Modul B11/12 Electronic

Principle

The B11 / B12 modules are developed to get fast piezoactuator drive and a low static high voltage current.

Communication

The communication is done by reading and writing shift registers via Clk, DataIn, DataOut, and Strobe.

The output shift register is written while the Strobe signal is low. With the rising transition of the Strobe the content of the shift Register is latched in the outputregister and the dots are set in this pattern.

With Strobe high the interaction Buttons are latched and following Clks shift out their state. There are 2 clocks for each module reagardless if there is one or two button. The data changes on the falling transition of clk.

It is possible to read the buttons several times without new output pattern. To latch the new buttonstate the Strobe must be switched low and high again while Clk is held high.

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Modul B11/12

Sample Program

```
//Macros for port driving
#define CLK_H  P3|=1
#define CLK_L  P3&=~1
#define DOUT_H P3|=2
#define DOUT_L P3&=~2
#define STROBE_H  P3|=4
#define STROBE_L  P3&=~4
#define DIN P3&0x08

void ModulRdWr(unsigned char *data)
/*puts the pattern in the module and reads out the interaction
buttons*/
{
unsigned int i,j;
unsigned char outdat,indat;
unsigned char tmpCurPos=0xff;
/*send pattern to shift register*/
STROBE_L;
for (j=0;j<AnzModule;j++)     //for all Modules
{
      outdat =*(data+AnzModule-j-1);
     for (i=0;i<8;i++)
          {
            CLK_L;
            if (outdat & 1) //Dataoutput
                    DOUT_H;
             else
                    DOUT_L;
            outdat>>=1;
            wait();             //short delay to limit speed
            CLK_H;                                  wait();
          }
}
STROBE_H;
wait();
for (j=AnzModule;j!=0;)     /*read interaction button*/
{
   indat=0;
          for (i=0;i<2;i++)
          {
                    wait();               //short wait to limit speed
                    CLK_L;                                  wait();
                    indat<<=1;
                    if (DIN)  /*Data in*/
                              indat|=1;
                    else
                              indat&=~1;                              CLK_H;
                    }
                    j--;                  //next Mod
                    CursorPattern[j]=indat;
                    if (indat)            /*interaction button pressed*/
                    {
                       if (indat &1)              /*Front Switch*/
                              tmpCurPos=j;
                        else
                              tmpCurPos=j+100;  /*Back = position +100*/
                    }
                    CursorPos=tmpCurPos;
          }
          CLK_L;
          STROBE_L;
 }
```


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Relation Dot/Bits

The Dots are driven by the Databits in the following relation:

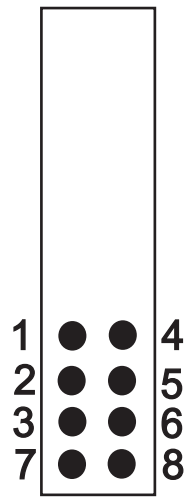
Dot	bit (Modul B11)	bit (Modul B12)
1	1	1 invers (Dot is set with Bit=0)
2	2	5
3	3	6 invers
4	4	0 invers
5	5	3
6	6	2 invers
7	7	7
8	8	4

This relations should be took into account in the Character / Braillepattern table.

only for B12 Modul:
For test puposes (where running time doesn't matter) this is a simple conversion program:

```
if (BraillePatt &0x01)     //Pin 1
        HardwarePatt =0x2;
if (BraillePatt &0x02)
        HardwarePatt |=0x20;
if (BraillePatt &0x04)
        HardwarePatt |=0x40;
if (BraillePatt &0x08)
        HardwarePatt |=0x1;
if (BraillePatt &0x10)
        HardwarePatt |=0x8;
if (BraillePatt &0x20)
        HardwarePatt |=0x4;
if (BraillePatt &0x40)
        HardwarePatt |=0x80;
if (BraillePatt &0x80)  //Pin 8
        HardwarePatt |=0x10;
HardwarePatt ^=0x47;
```

Dot Positions



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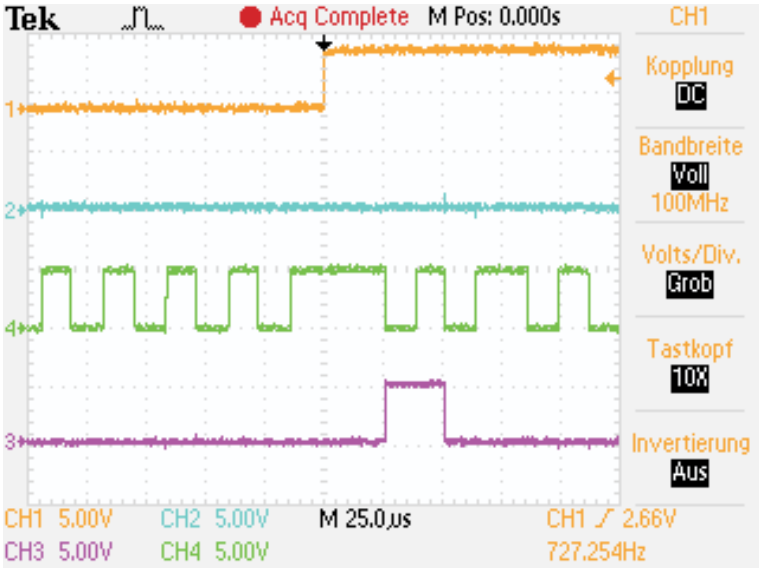
Signal Diagram



This are the signals around the Strobe H transisiton

channel 1	yellow	Strobe
channel 2	blue	data to module (piezo output)
channel 3	purple	data frome module (key read)
channel 4	green	Clk

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