W128-6x8/6x9

Graphics 128x64 with KS0713 Controller

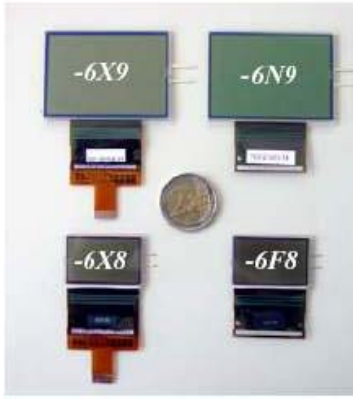
MMS Electronics Ltd

2 DIFFERENT SIZES
2 DIFFERENT CONNECTION TYPES

Display size
6x9 = 56 x 43 (See picture)
6x8 = 34 x 25

TECHNICAL DATA

- CONTROLER INCLUDED KS01713
- SUPPLY VOLTAGE VDD = 2.4 .. 3.6V
- LOW POWER, EXCELLENT FOR HANDHELD APPLICATIONS
- NEGATIVE PRODUCE ON CHIP
- INTEGRATED TEMPERATURE COMPENSATON
- DIGITAL CONTRAST ADJUSTMENT
- ONBOARD DISPLAY RAM
- INPUT SERIAL (SIS, SCLK, CS) OR PARALLEL (DB0 .. DB7)
- Z80 OR 6800 MODE
- 0.5mm FCC CABLE WITH CONNECTOR
- 0.3mm FOR DIRECT SOLDERING
- EL BACKLIGHT OR LED BACKLIGHT OPTIONAL
- OPERATING TEMPERATURE –20 .. + 70 °C



ACCESSORIES

EL INVERTER	EA PSEL-22A
LED LIGHT PIPE FOR 4 LED's	EA LG 56x40-A

ORDERING INFORMATION

MINI GRAPHIC	128x64, KS0713 WITH FCC CABLE	EA W128A-6X9HEW
MICRO GRAPHIC	128x64, KS0713 WITH FCC CABLE	EA W128W-6X8HEW
ZIFF CONNECTOR FOR FCC CABLE		EA WF050-18S
MINI GRAPHIC	128x64, KS0713 SOLDER DIRECT TO LCD	EA W128-6N9HEW
MICRO GRAPHIC	128x64, KS0713 SOLDER DIRECT TO LCD	EA W128-6F8HEW

(For drawing reference see German datasheet)

CONNECTION WITH ZIFF CONNECTOR

The connection is made over an 18 pin FCC cable with pitch of 0.5 mm. Selection can be made on Pin 17 (MI) for Z80 or 6800 interfaces. Pin 18 (PS) is parallel or serial data selection.

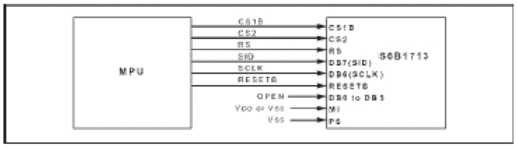
Pinout

Pin	Symbol	I/O	Description
1	VDD		Power supply pin for logic
2	VSS		Ground pin, connected to 0V
3	CS1B	I	Chip select input pins Data/Instruction I/O is enabled only when CS1B 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 CS1B 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	RS	I	Register select input pin RS = "H": DB0 to DB7 are display data RS = "L" :DB0 to DB7 are control data
7	WR R/W	I	When connected to Z80-family MPU: Write enable input pin. The data on DB0~DB7 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", DB0~DB7 are in an output status When connected to 68-family MPU: R/W = "H": When E is "H", DB0~DB7 are in an output status R/W = "L": The data on DB0~DB7 are latched at the falling edge of the E signal
9	DB0	I/O	8-bit bi-directional data bus that is connected to the standard 8-bit microprocessor data b When chip select is not active, DB0~DB7 may be high impedance. When the serial interface selected (PS="L"): DB0~DB5 are high impedance DB6: serial input clock (SCLK) DB7: serial input data (SID)
10	DB1		
11	DB2		
12	DB3		
13	DB4		
14	DB5		
15	DB6		
16	DB7		
17	MI	I	Microprocessor interface selects pin MI = "H": 6800-series MPU interface MI = "L": Z80-series MPU interface
18	PS	I	Parallel/Serial data input select pin

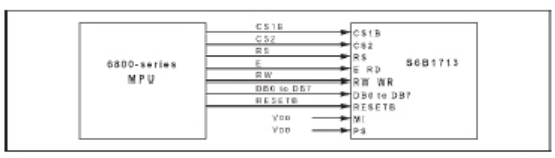
	Interface	Data	Read/Write	Serial clock
PS = "H":	Parallel	DB0~DB7	E_RD,RW_WR	-
PS = "L":	Serial	SID(DB7)	Write only	SCLK(DB6)

In serial mode it is impossible to read data from the on-chip RAM. DB0~DB5 are high impedance and E_RD and RW_WR must be fixed to either "H" or "L"

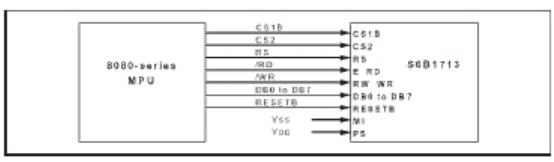
APPLICATION EXAMPLE:
For exact timing specification refer to KS0713 datasheet. Datasheet can be downloaded from www.lcdmodule.de/eng/pdf/zubehoer/ks0713.pdf



Serial Mode



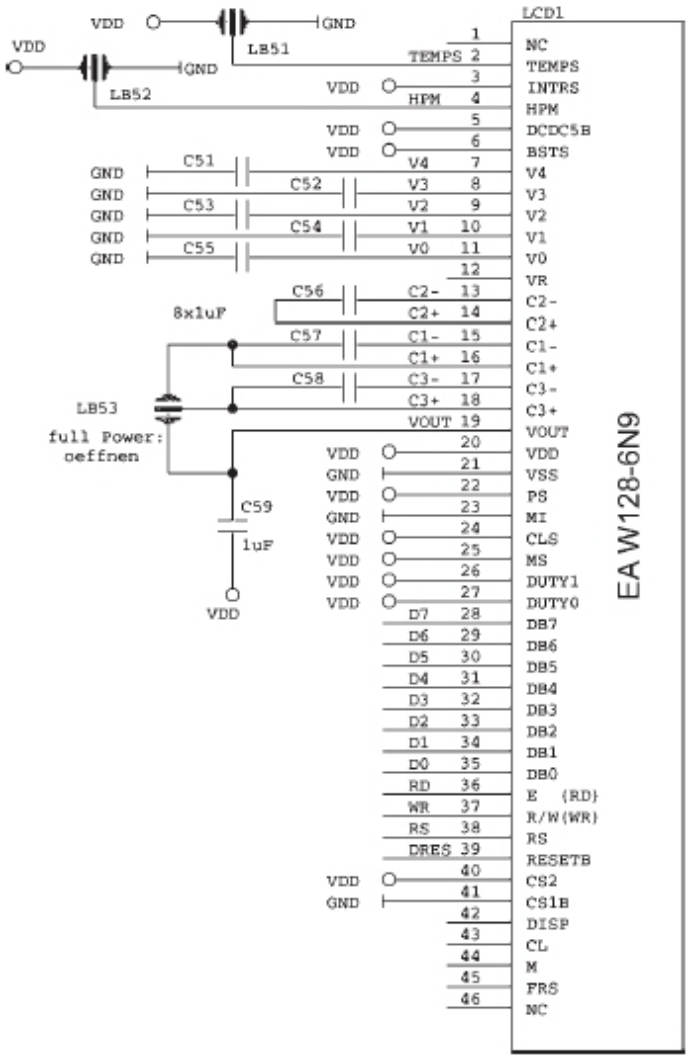
6800-er Interface



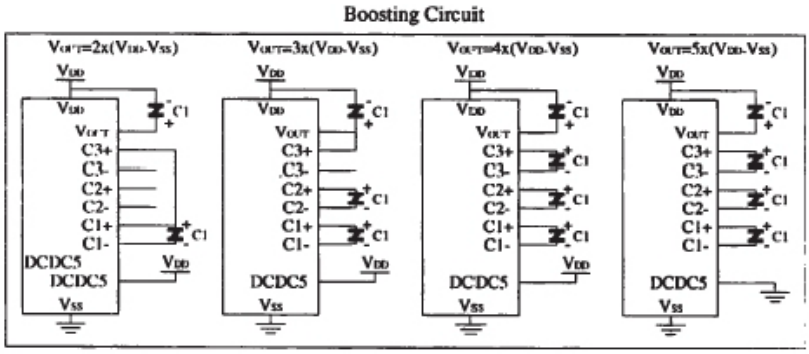
Z80 Interface

Direct solder connection are versions -6F8 and -6N9.
Matrix of 46 pin pitch 0.3 mm. This fine pitch does not allow for hand soldering.
A few external capacitors are required . (See drawing)

Pin	Symbol		Pin	Symbol
1	NC		24	CLS
2	TEMPS		25	MS
3	INTRS		26	DUTY1
4	HPM		27	DUTY0
5	DCDC5B		28	DB7
6	BSTS		29	DB6
7	V4		30	DB5
8	V3		31	DB4
9	V2		32	DB3
10	V1		33	DB2
11	V0		34	DB1
12	VR		35	DB0
13	C2-		36	E_RD
14	C2+		37	RW_WR
15	C1-		38	RS
16	C1+		39	RESETB
17	C3-		40	CS2
18	C3+		41	CS1B
19	VOUT		42	DISP
20	VDD		43	CL
21	VSS		44	M
22	PS		45	FRS
23	MI		46	NC



EXAMPLES
For exact timing specification refer to KS0713 datasheet. Datasheet can be downloaded from www.lcdmodule.de/eng/pdf/zubehoer/ks0713.pdf



INITIALISATION EXAMPLE

```
;-------------------------------------------------
; Konstanten für Display Komandos
;-------------------------------------------------
DISPOFF             .EQU   10101110b        ; Display OFF
DISPON              .EQU   10101111b        ; Display ON
DISPSTART           .EQU   01000000b        ; Display start line
REFVOLTMODE         .EQU   10000001b
PAGEADR             .EQU   10110000b        ; Set page address
COLADRL             .EQU   00000000b        ; Value for LSB column address
COLADRH             .EQU   00010000b        ; Value for MSB column address
ADCSELECT           .EQU   10100000b
REVERSEDISP         .EQU   10100110b
ENTIREDISP          .EQU   10100100b
LCDBIAS             .EQU   10100010b
SETMODIFYRD         .EQU   11100000b
RESMODIFYRD         .EQU   11101110b
RESET               .EQU   11100010b
SHLSELECT           .EQU   11000000b
POWERCTRL           .EQU   00101000b
REGRESISTOR         .EQU   00100000b
STATINDMODE         .EQU   10101100b

;-------------------------------------------------
; Makros für Displayausgaben
;-------------------------------------------------
#define             DISPBEF CLR RS          ; Instruction
#define             DISPDAT SETB RS         ; Data
#define             DISPOUTA MOVX @R0,A
#define             DISPINA MOVX A,@R0
#define             DISPBEFOUTA             LCALL DSPBEFOUT
#define             DISPDATOUTA             LCALL DSPDATOUT
#define             DISPDATINA              LCALL DSPDATIN
#define             COLADR                  LCALL SETCOLOFF
```

;----------
; Initialise Display
;----------

```
DISPINIT:           CLR    DRES             ; Display Reset
                    NOP
                    SETB   DRES

                    MOV    A,#50
                    LCALL  WARTEMS
                    MOV    A,#DISPSTART
                    DISPBEFOUTA
                    MOV    A,#DISPON
                    DISPBEFOUTA
                    MOV    A,#ENTIREDISP
                    DISPBEFOUTA
                    MOV    A,#SHLSELECT
                    DISPBEFOUTA
                    MOV    A,#ADCSELECT+1
                    DISPBEFOUTA
                    MOV    A,#REFVOLTMODE
                    DISPBEFOUTA
                    MOV    A,#40            ; 0..63
                    DISPBEFOUTA
                    MOV    A,#LCDBIAS+1
                    DISPBEFOUTA
                    MOV    A,#POWERCTRL+111b
                    DISPBEFOUTA
                    MOV    A,#REGRESISTOR+110b
                    DISPBEFOUTA

                    RET
```

; Send command in A to Display

```
;-------------------------------------------------
DSPBEFOUT:          DISPBEF
                    DISPOUTA
                    RET
```

; Send data in A to Display

```
;-------------------------------------------------
DSPDATOUT:          DISPDAT
                    DISPOUTA
                    RET
```

For full data details KS0713 datasheet.