

NHD-0420H1Z-FSW-GBW

Character Liquid Crystal Display Module

NHD- Newhaven Display
0420- 4 lines x 20 characters
H1Z- Model
F- Transflective
SW- Side White LED Backlight
G- STN- Gray
B- 6:00 view
W- Wide Temp. (-20°C ~ +70°C)
RoHS Compliant

Newhaven Display International, Inc.

2511 Technology Drive, Suite 101

Elgin IL, 60124

Ph: 847-844-8795

Fax: 847-844-8796

www.newhavendisplay.com

nhtech@newhavendisplay.com

nhsales@newhavendisplay.com

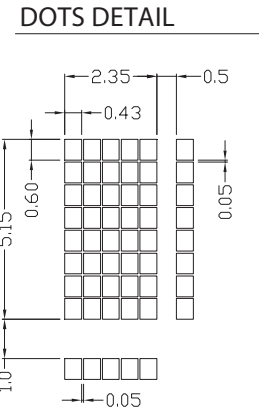
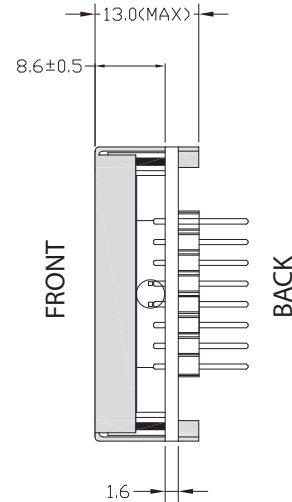
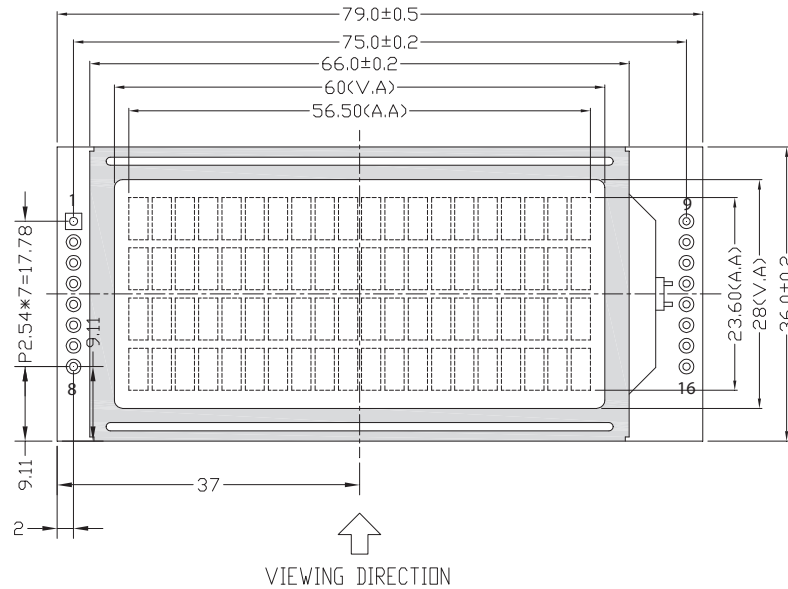
Document Revision History

| Revision | Date | Description | Changed by |
|----------|------------|---------------------------|------------|
| 0 | 10/21/2008 | Initial Release | - |
| 1 | 1/28/2010 | User Guide Reformat | MC |
| 2 | 1/5/2011 | Update Driver Information | JT |

Functions and Features

- 4 lines x 20 characters
- Built-in controllers (SPLC780D-01 or ST7066U)
- +5.0V Power Supply
- 1/16 duty, 1/5 bias
- RoHS compliant

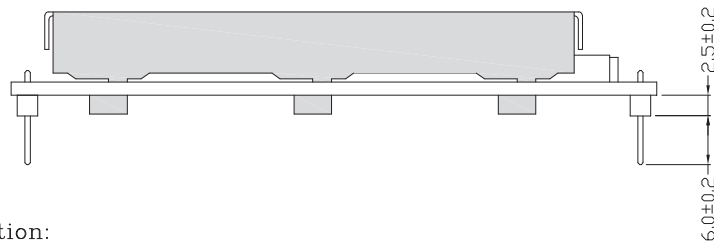
Mechanical Drawing



SCALE=4.0:1

PIN ASSIGNMENT

| | |
|----|-------|
| 1 | VSS |
| 2 | VDD |
| 3 | V0 |
| 4 | RS |
| 5 | RW |
| 6 | E |
| 7 | DB0 |
| 8 | DB1 |
| 9 | DB2 |
| 10 | DB3 |
| 11 | DB4 |
| 12 | DB5 |
| 13 | DB6 |
| 14 | DB7 |
| 15 | LED + |
| 16 | LED - |



Specification:

- 1). Driving: Duty:1/16, Bias:1/5, VLCD:4.5V, VDD:5.0V
- 2). Viewing Direction: 6 O'clock
- 3). Display mode: STN/Transflective/Gray
- 4). Operating temp.: -20°C~+70°C
Storage temp.: -30°C~+80°C
- 5). Driver: ST7066 or SPLC780D
- 6). Backlight: White/ Side Backlight/5.0V

NEWHAVEN DISPLAY
NHD-0420H1Z-FSW-GBW

Pin Description and Wiring Diagram

| Pin No. | Symbol | External Connection | Function Description |
|---------|---------|---------------------|---|
| 1 | Vss | Power Supply | Ground |
| 2 | VDD | Power Supply | Supply voltage for logic (+5.0V) |
| 3 | V0 | Power Supply | Power supply for contrast (approx. 0.5V) |
| 4 | RS | MPU | Register select signal. RS=0: Command, RS=1: Data |
| 5 | R/W | MPU | Read/Write select signal, R/W=1: Read R/W:=0: Write |
| 6 | E | MPU | Operation enable signal. Falling edge triggered. |
| 7-10 | DB0-DB3 | MPU | Four low order bi-directional three-state data bus lines. These four are not used during 4-bit operation. |
| 11-14 | DB4-DB7 | MPU | Four high order bi-directional three-state data bus lines. |
| 15 | LED+ | Power Supply | Power supply for LED Backlight (+5.0V via on-board resistor) |
| 16 | LED- | Power Supply | Ground for backlight |

Recommended LCD connector: 2.54mm pitch pins

Backlight connector: --- Mates with: ---



Electrical Characteristics

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-----------------------------|--------|-------------------|------|------|------|------|
| Operating Temperature Range | Top | Absolute Max | -20 | - | +70 | °C |
| Storage Temperature Range | Tst | Absolute Max | -30 | - | +80 | °C |
| Supply Voltage | VDD | | 4.7 | 5.0 | 5.5 | V |
| Supply Current | IDD | Ta=25°C, VDD=5.0V | - | 2.5 | 3.0 | mA |
| Supply for LCD (contrast) | VDD-V0 | Ta=25°C | - | 4.5 | - | V |
| "H" Level input | Vih | | 2.2 | - | VDD | V |
| "L" Level input | Vil | | 0 | - | 0.6 | V |
| "H" Level output | Voh | | 2.4 | - | - | V |
| "L" Level output | Vol | | - | - | 0.4 | V |
| | | | | | | |
| Backlight Supply Voltage | Vled | - | - | 5.0 | - | V |
| Backlight Supply Current | Iled | Vled=5.0V | - | 15 | - | mA |

Optical Characteristics

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|------------------------------------|--------|-----------|------|------|------|------|
| Viewing Angle – Vertical (top) | AV | Cr ≥ 2 | - | 25 | - | ° |
| Viewing Angle – Vertical (bottom) | AV | Cr ≥ 2 | - | 70 | - | ° |
| Viewing Angle – Horizontal (left) | AH | Cr ≥ 2 | - | 30 | - | ° |
| Viewing Angle – Horizontal (right) | AH | Cr ≥ 2 | - | 30 | - | ° |
| Contrast Ratio | Cr | | - | 2 | - | - |
| Response Time (rise) | Tr | - | - | 120 | 150 | ms |
| Response Time (fall) | Tf | - | - | 120 | 150 | ms |

Controller Information

Built-in SPLC780D. Download specification at http://www.newhavendisplay.com/app_notes/SPLC780D.pdf

Built-in ST7066U. Download specification at http://www.newhavendisplay.com/app_notes/ST7066U.pdf

Display character address code

| | | | | | | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 0A | 0B | 0C | 0D | 0E | 0F | 10 | 11 | 12 | 13 |
| 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 4A | 4B | 4C | 4D | 4E | 4F | 50 | 51 | 52 | 53 |
| 14 | 15 | 16 | 17 | 18 | 19 | 1A | 1B | 1C | 1D | 1E | 1F | 20 | 21 | 22 | 24 | 25 | 26 | 26 | 27 |
| 54 | 55 | 56 | 57 | 58 | 59 | 5A | 5B | 5C | 5D | 5E | 5F | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 |

Built-in Font Table

| Lower 4 Bits \ Upper 4 Bits | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
|-----------------------------|------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| xxxx0000 | CG RAM (1) | | | 0 | a | P | ` | P | | | | - | タ | ミ | & | P |
| xxxx0001 | (2) | | ! | 1 | A | Q | a | q | | | 。 | ア | チ | △ | ä | q |
| xxxx0010 | (3) | | " | 2 | B | R | b | r | | | 「 | イ | ツ | × | ß | θ |
| xxxx0011 | (4) | | # | 3 | C | S | c | s | | | 」 | ウ | テ | モ | ε | ε |
| xxxx0100 | (5) | | \$ | 4 | D | T | d | t | | | 、 | エ | ト | ト | μ | Ω |
| xxxx0101 | (6) | | % | 5 | E | U | e | u | | | ・ | オ | ナ | 1 | ø | ü |
| xxxx0110 | (7) | | & | 6 | F | V | f | v | | | ヲ | カ | ニ | ヨ | ρ | ∑ |
| xxxx0111 | (8) | | ' | 7 | G | W | g | w | | | フ | キ | ヌ | ラ | g | π |
| xxxx1000 | (1) | | (| 8 | H | X | h | x | | | イ | ク | ネ | リ | √ | ∞ |
| xxxx1001 | (2) | |) | 9 | I | Y | i | y | | | ウ | ケ | ル | ル | ' | γ |
| xxxx1010 | (3) | | * | : | J | Z | j | z | | | エ | コ | ハ | レ | j | ≠ |
| xxxx1011 | (4) | | + | ; | K | [| k | [| | | オ | サ | ヒ | ロ | * | ≠ |
| xxxx1100 | (5) | | , | < | L | ¥ | l | l | | | カ | シ | フ | ク | φ | ∞ |
| xxxx1101 | (6) | | - | = | M |] | m |) | | | ユ | ス | ハ | ン | も | ÷ |
| xxxx1110 | (7) | | . | > | N | ^ | n | → | | | ヨ | セ | ホ | ° | ñ | |
| xxxx1111 | (8) | | / | ? | O | _ | o | ← | | | ツ | リ | マ | ° | ö | ■ |

Example Initialization Program

8-bit Initialization:

```

/*****/
void command(char i)
{
    P1 = i;                //put data on output Port
    D_I =0;                //D/I=LOW : send instruction
    R_W =0;                //R/W=LOW : Write
    E = 1;
    Delay(1);              //enable pulse width >= 300ns
    E = 0;                 //Clock enable: falling edge
}
/*****/
void write(char i)
{
    P1 = i;                //put data on output Port
    D_I =1;                //D/I=LOW : send data
    R_W =0;                //R/W=LOW : Write
    E = 1;
    Delay(1);              //enable pulse width >= 300ns
    E = 0;                 //Clock enable: falling edge
}
/*****/
void init()
{
    E = 0;
    Delay(100);            //Wait >15 msec after power is applied
    command(0x30);         //command 0x30 = Wake up
    Delay(30);             //must wait 5ms, busy flag not available
    command(0x30);         //command 0x30 = Wake up #2
    Delay(10);             //must wait 160us, busy flag not available
    command(0x30);         //command 0x30 = Wake up #3
    Delay(10);             //must wait 160us, busy flag not available
    command(0x38);         //Function set: 8-bit/2-line
    command(0x10);         //Set cursor
    command(0x0c);         //Display ON; Cursor ON
    command(0x06);         //Entry mode set
}
/*****/
```

```

4-bit Initialization:
/*****/
void command(char i)
{
    P1 = i;                //put data on output Port
    D_I =0;                //D/I=LOW : send instruction
    R_W =0;                //R/W=LOW : Write
    Nybble();              //Send lower 4 bits
    i = i<<4;              //Shift over by 4 bits
    P1 = i;                //put data on output Port
    Nybble();              //Send upper 4 bits
}
/*****/
void write(char i)
{
    P1 = i;                //put data on output Port
    D_I =1;                //D/I=HIGH : send data
    R_W =0;                //R/W=LOW : Write
    Nybble();              //Clock lower 4 bits
    i = i<<4;              //Shift over by 4 bits
    P1 = i;                //put data on output Port
    Nybble();              //Clock upper 4 bits
}
/*****/
void Nybble()
{
    E = 1;
    Delay(1);              //enable pulse width >= 300ns
    E = 0;                 //Clock enable: falling edge
}
/*****/
void init()
{
    P1 = 0;
    P3 = 0;
    Delay(100);            //Wait >15 msec after power is applied
    P1 = 0x30;             //put 0x30 on the output port
    Delay(30);             //must wait 5ms, busy flag not available
    Nybble();              //command 0x30 = Wake up
    Delay(10);             //must wait 160us, busy flag not available
    Nybble();              //command 0x30 = Wake up #2
    Delay(10);             //must wait 160us, busy flag not available
    Nybble();              //command 0x30 = Wake up #3
    Delay(10);             //can check busy flag now instead of delay
    P1= 0x20;              //put 0x20 on the output port
    Nybble();              //Function set: 4-bit interface
    command(0x28);         //Function set: 4-bit/2-line
    command(0x10);         //Set cursor
    command(0x0F);         //Display ON; Blinking cursor
    command(0x06);         //Entry Mode set
}
/*****/

```


Quality Information

| Test Item | Content of Test | Test Condition | Note |
|---------------------------------------|---|---|------|
| High Temperature storage | Endurance test applying the high storage temperature for a long time. | +80°C , 48hrs | 2 |
| Low Temperature storage | Endurance test applying the low storage temperature for a long time. | -30°C , 48hrs | 1,2 |
| High Temperature Operation | Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time. | +70°C 48hrs | 2 |
| Low Temperature Operation | Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time. | -20°C , 48hrs | 1,2 |
| High Temperature / Humidity Operation | Endurance test applying the electric stress (voltage & current) and the high thermal with high humidity stress for a long time. | +40°C , 90% RH , 48hrs | 1,2 |
| Thermal Shock resistance | Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress. | 0°C,30min -> 25°C,5min -> 50°C,30min = 1 cycle 10 cycles | |
| Vibration test | Endurance test applying vibration to simulate transportation and use. | 10-55Hz , 15mm amplitude. 60 sec in each of 3 directions X,Y,Z For 15 minutes | 3 |
| Static electricity test | Endurance test applying electric static discharge. | VS=800V, RS=1.5kΩ, CS=100pF One time | |

Note 1: No condensation to be observed.

Note 2: Conducted after 4 hours of storage at 25°C, 0%RH.

Note 3: Test performed on product itself, not inside a container.

Precautions for using LCDs/LCMs

See Precautions at www.newhavendisplay.com/specs/precautions.pdf

Warranty Information and Terms & Conditions

http://www.newhavendisplay.com/index.php?main_page=terms

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А