Short documentation to the gaming console

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1 Preface

This console has the purpose of teaching advanced microcontroller programming by the means of implementing a game on existing hardware. The challenge hereby is to cope with the limitiation given by the atmega microcontrollers used in this project and the reasonable use of the display's drawing mechanisms.

2 General overview

The PCB board for this gaming console consists of two Atmega microcontrollers referred as the *master* and the *slave*.

The output is generated by a display with 160×104 Pixels. A small speaker can give audio feedback generated by a PWM.

As input there are two action-buttons A and B, two control buttons *START* and *SELECT* and a four directional cross with *UP*, *DOWN*, *LEFT* and *RIGHT*. There is also a reset button, hidden and protected agains accitential triggering. A combined volume control and on/off potentiometer is placed at the bottom side of the case.

The console can be either powered using an external source of $\approx 4 - 7$ Volts or with four AA batteries in the bottom of the case. Two ISP programm interfaces are available, the lower one next to the volume control programms the slave where the one on the right is connected to the master controller.
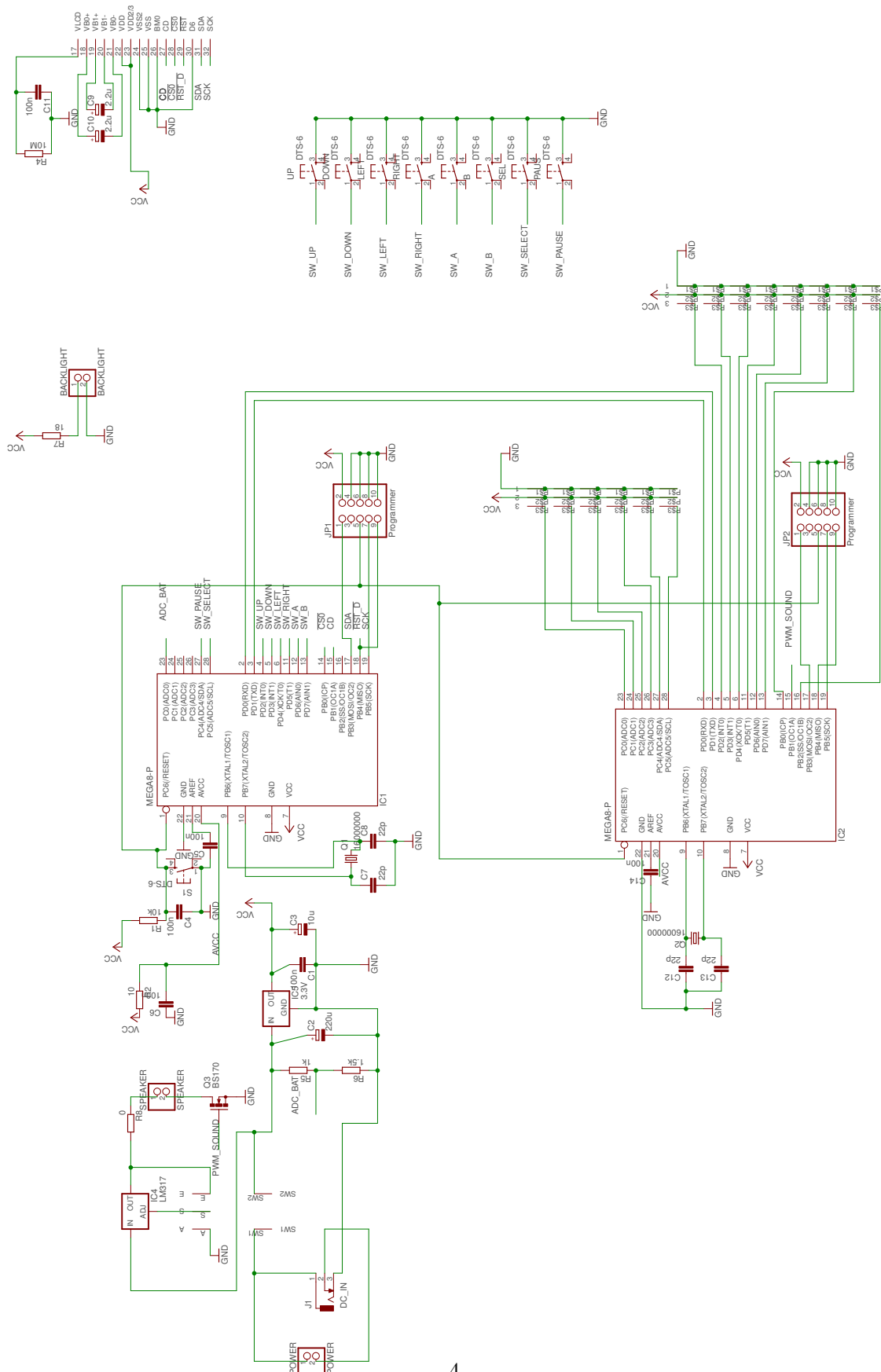
3 Details master controller

The Master controller is a atmega328 with 32KBytes program memory and 2KBytes SRAM. It is connected to the display and the buttons. Its ADC can read the battery voltage.

PIN	Connected to
C0	Battery voltage (ADC0)
C4	Button *PAUSE*
C5	Button *SELECT*
D0	RX to slave's TX
D1	TX to slave's RX
D2	Button *UP*
D3	Button *DOWN*
D4	Button *LEFT*
D5	Button *RIGHT*
D6	Button *A*
D6	Button *B*

4 Details slave controller

5   Diagramms

5.1   Schematic

5.2 Layout