Reloading Calibration Registers on ZDR-16

EPISENSOR

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Prerequisites

The following prerequisites apply to this application note;
- The ZDR must be at least version 3.66
- The original calibration registers must be available
- The original ZDR Type - r1k, 300, 600 etc. must be known along with the default Ratios, Gain and Burden from the original calibration.

Overview of the procedure

There is one set of tokens that need to be configured to calibrate a ZDR. This set of registers is called the "Calibration Constants" and defines things such as the ZDR SubType, the VT and CT Ratio, the Gain and the Burden Resistor. These are set by EpiSensor at the end of the manufacturing process using either a serial command, or an Over-The-Air command. Once these are set, a known voltage and current are injected into the ZDR and the calibration procedure is run. This results in a second set of tokens being generated and saved by the ZDR during the calibration process. These are called the "Calibration Registers"

In order to reload the calibration, we need the original Calibration Constants and Calibration Registers and these can be reloaded into the ZDR using either a serial cable, or over the air through the gateway.

Serial Reload

Commands

calibrate

The "calibrate" command is used to reload the calibration constants to the ZDR

Parameters;

-d	Dummy Calibration, Load Calibration Constants Only and Do Not Calibrate

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-v	Calibration voltage
-i	Calibration current
-t	ZDR Sub Type - r1k, 300, 600 etc.
-vr	VISO Ratio, usually 2043, default is 2043
-ctr	CT Ratio, 10000 for an Algodue Rogowski, 3000 for J&D, default is 3000
-b	Burden resistor value
-g	Gain

When reloading the calibration constants, make sure to specify the "-d" parameter.
Example;
calibrate -d -v 2300 -i 1000 -t r1k -vr 2043 -ctr 10000 -b 1

setcal

This command sets a single calibration register.
Parameters;

-r	Register Address
-v	Register Value

Example;
setcal -v 4380 -v 0FEB05FF

Setting each value individually can become quite tedious on a ZDR. There are 52 calibration registers that need to be set, and another 4 for the 4-20mA section if that is to be also set.

Teraterm Macro

A teraterm macro has been created to make the setting of both the Calibration Constants and the Calibration Registers more efficient. The Macro is called "SerialRecalibration.ttl" and is located on EPI-Server:/Products/ZDR-16
The macro has 2 parts, each of which must be configured before the macro is run on a live ZDR-16;

First, set the "calibrate" command so it's parameters match the original calibration. This will make sure the Calibration Constants are set correctly.

Second, Copy the Register Values into a file called "CalibrationRegisters.txt". This file contains the register addresses and values for all registers to be reloaded. Each line represents a single register and each line has the following example format;

Register:0x4380, Value:0x0FEB05FF

This format is the same as the output from the "printcal" command which is used to save the register values during the original calibration process. It should be a simple case of "Copy and Paste" the original calibration values into this file.

Once the calibration constants are configured in the Macro, and the calibration registers are copied into the text file, simply run the Macro using Teraterm to connect to the serial port of the ZDR.

Once the macro has run, reset the ZDR so it reloads its calibration from the beginning.

If the WattHour registers are also corrupt, reset them in the normal way through the gateway.

Over The Air Reload via ZapHost

The Over the Air method uses the ZapHost on the gateway and generates a series of CMDC commands to reset the Calibration Constants and Calibration Registers. As this method requires many of the values to be converted to Hex equivalents, a Macro is the only sensible way to achieve this.

In order for Teraterm to connect to the ZapHost, the epi-gateway snap must be stopped.
To connect Teraterm to the ZapHost, connect to it's IP Address via telnet, using port number 4901.

Teraterm Macros

Two macros have been created to load the calibration constants and registers. They are located in EPI-SERVER:/Production/Products/ZDR-16. They must be run so the Constants are loaded first followed by the Registers.

SetCalibrationConstantsUsingRadio.ttl

This Macro prompts the user for the short address of the ZDR and then each of the calibration constants required. They are converted to CMDC commands and sent through the ZapHost.

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SetCalibrationRegistersUsingRadio.ttl

Copy the Register Values into a file called "CalibrationRegisters.txt". This file contains the register addresses and values for all registers to be reloaded. Each line represents a single register and each line has the following example format;

Register:0x4380, Value:0x0FEB05FF

This format is the same as the output from the "printcal" command which is used to save the register values during the original calibration process. It should be a simple case of "Copy and Paste" the original calibration values into this file.

This Macro prompts the user for the short address of the ZDR and then loops through each line in the CalibrationRegisters file and sends each to the ZDR using the CMDC command.

Once both macros have run, reset the ZDR so it reloads its calibration from the beginning.

If the WattHour registers are also corrupt, reset them in the normal way through the gateway.