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# Analog to Digital Converter (ADC)

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# Introduction

- One essential component of these microcontrollers is the Analog to Digital Converter (ADC), which plays a crucial role in converting analog signals from the real world into digital data that can be processed by the microcontroller.
- In this article, we will explore the ADC in the STM32F4xx series, its applications, and some of the key registers involved in its configuration.



# Applications

- **Sensor Interfacing**

- Many real-world sensors, such as temperature sensors, light sensors, and pressure sensors, generate analog signals. The ADC allows the microcontroller to interface with these sensors and convert their analog outputs into digital values for further processing.

- **Audio Processing**

- In audio applications, such as audio recording or playback, the ADC can convert analog audio signals from microphones or audio inputs into digital data for processing and transmission.

- **Measurement Systems**

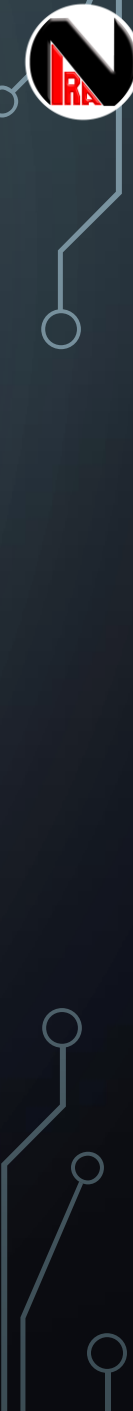
- STM32F4xx microcontrollers are commonly used in measurement and control systems. The ADC helps in reading analog signals from sensors, transducers, and other measurement devices accurately.

- **Motor Control**

- In motor control applications, analog signals representing motor currents or position feedback are often converted by the ADC to control and monitor the motors' behavior.

- **Power Management**

- The ADC can be used to monitor the voltage and current levels in power management systems, ensuring safe and efficient operation.



# Registers

- ADC\_CR1 (Control Register 1)
- ADC\_CR2 (Control Register 2)
- ADC\_SQR1 (Regular Sequence Register 1)
- ADC\_SQR3 (Regular Sequence Register 3)
- ADC\_DR (Data Register)
- ADC\_ISR (Interrupt and Status Register)
- ADC\_CR2 (Control Register 2)
- ADC\_CCR (Common Control Register)