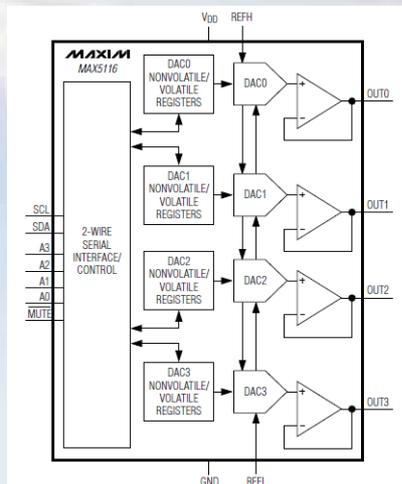


Projektarbeit

Control of 2-Wire and 3-Wire Bus through PC USB port and GUI in Matlab

In our project MRExcite, a number of active RF circuits for a 7 Tesla MR Imaging system will be designed based on commercial integrated circuits (ICs). Certain circuits, like D/A converters, require digital data input for the control of its function. The digital data transfer can use a bus system, either serial or parallel. It is intended to use integrated circuits which apply the 3-wire SPI bus or the 2-wire Inter-IC (I2C) bus. Remote control from a PC is intended to be realized by the USB bus. In a simple implementation using a commercial modem, this bus can be interfaced through the USB port of a PC while the USB port can be controlled using, e.g., Matlab.



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Project Task

The project task is to assemble two commercial USB – to – I2C modem kits from Horter&Kalb and develop a suitable software program in Matlab for the control of the 2-Wire I2C Bus through the PC. Prove the functionality of the bus and of the control software by checking the transmission and the logic bit patterns using a Logic Analyzer. Exercise by controlling a simple example circuit with I2C bus control, e.g.

a temperature sensor. Next, build a D/A converter circuit by designing a printed circuit board for the MAX515 Quad 8-Bit DAC IC from Maxim. Control the amplitude of the analog output voltages by programming the I2C bus. Finally, realize a Graphical User Interface for easy handling of the selection and setting of the amplitudes of one or several converters connected to the bus.

If time allows, check out a modification of the realized bus system to serve the SPI protocol which is used in many other ICs.

At the end of the work, a public presentation of results is to be given.