# Hackable ESP device

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# Chapter 1

# Hackable ESP8266 device

Firmware for ESP8266 based device (D1 Mini board) with designed vunerabilities to practice ethical hacking. The software is tested on the following boards:

- D1 Mini

## 1.1 Getting Started

These instructions will get you a copy of the project up and running on your D1 Mini (or other ESP8266 based boards) for development or hacking purposes.

### 1.1.1 Prerequisites

The software is written, compiled and uploaded using the Arduino IDE. Platform.io and Visual Studio Code can be used as well. Use the script to convert the project to a Platform.io.

### 1.1.2 Dependecies

#### 1.1.2.1 Libaries

- ESP for Arduino IDE
- ESP Async WebServer V1.2.3
- ESPAsyncWebServer-esphome V2.1.0
- Neotimer V1.1.6

#### 1.1.2.2 Files

- config.h

### 1.1.3 Installing

#### General install

1. Install the `driver` for the esp8266
2. Clone the repository

There are multiple ways to upload the program files to the board. The two ways listed here are using Arduino IDE and Platformio on visual studio code

#### Arduino IDE

1. Install the `Arduino IDE`
2. `Add the esp8266 libaries to Arduino IDE`
3. Follow `this` tutorial about the SPIFFS.
4. Navigate to the `hackableEspDevice` folder.
5. Open `hackableEspDevice.ino`.
6. Upload the files in the `data` folder (see the tutorial).
7. Upload the program to the device.
8. Connect to the `Configure Smartlight Wifi` AP to configure the wifi.

#### Visual Studio Code + Platformio

1. Install the `Platformio` plugin.
2. Perpare files for platformio
   - Run the `toPlatformio.ps1` script and select the copy or sybolic option
   - Run the `toPlatformio.ps1` script and select fix
   - Or perpare the files manualy see manual prep platformio
3. Open visual studio code in the `HackableEspDevicePlatformio` directory
4. In visual studio code open the project in the platformio addon. `(Platoformio > Projects > open HackableEspDevicePlatformio)`
5. Upload the program `(project tasks > General> Upload)`
6. Upload the filesystem Image `(Project tasks > Platform > Upload filesystem Image)`
7. Done the device should now be ready for use

### 1.1.4 Manual platformio prep

1. create the correct hiarchy
   |HackableEspDevicePlatformio\ \ |— platformio.ini \ |— src\ \ |— src\main.cpp\ |— data\

1. the src dir needs to contain all the files from the `hackableEspDevice` directory except the data directory
2. rename the `hackableEspDevice.ino` to `main.cpp`
3. in `main.cpp` add a reference to all functions in main eg.\ void setup();\ void setup();\ void initializeHostname();\ void connectWifi();\ void initializeServer();\ void loop();\ String processor(const String& var);\ String getContentType(String filename);\ void handleFileRequest(String path, uint8_t permissionLevel);\ void handleFileUpload();\ void handleFileDownload();
4. Move the platoformio.ini file from the root dir to the `hackableEspDevicePlatoformio` dir
5. Copy all files from `hackableEspDevice\data` to `hackableEspDevicePlatformio\data`

## 1.2 Hardware

- 1x D1 Mini Board
- 1x USB to USB-mini cable

## 1.3 Questions or feedback?

There is technical documentation available if you want to contribute to this project. There is an user manual as well, contact us for information. You can open an issue if you have questions or feedback for this repository.

## 1.4 Authors

- **Luke de Munk** - *Head author* - `LinkedIn`
- **Thijs Takken** - *Head author* - `LinkedIn`
- **Christina Kostine** - *Head author* - `LinkedIn`
- **Twenne Elffers** - *Head author* - `LinkedIn`

# Chapter 2

# Class Index

## 2.1 Class List

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

# Chapter 3

# File Index

## 3.1 File List

Here is a list of all files with brief descriptions:

# Chapter 4

# Class Documentation

## 4.1 BufferOverflow Class Reference

`#include <BufferOverflow.h>`

### Public Member Functions

- BufferOverflow ()
  *Constructor.*
- void ls ()
  *Prints the fake list of files.*
- void vi ()
  *Prints the vulnerable testprogram.*
- void objectDump ()
  *Prints the disassembled code of the vulnerable testprogram.*
- bool runCProgram (String arg)
  *Simulates the vulnerable testprogram.*

### 4.1.1 Detailed Description

Definition at line 20 of file BufferOverflow.h.

### 4.1.2 Constructor & Destructor Documentation

#### 4.1.2.1 BufferOverflow()

`BufferOverflow::BufferOverflow ( )`

Constructor.

Definition at line 15 of file BufferOverflow.cpp.

### 4.1.3 Member Function Documentation

#### 4.1.3.1 ls()

```
void BufferOverflow::ls ( )
```

Prints the fake list of files.

Definition at line 24 of file BufferOverflow.cpp.

#### 4.1.3.2 objectDump()

```
void BufferOverflow::objectDump ( )
```

Prints the disassembled code of the vulnerable testprogram.

Definition at line 70 of file BufferOverflow.cpp.

#### 4.1.3.3 runCProgram()

```
bool BufferOverflow::runCProgram (
            String arg )
```

Simulates the vulnerable testprogram.

**Parameters**

| | |
|---|---|
| *arg* | Given argument |

**Returns**

bool True if the buffer overflow attack is done correctly

Definition at line 127 of file BufferOverflow.cpp.

#### 4.1.3.4 vi()

```
void BufferOverflow::vi ( )
```

Prints the vulnerable testprogram.

Definition at line 34 of file BufferOverflow.cpp.

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

- hackableEspDevice/BufferOverflow.h
- hackableEspDevice/BufferOverflow.cpp

## 4.2 name Class Reference

`#include <classTemplate.h>`

### Public Member Functions

- name ()
  *Constructor.*
- void test ()
  *brief*

### 4.2.1 Detailed Description

Definition at line 13 of file classTemplate.h.

### 4.2.2 Constructor & Destructor Documentation

#### 4.2.2.1 name()

`name::name ( )`

Constructor.

**Parameters**

| *var* | desc |
|---|---|

**Returns**

var desc

Definition at line 18 of file classTemplate.cpp.

### 4.2.3 Member Function Documentation

#### 4.2.3.1 test()

```
void name::test ( )
```

brief

**Parameters**

| *var* | desc |
|---|---|

**Returns**

var desc

Definition at line 29 of file classTemplate.cpp.

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

- classTemplate.h
- classTemplate.cpp

## 4.3 SerialCommandExecuter Class Reference

`#include <SerialCommandExecuter.h>`

### Public Member Functions

- SerialCommandExecuter ()
  *Constructor.*
- void executeCommand ()
  *Reads the commands and sends them to the parser.*
- void setUsers (String *users, uint8_t numUsers)
  *Sets the users for user list.*

### 4.3.1 Detailed Description

Definition at line 46 of file SerialCommandExecuter.h.

### 4.3.2 Constructor & Destructor Documentation

#### 4.3.2.1 SerialCommandExecuter()

`SerialCommandExecuter::SerialCommandExecuter ( )`

Constructor.

Definition at line 16 of file SerialCommandExecuter.cpp.

### 4.3.3 Member Function Documentation

#### 4.3.3.1 executeCommand()

```
void SerialCommandExecuter::executeCommand ( )
```

Reads the commands and sends them to the parser.

Definition at line 40 of file SerialCommandExecuter.cpp.

#### 4.3.3.2 setUsers()

```
void SerialCommandExecuter::setUsers (
            String * users,
            uint8_t numUsers )
```

Sets the users for user list.

**Parameters**

| | |
|---|---|
| *users* | Array of the users |
| *numUsers* | Number of users |

Definition at line 27 of file SerialCommandExecuter.cpp.

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

- hackableEspDevice/SerialCommandExecuter.h
- hackableEspDevice/SerialCommandExecuter.cpp

## 4.4 UserHandler Class Reference

```
#include <userHandler.h>
```

### Public Member Functions

- UserHandler (ESP8266WebServer *server)
  *Constructor.*
- void updateUsers ()
  *Updates the users from the config file in workmemory.*
- String * getUsers ()
  *Gets users.*
- uint8_t getNumberOfUsers ()
  *Gets number users.*
- bool checkPermission (uint8_t permissionLevel, ESP8266WebServer *server)
  *Checks if user has permission.*

### 4.4.1 Detailed Description

Definition at line 16 of file userHandler.h.

### 4.4.2 Constructor & Destructor Documentation

#### 4.4.2.1 UserHandler()

```
UserHandler::UserHandler (
            ESP8266WebServer * server )
```

Constructor.

**Parameters**

| | |
|---|---|
| *server* | Webserver object |

Definition at line 17 of file userHandler.cpp.

### 4.4.3 Member Function Documentation

#### 4.4.3.1 checkPermission()

```
bool UserHandler::checkPermission (
            uint8_t permissionLevel,
            ESP8266WebServer * server )
```

Checks if user has permission.

**Parameters**

| | |
|---|---|
| *permissionLevel* | 0 = not logged in, 1 = user, 2 = admin |
| *server* | Webserver object |

**Returns**

bool If user has permission

Definition at line 80 of file userHandler.cpp.

#### 4.4.3.2 getNumberOfUsers()

```
uint8_t UserHandler::getNumberOfUsers ( )
```

Gets number users.

Definition at line 68 of file userHandler.cpp.

#### 4.4.3.3 getUsers()

```
String * UserHandler::getUsers ( )
```

Gets users.

Definition at line 59 of file userHandler.cpp.

#### 4.4.3.4 updateUsers()

```
void UserHandler::updateUsers ( )
```

Updates the users from the config file in workmemory.

Definition at line 26 of file userHandler.cpp.

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

- hackableEspDevice/userHandler.h
- hackableEspDevice/userHandler.cpp

# Chapter 5

# File Documentation

## 5.1 classTemplate.cpp File Reference

## 5.2 classTemplate.cpp

Go to the documentation of this file.

```
00001 /*
00002  * File:      name.cpp
00003  * Author:    Luke de Munk
00004  * Class:     name
00005  * Version:   0.1
00006  *
00007  * Description
00008  */
00009 //#include "name.h"
00010
00011 /*****************************************************************************/
00017 /*****************************************************************************/
00018 name::name() {
00019
00020 }
00021
00022 /*****************************************************************************/
00028 /*****************************************************************************/
00029 void name::test() {
00030
00031 }
```

## 5.3 classTemplate.h File Reference

### Classes

- class name

## 5.4 classTemplate.h

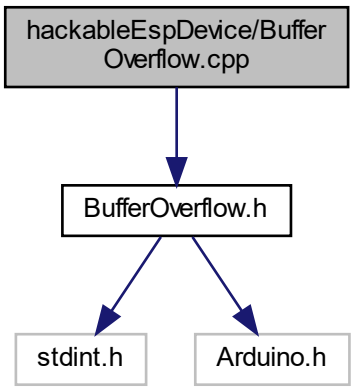
Go to the documentation of this file.

```
00001 /*
00002  * File:      name.h
00003  * Author:    Luke de Munk
00004  * Class:     name
00005  * Version:   0.1
```

```
00006  *
00007  * Description
00008  */
00009 #ifndef name_H
00010 #define name_H
00011 //#include <Arduino.h>
00012
00013 class name
00014 {
00015     public:
00016         name();
00017         void test();
00018
00019     private:
00020 };
00021 #endif
```

## 5.5 hackableEspDevice/BufferOverflow.cpp File Reference

`#include "BufferOverflow.h"`
Include dependency graph for BufferOverflow.cpp:




## 5.6 BufferOverflow.cpp

Go to the documentation of this file.

```
00001 /*
00002  * File:      BufferOverflow.h
00003  * Author:    Luke de Munk
00004  * Version:   0.1
00005  *
00006  * Buffer flow simulator. All elements of the bufferflow are in this class.
00007  */
00008 #include "BufferOverflow.h"
00009
00010 /*****************************************************************************/
00014 /*****************************************************************************/
00015 BufferOverflow::BufferOverflow() {
00016     _clearInput();                                                    //First time call is the
       declaration of the array.
00017 }
00018
00019 /*****************************************************************************/
00023 /*****************************************************************************/
00024 void BufferOverflow::ls() {
```

```
00025     Serial.println(F("testprogram.c"));
00026     Serial.println(F("testprogram"));
00027 }
00028
00029 /*****************************************************************************/
00033 /*****************************************************************************/
00034 void BufferOverflow::vi() {
00035
       Serial.println(F("|-----------FILENAME-----------|-----------TYPE-----------|-----------AUTOR-----------|"));
00036
       Serial.println(F("|---------testprogram.c--------|---------READONLY---------|-----------admin-----------|"));
00037
       Serial.println(F("|-------------------------------------------------------------------------------------|"));
00038     Serial.println(F("1     /*
            |"));
00039     Serial.println(F("2      * File:   testprogram.c
            |"));
00040     Serial.println(F("3      * Author: admin
            |"));
00041     Serial.println(F("4      *
            |"));
00042     Serial.println(F("5      * To test superuser login. DELETE WHEN FINISHING DEVELOPMENT!!!
            |"));
00043     Serial.println(F("6      */
            |"));
00044     Serial.println(F("7     #include <stdio.h>
            |"));
00045     Serial.println(F("8     #include <string.h>
            |"));
00046     Serial.println(F("9
            |"));
00047     Serial.println(F("10
            |"));
00048     Serial.println(F("11
       /*****************************************************************************/    |"));
00049     Serial.println(F("12    /*!
            |"));
00050     Serial.println(F("13      @brief    Logs given user name in as superuser and logs out again.
            |"));
00051     Serial.println(F("14    */
            |"));
00052     Serial.println(F("15
       /*****************************************************************************/    |"));
00053     Serial.println(F("16    int main(int argc, char** argv) {
            |"));
00054     Serial.println(F("17        char username[10];
            |"));
00055     Serial.println(F("18        strcpy(username, argv[1]);
            |"));
00056     Serial.println(F("19        login(*username);
            |"));
00057     Serial.println(F("20        logout();
            |"));
00058     Serial.println(F("21
            |"));
00059     Serial.println(F("22        return 0;
            |"));
00060     Serial.println(F("23    }
            |"));
00061
       Serial.println(F("|-------------------------------------------------------------------------------------|"));
00062     Serial.println(F(""));
00063 }
00064
00065 /*****************************************************************************/
00069 /*****************************************************************************/
00070 void BufferOverflow::objectDump() {
00071     Serial.println(F("testprogram:     file format elf32-littlearm"));
00072     Serial.println(F(""));
00073     Serial.println(F("Disassembly of section .init:"));
00074     Serial.println(F(""));
00075     Serial.println(F("00010438 <main>:"));
00076     Serial.println(F("   10438: e92d4800  push  {fp, lr}"));
00077     Serial.println(F("   1043c: e28db004  add fp, sp, #4"));
00078     Serial.println(F("   10440: e24dd018  sub sp, sp, #24"));
00079     Serial.println(F("   10444: e50b0018  str r0, [fp, #-24]  ; 0xffffffe8"));
00080     Serial.println(F("   10448: e50b101c  str r1, [fp, #-28]  ; 0xffffffe4"));
00081     Serial.println(F("   1044c: e51b301c  ldr r3, [fp, #-28]  ; 0xffffffe4"));
00082     Serial.println(F("   10450: e2833004  add r3, r3, #4"));
00083     Serial.println(F("   10454: e5932000  ldr r2, [r3]"));
00084     Serial.println(F("   10458: e24b3010  sub r3, fp, #16"));
00085     Serial.println(F("   1045c: e1a01002  mov r1, r2"));
00086     Serial.println(F("   10460: e1a00003  mov r0, r3"));
00087     Serial.println(F("   10464: ebffffab  bl  10318 <strcpy@plt>"));
00088     Serial.println(F("   10468: e55b3010  ldrb  r3, [fp, #-16]"));
00089     Serial.println(F("   1046c: e1a00003  mov r0, r3"));
00090     Serial.println(F("   10470: eb000004  bl  10488 <login>"));
```

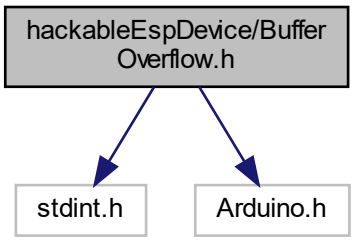
```
00091     Serial.println(F("   10474: eb00000d  bl  104b0 <logout>"));
00092     Serial.println(F("   10478: e3a03000  mov r3, #0"));
00093     Serial.println(F("   1047c: e1a00003  mov r0, r3"));
00094     Serial.println(F("   10480: e24bd004  sub sp, fp, #4"));
00095     Serial.println(F("   10484: e8bd8800  pop {fp, pc}"));
00096     Serial.println(F(""));
00097     Serial.println(F("00010488 <login>:"));
00098     Serial.println(F("   10488: e92d4800  push  {fp, lr}"));
00099     Serial.println(F("   1048c: e28db004  add fp, sp, #4"));
00100     Serial.println(F("   10490: e24dd008  sub sp, sp, #8"));
00101     Serial.println(F("   10494: e50b0008  str r0, [fp, #-8]"));
00102     Serial.println(F("   10498: e59f000c  ldr r0, [pc, #12] ; 104ac <login+0x24>"));
00103     Serial.println(F("   1049c: ebffff9a  bl  1030c <printf@plt>"));
00104     Serial.println(F("   104a0: e1a00000  nop     ; (mov r0, r0)"));
00105     Serial.println(F("   104a4: e24bd004  sub sp, fp, #4"));
00106     Serial.println(F("   104a8: e8bd8800  pop {fp, pc}"));
00107     Serial.println(F("   104ac: 0001053c  .word 0x0001053c"));
00108     Serial.println(F(""));
00109     Serial.println(F("000104b0 <logout>:"));
00110     Serial.println(F("   104b0: e92d4800  push  {fp, lr}"));
00111     Serial.println(F("   104b4: e28db004  add fp, sp, #4"));
00112     Serial.println(F("   104b8: e59f0008  ldr r0, [pc, #8]  ; 104c8 <logout+0x18>"));
00113     Serial.println(F("   104bc: ebffff92  bl  1030c <printf@plt>"));
00114     Serial.println(F("   104c0: e1a00000  nop     ; (mov r0, r0)"));
00115     Serial.println(F("   104c4: e8bd8800  pop {fp, pc}"));
00116     Serial.println(F("   104c8: 00010548  .word 0x00010548"));
00117     Serial.println(F(""));
00118 }
00119
00120 /*****************************************************************************/
00126 /*****************************************************************************/
00127 bool BufferOverflow::runCProgram(String arg) {
00128     _formatInput(arg);
00129     if (_numChars < OVERFLOW_BEGIN) {
00130         Serial.println("You are now super user.");
00131         Serial.print("Hello ");
00132         Serial.println(arg);
00133         Serial.println("You are not longer super user.");
00134     } else {
00135         if (_checkBufferOverflow()) {
00136           return true;
00137         }
00138     }
00139     return false;
00140 }
00141
00142 /*****************************************************************************/
00147 /*****************************************************************************/
00148 bool BufferOverflow::_checkBufferOverflow() {
00149   if(_getOverflowPortion() == RETURN_ADDRESS) {
00150     return true;
00151   }
00152
00153   _printOverflowError();                                          //If the overflow is not
      correctly, print value of the return address pointer
00154   return false;
00155 }
00156
00157 /*****************************************************************************/
00161 /*****************************************************************************/
00162 void BufferOverflow::_printOverflowError() {
00163   Serial.println("Program received signal SIGSEGV, Segmentation fault.");
00164   Serial.print("0x");
00165   _getOverflowPortion(true);
00166   Serial.println(" in ?? ()");
00167 }
00168
00169 /*****************************************************************************/
00174 /*****************************************************************************/
00175 void BufferOverflow::_formatInput(String input) {
00176     String tmp = "";
00177
00178     _clearInput();
00179
00180     /* Set every character in an element */
00181     for (uint16_t i = 0; i < input.length(); i++) {
00182         if (input[i] == '\\') {
00183             _formattedInput[_numChars] = "\\x";                   //Move all hex chars in
      one element (for ex.: '\x90')
00184             _formattedInput[_numChars] += input[i+2];
00185             _formattedInput[_numChars] += input[i+3];
00186             i += 3;                                               //Increase with 3, because
      the number of chars taken for a hex is 4 ('\x90')
00187         } else {
00188             _formattedInput[_numChars] = input[i];
00189         }
00190         _numChars++;
```

```
00191     }
00192
00193     /* Turn the whole array, to simulate little endian systems */
00194     for (uint8_t i = 0; i < _numChars/2-1; i++) {
00195         tmp = _formattedInput[i];
00196         _formattedInput[i] = _formattedInput[_numChars-i-1];
00197         _formattedInput[_numChars-i-1] = tmp;
00198         tmp = "";
00199     }
00200 }
00201
00202 /*****************************************************************************/
00208 /*****************************************************************************/
00209 String BufferOverflow::_getOverflowPortion(bool print) {
00210     String overflowPortion = "";
00211
00212     if(_numChars < OVERFLOW_LENGTH) {
00213         uint8_t numMissingBytes = OVERFLOW_LENGTH - _numChars;
00214         overflowPortion += _generateRandomBytes(numMissingBytes);
00215
00216         if (print) {
00217             Serial.print(overflowPortion);
00218         }
00219
00220         /* To determine and print the overflow portion */
00221         for (uint8_t i = 0; i < ADDRESS_LENGTH - numMissingBytes; i++) {
00222             /* Check if is hex number, else print as hex */
00223             if (_formattedInput[i][0] == '\\') {
00224                 overflowPortion += _formattedInput[i][2];
00225                 overflowPortion += _formattedInput[i][3];
00226                 if (print) {
00227                     Serial.print(_formattedInput[i][2]);
00228                     Serial.print(_formattedInput[i][3]);
00229                 }
00230             } else {
00231                 overflowPortion += _formattedInput[i];
00232                 if (print) {
00233                     Serial.print(char(_formattedInput[i][0]), HEX);
00234                 }
00235             }
00236         }
00237     } else {
00238         /* To print the overflow portion */
00239         uint8_t delta = abs(_numChars - OVERFLOW_LENGTH);
00240         for (uint8_t i = delta; i < delta + ADDRESS_LENGTH; i++) {
00241             /* Check if is hex number, else print as hex */
00242             if (_formattedInput[i][0] == '\\') {
00243                 overflowPortion += _formattedInput[i][2];
00244                 overflowPortion += _formattedInput[i][3];
00245                 if (print) {
00246                     Serial.print(_formattedInput[i][2]);
00247                     Serial.print(_formattedInput[i][3]);
00248                 }
00249             } else {
00250                 if (print) {
00251                     Serial.print(char(_formattedInput[i][0]), HEX);
00252                 }
00253                 overflowPortion += _formattedInput[i];
00254             }
00255         }
00256     }
00257     return overflowPortion;
00258 }
00259
00260 /*****************************************************************************/
00264 /*****************************************************************************/
00265 void BufferOverflow::_clearInput() {
00266     for (uint16_t i = 0; i < MAX_NUM_CHARS; i++) {
00267         _formattedInput[i] = "";
00268     }
00269     _numChars = 0;
00270 }
00271
00272 /*****************************************************************************/
00279 /*****************************************************************************/
00280 String BufferOverflow::_generateRandomBytes(uint8_t numBytes) {
00281     String bytes = "";
00282     randomSeed(numBytes);
00283
00284     for (uint8_t i = 0; i < numBytes; i++) {
00285         bytes += String(random(127), HEX);
00286     }
00287     return bytes;
00288 }
```

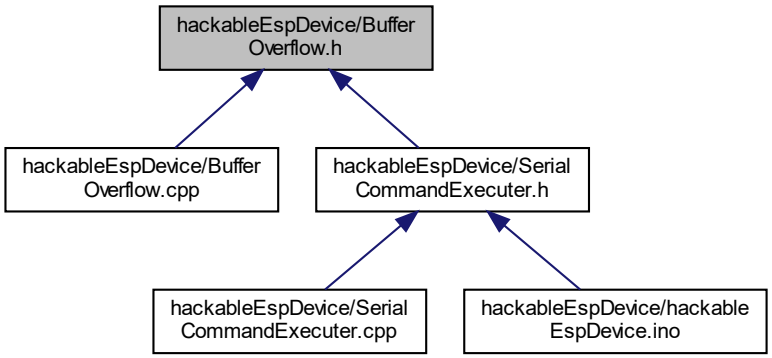
## 5.7 hackableEspDevice/BufferOverflow.h File Reference

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

Include dependency graph for BufferOverflow.h:




This graph shows which files directly or indirectly include this file:




### Classes

- class BufferOverflow

### Macros

- #define OVERFLOW_BEGIN 16
- #define ADDRESS_LENGTH 4
- #define OVERFLOW_LENGTH 20
- #define RETURN_ADDRESS "00010488"
- #define MAX_NUM_CHARS 256

## 5.7.1 Macro Definition Documentation

### 5.7.1.1 ADDRESS_LENGTH

```
#define ADDRESS_LENGTH 4
```

Definition at line 15 of file BufferOverflow.h.

### 5.7.1.2 MAX_NUM_CHARS

```
#define MAX_NUM_CHARS 256
```

Definition at line 18 of file BufferOverflow.h.

### 5.7.1.3 OVERFLOW_BEGIN

```
#define OVERFLOW_BEGIN 16
```

Definition at line 14 of file BufferOverflow.h.

### 5.7.1.4 OVERFLOW_LENGTH

```
#define OVERFLOW_LENGTH 20
```

Definition at line 16 of file BufferOverflow.h.

### 5.7.1.5 RETURN_ADDRESS

```
#define RETURN_ADDRESS "00010488"
```

Definition at line 17 of file BufferOverflow.h.

## 5.8 BufferOverflow.h

Go to the documentation of this file.

```
00001 /*
00002  * File:      BufferOverflow.h
00003  * Author:    Luke de Munk
00004  * Class:     BufferOverflow
00005  * Version:   0.1
00006  *
00007  * Buffer flow simulator. All elements of the bufferflow are in this class.
00008  */
00009 #ifndef BUFFER_OVERFLOW_H
00010 #define BUFFER_OVERFLOW_H
00011 #include <stdint.h>
00012 #include "Arduino.h"
00013
00014 #define OVERFLOW_BEGIN    16                                          //Because array is in byte
       resolution, 10 becomes 16. Then the return address pointer starts
00015 #define ADDRESS_LENGTH    4                                           //Address is 32 bits long,
       so 4 bytes
00016 #define OVERFLOW_LENGTH   20//OVERFLOW_BEGIN + ADDRESS_LENGTH
00017 #define RETURN_ADDRESS    "00010488"                                  //0x00010488 == address of
       login function.
00018 #define MAX_NUM_CHARS     256
00019
00020 class BufferOverflow
00021 {
00022     public:
00023         BufferOverflow();
00024         void ls();
00025         void vi();
00026         void objectDump();
00027         bool runCProgram(String arg);
00028
00029     private:
00030         bool _checkBufferOverflow();
00031         void _printOverflowError();
00032         void _formatInput(String input);
00033         String _getOverflowPortion(bool print = false);
00034         void _clearInput();
00035         String _generateRandomBytes(uint8_t numberOfBytes);
00036
00037         String _formattedInput[256];
00038         uint8_t _numChars;
00039 };
00040 #endif
```

## 5.9 hackableEspDevice/config2.h File Reference

### Macros

- #define WIFI_SSID "Lucy my darling"
- #define WIFI_PASSWORD "Hetwachtwoordis1tm6"
- #define DEFAULT_HOSTNAME "smartlight"
- #define HOSTNAME_ADRESS 1
- #define MAX_HOSTNAME_LENGTH 32
- #define HTTP_CONFIG_LOCATION "/conf.txt"
- #define PERMISSION_LVL_ALL 0
- #define PERMISSION_LVL_USER 1
- #define PERMISSION_LVL_ADMIN 2
- #define USER_INFO_LENGTH 3
- #define MAX_NUMBER_USERS 10
- #define ROOT_PASSWORD "p@$Sw0rd"

### 5.9.1 Macro Definition Documentation

#### 5.9.1.1 DEFAULT_HOSTNAME

```
#define DEFAULT_HOSTNAME "smartlight"
```

Definition at line 16 of file config2.h.

#### 5.9.1.2 HOSTNAME_ADRESS

```
#define HOSTNAME_ADRESS 1
```

Definition at line 17 of file config2.h.

#### 5.9.1.3 HTTP_CONFIG_LOCATION

```
#define HTTP_CONFIG_LOCATION "/conf.txt"
```

Definition at line 20 of file config2.h.

#### 5.9.1.4 MAX_HOSTNAME_LENGTH

```
#define MAX_HOSTNAME_LENGTH 32
```

Definition at line 18 of file config2.h.

#### 5.9.1.5 MAX_NUMBER_USERS

```
#define MAX_NUMBER_USERS 10
```

Definition at line 28 of file config2.h.

#### 5.9.1.6 PERMISSION_LVL_ADMIN

```
#define PERMISSION_LVL_ADMIN 2
```

Definition at line 25 of file config2.h.

#### 5.9.1.7 PERMISSION_LVL_ALL

```
#define PERMISSION_LVL_ALL 0
```

Definition at line 23 of file config2.h.

#### 5.9.1.8 PERMISSION_LVL_USER

```
#define PERMISSION_LVL_USER 1
```

Definition at line 24 of file config2.h.

#### 5.9.1.9 ROOT_PASSWORD

```
#define ROOT_PASSWORD "p@$Sw0rd"
```

Definition at line 30 of file config2.h.

#### 5.9.1.10 USER_INFO_LENGTH

```
#define USER_INFO_LENGTH 3
```

Definition at line 27 of file config2.h.

#### 5.9.1.11 WIFI_PASSWORD

```
#define WIFI_PASSWORD "Hetwachtwoordis1tm6"
```

Definition at line 13 of file config2.h.

#### 5.9.1.12 WIFI_SSID

```
#define WIFI_SSID "Lucy my darling"
```

Definition at line 12 of file config2.h.

## 5.10 config2.h

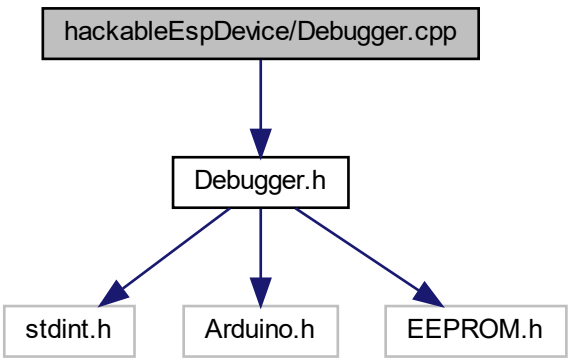
Go to the documentation of this file.

```
00001 /*
00002  * File:      config.h
00003  * Author:    Luke de Munk
00004  *
00005  * Configuration options can be configured here. This file
00006  * is in the .gitignore list, so this file will not be pushed.
00007  */
00008 #ifndef CONFIG_H
00009 #define CONFIG_H
00010
00011 /* Network credentials */
00012 #define WIFI_SSID         "Lucy my darling"
00013 #define WIFI_PASSWORD     "Hetwachtwoordis1tm6"
00014
00015 /* Hostname */
00016 #define DEFAULT_HOSTNAME        "smartlight"
00017 #define HOSTNAME_ADRESS         1
00018 #define MAX_HOSTNAME_LENGTH     32
00019
00020 #define HTTP_CONFIG_LOCATION    "/conf.txt"
00021
00022 /* Permission levels */
00023 #define PERMISSION_LVL_ALL      0
00024 #define PERMISSION_LVL_USER     1
00025 #define PERMISSION_LVL_ADMIN    2
00026
00027 #define USER_INFO_LENGTH        3                                   //Username, password and
       permission level
00028 #define MAX_NUMBER_USERS        10
00029
00030 #define ROOT_PASSWORD           "p@$Sw0rd"                          //For serial debug
00031 #endif
```

## 5.11 hackableEspDevice/Debugger.cpp File Reference

`#include "Debugger.h"`

Include dependency graph for Debugger.cpp:




### Functions

- void debug (String text)

*Prints text if debug is enabled.*

- void debugln (String text)

  *Prints text (+'
  ') if debug is enabled.*
- bool getDebugEnabled ()

  *Gets if debug is enabled.*
- void setDebugEnabled (bool isEnabled)

  *Sets if debug is enabled.*

## 5.11.1 Function Documentation

### 5.11.1.1 debug()

```
void debug (
            String text )
```

Prints text if debug is enabled.

**Parameters**

| | |
|---|---|
| *text* | String of text that needs to be printed |

Definition at line 16 of file Debugger.cpp.

### 5.11.1.2 debugln()

```
void debugln (
            String text )
```

Prints text (+'
') if debug is enabled.

**Parameters**

| | |
|---|---|
| *text* | String of text that needs to be printed |

Definition at line 30 of file Debugger.cpp.

### 5.11.1.3 getDebugEnabled()

```
bool getDebugEnabled ( )
```

Gets if debug is enabled.

**Returns**

isEnabled If debug is enabled (true == enabled)

Definition at line 43 of file Debugger.cpp.

#### 5.11.1.4 setDebugEnabled()

```
void setDebugEnabled (
             bool isEnabled )
```

Sets if debug is enabled.

**Parameters**

| | |
|---|---|
| *isEnabled* | If debug is enabled (true == enabled) |

Definition at line 54 of file Debugger.cpp.

## 5.12 Debugger.cpp

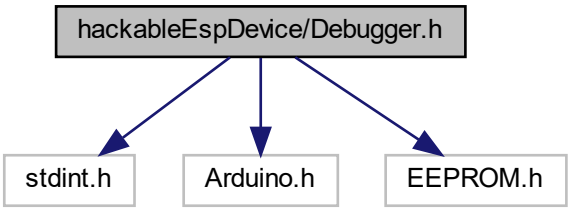
Go to the documentation of this file.

```
00001 /*
00002  * File:      Debugger.h
00003  * Author:    Luke de Munk
00004  * Version:   0.1
00005  *
00006  * Class for handling the debug prints.
00007  */
00008 #include "Debugger.h"
00009
00010 /*************************************************************************/
00015 /*************************************************************************/
00016 void debug(String text) {
00017     EEPROM.begin(1);
00018     bool isEnabled = EEPROM.read(ENABLE_DEBUG_FLAG_ADDRESS);
00019     if(isEnabled) {
00020         Serial.print(text);
00021     }
00022 }
00023
00024 /*************************************************************************/
00029 /*************************************************************************/
00030 void debugln(String text) {
00031     bool isEnabled = EEPROM.read(ENABLE_DEBUG_FLAG_ADDRESS);
00032     if(isEnabled) {
00033         Serial.println(text);
00034     }
00035 }
00036
00037 /*************************************************************************/
00042 /*************************************************************************/
00043 bool getDebugEnabled() {
00044     bool isEnabled = EEPROM.read(ENABLE_DEBUG_FLAG_ADDRESS);
00045     return isEnabled;
00046 }
00047
00048 /*************************************************************************/
00053 /*************************************************************************/
00054 void setDebugEnabled(bool isEnabled) {
00055     EEPROM.write(ENABLE_DEBUG_FLAG_ADDRESS, (uint8_t) isEnabled);           //Set the debug flag
00056     EEPROM.commit();                                                        //Write to EEPROM
00057 }
```

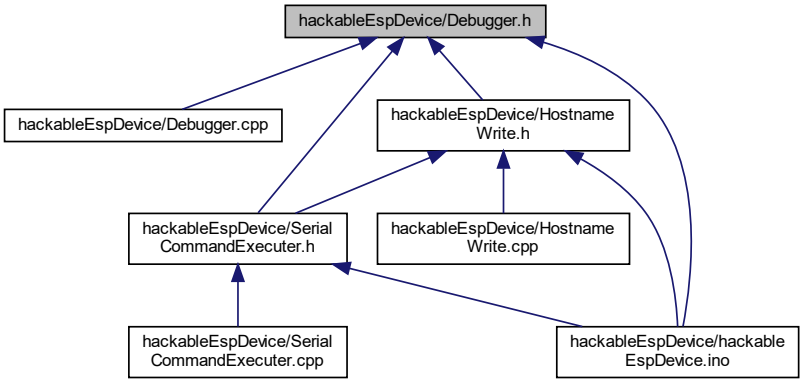
## 5.13 hackableEspDevice/Debugger.h File Reference

```
#include <stdint.h>
#include "Arduino.h"
#include <EEPROM.h>
```

Include dependency graph for Debugger.h:




This graph shows which files directly or indirectly include this file:




### Macros

- #define ENABLE_DEBUG_FLAG_ADDRESS 0

### Functions

- void debug (String text)

  *Prints text if debug is enabled.*
- void debugln (String text)

  *Prints text (+'
  ') if debug is enabled.*
- bool getDebugEnabled ()

  *Gets if debug is enabled.*
- void setDebugEnabled (bool isEnabled)

  *Sets if debug is enabled.*

## 5.13.1 Macro Definition Documentation

### 5.13.1.1 ENABLE_DEBUG_FLAG_ADDRESS

```
#define ENABLE_DEBUG_FLAG_ADDRESS 0
```

Definition at line 21 of file Debugger.h.

## 5.13.2 Function Documentation

### 5.13.2.1 debug()

```
void debug (
            String text )
```

Prints text if debug is enabled.

**Parameters**

| | |
|---|---|
| *text* | String of text that needs to be printed |

Definition at line 16 of file Debugger.cpp.

### 5.13.2.2 debugln()

```
void debugln (
            String text )
```

Prints text (+'
') if debug is enabled.

**Parameters**

| | |
|---|---|
| *text* | String of text that needs to be printed |

Definition at line 30 of file Debugger.cpp.

#### 5.13.2.3 getDebugEnabled()

```
bool getDebugEnabled ( )
```

Gets if debug is enabled.

**Returns**

isEnabled If debug is enabled (true == enabled)

Definition at line 43 of file Debugger.cpp.

#### 5.13.2.4 setDebugEnabled()

```
void setDebugEnabled (
            bool isEnabled )
```

Sets if debug is enabled.

**Parameters**

| | |
|---|---|
| *isEnabled* | If debug is enabled (true == enabled) |

Definition at line 54 of file Debugger.cpp.

## 5.14 Debugger.h

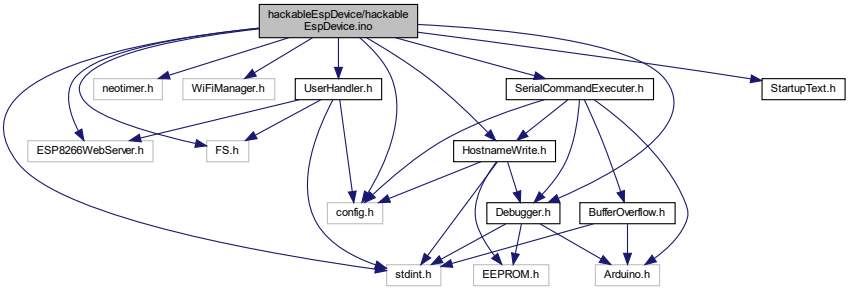
Go to the documentation of this file.

```
00001 /*
00002  * File:      Debugger.h
00003  * Author:    Luke de Munk
00004  * Version:   0.1
00005  *
00006  * Class for handling the debug prints.
00007  */
00008 #ifndef DEBUGGER_H
00009 #define DEBUGGER_H
00010 #include <stdint.h>                                                    //For defining bits per
       integer
00011 #include "Arduino.h"
00012 #include <EEPROM.h>                                                    //For reading from and
       writing to flash memory, used for resetting wifi
00013
00014 /*
00015  * 1 byte to store the enable debug flag.
00016  * Is done in EEPROM, because the
00017  * flag is then non-volatile and can
00018  * be used by multiple classes. Also
00019  * is saved during restart.
00020  */
00021 #define ENABLE_DEBUG_FLAG_ADDRESS   0
00022
00023 void debug(String text);
00024 void debugln(String text);
00025 bool getDebugEnabled();
00026 void setDebugEnabled(bool isEnabled);
00027
00028 #endif
```

# 5.15 hackableEspDevice/hackableEspDevice.ino File Reference

```
#include <ESP8266WebServer.h>
#include <FS.h>
#include <stdint.h>
#include <neotimer.h>
#include <WiFiManager.h>
#include "config.h"
#include "UserHandler.h"
#include "SerialCommandExecuter.h"
#include "Debugger.h"
#include "HostnameWrite.h"
#include "StartupText.h"
```

Include dependency graph for hackableEspDevice.ino:




## Macros

- #define ON LOW
- #define OFF HIGH

## Functions

- ESP8266WebServer server (80)
- void setup ()

  *Setup microchip.*
- void initializeHostname ()

  *Initializes hostname.*
- void setupWifi ()

  *Connects to WiFi if it can, otherwise starts as AP to configure WiFI.*
- void initializeServer ()

  *Takes care of the webservices like pageloading.*
- void loop ()

  *Mainloop.*
- String processor (const String &var)

  *Replaces placeholders with actual data in HTML page.*
- String getContentType (String filename)

  *Converts the file extension to the MIME type.*
- void handleFileRequest (String path, uint8_t permissionLevel)

  *Sends the requested file if the user has permission.*
- void handleFileUpload ()

  *Handles the file upload to the SPIFFS.*
- void handleFileDownload ()

  *Handles the file download to the SPIFFS.*

## Variables

- Neotimer timer = Neotimer(30000)
- uint8_t ledState = OFF
- UserHandler userHandler & server
- SerialCommandExecuter cliExecuter
- File fsUploadFile

### 5.15.1 Macro Definition Documentation

#### 5.15.1.1 OFF

```
#define OFF HIGH
```

Definition at line 24 of file hackableEspDevice.ino.

#### 5.15.1.2 ON

```
#define ON LOW
```

Definition at line 23 of file hackableEspDevice.ino.

### 5.15.2 Function Documentation

#### 5.15.2.1 getContentType()

```
String getContentType (
            String filename )
```

Converts the file extension to the MIME type.

**Parameters**

| | |
|---|---|
| *filename* | Name of the file |

**Returns**

String MIME type of the file

Definition at line 290 of file hackableEspDevice.ino.

#### 5.15.2.2 handleFileDownload()

```
void handleFileDownload ( )
```

Handles the file download to the SPIFFS.

Definition at line 374 of file hackableEspDevice.ino.

#### 5.15.2.3 handleFileRequest()

```
void handleFileRequest (
            String path,
            uint8_t permissionLevel )
```

Sends the requested file if the user has permission.

**Parameters**

| | |
|---|---|
| *path* | Path to the file |
| *permissionLevel* | 0 = not logged in, 1 = user, 2 = admin |

Definition at line 307 of file hackableEspDevice.ino.

#### 5.15.2.4 handleFileUpload()

```
void handleFileUpload ( )
```

Handles the file upload to the SPIFFS.

Definition at line 339 of file hackableEspDevice.ino.

#### 5.15.2.5 initializeHostname()

```
void initializeHostname ( )
```

Initializes hostname.

Definition at line 77 of file hackableEspDevice.ino.

#### 5.15.2.6 initializeServer()

```
void initializeServer ( )
```

Takes care of the webservices like pageloading.

Definition at line 135 of file hackableEspDevice.ino.

#### 5.15.2.7 loop()

```
void loop ( )
```

Mainloop.

Definition at line 252 of file hackableEspDevice.ino.

#### 5.15.2.8 processor()

```
String processor (
            const String & var )
```

Replaces placeholders with actual data in HTML page.

Definition at line 274 of file hackableEspDevice.ino.

#### 5.15.2.9 server()

```
ESP8266WebServer server (
            80  )
```

#### 5.15.2.10 setup()

```
void setup ( )
```

Setup microchip.

Definition at line 40 of file hackableEspDevice.ino.

#### 5.15.2.11 setupWifi()

```
void setupWifi ( )
```

Connects to WiFi if it can, otherwise starts as AP to configure WiFI.

Definition at line 108 of file hackableEspDevice.ino.

### 5.15.3 Variable Documentation

#### 5.15.3.1 cliExecuter

```
SerialCommandExecuter cliExecuter
```

Definition at line 31 of file hackableEspDevice.ino.

#### 5.15.3.2 fsUploadFile

```
File fsUploadFile
```

Definition at line 33 of file hackableEspDevice.ino.

#### 5.15.3.3 ledState

```
uint8_t ledState = OFF
```

Definition at line 28 of file hackableEspDevice.ino.

#### 5.15.3.4 server

```
UserHandler userHandler& server
```

Definition at line 30 of file hackableEspDevice.ino.

#### 5.15.3.5 timer

```
Neotimer timer = Neotimer(30000)
```

Definition at line 27 of file hackableEspDevice.ino.

## 5.16 hackableEspDevice.ino

Go to the documentation of this file.

```
00001 /*
00002  * File:      hackableEspDevice.ino
00003  * Authors:   ESPinoza (Team 1)
00004  * Version:   0.1
00005  *
00006  * The main file of the firmware of a vunerable-by-design ESP8266 controller.
00007  * For more information, go to: https://gitlab.fdmci.hva.nl/munkl/hackable_esp_device
00008  *
00009  */
00010 #include <ESP8266WebServer.h>                                    //For running the
       webserver
00011 #include <FS.h>                                                  //For SPIFFS
00012 #include <stdint.h>                                              //For defining bits per
       integer
00013 #include <neotimer.h>                                            //For non-blocking timers
       (used for code execution in intervals)
00014 #include <WiFiManager.h>
00015 #include "config.h"                                              //For the configuration.
       If not exists: copy "config_template.h", add your configuration and rename to "config.h"
00016 #include "UserHandler.h"                                         //For handling the users
       from the config.conf
00017 #include "SerialCommandExecuter.h"                               //For handling serial
       commands
00018 #include "Debugger.h"                                            //For handling debug
       messages
00019 #include "HostnameWrite.h"                                       //For handling the
       hostname changes
00020 #include "StartupText.h"                                         //For printing startup log
       files
00021
00022 /* On and off are inverted because the built-in led is active low */
00023 #define ON                    LOW
00024 #define OFF                   HIGH
00025
00026 ESP8266WebServer server(80);                                     //Object that listens for
       HTTP requests on port 80
00027 Neotimer timer = Neotimer(30000);                                //Setup a 30 second timer,
       to execute code with a 30 interval
00028 uint8_t ledState = OFF;                                         //Declare led state
       variable
00029
00030 UserHandler userHandler(&server);                                //For handling the
       authentication
00031 SerialCommandExecuter cliExecuter;
00032
00033 File fsUploadFile;                                               //A File object to
       temporarily store the received file
00034
00035 /********************************************************************************/
00039 /********************************************************************************/
00040 void setup() {
00041     Serial.begin(115200);                                       //Serial port for
       debugging purposes
00042
00043     /* Initialize SPIFFS */
00044     if(!SPIFFS.begin()) {
00045         debugln("An Error has occurred while mounting SPIFFS");
00046         return;
00047     }
00048
00049     debugln("Debug is enabled");
00050
00051     /* If debug is enabled, the root password is printed in a big string of text */
00052     if (getDebugEnabled()) {
00053       String mess = "ROOT: " + String(ROOT_PASSWORD);
00054       printStartupText(mess);
00055     }
00056
00057     //debug("WiFi Password: ");
00058     //debugln(WIFI_PASSWORD);                                     //Print WiFi password one
       time in plain text when debugger is enabled
00059
00060     pinMode(LED_BUILTIN, OUTPUT);
00061     digitalWrite(LED_BUILTIN, ledState);
00062
00063     initializeHostname();
00064     setupWifi();
00065     initializeServer();
00066     userHandler.updateUsers();
00067     cliExecuter.setUsers(userHandler.getUsers(), userHandler.getNumberOfUsers());
00068
00069     debugln("Serial commands available. Typ 'help' for help.");
```

```
00070 }
00071
00072 /*************************************************************************/
00076 /*************************************************************************/
00077 void initializeHostname() {
00078     String customHostname = getHostname();
00079     /* Check if custom hostname is set, otherwise use default */
00080     if (customHostname != "") {
00081         /* Check if hostname can be set */
00082         if (WiFi.hostname(customHostname)){
00083             debug(customHostname);
00084             debugln(" is the hostname.");
00085         } else {
00086             debug("Could not set '");
00087             debug(customHostname);
00088             debugln("' as hostname.");
00089         }
00090     } else {
00091         if (WiFi.hostname(DEFAULT_HOSTNAME)) {
00092             debug(DEFAULT_HOSTNAME);
00093             debugln(" is the hostname.");
00094         } else {
00095             debug("Could not set '");
00096             debug(DEFAULT_HOSTNAME);
00097             debugln("' as hostname.");
00098         }
00099     }
00100 }
00101
00102 /*************************************************************************/
00107 /*************************************************************************/
00108 void setupWifi() {
00109     WiFiManager wifiManager;
00110
00111     if (wifiManager.autoConnect(WIFI_CONF_AP_NAME)) {
00112         Serial.print("Connected to: ");
00113         Serial.println(WiFi.SSID());
00114         Serial.print("IP: ");
00115         Serial.println(WiFi.localIP());
00116     } else {
00117         Serial.println("Failed to connect, connect with AP");
00118         ESP.restart();
00119     }
00120
00121     debug("Copy and paste the following URL: http://");
00122
00123     if (WiFi.hostname(DEFAULT_HOSTNAME)) {
00124         debugln(DEFAULT_HOSTNAME);
00125     } else {
00126         debugln(WiFi.hostname().c_str());
00127     }
00128 }
00129
00130 /*************************************************************************/
00134 /*************************************************************************/
00135 void initializeServer() {
00136     /*
00137     *  Routes for loading all the necessary files
00138     */
00139     /* Route for home page */
00140     server.on("/", HTTP_GET, []() {
00141         handleFileRequest("/index.html", PERMISSION_LVL_ALL);
00142     });
00143
00144     /* Route for admin controls */
00145     server.on("/admin", HTTP_GET, []() {
00146         handleFileRequest("/admin.html", PERMISSION_LVL_ADMIN);
00147     });
00148
00149     /* Route for user controls */
00150     server.on("/user", HTTP_GET, []() {
00151         handleFileRequest("/user.html", PERMISSION_LVL_USER);
00152     });
00153
00154     /* Route for file upload page */
00155     server.on("/upload", HTTP_GET, []() {
00156         handleFileRequest("/upload.html", PERMISSION_LVL_ADMIN);
00157     });
00158
00159     /* Route for file download page */
00160     server.on("/download", HTTP_GET, []() {
00161         handleFileRequest("/download.html", PERMISSION_LVL_USER);
00162     });
00163
00164     /* Load style_desktop.css file, styling for desktop version */
00165     server.on("/style_desktop.css", HTTP_GET, []() {
00166         handleFileRequest("/style_desktop.css", PERMISSION_LVL_ALL);
```

```
00167     });
00168
00169     /* Load style_mobile.css file, styling for mobile version */
00170     server.on("/style_mobile.css", HTTP_GET, []() {
00171         handleFileRequest("/style_mobile.css", PERMISSION_LVL_ALL);
00172     });
00173
00174     /* Load style_switch.css file, styling for the on/off switch */
00175     server.on("/style_switch.css", HTTP_GET, []() {
00176         handleFileRequest("/style_switch.css", PERMISSION_LVL_ALL);
00177     });
00178
00179     /* Load favicon.ico file, site icon */
00180     server.on("/favicon.ico", HTTP_GET, []() {
00181         handleFileRequest("/favicon.ico", PERMISSION_LVL_ALL);
00182     });
00183
00184     /* Load jquery.min.js file, for ajax */
00185     server.on("/jquery.min.js", HTTP_GET, []() {
00186         handleFileRequest("/jquery.min.js", PERMISSION_LVL_ALL);
00187     });
00188
00189     /* Load base.js file, JavaScript for site */
00190     server.on("/base.js", HTTP_GET, []() {
00191         handleFileRequest("/base.js", PERMISSION_LVL_ALL);
00192     });
00193
00194     /* Load switch.js file, JavaScript for on/off switch */
00195     server.on("/switch.js", HTTP_GET, []() {
00196         handleFileRequest("/switch.js", PERMISSION_LVL_ALL);
00197     });
00198     /*
00199     * End of file loading
00200     */
00201
00202     /*
00203     * Routes for JavaScript data receiving
00204     */
00205     /* Route for setting power */
00206     server.on("/set_power", HTTP_GET, []() {
00207         if (server.arg("state")) {
00208             ledState = atoi(server.arg("state").c_str());
00209             digitalWrite(LED_BUILTIN, !ledState);
00210         }
00211         handleFileRequest("/index.html", PERMISSION_LVL_ALL);
00212     });
00213
00214     /* Route for restarting the server */
00215     server.on("/restart", HTTP_GET, []() {
00216         handleFileRequest("/", PERMISSION_LVL_ALL);
00217         ESP.restart();
00218     });
00219     /*
00220     * End of JavaScript data receiving
00221     */
00222     /*
00223     * Routes for file management
00224     */
00225     /* Route for file upload request */
00226     server.on("/upload", HTTP_POST, []() {
00227         server.send(200);                                          //HTTP code 200 == OK
00228         debugln("Wait, something got uploaded");
00229       }, handleFileUpload                                          //Receive and save the
      file
00230     );
00231     /* Route for file upload request */
00232     server.on("/download", HTTP_POST, []() {
00233         debugln("File download request");
00234       }, handleFileDownload                                        //Receive and save the
      file
00235     );
00236     /*
00237     * End of routes for file management
00238     */
00239     /* Not found */
00240     server.onNotFound([]() {                                       //If the client requests
      any URI
00241         handleFileRequest(server.uri(), PERMISSION_LVL_ALL);       //send it if it exists
00242         debugln("NOT_FOUND?");
00243     });
00244     server.begin();                                                //Start server
00245 }
00246
00247 /*****************************************************************************/
00251 /*****************************************************************************/
00252 void loop() {
00253   server.handleClient();
```

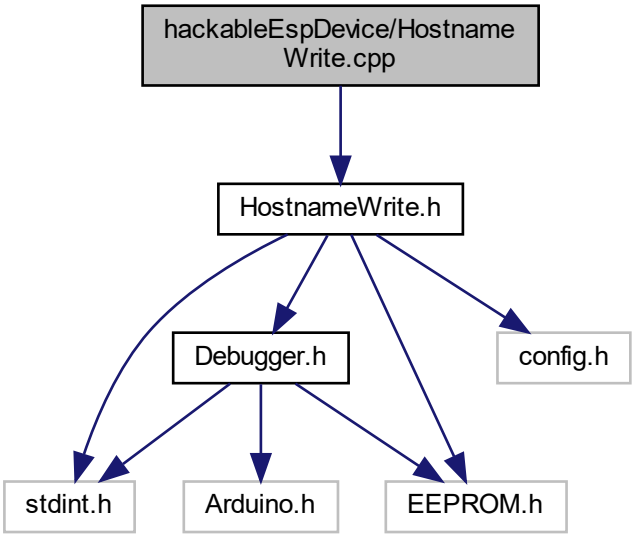
```
00254   if(timer.repeat()){                                                    //Prints WiFi password
      every 30 second on serial in the form of stars: "*****", so it is not readable, it's a hint
00255       //debug("Wifi Password: ");
00256       String wifipass = "WiFi.password()?";
00257       uint8_t charCount = wifipass.length();                             //Count how many
      characters the WiFi password contains
00258       for (uint8_t i = 0; i < charCount; i++) {
00259         //Serial.print("*");                                               //Print a "*" for each
      password character
00260       }
00261       //Serial.println("");
00262   }
00263
00264   if(Serial.available()) {
00265     cliExecuter.executeCommand();
00266   }
00267 }
00268
00269 /************************************************************************/
00273 /************************************************************************/
00274 String processor(const String& var){
00275     if (var == "LED_STATE") {
00276         return (String) ledState;
00277     } else {
00278         return " placeholder_error ";
00279     }
00280     return String();
00281 }
00282
00283 /************************************************************************/
00289 /************************************************************************/
00290 String getContentType(String filename) {
00291   if (filename.endsWith(".html")) return "text/html";
00292   else if (filename.endsWith(".css")) return "text/css";
00293   else if (filename.endsWith(".js")) return "application/javascript";
00294   else if (filename.endsWith(".ico")) return "image/x-icon";
00295   else if (filename.endsWith(".gz")) return "application/x-gzip";
00296   else if (filename.endsWith(".txt")) return "text/plain";
00297   return "text/plain";
00298 }
00299
00300 /************************************************************************/
00306 /************************************************************************/
00307 void handleFileRequest(String path, uint8_t permissionLevel) {
00308     if(!userHandler.checkPermission(permissionLevel, &server)) {
00309         server.requestAuthentication();
00310         return;
00311     }
00312
00313     debugln(String("Requested file: ") + path);
00314
00315     String contentType = getContentType(path);                             //Get the MIME type
00316     String pathWithGz = path + ".gz";
00317
00318     if (SPIFFS.exists(pathWithGz)) {                                       //If there's a compressed
      version available
00319         path += ".gz";                                                     //Use the compressed
      verion
00320     }
00321
00322     if (SPIFFS.exists(path)) {
00323         File file = SPIFFS.open(path, "r");                                //Open the file
00324         size_t sent = server.streamFile(file, contentType);                //Send it to the client
00325         file.close();                                                      //Close the file again
00326         debugln(String("Sent file: ") + path);
00327         return;
00328     }
00329
00330     debugln(String("File Not Found: ") + path);                            //If the file doesn't
      exist, return false
00331     server.send(404, "text/plain", "404: Not Found");                      //otherwise, respond with
      a 404 (Not Found) error
00332 }
00333
00334 /************************************************************************/
00338 /************************************************************************/
00339 void handleFileUpload() {
00340     HTTPUpload& upload = server.upload();
00341
00342     if (upload.status == UPLOAD_FILE_START) {
00343         String filename = upload.filename;
00344
00345         if (!filename.startsWith("/")) {
00346             filename = "/" + filename;
00347         }
00348
00349         debugln(String("Upload file named: ") + filename);
```

```
00350
00351         fsUploadFile = SPIFFS.open(filename, "w");                            //Open the file for
      writing in SPIFFS (create if it doesn't exist)
00352
00353     } else if (upload.status == UPLOAD_FILE_WRITE && fsUploadFile ) {
00354         fsUploadFile.write(upload.buf, upload.currentSize);                   //Write the received bytes
      to the file
00355     } else if (upload.status == UPLOAD_FILE_END) {
00356         if (fsUploadFile) {                                                   //If the file was
      successfully created
00357             fsUploadFile.close();                                            //Close the file again
00358             debugln(String("handleFileUpload Size: ") + upload.totalSize);
00359             server.sendHeader("Location","/success.html");                   //Redirect the client to
      the success page
00360             server.send(303);
00361             userHandler.updateUsers();
00362             cliExecuter.setUsers(userHandler.getUsers(), userHandler.getNumberOfUsers()); //Update
      users for cli as well
00363         } else {
00364             server.send(500, "text/plain", "500: couldn't create file");
00365         }
00366     }
00367 }
00368
00369 /*********************************************************************/
00373 /*********************************************************************/
00374 void handleFileDownload() {
00375     String filename = server.arg("filekey");                                  //Get user input for
      filename
00376
00377     if(!filename.startsWith("/")) {
00378         filename = "/" + filename;
00379     }
00380
00381     if (!SPIFFS.exists(filename)) {
00382         server.send(404, "text/plain", "404: file not found!");
00383         return;
00384     }
00385
00386     File download = SPIFFS.open(filename, "r");
00387
00388     debugln("Start sending file");
00389
00390     server.sendHeader("Content-Type", "text/text");
00391     server.sendHeader("Content-Disposition", "attachment; filename="+filename);
00392     server.sendHeader("Connection", "close");
00393     server.streamFile(download, "application/octet-stream");
00394     download.close();
00395     server.send(200);                                                        //HTTP code 200 == OK
00396 }
```

## 5.17 hackableEspDevice/HostnameWrite.cpp File Reference

```
#include "HostnameWrite.h"
```

Include dependency graph for HostnameWrite.cpp:




### Functions

- String getHostname ()
  *Gets the hostname from the EEPROM.*
- void writeHostname (char hostname[MAX_HOSTNAME_LENGTH])
  *Writes the new hostname to the EEPROM.*
- void setEEPROMToNULL (int writeLength, int startAdress)
  *Resets the EEPROM at the startAdress.*
- void checkEepromCommit ()
  *Checks if the eeprom was actually committed.*

### 5.17.1 Function Documentation

#### 5.17.1.1 checkEepromCommit()

```
void checkEepromCommit ( )
```

Checks if the eeprom was actually committed.

Definition at line 77 of file HostnameWrite.cpp.

#### 5.17.1.2 getHostname()

```
String getHostname ( )
```

Gets the hostname from the EEPROM.

**Returns**

hostname contains the hostname from eeprom (true == enabled)

Definition at line 17 of file HostnameWrite.cpp.

#### 5.17.1.3 setEEPROMToNULL()

```
void setEEPROMToNULL (
            int writeLength,
            int startAdress )
```

Resets the EEPROM at the startAdress.

**Parameters**

| | |
|---|---|
| *writeLength* | int of total lenth to be writen |
| *startAdress* | int of start adress |

Definition at line 54 of file HostnameWrite.cpp.

#### 5.17.1.4 writeHostname()

```
void writeHostname (
            char hostname[MAX_HOSTNAME_LENGTH] )
```

Writes the new hostname to the EEPROM.

**Parameters**

| | |
|---|---|
| *hostname* | char[32] that contains the hostname to be written |

Definition at line 35 of file HostnameWrite.cpp.

## 5.18 HostnameWrite.cpp

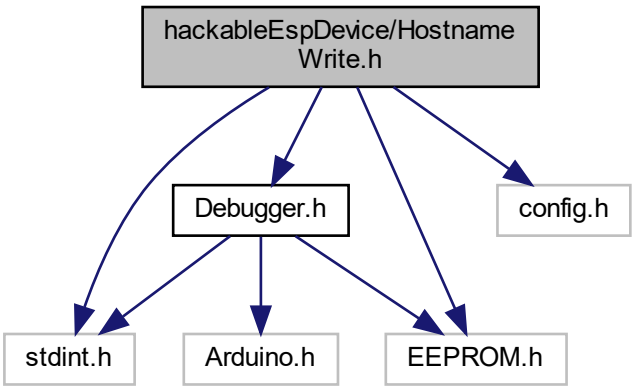
Go to the documentation of this file.

```
00001 /*
00002  * File:      HostnameWrite.cpp
00003  * Author:    Twenne Elffers
00004  * Class:     HostnameWrite
00005  * Version:   0.1
00006  *
00007  * Writes hostname to the EEPROM.
00008  */
00009 #include "HostnameWrite.h"
00010
00011 /*****************************************************************************/
00016 /*****************************************************************************/
00017 String getHostname() {
00018     char hostname[MAX_HOSTNAME_LENGTH];
00019     EEPROM.begin(MAX_HOSTNAME_LENGTH);
00020
00021     for (uint8_t i = 0; i < MAX_HOSTNAME_LENGTH; i++){
00022         EEPROM.get(HOSTNAME_ADRESS+i, hostname[i]);
00023     }
00024
00025     EEPROM.end();
00026     return String(hostname);
00027 }
00028
00029 /*****************************************************************************/
00034 /*****************************************************************************/
00035 void writeHostname(char hostname[MAX_HOSTNAME_LENGTH]) {
00036     EEPROM.begin(MAX_HOSTNAME_LENGTH);
00037
00038     for (int i = 0; i< MAX_HOSTNAME_LENGTH; i++){
00039         EEPROM.write(HOSTNAME_ADRESS+i, hostname[i]);
00040         yield();
00041     }
00042
00043     checkEepromCommit();
00044     EEPROM.end();
00045 }
00046
00047 /*****************************************************************************/
00053 /*****************************************************************************/
00054 void setEEPROMToNULL(int writeLength, int startAdress){
00055     EEPROM.begin(writeLength);
00056
00057     for (int i = 0; i< writeLength; i++){
00058         EEPROM.write(startAdress+i, 0);
00059         yield();
00060     }
00061
00062     checkEepromCommit();
00063
00064     debug("Reset Value at: ");
00065     debug(String(startAdress));
00066     debug(" till ");
00067     debugln(String(startAdress+writeLength));
00068
00069     EEPROM.end();
00070 }
00071
00072 /*****************************************************************************/
00076 /*****************************************************************************/
00077 void checkEepromCommit() {
00078     if (EEPROM.commit()) {
00079         debugln("Data written!");
00080     } else {
00081         debugln("ERROR! Data not written!");
00082     }
00083 }
```

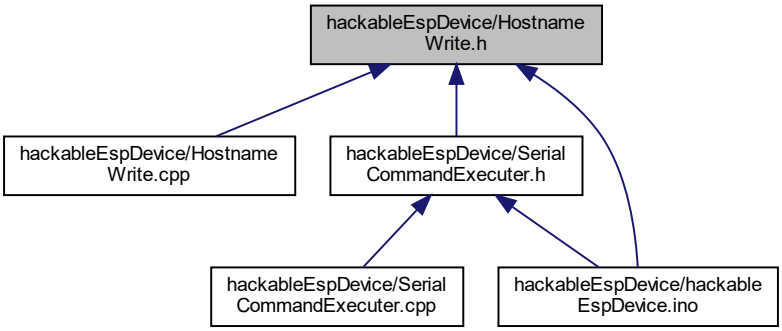
## 5.19 hackableEspDevice/HostnameWrite.h File Reference

```
#include <stdint.h>
#include <EEPROM.h>
#include "Debugger.h"
#include "config.h"
```

Include dependency graph for HostnameWrite.h:




This graph shows which files directly or indirectly include this file:




## Functions

- String getHostname ()

  *Gets the hostname from the EEPROM.*
- void writeHostname (char hostname[32])
- void setEEPROMToNULL (int writeLength, int startAdress)

  *Resets the EEPROM at the startAdress.*
- void checkEepromCommit ()

  *Checks if the eeprom was actually committed.*

### 5.19.1 Function Documentation

#### 5.19.1.1 checkEepromCommit()

```
void checkEepromCommit ( )
```

Checks if the eeprom was actually committed.

Definition at line 77 of file HostnameWrite.cpp.

#### 5.19.1.2 getHostname()

```
String getHostname ( )
```

Gets the hostname from the EEPROM.

**Returns**

hostname contains the hostname from eeprom (true == enabled)

Definition at line 17 of file HostnameWrite.cpp.

#### 5.19.1.3 setEEPROMToNULL()

```
void setEEPROMToNULL (
            int writeLength,
            int startAdress )
```

Resets the EEPROM at the startAdress.

**Parameters**

| | |
|---|---|
| *writeLength* | int of total lenth to be writen |
| *startAdress* | int of start adress |

Definition at line 54 of file HostnameWrite.cpp.

#### 5.19.1.4 writeHostname()

```
void writeHostname (
            char hostname[32] )
```

## 5.20 HostnameWrite.h

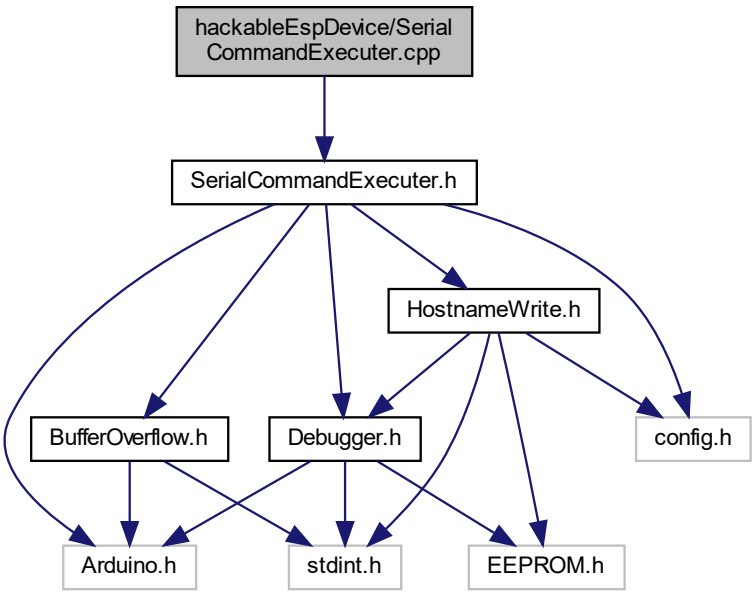
Go to the documentation of this file.

```
00001 /*
00002  * File:       HostnameWrite.h
00003  * Author:     Twenne Elffers
00004  * Class:      HostnameWrite
00005  * Version:    0.1
00006  *
00007  * Writes hostname to the EEPROM.
00008  */
00009 #ifndef HOSTNAME_WRITE_H
00010 #define HOSTNAME_WRITE_H
00011 #include <stdint.h>                                          //For defining bits per
       integer
00012 #include <EEPROM.h>                                          //For reading from and
       writing to EEPROM
00013 #include "Debugger.h"                                        //For handling debug
       messages
00014 #include "config.h"                                         //For the configuration
00015
00016 String getHostname();
00017 void writeHostname(char hostname[32]);
00018 void setEEPROMToNULL(int writeLength, int startAdress);
00019 void checkEepromCommit();
00020 #endif
```

## 5.21 hackableEspDevice/SerialCommandExecuter.cpp File Reference

`#include "SerialCommandExecuter.h"`

Include dependency graph for SerialCommandExecuter.cpp:




## 5.22 SerialCommandExecuter.cpp

Go to the documentation of this file.

```
00001 /*
00002  * File:      SerialCommandExecuter.cpp
00003  * Author:    Luke de Munk & Twenne Elffers
00004  * Class:     SerialCommandExecuter
00005  * Version:   0.1
00006  *
00007  * Parses and executes serial terminal commands.
00008  */
00009 #include "SerialCommandExecuter.h"
00010
00011 /*****************************************************************************/
00015 /*****************************************************************************/
00016 SerialCommandExecuter::SerialCommandExecuter() {
00017     _isLoggedIn = false;
00018 }
00019
00020 /*****************************************************************************/
00026 /*****************************************************************************/
00027 void SerialCommandExecuter::setUsers(String* users, uint8_t numUsers) {
00028     /* Copy users */
00029     for (uint8_t i = 0; i < MAX_NUMBER_USERS*USER_INFO_LENGTH; i++) {
00030         _users[i] = users[i];
00031     }
00032     _numberUsers = numUsers;
00033 }
00034
00035 /*****************************************************************************/
00039 /*****************************************************************************/
00040 void SerialCommandExecuter::executeCommand() {
00041     String command = Serial.readString();
00042
00043     if (command != "") {
00044         if (_isLoggedIn) {
00045           Serial.print("~# ");                                    //For the Linux feeling,
      superuser
00046         } else {
00047           Serial.print("~$ ");                                    //For the Linux feeling,
      no superuser
00048         }
00049         Serial.print(command);                                    //Echo command (command
      ends with \n)
00050
00051         _parseCommand(command);
00052     }
00053 }
00054
00055 /*****************************************************************************/
00061 /*****************************************************************************/
00062 bool SerialCommandExecuter::_parseCommand(String commandString) {
00063     String* trimmedCmdLine = _trimCommand(commandString);
00064     String command = trimmedCmdLine[0].c_str();
00065     String params[MAX_NUMBER_PARAMS] = {""};
00066     uint8_t numParams = 0;
00067
00068     while (numParams < MAX_NUMBER_PARAMS) {
00069         if (trimmedCmdLine[numParams+1] == "") {                  //+1, because the command
      is in the first cell
00070             break;
00071         }
00072         numParams++;
00073     }
00074
00075     for (uint8_t i = 1; i-1 < numParams; i++){                    //+1, because the command
      is in the first cell
00076         params[i-1] = trimmedCmdLine[i].c_str();
00077     }
00078
00079     /* Check which command is given */
00080     if (command == COMMAND_HELP) {
00081         _printHelp(COMMAND_HELP);
00082     } else {
00083         /* If help needs to be printed, print it and return */
00084         if (_checkHelp(params[0], command)) {
00085           return true;
00086         }
00087     }
00088
00089     if (command == COMMAND_DEBUG) {
00090         if (!_checkParams(numParams, 1, 1) || !_enableDebug(params[0])) {
00091             return false;
00092         }
00093     } else if (command == COMMAND_SU) {
00094         if (!_checkParams(numParams, 1, 1) || !_superUserLogin(params[0])) {
00095             return false;
00096         }
00097     } else if (command == COMMAND_KEYS) {
00098         if (!_viewKey()) {
```

```
00099             return false;
00100         }
00101     } else if ((command == COMMAND_RESTART)) {
00102         _restart();
00103     } else if (command == COMMAND_USERS) {
00104         if (!_viewUsers()) {
00105           return false;
00106         }
00107     } else if (command == COMMAND_HOSTNAME) {
00108         if (!_checkParams(numParams, 0, 2) || !_hostname(params)) {
00109           return false;
00110         }
00111     } else if (command == COMMAND_LS) {
00112         buffOverflow.ls();
00113     } else if (command == COMMAND_VI) {
00114         if (_checkParams(numParams, 1, 1)) {
00115           if (params[0] == "./testprogram.c" || params[0] == "testprogram.c") {
00116             buffOverflow.vi();
00117           } else {
00118               Serial.println(ERROR_NO_FILE);
00119               return false;
00120           }
00121         }
00122     } else if (command.substring(0, 2) == COMMAND_RUN) {                    //Substring == "./" the
      rest is filename
00123         if (_checkParams(numParams, 0, 1)) {
00124             String filename = command.substring(2);                          //The rest of the
      command is filename
00125
00126             if (filename == "testprogram.c") {
00127                 Serial.println(ERROR_PERM_DENIED);
00128                 return false;
00129             }
00130
00131             if (filename != "testprogram") {
00132                 Serial.println(ERROR_NO_FILE_DIR);
00133                 return false;
00134             }
00135
00136             if (numParams == 1) {
00137                 /* If buffer overflow is done correctly,
00138                  * user is logged in.
00139                  */
00140                 if (buffOverflow.runCProgram(params[0])) {
00141                     _isLoggedIn = true;
00142                     Serial.println(MESS_SUPER_USER);
00143                 }
00144             } else {
00145                 buffOverflow.runCProgram("");
00146             }
00147         }
00148     } else if (command == COMMAND_OBJDUMP) {
00149       if (_checkParams(numParams, 2, 2)) {
00150         if (params[0] != "-d") {
00151             Serial.println(ERROR_WRONG_ARGS);
00152             return false;
00153         }
00154           if (params[1] == "./testprogram" || params[1] == "testprogram") {
00155             buffOverflow.objectDump();
00156           } else {
00157               Serial.println(ERROR_NO_FILE);
00158             return false;
00159           }
00160         }
00161     } else {
00162         Serial.println(ERROR_CMD_NOT_FOUND);
00163         return false;
00164     }
00165     return true;
00166 }
00167
00168 /*****************************************************************************/
00174 /*****************************************************************************/
00175 String* SerialCommandExecuter::_trimCommand(String commandString) {
00176     static String commandItems[1+MAX_NUMBER_PARAMS] = {""};                  //To save command and
      parameters, each in own cell
00177     String item = "";                                                       //Can be a command or
      parameter
00178     uint8_t paramCounter = 0;
00179
00180     /* Reset static array */
00181     for (uint16_t x = 0; x < 1+MAX_NUMBER_PARAMS; x++) {
00182         commandItems[x] = "";
00183     }
00184
00185     /* Count number of parameters by adding to temp variable if not a whitespace or end of line*/
00186     for (uint16_t c = 0; c < commandString.length(); c++) {
```

```
00187         if (commandString[c] == ' ' || commandString[c] == '\n') {
00188             /* If item is not empty: add to item array */
00189             if (item != ""){
00190                 commandItems[paramCounter] = item;                          //Save param to items list
00191                 item = "";                                                 //Reset item value
00192                 paramCounter++;
00193             }
00194         } else { // if not a whitepace add to item
00195             item += commandString[c];
00196         }
00197     }
00198     return commandItems;
00199 }
00200
00201 /*****************************************************************************/
00208 /*****************************************************************************/
00209 bool SerialCommandExecuter::_checkParams(uint8_t numParams, uint8_t minNumberParams, uint8_t
      maxNumberParams) {
00210   if (numParams < minNumberParams) {
00211       Serial.println(ERROR_TOO_FEW_ARGS);
00212       return false;
00213   } else if (numParams > maxNumberParams) {
00214       Serial.println(ERROR_TOO_MANY_ARGS);
00215       return false;
00216   }
00217   return true;
00218 }
00219
00220 /*****************************************************************************/
00225 /*****************************************************************************/
00226 void SerialCommandExecuter::_printHelp(String command) {
00227     /* Print help lines according to command */
00228     if (command == "" || command == COMMAND_HELP) {                          //Default help
00229         Serial.println("|--------------------------HELP--------------------------|");
00230         Serial.println("This is a commandline interface that allows access to the smartlight config");
00231         _printCommands();
00232     } else if (command == COMMAND_DEBUG) {
00233         Serial.println("Usage: enableDebug [--off]              Turns the debug off");
00234         Serial.println("       enableDebug [--on]               Turns the debug on");
00235     } else if (command == COMMAND_SU) {
00236       Serial.println("Usage: su {passwd}                       Login as superuser");
00237     } else if (command == COMMAND_KEYS) {
00238         Serial.println("Usage: sshkeys                          Shows ssh keys");
00239     } else if (command == COMMAND_RESTART) {
00240         Serial.println("Usage: reboot                           Reboots the device");
00241     } else if (command == COMMAND_USERS) {
00242         Serial.println("Usage: users                            Shows usertable of website");
00243     } else if (command == COMMAND_HOSTNAME) {
00244         Serial.println("Usage: hostname                         Gives the current hostname");
00245         Serial.println("       hostname [--set] {newhostname}   Set new hostname. (needs reboot)");
00246         Serial.println("       hostname [-i]                    Gives the current ip-address");
00247         Serial.println("       hostname [--default]             Sets the hostname to the default
      hostname");
00248     } else if (command == COMMAND_LS) {
00249         Serial.println("Usage: ls                               Shows files in current folder");
00250     } else if (command == COMMAND_VI) {
00251         Serial.println("Usage: vi {filename}                    Opens file in text editor");
00252     }else if (command == COMMAND_RUN) {
00253         Serial.println("Usage: ./{filename}                     Runs an executable file");
00254     } else if (command == COMMAND_OBJDUMP) {
00255         Serial.println("Usage: objdump -d {filename}            Prints disassembled code of an
      executable file");
00256     } else {
00257         Serial.println(ERROR_CMD_NOT_FOUND);
00258     }
00259 }
00260
00261 /*****************************************************************************/
00265 /*****************************************************************************/
00266 void SerialCommandExecuter::_printCommands() {
00267     Serial.println("Available commands:");
00268     Serial.println(COMMAND_HELP);
00269     Serial.println(COMMAND_DEBUG);
00270     Serial.println(COMMAND_SU);
00271     Serial.println(COMMAND_KEYS);
00272     Serial.println(COMMAND_RESTART);
00273     Serial.println(COMMAND_USERS);
00274     Serial.println(COMMAND_HOSTNAME);
00275     Serial.println(COMMAND_LS);
00276     Serial.println(COMMAND_VI);
00277     Serial.println(COMMAND_OBJDUMP);
00278 }
00279
00280 /*****************************************************************************/
00287 /*****************************************************************************/
00288 bool SerialCommandExecuter::_enableDebug(String enable) {
00289     if (enable == "--on") {
```

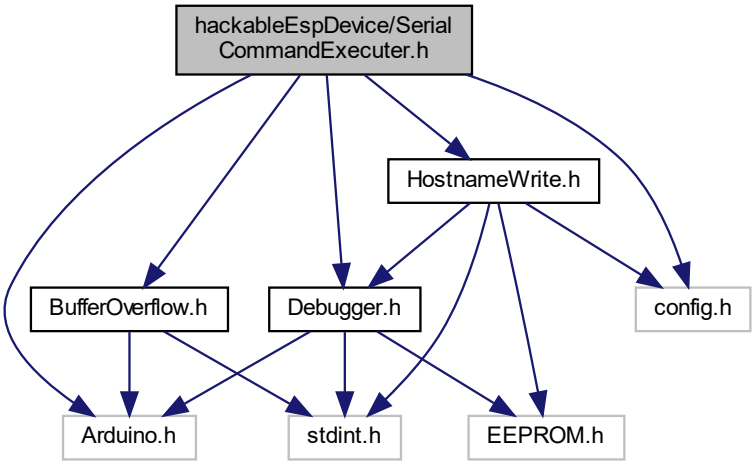
```
00290         setDebugEnabled(true);
00291         Serial.println("debug = true");
00292     } else if (enable == "--off") {
00293         setDebugEnabled(false);
00294         Serial.println("debug = false");
00295     } else {
00296         Serial.println(ERROR_WRONG_ARGS);
00297         return false;
00298     }
00299     return true;
00300 }
00301
00302 /*****************************************************************************/
00308 /*****************************************************************************/
00309 bool SerialCommandExecuter::_superUserLogin(String password) {
00310     if (password == ROOT_PASSWORD) {
00311         _isLoggedIn = true;
00312         Serial.println(MESS_SUPER_USER);
00313     } else {
00314         Serial.println(ERROR_WRONG_PWD);
00315         return false;
00316     }
00317     return true;
00318 }
00319
00320 /*****************************************************************************/
00325 /*****************************************************************************/
00326 bool SerialCommandExecuter::_viewKey() {
00327     if (!_isLoggedIn) {
00328         Serial.println(ERROR_NO_PERMISSION);
00329         return false;
00330     }
00331     Serial.println("Encryption key for config.conf");
00332     return true;
00333 }
00334
00335 /*****************************************************************************/
00339 /*****************************************************************************/
00340 void SerialCommandExecuter::_restart() {
00341     Serial.print("Restarting in ");
00342
00343     /* Wait 3 seconds */
00344     for (uint8_t s = 3; s > 0; s--) {
00345         Serial.print(s);
00346         Serial.print(" ");
00347         delay(1000);
00348     }
00349     ESP.restart();
00350 }
00351
00352 /*****************************************************************************/
00357 /*****************************************************************************/
00358 bool SerialCommandExecuter::_viewUsers() {
00359     String userPrints[USER_INFO_LENGTH] = {""};
00360
00361     if (!_isLoggedIn) {
00362         Serial.println(ERROR_NO_PERMISSION);
00363         return false;
00364     }
00365
00366     Serial.println("|-USERNAME------|-PASSWORD------|-ROLE--|");
00367
00368     for (uint8_t i = 0; i < _numberUsers; i += 3) {
00369         userPrints[0] = _users[i].c_str();                                  //Username
00370         if(atoi(_users[i+2].c_str()) == PERMISSION_LVL_USER) {
00371             userPrints[1] = _users[i+1].c_str();                           //Password
00372             userPrints[2] = "User";                                        //Permission level/role
00373         } else if (atoi(_users[i+2].c_str()) == PERMISSION_LVL_ADMIN) {
00374             userPrints[1] = "******";                                      //Password, not printed
00375             userPrints[2] = "Admin";                                       //Permission level/role
00376         }
00377         Serial.printf("| %s\t| %s\t| %s\t|\n", userPrints[0].c_str(), userPrints[1].c_str(),
       userPrints[2].c_str());
00378     }
00379     return true;
00380 }
00381
00382 /*****************************************************************************/
00389 /*****************************************************************************/
00390 bool SerialCommandExecuter::_hostname(String* params) {
00391     uint8_t numParams = params->length();
00392     if (numParams == 0) {                                                  //If empty: show hostname
00393       Serial.print("Hostname is: ");
00394       Serial.println(String(getHostname()));
00395       return true;
00396     }
00397
```

```
00398     if (params[0] == "--set" && params[1] != "") {                          //If parameter == "--set"
      check if next value is not empty
00399         char newHostname[MAX_HOSTNAME_LENGTH];
00400         params[1].toCharArray(newHostname, MAX_HOSTNAME_LENGTH);
00401         writeHostname(newHostname);
00402     } else if (params[0] == "--default"){
00403         writeHostname(DEFAULT_HOSTNAME);
00404     } else {
00405         Serial.println(ERROR_WRONG_ARGS);                                   //If it can't find
      suitable params: give error
00406         return false;
00407     }
00408     return true;
00409 }
00410
00411 /*****************************************************************************/
00419 /*****************************************************************************/
00420 bool SerialCommandExecuter::_checkHelp(String param, String command) {
00421     if (param == "-h" || param == "--help") {
00422         _printHelp(command);
00423         return true;
00424     }
00425     return false;
00426 }
```

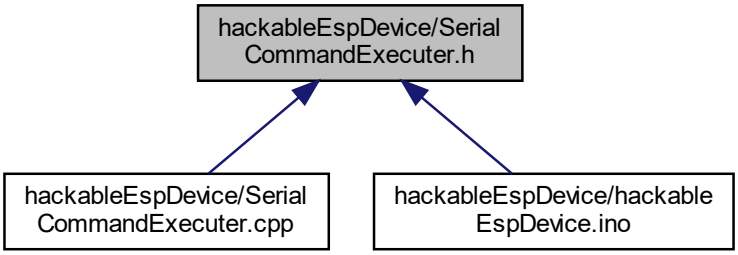
## 5.23 hackableEspDevice/SerialCommandExecuter.h File Reference

```
#include "Arduino.h"
#include "config.h"
#include "Debugger.h"
#include "HostnameWrite.h"
#include "BufferOverflow.h"
```

Include dependency graph for SerialCommandExecuter.h:



This graph shows which files directly or indirectly include this file:




## Classes

- class SerialCommandExecuter

## Macros

- #define MAX_NUMBER_PARAMS 2
- #define COMMAND_HELP "help"
- #define COMMAND_DEBUG "enableDebug"
- #define COMMAND_SU "su"
- #define COMMAND_KEYS "sshkeys"
- #define COMMAND_RESTART "reboot"
- #define COMMAND_USERS "users"
- #define COMMAND_HOSTNAME "hostname"
- #define COMMAND_LS "ls"
- #define COMMAND_VI "vi"
- #define COMMAND_RUN "./"
- #define COMMAND_OBJDUMP "objdump"
- #define MESS_SUPER_USER "You are now super user."
- #define ERROR_TOO_MANY_ARGS "Too many arguments. Typ 'help' for help."
- #define ERROR_CMD_NOT_FOUND "Bash: command not found. Typ 'help' for help."
- #define ERROR_PERM_DENIED "Bash: Permission denied"
- #define ERROR_WRONG_ARGS "Wrong argument(s). Add '-h' or '--help' to the command for help."
- #define ERROR_TOO_FEW_ARGS "Too few arguments. Typ 'help' for help."
- #define ERROR_WRONG_PWD "Wrong password."
- #define ERROR_NO_PERMISSION "You are no super user. Use 'su {password}' to log in."
- #define ERROR_NO_FILE "No such file."
- #define ERROR_NO_FILE_DIR "No such file or directory."

### 5.23.1 Macro Definition Documentation

#### 5.23.1.1 COMMAND_DEBUG

```
#define COMMAND_DEBUG "enableDebug"
```

Definition at line 20 of file SerialCommandExecuter.h.

#### 5.23.1.2 COMMAND_HELP

```
#define COMMAND_HELP "help"
```

Definition at line 19 of file SerialCommandExecuter.h.

#### 5.23.1.3 COMMAND_HOSTNAME

```
#define COMMAND_HOSTNAME "hostname"
```

Definition at line 25 of file SerialCommandExecuter.h.

#### 5.23.1.4 COMMAND_KEYS

```
#define COMMAND_KEYS "sshkeys"
```

Definition at line 22 of file SerialCommandExecuter.h.

#### 5.23.1.5 COMMAND_LS

```
#define COMMAND_LS "ls"
```

Definition at line 28 of file SerialCommandExecuter.h.

#### 5.23.1.6 COMMAND_OBJDUMP

```
#define COMMAND_OBJDUMP "objdump"
```

Definition at line 31 of file SerialCommandExecuter.h.

#### 5.23.1.7 COMMAND_RESTART

```
#define COMMAND_RESTART "reboot"
```

Definition at line 23 of file SerialCommandExecuter.h.

#### 5.23.1.8 COMMAND_RUN

```
#define COMMAND_RUN "./"
```

Definition at line 30 of file SerialCommandExecuter.h.

#### 5.23.1.9 COMMAND_SU

```
#define COMMAND_SU "su"
```

Definition at line 21 of file SerialCommandExecuter.h.

#### 5.23.1.10 COMMAND_USERS

```
#define COMMAND_USERS "users"
```

Definition at line 24 of file SerialCommandExecuter.h.

#### 5.23.1.11 COMMAND_VI

```
#define COMMAND_VI "vi"
```

Definition at line 29 of file SerialCommandExecuter.h.

#### 5.23.1.12 ERROR_CMD_NOT_FOUND

```
#define ERROR_CMD_NOT_FOUND "Bash:  command not found.  Typ 'help' for help."
```

Definition at line 37 of file SerialCommandExecuter.h.

#### 5.23.1.13 ERROR_NO_FILE

```
#define ERROR_NO_FILE "No such file."
```

Definition at line 43 of file SerialCommandExecuter.h.

#### 5.23.1.14 ERROR_NO_FILE_DIR

```
#define ERROR_NO_FILE_DIR "No such file or directory."
```

Definition at line 44 of file SerialCommandExecuter.h.

#### 5.23.1.15 ERROR_NO_PERMISSION

```
#define ERROR_NO_PERMISSION "You are no super user.  Use 'su {password}' to log in."
```

Definition at line 42 of file SerialCommandExecuter.h.

#### 5.23.1.16 ERROR_PERM_DENIED

```
#define ERROR_PERM_DENIED "Bash:  Permission denied"
```

Definition at line 38 of file SerialCommandExecuter.h.

#### 5.23.1.17 ERROR_TOO_FEW_ARGS

```
#define ERROR_TOO_FEW_ARGS "Too few arguments.  Typ 'help' for help."
```

Definition at line 40 of file SerialCommandExecuter.h.

#### 5.23.1.18 ERROR_TOO_MANY_ARGS

```
#define ERROR_TOO_MANY_ARGS "Too many arguments.  Typ 'help' for help."
```

Definition at line 36 of file SerialCommandExecuter.h.

#### 5.23.1.19 ERROR_WRONG_ARGS

```
#define ERROR_WRONG_ARGS "Wrong argument(s).  Add '-h' or '--help' to the command for help."
```

Definition at line 39 of file SerialCommandExecuter.h.

#### 5.23.1.20 ERROR_WRONG_PWD

```
#define ERROR_WRONG_PWD "Wrong password."
```

Definition at line 41 of file SerialCommandExecuter.h.

#### 5.23.1.21 MAX_NUMBER_PARAMS

```
#define MAX_NUMBER_PARAMS 2
```

Definition at line 17 of file SerialCommandExecuter.h.

#### 5.23.1.22 MESS_SUPER_USER

```
#define MESS_SUPER_USER "You are now super user."
```

Definition at line 33 of file SerialCommandExecuter.h.

## 5.24 SerialCommandExecuter.h

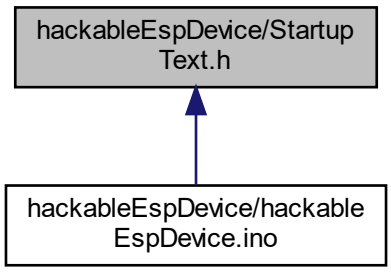
Go to the documentation of this file.

```
00001 /*
00002  * File:      SerialCommandExecuter.h
00003  * Author:    Luke de Munk & Twenne Elffers
00004  * Class:     SerialCommandExecuter
00005  * Version:   0.1
00006  *
00007  * Parses and executes serial terminal commands.
00008  */
00009 #ifndef SERIAL_COMMAND_EXECUTER_H
00010 #define SERIAL_COMMAND_EXECUTER_H
00011 #include "Arduino.h"
00012 #include "config.h"                                          //For the configuration.
00013 #include "Debugger.h"                                        //For handling debug
       messages
00014 #include "HostnameWrite.h"
00015 #include "BufferOverflow.h"
00016
00017 #define MAX_NUMBER_PARAMS  2
00018
00019 #define COMMAND_HELP            "help"
00020 #define COMMAND_DEBUG           "enableDebug"
00021 #define COMMAND_SU              "su"
00022 #define COMMAND_KEYS            "sshkeys"
00023 #define COMMAND_RESTART         "reboot"
00024 #define COMMAND_USERS           "users"
00025 #define COMMAND_HOSTNAME        "hostname"
```

```
00026
00027 /* Used for buffer overflow */
00028 #define COMMAND_LS              "ls"
00029 #define COMMAND_VI              "vi"
00030 #define COMMAND_RUN             "./"
00031 #define COMMAND_OBJDUMP         "objdump"
00032
00033 #define MESS_SUPER_USER         "You are now super user."
00034
00035
00036 #define ERROR_TOO_MANY_ARGS     "Too many arguments. Typ 'help' for help."
00037 #define ERROR_CMD_NOT_FOUND     "Bash: command not found. Typ 'help' for help."
00038 #define ERROR_PERM_DENIED       "Bash: Permission denied"
00039 #define ERROR_WRONG_ARGS        "Wrong argument(s). Add '-h' or '--help' to the command for help."
00040 #define ERROR_TOO_FEW_ARGS      "Too few arguments. Typ 'help' for help."
00041 #define ERROR_WRONG_PWD         "Wrong password."
00042 #define ERROR_NO_PERMISSION     "You are no super user. Use 'su {password}' to log in."
00043 #define ERROR_NO_FILE           "No such file."
00044 #define ERROR_NO_FILE_DIR       "No such file or directory."
00045
00046 class SerialCommandExecuter
00047 {
00048     public:
00049         SerialCommandExecuter();
00050         void executeCommand();
00051         void setUsers(String* users, uint8_t numUsers);
00052
00053     private:
00054         bool _parseCommand(String command);
00055         String* _trimCommand(String commandString);
00056         bool _checkParams(uint8_t numParams, uint8_t minNumberParams, uint8_t maxNumberParams);
00057
00058         void _printHelp(String command);
00059         void _printCommands();
00060         bool _enableDebug(String enable);
00061         bool _superUserLogin(String password);
00062         bool _viewKey();
00063         void _restart();
00064         bool _viewUsers();
00065         bool _hostname(String* params);
00066         bool _checkHelp(String param, String command);
00067
00068         bool _isLoggedIn;
00069         String _users[MAX_NUMBER_USERS*USER_INFO_LENGTH];
00070         uint8_t _numberUsers;
00071         BufferOverflow buffOverflow;
00072 };
00073 #endif
```

## 5.25 hackableEspDevice/StartupText.h File Reference

This graph shows which files directly or indirectly include this file:




### Macros

- #define LENGTH 20

## Functions

- bool printStartupText (String hiddenMess)

  *Prints bytes of information with a message wrapped in it.*
- bool printStringInBytes (String str)

  *Converts message in bytes and prints it.*

### 5.25.1 Macro Definition Documentation

#### 5.25.1.1 LENGTH

```
#define LENGTH 20
```

Definition at line 12 of file StartupText.h.

### 5.25.2 Function Documentation

#### 5.25.2.1 printStartupText()

```
bool printStartupText (
            String hiddenMess )
```

Prints bytes of information with a message wrapped in it.

**Parameters**

| | |
|---|---|
| *hiddenMess* | String of text that needs to be printed |

**Returns**

bool If conversion is successfull

Definition at line 25 of file StartupText.h.

#### 5.25.2.2 printStringInBytes()

```
bool printStringInBytes (
            String str )
```

Converts message in bytes and prints it.

**Parameters**

| | |
|---|---|
| *str* | String of text that needs to be printed |

**Returns**

bool If conversion is successfull

Definition at line 303 of file StartupText.h.

## 5.26 StartupText.h

Go to the documentation of this file.

```
00001 /*
00002  * File:      startupText.h
00003  * Author:    Luke de Munk
00004  * Version:   0.1
00005  *
00006  * Static text in bytes that is printed when debug is on, to show
00007  * vulnerable information packed in it.
00008  */
00009 #ifndef STARTUP_TEXT_H
00010 #define STARTUP_TEXT_H
00011
00012 #define LENGTH    20                                                    //Number of bytes per line
00013
00014 /* Declare functions, because it is not a class */
00015 bool printStartupText(String hiddenMess);
00016 bool printStringInBytes(String str);
00017
00018 /*****************************************************************************/
00024 /*****************************************************************************/
00025 bool printStartupText(String hiddenMess) {
00026     /* Serial.println(F(x));, because then the strings are stored in FLASH */
00027     Serial.println(F("Bootlog file print: "));
00028     Serial.println(F("53 74 61 72 74 75 70 20 62 75 73 79 2E 2E 2E 0A 65 74 73"));
00029     Serial.println(F("20 4A 61 6E 20 20 38 20 32 30 31 33 2C 72 73 74 20 63 61"));
00030     Serial.println(F("75 73 65 3A 32 2C 20 62 6F 6F 74 20 6D 6F 64 65 3A 28 33"));
00031     Serial.println(F("2C 36 29 0A 6C 6F 61 64 20 30 78 34 30 31 30 66 30 30 30"));
00032     Serial.println(F("2C 20 6C 65 6E 20 33 35 38 34 2C 20 72 6F 6F 6D 20 31 36"));
00033     Serial.println(F("20 0A 74 61 69 6C 20 30 0A 63 68 6B 73 75 6D 20 30 78 62"));
00034     Serial.println(F("30 0A 63 73 75 6D 20 30 78 62 30 0A 76 32 38 34 33 61 35"));
00035     Serial.println(F("61 63 0A 7E 6C 64 0A 45 78 65 63 75 74 61 62 6C 65 20 73"));
00036     Serial.println(F("65 67 6D 65 6E 74 20 73 69 7A 65 73 3A 0A 49 52 4F 4D 20"));
00037     Serial.println(F("20 20 3A 20 33 30 38 31 35 36 20 20 20 20 20 20 20 20 20"));
00038     Serial.println(F("20 2D 20 63 6F 64 65 20 69 6E 20 66 6C 61 73 68 20 20 20"));
00039     Serial.println(F("20 20 20 20 20 20 28 64 65 66 61 75 6C 74 20 6F 72 20 49"));
00040     Serial.println(F("43 41 43 48 45 5F 46 4C 41 53 48 5F 41 54 54 52 29 20 0A"));
00041     Serial.println(F("49 52 41 4D 20 20 20 3A 20 32 37 32 39 32 20 20 20 2F 20"));
00042     Serial.println(F("33 32 37 36 38 20 2D 20 63 6F 64 65 20 69 6E 20 49 52 41"));
00043     Serial.println(F("4D 20 20 20 20 20 20 20 20 20 20 28 49 43 41 43 48 45 5F"));
00044     Serial.println(F("52 41 4D 5F 41 54 54 52 2C 20 49 53 52 73 2E 2E 2E 29 20"));
00045     Serial.println(F("0A 44 41 54 41 20 20 20 3A 20 31 32 35 32 20 20 29 20 20"));
00046     Serial.println(F("20 20 20 20 20 20 20 2D 20 69 6E 69 74 69 61 6C 69 7A 65"));
00047     Serial.println(F("64 20 76 61 72 69 61 62 6C 65 73 20 28 67 6C 6F 62 61 6C"));
00048     Serial.println(F("2C 20 73 74 61 74 69 63 29 20 69 6E 20 52 41 4D 2F 48 45"));
00049     Serial.println(F("41 50 20 0A 52 4F 44 41 54 41 20 3A 20 33 30 35 36 20 20"));
00050     Serial.println(F("29 20 2F 20 38 31 39 32 30 20 2D 20 63 6F 6E 73 74 61 6E"));
00051     Serial.println(F("74 73 20 20 20 20 20 20 20 20 20 20 20 20 20 28 67 6C 6F"));
00052     Serial.println(F("62 61 6C 2C 20 73 74 61 74 69 63 29 20 69 6E 20 52 41 4D"));
00053     Serial.println(F("2F 48 45 41 50 20 0A 42 53 53 20 20 20 20 3A 20 32 36 33"));
00054     Serial.println(F("36 38 20 29 20 20 20 20 20 20 20 20 20 2D 20 7A 65 72 6F"));
00055     Serial.println(F("65 64 20 76 61 72 69 61 62 6C 65 73 20 20 20 20 20 20 28"));
00056     Serial.println(F("67 6C 6F 62 61 6C 2C 20 73 74 61 74 69 63 29 20 69 6E 20"));
00057     Serial.println(F("52 41 4D 2F 48 45 41 50 20 0A 42 6F 61 72 64 20 20 3A 20"));
00058     Serial.println(F("22 57 65 4D 6F 73 20 44 31 20 4D 69 6E 69 22 0A 44 65 62"));
00059     Serial.println(F("75 67 20 20 3A 20 54 72 75 65 0A 43 50 55 20 66 72 65 71"));
00060     Serial.println(F("75 65 6E 63 79 20 3A 20 38 30 4D 48 7A 0A 56 75 6C 6E 65"));
00061     Serial.println(F("72 61 62 69 6C 69 74 79 20 41 73 73 65 73 73 6D 65 6E 74"));
00062     Serial.println(F("20 53 63 61 6E 20 53 74 61 74 75 73 0A 53 69 6E 67 6C 65"));
00063     Serial.println(F("20 6D 61 74 63 68 69 6E 67 20 61 63 63 6F 75 6E 74 20 66"));
00064     Serial.println(F("6F 75 6E 64 20 69 6E 20 64 6F 6D 61 69 6E 0A 55 73 65 72"));
00065     Serial.println(F("20 61 75 74 68 65 6E 74 69 63 61 74 69 6F 6E 20 61 67 61"));
00066     Serial.println(F("69 6E 73 74 20 41 63 74 69 76 65 20 44 69 72 65 63 74 6F"));
```

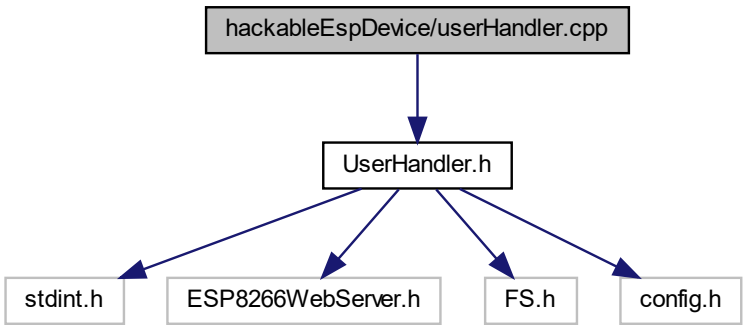
```
00067     Serial.println(F("72 79 20 66 61 69 6C 65 64 20 73 69 6E 63 65 20 75 73 65"));
00068     Serial.println(F("72 20 69 73 20 63 6F 6E 73 69 64 65 72 65 64 20 74 6F 20"));
00069     Serial.println(F("62 65 20 69 6E 20 72 65 73 74 72 69 63 74 65 64 20 6C 6F"));
00070     Serial.println(F("67 6F 6E 20 68 6F 75 72 73 0A 54 72 75 73 74 73 65 63 20"));
00071     Serial.println(F("65 67 72 65 73 73 20 70 6F 6C 69 63 79 20 77 61 73 20 73"));
00072     Serial.println(F("75 63 63 65 73 73 66 75 6C 6C 79 20 64 6F 77 6E 6C 6F 61"));
00073     Serial.println(F("64 65 64 0A 52 41 44 49 55 53 20 44 54 4C 53 3A 20 72 65"));
00074     Serial.println(F("63 65 69 76 65 64 20 63 6C 69 65 6E 74 20 68 65 6C 6C 6F"));
00075     Serial.println(F("20 76 65 72 69 66 79 20 72 65 71 75 65 73 74 0A 54 68 65"));
00076     Serial.println(F("20 75 73 65 72 27 73 20 6F 72 20 68 6F 73 74 27 73 20 61"));
00077     Serial.println(F("63 63 6F 75 6E 74 20 69 73 20 69 6E 20 72 65 73 74 72 69"));
00078     Serial.println(F("63 74 65 64 20 6C 6F 67 6F 6E 20 68 6F 75 72 73 3B 20 73"));
00079     Serial.println(F("65 74 74 69 6E 67 20 74 68 65 20 49 64 65 6E 74 69 74 79"));
00080     Serial.println(F("41 63 63 65 73 73 52 65 73 74 72 69 63 74 65 64 20 66 6C"));
00081     Serial.println(F("61 67 20 74 6F 20 74 72 75 65 2E 20 74 72 75 65 0A 53 65"));
00082     Serial.println(F("6E 74 20 54 45 41 50 20 52 65 73 75 6C 74 20 54 4C 56 20"));
00083     Serial.println(F("69 6E 64 69 63 61 74 69 6E 67 20 73 75 63 63 65 73 73 0A"));
00084     Serial.println(F("47 75 65 73 74 20 73 65 73 73 69 6F 6E 20 6C 69 6D 69 74"));
00085     Serial.println(F("20 69 73 20 61 63 74 69 76 65 3B 20 72 65 6D 6F 76 69 6E"));
00086     Serial.println(F("67 20 6F 6C 64 65 72 20 67 75 65 73 74 20 73 65 73 73 69"));
00087     Serial.println(F("6F 6E 73 0A 53 65 76 65 72 61 6C 20 63 65 72 74 69 66 69"));
00088     Serial.println(F("63 61 74 65 73 20 61 72 65 20 63 6F 6E 66 69 67 75 72 65"));
00089     Serial.println(F("64 20 6F 6E 20 49 64 50 2C 68 6F 77 65 76 65 72 20 63 61"));
00090     Serial.println(F("6E 20 6E 6F 74 20 64 65 74 65 72 6D 69 6E 65 20 63 65 72"));
00091     Serial.println(F("74 69 66 69 63 61 74 65 20 66 6F 72 20 73 69 67 6E 61 74"));
00092     Serial.println(F("75 72 65 0A 53 75 73 70 65 6E 64 20 6C 6F 67 20 63 6F 6C"));
00093     Serial.println(F("6C 65 63 74 6F 72 0A 46 61 69 6C 65 64 20 74 6F 20 6A 6F"));
00094     Serial.println(F("69 6E 20 74 6F 20 41 44 0A 49 67 6E 6F 72 65 20 4D 61 63"));
00095     Serial.println(F("68 69 6E 65 20 41 75 74 68 6F 72 69 7A 61 74 69 6F 6E 20"));
00096     Serial.println(F("50 41 43 20 72 65 71 75 65 73 74 20 62 65 63 61 75 73 65"));
00097     Serial.println(F("20 6F 66 20 63 75 72 72 65 6E 74 20 50 41 43 20 6F 66 20"));
00098     Serial.println(F("74 68 65 20 73 61 6D 65 20 74 79 70 65 20 77 61 73 20 75"));
00099     Serial.println(F("73 65 64 20 74 6F 20 73 6B 69 70 20 69 6E 6E 65 72 20 6D"));
00100     Serial.println(F("65 74 68 6F 64 0A 4E 54 50 20 53 65 72 76 65 72 20 73 65"));
00101     Serial.println(F("74 0A 43 68 69 70 20 69 73 20 45 53 50 38 32 36 36 45 58"));
00102     Serial.println(F("0A 46 65 61 74 75 72 65 73 3A 20 57 69 46 69 0A 43 72 79"));
00103     Serial.println(F("73 74 61 6C 20 69 73 20 32 36 4D 48 7A 0A 4D 41 43 3A 20"));
00104     Serial.println(F("38 63 3A 61 61 3A 62 35 3A 37 62 3A 65 30 3A 61 38 0A 43"));
00105     Serial.println(F("6F 6D 70 72 65 73 73 65 64 20 33 34 34 36 30 38 20 62 79"));
00106     Serial.println(F("74 65 73 20 74 6F 20 32 34 38 38 32 36 2E 2E 2E 0A 48 61"));
00107     Serial.println(F("73 68 20 6F 66 20 64 61 74 61 20 76 65 72 69 66 69 65 64"));
00108     Serial.println(F("2E 0A 43 6C 69 65 6E 74 20 63 65 72 74 69 66 69 63 61 74"));
00109     Serial.println(F("65 20 77 61 73 20 72 65 71 75 65 73 74 65 64 20 62 75 74"));
00110     Serial.println(F("20 6E 6F 74 20 72 65 63 65 69 76 65 64 20 69 6E 73 69 64"));
00111     Serial.println(F("65 20 74 68 65 20 74 75 6E 6E 65 6C 2E 20 57 69 6C 6C 20"));
00112     Serial.println(F("63 6F 6E 74 69 6E 75 65 20 77 69 74 68 20 69 6E 6E 65 72"));
00113     Serial.println(F("20 6D 65 74 68 6F 64 2E 0A 54 65 6C 65 6D 65 74 72 79 20"));
00114     Serial.println(F("6D 65 73 73 61 67 65 73 20 77 65 72 65 20 73 65 6E 74 20"));
00115     Serial.println(F("73 75 63 63 65 73 73 66 75 6C 6C 79 0A 44 65 6C 65 74 65"));
00116     Serial.println(F("20 6E 6F 64 65 20 66 61 69 6C 65 64 0A 50 72 6F 66 69 6C"));
00117     Serial.println(F("65 72 20 45 6E 64 50 6F 69 6E 74 20 63 6F 6C 6C 65 63 74"));
00118     Serial.println(F("69 6F 6E 20 65 76 65 6E 74 20 6F 63 63 75 72 72 65 64 0A"));
00119     Serial.println(F("52 41 44 49 55 53 20 44 54 4C 53 20 43 6F 41 20 68 61 6E"));
00120     Serial.println(F("64 73 68 61 6B 65 20 73 74 61 72 74 65 64 0A 52 75 6E 6E"));
00121     Serial.println(F("69 6E 67 20 73 74 75 62 2E 2E 2E 0A 53 74 75 62 20 72 75"));
00122     Serial.println(F("6E 6E 69 6E 67 2E 2E 2E 0A 53 74 6F 70 65 64 20 54 41 41"));
00123     Serial.println(F("43 41 43 53 2B 20 6C 69 73 74 65 6E 65 72 0A 53 65 6C 65"));
00124     Serial.println(F("63 74 65 64 20 41 63 63 65 73 73 20 53 65 72 76 69 63 65"));
00125     Serial.println(F("20 74 79 70 65 20 69 73 20 6E 6F 74 20 44 65 76 69 63 65"));
00126     Serial.println(F("20 41 64 6D 69 6E 69 73 74 72 61 74 69 6F 6E 0A 4C 6F 63"));
00127     Serial.println(F("61 6C 20 6D 6F 64 65 0A 55 73 65 72 20 61 75 74 68 65 6E"));
00128     Serial.println(F("74 69 63 61 74 69 6F 6E 20 61 67 61 69 6E 73 74 20 41 63"));
00129     Serial.println(F("74 69 76 65 20 44 69 72 65 63 74 6F 72 79 20 66 61 69 6C"));
00130     Serial.println(F("65 64 20 73 69 6E 63 65 20 75 73 65 72 20 68 61 73 20 69"));
00131     Serial.println(F("6E 76 61 6C 69 64 20 63 72 65 64 65 6E 74 69 61 6C 73 0A"));
00132     Serial.println(F("43 41 20 73 65 72 76 69 63 65 20 64 69 73 61 62 6C 65 64"));
00133     Serial.println(F("0A 43 68 61 6E 67 69 6E 67 20 62 61 75 64 20 72 61 74 65"));
00134     Serial.println(F("20 74 6F 20 34 36 30 38 30 30 0A 43 6F 6E 66 69 67 75 72"));
00135     Serial.println(F("69 6E 67 20 66 6C 61 73 68 20 73 69 7A 65 2E 2E 2E 0A 41"));
00136     Serial.println(F("75 74 6F 2D 64 65 74 65 63 74 65 64 20 46 6C 61 73 68 20"));
00137     Serial.println(F("73 69 7A 65 3A 20 34 4D 42 0A 49 6E 76 61 6C 69 64 20 6E"));
00138     Serial.println(F("65 77 20 70 61 73 73 77 6F 72 64 2E 20 43 6F 6E 74 61 69"));
00139     Serial.println(F("6E 73 20 72 65 73 65 72 76 65 64 20 77 6F 72 64 0A 52 53"));
00140     Serial.println(F("41 20 61 67 65 6E 74 20 63 6F 6E 66 69 67 75 72 61 74 69"));
00141     Serial.println(F("6F 6E 20 75 70 64 61 74 65 64 2C 20 52 53 41 20 61 67 65"));
00142     Serial.println(F("6E 74 20 72 65 73 74 61 72 74 65 64 0A 4C 6F 6F 6B 75 70"));
00143     Serial.println(F("20 53 49 44 20 42 79 20 4E 61 6D 65 20 72 65 71 75 65 73"));
00144     Serial.println(F("74 20 66 61 69 6C 65 64 0A 53 74 61 72 74 20 6C 69 73 74"));
00145     Serial.println(F("65 6E 69 6E 67 20 74 6F 20 74 63 70 20 70 6F 72 74 0A 49"));
00146     Serial.println(F("67 6E 6F 72 65 20 4D 61 63 68 69 6E 65 20 41 75 74 68 6F"));
00147     Serial.println(F("72 69 7A 61 74 69 6F 6E 20 50 41 43 20 72 65 71 75 65 73"));
00148     Serial.println(F("74 20 62 65 63 61 75 73 65 20 6F 66 20 63 75 72 72 65 6E"));
00149     Serial.println(F("74 20 50 41 43 20 6F 66 20 74 68 65 20 73 61 6D 65 20 74"));
00150     Serial.println(F("79 70 65 20 77 61 73 20 75 73 65 64 20 74 6F 20 73 6B 69"));
00151     Serial.println(F("70 20 69 6E 6E 65 72 20 6D 65 74 68 6F 64 0A 49 53 45 20"));
00152     Serial.println(F("75 70 67 72 61 64 65 20 2D 20 4D 6E 54 0A 49 53 45 20 42"));
00153     Serial.println(F("61 63 6B 75 70 20 68 61 73 20 73 74 61 72 74 65 64 0A 54"));
```

```
00154     Serial.println(F("72 75 73 74 73 65 63 20 65 67 72 65 73 73 20 70 6F 6C 69"));
00155     Serial.println(F("63 79 20 77 61 73 20 73 75 63 63 65 73 73 66 75 6C 6C 79"));
00156     Serial.println(F("20 64 6F 77 6E 6C 6F 61 64 65 64 0A 52 41 44 49 55 53 20"));
00157     Serial.println(F("44 54 4C 53 3A 20 72 65 63 65 69 76 65 64 20 63 6C 69 65"));
00158     Serial.println(F("6E 74 20 68 65 6C 6C 6F 20 76 65 72 69 66 79 20 72 65 0A"));
00159     /* Print the message, return false if is not successfull */
00160     if (!printStringInBytes(hiddenMess)) {
00161       return false;
00162     }
00163     Serial.println(F("75 65 73 74 0A 47 75 65 73 74 20 73 65 73 73 69 6F 6E 20"));
00164     Serial.println(F("6C 69 6D 69 74 20 69 73 20 61 63 74 69 76 65 3B 20 72 65"));
00165     Serial.println(F("6D 6F 76 69 6E 67 20 6F 6C 64 65 72 20 67 75 65 73 74 20"));
00166     Serial.println(F("73 65 73 73 69 6F 6E 73 0A 49 67 6E 6F 72 65 20 4D 61 63"));
00167     Serial.println(F("68 69 6E 65 20 41 75 74 68 6F 72 69 7A 61 74 69 6F 6E 20"));
00168     Serial.println(F("50 41 43 20 72 65 71 75 65 73 74 20 62 65 63 61 75 73 65"));
00169     Serial.println(F("20 6F 66 20 63 75 72 72 65 6E 74 20 50 41 43 20 6F 66 20"));
00170     Serial.println(F("74 68 65 20 73 61 6D 65 20 74 79 70 65 20 77 61 73 20 75"));
00171     Serial.println(F("73 65 64 20 74 6F 20 73 6B 69 70 20 69 6E 6E 65 72 20 6D"));
00172     Serial.println(F("65 74 68 6F 64 0A 43 6C 69 65 6E 74 20 63 65 72 74 69 66"));
00173     Serial.println(F("69 63 61 74 65 20 77 61 73 20 72 65 71 75 65 73 74 65 64"));
00174     Serial.println(F("20 62 75 74 20 6E 6F 74 20 72 65 63 65 69 76 65 64 20 69"));
00175     Serial.println(F("6E 73 69 64 65 20 74 68 65 20 74 75 6E 6E 65 6C 2E 20 57"));
00176     Serial.println(F("69 6C 6C 20 63 6F 6E 74 69 6E 75 65 20 77 69 74 68 20 69"));
00177     Serial.println(F("6E 6E 65 72 20 6D 65 74 68 6F 64 2E 0A 54 65 6C 65 6D 65"));
00178     Serial.println(F("74 72 79 20 6D 65 73 73 61 67 65 73 20 77 65 72 65 20 73"));
00179     Serial.println(F("65 6E 74 20 73 75 63 63 65 73 73 66 75 6C 6C 79 0A 50 72"));
00180     Serial.println(F("6F 66 69 6C 65 72 20 45 6E 64 50 6F 69 6E 74 20 63 6F 6C"));
00181     Serial.println(F("6C 65 63 74 69 6F 6E 20 65 76 65 6E 74 20 6F 63 63 75 72"));
00182     Serial.println(F("72 65 64 0A 52 41 44 49 55 53 20 44 54 4C 53 20 43 6F 41"));
00183     Serial.println(F("20 68 61 6E 64 73 68 61 6B 65 20 73 74 61 72 74 65 64 0A"));
00184     Serial.println(F("53 74 6F 70 70 65 64 20 54 41 43 41 43 53 2B 20 6C 69 73"));
00185     Serial.println(F("74 65 6E 65 72 0A 53 65 6C 65 63 74 65 64 20 41 63 63 65"));
00186     Serial.println(F("73 73 20 53 65 72 76 69 63 65 20 74 79 70 65 20 69 73 20"));
00187     Serial.println(F("6E 6F 74 20 44 65 76 69 63 65 20 41 64 6D 69 6E 69 73 74"));
00188     Serial.println(F("72 61 74 69 6F 6E 0A 43 41 20 73 65 72 76 69 63 65 20 64"));
00189     Serial.println(F("69 73 61 62 6C 65 64 0A 52 53 41 20 61 67 65 6E 74 20 63"));
00190     Serial.println(F("6F 6E 66 69 67 75 72 61 74 69 6F 6E 20 75 70 64 61 74 65"));
00191     Serial.println(F("64 2C 20 52 53 41 20 61 67 65 6E 74 20 72 65 73 74 61 72"));
00192     Serial.println(F("74 65 64 0A 53 74 61 72 74 20 6C 69 73 74 65 6E 69 6E 67"));
00193     Serial.println(F("20 74 6F 20 74 63 70 20 70 6F 72 74 0A 49 67 6E 6F 72 65"));
00194     Serial.println(F("20 4D 61 63 68 69 6E 65 20 41 75 74 68 6F 72 69 7A 61 74"));
00195     Serial.println(F("69 6F 6E 20 50 41 43 20 72 65 71 75 65 73 74 20 62 65 63"));
00196     Serial.println(F("61 75 73 65 20 6F 66 20 63 75 72 72 65 6E 74 20 50 41 43"));
00197     Serial.println(F("20 6F 66 20 74 68 65 20 73 61 6D 65 20 74 79 70 65 20 77"));
00198     Serial.println(F("61 73 20 75 73 65 64 20 74 6F 20 73 6B 69 70 20 69 6E 6E"));
00199     Serial.println(F("65 72 20 6D 65 74 68 6F 64 0A 49 53 45 20 42 61 63 6B 75"));
00200     Serial.println(F("70 20 68 61 73 20 73 74 61 72 74 65 64 0A 53 6D 61 72 74"));
00201     Serial.println(F("20 4C 69 63 65 6E 73 69 6E 67 20 61 75 74 68 6F 72 69 7A"));
00202     Serial.println(F("61 74 69 6F 6E 20 72 65 6E 65 77 61 6C 20 73 75 63 63 65"));
00203     Serial.println(F("73 73 0A 52 65 6D 69 6E 64 65 72 3A 20 41 73 73 69 67 6E"));
00204     Serial.println(F("20 4E 41 44 20 50 72 6F 66 69 6C 65 73 2E 0A 52 41 44 49"));
00205     Serial.println(F("55 53 20 44 54 4C 53 3A 20 73 65 6E 74 20 66 69 6E 69 73"));
00206     Serial.println(F("68 65 64 20 6D 65 73 73 61 67 65 0A 50 72 65 70 61 72 65"));
00207     Serial.println(F("64 20 54 4C 53 20 53 65 72 76 65 72 4B 65 79 45 78 63 68"));
00208     Serial.println(F("61 6E 67 65 20 6D 65 73 73 61 67 65 0A 54 68 65 20 73 65"));
00209     Serial.println(F("63 75 72 69 64 20 66 69 6C 65 20 68 61 73 20 62 65 65 6E"));
00210     Serial.println(F("20 72 65 6D 6F 76 65 64 0A 55 70 64 61 74 65 64 20 45 41"));
00211     Serial.println(F("50 2D 54 4C 53 20 4D 61 73 74 65 72 20 4B 65 79 20 47 65"));
00212     Serial.println(F("6E 65 72 61 74 69 6F 6E 20 70 65 72 69 6F 64 0A 50 65 72"));
00213     Serial.println(F("66 6F 72 6D 65 64 20 66 61 6C 6C 62 61 63 6B 20 74 6F 20"));
00214     Serial.println(F("73 65 63 6F 6E 64 61 72 79 20 4F 43 53 50 20 73 65 72 76"));
00215     Serial.println(F("65 72 0A 49 53 45 20 68 61 73 20 72 65 66 72 65 73 68 65"));
00216     Serial.println(F("64 20 61 75 74 68 65 6E 74 69 63 61 74 69 6F 6E 20 61 67"));
00217     Serial.println(F("61 69 6E 73 74 20 41 50 49 43 20 73 75 63 63 65 73 73 66"));
00218     Serial.println(F("75 6C 6C 79 0A 52 41 44 49 55 53 20 44 54 4C 53 3A 20 53"));
00219     Serial.println(F("65 6E 74 20 61 6E 20 4F 43 53 50 20 72 65 71 75 65 73 74"));
00220     Serial.println(F("20 74 6F 20 74 68 65 20 70 72 69 6D 61 72 79 20 4F 43 53"));
00221     Serial.println(F("50 20 73 65 72 76 65 72 20 66 6F 72 20 74 68 65 20 43 41"));
00222     Serial.println(F("0A 55 73 65 72 20 6F 72 20 68 6F 73 74 20 64 69 73 61 62"));
00223     Serial.println(F("6C 65 64 20 69 6E 20 63 75 72 72 65 6E 74 20 49 44 53 74"));
00224     Serial.println(F("6F 72 65 20 69 6E 20 61 74 74 72 69 62 75 74 65 20 72 65"));
00225     Serial.println(F("74 72 69 65 76 61 6C 20 6D 6F 64 65 0A 53 6B 69 70 70 69"));
00226     Serial.println(F("6E 67 20 75 6E 75 73 61 62 6C 65 20 64 6F 6D 61 69 6E 0A"));
00227     Serial.println(F("50 72 65 70 61 72 65 64 20 45 41 50 2D 52 65 71 75 65 73"));
00228     Serial.println(F("74 20 77 69 74 68 20 61 6E 6F 74 68 65 72 20 45 41 50 2D"));
00229     Serial.println(F("4D 53 43 48 41 50 20 63 68 61 6C 6C 65 6E 67 65 0A 49 64"));
00230     Serial.println(F("65 6E 74 69 74 79 20 70 6F 6C 69 63 79 20 72 65 73 75 6C"));
00231     Serial.println(F("74 20 69 73 20 63 6F 6E 66 69 67 75 72 65 64 20 66 6F 72"));
00232     Serial.println(F("20 70 61 73 73 77 6F 72 64 20 62 61 73 65 64 20 61 75 74"));
00233     Serial.println(F("68 65 6E 74 69 63 61 74 69 6F 6E 20 6D 65 74 68 6F 64 73"));
00234     Serial.println(F("20 62 75 74 20 72 65 63 65 69 76 65 64 20 63 65 72 74 69"));
00235     Serial.println(F("66 69 63 61 74 65 20 62 61 73 65 64 20 61 75 74 68 65 6E"));
00236     Serial.println(F("74 69 63 61 74 69 6F 6E 20 72 65 71 75 65 73 74 0A 46 61"));
00237     Serial.println(F("69 6C 65 64 20 74 6F 20 66 6F 72 77 61 72 64 20 72 65 71"));
00238     Serial.println(F("75 65 73 74 20 74 6F 20 74 6F 20 63 75 72 72 65 6E 74 20 72 65 6D"));
00239     Serial.println(F("6F 74 65 20 52 41 44 49 55 53 20 73 65 72 76 65 72 3B 20"));
00240     Serial.println(F("61 6E 20 69 6E 76 61 6C 69 64 20 72 65 73 70 6F 6E 73 65"));
```

```
00241     Serial.println(F("20 77 61 73 20 72 65 63 65 69 76 65 64 0A 55 73 65 72 20"));
00242     Serial.println(F("6C 6F 67 69 6E 20 74 6F 20 49 53 45 20 63 6F 6E 66 69 67"));
00243     Serial.println(F("75 72 61 74 69 6F 6E 20 6D 6F 64 65 20 66 61 69 6C 65 64"));
00244     Serial.println(F("0A 55 6E 61 62 6C 65 20 74 6F 20 66 69 6E 64 20 27 75 73"));
00245     Serial.println(F("65 72 6E 61 6D 65 27 20 61 74 74 72 69 62 75 74 65 20 61"));
00246     Serial.println(F("73 73 65 72 74 69 6F 6E 0A 56 61 6C 69 64 20 69 6E 63 6F"));
00247     Serial.println(F("6D 69 6E 67 20 61 63 63 6F 75 6E 74 69 6E 67 20 72 65 71"));
00248     Serial.println(F("75 65 73 74 0A 41 75 74 68 65 6E 74 69 63 61 74 69 6F 6E"));
00249     Serial.println(F("20 66 61 69 6C 65 64 20 62 65 63 61 75 73 65 20 4E 54 4C"));
00250     Serial.println(F("4D 20 77 61 73 20 62 6C 6F 63 6B 65 64 0A 53 6B 69 70 70"));
00251     Serial.println(F("69 6E 67 20 75 6E 6A 6F 69 6E 65 64 20 64 6F 6D 61 69 6E"));
00252     Serial.println(F("0A 54 68 65 20 75 73 65 72 20 69 73 20 6E 6F 74 20 66 6F"));
00253     Serial.println(F("75 6E 64 20 69 6E 20 74 68 65 20 69 6E 74 65 72 6E 61 6C"));
00254     Serial.println(F("20 67 75 65 73 74 73 20 69 64 65 6E 74 69 74 79 20 73 74"));
00255     Serial.println(F("6F 72 65 0A 43 68 61 6E 67 65 20 70 61 73 73 77 6F 72 64"));
00256     Serial.println(F("20 61 67 61 69 6E 73 74 20 41 63 74 69 76 65 20 44 69 72"));
00257     Serial.println(F("65 63 74 6F 72 79 20 66 61 69 6C 65 64 20 73 69 6E 63 65"));
00258     Serial.println(F("20 75 73 65 72 20 68 61 73 20 61 20 6E 6F 6E 2D 63 6F 6D"));
00259     Serial.println(F("70 6C 69 61 6E 74 20 70 61 73 73 77 6F 72 64 0A 41 70 70"));
00260     Serial.println(F("61 72 65 6E 74 20 6D 69 73 63 6F 6E 66 69 67 75 72 61 74"));
00261     Serial.println(F("69 6F 6E 20 6F 66 20 45 78 74 65 72 6E 61 6C 20 50 6F 6C"));
00262     Serial.println(F("69 63 79 20 53 65 72 76 65 72 0A 41 75 74 68 6F 72 69 7A"));
00263     Serial.println(F("61 74 69 6F 6E 20 70 72 6F 66 69 6C 65 2F 73 20 73 70 65"));
00264     Serial.println(F("63 69 66 69 65 64 20 61 72 65 20 6E 6F 74 20 73 75 69 74"));
00265     Serial.println(F("65 64 20 66 6F 72 20 74 68 69 73 20 4E 65 74 77 6F 72 6B"));
00266     Serial.println(F("20 41 63 63 65 73 73 20 44 65 76 69 63 65 0A 52 65 63 65"));
00267     Serial.println(F("69 76 65 64 20 61 20 72 65 61 75 74 68 65 6E 74 69 63 61"));
00268     Serial.println(F("74 65 20 72 65 73 70 6F 6E 73 65 0A 4C 6F 67 67 69 6E 67"));
00269     Serial.println(F("20 63 6F 6D 70 6F 6E 65 6E 74 20 6E 6F 77 20 72 65 61 64"));
00270     Serial.println(F("79 20 74 6F 20 72 65 63 65 69 76 65 20 63 6F 6E 66 69 67"));
00271     Serial.println(F("75 72 61 74 69 6F 6E 20 63 68 61 6E 67 65 73 0A 52 65 74"));
00272     Serial.println(F("75 72 6E 65 64 20 54 41 43 41 43 53 2B 20 41 75 74 68 65"));
00273     Serial.println(F("6E 74 69 63 61 74 69 6F 6E 20 52 65 70 6C 79 0A 45 76 61"));
00274     Serial.println(F("6C 75 61 74 69 6E 67 20 47 72 6F 75 70 20 4D 61 70 70 69"));
00275     Serial.println(F("6E 67 20 50 6F 6C 69 63 79 0A 4C 44 41 50 20 66 65 74 63"));
00276     Serial.println(F("68 20 66 6F 75 6E 64 20 6E 6F 20 6D 61 74 63 68 69 6E 67"));
00277     Serial.println(F("20 61 63 63 6F 75 6E 74 20 69 6E 20 64 6F 6D 61 69 6E 0A"));
00278     Serial.println(F("4D 61 63 68 69 6E 65 20 61 75 74 68 65 6E 74 69 63 61 74"));
00279     Serial.println(F("69 6F 6E 20 61 67 61 69 6E 73 74 20 41 63 74 69 76 65 20"));
00280     Serial.println(F("44 69 72 65 63 74 6F 72 79 20 66 61 69 6C 65 64 20 73 69"));
00281     Serial.println(F("6E 63 65 20 6D 61 63 68 69 6E 65 20 69 73 20 63 6F 6E 73"));
00282     Serial.println(F("69 64 65 72 65 64 20 74 6F 20 62 65 20 69 6E 20 72 65 73"));
00283     Serial.println(F("74 72 69 63 74 65 64 20 6C 6F 67 6F 6E 20 68 6F 75 72 73"));
00284     Serial.println(F("0A 41 73 73 65 72 74 69 6F 6E 20 64 6F 65 73 20 6E 6F 74"));
00285     Serial.println(F("20 63 6F 6E 74 61 69 6E 20 73 75 62 6A 65 63 74 20 63 6F"));
00286     Serial.println(F("6E 66 69 72 6D 61 74 69 6F 6E 0A 55 73 65 72 20 72 65 63"));
00287     Serial.println(F("6F 72 64 20 77 61 73 20 63 61 63 68 65 64 20 69 6E 20 50"));
00288     Serial.println(F("61 73 73 63 6F 64 65 20 63 61 63 68 65 0A 49 64 65 6E 74"));
00289     Serial.println(F("69 74 79 20 72 65 73 6F 6C 75 74 69 6F 6E 20 62 79 20 63"));
00290     Serial.println(F("65 72 74 69 66 69 63 61 74 65 20 66 6F 75 6E 64 20 61 6D"));
00291     Serial.println(F("62 69 67 75 6F 75 73 20 61 63 63 6F 75 6E 74 73 0A 53 74"));
00292     Serial.println(F("61 72 74 75 70 20 43 6F 6D 70 6C 65 74 65 21 2E 2E 2E 2E"));
00293     return true;
00294 }
00295
00296 /*****************************************************************************/
00302 /*****************************************************************************/
00303 bool printStringInBytes(String str) {
00304     uint8_t messLength = str.length() + 1;
00305     /* Check if string is not too long */
00306     if (messLength > LENGTH) {
00307       return false;
00308     }
00309     unsigned char messBytes[messLength];
00310     str.getBytes(messBytes, messLength);
00311     uint8_t i;
00312     for (i = 0; i < messLength; i++) {
00313       if (messBytes[i] != 0) {
00314         Serial.print(messBytes[i], HEX);
00315         Serial.print(" ");
00316       }
00317     }
00318     Serial.print("0A ");
00319     i++;
00320     /* Print . (2E) until end of line, to match random data */
00321     while (i < LENGTH-1) {
00322       Serial.print("2E ");
00323       i++;
00324     }
00325     Serial.println("2E");
00326     return true;
00327 }
00328 #endif
```

## 5.27 hackableEspDevice/userHandler.cpp File Reference

`#include "UserHandler.h"`
Include dependency graph for userHandler.cpp:




## 5.28 userHandler.cpp

Go to the documentation of this file.

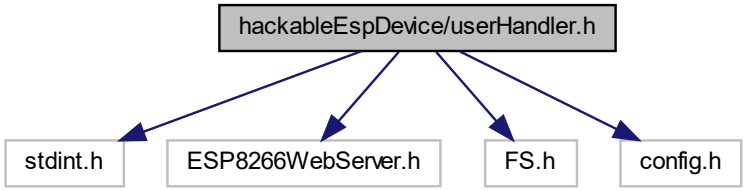
```
00001 /*
00002  * File:      UserHandler.cpp
00003  * Author:    Luke de Munk & Twenne Elffers
00004  * Class:     UserHandler
00005  * Version:   0.1
00006  *
00007  * Class for the http authentication process.
00008  */
00009 #include "UserHandler.h"
00010
00011 /*****************************************************************************/
00016 /*****************************************************************************/
00017 UserHandler::UserHandler(ESP8266WebServer *server) {
00018     _numberUsers = 0;
00019 }
00020
00021 /*****************************************************************************/
00025 /*****************************************************************************/
00026 void UserHandler::updateUsers() {
00027     /* If there is no file, return 0 users */
00028     if (!SPIFFS.exists(HTTP_CONFIG_LOCATION)) {
00029         _numberUsers = 0;
00030         return;
00031     }
00032
00033     File configFile = SPIFFS.open(HTTP_CONFIG_LOCATION, "r");
00034     String line;
00035     String* user;
00036
00037     /* Extract user information line by line */
00038     for(uint8_t i = 0; i < MAX_NUMBER_USERS*USER_INFO_LENGTH; i+=USER_INFO_LENGTH) {
00039         line = configFile.readStringUntil('\n');                          //Read a line from the
      file
00040         if (line != "" && line.indexOf(":") != -1) {
00041             user = _parseLine(line);
00042             _users[i] = user[0].c_str();
00043             _users[i+1] = user[1].c_str();
00044             _users[i+2] = user[2].c_str();
00045         } else {
00046             _numberUsers = i-1;
00047             break;
00048         }
00049         _numberUsers = i-1;
```

```
00050     }
00051     configFile.close();
00052 }
00053
00054 /*************************************************************************/
00058 /*************************************************************************/
00059 String* UserHandler::getUsers() {
00060     return _users;
00061 }
00062
00063 /*************************************************************************/
00067 /*************************************************************************/
00068 uint8_t UserHandler::getNumberOfUsers() {
00069     return _numberUsers;
00070 }
00071
00072 /*************************************************************************/
00079 /*************************************************************************/
00080 bool UserHandler::checkPermission(uint8_t permissionLevel, ESP8266WebServer *server) {
00081     bool isLoggedIn = false;
00082     bool hasPermission = false;
00083     uint8_t userIndex = 0;
00084
00085     if (permissionLevel == PERMISSION_LVL_ALL) {
00086         return true;
00087     } else {
00088         for (uint8_t i = 0; i < _numberUsers; i += 3) {
00089             if (server->authenticate(_users[i].c_str(), _users[i+1].c_str())) {
00090                 userIndex = i;
00091                 isLoggedIn = true;
00092                 break;
00093             }
00094         }
00095
00096         if (isLoggedIn && atoi(_users[userIndex+2].c_str()) >= permissionLevel) {
00097             return true;
00098         }
00099     }
00100     return false;
00101 }
00102
00103 /*************************************************************************/
00109 /*************************************************************************/
00110 String* UserHandler::_parseLine(String line) {
00111   static String userInfo[3];
00112
00113   uint8_t indexForUsername = line.indexOf(":");                          //gets loc of first ":"
00114   uint8_t indexForPassword = line.indexOf(":", indexForUsername+1);      //gets loc of second ":"
00115
00116   userInfo[0] = line.substring(0, indexForUsername);                     //Selects xxxx from
      xxxx:yyyy:zzzz, username
00117   userInfo[1] = line.substring(indexForUsername+1, indexForPassword);    //Selects yyyy from
      xxxx:yyyy:zzzz, password
00118   userInfo[2] = line.substring(indexForPassword+1);                      //Selects zzzz from
      xxxx:yyyy:zzzz, usertype
00119   return userInfo;
00120 }
```

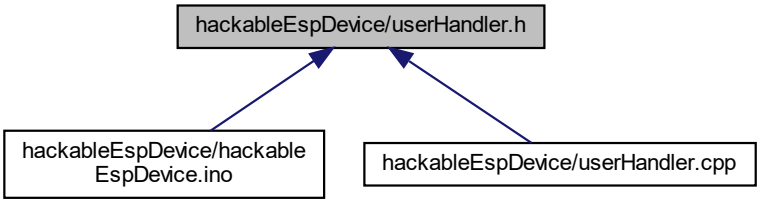
## 5.29 hackableEspDevice/userHandler.h File Reference

```
#include <stdint.h>
#include <ESP8266WebServer.h>
#include <FS.h>
#include "config.h"
```

Include dependency graph for userHandler.h:




This graph shows which files directly or indirectly include this file:




## Classes

- class UserHandler

# 5.30 userHandler.h

Go to the documentation of this file.

```
00001 /*
00002  * File:      UserHandler.h
00003  * Author:    Luke de Munk
00004  * Class:     UserHandler
00005  * Version:   0.1
00006  *
00007  * Class for the http authentication process.
00008  */
00009 #ifndef USER_HANDLER_H
00010 #define USER_HANDLER_H
00011 #include <stdint.h>
00012 #include <ESP8266WebServer.h>                                    //For running the
       webserver
00013 #include <FS.h>                                                  //For SPIFFS
00014 #include "config.h"                                              //For the configuration
00015
00016 class UserHandler
00017 {
00018     public:
00019         UserHandler(ESP8266WebServer *server);
00020         void updateUsers();
00021         String* getUsers();
```

```
00022         uint8_t getNumberOfUsers();
00023         bool checkPermission(uint8_t permissionLevel, ESP8266WebServer *server);
00024
00025     private:
00026         String* _parseLine(String line);
00027         String _users[MAX_NUMBER_USERS*USER_INFO_LENGTH];
00028         uint8_t _numberUsers;
00029 };
00030 #endif
```

## 5.31 README.md File Reference

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