

# Displays

Martin Elich

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# Hitachi HD44780

- widely used in text displays
- usually from 1x8 to 4x40 characters
- can be controlled with 4 or 8 data wires
- 4x40 displays have two controllers
- displays usually have 16 pins
- including power, contrast control, backlight
- different character sets
  - HD44780A00 - english and other world languages
  - HD44780A02 - more focused on european languages
  - HD44780Bxx - custom character sets

# PIN assignments

1	Vss	GND
2	VDD	VDD +5V
3	Vee, V0	contrast
4	RS	0 - control, 1 - data
5	R/W	0 - read, 1 - write
6	E	clock
7	DB0	data 0
8	DB1	data 1
9	DB2	data 2
10	DB3	data 3
11	DB4	data 4
12	DB5	data 5
13	DB6	data 6
14	DB7	data 7
15	LED+	anode backlight
16	LED-	cathode backlight

# Operation modes

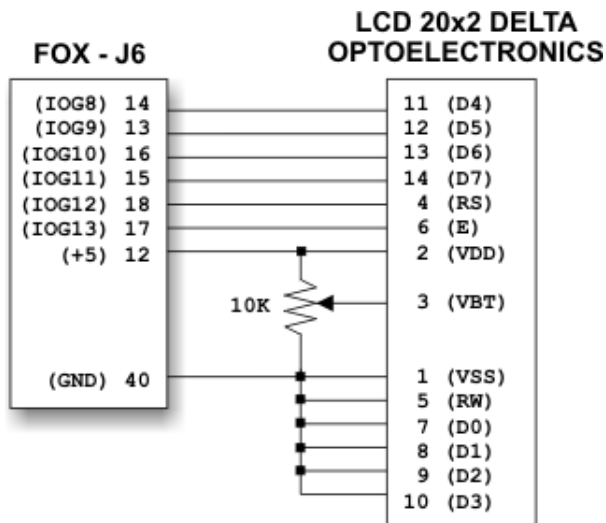
## 8-bit data

- all DB pins are used for data
- set all 8 bits on DB pins then tick on E

## 4-bit data

- only DB4-DB7 is used for data
- DB0-DB3 is connected to ground
- set the highest 4 bits on DB4-DB7 then tick on E
- set the lowest 4 bits on DB4-DB7 then tick on E

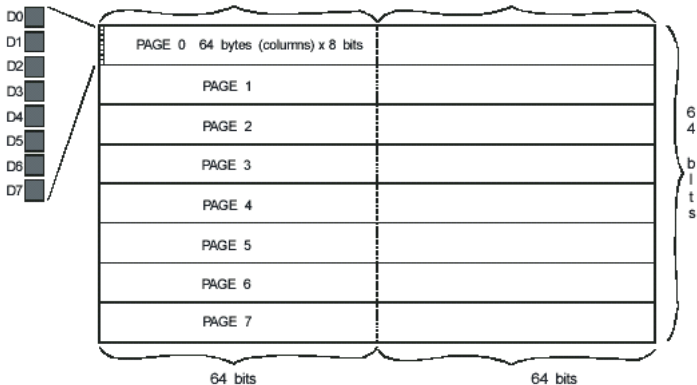
# Circuit 4-bit operation mode



# Samsung KS107

- widely used in cheap graphical displays
- resolution of 128 x 64 points
- not many features
- displays have two controllers
- operated as "remote memory"
- no character set

# Memory organisation



# PIN assignments

1	Vss	GND
2	VDD	power supply
3	V0	LCD driver supply voltage
4	D/I	data input/output pin of internal shift register
5	R/W	Read or Write
6	E	Enable signal
7	DB0	data 0
8	DB1	data 1
9	DB2	data 2
10	DB3	data 3
11	DB4	data 4
12	DB5	data 5
13	DB6	data 6
14	DB7	data 7
15	CS1	Chip Selection
16	CS2	Chip Selection
17	RES	Reset Signal
18	VEE	contrast??
19	A	anode backlight
20	K	cathode backlight



# Circuit 4-bit operation mode

