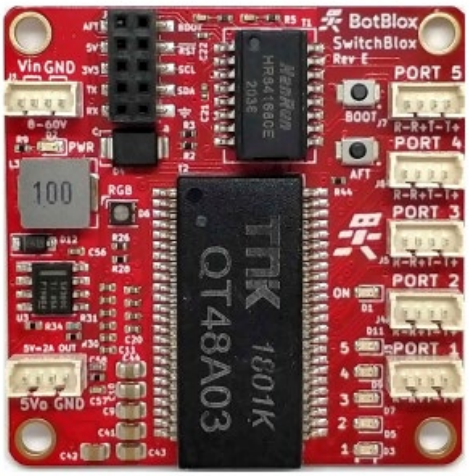
SwitchBlox

Small 5 port 10/100Mbps Ethernet Switch



DESCRIPTION

The BotBlox SwitchBlox is a small form factor 5 port 10/100Mbps (10BASE-T/100BASE-TX) unmanaged 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 60V, and provides a 5A, 2A power output.

FEATURES

- 5 x 10/100M (10BASE-T/100BASE-TX) ethernet ports
- Input voltage range from 5.1 to 60V
- Reverse protected voltage input
- Transient protected voltage input
- 45mm x 45mm board size
- Molex Picoblade connectors for power and ports
- Automatic MDI-X crossover
- Unmanaged (out-the-box) functionality

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HOW TO ORDER

Part Number	CF-02BBSWB	SwitchBlox
	CF-02BBSWBNDAA	SwitchBlox – NDAA Compliant

GENERAL SPECIFICATIONS

Voltage Input	5V to 60V DC (65V absolute max) (Reverse Protected)
Voltage Output	5V ± 5%, 2A
Supported Protocols	10BASE-T, 100BASE-TX
Power Consumption	300mW (idle) to 700mW (full switching)
Weight	15 grams
Size	44.5 mm x 44.5 mm x 11.3 mm
Operating Temperature	-10°C to +80°C
Storage Temperature	-65°C to +150°C

GENERAL OPERATING INSTRUCTIONS

SwitchBlox 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 60V.

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

- Apply a voltage between 5.1V to 60V to the voltage input terminals.
- Connect external devices to the ethernet ports using RJ45 to Picoblade cables.
- SwitchBlox will automatically begin auto negotiation with connected devices and begin receiving and forwarding packets to/from all connected devices.

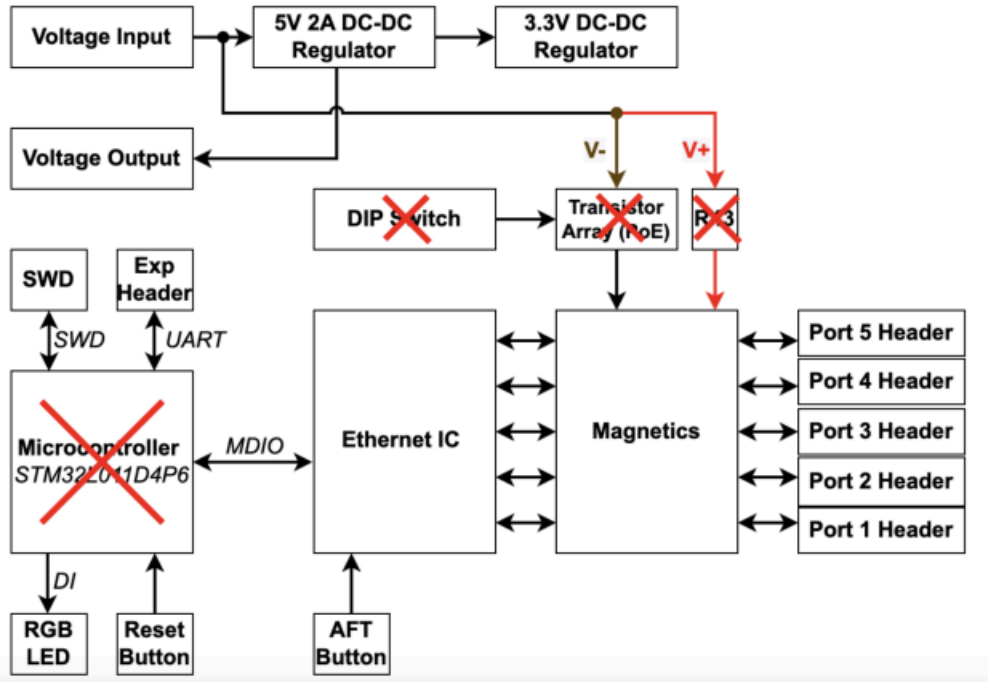
SAFETY INFORMATION

- This device can operate on voltages near and above 60V. Please read this manual before operating.
- This device is provided “as is”. In-application testing prior to integration is recommended.

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- 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 2A is drawn from the 5V output. In such cases, passive air cooling or heat sinking should be considered.

BLOCK DIAGRAM



SwitchBlox Block Diagram

INCLUDED EQUIPMENT

The product includes the following:

1 x SwitchBlox board

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

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

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RoHS Certification of Compliance

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

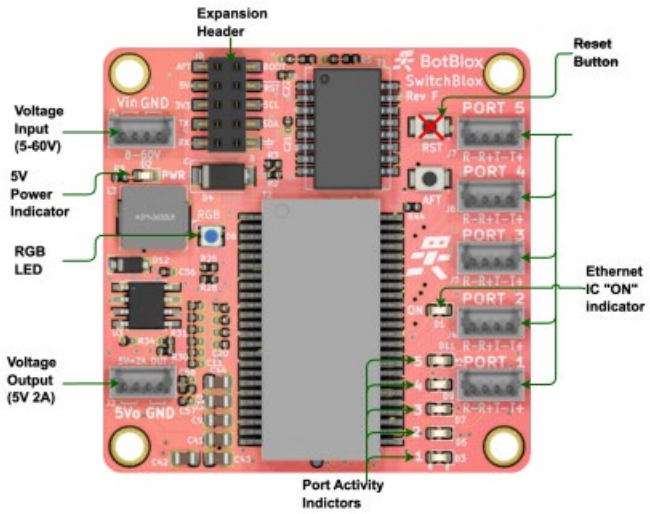
BOARD REVISIONS

The information in this datasheet applies to revision E and F. Both revisions are functionally identical, however rev F has the following changes:

- Boot button on Rev E is replaced with a microcontroller reset button on Rev F.
- PoE injection resistor R43 is not populated on Rev F. R43 is populated on Rev E. This resistor injects voltage onto the transformer TX pairs which can cause power issues when connected with downstream devices that have circuitry directly on the ethernet lines. R43 was depopulated in Rev F to prevent potential problems.
- PoE circuitry has been removed.
- STM32 microcontroller is not present.

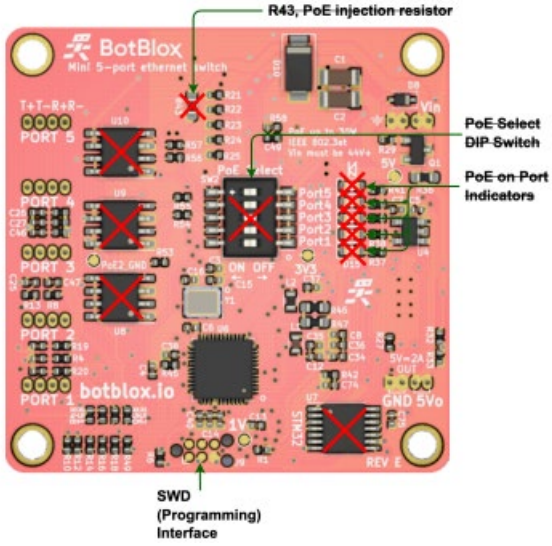
HARDWARE INTERFACE

Board Map



Front

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SwitchBlox Board Map (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:

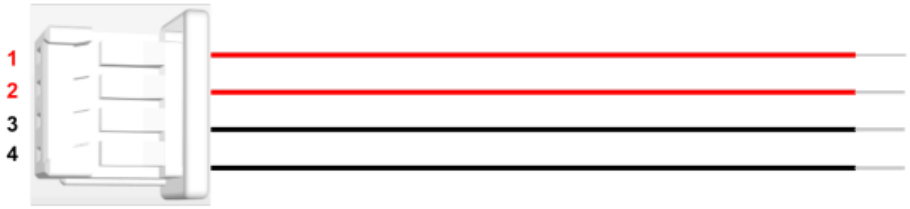
- Voltage input can range from 5 to 60V
- Maximum allowable voltage of 65V
- Transient voltage protection above 66.3V
- Reverse polarity protection

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



Voltage input 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 2A output current
- Around 132uF of capacitance on the 5V rail



Voltage output header pinout

Cable pinout

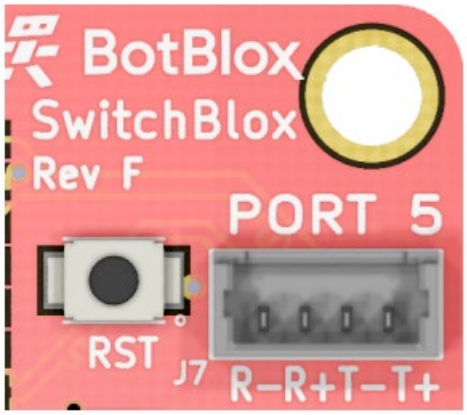


Voltage input cable pinout)red = 5V, black = GND)

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

Ethernet Ports

There are five ethernet connectors on SwitchBlox. 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 five 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

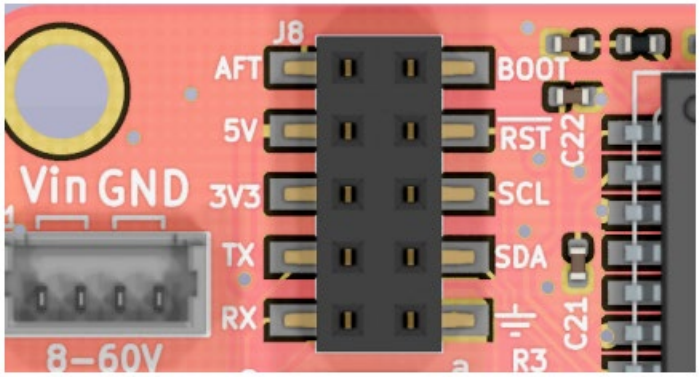


Ethernet cable pinout

Extensions header

SwitchBlox boards have an extension header for switch management. The extension header provides the following interfaces:

- MDIO/I2C
- Onboard 5V output rail (can be used to supply power to the board).
- Onboard 3V3 rail (can be used to supply power to the board).
- The AFT (Automatic Factory Test) signal, not intended for customer applications

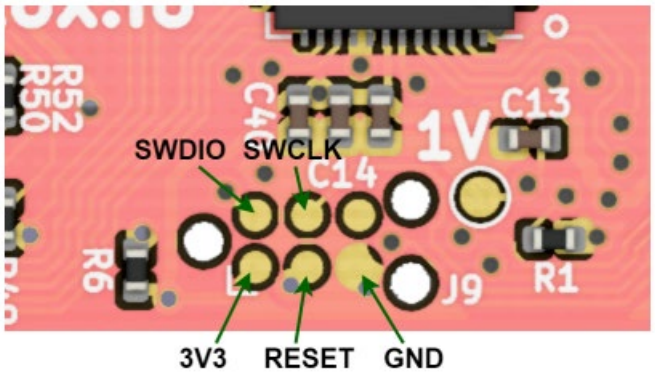


Extension header pinout

The part number for the extension header is 0787881014, the mating part for this header is 877581013.

SWD Programming Header

A programming header on the back of the board allows SWD access to the STM32 footprint on SwitchBlox. Note that this board does not include the STM32.



SWD programming header pinout

This header allows access to the SWD port on a STM32 microcontroller (if soldered onto the board), 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. This board ships without an STM32 soldered.

Other Interfaces

LED's

There are 12 LED's on Switchbox 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.

The Ethernet IC "ON" Indicator LED (Green) indicates that the ethernet IC is powered up and working. 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

Unmanaged Switch

To use SwitchBlox in an unmanaged application requires no configuration. Simply connect a voltage to the voltage input and connect downstream devices.

Device Characteristics

Operating Conditions

Voltage Input Maximum	65V
Storage Temperature	-30°C +85°C
Operating Temperature	-10°C to +80°C
5V Output Current	2.3A

5.1.2 Nominal (Test) Ratings

Voltage Input	65V
5V Output Current	0mA