Interfacing Sensors and PLCs using Microcontrollers for Mass Production

In order to have a smart system in this modern world, System heavily depends upon the incoming sensor data from the sensors. This incoming sensor data is basically raw analog data coming out of the sensor. This analog signals needs to converted to digital signals to extract the information. This essay is focused on the interface between the sensor and PLC. Since the incoming raw data from sensors are analog signals, the microcontroller as an interface is responsible for converting the analog signals from sensors into digital signals which is mostly done by Analog-to.Digital Converters (ADC). Then this digital signals is fed to the PLC.

For this interface, it is required to have a robust and reliable microcontroller. Two microcontroller have been shortisted for such an application: EFM8BB1 and EFM8LB1. Both of microcontroller are quite formidable for the application but still, it requires the shortlisting in every prospect. This means that, in order to build this interface between sensors and PLCs, the main concern would be the ADC conversion.

- In case of EFM8BB1, it has about 16 inputs, which means theoretically, it is possible to connect 16 different sensors to a single microcontroller whereas EFM8LB1 allows up to 20 inputs.

- In case of EFM8BB1, there are three modes: 12-bit, 10-bit and 8-bit modes which can be selected by programmer depending upon the requirements. But for the sake of comparison, the 12-bit mode ouputs upto 200K samples per second whereas in case of EFM8LB1, there are 14-bit, 12-bit and 10-bit mode, in which 12-bit mode outputs upto 1M samples per second which does make a lot of difference.

- Special method exist for the conversion. For EFM8BB1, the conversion can be done in burst mode, in which one set of accumulated data per trigger is produced. Accumulated data set can consist of 1, 4, 8, 16, 32, and 64 samples depending upon the internal low power frequency oscillator, which means that burst mode can be used for the low power applications. On the side of EFM8LB1, there is just single method of conversion. As soon as the trigger occurs, the conversion starts and do its job until the incoming analog signal set from the input is finished, once its finished, accumulation is completed and thus the whole accumulated data set is transferred. This can be very helpful while working with sensors which large amount of continuous data.

This three points can be very important for the required application. Depending on the number of inputs and conversion rate, it is clear that EFM8LB1 would be a better choice

out of the shortlist. However, if the low power is required regardless of the conversion rate, EFM8BB1’s burst mode with 64 sampled accumulated set would be a choice as well