NEWHAVEN DISPLAY INTERNATIONAL

User's Guide

NHD-320240WG-BxFGH-VZ#

LCM

(Liquid Crystal Display Graphic Module)

RoHS Compliant

NHD-	Newhaven Display
320240-	320 x 240 pixels
WG-	Display Type: Graphic
B x-	Model serial number: B, x: New IC rev.
F-	White CCFL B/L
G-	STN Gray
H-	Transflective, 6:00 View , Wide Temperature (-20 ~ +70c)
VZ#-	Built-in Negative voltage ; RoHS

For product support, contact

Newhaven Display International
2511 Technology Drive, #101
Elgin, IL 60124
Tel: (847) 844-8795 Fax: (847) 844-8796

March 12, 2009

Contents

1.Module Classification Information

NHD 320240 W G – BX F G H – VZ#

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ 9

① Brand：Newhaven Display

② Display Font：320 x 240 Dots

③ Factory Line: W

④ Display Type：H→Character Type, G→Graphic Type, C→ Color

⑤ Model / Serial number = **B, X =** SID13700 IC

⑥ Backlight Type：
N→Without backlight
B→EL, Blue green
D→EL, Green
W→EL, White
F→CCFL, White
Y→LED, Yellow Green
T→LED, White
A→LED, Amber
R→LED, Red
O→LED, Orange
G→LED, Green

⑦ LCD Mode：
B→TN Positive, Gray
N→TN Negative,
G→STN Positive, Gray
Y→STN Positive, Yellow Green
M→STN Negative, Blue
F→FSTN Positive
T→FSTN Negative
C→STN Color

⑧ LCD Polarize Type/ Temperature range/ View direction
A→Reflective, N.T, 6:00
D→Reflective, N.T, 12:00
G→Reflective, W. T, 6:00
J→Reflective, W. T, 12:00
B→Transflective, N.T,6:00
E→Transflective, N.T.12:00
H→Transflective, W.T,6:00
K→Transflective, W.T,12:00
C→Transmissive, N.T,6:00
F→Transmissive, N.T,12:00
I→Transmissive, W. T, 6:00
L→Transmissive, W.T,12:00

9 Special Code **VZ#** : Built-in Negative voltage ; RoHS

2.Precautions in Use of LCD Module

(1)Avoid applying excessive shock to the module or making any alterations or modifications to it.

(2)Don't make extra holes on the printed circuit board, modify its shape or change the components of LCD Module.

(3)Don't disassemble the LCM.

(4)Don't operate it above the absolute maximum rating.

(5)Don't drop, bend or twist LCM.

(6)Soldering: only to the I/O terminals.

(7)Storage: please store in anti-static electricity container and clean environment.

3.General Specification for NHD-320240WG-BXFGH-VZ#

ITEM	STANDARD VALUE	UNIT
Number of dots	320x240	dots
Outline dimension	166.8(W) x 109.0(H) x 13.0max(T)	mm
View area	122.0(W) x 92.0(H)	mm
Active area	115.18(W) x 86.38(H)	mm
Dot size	0.34(W) x 0.34(H)	mm
Dot pitch	0.36(W) x 0.36(H)	mm
LCD type	STN Gay, Transflective	
View direction	6 o'clock	
Backlight	CCFL, White	

4.Absolute Maximum Ratings

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating Temperature	T_{OP}	-20	—	+70	℃
Storage Temperature	T_{ST}	-30	—	+80	℃
Input Voltage	V_I	0	—	V_{DD}	V
Supply Voltage For Logic	V_{DD}	0	—	6.5	V
Supply Voltage For LCD	V_{DD}-V_{EE}	0	—	32	V

5.Electrical Characteristics

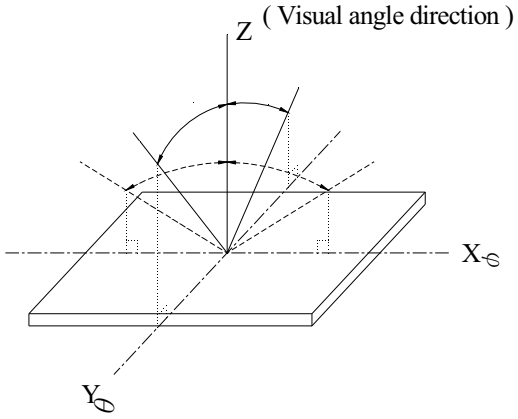
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Logic Voltage	V_{DD}-V_{SS}	—	—	5.0	5.5	V
Supply Voltage For LCD	V_{DD}-V_O	Ta=-20℃	—	—	26.0	V
		Ta=25℃	—	24.0	—	V
		Ta=+70℃	22.0	—	—	V
Input High Volt.	V_{IH}	—	0.8V_{DD}	—	V_{DD}	V
Input Low Volt.	V_{IL}	—	0	—	0.2V_{DD}	V
Output High Volt.	V_{OH}	—	V_{DD} -0.4	—	—	V
Output Low Volt.	V_{OL}	—	—	—	0.4	V
Supply Current	I_{DD}	—	95.0	100.0	110.0	mA

6.Optical Characteristics

ITEM	SYMBAL	CONDITION	MIN	TYP	MAX	UNIT
View Angle	(V) θ	CR≧2	10	—	105	deg.
	(H) φ	CR≧2	-30	—	30	deg.
Contrast Ratio	CR	—	—	3	—	—
Response Time	T rise	—	—	200	300	ms
	T fall	—	—	150	200	ms

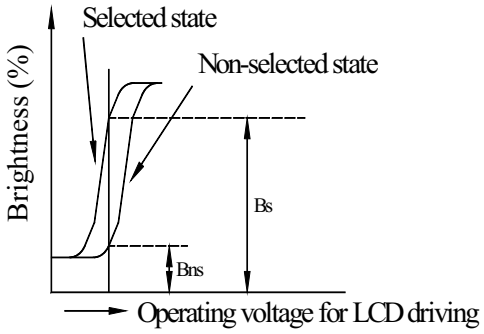
6.1 Definitions

■View Angles

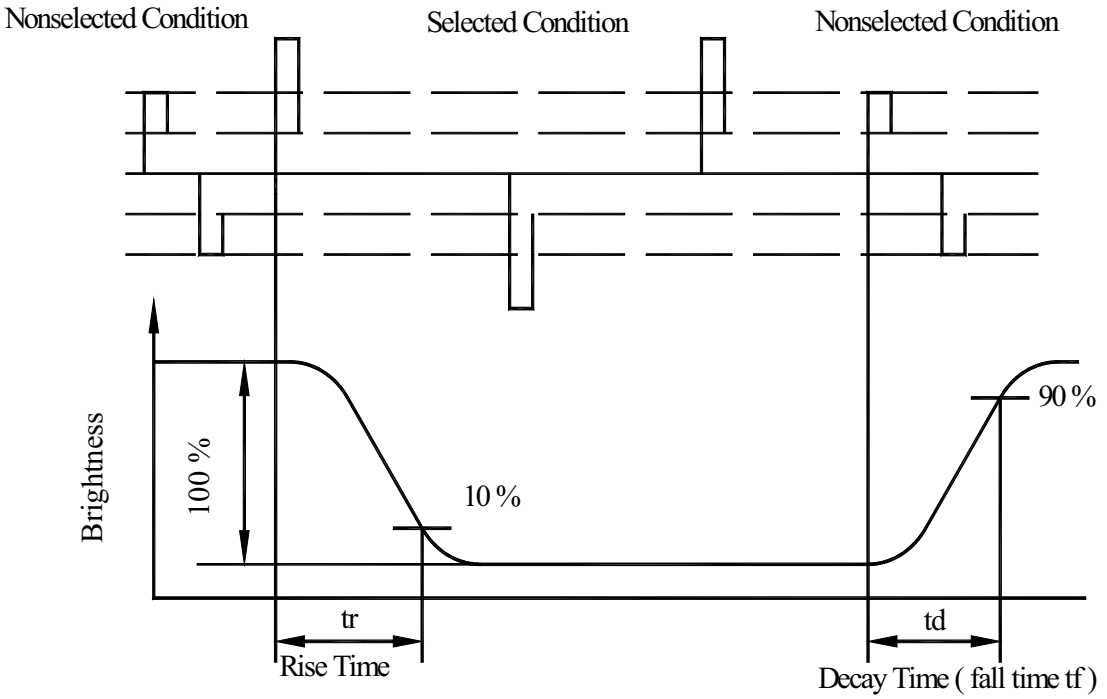


■Contrast Ratio

$$CR = \frac{\text{Brightness at selected state (BS)}}{\text{Brightness at non-selected state (Bns)}}$$



■Response time

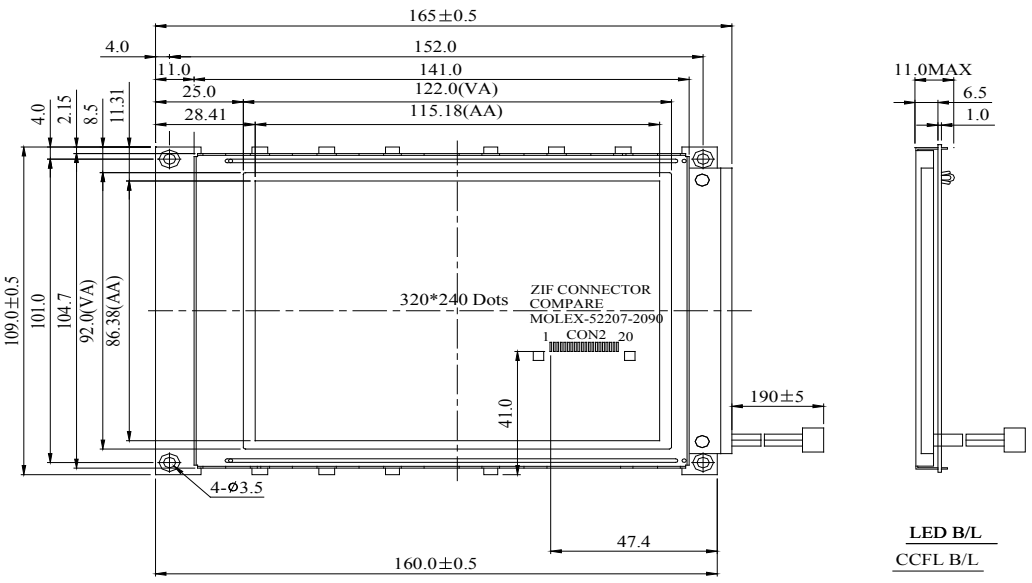


7.Interface Description

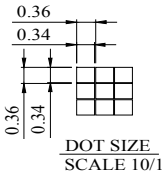
Pin No.	Symbol	Level	Description
1	V_{SS}	0V	Ground
2	V_{DD}	5.0V	Power supply for Logic
3	V_O	(Variable)	Driving voltage for LCD
4	A0	H/L	RD=L WR=H , A0=L :Data Read AO=H :Status read RD=H WR=L , A0=L :Data Write AO=H :Command write
5	$\overline{WR}$	H/L	8080 family MPU interface: Write signal
6	$\overline{RD}$	H/L	8080 family MPU interface: Read signal
7~14	DB0~DB7	H/L	Data bus
15	$\overline{CS}$	H/L	Chip select, Active L
16	$\overline{RES}$	H/L	Controller reset signal, Active L
17	V_{EE}	-25V	Negative voltage output (Optional)
18	SEL1		NC (6800 series MPU interface option) *Note1
19	(FGND)		NC (Frame Ground option)
20	NC		No connection

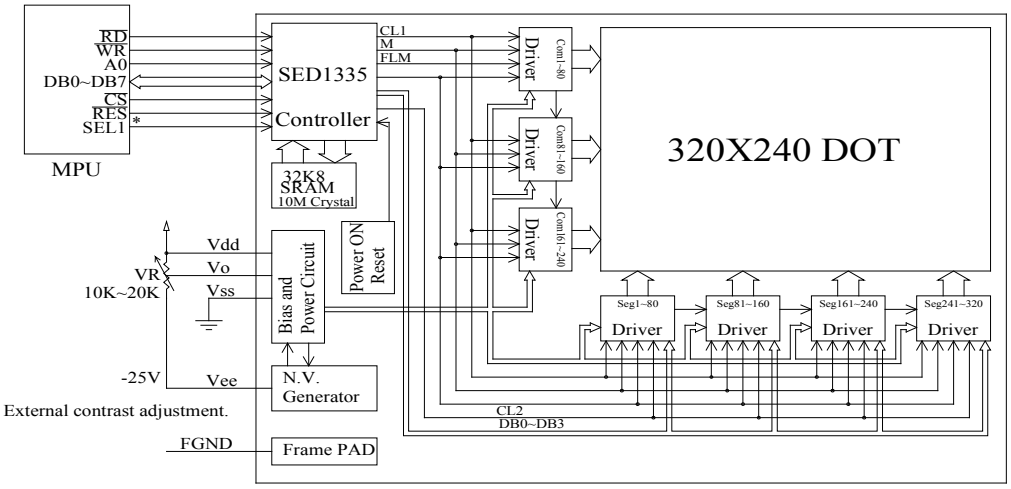
Note1: Setup by hardware

8.Contour Drawing & Block diagram



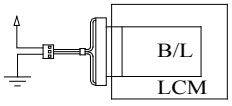
PIN NO.	SYMBOL
1	Vss
2	Vdd
3	Vo
4	A0
5	$\overline{WR}$
6	$\overline{RD}$
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7
15	$\overline{CS}$
16	$\overline{RES}$
17	Vee
18	SEL1
19	FGND
20	NC





*:6800 family or 8080family interface selectable.

Led B/L drive directly from connector .



9. Quality Assurance

◆ Screen Cosmetic Criteria

No.	Defect	Judgement Criteria	Partition
1	Spots	A) Clear Size: d mm — Acceptable Qty in active area d ≦0.1 — Disregard 0.1<d≦0.2 — 6 0.2<d≦0.3 — 2 0.3<d — 0 Note: Including pin holes and defective dots which must be within one pixel size. B) Unclear Size: d mm — Acceptable Qty in active area d ≦0.2 — Disregard 0.2<d≦0.5 — 6 0.5<d≦0.7 — 2 0.7<d — 0	Minor
2	Bubbles in Polarize	Size: d mm — Acceptable Qty in active area d≦0.3 — Disregard 0.3<d≦1.0 — 3 1.0<d≦1.5 — 1 1.5<d — 0	Minor
3	Scratch	In accordance with spots cosmetic criteria. When the light reflects on the panel surface, the scratches are not to be remarkable.	Minor
4	Allowable Density	Above defects should be separated more than 30mm each other.	Minor
5	Coloration	Not to be noticeable coloration in the viewing area of the LCD panels. Back-light type should be judged with back-light on state only.	Minor

10.RELIABILITY

■Content of Reliability Test

Environmental Test				
No.	Test Item	Content of Test	Test Condition	Applicable Standard
1	High Temperature storage	Endurance test applying the high storage temperature for a long time.	80℃ 200hrs	——
2	Low Temperature storage	Endurance test applying the high storage temperature for a long time.	-30℃ 200hrs	——
3	High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70℃ 200hrs	——
4	Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20℃ 200hrs	——
5	High Temperature/ Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time.	80℃,90%RH 96hrs	——
6	High Temperature/ Humidity Operation	Endurance test applying the electric stress (Voltage & Current) and temperature / humidity stress to the element for a long time.	70℃,90%RH 96hrs	——
7	Temperature Cycle	Endurance test applying the low and high temperature cycle. -30℃ 25℃ 80℃ → ← 30min 5min 30min 1 cycle	-30℃/80℃ 10 cycles	——
Mechanical Test				
8	Vibration test	Endurance test applying the vibration during transportation and using.	10~22Hz→1.5mmp-p 22~500Hz→1.5G Total 0.5hrs	——
9	Shock test	Constructional and mechanical endurance test applying the shock during transportation.	50G Half sign wave 11 msedc 3 times of each direction	——
10	Atmospheric pressure test	Endurance test applying the atmospheric pressure during transportation by air.	115mbar 40hrs	——
Others				
11	Static electricity test	Endurance test applying the electric stress to the terminal.	VS=800V,RS=1.5kΩ CS=100pF 1 time	——

***Supply voltage for logic system=5V. Supply voltage for LCD system =Operating voltage at 25℃

11. Backlight Information

CCFL backlight Specification (Ta=25℃)

Item	Symbol	Specification			Unit	Condition
		Min	Typ	Max		
Driving Voltage	V_{FL}	—	278	—	Vrms	—
Input current	I_{FL}	3.0	5.0	6.0	mArms	—
Power consumption	W	—	1.35	—	W	—
Starting Voltage	V_{FLS}	—	530	—	Vrms	—
Luminance	L	—	550	—	Cd/m^2	φ , θ =0 deg, I_{FL} =5.0mArms
Chromaticity	x	—	0.340	—	—	—
	y	—	0.370	—	—	—
Luminance Uniformity (Testing 9 point)	—	75%	—	—	%	φ , θ =0 deg, I_{FL} =5.0mArms
Life time	—	20,000	—	—	hrs	