BotBlox



GigaBlox

Small 5 port Gigabit Ethernet Switch

MPN: BB-GGB-C-1

Datasheet

January 2021

Board revision C

BotBlox

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1 General Information

1.1 Functionality and Features of GigaBlox

The BotBlox GigaBlox is a small form factor 5 port 10/100/1000Mbps (10BASE-T/100BASE-TX/1000BASE-T) layer 2 unmanaged ethernet switch. It has a non-blocking fabric, meaning that 1000Mbps speed can be achieved simultaneously on all ports.

It runs from a wide input voltage range of 5.1 to 60V allowing integration into a wide range of applications.

1.1.1 Features

- 5 x 10/100/1000M (10BASE-T/100BASE-TX/1000BASE-T) ethernet ports
- Input voltage range from 5.1 to 60V
- 45mm x 45mm board size
- Molex Picoblade connectors for power and ports
- Automatic MDI-X crossover
- Auto-negotiation with connected devices to achieve maximum speed
- Unmanaged (out-the-box) functionality

1.1.2 General Information

Voltage Input	5.1V to 60V DC (65V absolute max)
Supported Protocols	10BASE-T, 100BASE-TX, 1000BASE-T
Power Consumption	260mW (idle) to 1100mW (full switching)
Weight	18 grams
Size	45 mm x 45 mm x 23.7 mm
Operating Temperature	0°C to +70°C
Storage Temperature	-30°C to +100°C

Table 1: General Information

1.1.3 General Operating Instructions

GigaBlox 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.

GigaBlox can be operated immediately by following the steps below.

1) Apply a voltage between 5.1V to 60V to the voltage input terminals.

2) Connect external devices to the ethernet ports using RJ45 to Picoblade cables.

3) GigaBlox will automatically begin auto negotiation with connected devices and begin receiving and forwarding packets to/from all connected devices.

There is no managed mode on GigaBlox, it can only operate as an unmanaged 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

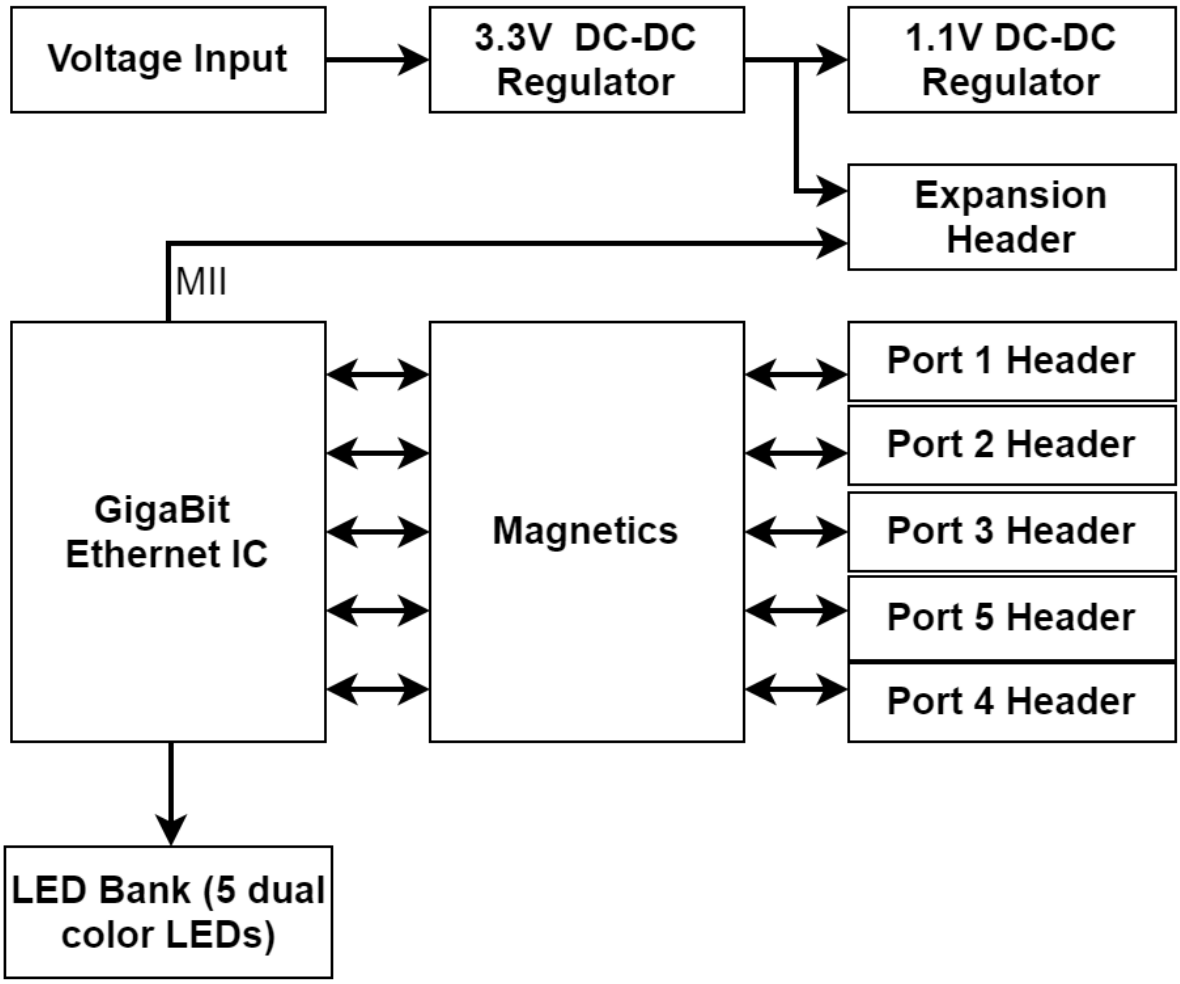


Figure 1: GigaBlox Block Diagram

1.4 Included Equipment

The product includes the following:
1 x GigaBlox board
5 x Molex Picoblade to RJ45 8-way Unshielded Twisted Pair cables (300mm)
1 x Molex Picoblade to bare, tinned leads (300mm)

1.5 RoHS Certification of Compliance

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

2 Hardware Interfaces

2.1 Board Map

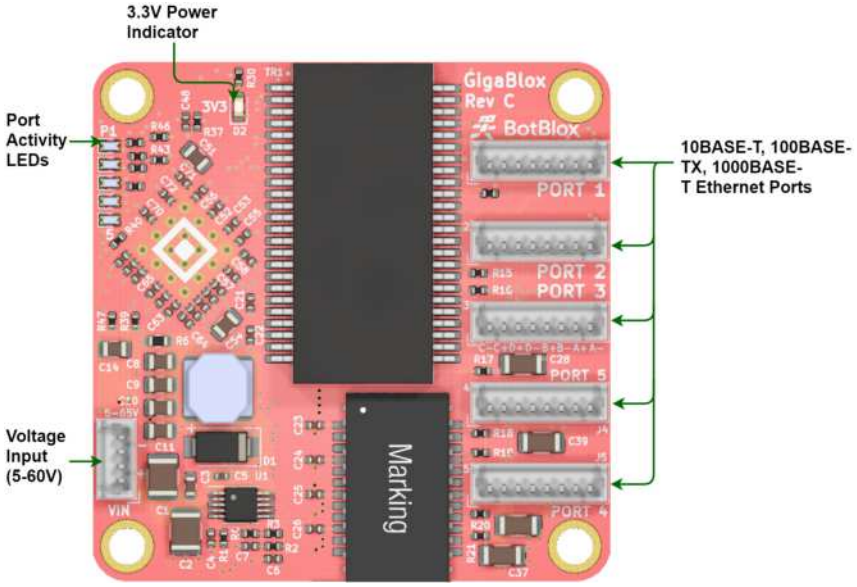


Figure 2: GigaBlox Board Map (front)

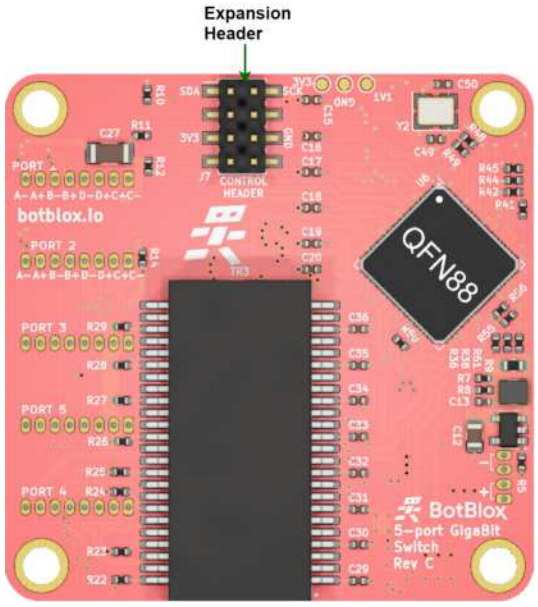


Figure 3: GigaBlox Board Map (back)

2.2 Connectors and Pinouts

2.1.1 Voltage Input

The bottom 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

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

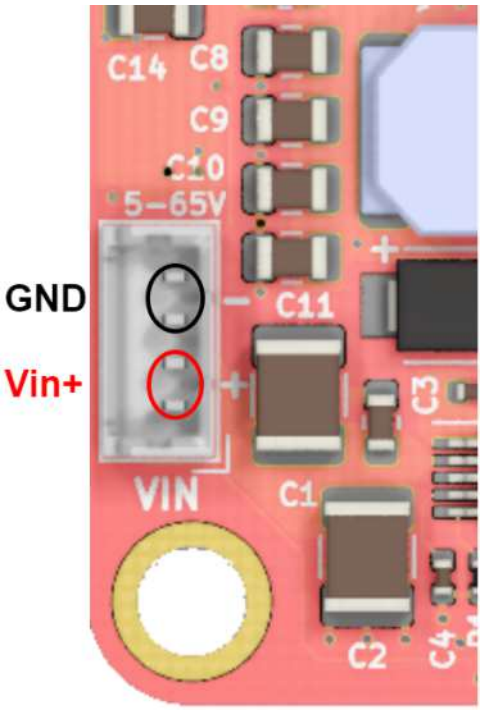


Figure 4: Voltage input header pinout

Connector part numbers

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

Table 2: Voltage input connector pinout and part numbers

Cable pinout

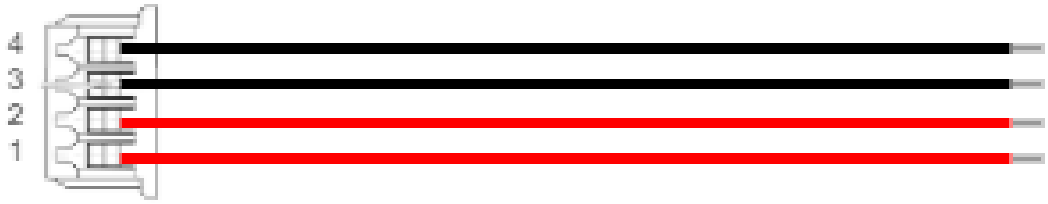


Figure 5: Voltage input cable pinout (red = V+, black = GND)

2.1.2 Ethernet Ports

There are five ethernet connectors on GigaBlox. Each connector has eight pins corresponding to the four signals required for 1000BASE-T which are A+, A-, B+, B-, C+, C-, D+ and D-. The pin mapping of all five connectors is identical.



Figure 6: Ethernet port pinout

Connector on board	Mating header	Crimp used	Wire used
530470810	0510210800	500798000	UL1061, 28AWG

Table 3: Ethernet connector pinout and part numbers

Cable pinout

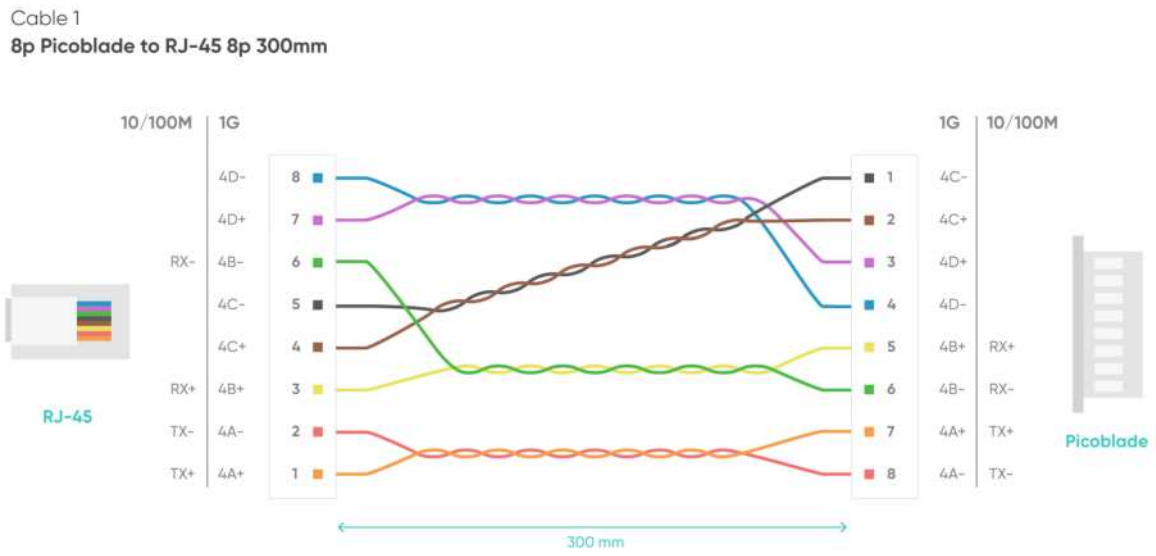


Figure 7: Ethernet cable pinout

Compatibility with SwitchBlox Cables
GigaBlox can be used with 4 pin SwitchBlox cables at 10/100M speed by plugging the SwitchBlox cables into the right-hand side of the 8 pin connector.

This is because the right-most signals on the GigaBlox 8 pin headers are the A- (Tx-), A+ (Tx+), B- (RX-) and B+ (RX+) signals, which are all that are needed for 10/100Mbps.

2.1.4 Extension header

BotBlox boards have an extension header that is typically depopulated on all boards. This extension header carries the following signals.

- 3V3 and Ground: This can be used to input 3.3V directly to the board when no input voltage is present, or to output 3.3V when an input voltage is present.
- MDIO/SDA and MDC/SCL MII pins on the GigaBlox ethernet IC. These pins are broken out for future testing. At present the internal registers of the ethernet switch are not published by the manufacturer.

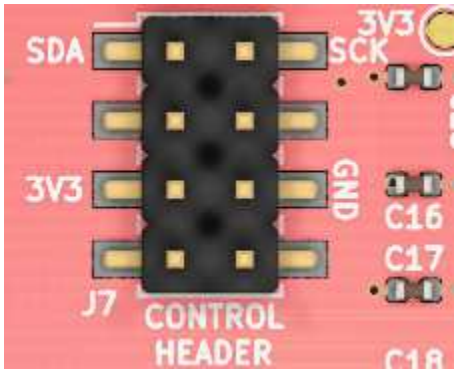


Figure 8: Extension header pinout

2.2 Other Interfaces

2.2.1 LEDs

There are 6 LEDs on GigaBlox in total. None of the LED signals can be taken off board.

The 3V3 Power Indicator LED (**Green**) indicates that voltage is present on the 3V3 line. It should be solid green in normal operation.

Each Port Activity LED (**Red**/**Green**) corresponds to a specific port. They indicate activity on each port and will blink when there is traffic on a port. The color of the LED indicates the link speed, with **Red** meaning 10/100M speed, and **Green** meaning 1G speed. They should be solid off when a port is not connected to any device, and they should blink under normal operation. A solid LED indicates either constant traffic, or a fault with the port.

3 Software Interfaces

There is currently no software interface on GigaBlox. It functions solely as an unmanaged switch.

4 Device Configuration

4.1 Unmanaged Switch

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

4.2 Managed Switch

Operating GigaBlox as a managed switch is not possible at present.

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	65V
Storage Temperature	-30°C +100°C
Operating Temperature	0 to 70°C

Table 4: Ethernet connector pinout and part numbers

6 Known Hardware Bugs

6.1 Bug BB-GGB-C-1:0001

6.1.1 Affected boards

GigaBlox, all revisions

6.1.2 Description

Identical ports on two GigaBlox that are powered on at the same time will not establish a link.

6.1.3 Reproduction steps

Power on two GigaBlox at the same time and use an interconnect cable to connect two identical ports on each GigaBlox to each other (e.g. port 1 to port 1 or port 2 to port 2, etc). The ports will not connect. This only occurs when two GigaBlox are powered on at the same time. If the GigaBlox are powered on at different times, the ports will establish a connection.

6.1.4 Solution/Workaround

When connecting two GigaBlox together directly, use different ports on each GigaBlox.

7 Datasheet Changelog

Date	Datasheet Version	Author	Notes
04/01/2021	C_A	Josh Elijah	Initial release
03/06/2021	C_B	Josh Elijah	Added bug sections - Auto Negotiation on identical ports bug added

8 Contact

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

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9 Declaration of Conformity

BotBlox (trading officially as Kapek Ltd) declares that the product GigaBlox (BB-GGB-A-1) is in compliance with Directive 2014/30/EU. The full text of the EU declaration of conformity is available at the following web address. https://www.botblox.io/ce-compliance-documentation/