Keywords: V3 pin, energy meter, comparator, auxiliary input, Teridian, energy meter, residential meter, 3-phase meter

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APPLICATION NOTE 5121

Using the V3 Pin on the 71M6513 3-Phase Energy Meter IC

Abstract: This document describes the proper connection of the dual-use input V3 pin for Maxim's Teridian™ 71M6513/71M6513H energy meter ICs. The V3 pin can operate either as a comparator input, where VBIAS is the threshold, or as an auxiliary analog input.

Background

Purpose of the V3 Pin

The V3 pin is a dual-use input pin to Maxim's Teridian 71M6513. It can operate as a comparator input, where VBIAS (1.5V) is the threshold, or it can operate as an auxiliary analog input. When used as a comparator, the result of the comparison will be reflected in the COMP_STAT bit 2, accessible in I/O RAM.

Uses for the V3 Pin

When used as an auxiliary analog input, the voltage applied to V3 is sampled during the so-called "alternate multiplexer cycles" initiated under MPU control. While the sampling of the regular analog signals (IA, VA, IB, VB, IC, and VC) occurs frequently (2520.6 frames per second), the alternate multiplexer cycles are typically initiated at less frequent intervals, e.g., once per second when used for temperature measurement or at 250Hz for neutral current measurement.

Another difference between V3 and the regular analog inputs IA, VA, IB, VB, IC, and VC is that the zero reference of V3 is not V3P3 (3.3V), but VBIAS (1.5V).

Proper Connection of the V3 Pin

One of the following cases will apply to every design involving the 71M6513:

1. The V3 pin is unused. In this case, the V3 pin should be left floating or terminated to the VREF pin.
2. The V3 pin is used as a comparator input. In this case, the digital input voltage applied to V3 should be limited to VBIAS ±0.9V.
3. The V3 pin is used either as an auxiliary analog input, and temperature measurements are made using the alternate multiplexer cycle. In this case, it is very important that the V3 input range is restricted to VBIAS ±0.9V (i.e., 0.6V to 2.4V). Otherwise, the TEMP or V3 measurement could be inaccurate.

The third case is particularly important for customers who are using the TEMP samples for temperature compensation, especially with 71M6513H devices.

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