

LCD-MODULE 2x16 - 6.68mm INCL. CONTROLLER HD44780

no mounting
required



EA DIP162J-DN3LW
75 x 27 x 11 mm

EA DIP162-DN3LW
75 x 27 x 11 mm



EA DIP162-DHNLED
68 x 27 x 11 mm

FEATURES

- * HIGH CONTRAST LCD SUPERTWIST DISPLAY
- * EA DIP162-DNLED: YELLOW/GREEN WITH LED BACKLIGHT
- * EA DIP162-DN3LW AND DIP162J-DN3LW WITH WHITE LED B/L., LOW POWER
- * INCL. HD 44780 OR COMPATIBLE CONTROLLER
- * INTERFACE FOR 4- AND 8-BIT DATA BUS
- * POWER SUPPLY +5V OR $\pm 2.7V$ OR $\pm 3.3V$
- * OPERATING TEMPERATURE $0\sim+50^{\circ}C$ (-DN3LW, -DHNLED: $-20\sim+70^{\circ}C$)
- * LED BACKLIGHT Y/G max. 150mA@+25°C
- * LED BACKLIGHT WHITE max. 45mA@+25°C
- * SOME MORE MODULES WITH SAME MECHANIC AND SAME PINOUT:
 - DOTMATRIX 1x8, 4x20
 - GRAPHIC 122x32
- * NO SCREWS REQUIRED: SOLDER ON IN PCB ONLY
- * DETACHABLE VIA 9-PIN SOCKET EA B200-9 (2 PCS. REQUIRED)

ORDERING INFORMATION

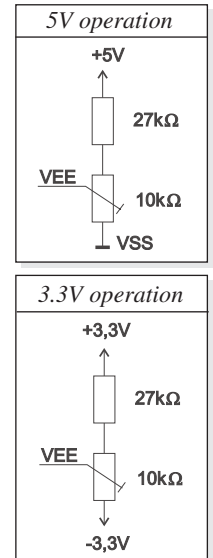
LCD MODULE 2x16 - 6.68mm WITH BACKLIGHT Y/G
 SAME BUT WITH $T_{OP.} -20..+70^{\circ}C$ INCL. TEMP. COMPENSATION
 SAME IN BLUE-WHITE OPTIC, $T_{OP.} -20..+70^{\circ}C$ INCL. TEMP. COMP.
 SAME IN BLACK&WHITE, $T_{OP.} -20..+70^{\circ}C$ INCL. TEMP. COMP.
 9-PIN SOCKET, HEIGHT 4.3mm (1 PC.)
 SUITABLE BEZEL (WINDOW 60.0x14.8 mm)
 ADAPTOR PCB WITH STANDARD PINOUT PITCH 2.54mm

EA DIP162-DNLED
 EA DIP162-DHNLED
 EA DIP162-DN3LW
 EA DIP162J-DN3LW
 EA B200-9
 EA 017-2UKE
 EA 9907-DIP

**ELECTRONIC
ASSEMBLY**
making things easy

Pinout

| Pin | Symbol | Level | Function | Pin | Symbol | Level | Function |
|-----|--------|-------|-----------------------------|-----|---------|-------|----------------------------|
| 1 | VSS | L | Power Supply 0V (GND) | 10 | D3 | H / L | Display Data |
| 2 | VDD | H | Power Supply +5V | 11 | D4 (D0) | H / L | Display Data |
| 3 | VEE | - | Contrast adjust. (about 0V) | 12 | D5 (D1) | H / L | Display Data |
| 4 | RS | H / L | H=Command, L=Data | 13 | D6 (D2) | H / L | Display Data |
| 5 | R/W | H / L | H=Read, L=Write | 14 | D7 (D3) | H / L | Display Data, MSB |
| 6 | E | H | Enable (falling edge) | 15 | - | - | NC (see EA DIP122-5N) |
| 7 | D0 | H / L | Display Data, LSB | 16 | - | - | NC (see EA DIP122-5N) |
| 8 | D1 | H / L | Display Data | 17 | A | - | LED B/L+ Resistor required |
| 9 | D2 | H / L | Display Data | 18 | C | - | LED B/L - |



Contrast Adjustment

Contrast voltage for all displays of EA DIP162-D series is typ. 5V. That means that for 3.3V operation an additional negative voltage of min. 1.7V is required.

Display modules for -20..+70°C are equipped with an on-board temperature compensation. So there's no more need for contrast adjustment while operation anymore.

Backlight

Using the LED backlight requires an current source or external current-limiting resistor. Forward voltage for yellow/green backlight is 3.9~4.2V and for white LED backlight 3.0~3.6V. Please take care of derating for $T_a > +25^\circ\text{C}$

Note: Do never drive backlight direct to 5V; immediately damage my happen !

Character set

Character set shown below is already built in. In addition to that you are able to define up to 8 characters by yourself.

| Lower 4 bit | Upper 4 bit | 0000 (\$0x) | 0010 (\$2x) | 0011 (\$3x) | 0100 (\$4x) | 0101 (\$5x) | 0110 (\$6x) | 0111 (\$7x) | 1010 (\$Ax) | 1011 (\$Bx) | 1100 (\$Cx) | 1101 (\$Dx) | 1110 (\$Ex) | 1111 (\$Fx) |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| xxxx0000 (\$x0) | CG RAM (0) | | 0 | 1 | P | ~ | P | | - | 9 | 3 | u | p | |
| xxxx0001 (\$x1) | (1) | ! | 1 | A | Q | a | 4 | | . | 7 | 7 | 4 | ä | q |
| xxxx0010 (\$x2) | (2) | " | 2 | B | R | b | r | | r | i | u | x | p | o |
| xxxx0011 (\$x3) | (3) | # | 3 | C | S | c | s | | j | u | t | e | e | w |
| xxxx0100 (\$x4) | (4) | \$ | 4 | D | T | d | t | | \ | I | t | f | h | o |
| xxxx0101 (\$x5) | (5) | % | 5 | E | U | e | u | | . | o | o | u | o | ü |
| xxxx0110 (\$x6) | (6) | & | 6 | F | V | f | v | | 7 | o | o | o | p | z |
| xxxx0111 (\$x7) | (7) | ' | 7 | G | W | g | w | | 7 | o | o | o | g | z |
| xxxx1000 (\$x8) | CG RAM (0) | (| 8 | H | X | h | x | | i | o | o | o | r | z |
| xxxx1001 (\$x9) | (1) |) | 9 | I | Y | i | y | | o | o | o | o | ' | y |
| xxxx1010 (\$xA) | (2) | * | : | J | Z | j | z | | e | o | o | o | j | z |
| xxxx1011 (\$xB) | (3) | + | ; | K | [| k | [| | o | o | o | o | * | z |
| xxxx1100 (\$xC) | (4) | , | < | L | ¥ | l | l | | o | o | o | o | o | z |
| xxxx1101 (\$xD) | (5) | - | = | M |] | m |] | | o | o | o | o | o | z |
| xxxx1110 (\$xE) | (6) | . | > | N | ^ | n | ^ | | o | o | o | o | o | z |
| xxxx1111 (\$xF) | (7) | / | ? | O | _ | o | _ | | o | o | o | o | o | z |

Table of command

| Instruction | Code | | | | | | | | | | Description | Execute Time (max.) |
|----------------------------|------|-----|------------|------|------|------|------|-----------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| | RS | R/W | DB 7 | DB 6 | DB 5 | DB 4 | DB 3 | DB 2 | DB 1 | DB 0 | | |
| Clear Display | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | Clears all display and returns the cursor to the home position (Address 0). | 1.64ms |
| Cursor At Home | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | * | Returns the Cursor to the home position (Address 0). Also returns the display being shifted to the original position. DD RAM contents remain unchanged. | 1.64ms |
| Entry Mode Set | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | I/D | S | Sets the Cursor move direction and specifies or not to shift the display. These operation are performed during data write and read. | 40µs |
| Display On/Off Control | 0 | 0 | 0 | 0 | 0 | 0 | 1 | D | C | B | Sets ON/OFF of all display (D) cursor ON/OFF (C), and blink of cursor position character (B). | 40µs |
| Cursor / Display Shift | 0 | 0 | 0 | 0 | 0 | 1 | S/C | R/L | * | * | Moves the Cursor and shifts the display without changing DD RAM contents. | 40µs |
| Function Set | 0 | 0 | 0 | 0 | 1 | DL | N | F | * | * | Sets interface data length (DL) number of display lines (L) and character font (F). | 40µs |
| CG RAM Address Set | 0 | 0 | 0 | 1 | ACG | | | | | Sets the CG RAM address. CG RAM data is sent and received after this setting. | | 40µs |
| DD RAM Address Set | 0 | 0 | 1 | ADD | | | | | Sets the DD RAM address. DD RAM data is sent and received after this setting. | | 40µs | |
| Busy Flag / Address Read | 0 | 1 | BF | AC | | | | | Reads Busy flag (BF) indicating internal operation is being performed and reads address counter contents. | | - | |
| CG RAM / DD RAM Data write | 1 | 0 | Write Data | | | | | Writes data into DD RAM or CG RAM | | 40µs | | |
| CG RAM / DD RAM Data Read | 1 | 1 | Read Data | | | | | Reads data from DD RAM or CG RAM | | 40µs | | |

Creating your own characters

All these character display modules got the feature to create 8 own characters (ASCII Codes 0..7) in addition to the 192 ROM fixed codes.

- 1.) The command "CG RAM Address Set" defines the ASCII code (Bit 3,4,5) and the dot line (Bit 0,1,2) of the new character. Example demonstrates creating ASCII code \$00.
- 2.) Doing 8 times the write command "Data Write" defines line by line the new character. 8th. byte stands for the cursor line.
- 3.) The new defined character can be used as a "normal" ASCII code (0..7); use with "DD RAM Address Set" and "Data Write".

| Set CG RAM Address | | | Data | | | | | | | |
|--------------------|------|---|------|---|---|---|---|---|---|------|
| Adresse | Hex | | Bit | | | | | | | |
| | | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 0 0 | \$40 | | | | | | | | | |
| 0 0 1 | \$41 | | | | | | | | | |
| 0 1 0 | \$42 | | | | | | | | | |
| 0 1 1 | \$43 | | | | | | | | | |
| 1 0 0 | \$44 | | | | | | | | | |
| 1 0 1 | \$45 | | | | | | | | | |
| 1 1 0 | \$46 | | | | | | | | | |
| 1 1 1 | \$47 | | | | | | | | | |
| | | X | X | X | | | | | | |
| | | 0 | 0 | 1 | 0 | 0 | | | | \$04 |
| | | 0 | 0 | 1 | 0 | 0 | | | | \$04 |
| | | 0 | 0 | 1 | 0 | 0 | | | | \$04 |
| | | 0 | 0 | 1 | 0 | 0 | | | | \$04 |
| | | 1 | 0 | 1 | 0 | 1 | | | | \$15 |
| | | 0 | 1 | 1 | 1 | 0 | | | | \$0E |
| | | 0 | 0 | 1 | 0 | 0 | | | | \$04 |
| | | 0 | 0 | 0 | 0 | 0 | | | | \$00 |

INITIALISATION FOR A 2 LINE DISPLAY / 8-BIT MODE

| Command | RS | R/W | DB7 | DB6 | DB5 | DB4 | DB3 | DB2 | DB1 | DB0 | Remark |
|----------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------------------|
| Function Set | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 8-Bit Data Length, 2/4 lines, 5x7 Font |
| Display ON/OFF | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | Display on, Cursor visible, Cursor blink |
| Clear Display | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | Clear Display, Cursor Home |
| Entry Mode Set | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | Cursor Auto-Increment |

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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