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ECE300

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HW 04

1. The TM4C123GH6PM uses Successive Approximation ADC.
2. In single-ended-input mode, precision, range and resolution are as follows.

Precision: 12-bits

Range: VREFP(0xFFF) – VREFN(0x000)

Resolution: mV per ADC code = (VREFP – VREFN) / 4096

1. The voltage swing that can be measured by differential-input mode is larger than single-ended mode. This is so because in differential-input mode two input voltages are being compared. As each of these voltages VIN- and VIN+ can be between VREFN and VREFP, there is a wider range of voltages to be represented by the ADC code. The simplest way to demonstrate this is to think of the extreme cases. If VIN- = VREFN and VIN+ = VREFP, then this is 2 \* (VREFP – VREFN) away from when VIN- = VREFP and VIN+ = VREFN. Therefore, the mV per ADC code for differential-input mode can be written: (2 \*(VREFP – VREFN)) / 4096, whereas for single-ended input mode, it would be just: (VREFP – VREFN) / 4096.
2. Sample sequencers 0 – 3 are programmable inputs, which allow the ADC to collect data from many input sources simultaneously without having to be reconfigured. They handle data capture and the way that the sampling is done (e.g. single-ended vs. differential-input). The sequencers are identical except for the number of samples that can be captured by each and the size of the FIFO buffer for each.