SwitchBlox Nano

Tiny 3 port 10/100Mbps Ethernet Switch



DESCRIPTION

The SwitchBlox Nano is a tiny form factor 3 port 10/100Mbps (10BASE-T/100BASE-TX) Layer 2 unmanaged and managed ethernet switch. It has a non-blocking fabric, meaning that 100Mbps speed can be achieved simultaneously on all ports. It runs from a wide input voltage range of 5.1 to 40V, and provides a 5A, 0.5A power output. It also features PoE injection onboard, and houses a microcontroller for custom firmware upload.

FEATURES

- 3 x 10/100M (10BASE-T/100BASE-TX) ethernet ports Input voltage range from 5.1 to 40V
- Transient protected voltage input
- 25.5 mm x 25.5 mm board size
- Molex Picoblade connectors for power and ports
- Automatic MDI-X crossover
- Unmanaged (out-the-box) functionality

HOW TO ORDER

Part Number	CF-02BBSWN	SwitchBlox Nano
	CF-02BBSWNNDAA	SwitchBlox Nano – NDAA Compliant

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GENERAL SPECIFICATIONS

Voltage Input	5V to 45V DC (45V absolute max)
Voltage Output	5V ± 5%, 0.5A
Supported Protocols	10BASE-T, 100BASE-TX
Power Consumption	220mW (idle) to 400mW (full switching)
Weight	10 grams
Size	25.5mm x 25.5mm x 7.23mm
Operating Temperature	-10°C to +80°C
Storage Temperature	-40°C to +85°C

GENERAL OPERATING INSTRUCTIONS

SwitchBlox Nano is designed for use in commercial and industrial environments, operating from a nominal supply voltage of 24V, but with the ability to operate from as low as 5.1V and as high as 40V.

In the simplest case of an unmanaged switch application, SwitchBlox Nano can be operated immediately by following the following steps.

- Apply a voltage between 5.1V to 40V to the voltage input terminals.
- Connect external devices to the ethernet ports using RJ45 to Picoblade cables.
- SwitchBlox Nano will automatically begin auto negotiation with connected devices and begin receiving and forwarding packets to/from all connected devices.

In managed mode SwitchBlox Nano can implement VLAN setup, port mirroring and QoS.

Other methods of operation are possible by uploading firmware to the microcontroller on SwitchBlox Nano.

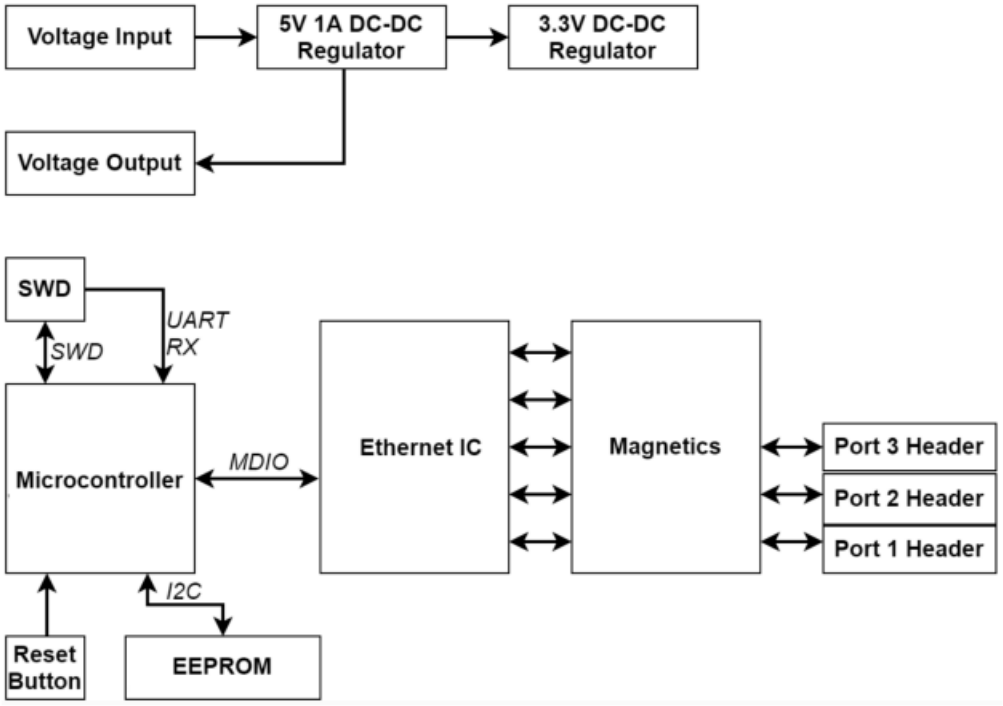
By default SwitchBlox Nano ships without any firmware.

SAFETY INFORMATION

- This device can operate on voltages near and above 40V. Please read this manual before operating.
- This device is provided “as is”. In-application testing prior to integration is recommended.
- This device is provided as an electronic circuit board, and requires integration into chassis for full ingress protection.
- Do not use this product in wet environments without integrating into a chassis.
- Do not operate this product beyond the rated temperature and voltages.
- The board temperature can reach 60°C when 0.5A is drawn from the 5V output. In such cases, passive air cooling or heat sinking should be considered.

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BLOCK DIAGRAM



INCLUDED EQUIPMENT

The product includes the following:

1 x SwitchBlox Nano board

3 x Molex Picoblade to RJ45 4-way Unshielded Twisted Pair cables (300mm)

2 x Molex Picoblade to bare, tinned leads (300mm)

RoHS Certification of Compliance

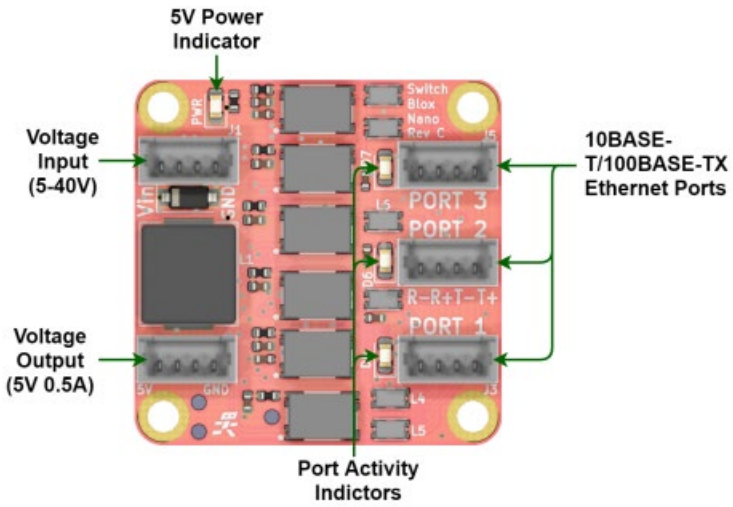
The BotBlox SwitchBlox Nano complies with the RoHS (Restriction of Hazardous Substances Directive) Certificate of Compliance.

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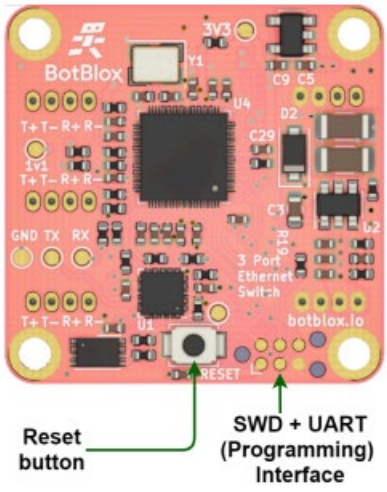
HARDWARE INTERFACE

Board Map

Front



Back



CONNECTORS AND PINOUTS

Voltage Input

The top left connector is the voltage input terminal. A four pin connector is used to allow the input voltage to be easily daisy chained between boards (two wires per power rail).

The voltage input has the following features:

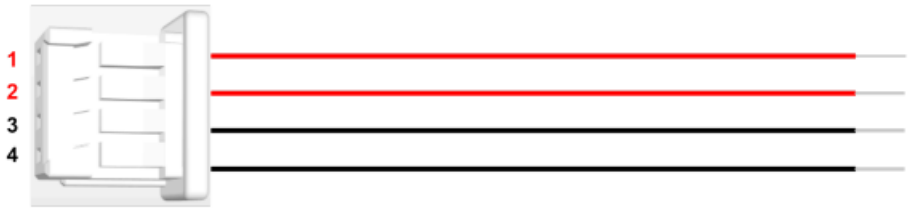
- Voltage input can range from 5 to 40V
- Maximum allowable voltage of 45V Reverse polarity protection

The pinout of the voltage input connector is shown in figure 4 below.



Voltage Inpur Header pinout

Connector on board	Mating header	Crimp used	Wire used
530470410	0510210400	500798000	UL1061, 28AWG



Voltage input cable pinout (red = V+, black = GND)

Voltage Output

The bottom left connector is the voltage output terminal. A four pin connector is used to increase the maximum output current.

The voltage output has the following features:

- Voltage output is nominally 5V with tolerance of ±5%
- Up to 0.5A output current
- Around 30uF of capacitance on the 5V rail

The pinout of the voltage output connector is shown below.



Voltage output header pinout

Cable pinout

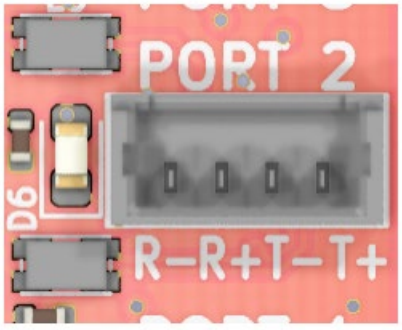


Connector part numbers

Connector on board	Mating header	Crimp used	Wire used
530470410	0510210400	500798000	UL1061, 28AWG

Ethernet Ports

There are three ethernet connectors on SwitchBlox Nano. Each connector has four pins corresponding to the four signals required for 100BASE-TX which are R+, R-, T- and T+. The pin mapping of all three connectors is identical.



Ethernet port pinout

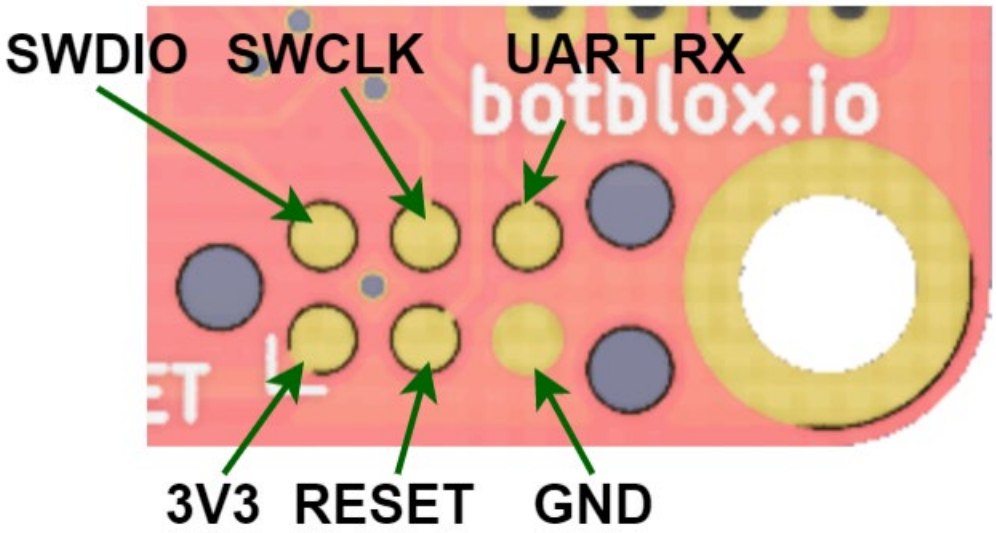
Connector on board	Mating header	Crimp used	Wire used
530470410	0510210400	500798000	UL1061, 28AWG

Ethernet connector pinout and part numbers



SWD Programming and UART RX Header

A programming header on the back of the board allows the microcontroller on SwitchBlox Nano to be programmed over SWD.



SWD programming and UART RX header pinout

This header allows access to the SWD port on the onboard microcontroller, and requires the use of a 6-pin needle adapter such as the J-Link 6-pin needle adapter along with an in-circuit programmer such as the J-Link.

An unused pin on this header also connects to the UART RX on the microcontroller. This approach allows at least unidirectional UART communication (from a host to SwitchBlox Nano) for uploading switch management configuration, without needing another connector on the board. The same 6-pin needle adapter is used to access this pin. The needle adapter should then connect to any USB to UART converter, using the GND and UART_RX pins.

Other Interfaces

LED's

There are 4 LEDs on SwitchBlox Nano in total. None of the LED signals can be taken off board.

The 5V Power Indicator LED (Green) indicates that voltage is present on the 5V line. It should be solid green in normal operation.

Each Port Activity LED (Green) corresponds to a specific port. They indicate activity on each port and will blink when there is traffic on a port. They should be solid off when a port is not connected to any device, and they should blink under normal operation. A solid green LED indicates either constant traffic, or a fault with the port.

Device Configuration

Operating Conditions

Absolute Maximum Ratings Operating in these ranges will reduce the lifetime of the device.

Voltage Input Maximum	45V
Storage Temperature	-30°C +85°C
Operating Temperature	-10°C to +80°C
5V Output Current	0.5A