Subsystem Design
ADC to SPI

TEXAS INSTRUMENTS

Description

The ADC to SPI subsystem example demonstrates how to use the internal ADC to convert an analog signal into a digital representation and transfer the result through SPI. The example configures the MCU to act as an external ADC, receive SPI commands from a SPI controller, and execute the received command accordingly. With simple example commands provided, users can utilize the framework to implement their own commands. Optionally, the MCU can also process the ADC data before transmitting the data through SPI, which is especially useful in applications that need to process the raw data into meaningful values. Download the code for the ADC to SPI example.

The following figure shows a block diagram of the system.
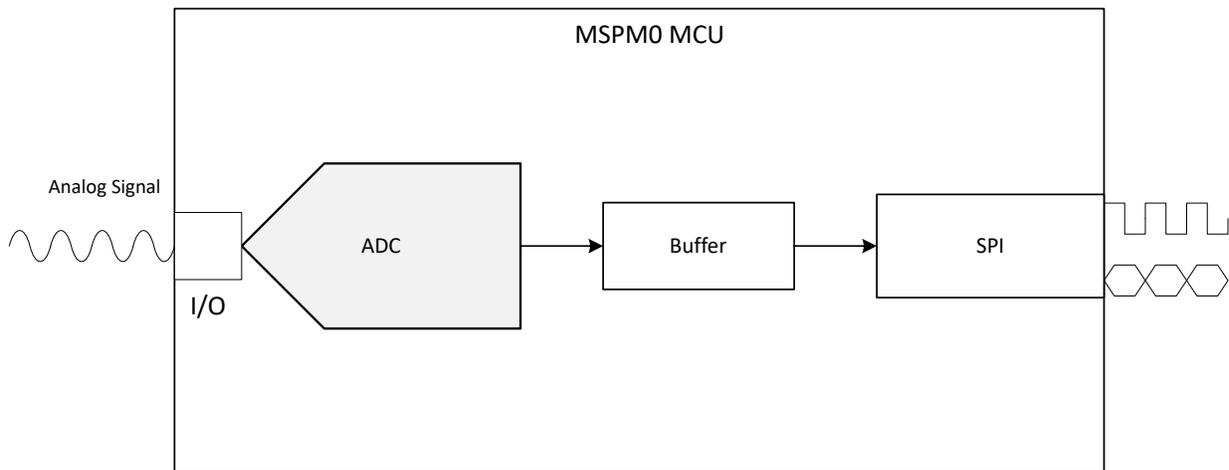
Figure 1-1. Subsystem Functional Block Diagram

Required Peripherals

The application requires the internal ADC and 1 instance of the SPI.

Sub-block Functionality	Peripheral Used	Notes
Analog signal capture	ADC	Called ADC12_0_INST in code
Sending ADC data	SPI	Device is the peripheral for this example

Compatible Devices

Based on the requirements in the Required Peripherals table some compatible devices and corresponding EVMs are listed below. Other MSPM0 devices can be used with this subsystem as long as they have the required peripherals.

Compatible Devices	EVM
MSPM0Lxxx	LP-MSPM0L1306
MSPM0Gxxx	LP-MSPM0G3507

Design Steps

1. Determine the configuration for the ADC including reference source, reference value, and sampling rate based on the expected analog input and design requirements.
2. Configure the ADC in SysConfig based on requirements in the previous step.
3. Configure the SPI peripheral in SysConfig, setting the SPI in peripheral mode.
4. Write Application Code to transfer the ADC data from the memory registers to transmit through SPI. Optionally add commands to perform different tasks. See the Software Flowchart for an overview or view the code directly.

Software Flowchart
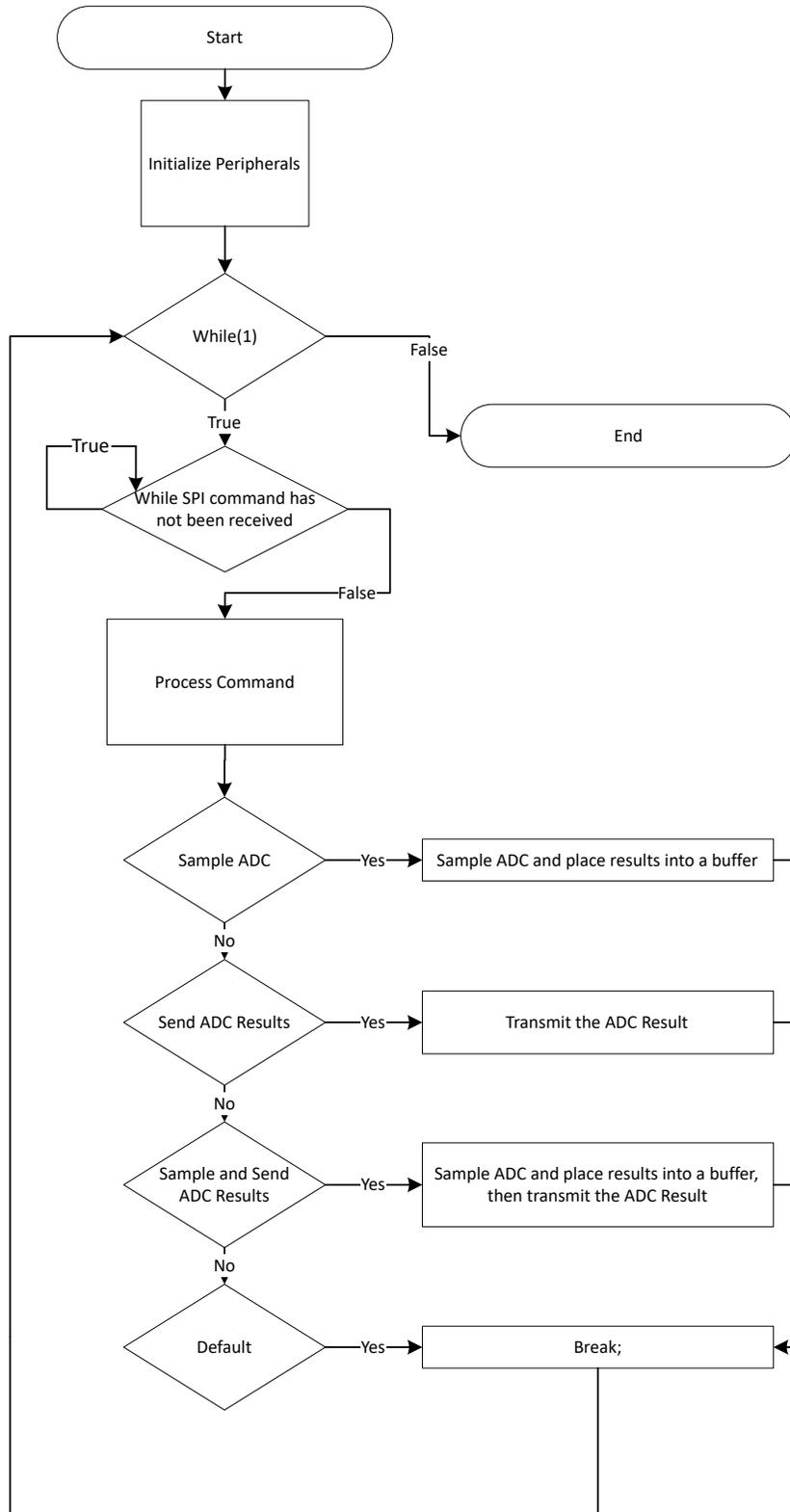
Figure 1-2. Application Software Flowchart

Additional Resources
- Download the MSPM0 SDK
- Learn more about SysConfig
- MSPM0L1306
- MSPM0G3507
- MSPM0 ADC Academy
- MSPM0 SPI Academy

Revision History

DATE	REVISION	NOTES
December 2023	*	Initial Release

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