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SWITCHCORE MODULE

COMPACT 8-PORT 10/100M ETHERNET

PDS - 384

SwitchCore Module is an 8-port (10/100BASE-T) Ethernet switch in an ultra-compact, modular form factor.

This module, at in incredibly small size of 27.6mm x 27.6mm x 10.7mm (1.09 x 1.09 x 0.43 inches), allows advanced Ethernet routing and switching capability to be added directly to an application, through modular stacking connector, without the need for any custom development.

SwitchCore addresses many of the requirements defined in the MOD PAYLOAD standard for UAS and other small vessels.

At present, SwitchCore ships as an unmanaged Ethernet switch, but custom firmware is being developed to enable CLI configuration for L2 and L3 switch management.

SwitchCore does not contain any cable-mate connectors. It is designed to be mounted to a baseboard for connector breakout. This allows full flexibility for connector position and type for customer applications.

SwitchBlox contains all required Ethernet circuitry, including transformers, meaning the baseboard only needs to provide connectors. For testing, or applications that don't intend to integrate SwitchCore, you can purchase the SwitchCore Baseboard. When both systems are mated, the SwitchCore system looks as below.

FEATURES & BENEFITS:

- 8 x 10/100-T galvanically isolated Ethernet ports
- Ultra small form factor (27mm x 27mm x 10mm), designed for direct embedding into a custom PCB
- Protective chassis for ultra rugged performance (MIL-STD-810H qualified)
- Military and automotive grade components for trusted performance in harsh environments
- Modular stackable header for custom integration
- Coming soon - Switch management and routing

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A MODULE DESIGN

This module is designed for direct integration into a customer's PCB, bringing "turn-key" Ethernet switch and routing with no work required by the customer. This allows system engineers to focus on building their system, rather than worry about the specifics of ethernet networking. No other solution exists on the market that brings this level of integration and performance in such a small, rugged form factor.

A DESIGN FOR MOBILE APPLICATIONS

BotBlox products are designed for use in mobile applications like drones and vehicles, that demand ultra low size and weight without sacrificing ruggedness or functionality. BotBlox specialises in crafting the smallest networking solutions on the market, that are also fully MIL-STD-810H tested and run management for intelligent networking at the edge.

HOW TO ORDER

Part Number	CF-02BBSCO	SwitchCore Module

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1.General Information

1.1 Functionality and Features of SwitchCore

The BotBlox SwitchCore is an PCB mountable ethernet switch module that houses 8 x 10/100BASE-TX ports for embedding into challenging environments. With a total size of 27.6 x 27.6 x 10.7 mm and a weight of 16 grams, no other wired ethernet device currently exists in such a small form factor. SwitchCore is targeted to harsh and size limited applications that need to add a plug-and-play ethernet network as a module directly into their system with minimal work.

SwitchCore is a module and has to be mated with a baseboard to provide power supply and connector breakout. This allows SwitchCore to form the heart of any flexible ethernet system through a custom baseboard design. SwitchCore can be used immediately with the BotBlox SwitchCore Baseboard, which provides connector breaks for the eight ethernet ports, management serial port and power.

When used with the baseboard, SwitchCore does not require any configuration or software to function as an unmanaged switch. SwitchCore currently runs layer 2 management software that is accessible over a CLI on the serial port.

SwitchCore contains all ethernet circuitry necessary, including magnetics, meaning a custom baseboard only needs to provide connectors and does not need transformers or common mode chokes.

1.1.1 Hardware Features

- 8 x 10/100BASE-TX ethernet ports (magnetics included)
- Input voltage range from 4V to 40V
- 27.6 x 27.6 x 10.7 mm (1.09 x 1.09 x 0.43 inches)
- 1.5 watts max power consumption
- 3.3V, 100mA output
- 3.3V TTL serial management port
- Command Line Interface for port status and configuration and VLAN
- Hirose DF40HC(4.0)-60DS-0.4V(51) modular connector for connection to baseboard
- Automatic MDI-X crossover and polarity correction on the 8 10/100BASE-TX ports
- Auto-negotiation on all ports with connected devices to achieve maximum speed
- Plug and play functionality when used with SwitchCore Baseboard

1.1.2 General Information

Voltage Input	4V to 40V DC (70V Absolute maximum)
Supported Protocols	10BASE-T, 100BASE-TX
Power Consumption	1.5W maximum
Weight	16 grams
Size	27.6 x 27.6 x 10.7 mm (1.09 x 1.09 x 0.43 inches)
Operating Temperature	-40°C to +85°C
Storage Temperature	-50°C to +125°C

Table 1: General Information

1.1.3 General Operating Instructions

SwitchCore is designed for use in harsh, space constrained environments, operating from a nominal supply voltage of 12V, but with the ability to operate from as low as 4V and as high as 40V.

A baseboard needs to be used with SwitchCore to provide access to the ports and power on the board.

To use SwitchCore, first mate the module with a baseboard then apply an input voltage from 4 to 40V.

If the SwitchCore Baseboard is used then SwitchCore will begin functioning as an unmanaged switch on all 8 ports without any configuration necessary.

Command line access for switch management on SwitchCore is accessible via the TTL level serial port on the SwitchCore, which can be accessed via the SwitchCore baseboard, or any custom baseboard, through the stacking connector on SwitchCore.

1.2 Safety Information

- This device can operate on voltages near and above 40V. Please read this manual before operating.
- This device is fully functionally tested prior to shipment however in-application testing prior to integration is recommended.
- This device is provided as a module for basic ingress protection, but is not waterproofed.

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- 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 Included Equipment

The product includes the following:
1 x SwitchCore Module

1.4 RoHS Compliance

SwitchCore complies with the RoHS (Restriction of Hazardous Substances Directive) Certificate of Compliance.

2. Hardware Interfaces

2.1 Hardware Map

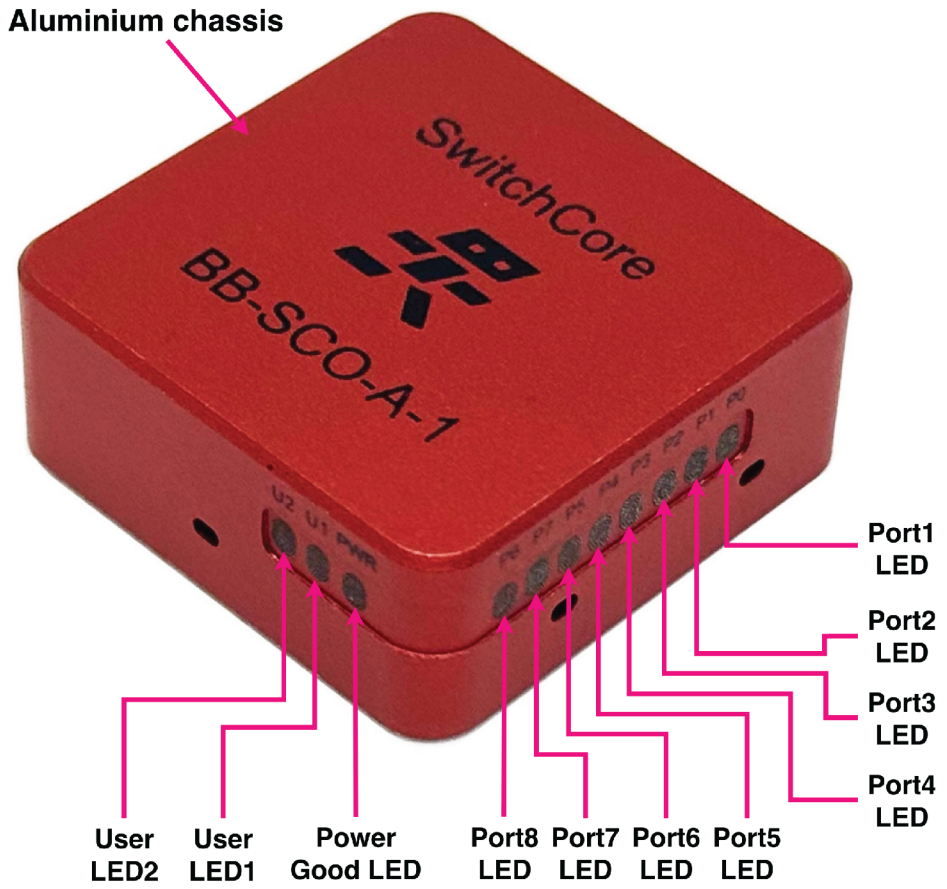

Figure 1: SwitchCore Hardware Map (top)

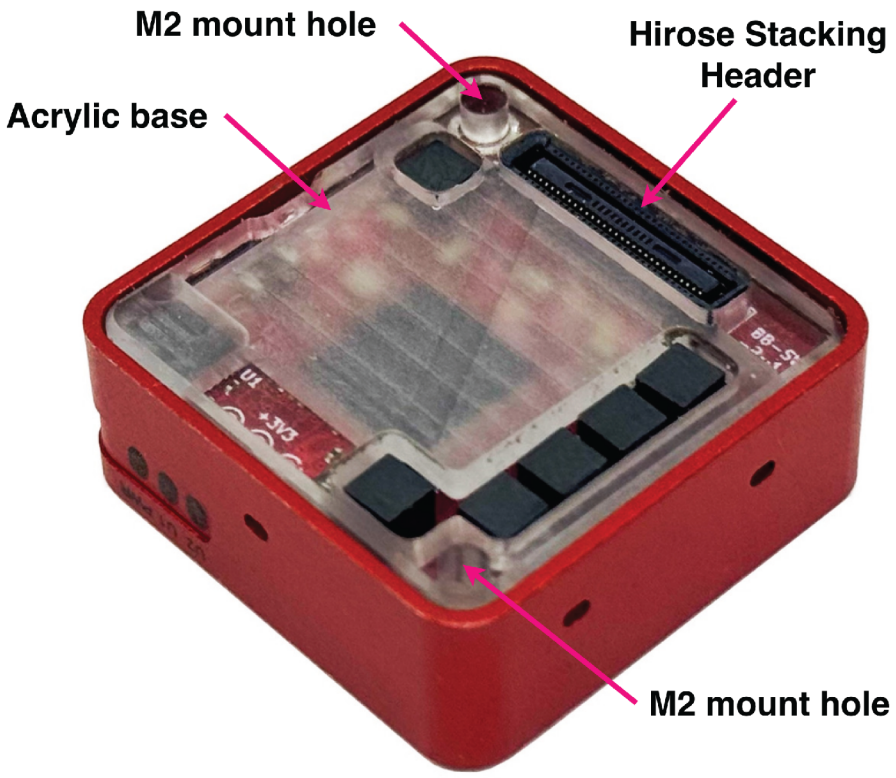

Figure 2: SwitchCore Hardware Map (bottom)

2.2 Connectors and Pinouts

2.2.1 Hirose connector

On the bottom of SwitchCore is a single 60 pin Hirose DF40HC(4.0)-60DS-0.4V(51) receptacle. This forms the entire electrical interface of SwitchCore, there are no other connectors. This connector carries the following signals:

- 4 - 40 V voltage input
- 8 x 10/100BASE-TX ethernet ports
- 2 x 3.3V TTL UART ports
- 1 x serial wire debug port
- 1 x 3.3V output (100mA max)

This Hirose connector provides a high density, high contact reliability, shock resistant, high speed interconnection to a baseboard, while maintaining full galvanic isolation between each Ethernet port.

Part used on SwitchCore (receptacle): DF40HC(4.0)-60DS-0.4V(51) Associated mating part, as used on SwitchCore baseboard (plug): DF40C-60DP-0.4V(51)

The table below shows the key performance characteristics of this connector system.

Pin pitch	0.4 mm
Mated height (plug + receptacle)	4 mm
Maximum mating cycles	30
Rated voltage	50 V
Maximum bandwidth	20 Gbps
Contact resistance	90 mΩ
Shock rating	490 m/s_2 (50G), 11ms pulse, 3 times for each 3 axes

Table 2: Connector specifications

An image of the receptacle and plug are shown below in figures 3 and 4.

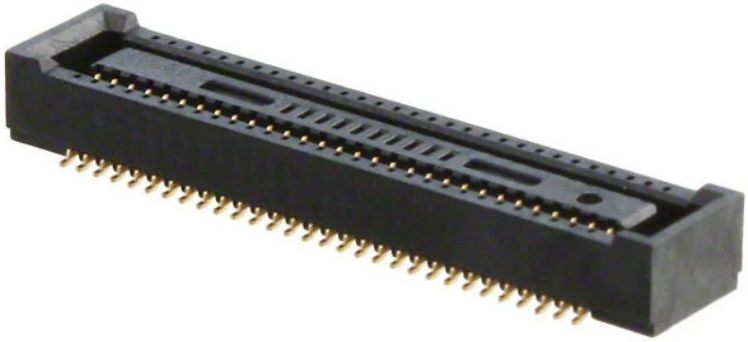

Figure 3: Hirose receptacle, as used on SwitchCore Module (DF40HC(4.0)-60DS-0.4V(51))

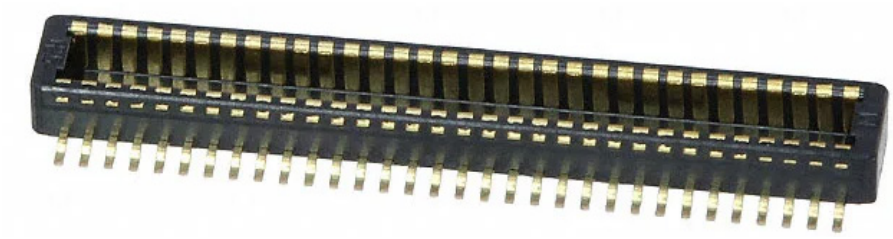

Figure 4: Hirose Plug, as used on SwitchCore BaseBoard (DF40C-60DP-0.4V(51))

Figure 5 provides index information for pins 1, 2 59 and 60, as referenced in table 3 below.

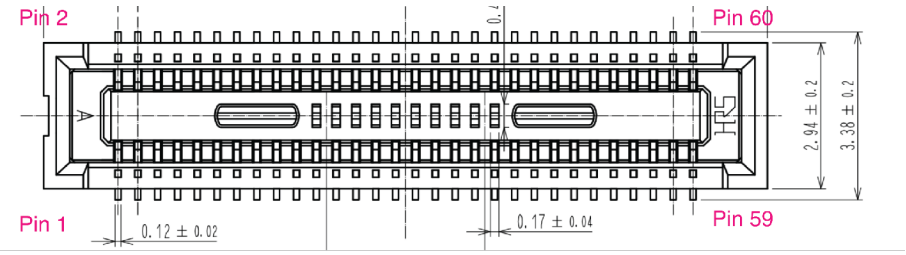

Figure 5: Index information for the receptacle used on SwitchCore, as viewed from the top of the connector.

The pin numbering used on the receptacle on the module is mirrored on the plug on the baseboard.

This means that the associated signals on the receptacle connect to the "mirrored" pin number on the plug.

For example, pins 1 and 3 carrying VBUS on the receptacle (on SwitchCore Module) connect to pins 2 and 4 on the plug (on the baseboard).

The signal to pin assignments used on SwitchCore are detailed in table 3 below.

Pin name	Pin number on receptacle on module	Description
VBUS	1	Power input, connect to the positive terminal of the power supply for SwitchCore. Input range is 4 - 40V.
VBUS	3	
GND	5	Power ground, connect to the negative terminal of power supply for SwitchCore
GND	7	
3.3V	9	3.3V output reference, 100mA maximum current draw
USART6_RX	13	3.3V TTL level serial port, connected to USART6 on the internal controller. This port is a spare and currently un-implemented. This port is not 5V tolerant. (RX is input to module, TX is output from module). Can be left floating or broken out to a connector on a baseboard.
USART6_TX	15	

Pin name	Pin number on receptacle on module	Description
USART1_RX	17	3.3V TTL level serial port, connected to USART1 on the internal controller. This port is used to access the onboard command line interface. This port is not 5V tolerant. (RX is input to module, TX is output from module). Can be left floating or broken out to a connector on a baseboard.
USART1_TX	19	
SWDIO	21	Serial Wire Debug Input/Output on the main controller on Switch-Core. Generally not used unless for firmware upload or advanced controller debug. Can be left floating or broken out to a connector on a baseboard.
SWCLK	23	Serial Wire Debug Clock, on the main controller on SwitchCore. Generally not used unless for firmware upload or advanced controller debug. Can be left floating or broken out to a connector on a baseboard.
JTDO_SWO	25	Serial Wire Debug Output, on the main controller on SwitchCore. Generally not used unless for firmware upload or advanced controller debug. Can be left floating or broken out to a connector on a baseboard.
UC_NRST	11	Hard reset line for the internal controller on SwitchCore. Active low, needs to be pulled high on with a 10k resistor on the baseboard. This pin is used with the SWD port pins to perform firmware updates. Pulling this signal low will cause a hard reset on the internal controller, preventing the CLI and management software from running. This will not affect the unmanaged switching operation of Switch-Core (SwitchCore will continue to forward packets even if the controller is in reset). Can be left floating or broken out to a connector on a baseboard.
CRX1_N	4	Port 1 100BASE-TX Differential Data Pair RX and TX Note: 100BASE-TX and 10base-t are supported, with full auto-negotiation and auto-mdi(x). SwitchCore contains magnetics on all ethernet ports, so these pins do not need any additional circuitry and can be connected to a passive connector
CRX1_P	6	
CTX1_P	8	
CRX1_N	10	

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Pin name	Pin number on receptacle on module	Description
CTX2_P	14	Port 2 100BASE-TX Differential Data Pair RX and TX Note: 100BASE-TX and 10base-t are supported, with full auto-negotiation and auto-mdi(x). SwitchCore contains magnetics on all ethernet ports, so these pins do not need any additional circuitry and can be connected to a passive connector.
CTX2_N	16	
CRX2_N	18	
CRX2_P	20	
CRX3_P	32	Port 3 100BASE-TX Differential Data Pair RX and TX Note: 100BASE-TX and 10base-t are supported, with full auto-negotiation and auto-mdi(x). SwitchCore contains magnetics on all ethernet ports, so these pins do not need any additional circuitry and can be connected to a passive connector.
CRX3_N	34	
CTX3_N	36	
CTX3_P	38	
CTX4_P	42	Port 4 100BASE-TX Differential Data Pair RX and TX Note: 100BASE-TX and 10base-t are supported, with full auto-negotiation and auto-mdi(x). SwitchCore contains magnetics on all ethernet ports, so these pins do not need any additional circuitry and can be connected to a passive connector.
CTX4_N	44	
CRX4_N	46	
CRX4_P	48	
CTX5_P	52	Port 5 100BASE-TX Differential Data Pair RX and TX Note: 100BASE-TX and 10base-t are supported, with full auto-negotiation and auto-mdi(x). SwitchCore contains magnetics on all ethernet ports, so these pins do not need any additional circuitry and can be connected to a passive connector.
CTX5_N	54	
CRX5_N	56	
CRX5_P	58	
CTX6_P	51	Port 6 100BASE-TX Differential Data Pair RX and TX Note: 100BASE-TX and 10base-t are supported, with full auto-negotiation and auto-mdi(x). SwitchCore contains magnetics on all ethernet ports, so these pins do not need any additional circuitry and can be connected to a passive connector.
CTX6_N	53	
CRX6_N	55	
CRX6_P	57	
CTX7_P	41	Port 7 100BASE-TX Differential Data Pair RX and TX Note: 100BASE-TX and 10base-t are supported, with full auto-negotiation and auto-mdi(x).
CTX7_N	43	

Pin name	Pin number on receptacle on module	Description
CRX7_P	45	SwitchCore contains magnetics on all ethernet ports, so these pins do not need any additional circuitry and can be connected to a passive connector.
CRX7_N	47	
CTX8_N	31	Port 8 100BASE-TX Differential Data Pair RX and TX Note: 100BASE-TX and 10base-t are supported, with full auto-negotiation and auto-mdi(x). SwitchCore contains magnetics on all ethernet ports, so these pins do not need any additional circuitry and can be connected to a passive connector.
CTX8_P	33	
CRX8_P	35	
CRX8_N	37	
GNDREF	2	Chassis ground. This ground is isolated from the power ground output and should either be left floating on the baseboard or connected to the chassis or cable shield used with the ethernet cables for the baseboard.
GNDREF	12	
GNDREF	22	
GNDREF	30	
GNDREF	40	
GNDREF	50	
GNDREF	60	
GNDREF	29	
GNDREF	39	
GNDREF	49	
GNDREF	59	

Table 3: Connector pin assignments on SwitchCore

2.3 Ports and Interfaces

2.3.1 8 x 10/100BASE-TX Ethernet Ports

There are 8 copper ethernet ports on SwitchCore that can operate in 10BASE-T and 100BASE-TX modes.

2.3.1.1 Auto negotiation

These 8 ports support auto negotiation and will automatically negotiate with any connected device to achieve the highest possible link speed based on the connected device's capabilities. This is the default configuration of these ports on SwitchCore.

Auto negotiation can be disabled through switch configuration, and the port can be fixed to a particular speed. In most cases it is not advisable to do this since it is simpler to just let the auto negotiation protocol handle any differences in port capabilities.

2.3.1.2 Auto-MDI/X

The 8 ports support Auto-MDI/X by default, meaning the ports will automatically determine whether or not they need to cross over between its pairs as shown in table 6. This means that an external crossover cable is not required when using these ports.

If a connected device cannot automatically correct for a crossover cable, the ports on SwitchCore will make the necessary adjustments prior to commencing auto negotiation.

If a connected device can automatically correct for crossover, SwitchCore will implement a random algorithm as described in IEEE 802.3 clause 40.4.4 to determine which device performs the crossover.

This feature can be disabled through switch configuration, however this is not advised unless the pin mappings are thoroughly checked.

Pin	MDI		MDIX	
	100BASE-TX	10BASE-T	100BASE-TX	10BASE-T
CTXn_±	TX±	TX±	RX±	RX±
CRXn_±	RX±	RX±	TX±	TX±

Table 4: MDI/MDIX Pin Mapping

2.3.1.3 Polarity Correction
SwitchCore will automatically correct polarity (+ and - wiring mistakes) errors in the receive connections in 10BASE-T links. In 100BASE-TX, the polarity does not matter. This allows SwitchCore to compensate for an incorrect polarity.

2.3.1.4 Magnetics
IEEE 802.3, Clauses 33.4.1 and 40.8.3 require that copper ethernet ports are galvanically isolated with a minimum isolation voltage of 1500 VRMS for 60 seconds between each port.

Practically this means adding signal transformers and common mode chokes (colloquially named “magnetics”) to each port, which adds size, weight and design complexity.

SwitchCore embeds these magnetics inside the module. Achieving this without adding significant size to SwitchCore was done through a novel transformer design that Bot-Blox achieved working directly with a transformer manufacturer.

The embedding of magnetics into the module means that the baseboard does not need to contain any additional circuitry on the ethernet signals. They can be directly routed onto a passive connector. The only requirements for these signals on the baseboard are 100Ω (±10%) is maintained. For design guidelines, please refer to the open source design files for SwitchCore BaseBoard.

For custom baseboards that place the ethernet signals onto RJ-45 jacks, be aware that many RJ-45 jacks embed magnetics inside them (often called magjacks).

Using such a magjack with SwitchCore will place an additional unnecessary transformer onto the ethernet signals. This is suboptimal as it will reduce the amplitude of the ethernet signals thus reducing overall range/performance.

Thus, we recommend using a passive RJ-45 connector such as 54602-910LF.

2.3.1.5 Chassis ground (GNDREF)
Since SwitchCore embeds magnetics, there are two grounds present on the connector of the module. Power ground “GND" (negative side of the voltage input) and cable/chassis ground “GNDREF”. GNDREF is the chassis-side reference of the onboard Ethernet magnetics and must remain isolated from the module’s digital/power ground. There are two ways to connect GNDREF on a baseboard, depending on whether the baseboard uses shielded cables and/or connects to a chassis.

For baseboards that use shielded cables and/or connect to a chassis
On a customer baseboard, GNDREF should normally be routed to the chassis or shield plane and used as the connection for RJ-45 shield tabs and any cable shielding. In such

situations, GNDREF and power ground are typically connected via a simple EMC network; this is handled in the module using the EMC network shown in figure 6 below.

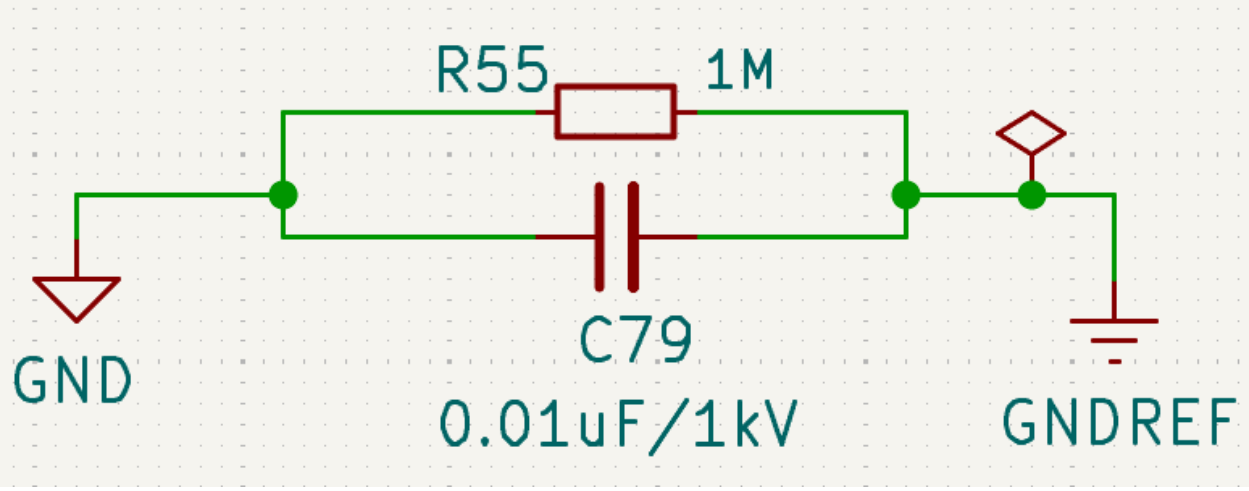

Figure 6: The EMC network between power ground (GND) and chassis ground (GNDREF) inside SwitchCore Module

This network exists to achieve the following:

- Low impedance path for high frequency noise: Provides a low impedance return path to power ground for high frequency common- mode noise picked up in the cables. This allows the common-mode noise to flow back to power ground rather than radiate out from the cables.
- ESD clamping: If an ESD event occurs on the RJ-45 shield or cable, the chassis ground can charge to several kilovolts. The capacitor is able to briefly conduct the fast edge of the ESD pulse to equalise the GNDREF and GND, preventing arcing through the transformer. Remaining charge buildup is then slowly equalised later through the 1MΩ resistor.
- Prevent huge differences between GNDREF and GND: Allowing GNDREF to float completely could cause it to sit an an undefined potential, very different to GND. This high impedance connection keeps both grounds relatively coupled without breaking the required isolation rules as defined in IEEE 802.3, Clauses 33.4.1 and 40.8.3.

As a result of this EMC network, there is no need to add additional circuitry to connect GND and GNDREF on the baseboard.

For baseboards that use unshielded cables and do not connect to a chassis.

If a baseboard uses unshielded RJ-45 jacks, unshielded twisted-pair (UTP) cable or does not connect to a chassis, GNDREF may alternatively be left unconnected, in which case the Ethernet isolation barrier remains intact but no chassis reference is provided for EMI suppression. In most cases this is perfectly acceptable within mobile systems.

Do not directly connect GNDREF and GND together on a baseboard design. In nearly all cases it is preferable to leave GNDREF floating.

2.3.2 Power Input

SwitchCore is designed to run from a 4 - 40V input voltage (VBUS), with overvoltage protection up to 70V. This input voltage is not fully protected against transient voltage, thus care should be taken when integrating SwitchCore into a system that is expected to have high transient voltages VBUS (such as a system that uses brushless DC motors).

We highly recommend adding a TVS clamping diode to the baseboard power input, such as the SMF54CA, as this can prevent the fast majority of failures on SwitchCore. The protection circuit used on SwitchCore baseboard is shown in figure 7 below.

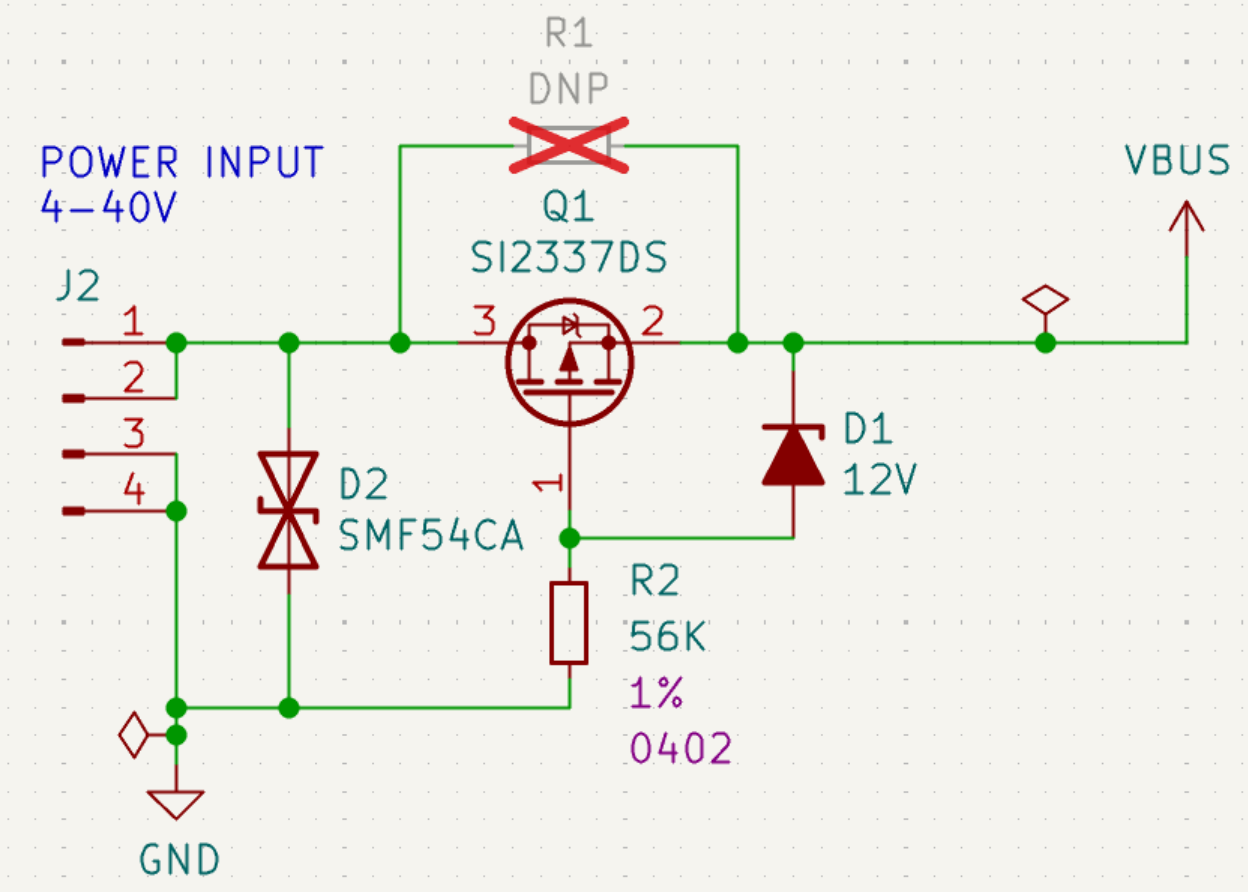

Figure 7: The power input protection circuit used on SwitchCore Baseboard which includes transient voltage suppression (D2) and reverse polarity protection (Q1, R2, D1).

Table 5 below shows the part numbers for the components in figure 7.

Component	Description	Part Number
J2	Molex Picoblade, 4 pin, 1.25mm Vertical Header	0530470410
D2	TVS diode, 54V Standoff voltage	SMF54CA
Q1	P-CHANNEL 80-V (D-S) MOSFET	SI2337DS-T1-BE3
R2	56Kohm resistor	RC0402FR-0756KL
D1	12V Zener diode (protects gate of Q1	MM3Z12VT1G

Table 5: Part numbers used in figure 7

Table 6 below shows more specifications of the power input port on SwitchCore.

Input capacitance @ 25°C	2.2 uF
Absolute maximum voltage input	70 V
Minimum input voltage	4V
ESD rating	±2000 V (Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001)
Internal switching frequency	2.2MHz
Efficiency @ 12V input	83%
Efficiency @ 24V input	80%
Efficiency @ 48V input	74%

Table 6: Key characteristics of the power input port on SwitchCore

While SwitchCore can operate on an unstable voltage varying from 4 - 40V, we recommend adding bulk capacitance of at least 10uF close to the power input pins on SwitchCore to provide additional protection against voltage variations.

2.3.3 TTL Serial (UART) Ports

SwitchCore contains two serial ports that allow the user to interact with the onboard Command Line Interface (CLI), allowing switch configuration.

Note that both RX and TX are 3.3V level signals and do not require any external pull ups. For external connections, ensure that GND is common between SwitchCore and the connected device.

These serial ports are unisolated, unprotected, and directly connected to pins on the controller inside SwitchCore, which are not 5V tolerant. Thus care should be taken when interfacing these pins with external devices.

In most cases, you should use a 3.3V level UART to USB/Ethernet converter to connect these pins to a PC, ensuring that the ground on SwitchCore and the ground on your converter are connected. Do not connect the 3.3V output on SwitchCore to the 3.3V output on your converter, as this will cause both voltages to conflict with each other. Note that RX is an input to SwitchCore and should be connected to the TX output on your converter (and vice versa).

WARNING! These pins are not 5V tolerant. You must ensure that you only connect it to a 3.3V level device.

Using a 5V device on these pins will permanently damage SwitchCore!

Both ports are capable of outputting the onboard CLI; however only USART1 is programmed to do this. USART6 is currently unimplemented but provides an additional serial port for future use such as interfacing with other devices or operating as a serial to ethernet converter. The two USART6 pins may also be configured as GPIO pins for other custom applications.

Please get in touch at info@botblox.org if this is of interest to your application.

2.3.4 SWD Programming Port

A programming port on SwitchCore allows debugging and firmware upload to the main controller inside SwitchCore. In most customer applications this port should not be used, however it is advisable to break this port out onto a header on the baseboard to allow easy firmware upgrade and debugging if needed.

2.3.5 Controller Hard Reset

Direct access to the hard reset line on SwitchCore is accessible over the module. This is necessary for use with the SWD programming port. It should be pulled up to the 3.3V rail output from SwitchCore with a 10Kohm resistor. In most applications you should not use this signal.

2.3.6 LED Indicators

There are 11 LED indicators inside SwitchCore Module, which are visible on the sides of the chassis. None of these signals are present on the module connector and thus cannot be broken out from the module.

2.3.6.1 Power LED

A single LED labeled “PWR” indicates the main internal voltage supply of SwitchCore is functional.

2.3.6.2 Ethernet Activity Indicator LEDs

There are eight single-color LEDs, one associated with each ethernet port, labelled P0 to P7 respectively. These LEDs are solid when a link is present and blink to indicate link activity.

There is a chassis label error on initial versions of SwitchCore, such that P0 refers to Port 1, P1 refers to Port 2 and so on. This is fixed in later versions of SwitchCore.

3.System Fabric Information

3.1 System Information

The ethernet switch aspect of SwitchCore has the following capabilities.

3.1.1 Switch Fabric

Packet Buffer Memory	1 Mbits
Jumbo Frame Support	No, up to 1552Bytes only
# of MAC Addresses	2K
Ports 1-8 Capability	10/100BASE-TX
Forwarding method	Store and forward
Energy efficient ethernet	Disabled by default

Table 7: SwitchCore switch fabric capabilities

3.1.2 Management features

The table below shows a list of all network management features that are possible on SwitchCore hardware, however most have not yet been implemented in software. This provides an idea of what SwitchCore will eventually be capable of as the software is developed, along with a snapshot of the current feature set as of time of writing (refer to Section 9).

Port control (auto-negotiation toggle, speed control, auto-MDI(X))	Yes
Port statistics	Yes
EEE toggle	Not yet
802.1Q VLANs	Yes, 16 total
Port-based VLANs	Yes
Double Tagging (Q in Q)	Not yet
IGMP Multicast Routing v1/v2/v3	Not yet
STP, RSTP, MSTP	Not yet
Link Aggregation (LAG/Port Trunking)	Not yet
QoS (Port and Tag based)	Not yet

Port control (auto-negotiation toggle, speed control, auto-MDI(X))	**Yes**
Update over Ethernet	Not yet
Firewalling	Not yet
VPN	Not yet
Tshark and TCPDump	Not yet

Table 8: SwitchCore management features

4 Software Interfaces

As of time of writing, SwitchCore runs a basic command line interface for port management and VLAN. This software is called BloxOSRout. This allows for basic switch management and non-volatile configurations to be loaded onto SwitchCore. Over time this software will be developed into a full fledged routing OS.

5 Device Configuration

5.1 Unmanaged Switch

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

5.2 Managed Switch

To use SwitchCore in a managed application requires a 3.3V UART device to be connected. Please refer to our documentation on using BloxOSRout.

6. Mechanical drawings

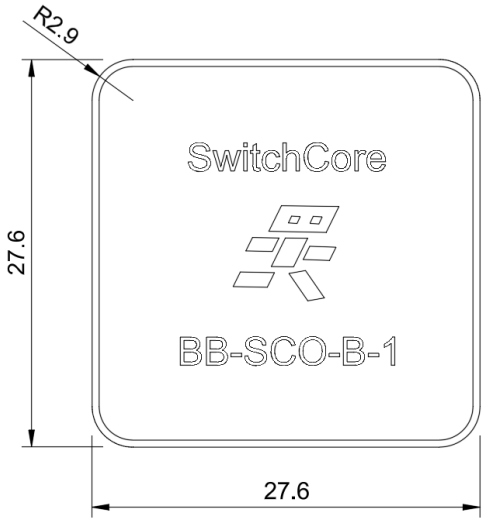

Figure 8. SwitchCore mechanical drawing, top view (mm)

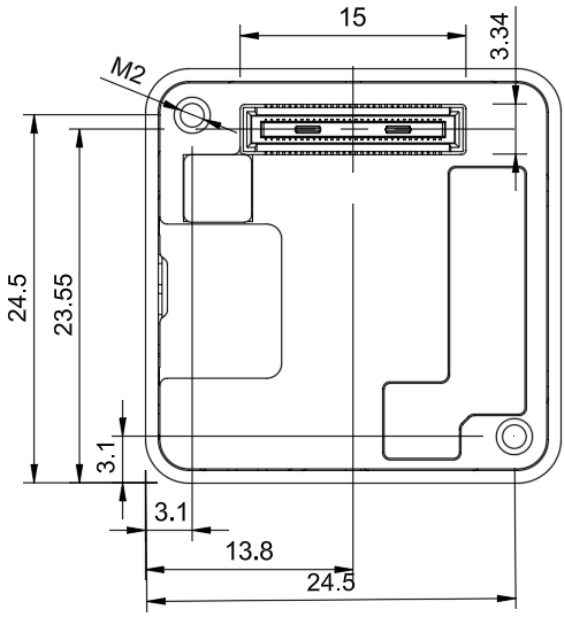

Figure 9. SwitchCore mechanical drawing, bottom view (mm)

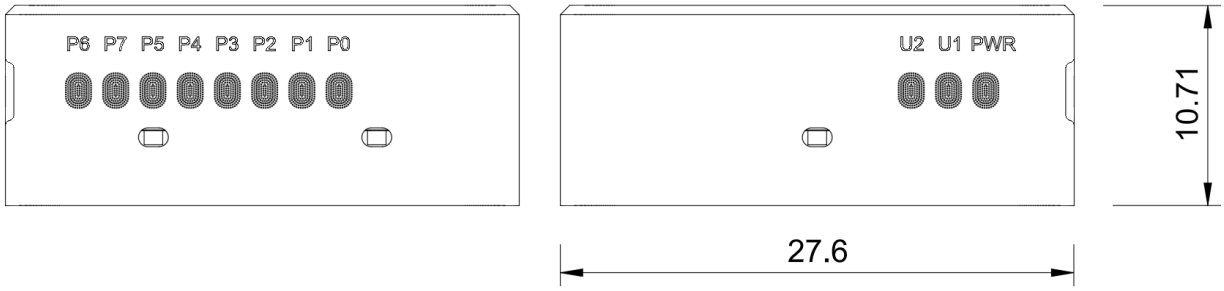

Figure 10. SwitchCore mechanical drawing, side view (mm)

Figure 7: The power input protection circuit used on SwitchCore Baseboard which includes transient voltage suppression (D2) and reverse polarity protection (Q1, R2, D1).

3D CAD can be found in the link below.
https://grabcad.com/library/switchcore-module-1

7.Thermal Considerations

The internal circuitry of SwitchCore is highly optimized to reduce power consumption, and the aluminium chassis of SwitchCore thermally couples directly to all power dissipating components inside the module.

Because of this SwitchCore can be with no additional heatsinking. SwitchCore can be deployed directly into an enclosed environment with ambient temperatures up to 85°C.

8. Assembly and Mounting Information

8.1 Required Hardware

- SwitchCore Module
- SwitchCore BaseBoard (or custom baseboard)
- 2 x M2 x 10mm machine screws (Example: SPP-M2-10-A2)

8.2 Assembly method

The chassis SwitchCore has two mounting holes that are threaded internally, which should be used to securely mount SwitchCore into a baseboard.

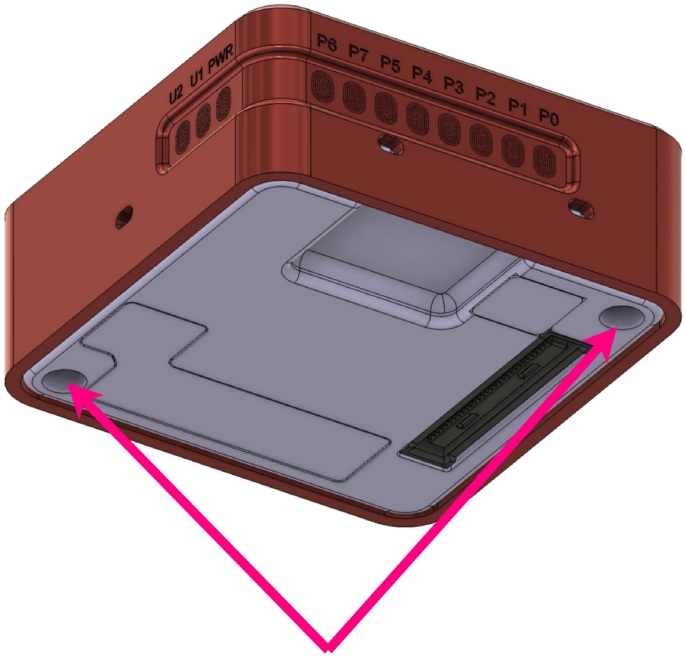

Figure 12. The two threaded M2 mount holes on SwitchCore

Assuming a 1.6mm thick baseboard is used, two M2 x 10mm screws can be used to securely

Mount the module into the baseboard, as shown in figure 12.

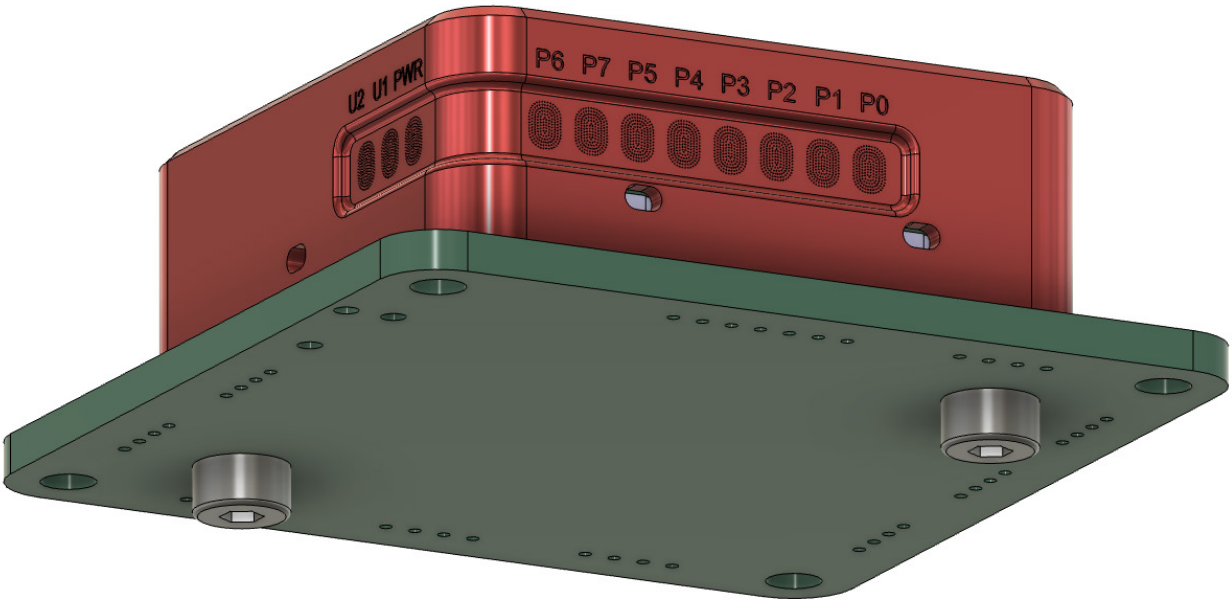

Figure 13. SwitchCore mounted onto a baseboard using screws

9. Datasheet Changelog

Date	Datasheet Version	Author	Notes
29/11/2025	A_A	Josh Elijah	Initial release

10. Contact

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

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11. Certificate of Conformity

The full text of the Certificate of Conformity of this product is available at the following web address. https://botblox.io/documentation/

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