

# NanoPi NEO Core

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## 1 Introduction

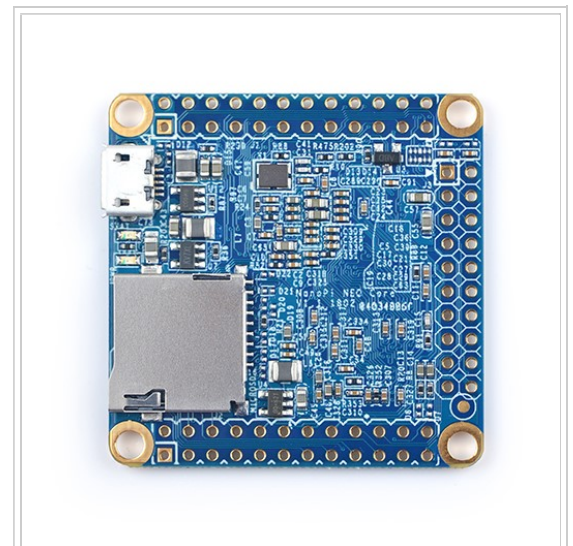
- The NanoPi NEO Core(abbreviated as "NEO Core") is an alternative NanoPi NEO that works like a CPU board with male pin-headers. It has the same form factor as the NanoPi NEO and same pin descriptions. The connectors and ports are populated to pin-headers on the NEO Core. The NanoPi NEO Core has ESD protection for its MicroUSB port and TF card slot. In addition the NEO Core can have an optional onboard eMMC flash which is preferred by industrial customers.
- The NEO Core uses a popular Allwinner H3 SoC and has onboard 256M/512M DDR3 RAM. FriendlyElec offers models with three eMMC options: 8GB/16GB/32GB and one that doesn't have eMMC at all.
- FriendlyElec migrated UbuntuCore with mainline kernel 4.14 for it.
- FriendlyElec develops a Mini Shield for NanoPi NEO Core/Core2 which has the same form factor as the RPi 3. When a NanoPi NEO Core is connected to this Mini Shield the whole assembled module can be well fit into a common RPi 3's case.



Overview

## 2 Hardware Spec

- CPU: Allwinner H3, Quad-core Cortex-A7 Up to 1.2GHz
- DDR3 RAM: 256MB/512MB DDR3 RAM
- Storage: NC/8GB/16GB/32GB eMMC
- MicroSD Slot x 1
- MicroUSB: OTG and power input
- GPIO: two 2.54mm spacing 12x2pin header, one 2.54mm spacing 10x2pin header
- Connectivity: 10/100M Ethernet(6Pin, included in 2.54mm pitch pin header)
- USB Host x3(included in 2.54mm pitch pin header)
- Debug Serial Port(4Pin, included in 2.54mm pitch pin header )
- Audio input/output Port(4Pin, included in 2.54mm pitch pin header )
- GPIO:It includes UART, SPI, I2C, IO etc
- PC Size: 40 x 40mm
- Power Supply: DC 5V/2A
- Temperature measuring range: -20°C to 70°C
- OS/Software: U-boot, Ubuntu-Core
- Weight: xxg(WITHOUT Pin-headers)

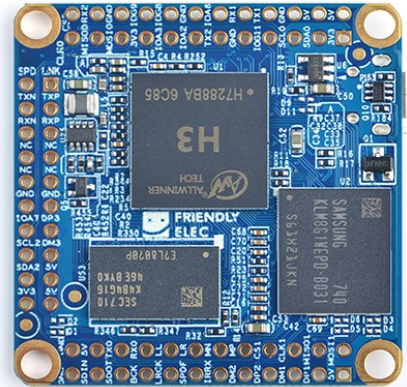


Front

## 3 Diagram, Layout and Dimension

### 3.1 Layout

## ■ GPIO1 Pin Description



Back

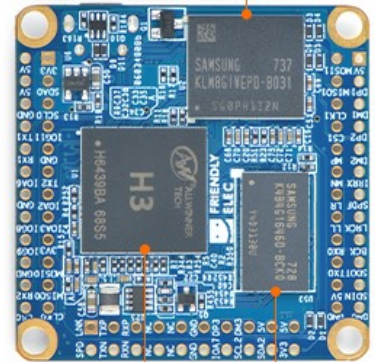
GPIO2 12x2pin:  
USB/I2S/SPI1/Audio/UART0

GPIO1 12x2pin:  
5V/UART1/3V3/I2C0/SPI0/GPIO

MicroSD Slot

MicroUSB OTG

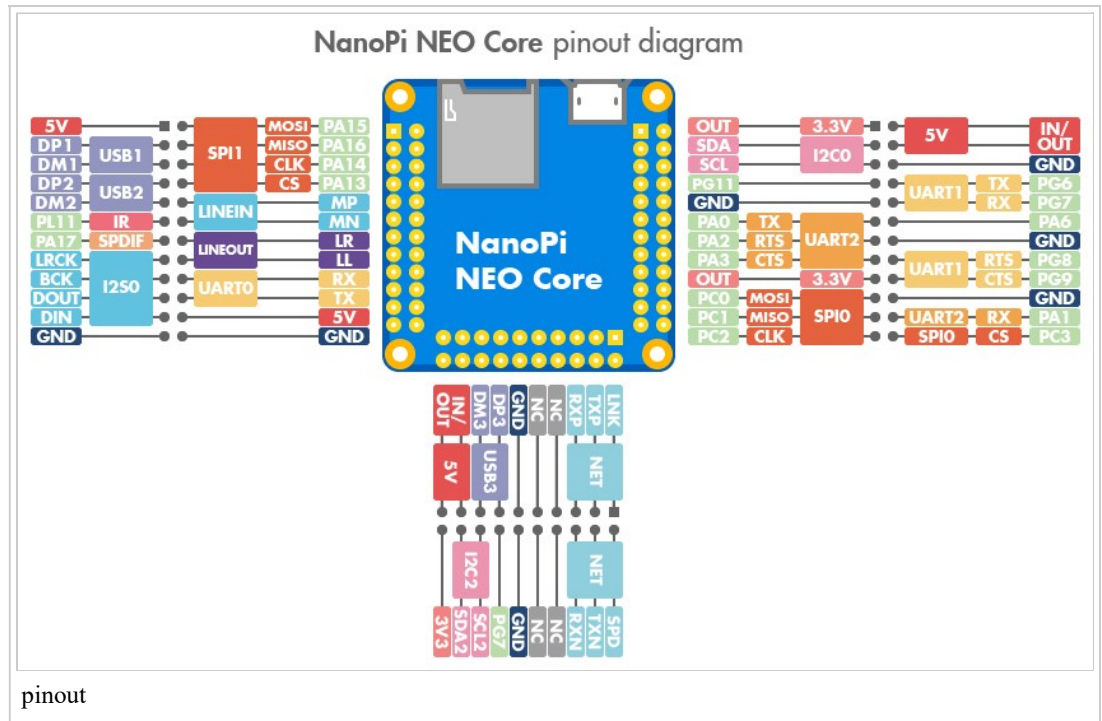
8GB eMMC



GPIO3 10x2pin:  
Ethernet/USB3/I2C2/5V/3V3

Allwinner H3  
256MB/512MB  
DDR3 RAM

NanoPi NEO Core Layout



Pin#	Name	Linux gpio	Pin#	Name	Linux gpio
1	SYS_3.3V		2	VDD_5V	
3	I2C0_SDA / GPIOA12		4	VDD_5V	
5	I2C0_SCL / GPIOA11		6	GND	
7	GPIOG11	203	8	UART1_TX / GPIOG6	198
9	GND		10	UART1_RX / GPIOG7	199
11	UART2_TX / GPIOA0	0	12	GPIOA6	6
13	UART2_RTS / GPIOA2	2	14	GND	
15	UART2_CTS / GPIOA3	3	16	UART1_RTS / GPIOG8	200
17	SYS_3.3V		18	UART1_CTS / GPIOG9	201
19	SPI0_MOSI / GPIOC0	64	20	GND	
21	SPI0_MISO / GPIOC1	65	22	UART2_RX / GPIOA1	1
23	SPI0_CLK / GPIOC2	66	24	SPI0_CS / GPIOC3	67

## ■ GPIO2 Pin Description

Pin#	Name	Linux gpio	Pin#	Name	Linux gpio
1	VDD_5V		2	SPI1_MOSI / GPIOA15	15
3	USB-DP1		4	SPI1_MISO / GPIOA16	16
5	USB-DM1		6	SPI1_CLK / GPIOA14	14
7	USB-DP2		8	SPI1_CS / GPIOA13	13
9	USB-DM2		10	MICIN1P	
11	GPIOL11/IR-RX	363	12	MICIN1N	
13	SPDIF-OUT/GPIOA17	17	14	LINEOUTR	
15	PCM0_SYNC/I2S0_LRCK/I2C1_SCL		16	LINEOUTL	
17	PCM0_CLK/I2S0_BCK/I2C1_SDA		18	UART_RXD0 / GPIOA5 / PWM0	5
19	PCM0_DOUT/I2S0_SDOUT		20	UART_TXD0 / GPIOA4	4
21	PCM0_DIN/I2S0_SDIN		22	VDD_5V	
23	GND		24	GND	

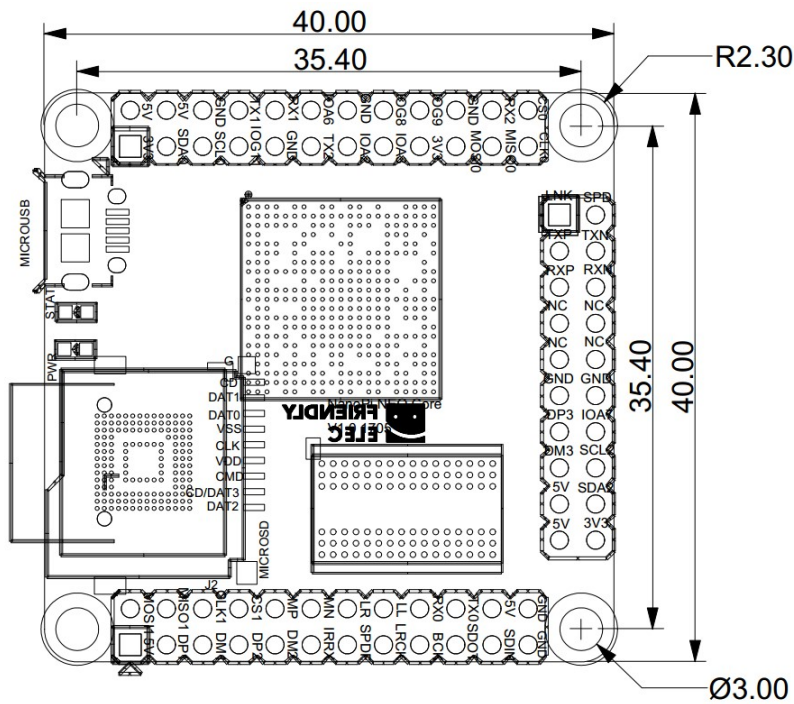
#### ■ GPIO3 Pin Description

Pin#	Name	Linux gpio	Pin#	Name	Linux gpio
1	EPHY-LINK-LED		2	EPHY-SPD-LED	
3	EPHY-TXP		4	EPHY-TXN	
5	EPHY-RXP		6	EPHY-RXN	
7	NC		8	NC	
9	NC		10	NC	
11	GND		12	GND	
13	USB-DP3		14	GPIOA7	7
15	USB-DM3		16	I2C2_SCL / GPIOE12	
17	5V		18	I2C2_SDA / GPIOE13	
19	5V		20	SYS_3.3V	

#### Note:

1. SYS\_3.3V: 3.3V power output
2. VVDD\_5V: 5V power input/output. When the external device's power is greater than the MicroUSB's the external device is charging the board otherwise the board powers the external device. The input range is 4.7V ~ 5.6V
3. All pins are 3.3V, output current is 5mA
4. For more details refer to its schematic NanoPi-NEO-Core-V1.1-1802-Schematic.pdf ([http://wiki.friendlyarm.com/wiki/images/a/a4/Nanopi\\_neo\\_core-v1.1-1802.pdf](http://wiki.friendlyarm.com/wiki/images/a/a4/Nanopi_neo_core-v1.1-1802.pdf))

### 3.2 Dimensional Diagram



For more details refer to the document: NanoPi NEO Core V1.1 1802 pcb in dxf format ([http://wiki.friendlyarm.com/wiki/index.php/File:NanoPi\\_NEO\\_Core-V1.1\\_pcb-Dim.rar](http://wiki.friendlyarm.com/wiki/index.php/File:NanoPi_NEO_Core-V1.1_pcb-Dim.rar))

## 4 Get Started

### 4.1 Essentials You Need

Before starting to use your NanoPi NEO Core get the following items ready

- NanoPi NEO Core
- microSD Card/TF Card: Class 10 or Above, minimum 8GB SDHC
- microUSB power. A 5V/2A power is a must
- A Host computer running Ubuntu 16.04 64 bit system

### 4.2 TF Cards We Tested

To make your NanoPi NEO Core boot and run fast we highly recommend you use a Class10 8GB SDHC TF card or a better one. The following cards are what we used in all our test cases presented here:

- SanDisk TF 8G Class10 Micro/SD TF card:

SanDisk 闪迪



- SanDisk TF128G MicroSDXC TF 128G Class10 48MB/S:

