12.2003

LCD MODULE 1x8 - 11.48mm INCL. CONTROLLER HD 44780





Dimension 68 x 27 mm 11mm flat even with LED B/L

FEATURES

- * HIGH CONTRAST LCD SUPERTWIST DISPLAY GRAY OR YELLOW/GREEN
- * COMPATIBLE TO HD 44780 STANDARD
- * INTERFACE FOR 4- AND 8-BIT DATA BUS
- * POWER SUPPLY +2.7~5.5V (BACKLIGHT 4.1V)
- * OPERATING TEMPERATURE RANGE 0~+50°C OR -20~+70°C
- * BULIT-IN TEMP. COMP. WITH EA DIP081-CHNLED
- * LED BACKLIGHT Y/G typ. 150mA@4.1V, max. 200mA
- * SOME MORE MODULES WITH SAME MECHANIC AND SAME PINOUT:
 - DOTMATRIX 2x16, 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 1x8 - 11.48mm WITH BACKLIGHT Y/GEA DIP081-CNLEDSAME BUT WITH T_{OP.} -20~+70°C, INCL. TEMP.COMP.EA DIP081-CHNLED9-PIN SOCKET, HEIGHT 4.3mm (1 PC.)EA B200-9SUITABLE BEZEL (WINDOW 60.0x14.8 mm)EA 017-2UKEADAPTOR PCB WITH STANDARD PINOUT PITCH 2.54mmEA 9907-DIP



PINOUT

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Pin	Symbol	Level	Function		Pin	Symbol	Level	Function	5V operation
1	VSS	L	Power Supply 0V (GND)		10	D3	H/L	Display Data	+5V
2	VDD	Н	Power Supply +5V		11	D4 (D0)	H/L	Display Data	
3	VEE	-	Contrast adjust. (about 0V)	1	12	D5 (D1)	H/L	Display Data	27kΩ
4	RS	H/L	H=Command, L=Data	1	13	D6 (D2)	H/L	Display Data	
5	R/W	H/L	H=Read, L=Write		14	D7 (D3)	H/L	Display Data, MSB	<u>VEE</u> 10kΩ
6	E	Н	Enable (falling edge)	1	15	-	-	NC (see EA DIP122-5N)	
7	D0	H/L	Display Data, LSB	1	16	-	-	NC (see EA DIP122-5N)	
8	D1	H/L	Display Data	1	17	А	-	LED B/L+ Resistor required	3.3V operation
9	D2	H/L	Display Data	1	18	С	-	LED B/L -	+3,3V



Both displays EA DIP081-CNLED and -CHNLED do have an driving voltage for contrast of typ. 4,9V. For 3.3V operation additional -3.3V is required.

Version EA DIP081-CHNLED for ext. temperature range -20..+70°C does have a built-

in temperature compensation; so there's no need for contrast adjustment while operation.

BACKLIGHT

Backlight do need an external resistor limiting the current limitor. Calculation is: R=U/I, so at 5V supply:

R_{gelb/grün}=(5,0V-4,1V)/0,15A=60hm

Caution: do never drive backlight direct with 5V; damage may come suddenly.

CHARACTER SET

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

		_											
Lower 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)		Ø	i]	P	۰.	P			-51	Ξ.	0	р
xxxx0001 (\$x1)	(1)	!	1	F	Q	÷	4	CI	7	子	ú	ij	q
xxxx0010 (\$x2)	(2)		2	E	R	Ŀ	r	Г	イ	Ņ	×	F	8
xxxx0011 (\$x3)	(3)	#	3	[]:	5	С.	S	L.	ウ	Ŧ	끈	÷	67
xxxx0100 (\$x4)	(4)	\$	4	D	7	<u>1</u>	ţ.	×.	I	ŀ	17	-i	Ω
xxxx0101 (\$x5)	(5)	~	5	E	U	12	Ч	•	オ	<u>;</u> †-	1	S	ü
xxxx0110 (\$x6)	(6)	8.	6	j-	Ų	ŀ.	V	7	jŢ	-	3	p	Σ
xxxx0111 (\$x7)	(7)	7	7	Ei	Į.,	9	Ļ.	7	†	X	7	9	π
xxxx1000 (\$x8)	CG RAM (0)		8	-	Х	h	X	4	2	字	Ņ	 ۲	X
xxxx1001 (\$x9)	(1)	\supset	9	Ι	Ŷ	i	у	<u>ت</u>	΄ Τ	J	ib	!	y
xxxx1010 (\$xA)	(2)	*		J	Ζ	j	Z	:I :]]	1 ÌI	Į.⁄	j	Ŧ
xxxx1011 (\$xB)	(3)	-+-	;	К	Ľ	k	{	7	ÿ		D	×	Б
xxxx1100 (\$xC)	(4)	,	$\langle \cdot \rangle$	L.	¥	1	ļ	1 77	Ð	7	ņ	¢	P1
xxxx1101 (\$xD)	(5)		==	ľ		ľ'n	>	.⊐.	Z	·^.	_/	÷.	÷
xxxx1110 (\$xE)	(6)	•	\geq	ŀ.	~	n	÷	Э	セ	it:	~~	ħ	
xxxx1111 (\$xF)	(7)	/	?	Ū		0	÷	<u>יי</u>	y.	7	<u>[</u>]	ö	



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TABLE OF COMMAND

					Co	de						Execute
Instruction	RS	R/W	DB 7	DB 6	DB 5	DB 4	DB 3	DB 2	DB 1	DB 0	Description	Time (max.)
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	с	в	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								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			F	Read	Dat	a			Reads data from DD RAM or CG RAM	40µs

INI	INITIALISISATION FOR A 1 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	0	0	0	0	8 bit data length, 1 line display, 5x7 font			
Display ON/OFF	0	0	0	0	0	0	1	1	1	1	display on, cursor on, cursor blink			
Clear Display	0	0	0	0	0	0	0	0	0	1	clear display, cursor 1st. row, 1st. column			
Entry Mode Set	0	0	0	0	0	0	0	1	1	0	cursor increments automatically			

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.
- Set CG RAM Address Data Bit Adresse Hex Hex 7 6 5 4 3 2 1 0 0 0 1 0 0 0 0 0 \$40 \$04 0 0 1 0 1 \$41 0 0 0 \$04 0 1 0 \$42 0 0 1 0 0 \$04 0 1 1 \$43 0 0 1 0 0 \$04 ххх 1 0 1 0 1 1 0 0 \$44 \$15 0 1 1 1 1 0 \$0E 1 \$45 0 1 1 0 \$46 0 0 1 0 0 \$04 1 1 1 0 0 0 0 0 \$47 \$00
- 3.) The new defined character can be used as a "normal" ASCII code (0..7); use with "DD RAM Address Set" and "Data Write".



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