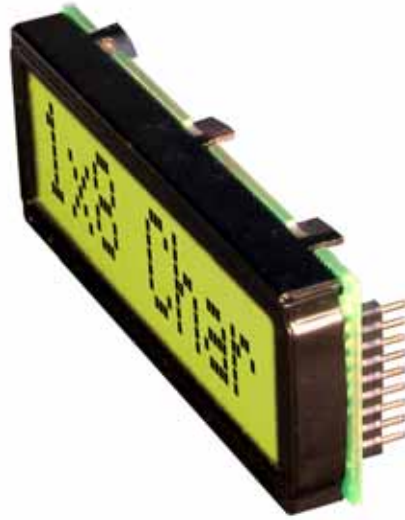


## INCL. CONTROLLER HD 44780

no more mounting  
required



*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
- \* BUILT-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

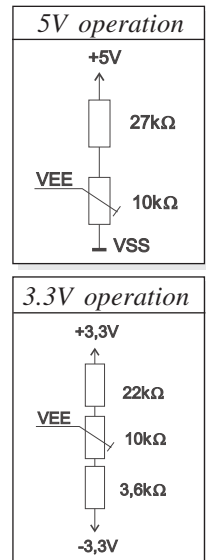
LCD MODULE 1x8 - 11.48mm WITH BACKLIGHT Y/G  
 SAME BUT WITH T<sub>OP.</sub> -20~+70°C, INCL. TEMP.COMP.  
 9-PIN SOCKET, HEIGHT 4.3mm (1 PC.)  
 SUITABLE BEZEL (WINDOW 60.0x14.8 mm)  
 ADAPTOR PCB WITH STANDARD PINOUT PITCH 2.54mm

**EA DIP081-CNLED**  
**EA DIP081-CHNLED**  
**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	RW	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

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 limiter. Calculation is:  $R=U/I$ , so at 5V supply:

$$R_{\text{gelb/grün}} = (5,0V - 4,1V) / 0,15A = 6 \text{ Ohm}$$

**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 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	`	~		-	9	3	α	p	
xxxx0001 (\$x1)	(1)	!	1	A	Q	a	q		µ	7	7	4	ä	q
xxxx0010 (\$x2)	(2)	"	2	B	R	b	r		Γ	ι	ψ	χ	β	θ
xxxx0011 (\$x3)	(3)	#	3	C	S	c	s		┘	ϖ	τ	ε	ε	ω
xxxx0100 (\$x4)	(4)	\$	4	D	T	d	t		\	I	t	τ	μ	Ω
xxxx0101 (\$x5)	(5)	%	5	E	U	e	u		·	Α	Α	1	σ	Ü
xxxx0110 (\$x6)	(6)	&	6	F	V	f	v		ヲ	カ	ニ	ヨ	ρ	Σ
xxxx0111 (\$x7)	(7)	'	7	G	W	g	w		ア	キ	ヌ	ウ	g	π
xxxx1000 (\$x8)	CG RAM (0)		8	H	X	h	x		イ	ウ	ネ	リ	フ	Σ
xxxx1001 (\$x9)	(1)	)	9	I	Y	i	y		ウ	ケ	ノ	ル	"	γ
xxxx1010 (\$xA)	(2)	*	!	J	Z	j	z		エ	コ	ハ	レ	j	≠
xxxx1011 (\$xB)	(3)	+	;	K	[	k	[		オ	ウ	ヒ	ロ	*	≠
xxxx1100 (\$xC)	(4)	,	<	L	¥	l	l		カ	シ	フ	ワ	φ	≠
xxxx1101 (\$xD)	(5)	-	=	M	] m	>			ユ	ズ	へ	ン	ε	÷
xxxx1110 (\$xE)	(6)	.	>	N	^ n	→			ヨ	セ	ホ	へ	ñ	
xxxx1111 (\$xF)	(7)	/	?	O	_ o	←			ウ	リ	マ	マ	ö	

**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

**INITIALISATION 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.

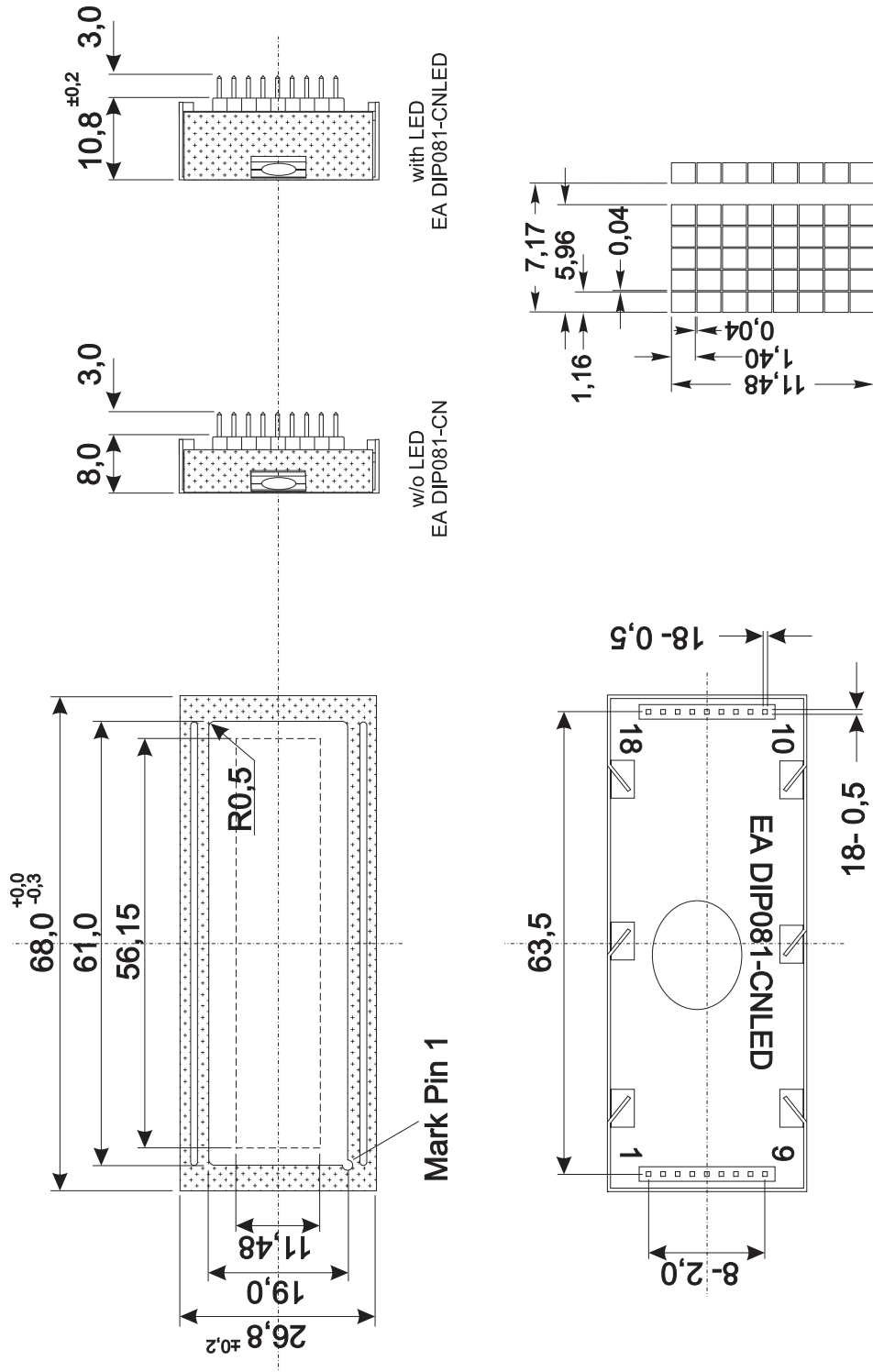
- 1.) The command "CG RAM Address Set" defines the ASCII code (Bit 3,4,5) and the dot line (Bit 0,1,2) of the new character. Example demonstrates creating ASCII code \$00.
- 2.) Doing 8 times the write command "Data Write" defines line by line the new character. 8th. byte stands for the cursor line.
- 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							Hex	
7	6	5	4		3	2	1	0	Hex		
0	1	0	0	0	0	0	0	0	0	0	\$04
				0	0	1	0	0	0	0	\$04
				0	1	0	0	0	0	0	\$04
				0	1	1	0	0	0	0	\$04
				1	0	0	0	0	0	0	\$15
				1	0	1	0	0	0	0	\$0E
				1	1	0	0	0	0	0	\$04
				1	1	1	0	0	0	0	\$00

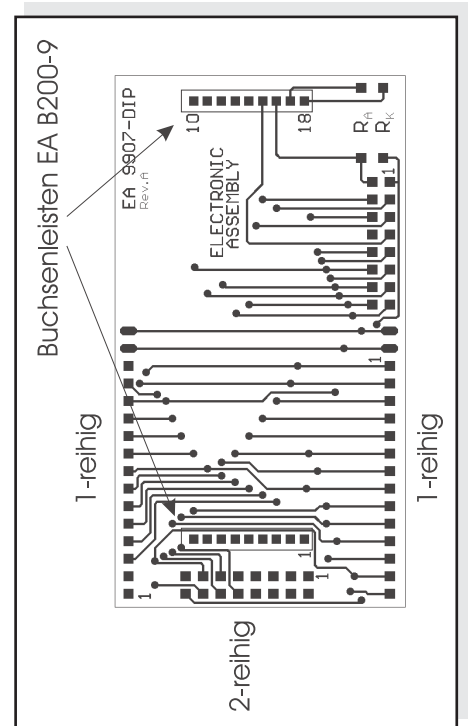
# EA DIP081-CNLED

ELECTRONIC ASSEMBLY reserves the right to change specifications without prior notice. Printing and typographical errors reserved.

## DIMENSIONS



*all dimensions are in mm*



*Adaptor pcb  
EA 9907-DIP*

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