Description

The Holjeron BusBlock Digital I/O Module is designed to handle small amounts of digital inputs and/or outputs in a limited amount of space. The BusBlock Digital I/O Module has 8 points. Each point can be configured as either an input or an output. Field terminations are captive screw terminals.

Other BusBlock products include analog input, analog output and frequency modules.

Warranty/Remedy

Seller warrants its products to be free from defects in design, material and workmanship under normal use and service. Seller will repair or replace without charge any such products it finds to be so defective on its return to Seller within 18 months after date of shipment by Seller. **The foregoing is in lieu of all other expressed or implied warranties (except title), including those of merchantability and fitness for a particular purpose.** The foregoing is also purchaser's sole remedy and is in lieu of all other guarantees, obligations, or liabilities or any consequences incidental, or punitive damages attributable to negligence or strict liability, all by way of example.

While Holjeron provides application assistance, personally and through our literature, it is up to the customer to determine the suitability of the product in the application.
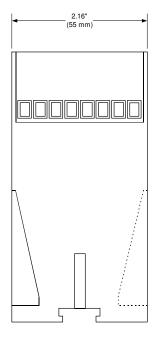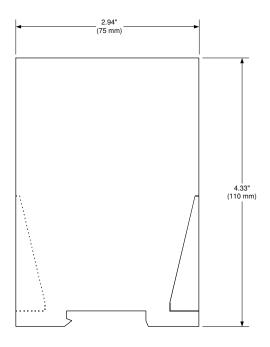
All information contained herein, including illustrations, specifications and dimensions, is believed to be reliable as of the date of publication, but is subject to change without notice.

Specifications

Part Number	8 Point Digital I/O Module		BBK-DIG108
Electrical	SDS Voltage Range		11-25 VDC
	Current Consumption		25 mA @24 VDC
	Data Rates		125, 250, 500 and 1000 kbps
	Isolation (I/O from SDS bus)		2500 Vrms @ 1 Min, 400Vrms cont. VDE 560Vpeak, CSA accepted
Inputs	Type		Current Sourcing (PNP devices)
	Number		Up to eight (8)
	Voltage		10-30 VDC
	Maximum Current		10 mA per input plus loads
Outputs	Type		Current Sinking (NPN)
	Number		Up to eight (8)
	Voltage		10-30 VDC
	Maximum Current		2.5 Amps per output @ 25°C 1.5 Amps per output @ 70°C
Environmental	Temperature	Storage	-40° to 85° C (-40° to 185° F)
		Operating	-25° to 70° C (-13° to 158° F)
	Humidity		5-95% RH, non-condensing
	Vibration		2G at 10 to 500 Hz
	Shock		10G
Physical	Dimensions		2.95" H x 2.17" W x 4.33" D
	Weight		8 oz
	Color		Bone Gray
	Case Material		Polycarbonate
	Mounting		DIN Rail or foot mount
	Terminations		Cage Clamp Screw Terminal
	Indication (details on page 4)	Power	Red-Green LED
		Activity	Red-Green LED
		Error	Red-Green LED
		AUX (I/O Power)	Red-Green LED
Certifications	CSA		C22.2 N0. 14-10
	UL		508 (17th Edition)

Holjeron
Matthews Automation Solutions

Dimensions

2.16"
(55 mm)

2.94"
(75 mm)

4.33"
(110 mm)

Wiring

Digital

SDS

10-30 VDC
I/O Power

Bus - | Bus + | Gnd | DC+ | DC+ | Gnd | Gnd | Gnd

Power   Activity   Error   AUX

Holjeron

BusBlock I/O Module for SDS   11-25 VDC, 60 mA

BusBlock Module

8 Point Digital I/O
BBK-DIG108
www.holjeron.com   File # xxxxxxxx

I/O 1 | I/O 2 | I/O 3 | I/O 4 | I/O 5 | I/O 6 | I/O 7 | I/O 8

+   Device   -

Typical of
Eight Points

Configuration Tools

Holjeron ZTC-F64 Multi-Config Tool (ZTC-F64-DOTS)

Holjeron offers a configuration tool that connects to the USB port of a personal computer and 24V power, either from the Bus or a dedicated power supply. This tool can be used to configure or master an SDS Network, a ViaBus network, or Holjeron's Zonelink.S serial communication for multi-zone MDR Controls.

Legacy Configuration Tools:

These tools below (and others) can be used for configuration, but are no longer sold or supported:

Holjeron HSIM Portable Configuration Tool for SDS (HSM-PTB101)

Honeywell hand-held activator

Honeywell Think & Do Software using Holjeron's PCI Interface Card to communicate with a PC.

Quick Start

The following steps are the minimum steps to configure BusBlock module. Default values are shown in bold.

Baud Rate

Baud rate selections are as follows:
0 = Autobaud
1 = 1000 kbps
2 = 500 kbps
3 = 250 kbps
4 = 125 kbps

Set Device Address

Set the address before attaching any component to a complete bus. This will help prevent duplicate addresses on a bus.

Using a configuration tool, change the device address from the default. All units are shipped from the factory as **address 126**.

Tag Name

Tag Name (attribute 56) is a 32-character string that the user can enter to describe the functionality and/or location of each channel of the BusBlock Digital I/O Module.

LED Diagnostic Indicator Patterns

Current (Third) Generation (Rev 5+)

- **Third Generation modules have Red-Green LEDs for all indicators.**

PWR	SDS	ERR	AUX	Indication
OFF	OFF	OFF	OFF	**OFF** (DC+ is less than 8 volts)
SG	SG	SG	SG	**1st LED Test Pattern (Third Gen)** (All Green segments ON)
SR	SR	SR	SR	**2nd LED Test Pattern (Third Gen)** (All Red segments ON)
* SR	SR	SR	OFF	* **Waiting for DC+ to reach SDS minimum of 11V** (User never sees if normal start-up)
* SR	SR	OFF	OFF	* **Waiting for valid EEPROM access** (User never sees if normal start-up)
SG	OFF	FG	OFF	**Waiting to Autobaud (Third Gen)** (Not seen if fixed rate is used.)
SG	OFF	SG	I/O*	**NORMAL CONDITION - Nothing to transmit on the CAN bus**
SG	IG	SG	I/O*	**NORMAL CONDITION - Trying to transmit on the CAN bus**
SG	OFF	FR	I/O*	**Nothing to transmit on the CAN bus and minor diagnostic bit(s) set**
SG	IG	FR	I/O*	**Trying to transmit on the CAN bus and minor diagnostic bit(s) set**
SG	OFF	SR	I/O*	**Not transmitting on the CAN bus and MAJOR diagnostic bit(s) set**
SG	IG	SR	I/O*	**Trying to transmit on the CAN bus and MAJOR diagnostic bit(s) set**
* SG	SFR	SR	I/O*	* **BUS OFF Condition** (SDS LED solid or flashing red only *during* BUS OFF condition)

* **These patterns available on units manufactured after June 2015, as identified by Serial Number (2015182X or higher)**

OFF = LED is OFF
SG = Solid Green
SR = Solid Red
FG = Flashing Green
FR = Flashing Red
SFR = Solid OR Flashing Red
IG = Intermittent Green
FR = Flashing Red
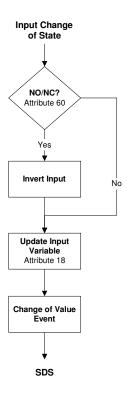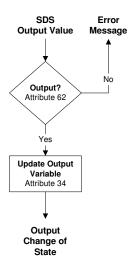**I/O = If AUX is Solid Green indicates that Power for I/O is Present**

Operation

The BusBlock Digital I/O module reads inputs and writes outputs using the processes defined below.

Input Change of State

Input NO/NC

The BusBlock Digital I/O Module can be configured to invert the state of an incoming input point by turning on a bit in **Input NO/NC (attribute 60)**.

Input Variable

Attribute 18 functions as the input attribute for the BusBlock Digital I/O Module. Whenever an event is generated that reports the state of inputs, the data in attribute 18 will be passed.

> ### Note
>
> **When using a packaged control system, such as Think & Do Software, it is not necessary to explicitly read input and output variables. The SDS I/O Driver and Interface Card perform this function. All that is required is to map inputs and outputs as described in the software user manual.**

Input Event Mode

Most systems will require a BusBlock I/O Module to generate an event whenever one or more inputs change state. This requires the **Unsolicit Mode (attribute 6)** be enabled by setting its value to **1**. Other options are to disable change of value events (Unsolicit Mode = 0) or use the **Cyclic Timer (Attribute 10)** by setting it to some non-zero value. The Cyclic Timer will transmit the input variable on an interval equal to the value in the Cyclic Timer attribute times 10 milliseconds (0.01 seconds).

Output Configuration

Each point on the BusBlock Digital I/O Module can be used as an input or an output. By default, each point is an input. Configuring a point as an output requires setting a corresponding bit to a value of 1 in the **Output Mask (attribute 62)**. The table below lists each bit and its associated numeric value. Adding the values for each bit that is to be used as an output will provide a numeric entry for the attribute value.

I/O Point	Value
0	1
1	2
2	4
3	8
4	16
5	32
6	64
7	128

For example, if the first four points are to be used as outputs the value for the attribute would be 15 (1+2+4+8).

Output Variable

Attribute 34 functions as the output attribute for the BusBlock Digital I/O Module. Whenever the host controller changes the state of an output it is writing to attribute 34.

Diagnostics

The Diagnostics Register (**attribute 9**) is two bytes and contains the minimum diagnostics required for the Smart Distributed System, plus additional diagnostics specific to the BusBlock Digital I/O module.

Diagnostic Register Bit Definitions Byte 0

Bit	Name	Description
0		Reserved
1	WDOG	Output watchdog timer expired
2	BUSOFF	CAN Bus communications error
3		Reserved
4		Reserved
5		Reserved
6		Reserved
7	EPRM	EEPROM error detected

Diagnostic Register Bit Definitions Byte 1

Bit	Name	Description
0	SRVLIFE	Service Life exceeded
1		Reserved
2	IOERR	I/O error
3	SDSPWR	SDS Supply Voltage Out of Range (11-27V)
4		Reserved
5		Reserved
6	CANOVRN	CAN Overrun
7		Reserved

SDS host controllers are equipped to receive a diagnostic event, then automatically obtain the information from the **Diagnostic Register (attribute 9)**. Consult the documentation for the host controller being used to determine how errors are handled.

WDOG

The WDOG diagnostic occurs whenever the **Output Watchdog Timer (attribute 50)** times out.

The Output Watchdog Timer is reset whenever the BusBlock module receives a message over SDS. If a message is not received in the time entered any point configured as an output will be set to the state for that bit in the **Default Output (attribute 51)**.

The Output Watchdog Timer is entered in increments of 10 milliseconds (0.01 seconds). For example, a value of 100 equals 1 second.

BUSOFF

The CAN controller on the BusBlock module counts error messages. Every error message increments a counter by 8, every good message decrements the counter by 1. If the counter reaches 128 then the module will go BUSOFF, and will need to be reset by the host controller.

EPRM

The EPRM error will occur when the microprocessor on the BusBlock module is unable to read or write EEPROM.

SRVLIFE

BusBlock modules are equipped with two attribute settings for managing the service life of the module. The first, **Service Time (attribute 63)** is the number of hours the module has been in operation. The second, **Service Life (attribute 64)** is set by the user, and is the number of service hours before the unit requires maintenance and/or replacement. When the Service Time value reaches the Service Life setting then an SRVLIFE diagnostic is transmitted.

IOERR

The IOERR diagnostic is enabled when the microprocessor on the BusBlock detects that I/O power is not present.

SDSPWR

This diagnostic is set when SDS bus voltage falls below the required level of 11 VDC.

CANOVRN

The CAN Overrun error is generated when the buffer is overloaded. Check the SDS bus for bad devices or poor connections.

Attribute 54 – CAN Error Status Codes

0	No error
1	Stuff error
2	Form error
3	Acknowledgement error
4	Bit recessive error
5	Bit dominant error
6	CRC error
7	reserved

Attributes

ID	Description	R/W	Data Type	*Size*	*Count*	Default
0	Network Data Descriptor	R	Unsigned	Byte	6	12h,01h,07h,22h,81h,07h
1	Baud Rate	R	Unsigned	Byte	1	0 [autobaud]
2	Object Model	R	Unsigned	Byte	5	1, 41, 5, 2, 2
3	Vendor Id	R	Unsigned	Word	1	9 [Holjeron]
4	Logical Address	R	Unsigned	Byte	1	125
6	Un/solicited Mode	W	Boolean	Undef	1	1
7	Software Version	R	Character	Undef	12	
8	Diagnostic Counter	R	Unsigned	Byte	1	
9	Diagnostic Register	W	Unsigned	Byte	2	
10	Cyclic Timer	W	Unsigned	Word	1	0 [disabled]
11	Serial Number	R	Unsigned	Long	1	
12	Date Code	R	Character	Undef	4	
13	Catalog Listing	R	Character	Undef	32	BBK-DIG108
14	Vendor	R	Character	Undef	32	Holjeron
15	Description	W	Character	Undef	32	8 Point Digital I/O
18	Input Variable	R	Boolean	Undef	8	
34	Output Variable	W	Boolean	Undef	8	
50	Output Watchdog Timer	W	Unsigned	Word	1	0 [disabled]
51	Default Output	W	Boolean	Undef	8	0
54	CAN Error Status Code	R	Unsigned	Byte	1	
55	Manufacturing Codes	R	Unsigned	Byte	1	88h
56	Tag Name	W	Character	Undef	32	
60	NO/NC	W	Boolean	Undef	32	00h
62	Output Mask	W	Boolean	Undef	32	00h
63	Service Time	R	Unsigned	Word	1	
64	Service Life	W	Unsigned	Word	1	5000

Actions

ID	Description	Request Data	Response Data
0	NOOP	---	---
1	Change Address	New logical address	
2	Self Test	---	---
6	Clear All Errors	---	---
8	Enroll Logical Device	---	Vendor Id, Serial Number
10	Change Baud Rate	New baud rate (0…4)	
51	Force State	Input Variable	
52	Unforce State	---	---
53	Read Attribute Descriptor	Attribute Id	Attribute Id, Attribute Descriptor
57	Password	Password	
60	Reset Factory Defaults	---	---

Events

ID	Description	Event Data
0	Diagnostic Event	Number of diagnostic bits set in Attribute 9
3	End of Timer	Attribute, Input Variable
6	Change of Value	Attribute, Input Variable
7	NOOP	---

Legacy LED Diagnostic Indicator Patterns

Second Generation (Rev 2 – Rev 4)

- **Second Generation modules have Red-Green LEDs for all indicators.**

PWR	SDS	ERR	AUX	Indication
OFF	OFF	OFF	OFF	**OFF** (DC+ is less than 8 volts)
SG	SG	SG	I/O*	**1st LED Test Pattern (Second Gen)**
SG	SR	SR	I/O*	**2nd LED Test Pattern (Second Gen)**
SG	OFF	FG	I/O*	**Waiting to Autobaud (Second Gen)** (Not seen if fixed rate is used.)
SG	OFF	SG	I/O*	**NORMAL CONDITION - Nothing to transmit on the CAN bus**
SG	IG	SG	I/O*	**NORMAL CONDITION - Trying to transmit on the CAN bus**
SG	OFF	FR	I/O*	**Nothing to transmit on the CAN bus and minor diagnostic bit(s) set**
SG	IG	FR	I/O*	**Trying to transmit on the CAN bus and minor diagnostic bit(s) set**
SG	OFF	SR	I/O*	**Not transmitting on the CAN bus and MAJOR diagnostic bit(s) set**
SG	IG	SR	I/O*	**Trying to transmit on the CAN bus and MAJOR diagnostic bit(s) set**

OFF = LED is OFF
SG = Solid Green
SR = Solid Red
FG = Flashing Green
FR = Flashing Red
SFR = Solid OR Flashing Red
IG = Intermittent Green
FR = Flashing Red
I/O = If AUX is Solid Green indicates that Power for I/O is Present

Legacy LED Diagnostic Indicator Patterns

First Generation – (Rev 0 - Rev 1)

- **First Generation modules have Green LEDs for PWR, SDS, and AUX and Red LED's for ERR indication.**

PWR	SDS	ERR	AUX*	Indication
OFF	OFF	OFF	OFF	**OFF** (DC+ is less than 8 volts)
SG	OFF	OFF	I/O*	**NORMAL CONDITION - Not trying to transmit on the CAN bus**
SG	IG	OFF	I/O*	**NORMAL CONDITION - Trying to transmit on the CAN bus**
SG	IG	SR	I/O*	**Trying to transmit on the CAN bus and diagnostic bit(s) set**
SG	OFF	SR	I/O*	**Not transmitting on the CAN bus and diagnostic bit(s) set**
SG	SG	SR	I/O*	**BUS OFF fault condition**
SG	OFF	FR	I/O*	**Nothing to transmit on the CAN bus and major diagnostic bit(s) set**

OFF = LED is OFF

SG = Solid Green

SR = Solid Red

FG = Flashing Green

FR = Flashing Red

IG = Intermittent Green

FR = Flashing Red

I/O = If AUX is Solid Green indicates that Power for I/O is Present