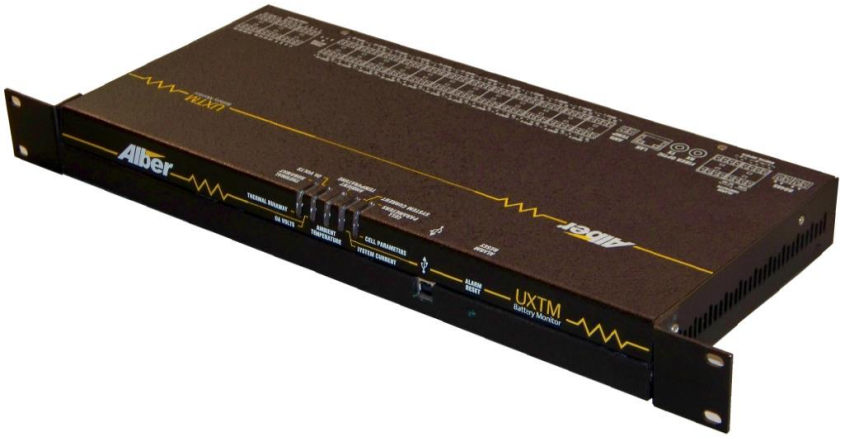
Alber Universal Xplorer Telecom Monitor (UXTM) Battery Monitor

Product Description Guide



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1. Glossary of Terms

The following is a list of terms commonly used with respect to batteries and battery monitoring.

Term	Definition
Battery	Two or more cells connected together electrically in series or parallel.
Cell	The basic electrochemical unit, characterized by an anode and a cathode, used to receive, store and deliver electrical energy.
Current transducer	The component that measures current.
DC resistance measurement	A test method that places a load across a group of cells and measures the instantaneous voltage response to calculate the battery's state of health.
Discharge rate	The rate, in Amperes or Watts, at which current or power is delivered by a battery.
Float current	The current drawn by a cell that is being float charged.
Intercell connector	An electrical conductor used to connect adjacent cells on the same rack.
Intertier connector	An electrical conductor used to connect two cells on different steps of the same rack.
Internal ohmic measurement	A measurement of the electronic and ionic conduction path within a cell or unit using techniques commonly known as impedance, conductance or resistance tests.
Jar	The container that holds a cell or a group of cells. A battery container can be a single cell or multicell unit, also called a *monobloc*.
Monobloc or multicell unit	A multicell container in which cells are installed. (Multicell Unit *US*, Monobloc *outside the US*)
Ohmic value	The unit of measure that indicates resistance of a conductor (intercell or intertier) or a cell / monobloc.
Ripple current	A type of electrical noise characterized by a uniform waveform riding in the DC circuit, normally expressed as peak, peak to peak, or RMS (Root Mean Square) voltage or current.
String	A number of cells connected together in series to form a battery.

Table 1 - Glossary of Terms

2. Product Overview

2.1 Product Description

The Universal Xplorer Telecom Monitor (UXTM) is a stationary battery monitor designed for use in telecommunications or in DC powered data centers. The system architecture is a flexible design for monitoring virtually any battery configuration using VLA, VRLA or NiCd technologies in 24 to 48VDC applications. What sets Vertiv monitors apart from others is the ability to provide early warning of potential battery problems. The monitors check the state of health of each cell and its associated connections by performing a proactive, patented resistance test, a proven technology to reliably predict battery performance.

2.2 Supported System Configurations

Refer to the following table to identify supported systems. If the desired configuration is not in the table, contact Vertiv for further information. As the table shows, the monitor has the ability to monitor up to 24 cells or monoblocs that can be divided or configured in up to four parallel strings.

Technology	**Volts**	**Battery/String Configuration** (Number of strings) x (Number of data points) x (Nominal voltage of data point)
1V NiCd Cells	24V	1X18X1V
2V Cells	24V	1X12X2V 2X12X2V
2V Cells	48V	1X24X2V
4V Monobloc	24V	1X6X4V 2X6X4V 3X6X4V 4X6X4V
4V Monobloc	48V	1X12X4V 2X12X4V
6V Monobloc	24V	1X4X6V 2X4X6V 3X4X6V 4X4X6V
6V Monobloc	48V	1X8X6V 2X8X6V 3X8X6V
6V Monobloc	48V	1X7X6V 2X7X6V 3X7X6V

Table 2 - Battery/String Configurations

Technology	Volts	Battery/String Configuration (Number of strings) x (Number of data points) x (Nominal voltage of data point)
8V Monobloc	24V	1X3X8V 2X3X8V 3X3X8V 4X3X8V
8V Monobloc	48V	1X6X8V 2X6X8V 3X6X8V 4X6X8V
12V Monobloc	24V	1X2X12V 2X2X12V 3X2X12V 4X2X12V
12V Monobloc	48V	1X4X12V 2X4X12V 3X4X12V 4X4X12V
16V Monobloc	48V	1X3X16V 2X3X16V 3X3X16V 4X3X16V

Table 2 - Battery/String Configurations (Continued)

The system functions as a stand-alone monitor, in that no external computer is required for normal operation. Depending on the model, connectivity to existing BDSU systems or Building Management Systems is available through fiber optic, RS-485 or Ethernet. A local computer can be connected for real time data viewing of battery parameters and system startup with a user-friendly program.

Refer to the System Connections Configuration figure for a single string of 24 cells.

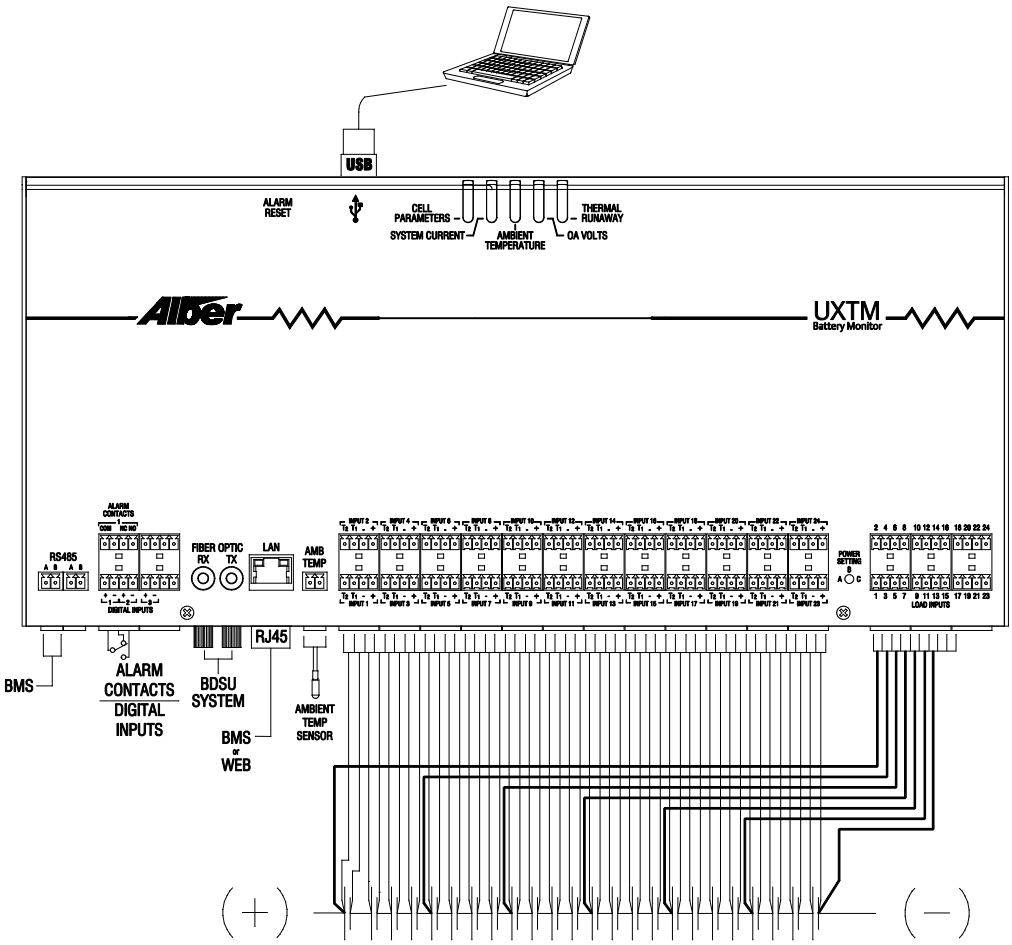

Figure 1 - System Connections (1X24X2V Configuration)

3. Features

The system is compatible with the BDSU architecture. For a full description of features used with that system, refer to the BDSU Product Description Guide.

- System configuration is field configurable
- Modular architecture to support virtually any battery configuration used in a 24/48 volt application
- Continual real time scanning of the following parameters:
  - Individual cell voltage
  - Individual cell temperature
  - String discharge current
  - String float current
  - String ripple current
  - Ambient temperature
- Automatic testing of internal resistance, and intercell and intertier connection measurements
- Stores discharge events, identifying length and depth of each cycle
- Fiber optic connectivity for BDSU system network integration (optional feature available on models 1007-2XX or 1007-3XX)
- Form C contacts for battery parameter or hardware alarm
- Embedded Web server
- Isolated RS-485 interface for third party vendor integration
- 19" rack mount or wall mount
- USB connectivity for PC to allow real time data viewing and configuration
- Remote network LAN connection (optional feature available on models 1007-1XX or 1007-3XX)
- Local status indicators and alarm reset
- Maintenance override - global disable of all alarms
- Supports up to four Intertier connections
- Self calibrating
- Supports YDN-23, MODBUS, SNMP and SMTP protocols

4. Measurement Capabilities

The UXTM has the following measurement capabilities.

Cell or Monobloc Level Measurements

- 24 voltages, 1, 2, 4, 6, 8, 12 or 16 volt
- 24 temperatures (negative cell post)
- 24 internal resistances
- 23 intercell/intertier resistances

String Level Measurements

- Overall voltage
- Discharge current
- Float current
- Ripple current

System Level Measurements

- Ambient temperature

4.1 Optional Accessories

The following optional accessory is available.

- Individual cell/monobloc temperature sensors

5. Operating Modes

Although the monitoring system excels as a maintenance tool, the real advantage is knowing the current status of the batteries at a glance. By using status lights and extensive graphics when used with the Battery Explorer software, pertinent status and alarm events are easily accessible.

5.1 Normal Operating Mode

In normal operating mode, the system continuously scans all parameters within a one-second time frame. As readings are taken, they are compared to user-programmed alarm thresholds. Each parameter is constantly compared to the previously scanned value and, if the value exceeds an alarm threshold, the unit triggers an alarm event, causing the Form C alarm contact to activate and the internal registers to be set to notify the battery management system.

5.2 Discharge Mode

If a discharge is detected, the system goes into a data logging mode and stores discharge start and end times, the lowest overall voltage reached, and the highest string current reached during the event. When used with the BDSU, the system stores battery voltages, temperatures, and discharge current in an embedded database.

5.3 Acceptance/Performance Test

Real time data viewing allows the user to monitor the individual cell voltage, cell temperature, overall voltage and discharge currents during a discharge.

5.4 Resistance Test

A battery resistance test may be performed at user-set intervals or on demand. The test utilizes a patented technology that can identify failing cells or monoblocs, allowing service to be performed on a proactive schedule. Additional measurements taken include intercell and intertier/interrow resistance measurements for identifying bad connections due to improper torque or corrosion at the connections.

5.5 Alarm Mode

Every monitored parameter can have an assigned alarm threshold. When any parameter goes outside the normal range, the Alarm LED lights and a Form C contact energizes. The event stays latched until reset.

6. Model Number Descriptions

The model number is in the format of PPPP-COB, where PPPP is 1007 and C, O, and B are described below.

PPPP–	C	O	B	Description	Choices
1007	C			Communications	0 = RS-485 Only 1 = Network 2 = Fiber Optic 3 = Network and Fiber Optic
1007		O		Options	0 = None 1–9 = Reserved
1007			B	Branding	0 = OEM 1–9 = Reserved

Table 3 - Model Number Description

6.1 Parts List

The following items are included with each order of a UXTM.

Name	Part Number	Description	Requirements
Sense lead harness (standard)	1102-153-XX XX=length Available in 12', 25'or 50'	Harness for monitoring internal cell/monobloc voltage/resistance	Quantity is configuration dependent
Ambient temperature sensors	1102-154-XX XX=length Available in 12', 25'or 50'	Ambient temperature sensor used to monitor room or cabinet temperature	One supplied per system
USB Cable	2025-108	3 meter USB communication cable	One supplied per system
Fused load lead	1102-160-XX XX=length Available in 12', 25'or 50'	Harness for connecting power and load module for internal resistance testing	Quantity is configuration dependent
Load fuse	4301-015	Fuse used in fused load lead	Quantity is configuration dependent
4 Position Connector	2140-047	4 position plug connector for connecting voltage sense and load leads and alarm contacts	Quantity is configuration dependent
2 Position Connector	2140-048	2 position plug connector for connecting RS-485 communication	Two supplied per system

Table 4 - Standard Parts List

The following items are optional accessories and must be ordered separately.

Name	Part Number	Description	Requirements
Sense lead harness with ring terminal temperature sensor	2900-051-XX XX=length Available in 12', 25'or 50'	Harness for monitoring individual cell/monobloc temperatures with a ring terminal	One required per cell
Sense lead harness with quick connect temperature sensor	2900-048-XX XX=length Available in 12', 25'or 50'	Harness for monitoring individual cell/monobloc temperatures with a quick connect	One required per cell
Wall mount brackets	KIT-1200-377	Flush mounting brackets for wall mounting unit	1 set per unit
19" rack mount brackets	KIT-1200-376	19" rack mount mounting brackets	1 set per unit
5/16" dual tab washer	2120-066B	Dual tab washer for sense lead connections	Quantity is configuration dependent
5/16" single tab washer	2120-030B	Single tab washer for sense lead connections	Quantity is configuration dependent

Table 5 - Optional Accessories Parts List

7. Panel Controls and Indicators

This section describes the front and rear panels of the UXTM. Additional descriptions may appear elsewhere in this guide or in related manuals.

7.1 Front Panel (All Models)

This section describes the components on the front panel of the UXTM.

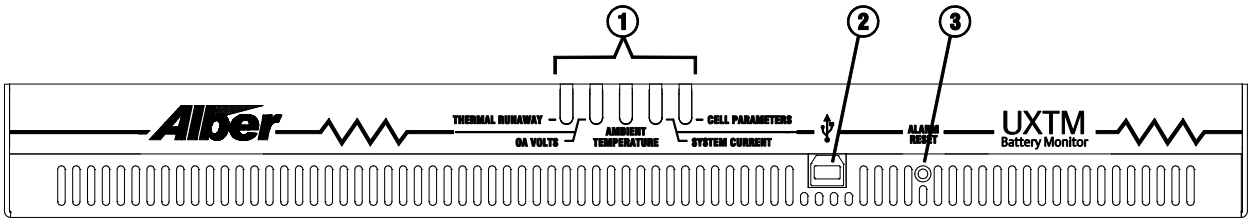

Figure 2 - UXTM Front Panel

The UXTM front panel has the following components. The numbers in the table refer to the callout numbers in the preceding figure.

Number	Description	Function
1	Front Panel Indicators	Used for showing system alarm status and mode of operations. • CELL PARAMETERS LED – stays off or blinks green when no alarms are present. The LED stays red or blinks amber when cell parameters are out of range. • SYSTEM CURRENT LED – stays off or blinks green when no alarms are present. The LED stays red or blinks amber when system current is out of range. • AMBIENT TEMPERATURE LED – stays off or blinks green when no alarms are present. The LED stays red or blinks amber when ambient temperature is out of range. • OA VOLTS LED – stays off or blinks green when no alarms are present. The LED stays red and blinks amber when system detects over all volts is out of range. • THERMAL RUNAWAY LED – stays off or blinks green when no alarms are present. The LED stays red and blinks amber when the system detects a thermal runaway event occurring. • All LEDs sequentially scans amber while system is in maintenance mode. • All LEDs flash amber while system is performing a battery discharge. • All LEDs flash green while system is running a resistance test. • All LEDs flash red and alternating green while system is performing a firmware upgrade.
2	USB Connection	Allows connectivity of computers for setup, configuration, and real time data viewing.
3	Alarm Rest Button	Reset button for resetting latched alarms.

Table 6 - UXTM Front Panel Component Descriptions

7.2 Rear Panel

This section describes the components on the rear panel of the UXTM.

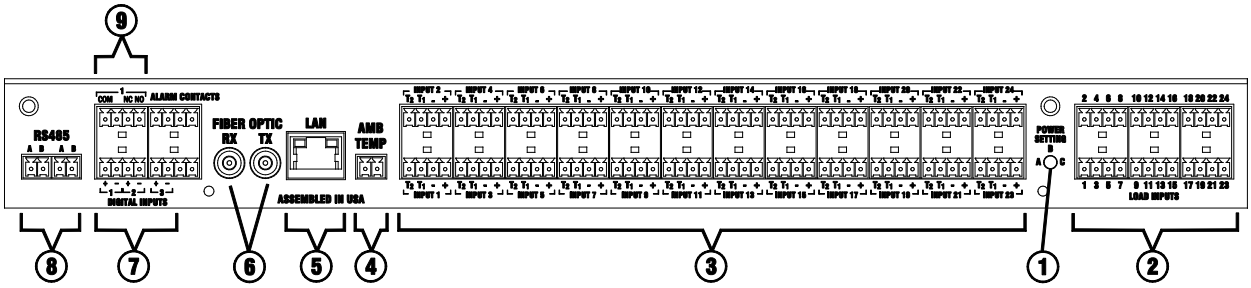

Figure 3 - UXTM Rear Panel

The UXTM rear panel has the following components. The numbers in the table refer to the callout numbers in the preceding figure.

Number	Description	Function
1	Load Setting	Used to set up the unit to work on specific battery configurations.
2	Load Inputs	Load connections for performing internal resistance measurements.
3	Cell Voltage and Temperature Inputs	Sense lead connections for making voltage and temperature measurements.
4	Ambient Temperature Input	Ambient temperature probe connection.
5	LAN Connection	Ethernet connection for network connectivity. This is optional and is only available on the 1007-1XX or 1007-3XX models.
6	Fiber Optic Connections	Used for communication to the BDSU network consisting of UXBM and UXSM modules. This is optional and only available on the 1007-2XX or 1007-3XX models.
7	Digital Inputs	Used for monitoring dry contact inputs or voltage level inputs.
8	RS-485 Connection	Used for remote communications using a YDN23 or MODBUS protocol.
9	Alarm Contact	Form C alarm contact for remote alarm notification.

Table 7 - UXTM Rear Panel Component Descriptions

8. UXTM Specifications

8.1 UXTM System Specifications

Safety Approvals

- UL60950-1, IEC60950-1, EN60950-1

EMC Approvals

- EN300 386, 2001 class B
- FCC part 15 class B

Reliability

- MTBF exceeds 45 years at 30ºC calculated using Telcordia TR-332

Operating Environment

- Temperature Range: 0ºC to 50ºC (32ºF to 122ºF)
- Humidity Range: 5% to 95% RH (non-condensing) at 0ºC to 32ºC
- Indoor Use Only
- Installation Category I
- Pollution Degree 2
- Altitude: 0 to 2000 meters above sea level

Alarms

- Form C relay contact, 2A at 30Vdc

Input Power

- DC Powered, 18 to 58VDC, 7.5W max.

Communications

- RS485 - YDN-23 or MODBUS
- Ethernet -TCP/IP MODBUS, SNMP and SMTP
- USB
- Fiber optic for BDSU integration

Packaging

- 1U chassis
- 15.75"W x 1.75"H x 7.00"D
- 2.9 lbs.
- Wall or 19" Rack Mount

8.2 Cell Measurements

This section describes cell measurement specifications.

Parameter	Tolerance		
Cell Voltage	1V range	0 to 4V	0.1% ±1mV
	2V range	0 to 4V	0.1% ±2mV
	4V range	0 to 6V	0.1% ±4mV
	6V range	0 to 9V	0.1% ±6mV
	8V range	0 to 12V	0.1% ±8mV
	12V range	0 to 18V	0.1% ±12mV
	16V range	0 to 24V	0.1% ±16mV
Internal Cell Resistance	0 to 32,000μΩ, 5% of reading ±2μΩ		
Intercell Resistance	0 to 5000μΩ, 5% of reading ±5μΩ		
Intertier Resistance	0 to 5000μΩ, 5% of reading ±5μΩ		
Cell/Monobloc Temperature	0°C to 80°C ±0.1°C (32°F to 176°F)		

Table 8 - Cell Measurement Specifications

8.3 System Measurements

This section describes system measurement specifications.

Parameter	Tolerance	Number Of Inputs
String Voltage	0 to 56 volts	Calculated
Discharge Current	0 to 4000ADC ±1% of full scale	Calculated
Ripple Current	0 to 250 Amperes RMS, ±5% of full scale	Calculated
Float Current	0 to 5000mADC, ±1% of full scale, ±50mA	Calculated
Ambient Temperature	0°C to 80°C±0.1°C (32°F to 176°F)	1

Table 9 - System Measurement Specifications

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