

MATE3-Class System Display Data Logging References

Objective of the application note

This document applies to the MATE3 class of system display products, including MATE3 and MATE3s. The document provides references when the system display is used to log and interpret data on a personal computer (PC), as well as status information from various OutBack devices.

The audience for this document is a qualified installer with experience on data logging. The reader may need to refer to the appropriate *Programming Guide* for more information about data logging.

Scope

A MATE3-class system display communicates with OutBack devices through a proprietary communication link. It receives pre-defined status pages and can issue commands to various OutBack devices. The system display can be directly connected to a single OutBack device or to multiple devices using an OutBack Communications Manager (HUB4 or HUB10.3).

This information applies to:

- MATE3 firmware revisions 2.7.16 and greater.
- All revisions of MATE3s.

This application note does not cover all possible situations or applications due to potential complexity or impracticality.

Communication Protocol

Status information from the supported OutBack devices is provided. This protocol allows information to be passed between a personal computer and an OutBack device using the system display.

The data streams sent from an inverter, charge controller and a FLEXnet DC battery monitor all have a different content; however, the format is the same. Information generated onto an SD card is saved in a generic .csv file format, which can be read by most spreadsheet programs.

Application Note

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FX-Class / FXR-Class Inverter Data Stream

Table 1 below shows the data stream generated for each inverter connected to the system. This includes all variants on the FX and FXR series such as VFX, GTFX, GVFX, FXR, VFXR and so on.

- The data stream for each inverter is 52 characters long.
- An example is 00,2,00,00,00,119,000,00,00,000,01,254,008,000,033.

Table 1 Data Stream Matrix for FX-Class Inverters

Date	Time	Port	Device Type	Inverter Current	Charger Current	Buy Current	AC In Voltage	AC Out Voltage	Sell Current	Inverter Operating Mode (Table 2)	Error Code (Table 3)	AC Mode (Table 4)	Battery Voltage	Misc (Table 5)	Warning Code (Table 6)	Checksum
X/XX/XX	XX:XX:XX	XX	2	XX	XX	XX	XXX	XXX	XX	XX	XXX	XX	XX.X	XXX	XXX	XXX

Descriptions of Data Stream Items for the FX-Class Inverter

The items below describe each category shown in Table 1.

Port Number: Indicates the designation of the OutBack HUB port used by the inverter. The addresses will be 01 to 10 and will correspond to the appropriate numbered port. If the system display is connected directly to the inverter without a HUB, this item will read 00.

Device Type: Indicates the presence of an FX-class or FXR-class inverter. For the FX class, the device type is 2. For the FXR class, the device type is 5.

Inverter Current: Measures the AC current the inverter is delivering to loads from the batteries. The range is 00 to 99 in increments of 1 ampere.

Charger Current: Measures the AC current the inverter is taking from the AC input and delivering to the batteries. The range is 00 to 99 in 1-ampere increments.

Buy Current: Measures AC current the inverter is taking from the AC input and delivering to both the batteries and output loads. The range is 00 to 99 in 1-ampere increments.

AC Input Voltage: Measures the voltage at the inverter’s AC input terminals. The range is 000 to 256 in 1-volt increments. If value 1 of **Misc** is set, this number must be doubled. See the definition of **Misc** on page 4.

AC Output Voltage: Measures the voltage at the inverter’s AC output terminals. The range is 000 to 256 in 1-volt increments. If value 1 of **Misc** is set, then this number must be doubled. See the definition of **Misc** on page 4.

Sell Current: Measures the AC current the inverter is taking from the batteries and delivering to the AC input. The range is 00 to 99 in 1-ampere increments.

Inverter Operating Modes: Reports any of a variety of functions that can be performed by the inverter. The range is 00 to 99, although not all items are in use. Items and their corresponding modes are shown in Table 2.

Application Note

- **Inverter Off:** The user has turned the inverting mode off and no other functions are active.
- **Search:** The inverter is using the Search function of the inverting mode.
- **Inverter On:** The inverter is powering loads with the inverting mode.
- **Charge:** The inverter is using an AC source to charge the batteries.
- **Silent:** The inverter is using an AC source, but has entered the quiescent period following a battery charging cycle.
- **Float:** The inverter is using an AC source and is in the low-level maintenance stage of a battery charging cycle.
- **Equalize:** The user has initiated equalization, a controlled overcharge for battery maintenance.
- **Charger Off:** The user has manually turned the charging function off.
- **Support:** The inverter is drawing power from the batteries to support an AC source which is running heavy loads.
- **Sell Enabled:** A grid-interactive inverter is exporting more power than it has AC loads. This excess power flows out through the inverter's AC input. It is measured with the **Sell Current** meter (characters 24 and 25).
- **Pass-through:** The inverter is transferring AC power from a source on its input to operate output loads. This mode is used by a grid-interactive inverter waiting for criteria to be met before it begins selling.
- **Inverter Error:** The inverter has suffered a critical fault and has probably stopped functioning. Characters 30 to 32 show the nature of the error. (See **Error Code** and Table 3 on page 5.)
- **AGS Error:** The system display tried to automatically start the generator in Advanced Gen Start mode and failed, or the generator was successfully started, then stopped unexpectedly.
- **Comm Error:** The inverter's control board is no longer communicating. The inverter may require repair.

Table 2
FX Inverter Operating Modes

Data	Description
00	Inverter Off
01	Search
02	Inverter On
03	Charge
04	Silent
05	Float
06	Equalize
07	Charger Off
08	Support
09	Sell Enabled
10	Pass-through
90	Inverter Error
91	AGS Error
92	Comm Error

EXAMPLE:

A grid-interactive inverter has an **Offset** setting of 25.6 Vdc and 10 amps (1200 watts) of AC output load. DC sources contribute 480 watts to the battery. The inverter maintains the battery at 25.6 Vdc by converting the excess 480 watts of DC power to AC. The inverter mode displays **Support** with the **Inverter Current** meter showing 4 amps (480 watts) of production. The **Buy Current** would show 6 amps (720 watts), for 10 amps (1200 watts) of total AC load current. If the AC load was removed, the inverter would have **Sell Enabled** as the mode, and show 4 amps of **Sell Current**.

Application Note

Descriptions of Data Stream Items (continued)

Error Codes: There are 8 individual values displayed in values ranging from 000 to 255. Each value represents a different error as shown in Table 3. If more than one error occurs, the values are additive. For example, an overtemp error would return a 4. A backfeed error would return a value of 128. An overtemp error and backfeed error would return a value of $4 + 128 = 132$.

AC Modes: This represents the status of the AC input. The range is 00 to 99, but only three states are in use as shown in Table 4. **No AC** means that no AC source has been detected by the inverter. **AC Drop** means that AC is present but the inverter is not allowed to accept it. **AC Use** means AC is present and valid, and the inverter will utilize it.

Battery Voltage: The DC voltage as measured at the inverter's battery terminals. The range is 000 to 999, incorporating one decimal place. For example, a 24.8 Vdc battery voltage will be sent as '248'.

The resolution of battery voltage is 0.1 Vdc for 12-volt systems, 0.2 Vdc for 24-volt systems, and 0.4 Vdc for 48-volt systems.

Misc: Values are displayed in values ranging from 000 to 255. Each value represents a different condition. Only two of the values are used at this time (see Table 5). Value 1, indicates an inverter with greater than 200 Vac output. If this value is set, then AC input and output voltages must be multiplied by two *and all currents must be divided by two*. Value 128 indicates the status of the inverter's AUX output. If it is set, the AUX output is active.

If more than one error occurs, the values are additive.

Table 3 FX Error Codes

Value	Description
1	Low Vac Output
2	Stacking Error
4	Over Temp
8	Low Battery
16	Phase Loss
32	High Battery
64	Shorted Output
128	Backfeed

Table 4 FX AC Modes

Value	Description
00	No AC
01	AC Drop
02	AC Use

Table 5 FX Misc

Value	Description
1	230 Vac unit
2	Reserved by inverter
4	Reserved by inverter
8	Reserved by inverter
16	Reserved by inverter
32	Reserved by inverter
64	Reserved by inverter
128	AUX output ON

Items labeled "Reserved by inverter" change without notice and are intentionally not published by OutBack.

Application Note

Warning Codes: Values are displayed in values ranging from 000 to 255. Each value represents a different warning as shown in Table 6. If more than one warning occurs, the values are additive. For example, a low AC input voltage and low AC input frequency would return a value of 10.

Table 6 FX Warning Codes

Value	Description
1	AC Input Freq High
2	AC Input Freq Low
4	Input Vac High
8	Input Vac Low
16	Buy Amps > Input size
32	Temp Sensor Failed
64	Comm Error*
128	Fan Failure

*For FX3048T inverters upgraded to firmware revision 67, value 64 is assigned to “Shorted Relay Fault”. This warning indicates a problem with the inverter’s transfer relay.

Checksum: This is a simple additive checksum of the decimal values of the data stream. Range is 000 to 999.

EXAMPLE:

- 00,2,00,00,00,119,000,00,00,000,01,254,008,000,033
- 0+0+2+0+0+0+0+0+0+1+1+9+0+0+0+0+0+0+0+0+0+0+0+1+2+5+4+0+0+8+0+0+0=033
- 01,2,00,00,00,120,000,00,02,000,01,254,008,000,028
- 0+1+2+0+0+0+0+0+0+1+2+0+0+0+0+0+0+0+2+0+0+0+0+1+2+5+4+0+0+8+0+0+0=028

Radian-Class Inverter Data Stream

Table 8 shows the data stream generated for each “Radian-class” inverter connected to the system. (This includes all variations of the GS inverter.)

- The data stream for each inverter is 80 characters long.
- An example is 00,6,00,00,00,00,119,000,119,00,00,00,00,121,000,121,04,000,02,554,000,000,056.

Table 7 Data Stream Matrix for Radian-Class Inverter

Date	Time	Port	Device Type (6)	L1 Inverter Current	L1 Charger Current	L1 Buy Current	L1 Sell Current	L1 Grid Input Voltage	L1 Generator Input Voltage	L1 Output Voltage	L2 Inverter Current	L2 Charger Current
X/XX/XX	XX:XX:XX	XX	6	XX	XX	XX	XX	XXX	XXX	XXX	XX	XX

L2 Buy Current	L2 Sell Current	L2 Grid Input Voltage	L2 Generator Input Voltage	L2 Output Voltage	Inverter Operating Mode (Table 8)	Error Codes (Table 9)	AC Modes (Table 10)	Battery Voltage	Misc (Table 11)	Warning Codes (Table 12)	Checksum
XX	XX	XXX	XXX	XXX	XX	XXX	XX	XX.X	XXX	XXX	XXX

Descriptions of Data Stream Items for the Radian-Class Inverter

The items below describe each category shown in Table 7.

Port Number: Indicates the designation of the OutBack HUB port used by the inverter. The addresses will be 01 to 10 and will correspond to the appropriate numbered port. If the system display is connected directly to the inverter without a HUB, this item will read 00.

Device Type: Indicates the presence of a Radian-class inverter. This device type is always 6.

Inverter Current: Measures the AC current the inverter is delivering to loads from the batteries. The range is 00 to 99 in increments of 1 ampere.

Charger Current: Measures the AC current the inverter is taking from the AC input and delivering to the batteries. The range is 00 to 99 in increments of 1 ampere.

Application Note

Buy Current: Measures AC current the inverter is taking from the AC input and delivering to both the batteries and output loads. The range is 00 to 99 in 1-ampere increments.

Grid Input Voltage: Measures the voltage at the inverter's AC input terminals labeled **GRID**. This data is for both the L1 and L2 input lines in separate portions of the data stream. On each line, the range is 000 to 256 in 1-volt increments. When the **230 Vac Inverter** item in Table 11 is set (128), this number must be doubled. When this item is not set, the value reads as a 120 Vac inverter. See Table 11 (**Radian Misc**) on page 9.

Generator Input Voltage: Measures the voltage at the inverter's AC input terminals labeled **GEN**. This data is for both the L1 and L2 input lines in separate portions of the data stream. On each line, the range is 000 to 256 in 1-volt increments. When the **230 Vac Inverter** item in Table 11 is set (128), this number must be doubled. When this item is not set, the value reads as a 120 Vac inverter. See Table 11 (**Radian Misc**) on page 9.

AC Output Voltage: Measures the voltage at the inverter's AC output terminals. This data is listed for both the L1 and L2 inputs in separate data stream sections. The range on each line is 000 to 256 in 1-volt increments.

Sell Current: Measures the AC current the inverter is taking from the batteries and delivering to the AC input. The range is 00 to 99 in 1-ampere increments.

Inverter Operating Modes: Reports any of a variety of functions that can be performed by the inverter. The range is 00 to 99, although not all items are in use. Items and corresponding modes are shown in Table 8.

- **Inverter Off:** The user has turned the inverting mode off and no other functions are active.
- **Search:** The inverter is using the Search function of the inverting mode.
- **Inverter On:** The inverter is powering loads with the inverting mode.
- **Charge:** The inverter is using an AC source to charge the batteries.
- **Silent:** The inverter is using an AC source, but has entered the quiescent period following a battery charging cycle.
- **Float:** The inverter is using an AC source and is in the low-level maintenance stage of a battery charging cycle.
- **Equalize:** The user has initiated equalization, a controlled overcharge for battery maintenance.
- **Charger Off:** The user has manually turned the charging function off.
- **Support:** The inverter is drawing power from the batteries to support an AC source which is running heavy loads.
- **Sell Enabled:** A grid-interactive inverter is exporting more power than it has AC loads. This excess power is flowing out through the inverter's AC input. It is measured with the **Sell Current** meter (characters 24 and 25).
- **Pass-through:** The inverter is transferring AC power from a source on its input to operate loads on the output. This mode is the result of a grid-interactive inverter waiting for criteria to be met before it begins selling.

Table 8
Radian
Operating Mode

Data	Description
00	Inverter Off
01	Search
02	Inverter On
03	Charge
04	Silent
05	Float
06	Equalize
07	Charger Off
08	Support
09	Sell Enabled
10	Pass-through
11	Slave Inverter On
12	Slave Inverter Off
14	Offset
90	Inverter Error
91	AGS Error
92	Comm Error

Application Note

- **Slave Inverter On (or Off):** The master inverter has turned a (parallel-stacked) unit on (or off) due to conditions.
- **Offset:** The inverter is offsetting use of the AC source by using excess DC power to run loads.
- **Inverter Error:** The inverter has suffered a critical fault and has probably stopped functioning. Characters 58 to 60 show the nature of the error. (See **Error Codes**, below, and Table 10.)
- **AGS Error:** The system display tried to automatically start the generator in Advanced Gen Start mode and failed. This error will also occur if the generator was successfully started, then stopped unexpectedly.
- **Comm Error:** The inverter's control board is no longer communicating. The inverter may require repair.

EXAMPLE:

A grid-interactive inverter has an **Offset** setting of 51.2 Vdc and 10 amps (1200 watts) of AC output load on L1. DC sources contribute 480 watts to the battery. The inverter maintains the battery at 51.2 Vdc by converting the excess 480 watts of DC power to AC. The inverter mode displays **Support** with the **Inverter Current** meter showing 4 amps (480 watts) of production. The **Buy Current** would show 6 amps (720 watts), for 600 watts of total AC load current. If the AC load was removed, the inverter would have **Sell Enabled** as the mode and show 4 amps of **Sell Current**.

Error Codes: There are 8 individual values displayed in values ranging from 000 to 255. Each value represents a different error as shown in Table 10. If more than one error occurs, the values are additive. For example, an overtemp error and backfeed error would return a value of 132.

AC Mode: This represents the status of the AC input. The range is 00 to 99, but only three states are in use as shown in Table 10. **No AC** means that no AC source has been detected by the inverter. **AC Drop** means that AC is present but the inverter is not allowed to accept it. **AC Use** means AC is present and valid, and the inverter will utilize it.

Battery Voltage: The DC voltage as measured at the inverter's battery terminals. The range is 000 to 999, incorporating one decimal place. For example, a 24.8 Vdc battery voltage will be sent as '248'. The resolution of battery voltage is 0.4 Vdc for 48-volt systems.

Misc: There are 8 individual values displayed in values ranging from 000 to 255. Only certain values are in use at this time. Each value represents a different condition. Value 64 indicates the AC input that is presently in use. (AC1 is the Radian input labeled **GRID**. AC2 is the input labeled **GEN**.) Value 128 indicates the Radian inverter's nominal output voltage. As noted on page 8, when this value is active, the input voltage readings from Table 7 must be multiplied by two.

Items labeled "Reserved by inverter" change without notice and are intentionally not published by OutBack.

Table 9

Radian Error Codes

Value	Description
1	Low Vac Output
2	Stacking Error
4	Over Temp
8	Low Battery
16	Comm Fault
32	High Battery
64	Shorted Output
128	Backfeed

Table 10

Radian AC Modes

Value	Description
00	No AC
01	AC Drop
02	AC Use

Table 11

Radian Misc

Value	Description
1	Reserved by inverter
2	Reserved by inverter
4	Reserved by inverter
8	Reserved by inverter
16	AUX output ON
32	Relay output ON
64	1 = AC 2 selected 0 = AC 1 selected
128	1 = 230 Vac inverter 0 = 120 Vac inverter

Application Note

Warning Codes: There are 8 individual values displayed in values ranging from 000 to 255. Each value represents a different warning as shown in Table 12. If more than one warning occurs, the values are additive. For example, a low AC input voltage and low AC input frequency would return a value of 010.

**Table 12 Radian
Warning Codes**

Value	Description
1	AC Input Freq High
2	AC Input Freq Low
4	Input Vac High
8	Input Vac Low
16	Buy Amps > Input size
32	Temp Sensor Failed
64	Phase Loss
128	Fan Failure

Checksum: This is a simple additive checksum of the decimal values of the data stream. Range is 000 to 999.

EXAMPLE:

- 00,6,00,00,00,00,119,000,119,00,00,00,00,121,000,121,04,000,02,554,000,000,056
- $0+0+6+0+0+0+0+0+0+0+0+0+0+0+0+1+1+9+0+0+0+0+1+1+9+0+0+0+0+0+0+0+0+0+0+0+1+2+1+0+0+0+0+1+2+1+0+4+0+0+0+0+2+5+5+4+0+0+0+0+0+0+0=056$

Charge Controller Data Stream

This is the data stream generated for each OutBack charge controller connected to the system.

- The data stream for each charge controller is 52 characters long.
- An example is 00,3,00,08,06,034,031,00,05,000,02,262,000,000,045.

Table 13 Data Stream Matrix for Charge Controller

Date	Time	Port	Device Type (3)	Unused	Charger Current	PV Current	PV Voltage	Daily KWh	CC Amps (tenths)	Aux Mode (Table 14)	Error Code (Table 15)	Charger Mode (Table 16)	Battery Voltage	Daily Amp Hours	unused	Checksum
X/XX/XX	XX:XX:XX	XX	3	00	XX	XX	XXX	XX.X	0.X	XX	XXX	XX	XX.X	XXXX	00	XXX

Descriptions of Data Stream Items for the FLEXmax CC

Port Number: Indicates the designation of the OutBack HUB port used by the charge controller. The addresses will be 01 to 10 and will correspond to the appropriate numbered port. If the system display is connected directly to the charge controller without a HUB, this item will read 00.

Device Type: Indicates the presence of an OutBack charge controller of any model. This device type is always 3.

Charger Current: Measures the DC current delivered from the controller output to the batteries. The range is 00 to 99 in increments of 1 ampere. (A separate item measures tenths of an amp. The MX60 controller does not use this item.)

PV Current: Measures the DC current delivered from the PV array to the charge controller’s input. The range is 00 to 99 in increments of 1 ampere.

PV Input Voltage: The DC voltage as measured at the charge controller’s input (PV) terminals. The range is 000 to 255 in increments of 1 volt.

Daily Kilowatt-Hours: The kilowatt-hours harvested by the controller that day. The range is 000 to 999, incorporating one decimal place. For example, a harvest of 55.5 kilowatt-hours will be sent as ‘555’. This number is reset to zero any time the controller undergoes its wakeup procedure, or every 24 hours.

Application Note

AUX Modes: The current operating mode for the charge controller's (example FM80/60) auxiliary terminals. (See Table 14.) The range is 00 to 99. (The MX60 controller only uses the first six modes on the list.) When the AUX output becomes active, add 64 to the disabled value. Hence, values below 63 indicate the selected AUX mode, while values above 63 also show that it is active. For example, a disabled vent fan would have a value 04 and an enabled vent fan would result in a value of 68.

Fault Codes: There are 8 individual values displayed in values ranging from 000 to 255. Each value represents a different fault as shown in Table 15. For example, a shorted battery sensor would return a value of 32. Only certain values are used.

- In MX60 controllers, this is only valid with firmware above revision 5.11.
- In FLEXmax 100 and FLEXmax Extreme controllers, bit 4 and 5 (values 8-16) are in use. Bit 4 represents the **Fault Input Active** error. Bit 5 is the Over Temperature error.)

Charger Mode: Reports the charge controller's present status in a three-stage charge cycle. The range is 00 to 99, although not all items are in use. Items and their corresponding modes are shown in Table 16.

- **Silent:** The controller has entered the quiescent period following a charging cycle.
- **Float:** The controller is in a low constant-voltage charge, the last stage of a charging cycle.
- **Bulk:** The controller is in a constant-current charge, the beginning stage of a charging cycle.
- **Absorb:** The controller is in a high constant-voltage charge, the middle stage of a charging cycle.
- **Equalize:** The controller is running equalization, a controlled overcharge for battery maintenance.

Battery Voltage: The DC voltage as measured at the charge controller's battery terminals. The range is 000 to 999, incorporating one decimal place. For example, a 24.8 Vdc battery voltage will be sent as '248'.

Daily AH: The daily total of amp-hours delivered to the batteries by the charge controller. Range is 0000 to 2000. The number is reset to zero at midnight. This item is not valid for the MX60 controller; '9999' will be returned.

Checksum: This is a simple additive checksum of the decimal values of the Status page. Range is 000 to 999.

EXAMPLE:

- 00,3,00,08,06,034,031,00,05,000,02,262,000,000,045
- 0+0+3+0+0+0+8+0+6+0+3+4+0+3+1+0+0+0+5+0+0+0+0+2+2+6+2+0+0+0+0+0+0=045

Table 14
CC AUX Modes

Disabled	Enabled	Description
00	64	Disabled
01	65	Diversion
02	66	Remote
03	67	Manual
04	68	Vent Fan
05	69	PV Trigger
06	70	Float
07	71	Fault Output
08	72	Night Light
09	73	PWM Diversion
10	74	Low Battery

Table 15
CC Fault Codes

Value	Description
1-16	Unused (see text)
32	Shorted battery sensor
64	Too hot
128	High VOC

Table 16
CC Charger Modes

Data	Description
00	Silent
01	Float
02	Bulk
03	Absorb
04	Equalize

FLEXnet DC Data Stream

This is the data stream generated for a FLEXnet DC (FN-DC) battery monitor connected to the system.

- The data stream for the FLEXnet DC is 52 characters long.
- An example is 0,4,0000,0126,0000,02,00023,287,099,001,00,33,062.

Table 17 Data Stream Matrix for FLEXnet DC Battery Monitor

Date	Time	Port	Device Type (4)	Shunt A Amps	Shunt B Amps	Shunt C Amps	Extra Data Identifier (Table 18)	Extra Data	Battery Voltage	SOC	Shunt Enable			Status Flag (Table 19)	Battery Temp	Checksum
											Shunt 1	Shunt 2	Shunt 3			
X/XX/XX	XX:XX:XX	XX	4	XXX.X	XXX.X	XXX.X	XX	XXXXXX	XX.X	XXX	X	X	X	XX	XX	XXX

Descriptions of Data Stream Items for the FLEXnet DC

Port Number: Indicates the designation of the OutBack HUB port used by the FLEXnet DC. The addresses will be 01 to 10 and will correspond to the appropriate numbered port.

Device Type: Indicates the presence of a FLEXnet DC monitor. This device type is always 4.

Shunt Current: Measures the DC current delivered across a specified shunt. The range is 0009 to 9999, incorporating one decimal place. For example, a current of 112.3 amps will be sent as '1123'. Separate character strings report the status of up to three shunts (A, B, and C), if present).

Extra Data Identifier: This data stream reflects data that typically changes very slowly. This column provides an identifier for the type of data appearing in the next column (**Extra Data**). A total additive value from 0 to 63 can be determined from the **Type** section of Table 18.

NOTE: The **Sign** section of Table 18 adds 64 to the **Type** to indicate a negative **Extra Data** value. If the **Identifier** is over 64, subtract 64 before determining the additive value in Table 18. Make certain to note that the **Extra Data** is a negative number.

Table 18 Extra Data Identifier for FN-DC

Sign	extra data numeric sign
0:	positive value
64:	negative value
Type	
0:	Accumulated AH ¹ shunt 'A'
1:	Accumulated kWh ² shunt 'A'
2:	Accumulated AH ¹ shunt 'B'
3:	Accumulated kWh ² shunt 'B'
4:	Accumulated AH ¹ shunt 'C'
5:	Accumulated kWh ² shunt 'C'
6:	Days since full ³
7:	Today's minimum SOC ⁴
8:	Today's net input AH ¹
9:	Today's net output AH ¹
10:	Today's net input kWh ²
11:	Today's net output kWh ²
12:	Charge factor corrected Net battery AH ¹
13:	Charge factor corrected Net battery kWh ²
14-35:	Reserved
¹ AH values: 00000 to 65535 (0 to 65535 amp-hours) ² kWh values: 00000 to 65535 (000.00 to 655.35 kilowatt-hours) ³ Days since full output: 00000 to 09999 (0.0 to 999.9) ⁴ Minimum SOC output: 00000 to 00100 (0 to 100 percent)	

Application Note

For example, if **Today's Net Input AH¹** had an **Extra Data Identifier** value of 8 and **Extra Data** of 100, this would represent a net input of 100 AH. If **Today's Net Input AH¹** had an **Extra Data Identifier** value of 72 and **Extra Data** of 100, this would represent a net input of -100 AH.

Extra Data: This is the actual value of the **Extra Data Modifier** above.

FLEXnet DC Battery Voltage: The DC voltage as measured at the batteries by the FLEXnet DC's sense wires. The range is 000 to 999, incorporating one decimal place. For example, a voltage of 24.8 Vdc will be sent as '248'.

Battery State of Charge: The state of charge as determined by the programmed parameters of the FLEXnet DC. The range is 0 to 100 percent.

Shunt Enable Flags: Indicates whether shunts A through C are enabled (a state of 0) or disabled (a state of 1).

Status Flags: There are 6 individual values displayed in values ranging from 000 to 255. Each value is a flag for a different function as shown in Table 19.

Relay State indicates whether the function has been set to manual mode (a state of 0) or automatic mode (a state of 1).

Relay Mode indicates whether the AUX relay is open (a state of 0) or closed (a state of 1).

EXAMPLE: A returned value of 009 would indicate that the FLEXnet DC charge parameters have been met and that the values are negative for Shunt 1.

Battery Temperature: The temperature of the batteries as reported by the Remote Temperature Sensor (RTS). The range is 00 to 70. This represents a range of degrees Celsius that is ten less than the value shown. The result is a range of -10°C to 60°C. A value of 99 indicates that no RTS is installed.

Checksum: '000' to '999'. This is a simple additive checksum of the decimal values of the Status page.

EXAMPLE:

- 00,4,0000,0126,0000,02,00023,287,099,001,00,33,062
- 0+0+4+0+0+0+0+0+1+2+6+0+0+0+0+0+2+0+0+0+2+3+2+8+7+0+9+9+0+0+1+0+0+3+3=062

Table 19
Status Flag

Value	Description
1	Charge parms met
2	Relay State
4	Relay Mode
8	Shunt A values are negative
16	Shunt B values are negative
32	Shunt C values are negative

Troubleshooting

Symptom	Solution
SD card not reading	Card not fully engaged Card inserted the wrong direction
No data on SD card	Data logging not enabled Data not in .csv format Card locked out (write protection enabled) Card not fully engaged Card full Card file system not in an acceptable format (FAT16 or FAT32) Card needs to be formatted or reformatted
Data blank on computer	Extract zip files from SD card to computer

Application Note

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.

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Other

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