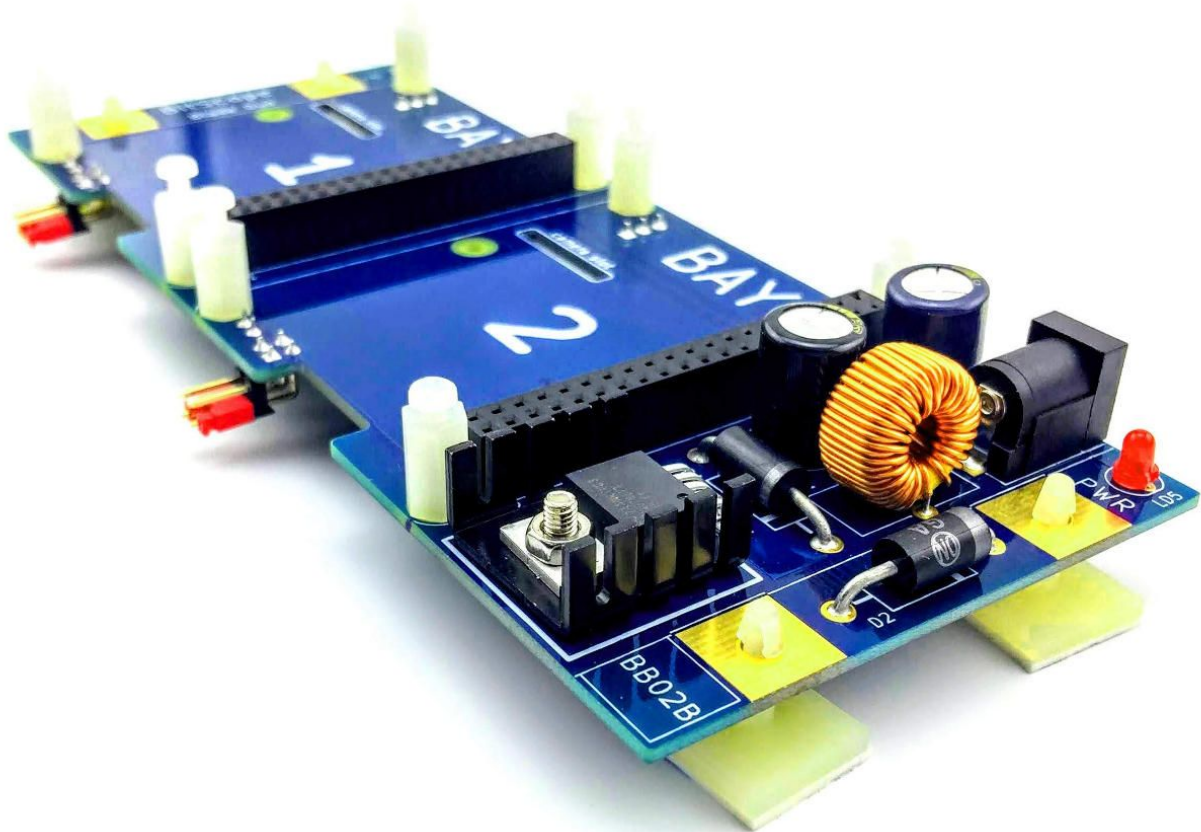


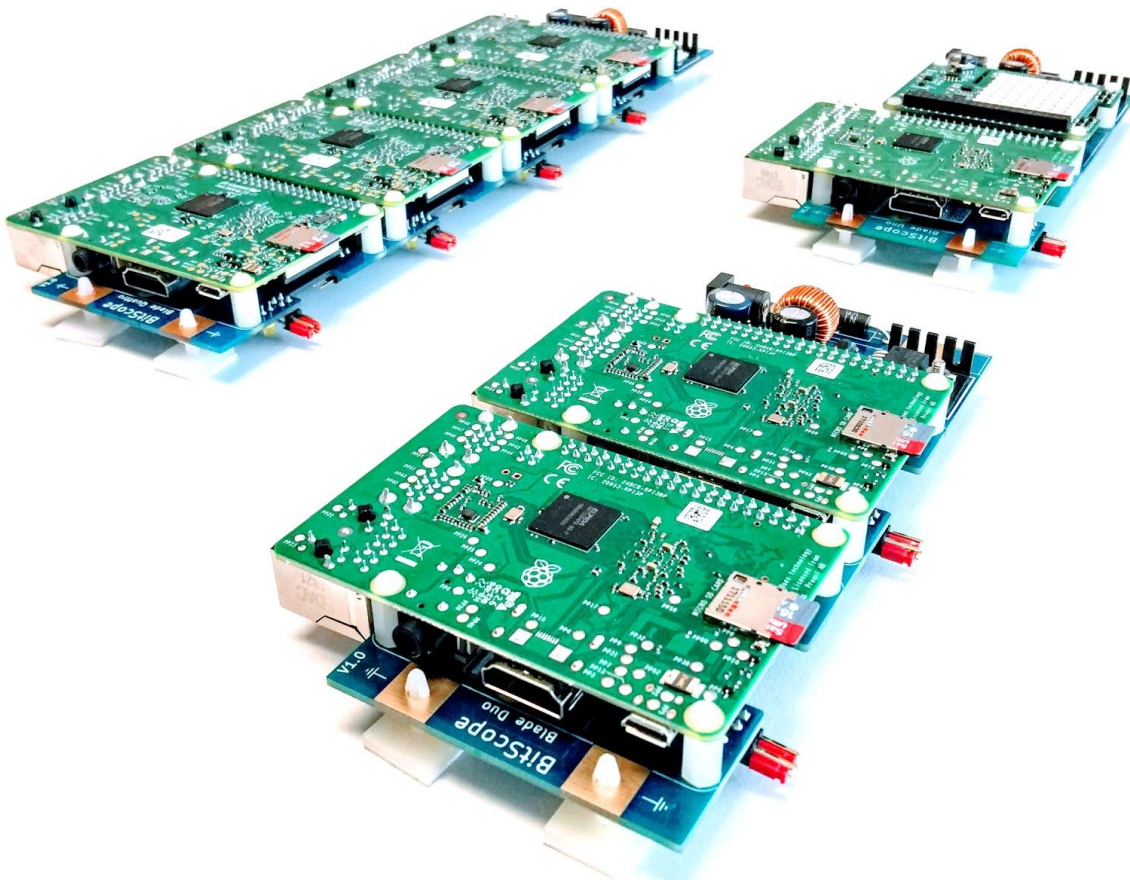
# BitScope

# Blade Duo



Industrial Deployment Solution for Raspberry Pi.

# Overview >



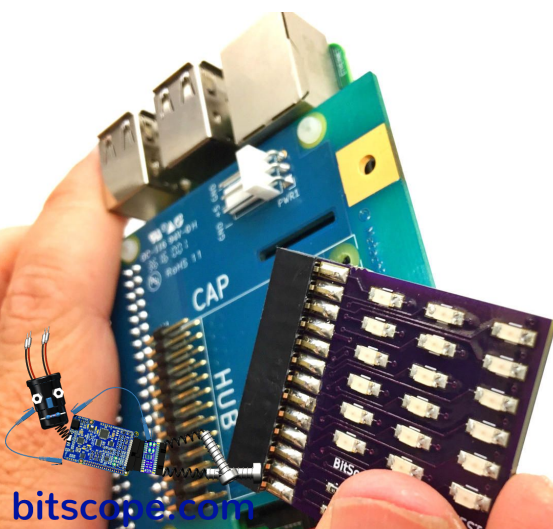
**Blade Duo** is one of three **BitScope Blade** industrial motherboards for Raspberry Pi.

It simplifies Raspberry Pi deployment with mounting options ranging from open frame with M3 mounting tabs, desktop and wall mounting to 19" racks, cluster packs and modules.

Blade Duo accepts DC power from 12V to 48V via a power socket or the mounting tabs. Local 5V regulation ensures the Raspberry Pi and expansion cards are powered reliably and auxiliary connectors are available to power external devices such as cooling fans.

The USB and Ethernet ports are accessible at the rear, Micro SD cards at the front and the HDMI port at the left edge for connection of a monitor to one Raspberry Pi. An expansion bus supports hub cards connected underneath for I2C, SPI, GPIO and serial I/O.

Blade Duo makes it easy to build scalable IoT, Edge and Cluster compute applications with Raspberry Pi. Mix and match with Blade Uno for HAT support.



# Features >

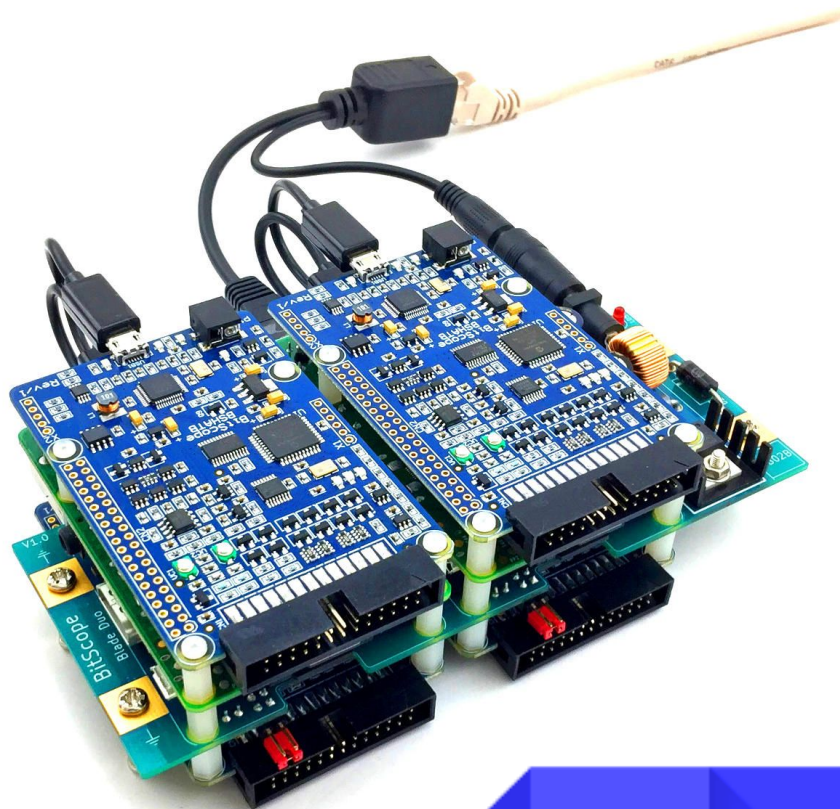
Blade Duo offers the following features and capabilities:

1. Supports **Raspberry Pi A+, B+, 2B, 3B, 3B+** and **Zero W**.
2. Accepts DC power from **12V to 48V DC** (up to 20W).
3. Connect power via **2.1mm/2.5mm** or **Power Tabs**.
4. Supports **Passive PoE** with (optional) injector cables.
5. **Regulated 5V power** for attached devices (such as fans).
6. Can power **external USB devices** such as SSD and HDD.
7. Individual **power** and **interrupt** control for Raspberry Pi.
8. Accessible **USB** and **Network** ports and one **HDMI** port.
9. Blade **HUB expansion** bus and **AUX power** connectors.
10. Supports **Blade Rack** and **Cluster Pack** solutions.

Blade Duo is designed to make it easy to deploy multiple Raspberry Pi for industrial IoT and Edge computing.

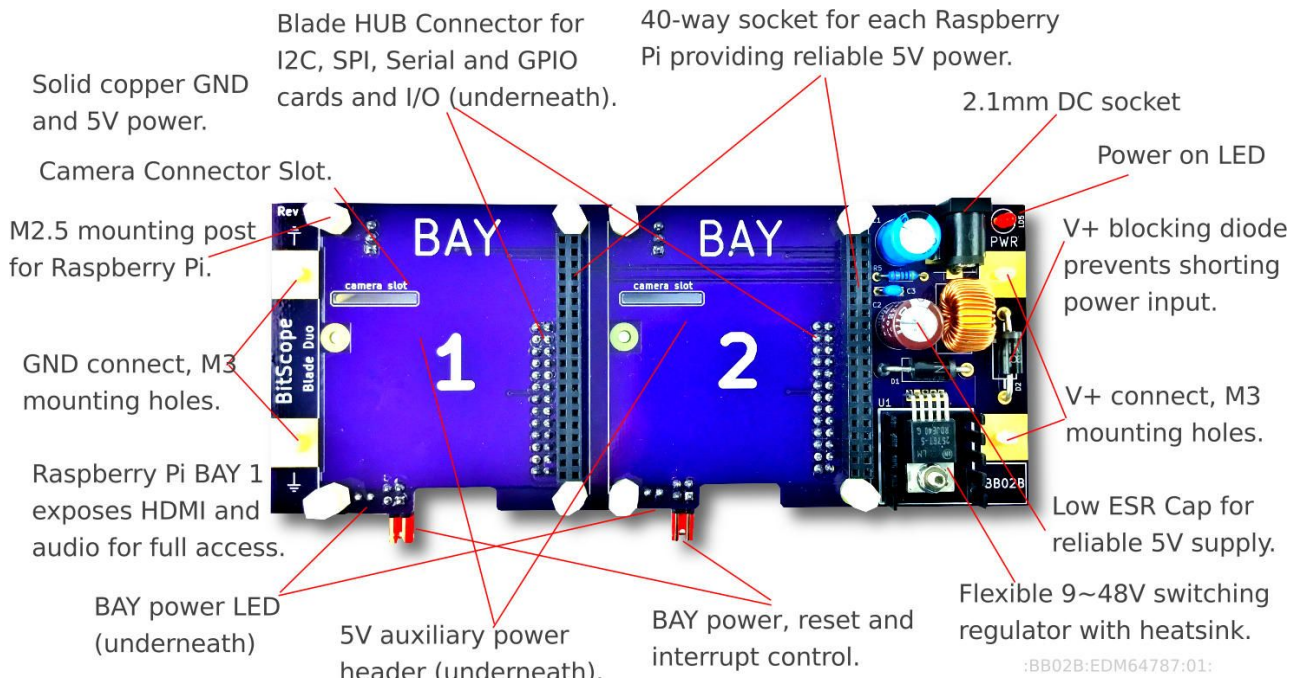
Supporting DC power from 12V to 48V, which can be unregulated, SLA battery backed or delivered via passive PoE, Blade Duo offers a very robust power and mounting solution.

Blade Duo can be stacked mounted with BitScope or mixed and matched with Blade Uno for HAT compatibility.





# Product Details >



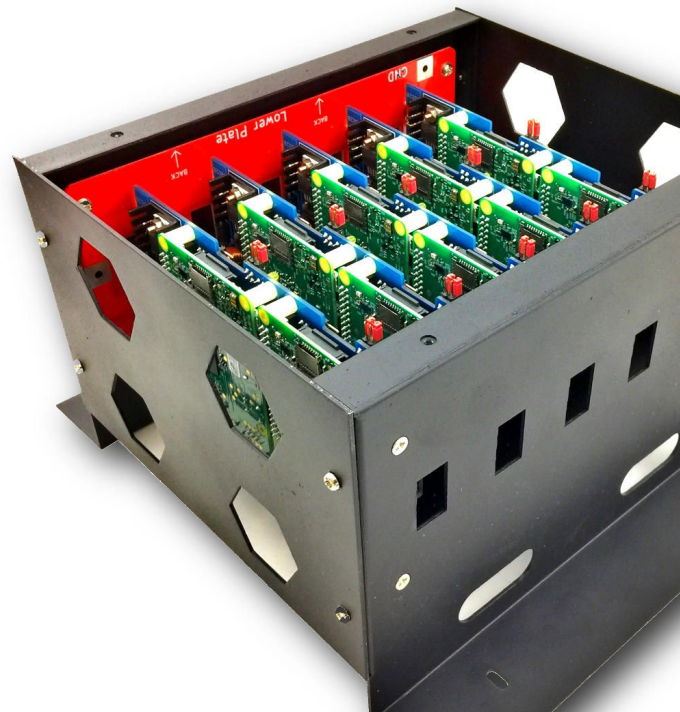
Blade Duo provides two mounting BAYs for a pair of Raspberry Pi.

Underneath each BAY is a HUB bus for expansion cards and AUX power connectors which can power external 5V devices such as cooling fans or other peripherals. A total load of up to 20W can be supported by each Blade.

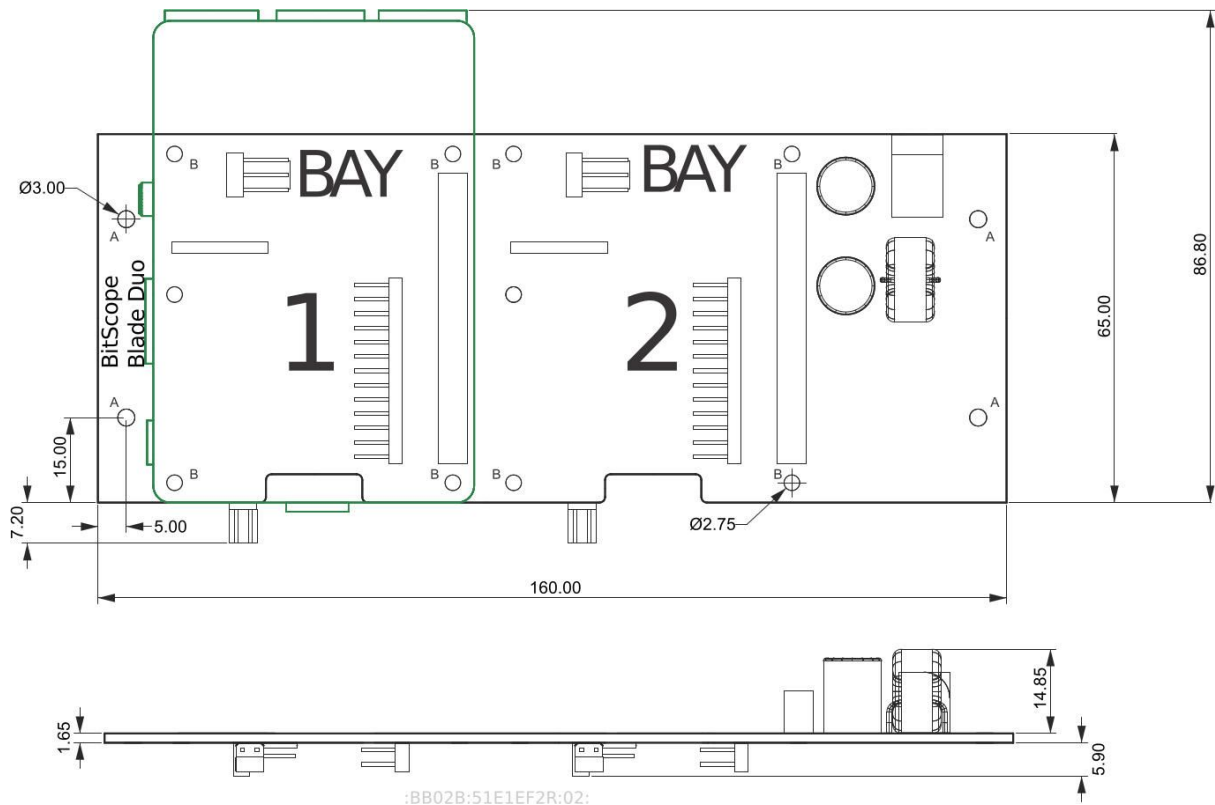
A header controls power to each Raspberry Pi without the need to switch the external power source. It's compatible with BitScope Control Plane solutions for remote control of Raspberry Pi.

The standard kit includes stand-offs and mounting tabs and screws. It can be powered via the mounting tabs for "power wiring free" use in clusters and racks. Passive PoE is also supported enabling bespoke remote IoT solutions.

Duo is the ideal IoT Edge computing platform that scales from 2 nodes to more than 200 in pack, rack and cluster configurations with Uno and Quattro.



# Mechanical >



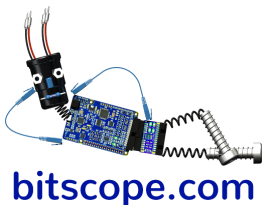
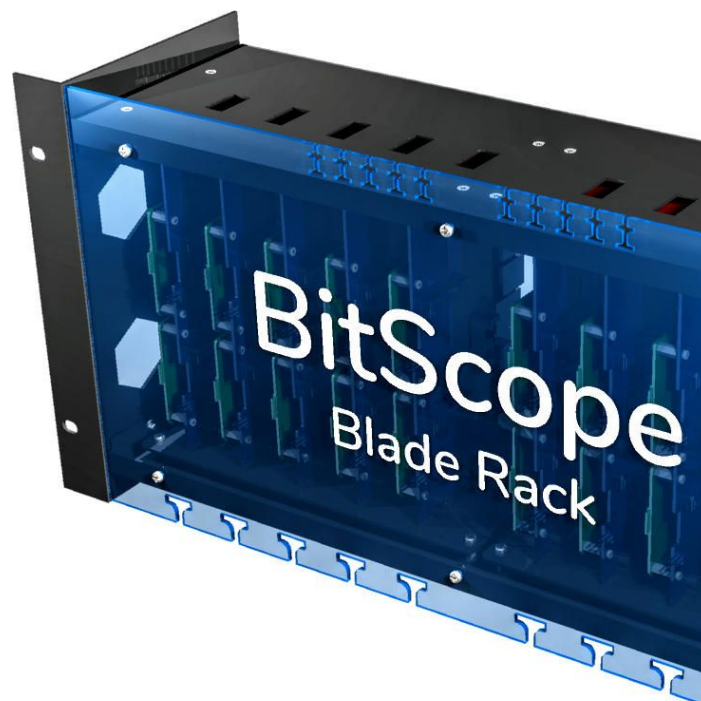
Like all Blades, Duo is compatible with BitScope Blade Rack mounting solutions.

Up to 10 Blade Duo can be mounted in a 5RU 19" Rack unit. Cluster plates and rear fans facilitate 12V~48V power distribution and cooling.

Blade Duo has the same form factor as Blade Uno so these two boards may be mixed and matched within a single Rack.

Each Raspberry Pi may be individually powered and Network, USB accessible at the rear. The HDMI of the lower Raspberry Pi is accessible at the base. A removable perspex front panel allows Micro SD access. WiFi and Bluetooth may also be used.

A range of small and large rack systems as well as full cluster solutions are available with Blade Duo.



## Small Racks >

BitScope Blade Racks built with multiple Raspberry Pi and networking are available.

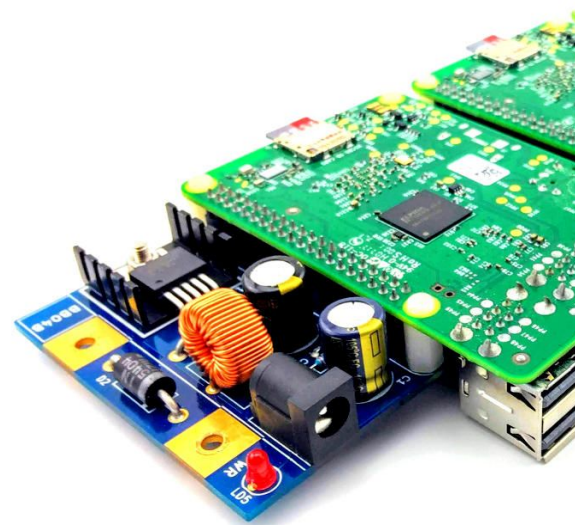


The 1RU **Blade Rack Four** can mount a pair of Blade Duo internally. The perspex front panel allows WiFi and Bluetooth radios to be accessed externally.

The BitScope Blade is included with Blade Rack Four. The Raspberry Pi are sold separately. Power supplies from 12V to 48V with sufficient power rating are compatible.

Raspberry Pi 3B requires up to 7W and 3B+ requires up to 10W per node. Passive PoE cables may be used to power the Blade boards individually.

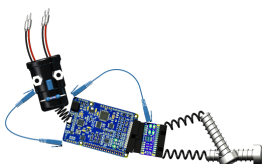
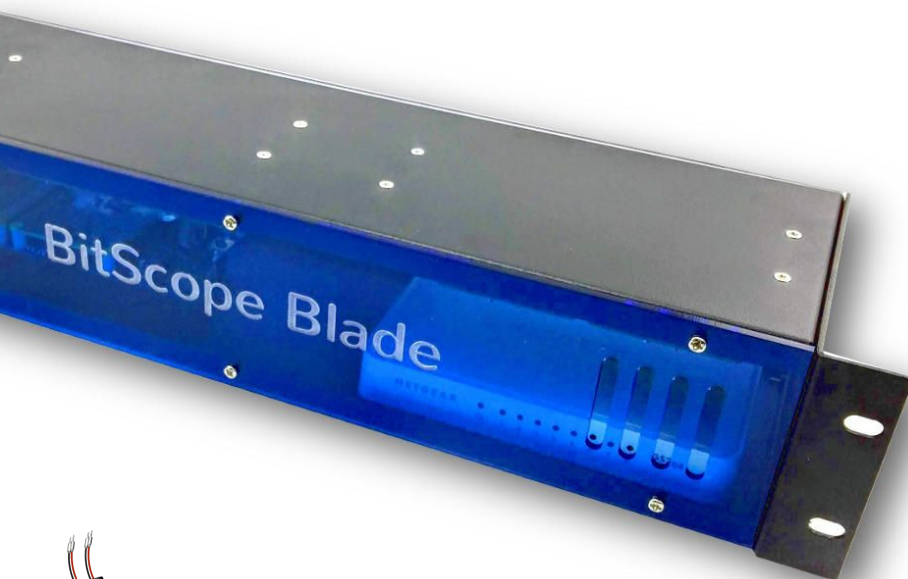
Of more Raspberry Pi nodes with an integrated switch are required, the 2RU **Blade Rack Six** is available.



Built with 3 x Blade Duo and an 8-port network switch Six the ideal solution to build small clusters with Raspberry Pi 3B+.

A range of other configurations are available upon request.

All are built with Blade.





# Cluster Packs >

For larger installations using many more Raspberry Pi, **Cluster Packs** can be used.

Cluster Packs consolidate up to five BitScope Blade to offer a compact and convenient way to power and mount a large number Raspberry Pi.

Up to 10 Raspberry Pi can be combined into a single Cluster Pack.

It's possible to mix and match Blade Uno and Blade Duo in a single Pack.

Packs are built with **Cluster Plates**.

Cluster Plates are available separately or bundled as part of a Pack.

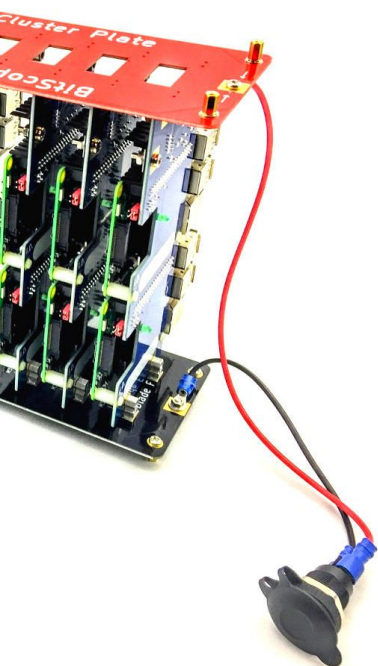
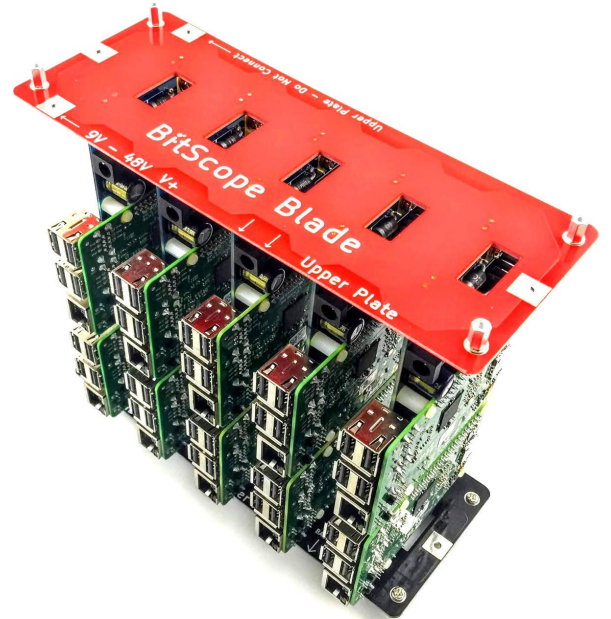
They include the nuts, bolts, mounting tabs and power wiring required to connect a power source.

Cluster Plates distribute power to all Blade boards in the pack eliminating the need to individual power wiring for each Blade.

Cluster Packs may be mounted in custom metalwork. Full mechanical specifications are available. They are also used to build larger Blade Racks.

For even larger applications, cluster plates are available that support 30 Raspberry Pi in a Blade Duo based pack.

Up to 60 Raspberry Pi can be mounted with Blade Quattro.



# Large Racks >

**Large Blade Racks** are built using Cluster Packs assembled with Blade Duo or Quattro.

Blade Racks built with Duo are available in sizes up to 20 Raspberry Pi in one rack.

The Blade Rack comprises two Cluster Packs inside and work with Raspberry Pi 2B, **3B** and **3B+** subject to a power budget and supply.

Like the smaller racks, these models are compatible with standard 19" racks.



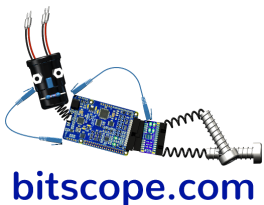
Racks have removable perspex front panels for operational visibility and WiFi accessibility. They also allow access to Micro SD cards. Four cooling fans, powered by the Blade boards, are mounted at the rear of rack to ensure airflow.

All Raspberry Pi USB and LAN ports are accessible at the rear and the HDMI ports of each Raspberry Pi in Blade Bay 1 are available at the base of the rack unit.



Power is connected via single bus for both cluster packs for use with a single DC power supply. Any power supply that meets the power load of the rack and provides 12V to 48V will work. It does not even need to be a regulated power source.

For example, power supplies used for 24V LED lighting are ideal.





# Cluster Modules >

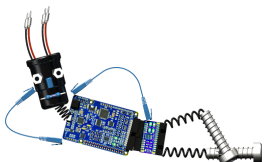
BitScope **Cluster Modules** are a turn-key compute cluster solutions for Raspberry Pi. They comprise Blade Duo and Quattro in large Cluster Packs mounted in 19" rack units.



Available in 48, 96 and 144 node sizes and built with Blade Duo and/or Quattro they use the same power and mounting solution as the Large Blade Racks but they also include an integrated network fabric with up to 60Gb/s external bandwidth, built-in power supplies and rack stackable cooling systems.

Each module has a Control Plane for out-of-band power control.

Whether it's two Raspberry Pi for an Industrial IoT module or a 3000 core cluster for HPC R&D, BitScope Blade offers the perfect scalable deployment solution.



## Warnings >

- This product should only be connected to a power source rated for 12V to 48V DC capable of providing 12W to 24W or more. Any external power supply used with Blade shall comply with relevant regulations and standards applicable in the country of intended use.
- This product should be operated in a well-ventilated environment and, if used inside a case, the case should not be covered.
- Whilst in use stand-alone, this product should be placed on a stable, flat, non-conductive surface and should not be contacted by conductive items.
- The connection of incompatible devices may affect compliance, result in damage to the unit, and invalidate the warranty.
- All peripherals used with this product should comply with relevant standards for the country of use and be marked accordingly to ensure that safety and performance requirements are met.
- The cables and connectors of all peripherals used with this product must have adequate insulation so that relevant safety requirements are met.

## Safety Instructions >

To avoid malfunction of or damage to this product, please observe the following:

- Do not expose to water or moisture, or place on a conductive surface whilst in operation.
- Do not expose to heat from any source; the Raspberry Pi and Blade Solo are designed for reliable operation at normal ambient temperatures.
- Take care whilst handling to avoid mechanical or electrical damage to the printed circuit board and connectors.
- Whilst it is powered, avoid handling the printed circuit board, or only handle it by the edges to minimise the risk of electrostatic discharge damage.

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