

### Display modules from Electronic Assembly

Electronic Assembly markets a broad spectrum of top-quality industrial displays to customers in a number of industries ranging from process automation and machinery manufacturing to IT. Because Electronic Assembly offers all the familiar advantages of a mid size company, it has the flexibility to accommodate the wide-ranging needs of its customers.

Electronic assembly provides free-to-download SW development tools. In a production range we can find world unique real 3,3V displays, modules with user-selectable backlight as well as intelligent graphic displays with powerful drawing and other graphic functions.

#### Typical features of Electronic Assembly display modules:

- no time-consuming graphics programming at a low level
- drastically reduced time-to-market
- high flexibility thanks to powerful commands and a variety of interfaces (RS-232, I, C, SPI)
- extremely compact construction
- price advantage compared to customized solutions



### Bezels - an important accessory making a real usage easier

- **EA 017-xxU series**

These bezels give your equipment a professional design without extra tooling. The bezels of the EA 017-xxU series are made of black ABS material to UL 94 V0 (up to 100°C, self-extinguishing, non-combustible) with a scratch-resistant, structured surface. They contain a snap-in mechanism for mounting a wide range of plates with a thickness of 1mm. The plates can thus be easily replaced, as required. A front plate can also be delivered with the specified bezels (clear plexiglass, anti-glare plexiglass or glass).

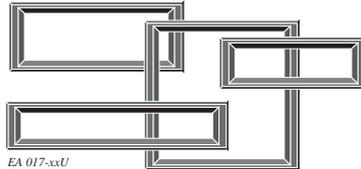
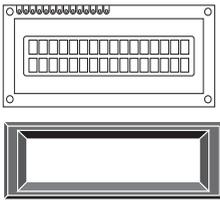


- **EA 017-xx series**

The bezels of the EA 017-xx series have a matt black, coated surface and an undercut at the back for sticking on plexiglass plates with a thickness of 1-2mm. The specified bezels can be delivered optionally with or without a fitted plexiglass plate.

- **EA 027-xxKE series**

The bezels of the EA 027-xxKE series are made of anthracite-colored ABS material. They are delivered exclusively with a replaceable, anti-glare plexiglass plate.



Ordering information	viewing area		bezel size		cutout		studs G	matching lcd-module dotmatrix / graphic	
	A	B	C	D	E	F			
EA 017-1U	63,5	12,8	79,5	25,0	69,7	19,2	74,5	EA 7161-A	1x16
EA 017-2U	60,0	14,8	76,0	27,0	66,2	21,2	71,0	EA 7162	2x16
EA 017-3	131,5	13,0	147,5	25,2	137,7	19,4	142,5	(EA 7321)	1x32
EA 017-4U	153,0	14,8	169,0	27,0	159,2	21,2	164,0	EA 7402	2x40
EA 017-5	140,0	15,8	156,0	28,0	146,2	22,2	151,0	EA 7322-B	2x32
EA 017-6U	98,5	12,8	114,5	25,0	104,7	19,2	109,5	EA 7161-E	1x16
EA 017-7U	81,5	17,2	97,5	29,4	87,7	23,6	92,5	EA 7202	2x20
EA 017-8U	60,8	24,2	76,8	36,4	67,0	30,6	71,8	EA 7164	4x16
EA 017-9U	75,0	24,2	91,0	36,4	81,2	30,6	86,0	EA 7204	4x20
EA 017-10U	131,0	38,0	147,0	50,2	137,2	44,4	142,0	EA 7240-6	240x64
EA 017-12U	97,4	22,4	113,4	34,6	103,6	28,8	108,4	EA 7162-B	2x16
EA 017-13U	145,0	28,0	161,0	40,2	151,2	34,4	156,0	EA 7404	4x40
EA 017-14U	92,0	14,8	108,0	27,0	98,4	21,2	103,0	EA 7242	2x24
EA 017-15U	68,0	68,0	84,0	80,2	74,2	74,4	79,0	EA VK-2128	128x128
EA 017-16U	75,0	39,0	91,0	51,2	81,2	45,4	86,0	EA VK-2080	160x80
EA 017-17U	58,0	32,5	74,0	44,7	64,2	38,9	69,0	EA VK-2064	128x64
EA 017-18U	99,5	80,5	115,5	92,7	105,7	86,9	110,5	EA VK-5160	160x128
EA 017-23	121,0	12,0	137,0	24,2	127,2	18,4	132,0	EA 8201-B	1x20
EA 017-25	121,0	41,5	137,0	53,7	127,2	47,9	132,0	EA 8204-B	4x20
EA 017-27	145,0	33,8	161,0	46,0	151,2	40,2	156,0	EA 8202-C	2x20
EA 017-28	145,0	63,9	161,0	76,1	151,2	70,3	156,0	EA 8204-C	4x20

### OLED

In our offer we have alphanumeric displays series EAW from Electronic Assembly. They provide a contrast ratio of minimum 2000:1, thanks to their real black background and active technology. Series EAW have an extremely fast 10us response time, which stays fast even at icy temperatures. Great advantage over standard LCD modules is their ability to provide a full contrast even at -40°C.

No limitation in viewing angle and no need for contrast adjustment belong to another advantages in comparison to LCD displays. EAW displays have an integrated controller (HD44780-like) and already as a standard, they provide all important characters sets: English, Japanese, European and Cyrillic. Further, up to 8 characters can be defined by user. Displays can work with 5V or 3.3V without modification. Some types are available in two versions – light green and icewhite.



OLED										
Part-Number	Row x Column	Char height	Module size			Viewing Area		Accessories (Frames)	Hints	Drawing page
			B	H	T	B	H			
EA W082-XLG	2x8	5.5	58.0	32.0	10.0	38.0	16.0	---	yellow/green	7
EA W162-X3LW	2x16	5.5	80.0	36.0	10.0	66.0	16.0	EA 017-2U	icewhite	7
EA W162-X3LG	2x16	5.5						EA 017-2U	yellow/green	7
EA W162-X9LG	2x16	5.5	85.0	36.0	10.0	66.0	16.0	EA 017-2U	yellow/green	8
EA W162-XLG	2x16	5.5	84.0	44.0	10.0	66.0	16.0	EA 017-2U	yellow/green	8
EA W162-XBLW	2x16	8.9	122.0	55.0	10.0	99.0	24.0	EA 017-12U	icewhite	9
EA W162-XBLG	2x16	8.9						EA 017-12U	yellow/green	9
EA W202-XLG	2x20	5.5	116.0	37.0	9.8	85.0	18.6	EA 017-7U	yellow/green	9
EA W204-XLG	4x20	5.5	98.0	60.0	10.0	70.0	25.2	EA 017-9U	yellow/green	10

### TECHNICAL DATA

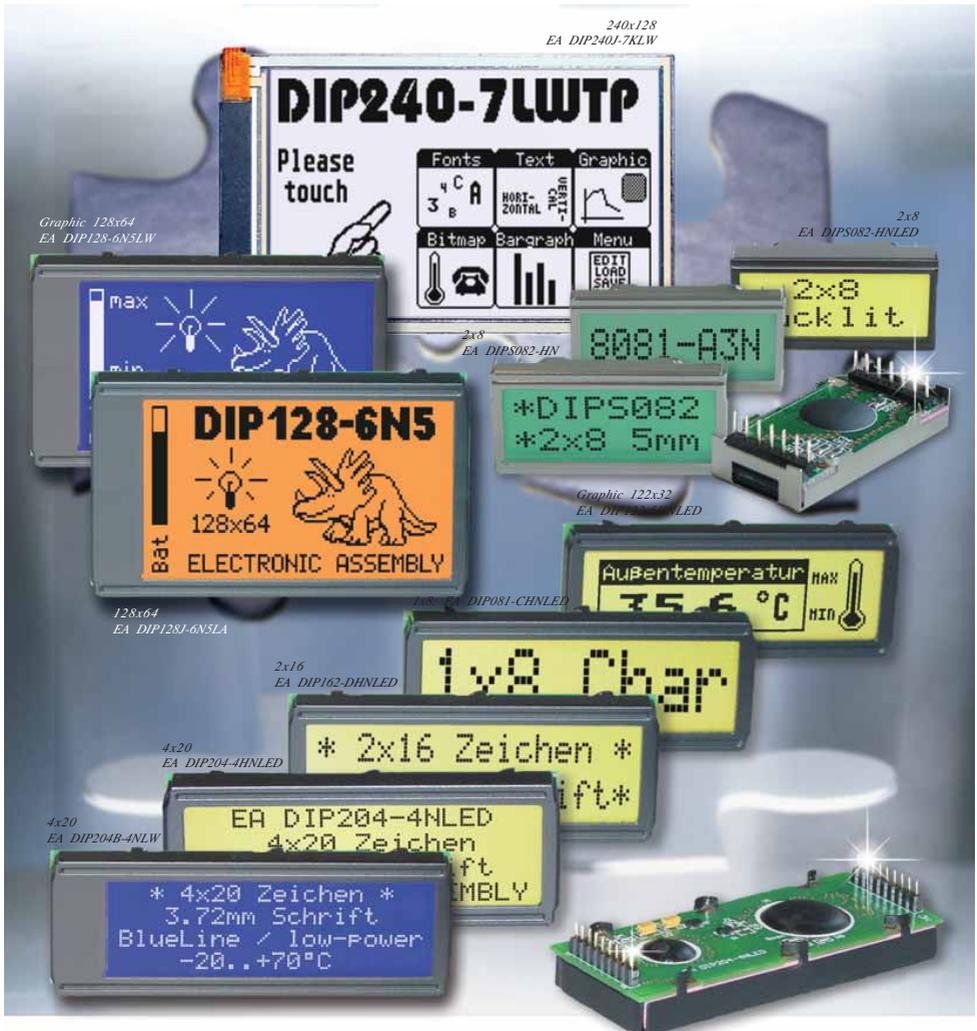
- \* INTEGRATED CONTROLLER (HD44780-LIKE)
- \* INPUT 4- OR 8-BIT DATA-BUS, 3 CONTROL-WIRES(R/W, E, RS)
- \* ASCII-CHAR SET AND SPECIAL SYMBOLS STORED IN CHARACTER-ROM
- \* UP TO 8 CHARACTERS (ASCII-CODE 0..7) CAN BE DEFINED BY USER
- \* DIFFERENT FUNCTIONS WITH ONE INSTRUCTION:
  - CLEAR DISPLAY, CURSOR HOME, CURSOR ON/OFF, BLINKING CURSOR
  - SHIFT DISPLAY, SHIFT CURSOR, READ/WRITE DISPLAY DATA, ETC.
- \* SIMPLE SUPPLY (3.3..5V).
- \* LOW POWER CONSUMPTION (15..50 mA)
- \* OPERATING TEMPERATURE -40..+80°C
- \* 4 INTEGRATED FONTS

### DIP series - clear assembling benefit

Because of their design, DIP modules are extremely compact: there is no PCB overhang, no drilled holes for assembly and no contact pads for connectors or cables. The viewing area is optimally sized and the large font makes reading easier.

DIP modules are simply inserted in the PCB and soldered in place. No screws, distance sleeves or cables are required.

Series are compatible both in terms of pins and dimensions. It is therefore a simple matter to use both a text display (e.g. 2 x 16) and a graphics display (e.g. 122 x 32) within a series without the need for any mechanical or hardware modifications.



### All modules at a glance

Dimension	Characte	Char. size	Backlight	Ordering code
40x20mm	1x8	7.15 mm	none	EA 8081-A3N
	2x8	5.01 mm	none	EA DIPS082-HN
			yellow/green	EA DIPS082-HNLED
68x27mm / 75x27mm	1x8	11.48 mm	yellow/green	EA DIP081-CHNLED
	2x16	6.68 mm	yellow/green	EA DIP162-DHNLED
			black&white	EA DIP162J-DN3LW
			blue-white	EA DIP162-DN3LW
	4x20	3.73 mm	yellow/green	EA DIP204-4HNLED
			black&white	EA DIP204J-4NLW
			blue-white	EA DIP204B-4NLW
	122x32	Graphic	yellow/green	EA DIP122-5HNLED
			blue-white	EA DIP122B-5NLW
			amber	EA DIP122J-5NLA
75x46mm	128x64	Graphic	black&white	EA DIP128J-6N5LW
			blue-white	EA DIP128-6N5LW
			amber	EA DIP128J-6N5LA
	4x20	6.45 mm	black&white	EA DIP204J-6NLW
			blue-white	EA DIP204B-6NLW
			black&white	EA DIP240J-7KLW
113x70mm	240x128	Graphic	blue-white	EA DIP240B-7KLW
			amber	EA DIP240J-7KLA

### SMART MOUNTING !

Assembling is done within 2 steps only: **place - solder - ready**. There are no more cables, screws or pin header necessary. Economy is double: first in development because there's no need to design any mechanical fixing; later during production you'll save time piece by piece for non-mounting the display: There's nothing to screw on anymore !

### LARGE DISPLAY - LESS DIMENSIONS

DIP modules are using the available space optimal. Or do you know any other display with well readable 5.05~11.48mm character height with such compact outline dimension? Traditional displays do have smaller type size at much bigger physical outline.

How does it work? DIP modules do not need these senseless pcb border with mounting holes and through hole connector.

### COMPATIBLE

All modules from DIP series do have standard controller built in. Character displays are compatible to HD 44780 in pinout and software and graphic displays do have SED 1520, KS 0107/0108 or T6963 compatible controller onboard. By the way modules of same series can replace each other because pinout and mechanical dimensions are compatible - adequate software supposed. Later on an upgrade from character to graphic display is possible at any time. Most of DIP module series are featured with a LED backlight in yellow/green, blue-white, amber or black&white.

### LOW POWER

Power consumption without backlight is typ. 1mA@5V and incl. blue-white backlight 60~160mA only.

All modules at a glance				
Dimension	Characte	Char. size	Backlight	Ordering code
40x20mm	1x8	7.15 mm	none	EA 8081-A3N
	2x8	5.01 mm	none	EA DIPS082-HN
			yellow/green	EA DIPS082-HNLED
68x27mm / 75x27mm	1x8	11.48 mm	yellow/green	EA DIP081-CHNLED
	2x16	6.68 mm	yellow/green	EA DIP162-CHNLED
			black&white	EA DIP162J-DN3LW
			blue-white	EA DIP162-DN3LW
	4x20	3.73 mm	yellow/green	EA DIP204-4HNLED
			black&white	EA DIP204J-4NLW
			blue-white	EA DIP204B-4NLW
	122x32	Graphic	yellow/green	EA DIP122-5HNLED
			blue-white	EA DIP122B-5NLW
			amber	EA DIP122J-5NLA
75x46mm	128x64	Graphic	black&white	EA DIP128J-6N5LW
			blue-white	EA DIP128-6N5LW
			amber	EA DIP128J-6N5LA
4x20	6.45 mm	black&white	EA DIP204J-6NLW	
		blue-white	EA DIP204B-6NLW	
		black&white	EA DIP240J-7KLW	
113x70mm	240x128	Graphic	blue-white	EA DIP240B-7KLW
			amber	EA DIP240J-7KLA



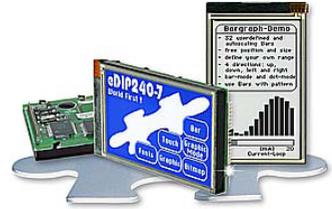
128x64 dots  
75x46mm

### eDIP

The first intelligent graphic displays:

- 480x272 dots color
- 240x320 dots monochrome
- 320x240 dots monochrome

no time-consuming graphics programming, powerful commands and a variety of interfaces (RS-232, I<sup>2</sup>C, SPI), extremely compact construction, clear price advantage compared to individualized solutions



## Touchpanel with SPI, I<sup>2</sup>C, RS-232

- \* touch panel incl. controller
- \* RS-232 + I<sup>2</sup>C-Bus + SPI
- \* USB + RS-485 via external circuit
- \* character sets & graphic functions
- \* 128x64 .. 320x240 monochrome
- \* colored TFT 3.2" and 4.3"
- \* single supply +5V (some +3.3V)
- \* T<sub>op.</sub> -20..+70°C



Characteristics				
Display	Resolution	Size	Color	Op. Voltage
EA eDIP128-6	128x64	2.8"	black&white or blue	3.3~5V
EA eDIP160-7	160x104	3.3"	black&white or blue	3.3~5V
EA eDIPTFT32-A	320x240x3	3.2"	TFT	3.3~5V
EA eDIP240-7	240x128	4.5"	black&white or blue	5V
EA eDIPTFT43	480x272x3	4.3"	TFT	5V
EA eDIP320-8	320x240	5.7"	black&white or blue	5V

## Whether Monochrome or Color

This is how graphics programming will look in the future

No more "pixel programming" but, instead, efficient operation with extensive drawing functions and fonts. The advantages are obvious:

- \* no time-consuming graphics programming
- \* drastically reduced time-to-market
- \* tested functions validated thousands of times
- \* unparalleled flexibility thanks to powerful commands
- \* extremely compact construction
- \* a clear price advantage compared to individualized solutions



### Powerful commands

such as the touchkey with menu function, clipboard, bargraph, centered strings... You can therefore create the screen layout you want with just a few, easily understood commands. All the commands are based on coordinate specifications and can therefore be applied and moved to the nearest pixel. There is a built-in self-test facility for

Characteristics				
Display	Resolution	Size	Color	Op. Voltage
EA eDIP128-6	128x64	2.8"	black&white or blue	3.3~5V
EA eDIP160-7	160x104	3.3"	black&white or blue	3.3~5V
EA eDIPTFT32-A	320x240x3	3.2"	TFT	3.3~5V
EA eDIP240-7	240x128	4.5"	black&white or blue	5V
EA eDIPTFT43	480x272x3	4.3"	TFT	5V
EA eDIP320-8	320x240	5.7"	black&white or blue	5V

demonstration purposes and initial testing.

### 3 different interfaces: RS-232, I<sup>2</sup>C, SPI

There is something to match every system: depending on the configuration, the connection can be established via an RS-232 (CMOS level), SPI or I<sup>2</sup>C bus interface.

### USB, RS-485 interface

With a simple external IC (e.g. FT232R or SN75176) it is easy to adapt to some more interfaces. Application notes are available.

### Touch Panel

Optionally, we can also supply this display with an analog touch panel which can be used for all types of input. An integrated touch controller is responsible for representing and labelling the keys as well as for their interpretation. What is more, the shape, size and number of the keys can be modified whenever required at runtime. This permits a clear, well-organized screen layout that helps eliminate operating errors. Device adaptations for foreign countries and languages are simple to implement even in tiny runs. This also includes e.g. Cyrillic, Hebrew, Arabic.



### eDIP TFT series

TFT display with 4.3", which is immediately running and it provides from the first minute the full functionality. The display does require a single supply 5V= and an interface RS-232, I2C or SPI only.

All character sets and control /graphic functions for the display and the touch panel are immediately available.

- \* **No Controller Board required !**
- \* **RS-232 + I<sup>2</sup>C Bus + SPI**
- \* **Character Set & Graphic Functions**
- \* **3.2" and 4.3" / 65536 colors**
- \* **Single Supply +5V (3.2" also +3.3V)**
- \* **Incl. Touch Panel Controller**
- \* **T<sub>Op.</sub> -20..+70°C**



Characteristics				
Value	Condition	EA eDIPTFT32	EA eDIPTFT43	Unit
Resolution		320x240x3	480x272x3	dots
Dimension		82x61	107x71	mm
Size		3.2	4.3	inch
Operating Temp.		-20..+70		°C
Operating Voltage		3.3-5V	5	V
Brightness (white)	w/o. Touch	700	500	cd/m <sup>2</sup>
	with Touch	550	410	cd/m <sup>2</sup>
Power Supply	Backlight 100%	160/120	180	mA
	Backlight off	37/25	80	mA

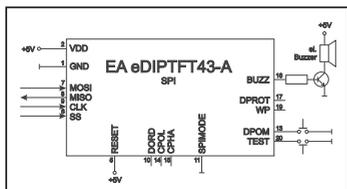
In recent years TFT displays came to the top for mobile phones, PDA and digital cameras. It stands to reason that more and more industrial applications like to be equipped with a coloured display, too. Thanks to the colours, process parameters or limit exceeds can be highlighted very easy. Simultaneously a coloured TFT display point up the valence and the product image of your equipment. Last but not least the non-reached brilliance and the excellent contrast satisfy even sophisticated guys immediately.



EA eDIPTFT43-ATP  
4.3" - 480x272x3

### Complex Driving ? No !

After the engineer had taken a closer look at the standard TFT panels on market, decision is often against those beautiful coloured TFT panels. The reason is, that the effort for driving such a display is tremendous and requires something like a PC board. Cost for those are easy a multiple of price then for the display alone. Also the high current consumption for those boards and the long delay for power-up and boot sequence make these systems unhandy. In addition to that the required development effort for hard- and software is considerable. This is no longer profitable for a quantity of 100 or 1,000 pcs. The time consumption for such a development and the expense are clearly to high.



### The solution

But there is an alternative: using an *intelligent* display. This is quiet easy to integrate into a typical microcontroller system; because it's ready for operation immediately.

Power supply is wide range +3.3V~5V for the 3.2" version and +5V for the 4.3"



version. One of 3 interface RS-232, I<sup>2</sup>C and SPI can be used for communication. A lot of different character sets and graphic functions are already built-in and can be used immediately. The internal FLASH provides the possibility to store pictures up to 65,536 colours (JPEG, BMP , TGA and GIF incl. animation). Individual company logos are created with ease. Alterable character sets (Cyrillic, Hebrew, Arabic...) which are created easily by a free-of-charge Windows tool, make it near to join international markets.

Characteristics				
Value	Condition	EA eDIPTFT32	EA eDIPTFT43	Unit
Resolution		320x240x3	480x272x3	dots
Dimension		82x61	107x71	mm
Size		3.2	4.3	inch
Operating Temp.		-20...+70		°C
Operating Voltage		3.3-5V		V
Brightness (white)	w/o. Touch	700	500	cd/m <sup>2</sup>
	with Touch	550	410	cd/m <sup>2</sup>
Power Supply	Backlight 100%	160/120	180	mA
	Backlight off	37/25	80	mA

### The Touch Panel

Thanks to the touch panel and FLASH technology it is easy to create a simple and clear user guidance. This is because only those keys and functions are visible, that are needed in current mode of operation; double key strokes and deep menu structures are no longer necessary. This will prevent mal-functions from the beginning. A large number of functions do support the touch panel. Individual key size and key position are possible; even adjustments can be done by a quick defined slide bar.

The large functionality gain this display to a complete HMI which is on the other hand very compact. The operating temperature range is good for the wide range of -20...+70°C. A long term availability and the high quality makes this display perfect for industrial, automotive and medicine applications.

As an accessory there is a black anodized mounting bezel made of aluminium available. With that the display can be easily mounted direct to front panel.



Ordering code		Dimension
EA eDIPTFT32-A	3.2"	82x61x12mm
EA eDIPTFT43-A	4.3"	107x71x12mm
EA eDIPTFT57-A	5.7"	146x107x13mm
EA eDIPTFT70-A	7"	170x112x14mm

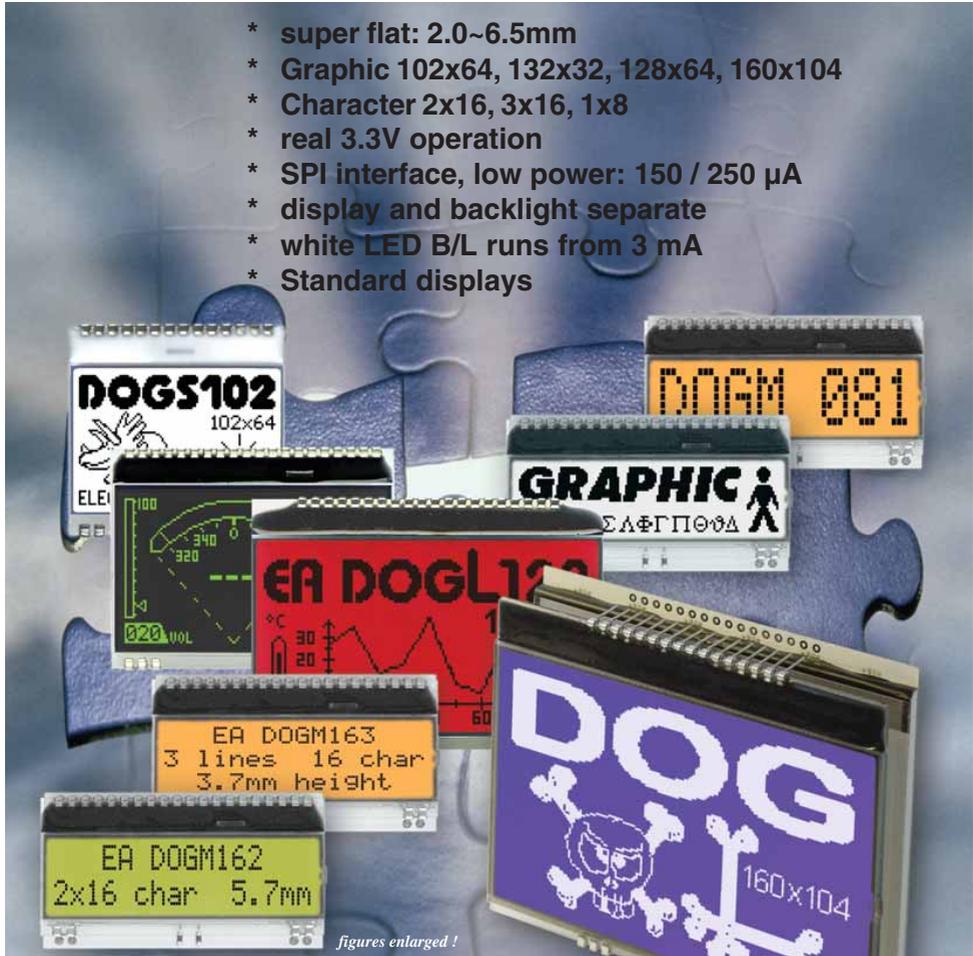
### DOG series

This display series was specially developed for low-power hand-held applications. For the first time it is possible to operate a standard display at 3.3V, maintaining extremely low power consumption

- can be soldered directly into the PCB without any further assembly
- 4-bit, 8-bit and SPI interface
- many different designs which can be implemented as of 1 unit

Six different colors are available as backlighting.

- \* super flat: 2.0~6.5mm
- \* Graphic 102x64, 132x32, 128x64, 160x104
- \* Character 2x16, 3x16, 1x8
- \* real 3.3V operation
- \* SPI interface, low power: 150 / 250  $\mu$ A
- \* display and backlight separate
- \* white LED B/L runs from 3 mA
- \* Standard displays



**ELECTRONIC  
ASSEMBLY**



display type	technology	optional backlight	readability	display color non backlighted	display color with backlighted	recommended backlight color
	FSTN pos. transfective	it's fine with and without backlight	readable even without backlight	black on white	black on backlight color	white, blue, RGB
	STN pos. yellow/green transmissive	backlight unit required	readable even without backlight	dark green on yellow/green	black on yellow/green or amber	yellow/green, amber
	STN neg. blue transmissive	usage only with backlight	---	---	backlight color on blue background	white, yellow/green
	FSTN neg. transmissive	usage only with backlight	---	---	backlight color on black background	white, RGB
	STN pos. yellow/green reflective	no backlight possible	finest readable without backlight	dark green on yellow/green	---	---

### • Character Displays

- 1 x 8 characters with 11.97 mm font
- 2 x 16 characters with 5.57mm font
- 3 x 16 characters with 3.65mm font
- 4 x 20 characters with 4.8mm font

### • Graphic Displays

- 102x64 dots, 1.7"
- 132x32 dots, 2.1"
- 128x64 dots, 2.3"
- 128x64 dots, 2.8"
- 240x64 dots, 3.6"
- 160x104 dots, 3.3"
- 240x128 dots, 3.9"

