

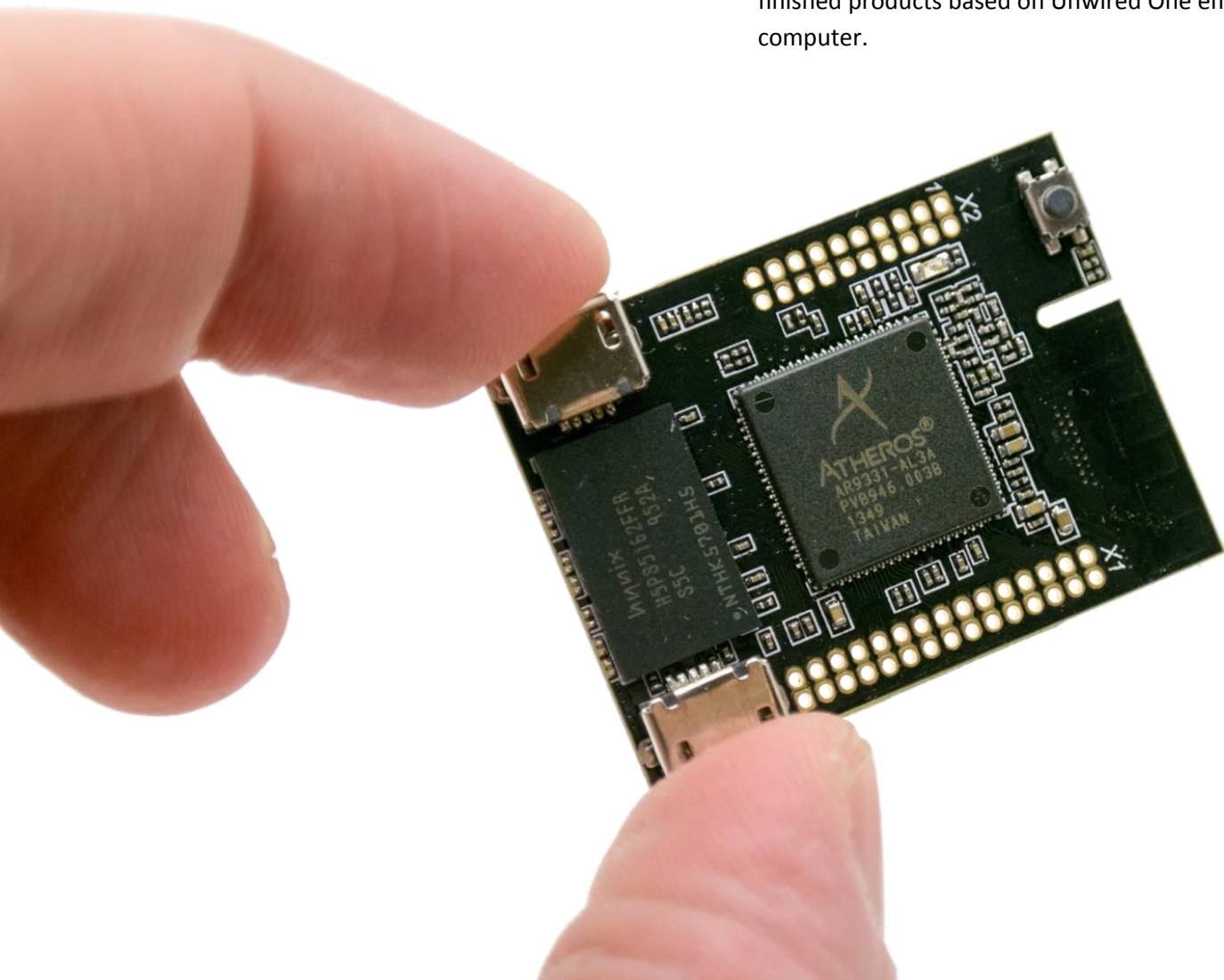
## Main Features

- High performance 400 MHz MIPS24K processor core
- Ultra-compact 25×35×4mm form-factor
- 802.11 b/g/n and Ethernet support
- Integrated 2.4 GHz Wi-Fi antenna
- USB 2.0 interface support
- SPI, UART, I<sup>2</sup>C, 1-Wire interfaces support
- Can be used as standalone computing module or integrated on the main board
- 5V, 3.3V or 3.6...6V power supply
- Regulated 3.3V and 2.75V outputs for peripheral devices
- Fast and simple software development with C/C++, Python, Perl, and other programming languages
- 0.7W typical power consumption
- 0.3W minimum power consumption

**Unwired One** is a high performance and ultra-compact embedded computer with integrated Wi-Fi interface, created specifically for use in “smart home” infrastructure, Internet-of-Things devices, remote control and data acquisition systems, robotics, etc.

Unwired One computing core is based on 32-bit MIPS 24K architecture and can be clocked at 200 MHz or 400 MHz. Unwired One has fully integrated and ready to use Wi-Fi adapter, including onboard PCB antenna. OpenWRT operating system is based on GNU/Linux, ensuring simpler and faster software development even in the most complex projects.

Programming environment is familiar for most application programmers, with supported languages including C/C++, Perl, Python, PHP, and others. Extensive support for various network protocols, databases, dynamic web pages and other services and utilities minimizes resources needed to develop complex and finished products based on Unwired One embedded computer.



## Technical Specifications

<i>Chipset</i>	Qualcomm Atheros AR9331
<i>CPU core</i>	32-bit MIPS 24K
<i>CPU frequency</i>	400 MHz (default) 200 MHz (power-saving mode)
<i>Flash memory</i>	16 MB NOR flash
<i>RAM</i>	64 MB DDR2 SDRAM
<i>Connectors</i>	1×microUSB (USB 2.0 interface) 1×microUSB (3.6...6V power supply) 1×PLLD-1,27-30 (all available interfaces and power) 1×PLLD-1,27-20 (all available interfaces and power)
<i>External Wi-Fi antenna</i>	Optional (boards with U.fl connector can be ordered with MOQ 500 pcs.)
<i>Interfaces</i>	Wi-Fi 802.11 b/g/n (1×1, up to 150 Mbps, 2.4 GHz, integrated PCB antenna) 1×USB 2.0 (host/client) 26×GPIO 1×I <sup>2</sup> S/SPDIF 2×Fast Ethernet 10/100 Mbps 1×SPI 1×I <sup>2</sup> C 1×16550 UART
<i>GPIO</i>	Max load current 24 mA Min "1" output voltage level: 2.44 V Max "0" output voltage level: 0.1 V Max input voltage: 3.3 V Max recommended input voltage: 2.75 V
<i>Power supply</i>	5 V (with USB 2.0 support) 3.3 V (without USB 2.0 support) 3.6...6 V (using integrated voltage regulator, without USB 2.0 support)
<i>Power consumption</i>	Max: 1.5 W (no external load) Typ: 0.7 W (400 MHz, Wi-Fi enabled) Min: 0.3 W (200 MHz, Wi-Fi disabled)
<i>Integrated voltage regulators</i>	3.3 V, switching mode, max external load 700 mA 2.75 V, linear LDO, max external load 300 mA Combined load should not exceed 700 mA
<i>Operating system</i>	OpenWRT 14.07 "Barrier Breaker"
<i>Dimensions</i>	25×35×4 mm
<i>Weight</i>	3 g

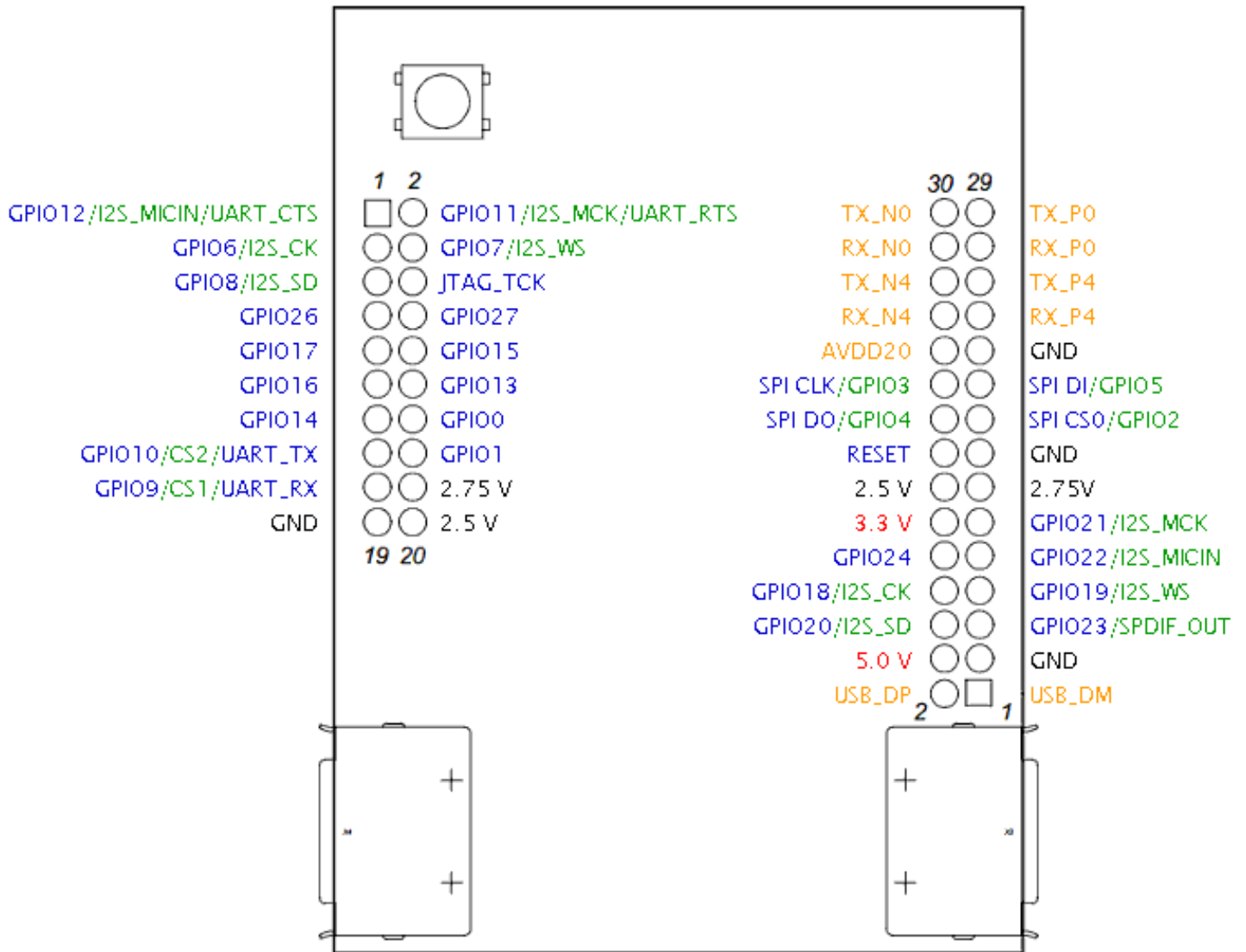
**Absolute Maximum Ratings**

<i>Supply voltage, min</i>	-0.3 V
<i>5 V supply voltage, max</i>	6.0 V
<i>3.3 V supply voltage, max</i>	3.6 V
<i>GPIO load current</i>	24 mA
<i>GPIO input voltage, min</i>	-0.3 V
<i>GPIO input voltage, max</i>	3.6 V
<i>GPIO logic "1" input voltage, min</i>	0.7 V
<i>GPIO logic "0" input voltage, max</i>	0.3 V
<i>2.75 V voltage regulator load, max</i>	300 mA
<i>3.3 V voltage regulator load, max</i>	700 mA
<i>2.75 V and 3.3 V voltage regulator combined load, max</i>	700 mA
<i>Operating temperatures</i>	0...70 °C

**Recommended Operating Conditions**

<i>5 V power supply voltage (with USB 2.0 support)</i>	4.75...5.25 V
<i>5 V power supply voltage (without USB 2.0 support)</i>	3.6...6.0 V
<i>3.3 V power supply voltage</i>	3.0...3.6 V
<i>GPIO supply voltage</i>	2.25...2.75 V

## Pinout



## Назначение выводов

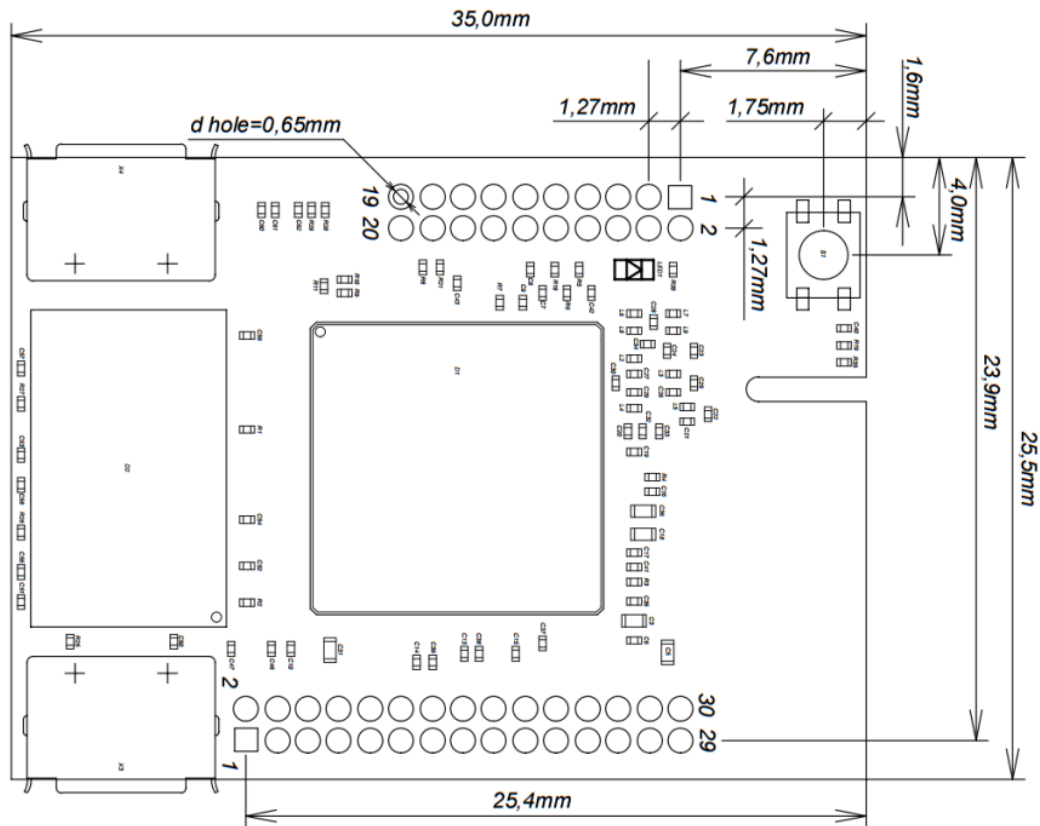
Название	Номер	Назначение
<i>USB_DM</i>	X1-1	USB interface (same as on the microUSB connector)
<i>USB_DP</i>	X1-2	USB interface (same as on the microUSB connector)
<i>RESET</i>	X1-6	CPU hardware reset
<i>JTAG_TCK</i>	X2-6	JTAG debug interface
<i>RX_P0</i>	X1-27	1st Ethernet port
<i>RX_N0</i>	X1-28	1st Ethernet port
<i>TX_P0</i>	X1-29	1st Ethernet port
<i>TX_N0</i>	X1-30	1st Ethernet port
<i>RX_P4</i>	X1-23	2nd Ethernet port
<i>RX_N4</i>	X1-24	2nd Ethernet port
<i>TX_P4</i>	X1-25	2nd Ethernet port
<i>TX_N4</i>	X1-26	2nd Ethernet port
<i>AVDD20</i>	X1-22	Ethernet power supply (2.0 VDC)
<i>GND</i>	X1-3 X1-15 X1-21 X2-19	Common ground
<i>5.0 V</i>	X1-4	Input voltage: 5 V $\pm$ 5 % if you need USB or 3.6...6 V if you don't
<i>3.3 V</i>	X1-12	700 mA output if the board is powered through 5.0 V input or 3.3 V input for external 3.3 V power supply
<i>2.75 V</i>	X1-13 X2-18	300 mA output for use with GPIOs
<i>2.5 V</i>	X1-14 X2-20	On-chip 2.5 V source; not recommended, use 2.75 V instead
<i>GPIO0</i>	X2-14	Regular GPIO
<i>GPIO1</i>	X2-16	Regular GPIO
<i>GPIO2/CS0</i>	X1-17	Regular GPIO and hardware SPI CS0 line
<i>GPIO3/CLK</i>	X1-20	Regular GPIO and hardware SPI CLK line
<i>GPIO4/DO</i>	X1-18	Regular GPIO and hardware SPI DO (MOSI) line
<i>GPIO5/DI</i>	X1-19	Regular GPIO and hardware SPI DI (MISO) line
<i>GPIO6</i>	X2-3	Regular GPIO
<i>GPIO7</i>	X2-4	Regular GPIO
<i>GPIO8</i>	X2-5	Regular GPIO
<i>GPIO9</i>	X2-17	Regular GPIO, hardware SPI CS1 line, and UART RX
<i>GPIO10</i>	X2-15	Regular GPIO, hardware SPI CS2 line, and UART TX

Название	Номер	Назначение
<i>GPIO11</i>	X2-2	OpenWRT settings software reset (active level: low) Bootloader recovery mode selection (active level: low) Regular GPIO, I2S interface, and UART RTS
<i>GPIO12</i>	X2-1	Regular GPIO, I2S interface, and UART CTS
<i>GPIO13</i>	X2-12	Regular GPIO (NB: cannot be used as input!)
<i>GPIO14</i>	X2-13	Regular GPIO (NB: cannot be used as input!)
<i>GPIO15</i>	X2-10	Regular GPIO (NB: cannot be used as input!)
<i>GPIO16</i>	X2-11	Regular GPIO (NB: cannot be used as input!)
<i>GPIO17</i>	X2-9	Regular GPIO (NB: cannot be used as input!)
<i>GPIO18</i>	X1-8	Regular GPIO and I2S interface
<i>GPIO19</i>	X1-7	Regular GPIO and I2S interface
<i>GPIO20</i>	X1-6	Regular GPIO and I2S interface
<i>GPIO21</i>	X1-11	Regular GPIO and I2S interface
<i>GPIO22</i>	X1-9	Regular GPIO and I2S interface
<i>GPIO23</i>	X1-5	Regular GPIO and S/PDIF interface
<i>GPIO24</i>	X1-10	Regular GPIO
<i>GPIO26</i>	X2-7	Regular GPIO (NB: there's no GPIO25)
<i>GPIO27</i>	X2-8	Onboard LED (active level: low) Regular GPIO

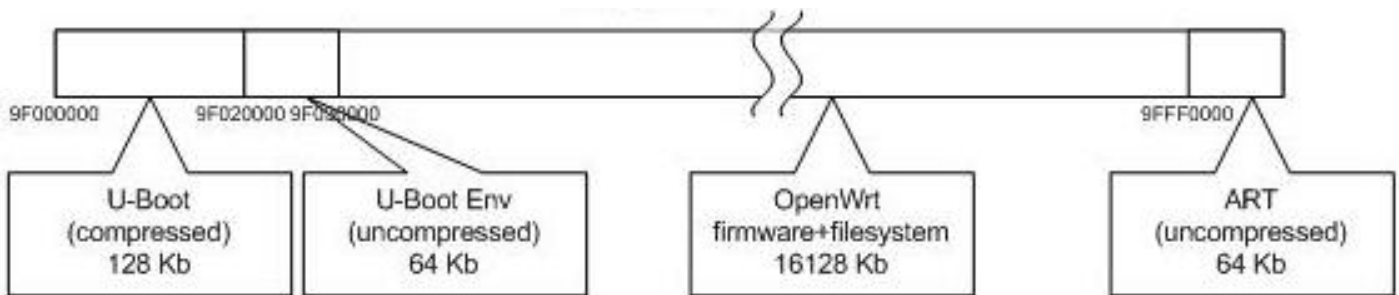
Multiplexed pins — those with 2 or more functions — must be configured through SoC internal registers. For example, if GPIO9 and GPIO10 are configured as UART interface, they can't be used as regular GPIOs or SPI chip select outputs — you have to disable UART first. Details can be found in the AR9331 datasheet. Absence of GPIO25 and GPIO13...17 reduced functionality are hardware limitations and can't be overcome. Also please pay special attention when using GPIO11 (software reset and recovery) and GPIO27 (onboard LED).

Besides hardware interfaces, some protocol may be built in software only.

## Board Dimensions And Layout



## Flash Memory Layout



- U-Boot bootloader partition: compressed, base address 0x9F000000, size 0x20000
- U-Boot environment variables partition: uncompressed, base address 0x9F020000, size 0x10000
- OpenWRT OS partition: uncompressed, base address 0x9F030000, size 0xFC0000
- ART radio settings partition: uncompressed, base address 0x9FFF0000, size 0x10000

## First Start

To power Unwired One on it is necessary to supply 5 V power with at least 300 mA current capability to the “DC” microUSB connector. Regular 5 V microUSB cellphone charger can be used as power supply.

A single onboard LED flash indicates power availability, repeating flashes — OpenWRT OS loading process, constant LED light indicates fully loaded system. Board initialization and OS boot process take about 30 seconds.

Wi-Fi adapter AP mode will be automatically enable with “UnwiredOne” SSID and no encryption. Please use tablet, PC, or smartphone with Wi-Fi support to connect to the board. It is recommended to change SSID and enable encryption for later use.

## Basic Setup

Web interface is available to change network settings, including encryption mode and password, as well as basic system settings. Default address in AP mode is <http://192.168.0.254:80>

Login: *root*

Password: *admin*

It is recommended to change password for later use.

## Command Line Interface

Linux command line interface can be accessed via SSH using corresponding software on PC, tablet, or smartphone. SSH server is listening on 192.168.0.254:22 address.

Login: *root*

Password: *admin*

SSH and web interface user credentials are synchronized, thus if password was changed via web interface, new password should be used with SSH, and vice versa.

## Serial Interface

Serial UART interface is available on Unwired One by default for debugging and recovery, and bootloader and OS consoles use it as default output.

With Unwired One Basic model, serial interface can be accessed from PC with external USB-UART adapter with 3.3 V I/O voltage level, using GPIO9/RX and GPIO10/TX pins. UART adapters with 5 V I/O level must not be used.

With Unwired One PRO model, serial interface can be accessed from PC with regular microUSB cable, connected to the “DC” microUSB port, as PRO model has an integrated USB-UART adapter.

UART console can be completely disabled with *fw\_setenv silent 1* command in Linux shell. To re-enable it, use *fw\_setenv silent* command.