# ADC_Queued_Scan_1 for KIT_AURIX_TC334_LK

## ADC queued source

AURIX™ TC3xx Microcontroller Training
V1.0.0

# Scope of work

**The Enhanced Versatile Analog-to-Digital Converter (EVADC) is configured to measure multiple analog signals in a sequence using queued request.**

The Queued Request of the Enhanced Versatile Analog-to-Digital Converter (EVADC) module is used to continuously scan the analog inputs channels 7, 6 and 5 of group 8.

# Introduction

- The Enhanced Versatile Analog-to-Digital Converter module (EVADC) of the AURIX™ TC33x comprises 4 independent analog to digital converters (EVADC groups) with up to 16 analog input channels each
- Each channel can convert analog inputs with a resolution of up to 12-bit
- Analog/Digital conversions can be requested by several request sources:
  - **Queued request source**, specific to a single group
  - **Synchronization source**, synchronized conversion request from another ADC master kernel
- A queued source can issue conversion requests for an arbitrary sequence of input channels. The channel numbers for this sequence can be freely programmed
- The trigger for the conversion via the queued source can be sent:
  - Once (by another external module)
  - On a regular time base (by an external timer)
  - Permanently (by using the refill option)

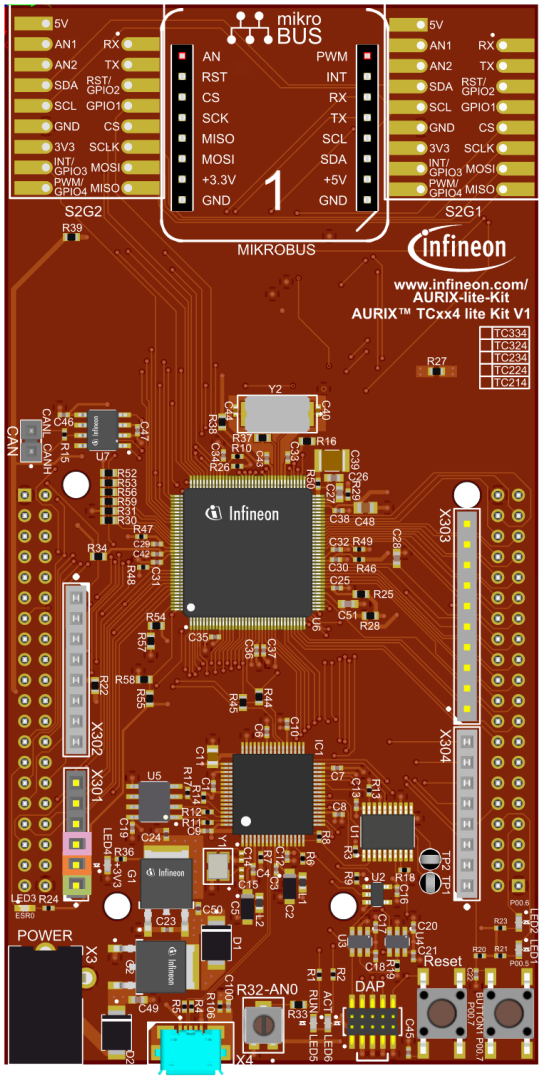
# Hardware setup

This code example has been developed for the board KIT_A2G_TC334_LITE.

The signals to be measured have to be connected to channels 7, 6 and 5 of the group 8 of the EVADC (pins AN39, AN38, AN37).

| | X301 |
|---|---|
| 5 | 6 |
| 4 | 5 |
| 6 | 4 |
| 7 | 3 |
| 8 | 2 |
| 9 | 1 |

**Note:** The reference voltage (VAREF) of the EVADC on the board KIT_A2G_TC334_LITE is 3.3 V.
**Note**: The channels can be HW filtered by the board, depending on which capacitor/resistors couples are soldered. Consult the AURIX™ TC334 lite Kit's User Manual to check which channels are filtered by HW.



# Implementation

**Configuration of the EVADC**

The configuration of the EVADC is done in the ***initEVADC()*** function in four different steps:

- Configuration of the **EVADC module**
- Configuration of the **EVADC group**
- Configuration of the **EVADC channels**
- Filling the queue

**Configuration of the EVADC module with the function *initEVADCModule()***

The default configuration of the EVADC module, given by the iLLDs, can be used for this example.
This is done by initializing an instance of the ***IfxEvadc_Adc_Config*** structure and applying default values to its fields through the function ***IfxEvadc_Adc_initModuleConfig()***.
Then, the configuration can be applied to the EVADC module with the function ***IfxEvadc_Adc_initModule()***.

# Implementation

**Configuration of the EVADC group with the function *initEVADCGroup()***

The configuration of the EVADC group is done by initializing an instance of the ***IfxEvadc_Adc_GroupConfig*** structure with default values through the function ***IfxEvadc_Adc_initGroupConfig()*** and modifying the following fields:

- ***groupId*** – to select which converters to configure
- ***master*** – to indicate which converter is the master. In this example, only one converter is used, therefore it is also the master
- ***arbiter*** – a structure that represents the enabled request sources. In this example, it is set to ***arbiter.requestSlotQueue0Enabled***
- ***triggerConfig*** – a parameter that specify the trigger configuration

Then, the user configuration is applied through the function ***IfxEvadc_Adc_initGroup()***.

# Implementation

**Configuration of the EVADC channels with the function *initEVADCChannels()***

The configuration of each channel is done by initializing a separate instance of the ***IfxEvadc_Adc_ChannelConfig*** structure with default values through the function ***IfxEvadc_Adc_initChannelConfig()*** and modifying the following fields:

- ***channelId*** – to select the channel to configure
- ***resultRegister*** – to indicate the register where the A/D conversion value is stored

Then, the configuration is applied to the channel with the function ***IfxEvadc_Adc_initChannel()***.

**Filling the queue**

Each channel is added to the queue through the function ***IfxEvadc_Adc_addToQueue()***.

When the EVADC configuration is done and the queue is filled, the conversion is started with the function ***IfxEvadc_Adc_startQueue()***.

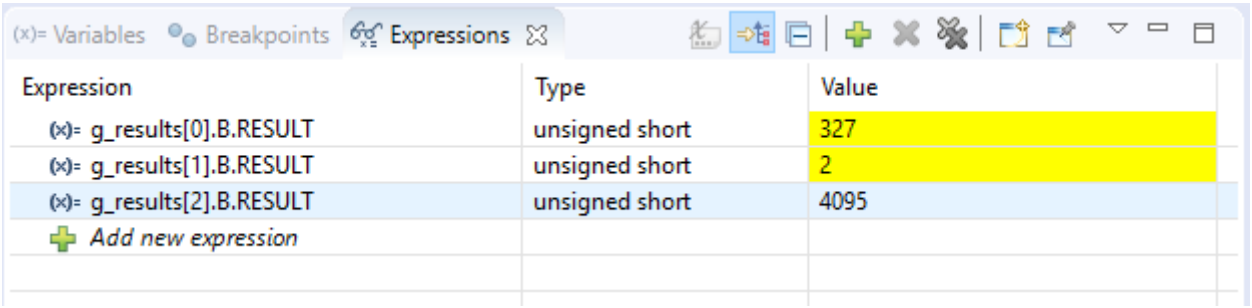
To read a conversion, the iLLD API ***IfxEvadc_Adc_getResult()*** is used inside the function ***readEVADC()***.

All the functions used for configuring the EVADC module, its groups and channels together with reading the conversion results can be found in the iLLD header ***IfxEvadc_Adc.h***.

# Run and Test

After code compilation and flashing the device, perform the following steps:

- Run the code and then pause it
- Repeat step number one to see that the result is changing accordingly to the signal you measure, AN39 is ***g_results[0]***, AN38 is ***g_results[1]*** and AN37 is ***g_results[2]***.




**Note:** The maximum and minimum values are expressed as a 12-bits integer value, in decimal format (0 - 4095 range), 3.3V being the maximum measurable value.

# References


- AURIX™ Development Studio is available online:
- https://www.infineon.com/aurixdevelopmentstudio
- Use the *„Import...“* function to get access to more code examples.

- More code examples can be found on the GIT repository:
- https://github.com/Infineon/AURIX_code_examples

- For additional trainings, visit our webpage:
- https://www.infineon.com/aurix-expert-training

- For questions and support, use the AURIX™ Forum:
- https://www.infineonforums.com/forums/13-Aurix-Forum

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**Edition 2021-12**
**Published by**
**Infineon Technologies AG**
**81726 Munich, Germany**



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**Document reference**
**ADC_Queued_Scan_1_KIT_TC334_LK**

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