

Switcher

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1 Introduction

2 Hardware

3 Software

3.1 Peripherals

3.1.1 Analogue to Digital Convertors (ADCs)

A single ADC is multiplexed to measure three voltages on the board.

3.1.2 Universal Asynchronous/Synchronous Transceiver (UART)

The UART is configured to run at 115200 baud with no control flow with a ring buffer interface. Transmission from the microcontroller happens through **uartLoadOut** which adds to the **8 byte** buffer and is then unloaded from a timer. The input is not interrupt driven and is handled in the main control loop using a **5 byte** buffer that is enough to contain the longest command.

3.1.3 Programmable Counter Array (PCA)

The Pulse Width Modulation (PWM) is controlled from the counter array. The output runs at approximately 96KHz with 8 bits to control the duty cycle. A high resolution for control would be favourable for this application but the frequency achieved in 16-bit mode is far too low for this application.

3.1.4 Timers

Timer 0 is used as baud rate generation for the UART. **Timer 2** is used to trigger an Interrupt Service Routine (ISR) which runs at 4KHz. The ISR controls the UART transmission, sampling of the ADC, running the controller and finally setting the PWM.

3.2 Operation

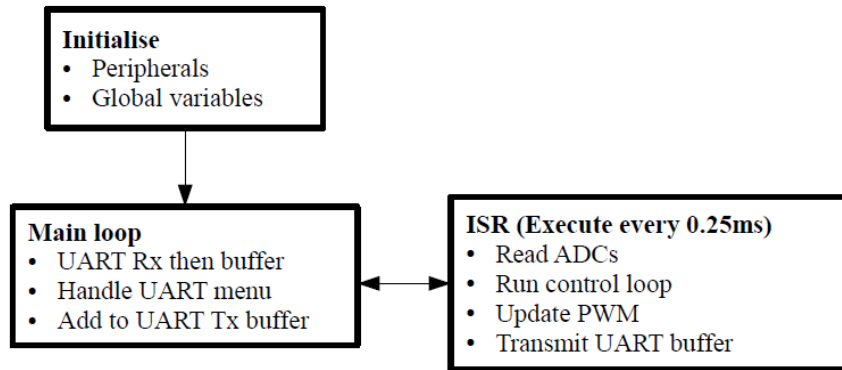


Figure 1: Software overview.

3.3 UART Menu

Command	Char	Send numbers	Return numbers	Notes
Enable	g	0	0	0
Disable	s	0	0	0
Read ADC1	x	0	4	Result in mV
Read ADC2	y	0	4	Result in mV
Read ADC3	z	0	4	Result in mV
Read output current	j	0	4	Result in mA
Set output voltage	v	4	0	Send value in mV
Set otuput current	c	4	0	Send value in mA
Set controller P	p	4	0	Value is divide by 10
Set controller I	i	4	0	Value is divide by 10
Set input voltage upper limit	u	4	0	Send value in mV
Set input voltage lower limit	l	4	0	Send value in mV

Table 1: UART menu