

User's Guide

NHD-320240WG-BOTMI-VZ LCM

(Liquid Crystal Graphic Display Module)

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September 29, 2008

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1. Module Classification Information

NHD 320240 W G — **BO T M I - 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 = **BO Built-in RA8835 controller (Epson 1335 equiv.)**
- ⑥ Backlight Type : N→Without backlight
- | | |
|---------------------|----------------------|
| B→EL, Blue green | A→LED, Amber |
| D→EL, Green | R→LED, Red |
| W→EL, White | O→LED, Orange |
| F→CCFL, White | G→LED, Green |
| Y→LED, Yellow Green | T →LED, White |
- ⑦ LCD Mode : B→TN Positive, Gray T→FSTN Negative
- | | |
|------------------------------|-----------------|
| N→TN Negative, | C→STN Color |
| G→STN Positive, Gray | F→FSTN Positive |
| Y→STN Positive, Yellow Green | |
| M →STN Negative, Blue | |
- ⑧ LCD Polarize Type/ A→Reflective, N.T, 6:00 H→Transflective, W.T,6:00
- | | |
|--|------------------------------------|
| Temperature range/ D→Reflective, N.T, 12:00 | K→Transflective, |
| View direction G→Reflective, W. T, 6:00 | W.T,12:00 |
| J→Reflective, W. T, 12:00 | C→Transmissive, N.T,6:00 |
| B→Transflective, N.T,6:00 | F→Transmissive, N.T,12:00 |
| E→Transflective, N.T.12:00 | I →Transmissive, W. T, 6:00 |
| | L→Transmissive, W.T,12:00 |
- 9 Special Code **VZ** : Built-in Negative voltage

2. Precautions in Use of LCD Module

- (1) Avoid applying excessive shocks 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 storage in anti-static electricity container and clean environment.

3. General Specification:

NHD-320240WG-BOTMI-VZ

ITEM	STANDARD VALUE	UNIT
Number of dots	320x240	dots
Outline dimension	166.8(W) x 109.0(H) x 11.0max(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- Blue , Negative, Transmissive	
View direction	6 o'clock	
Backlight	LED, White	

4. Absolute Maximum Ratings

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating Temperature	T_{OP}	-20	—	+70	°C
Storage Temperature	T_{ST}	-30	—	+80	°C
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

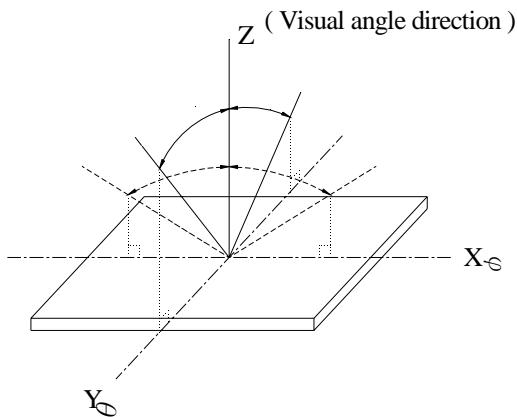
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Logic Voltage	$V_{DD}-V_{SS}$	—	4.5	5.0	5.5	V
Supply Voltage For LCD	$V_{DD}-V_O$	$T_a=-20^{\circ}\text{C}$	—	—	26.0	V
		$T_a=25^{\circ}\text{C}$	—	24.0	—	V
		$T_a=+70^{\circ}\text{C}$	22.0	—	—	V
Input High Volt.	V_{IH}	—	$0.5V_{DD}$	—	V_{DD}	V
Input Low Volt.	V_{IL}	—	0	—	$0.2V_{DD}$	V
Output High Volt.	V_{OH}	—	2.4	—	—	V
Output Low Volt.	V_{OL}	—	—	—	0.4	V
Supply Current	I_{DD}	—	95.0	100.0	110.0	mA

6. Optical Characteristics

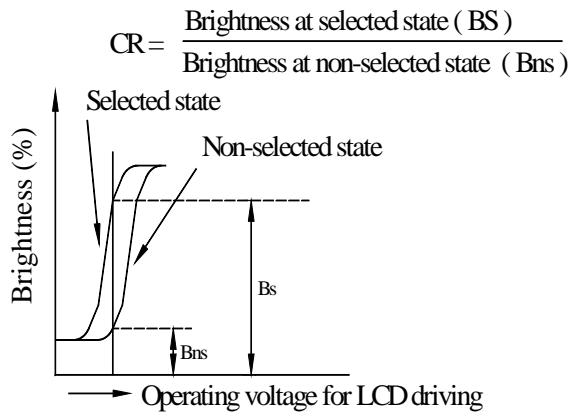
ITEM	SYMBAL	CONDITION	MIN	TYP	MAX	UNIT
View Angle	(V) θ	$CR \geq 2$	20	—	40	deg.
	(H) φ	$CR \geq 2$	-30	—	30	deg.
Contrast Ratio	CR	—	—	3	—	—
Response Time	T rise	—	—	150	200	ms
	T fall	—	—	150	200	ms

6.1 Definitions

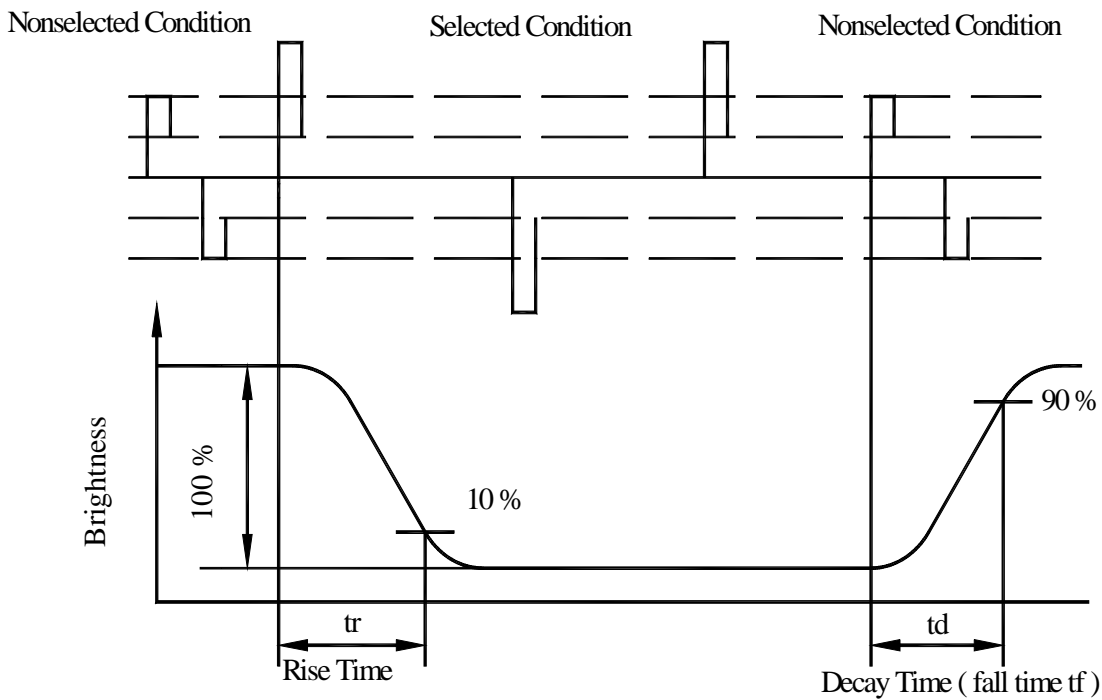
■ View Angles



■ Contrast Ratio



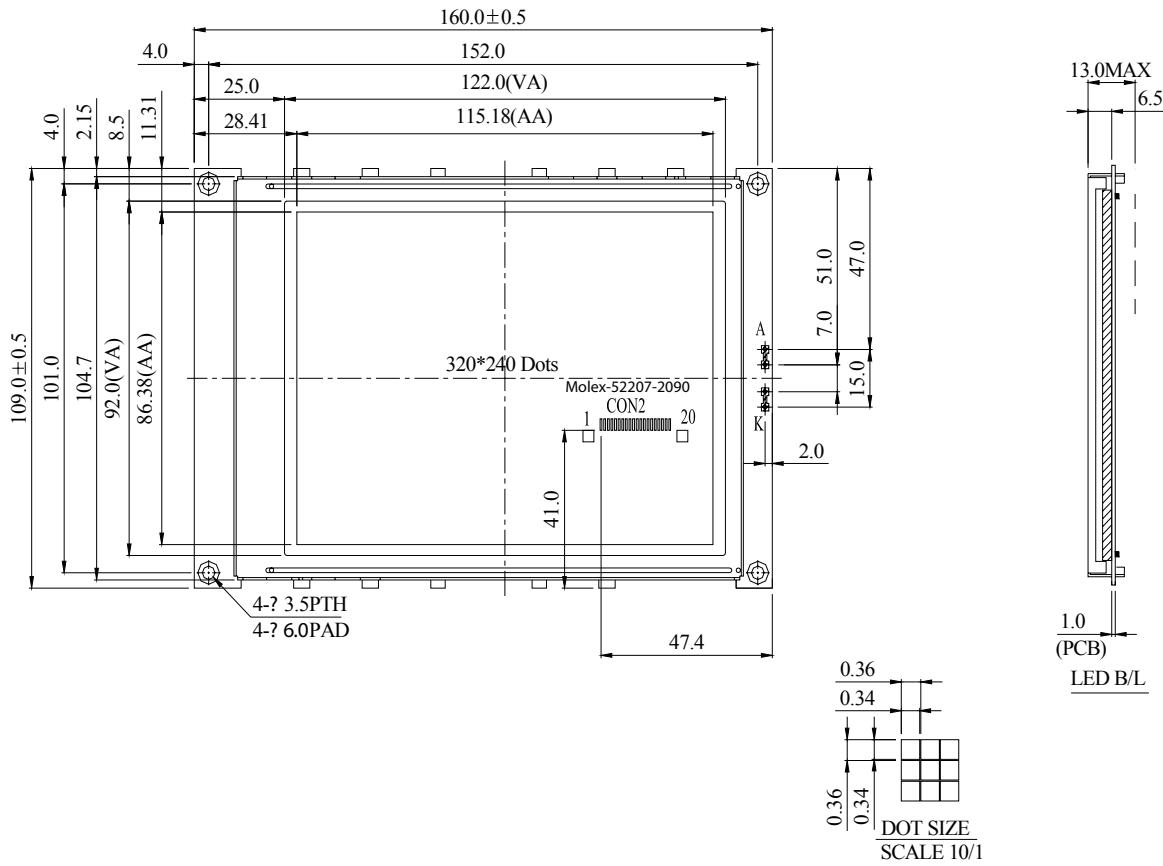
■ Response time



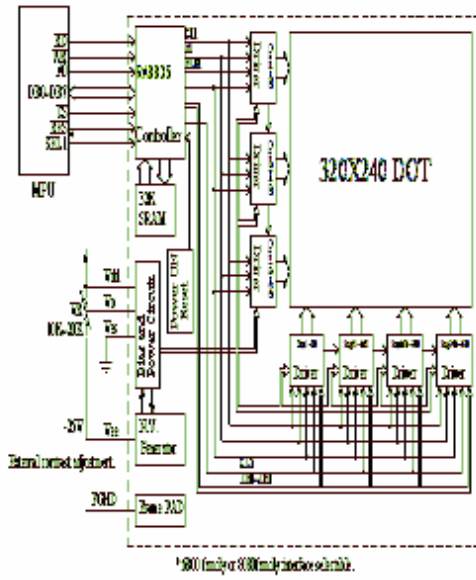
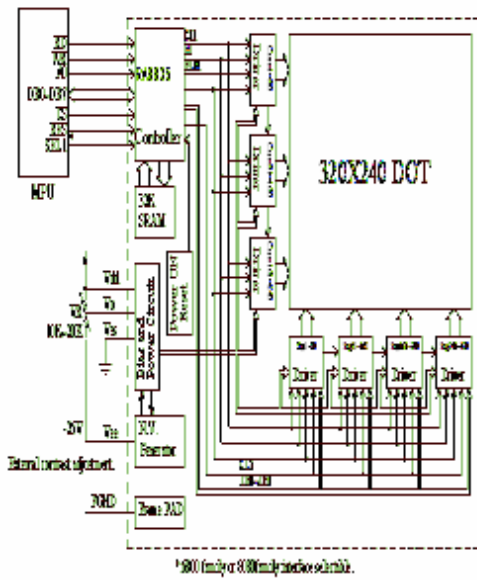
7. Interface Description

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	$\overline{\text{WR}}$	H/L	8080 family: Write signal, 6800 family: R/W signal
6	$\overline{\text{RD}}$	H/L	8080 family: Read signal, 6800 family: Enable clock
7~14	DB0~DB7	H/L	Data bus
15	$\overline{\text{CS}}$	H/L	Chip select, Active L
16	$\overline{\text{RES}}$	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

8. Contour Drawing & Block diagram



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



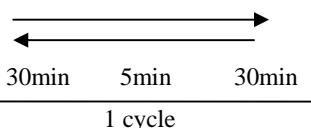
9. Quality Assurance

◆ Screen Cosmetic Criteria

No.	Defect	Judgement Criterion	Partition																				
1	Spots	<p>A) Clear</p> <table border="1"> <thead> <tr> <th>Size: d mm</th> <th>Acceptable Qty in active area</th> </tr> </thead> <tbody> <tr> <td>$d \leq 0.1$</td> <td>Disregard</td> </tr> <tr> <td>$0.1 < d \leq 0.2$</td> <td>6</td> </tr> <tr> <td>$0.2 < d \leq 0.3$</td> <td>2</td> </tr> <tr> <td>$0.3 < d$</td> <td>0</td> </tr> </tbody> </table> <p>Note: Including pin holes and defective dots which must be within one pixel size.</p> <p>B) Unclear</p> <table border="1"> <thead> <tr> <th>Size: d mm</th> <th>Acceptable Qty in active area</th> </tr> </thead> <tbody> <tr> <td>$d \leq 0.2$</td> <td>Disregard</td> </tr> <tr> <td>$0.2 < d \leq 0.5$</td> <td>6</td> </tr> <tr> <td>$0.5 < d \leq 0.7$</td> <td>2</td> </tr> <tr> <td>$0.7 < d$</td> <td>0</td> </tr> </tbody> </table>	Size: d mm	Acceptable Qty in active area	$d \leq 0.1$	Disregard	$0.1 < d \leq 0.2$	6	$0.2 < d \leq 0.3$	2	$0.3 < d$	0	Size: d mm	Acceptable Qty in active area	$d \leq 0.2$	Disregard	$0.2 < d \leq 0.5$	6	$0.5 < d \leq 0.7$	2	$0.7 < d$	0	Minor
Size: d mm	Acceptable Qty in active area																						
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$0.2 < d \leq 0.5$	6																						
$0.5 < d \leq 0.7$	2																						
$0.7 < d$	0																						
2	Bubbles in Polarize	<table border="1"> <thead> <tr> <th>Size: d mm</th> <th>Acceptable Qty in active area</th> </tr> </thead> <tbody> <tr> <td>$d \leq 0.3$</td> <td>Disregard</td> </tr> <tr> <td>$0.3 < d \leq 1.0$</td> <td>3</td> </tr> <tr> <td>$1.0 < d \leq 1.5$</td> <td>1</td> </tr> <tr> <td>$1.5 < d$</td> <td>0</td> </tr> </tbody> </table>	Size: d mm	Acceptable Qty in active area	$d \leq 0.3$	Disregard	$0.3 < d \leq 1.0$	3	$1.0 < d \leq 1.5$	1	$1.5 < d$	0	Minor										
Size: d mm	Acceptable Qty in active area																						
$d \leq 0.3$	Disregard																						
$0.3 < d \leq 1.0$	3																						
$1.0 < d \leq 1.5$	1																						
$1.5 < d$	0																						
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°C 200hrs	—
2	Low Temperature storage	Endurance test applying the high storage temperature for a long time.	-30°C 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°C 200hrs	—
4	Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	—
5	High Temperature/ Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time.	80°C, 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°C, 90%RH 96hrs	—
7	Temperature Cycle	Endurance test applying the low and high temperature cycle. -30°C 25°C 80°C  30min 5min 30min 1 cycle	-30°C/80°C 10 cycles	—
Mechanical Test				
8	Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 15mm Vibration Frequency : 10~15Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	—
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°C

11. Backlight Information

(Ta=25°C)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION
Supply Current	I _{LED}	120	160	240	mA	V=3.5V
Supply Voltage	V	3.4	3.5	3.6	V	—
Reverse Voltage	V _R	—	—	10	V	—
Luminous Intensity	I _V	220	250	—	CD/M ²	I _{LED} =160mA
Life Time	—	—	50K	—	Hr.	I _{LED} =160mA
Color	WHITE					

Note: The LED of B/L is driven by current only, drive voltage is for reference only.

Drive voltage can make driving current under safety area (current between minimum and maximum).

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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