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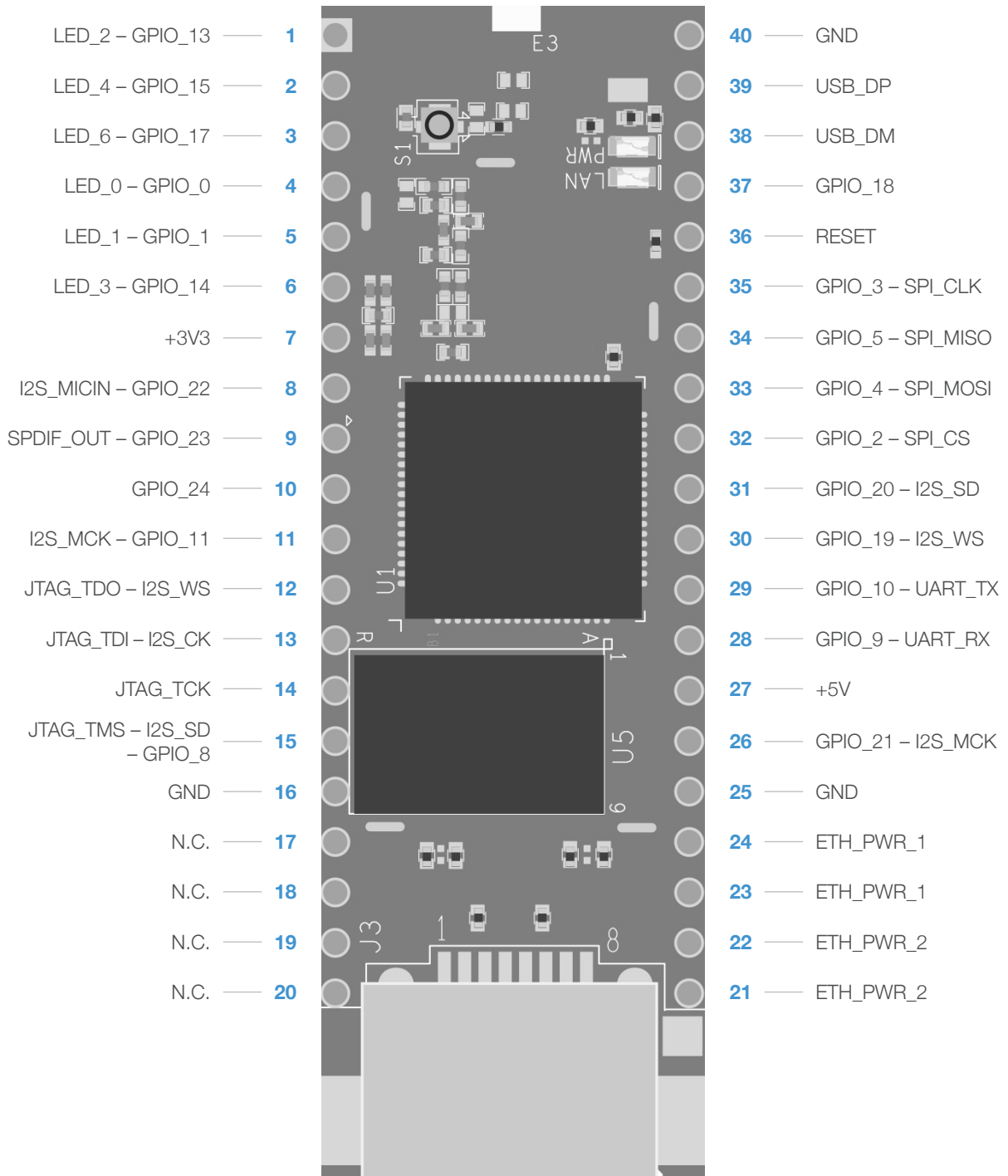
Extremely low cost and CE certification make this platform very attractive for the DIY and small-scale projects requiring wi-fi connectivity without substantial investment in RF design.

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

LED_2 – GPIO_13 — **1**	**40** — GND
LED_4 – GPIO_15 — **2**	**39** — USB_DP
LED_6 – GPIO_17 — **3**	**38** — USB_DM
LED_0 – GPIO_0 — **4**	**37** — GPIO_18
LED_1 – GPIO_1 — **5**	**36** — RESET
LED_3 – GPIO_14 — **6**	**35** — GPIO_3 – SPI_CLK
+3V3 — **7**	**34** — GPIO_5 – SPI_MISO
I2S_MICIN – GPIO_22 — **8**	**33** — GPIO_4 – SPI_MOSI
SPDIF_OUT – GPIO_23 — **9**	**32** — GPIO_2 – SPI_CS
GPIO_24 — **10**	**31** — GPIO_20 – I2S_SD
I2S_MCK – GPIO_11 — **11**	**30** — GPIO_19 – I2S_WS
JTAG_TDO – I2S_WS — **12**	**29** — GPIO_10 – UART_TX
JTAG_TDI – I2S_CK — **13**	**28** — GPIO_9 – UART_RX
JTAG_TCK — **14**	**27** — +5V
JTAG_TMS – I2S_SD – GPIO_8 — **15**	**26** — GPIO_21 – I2S_MCK
GND — **16**	**25** — GND
N.C. — **17**	**24** — ETH_PWR_1
N.C. — **18**	**23** — ETH_PWR_1
N.C. — **19**	**22** — ETH_PWR_2
N.C. — **20**	**21** — ETH_PWR_2

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 ash. 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 ash 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 rmmod, 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 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