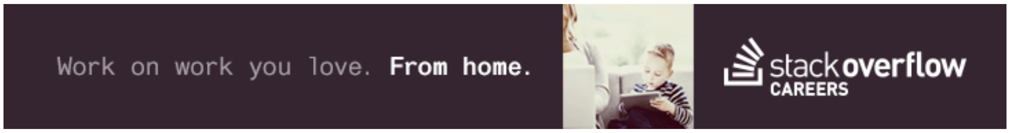
UART vs I2C vs SPI for inter-processor communication between microcontrollers



I am examining a way to connect two microcontrollers. On the level of serialization I am thinking of using Nano protobuffers (http://code.google.com/p/nanopb/). This way I can encode/decode messages and send them between two processors.

Basically, one small processor would be the RPC server, capable of doing several functions. Bigger processor will call there RPCs via messages sent, and then when data is ready, it will read it from smaller processor.

What would be the pros/cons of using UART, I2C or SPI?

Messages will be put in the mailbox que prior to sending.

Best regards, Drasko

embedded microcontroller i2c uart spi

asked Jan 30 '14 at 23:27

Drasko DRASKOVIC
60 1 1 4

1 This question appears to be off-topic because it is about computer design, not programming. – Adi Inbar Jan 31 '14 at 2:59

i2c is unpleasant in general, bidirectional data lines always cause problems, only use it as a last resort for peripherals that dont have another option. – dwelch Jan 31 '14 at 3:09

You may use the fastest one. Basically it is SPI. – kirill Jan 31 '14 at 21:15

1 Answer

It depends of your total requirements and how expensive are pins.

I2C only needs two pins, but it's slow and to handle it with or without interrupts is a pain, even with the build in peripheral modules. It's a master/slave system, it's good for controlling many slow devices like temp sensors.

Uart needs two pins, it's normally faster, easier to handle, but requires (nearly) the same clocks at both sides. One to one asynchronous system, can be good if both systems needs to be send sometimes data without waiting for a master poll request.

SPI needs 3 (or 4 with CS) pins, it's the fastest, simple to implement even with DMA, low cpu time overhead, often buffered. When you have enough free pins I would prefer it.

edited Jul 23 '14 at 8:01

answered Feb 8 '14 at 6:33

jeb
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maybe "slow cpu time overhead" should be instead "low cpu time overhead"? – pablochacin Jul 23 '14 at 7:53

@pablochacin Yes, and i tried to fix some other spelling bugs – jeb Jul 23 '14 at 8:01