUN 08	
				OUR REF. X4950		APPROVED BY: <i>[Signature]</i> DATE: 17/6/08	
				CUSTOMER REF.			

**ELECTRICAL CHARACTERISTICS**

Conditions: VSS=0V, Ta=25°C

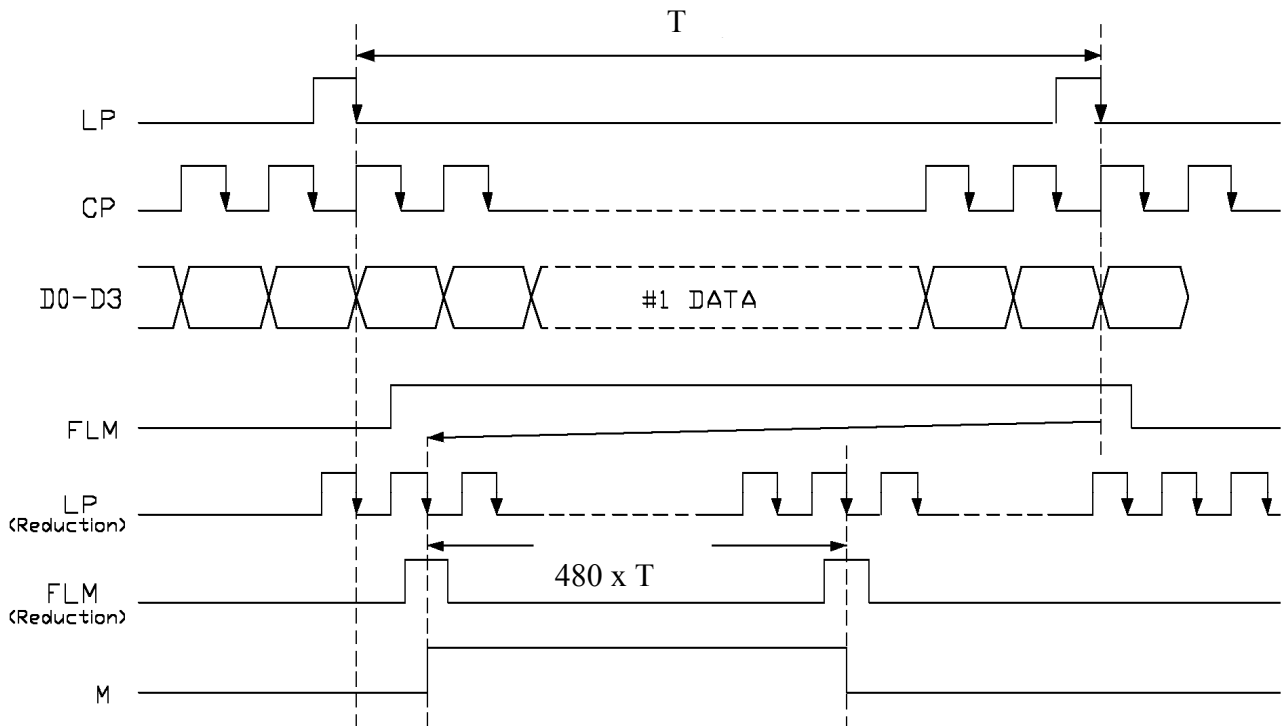
Item	Symbol	MIN.	TYP.	MAX.	Unit	Item	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage for Logic	VDD	4.75	5.0	5.25	V	“H”Level Input Voltage	VIH	0.8 VDD	—	VDD	V
Supply Current for Logic	IDD	—	6.0	17.0	mA	“L”Level Input Voltage	VIL	0	—	0.2VDD	V
Input Voltage for LCD(*)	VO	-17.9	-17.0	-16.2	V	—	—	—	—	—	—
<b>EL Backlight Voltage (VEL)</b>											
EL (@ Frequency 400Hz)	VBL	—	—	—	Vrms	—	—	—	—	—	—
<b>Side-lited LED Backlight Forward Voltage (VF)</b>						<b>Side-lited LED Backlight Forward Current (IF)</b>					
White	VBL	—	—	—	V	White	IBL	—	—	—	mA
Blue	VBL	—	—	—	V	Blue	IBL	—	—	—	mA
Yellow Green	VBL	—	—	—	V	Yellow Green	IBL	—	—	—	mA
<b>Array LED Backlight Forward Voltage (VF)</b>						<b>Array LED Backlight Forward Current (IF)</b>					
Yellow Green	VBL	—	—	—	V	Yellow Green	IBL	—	—	—	mA
Amber	VBL	—	—	—	V	Amber	IBL	—	—	—	mA
Orange	VBL	—	—	—	V	Orange	IBL	—	—	—	mA
Soft Orange	VBL	—	—	—	V	Soft Orange	IBL	—	—	—	mA
<b>CCFL Backlight Voltage</b>						<b>CCFL Backlight Current</b>					
White	VBL	—	400	—	Vrms	White	IBL	—	5.0	—	mA

Note (\*): The module VO  $-17V \pm 5\%$  represents input voltage of LCD.The corresponding LCD voltage = VDD-VO, is  $22V \pm 5\%$  for optimum contrast.**ABSOLUTE MAXIMUM RATINGS**

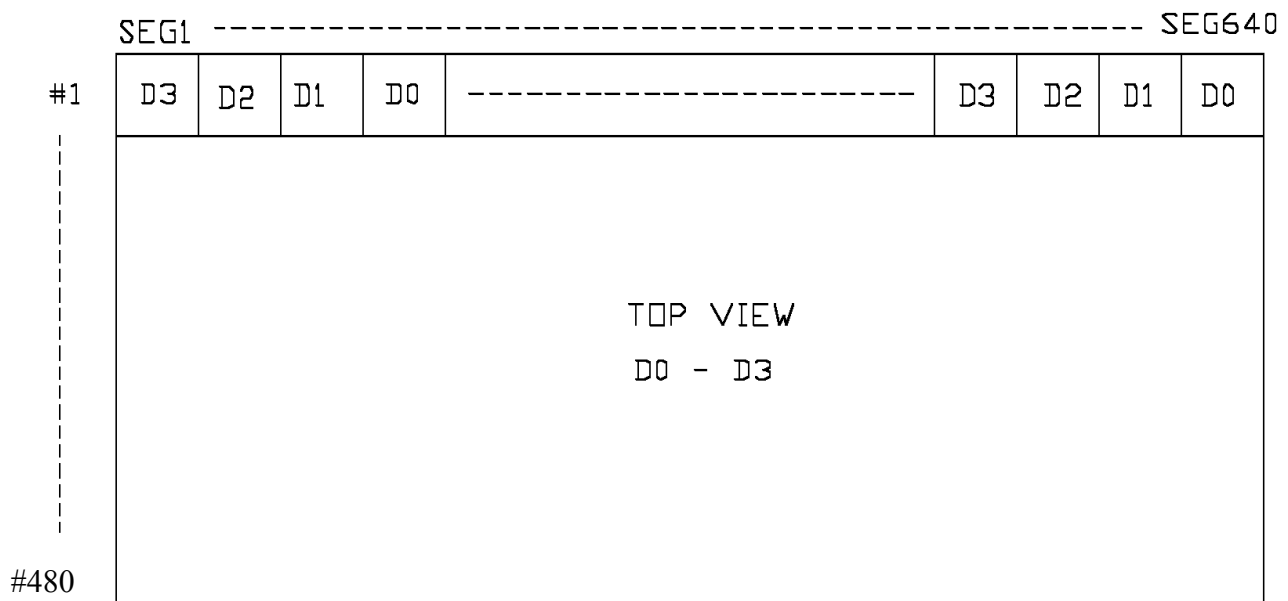
Please make sure not to exceed the following maximum rating values under the worst application conditions

Item	Symbol	Rating (for normal temperature)	Rating (for wide temperature)	Unit
Supply Voltage	VDD	-0.3 to +7.0	-0.3 to +7.0	V
Input Voltage	VIN	-0.3 to VDD +0.3	-0.3 to VDD +0.3	V
Operating Temperature	Topr	0 to 50	-20 to 70	°C
Storage Temperature	Tstg	-10 to 60	-30 to 80	°C

**TIMING CHART**



**DISPLAY AND DATA**



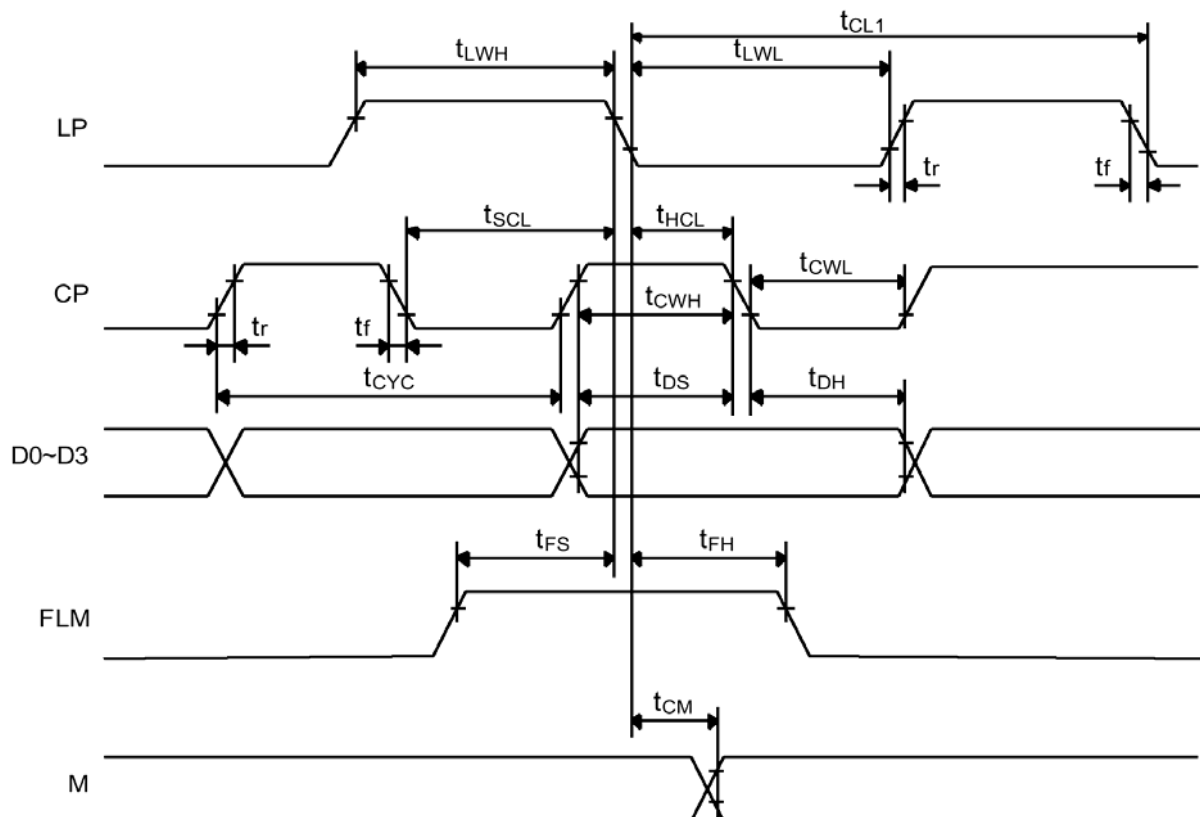
## AC CHARACTERISTICS

Parameter	Symbol	Min.	Max.	Units
Clock Pulse Cycle Time	$t_{CYC}$	167	—	ns
Clock Pulse High Level Width	$t_{CWH}$	50	—	ns
Clock Pulse Low Level Width	$t_{CWL}$	50	—	ns
Clock Pulse Setup Time	$t_{SCL}$	80	—	ns
Clock Pulse Hold Time	$t_{HCL}$	80	—	ns
Clock Pulse Rise/Fall Time	$t_r, t_f$	—	50	ns
LP High Level Width	$t_{LWH}$	50	—	ns
LP Low Level Width	$t_{LWL}$	50	—	ns
LP Cycle Time	$t_{CL1}$	250	—	ns
Data Setup Time	$t_{DS}$	30	—	ns
Data Hold Time	$t_{DH}$	30	—	ns
FLM Data Setup Time	$t_{FS}$	100	—	ns
FLM Data Hold Time	$t_{FH}$	100	—	ns
M Phase Difference	$t_{CM}$	—	250	ns

Note : Please satisfy the following conditions (1), (2) in the same time.

(1)  $t_r, t_f < (t_{CYC} - t_{CWH} - t_{CWL}) / 2$

(2)  $t_r, t_f \leq 50$





**ELECTRO-OPTICAL CHARACTERISTICS**

MEASURING CONDITION: POWER SUPPLY =  $V_{OP} / 64 \text{ Hz}$   
 TEMPERATURE =  $23 \pm 5 \text{ }^\circ\text{C}$   
 RELATIVE HUMIDITY =  $60 \pm 20\%$

ITEM	SYMBOL	UNIT	TYP. STN
RESPONSE TIME	Ton	ms	370
	Toff	ms	470
CONTRAST RATIO	Cr	-	7
VIEWING ANGLE (6 O'clock) (Cr $\geq$ 2)	V3:00	$^\circ$	40
	V6:00	$^\circ$	50
	V9:00	$^\circ$	40
	V12:00	$^\circ$	30

THE ELECTRO-OPTICAL CHARACTERISTICS ARE MEASURED VALUE BUT NOT GUARANTEED ONES.

**RELIABILITY OF LCD MODULE**

ITEM	TEST CONDITION FOR NORMAL TEMPERATURE	TEST CONDITION FOR WIDE TEMPERATURE	TIME
High temperature operating	50°C	70°C	240 hours
Low temperature operating	0°C	-20°C	240 hours
High temperature storage	60°C	80°C	240 hours
Low temperature storage	-10°C	-30°C	240 hours
Temperature-humidity storage	40°C 90% R.H.	60°C 90% R.H.	96 hours
Temperature cycling	-10°C to 60°C 30 Min Dwell	-30°C to 80°C 30 Min Dwell	5 cycle
Vibration Test at LCM Level	Freq 10-55 Hz Sweep rate: 10-55-10 at 1 min Sweep mode Linear Displacement: 2 mm p-p 1 Hour each for X, Y, Z	Freq 10-55 Hz Sweep rate: 10-55-10 at 1 min Sweep mode Linear Displacement: 2 mm p-p 1 Hour each for X, Y, Z	—

**QUALITY STANDARD OF LCD MODULE**

<b>1.0</b>	<b>Sampling Method</b>		
	Sampling Plan : MIL STD 105 E Class of AQL : Level II/Single Sampling Critical : 0.25% Major 0.65% Minor 1.5%		
<b>2.0</b>	<b>Defect Group</b>	<b>Failure Category</b>	<b>Failure Reasons</b>
	Critical Defect 0.25%(AQL)	Malfunction	Open Short Burnt or dead component Missing part/improper part P.C.B. Broken
	Major Defect 0.65%(AQL)	Poor Insulation	Potential short High current Component damage or scratched or Lying too close improper coating
		Poor Conduction	Damage joint Wrong polarity Wrong spec. part Uneven/intermittent contact Loose part Copper peeling Rust or corrosion or dirt's
	Minor Defect 1.5%(AQL)	Cosmetic Defect	Minor scratch Flux residue Thin solder Poor plating Poor marking Crack solder Poor bending Poor packing Wrong size

## HANDLING PRECAUTIONS

### (1) CAUTION OF LCD HANDLING & CLEANING

The polarizing plate on the surface of the panel is made from organic substances. Be very careful for chemicals not to touch the plate or it leads the polarizing plate to deteriorate.

If the use of a chemical is unavoidable, wipe the panel lightly with soft materials, such as gauze and absorbent cotton, soaked in a solvent.

\*Usable solvent: Alcohol (ethanol, IPA and the like)

\*Appropriate solvent: Ketones, ethyl alcohol

Avoid wiping with a dry cloth, since it could damage the surface of the polarizing plate and others.

### (2) CAUTION AGAINST STATIC CHARGE

The LCD modules use CMOS LSI drivers, so customers are recommended that any unused input terminal would be connected to  $V_{DD}$  or  $V_{SS}$ , do not input any signals before power is turned on, and ground your body, work/assembly areas, assembly equipment to protect against static electricity.

### (3) PACKAGING

Avoid intense shock and falls from a height and do not operate or store them exposed to direct sunshine or high temperature/humidity for long periods.

### (4) CAUTION FOR OPERATION

The viewing angle can be adjusted by varying the LCD driving voltage  $V_O$ .

Driving voltage should be kept within specified range, excess voltage shortens display life.

Response time increases with decrease in temperature.

Display may turn black or dark Blue at temperature above its operational range; this is however not destructive and the display will return to normal once the temperature falls back to range.

Mechanical disturbance during operation (such as pressing on the viewing area) may cause the segments to appear "fractured". They will recover once the display is turned off.

Condensation at terminals will cause malfunction and possible electrochemical reaction. Relative humidity of the environment should therefore be kept below 60%.

### (5) SAFETY

Liquid crystal may leak out of a damaged LCD, it is recommended to wash off the liquid crystal by using solvents such as acetone or ethanol and should be burned up later.

If any liquid leaks out of a damaged glass cell comes in contact with your hands, wash it off with soap and water immediately.

## WARRANTY

CLOVER will replace or repair any of her LCD module in accordance with her LCD specification for a period of one year from date of shipment. The warranty liability of Clover is limited to repair and/or replacement. Clover will not be responsible for any subsequent or consequential event.