DHMI 4.3

User Manual

Your Digital Heroes.

History

Revision	Date	Description or changes	Name
R01	29.06.2020	Draft	MAD
R01	14.07.2020	Completion of draft 1 and handover to SG and FG for review.	MAD
R01	31.08.2020	Feedback from SG and FG again	SG, FG
R01	09.09.2020	Implementation of the improvement suggestions and final version	MAD
R01	26.01.2021	Forwarding for release to SG	MAD
R01	09.02.2021	Final revision after feedback from SG and publication	MAD
R01	05.07.2021	Additional information on the power supply unit used	MAD
R01	05.07.2021	Release	SG
R02	25.10.2023	Chapter 5.1.2: changed information about power supply connector	SG
R02	04.12.2023	Change of product pictures (with HMI dashboard) and release of version R02	MAD
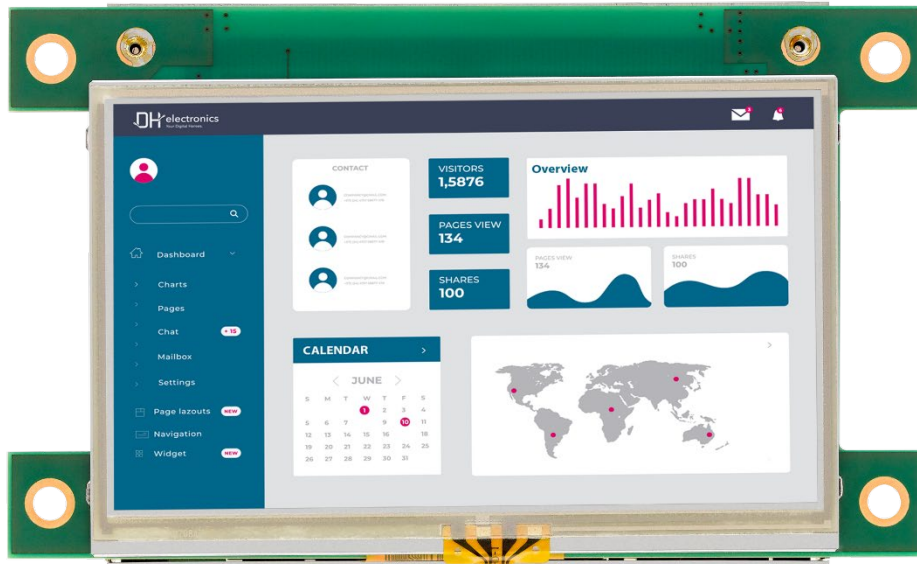
Dear customers,

we are passionate about technology - and have been for over 25 years. Our motivation is to be a pioneer for the digital future with our solutions. In doing so, our explorer nature drives us to realize our vision of the future and to think outside the box.

We see ourselves as Digital Heroes who work with you to find an individual solution to your problem - and this product is no exception.

Thank you for choosing us and thus a product that contains innovative solutions down to the smallest detail. To ensure that you can use our product permanently and without errors, please read this manual carefully and keep it for future reference.

However, if you ever have a problem, please contact us. We are here for you and will be happy to help you at any time.

We wish you much pleasure with this product.

Your Digital Heroes Team.

Table of contents

1 General product information

1.1 Product details

With DHMI 4.3 you have chosen a product from our DHMI product family. The abbreviation HMI stands for Human Machine Interface. Our DHMIs are equipped with resistive touch displays and our SOM as standard. In addition, they are available both frameless and with an anodized aluminum frame (except DHMI 4.3 here only frameless).

To ensure long-lasting, error-free use, these instructions must be read carefully before use and be available for future reference. Further useful information, documents and software can be found, if necessary, at www.dh-electronics.com.

Product name	**DHMI 4.3**
Product revision	R01
Product variant	DH Standard
Manufacturer	DH electronics GmbH

1.2 Scope of delivery

The following list provides an overview of the components included in the scope of delivery.

- Manual
- DHMI 4.3

1.3 Manufacturer and customer service address

We make every effort to provide you with all the necessary information about our products. However, if you are unable to resolve a situation on your own with the help of the user manual and documents on the website, we will be happy to help you. Please feel free to contact the Digital Heroes team:

- About our website: https://www.dh-electronics.com/kontakt-support
- By Email: support@dh-electronics.com
- By phone: +49 8662 4882 0
- By mail: DH electronics GmbH, Am Anger 8, 83346 Bergen, Germany

2 Product description

The DHMI 4.3 is a compact touch panel computer that has already proven itself in harsh industrial environments. Thanks to resistive 4-wire touch, operation is possible at any time even under difficult conditions, for example with gloves or in damp conditions. We use high-performance and at the same time energy-saving DHCOM modules from our DHSOM product family as the computer core, giving you the greatest possible flexibility in the choice of computer module. In the following we present the advantages of our touch panel computers compared to competitive products:

- **DH Modular system**

  Thanks to our family concept based on a modular system, you can configure your HMI entirely according to your wishes and requirements. To do this, use existing components that have been proven in practice and combine them as you wish to obtain the optimum solution for your application. Our modular principle gives you maximum flexibility and allows you to develop the right solution for you quickly and cost-effectively. In addition to the frame design, you can also determine the choice of computer module and interfaces yourself during customized development.

- **Everything from one source**

  DH electronics is characterized by combined know-how in the fields of software and hardware. Our experience in both areas enables us to develop completely thought-out, high-performance complete devices, which we realize completely ourselves from the idea to the implementation. As our customer, you will always have a competent contact person at hand for all matters, who will take care of your request as quickly as possible.

- **Fast and cost-effective development**

  Thanks to the use of our proven computer modules from the DHSOM product range, we can offer you a quickly available solution at favorable conditions. Computing power, interfaces, operating system and much more can thus be individually adapted to your needs.

- **Cost-saving solution thanks to innovative 5-cent cooling system**

  Our innovative cooling solution eliminates the need for conventional heat sinks, saving space and cost. Instead, heat is dissipated from the processor through thermal vias into the inner copper layers of the PCB over a 5-cent copper area using a gap pad. There, the heat is distributed evenly over the carrier board and is dissipated by it to the environment primarily by convection and thermal radiation. The even heat distribution protects the remaining components from overheating.
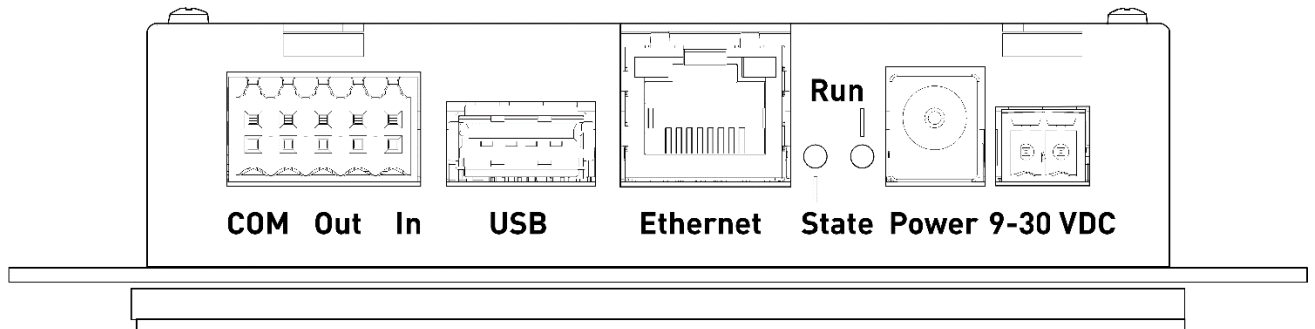
2.1 Overview

Figure 1– Front DHMI 4.3

Figure 2– Rear DHMI 4.3

2.2 Pin assignment

In the following figure, the connections are shown once again in enlarged form and labeled. Detailed information about the interfaces can be found in chapter 5.1.

Note

The assignment of the RJ45 sockets corresponds to the Ethernet standard.

The assignment of the USB sockets corresponds to the USB 2.0 standard.

2.3 Technical data

The following table gives an overview of the technical data of the Touch Panel Computer.

CPU DETAILS	
CPU Name	NXP i.MX6 Solo (standard version, other CPUs are also possible)
CPU Type	ARM Cortex®-A9
CPU Clock	Up to 800 MHz
MEMORY	
DDR3 RAM	1024 MB
eMMC Flash	4 GB
E2Prom	128 byte
Micro SD Socket	Available on module
Real Time Clock (RTC)	Available on module

CONNECTIVITY	
USB 2.0	1x Host (High-speed)
Ethernet	1x 10 / 100 Mbps, IEEE 1588
Serial interfaces	1x RS232 (Rx, Tx, Rts, Cts) 1x RS485 (available instead of RS232)
Input | Output	1x Input 1x Output
CAN	1x 1 Mbps
MULTIMEDIA	
2D | 3D GPU	2D: Vivante GC320 for i.MX6 Solo 3D: Vivante GC880 with 1 shader for i.MX6 Solo
2D | 3D Acceleration	Yes | Yes
Display diagonal	4.3 inch
Resolution	480 x 272 RGB
Color depth	16M
MTBF	Min. 20.000 hrs LED life time (After 20.000 hrs: 50% of original brightness)
Resistive touch	4-wire
OPERATING SYSTEMS	
Supported BSPs	Linux (Yocto or Debian based) | Android 5.0 (or newer) | Windows on request
Setup and Configuration	Get our free web browser to configure the DHMI or to display any website.
PHYSICAL	
Dimensions | Weight	130 x 80 x 31 mm | 280 g
Temperature	0 °C to +70 °C storage | 0 to +50 °C operating
Moisture	+10 % to +80 % (non-condensing)
Power Supply | Dissipation	24 VDC $\pm$ 10 % | typ. 5.0 W
Certifications	EN 61000-6-2 | EN 61000-6-3

3 Safety instructions

The external power supply used must be tested according to IEC 62368.

3.1 Graphic symbols for safety-related information

Symbol	Category	Description
	Commandment sign	Before use erden
	Prohibition sign	General prohibition sign
	Warning sign	General warning sign
	Warning sign	Warning of electrical voltage

3.2 Activities according to user groups

Activity	Layman	Trained professionals	Employee technical sales
Unpacking and setting up		X	
Connecting and commissioning		X	
Operation	X		
Disturbance treatment			X
Maintenance			X
Disassembly		X	
Disposal		X	

3.3 Intended use

The DHMI 4.3 Touch Panel Computer is a Human Machine Interface specially designed for use in industrial environments. The device may only be used in indoor applications. Any other use is not intended and may lead to malfunctions. For instructions on safe commissioning and maintenance, please refer to the chapters with the same names. Please contact us in the event of a malfunction if you are unable to rectify the problem yourself.

3.4 User group

The device may only be used by trained specialist personnel or appropriately instructed laypersons. The qualified personnel can perform the tasks mentioned in chapter 3.2 independently. In case of malfunctions and for maintenance tasks, an employee from the technical sales department must be contacted.

3.5 Dangers

Improper use of the device may result in damage to objects or injury to persons. It is therefore essential to observe the safety instructions contained in the User Manual and not to deviate from the recommended procedures, particularly when commissioning and decommissioning, during maintenance or in the event of a fault.

3.6 Special precautions

If the precautions mentioned in the user manual are observed and the warning and safety instructions are followed, the device should operate properly. If you nevertheless have the feeling that safe use is no longer guaranteed, disconnect the device from the power supply as quickly as possible and, if necessary, contact a member of the technical sales staff.

4 Prepare use of the product

The following paragraph describes the correct procedure before the actual use of the product.

4.1 Transport and storage

All DH electronics products are delivered in professional packaging. In any case, the products are protected against shocks, if necessary, special ESD packaging is used. Our products may only be transported and stored in the original packaging supplied, this is the only way to guarantee high product quality even over a longer transport or storage period. The scope of delivery should be checked as soon as the product is unpacked, after which the packaging must be disposed of properly. The customer bears the responsibility for this.

4.2 Disposal of goods and packaging material

Packaging material must in principle be disposed of properly by the customer. In addition, the customer assumes the obligation to dispose of the delivered goods after termination of use at his own expense in accordance with the statutory provisions. The customer shall indemnify DH electronics GmbH from the obligation to take back the goods and from any claims of third parties in connection therewith.

If the delivered goods are passed on to third parties, the customer must contractually instruct any third parties to assume the obligation to dispose of the goods and to pass on this obligation. If the customer fails to do so, it shall be obliged to take back the delivered goods at its own expense after termination of use and to dispose of them properly in accordance with the statutory provisions.

4.3 Preparation before installation

Safety instructions

⚠️	- Dangerous voltages for people can occur in electrical systems. There is a risk of electric shock if live parts are touched. - Make sure that the device is disconnected from the power supply. *Do not supply the device via an AC mains supply.*
⏚	The device must be grounded before use.
⚠️	- Do not drop the device. - Make sure that the ventilation slots of the housing are not covered and observe the mounting instructions below!
🚫	The device must not be operated in a flammable or explosive environment.

Assembly instructions

The device is available both with and without a frame and can be mounted directly in the control cabinet. For this, four screws are required, with which the touch panel computer is screwed from behind against the opening in the switch cabinet. A recess according to the dimensions of the touch panel computer (with or without frame) must be provided in the control cabinet wall.
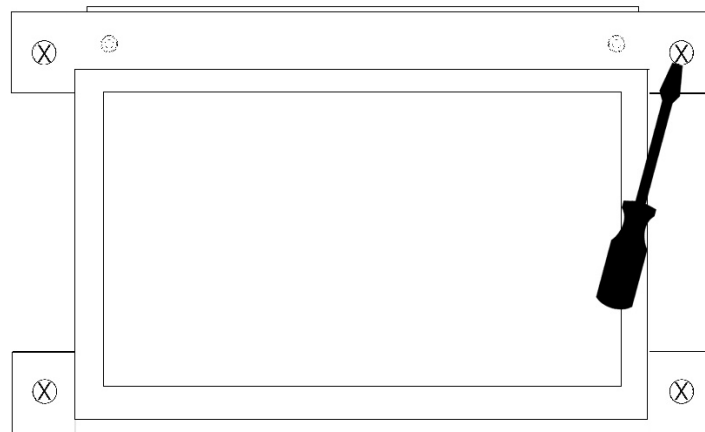
4.4 Commissioning

The device is delivered ready for operation. Proceed as described in the following paragraph during startup, and also observe the safety instructions in Chapter 3.

- Make sure that the voltage supply on the customer side is switched off first.

- Mount the device in the intended location.

  A +24 VDC power supply unit must be used for the power supply of the device.

  The device must not be supplied with AC voltage.

- Connect the negative line of the supply voltage to the negative pole of the HMI for the power supply.

- Connect the positive line of the supply voltage to the positive pole of the single or double-pole connector of the HMI for the voltage supply.

- Switch on the supply voltage.

- The device boots automatically.

5 Operation

Observe the safety instructions from chapter 3 and the start-up instructions from 4.4. To ensure safe operation, the device may only be operated by trained personnel according to 3.2.

5.1 Interfaces

The device has various interfaces, which are listed and briefly explained below. It should be mentioned here that the picoITX baseboard and a computer module from the DHSOM series are used in every DHMI device. The interfaces of the picoITX are routed to the outside and are therefore also available on the DHMI. In this paragraph the interfaces are described briefly, detailed information can be found in the [user manual of](#) the picoITX baseboard on our website.
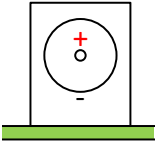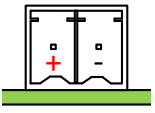
The interfaces relevant for DHMI are listed below:

- Voltage supply (X6 and X7) *
- Industrial connectors with CAN, IO, RS485 and RS232 (X8)
- USB (X10)
- Ethernet (X4)
- Status and Run LEDs

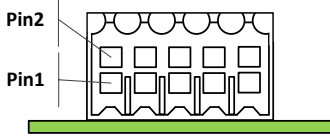* Terminal designation on picoITX baseboard see User Manual picoITX

5.1.1 Power supply

- The device is supplied with +24 VDC, an AC supply is not permitted. Either a simple connector or a two-pin connector can be used for the voltage supply.
- The positive and negative poles must be connected according to the connector labeling.

Figure	Designation
	Simple connector
	Two pole connector

5.1.2 Industrial connectors

The device has a ten-pin industrial connector that enables communication via CAN, IO or RS485 or RS232. Detailed information about the pin assignment as well as the current and voltage values can be found in the user manual of the picoITX baseboard. We used a connector type Weidmüller 1728010000, as counterpart we recommend Weidmüller Art. No. 1277490000.

Pin	Designation	Description
Pin1	RXD | RS485_A	Receive Data | RS485 Data A
Pin2	TXD | RS485_B	Transmit Data | RS485 Data B
Pin3	RTS	Request to Send
Pin4	CTS	Clear to Send
Pin5	GND_IN	Ground DH picoITX supply voltage
Pin6	GND_OC	Ground for optocoupler inputs
Pin7	Output_1	Open Collector Output 1
Pin8	CAN_H | Output_2	CAN_High | Open Collector Output 2
Pin9	Input_1	Optocoupler Input 1
Pin10	CAN_L | Input_2	CAN_LOW | Optocoupler Input 2

5.1.3 USB

A USB 2.0 host port for low, full and high-speed applications is available on the DHMI 4.3. The assignment of the USB sockets corresponds to the USB 2.0 standard.

5.1.4 Ethernet

An Ethernet connector with 10 / 100 Mbps is available on the DHMI 4.3. The connector is equipped with a yellow link and green speed LED. The assignment of the RJ45 sockets corresponds to the Ethernet standard.

5.1.5 LEDs

The two LEDs provide information about the system status. The green "Run" LED indicates that the integrated computer module is no longer in the reset state. The yellow "Status" LED can be used as desired, the configuration is done directly via the computer module (DHCOM), which can be freely selected depending on the application. For example, the LED could indicate that the operating system or a customer application has been successfully started. In the case of a headless device, the yellow LED can also be used as a status indicator for updates. For this case, the DHCOM bootloader enables the use of an update status LED (for details, refer to the update description of the bootloader).

5.1.6 Resistive touchscreen

The resistive 4.3 inch touch display has a size of 130 x 80 x 31 mm and a resolution of 480 x 272 pixels. The HMI is EN6100-6-2 and EN6100-6-3 certified, which allows the use in industrial and commercial environments. In addition, operation is possible in damp conditions or with various gloves.

5.2 Frame and installation situation

In contrast to the DHMI 7, 8 and 10.1, the DHMI 4.3 is only available in a frameless version. This makes it particularly suitable for installation in control cabinets in industrial and commercial applications.

5.3 Normal operation

After completing the wiring, the device can be connected to the input voltage.

The functionality depends on the specific programming.

5.4 Malfunction

The procedure in the event of a fault depends on the software. A description will follow shortly.

6 Software documentation

The following chapter describes the software structure and the operating options of the DHMI. Since changes can occur frequently, especially in the area of software, we also refer you to the [DH Wiki](#). Here you will always find up-to-date information on all software issues. Information from the DHMI section available in the Wiki generally applies to all DHMI variants with 4.3'', 7'', 8'' and 10.1''.

6.1 Web browser

The DHMI web browser allows you to view any web pages on the DHMI display. By default, the web pages are displayed in full screen mode without navigation bar (kiosk mode). The configuration web page is displayed as the start page. The start page can be changed via the configuration web server.

6.1.1 Views

In the web browser, you can choose between the "Kiosk mode" and "Navigation" views. In kiosk mode (default setting), the navigation bar is hidden and the web page is displayed in full screen. Using the configuration web server in the "Web browser settings" menu, the kiosk mode can be deactivated and a navigation bar can be displayed.
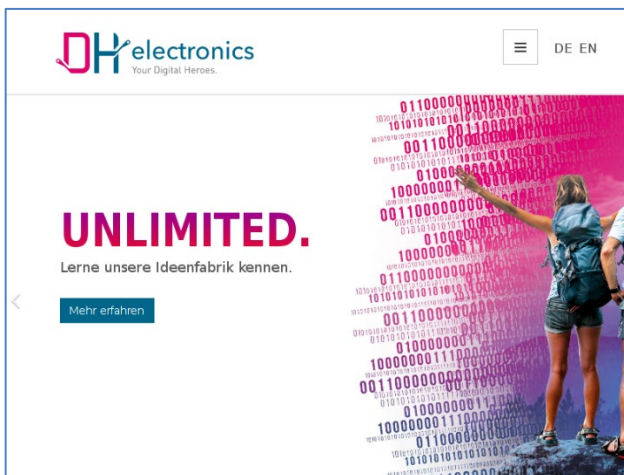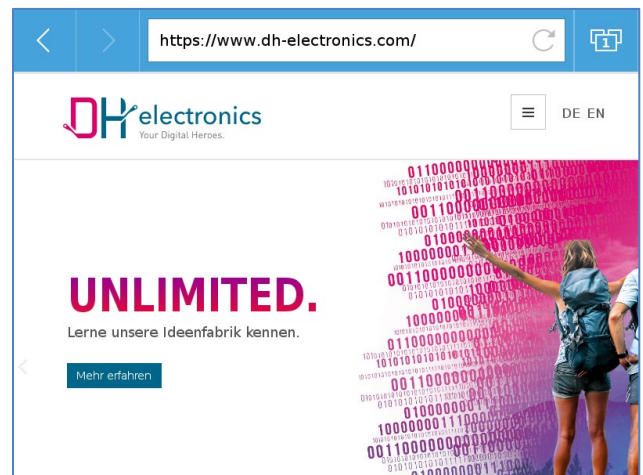

Figure 3- Web browser in kiosk mode

Figure 4- Web browser with navigation bar

The kiosk mode is deactivated via the configuration web server and thus the navigation bar is displayed.

The navigation bar consists of three different controls:

- Back and forward buttons for navigation between web pages
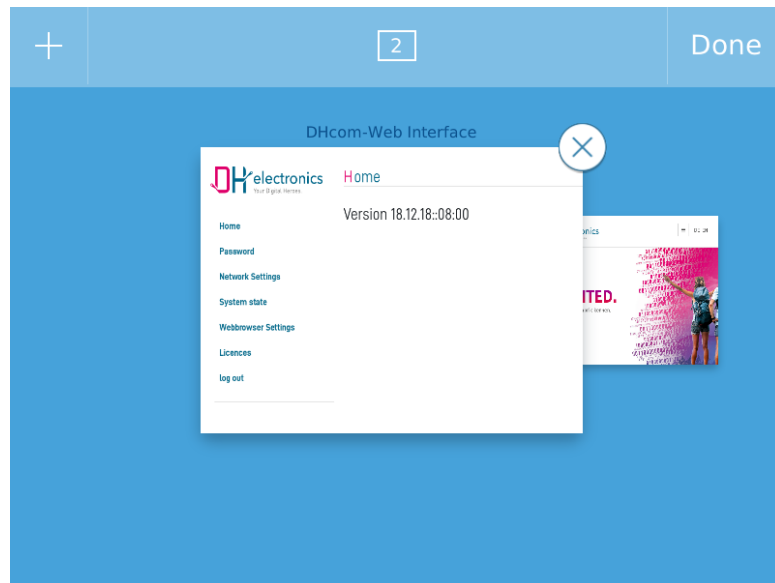- Address bar
- Tabview

Figure 5- Tabview view

A click on "Tabview" shows the currently opened tabs. A maximum of 10 tabs can be open at the same time. The number of open tabs can have an impact on the performance of the overall system. The "Tabview" area is not available in kiosk mode. A swipe gesture can be used to navigate within the tab list. A tab is selected and opened by touching the corresponding thumbnail of the web page. Tabs can be closed via the "X" button at the right corner of the thumbnail.

6.1.2 Operation

The web browser can be operated via the touchscreen, the following gestures are available for this:

- Single click: Action is executed (e.g. press button)
- Drag/Scroll: Navigation to website elements outside the current display image
- Press and hold: Opens the context menu so that you can navigate between individual pages or reload a page even in kiosk mode without a navigation bar.

The web browser has a virtual keyboard which is automatically displayed as soon as an input control element is focused. Operation via mouse and keyboard is currently not possible.

6.1.3 Debugging

Web pages can be debugged on the target using remote access via an external web browser based on Chromium (e.g. Google Chrome). The debug mode is disabled by default and can be enabled via the configuration web server under the web browser settings. In addition, the debug port can also be specified there. Chrome DevTools can be

used to display the web console of the web pages opened on the web browser. To do this, the IP of the DHMI and the port specified in the Web Browser Settings (see chapter "Web Browser Settings") must be accessed via an external web browser (based on Chromium). A web page "Inspectable Pages" opens with the opened tabs in the web browser:
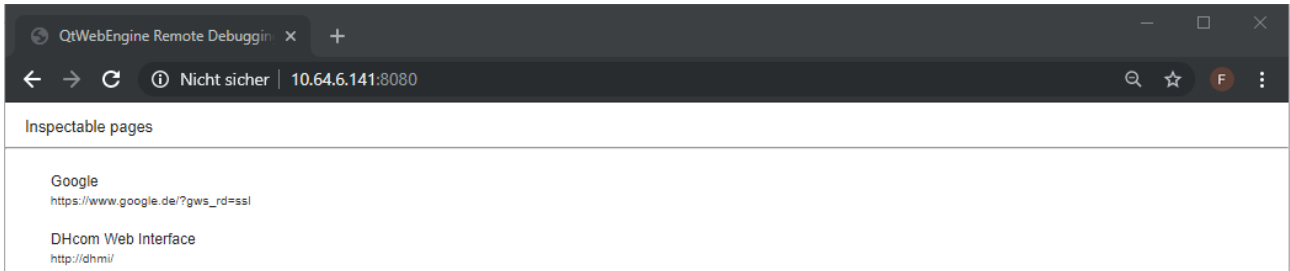

Figure 6- Inspectable Pages

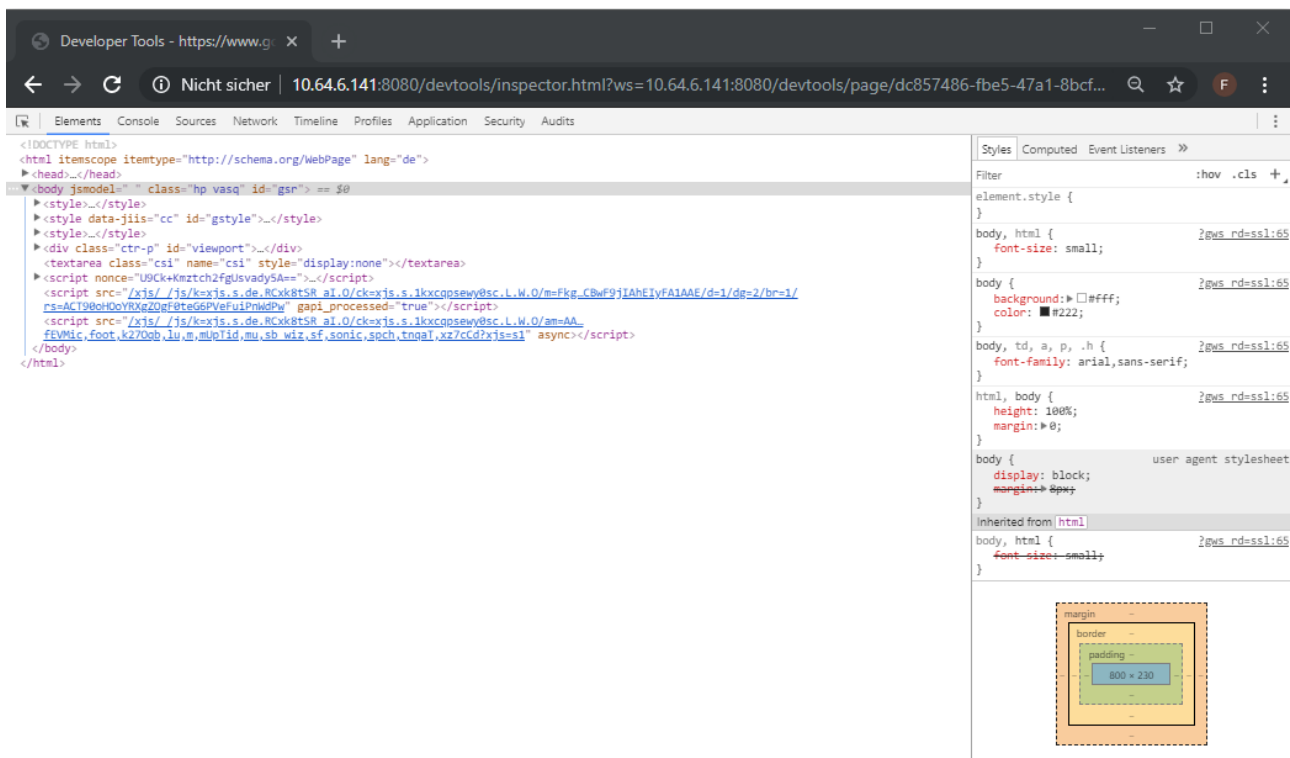After clicking on one of the listed web pages, the web console of that page will open:

Figure 7- Web console

Note

Newer versions of Google Chrome may no longer support the webengine version of the DHMI web browser. In this case, debugging must be performed with an older Chrome version.

6.2 Configuration web server

The configuration web server can be used to easily make changes to various system settings via the web browser on the DHMI or remotely via an external web browser.

6.2.1 Access

After starting DHMI, the web browser will display the configuration web server by default.
If the web browser is not running in kiosk mode (see chapter 6.2.8.1), the configuration web server can be reached by entering "dhmi" in the address bar locally on the device.

Figure 8- Calling the configuration web server

Alternatively, the configuration web server can also be reached from another device:

- Access via IP address obtained from DHCP server
- Access via a statically assigned IP address

6.2.2 Login

After DHMI is started for the first time, the login screen is displayed first, then the default password must be changed. The default login information is:

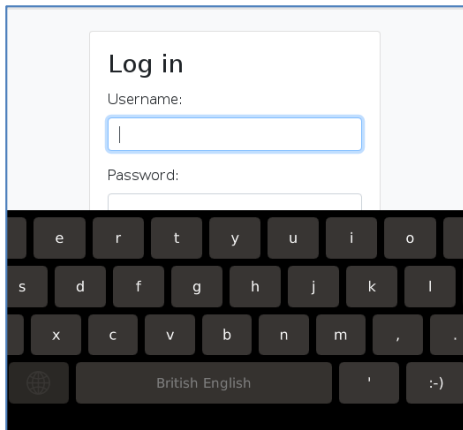- **Username:** admin
- **Password:** admin
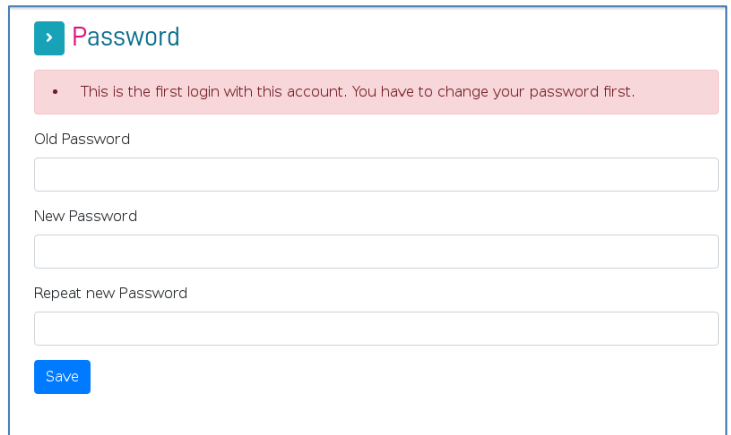
Figure 9- Login Screen

Figure 10- Set up new password

6.2.3 Navigation bar

The navigation bar is collapsed by default. It can be expanded and collapsed again using the arrow button. The navigation bar is used to navigate in the menu items of the configuration web server. Some menu items have further submenus which are displayed by clicking on the menu item.
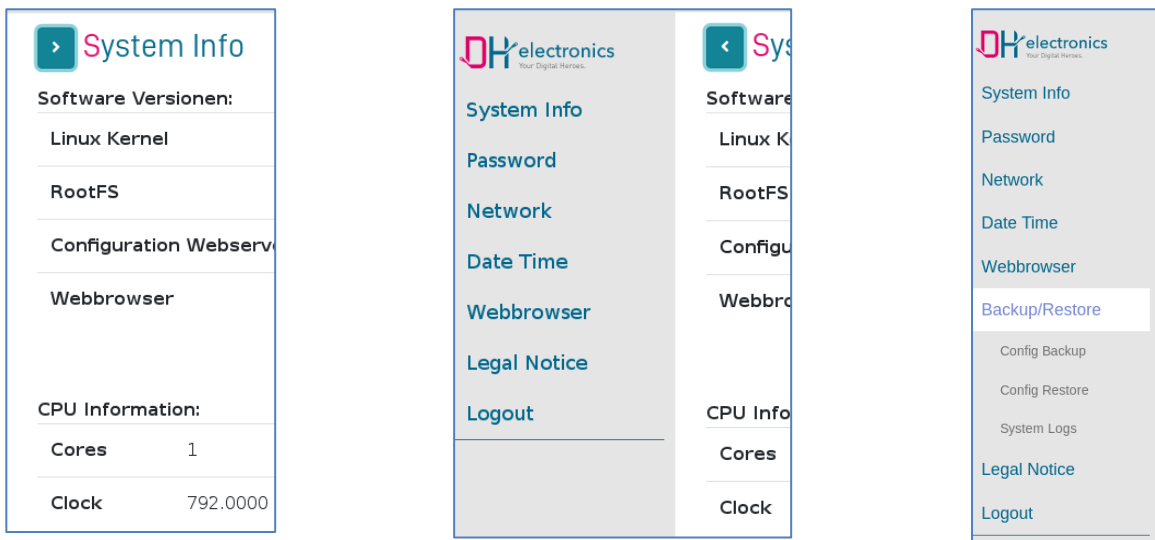

Figure 11- Navigation bar

6.2.4 System Info

Software versions and hardware details are displayed under "System Info". The RootFS version corresponds to the version of the DHMI update package. The web browser version (web engine) is only displayed when this page is called on DHMI.
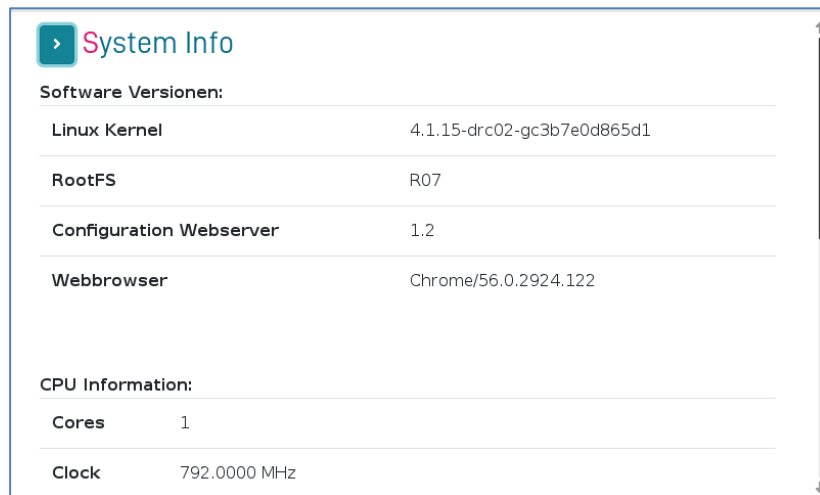
Figure 12- System Info

6.2.5 Change password

The password can be changed at any time under the "Password" tab. The default data are:

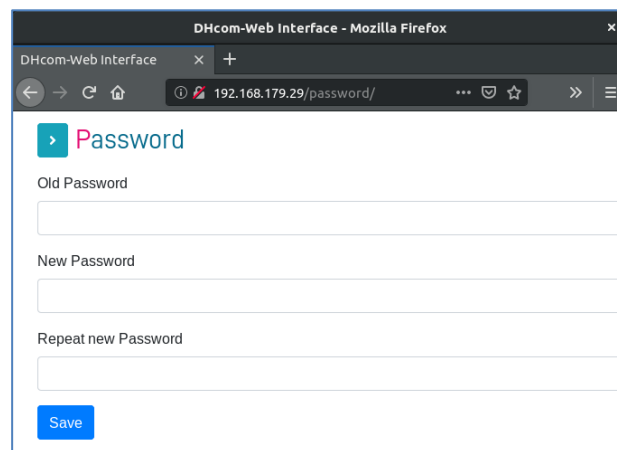- **Username:** admin
- **Password:** admin

Figure 13- Change Password

6.2.6 Date Time

The date and time can be set or changed under the "Date Time" tab. The time and date are also stored in the RTC so that they are retained even after a power failure. Alternatively, NTP can be activated and the current time can be synchronized with an NTP server.
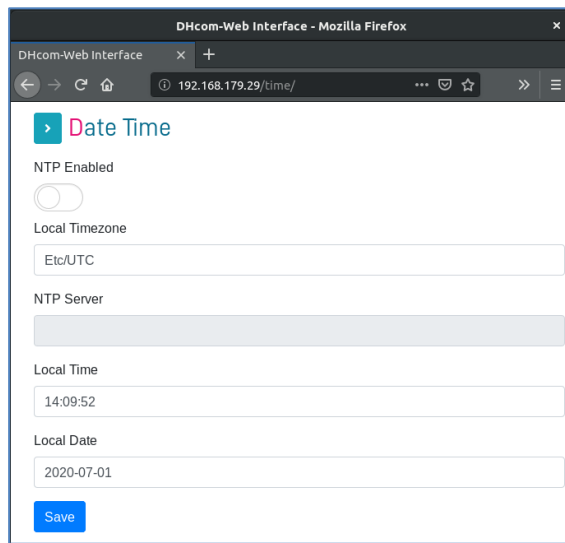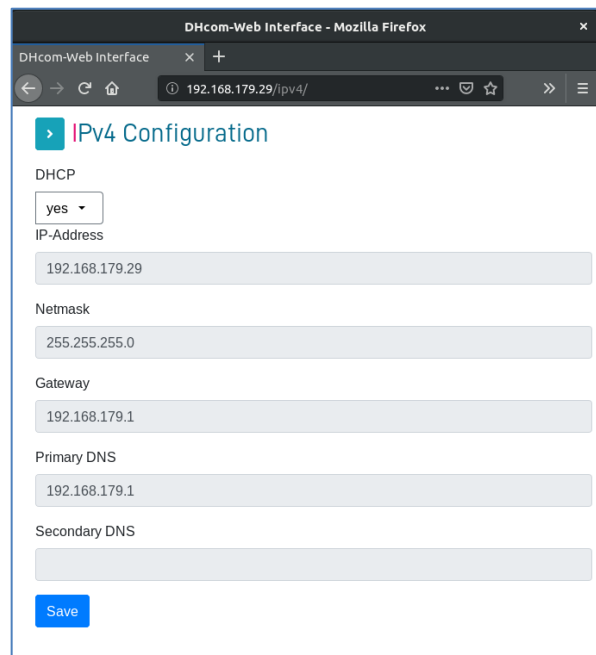
Figure 14- Date Time

6.2.7 Network settings

IP configuration

Under "IPv4 Configuration" the IP settings of the system can be changed. The default setting is DHCP. If DHCP was selected with "yes", no static IP can be assigned and the text boxes are deactivated. A click on "Save" accepts the settings.

Hostname

Under "Hostname" the hostname of the system is set. This allows several devices in the network to be distinguished. The configuration web server can be called up via this host name using the web browser on the DHMI. If the host name is e.g. dhmi it can be called on the DHMI web browser as follows (not in kiosk mode):
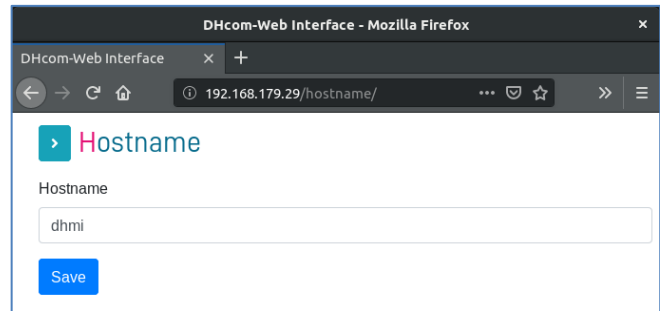
MAC address:

Under "MAC Address" the current MAC address of the Ethernet interface is retrieved. If the switch "Use NIC Address" is active, the MAC address of the chip is used. If the switch is deactivated, an own MAC address can be defined by software. It is possible to switch back to the predefined MAC address at any time by activating the switch again.
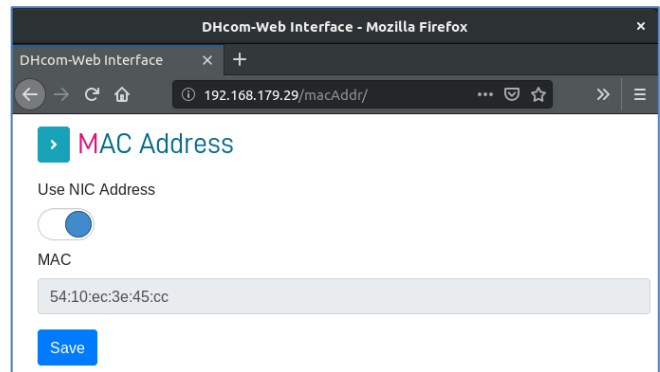
6.2.8 Web browser settings

6.2.8.1 Appearance

Under the "Appearance" tab, the appearance and behavior of the user interface can be set.

- Kiosk mode: The toggle switch is used to turn the kiosk mode on and off. If the kiosk mode is activated, the web browser runs in full screen mode without navigation bar.
- Screen Saver: The time [min.] after which the display switches off is configured here. A touch on the display switches the display on again. If a 0 is entered, the screen saver is deactivated.
- Rotation: Here you can configure the orientation of the web browser on the display.
- Default URL: Specifying the complete URL, the start page to be displayed is configured here. URL: "http://www.dh-electronics.com" instead of "dh-electronics.com" or "www.dh-electronics.com".

6.2.8.2 Advanced

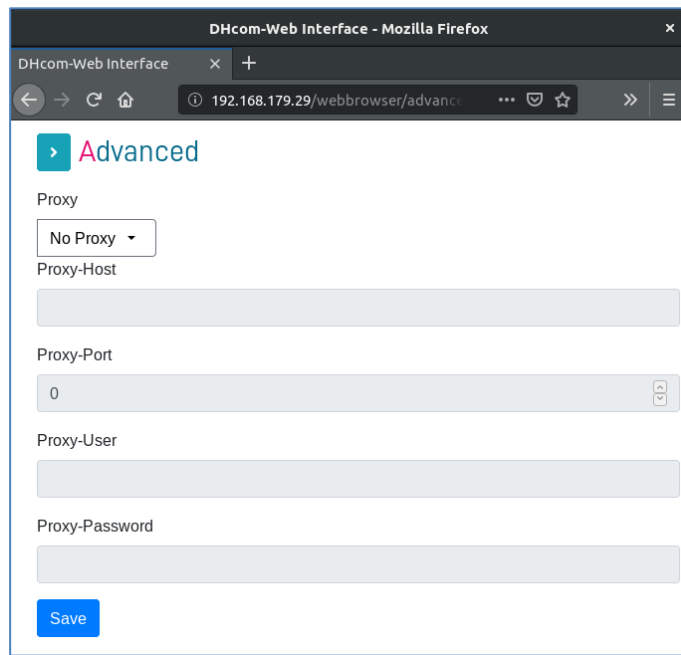Under the "Advanced" tab, the proxy settings of the web browser can be changed.
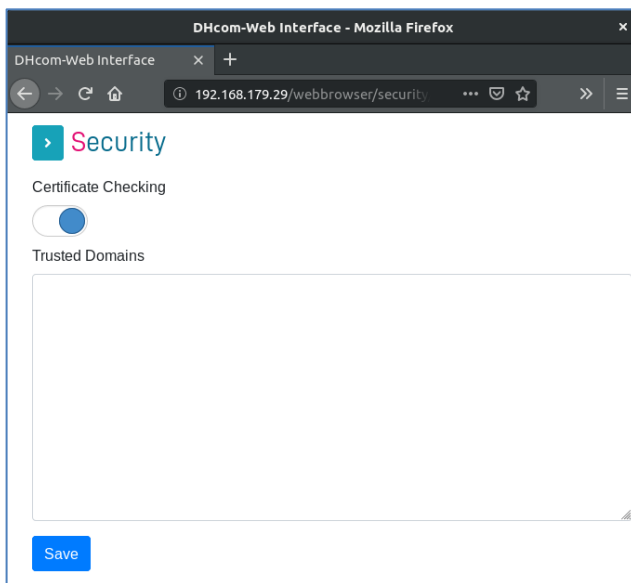
Figure 15- Web Browser Advanced

6.2.9 Security

- Certificate Checking: This can be used to globally disable the checking of invalid certificates.
- Trusted Domains: A comma-separated list of domains that are trusted can be specified here. In this way, websites with self-signed certificates can also be displayed.
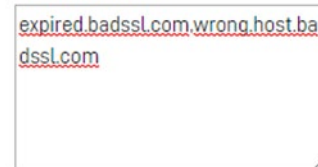- Both settings require a restart of the system.

Figure 16- Web Browser Security

6.2.10   Debug

- Remote Debugging Enabled: Can be enabled to debug remote web pages. It takes a few seconds before the option becomes active after clicking the "Save" button, because the web browser has to restart itself.
- Debugging port: Port which is used for remote debugging if debugging has been activated. For port 8080, for example, 0.0.0.0:8080 must be entered.
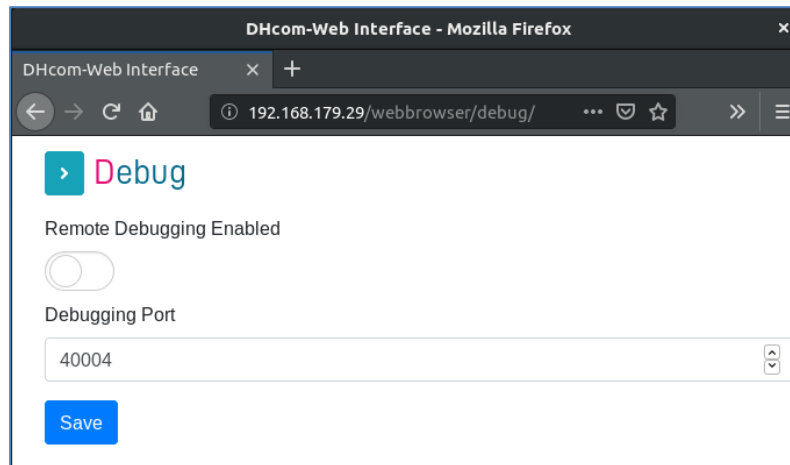

Figure 17- Web Browser Debug

6.2.11   Backup/Restore

For the web browser there are also backup or restore options, which are described below.

6.2.11.1 Config Backup

The menu item "Config Backup" can be used to download a backup of all settings that can be configured via the web server. The following settings are excluded: MAC address, password, hostname.

The menu item "Config Backup" is not available via the display and a backup can generally only be downloaded via an external web browser.

6.2.11.2 Config Restore

A previously created backup can be selected via the "Config Restore" menu item using the "Browse" button. After clicking on Restore, this is then applied to the system. The "Config Restore" menu item is not available via the display and a backup can generally only be imported via an external web browser.

6.2.11.3 Logs backup

An archive (. zip) with the system log files can be downloaded via the "System Logs" menu item. The menu item "Logs Backup" is not available via the display and a backup can generally only be downloaded via an external web browser.
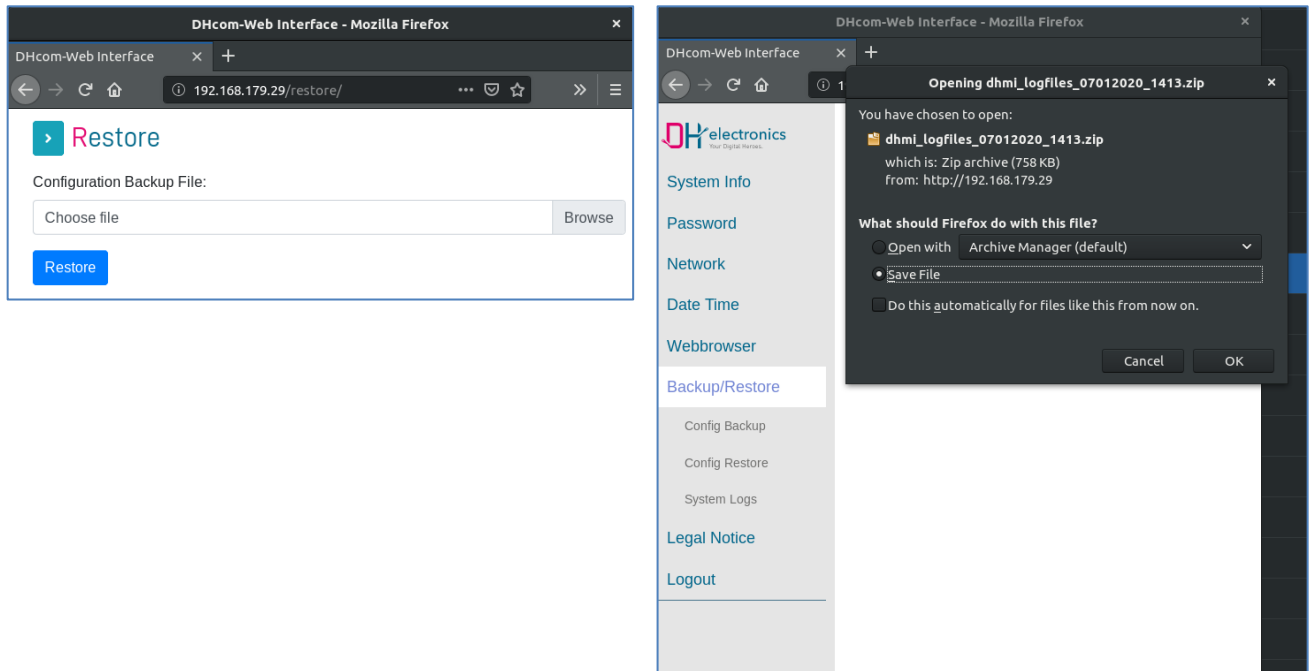

Figure 18- Web browser backup

6.3   SSH access

No root access is possible via SSH. However, there is a restricted service user:

Username: service

Password: service@DHMI%2020$

When you log in for the first time, you will be prompted to change your password.

6.4   DHMI Update

The following chapter describes the update options for DHMI in more detail.

6.4.1 Update archive

The update archive is **delivered** as a . zip file with the naming scheme **BIN_DHMI < disply-size> Inch imx6_< version>_< date>. zip.**

6.4.2 Update process

The following is a brief description of the update process with all the necessary steps.

1. Have a FAT32 formatted USB stick with at least 1GB storage capacity ready.

2. Unpack the contents of the update archive to the root directory of the USB stick.

3. Disconnect the power supply.

4. Plug the USB stick into the USB socket of the device.

5. Connect the power supply.

6. After a few seconds the display shows the update status "in progress".

7. After the update has been successfully completed (approx. 2 min.), the update status "done" is displayed.

8. If the update could not be performed successfully, an error message "error" appears.

   In this case you should use another USB stick and start the update again.

Figure 19- DHMI Update Status

9. After reconnecting and disconnecting the power supply, the device starts with the new software. The current software versions of the DHMI can be checked via the System Info page (start page). The RootFS version corresponds to the version of the update package.
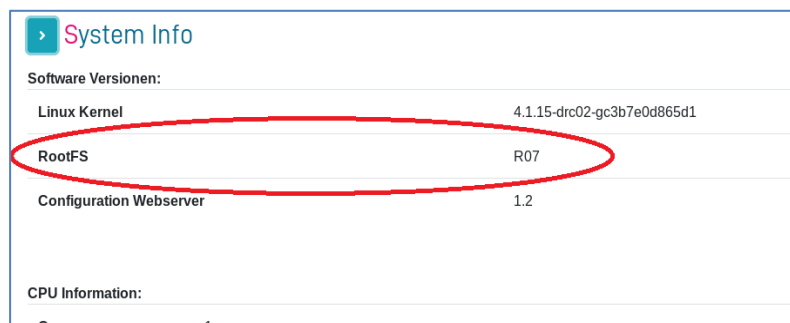

Figure 20- DHMI Update RootFS

6.4.3 Adoption of the system settings during an update

Most of the settings (website password included) are preserved during a system update. The following settings will not be applied:

- NTP enabled
- Time zone
- SSH password

7 Maintenance

The longevity of a product can only be guaranteed with proper maintenance. Use a damp cloth to clean the display and keys. Perform cleaning at regular intervals. For this purpose, disconnect the device from the power supply to avoid false triggering.

8 Decommissioning , Dismantling , Disposal

The decommissioning of the device is carried out step by step and is briefly explained below.

- Save all relevant data and shut down the system.
- Disconnect the device from the supply voltage.
- Remove all connections from the device.
- Disassemble the device.

Use the original packaging for transport and intermediate storage. As the customer, you are obligated to dispose of the device properly. Therefore, in case of disposal, observe the guidelines given in chapter 4.1 and 4.2. If necessary, the device or parts of it can be recycled.

9 Ordering information

If you need individual parts of the device, please contact our sales department. In exceptional cases, individual parts cannot be reordered separately.

10 Customization

For larger quantities, a customized design for the front panel can be designed and printed upon request.

If you are interested, please contact one of our sales staff.

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