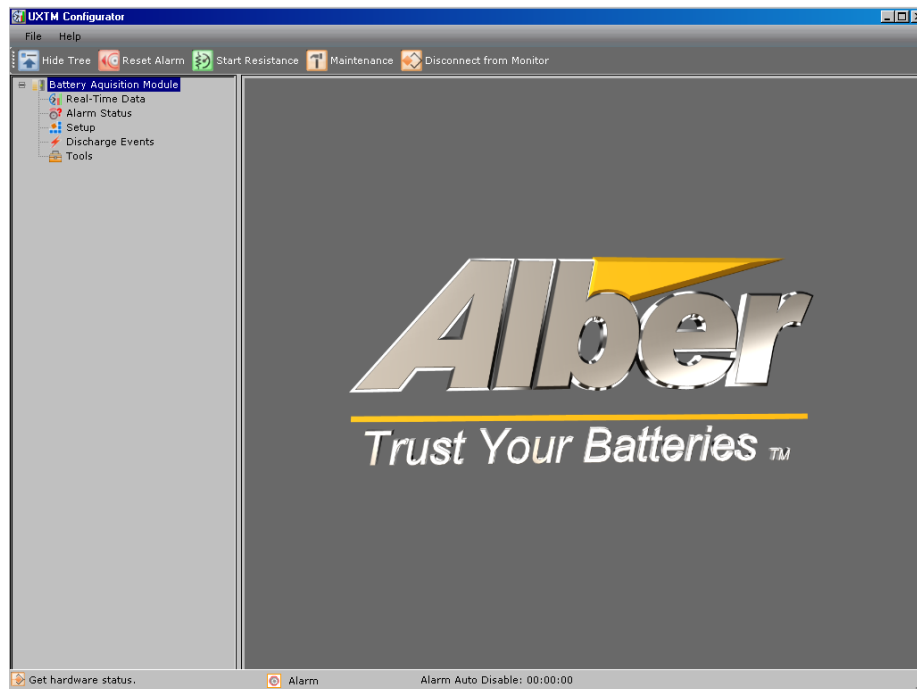


Alber Universal Xplorer Telecom Monitor (UXTM) Battery Monitor

Calibration Guide



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4200-099

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Revision	Date of Change	Description of Change	By
1.00	05/05/11	Initial Release	MS
1.01	09/12/11	Title change and Marketing updates	MS
1.02	01/30/12	Technical updates and equipment setup drawing and the calibration procedures.	MS
1.03	06/24/15	Added new address and phone number.	MS
2	02/15/16	Updated revision number from 1.03 to 2. This was done so documentation can be added to the Agile/LES system. Also updated the copyright year from 2015 to 2016	MH, MS

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1. Safety Information

1.1 General

The protective features of this product may be damaged if it is used in a manner not specified in the operation/installation instructions. This manual describes the general installation of the system. If the system has features or accessories not described in this manual, contact Albér.

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific WARNINGS elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Albér assumes no liability for the customer's failure to comply with these requirements.



Note

- Use safety equipment when working in and around the batteries.
- Notice the system's external markings described under Safety Symbols, page 2.
- Never energize the UXTM until after the installation is complete.
- Never exceed equipment voltage, power ratings or capabilities.

1.2 Document Symbols

The symbols below appear in this manual or are affixed to the Albér device. It is important to review these symbols and to understand the type of instructional information they convey.



Warning

Highlights areas related to user safety.

Calls attention to a procedure, practice, or condition which, if not correctly followed, could result in personal injury. Do not proceed beyond a Warning symbol until the indicated conditions are fully understood and met. Always observe safety information when installing, setting up or operating this product.



Caution

Highlights areas related to product or data safety.

Calls attention to an operating procedure or condition which, if not correctly followed, could result in damage to the product or permanent loss of data. Do not proceed beyond a Caution symbol until the indicated conditions are fully understood and met.





Note

The Note symbol calls attention to important information.

Describes additional information to help the user.

1.3 Safety Symbols

The following symbols may appear on the system or individual equipment.

	Caution. Risk of danger.
	Equipment protected throughout by double insulation or reinforced insulation.

1.4 Product Safety Practices

The following describe safety practices particular to the installation or operation of the product.

Equipment Service

Proper installation and testing are essential to the correct functioning of the system. If you have questions, contact Albér and request monitor assistance. Except as explained in this manual, do not attempt to service Albér equipment.

Any adjustment, maintenance or repair of this product must be performed by qualified personnel. Contact an Albér customer service engineer and request assistance. Only qualified and trained personnel may perform the operations described in this manual. All safety information must be read, understood, and strictly adhered to before installing, powering up or using the equipment or software (the "system".)

Equipment Grounding

To minimize shock hazard, the system chassis must be connected to an electrical protective earth ground when required. When AC mains are used for the power source, the system must be connected to the AC power mains through a grounded power cable, with the ground wire firmly connected to an electrical safety ground at the power outlet.

Fuses

For continued protection, fuses with the required rated current, voltage, and type, such as normal, slow blow, fast blow or time delay, must be used.

Equipment Access

Operating personnel must not remove equipment covers, shields or panels. Component repair, replacement, and internal adjustments must be made only by qualified service personnel.

Operating Damaged Equipment

Do not operate damaged equipment. Equipment that appears damaged or defective must be made inoperative and secured against unintended operation until repaired by qualified service personnel. Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture or any other reason, remove power and do not use the product until safe operation can be verified by qualified service personnel. If necessary, contact Albér to ensure the safety features are maintained.

Servicing and Adjusting

Do not service or adjust alone. While in the battery circuit, do not attempt internal service or adjustment of this equipment unless another person is able to assist.

Substituting Parts or Modifying Equipment

Do not substitute parts or modify equipment. Due to the possibility of introducing additional hazards, do not substitute parts or perform any unauthorized modification to the product. If necessary, contact Albér to ensure the safety features are maintained.

Insulation Rating For Wires

Use only wire supplied with the installation kit.

Ventilation

Never block equipment ventilation ports or openings. The equipment must have adequate ventilation to prevent overheating. Ensure equipment is operated within specified temperature and humidity ranges.

2. String Current Calibration

2.1 Equipment Required

- 6.5 digit voltmeter (DVM) capable of measuring 10uV - Keithley 2701 or equivalent
- Precision 10uV to 500mV DC Voltage Standard (Calibration Source) – EDC MV106 or equivalent
- 18V, 10W DC power supply

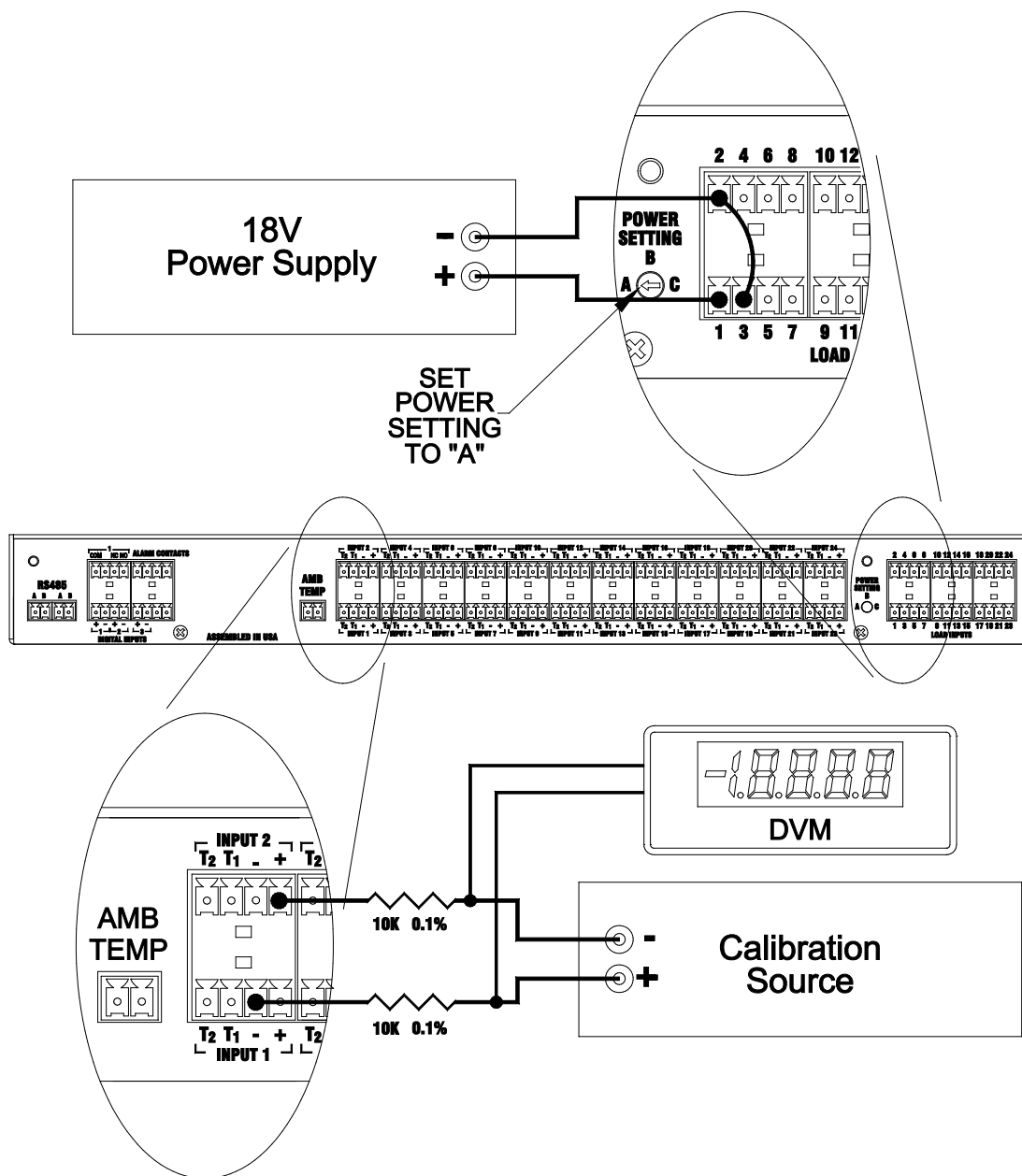


Figure 1 - Equipment Setup

2.2 Calibration Procedure

Set up the equipment as shown in figure 1. The positive (+) output of the Calibration source is connected to Input 1 (-) and the negative (-) output is connected to Input 2 (+) of the UXTM through 10K Ohm precision resistors.

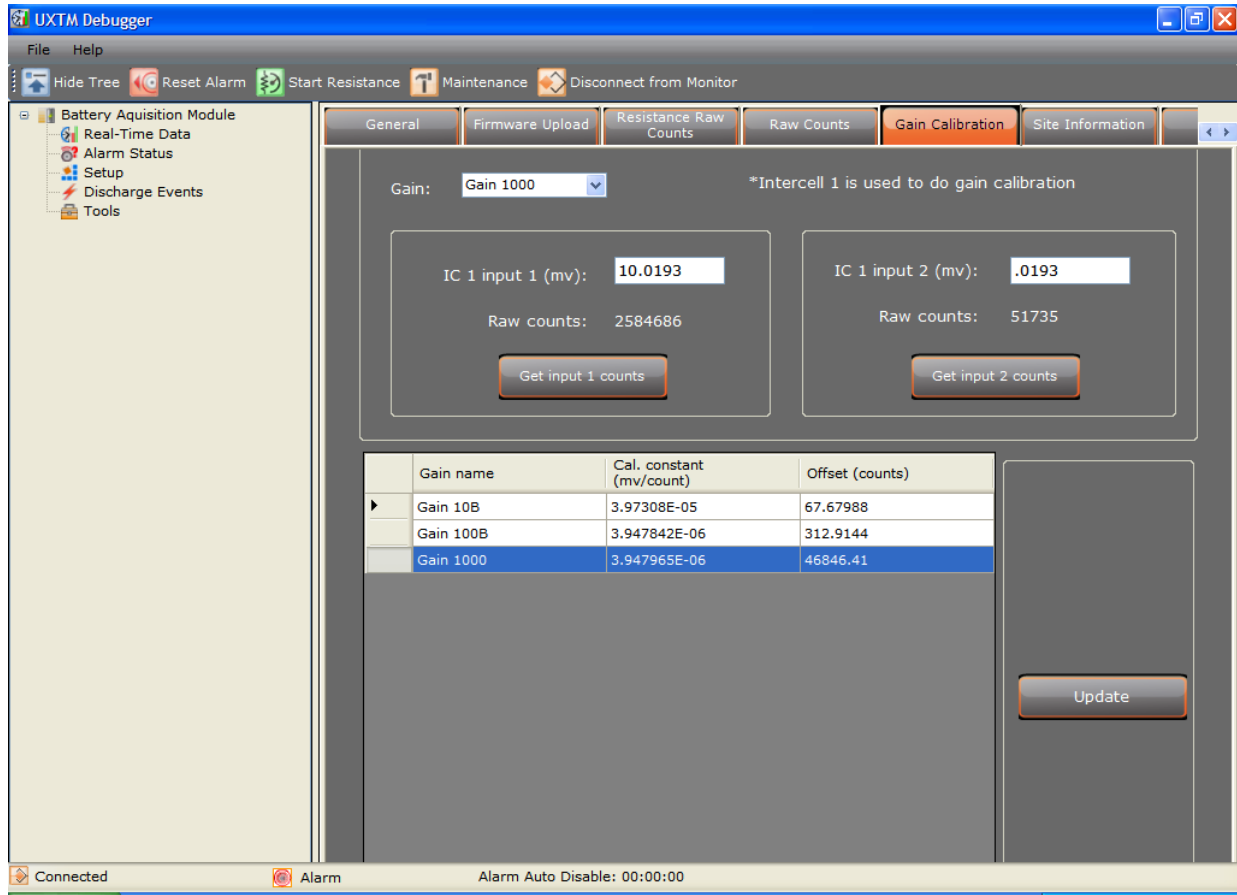


Figure 2 - Tools Gain Calibration

To calibrate the string current:

1. Zero out DMM errors using the method specific for the equipment being used (If using Keithley 2701, short the inputs then press the REL button).
2. Establish a USB connection between the UXTM Configurator software and the UXTM and navigate to the **Gain Calibration** tab under the **Tools** menu of the UXTM Configurator software (see Figure 2).
3. From the **Gain** drop-down box of the **Gain Calibration** tab select the gain level to be calibrated (Gain 10 for example).
4. Adjust the Calibration source to the nominal Input Voltage 1 value for the selected gain level (100.100 mV for Gain 10) shown in table 1.

Gain Level	Input voltage 1	Input voltage 2
Gain 10B	100.100 mV	100 uV
Gain 100B	10.020 mV	20 uV
Gain 1000	1.020 mV	20 uV

Table 1 - Calibration Input Voltages

5. Record the actual input value indicated by the DVM in the IC 1 input 1 box of the Gain Calibration tab.
6. Click **Get Input 1 Counts** and the Raw Counts value will update.
7. Click **Get Input 1 Counts** a second time after the raw counts have been updated and wait for a second raw counts update before moving on to the next step.
8. Adjust the Calibration source to the nominal Input Voltage 2 value for the selected gain level (100uV for Gain 10) shown in table 1.
9. Record the actual input value indicated by the DVM in the IC 1 input 2 box of the Gain Calibration tab.
10. Click **Get Input 2 Counts** and the Raw Counts value will update.
11. Click **Get Input 2 Counts** a second time after the raw counts have been updated and wait for a second raw counts update before moving on to the next step.
12. Click **Update** to send the calibration constants to the UXTM. Typical raw count values are shown in table 2.

Gain	Input voltage 1	Typical Counts	Input voltage 2	Typical Counts
Gain 10B	100.100 mV	2541760	100 uV	2578
Gain 100B	10.020 mV	2538220	20 uV	5096
Gain 1000	1.020 mV	2584864	20 uV	51722

Table 2 - Calibration Voltages and Typical Raw Count Values

13. Repeat steps 3 through 12 for the remaining gain levels in table 1. Choose each gain level from the Gain drop-down box and adjust the Calibration source to the corresponding nominal input voltage value shown in table 1.