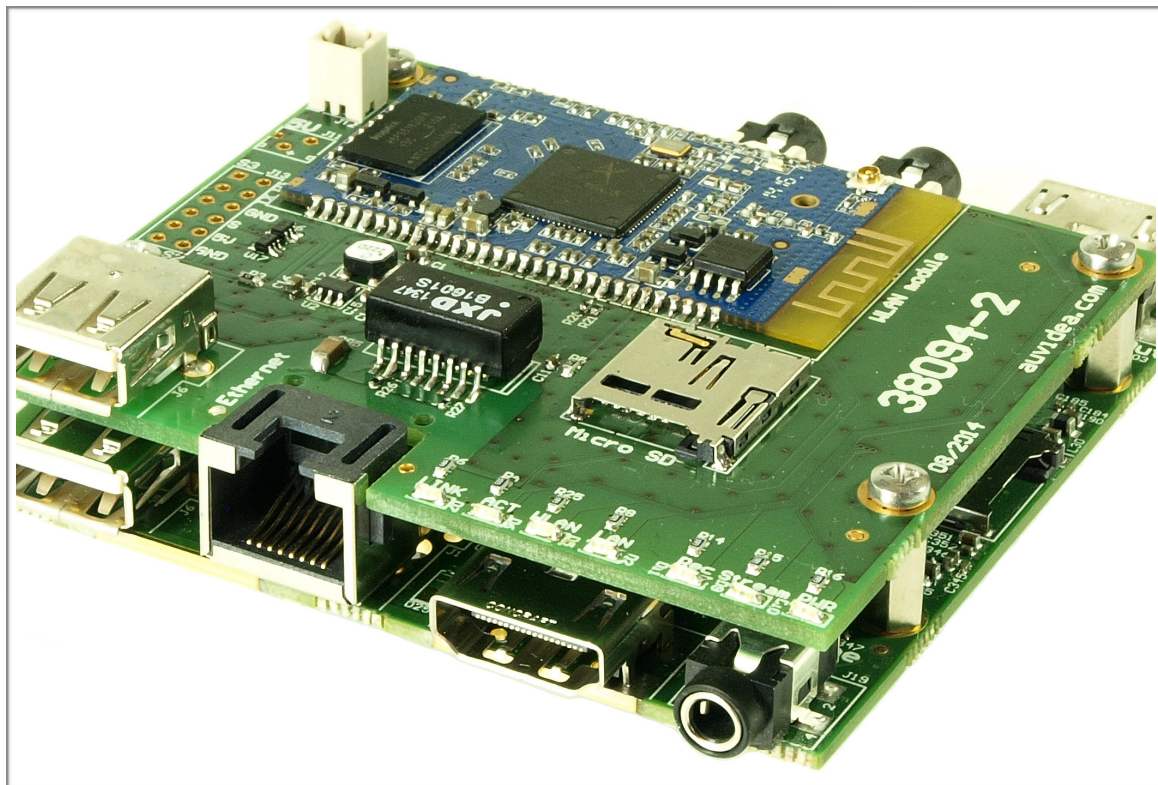


Technical Reference Manual

W100

Version 1.2



W100 add-on to E1xx

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Auvidea GmbH
Kellerberg 3
D-86920 Denklingen
Tel: +49 8243 7714 622
info@auvidea.com
www.auvidea.com

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Introduction

W100

Compact and low cost WLAN add-on module for the E110. The W100 is a fully open system and its functionality may be customized by the user. It may be used for various tasks. Also a toolchain and packet manager is available for custom software development and installation. Please check www.openwrt.org for further details.

Key functions

- WLAN interface for E110 (may be disabled in software)
- networking functions (openWRT based router with 3 ports)
- video transmuxing (e.g. RTSP to RTMP)

Technical details

- 400 MHz MPIS Processor
- 64 MB DDR2 RAM
- 16 MB on board Flash
- USB-2 (480 Mbit/s) type A
- 2x 10/100 Mbit Ethernet (RJ45) (LAN to E110, WAN to RJ45)
- 2.4 GHz WLAN interface (U.FL connector)
- extent flash storage by mounting E110 flash via davfs

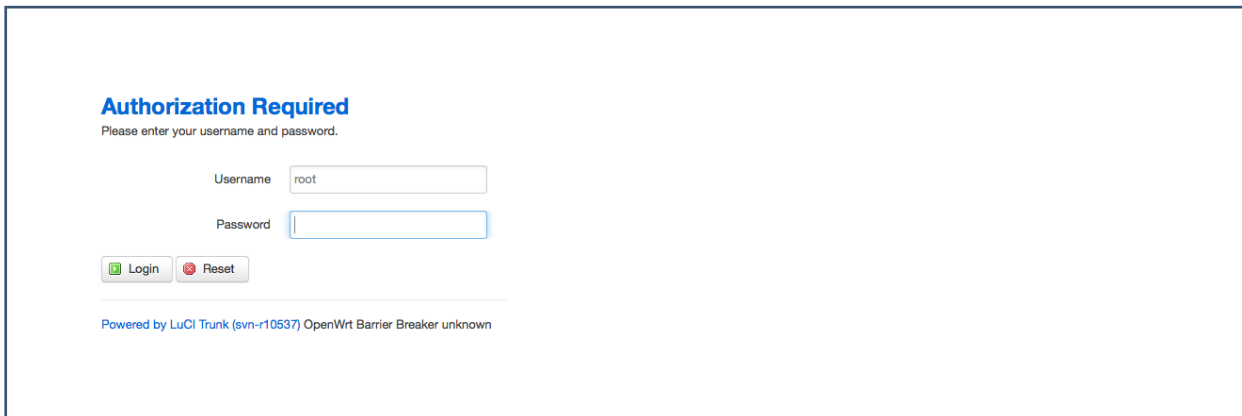
Configuration

LuCI web interface

The GET calls in the first section call a couple a sample API calls. The <form> element in the second section changes 2 „settings“ parameters (width and height) by displaying a form with 2 input fields and a submit button, which assembles the POST string and sends it to the API interface. This example is included in the E110. Just open „http://<ip-address>“ in a web browser window.

authorization

The default password is auvidea with username root. This also applies to the console access with SSL.



Please note that any subdirectories show in the /api/www GET request.

Control	Encoder	Overlay	Audio	EDID	Timer	Decoder	Network	System	Videos	API	Manual	Contact
----------------	---------	---------	-------	------	-------	---------	---------	--------	--------	-----	--------	---------

System model E110-W serial # 110002061 firmware v1.8.114 hardware 38056-3 (rev 3)	System configuration LED: <input type="checkbox"/> on <input type="checkbox"/> off <input type="checkbox"/> auto record <input type="checkbox"/> on <input type="checkbox"/> off <input type="checkbox"/> auto stream <input type="checkbox"/> on <input type="checkbox"/> off <input type="checkbox"/> auto power get PWM settings PWM: <input type="text" value="0"/> servo 1 <input type="text" value="50"/> frequency 1 <input type="text" value="0"/> servo 2 <input type="text" value="50"/> frequency 2 <input type="text" value="0"/> servo 3 <input type="text" value="50"/> frequency 3 www: <input type="button" value="directory"/> <input type="button" value="copy"/> <input type="button" value="backup"/> log: <input type="button" value="log"/> <input type="button" value="on"/> <input type="button" value="off"/> <input type="button" value="clear"/> upgrade: <input type="text" value="enter filename here"/> <input type="button" value="upgrade"/> <input type="button" value="warm reboot"/>	developer preview Request (GET) http://192.168.02.160/api/www Response <pre> status: 200 (OK) { "status": 200, "www_root": [" 2048 Jan 1 00:14 ffmpeg", " 23541 Oct 26 2014 functions.js", " 14 Jan 1 00:01 image.jpg -> /tmp/imag", " 66994 Oct 26 2014 index.html", " 141763 Jan 1 1970 jquery.js", " 53353 Jan 1 1970 logo.png", " 3290704 Oct 27 2014 manual.pdf", " 7 Jan 1 00:01 media -> /media/", " 4711 Jan 1 1970 no_video_preview.png", " 4860 Jan 1 00:04 style.css", " 8795 Jan 1 1970 test.html"] } </pre>
--	--	---

startup ffmpeg

FFMPEG is located in the flash memory in the /data/www directory of the E110. So FFMPEG may be updated with the web utilities of the E110. The W100 mounts this web directory with davfs at startup. Make make sure, that the stream.sh is executed at startup. This also loads ffmpeg with a publishing point to be specified. Please enter the desired publishing point between the quotes in the format: „rtmp://<server>/<publishing_point>“. Remove the „#“ in the beginning of this line to activate this command at startup of the system.

Local Startup

This is the content of /etc/rc.local. Insert your own commands here (in front of 'exit 0') to execute them at the end of the boot process.

```
# Put your custom commands here that should be executed once
# the system init finished. By default this file does nothing.

#stream.sh "" 2> /dev/null &
```

/bin/stream.sh

```
#!/bin/ash

mkdir /mnt/web/
echo "http://192.168.2.160/ffmpeg/ 0 0" > /etc/davfs2/secrets
chmod -r /etc/davfs2/secrets

until ping -c 1 192.168.2.160; do
sleep 1
echo "host not reachable..."
done

mount.davfs http://192.168.2.160/ffmpeg/ /mnt/web/
chmod +x /mnt/web/bin/ffmpeg
sleep 1
while true; do
pub=""$1""
/mnt/web/bin/ffmpeg -i rtmp://192.168.2.160:554/stream -c copy -f flv $pub
sleep 1
done
```

The contents of the ffmpeg directory may be viewed in a web browser.

<http://192.168.2.160/ffmpeg/bin>

ffmpeg	01-Jan-1970 00:09	8.8M
ffprobe	01-Jan-1970 00:09	8.7M
ffserver	01-Jan-1970 00:09	8.1M

Log into the W100 command line console with SSH, to view the contents of the mounted web directory from the E110. The default root password is „auvidea“. Please make sure that stream.sh in local startup (/etc/rc.local) got executed at startup, as this mounts the web directory.

The W100 mounts the „ffmpeg“ directory at startup via davfs. davfs is a file system, which can mount HTTP based network drives.

You can add more files to the ffmpeg directory or your custom directories. Just mount them with: mount.davfs http://192.168.2.160/<source dir> /mnt/<destination dir>

SSH console of W100

```
$ ssh root@192.168.2.1
root@192.168.2.1's password:

BusyBox v1.19.4 (2014-10-24 17:16:36 CEST) built-in shell (ash)
Enter 'help' for a list of built-in commands.

|_| .----- .----- .| | | | .----- .| |_| | | | | |
| - | | _ | -_| | | | | | | _| | _|
|_____| | _|_____|_|_| |_____|_|_| |_____|
      |_| W I R E L E S S   F R E E D O M

-----
BARRIER BREAKER (Bleeding Edge, unknown)
-----
* 1/2 oz Galliano          Pour all ingredients into
* 4 oz cold Coffee        an irish coffee mug filled
* 1 1/2 oz Dark Rum       with crushed ice. Stir.
* 2 tsp. Creme de Cacao

-----
root@Auvidea:~# cd /mnt/web
root@Auvidea:/mnt/web# ls -l
drwxr-xr-x  2 root  root           0 Jan  1  1970 bin
drwxr-xr-x  9 root  root           0 Jan  1  1970 include
drwxr-xr-x  3 root  root           0 Jan  1  1970 lib
drwx----- 2 root  root           0 Nov  4 15:05 lost+found
drwxr-xr-x  3 root  root           0 Jan  1  1970 share
root@Auvidea:/mnt/web# cd bin
root@Auvidea:/mnt/web/bin# ls -l
-rw-r--r--  1 root  root      9241168 Jan  1  1970 ffmpeg
-rw-r--r--  1 root  root      9162704 Jan  1  1970 ffprobe
-rw-r--r--  1 root  root      8498960 Jan  1  1970 ffserver
root@Auvidea:/mnt/web/bin#
```

Firmware installation

Please get the latest firmware for the W100. The firmware consists of two parts.

1. bin file to upgrade the firmware
2. tar file to restore the settings

Use a computer with 2.4GHz Wifi (DHCP). By default the W100 is configured as DHCP server.

SSID: auvidea
password: auvidea12

Open the LuCI interface of the W100. The default IP address is 192.160.2.1.

user: root
password: auvidea

Go to the menu item „system/backup“ and install the supplied bin file (flash firmware). Next go to the tab „system/backup“ again and install the supplied tar file (backup/restore).

Go to the menu item „system/reboot“ and perform a warm reboot.

Go to the menu item „system/startup“ and specify the task to perform at each startup:

1. put a „#“ in front of the „stream.sh“ line, to disable the custom startup functions.
2. put the publishing point address in quote after „stream.sh“ to enable transmuxing from RTSP to RTMP.

Attaching serial console and servos

Serial console

For low level system access to the W100 a serial console may be attached. Please use a USB to TTL converter cable. The 3 TTL leads are connected to a 2.54mm pin header on the W100 module. The leads are:

- receive (RX) - top pin in red box
- transmit (TX) - middle pin
- ground (GND) - bottom pin



If you are not able to get a connection, then please swap the receive and transmit leads.

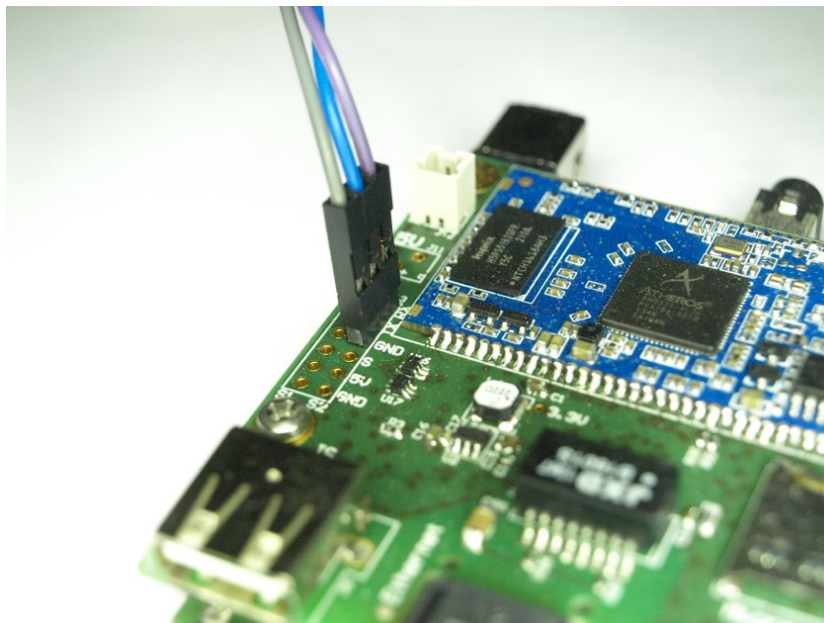
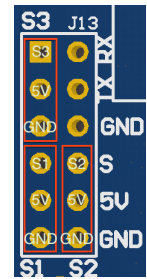
By default the 3 pin header (J13) is not populated. Please get a 3 pin pin header with 2.54mm (0.1“) pitch. If you would also connect to the 3 servo ports on J13, please install a 2x6 pin header of the same pitch.

Servo control

The firmware of the E110 (web GUI and http request API) can control up to 3 servos. These are marked with 3 red boxes on the right. GND is the bottom pin. The middle pin carries the 5 Volt power supply for the servo. Please make sure to limit power usage. The top pin is the servo signal (5V PWM signal).

The PWM signal may also be used for custom functions. Pulse width, duty cycle and frequency may be fully controlled. For standard servos, the frequency must be 50 Hz.

Please note, that the 3 LEDs for record, stream and power on the W100 module are also controlled by the 3 PWM signals.



Default network configuration

Default configuration

The W100 default network configuration is stored in the file `/etc/config/network`. Please reset this file to its default status, if you experience network issues which you cannot resolve in the LuCI web interface. Swap `eth0` and `eth1` in this file to swap the 2 Ethernet interfaces of the W100.

`/etc/config/network`

```
config interface 'loopback'
    option ifname 'lo'
    option proto 'static'
    option ipaddr '127.0.0.1'
    option netmask '255.0.0.0'

config interface 'lan'
    option ifname 'eth1'
    option type 'bridge'
    option proto 'static'
    option netmask '255.255.255.0'
    option ipaddr '192.168.2.1'

config interface 'wan'
    option ifname 'eth0'
    option proto 'dhcp'

config switch
    option name 'eth1'
    option reset '1'
    option enable_vlan '1'

config switch_vlan
    option device 'eth1'
    option vlan '1'
    option ports '0 1 2 3 4'
```

Router configuration

Default configuration

WLAN interface: DHCP master
 default IP address: 192.168.2.1
 default IP address of E110: 192.168.2.160
 SSID: auvideo (password: auvideo12)
 root password for SSH access: auvideo

WAN interface (eth0 - RJ45 connector on the W100 module): DHCP slave

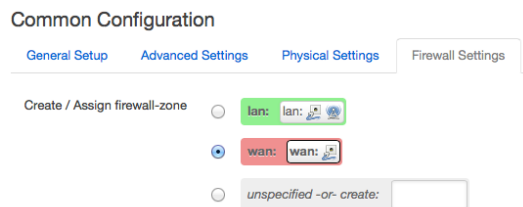
Only the W100 can be reached via this interface. However this may be reconfigured, so that both devices (W100 and E110) are mapped to the same IP address provided by your DHCP server..

Sample firewall configuration for the WAN interface

In the example below the IP address retrieved via DHCP is: 192.168.0.80. This may vary depending on your network.

192.168.0.80:80	Web interface of W110 (HTTP) - :80 may be omitted
192.168.0.80:22	SSH access to W100
192.168.0.80:8080	Web interface of E110 (HTTP)
192.168.0.80:88	SSH access to E110 (must be enabled first - see E110 manual)
192.168.0.80:554	RTSP streaming

First configure the WAN interface for the wan firewall mode (in the LuCI interface). Please go to Network/Interfaces/WAN/Edit/Firewall settings and check „wan“.



Next configure the firewall settings in Network/Firewall/Port forward:

Firewall - Port Forwards

Port forwarding allows remote computers on the Internet to connect to a specific computer or service within the private LAN.

Port Forwards

Name	Match	Forward to	Enable	Sort
E110 HTTP	IPv4-TCP, UDP From <i>any host</i> in <i>wan</i> Via <i>any router IP</i> at port <i>8080</i>	IP <i>192.168.2.160</i> , port <i>80</i> in <i>lan</i>	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
E110 SSH	IPv4-TCP, UDP From <i>any host</i> in <i>wan</i> Via <i>any router IP</i> at port <i>88</i>	IP <i>192.168.2.160</i> , port <i>22</i> in <i>lan</i>	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
E110 RTSP	IPv4-TCP, UDP From <i>any host</i> in <i>wan</i> Via <i>any router IP</i> at port <i>554</i>	IP <i>192.168.2.160</i> , port <i>554</i> in <i>lan</i>	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

Power

12V power input

The E110-W may be either powered by its main 12V power input. Alternatively it may be powered by the 12V power input on the W100 module (J12).

Connector

By default the power connector J12 is not populated on the W100 module (type: TE 292207-2)

Power cable

The power cable is: TE 2058943-1. It is available at digikey.com. Standard length: 158mm.

