Application Note: AS8510-AN04 – Arduino Shield

AS8510

AN04 – Arduino Shield

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Revision History

Revision	Date	Owner	Description
1.1	06.10.2014	gheh	Version 1.1

1 General Description

This document describes the AS8510 Arduino Shield Reference design.

It is an add-on to the very popular Arduino Series of uC development boards.

The reference design allows to measure current and voltage via the AS8510 A/D IC and to use the measured data in any Arduino sketch.

Schematic and Layout are available on the homepage for free use with no restrictions. Libraries to Interface to the Arduino IDE as well as example code can be downloaded from the homepage as well.

1.1 Kit Content

The kit consists of the Shield with connections for current and voltage measurement.

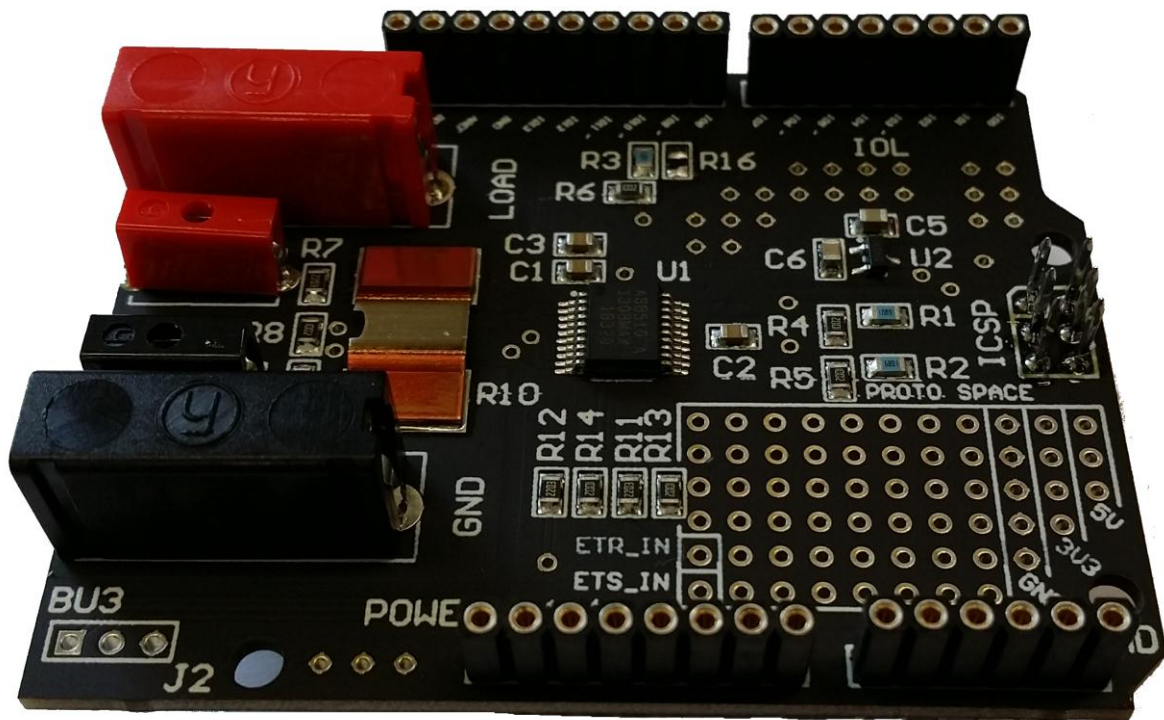Software, example code, and all cad files are available from the download area at

#URL

Figure 1: AS8510 Arduino Shield

2   Getting Started

- To get started connect the AS8510 Shield to your Arduino board like in the following picture:

Figure 2: AS8510 Arduino Shield connected to the Arduino Uno board

- Install the Arduino IDE from: http://arduino.cc/en/Main/Software
- Download the example code and lib files from the Homepage: #URL
- Move the AS8510 folder to the libraries folder of the Arduino IDE
- Open the as8510_arduino_test.ino file in the Arduino IDE
- You can compile the test project and download it to the Arduino Board
- The test project will output measured current and voltage into the serial monitor of the Arduino IDE.
- The test project has calibration data for current and voltage channel which has a tolerance between manufacturing lots. You can tweak the measurement performance by comparing the measured values to value measured with a DMM and change the calibration coefficients accordingly.

3 Hardware Description

The AS8510-Arduino Shield is powered via the Arduino Board.

Connectors A and D are for current measurement.

The connectors in between (B and C) as well as J1 (F) are for voltage measurement.

Keep in mind that GND of current measurement and voltage measurement are the same and are connected to the GND of the Arduino.
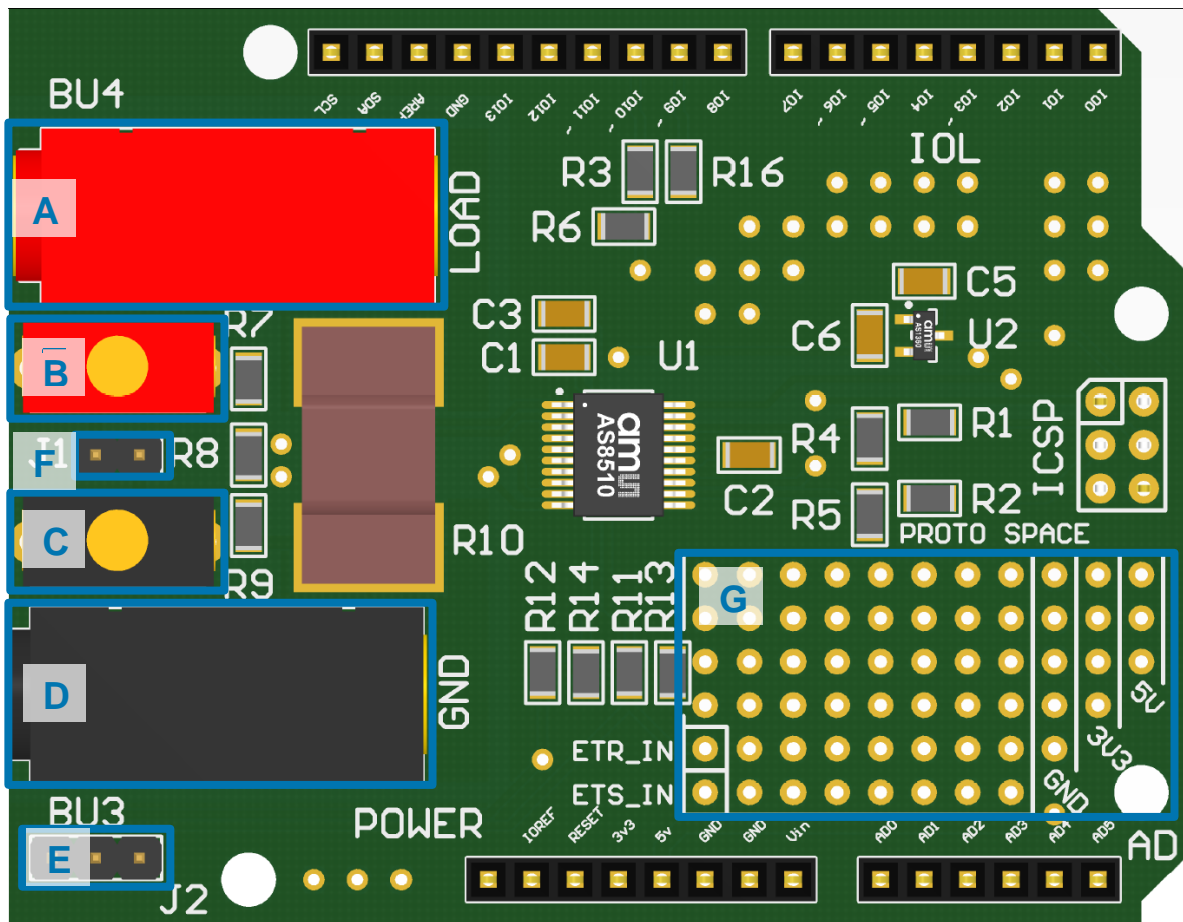

Figure 3: PCB Connection Diagram

Label	Name	Designator	Description	Info
A	LOAD	BU4	+ current input	Connect + side of current measurement path here
B	V_MEAS_+		+ voltage input	Connect + side of voltage measurement path here
C	V_MEAS_GND		- voltage input	Connect GND side of voltage measurement path here (connected to GND connector D)
D	GND	BU3	- current input	Connect GND side of current measurement path here

Label	Name	Designator	Description	Info
E	V_MEAS2	J2	Additional measurement inputs	Additional voltage measurement inputs (ETR / ETS)
F	V_MEAS	J1	Voltage measurement	Same connection as B/C but as a pin header

Table 1: PCB Connections

4   Software Description

The AS8510 Library which is part of the example code available from the homepage contains the following functions:

AS8510.begin();

Initializes all necessary pins and activates the SPI interface

AS8510.set_volt_calib(cal_value);

Used to calibrate the voltage channel

AS8510.set_curr_calib(cal_value);

Used to calibrate the current channel

AS8510.set_curr_gain(40);

Changes the gain in the current channel.

Possible values are 1,5,25,40,100. This allows you to trade current range versus accuracy.

Typical value is 40

AS8510.autoconversion();

Starts the autoconversion procedure.. New values are available each millisecond

AS8510.read_voltage()

Outputs the measured voltage in millivolts

AS8510.read_current()

Outputs the measured current in milliamps

5   Board Schematics, Layout and BOM
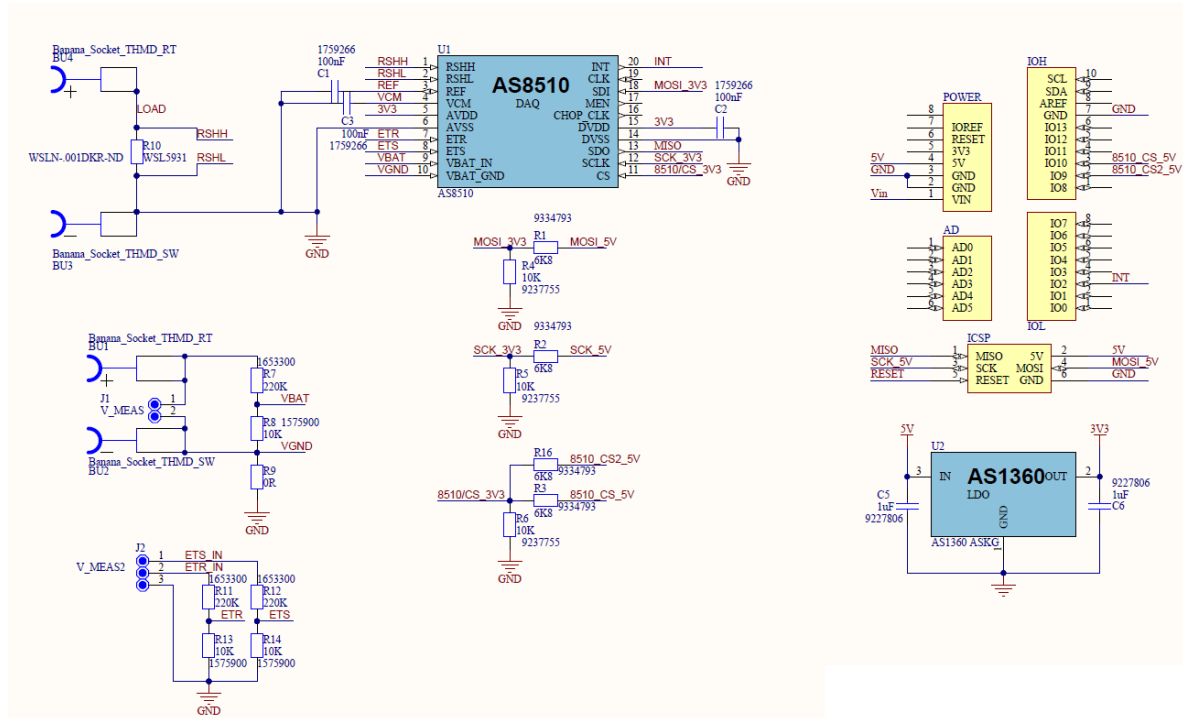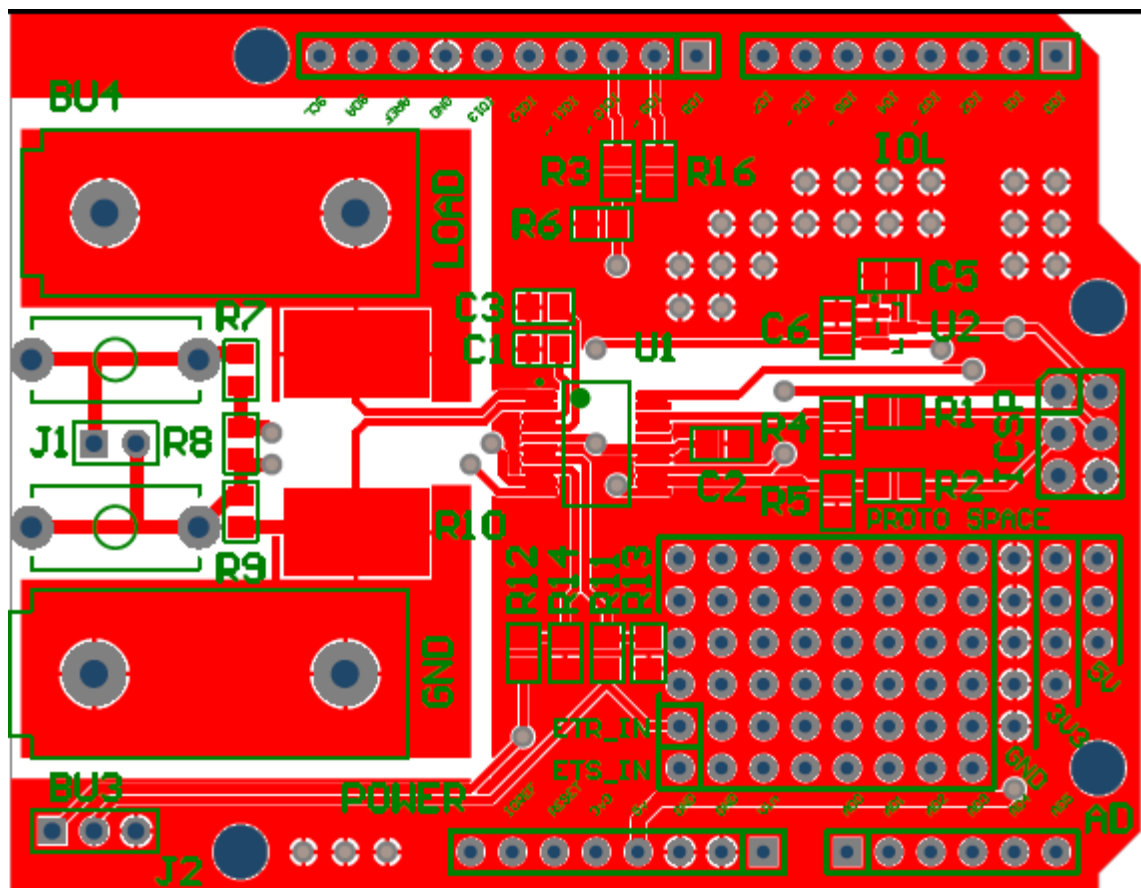

Figure 4: AS8510 Arduino Shield Schematic
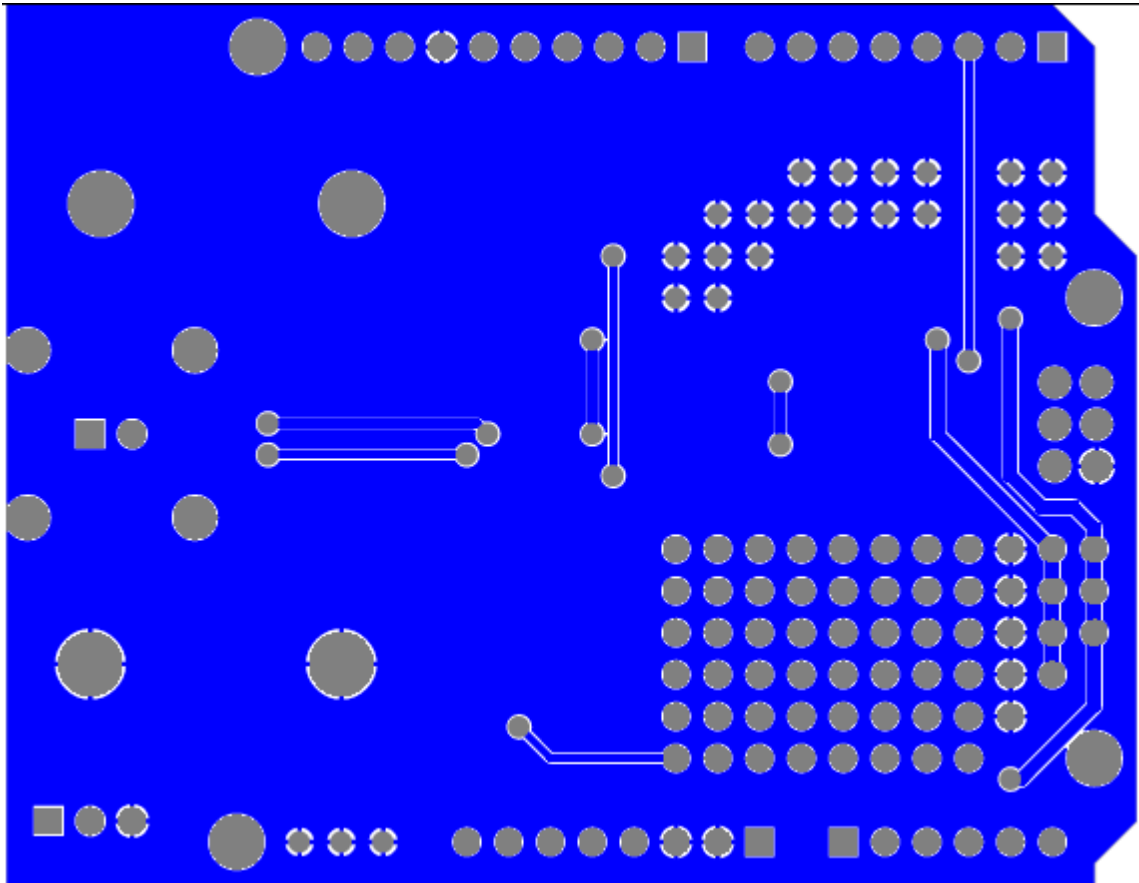
Figure 5: AS8510 Arduino Shield Top Layer

Figure 6: AS8510 Arduino Shield Bottom Layer

6   Ordering Information

The AS8510 Arduino Shield can be ordered via www.ams.com/RefDesign/AS8510-Arduino .

Table 11: Ordering Information

Ordering Code	
990600809	AS8510 Arduino Shield