

2.7 Extended circuit with ATmega644 or ATmega1284

A extended circuit for ATmega644/1284 processors was developed with Nick L. from the Ukraine. The circuit 2.23 enables a additional test of crystals and a extended range for the frequency measurement. Although the basic circuit is very similar to the circuit 2.1, the port assignment is different. A rotary pulse encoder with circuit 2.5 can be connected here at the pins PB5 and PB7 (instead of PD1 and PD3). Both signals and also the power signals VCC and GND are available at the ISP connector, so that the extension can also be connected here.

The 16:1 frequency divider of the 74HC4060 is allways used for frequencies above $2MHz$. The frequency divider can also be used for frequencies between $25kHz$ and $400kHz$ to upgrade the frequency resolution by using the period measurement. For switching between the operational states (frequency divider and crystal oszillator) the analog switches 74HC4052 are used. The table 2.5 shows the pin assignments for the ATmega324/644/1284 microcontrollers for different display connections. The using of the I²C interface is only possible with the SSD1306 controller. The signals of the I²C interface require a pull-up resistor of $4.7k\Omega$ to $3.3V$. The outputs of the ATmega is only switched to $0V$ for the I²C signals.

Port	Character LCD	Graphic LCD SPI 4-wire	Graphic LCD I ² C	additional function
PB2	LCD-RS			
PB3	LCD-E	(LCD-CE)	LCD-SCL	
PB4	LCD-D4	LCD-REST	LCD-SDA	
PB5	LCD-D5	LCD-RS		ISP-MOSI Rotary encoder 2
PB6	LCD-D6	LCD-SCLK		ISP-MISO
PB7	LCD-D7	LCD-SI		ISP-SCK Rotary encoder 1

Table 2.5. Different variations of the display port assignments

You can also connect a display with the ST7108 controller ito the ATmega644 of ATmega1284 by using a little circuit as shown in figure 2.22. You should also respect the different pin assignments of display modules with ST7108 controllers as shown in table 2.3 at page 18.

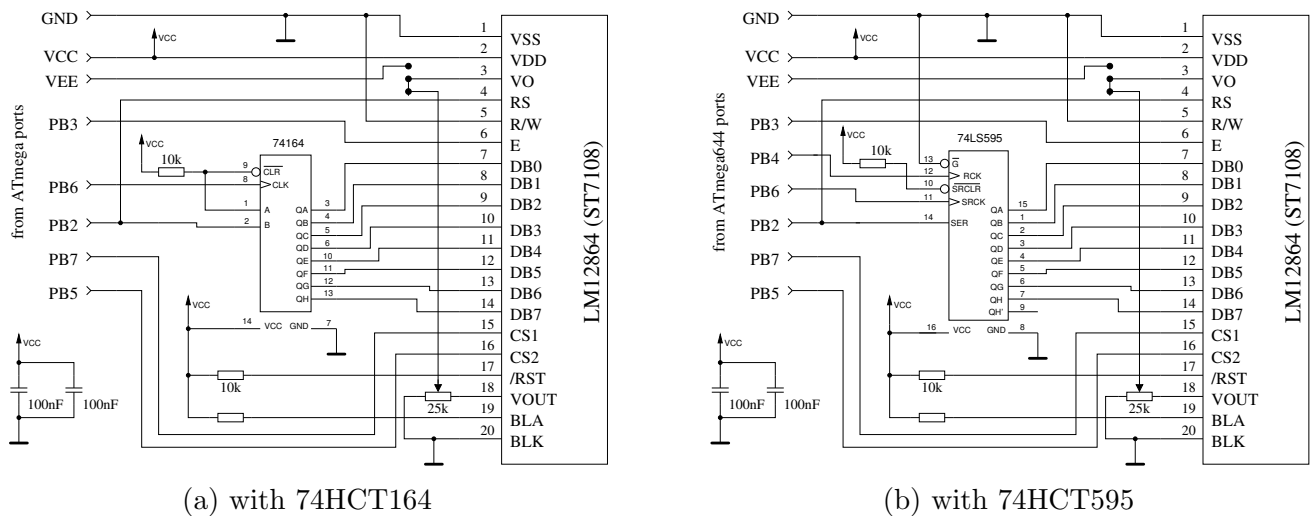


Figure 2.22. Connection of a ST7108 Controller to a ATmega644/1284

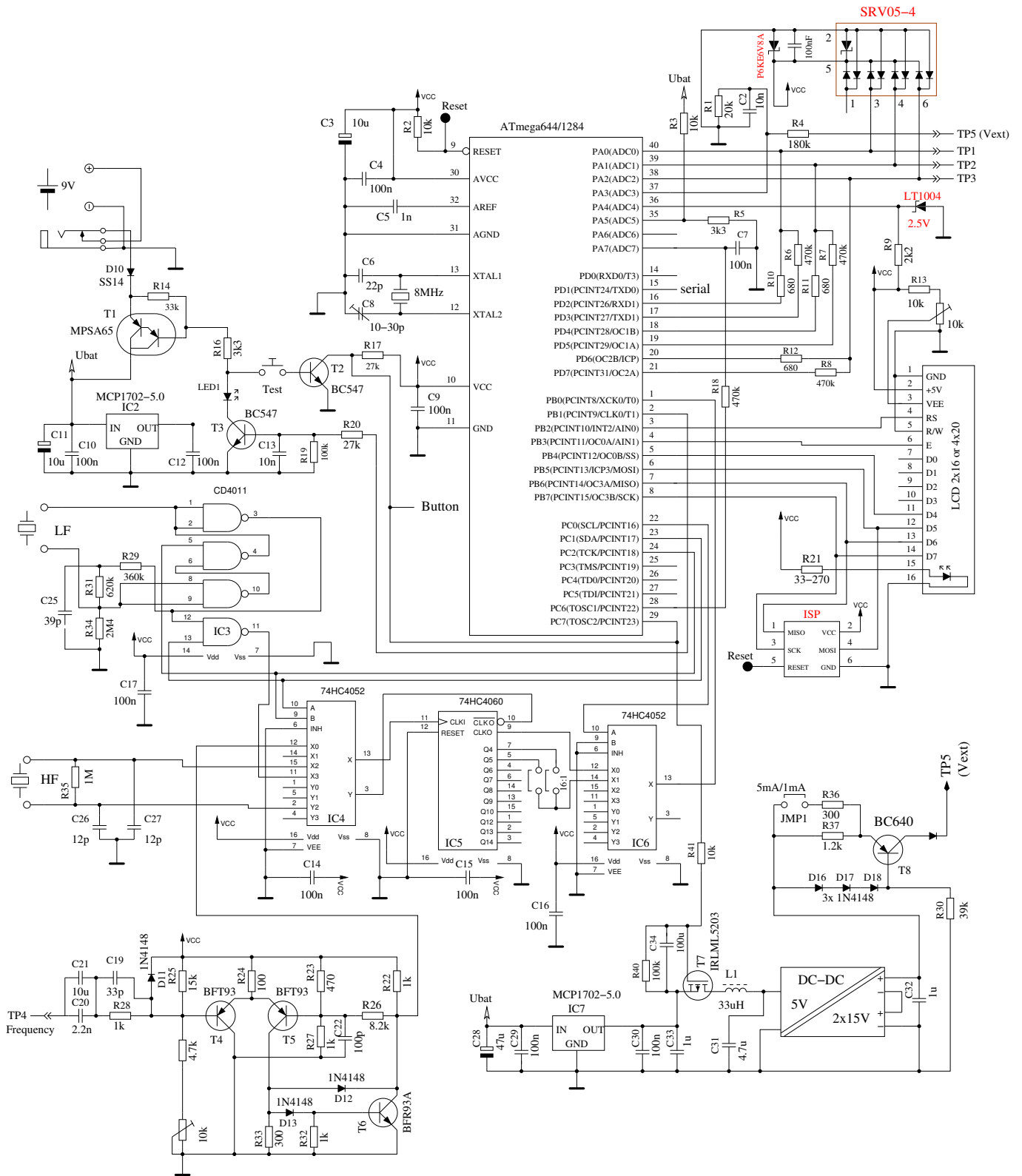


Figure 2.23. Extended Transistor Tester circuit with ATmega644

2.8 Buildup of a tester with ATmega1280 or Arduino Mega

The basic circuit of the tester can also be build with a Arduino Mega with a ATmega1280 or ATmega2560 microcontroller with a shield. The required connections are shown in figure 2.24. The names for the connections of the display signals of the Arduino are shown with green color.

Port	Character LCD	ST7565 SPI	ST7920 seriell	ST7108 seriell	SSD1306 I ² C	additional function
PA0	LCD-D4	LCD-REST	LCD-RESET	HC595-RCK		
PA1	LCD-D5	LCD-RS		LCD-CS2		rotary encoder 2
PA2	LCD-D6	LCD-SCLK		HC164-CLK		
PA3	LCD-D7	LCD-SI		LCD-CS1		rotary encoder 1
PA4	LCD-RS		LCD-B0	LCD-RS HC164-SER	LCD-SDA	
PA5	LCD-E	(LCD-CE)	LCD-EN	LCD-EN	LCD-SCL	
PA7	key signal					

Table 2.6. Connections for different display to the ATmega1280/2560 processors