OutBack POWER™
member of The Group™

AXS Port
SunSpec Modbus Interface
Owner's Manual

GRIDHybrid™

OPTICS RE Compatible

About OutBack Power Technologies

OutBack Power Technologies is a leader in advanced energy conversion technology. OutBack products include true sine wave inverter/chargers, maximum power point tracking charge controllers, and system communication components, as well as circuit breakers, batteries, accessories, and assembled systems.

Grid/Hybrid™

As a leader in off-grid energy systems designed around energy storage, OutBack Power is an innovator in Grid/Hybrid system technology, providing the best of both worlds: grid-tied system savings during normal or daylight operation, and off-grid independence during peak energy times or in the event of a power outage or an emergency. Grid/Hybrid systems have the intelligence, agility and interoperability to operate in multiple energy modes quickly, efficiently, and seamlessly, in order to deliver clean, continuous and reliable power to residential and commercial users while maintaining grid stability.

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Introduction

Welcome to OutBack Power Systems

Thank you for purchasing the OutBack AXS Port. This product provides communication with other OutBack devices. The device uses Ethernet access implemented by the Modbus Transmission Control Protocol. The SunSpec protocol enables sending and receiving of remote commands, control settings, and status information.

The AXS Port is enabled for OPTICS RE. OPTICS RE is the web-based remote monitoring and control application for OutBack devices.

NOTE: This product is for use in place of a system display such as the MATE3. OutBack does not support the use of the AXS Port and a system display at the same time.

Audience

This manual is intended for use by anyone required to install and operate this equipment. Operators must have software engineering knowledge and must be conversant in ANSI C programming and the Modbus protocol. SunSpec client software is required for operation.

AXS Port Features

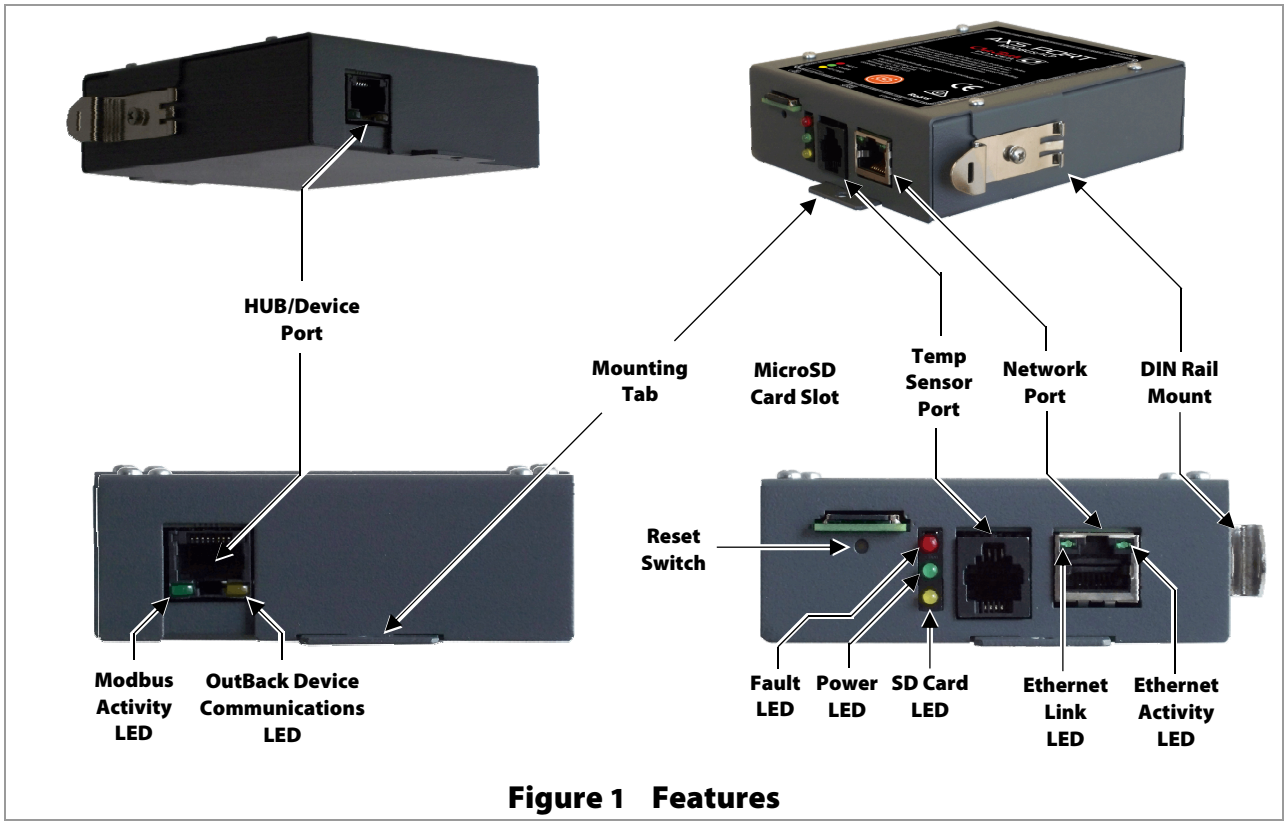


Figure 1 Features

Dimensions

Figure 2 Dimensions

Accessories

- A CAT5 cable of 3' length is included with this product for connection to the HUB Communications Manager.
- The AXS Port can use a Type 2 microSD card for logging operational status information about the system. A 2 GB microSD card is included. The SD card is also required for performing firmware updates.
- The AXS Port can be equipped with a clip for mounting on a DIN rail. This clip is included.
- The AXS Port can be equipped with an additional temperature sensor to supplement the battery sensor used by other OutBack devices. Ambient temperature of a room, PV array, etc. can be sent as additional status information. The sensor is the standard OutBack remote temperature sensor (RTS). The RTS is not included with the AXS Port.

Operation

Installation Instructions

Mounting

To mount the AXS Port directly on a wall or flat surface:

1. Insert two screws (appropriate for the surface) into the mounting holes at the top and bottom of the device. The holes will accept up to a #6 screw.
2. Tighten securely.

Figure 3 Wall Mount

To mount the AXS Port on a DIN rail:

1. Orient the AXS Port upright so that the DIN rail clip is next to the rail.
2. Next, place the clip against the DIN rail. Hook the upper edge of the clip over the DIN rail.
3. Press on the lower edge to bend it. Slide the clip over the DIN rail and snap into place. Release the clip once the device is securely in place.

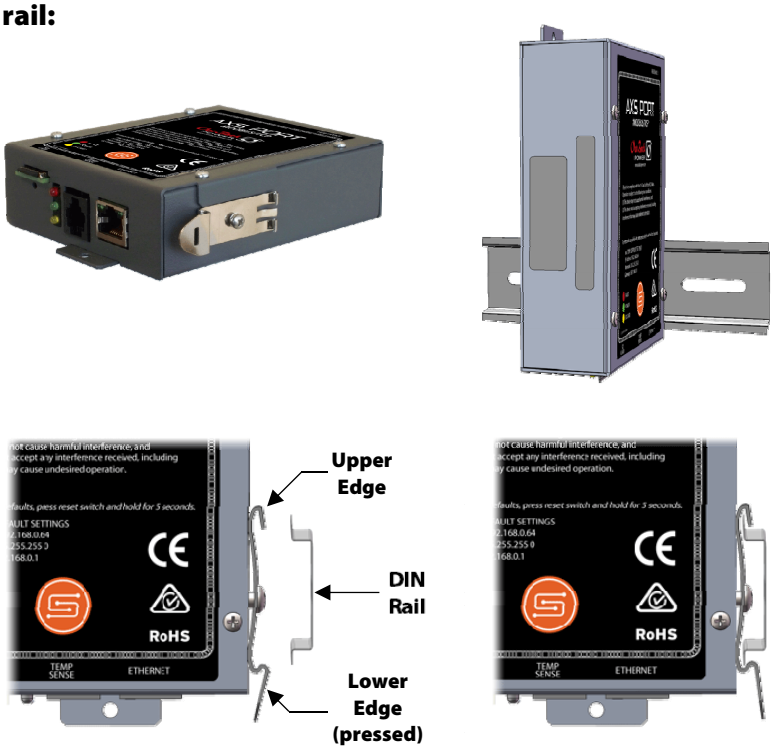


Figure 4 DIN Rail Mount

Networking

If a single OutBack product is used, it can connect directly to the AXS Port. If multiple OutBack products are networked on an OutBack HUB, the HUB can connect to the AXS Port.

1. Connect the CAT5 cable from the OutBack device to the connection labeled "HUB Port" on the AXS Port. The Power LED will illuminate. See Figure 7.
2. Connect the network cable to the connection labeled "Network Port" on the AXS Port.
3. Connect the other end of the network cable to the network or Internet. When an Ethernet link is established, the Ethernet Link LED will illuminate. See Figure 7.

   NOTE: DHCP is enabled by default.

   The connections shown below are used for Internet access with the OPTICS RE interface. Other connections are possible. The AXS Port can connect using a network switch or a wireless network router.

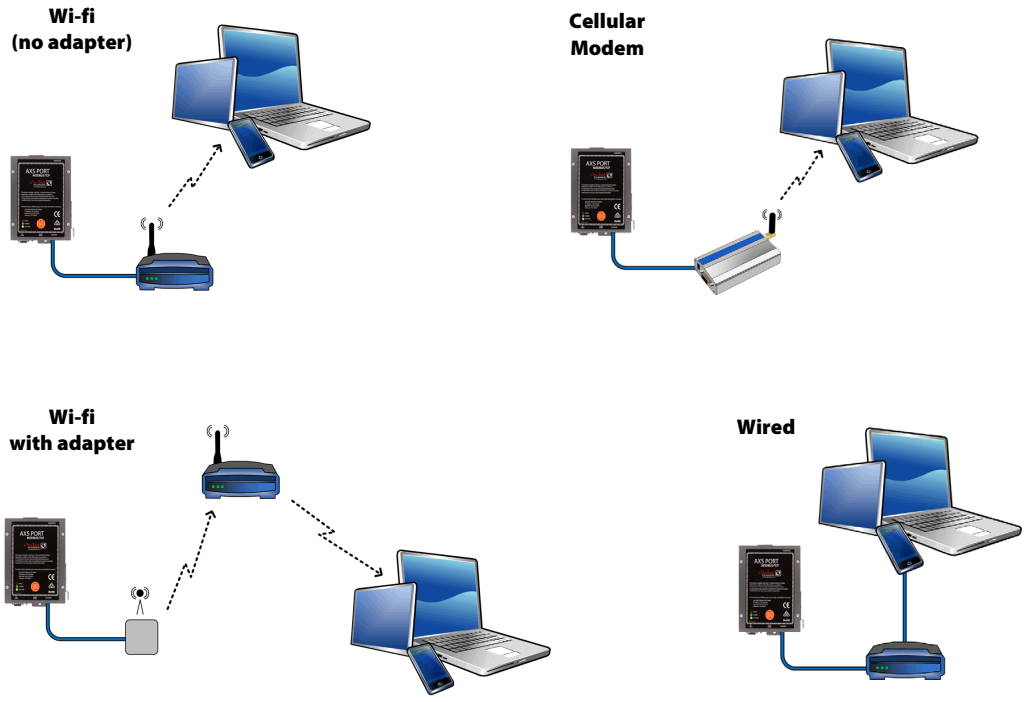
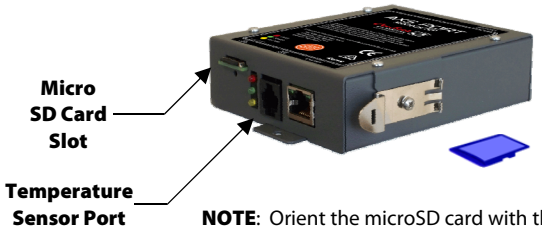


Figure 5 Networking

- If the optional temperature sensor (the OutBack RTS) will be used, secure the RTS to the surface being monitored. Insert the RTS into the Temperature Sensor port.
- If the microSD card will be used for logging data, insert the card into the slot.

  When the SD card is inserted correctly, the SD Card LED will illuminate. See Figure 7.



NOTE: Orient the microSD card with the conductors facing down. The angled corner enters on the right of the slot.

Figure 6 Accessories

LED Indicators

- **OutBack Device Communications LED:** Blinks when data is being transmitted or received from OutBack devices on this port.
- **Modbus Activity LED:** Blinks when Modbus registers are being written or read.
- **Ethernet Activity LED:** Illuminates when the AXS Port is transmitting or receiving Ethernet packets.
- **Ethernet Link LED:** Illuminates when the AXS Port has established an Ethernet link with a network or with the Internet. See Figure 5.
- **Fault LED:** Illuminates when the ***OutBack_error*** field is occupied by any error code. (See Table 1.) See page 19 for a list of error codes. This LED will blink upon pressing the reset switch (see below).
- **Power LED:** Illuminates when the AXS Port is powered up. Power is supplied by an OutBack device. See Figure 5.
- **SD Card LED:** Illuminates when a microSD card is correctly placed in the slot. See Figure 6.

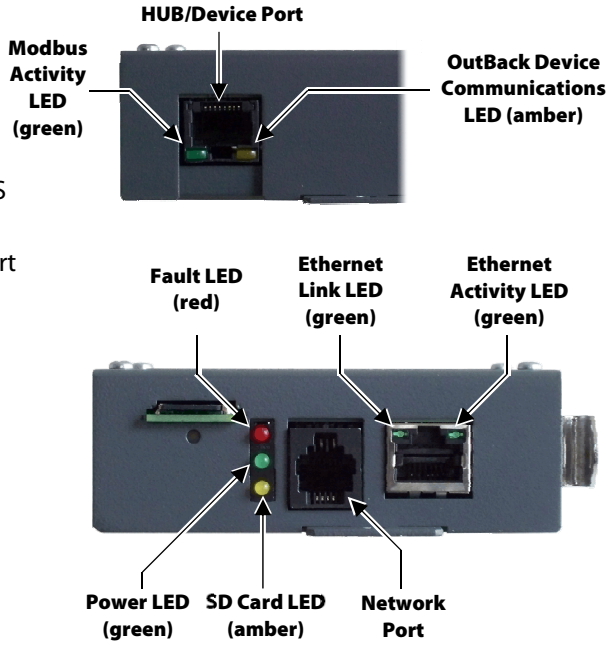


Figure 7 LED Indicators

Reset Switch

The AXS Port has a reset switch located below the SD Card slot. Using the reset switch will restore all settings to the factory default values. This includes removing the password and disabling any security which has been activated. (See the next page.)

The reset switch is recessed to avoid being accidentally pressed. Insert a paper clip, wire, or similar narrow tool. The switch should be held for five seconds. The Fault LED will blink during the resetting process.

Figure 8 Reset Switch

Security Protection

To enhance security, the AXS Port has been designed to enable a basic form of encryption. To enable it, the user must contact OutBack Power Technologies. A non-disclosure agreement must be signed.

Resetting the AXS Port with the reset switch will restore all values to the factory default settings. This includes removing the password and disabling the security features.

Using the AXS Port with the security features disabled is not recommended when communicating over the Internet. Since the initial password state is unsecured, it is recommended that the password is set over a secure local area network before connecting to the Internet.

SunSpec Blocks

The AXS Port uses the SunSpec protocol to assemble blocks of data on each connected product. The SunSpec client software can read or write to each field in a data block on the AXS Port. The fields are used for remote commands, control settings, or status information on the OutBack product.

A user with SunSpec client software can use the following tables to interpret these data blocks. Samples of the SunSpec client software are available on the OutBack website's AXS Port page at www.outbackpower.com/outback-products/communications/item/axs-port?category_id=440. For more information on the SunSpec protocol, go to www.sunspec.org.

Columns

- ***DID***: A unique identifier for a device type within the system.
- ***Start*** and ***End***: The register addresses for the beginning and end of each field, offset from the beginning of the block.
- ***Size***: The number of registers occupied by each field.
- ***R/W***: Indicates this field's permissions.
- ***Field name***: The name and function of each field.
- ***Type***: Explains how the field's data is formatted.
- ***Units***: The units of measure for each field, if applicable.
- ***Scale Factor***: Indicates scaling a measurement value.
- ***Contents***: Classification of field data (or a fixed value, where applicable).
- ***Description***: Describes the field data.

SunSpec Block Structure

The first block is the Common Block, which supplies vendor and model information for the device.

The second (and subsequent) blocks will be device-specific, such as a block for charge controllers. **NOTE**: OutBack charge controllers have a separate block for status fields and a separate block for command and control fields. See page 12.

The final End Block formally marks the end of the block structure.

Device-Specific Blocks

The following blocks show an example of devices supported by OutBack Power.

NOTE: The blocks depicted here may be subject to change without notice and should be used as examples only. For current blocks, go to the AXS Port page on www.outbackpower.com. An application note is available displaying all device blocks.

OutBack Block:

This block is for the AXS Port itself, with network settings and other configuration parameters.

Table 1 OutBack Block

DID	Start	End	Size	R/W	Field Name	Type	Units	Scale Factor	Contents	Description
64110	0	0	1	R	C_SunSpec_DID	uint16	N/A	N/A	64110	Uniquely identifies this as a SunSpec OutBack Interface
64110	1	1	1	R	C_SunSpec_Length	uint16	Registers	N/A	282	Length of block in 16-bit registers
64110	2	2	1	R	OutBack_Major_Firmware_ Number	uint16	N/A	N/A	Read Only	OutBack Major firmware revision
64110	3	3	1	R	OutBack_Mid_Firmware_ Number	uint16	N/A	N/A	Read Only	OutBack Mid firmware revision
64110	4	4	1	R	OutBack_Minor_Firmware _Number	uint16	N/A	N/A	Read Only	OutBack Minor firmware revision
64110	5	5	1	R	OutBack_Encryption_Key	uint16	N/A	N/A	Read Only	Encryption key for current session (0 = Encryption not enabled)
64110	6	12	7	R	OutBack_MAC_Address	String (14)	N/A	N/A	Read Only	Ethernet MAC address
64110	13	20	8	W	OutBack_Write_Password	String (16)	N/A	N/A	Write Only	Password required to write to any register
64110	21	21	1	R/W	OutBack_Enable_DHCP	uint16	Enumerated	N/A	Programmable	0 = DHCP Disabled, use configured network parameter; 1 = DHCP Enabled
64110	22	23	2	R/W	OutBack_TCP/IP_Address	uint32	Address	N/A	Programmable	TCP/IP Address xxx.xxx.xxx.xxx
64110	24	25	2	R/W	OutBack_TCP/IP_Gateway_ MSW	uint32	Address	N/A	Programmable	TCP/IP Gateway xxx.xxx.xxx.xxx
64110	26	27	2	R/W	OutBack_TCP/IP_Netmask _MSW	uint32	Address	N/A	Programmable	TCP/IP Netmask xxx.xxx.xxx.xxx
64110	28	29	2	R/W	OutBack_TCP/IP_DNS_1_ MSW	uint32	Address	N/A	Programmable	TCP/IP DNS 1 xxx.xxx.xxx.xxx
64110	30	31	2	R/W	OutBack_TCP/IP_DNS_2_ MSW	uint32	Address	N/A	Programmable	TCP/IP DNS 2 xxx.xxx.xxx.xxx
64110	32	32	1	R/W	OutBack_Modbus_Port	uint16	N/A	N/A	Programmable	OutBack MODBUS IP port, default 502
64110	33	52	20	R/W	OutBack_SMTP_Server_ Name	String (40)	N/A	N/A	Programmable	Email server name
64110	53	68	16	R/W	OutBack_SMTP_Account_ Name	String (32)	N/A	N/A	Programmable	Email account name
64110	69	69	1	R/W	OutBack_SMTP_SSL_ Enable	uint16	Enumerated	N/A	Programmable	0 = SSL Disabled; 1 = SSL Enabled (not implemented)
64110	70	77	8	W	OutBack_SMTP_Email_ Password	String 16)	N/A	N/A	Write Only	Email account password
64110	78	97	20	R/W	OutBack_SMTP_Email_ User_Name	String (40)	N/A	N/A	Programmable	Email account User Name
64110	98	98	1	R/W	OutBack_Status_Email_ Interval	uint16	N/A	N/A	Programmable	0 = Status Email Disabled, 1-23 Status Email every n hours
64110	99	99	1	R/W	OutBack_Status_Email_ Status_Time	uint16	N/A	N/A	Programmable	Hour of first status email of the day
64110	100	124	25	R/W	OutBack_Status_Email_ Subject_Line	String (50)	N/A	N/A	Programmable	Status Email Subject Line
64110	125	144	20	R/W	OutBack_Status_Email_To _Address_1	String (40)	N/A	N/A	Programmable	Status Email to Address 1
64110	145	164	20	R/W	OutBack_Status_Email_To _Address_2	String (40)	N/A	N/A	Programmable	Status Email to Address 2
64110	165	165	1	R/W	OutBack_Alarm_Email_ Enable	uint16	Enumerated	N/A	Programmable	0 = Disabled; 1 = Enabled
64110	166	190	25	R/W	OutBack_Alarm_Email_ Subject_Line	String (50)	N/A	N/A	Programmable	Status Alarm_Subject Line
64110	191	210	20	R/W	OutBack_Alarm_Email_To_ Address_1	String (40)	N/A	N/A	Programmable	Status Alarm to Address 1
64110	211	230	20	R/W	OutBack_Alarm_Email_To_ Address_2	String (40)	N/A	N/A	Programmable	Status Alarm to Address 2
64110	231	238	8	W	OutBack_FTP_Password	String (16)	N/A	N/A	Write Only	FTP password
64110	239	246	8	W	OutBack_Telnet_Password	String (16)	N/A	N/A	Write Only	Telnet password (not implemented)
64110	247	247	1	R/W	OutBack_SD_Card_Data_ Log_Write_Interval	uint16	N/A	N/A	Programmable	0 = SD-Card Data Logging disabled, 1-60 seconds
64110	248	248	1	R/W	OutBack_SD_Card_Data_ Log_Retain_Days	uint16	N/A	N/A	Programmable	0 = Log until SD-Card is full then erase oldest, 1-731 Number of days to retain data logs

Table 1 OutBack Block

DID	Start	End	Size	R/W	Field Name	Type	Units	Scale Factor	Contents	Description
64110	249	249	1	R/W	OutBack_SD_Card_Data_ Logging_Mode	uint16	Enumerated	N/A	Programmable	0 = Disabled; 1 = Excel Format; 2 = Compact Format
64110	250	269	20	R/W	OutBack_Time_Server_ Name	String (40)	N/A	N/A	Programmable	Timeserver domain name
64110	270	270	1	R/W	OutBack_Enable_Time_ Server	uint16	Enumerated	N/A	Programmable	0 = Time Server Disabled, use configured time parameters; 1 = Time Server Enabled
64110	271	271	1	R/W	OutBack_Set_Time_Zone	int16	Hours	N/A	Programmable	Time Zone -12-11
64110	272	272	1	R/W	OutBack_Year	uint16	N/A	N/A	Programmable	Clock year (4 digit)
64110	273	273	1	R/W	OutBack_Month	uint16	N/A	N/A	Programmable	Clock Month (1 - 12)
64110	274	274	1	R/W	OutBack_Day	uint16	N/A	N/A	Programmable	Clock Day (1 - 31)
64110	275	275	1	R/W	OutBack_Hour	uint16	N/A	N/A	Programmable	Clock Hour (0 - 23)
64110	276	276	1	R/W	OutBack_Minute	uint16	N/A	N/A	Programmable	Clock Minute (0 - 59)
64110	277	277	1	R/W	OutBack_Second	uint16	N/A	N/A	Programmable	Clock Second (0 - 59)
64110	278	278	1	R	OutBack_Temp_Batt	int16	Degrees C	N/A	Measured	Battery temp in degrees C
64110	279	279	1	R	OutBack_Temp_Ambient	int16	Degrees C	N/A	Measured	Ambient temp from temp sensor connected to device, in degrees C
64110	280	280	1	R	OutBack_Temp_SF	int16	N/A	N/A	0	Temperature Scale Factor
64110	281	281	1	R	OutBack_Error	uint16	Bitfield	N/A	Read Only	Bit field for errors. *See Table 6 on page 19.*
64110	282	282	1	R	OutBack_Status	uint16	Bitfield	N/A	Read Only	Bit field for status. *TBD.*
64110	283	283	1	N/A	OutBack_Spare_Register_1	uint16	N/A	N/A	N/A	For future use

Charge Controller Block:

This block is usable for most OutBack charge controllers with the exception of the OutBack MX60. It is a status-only block and does not contain command or control fields.

Table 2 Charge Controller Block

DID	Start	End	Size	R/W	Name	Type	Units	Scale Factor	Contents	Description
64111	0	0	1	R	C_SunSpec_DID	uint16	N/A	N/A	64111	Uniquely identifies this as a SunSpec Basic Charge Controller
64111	1	1	1	R	C_SunSpec_Length	uint16	Registers	N/A	23	Length of block in 16-bit registers
64111	2	2	1	R	CC_port_number	uint16	N/A	N/A	0-10	Port number on OutBack network
64111	3	3	1	R	CCconfig_Voltage_SF	int16	N/A	N/A	-1	DC Voltage Scale Factor
64111	4	4	1	R	CCconfig_Current_SF	int16	N/A	N/A	0	DC Current Scale Factor
64111	5	5	1	R	CCconfig_Power_SF	int16	N/A	N/A	0	DC Power Scale Factor
64111	6	6	1	R	CCconfig_AH_SF	int16	N/A	N/A	0	DC Amp Hours Scale Factor
64111	7	7	1	R	CCconfig_KWH_SF	int16	N/A	N/A	-1	DC kWH Scale Factor
64111	8	8	1	R	CC_Batt_Voltage_SF	uint16	Volts	Voltage _SF	Measured	Battery Voltage
64111	9	9	1	R	CC_Array_Voltage_SF	uint16	Volts	Voltage _SF	Measured	DC Source Voltage
64111	10	10	1	R	CC_Batt_Current_SF	uint16	Amps	Voltage _SF	Measured	Battery Current
64111	11	11	1	R	CC_Array_Current_SF	uint16	Amps	Current _SF	Measured	DC Source Current
64111	12	12	1	R	CC_Charger_State	uint16	Enumerated	N/A	Descriptive	0 = Silent; 1 = Float; 2 = Bulk; 3 = Absorb; 4 = EQ
64111	13	13	1	R	CC_Watts	uint16	Watts	Power _SF	Measured	CC Wattage Output
64111	14	14	1	R	CC_Todays_Min_Battery_ Volts	uint16	Volts	Voltage _SF	Measured	Minimum Voltage for battery today
64111	15	15	1	R	CC_Todays_Max_Battery_ Volts	uint16	Volts	Voltage _SF	Measured	Maximum Voltage for battery today
64111	16	16	1	R	CC_VOC	uint16	Volts	Voltage _SF	Measured	Last Open Circuit Voltage (array)
64111	17	17	1	R	CC_Todays_Peak_VOC	uint16	Volts	N/A	Measured	Highest VOC today
64111	18	18	1	R	CC_Todays_kWH	uint16	KWH	KWH_SF	Measured	Daily accumulated kilowatt-hours output
64111	19	19	1	R	CC_Todays_AH	uint16	AH	AH_SF	Measured	Daily accumulated amp-hours output
64111	20	20	1	R	CC_Lifetime_kWH_Hours	uint16	KWH	N/A	Measured	Lifetime Total kilowatt hours
64111	21	21	1	R	CC_Lifetime_kAmp_Hours	uint16	Amps	KWH_ SF	Measured	Lifetime Total kiloamp-hours
64111	22	22	1	R	CC_Lifetime_Max_Watts	uint16	Watts	Power_ SF	Measured	Lifetime Maximum Wattage
64111	23	23	1	R	CC_Lifetime_Max_Battery_ Volts	uint16	Volts	Voltage _SF	Measured	Lifetime Maximum Battery Voltage
64111	24	24	1	R	CC_Lifetime_Max_VOC	uint16	Volts	Voltage _SF	Measured	Lifetime Maximum VOC

Charge Controller Configuration Block:

This block always accompanies the Charge Controller Block. It is usable for most OutBack charge controllers with the exception of the OutBack MX60. It contains command and control fields for the charge controller, as well as vendor-specific status fields.

Table 3 Charge Controller Configuration Block

DID	Start	End	Size	R/W	Name	Type	Units	Scale Factor	Contents	Description
64112	0	0	1	R	C_SunSpec_DID	uint16	N/A	N/A	64112	Vendor Extension for OutBack Charge Controllers
64112	1	1	1	R	C_SunSpec_Length	uint16	Registers	N/A	64	Length of block in 16-bit registers
64112	2	2	1	R	CCconfig_port_number	uint16	N/A	N/A	0-10	Port number on OutBack network
64112	3	3	1	R	CCconfig_Voltage_SF	int16	N/A	N/A	-1	DC Voltage Scale Factor
64112	4	4	1	R	CCconfig_Current_SF	int16	N/A	N/A	0	DC Current Scale Factor
64112	5	5	1	R	CCconfig_Hours_SF	int16	N/A	N/A	-1	Time in Hours Scale Factor
64112	6	6	1	R	CCconfig_Power_SF	int16	N/A	N/A	0	Power Scale Factor
64112	7	7	1	R	CCconfig_AH_SF	int16	N/A	N/A	0	Amp Hours Scale Factor
64112	8	8	1	R	CCconfig_KWH_SF	int16	N/A	N/A	-1	DC kWH Scale Factor
64112	9	9	1	R	CCconfig_Faults	uint16	Bitfield	N/A	Descriptive	CC Error Flags: High VOC, Over temp, Shorted Battery Temp Sensor
64112	10	10	1	R/W	CCconfig_Absorb_Volts	uint16	Volts	Voltage _SF	Programmable	Absorb Voltage Target
64112	11	11	1	R/W	CCconfig_Absorb_Time_ Hours	uint16	Hours	Hours _SF	Programmable	Absorb Time Hours
64112	12	12	1	R/W	CCconfig_Absorb_End_ Amps	uint16	Amps	Voltage _SF	Programmable	Amperage to end Absorbing
64112	13	13	1	R/W	CCconfig_Rebulk_Volts	uint16	Volts	Voltage _SF	Programmable	Voltage to re-initiate Bulk charge
64112	14	14	1	R/W	CCconfig_Float_Volts	uint16	Volts	Voltage _SF	Programmable	Float Voltage Target
64112	15	15	1	R/W	CCconfig_Bulk_Current	uint16	Amps	Voltage _SF	Programmable	Max Output Current Limit
64112	16	16	1	R/W	CCconfig_EQ_Volts	uint16	Volts	Voltage _SF	Programmable	Target Voltage for Equalize
64112	17	17	1	R/W	CCconfig_EQ_Time_Hours	uint16	Hours	N/A	Programmable	EQ Time Hours
64112	18	18	1	R/W	CCconfig_Auto_EQ_Days	uint16	Days	N/A	Programmable	Auto EQ Interval Days
64112	19	19	1	R/W	CCconfig_MPPT_Mode	uint16	Enumerated	Descrip tive	Programmable	0 = Auto; 1 = U-Pick
64112	20	20	1	R/W	CCconfig_Sweep_Width	uint16	Enumerated	Descrip tive	Programmable	0 = Full; 1 = Half
64112	21	21	1	R/W	CCconfig_Sweep_Max_ Percentage	uint16	Enumerated	Descrip tive	Programmable	0 = 80; 1 = 85; 2 = 90; 3 = 99
64112	22	22	1	R/W	CCconfig_U_Pick_PWM_ Duty_Cycle	uint16	Percentage	Voltage _SF	Programmable	Park Duty Cycle (%)
64112	23	23	1	R/W	CCconfig_Grid_Tie_Mode	uint16	Enumerated	Descrip tive	Programmable	0 = Grid Tie Mode disabled; 1 = Grid Tie Mode enabled
64112	24	24	1	R/W	CCconfig_Temp_Comp_ Mode	uint16	Enumerated	Descrip tive	Programmable	0 = Wide; 1 = User Limited
64112	25	25	1	R/W	CCconfig_Temp_Comp_ Lower_Limit_Volts	uint16	Volts	Voltage _SF	Programmable	RTS compensation lower voltage limit
64112	26	26	1	R/W	CCconfig_Temp_Comp_ Upper_Limit_Volts	uint16	Volts	Voltage _SF	Programmable	RTS compensation upper voltage limit
64112	27	27	1	R/W	CCconfig_Auto_Restart_ Mode	uint16	Enumerated	Descrip tive	Programmable	0 = Off; 1 = Restart every 90 minutes; 2 = Restart every 90 minutes if absorb charging or float charging
64112	28	28	1	R/W	CCconfig_Wakeup_VOC	uint16	Volts	Voltage _SF	Programmable	Voc change which causes Wakeup occurs
64112	29	29	1	R/W	CCconfig_Snooze_Mode_ Amps	uint16	Amps	Voltage _SF	Programmable	Snooze Mode Amps
64112	30	30	1	R/W	CCconfig_Wakeup_Interval	uint16	Mins	N/A	Programmable	How often to check for Wakeup condition
64112	31	31	1	R/W	CCconfig_AUX_Mode	uint16	Enumerated	Descrip tive	Programmable	0 = Float; 1 = Diversion: Relay; 2 = Diversion: Solid St; 3 = Low Batt Disconnect; 4 = Remote; 5 = Vent Fan; 6 = PV Trigger; 7 = Error Output; 8 = Night Light
64112	32	32	1	R/W	CCconfig_AUX_Control	uint16	Enumerated	Descrip tive	Programmable	0 = Off; 1 = On; 2 = Auto
64112	33	33	1	R	CCconfig_AUX_State	uint16	Enumerated	Descrip tive	Read Only	0 = Disabled; 1 = Enabled
64112	34	34	1	R/W	CCconfig_AUX_Polarity	uint16	Enumerated	Descrip tive	Programmable	0 = Low; 1 = High
64112	35	35	1	R/W	CCconfig_AUX_Low_Batt_ Disconnect	uint16	Volts	Voltage _SF	Programmable	Low Battery Disconnect Voltage

Table 3 Charge Controller Configuration Block

DID	Start	End	Size	R/W	Name	Type	Units	Scale Factor	Contents	Description
64112	36	36	1	R/W	CCconfig_AUX_Low_Batt_Reconnect	uint16	Volts	Voltage_SF	Programmable	Low Battery Reconnect Volts
64112	37	37	1	R/W	CCconfig_AUX_Low_Batt_Disconnect_Delay	uint16	Secs	N/A	Programmable	Low Battery Disconnect Delay (secs)
64112	38	38	1	R/W	CCconfig_AUX_Vent_Fan_Volts	uint16	Volts	Voltage_SF	Programmable	Vent Fan Voltage
64112	39	39	1	R/W	CCconfig_AUX_PV_Limit_Volts	uint16	Volts	Voltage_SF	Programmable	Voltage at which PV disconnect occurs
64112	40	40	1	R/W	CCconfig_AUX_PV_Limit_Hold_Time	uint16	Secs	N/A	Programmable	AUX PV Trigger Hold Time
64112	41	41	1	R/W	CCconfig_AUX_Night_Light_Thres_Volts	uint16	Volts	Voltage_SF	Programmable	Voltage Threshold for AUX Night Light
64112	42	42	1	R/W	CCconfig_Night_Light_ON_Hours	uint16	Hours	N/A	Programmable	Night Light ON Time
64112	43	43	1	R/W	CCconfig_Night_Light_ON_Hyst_Time	uint16	Secs	N/A	Programmable	Night Light ON Hyst Time
64112	44	44	1	R/W	CCconfig_Night_Light_OFF_Hyst_Time	uint16	Secs	N/A	Programmable	Night Light OFF Hyst Time
64112	45	45	1	R/W	CCconfig_AUX_Error_Battery_Volts	uint16	Volts	Voltage_SF	Programmable	Battery voltage at which Aux Error occurs
64112	46	46	1	R/W	CCconfig_AUX_Divert_Hold_Time	uint16	Hours	Voltage_SF	Programmable	AUX Diver Hold Time
64112	47	47	1	R/W	CCconfig_AUX_Divert_Delay_Time	uint16	Secs	N/A	Programmable	AUX Divert Delay
64112	48	48	1	R/W	CCconfig_AUX_Divert_Relative_Volts	int16	Volts	Voltage_SF	Programmable	AUX Divert Relative Volts
64112	49	49	1	R/W	CCconfig_AUX_Divert_Hyst_Volts	uint16	Volts	Voltage_SF	Programmable	AUX Divert Hyst Volts
64112	50	50	1	R	CCconfig_Major_Firmware_Number	uint16	N/A	N/A	Read Only	Charge Controller Major firmware revision
64112	51	51	1	R	CCconfig_Mid_Firmware_Number	uint16	N/A	N/A	Read Only	Charge Controller Mid firmware revision
64112	52	52	1	R	CCconfig_Minor_Firmware_Number	uint16	N/A	N/A	Read Only	Charge Controller Minor firmware revision
64112	53	53	1	W	CCconfig_Set_Data_Log_Day_Offset	uint16	Days	N/A	Write Only	Day offset 0-128, 0 =Today, 1 = -1 day …
64112	54	54	1	R	CCconfig_Get_Current_Data_Log_Day_Offset	uint16	Days	N/A	Read Only	Current Data Log Day Offset
64112	55	55	1	R	CCconfig_Data_Log_Daily_AH	uint16	AH	AH_SF	Read Only	Data Log AH
64112	56	56	1	R	CCconfig_Data_Log_Daily_kWH	uint16	KWH	KWH_SF	Read Only	Data Log kWH
64112	57	57	1	R	CCconfig_Data_Log_Daily_Max_Output_Amps	uint16	Amps	Voltage_SF	Read Only	Data Log maximum Output Amps
64112	58	58	1	R	CCconfig_Data_Log_Daily_Max_Output_Watts	uint16	Watts	Power_SF	Read Only	Data Log maximum Output Wattage
64112	59	59	1	R	CCconfig_Data_Log_Daily_Absorb_Time	uint16	Mins	N/A	Read Only	Data Log Absorb Time Minutes
64112	60	60	1	R	CCconfig_Data_Log_Daily_Float_Time	uint16	Mins	N/A	Read Only	Data Log Float Time Minutes
64112	61	61	1	R	CCconfig_Data_Log_Daily_Min_Batt_Volts	uint16	Volts	Voltage_SF	Read Only	Data Log minimum daily battery voltage
64112	62	62	1	R	CCconfig_Data_Log_Daily_Max_Batt_Volts	uint16	Volts	Voltage_SF	Read Only	Data Log maximum daily battery voltage
64112	63	63	1	R	CCconfig_Data_Log_Daily_Max_Input_Volts	uint16	Volts	N/A	Read Only	Data Log maximum daily input voltage
64112	64	64	1	R	CCconfig_Clear_Data_Log_Read	uint16	N/A	N/A	Read Old	Read value needed to clear data log
64112	65	65	1	W	CCconfig_Clear_Data_Log_Write_Complement	uint16	N/A	N/A	Write Only	Write value's complement to clear data log (not Implemented)

SD Card Logging

When enabled, the microSD card inserted in the slot will record operational status data about the system. The AXS Port will record data to the microSD card up to the limit of the card. (It has been tested with microSD cards up to 8 GB.) The interval for automatic downloading to the microSD card can be set at intervals from 1 to 60 seconds. This setting is made in the field titled ***Outback_SD_Card_Data_ Log_Write_Interval***. The default setting is 0 (disabled).

If the card's capacity is exceeded, the data will begin to be overwritten starting with the oldest first.

Datalogging with OPTICS RE

If the AXS Port is disconnected from OPTICS RE (through loss of the internet connection), the OPTICS Replay function will be used. During the connection loss, the AXS Port will continue logging data to the SD card. Upon reconnection, the AXS Port will begin uploading the Replay file from the SD card to OPTICS RE. If the upload is successful, this will prevent gaps in OPTICS RE datalogging.

Data Log File Format

As noted on page 10, each OutBack product exports data in comma-separated ASCII strings.

Information generated by this function will be saved on the SD card in a generic **.csv** file format, which can be read by most spreadsheet programs. The file name on the **.csv** file will appear as follows:

Example: 11062722.csv (YYMMDDHR.csv)

Where: YY = Last 2 digits of the year, MM = Month (01-12), DD = Day (01-31), HR = Hour (00-23)

NOTE: This header line is NOT included in the download.

Date	Time	Port	Device type	Invrt current	Chrg current	Buy current	Ac input voltage	Ac output voltage	Sell current	Operating mode	Error mode	Ac mode	Battery voltage	Misc	Warning mode
5/31/15	17:28:20	1	2	2	0	0	0	230	0	2	0	0	500	25	0
5/31/15	17:28:20	2	2	2	0	0	0	230	0	2	0	0	508	25	0
5/31/15	17:28:20	3	2	2	0	0	0	230	0	2	0	0	508	25	0

Figure 9 Data Log Example for the FX (E series) Inverter

NOTE: This header line is included in the download.

Date	AH	Kwh	Max Amps	Max Watts	Absorb Time	Float Time	Min Battery V	Max Battery V	MAX VOC
6/13/15	0	0	1.2	29	0:00	0:00	24.1	29.1	122
6/12/15	38	0.9	5.5	143	0:00	0:00	24.1	29	122
6/11/15	32	0.8	5.6	144	0:00	0:00	24.1	28.7	120

Figure 10 Data Log Example for the Charge Controller

NOTE: The log data and structure are not the same for all devices. For details on Radian-class inverters, FXR-class inverters, and other devices, see www.outbackpower.com.

FTP Access to Logs

A file transfer protocol (FTP) site such as FileZilla may be used to connect to the AXS Port. The FTP client presents a normal file explorer display of the files stored on the microSD card.

The log files are stored under the LOGFILES directory. The naming convention of the log files is the same as noted above.

NOTE: FTP access should not be used while using OPTICS RE. The AXS Card does not have enough memory to support both protocols at the same time.

Firmware Updates

The firmware revision of the AXS Port can be updated directly using a microSD card, or it can be updated using an FTP site and the microSD card.

To update the firmware directly:

1. If necessary, load a firmware update to the microSD card. These updates are available at the OutBack website, www.outbackpower.com.
2. Insert the SD card into the slot on the AXS Port. See Figure 11.
3. Disconnect any OutBack device cable from the AXS Port.
4. Using a narrow tool, press and hold the reset switch. See Figure 11. (Refer to Figure 8 on page 9 for more information.)
5. Reconnect the OutBack device cable. The amber SD Card LED will blink while the firmware is being updated. When this indicator stops blinking, release the switch.

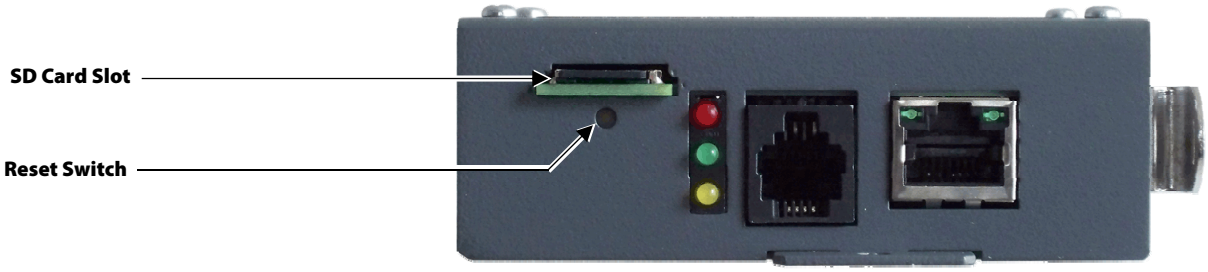


Figure 11 Firmware Update

To update the firmware using an FTP site and the SD Card:

1. Connect to the AXS Port using the FTP site.
2. Copy the update file from the OutBack website to the UPDATEFW directory on the microSD card. **NOTE**: It may be necessary to create this directory on the SD card first, using the FTP client.
3. Once the update file is copied, disconnect the FTP client from the AXS Port.
4. The AXS Port will detect the disconnection of the FTP client and will automatically update the firmware if the correctly named file is found in the UPDATEFW directory. After a successful firmware update, the update file will be erased from the UPDATEFW directory.

Email Functions

The AXS Port can send email messages with alarms or other status reports. To enable the email function in the AXS Port, certain fields in the OutBack block must be set up using Modbus client software. (See Table 1 on page 11.)

Table 4 Email Setup

Field	Value
OutBack_SMTP_Server_Name	Email account name, such as *outbackpower.com*
OutBack_SMTP_Account_Name	Name of SMTP server for sending mail, such as *smtp.gmail.com*
OutBack_SMTP_Account_Name	Email account name, such as *outbackpower.com*
OutBack_SMTP_Email_User_Name	Email user name, such as *device24@outbackpower.com*
OutBack_SMTP_Email_Password	Email user account password, such as *mypassword*
OutBack_Status_Email_Subject_Line	Status email subject line text
OutBack_Status_Email_To_Address_1	First recipient address
OutBack_Status_Email_To_Address_2	Second recipient address
OutBack_Status_Email_Interval	Number of hours between status email (1-23) **NOTE**: 0 = status email disabled
OutBack_Status_Email_Status_Time	First hour within day that status email will be sent (0-23)

Messages will be sent to the designated recipient addresses starting at the time indicated, and repeating at the appropriate interval.

For example, if ***OutBack_Status_Email_Status_Time*** is set to 10 and ***OutBack_Status_Email_Interval*** is set to 4, then a status email will be sent at 10 AM, 2 PM, 6 PM, and 10 PM.

NOTES:

Troubleshooting

Basic Troubleshooting

Table 5 Basic Troubleshooting

Symptom	Possible Cause	Remedy
Power LED does not illuminate	The OutBack device may not be powered; the CAT5 cable may be damaged or disconnected	Make sure the OutBack device is powered; check the cable connection or replace the cable
Ethernet Link LED does not illuminate	The CAT5 cable may not be making connection; network port may be inactive	Check the cable connection or replace the cable; use another network port; verify that the networking device is functional
SD Card LED does not illuminate	SD card not correctly placed, or defective card	Insert the card firmly or replace the card
Fault LED illuminates	***OutBack_error*** field in OutBack block is occupied by an error code	Check for error codes
Time-based functions are incorrect following power loss	Discharged internal battery	Replace BR2032 battery inside AXS Port; a CR2032 battery is acceptable but has a temperature range of only -25°C to 60°C

Error Codes

Table 6 Error Codes

Bit Position	Definition
0	Last register write exceeded high range limit for register
1	Last register write was less than low range limit for register
2	Last register write was an invalid value
3	No response from DHCP server
4	DNS resolve failed
5	SMTP authentication failed (email)
6	SMTP message sending failed (email)
7	FTP password error
8	SD card error
9	SNTP failure (Internet time)
10	Register write attempted on read-only register

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Specifications

Regulatory Specifications

Table 7 Regulatory Specifications

Specification	Details
FCC Compliance	Part 15, subpart B
CE Compliance	Yes
RoHS Compliance	Yes

Device Specifications

Table 8 Device Specifications

Specification	Details	Additional Data
Power	Supplied by OutBack device	
Status Indicators	Seven LED indicators	
Clock	On-board real-time clock with battery backup	
Internet Standards	TCPIP, DNS, SMTP, FTP, DHCP, NTP	
Ports	Hub/Device	RJ-45
	Communications	RJ-45
	Temperature Sensor	RJ-11
Communication Protocol	Modbus TCP to the SunSpec standard	
OutBack Device Interface	OutBack Proprietary	
PC Interface	10/100 Ethernet	
Mounting	DIN clip (provided) or surface mounting	
Environmental Rating	Indoor Type 1 (IP 30) non-condensing	
Temperature Ranges	AXS Port: -40°C to 75°C	
	SD Card: -25°C to 75°C	
Weight	Unit	0.5 lb (0.23 kg)
	Shipping	2.1 lb (0.95 kg)
Dimensions - (H x W x D)	Unit	1.29" x 3.5" x 4.99" (3.3 x 8.9 x 12.7 cm)
	Shipping	3.25" x 9" x 13.5" (19 x 22.9 x 34.3 cm)
SD Card Size	MicroSD Type 2	2 GB capacity
Options	OutBack RTS	

Factory Default Settings

The AXS Port comes written with these settings. The unit will revert to these settings when the reset switch is used (see page 9).

- IP Address 192.168.0.64
- Netmask 255.255.255.0
- Gateway 192.168.0.1
- DNS 1 4.2.2.1
- DNS 2 4.2.2.2
- DHCP Enabled
- Modbus port 502
- Encryption disabled

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