

Centipede is QCA AR9331 SoC based DIP platform with an integrated 2.4 GHz 802.11N (1x1) radio

Its tiny form factor (22 x 60 mm), integrated RJ-45, an on-board omni-directional chip antenna and "breadboardable" layout allows easy integration into any hardware design with a quick time to market approach.

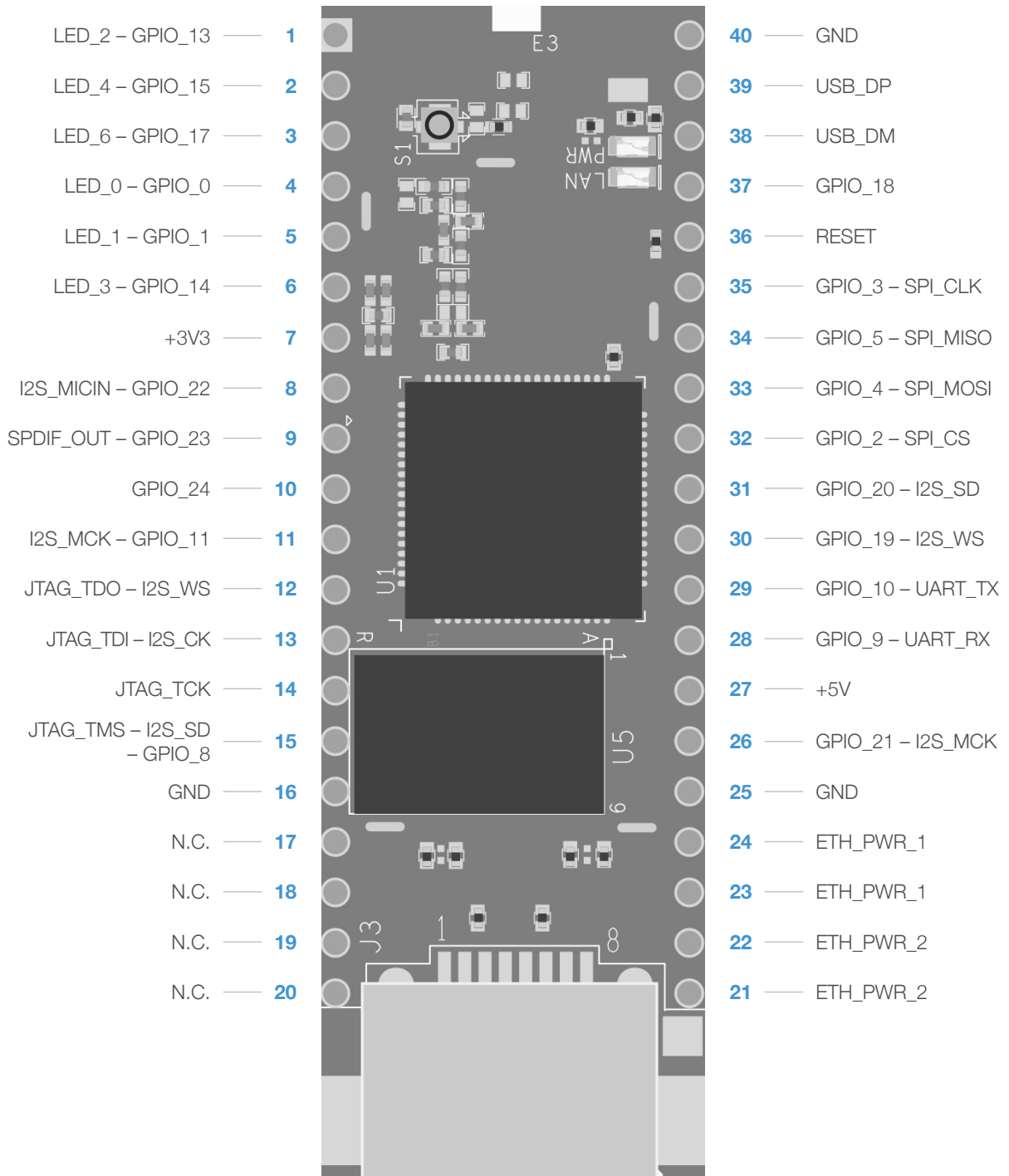
Extremely low cost and CE certification make this platform very attractive for the DIY and small-scale projects requiring wi-fi connectivity without substantial investment in RF design.

Centipede is running OpenWrt Linux. Source code with all the necessary patches is provided on a Github <https://github.com/8devices> and is supported by the growing community on our forum <http://www.8devices.com/community>.

Quick specs

- 802.11 bgn, 2.4 GHz, 1x1 SISO, 150 Mbps max data rate, 21 dB output power
- 3 dBi integrated omni-directional ceramic chip antenna
- 16 MB Flash, 64 MB DDR 2 RAM
- OpenWrt Linux flash image with sources available for download
- CPU – AR9331, 400 MHz clock speed
- 22 by 60 mm size
- DIP, "breadboardable" design
- Power supply – 5V
- Available interfaces - 1 x Ethernet, USB host/slave, serial port, i2S, SPDIF, SLIC, 24 x GPIO

Centipede pinout



| Pin | Name | I/O | Description |
|-----|--|------------|---|
| 1 | LED2 (ETH 0, GPIO 13) Bootstrap H | O (I/O) | Ethernet switch LED1, Bootstrap pin high |
| 2 | LED4 (GPIO 15) Bootstrap L | O (I/O) | Ethernet switch LED3, Bootstrap pin low |
| 3 | LED6 (GPIO 17) Bootstrap H | O (I/O) | Ethernet switch LED5, Bootstrap pin high |
| 4 | LED 0 (WLAN LED, GPIO 0) Bootstrap H | O (I/O) | WLAN LED1, Bootstrap pin high |
| 5 | LED1 (GPIO 1) Bootstrap H | O (I/O) | WLAN LED2, Bootstrap pin high |
| 6 | LED3 (ETH 1, GPIO 14) Bootstrap L | O (I/O) | Ethernet switch LED2, Bootstrap pin low |
| 7 | 3.3V output (+3VD) | - | Output +3.3V |
| 8 | i2S MICIN (SLIC DATA IN, GPIO 22) | O (I/O) | Data input (Data transmitted from SLIC to Centipede) |
| 9 | SPDIF OUT (GPIO 23) | O (I/O) | Speaker output |
| 10 | GPIO 24 | O (I/O) | GPIO pin |
| 11 | i2S MCK (SLIC DATA OUT, GPIO 11) | O (I/O) | Master clock (Data transmitted from Centipede to SLIC) |
| 12 | JATAG TDO, i2S WS (SLIC FS OUT, GPIO 12) | O (I/O) | Word select for stereo (Frame sync out) |
| 13 | JTAG TDI, i2S CK (SLIC CLK, GPIO 6) | O (I/O) | Stereo clock (SLIC clock) |
| 14 | JTAG TCK | O | JTAG Test Clock |
| 15 | JTAG TMS, i2S SD (SLIC FS IN, GPIO 8) | I (I/O) | Serial data input/ output (Frame sync in) |
| 16 | GND | - | Ground connection |
| 17 | N.C. | - | Not connected |
| 18 | N.C. | - | Not connected |
| 19 | N.C. | - | Not connected |
| 20 | N.C. | - | Not connected |
| 21 | ETH PWR 2 | - | Connected to RJ-45 jack pins 7 and 8 |
| 22 | ETH PWR 2 | - | Connected to RJ-45 jack pins 7 and 8 |
| 23 | ETH PWR 1 | - | Connected to RJ-45 jack pins 4 and 5 |
| 24 | ETH PWR 1 | - | Connected to RJ-45 jack pins 4 and 5 |
| 25 | GND | - | Ground connection |
| 26 | i2S MCK (SLIC DATA OUT, GPIO 21) | O (I/O) | Master clock (Data transmitted from Centipede to SLIC) |
| 27 | +5V input (+5VD) | - | Input +5V |
| 28 | UART RX (SPI CS 1, GPIO 9) | I (O, I/O) | Serial data in (SPI chip select) |
| 29 | UART TX (SPI CS 2, GPIO 10) | O (O, I/O) | Serial data out (SPI chip select) |
| 30 | i2S WS (SLIC FS OUT, GPIO 19) | O (I/O) | Word select for stereo (Frame sync out) |
| 31 | i2S SD (SLIC FS IN, GPIO 20) | I (I/O) | Serial data input/ output (Frame sync in) |
| 32 | SPI CS0 (GPIO 2) | O (I/O) | SPI chip select |
| 33 | SPI MOSI (GPIO 4) | O (I/O) | Data transmission from the Centipede to an external device. On reset, SPI_MOSI (GPIO_4) is output and can directly interface with a SPI device such as a serial flash. If a serial flash is not used, these pins may be used as GPIO pins. |
| 34 | SPI MISO (GPIO 5) | IL (I/O) | Data transmission from an external device to the Centipede. On reset, SPI_MISO (GPIO_5) is input, which should be interfaced with an SPI device via a resistor divider for reliability. If a serial flash is not used, these pins may be used as GPIO pins. |
| 35 | SPI CLK (GPIO 3) | O (I/O) | SPI serial interface clock |
| 36 | Hardware reset | I | Hardware reset |
| 37 | GPIO 18 | O (I/O) | GPIO18/I2S_CK/SLIC_LK |
| 38 | USB_DM | I/O | USB- |
| 39 | USB_DP | I/O | USB+ |
| 40 | GND | - | Ground connection |

- IA** — analog input signal
- I** — digital input signal
- I/O** — digital bidirectional signal
- IL** — input signals with weak internal pull-up, to prevent signals from floating when open
- OA** — analog output signal
- O** — digital output signal

General GPIO characteristics

| Parameter | Units | Min | Max |
|---------------------|-------|------|------|
| Output high voltage | V | 2.44 | 2.8 |
| Output low voltage | V | -0 | 0.1 |
| Input high voltage | V | 1.93 | 3.0 |
| Input low voltage | V | -0.3 | 0.75 |

Current drive up to 24 mA.

GPIO

Bootstrap HIGH or LOW means that during bootstrap process (first few seconds when the device is turned on) these pins need to be in the specified state. If pins are not in required state then device will not boot correctly.

GPIO

LED GPIO LED0 (GPIO0), LED2 (GPIO13) and LED3 (GPIO14) are being used by kernel module "leds_gpio" - You can use them after removing leds_gpio module by rmmmod, or removing it permanently from /etc/ modules.d

Free GPIO pins: If you have some hobby project, it is advised to use GPIO pins 18, 19, 20, 21, 22 and 23 without any worries. These pins are not used during the booting process. Other GPIO pins should not be used if you don't know exactly what you want to achieve, because they are used during the boot process (bootstrap).

SPI interface

SPI interface must be used carefully, it's connected to the internal FLASH memory and CS1 or CS2 must be used.

Power supply

Centipede module is powered with 5V power supply, GND pins are interconnected on the Centipede module.

Software

8devices is providing OpenWRT linux distribution source code with necessary patches on GitHub [https:// github.com/8devices](https://github.com/8devices) and is supported by our growing community on <http://www.8devices.com/community> forum.

Power ratings

For the optimal performance and stability recommended power ratings must be used. Device might malfunction outside minimum and maximum power ratings.

| Parameter | Units | Min | Nominal | Max |
|-------------------|-------|------|---------|------|
| DC supply voltage | V | 4.85 | 5 | 5.15 |
| Current | A | 0.06 | 0.1 | 0.3 |

Operating conditions

The module can operate in a wide temperature range and different conditions depending on the enclosure. The following guidelines guarantee that it will work correctly.

| Parameter | Units | Min | Max |
|---------------------|-------|-----|-----|
| Working temperature | C | 0 | 65 |
| Storage temperature | C | -40 | 70 |
| Humidity | %RH | 10 | 90 |
| Storage humidity | %RH | 5 | 90 |

Radio characteristics

| | | | | | |
|---------------------|----------|-----------|-----------|-----------|-----------|
| 802.11N (20 MHz) | 7.2 Mbps | 14.4 Mbps | 21.7 Mbps | 28.9 Mbps | 43.3 Mbps |
| | -94 | -91 | -88 | -85 | -82 |
| 802.11N (40 MHz) | 15 Mbps | 30 Mbps | 45 Mbps | 60 Mbps | 90 Mbps |
| | -89 | -86 | -83 | -80 | -78 |
| 802.11N 20 MHz | 7.2 Mbps | 14.4 Mbps | 21.7 Mbps | 28.9 Mbps | 43.3 Mbps |
| | 21 | 20 | 20 | 19 | 18 |
| 802.11N 40 MHz | 15 Mbps | 30 Mbps | 45 Mbps | 60 Mbps | 90 Mbps |
| | 20 | 19 | 19 | 19 | 18 |

Centipede dimensions

