Erriez LM35 library for Arduino

1.0.0

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Contents

1 LM35 temperature sensor library for Arduino 1

2 Class Index 5

2.1 Class List . . . 5

3 File Index 7

3.1 File List . . . 7

4 Class Documentation 9

4.1 LM35 Class Reference . . . 9

4.1.1 Detailed Description . . . 9

4.1.2 Constructor & Destructor Documentation . . . 9

4.1.2.1 LM35(uint8_t pin) . . . 9

4.1.3 Member Function Documentation . . . 10

4.1.3.1 readTemperature() . . . 10

5 File Documentation 11

5.1 ErriezLM35.cpp File Reference . . . 11

5.1.1 Detailed Description . . . 11

5.2 ErriezLM35.h File Reference . . . 11

5.2.1 Detailed Description . . . 12

5.2.2 Macro Definition Documentation . . . 12

5.2.2.1 LM35_MAX_SAMPLES . . . 12

Index 13

Chapter 1

LM35 temperature sensor library for Arduino

This is an accurate LM35 analog temperature sensor library for Arduino with noise cancellation.

Library features

- Synchronous 10-bit unsigned temperature read
- Temperature range: 0.0 .. 110.0 degree Celsius
- Accuracy: 0.1 degree Celsius
- Noise cancellation
- Small footprint

Hardware

Supported hardware

- All ATmega328P MCU (Arduino UNO, Micro, Nano, etc)
- All ATmega32U4 MCU (Arduino Leonardo, Pro Micro, etc)
- Arduino ATmega2560

Notes:

- This library changes analog pins to ADC 1.1V internal reference voltage which affects all analog pins.
- The function `analogReference()` may not be supported with other non-AVR MCU's.

Arduino UNO - LM35 example

LM35	Arduino UNO
GND	GND
Vs	5V (or 3.3V)
Vout	A0 (ANALOG pin)

Notes:

- Keep wires short to prevent noise.

LM35 pins

LM35 specifications

- Supply voltage: 3.3V .. 30V
- Low power: Around 65uA
- Analog voltage interface

Examples

Arduino IDE | Examples | Erriez LM35 analog temperature:

- Example

Documentation

- Doxygen online HTML
- Doxygen PDF
- LM35 datasheet

Usage

Initialization

```
1 {c++}
2 #include <ErriezLM35.h>
3
4 // Connect LM35 data pin to Arduino DIGITAL pin
5 #define LM35_PIN   A0
6
7 LM35 lm35 = LM35(LM35_PIN);
```

Read temperature and humidity

```
1 {c++}
2 void loop()
3 {
4   // Read unsigned temperature from sensor
5   uint16_t lm35_temp = lm35.readTemperature();
6
7   // Print temperature
8   Serial.print(F("LM35: "));
9   Serial.print(lm35_temp / 10);
10   Serial.print(F("."));
11   Serial.print(lm35_temp % 10);
12   Serial.println(F(" *C"));
13
14   // Wait some time
15   delay(2000);
16 }
```

Serial output

```
1 Analog LM35 temperature sensor example
2
3 LM35: 18.1 *C
4 LM35: 18.2 *C
5 LM35: 18.2 *C
6
7 ...
```

Library dependencies

- None

Library installation

Please refer to the Wiki page.

Other Arduino Libraries and Sketches from Erriez

- Erriez Libraries and Sketches

Chapter 2

Class Index

2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

LM35
LM35 sensor class 9

Chapter 3

File Index

3.1 File List

Here is a list of all documented files with brief descriptions:

ErriezLM35.cpp
Analog LM35 temperature sensor library for Arduino 11
ErriezLM35.h
Analog LM35 temperature sensor library for Arduino 11

Chapter 4

Class Documentation

4.1 LM35 Class Reference

LM35 sensor class.

```
#include <ErriezLM35.h>
```

Public Member Functions

- LM35 (uint8_t pin)
  LM35 constructor.
- uint16_t readTemperature ()
  Read unsigned analog temperature.

4.1.1 Detailed Description

LM35 sensor class.

Definition at line 49 of file ErriezLM35.h.

4.1.2 Constructor & Destructor Documentation

4.1.2.1 LM35::LM35 (uint8_t *pin*) [explicit]

LM35 constructor.

The constructor changes the ADC to 1.1V internal ADC reference voltage for higher accuracy. This affects all ANALOG pins.

Parameters

pin	LM35 analog pin.

Definition at line 42 of file ErriezLM35.cpp.

4.1.3 Member Function Documentation

4.1.3.1 uint16_t LM35::readTemperature ( )

Read unsigned analog temperature.

Sample LM35 analog pin multiple times to find two identical samples to reduce noise. A maximum number of samples can be configured with macro LM35_MAX_SAMPLES. The last sampled temperature will be returned when no identical temperatures found.

Temperature range: 0.0 .. 110 degree Celsius: A negative temperature cannot be measured, because the ADC pin can only sample between positive 0.0 and 1.1 Volt.

Returns

Divide temperature by 10 to get the temperature integer, temperature modulo 10 results in the fraction, for example: int16_t temperature = 182 means 18.2 degree Celsius.

Definition at line 73 of file ErriezLM35.cpp.

The documentation for this class was generated from the following files:

- ErriezLM35.h
- ErriezLM35.cpp

Chapter 5

File Documentation

5.1 ErriezLM35.cpp File Reference

Analog LM35 temperature sensor library for Arduino.

```
#include "ErriezLM35.h"
```

5.1.1 Detailed Description

Analog LM35 temperature sensor library for Arduino.

Source: https://github.com/Erriez/ErriezLM35 Documentation: https://erriez.github.io/ErriezLM35

5.2 ErriezLM35.h File Reference

Analog LM35 temperature sensor library for Arduino.

```
#include <Arduino.h>
```

Classes

- class LM35

  LM35 sensor class.

Macros

- #define LM35_MAX_SAMPLES 10

  Check tested platform.

5.2.1 Detailed Description

Analog LM35 temperature sensor library for Arduino.

Source: https://github.com/Erriez/ErriezLM35 Documentation: https://erriez.github.io/ErriezLM35

5.2.2 Macro Definition Documentation

5.2.2.1 #define LM35_MAX_SAMPLES 10

Check tested platform.

Maximum number of LM35 ADC samples

Definition at line 45 of file ErriezLM35.h.

Index

ErriezLM35.cpp, 11
ErriezLM35.h, 11
    LM35_MAX_SAMPLES, 12

LM35, 9
    LM35, 9
    readTemperature, 10
LM35_MAX_SAMPLES
    ErriezLM35.h, 12

readTemperature
    LM35, 10