NAME

arduino_connect − establish connection to Arduino from MATLAB

SYNOPSIS

value **= arduino_connect ( )**

DESCRIPTION

arduino_connect is a function for interfacing with the **Arduino** microcontroller from **MATLAB**.

This function creates a daemon which acts as an intermediary between the **Arduino** and **MATLAB**. This daemon is a fork of MATLAB, the side effect of this is that when you exit from **MATLAB**, the daemon will still be running. To get rid of this server use the command "**killall -9 MATLAB**"

RETURNS

If the function returns successfully, it will return 1. If there is a problem, it will either hang (very unlikely) or issue a **MATLAB** error message.

AUTHOR

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SEE ALSO

analogRead(3), analogWrite(3), digitalRead(3), digitalWrite(3) analogWriteVector(3)

NAME

analogRead − read single sample from the Arduino ADC

SYNOPSIS

value **= analogRead (** *adc_port* **)**

DESCRIPTION

analogRead is a function for interfacing with the **Arduino** analog to digital converters (ADC) from **MATLAB**. When called the ADC samples the voltage at its input and converts the value to a digital representation.

Like all **Arduino** functions, **arduino_connect** must be called before this function will work.

The variable *adc_port* determines which of the 6 ADC inputs will be sampled, it should be a scalar. Valid values are integers from 0 through 5. These ADC inputs are labeled **A0**, **A1**, **A2**, **A3**, **A4**, and **A5** on the **Arduino** front panel.

Non-integer values for **adc_port** will be rounded according to the behavior of the C function **rint**(). Out of range values will result in function failure.

RETURNS

The variable *value* is the raw number returned by the ADC conversion, it will be a scalar. The **arduino** ADCs are 10 bit, so values for *value* will be integers ranging from 0, corresponding to the lowest voltage, upto 1023, corresponding to the highest voltage.

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SEE ALSO

arduino_connect(3), analogWrite(3), digitalRead(3), digitalWrite(3) analogWriteVector(3)

NAME

analogWrite − set PWM output of Arduino

SYNOPSIS

analogWrite (*pin* **,** *value* **)**

DESCRIPTION

analogWrite is a function for interfacing with the **Arduino** Pulse Width Modulation (PWM) outputs from **MATLAB**. Once a value has been set it will remain at that value until the **Arduino** reset, or a new value is set.

Like all **Arduino** functions, **arduino_connect** must be called before this function will work.

The variable *pin* determines which of the PWM pins will have its output set, it should be a scalar. Valid values are 0 through 13, although only 3, 5, 6, 9, 10, and 11 are PWM capable outputs. It should be noted that the default frequency of the PWM ports on **Arduino** is about 500 Hz, however the locally written sketch installed on the **Arduino** sets the frequency on pins 10 and 11 to 33 kHz in order to make the low-pass filter hack on pin 10 work better. Speaking of which, there is a low-pass filter attached between pin 10 output on the **Arduino** and the BNC port labelled **10** on the front panel.

The variable *value* is the raw number sent to the PWM port, it should be a scalar. The **Arduino UNO** PWM outputs are 8 bit, so valid values for *value* are integers ranging from 0, corresponding to the output always low, upto 255, corresponding to the output always high.

Non-integer values for parameters will be rounded according to the behavior of the C function **rint**(). Out of range values will result in function failure.

RETURNS

value.

BUGS

This function should return nothing. I haven't figured how to make a MEX file return nothing.

AUTHOR

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SEE ALSO

arduino_connect(3), analogRead(3), digitalRead(3), digitalWrite(3) analogWriteVector(3)

NAME

analogWriteVector − set PWM output of Arduino

SYNOPSIS

analogWriteVector (*pin* **,** *values* **)**

DESCRIPTION

analogWriteVector is a function for interfacing with the **Arduino** Pulse Width Modulation (PWM) outputs from **MATLAB**. Once a vetor of values has been sent, it will be iterated through until the **Arduino** reset, or a new function is called. This function is intended for use as a signal generator component.

Like all **Arduino** functions, **arduino_connect** must be called before this function will work.

The variable *pin* determines which of the PWM pins will have its output set, it should be a scalar. Valid values are 0 through 13, although only 3, 5, 6, 9, 10, and 11 are PWM capable outputs. It should be noted that the default frequency of the PWM ports on **Arduino** is about 500 Hz, however the locally written sketch installed on the **Arduino** sets the frequency on pins 10 and 11 to 33 kHz in order to make the low-pass filter hack on pin 10 work better. Speaking of which, there is a low-pass filter attached between pin 10 output on the **Arduino** and the BNC port labelled **10** on the front panel.

The variable *values* is the vector of raw numbers to be sent to the PWM port. The maximum length of the vector is currently 700. The **Arduino UNO** PWM outputs are 8 bit, so valid values for *value* are integers ranging from 0, corresponding to the output always low, upto 255, corresponding to the output always high.

The following command will generate a sine wave on pin 10.

```
>> analogWriteVector(10,128+127*sin(2*pi*[0:699]/700))
```

Non-integer values for parameters will be rounded according to the behavior of the C function **rint**(). Out of range values will result in function failure.

RETURNS

value.

BUGS

This function should return nothing. I haven't figured how to make a MEX file return nothing.

AUTHOR

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SEE ALSO

arduino_connect(3), analogRead(3), digitalRead(3), digitalWrite(3) analogWriteVector(3)

NAME

digitalRead − read value from Arduino digital pin

SYNOPSIS

value **= digitalRead (** *pin* **)**

DESCRIPTION

digitalRead is a function for interfacing with the **Arduino** digital inputs from **MATLAB**.

Like all **Arduino** functions, **arduino_connect** must be called before this function will work.

The variable *pin* determines which of the 14 digital inputs will be read, it should be a scalar. Valid values are integers from 0 through 13.

Non-integer values for **pin** will be rounded according to the behavior of the C function **rint**(). Out of range values will result in function failure.

RETURNS

The variable *value* is the number corresponding to the logical level of the pin. LOW maps to 0, HIGH maps to 1.

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SEE ALSO

arduino_connect(3), analogRead(3), analogWrite(3), digitalWrite(3), analogWriteVector(3)

NAME

digitalWrite − set digital output of Arduino

SYNOPSIS

digitalWrite (*pin* **,** *value* **)**

DESCRIPTION

digitalWrite is a function for interfacing with the **Arduino** digital outputs from **MATLAB**. Once a value has been set it will remain at that value until the **Arduino** reset, or a new value is set.

Like all **Arduino** functions, **arduino_connect** must be called before this function will work.

The variable *pin* determines which of the dgital pins will have its output set, it should be a scalar. Valid values are 0 through 13.

The variable *value* is the number sent to the pin, it should be a scalar of value 0 or 1.

Non-integer values for parameters will be rounded according to the behavior of the C function **rint**(). Out of range values will result in function failure.

RETURNS

value.

BUGS

This function should return nothing. I haven't figured how to make a MEX file return nothing.

AUTHOR

Mark Orchard-Webb, mark.orchard-webb@mcgill.ca

SEE ALSO

arduino_connect(3), analogRead(3), analogWrite(3), digitalRead(3), analogWriteVector(3)