

Embedded Systems Essentials with Arm: Getting Started

Module 5

KV4 (5): Using Mbed to Capture and Generate Analog Signals

The Mbed API provides libraries for both analog-to-digital conversion and digital-to-analog conversion.

This table shows four functions that can be used to read an analog signal.

AnalogIn (PinName pin) is a constructor that creates an AnalogIn connected to a specific pin.

'read' reads the input voltage, represented as a float in the range of 0 to 1.

'read u16' reads the input voltage, represented as an unsigned short in a particular range.

And finally, the 'float operator' is an operator shorthand for read.

Before using a GPIO for input and output, remember that not every port is suitable for digital AND analog IO, so be sure to select the correct ports. You should also remember that ports must be initialized and configured before being used as input OR output.

Here is an example of these functions being used in Mbed.

In the first two lines of the code, an analog input port and a digital output port are configured and initialized.

If the analog input rises above a given voltage, an LED is turned on. Otherwise, it is turned off.

The Mbed API provides an array of functions for analog output.

AnalogOut (PinName pin) is a constructor that creates an AnalogOut connected to a specific pin.

'write' and 'write u16' allow you to set the output voltage as either a percentage or an unsigned short.

'read' reads the output voltage, measured as a percentage.

Finally, 'AnalogOut operator float percent' and 'AnalogOut operator float' are operator shorthands for write and read, respectively.

This code shows the analog output commands in use.

This program outputs a 10-step ramp or 'for' loop with a value of 'f = 1 kilohertz'.

The output port is initialized in the second line of the program.

A 'for' loop is then carried out which increments the 'i' float variable by 0.1 until it reaches 1.

In each loop the signal takes the float 'i' and sets it to the signal, ramping up over 10 steps.