

# COMPACT GRAPHIC MODULE Issue 04.2011

## 240x128 DOTS WITH CONTROLLER T6963C



### FEATURES

- \* VERY BRIGHT AND CONTRASTY DISPLAY
- \* ALSO WITH ANALOGUE TOUCH PANEL
- \* DIRECT MOUNTING ON PCB
- \* BUILT-IN CONTROLLER T6963C
- \* 8-BIT DATA BUS INTERFACE
- \* BUILT-IN COMPLETE CHARACTER SET
- \* TEXT AND GRAPHIC SIMULTANOUSLY
- \* SELF DEFINABLE CHARACTERS
- \* LARGE DISPLAY MEMORY WITH 32kB (> 8 PAGES)
- \* POWER SUPPLY +5V, typ. 60mA (W./O. BACKLIGHT)
- \* CONTRASTS POWER GENERATOR ON-BOARD
- \* OPERATING TEMPERATURE RANGE -20 ... +70°C
- \* TEMPERATURE COMPENSATION CIRCUIT ON-BOARD

### ORDERING INFORMATION

LCD-GRAPHIC MODULE 240x128 BLUE, WITH LED-B./L.  
WITH TOUCH PANEL, ANALOGUE, 4-WIRE  
DITO. IN BLACK&WHITE  
WITH TOUCH PANEL, ANALOGUE, 4-WIRE  
SOCKET 1x20, 4.5mm HEIGHT (1 PC.)

EA DIP240B-7KLW  
EA DIP240B-7KLWTP  
EA DIP240J-7KLW  
EA DIP240J-7KLWTP  
EA B254-20

**ELECTRONIC  
ASSEMBLY**  
making things easy

## LC-GRAPHIC DISPLAY EA DIP240-7

The very successful display line from ELECTRONIC ASSEMBLY, called DIP-series get's with it's EA P240-7 a new member now. Simple placing and soldering into pcb will manage not even electrical contact but also mechanical mounting.

The displays EA DIP240-7 provide a full graphic resolution of 240x128 dots and are at once all advantages of modern displays: standard controller T6963 on-board, fashionable LED- backlight with blue optic, single supply +5V, no additional power supply is required, wide operating temperature range incl. built-in temperature compensation.

## LED BACKLIGHT

Both types are equipped with a white LED-backlight. Please note that LEDs are wearable parts. Life time is between 1,000 and 20,000 hours<sup>\*)</sup>, depending from ambient conditions. A current limiting resistor for max. 120mA is built-in already. Please take into account a derating for temperatures higher than >+25°C. To extend life time backlight can be switched on and off directly via processor port (pin LEDOff). Life time can be increase by reduction of driving current, too.

## CONTROLLER T6963C BUILT-IN

All modules provide a built-in T6963C. Therefore a direct interface to 8-Bit processor system is available together with a comfortable command set. With that there's a complete character set built-in for example. This can be extended or completely exchanged by some self-definable characters, too. Every single character may be advised by a, attribute like "invers", "blink" or "invisible". More than 8 pages are available even in graphic mode (32kB). Text can be joined via "and-", "or-", "exor-" function with graphics layer.

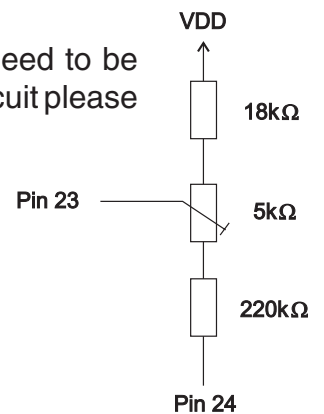
## CONTRAST ADJUSTMENT

Contrast pre-adjusted ex works. Thanks to the integrated temperature compensation there's no need to adjust while operation anymore.

Is contrast adjustment requested nevertheless, an external potentiometer need to be connected and SMD potentiometer RV1 has to be desoldered. For external circuit please follow the schematic at the right.

## PINOUT

Pin	Symbol	Function	Pin	Symbol	Function
1	N.C.	Do not connect	21	GND	Ground Potential for logic (0V)
2	N.C.		22	VDD	Power supply for logic (+5V)
3	N.C.		23	RV	Operating voltage for LC driving (input)
4	N.C.		24	VEE	Output voltage for LC driving
5	N.C.		25	C/D	L: Data input H: Command input
6	N.C.		26	WR	L: Data Write
7	N.C.		27	RD	L: Data Read
8	N.C.		28	CE	L: Chip Enable
9	N.C.		29	RST	L: Reset
10	N.C.		30	DB0	Data Bus Line, LSB
11	N.C.		31	DB1	Data Bus Line
12	N.C.		32	DB2	Data Bus Line
13	N.C.		33	DB3	Data Bus Line
14	N.C.		34	DB4	Data Bus Line
15	N.C.		35	DB5	Data Bus Line
16	N.C.		36	DB6	Data Bus Line
17	BOTTOM	Touch Panel	37	DB7	Data Bus Line, MSB
18	LEFT	Touch Panel	38	LEDoff	L: LED off; Pull-up 100k built-in
19	TOP	Touch Panel	39	A	LED backlight Anode +5V
20	RIGHT	Touch Panel	40	C	LED backlight Cathode 0V



<sup>\*)</sup> Prior art

## TOUCH PANEL

Ordering code EA DIP240B-7KLWTP (and EA DIP240J-7LWTP of course) do include a built-in touch panel.

Touch panel is an analogue one with 4-wire. Connection can be done via touch panel controller like MK712 from MICROCLOCK or ADS7846 from Burr-Brown. If there's a microcontroller with 4 switchable analogue inputs /digital outputs then touch panel can be connected directly to the uC.



Technische Daten					
Spezifikation		min	typ	max	Einheit
Widerstand	x	650	700	750	Ω
	y	125	175	225	Ω
Spannung		3		5	V
Schaltstrom		5		25	mA
Eigenkapazität			1.500		pF
Betätigungskraft		45		65	g
Kontaktprellen		5		10	ms
Betriebstemperatur		-20		+60	°C
Lagertemperatur		-20		+70	°C
Transmission		75		85	%
Lebensdauer			1.000.000		Schaltspiele

## CONTROLLER T6963C

Table below shows all commands of T6963C. A detailed description with timing informations you'll find in user manual "T 6963" (at <http://www.lcd-module.de/eng/dbl/dbl.htm> - controller).

Command	Command Code								Description	Remark			
	D7	D6	D5	D4	D3	D2	D1	D0					
Pointer Set	0	0	1	0	0	N2	N1	N0	N2 0 0 1	N1 0 1 0	N0 1 0 0	Cursor pointer set Offset register set Address pointer set	Status Check
Control Word Set	0	1	0	0	0	0	N1	N0		N1 0 0 1 1	N0 0 1 0 1	Text home address set Text area set Graphic home address set Graphic area set	Status Check
Mode Set	1	0	0	0	CG	N2	N1	N0	N2 0 0 0 1	N1 0 0 1 1	N0 0 1 0 0	Graphic and Text; CG=0: ROM, CG=1: RAM OR EXOR AND Text only (attribute capability)	
Display Mode	1	0	0	1	N3	N2	N1	N0				N3=0: Graphic display off N3=1: Graphic display on N2=0: Text display off N2=1: Text display on N1=0: Cursor display off N1=1: Cursor display on N0=0: Cursor blink off N0=1: Cursor blink on	
Cursor Pattern Select	1	0	1	0	0	N2	N1	N0	N2 0 1	N1 0 1	N0 0 1	specifies the number of cursor lines 1 line cursor (bottom line) 8 line cursor (8x8 dot cursor)	
Data Auto Read/Write	1	0	1	1	0	0	N1	N0		N1 0 0 1	N0 0 1 *	Continuous data can be written or read Data auto write set Data auto read set Auto reset	
Data Read/Write	1	1	0	0	0	N2	N1	N0				Data read/write command for 1 byte N2=0: Address pointer up/down N2=1: Address pointer unchanged N1=0: Address pointer up N1=1: Address pointer down N0=0: Data write N0=1: Data read	
Screen Peeking	1	1	1	0	0	0	0	0				Transfer display data to data stack for read from CPU	Status Check
Screen Copy	1	1	1	0	1	0	0	0				1 line display data which address is indicated by address pointer is copied to graphic RAM area	Status Check
Bit Set/Reset	1	1	1	1	N3	N2	N1	N0				N3=0: Bit reset N3=1: Bit set N2, N1, N0 indicates the bit in the pointed address (000 is LSB)	Status Check

Command set T6963C  
Internal connection:  
MD0, MD1, MD2, FS0: GND  
MDS, MD3: VDD  
FS1: GND (LB3 open, 8x8)  
FS1: VDD (LB3 short, 6x8)

