Advantech AE Technical Share Document

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Category	■FAQ ☐SOP	Related OS	N/A
Abstract	ADAM-6000 & ADAM-6200, How to convert the Modbus raw data into engineer unit		
Keyword	ADAM, Modbus, Raw data, Engineer unit. Analog input		
Related Product	ADAM-4017+, ADAM-4018+, ADAM-4019+, ADAM-4117, ADAM-6017, ADAM-6018, ADAM-6217, ADAM-6218		

■ **Problem Description**:

This document explain the formula to convert the Modbus raw data into engineer unit that represent the voltage, current, temperature for different AI input range of ADAM module.

■ **Brief Solution - Step by Step**:

Take the *Figure 1* as an example, the Modbus value of AI0 is "BF1D" in the hexadecimal, how to convert this value into a reasonable engineer unit between the physical input range (+/- 10V)?
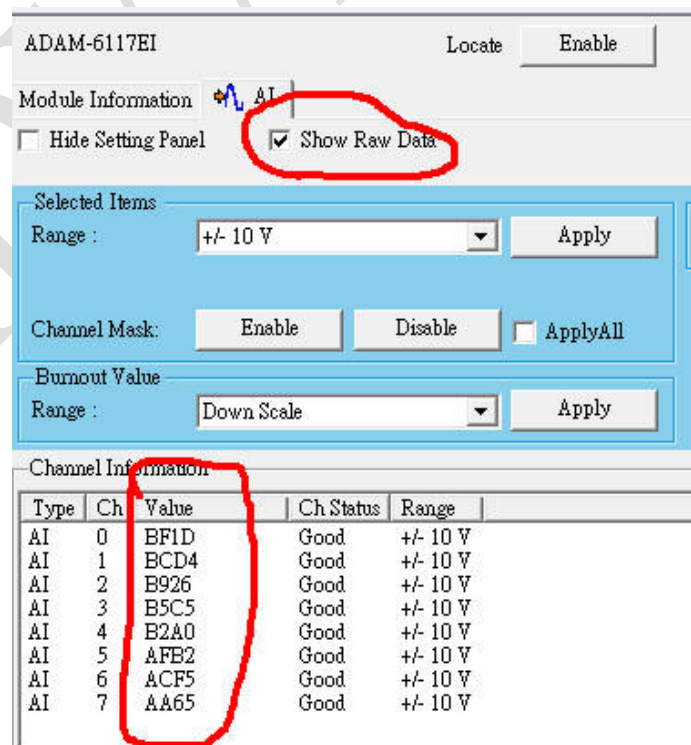

Figure 1

Since the resolution of the analog input is 16 bit, the full range of the Modbus raw data will locate in the range from 0 to 65535 (2^{16})

First of all, convert the raw data "BF1D" (HEX) to the decimal, which is 48925.
The customer can get the voltage value of AI0 with the *Equation 1*

$$Value\ in\ the\ engineer\ unit$$

$$= (Modbus\ raw\ data\ (in\ decimal))/65535 * input\ range$$

$$+ lower\ value\ of\ the\ input\ range$$

Equation 1

So the engineer unit of 48925 for the Modbus raw data equals to

48925/65535 * (10-(-10))+ (-10)=4.931V

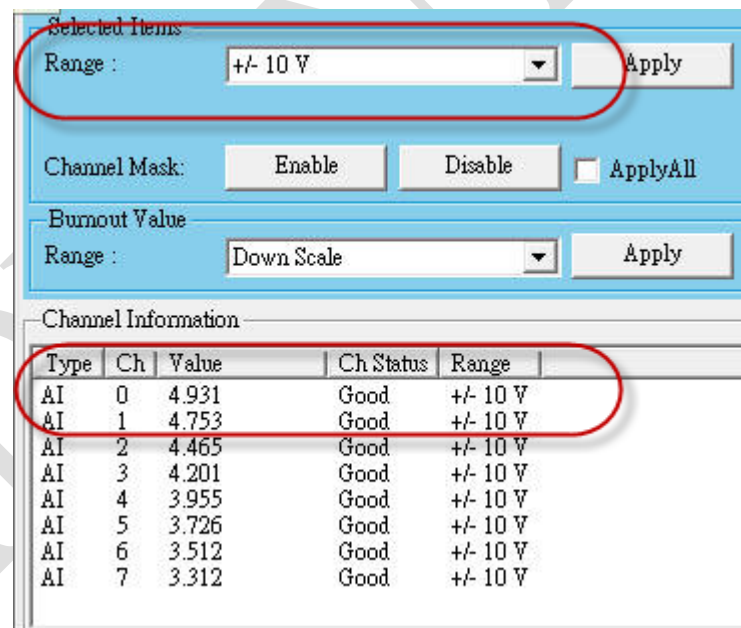The result is same as the value showed in the utility.(*Figure 2*)

Figure 2