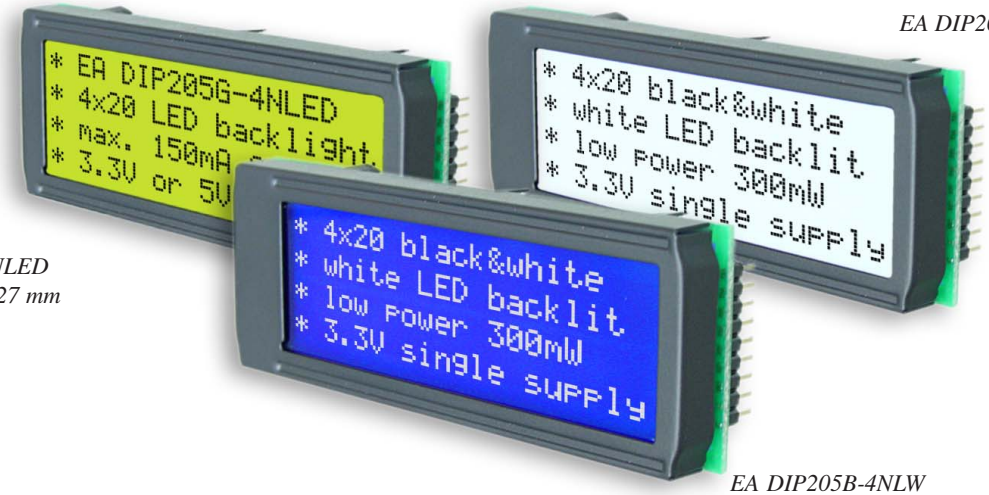
TEXT DISPLAY
4x20 - 3.75mm

Issue 03.2023

INCL. CONTROLLER RW1073



EA DIP205J-4NLW

EA DIP205G-4NLED
Dimension 68 x 27 mm

EA DIP205B-4NLW
Dimension 75 x 27 mm

FEATURES

* HIGH CONTRAST LCD SUPERTWIST DISPLAY
* CONTROLLER RW1073-0B (COMPATIBLE TO SSD1803)
* INTERFACE FOR 4- AND 8-BIT DATA BUS
* SERIAL SPI INTERFACE (SID, SOD, SCLK)
* POWER SUPPLY +3.3V / 1.5mA (W./O. B/L)
* ALTERNATIVELY +5V (NEED TO CHANGE 2 COMPONENTS)
* LED BACKLIGHT Y/G max. 150mA@+25°C
  LED BACKLIGHT BLUE-WHITE AND BLACK-WHITE max. 45mA@+25°C
* OPERATING TEMPERATURE RANGE -20..+70°C
* BUILT-IN TEMPERATURE COMPENSATION
* SOME MORE MODULES WITH SAME SIZE AND SAME PINOUT:
  - DOTMATRIX 1x8, 2x16
  - GRAPHIC 122x32
* NO SCREWS REQUIRED: SOLDER ONTO PCB ONLY
* DETACHABLE VIA 9-PIN SOCKET EA B200-9 (2 PCS REQUIRED)

ORDERING INFORMATION

LCD MODULE 4x20 - 3.75mm WITH LED BACKLIGHT Y/G	**EA DIP205G-4NLED**
BLUE-WHITE	**EA DIP205B-4NLW**
BLACK-WHITE	**EA DIP205J-4NLW**
9-PIN SOCKET, HEIGHT 4.3mm (1 PC.)	**EA B200-9**

PINOUT

Pin	Symbo	Level	Function	Pin	Symbo	Level	Function
1	VSS	L	Power Supply 0V (GND)	10	D3	H / L	Display Data
2	VDD	H	Power Supply +3.3V	11	D4 (D0)	H / L	Display Data
3	VEE	-	Contrast adjustment, input	12	D5 (D1)	H / L	Display Data
4	RS (CS)	H / L	H=Data, L=Command	13	D6 (D2)	H / L	Display Data
5	R/W (SID)	H / L	H=Read, L=Write	14	D7 (D3)	H / L	Display Data, MSB
6	E (SCLK)	H	Enable (falling edge)	15	-	-	NC (see EA DIP122-5N)
7	D0 (SOD)	H / L	Display Data, LSB	16	RES	L	Reset (internal Pullup 10k)
8	D1	H / L	Display Data	17	A	-	LED B/L+ Resistor required
9	D2	H / L	Display Data	18	C	-	LED B/L-

BACKLIGHT

Using the LED backlight requires a current source or external current-limiting resistor. Forward voltage for yellow/green backlight is 3.9~4.2V and for white LED backlight is 3.2~3.5V. Please take care of derating for T_a>+25°C.

Note: Do never connect backlight directly to 5V; this may destroy backlight immediately !

TABLE OF COMMAND RW1073

Instruction	RE	Instruction Code										Description	Execution Time(fosc =270KHz)
		RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		
Clear Display	X	0	0	0	0	0	0	0	0	0	1	Write "20H" to DDRAM. and set DDRAM address to "00H" from AC.	1.53ms
Return Home	0	0	0	0	0	0	0	0	0	1	X	Set DDRAM address "00H" from AC and return cursor to its original position if shifted. The contents of DDRAM are not changed.	1.53ms
Power Down Mode	1	0	0	0	0	0	0	0	0	1	PD	Set power down mode bit PD="1": power down mode set. PD="0": power down mode disable.	39uS
Entry Mode Set	0	0	0	0	0	0	0	0	1	I/D	S	Assign cursor moving direction, I/D="1": increment.. I/D="0": decrement. and display shift enable bit. S="1": make display shift of the enabled lines by the DS4-DS1 bits in the Shift Enable instruction. S="0": display shift disable.	39uS
	1	0	0	0	0	0	0	0	1	1	BID	Segment bidirectional function. BID="1": Seg60->Seg1. BID="0": Seg1->Seg60.	39uS
Display ON/OFF Control	0	0	0	0	0	0	0	1	D	C	B	Set display/cursor/blink on/off D="1": display on. D="0": display off. C="1": cursor on. C="0": cursor off. B="1": blink on. B="0": blink off.	39uS
Extended Function set	1	0	0	0	0	0	0	1	FW	B/W	NW	Assign font width; black/white inverting of cursor, and 4-line display mode bit. FW="1": 6-dot font width. FW="0": 5-dot font width B/W="1": black/white inverting of cursor enable. B/W="0": black/white inverting of cursor disable. NW="1": 4-line display mode. NW="0": 1-line or 2-line display mode.	39uS

Instruction	RE	Instruction Code										Description	Execution Time(fosc =270KHz)
		RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		
Cursor or Display Shift	0	0	0	0	0	0	1	S/C	R/L	X	X	Cursor or display shift S/C="1": display shift. S/C="0": cursor shift R/L="1": shift to right. R/L="0": shift to left.	39uS
Shift Enable	1	0	0	0	0	0	1	DS4	DS3	DS2	DS1	(When DH="1") Determine the line for display shift. DS1="1/0": 1 st line display shift enable/disable. DS2="1/0": 2 nd line display shift enable/disable. DS3="1/0": 3 rd line display shift enable/disable. DS4="1/0": 1 th line display shift enable/disable.	39uS
Function Set	0	0	0	0	0	1	DL	N	RE (0)	DH	REV	Set interface data length, (DL="1": 8 bit, DL="0": 4bit), Number of display line when NW="0", (N="1": 2-line, N="0": 1-line), extension register; RE(0), shift enable, (DH="1": display enable, DH="0": display disable), and reverse bit (REV="1": reverse display,. REV="0": normal display)	39uS
	1	0	0	0	0	1	DL	N	RE (1)	BE	0	Set DL,N,RE("1") and CGRAM/SEGRAM blink enable (BE) (BE="1": CGRAM/SEGRAM blink enable, BE="0": CGRAM/SEGRAM blink disable)	39uS
Set CGRAM Address	0	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	Set CGRAM address in address counter.	39uS
Set SEGRAM Address	1	0	0	0	1	X	X	AC3	AC2	AC1	AC0	Set SEGRAM address in address counter.	39uS
Set DDRAM Address	0	0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Set DDRAM address in address counter.	39uS
Read Busy Flag and Address	X	0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Can be known whether during internal operation or not by reading BF. The contents of address counter can also be read. (BF="1": busy state, BF="0": ready state)	0uS
Write Data	X	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write data into internal RAM (DDRAM/CGRAM/ SEGRAM)	43uS
Read Data	X	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read data into internal RAM (DDRAM/CGRAM/ SEGRAM)	43uS

INITIALISATION EXAMPLE FOR 8 BIT MODE											
Command	**RS**	**R/W**	**DB7**	**DB6**	**DB5**	**DB4**	**DB3**	**DB2**	**DB1**	**DB0**	**Hex**	**Description**
Function Set	0	0	0	0	1	1	0	1	0	0	$34	8 bit data length, extension bit RE=1
ext. Function Set	0	0	0	0	0	0	1	0	0	1	$09	4 line mode
Function Set	0	0	0	0	1	1	0	0	0	0	$30	8 bit data length, extension bit RE=0
Display ON/OFF	0	0	0	0	0	0	1	1	1	1	$0F	display on, cursor on, cursor blink
Clear Display	0	0	0	0	0	0	0	0	0	1	$01	clear display, cursor 1st. row, 1st. line
Entry Mode Set	0	0	0	0	0	0	0	1	1	0	$06	cursor will be automatically incremented

Addressing:

1st. line	*$00..$13*
2nd. line	*$20..$33*
3rd. line	*$40..$53*
4th. line	*$60..$73*

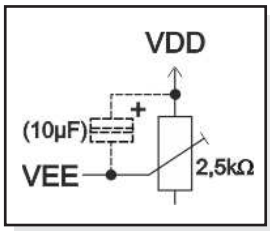
CHARACTER SET

A full character set is built-in already.
Additionally to that 8 more characters can be defined individually.

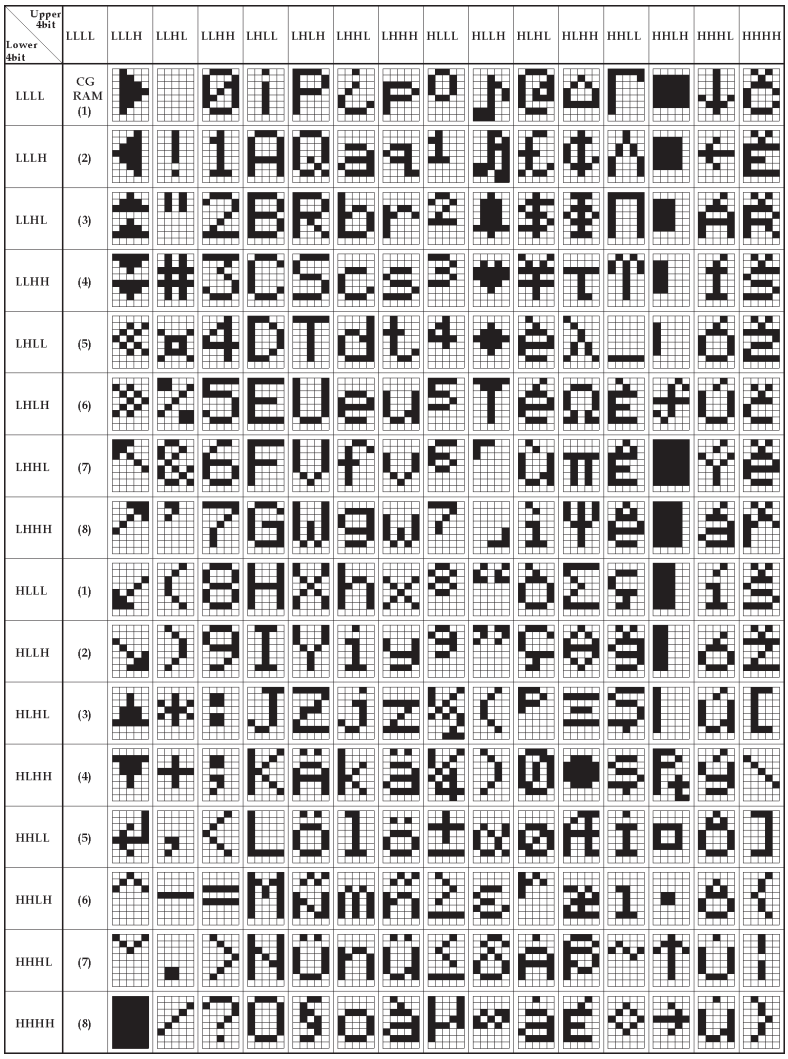
CONTRAST ADJUSTMENT

Pin 3 requires driving voltage for contrast VEE. Adjustment can be done by external potentiometer for example.

Note: In contrast to many other dotmatrix lcd modules input is supplied with VDD level here !



All versions do have a built-in temperature compensation; so there's no more need for contrast adjustment during operation anymore.



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 240 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 newly 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	
0	1	0	0 0	$40				0	0	1	0	0	$04
			0 1	$41				0	0	1	0	0	$04
			1 0	$42				0	0	1	0	0	$04
			1 1	$43				0	0	1	0	0	$04
			0 0	$44	X	X	X	1	0	1	0	1	$15
			0 1	$45				0	1	1	1	0	$0E
			1 0	$46				0	0	1	0	0	$04
			1 1	$47				0	0	0	0	0	$00

5V OPERATION

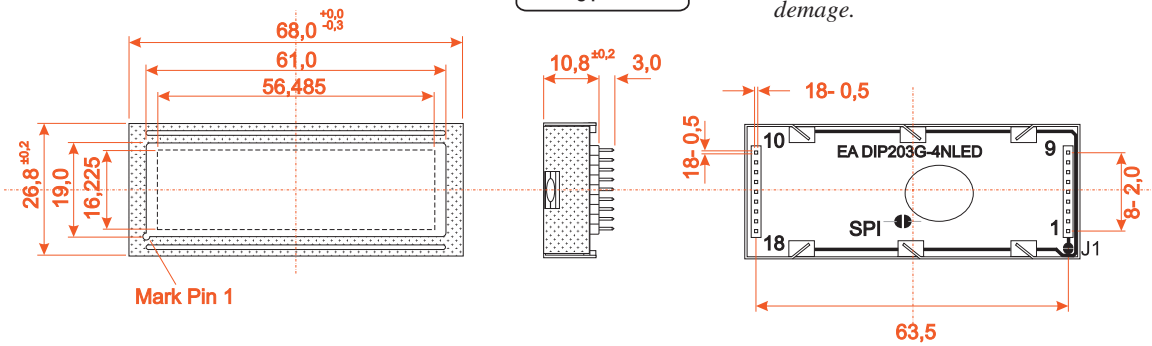
The supply voltage of the display ex work is 3.3V.
If a 5V-system is used, the display need to be modified by hand:
- remove C2
- add R6 with 0 ohms

COMPATIBILITY EA DIP203-4, DIP204-4 AND DIP205-4

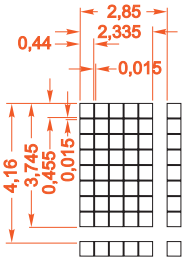
The displays of DIP203, DIP204 and DIP205 series are electrically and mechanically identical to each other running with 3.3V supply mode. Merely a 5V supply is not acceptable with the EA DIP203 series.

Note:
LC-Displays are generally not suited to wave or reflow soldering. Temperatures of over 80°C can cause lasting demage.

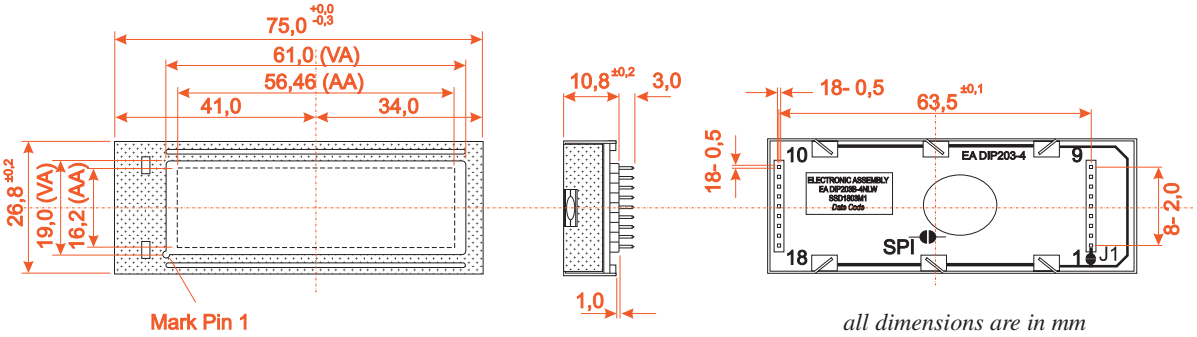
EA DIP205G-4NLED



all dimensions are in mm



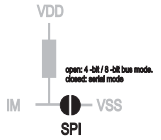
EA DIP205B-4NLW AND EA DIP205J-4NLW



all dimensions are in mm

SERIAL SPI MODE

Factory setting for interface is parallel with 4 bit or 8 bit data bus. Alternatively the module can be used with serial data stream. For that, solder link **SPI** has to be closed. Specification for serial operation mode is described in user manual for RW1073:
https://www.lcd-module.de/fileadmin/eng/pdf/zubehoer/RW1073-0B-002_Rev0.0-20121029.pdf
Software for initialisation and programming is same as for 8 bit.



DISPLAY VISIONS GmbH
Zeppelinstraße 19
D-82205 Gilching
Germany

Fon: +49 (0)8105-77 8090
Fax: +49 (0)8105-77 8099
e-Mail: info@lcd-module.de
Web: www.lcd-module.com