PoEBlox

Compact 360W PoE Switch

MPN: BB-PoE-A-1

Datasheet

February 2022

Board revision A

Contents

1 General Information

1.1 Functionality and Features of PoEBlox

      PoEBlox is a daughterboard that adds full active PoE capability to our range. It is designed as a power delivery daughterboard for GigaBlox Nano, which together forms a 4 port gigabit ethernet switch with PoE capability upto 90W per port.

.   PoEBlox achieves this with the use of an active PSE controller, onboard power FETs, and high power rated RJ45 Jack, all while retaining a very compact form factor.

      This system can provide data and power to any standard PoE device, drastically simplifying the construction of PoE based embedded systems.

1.1.1 Features

- Four IEEE802.3bt 4-pair ports with 1000BASE-T (gigabit Ethernet data pass-through)
- 90W PoE injection IEEE 802.3bt on each port
- Input voltage range from 44 to 57V
- Transient protected voltage input
- -40ºC to 85ºC Operation Range
- 70mm x 95mm board size
- RazorBeam connector compatible with GigaBlox Nano
- Molex NanoFit connector for input power
- Port ON status LEDs

1.1.2 General Information

Voltage Input	44V to 57V DC (70V absolute max)
PoE Maximum Power Output	360W (IEEE 802.3bt)
Supported Protocols	10BASE-T, 100BASE-TX, 1000BASE-T
Power Consumption	<0.1W
Weight	16 grams
Size	70 mm x 95 mm x 20 mm
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +125°C

Table 1: General Information

1.1.3 General Operating Instructions

PoEBlox is designed for use in commercial and industrial environments. To be able to operate full PoE switch function, the minimum PSE port voltage is 44 VDC for type 1, 50 V for type 2 and type 3, and 52 V for type 4. PoEBlox can still work with voltage below 44V (minimum is 18V) but only the switch function works.

In the simplest case, PoEBlox can be operated immediately by following the following steps.

1) Connect GigaBlox Nano to the RazorBeam connector on PoEBlox board

2) Connect powered devices (PDs) to the RJ45 ports

3) Apply a voltage between 44V to 57V to the voltage input terminals.

4) PoEBlox will detect PDs that have a valid signature, complete mutual identification, and apply power. Along with that, GigaBlox Nano will begin functioning as an unmanaged 10/100/1000Mbit/s network switch.

1.2 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.
- 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.
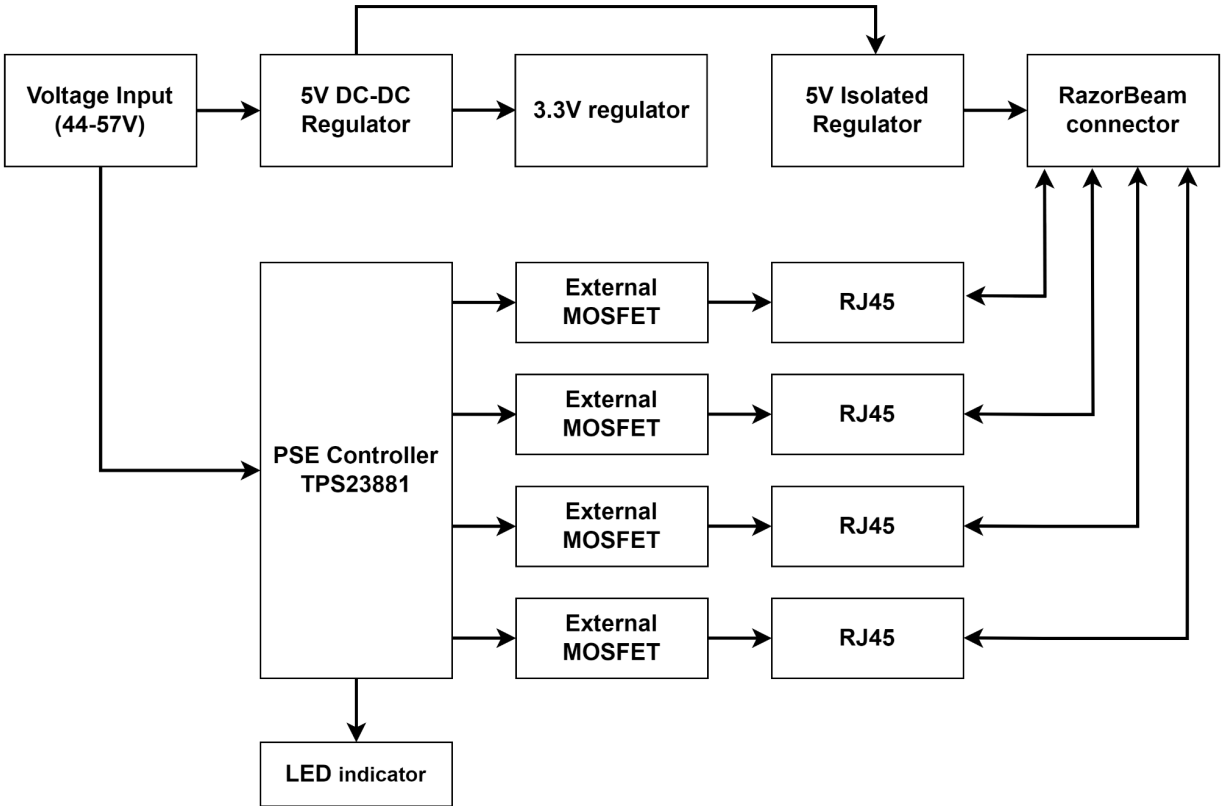
1.3 Block Diagram

Figure 1: PoEBlox Block Diagram

1.4 Included Equipment

The product includes the following:
1 x PoEBlox board
1 x Molex NanoFit to bare, tinned leads (300mm)

1.5 RoHS Certification of Compliance

The BotBlox PoEBlox complies with the RoHS (Restriction of Hazardous Substances Directive) Certificate of Compliance.
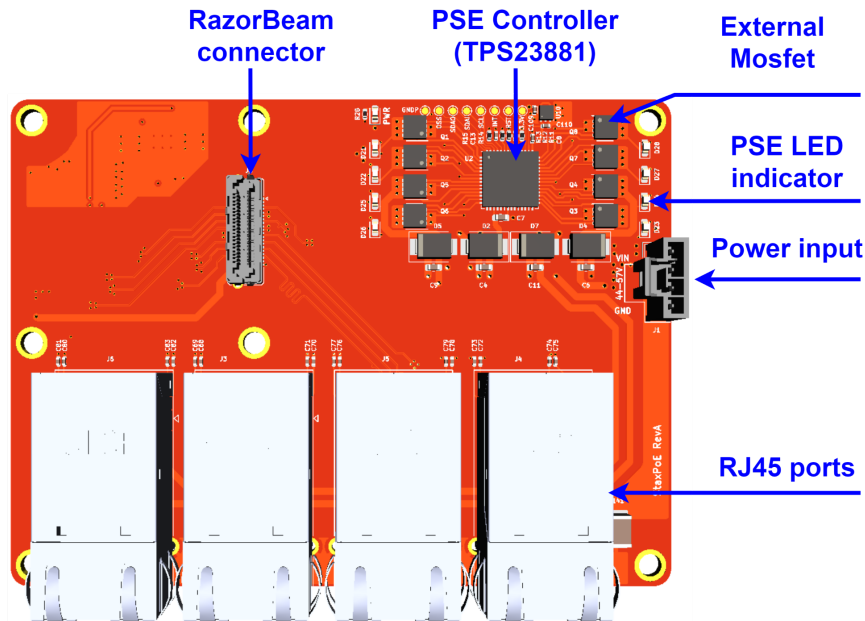
2 Hardware Interfaces

2.1 Board Map

Figure 2: PoEBlox Board Map (front)

2.2 Connectors and Pinouts

2.2.1 Voltage Input

The right connector is the voltage input terminal. A four pin connector is used to supply maximum 360W (two wires per power rail).

The voltage input has the following features:
- Voltage input can range from 44 to 57V
- Maximum allowable voltage of 70V
- Transient voltage protection above 66.3V
- Reverse polarity protection

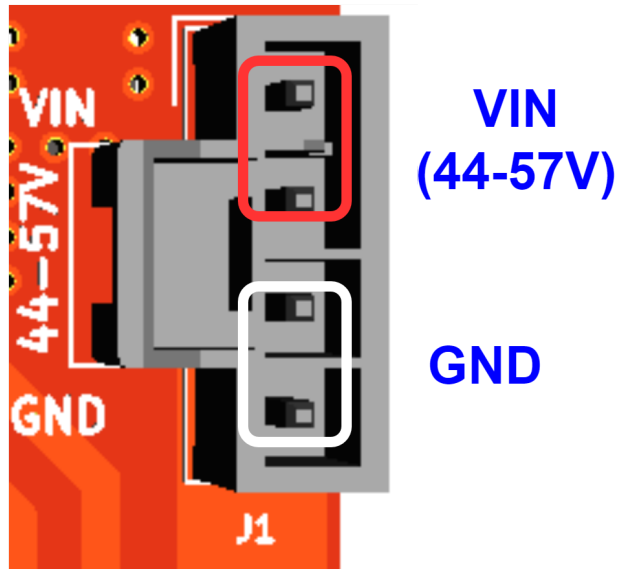The pinout of the voltage input connector is shown in figure 3 below.

Figure 3: Voltage input header pinout

Connector part numbers

Connector on board	Mating header	Crimp used	Wire used
1053091104	1053071204	1053002100	UL1061, 20AWG

Table 2: Voltage input connector pinout and part numbers

cable pinout

Figure 4: Voltage input cable pinout (red = V+, black = GND)

2.2.2 RazorBeam connector

RazorBeam connector on PoEBlox allows it to be connected to GigaBlox Nano to form a complete PoE switch system with 4 port gigabit ethernet switch and PoE capability upto 90W per port.
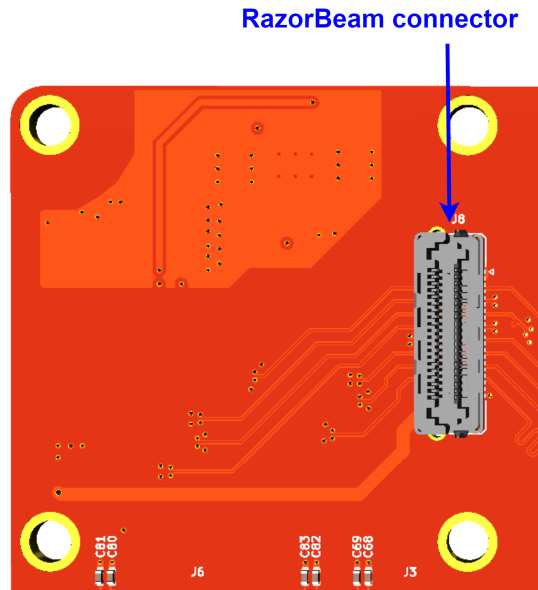

Figure 5: RazorBeam connector

2.2.3 Ethernet Ports

PoEBlox uses four high power RJ45 ports, which can both provide up to 90W of power on each port (360W total), and can transmit/receive data at 1Gbps
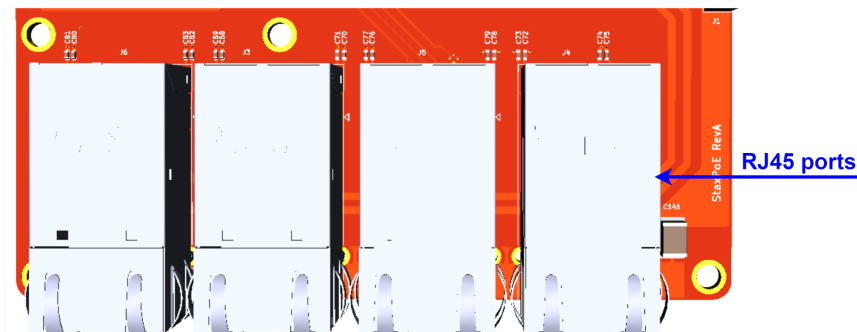

Figure 6: RJ45 Ports

2.3 Other Interfaces

2.3.1 LEDs

There are 9 LEDs on PoEBlox in total.

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

Figure 7: Power Indicator LED

The PoE LEDs indicate the status of output power at the RJ45 port. They should be solid on (**Green**) when the device is powered by RJ45 port. They should blink when the device is not connected or has no power at the RJ45 port.
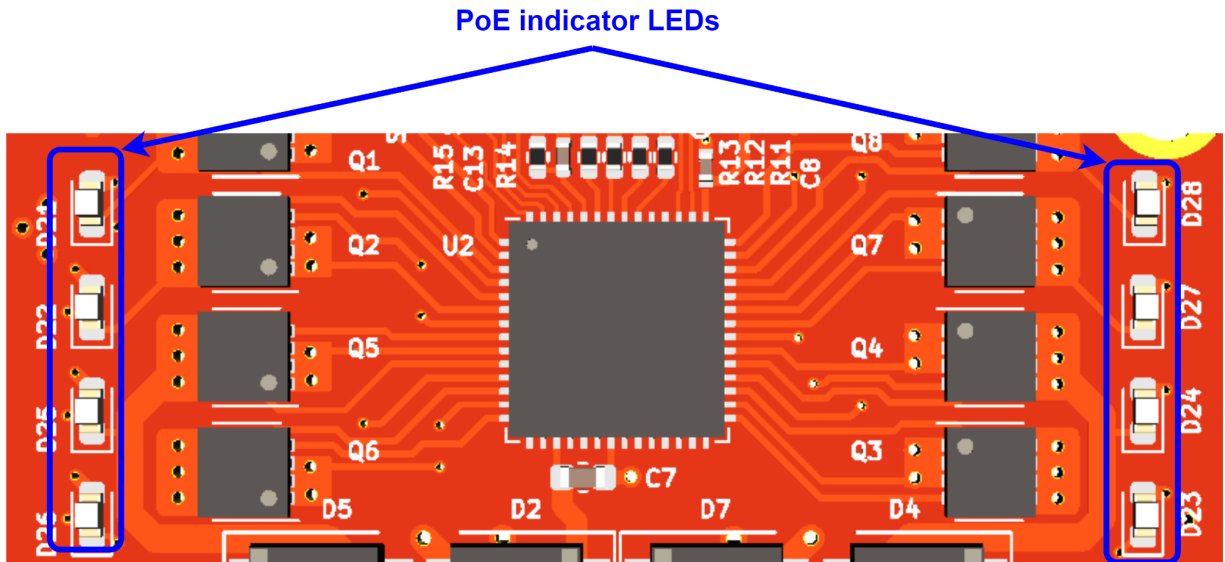

Figure 8: PoE Indicator LED

3 Software Interfaces

3.1 I2C

PoEBlox uses the TPS23881 power sourcing equipment (PSE) controller engineered to insert power onto Ethernet cables in accordance with the IEEE 802.3bt standard. The PSE controller can detect powered devices (PDs) that have a valid signature, complete mutual identification, and apply power. By default the IC runs in Auto mode. Semiauto and Manual mode need to be configured via I2C.

PoEBlox features a 3-wire I2C interface, using SDAI, SDAO, and SCL. They are exposed on test points. SDAI and SDAO can be interconnected for non-isolated system.
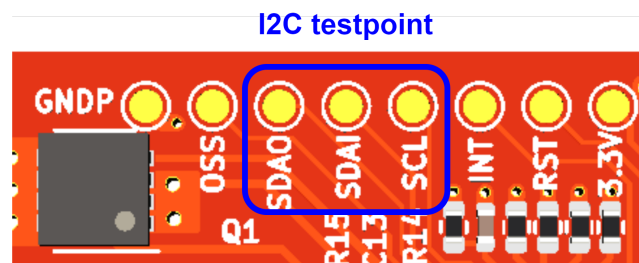

Figure 9: I2C Testpoints

4 Device Configuration

4.1 Auto mode

By default, PoEBlox runs in Auto mode. The port performs detection and classification (if valid detection occurs) continuously. Registers are updated each time a detection or classification occurs. The port power is automatically turned on based on the Power Allocation settings in register 0x29 if a valid classification is measured.

4.2 Semiauto mode

The port performs detection and classification (if valid detection occurs) continuously. Registers are updated each time a detection or classification occurs. The port power is not automatically turned on. A Power Enable command is required to turn on the port.

4.3 Manual/Diagnostic mode

The use of this mode is intended for system diagnostic purposes only in the event that ports cannot be powered in accordance with the IEEE 802.3bt standard from Semiauto or Auto modes. The port performs the functions as configured in the registers. There is no automatic state change. Singular detection and classification measurements will be performed when commanded. Ports will be turned on immediately after a Power Enable command without any detection or classification measurements. Even though multiple classification events may be provided, the port voltage will reset immediately after the last finger, resetting the PD.

5 Device Characteristics

5.1 Operating Conditions

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

Voltage Input Maximum	70V
PoE power Delivery (per port)	90W
Storage Temperature	-55°C to +125°C
Operating Temperature	-40°C to +85°C

6 Datasheet Changelog

Date	Datasheet Version	Author	Notes
23/02/2022	A_A	Josh Elijah	Initial release

7 Contact

If you have any questions regarding this product, please contact us:

josh@kapek
4 Pavilion Court 600 Pavilion Drive,
Northampton Business Park,
Northampton,
England
NN4 7SL