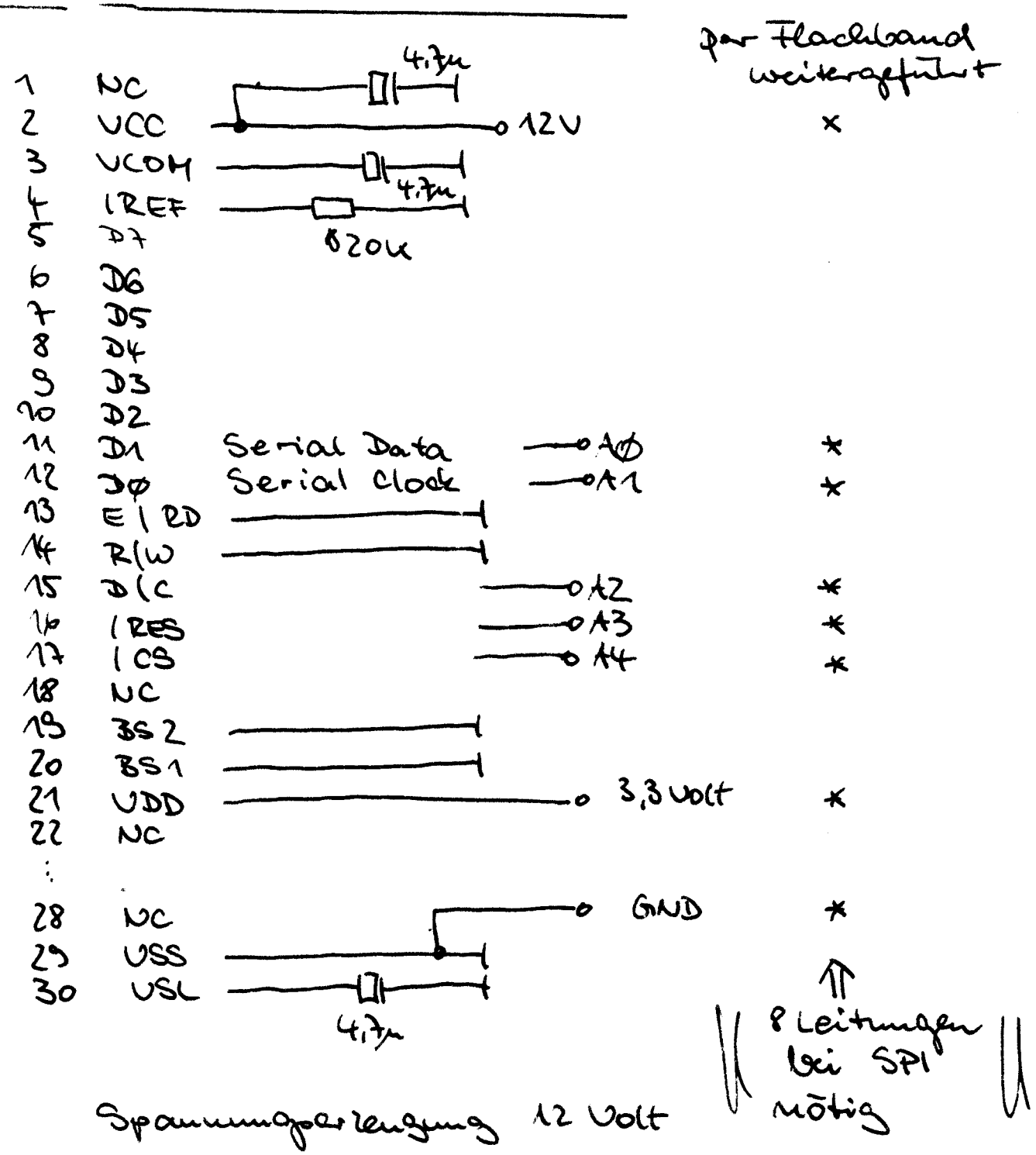
# Anschluß OSRAM Pictiva mit SSD0323




29.12.06

# SPI, Intel 8080, and Motorola 6800 communication protocol between MCU and OLED driver.

## Application Note AN007

### Introduction

This application note describes three different communication protocols between MCU and an OLED driver.

### SPI

SPI stands for Serial Peripheral Interface. It's a serial bus standard established by Motorola. Devices communicate using a master/slave relationship, in which the master initiates the data frame. SPI is a synchronous serial interface in which data in an 8-bit byte can be shifted one bit at a time (Refer to Figure 1).

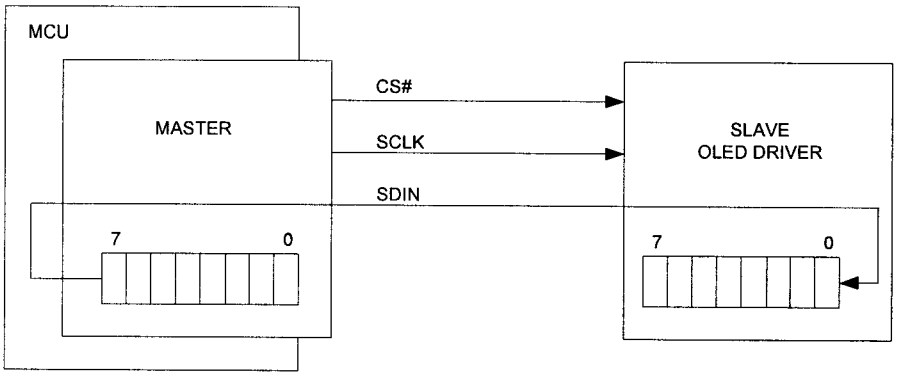



**Figure 1: Two SPI Modules Connected in a Master-Slave Configuration**

In the master SPI, the bits are sent out of the SDIN pin. The CS# pin must be low to select a slave device. SDIN is shifted into an 8-bit shift register on every rising edge of SCLK in the order of D7, D6, ...., D0. D/C is sampled on every eight clock and the data byte in the shift register is written to the Display Data RAM or command register in the same clock (Refer to Figure 2).

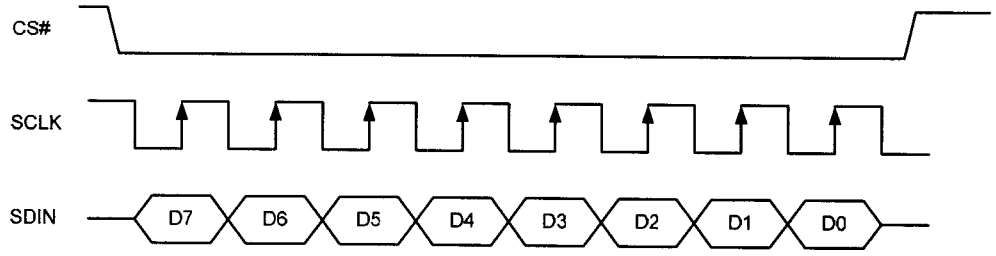



**Figure 2 – Display data write procedure in SPI mode**

## Communication

Calgary module, H55XX, is configured for an 8-bit parallel or serial interface. The user can choose either the parallel or serial interface through the BS2 (Pin # 19) as described in **Table 1**. Detailed communication timing diagram is available in SSD0323 data sheet.

| PIN | Name | DESCRIPTION | | |
|---|---|---|---|---|
| 1 | NC | No connect. | | |
| 2 | VCC(VLL) | OLED power supply voltage VCC (VLL) | | |
| 3 | VCOMH | Common (Row) High Voltage, a capacitor should be connected between this pin and VSS. | | |
| 4 | IREF | Segment (Column) Current Reference. A resistor should be connected between this pin and VSS. | | |
| | | **Parallel** | **Serial** | |
| 5 | D7 | Parallel Data 7 | NC | |
| 6 | D6 | Parallel Data 6 | NC | |
| 7 | D5 | Parallel Data 5 | NC | |
| 8 | D4 | Parallel Data 4 | NC | |
| 9 | D3 | Parallel Data 3 | NC | |
| 10 | D2 | Parallel Data 2 | NC (must be floating) | |
| 11 | D1 | Parallel Data 1 | Serial Data | |
| 12 | D0 | Parallel Data 0 | Serial Clock | |
| 13 | E (RD#) | E clock for 68 series;<br>RD strobe for 80 series | GND | |
| 14 | R/W (WR#) | Read/Write selector for 68 series;<br>Write strobe for 80 series | GND | |
| 15 | D/C | HIGH = Bus contains data for DDRAM, LOW = Bus contains command. | | |
| 16 | RES# | Reset. | | |
| 17 | CS# | Chip Select. | | |
| 18 | NC | No Connect. | | |
| 19 | BS2 | Interface Selection Pin 2: | | |
| | | | **6800 Parallel** | **8080 Parallel** | **Serial** |
| | | BS1 | 0 | 1 | 0 |
| | | BS2 | 1 | 1 | 0 |
| 20 | BS1 | Interface Selection Pin 1: See BS2 above. | | |
| 21 | VDD | Positive logic supply voltage | | |
| 22 | NC | No connect. | | |
| 23 | NC | No connect. | | |
| 24 | NC | No connect. | | |
| 25 | NC | No connect. | | |
| 26 | NC | No connect. | | |
| 27 | NC | No connect. | | |
| 28 | NC | No connect. | | |
| 29 | VSS | Ground. | | |
| 30 | VSL | Voltage Segment Low, a capacitor should be connected between this pin and VSS. | | |

**Table 1: Flex Connection Pin Out**

**Re: Pegelwandler Wiki**

Autor: AVRNIX (Gast)
Datum: 30.06.2006 15:24

http://www.mikrocontroller.net/forum/read-1-368161...

74HC4050 wäre für 5->3,3V geeignet!
Oder 74lvx .... .

**Re: Pegelwandler Wiki**

Autor: Andreas B. (baitronic)
Datum: 30.06.2006 15:41

@A.K: genau, weil ich so strunzfaul bin - und um n bisschen Zeit bis zum Anstoss zu vertreiben troll ich hier n bisschen rum ;-)

Die oben erwähnte AN heißt:
http://www-s.ti.com/sc/psheets/slaa148/slaa148.pdf (MSP430 an 3,3V/5V)

3,3<-> 5V:

SN74CB3T3306
MAX1741
MAX3378E

Pegelwandler für 3,3 Volt nach 5 Volt oder 5 auf 3,3 Volt

5V-> 3,3V:

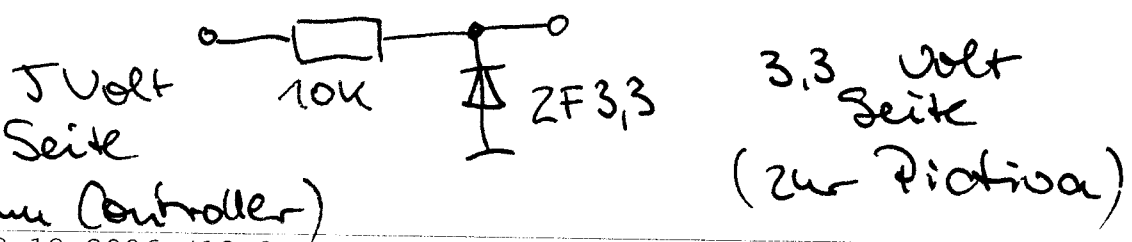
74LVXxxx (245, 244, 240 ...) an 3,3V für 5V->3,3V.
74lvc245dw
74lvt245
74lvx245 (nicht von Reichelt, nicht 5V tolerant)
MAX3373/MAX3375
LVC245A ('A' ist wichtig, I/Os 5V-tolerant, bei Reichelt erhältlich)
74LVX04
74LVX244 (fairchild)

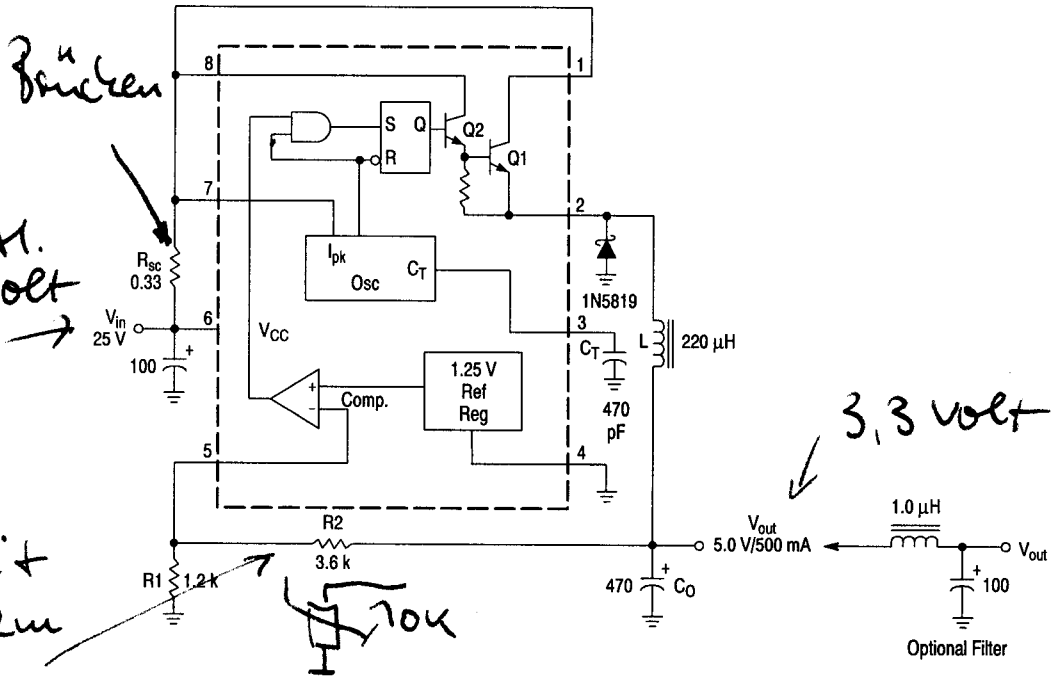
3,3V -> 5V:
74HCIxxx (245, 244, 240 ...) an 5V für 3,3V->5V
74HCT125
SN74LVC07AD

Kennt noch jemand weiter ICs? Was hat sich bewährt, was bekommt man leicht/schwierig und welche Specials muss man beachten?

Gruß Andreas

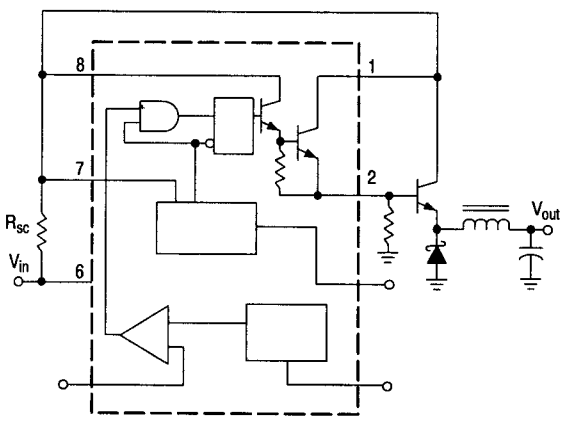
evtl. auch von 5 auf 3,3 Volt






| Test | Conditions | Results |
|---|---|---|
| Line Regulation | $V_{in}$ = 15 V to 25 V, $I_O$ = 500 mA | 12 mV = ±0.12% |
| Load Regulation | $V_{in}$ = 25 V, $I_O$ = 50 mA to 500 mA | 3.0 mV = ±0.03% |
| Output Ripple | $V_{in}$ = 25 V, $I_O$ = 500 mA | 120 mVpp |
| Short Circuit Current | $V_{in}$ = 25 V, $R_L$ = 0.1 Ω | 1.1 A |
| Efficiency | $V_{in}$ = 25 V, $I_O$ = 500 mA | 83.7% |
| Output Ripple With Optional Filter | $V_{in}$ = 25 V, $I_O$ = 500 mA | 40 mVpp |

**Figure 10. Step−Down Converter**



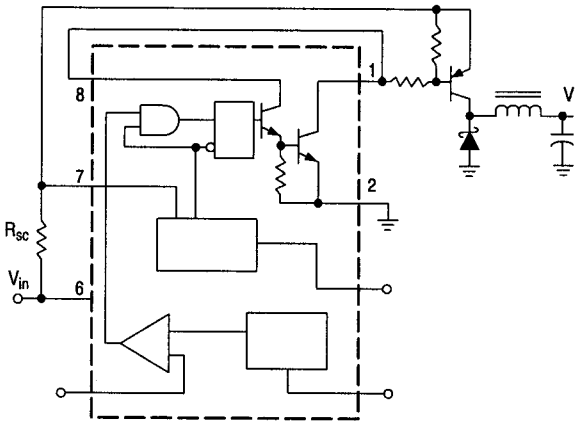
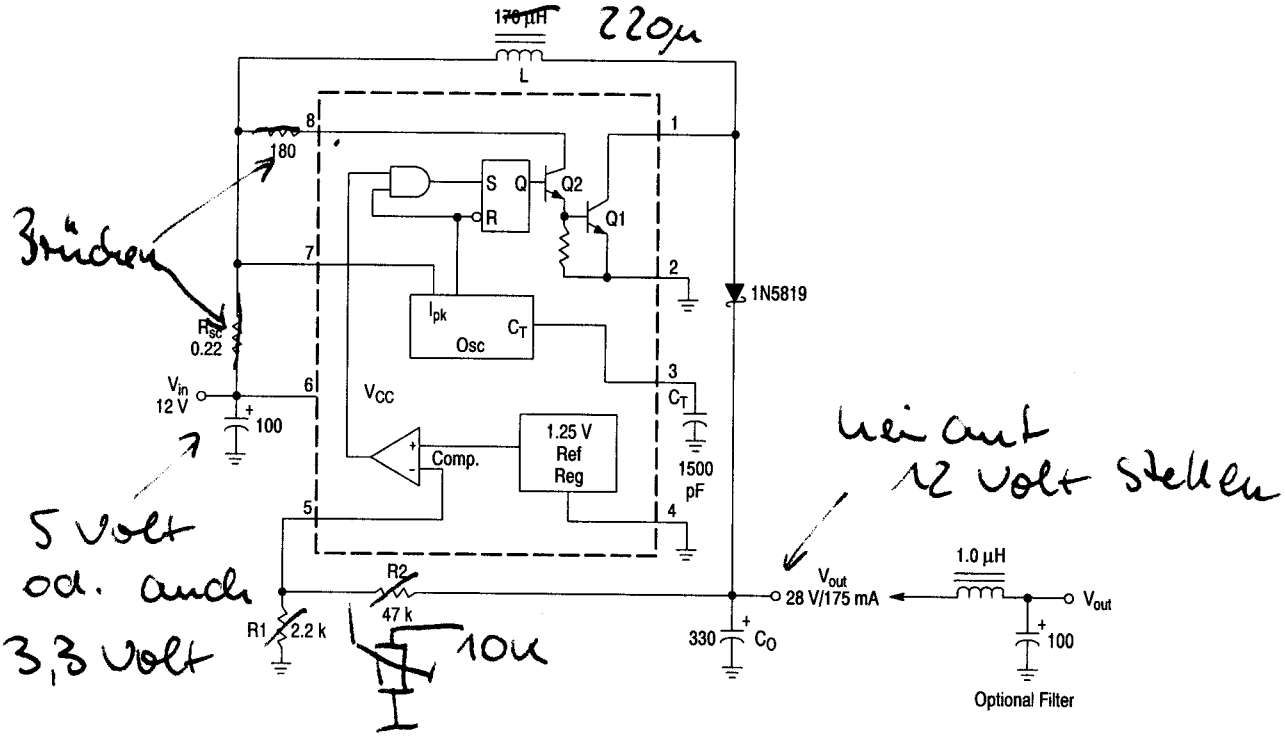




**Figure 11. External Current Boost Connections for $I_C$ Peak Greater than 1.5 A**

**11a. External NPN Switch**

**11b. External PNP Saturated Switch**




| Test | Conditions | Results |
|---|---|---|
| Line Regulation | $V_{in}$ = 8.0 V to 16 V, $I_O$ = 175 mA | 30 mV = ±0.05% |
| Load Regulation | $V_{in}$ = 12 V, $I_O$ = 75 mA to 175 mA | 10 mV = ±0.017% |
| Output Ripple | $V_{in}$ = 12 V, $I_O$ = 175 mA | 400 mVpp |
| Efficiency | $V_{in}$ = 12 V, $I_O$ = 175 mA | 87.7% |
| Output Ripple With Optional Filter | $V_{in}$ = 12 V, $I_O$ = 175 mA | 40 mVpp |

**Figure 8. Step−Up Converter**

12 Volt brauchen für Pictiva aus 3,3 oder 5 Volt