

# VERTIV™

## Albér MODBUS Protocol for Universal Xplorer Industrial Monitor (UXIM) and Universal Xplorer Telecom Monitor (UXTM)

### Reference Guide and Release Notes

#### REVISION 3.1 (4200-102)

#### Section Outline

- 1 MODBUS Protocol (ASCII Frame) Overview
- 2 UXIM/UXTM Register List for Function 3, 4 and 16 (Data Address: 0000H-270EH)
- 3 Using Commands
- 4 Alarm Type and PCB Revision/Version Information

#### 1 MODBUS Protocol (ASCII Frame) Overview

**NOTE:** Some features in this document are only implemented in the latest firmware release. To ensure you can utilize all features, verify you have the latest firmware version.

ITEM	DESCRIPTION
Frame	Colon, Address (H), Address (L), Function (H), Function (L), Data, LRC (H), LRC (L), CR, LF
ASCII Character	Every field in the frame is sent in ASCII character
Address	Device address is defined as: UXTM 1-254, UXIM 1-254
Error Control	LRC. If correct, send requested data back. If error is found, do nothing. The following binary bytes in the frame are checked: address, function and data
Bits per Byte	1 start bit, 7 data bits, 2 stop bits, no parity
Baud Rate	1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200 bps

#### 2 UXIM/UXTM Register List for Function 3, 4 and 16 (Data Address: 0000H-270EH)

##### Cell Parameters Table

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
Cell Voltage	Cell Voltage 1	33586	0E1H
	Cell Voltage 2		
	Cell Voltage 256	33841	0F00H
Cell Temperature	Cell Temperature 1	33906	0F41H
	Cell Temperature 2		
	Cell Temperature 256	34161	1040H
Resistance Test Start Time (for cell resistance and intercell)	Year/Month	34543	11BEH

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
	Day/Hour	34544	11BFH
	Minute/Second	34545	11C0H
Cell Resistance	Cell Resistance 1	34546	11C1H
	Cell Resistance 2		
	Cell Resistance 256	34801	12C0H
Intercell Resistance	Intercell 1	34866	1301H
	Intercell 2		
	Intercell 256	35121	1400H
Charger Cable Resistance (UXIM Only)	Positive Charger Cable Resistance	39242	2419H
	Negative Charger Cable Resistance	39243	241AH
Ground Fault Current	GF Current Cell 1	39244	241BH
	GF Current Cell 2		
	GF Current Cell 256	39499	251AH
Baseline Internal Resistance	Cell Resistance 1	39711	25EEH
	Cell Resistance 2		
	Cell Resistance 256	39966	26EDH
Baseline Intercell Resistance	Intercell 1	35122	1401H
	Intercell 2	35123	1402H
	Intercell 255	35375	14FEH

### String Parameters Table

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
Overall Voltage	OV String 1	32050	0801H
	OV String 2		
	OV String 3		
	OV String 4		
	OV String 16	32065	0810H
String Current (MSB=sign bit, 0=Positive, 1= Negative)	String 1 Current	32082	0821H
	String 2 Current		
	String 3 Current		
	String 4 Current		
	String 16 Current	32097	0830H
Float Current	String 1 Float Current	32114	0841H
	String 16 Float Current	32129	0850H

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
Ripple	String 1 Ripple	32146	0861H
	String 2 Ripple		
	String 3 Ripple		
	String 4 Ripple		
	String 16 Ripple	32161	0870H
Ambient Temperature	Ambient Temperature 1	31922	0781H
	Ambient Temperature 2 (UXIM only)	31923	0782H
Ground Fault Resistance (UXIM only)	Ground Fault Resistance at Battery System Positive	39707, 39708	25EAH, 25EBH
	Ground Fault Resistance at Battery System Negative	39709, 39710	25ECH, 25EDH
Digital Inputs	Digital Inputs (Bitfield)	39500	251BH
	DI-1	BIT 0	
	DI-2	BIT 1	
	DI-3	BIT 2	
	(Reserved)	BITS 3-15	

### Status Registers Table

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
Status	System Status	30385	0180H
	<i>Mode</i>	<i>Bit State</i>	<i>Bit</i>
	Monitor Mode	1=Monitor Mode	BIT 0
	R-Test in Progress	1= R-Test in progress	BIT 1
	Discharge in Progress	1=Discharge in progress	BIT 2
	Calibration in Progress	1=Calibration in progress	BIT 3
	Diagnostic in Progress	1=Diagnostic in progress	BIT 4
	Maintenance Mode	1=Maintenance Mode	BIT 5
	Major Alarm in Progress	1=Alarm in progress	BIT 6
	Hardware Failure	1=Hardware Failure	BIT 7
	Alarm Acknowledged	1= Alarm Acknowledged	BIT 8
	Minor Alarm in Progress	1= Alarm in progress	BIT 9
Reserved	Reserved	BIT 10-15	
Status	String Status	30386	0181H
	<i>Parameter</i>	<i>Bit State</i>	<i>Bit</i>
	String 1 Discharge State	1=Discharge in progress	BIT 0
	String 2 Discharge State	1=Discharge in progress	BIT 1
	String 3 Discharge State	1=Discharge in progress	BIT 2
String 4 Discharge State	1=Discharge in progress	BIT 3	

CATEGORY	NAME/DESCRIPTION		REFERENCE	DATA ADDRESS
			30387	0182H
	String 1 Alarm Status	1=String in alarm	BIT 0	
	String 2 Alarm Status	1=String in alarm	BIT 1	
	String 3 Alarm Status	1=String in alarm	BIT 2	
	String 4 Alarm Status	1=String in alarm	BIT 3	
<b>Status</b>	<b>Major High Alarm Status</b>		<b>39027</b>	<b>2342H</b>
	<b>Parameter</b>	<b>Bit State</b>	<b>Bit</b>	
	Cell Voltage	1= Alarm in progress	BIT 0	
	String Voltage	1= Alarm in progress	BIT 1	
	Float Current	1= Alarm in progress	BIT 2	
	Ripple Current	1= Alarm in progress	BIT 3	
	Cell Temperature	1= Alarm in progress	BIT 4	
	Cell Resistance	1= Alarm in progress	BIT 5	
	Intercell	1= Alarm in progress	BIT 6	
	Discharge Current	1= Alarm in progress	BIT 7	
	Charger Cable	1= Alarm in progress	BIT 8	
	Digital Input	1= Alarm in progress	BIT 9	
	Reserved	1= Alarm in progress	BIT 10	
	Ambient Temperature	1= Alarm in progress	BIT 11	
	Inter-tier	1= Alarm in progress	BIT 12	
	Cell to Ambient	1= Alarm in progress	BIT 13	
	Thermal Runaway cell to ambient	1= Alarm in progress	BIT 14	
	Thermal Runaway float current	1= Alarm in progress	BIT 15	
<b>Status</b>	<b>Major Low Alarm Status</b>		<b>39028</b>	<b>2343H</b>
	<b>Parameter</b>	<b>Bit State</b>	<b>Bit</b>	
	Cell Voltage	1= Alarm in progress	BIT 0	
	String Voltage	1= Alarm in progress	BIT 1	
	Float Current	1= Alarm in progress	BIT 2	
	Ripple Current	1= Alarm in progress	BIT 3	
	Cell Temperature	1= Alarm in progress	BIT 4	
	Cell Resistance	1= Alarm in progress	BIT 5	
	Reserved	1=Alarm in progress	BIT 6	
	Reserved	1=Alarm in progress	BIT 7	
	Reserved	1=Alarm in progress	BIT 8	

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
	Digital Input	1=Alarm in progress	BIT 9
	Ground Fault	1=Alarm in progress	BIT 10
	Ambient Temperature	1=Alarm in progress	BIT 11
	Inter-tier	1=Alarm in progress	BIT 12
	Reserved	1=Alarm in progress	BIT 13-15
<b>Status</b>	<b>Minor High Alarm Status</b>	<b>39029</b>	<b>2344H</b>
	<b>Parameter</b>	<b>Bit State</b>	<b>Bit</b>
	Cell Voltage	1= Alarm in progress	BIT 0
	String Voltage	1= Alarm in progress	BIT 1
	Float Current	1= Alarm in progress	BIT 2
	Ripple Current	1= Alarm in progress	BIT 3
	Cell Temperature	1= Alarm in progress	BIT 4
	Cell Resistance	1= Alarm in progress	BIT 5
	Intercell	1= Alarm in progress	BIT 6
	Discharge Current	1= Alarm in progress	BIT 7
	Charger Cable	1= Alarm in progress	BIT 8
	Digital Input	1= Alarm in progress	BIT 9
	Reserved	1= Alarm in progress	BIT 10
	Ambient Temperature	1= Alarm in progress	BIT 11
	Inter-tier	1= Alarm in progress	BIT 12
	Cell to Ambient	1= Alarm in progress	BIT 13
	Thermal Runaway cell to ambient	1= Alarm in progress	BIT 14
	Thermal Runaway float current	1= Alarm in progress	BIT 15
<b>Status</b>	<b>Minor Low Alarm Status</b>	<b>39030</b>	<b>2345H</b>
	<b>Parameter</b>	<b>Bit State</b>	<b>Bit</b>
	Minor Low Alarm	1= Alarm in progress	BIT 0
	String Voltage	1= Alarm in progress	BIT 1
	Float Current	1= Alarm in progress	BIT 2
	Ripple Current	1= Alarm in progress	BIT 3
	Cell Temperature	1= Alarm in progress	BIT 4
	Cell Resistance	1= Alarm in progress	BIT 5
	Reserved	1= Alarm in progress	BIT 6
	Reserved	1= Alarm in progress	BIT 7
	Reserved	1= Alarm in progress	BIT 8

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
	Digital Input	1= Alarm in progress	BIT 9
	Ground Fault	1= Alarm in progress	BIT 10
	Ambient Temperature	1= Alarm in progress	BIT 11
	Inter-tier	1= Alarm in progress	BIT 12
	Reserved	1= Alarm in progress	BIT 13-15

### Page Registers

#### *Discharge Page Register*

Current page of discharge data. Data is accessed one page at a time, ten records per page, starting with page 0.

49501

251CH

#### *Alarm Page Register*

Current page of alarm data. Data is accessed one page at a time, ten records per page, starting with page 0.

49502

251DH

### Alarm Disable Timer

Discharge remaining time of alarm disable/discharge duration. While a discharge is in progress, this register keeps track of its duration in seconds. At the end of a discharge, the register holds the alarm disable time (discharge normalization time) remaining in seconds.

39503  
(Byte 1-2)

251EH  
(Byte 1-2)

39504  
(Byte 3-4)

251FH  
(Byte 3-4)

Byte 1, Byte 2, Byte 3, Byte 4

39673  
(Byte 1-2)

25C8H  
(Byte 1-2)

R-Test Remaining Time of Alarm Disable

39674  
(Byte 3-4)

25C9H  
(Byte 3-4)

### Event Details Table

**NOTE:** In the following table, each category represents one page of 1-10 records each time. 0FFH is stuffed in all remaining memory spaces after the last record.

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
<b>Major Alarms</b>	<b>Actual Alarm Number= 10xPage Number + Record Number</b>		
	Alarm type of record 1 (see later tables for alarm type formats)	39505	2520H
	Current level of record 1		
	Starting year/month of record 1		
	Starting day/hour of record 1		
	Starting minute/second of record 1		
	Alarm type of record 10 (see later tables for alarm type formats)	39559	2556H
	Current level of record 10		

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
	Starting year/month of record 10		
	Starting day/hour of record 10		
	Starting minute/second of record 10		
<b>Minor Alarms</b>	<b>Actual Alarm Number= 10xPage Number + Record Number</b>		
	Alarm type of record 1 (see later tables for alarm type formats)	39043	9882H
	Current level of record 1		
	Starting year/month of record 1		
	Starting day/hour of record 1		
	Starting minute/second of record 1		
	Alarm type of record 10 (see later tables for alarm type formats)	39097	2388H
	Current level of record 10		
	Starting year/month of record 10		
	Starting day/hour of record 10		
	Starting minute/second of record 10		
<b>Discharge Data</b>	<b>Actual Discharge Number= 10xPage Number + Record Number</b>		
	String number of record 1	39560	2557H
	Lowest OV of record 1		
	Highest string current of record 1		
	Ambient temperature at end of record 1		
	Starting year/month of record 1		
	Starting day/hour of record 1		
	Starting minute/second of record 1		
	Ending year/month of record 1		
	Ending day/hour of record 1		
	Ending minute/second of record 1		
	String number of record 10	39669	25C4H
	Lowest OV of record 10		
	Highest string current of record 10		
	Ambient temperature at end of record 10		
	Starting year/month of record 10		
	Starting day/hour of record 10		
	Starting minute/second of record 10		
	Ending year/month of record 10		
	Ending day/hour of record 10		
	Ending minute/second of record 10		

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
Resistance Test			
Date/Time			
	Resistance test year/month	39670	25C5H
	Resistance test day/hour	39671	25C6H
	Resistance test minute/second	39672	25C7H

### Configuration Table (Alarm Thresholds/Inter-tier Configuration/Alarm Enable and Latch Information)

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
Major Alarm Thresholds	Segmented Array, Not recommended for new integration		
	High Cell Voltage Alarm Threshold	42754	0AC1H
	Low Cell Voltage Alarm Threshold	42722	0AA1H
	High Cell Resistance Alarm Threshold	42946	0B81H
	Low Cell Resistance Alarm Threshold	42914	0B61H
	High intercell Resistance Alarm Threshold	42978	0BA1H
	High Cell Temperature Alarm Threshold	42850	0B21H
	Low Cell Temperature Alarm Threshold	42786	0AE1H
	High Ambient Temperature Alarm Threshold	42466	09A1H
	Low Ambient Temperature Alarm Threshold	42402	0961H
	High Overall Voltage Alarm Threshold	42562	0A01H
	Low Overall Voltage Alarm Threshold	42530	09E1H
	High String Current Alarm Threshold	42594	0A21H
	High Ripple Current Alarm Threshold	42690	0A81H
	High Float Current Alarm Threshold	42658	0A61H
	Low Float Current Alarm Threshold	42626	0A41H
	Cell to Ambient Temperature Deviation Threshold	43106	0C21H
	Cell to Ambient Thermal Runaway Threshold	49711	25EEH
	High Float Current Thermal Runaway Threshold	49712	25EFH
	Discharge Trigger Current Threshold (Not for Alarm, used for discharge detection)	49713	25F0H
	Ground Fault Resistance Positive Threshold (K $\Omega$ ) [UXIM only]	49705	25E8H
	Ground Fault Resistance Negative Threshold (K $\Omega$ ) [UXIM only]	49706	25E9H
	Ground Fault Current Threshold (future)	49714	25F1H
	High Positive Charger Cable Resistance Alarm Threshold [UXIM only]	49720	25F7H



CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
	High Negative Charger Cable Resistance Alarm Threshold [UXIM only]	49721	25F8H
	High Intertier Resistance Threshold 1	43010	0BC1H
	High Intertier Resistance Threshold 2	43011	0BC2H
	High Intertier Resistance Threshold 3	43012	0BC3H
	High Intertier Resistance Threshold 4	43013	0BC4H
<b>Major Alarm Thresholds</b>	<b>Sequential Array, Only available in UXIM 1.4.0 and UXTM 1.22.0 (and after)</b>		
	High Cell Voltage Alarm Threshold	49134	23ADH
	Low Cell Voltage Alarm Threshold	49135	23AEH
	High Cell Resistance Alarm Threshold	49136	23AFH
	Low Cell Resistance Alarm Threshold	49137	23B0H
	High intercell Resistance Alarm Threshold	49138	23B1H
	High Cell Temperature Alarm Threshold	49139	23B2H
	Low Cell Temperature Alarm Threshold	49140	23B3H
	High Ambient Temperature Alarm Threshold	49141	23B4H
	Low Ambient Temperature Alarm Threshold	49142	23B5H
	High Overall Voltage Alarm Threshold	49143	23B6H
	Low Overall Voltage Alarm Threshold	49144	23B7H
	High String Current Alarm Threshold	49145	23B8H
	High Ripple Current Alarm Threshold	49146	23B9H
	High Float Current Alarm Threshold	49147	23BAH
	Low Float Current Alarm Threshold	49148	23BBH
	Cell to Ambient Temperature Deviation Threshold	49149	23BCH
	Cell to Ambient Thermal Runaway Threshold	49150	23BDH
	High Float Current Thermal Runaway Threshold	49151	23BEH
	Discharge Trigger Current Threshold (Not for Alarm, used for discharge detection)	49152	23BFH
	Ground Fault Resistance Positive Threshold (K $\Omega$ ) [UXIM only]	49153	23C0H
	Ground Fault Resistance Negative Threshold (K $\Omega$ ) [UXIM only]	49154	23C1H
	Ground Fault Current Threshold (future)	49155	23C2H
	High Positive Charger Cable Resistance Alarm Threshold [UXIM only]	49156	23C3H
	High Negative Charger Cable Resistance Alarm Threshold [UXIM only]	49157	23C4H
	High Intertier Resistance Threshold 1	49158	23C5H

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
	High Intertier Resistance Threshold 2	49159	23C6H
	High Intertier Resistance Threshold 3	49160	23C7H
	High Intertier Resistance Threshold 4	49161	23C8H
	High Cell Voltage Alarm Threshold	49027	2342H
<b>Minor Alarm Thresholds</b>			
	Low Cell Voltage Alarm Threshold	49028	2343H
	High Cell Resistance Alarm Threshold	49029	2344H
	Low Cell Resistance Alarm Threshold	49030	2345H
	High intercell Resistance Alarm Threshold	49031	2346H
	High Cell Temperature Alarm Threshold	49032	2347H
	Low Cell Temperature Alarm Threshold	49033	2348H
	High Ambient Temperature Alarm Threshold	49034	2349H
	Low Ambient Temperature Alarm Threshold	49035	234AH
	High Overall Voltage Alarm Threshold	49036	234BH
	Low Overall Voltage Alarm Threshold	49037	234CH
	High String Current Alarm Threshold	49038	234DH
	High Ripple Current Alarm Threshold	49039	234EH
	High Float Current Alarm Threshold	49040	234FH
	Low Float Current Alarm Threshold	49041	2350H
	Cell to Ambient Temperature Deviation Threshold	49042	2351H
	Cell to Ambient Thermal Runaway Threshold	49043	2352H
	High Float Current Thermal Runaway Threshold	49044	2353H
	Ground Fault Resistance Positive Threshold (K $\Omega$ ) [UXIM only]	49045	2354H
	Ground Fault Resistance Negative Threshold (K $\Omega$ ) [UXIM only]	49046	2355H
	Ground Fault Current Threshold (future)	49047	2356H
	High Positive Charger Cable Resistance Alarm Threshold [UXIM only]	49048	2357H
	High Negative Charger Cable Resistance Alarm Threshold [UXIM only]	49049	2358H
	High Intertier Resistance Threshold 1	49050	2359H
	High Intertier Resistance Threshold 2	49051	235AH

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
	High Intertier Resistance Threshold 3	49052	235BH
	High Intertier Resistance Threshold 4	49053	235CH
<b>Inter-tier Configuration</b>			
	Inter-tier 1 Configuration String # (Byte 1) Cell # (Byte 2)	49715	25F2H
	Inter-tier 2 Configuration String # (Byte 1) Cell # (Byte 2)	49716	25F3H
	Inter-tier 3 Configuration String # (Byte 1) Cell # (Byte 2)	49717	25F4H
	Inter-tier 4 Configuration String # (Byte 1) Cell # (Byte 2)	49718	25F5H
Enables	Ambient Temperature Enable (A value of 0 means all ambient temperature sensors are disabled. A value of N means Ambient Temperatures 1 to N are enabled.)	49719	25F6H
Auto Resistance Test Interval/Day/Week day	Resistance Test Period (Days), Absolute Day or Absolute week day based on the value in register 49695.	49694	25DDH
Auto Resistance Test Time Mode	12119= Absolute Day of Month (1-28) 12046= Absolute Week Day (0= Monday, 6= Sunday) Other Value= Day Interval	49695	25DEH
Resistance Alarm Type	BIT0= 1 Check resistance and intercell alarm using percentage change =0 Check resistance and intercell alarm using absolute value	49062	2365H
<b>Major High Alarm Enable</b>		<b>49063</b>	<b>2366H</b>
	BIT0 = 1 Enable Cell Voltage		
	BIT1 = 1 Enable String Voltage		
	BIT2 = 1 Enable Float Current		
	BIT3 = 1 Enable Ripple Current		
	BIT4 = 1 Enable Cell Temperature		
	BIT5 = 1 Enable Cell Resistance		
	BIT6 = 1 Enable Intercell		
	BIT7 = 1 Enable Discharge Current		
	BIT8 = 1 Enable Charger Cable Resistance		

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
	BIT9 = 1 Enable Digital Input		
	BIT10: Reserved		
	BIT11=1 Enable Ambient Temperature		
	BIT12=1 Enable Intertier		
	BIT13=1 Enable Cell to Ambient		
	BIT14=1 Enable Thermal Runaway Cell to Ambient		
	BIT15=1 Enable Thermal Runaway Float current		
<b>Major Low Alarm Enable</b>		<b>49064</b>	<b>2367H</b>
	BIT0 = 1 Enable Cell Voltage		
	BIT1 = 1 Enable String Voltage		
	BIT2 = 1 Enable Float Current		
	BIT3 = 1 Enable Ripple Current		
	BIT4 = 1 Enable Cell Temperature		
	BIT5 = 1 Enable Cell Resistance		
	BIT6 = Reserved		
	BIT7 = Reserved		
	BIT8 = Reserved		
	BIT9 = 1 Enable Digital Input		
	BIT10: 1 Enable Ground Fault		
	BIT11=1 Enable Ambient Temperature		
	BIT12=1 Enable Intertier		
	BIT13-15=Reserved		
<b>Minor High Alarm Enable</b>		<b>49065</b>	<b>2368H</b>
	BIT0 = 1 Enable Cell Voltage		
	BIT1 = 1 Enable String Voltage		
	BIT2 = 1 Enable Float Current		
	BIT3 = 1 Enable Ripple Current		
	BIT4 = 1 Enable Cell Temperature		
	BIT5 = 1 Enable Cell Resistance		
	BIT6 = 1 Enable Intercell		
	BIT7 = 1 Enable Discharge Current		
	BIT8 = 1 Enable Charger Cable Resistance		
	BIT9 = 1 Enable Digital Input		
	BIT10: Reserved		

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
	BIT11=1 Enable Ambient Temperature		
	BIT12=1 Enable Intertier		
	BIT13=1 Enable Cell to Ambient		
	BIT14=1 Enable Thermal Runaway Cell to Ambient		
	BIT15=1 Enable Thermal Runaway Float current		
<b>Minor Low Alarm Enable</b>		<b>49066</b>	<b>2369H</b>
	BIT0 = 1 Enable Cell Voltage		
	BIT1 = 1 Enable String Voltage		
	BIT2 = 1 Enable Float Current		
	BIT3 = 1 Enable Ripple Current		
	BIT4 = 1 Enable Cell Temperature		
	BIT5 = 1 Enable Cell Resistance		
	BIT6 = Reserved		
	BIT7 = Reserved		
	BIT8 = Reserved		
	BIT9 = 1 Enable Digital Input		
	BIT10: 1 Enable Ground Fault		
	BIT11=1 Enable Ambient Temperature		
	BIT12=1 Enable Intertier		
	BIT13-15=Reserved		
<b>Major High Alarm Latch</b>		<b>49067</b>	<b>236AH</b>
	BIT0 = 1 Latch Cell Voltage		
	BIT1 = 1 Latch String Voltage		
	BIT2 = 1 Latch Float Current		
	BIT3 = 1 Latch Ripple Current		
	BIT4 = 1 Latch Cell Temperature		
	BIT5 = 1 Latch Cell Resistance		
	BIT6 = 1 Latch Intercell		
	BIT7 = 1 Latch Discharge Current		
	BIT8 = 1 Latch Charger Cable Resistance		
	BIT9 = 1 Latch Digital Input		
	BIT10: Reserved		
	BIT11=1 Latch Ambient Temperature		
	BIT12=1 Latch Intertier		

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
	BIT13=1 Enable Cell to Ambient		
	BIT14=1 Enable Thermal Runaway Cell to Ambient		
	BIT15=1 Enable Thermal Runaway Float current		
<b>Major Low Alarm Enable</b>		<b>49068</b>	<b>236BH</b>
	BIT0 = 1 Latch Cell Voltage		
	BIT1 = 1 Latch String Voltage		
	BIT2 = 1 Latch Float Current		
	BIT3 = 1 Latch Ripple Current		
	BIT4 = 1 Latch Cell Temperature		
	BIT5 = 1 Latch Cell Resistance		
	BIT6 = Reserved		
	BIT7 = Reserved		
	BIT8 = Reserved		
	BIT9 = 1 Latch Digital Input		
	BIT10: 1 Latch Ground Fault		
	BIT11=1 Latch Ambient Temperature		
	BIT12=1 Latch Intertier		
	BIT13-15=Reserved		
<b>Minor High Alarm Latch</b>		<b>49069</b>	<b>236CH</b>
	BIT0 = 1 Latch Cell Voltage		
	BIT1 = 1 Latch String Voltage		
	BIT2 = 1 Latch Float Current		
	BIT3 = 1 Latch Ripple Current		
	BIT4 = 1 Latch Cell Temperature		
	BIT5 = 1 Latch Cell Resistance		
	BIT6 = 1 Latch Intercell		
	BIT7 = 1 Latch Discharge Current		
	BIT8 = 1 Latch Charger Cable Resistance		
	BIT9 = 1 Latch Digital Input		
	BIT10: Reserved		
	BIT11=1 Latch Ambient Temperature		
	BIT12=1 Latch Intertier		
	BIT13=1 Enable Cell to Ambient		
	BIT14=1 Enable Thermal Runaway Cell to Ambient		

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
	BIT15=1 Enable Thermal Runaway Float current		
Minor Low Alarm Latch		49070	236DH
	BIT0 = 1 Latch Cell Voltage		
	BIT1 = 1 Latch String Voltage		
	BIT2 = 1 Latch Float Current		
	BIT3 = 1 Latch Ripple Current		
	BIT4 = 1 Latch Cell Temperature		
	BIT5 = 1 Latch Cell Resistance		
	BIT6 = Reserved		
	BIT7 = Reserved		
	BIT8 = Reserved		
	BIT9 = 1 Latch Digital Input		
	BIT10: 1 Latch Ground Fault		
	BIT11=1 Latch Ambient Temperature		
	BIT12=1 Latch Intertier		
	BIT13-15=Reserved		

### Configuration Table (Firmware Commands/Site Information/Digital Input Information/Password)

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
Firmware Commands	Firmware Control Register	43490	0DA1H
	<i>Function</i>	<i>Value</i>	
	Start Resistance Test	0000H	
	Stop Resistance Test	00001H	
	Alarm Reset	00002H	
	Delete Discharge Data	00003H	
	Alarm Acknowledge	00004H	
Site Information	<b>(Null terminated strings or maximum length)</b>		
	Location Name	Byte 1/Byte 2	49673 25C8H
	Location Name	Byte 19/Byte 20	49682 25D1H
	Battery Name	Byte 1/Byte 2	40386 0181H
	Battery Name	Byte 41/Byte 42	40406 0195H
	String Name 1	Byte 1/Byte 2	41250 04E1H
	String Name 1	Byte 41/Byte 42	41270 04F5H
	String Name 2	Byte 1/Byte 2	41271 04F6H
	String Name 2	Byte 41/Byte 42	41291 050AH
	String Name 3	Byte 1/Byte 2	41292 050BH

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS	
	String Name 3	Byte 41/Byte 42	41312	051FH
	String Name 4	Byte 1/Byte 2	41313	0520H
	String Name 4	Byte 41/Byte 42	41333	0534H
	String Name 5	Byte 1/Byte 2	41334	0535H
	String Name 5	Byte 41/Byte 42	41354	0549H
	String Name 6	Byte 1/Byte 2	41355	054AH
	String Name 6	Byte 41/Byte 42	41375	055EH
	String Name 7	Byte 1/Byte 2	41376	055FH
	String Name 7	Byte 41/Byte 42	41396	0573H
	String Name 8	Byte 1/Byte 2	41397	0574H
	String Name 8	Byte 1/Byte 2	41417	0588H
	String Name 9	Byte 41/Byte 42	41418	0589H
	String Name 9	Byte 41/Byte 42	41438	059DH
	String Name 10	Byte 1/Byte 2	41439	059EH
	String Name 10	Byte 41/Byte 42	41459	05B2H
	String Name 11	Byte 1/Byte 2	41460	05B3H
	String Name 12	Byte 41/Byte 42	41480	05C7H
<b>Digital Input Alarm Configuration</b>				
	<b>Digital Input Major Alarm Latch</b>	<b>49082</b>	<b>2379H</b>	
	D0= 1 Latch Digital Input 1			
	D1= 1 Latch Digital Input 2			
	D2= 1 Latch Digital Input 3			
	D3- D15= Reserved			
	<b>Digital Input Minor Alarm Latch</b>	<b>49083</b>	<b>237AH</b>	
	D0= 1 Latch Digital Input 1			
	D1= 1 Latch Digital Input 2			
	D2= 1 Latch Digital Input 3			
	D3- D15= Reserved			
	<b>Digital Input Major Alarm Selection</b>	<b>49084</b>	<b>237BH</b>	
	D0= 1 Enable Digital Input 1			
	D1= 1 Enable Digital Input 2			
	D2= 1 Enable Digital Input 3			
	D3- D15= Reserved			
	<b>Digital Input Minor Alarm Selection</b>	<b>49085</b>	<b>237CH</b>	
	D0= 1 Enable Digital Input 1			



CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS	
	D1= 1 Enable Digital Input 2			
	D2= 1 Enable Digital Input 3			
	D3- D15= Reserved			
	<b>Digital Input Open/Close</b>	<b>49086</b>	<b>237DH</b>	
	1= Normal Open			
	0= Normal Close			
	D0= Digital Input 1			
	D1= Digital Input 2			
	D2= Digital Input 3			
	D3- D15= Reserved			
<b>Digital Input Name</b>				
	Digital Input Name 1	Byte 1/Byte 2	49087	237EH
	Digital Input Name 1	Byte 19/Byte 20	49096	2387H
	Digital Input Name 2	Byte 1/Byte 2	49097	2388H
	Digital Input Name 2	Byte 19/Byte 20	49106	2391H
	Digital Input Name 3	Byte 1/Byte 2	49107	2392H
	Digital Input Name 3	Byte 19/Byte 20	49116	239BH
	String Name 13	Byte 1/Byte 2	41481	05C8H
	String Name 13	Byte 41/Byte 42	41501	05DCH
	String Name 14	Byte 1/Byte 2	41502	05DDH
	String Name 14	Byte 41/Byte 42	41522	05F1H
	String Name 15	Byte 1/Byte 2	41523	05F2H
	String Name 15	Byte 41/Byte 42	41543	0606H
	String Name 16	Byte 1/Byte 2	41544	0607H
	String Name 16	Byte 41/Byte 42	41564	061BH
<b>Remote Password (Null terminated or maximum length)</b>				
	Password 1	Byte 1/Byte 2	49683	25D2H
	Password 1	Byte 3/Byte 4	49684	25D3H
	Password 1	Byte 5/Byte 6	49685	25D4H

## Unit Information

CATEGORY	NAME/DESCRIPTION	REFERENCE	DATA ADDRESS
<b>Unit Settings</b>			
	Model Number (ASCII)	39686	25D5
		39689	25D8
	Serial Number (ASCII)	39690	25D9
		39699	25E2
	Firmware Version (ASCII)	39700	25E3
		39703	25E6
	PCB Version	39704	25E7
	Installation Date: Year/Day	43170	0C61H
	Installation Date: ___/Month	43171	0C62H
	System Configuration (Reference Section 3.2)	49690	25D9H
	System Time: Year/Month	49691	25DAH
	System Time: Day/Hour	49692	25DBH
	System Time: Minute/Second	49693	25DCH

## 3 Using Commands

In communication frames, only integer numbers are transmitted. Transformation between integer numbers and decimal numbers is necessary when the computer receives and sends data.

### Data Transformation Table

PARAMETERS	TRANSFORMATION	
	<i>Apply Before Transmitting to Monitor</i>	<i>Apply After Receiving from Monitor</i>
Overall voltage (VDC)	N/A	/100
Cell voltage (VDC)	N/A	/1000
String current (A DC)	N/A	/1
Float current (mA DC)	N/A	/1
Ground Fault current (mA DC)	N/A	/1
Internal resistance ( $\mu\Omega$ )	N/A	/1
Intercell resistance ( $\mu\Omega$ )	N/A	/1
Ground Fault resistance ( $\Omega$ ) [UXIM only]	N/A	/1
Temperature (deg C)	N/A	/1024
Threshold of overall voltage (VDC)	X 100	/100
Threshold of cell voltage (VDC)	X 1000	/1000

PARAMETERS	TRANSFORMATION	
Threshold of String current (A DC)	X 1	/1
Threshold of float current (mA DC)	X 1	/1
Threshold of internal resistance ( $\mu\Omega$ )	X 1	/1
Threshold of intercell resistance ( $\mu\Omega$ )	X 1	/1
Threshold of Ground Fault resistance (K $\Omega$ ) [UXIM only]	X 1	/1
Threshold of temperature (deg C)	X 1024	/1024
Discharge level in current mode (A DC)	X1	/1

### System Configurations Table

TECHNOLOGY	BATTERY/STRING CONFIGURATION (# OF STRINGS x # OF DATA POINTS x NOMINAL VOLTAGE OF DATA POINT)	CONFIGURATION NUMBER
1V – NiCad Cells (24V)	1X18X1V	0
2V Cells (24V)	1X12X2V	1
2V Cells (24V)	2X12X2V	2
2V Cells (48V)	1X24X2V	3
4V Mono-Blocks (24V)	1X6X4V	4
	2X6X4V	5
	3X6X4V	6
	4X6X4V	7
4V Mono-Blocks (48V)	1X12X4V	8
	2X12X4V	9
6V Mono-Blocks (24V)	1X4X6V	10
	2X4X6V	11
	3X4X6V	12
	4X4X6V	13
6V Mono-Blocks (48V)	1X8X6V	14
	2X8X6V	15
	3X8X6V	16
8V Mono-Blocks (24V)	1X3X8V	17
	2X3X8V	18
	3X3X8V	19
	4X3X8V	20
8V Mono-Blocks (48V)	1X6X8V	21
	2X6X8V	22
	3X6X8V	23

TECHNOLOGY	BATTERY/STRING CONFIGURATION (# OF STRINGS x # OF DATA POINTS x NOMINAL VOLTAGE OF DATA POINT)	CONFIGURATION NUMBER
	4X6X8V	24
12V Mono-Blocks (24V)	1X2X12V	25
	2X2X12V	26
	3X2X12V	27
	4X2X12V	28
12V Mono-Blocks (48V)	1X4X12V	29
	2X4X12V	30
	3X4X12V	31
	4X4X12V	32
16V Mono-Blocks (48V)	1X4X12V	29
	1X3X16V	33
	2X3X16V	34
	3X3X16V	35
	4X3X16V	36

#### 4 Alarm Type and PCB Revision/Version Format

##### Alarm Type Format Table

###### DATA BIT LOCATION AND MEANING

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Parameter				Alarm Status	String number (0-15)				Cell number (0-127)						
For Battery System Ground Fault Resistance:															
0= Positive, 1= Negative															

##### Parameter Name/Value Table

PARAMETER NAME	VALUE
Cell voltage	0
Cell temperature	1
Cell resistance	2
Cell intercell	3
Overall voltage	4
String current	5
Float current	6
Ripple current	7

PARAMETER NAME	VALUE
Ambient temperature	8
Cell to ambient	9
Inter-tier	10
Cell to ambient thermal runaway	11
High float current thermal runaway	12
Ground fault	13
Charger cable resistance	14
Digital input	15

### Alarm Status Table

STATE	VALUE
High alarm	1
Low alarm	0

### PCB Version/Revision Format Table

DATA BIT LOCATION AND MEANING								
	Base Revision				Sub Revision			
	<i>D7</i>	<i>D6</i>	<i>D5</i>	<i>D4</i>	<i>D3</i>	<i>D2</i>	<i>D1</i>	<i>D0</i>
Value	0-'A'				0-15			
	1-'B'							
	2-'C'							
	3-'D'							
	4-'E'							
	5-'F'							
	6-'G'							
	7-'H'							