

seeed studio



Raspberry Pi  
Approved Reseller



Raspberry Pi  
Design Partner

# Seeed Studio Raspberry Pi® Series Catalog

Trusted Raspberry Pi® Edge Device and Customization Services Provider

[www.seeedstudio.com/raspberry-pi](http://www.seeedstudio.com/raspberry-pi)

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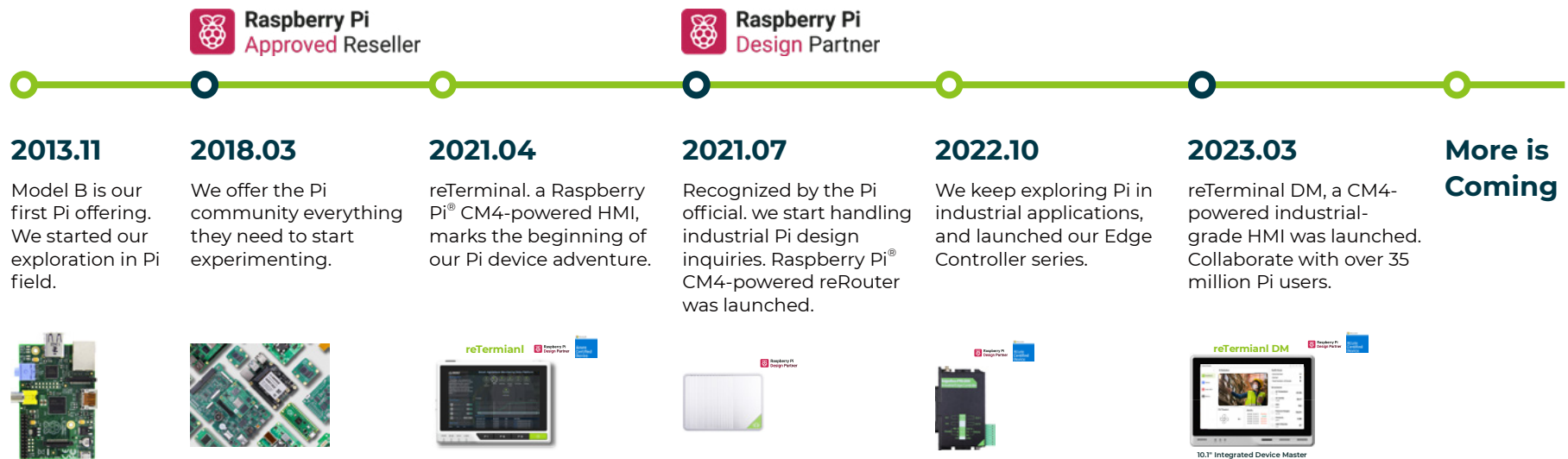
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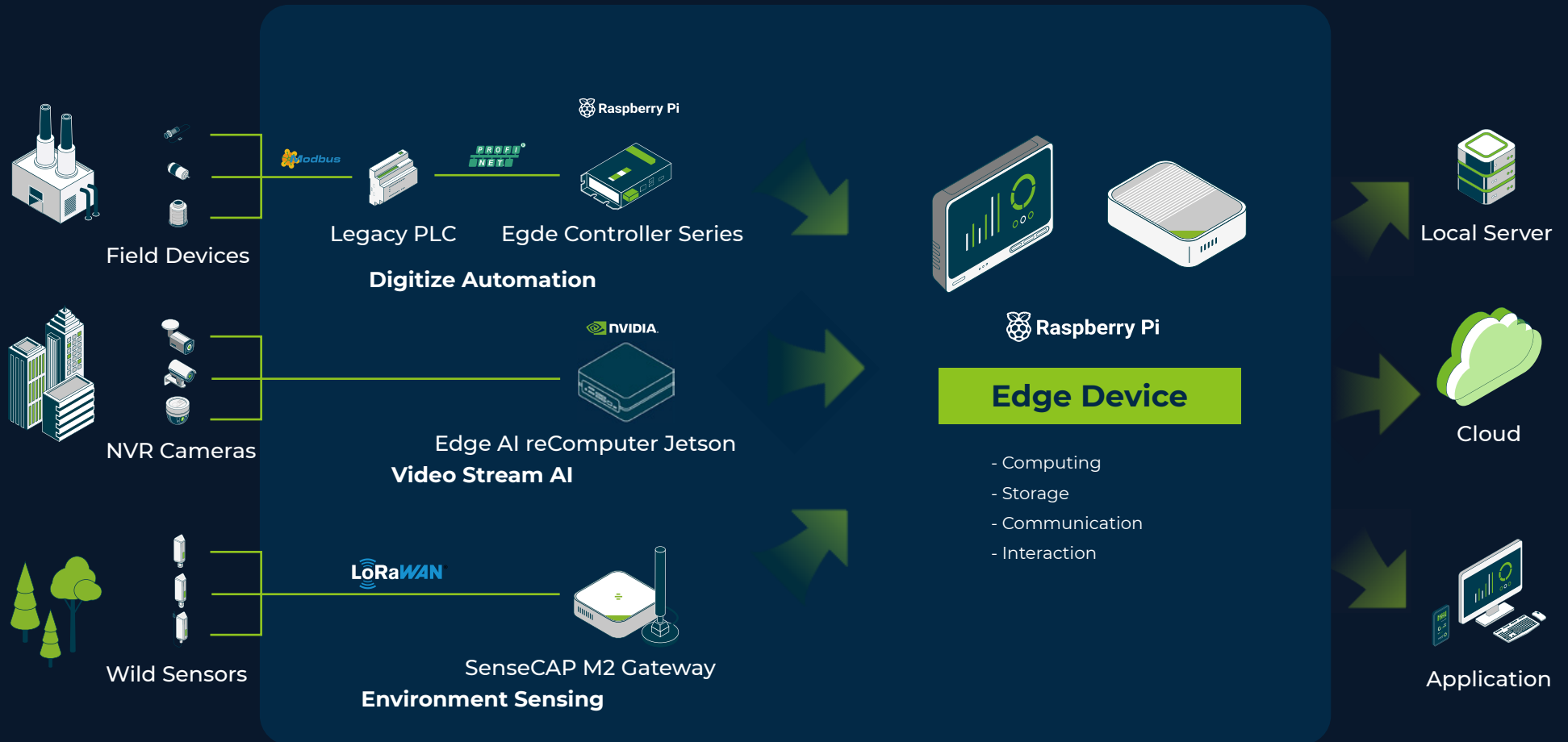
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# Introduction

With Over 14 Years Experience in Raspberry Pi® Hardware Design and Manufacturing, Seed Can Be Your Trusted ODM Partner for Customized Hardware Solution and off the Shelf Raspberry Pi®-Powered Edge Devices Provider.



# Our Raspberry Pi® Devices in IoT System







# Raspberry Pi® Device Designer

## EdgeBox-RPI-200

Raspberry Pi® CM4-Based Industrial Edge Computing Controller

An all-in-one, compact device of PLC, PAC, IIoT gateway with industry standard protocol

### Powerful Processor

- Powered by Raspberry Pi® CM4
- Running up to 1.5GHz up to 4GB RAM and 32GB eMMC

### Rich IO & Interface

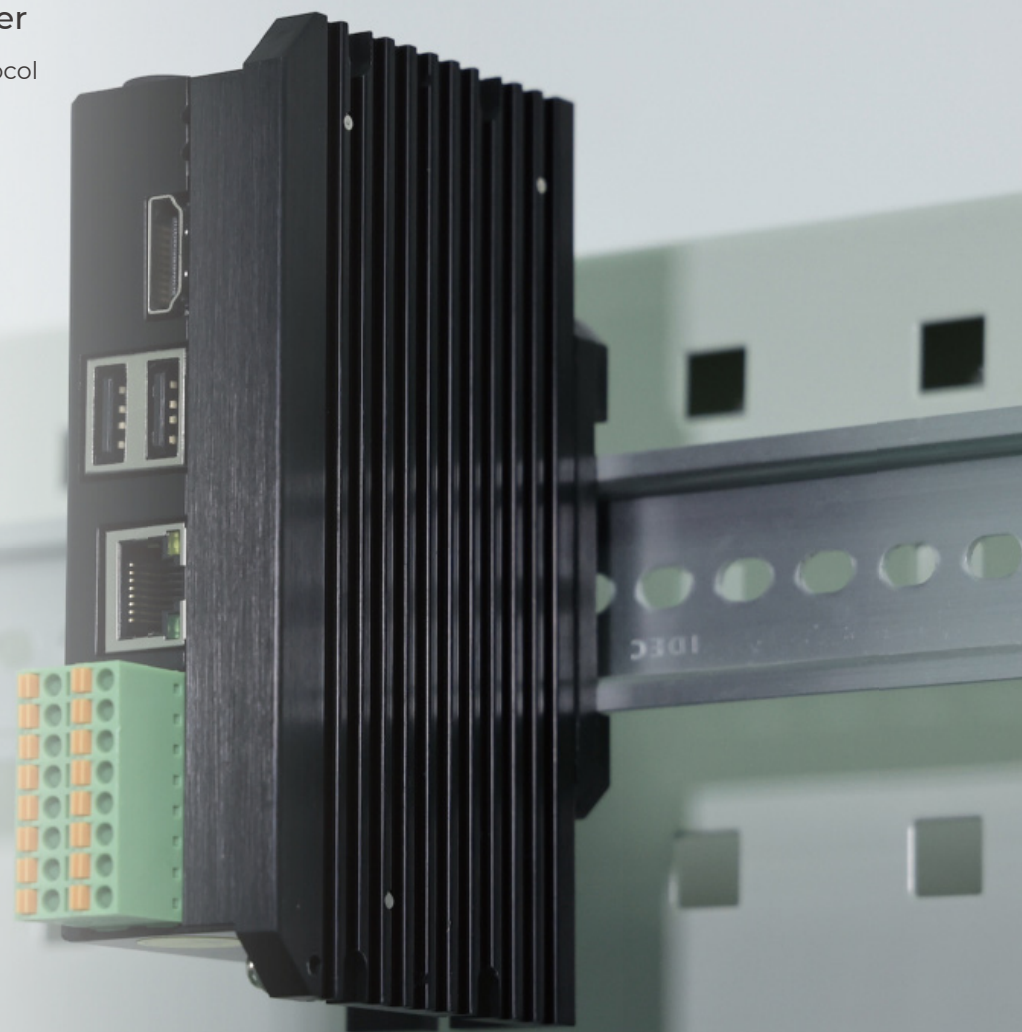
- 2x isolated DI; 2x isolated DO
- 1x isolated RS485, 1x RS232
- 2x USB2.0 A1 x M.2 slot support 2242 NVME SSD
- 1x HDMI 20 up to 4k@60fps

### Multiple Industrial Protocols

- RS485/RS232
- TCP IP
- Modbus
- OPC UA
- IEC 61131-3 compliant

### Multiple Communication Capabilities

- Build-in 2.4G/5G WiFi, BLE5.0
- Gigabit Ethernet RJ45 Port
- Mini PCIe Slot support 4G LTE LoRaWAN® Gateway/Zigbee Module
- Support AWS and Azure Cloud services





## Specifications

Product Name	EdgeBox-RPI-200
CPU	Quad-core Cortex-A72 CM4 Core @ 1.5GHz
Memory	1GB/2GB/4GB/8GB RAM
Storage	8GB/16GB/32GB eMMC M.2 slot for SSD
Certification	CE; FCC; RoHS; UKCA
Wireless	2.4 GHz, 5.0 GHz IEEE 802.11 b/g/n/ac Bluetooth 5.0, BLE
Video Interface	HDMI 2.0 (up to 4K@60fps)
Interfaces	1 x RJ45 Ethernet port support 10/100M/1000M 2 x USB 2.0 Port 1 x HDMI2.0 2 x Isolated DI 2 x Isolated DO 1 x Isolated RS485 1 x RS232 1 x mini PCIe slot support 4G LTE module, LoRaWAN® gateway module and Zigbee module 1 x M.2 socket with 2242 NVME SSD card support Dual-Band 802.11ac Wi-Fi (optional)
Dimensions	124mm x 76mm x 35mm
Operating Temperature	-20°C to +60°C
Storage Temperature	-25°C to +75 °C
EMI	IEC 61000-6-2
ESD Protection	4 kV/8 kV with IEC 61000-6-2 IEC61000-4-4
Additional features	Built in UPS with Supercap (optional) RTC Standalone Watchdog timer Cryptographic Encryption with ATECC608a Chip (optional)
Power Supply	DC 12-36 V

<b>1GB RAM and 8GB eMMC</b> model <b>1</b> <a href="#">SKU 102991558</a>	<b>2GB RAM, 8GB eMMC</b> <b>2.4G/5G Wi-Fi</b> model <b>2</b> <a href="#">SKU 102110772</a>
<b>4GB RAM, 16GB eMMC</b> <b>2.4G/5G Wi-Fi</b> model <b>3</b> <a href="#">SKU 102110771</a>	<b>4GB RAM, 32GB eMMC</b> <b>2.4G/5G Wi-Fi</b> model <b>4</b> <a href="#">SKU 102991559</a>
<b>8GB RAM, 32GB eMMC</b> <b>2.4G/5G Wi-Fi</b> model <b>5</b> <a href="#">SKU 114110227</a>	<b>2GB RAM, 8GB eMMC,</b> <b>UPS and 2.4G/5G Wi-Fi</b> model <b>6</b> <a href="#">SKU 114993117</a>



# Router

## reRouter

Raspberry Pi® CM4 Software  
Router With Dual Gigabit Ethernet Ports



### Fast and Smooth Experience

Powered by Raspberry Pi® Compute Module 4. It comes in two versions, one with 4GB RAM and 32GB eMMC, and the other with 2GB RAM and 32GB eMMC.

### Highly Scalable

Rich Interfaces Includes Dual Gigabit Ethernet Ports, Micro-SD Card Slot, Micro-HDMI Interface, USB 3.0, MIPI CSI, MIPI DSI

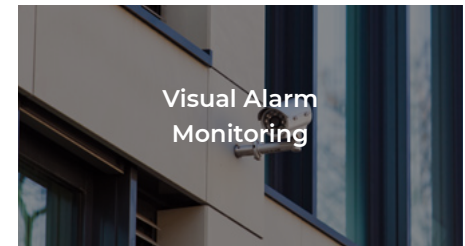


# Specifications

Product Name	reRouter
Dimension & Weight	235x120x65mm, 519g
Certification	CE; FCC; TELEC; RoHS; REACH; UK DoC; EU DoC
Networking	Dual Gigabit Ethernet Connectors
USB	2 x USB 3.0 Ports; 1 x USB 3.0 9-Pin Header
Processor	Broadcom BCM2711 quad-core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz 2GB/4GB (LPDDR4 with on-die ECC);
Memory	32GB eMMC
Storage	Micro-SD Card Slot (load system Image for non-eMMC CM4 version)
Camera	1 x MIPI CSI Connector
Display	1 x MIPI DSI Connector; 1 x Micro HDMI Connector
FPC	Interface for I2C and SPI
External Fan	Power connector for Fan
LAN7800 Industrial Temperature Range	-40°C to +85°C
Power	5V/3A using USB Type-C Port

<b>reRouter</b> <b>2GB</b> (LPDDR4 with on-die ECC) <b>32GB eMMC</b> SKU 110110205	model <b>1</b>	<b>reRouter</b> <b>4GB</b> (LPDDR4 with on-die ECC) <b>32GB eMMC</b> SKU 110110110	model <b>2</b>
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# Applications





# reTerminal

Raspberry Pi® CM4 based HMI Device for Home and Industry



## Raspberry Pi® All in One Board

reTerminal is your hand-size, powerful, ready-to-go, Raspberry Pi® CM4-based all in one device, powered by CM4 32GB, integrated with 5-inch IPS multi-touch screen, dual-band Wi-Fi & Bluetooth



## Rich Interfaces and Components

- 2 USB Type-A port
- Gigabit Ethernet
- Micro-HDMI, micro-SD card slot, MIPI camera interface
- Light sensor, accelerometer, buzzer, RTC and programmable buttons



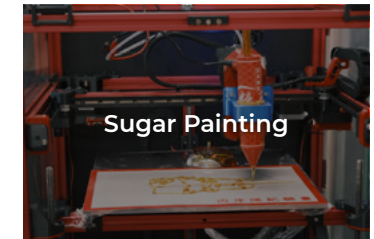
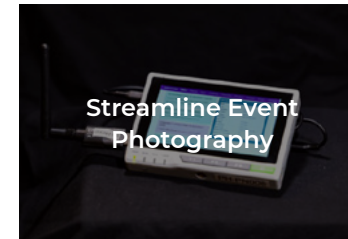
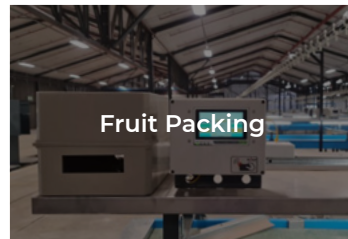


## Specifications

Product Name	reTerminal
Dimension & Weight	140 x 95 x 21mm, 400g
SKU	110070048; 110070108
Certification	CE; FCC; TELEC; RoHS; REACH; UK DoC; EU DoC
Processor	Broadcom BCM2711 quad-core Cortex-A72 (ARM v8)
Memory	4GB/8GB (LPDDR4 with on-die ECC) 32GB eMMC
Connectivity	Wi-Fi (2.4GHz and 5.0GHz IEEE 802.11b/g/n/ac); Bluetooth 5.0, BLE
Display	5-inch 720x1280 LCD Capacitive touch panel (support multi-touch)
HDMI	1 x Micro HDMI output (up to 4Kp60 supported)
CSI	1 x 2-lane MIPI CSI camera interface
Multimedia	H.265 (4Kp60 decode); H.264 (1080p60 decode, 1080p30 encode); OpenGL ES 3.0 graphics
Power	Voltage(5V DC); Current(3A(Minimum))
Operating Temperature	0 to 70°C( For the LCD Screen: 0 to 60°C)

<b>reTerminal</b> <b>4GB</b> (LPDDR4 with on-die ECC) <b>32GB eMMC</b> <u>SKU 110070048</u>	<b>model 1</b>	<b>reTerminal</b> <b>8GB</b> (LPDDR4 with on-die ECC) <b>32GB eMMC</b> <u>SKU 110070108</u>	<b>model 2</b>
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## Applications



# reTerminal E10-1-Expansion Board

An Expansion Board for the reTerminal

Empowers Rechargeable and Portable Functions, Enhanced Wireless Communication and Industrial Data Transmissions Along With Audio Capability.

**Gigabit Ethernet**

**LTE/4G/5G/LoRaWAN**  
(Modules not included)

• **RS-485** • **RS-232**  
• **CAN bus**

3 Power Supply:

**DC Jack**

**PoE**

**UPS - 18650  
Battery**  
(Battery not included)

Massive Storage



**M.2 for SATA SSD**

**seeed studio**  
**reTerminal E10-1**



**Plug and Play to  
Expand More Possibilities**

Expandable AI-Power Capabilities

**2 Microphones**

**1 Speaker**



### reTerminal E10-1 - Expansion Board

SKU 103060001

Supports DC Jack/PoE/UPS, Gigabit Ethernet, LTE/4G/5G/LoRaWAN, RS485/232, CAN, SATA 2.0

## Specifications

Power	DC Jack	Supply power to the reTerminal,the expansion board and the battery in DC 12V@4A
	PoE	The PoE power input is RJ45 and supports a maximum of 25W power input
	UPS-18650 Battery	2x battery holder with fixed pin. During the charging process,the battery will automatic ally stop charging if it is being overheated, and LED2 will flash the alarm.
External I/O	RS-485 Interface RS-232 Interface	Supports 256000 baud (the maximum communication rate)
	CAN	CAN at common-mode supports a 500KBps communication rate,CAN at FD mode supports the communication rate up to 8Mbps
	Antenna Interface	Equipped with four antennas
	RJ45 Interface for GigaEthernet	Equipped LAN7800 IC with the RJ45 interface and support PoE module
	DC Jack Power Interface	DC 12V@4A
	100 pins Industrial High-Speed Interface	Connects with reTerminal through 100 pins high-speed interface
Internal I/O	M.2 Interface	Supports SSD, M.2B KEY driver, USB3.0 GENI and SATA2, suitable for 2242/2280
	Mini-PCle	Supports UART, USB2.0, I2C, and SPI communication modes
	SIM Card Slot	Inserts the LTE/4G/5G SIM card
	Microphone	Two Analog Microphones
	Speaker	8Ω/1W
	Fan	3 pin fan (supports speed control and speed measurement)
Network	Wireless Connection	M.2 Interface Support4G/5G wireless modules Mini-PCle Support LTE/4G/LoRaWAN modules SIM card slot Insert Insert the LTE/4G/5G SIM card Antenna interface Equip four antennas
	Giga Ethernet	Equipped LAN7800 IC with the RJ45 interface and support PoE module
Display	LED1	DC Jack Power status indicator
	LED2	LED2, as the battery status indicator
	LED3	User LED
Dimension		140mm x 95mm x 30mm
Certification		CE, FCC, EU DoC, RoHS, REACH, UK DoC



# Compatible Softwares

## Application Tool

### | Node-RED



Node-RED is a programming tool for wiring together hardware devices, APIs and online services in new and interesting ways.

### | TensorFlow Lite



A mobile library for deploying machine learning models on mobile, microcontrollers and other edge devices.

### | Frigate NVR



Frigate is an open source NVR built around real-time AI object detection. All processing is performed locally on your own hardware, and your camera feeds never leave your home.

## Platform

### | Home Assistant



Open source home automation that puts local control and privacy first. Powered by a worldwide community of tinkerers and DIY enthusiasts. Perfect to run on a Raspberry Pi®.

### | Grafana



A fully managed observability platform for your applications and infrastructure. Leverage the best open source observability software – including Prometheus, Loki, and Tempo– without the overhead of installing, maintaining, and scaling your observability stack.

## SDK for Custom Linux OS

### | Yocto



An open-source project that helps developers create custom Linux-based operating systems for embedded devices.

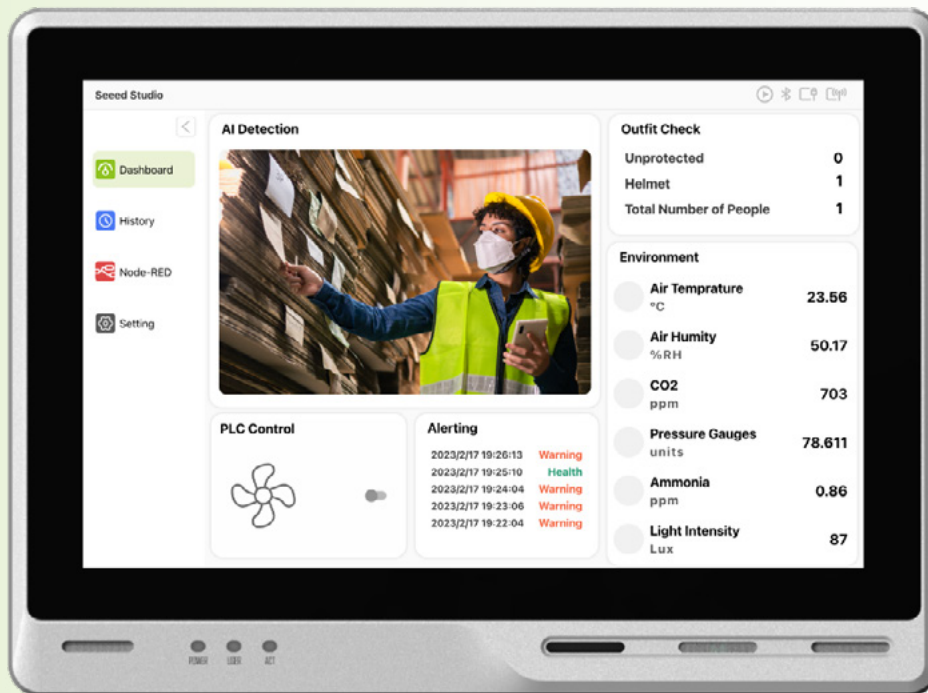
### | Buildroot



Popular open-source tool that simplifies the process of building customized Linux-based systems for embedded devices.

# reTerminal DM

10.1" Integrated Device Master



## HMI, PLC, Panel PC and Gateway in one

Perfect for distributed hub device



## Low code programming for event-driven applications

Natively integrated Node-RED for flow-based editing and one-click deploy, compatible with all software runs on Raspberry Pi®



## Rugged design for harsh working environment

IP65 front panel, -10~50°C operating temperature



## Hybrid connectivity

Support 5G, 4G LTE, LoRaWAN®, Wi-Fi, BLE, RS485/232, CANBus, 1000M Ethernet, USB, HDMI



## Open-source design in software and hardware

Raspberry Pi® CM4 8GB RAM 32GB eMMC core, welcome customization or derivatives



## Product warranty

Two-year warranty

reTerminal DM

1

SKU 114070201

reTerminal DM with  
Camera & PoE Version

2

SKU 114070221

## Specifications



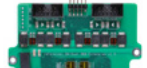










Basic	
CPU	CM4
	Quad-core Cortex-A72@ 1.5GHz
Memory	8GB RAM
Storage	32GB eMMC
	M.2 NVMe SSD Slot 2280-M Key *(optional) <sup>1&amp;2</sup>
OS Support	Raspbian
	SenseCraft Edge OS
Display	
Size	10.1"
Max. Resolution	1280 x 800
Max. Colors	16.7M (8-bit)
Luminance (nit)	400
Viewing Angle (H/V°)	1
Backlight Life (hrs)	30000
Touch Type	10-point Capacitive
Pencil Hardness	7H
Video&Audio	
Video	HDMI 2.0
Audio	Microphone x 2; Buzzer; 3.5mm Audio Jack
Camera	CSI *(optional) <sup>3</sup>
Interfaces	
Ethernet	1 x 10/100/1000 Mbps
	2 x 10/100/1000 Mbps*(optional) <sup>2</sup>
USB	2 x USB-A 2.0 Host
	2 x USB 3.0 *(optional) <sup>4</sup>
RS485	1 x RS-485 > Terminal Block
	1 x RS-485 > DB9 *(optional) <sup>5</sup>
RS232	1 x RS-232 > Terminal Block
	1 x RS-232 > DB9*(optional) <sup>5</sup>
CAN	1 x CAN-BUS > Terminal Block
DI	4 x DI > Terminal Block
DO	4 x DO > Terminal Block
40 Pin GPIO	Inside
Wireless Communication	
Wi-Fi	On-chip Wi-Fi <sup>6</sup>
BLE	On-chip BLE
LoRa <sup>®</sup>	Mini-PCIe for LoRaWAN <sup>®</sup> *(optional) <sup>7&amp;8</sup>
Cellular	Mini-PCIe for 4G *(optional) <sup>9&amp;10&amp;15</sup>

Power	
Input	2-pin Terminal Block
PoE	IEEE 802.3af Standard *(optional) <sup>11</sup>
Power Range	12-24V DC
	Note: No adapter in the standard product. <sup>12</sup>
Power Consumption	6W Typ; 9W Max
Power Switch	NO
Reboot Switch	YES
Environment	
Ingress Protection	IP65 Front Panel
Operating Temperature	-10~50 °C
Storage Temperature	-20~70 °C
Humidity (Operating)	10~95% RH
Mechanical	
Dimension (W x H x D)	259.4 x 191 x 42.2mm
Enclosure	Die-cast Aluminum Alloy
Mounting	Panel <sup>13</sup> , VESA, Din-Rail <sup>14</sup> Note: No mounting accessories in the standard product
Weight (Net)	1.8Kg
Vibration Resistance	5 Grms random vibration (5 ~ 500 Hz) during operation, IEC60068-2-64
Shock Resistance	Operating 50 G peak( 11ms duration), IEC 60068-2-27
Certification	
	CE; FCC; RoHS; UKCA; Telec; REACH
EMC	
ESD	EN61000-4-2, Level 3
EFT	EN61000-4-4, Level 2
Surge	EN61000-4-5, Level 2
Others	
RTC	High Accuracy RTC
Hardware WatchDog	1~255s
Security	ATECC608A
Warranty	2 Years
Heat Dissipation	Fanless

\*Options marked with an asterisk (\*) require additional purchase of corresponding accessory with the corresponding part number in the accessories list

\*The LoRa<sup>®</sup> Mark is a trademark of Semtech Corporation or its subsidiaries.t

## Optional Version & Accessories

No.	Note	Product	Product Name	SKU
1	No.2 is also needed to realize SSD function		SSD	<a href="#">112990267</a>
2	/		Dual LAN & SSD Extension Board	<a href="#">114993112</a>
3	/		Dual DB9 Extension Board	<a href="#">114993111</a>
4	This accessory is required to use DM WiFi Function.		CM4 WiFi/BLE Antenna Kit	<a href="#">114992364</a>
5	No.5 & No.6 must be used together to realize LoRaWAN function.		LoRa Antenna Kit	<a href="#">110061501</a>
6			Region optional LoRaWAN® Gateway Module (SPI)	US915 <a href="#">114992969</a> EU868 <a href="#">114993268</a>
7	Please choose No.9 with No.7 for 4G function while choose No.9 with No.8 for GPS functio.		4G Antenna Kit	<a href="#">110061502</a>
8			GPS Antenna Kit for reTerminal DM 4G Module	<a href="#">110061521</a>
9			Region optional LTE Cat 4 Module	North American <a href="#">113991134</a> EMEA and Thai <a href="#">113991135</a>
10	The two standard versions of reterminal DM do not come with built-in PoE capabilities. This module needs to be soldered onto the carrier board of the DM.		PoE Module Kit	<a href="#">110991925</a>
11	/		Power Adapter	US <a href="#">110061505</a> EU <a href="#">110061506</a>
12	/		Panel mount Kit	<a href="#">110061503</a>
13	/		Din-Rail mount Kit	<a href="#">114070181</a>

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Approved Reseller



Raspberry Pi  
Design Partner



# Software Solution

Raspberry Pi® CM4 core and Debian OS-based industrial solutions are supported by rich open-source software ecosystem. We are making our Raspberry Pi®-powered industrial solutions compatible with following software.



# Cloud

## AWS



Amazon Web Services (AWS) is the world's most comprehensive and broadly adopted cloud platform, offering over 200 fully featured services from data centers globally.

## Azure



On-premises, hybrid, multicloud, or at the edge—create secure, future-ready cloud solutions on Azure.

# Platform

## balena



Balena is a complete set of tools for building, deploying, and managing fleets of connected Linux devices.

## Influxdb



Open-source time series database designed for storing, querying, and analyzing time-stamped data.

## Grafana



Open-source data visualization and monitoring platform.

## N3uron



A modern and highly customizable Industrial IoT and Web Visualization software solution to empower organizations to accomplish any data collection project.

## Ignition Edge



Edge Computing, Data Collection, and HMI Software for the Network's Edge.

## CODESYS



CODESYS Control for Raspberry Pi® MC SL is an adapted CODESYS Control runtime system for Raspberry Pi® with more than one core on a single CPU.

## Home Assistant



An open-source home automation platform that allows users to control and automate various smart devices and services in their homes.

## Frigate



Open-source, real-time object detection software designed for video surveillance systems.

## Edge Impulse



Machine Learning Models Training Platform.

# Application Tool

## Node-RED



Node-RED is a programming tool for wiring together hardware devices, APIs and online services in new and interesting ways.

## OpenWRT



OpenWRT is an open-source Linux-based operating system designed for embedded devices such as routers and other networking equipment.

## OpenCV



Open-source computer vision and machine learning software library.

## Yolov5



Object detection training and inference models.

## Mediapipe



Open source corss-platform customizable ML solution for live and streaming media

## TensorFlow Lite



Lightweight version of the TensorFlow machine learning framework developed by Google.

## Flutter



an open-source UI (User Interface) toolkit developed by Google for creating natively compiled applications for mobile, web, and desktop platforms using a single codebase



## Node-RED

Node-RED is a programming tool for wiring together hardware devices, APIs, and online services. It provides a browser-based editor that makes it easy to wire together flows that can be deployed to its runtime in a single click.

[Learn more >> nodered.org](https://nodered.org)

## OpenWrt

OpenWrt is an open-source Linux operating system that runs on embedded devices/ routers. It has a filesystem that's fully writable and includes a package management system.

[Learn more >> openwrt.org](https://openwrt.org)

## Application

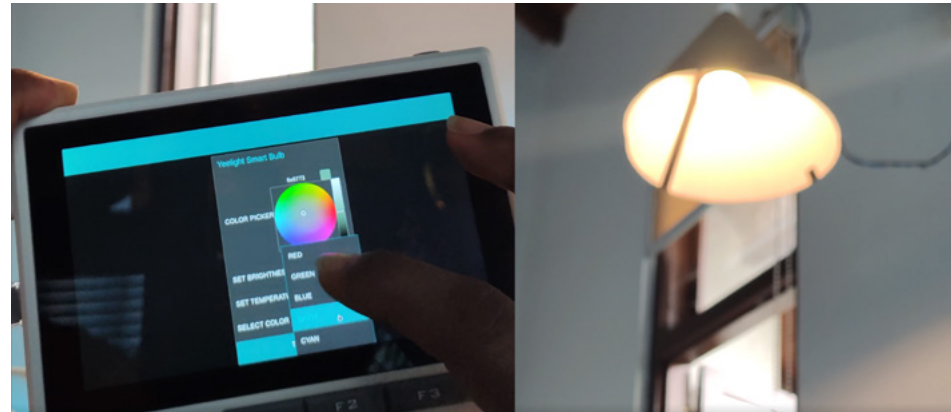
Home Automation  
Soft Route

## Supported Hardware

reTerminal  
reRouter

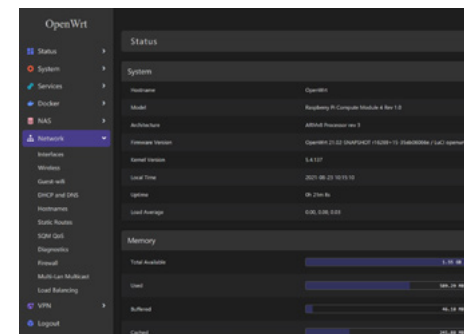
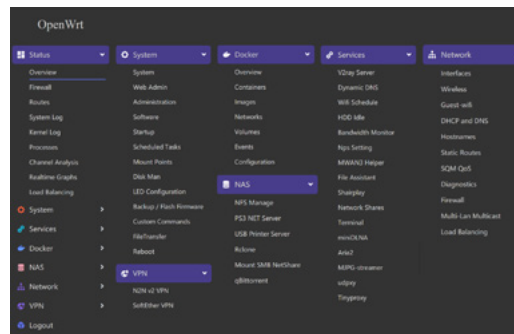
## Smart Home with Node-RED on OpenWrt

Do you know how to control your smart home appliances using Node-RED running on the OpenWrt System by Seeed Studio? This blog will explain how you can set up everything step-by-step. Also, the reTerminal LCD will be used to view the Node-RED dashboard to visualize the connected devices.



## Getting Started with OpenWrt on reRouter

Our reRouter comes with the OpenWrt software pre-installed, so you don't have to go through the trouble of flashing the image on a microSD card and installing it on the device yourself. There's DDNS, Bandwidth Monitor, File Assistant and Network Shares, but, Open-WRT will also offer you the V2Ray VPN, the option to schedule when to slow down external HDDs, to run the Nps, the MWAN3 Helper, the ShairPlay and more. It's worth mentioning the Docker and it allows you to run various available containers.



<https://www.seeedstudio.com/blog/2021/10/03/smart-home-with-node-red-on-openwrt/>

# seeed studio



## Home Assistant

Home Assistant is a free and open-source software for home automation designed to be a central control system for smart home devices with a focus on local control and privacy

[Learn more >> home-assistant.io](https://home-assistant.io)

### Application

Home Automation

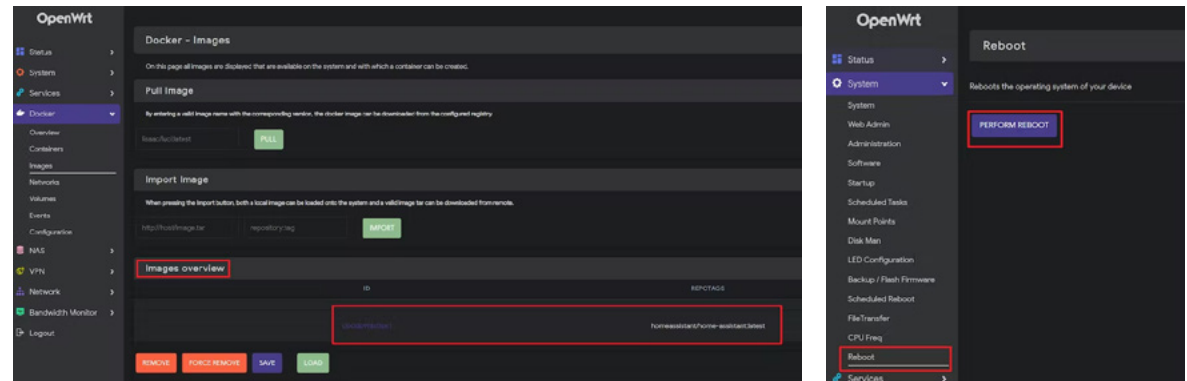
### Supported Hardware

[reTerminal](#)

[reRouter](#)

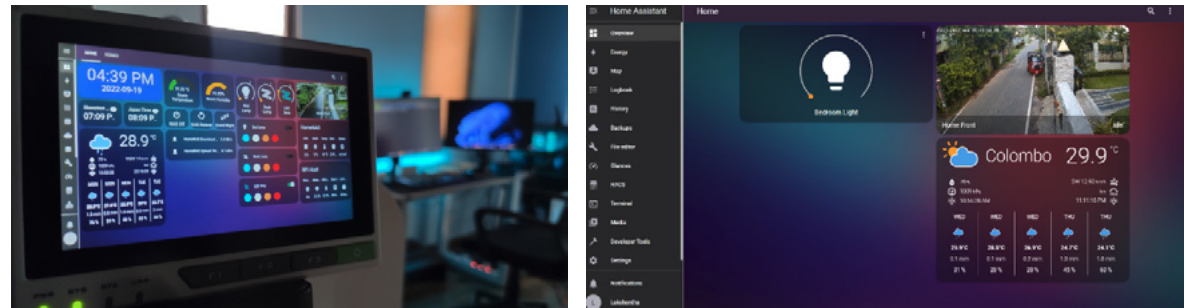
## Deploying Home Assistant on reRouter with OpenWrt

Home Assistant is the popular home automation control platform. Since HA needs to be online 7x24 hours, running on devices that are always on will be a good choice. The reRouter and H68K soft router from Seeed Studio support OpenWrt and Docker, so you can easily deploy Home Assistant and keep it stable online for a long time.



## Home Automation with Raspberry Pi®: Home Assistant, Router, NVR and more!

Using Raspberry Pi® as a smart home device is not strange. You can set up it for a secure soft router, firewall, smart home hub, or local NVR, or you can use Home Assistant to integrate everything together! Let's take a look at how to use Seeed Studio's Raspberry Pi® CM4-based devices reRouter and reTerminal to work with a local home automation system and customize it in a controller hub!



<https://www.seeedstudio.com/blog/2021/10/13/smart-home-with-home-assistant-on-openwrt/>

## Grafana

Grafana is a multi-platform open source analytics and interactive visualization web application. It provides charts, graphs, and alerts for the web when connected to supported data sources.

[Learn more >> grafana.com](https://grafana.com)

## InfluxDB

InfluxDB is an open source time series database.

[Learn more >> influxdata.com](https://influxdata.com)

## Application

Data Analytics and Visualization

## Supported Hardware

[reTerminal](#)

## Grafana Weather Dashboard on the reTerminal by Seeed Studio

In this project, an ESP32 is used to collect temperature, humidity and pressure readings. These will then be posted to a time-series database in InfluxDB.

InfluxDB can be run locally on a Raspberry Pi® or on their cloud server, we're going to be using their cloud server. We're then going to be using an analytics and visualisation application called Grafana to display the information that has been stored in the database.

Grafana can also be run locally on our Raspberry Pi® (or reTerminal in this case) or on their cloud server. We're going to be installing and running it locally on our reTerminal.



<https://wiki.seeedstudio.com/weather-dash-board-with-Grafana-reTerminal/>



seeed studio



## CODESYS

CODESYS is a leading manufacturer-independent IEC 61131-3 automation software for engineering control systems. It is the ideal programming tool for machine and process applications in machine building and system integration.

[Learn more >> codesys.com](https://www.codesys.com)

### Application

Industrial Automation

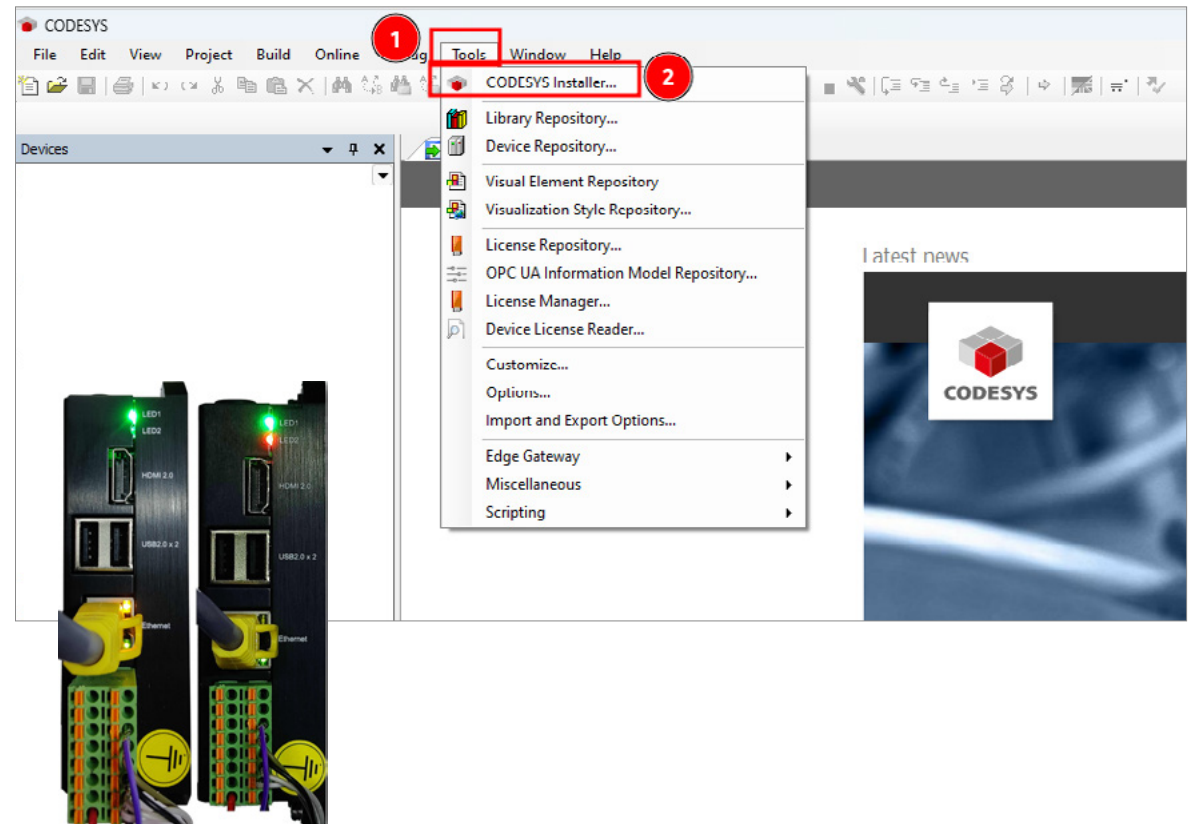
### Supported Hardware

[EdgeBox-RPi-200](#)

## EdgeBox-RPi-200 Getting Started with CODESYS

In this wiki, we have used the CODESYS Development System V3 software as IDE to config and program software to run on the EdgeBox-RPi-200. The first episode will be a Toggle user LED project.

As CODESYS is popular in IIoT area, and as one of the Raspberry Pi® Design Partners, we are focusing on developing more Pi-powered industrial products to be compatible with it.



<https://wiki.seeedstudio.com/Edgebox-rpi-200-codesys/>

## N3uron

A modern and highly customizable Industrial IoT and Web Visualization software solution to empower organizations to accomplish any data collection project.

[Learn more >> n3uron.com](https://n3uron.com)

## Balena

Balena is a complete set of tools for building, deploying, and managing fleets of connected Linux devices.

[Learn more >> balena.io](https://balena.io)

## Application

Industry 4.0; IIoT

## Supported Hardware

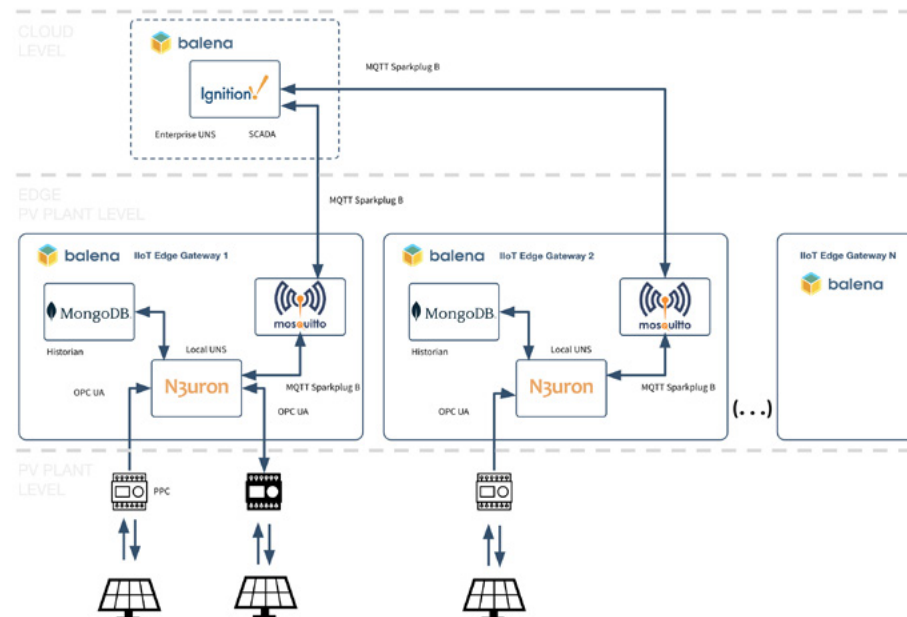
[EdgeBox-RPI-200](#)

# Remotely manage a Photovoltaic plant with an IIoT edge gateway running N3uron on balena

This blog post explores how the principles of Industry 4.0 and Industrial IoT (IIoT) can be applied to a solar farm using IIoT edge gateways. Specifically, it highlights the role of our EdgeBox-RPI-200 in remotely managing photovoltaic plants.

The EdgeBox-RPI-200 acts as an IIoT edge gateway running N3uron on balena, an out-of-the-box industrial IoT software solution for data management at the edge. It allows the consolidation of data from multiple sensors, PPCs, power meters, inverters, and weather stations in the PV plant and sends the data over OPC UA, converting it into MQTT Sparkplug B packages, which are published using Mosquitto MQTT broker and then pushed to a remote Ignition SCADA machine also running on balena.

It enables companies to perform Over-The-Air (OTA) and security updates from a centralized location, thereby enhancing productivity and operational security in the industrial sector.



<https://blog.balena.io/manage-photovoltaic-solar-plant-iiot-edge-gateway-n3uron-balena/>

## Home Assistant

Home Assistant is a free and open-source software for home automation designed to be a central control system for smart home devices with a focus on local control and privacy

[Learn more >> home-assistant.io](https://home-assistant.io)

## Frigate

Frigate is an open source NVR built around real-time AI object detection. All processing is performed locally on your own hardware, and your camera feeds never leave your home.

[Learn more >> frigate.video](https://frigate.video)

## Application

Home Automation; Smart Home

## Supported Hardware

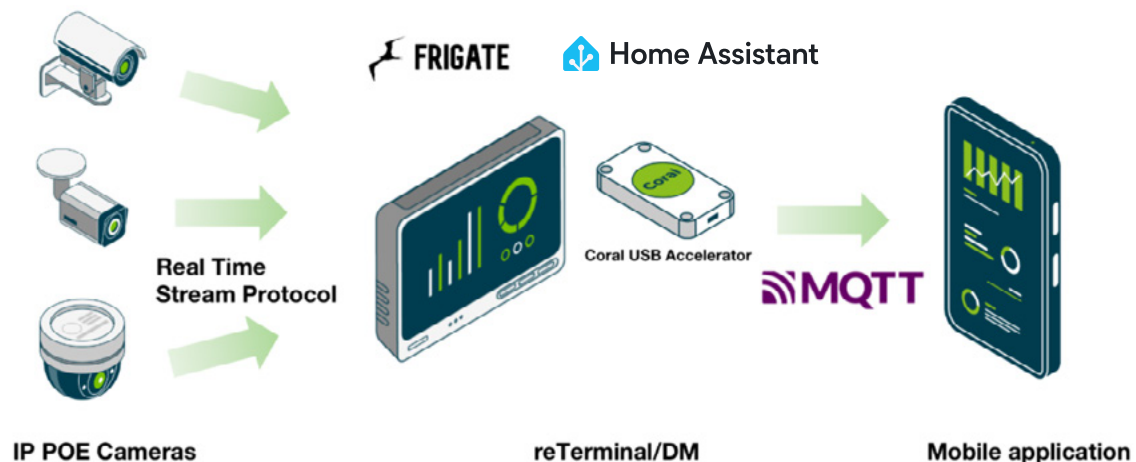
[reTerminal](#)

[reTerminal DM](#)

# Creating a Smart and Safe Haven: The Perfect Blend of reTerminal series, Home Assistant OS, and Frigate with Coral AI USB TPU

In an era where smart technology seamlessly integrates into our daily lives, the pursuit of an intelligent and secure home automation system has never been more compelling. Picture a scenario where your home not only caters to your needs but also promptly identifies and notifies you of suspicious activities in your backyard. This is where the convergence of cutting-edge hardware and open-source software takes center stage.

In this article, we'll delve into the dynamic synergy between the reTerminal series, Home Assistant OS, and the Frigate NVR add-on with Coral AI USB TPU. This transformative trio offers a unique opportunity to establish a centralized, privacy-conscious, and AI-driven home automation setup that not only enhances your lifestyle but also ensures the safety of your loved ones and property.



<https://www.seeedstudio.com/blog/2023/08/21/creating-a-smart-and-safe-haven-at-your-home/>

## OpenCV

OpenCV is an open-source computer vision and image processing library. It provides a wide range of tools and algorithms for tasks like object detection, tracking, and image manipulation. With support for multiple languages and platforms, OpenCV is widely used in fields such as robotics, augmented reality, and medical imaging.

[Learn more >> opencv.org](https://www.opencv.org)

### Application

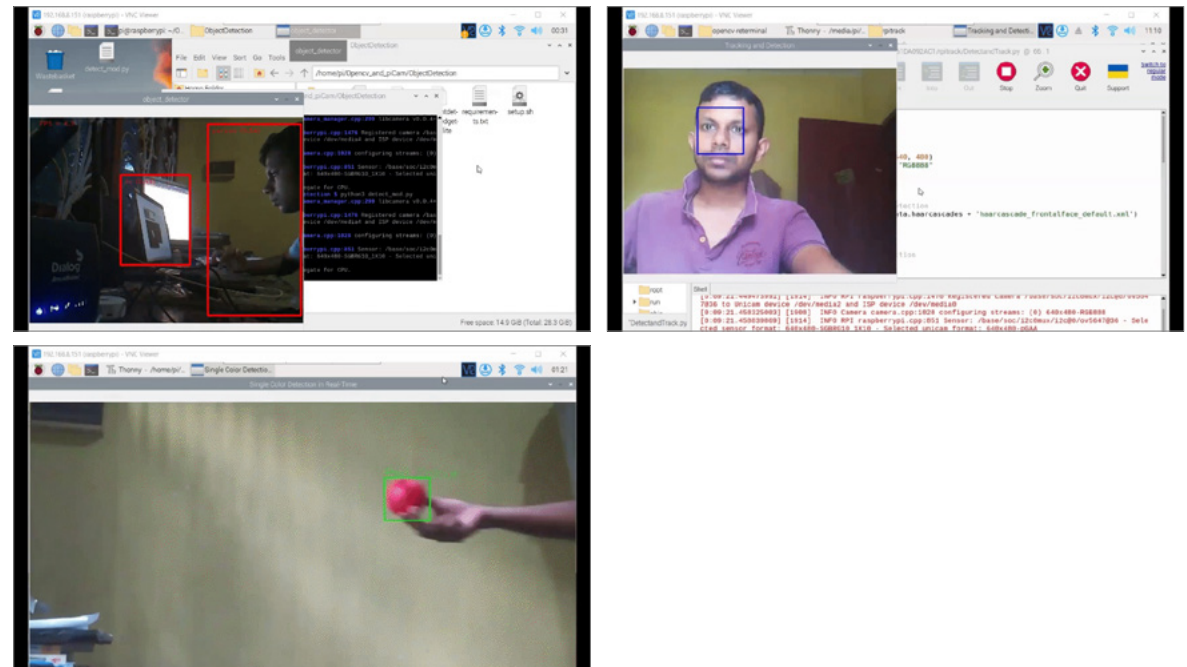
- Fresh Fruit Quality Control
- Medical Pills Sorting
- Robotics Vision

### Supported Hardware

[reTerminal](#)

## Perform Face Detection, Color Detection, and Object Detection on reTerminal with OpenCV and PiCam

The whole process of setting up the reTerminal with a freshly installed Raspberry Pi OS Bullseye or BookWorm OS and interacting with the PiCam and performing image processing and deep learning activities using the OpenCV library.



[https://wiki.seeedstudio.com/reTerminal\\_DM\\_opencv/](https://wiki.seeedstudio.com/reTerminal_DM_opencv/)

## Yolov5

YOLOv5 is a model in the You Only Look Once (YOLO) family of computer vision models. YOLOv5 is commonly used for detecting objects. It comes in four main versions: small (s), medium (m), large (l), and extra large (x), each offering progressively higher accuracy rates. Each variant also takes a different amount of time to train.

[Learn more >> Yolov5](#)

### Application

Security surveillance  
Retail analytics  
Autonomous systems

### Supported Hardware

[reTerminal DM](#)

## Train your own data set with Yolov5 and Deploy on reTerminal DM

A detailed guide on training custom datasets with YOLOv5 and deploying them on the reTerminal DM. It covers object detection basics, hardware/software setup, dataset selection, training, and inference, offering a comprehensive resource for real-time object detection applications.



<https://wiki.seeedstudio.com/reTerminal-DM-Yolo5/>



## Mediapipe

MediaPipe is a an open-source framework from Google for building multimodal (eg. video, audio, any time series data), cross platform (i.e Android, iOS, web, edge devices) applied ML pipelines. It is performance optimized with end-to-end on device inference in mind. Mediapipe is currently under active development and includes multiple demos.

[Learn more >> Mediapipe](#)

### Application

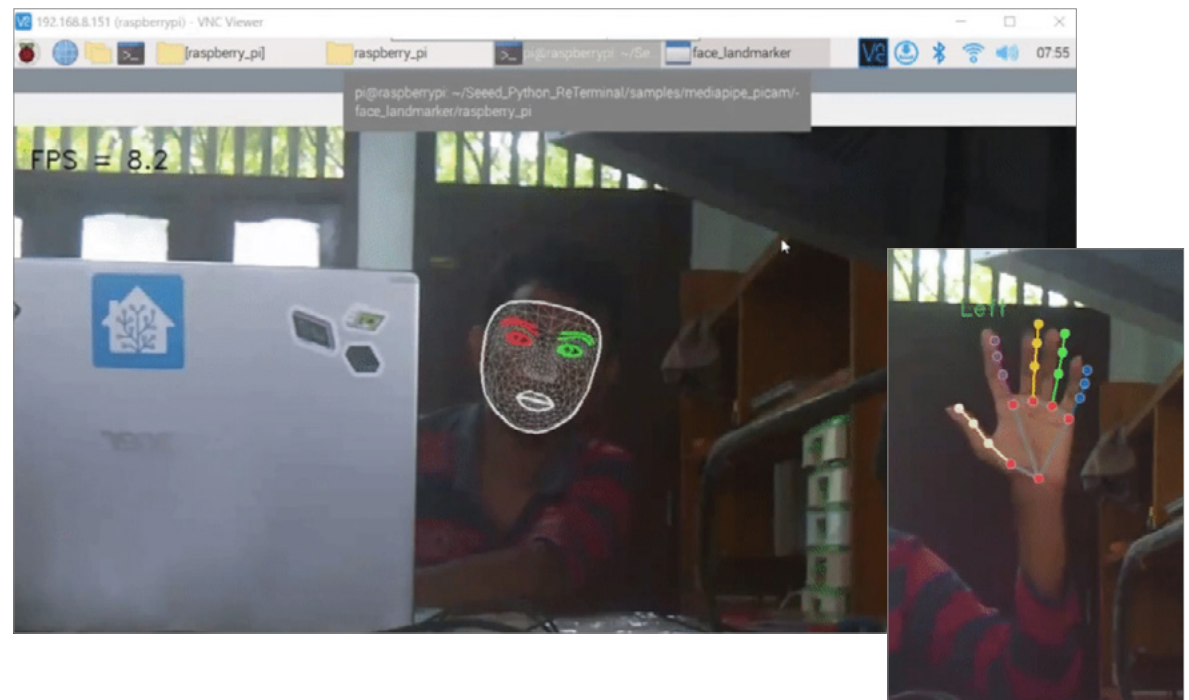
Face Detection  
Face Landmarker  
Hand Landmarker

### Supported Hardware

[reTerminal](#)

## ML Solutions in Meidapipe: To Run Face Detection, Face Landmarker, Hand Landmarker, Pose Landmarker on reTerminal

The tutorial covers hardware and software preparation, including recommendations for the Raspberry Pi 64-bit OS. It also provides instructions for implementing specific ML solutions using MediaPipe's features, such as face detection, face landmark, hand landmark, and pose landmark. The blog concludes with additional resources and tech support options. Overall, it offers a comprehensive starting point for utilizing MediaPipe on the reTerminal device.



[https://wiki.seeedstudio.com/reTerminal\\_ML\\_MediaPipe/](https://wiki.seeedstudio.com/reTerminal_ML_MediaPipe/)



## Edge Impulse

Edge Impulse empowers you to bring intelligence to your embedded projects by enabling devices to understand and respond to their environment. Whether you want to recognize sounds, identify objects, or detect motion, Edge Impulse makes it accessible and straightforward.

[Learn more >> Edge Impulse](#)

### Application

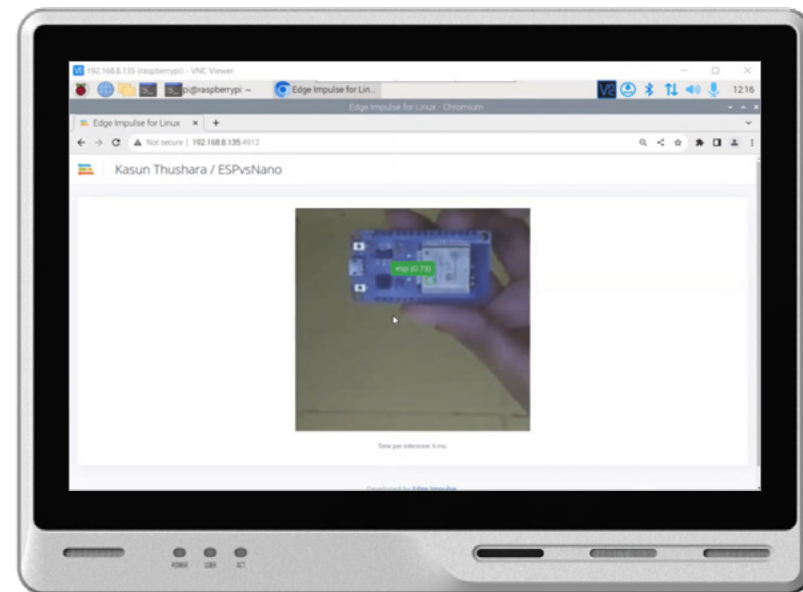
Object Detection

### Supported Hardware

[reTerminal DM](#)

## Object detection with Edge Impulse and reTerminal DM

In today's digital landscape, the integration of edge AI and IoT (Internet of Things) technologies has opened up exciting possibilities for developers and enthusiasts. One such powerful platform that simplifies the creation of machine learning models for edge devices is Edge Impulse. In this step-by-step guide, we will walk you through the process of installing Edge Impulse on your reTerminal DM device and creating a local object detection solution.



<https://wiki.seeedstudio.com/reTerminal-DM-edgeimpulse/>

## Flutter

Flutter is an open-source UI software development kit created by Google. It is used to develop cross platform applications for Android, iOS, Linux, Mac, Windows, Google Fuchsia, and the web from a single codebase. This means that you can use one programming language and one codebase to create two different apps (for iOS, Android and more).

[Learn more >> Flutter](#)

## Application

UI Design on HMI

## Supported Hardware

[reTerminal](#)

## Flutter for reTerminal: How to Make a Smart Lamp Demo

This wiki shows how to develop cross-platform user interfaces using Flutter for the reTerminal device. It covers installation steps for dependencies on the reTerminal and host PC, along with code examples for controlling GPIO pins.



<https://wiki.seeedstudio.com/reTerminal-build-UI-using-Flutter/>

seed studio



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Approved Reseller



Raspberry Pi  
Design Partner

# Customize Your Own Raspberry Pi® Hardware Solution

# We Could be Your Reliable Raspberry Pi® ODM Partner

With over 14+ years of experience as an open-source hardware manufacturer and an official Raspberry Pi® design partner, we offer two efficient ways to bring your concept to life swiftly. Choose from customizing our existing Raspberry Pi®-powered devices or utilize our comprehensive one-stop-shop customization service to design from scratch.

**Custom Design Inquiry:**

[www.seeedstudio.com/raspberry-pi](http://www.seeedstudio.com/raspberry-pi)



Below the product images, there are seven green circular icons with white symbols, each representing a customization service:

- Customize Logo**: Represented by a logo icon.
- Flash Firmware**: Represented by a USB drive icon.
- Branding and Labeling**: Represented by a bookmark icon.
- Certifications**: Represented by a document with a checkmark icon.
- Add/Remove Functional Modules**: Represented by a circuit board with a plus and minus sign icon.
- Modify I/O Ports**: Represented by a port connector icon.
- Design Enclosure**: Represented by a box with a checkmark icon.

# From Product Concept to Market

## DESIGN

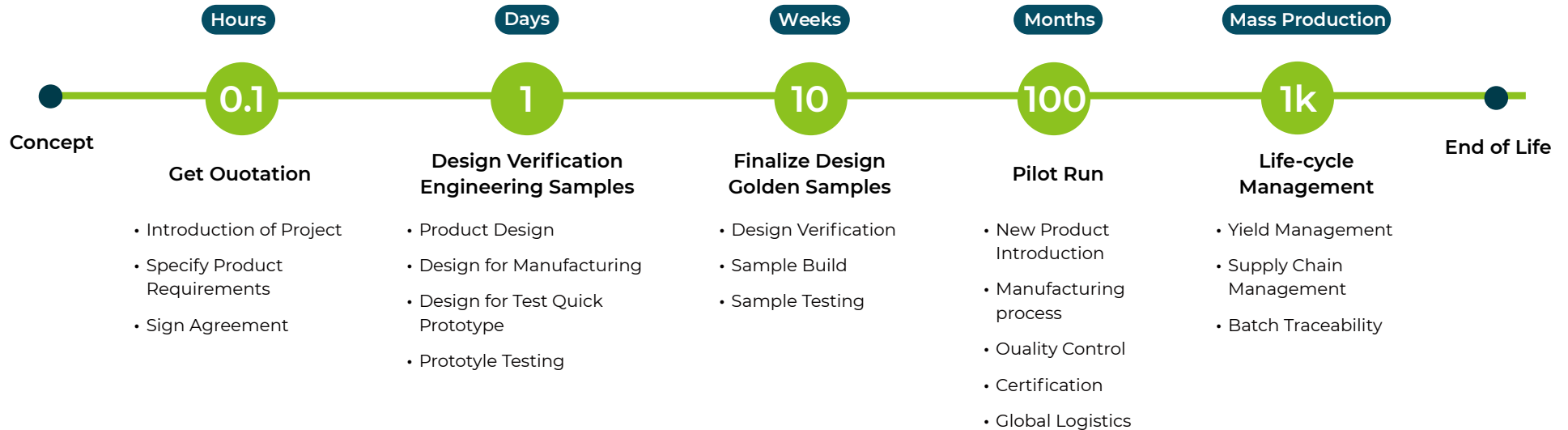
- ▶ PCBA
- ▶ Driver/BSP/SDK
- ▶ Mechanical
- ▶ Package
- ▶ Accessory
- ▶ Test Plan
- ▶ DFM/DFT
- ▶ Certification

## FULFILLMENT

- ▶ System Block Diagram
- ▶ PCB Schematic Pdf
- ▶ Key Components List
- ▶ Firmware/Image
- ▶ Mechanical 3D
- ▶ Test Plan/Report
- ▶ EVT/DVT Samples
- ▶ Certification Report
- ▶ PCB Design(IP)
- ▶ PCB Gerber(IP)
- ▶ FUII BOM(IP)
- ▶ SW Source Code(IP)

## MANUFACTURING

- ▶ 10-20 pcs Fast Prototype
- ▶ 1K~100K Batches
- ▶ Manufacturing
- ▶ 1~5 Year of Warranty
- ▶ 10+Years Life Time
- ▶ Product Life-cycle
- ▶ Management





seeed studio



Raspberry Pi  
Approved Reseller



Raspberry Pi  
Design Partner

# Raspberry Pi® Approved Reseller



# Water Cooling Kit for Raspberry Pi® 5

The First

Effectively Prevent Overheating, Ensure Stable Performance of Your Pi  
Collaborative Product Released by Seeed Studio and 52Pi



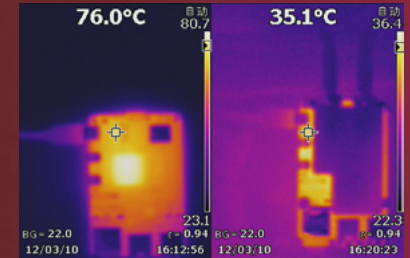
RGB Color Lighting

## Easy to Use

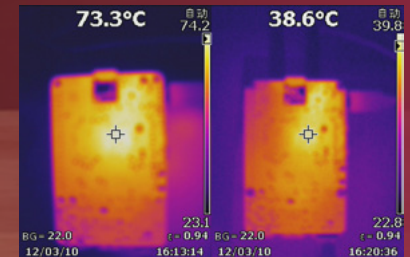
Integrated design of water pump and cooling fan, friendly to both beginners and Pi enthusiasts

## Specially Designed for Raspberry Pi 5

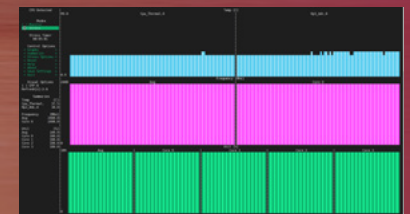
1.1 Mold Opening, Covering all heat resources, including CPU, Wi-Fi, Power Chip and eMMC



Comparison of the Raspberry Pi 5's PCB temperature under full load, without heat dissipation, and with a water cooling kit



Comparison of the temperature near the CPU on the back of the Raspberry Pi 5



The temperature of the Raspberry Pi 5 with water cooling kit is around 37°C under full load operation

# SBCs and MCUs

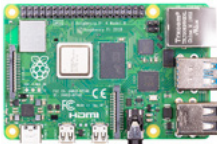
## Raspberry Pi® 5



**8GB** [SKU 102110919](#) | **4GB** [SKU 102110918](#)

Raspberry Pi® Fifth Flagship Development Computer is assembled with a powerful 2.4GHz 64-bit quad-core Arm processor and an 800MHz VideoCore VII GPU for impressive graphics. It offers advanced camera support, versatile connectivity, and enhanced peripherals, perfect for multimedia, gaming, and industrial tasks.

## Raspberry Pi® 4



**8GB** [SKU 102110421](#) | **4GB** [SKU 102110301](#) | **2GB** [SKU 102991317](#) | **1GB** [SKU 102110299](#)

Raspberry Pi® 4 Model B is the latest product in the popular Raspberry Pi® range of computers. It offers ground-breaking increases in processor speed, multimedia performance, memory, and connectivity compared to the prior-generation Raspberry Pi® 3 Model B+

## Raspberry Pi® 3 Model A+



**W** [SKU 102110358](#) | **WH** [SKU 102110359](#) | **2 W** [SKU 102110617](#)

The Raspberry Pi® 3 Model A+ is the latest product in the Raspberry Pi® 3 range

## Raspberry Pi® Zero



[SKU 102110359](#)

Raspberry Pi® Zero WH is a mini Linux development board with Bluetooth/wifi function, which has almost the same function as Raspberry Pi®.

## Raspberry Pi® Pico



[SKU 102110537](#)

Raspberry Pi® Pico is equipped with the powerful RP2040 chip, features high performance and rich on-board interfaces/ resources, yet offered a relatively low price. It is perfectly designed for the beginners to electronics, pretty suitable for IoT controlling applications.

# Computing Modules

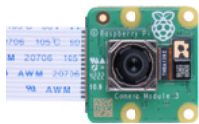
## Raspberry Pi® Compute Module 4



Part Number	SKU	Part Number	SKU
CM4001000	<a href="#">102991380</a>	CM4102008	<a href="#">102991377</a>
CM4001008	<a href="#">102991415</a>	CM4102032	<a href="#">102991378</a>
CM4008000	<a href="#">102991434</a>	CM4104000	<a href="#">102991431</a>
CM4002016	<a href="#">102991424</a>	CM4104016	<a href="#">102991433</a>
CM4101008	<a href="#">102991419</a>	CM4104032	<a href="#">102991379</a>
CM4102000	<a href="#">102991376</a>	CM4108032	<a href="#">102991441</a>
CM4108000	<a href="#">102991438</a>		

# Cameras

## Raspberry Pi® Camera Module 3



SKU 114993028

Sony IMX708, 4608 × 2592 pixels, IR cut filter, autofocus

Raspberry Pi® Camera Module 3 is a compact camera from Raspberry Pi®. It offers an IMX708 12-megapixel sensor with HDR, and features phase detection autofocus and IR cut filter.

## Raspberry Pi® Camera Module 3 NoIR



SKU 114993029

Sony IMX708, 4608 × 2592 pixels, autofocus

Raspberry Pi® Camera Module 3 NoIR is a compact camera from Raspberry Pi®. It offers an IMX708 12-megapixel sensor with HDR, and features phase detection autofocus.

## Raspberry Pi® Camera Module 3 Wide



SKU 114993030

Sony IMX708, 4608 × 2592 pixels, 120 degrees Diagonal FOV, IR cut filter, autofocus

Raspberry Pi® Camera Module 3 Wide is a compact camera from Raspberry Pi® with FOV, presenting 120 degrees Diagonal FOV. It offers an IMX708 12-megapixel sensor with HDR, and features phase detection autofocus and IR cut filter.

## Raspberry Pi® Camera Module 3 Wide NoIR

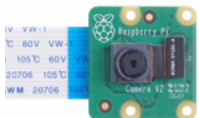


Sony IMX708, 4608 × 2592 pixels, 120 degrees Diagonal FOV, autofocus

Raspberry Pi® Camera Module 3 Wide NoIR is a compact camera from Raspberry Pi®, presenting 120 degrees Diagonal FOV. It offers an IMX708 12-megapixel sensor with HDR, and features phase detection autofocus.

SKU 114993031

## Raspberry Pi® Camera Module V2



Sony IMX219 sensor, compatible with most of SBCs or Dev boards.

Raspberry Pi® Camera v2 is the new official camera board released by the Raspberry Pi® Foundation. It carries an 8 megapixel Sony IMX219 image sensor with high resolution and great performance, and is compatible with most of SBCs or Dev boards which have a standard CSI(Camera Serial Interface).

SKU 113990214

## Raspberry Pi® PiNoir Camera Module V2



Sony IMX219PQ sensor, IR LEDs.

The Raspberry Pi® HD Pi NoIR Camera Board connects to any Raspberry Pi® or Compute Module, allowing you to create HD video and still photographs. The Pi NoIR (No Infrared) is the same as the standard camera module but without an IR filter. Therefore it is great for photography and video in the dark.

SKU 113990734

## Raspberry Pi® HQ Camera - M12 Mount



Raspberry Pi® High Quality Camera – Sony IMX477 /IMX477R

This camera sensor is all-model-Raspberry Pi®-compatible, designed to M12 mount lenses. It offers 12.3-Megapixel black-illuminated with stacked Sony IMX477R sensor. It is well suited to industrial and consumer applications.

SKU 114993032

## 5MP, 25mm lens for Raspberry Pi® Camera Sensor

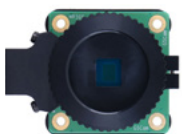


5MP, 25mm/ 12MP, 8mm /12MP, 2.7mm wide-angle lens/

The 5MP, 25mm lens for Raspberry Pi® Camera Sensor is well suited for Raspberry Pi® camera sensor with an M12-mount connection. It provides a 5 million pixel camera capture, and long-focus as 25mm focal length, designed for high-quality image capture.

SKU 114993033

## Raspberry Pi® Global Shutter Camera



Sony IMX296 sensor, suitable for sports photography and industrial machine vision.

Raspberry Pi® Global Shutter Camera equips 1.5-megapixel Sony IMX296 sensor, integrated global shutter camera capture, supporting CS-mount lenses, bringing accurate imaging in the presence of rapid motion, well suitable for sports photography and industrial machine vision.

SKU 114993075



# Add-ons & Expansion Boards

**reSpeaker 2-Mics Pi HAT for Raspberry Pi®**



[SKU 107100001](#)

**Grove Beginner Kit - Raspberry Pi® 4B - 4GB**



[SKU 110061127](#)

**Grove Shield for Pi Pico**



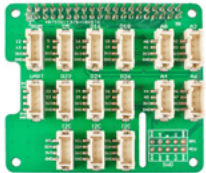
[SKU 103100142](#)

**Grove Starter Kit for Raspberry Pi® Pico with Free Course**



[SKU 110061283](#)

**Grove Base Hat for Raspberry Pi®**



[SKU 103030275](#)

**LTE Cat 1 Pi HAT (USA - VZW)**



[SKU 113990454](#)

**WM1302 Raspberry Pi® Hat**



[SKU 113100022](#)

**BliKVM HAT Black - Raspberry Pi® 4 extension board**



[SKU 114110229](#)

**BliKVM Plug-n-Play PCIe-  
Raspberry Pi® CM4**



[SKU 114110230](#)

# Accessories

**Raspberry Pi® Compute Module 4 Antenna Kit**

[SKU 114992364](#)



**Raspberry Pi® Official Case with Fan for Pi 5 Red/White**

[SKU 114993246](#)



**27W USB-C PD Power Supply Black**

[SKU 106990428](#)



**Raspberry Pi® Official Power Supply 15.3W USB-C**

[SKU 106990296](#)



**Raspberry Pi® Compute Module 4 IO Board**

[SKU 114992365](#)



**Official Raspberry Pi® Micro-HDMI To Standard-Male Cable**

[SKU 321990915](#)



**Raspberry Pi® 5 Official Camera Cable Standard - 300mm**

[SKU 114993247](#)



**Raspberry Pi® Official Active Cooler**

[SKU 114993229](#)



**Raspberry Pi® Debug Probe**

[SKU 114993074](#)



**Raspberry Pi® Keyboard DE Red/White**

[SKU 114992007](#)



**Raspberry Pi® Keyboard FR Black/Grey**

[SKU 114992012](#)



**Raspberry Pi® 400 Personal Computer - US version**

[SKU 114992369](#)



**SD Card preloaded with NOOBS**

[SKU 328010477](#)



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## Seeed Studio & Raspberry Pi®

Series Catalog V3.1  
January.2024

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## CONTACT US

Let us empower your Raspberry Pi Solution, send us an email at [edge@seeed.cc](mailto:edge@seeed.cc)

Check out our Raspberry Pi Landing Page: <https://www.seeedstudio.com/raspberry-pi>

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Our office: Shenzhen, China | Nagoya, Japan | Seeed Europe(for Europe, Middle East, and Africa) | Seeed U.S.



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