CprE 288 – Introduction to Embedded Systems
(Analog-to-Digital Converter- Review)

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S 2017
TM4C123 ADC

- Temp Sensor
- Sequencers
- Other sources

ADC

12 bit output
TM4C123 ADC

Temp Sensor → Sequencers

Priority
Trigger source

Other sources

ADC

Interrupt → 12 bit output

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TM4C123 ADC

Temp Sensor

Sequencers

Priority
Trigger source

Other sources

ADC

12 bit output

Interrupt

Trigger source

Priority

Input Channels

ADC 0

ADC 1

Triggers
Interrupts/Triggers
Interrupts/Triggers

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TM4C123 ADC

Temp Sensor

Sequencers

Other sources

Priority

Trigger source

12 channels

AIN0 – AIN11

ADC

12 bit output

Interrupt

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TM4C123 ADC

Temp Sensor

Sequencers

Other sources

12 channels AIN0 – AIN11

Configure GPIO

Priority Trigger source

ADC

12 bit output

Interrupt
TM4C123 ADC

- Temp Sensor
- Sequencers
- Other sources
- AIN0 – AIN11

Configure GPIO Registers
- AINx Pin
- RCGCGPIO
- GPIODIR
- GPIOAFSEL
- GPIODEN
- GPIOAMSEL
- GPIOADCCTL

Priority Trigger source

Interrupt

12 channels
12 bit output
TM4C123 ADC

- 12 channels (AIN0 – AIN11)
- Other sources
- Temp Sensor
- Priority
- Trigger source
- Sequencers
- Input source
- Interrupt
- Last sample
- ADC Sample
- ADC
- 12 bit output
- Interrupt

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TM4C123 ADC

Temp Sensor

Sequencers

Other sources

Priority Trigger source

ADC

12 channels AIN0 – AIN11

Read about the sequence sampler

Interrupt

12 bit output

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TM4C123 ADC

- Temp Sensor
- Sequencers
  - Priority
  - Trigger source
- Other sources
  - 12 channels
  - AIN0 – AIN11
- Configure ADC for sampling
  - RCGCADC
  - ADCACTSS
- ADC
  - 12 bit output
  - Interrupt

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TM4C123 ADC

- Temp Sensor
- Sequencers
- Other sources
- Priority
- Trigger source
- Interrupt

Configure ADC for sampling

ADC Active Sample Sequencer
ADCACTSS - Disable

12 channels
AIN0 – AIN11

12 bit output
TM4C123 ADC

- Temp Sensor
- Sequencers
- Other sources

12 channels
AIN0 – AIN11

Configure ADC for sampling

ADC Event Multiplexer Select
ADCEMUX

Interrupt

12 bit output
TM4C123 ADC

Temp Sensor

Sequencers

Other sources

12 channels
AIN0 – AIN11

Configure ADC for sampling

ADC Event Multiplexer Select
ADCEMUX

Trigger for ADC – Processor, GPIO

Interrupt

12 bit output
TM4C123 ADC

Temp Sensor

Sequencers

Other sources

12 channels AIN0 – AIN11

Configure ADC for sampling

ADC Event Multiplexer Select
ADCEMUX

Trigger for ADC – Timer?

12 bit output

Priority
Trigger source

Interrupt
TM4C123 ADC

Temp Sensor

Sequencers

Other sources

Priority
Trigger source

Configure ADC for sampling

ADC Sample Sequence Input Multiplexer
Select 2
ADCSSMUX2
Using SS2

12 channels
AIN0 – AIN11

12 bit output

Interrupt
TM4C123 ADC

- **Temp Sensor**
- **Sequencers**
  - Priority Trigger source
  - Other sources
    - 12 channels
      - AIN0 – AIN11
  - Configure ADC for sampling
    - ADC Sample Sequence Input Multiplexer
      - Select 2
        - ADCSSMUX2
  - MUX0
  - AINx
  - 12 bit output
  - 4 deep FIFO

- **Interrupt**

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Configure ADC for sampling

ADC Sample Sequence Control 2 (ADCSSCTL2)

Enable interrupts, choose temp sensor

12 channels
AIN0 – AIN11

12 bit output
TM4C123 ADC

- **Temp Sensor**
- **Sequencers**
- **Other sources**
  - 12 channels
  - AIN0 – AIN11

**Configure ADC for sampling**

**ADC Processor Sample Sequence Initiate**

**ADCPSSI**

- **Priority**
- **Trigger source**
- **Interrupt**

**ADC**

- **12 bit output**
TM4C123 ADC

Temp Sensor

Sequencers

Priority
Trigger source

Other sources
12 channels
AIN0 – AIN11

Configure ADC for sampling

ADC Interrupt mask
ADCIM

ADC

Interrupt
12 bit output

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TM4C123 ADC

12 channels
AIN0 – AIN11

Configure ADC for sampling
ADC Raw Interrupt Status
ADCRIS

12 bit output

Temp Sensor
Priority
Trigger source
Sequencers
Other sources

Interrupt

TM4C123 ADC

Temp Sensor

Sequencers

Other sources

12 channels
AIN0 – AIN11

Configure ADC for sampling

ADC Interrupt Status and Clear
ADCISC

12 bit output
TM4C123 ADC

- Temp Sensor
- Sequencers
- Other sources
- 12 channels AIN0 – AIN11
- Configure ADC for sampling
- ADC Enable ADCACTSS
- 12 bit output

Priority
Trigger source

Interrupt
TM4C123 ADC

Temp Sensor

Sequencers

Other sources

12 channels
AIN0 – AIN11

Configure ADC for sampling

ADC Results
ADCSSFIFO2

Interrupt

ADC

12 bit output