

Figure 2.2. Additional protection of the ATmega inputs

If the serial output of text is not required, the Pin PC3 of the ATmega can be used as analog input for measuring a external voltage. The voltage can be up to 50V with the optional 10:1 resistor divider and can be used for measuring the breakdown voltage of a zener diode. A current limiting power supply with up to 50V can be switched on with low signal at PD7 pin of the ATmega to deliver current for testing the break down voltage of a zener diode. Figure 2.3 shows a suggestion for this expansion. The tester shows the external voltage as long as you hold the key pressed. About 40mA more battery current is used by this expansion during key pressing.

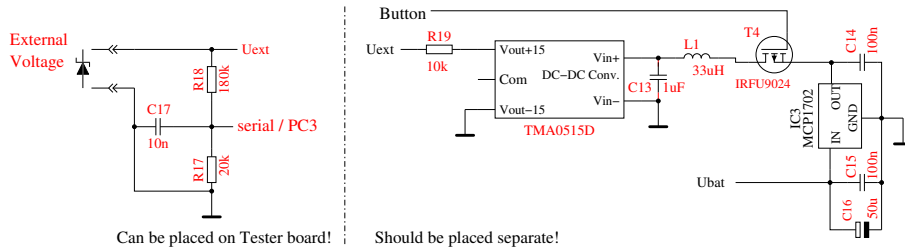


Figure 2.3. Expansion for measuring of break down voltage of Zener diodes

The 10:1 voltage divider can be used with the optional dialog part for the ATmega328 without the activated DC-DC converter for the zener diode measurement. Without the pressed key the voltage converter is not powered. For that the external voltage (for example battery voltage) can be measured at the zener diode port. You can only measure positiv DC voltages up to 50V. You have also to respect the correct polarity.

With the dialog part of the ATmega328 you can also select a frequency generator, which supports currently a selection of frequencies from 10Hz up to 2MHz. The output of the 5V signal is done with a 680Ω resistor to test port TP2. You can use the GND signal from the minus pin of the zener diode extension or the test port TP1. The test port TP3 is connected to GND with a 680Ω resistor.

For using the with the dialog selectable frequency measurement is a little hardware extension necessary. The input pin PD4 (T0/PCINT20) of the ATmega is used for the frequency measurement. The same pin is also used for the connection of the LCD. With normal layout, the PD4 pin is connected to the LCD-RS signal, with the strip grid design it is connected to LCD-D4. For both signals the PD4 pin can be switched to input as long as no output to the LCD is required. The LCD respect the input value only, if the LCD-E signal is switched to GND. For driving the input pin from external clock source at least one serial resistor of 270Ω should be used. Better you should use the circuit of figure 2.4 . The voltage at the PD4 pin (LCD-RS or LCD-D4) should be adjusted to 2.4V without the assembled ATmega or during frequency measurement of the ATmega, to get the best sensivity for the input frequency signal. The LCD should always be installed for adjusting, because the pull up resistor of the LCD change the voltage.