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Arduino SD Card Web Server

Created on: 28 January 2013

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Arduino
SD Card Web Server

Arduino
and micro SD
to make a web
ts a web page
. When a
sts a web page
no web server,
I fetch the web

page from the SD card.

**Arduino
Ethernet Shield
Tutorial**

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**Part 1: Ethernet
Shield Tutorial
Introduction**

Creating the Web Page

Because the web page is to be stored on the SD card, it must first be created using a text editor and then copied to the SD card.

Web Page Editor

A [text editor such as Geany](#) can be used – it is available to download for Windows and will be in the repositories for most Ubuntu based Linux distributions. Geany has syntax highlighting and will automatically close HTML tags for you which makes web page editing easier. It is possible to use any other text editor, even Windows Notepad.

Web Page

Create the following web page in a text editor. When you save the text file, give it the name: **index.htm**

```
<!DOCTYPE html>
<html>
  <head>
    <title>Arduino SD Card Web Page</title>
  </head>
  <body>
    <h1>Hello from the Arduino SD Card!</h1>
    <p>A web page from the Arduino SD card server.</p>
  </body>
</html>
```

Nothing new here, it is the same as the web page from the first web server in this tutorial with just the text changed. Test this web page by opening it in a web browser.

Copying the Web Page

You will need a micro SD card slot on your computer or a card reader that is capable of reading and writing a micro SD card.

Insert the micro SD card into the slot on the computer or card reader that is plugged into the computer and copy the **index.htm** file to the micro SD card.

and Hardware

Part 2: Basic Arduino Web Server

Part 3: HTML Web Page Structure

Part 4: Arduino SD Card Web Server

Part 5: Arduino Web Server LED Control

Part 6: Reading a Switch

Part 7: Reading a Switch using AJAX

Part 8: Reading a Switch Automatically using AJAX

Part 9: Reading an Analog Input and Switches using AJAX

Part 10: Linking Web Pages

Part 11: Web Page Images

Part 12: CSS Introduction

Now plug the SD card into the micro SD card slot on the Ethernet shield.

SD Card Web Server

Hardware

You should now have the micro SD card with web page copied to it inserted into the card slot on the Arduino Ethernet shield. The Ethernet shield should be plugged into a compatible Arduino and into an Ethernet cable connected to your network. The Arduino / Ethernet shield should be powered from a USB cable.

Arduino Sketch

The Arduino sketch that fetches the web page from the SD card and sends it to the browser is shown below.

```

/*-----
Program:      eth_websrv_SD

Description:   Arduino web server that serves up a basic
               page. The web page is stored on the SD card

Hardware:      Arduino Uno and official Arduino Ethernet
               shield. Should work with other Arduinos and
               compatible Ethernet shields.
               2Gb micro SD card formatted FAT16

Software:      Developed using Arduino 1.0.3 software
               Should be compatible with Arduino 1.0 +
               SD card contains web page called index.htm

References:    - WebServer example by David A. Mellis and
               modified by Tom Igoe
               - SD card examples by David A. Mellis and
               Tom Igoe
               - Ethernet library documentation:
               http://arduino.cc/en/Reference/Ethernet
               - SD Card library documentation:

```

Part 13:
Reading a
Switch with SD
Card Web
Server and Ajax

Part 14:
Reading Inputs
with Ajax and
XML

Part 15: Analog
Value Displayed
on Gauge

Part 16: Inputs
and Outputs
(I/O)

Part 17:
Accessing
HTML Tags with
CSS and
JavaScript

Part 18: CSS for
Positioning,
Sizing and
Spacing

Summary and
Conclusion

<http://arduino.cc/en/Reference/SD>

Date: 10 January 2013

Author: W.A. Smith, <http://startingelectronics.org>

```
#include <SPI.h>
#include <Ethernet.h>
#include <SD.h>

// MAC address from Ethernet shield sticker under board
byte mac[] = { 0xDE, 0xAD, 0xBE, 0xEF, 0xFE, 0xED };
IPAddress ip(10, 0, 0, 20); // IP address, may need to change
EthernetServer server(80); // create a server at port 80

File webFile;

void setup()
{
    Ethernet.begin(mac, ip); // initialize Ethernet device
    server.begin();          // start to listen for client
    Serial.begin(9600);      // for debugging

    // initialize SD card
    Serial.println("Initializing SD card...");
    if (!SD.begin(4)) {
        Serial.println("ERROR - SD card initialization failed!");
        return; // init failed
    }
    Serial.println("SUCCESS - SD card initialized.");
    // check for index.htm file
    if (!SD.exists("index.htm")) {
        Serial.println("ERROR - Can't find index.htm file!");
        return; // can't find index file
    }
    Serial.println("SUCCESS - Found index.htm file.");
}
```




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New Book on C Programming

C Programming with Arduino, published by Elektor, teaches the C programming language in an embedded environment using Atmel Studio and Arduino boards.

AVR MICROCONTROLLERS AND ATMEL STUDIO FOR C PROGRAMMING WITH ARDUINO



Warwick A. Smith

elektor

```
void loop()
{
    EthernetClient client = server.available(); // try to get new client

    if (client) { // got client?
        boolean currentLineIsBlank = true;
        while (client.connected()) {
            if (client.available()) { // client data available
                char c = client.read(); // read 1 byte (character) from client
                // last line of client request is blank and no more
                // respond to client only after last line of request
                if (c == '\n' && currentLineIsBlank) {
                    // send a standard http response header
                    client.println("HTTP/1.1 200 OK");
                    client.println("Content-Type: text/html");
                    client.println("Connection: close");
                    client.println();
                    // send web page
                    webFile = SD.open("index.htm");
                    if (webFile) {
                        while(webFile.available()) {
                            client.write(webFile.read());
                        }
                        webFile.close();
                    }
                    break;
                }
            }
            // every line of text received from the client
            if (c == '\n') {
                // last character on line of received text is a newline character
                // starting new line with next character
                currentLineIsBlank = true;
            }
            else if (c != '\r') {
                // a text character was received from client
                currentLineIsBlank = false;
            }
        } // end if (client.available())
    } // end while (client.connected())
}
```



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```
        delay(1);          // give the web browser time to rec  
        client.stop(); // close the connection  
    } // end if (client)  
}
```

Using the Sketch

Copy the above sketch and paste it into the Arduino IDE. Load the sketch to the Arduino and then surf to the IP address set in the sketch with your web browser. The web page that you created should be displayed in the browser as it is served up by the Arduino SD card web server.

Fault Finding

If the [previous sketch](#) in this tutorial worked, then the only thing that can go wrong is with initializing the SD card and finding the index.htm file on the card. If the file is not on the card or does not have the exact name index.htm, then the server will not be able to display the web page.

Open up the [Arduino serial monitor window](#) to see SD card diagnostic information.

Sketch Explanation

This sketch is a modified version of the **eth_websrv_page** sketch from the [Basic Arduino Web Server](#) part of this tutorial.

Additional Code

The sketch now initializes the SD card in the **setup()** function and sends diagnostic information out of the serial port that can be viewed in the Arduino serial monitor window.

Instead of sending the web page line by line from within the code as in the **eth_websrv_page** sketch, this new sketch now opens the **index.htm** file from the SD card and sends the contents to the web client (the web browser).

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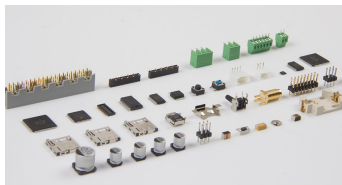
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Go to Part 5 →

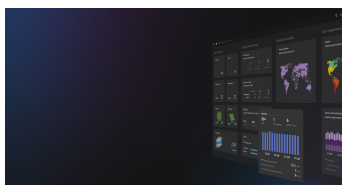
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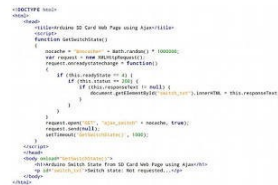


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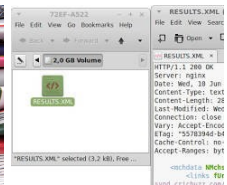


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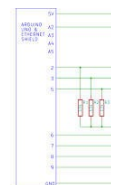


Arduino Ethernet Board Programming and Using



How to Save a File to the Arduino Card using

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Arduino Web Input and Output

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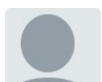
Thank you for an excellent tutorial. I had to change one line
 in the code for the SD card:

FROM client.println("Content-Type: text/html");
 TO client.println("Content-Type: html");

Without that change, the browser could not display the
 index.htm, but rather asked "download file".

thanks.....:)

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