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 | Project Number 272 |
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Multi Function Device - Abstract

This project deals with configuration and programming of the PSoC device alone for making functional modules (IC) to be used in application circuits. The design demonstrates a number of techniques applicable to PSoC based designs:

- ❖ practical use of the I2C slave device
- ❖ multiple configurations with one master overlapping configuration
- ❖ 8 input multiplexing of analog inputs to ACA02 or ACA03 blocks.

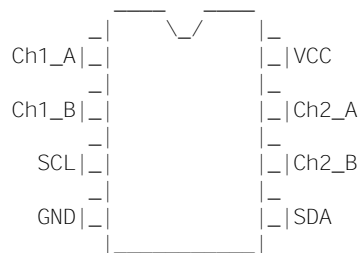
The configuration of the system is selected through I2C bus by way of a simple command. I2C bus is used to access input/output data as well as operating parameters of individual configurations (functional modules).

Included functional modules are of different complexity and different hardware/software contents. By using the applied techniques, many more modules can be included in one design eg. IRTx/Rx, UART, PWMs etc. This allows to make one design for a range of devices with main access through the I2C bus.

Functional Modules

This is a multiple configuration design. It works as one of the following devices:

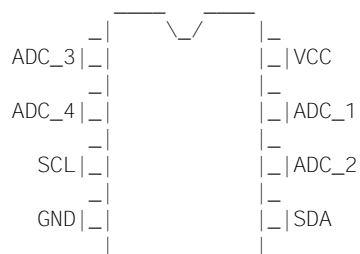
1) Dual Quadrature Decoder



Data from two independent decoders are stored in 16-bit counters which can be interpreted as 2's complement integer values thus allowing to accommodate -32768 to +32767 steps or as unsigned word values allowing to hold 0 to 65535 steps.

The input comparator threshold is user adjustable.

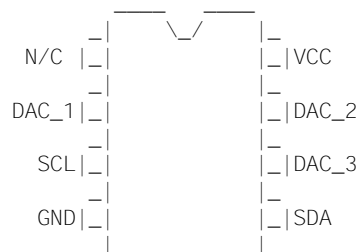
2) Quadruple 12-bit ADC with adjustable input sensitivity



Four voltages in the range 0.5 to 4.25V can be measured and converted into 12-bit integer values. All channels use the same ADC thus the readings are consistent between channels.

The sensitivity of inputs can be set through I2C by changing gain of input amplifier from 1 to 16.

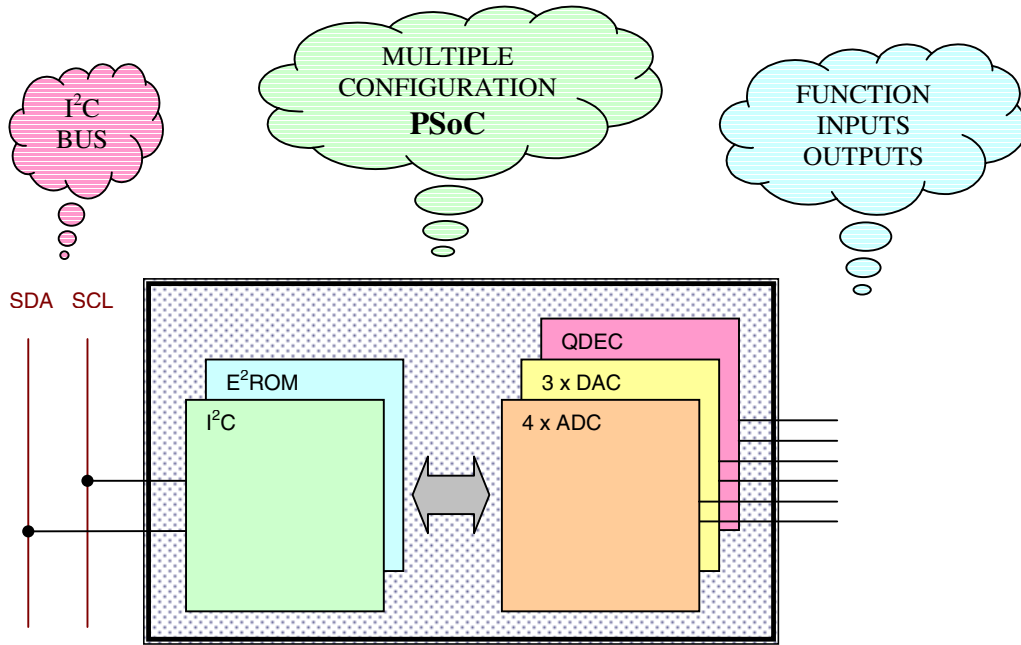
3) Triple 8-bit DAC converter with voltage output



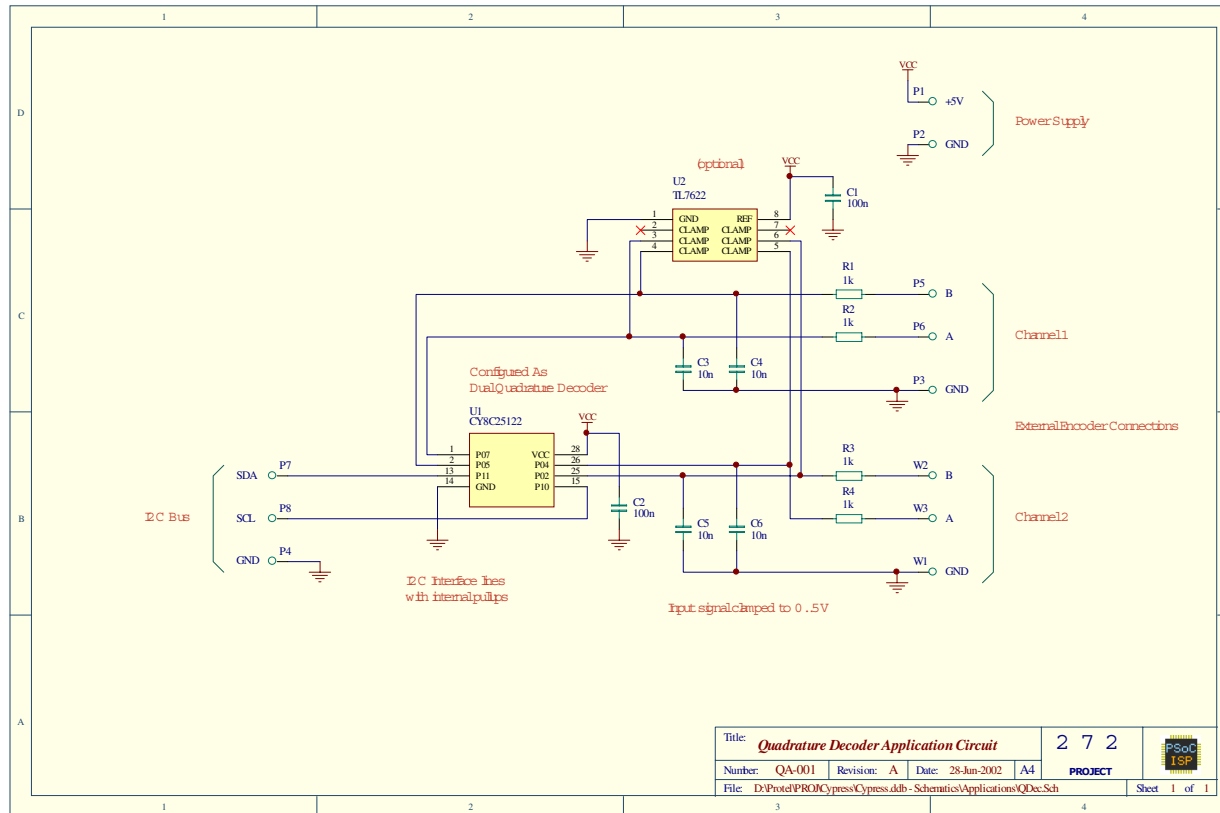
Three digital values 0..255 can be converted into voltages 0 to 5V.

The configurations are loaded as required by way of an I2C parameter.

One common feature of all configurations is the I2C interface. This was implemented as a separate configuration alone and then superimposed with all other loadable configurations by modifying the configuration tables in "psocconfigtbl.asm". This way there is only one instance of the I2C module to deal with.



Schematic



Title: Quadrature Decoder Application Circuit				272		
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File: D:\Protel\PROJ\Cypress\Cypress.ddb - Schematics\Applications\QDec.Sch						