

# GRAFIK 128x64

## IN 2 GRÖSSEN MIT ST7565



*Displayabmessungen*  
 -6X9: 56x43mm (Abbildung)  
 -6X8: 34x25mm

### TECHNISCHE DATEN

- \* INKL. KONTROLLER ST7565
- \* VDD = 2,7 ... 3,3V
- \* LOW POWER, ALSO IDEAL FÜR HANDHELD / TYP. 70µA@3V
- \* SINGLE SUPPLY: NEGATIV-SPANNUNGSERZEUGUNG ON CHIP
- \* INTEGRIERTE TEMPERATURKOMPENSATION
- \* DIGITALE KONTRASTEINSTELLUNG
- \* DISPLAY RAM ONBOARD
- \* EINGANG SERIELL (SI, SCL, A0) ODER PARALLEL (DB0 ... DB7)
- \* UNTERSTÜTZT Z80- UND 6800- MODE
- \* 0,5mm FFC KABEL FÜR STECKBAREN ANSCHLUSS
- \* EL-FOLIENBELEUCHTUNG ODER LED-BELEUCHTUNG
- \* BETRIEBSTEMPERATURBEREICH -20..+70°C

### ZUBEHÖR

- \* EL-INVERTER **EA PSEL-6**

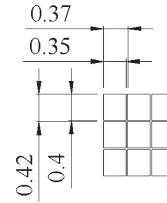
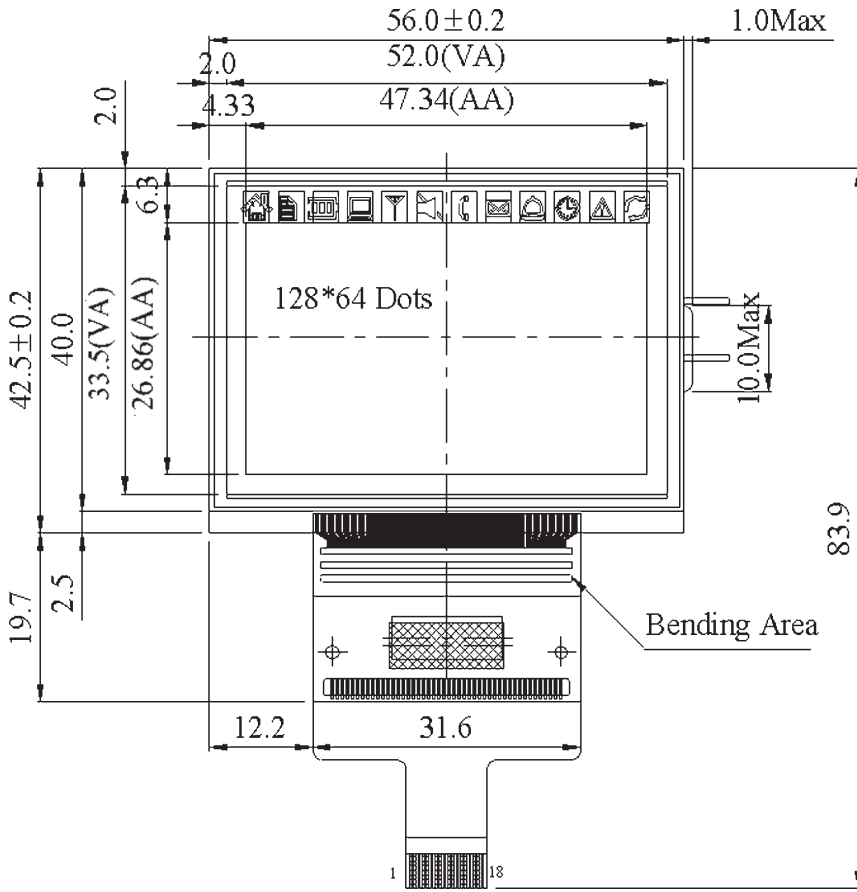
### BESTELLBEZEICHNUNG

MINI GRAFIK 128x64, ST7565 MIT FFC-KABEL, WEISSE LED  
 MINI GRAFIK MIT WEISSER EL-FOLIEN BELEUCHTUNG  
 MICRO GRAFIK 128x64, ST7565 MIT FFC-KABEL, EL-BEL.  
 ZIFF-STECKER PASSEND DAZU (BOTTOM CONTACT)

**EA W127W-6X9HLW**  
**EA W127W-6X9HEW**  
**EA W127W-6X8HEW**  
**EA WF050-18S**

**ELECTRONIC  
 ASSEMBLY**  
 making things easy

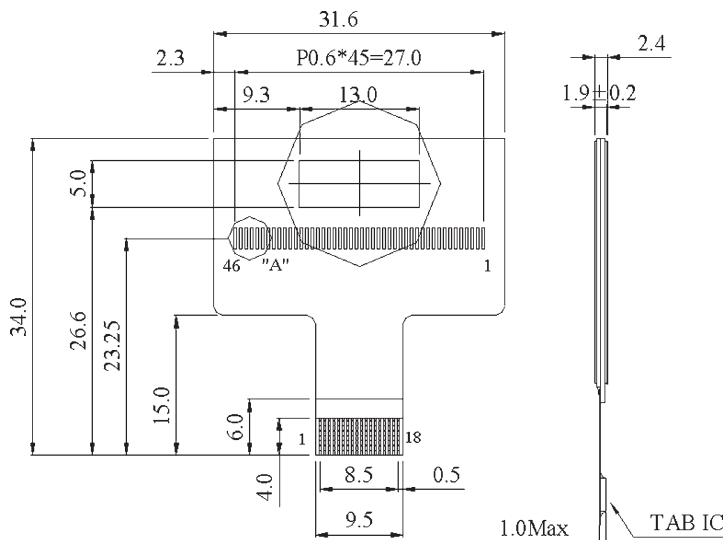
## EA W127W-6X9HEW (FSTN, BLACK&WHITE, EL-BELEUCHTUNG WEISS) mit FFC Kabel für ZIF Stecker



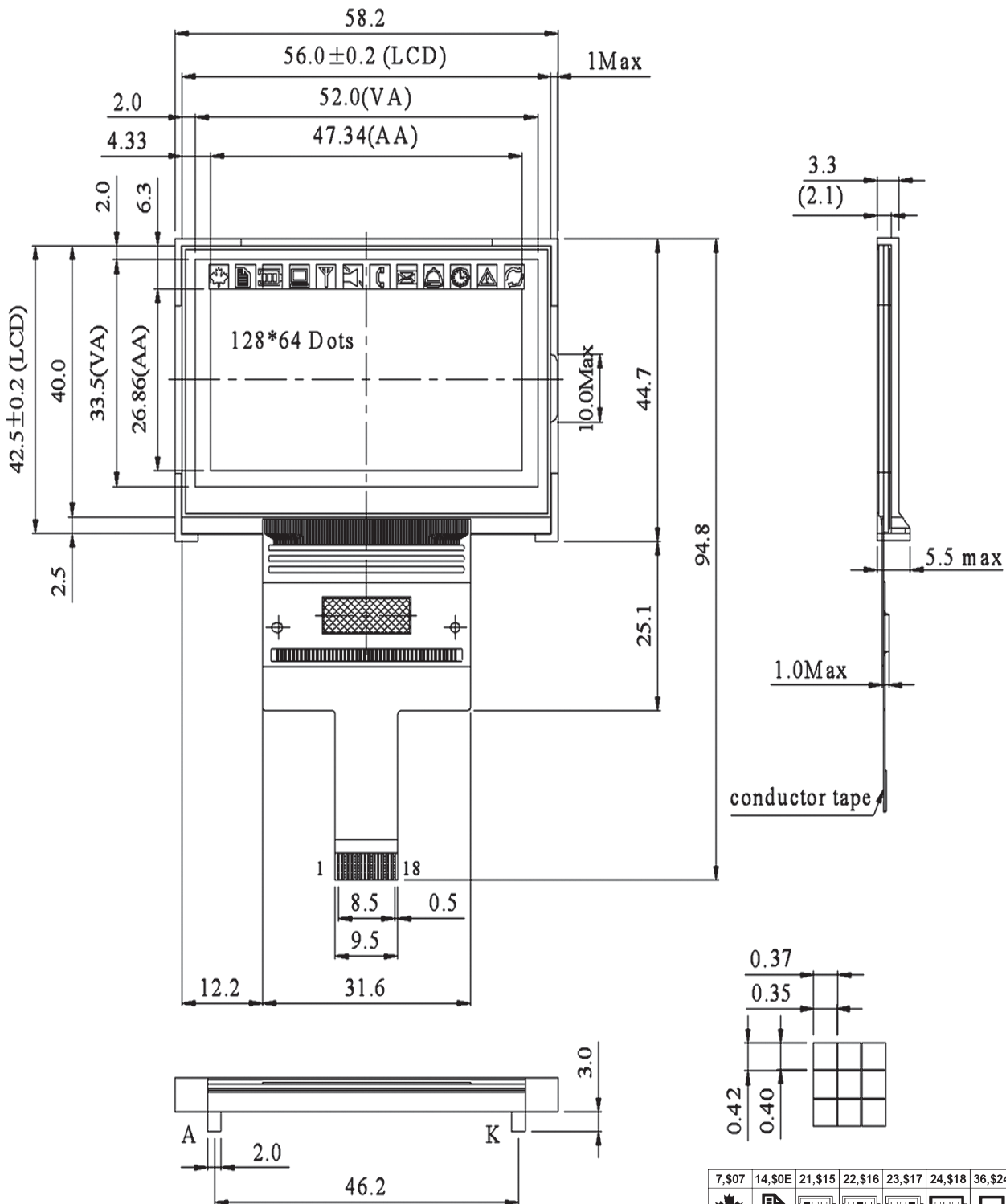
Optical characteristics FSTN						
Item	Symbol	Condition	min	typ	max	Unit
Viewing angle	$\theta$	CR=3	30	-	60	°
	$\phi$	CR=3	-45	-	45	°
Contrast ratio	CR		-	5	-	
Response time	T rise	20°C	-	150	200	ms
	T fall	20°C	-	150	200	ms

7,\$07	14,\$0E	21,\$15	22,\$16	23,\$17	24,\$18	36,\$24	51,\$33

62,\$3E	65,\$41	74,\$4A	84,\$54	95,\$5F	106,\$6A	117,\$75	127,\$7F



**EA W127W-6X9HLW (FSTN, BLACK&WHITE, WEISSE LED-BELEUCHTUNG)**  
mit FFC Kabel für ZIF Stecker

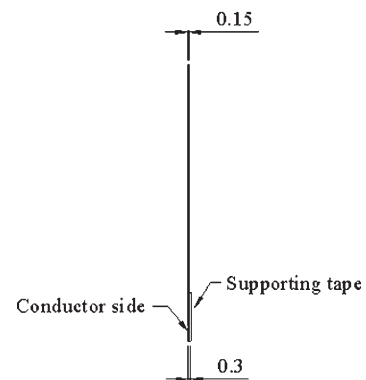
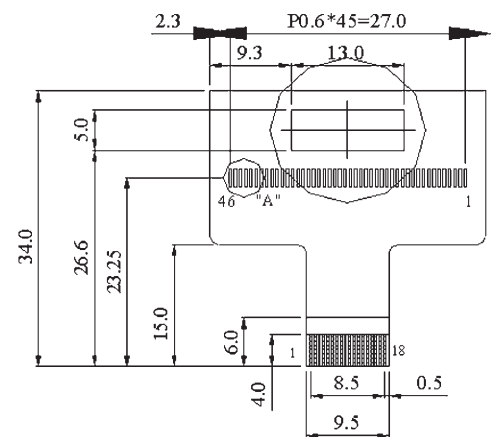
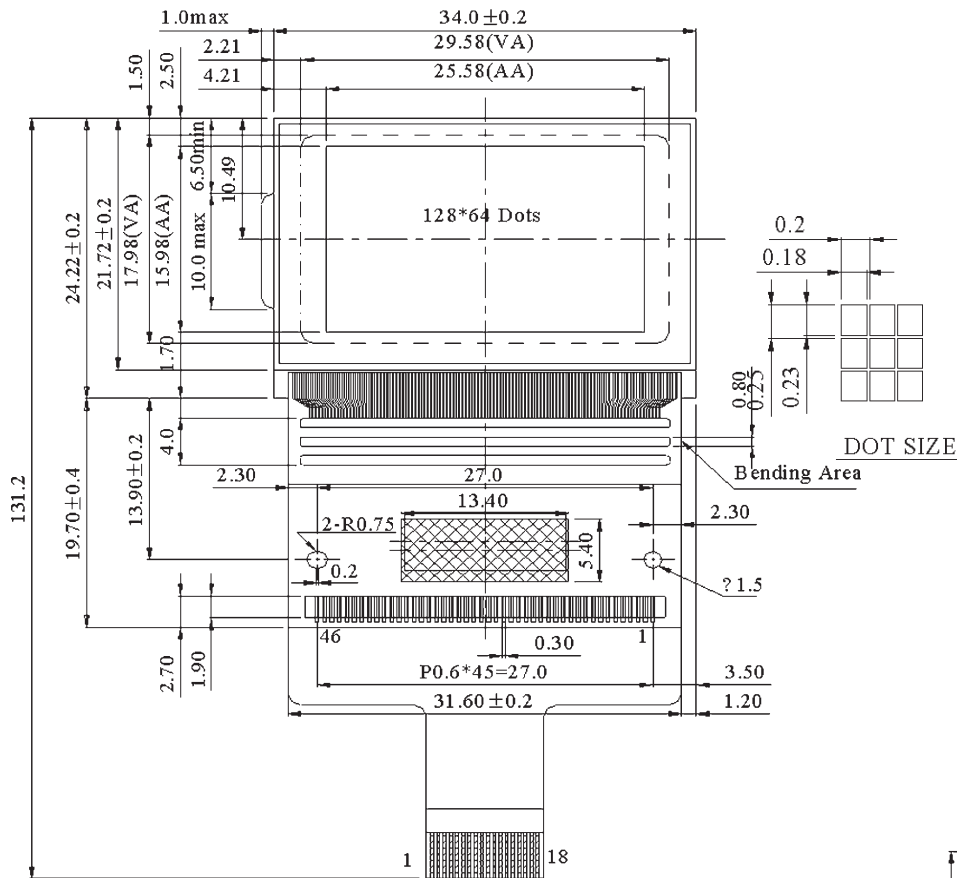


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7,\$07	14,\$0E	21,\$15	22,\$16	23,\$17	24,\$18	36,\$24	51,\$33
62,\$3E	65,\$41	74,\$4A	84,\$54	95,\$5F	106,\$6A	117,\$75	127,\$7F

$V_{F_{LED}} = \text{typ. } 3.5V, I_{LED} = \text{max. } 45mA @ 25^\circ C, \text{ consider derating for temperatures } > 25^\circ C. \text{ Life time max. } 50,000 \text{ hours}$

## EA W127W-6X8HEW (FSTN, BLACK&WHITE, EL-BELEUCHTUNG WEISS) mit FFC Kabel für ZIF Stecker



## ANSCHLUSS ÜBER ZIF-STECKER

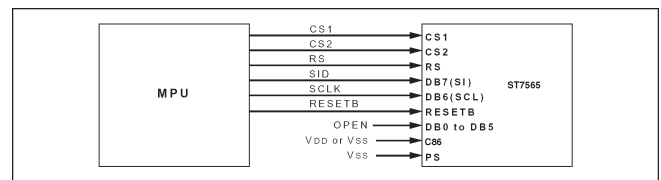
Der Anschluss erfolgt steckbar über ein 18-poliges FFC Kabel im Raster 0,5mm. Über den Pin 17 (C86) kann zwischen 6800- und Z80-Interface umgeschaltet werden. Der Pin 18 (P/S) bestimmt über Parallel- oder Seriellbetrieb.

Pinout															
Pin	Symbol	I/O	Description												
1	VDD		Power supply pin for logic												
2	VSS		Ground pin, connected to 0V												
3	CS1	I	Chip select input pins Data/Instruction I/O is enabled only when CS1 is "L" and CS2 is "H" When chip select is non-active, DB0 TO DB7 may be high impedance												
4	CS2	I	Chip select input pins Data/Instruction I/O is enabled only when CS1 is "L" and CS2 is "H" When chip select is non-active, DB0 TO DB7 may be high impedance												
5	RES	I	Reset input pin When RESETB is "L", initialization is executed												
6	A0	I	Register select input pin A0 = "H": D0 to D7 are display data A0 = "L": D0 to D7 are control data												
7	WR R/W	I	When connected to Z80-family MPU: Write enable input pin. The data on D0~D7 are latched at the rising edge of the WR When connected to 68-family MPU: R/W = "H": read, R/W = "L": write												
8	RD E	I	When connected to Z80-family MPU: Read enable clock input pin. When /RD is "L", D0~D7 are in an output status When connected to 68-family MPU: R/W = "H": When E is "H", D0~D7 are in an output status R/W = "L": The data on D0~D7 are latched at the falling edge of the E signal												
9	D0	I/O	8-bit bi-directional data bus that is connected to the standard 8-bit microprocessor data bus. When chip select is not active, D0~D7 may be high impedance.  When the serial interface selected (P/S="L"): D0~D5 are high impedance D6: serial input clock (SCL) D7: serial input data (SI)												
10	D1														
11	D2														
12	D3														
13	D4														
14	D5														
15	D6														
16	D7														
17	C86	I	Microprocessor interface selects pin C86 = "H": 6800-series MPU interface C86 = "L": Z80-series MPU interface												
18	P/S	I	Parallel/Serial data input select pin <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>Interface</td> <td>Data</td> <td>Read/Write</td> <td>Serial clock</td> </tr> <tr> <td>P/S = "H": Parallel</td> <td>D0~D7</td> <td>E_RD, RW_WR</td> <td>-</td> </tr> <tr> <td>P/S = "L": Serial</td> <td>SI(D7)</td> <td>Write only</td> <td>SCL(D6)</td> </tr> </table> In serial mode it is impossible to read data from the on-chip RAM. D0~D5 are high impedance and E_RD and RW_WR must be fixed to either "H" or "L"	Interface	Data	Read/Write	Serial clock	P/S = "H": Parallel	D0~D7	E_RD, RW_WR	-	P/S = "L": Serial	SI(D7)	Write only	SCL(D6)
Interface	Data	Read/Write	Serial clock												
P/S = "H": Parallel	D0~D7	E_RD, RW_WR	-												
P/S = "L": Serial	SI(D7)	Write only	SCL(D6)												

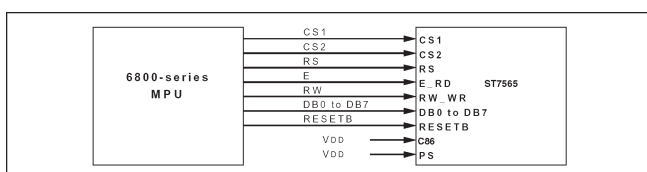
## APPLIKATIONSBEISPIELE

Genauere Spezifikationen zum Timing und zur Programmierung entnehmen Sie bitte dem Usermanual zum ST7565. Zu finden auf unserer Website unter

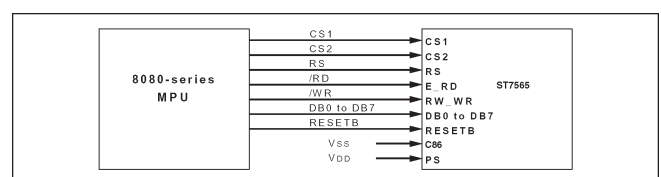
<http://www.lcd-module.de/eng/pdf/zubehoer/st7565.pdf>



Serial Mode



6800-er Interface



Z80 Interface

## ONBOARD KONTROLLER ST7565

Command	Command Code										Function	
	A0	/RD	/WR	D7	D6	D5	D4	D3	D2	D1		D0
(1) Display ON/OFF	0	1	0	1	0	1	0	1	1	1	0	LCD display ON/OFF 0: OFF, 1: ON
(2) Display start line set	0	1	0	0	1	Display start address					Sets the display RAM display start line address	
(3) Page address set	0	1	0	1	0	1	Page address					Sets the display RAM page address
(4) Column address set upper bit	0	1	0	0	0	0	1	Most significant column address				Sets the most significant 4 bits of the display RAM column address.
Column address set lower bit	0	1	0	0	0	0	0	Least significant column address				Sets the least significant 4 bits of the display RAM column address.
(5) Status read	0	0	1	Status			0	0	0	0	0	Reads the status data
(6) Display data write	1	1	0	Write data							Writes to the display RAM	
(7) Display data read	1	0	1	Read data							Reads from the display RAM	
(8) ADC select	0	1	0	1	0	1	0	0	0	0	0	Sets the display RAM address SEG output correspondence 0: normal, 1: reverse
(9) Display normal/reverse	0	1	0	1	0	1	0	0	1	1	0	Sets the LCD display normal/reverse 0: normal, 1: reverse
(10) Display all points ON/OFF	0	1	0	1	0	1	0	0	1	0	0	Display all points 0: normal display 1: all points ON
(11) LCD bias set	0	1	0	1	0	1	0	0	0	1	0	Sets the LCD drive voltage bias ratio 0: 1/9 bias, 1: 1/7 bias (ST7565)
(12) Read/modify/write	0	1	0	1	1	1	0	0	0	0	0	Column address increment At write: +1 At read: 0
(13) End	0	1	0	1	1	1	0	1	1	1	0	Clear read/modify/write
(14) Reset	0	1	0	1	1	1	0	0	0	1	0	Internal reset
(15) Common output mode select	0	1	0	1	1	0	0	0	*	*	*	Select COM output scan direction 0: normal direction 1: reverse direction
(16) Power control set	0	1	0	0	0	1	0	1	Operating mode		Select internal power supply operating mode	
(17) Vo voltage regulator internal resistor ratio set	0	1	0	0	0	1	0	0	Resistor ratio		Select internal resistor ratio(Rb/Ra) mode	
(18) Electronic volume mode set	0	1	0	1	0	0	0	0	0	0	1	Set the Vo output voltage electronic volume register
Electronic volume register set				0	0	Electronic volume value						
(19) Static indicator ON/OFF	0	1	0	1	0	1	0	1	1	0	0	0: OFF, 1: ON
Static indicator register set				0	0	0	0	0	0	0	0	Mode
(20) Booster ratio set	0	1	0	1	1	1	1	1	0	0	0	select booster ratio 00: 2x,3x,4x 01: 5x 11: 6x
				0	0	0	0	0	0	0	step-up value	
(21) Power saver												Display OFF and display all points ON compound command
(22) NOP	0	1	0	1	1	1	0	0	0	1	1	Command for non-operation
(23) Test	0	1	0	1	1	1	1	*	*	*	*	Command for IC test. Do not use this command

Display Data RAM

Page Address P3,P2,P1,P0	Data	RAM address	Line Address (HEX)	Com Output
0,0,0,0	DB0		00	COM1
	DB1		01	COM2
	DB2		02	COM3
	DB3		03	COM4
	DB4		04	COM5
	DB5		05	COM6
	DB6		06	COM7
	DB7		07	COM8
}			}	}
0,1,1,1	DB0		38	COM57
	DB1		39	COM58
	DB2		3A	COM59
	DB3		3B	COM60
	DB4		3C	COM61
	DB5		3D	COM62
	DB6		3E	COM63
	DB7		3F	COM64
0,1,1,1	DB0		40	COM65
Column Address	ADC=0	83 82 81 80 7F 7E 7D 7C 7B 7A	~	5 4 3 2 1 0
Segment Output	ADC=1	0 1 2 3 4 5 6 7 8 9	~	7E 7F 80 81 82 83
		12 11 10 9 8 7 6 5 4 3 2 1	~	6 5 4 3 2 1

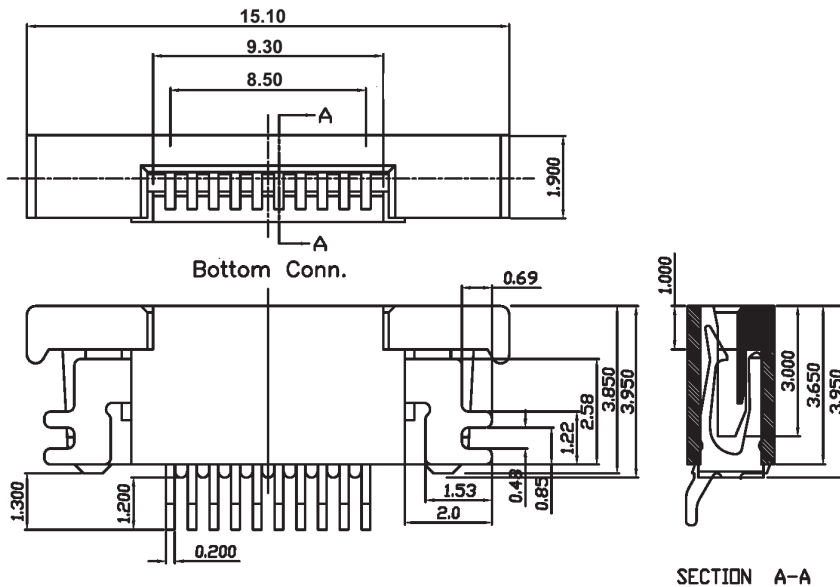
Eine genauere Beschreibung zur Programmierung entnehmen Sie bitte dem Usermanual zum ST7565. Zu finden auf unserer Website unter <http://www.lcd-module.de/eng/pdf/zubehoer/st7565.pdf>

## INITIALISIERUNGSBEISPIEL

```
-----  
; Konstanten fuer Display Kommandos ST7665  
-----  
DISPOFF .EQU 10101110b ; (1) Wert fuer Display OFF  
DISPON .EQU 10101111b ; (1) Wert fuer Display ON  
DISPSTART .EQU 01000000b ; (2) Basiswert fuer Display Start Line  
PAGEADR .EQU 10110000b ; (3) Basiswert fuer Page Address Set  
COLADRL .EQU 00000000b ; (4) Basiswert fuer LSB Column Address Set  
COLADRH .EQU 00010000b ; (4) Basiswert fuer MSB Column Address Set  
ADCSELECT .EQU 10100000b ; (8)  
REVERSEDISP .EQU 10100110b ; (9)  
DISPALLON .EQU 10100100b ; (10)  
LCDBIAS .EQU 10100010b ; (11)  
SETMODIFYRD .EQU 11100000b ; (12)  
RESMODIFYRD .EQU 11101110b ; (13)  
RESET .EQU 11100010b ; (14)  
COMMODE .EQU 11001000b ; (15)  
POWERCTRL .EQU 00101000b ; (16)  
VOLTAGEREG .EQU 00100000b ; (17)  
VOLUMESET .EQU 10000001b ; (18)  
STATICINDI .EQU 10101100b ; (19)  
  
#define COLOFF  
#ifndef COLOFF  
COLADROFF .EQU 4 ; Offset der Spaltenadresse fuer Displayinhalt  
DSPRAMOFF .EQU 0 ; Spaltenadresse fuer Display-RAM zur freien  
Benutzung  
#else  
COLADROFF .EQU 0 ; Offset der Spaltenadresse fuer Displayinhalt  
DSPRAMOFF .EQU 128 ; Spaltenadresse fuer Display-RAM zur freien  
Benutzung  
#endif  
  
-----  
; Makros fuer Displayausgaben  
-----  
#define DISPBEF CLR RS ; Befehlsmodus fuer Display  
#define DISPDAT SETB RS ; Datenmodus fuer Display  
#define DISPOUTA MOVX @R0,A  
#define DISPINA MOVX A,@R0  
#define DISPBEFOUTA LCALL DSPBEFOUT ; Befehl zum Display ausgeben  
#define DISPDATOUTA LCALL DSPDATOUT ; Daten zum Display ausgeben  
#define DISPDATINA LCALL DSPDATIN ; Daten vom Display lesen  
#define COLADR LCALL SETCOLOFF  
  
-----  
; Das Display initialisieren  
-----  
DISPINIT:  
 CLR DRES ; Display Reset  
 NOP  
 SETB DRES  
  
 MOV A,#50  
 LCALL WARTEMS  
  
 MOV A,#DISPSTART  
 DISPBEFOUTA  
  
 MOV A,#DISPON  
 DISPBEFOUTA  
  
 MOV A,#DISPALLON  
 DISPBEFOUTA  
  
 MOV A,#COMMODE  
 DISPBEFOUTA  
  
 MOV A,#ADCSELECT+1  
 DISPBEFOUTA  
  
 MOV A,#VOLUMESET ; Kontrast einstellen  
 DISPBEFOUTA  
 MOV A,#33 ; 0.63  
 DISPBEFOUTA  
  
 MOV A,#LCDBIAS+1  
 DISPBEFOUTA  
  
 MOV A,#POWERCTRL+111b  
 DISPBEFOUTA  
  
 MOV A,#VOLTAGEREG+100b  
 DISPBEFOUTA  
  
 RET  
  
-----  
; Befehl im A zum Display ausgeben  
-----  
DSPBEFOUT: DISPBEF  
 DISPPOUTA  
 RET  
  
-----  
; Daten im A zum Display ausgeben  
-----  
DISPDATOUT: DISPDAT  
 DISPOUTA  
 RET  
  
-----  
; Ein Byte vom Display in den A lesen  
-----  
DSPDATIN:  
 DISPDAT  
 DISPINA ; ersmal ein Dummy-Read  
 DISPINA ; Daten lesen  
 RET
```

# ZUBEHÖR

## ZIFF STECKER 0.5mm

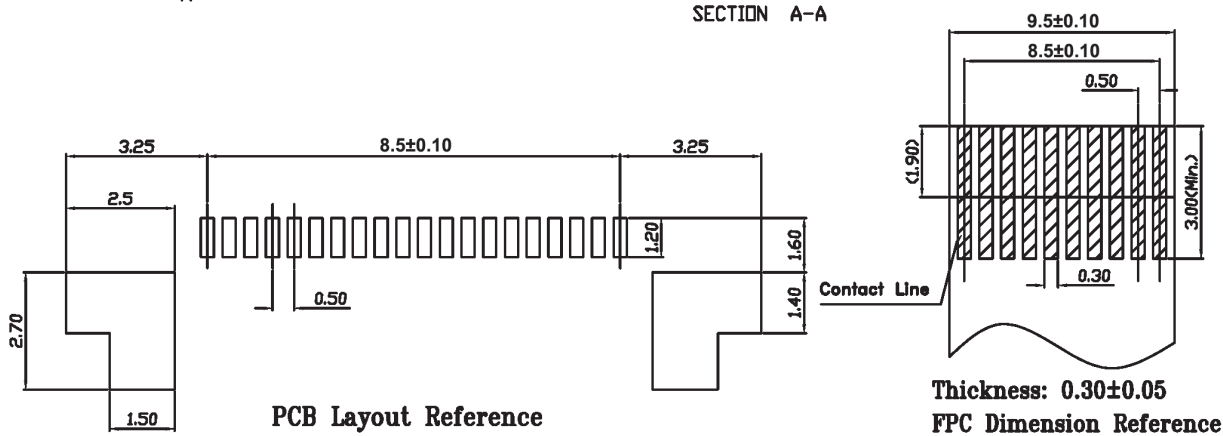


### Specifications:

Current rating:0.5 Amps  
Voltage Rating:50V DC  
Dielectric Withstanding:AC 500V  
Operating Temperature:-25°C ~ +85°C  
Contact resistance:20mohm max.  
Insulation resistance:50Mohm min.

### Materials:

Insulator:Nylon 6T  
Actuator:PPS  
Contact material:Phosphor Bronze  
Leg:Phosphor Bronze  
Plating:100u" Tin/Lead over  
45u" min. Nickel



alle Masse in mm

## BESTELLBEZEICHNUNG

ZIFF-STECKER PASSEND FÜR EA W127W-6X9 / W127W-6X8,  
BOTTOM CONTACT

EA WF050-18S

**ELECTRONIC  
ASSEMBLY**

making things easy