

Re: Microcontroller with 7V supply and I/O tolerance ?

Source: <http://coding.derkeiler.com/Archive/General/comp.arch.embedded/2004-10/1602.html>

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On 24 Oct 2004 05:17:17 -0700, mangled_us@yahoo.com (David) wrote:

*>But still... a device with a higher supply and I/O voltage
>tolerance must surely have many applications ?*

I do not see much need in a higher supply voltage, but higher I/O voltages would be nice. I think that the largest problem is due to the common use of multifunction pins, i.e. pins that can be programmed both as inputs or outputs, which requires a lot of electronics on the pin. Designing such pins for high I/O voltages would cause a lot of reverse biasing problems.

However, if dedicated input on output pins are used, the outputs could be simply open collector(drain) types, in which the external I/O voltage could be quite high, provided that there are no real or parasitic diodes from the output pin (collector/drain) to the Vdd. If the pin can sink sufficient currents (>20 mA) LEDs and small relays could be driven directly.

On the input side a high current protection diode would be required between each input and Vdd and the input can be used as voltage input, if the input voltage is always between 0 and Vdd or as a current input, with an external series resistor, if the input voltage can swing above Vdd. An extra resistor from input to ground may be needed to move the "low" state threshold sufficiently low.

A CPU with a low internal power consumption can be driven with a series resistor and a shunting zener from any voltage. The zener should keep the Vdd below the maximum allowed Vdd and should be big enough, so that it can also dissipate the total worst case input pin current flowing through the external series resistors through the input protection diodes to Vdd and through the zener to ground

As such, I do not see a problem if the CPU core Vdd is quite low (1.5-3.3V) but it sure would be nice to have (high voltage tolerant) `_current_` inputs and outputs (instead of voltage I/O).

comp.arch.embedded: Re: Microcontroller with 7V supply and I/O tolerance ?

Paul