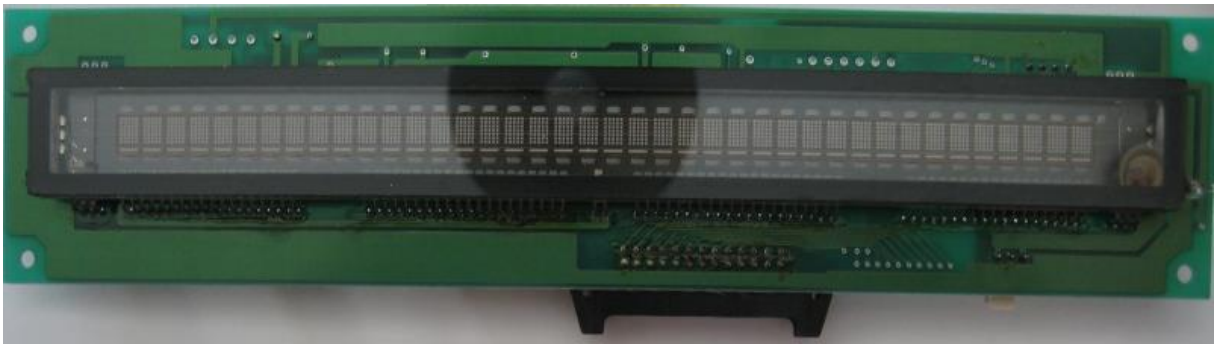
Futaba **M40SD04FN**



Disclaimer

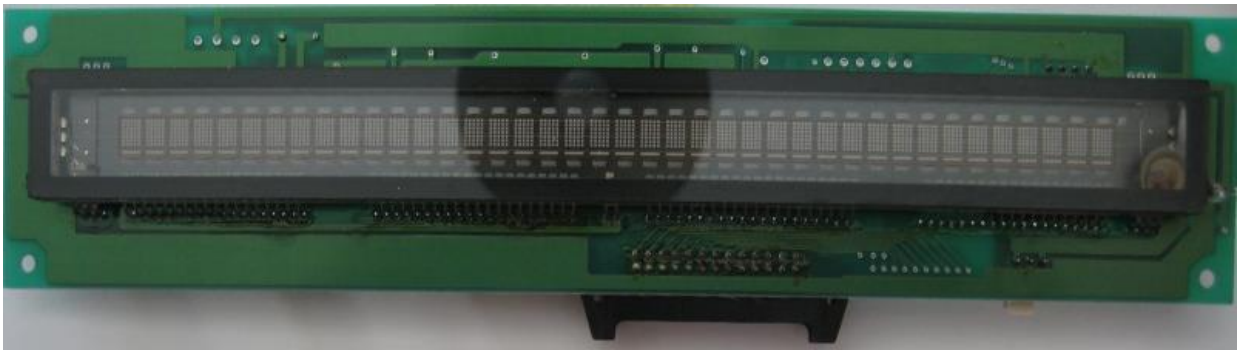
This documentation based on try & error and should never be treated as official documentation. There is no guarantee that information listed in this document is complete and there is no warranty about correctness of the information. The documentation is distributed as it is, no warranty implied or otherwise is given. The author is not liable for any loss or damage of data or hardware and other things caused by use of this documentation.

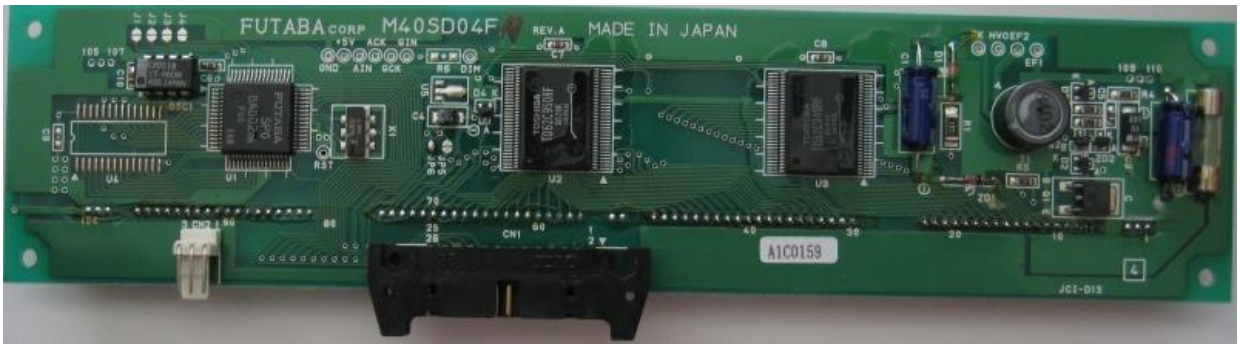
If there are any errors or more commands/information for this display, feel free to inform me and I will update this documentation. Please note that this documentation can be used for free but is **not** released as public domain.

Revision: 1.0 (2016-04-01)

www.muetze1.de

Pictures





Mechanical Properties

Rows x Columns	1 x 40
Char Set	5 x 7 dots
Special Features	Underline Cursor below matrix
Character size	3.5 x 5 mm
Character size (including cursor)	3.5 x 6 mm
Module size	240 x 55 mm
Mounting holes	at each corner, 230 x 45 mm, Ø 3.2 mm

Electrical Properties

Supply voltage	5 V DC
Supply current	0.6 A (measured: 410 mA, 560 mA (max))
Interfaces	parallel, asynchronous serial

Protocol Properties

Character Fonts	International Font, Japanese Katakana Font
Dimming	not supported
User Definable Font (UDF)	not supported
Cursor Modes	on, off, blinking
Cursor positioning	supported
Scroll modes	none, vertical, horizontal

Interface

Connector CN1, 26-pin boxed header

Pin	Signal	Description	Pin	Signal	Description
1	DB7	data bit 7	2	Gnd	Ground
3	DB6	data bit 6	4	Gnd	Ground
5	DB5	data bit 5	6	Gnd	Ground
7	DB4	data bit 4	8	Gnd	Ground
9	DB3	data bit 3	10	Gnd	Ground
11	DB2	data bit 2	12	Gnd	Ground
13	DB1	data bit 1	14	Gnd	Ground
15	DB0	data bit 0	16	Gnd	Ground
17	WR	Write signal	18	Gnd	Ground
19	RxD	Serial In (TTL level)	20	Gnd	Ground
21	BUSY	Busy signal	22	Gnd	Ground
23	/SEL	Select signal	24	Gnd	Ground
25	/TEST	Test display	26	???	unknown

All pins are input signals except pin 21 (BUSY). When the test signal (pin 16) is low, all characters of the font table will be output on the display. Leave the test mode by assigning a high level again.

Connector CN2, 3-pin (Molex KK series, 0.1”)

Pin	Signal	Description
1	Gnd	Ground
2	Vcc	5 V
3	Gnd	Ground

Parallel Interface

To write an character to the display, set the WR and /SEL signal to low (WR inactive, SEL active) and assign the data to write on the data lines (DB0 .. 7). Now toggle WR signal to high - short delay - and back to low. No deselect the display by setting /SEL back to high (inactive). Next data can be written, when the BUSY signal is low again.

The execution of commands can take up to 500 µS. If busy signal is not used, wait at least for this amount of time before initiating the next command. Each signal change has to be valid for at least 50 ns.

Serial Interface

The serial interface is RS232 with TTL level. The default communication settings are 1200 Baud, 8 bits, no parity, 1 stop bit.

Jumper

J4	J3	J2	J1	Funktion
1	1	1	1	Factory Setting

0: Short 1: Open X: Don’t Care

Protocol

Code	Bezeichnung	Beschreibung
BS (0x08)	Back Space	Cursor left
HT (0x09)	Horizontal Tab	Cursor right
LF (0x0A)	Line Feed	Cursor down
CR (0x0D)	Carriage Return	Cursor 1st column
DP (0x10) POS	Display Position	POS in range 0x00 .. 0x27 Display Position
DC1 (0x11) DC2 (0x12) DC3 (0x13)	Device Control 1 Device Control 2 Device Control 3	Vertical Scroll Mode No Scroll Mode Horizontal Scroll Mode
DC4 (0x14) DC5 (0x15) DC6 (0x16)	Device Control 4 Device Control 5 Device Control 6	Cursor Off Mode Cursor On Mode (non-blinking) Cursor On Mode (blinking)
CT0 (0x17) CT1 (0x18)	Character Table 0 Character Table 1	International Font Katakana Font
RST (0x1F)	Reset	Reset all settings, display content, etc

Example code

```
/*
 * Futaba M40SD04FN.c
 *
 * Created: 01.04.2016 17:11:32
 * Author : Muetze1
 */

#include <avr/io.h>
#include <util/delay.h>

// connection:
//   PORTB[0..7] = DB[0..7]
//   PORTC       = control lines (see below)

#define PIN_WR    PC0
#define PIN_SEL   PC1
#define PIN_BUSY  PC2

void outc(char a)
{
  PORTC &= ~(_BV(PIN_SEL) | _BV(PIN_WR));

  _delay_us(1); // delay 50 ns

  PORTB = a;

  _delay_us(1); // delay 50 ns

  PORTC |= _BV(PIN_WR);

  _delay_us(1); // delay 50 ns

  PORTC &= ~_BV(PIN_WR);
  PORTC |= _BV(PIN_SEL);

    // check BUSY signal
  //while ( PINC & _BV(PIN_BUSY) )
  //  ;
    // or wait max time
  _delay_us(500);
}

void outs(const char * s)
{
  while ( s && *s )
    outc(*s++);
}

int main(void)
{
  DDRB = 0xFF;                          // data port (PB0..7 = DB0..7)
  DDRC = _BV(PIN_SEL) | _BV(PIN_WR);  // control lines (/SEL, WR)
  //PORTC = _BV(PIN_BUSY);              // enable pull-up on BUSY

  _delay_ms(10);

  outc(0x1f);
  outs("Futaba M40SD04FN");
}
```

Example Code output: