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Dual Quad SATA HAT

English
中文（中国大陆）
español
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Introduction

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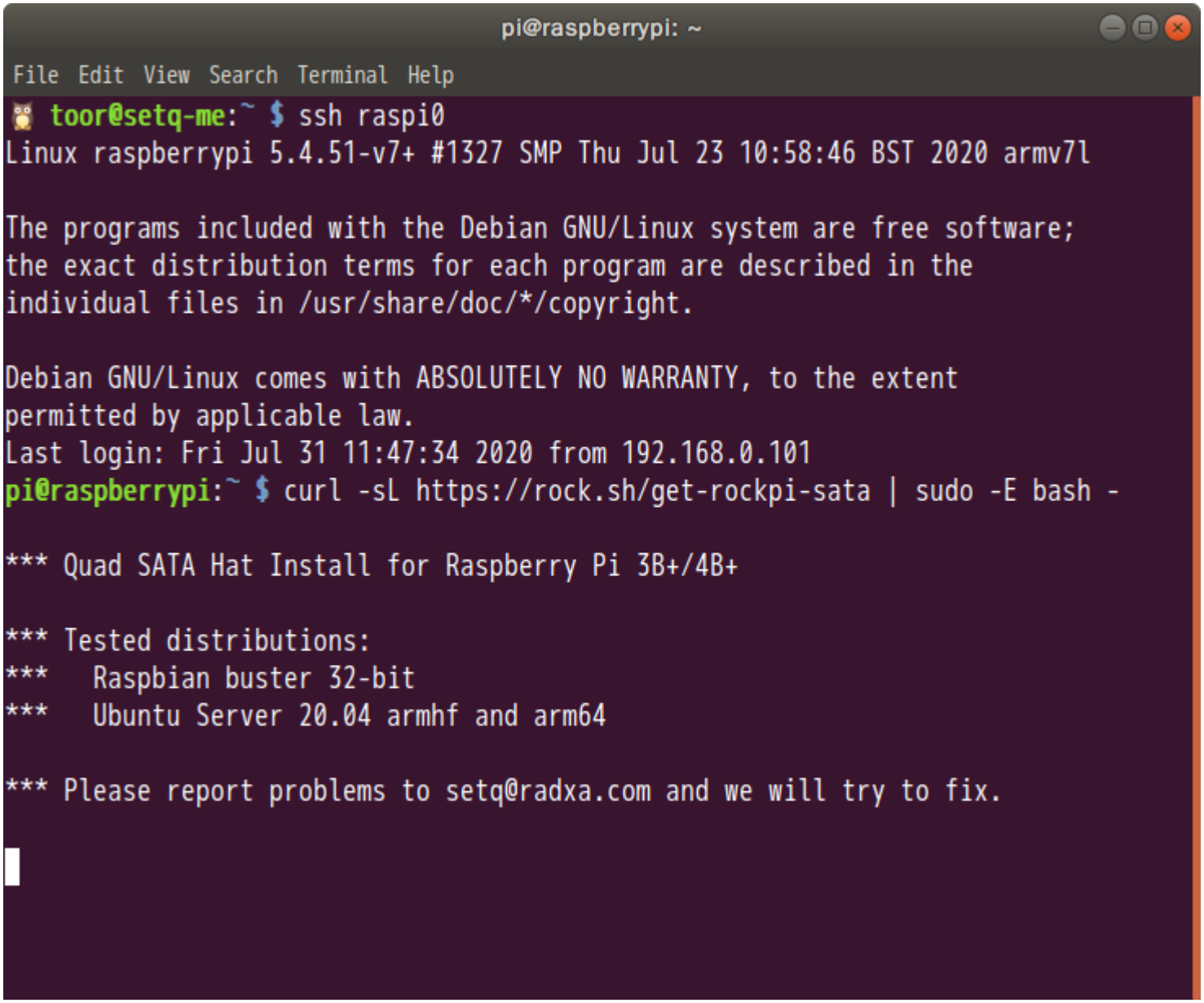
ROCK Pi Dual/Quad SATA HAT is an addon HAT designed for Raspberry Pi 4. It utilizes the high-speed USB3 buses on Raspberry Pi 4 and providing a complete NAS solution based on Raspberry Pi 4. It has the following features:

- Up to 4x HDD/SSD, support 2.5inch or 3.5inch SSD
- Utilize two independent USB3 buses on Raspberry Pi 4
- Type C power input with USB PD support for both 2.5inch SSD and Raspberry Pi 4(v1.1 hardware)
- 12V DC power input for 2.5 and 3.5 inch HDD and Raspberry Pi 4(v1.2 hardware)
- External standard ATX power supply support for 3.5inch HDD
- Support HDD suspend mode
- Support software RAID 0/1/5
- Support USB Direct Access Mode from PC
- Optional PWM control fan for HDD heat dispatching
- Optional OLED display for IP/Storage info

Software support

We provide an install script to help you get the SATA software that works in Raspberry Pi 4B.




```
curl -sL https://rock.sh/get-rockpi-sata | sudo -E bash -
```

Just copy the command above and paste it into the terminal and press enter. If you want more settings, check out section Software Configuration at the bottom of the page.

Upgrade firmware

1. How to upgrade F/W with jms561 under Raspberry Pi (https://forum.radxa.com/t/how-to-upgrade-f-w-with-jms561-under-raspberry-pi/3560)

2. How to upgrade F/W with jms561 under Windows (WIP)

NAS support(optional)

OpenMediaVault

Install: Installing OMV5 on Raspberry PI's (https://github.com/OpenMediaVault-Plugin-Developers/docs/blob/master/Adden-B-Installing_OMV5_on_an%20R-PI.pdf)

Troubleshooting:

1. OMV WebUI only shows two HDD's (https://forum.radxa.com/t/quad-sata-kit-and-openmediavault-5-raspberry-pi-4/3193)

This is likely because JMicron controllers incorrectly report identical serial numbers and other data which confuses various systems.

You can “fix” this by adding a rule to /lib/udev/rules.d/60-persistent-storage.rules **after** the entry for **“Fall back usb_id for USB devices”**:

```
# Fix Quad SATA HAT disk serial number
KERNEL=="sd*", ATTRS{idVendor}=="1058", ATTRS{idProduct}=="0a10", SUBSYSTEMS=="usb", PROGRAM="/root/serial.sh %k", ENV{ID_S
```

You will also need to create **/root/serial.sh** containing the following:

```
#!/bin/bash
/sbin/hdparm -I /dev/$1 | grep 'Serial Number' | awk '{print $3}'
```

And you need to add execute permission to the file via the following:

```
chmod +x /root/serial.sh
```

Finally, install the hdparm.

```
sudo apt-get install hdparm
```

This will ensure that unique paths are created based on the serial number of the actual drives and not the hat.

Supplied with this product

Dual version

- ROCK Pi Dual SATA HAT
- Mechanical spacers
- 2x USB 3.0 connection adapter *1
- CPU heatsink with fan(DF4 version only)

Quad version

- ROCK Pi Quad SATA HAT
- Mechanical spacers
- 4x USB 3.0 connection adapter *1
- CPU heatsink with fan(DF4 version only)

SATA HAT Top board(Optional)

- 0.91inch OLED
- One GPIO button
- PWM controlled 40x40mm FAN

Metal Case(Optional)

- Holds up to four 2.5 inch HDDs/SSDs
- Supports top board
- Top acrylic cover for OLED display
- Support fan for HDD heat dispatching air flow
- One button for powering off and OLED info switch

Other hardware needed

- Proper power adapter(Check power options below for more info)
- 2.5inch or 3.5inch HDD/SSD
- Raspberry Pi 4 or ROCK Pi 4 with OS running
- optional 7+15P SATA cable(For 3.5inch HDD or extending the length)

Model Number

Since the Raspberry Pi 4 changes the form factor(swapping USB and RJ45), we need a different USB connection adapter. The ROCK Pi 4 shares form factor with Raspberry Pi 3/3B+. Below is the different model number:

Model	Description
DF4	Dual version for Raspberry Pi 4
QF3	Quad version for ROCK Pi 4, Raspberry Pi 3/3B+
QF4	Quad version for Raspberry Pi 4

PINOUT

Pinout for 40PIN GPIO header

Description	Function	Pin#	Pin#	Function	Description
		1	2	VCC5V0_SYS	
OLED I2C	I2C_SDA	3	4	VCC5V0_SYS	
OLED I2C	I2C_SCL	5	6		
		7	8		
		9	10		
top board key	GPIO4_C2	11	12		
	GPIO4_C6	13	14		
		15	16	GPIO4_D2	reset OLED
		17	18		
		19	20		
		21	22	GPIO_RST1	reset SATA1/2
		23	24		
		25	26	ADC_IN0	
	SDA	27	28	SCL	
		29	30		
		31	32		
control tb-fan speed	PWM_33	33	34		
		35	36		
reset SATA3/4	GPIO_RST2	37	38		
		39	40		

Pinout for 2x5 PHD 2.0mm connector

Function	Pin#	Pin#	Function
I2C_SDA	1	2	VCC3V3_SYS
I2C_SCL	3	4	VCC5V0_SYS
GPIO4_D2	5	6	GPIO4_C2
GND	7	8	PWM_33
GND	9	10	NC

Getting Started

For V1.1 hardware revision, we use USB C for the power input on SATA HAT with PD/QC support. Same as option 1, you can choose USB PD power adapter > 35W to drive up to four 2.5inch HDDs and Raspberry PI at the same time. 3.5inch HDD powering is not supported by the USB C port.

V1.2 SATA HAT

For V1.2, we changed the power jack on SATA HAT to 12V DC because the 12V power adapter is much cheaper than the USB C PD adapter. Also, users want to power 3.5inch HDD with a power adapter instead of ATX PSU. The 12V DC jack is 5.5x2.1mm diameter. You need at least 12V/3A to power four 2.5inch HDD and 12V/5A to power four 3.5inch HDD.

Option 3: Powering from ATX PSU

If you plan to put the SATA HAT in a PC enclosure, then you can use the ATX PSU. Mostly ATX PSU can meet the power requirement. You need an ATX Floppy cable to power the SATA HAT and Raspberry Pi.

Software configuration

Just edit /etc/rockpi-sata.conf, take it effect by below command

```
sudo systemctl restart rockpi-sata.service
```

Below is the default **/etc/rockpi-sata.conf**, which you can modify according to the comments

```
[fan]
# When the temperature is above lv0 (35'C), the fan at 25% power,
# and lv1 at 50% power, lv2 at 75% power, lv3 at 100% power.
# When the temperature is below lv0, the fan is turned off.
# You can change these values if necessary.
lv0 = 35
lv1 = 40
lv2 = 45
lv3 = 50

[key]
# You can customize the function of the key, currently available functions are
# slider: oled display next page
# switch: fan turn on/off switch
# reboot, poweroff
# If you have any good suggestions for key functions,
# please add an issue on https://rock.sh/rockpi-sata
click = slider
twice = switch
press = none

[time]
# twice: maximum time between double clicking (seconds)
# press: long press time (seconds)
twice = 0.7
press = 1.8

[slider]
# Whether the oled auto display next page and the time interval (seconds)
auto = true
time = 10

[oled]
# Whether rotate the text of oled 180 degrees, whether use Fahrenheit
rotate = false
f-temp = false
```

SATA HAT Firmware Update

See Forum Discussion -> How to upgrade F/W with jms561 under Raspberry Pi (https://forum.radxa.com/t/how-to-upgrade-f-w-with-jms561-under-raspberry-pi/3560)

Troubleshooting

1. Quad SATA HAT Assembly and Troubleshooting (https://forum.radxa.com/t/quad-sata-hat-assembly-and-troubleshooting/3879)

Dimensions

Hardware Revision

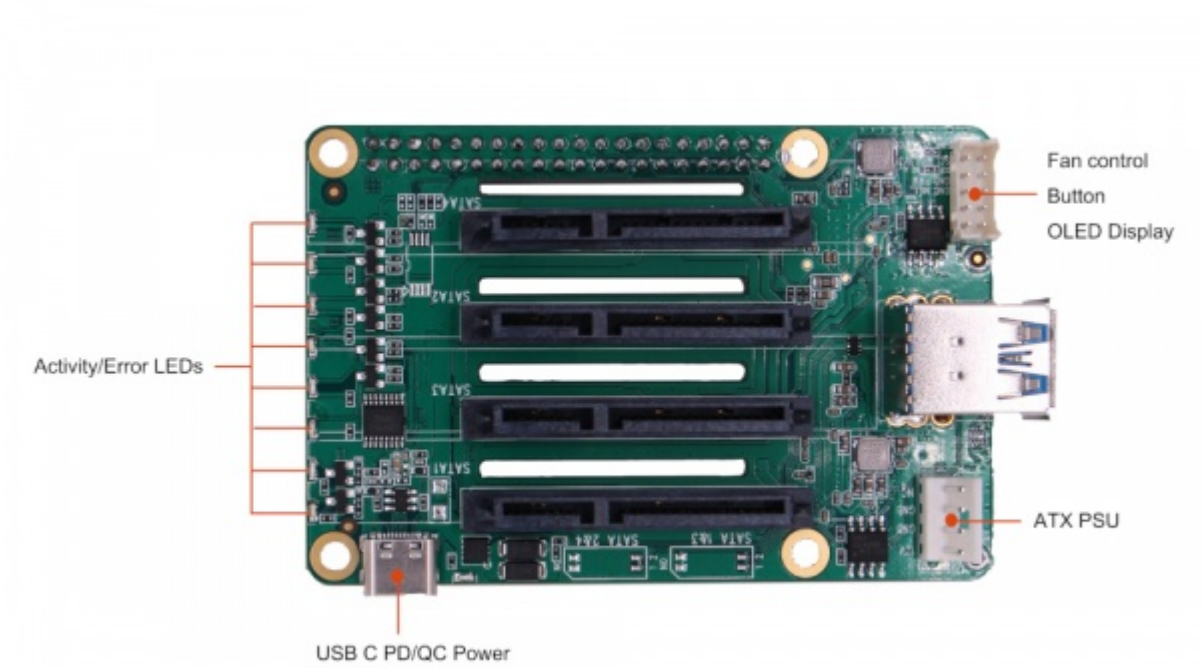
Assemble the Kits

(click image to play or watch on Youtube (https://www.youtube.com/watch?v=xz-AhmjiTu8&feature=youtu.be))

Full Setup Quad Sata Hat for Raspberry Pi 4 NAS Review

(click image to play or watch on Youtube (https://www.youtube.com/watch?v=Eix0PCB0byQ&feature=youtu.be))

Detail of the HAT board



Power Options

Power consumptions for typical disks:

	Power Consumption
SSD	<3W
2.5 HDD	3 ~ 5W
3.5 HDD	5 ~10W

Note: the table above is for reference, check your disk label for the exact power consumption. More info can be found here (https://linustechtips.com/main/topic/1062501-35-vs-25-hdd-power-consumption/).

Option 1: Powering from Raspberry Pi/ROCK Pi 40P GPIO header

The Raspberry Pi GPIO +5V can provide up to 1.5A power (https://pinout.xyz/pinout/pin2_5v_power), the typical SSD is 3W power consumption (https://www.anandtech.com/show/8747/samsung-ssd-850-evo-review/10). So you can drive up to two SSDs directly powering from Raspberry Pi with a good 5V/5A USB C power adapter.

The ROCK Pi 4 GPIO +5V can provide up to 4A current. You can drive four SSD/HDD directly if your power adapter can provide > 35W power.

Option 2: Powering from USB C or DC Jack on SATA HAT

V1.1 SATA HAT