

ANALOG TO DIGITAL CONVERTER (ADC)

Application Note

v1.1

INTRODUCTION

The goal of this document includes the following:

- To describe how to use the ADC (Analog to Digital Converter) interface on the Laird WB45NBT module.

HARDWARE

- 4-channel Analog-to-Digital Converter (ADC)
- 10-bit 312 K samples/sec. Successive Approximation Register ADC
- -2/+2 LSB (Least Significant Bit) Integral Non Linearity, -1/+1 LSB Differential Non Linearity
- Individual enable and disable of each channel
- External voltage reference for better accuracy on low voltage inputs
- Multiple trigger sources
 - Hardware or software trigger
 - External trigger pin
 - Timer Counter – 0 to 2 outputs: TIOA0 to TIOA2 trigger
- Sleep mode and conversion sequencer
 - Automatic wakeup on trigger and back to sleep mode after conversions of all enabled channels
- Four analog inputs shared with digital signals

ADC3 is located on pin 9 of the WB45NBT connector.

SOFTWARE

The A/D Converter is accessed through the AT91 ADC driver.

<http://www.at91.com/linux4sam/bin/view/Linux4SAM/IOAdcDriver>

Accessing the ADC in Linux

If the driver is not included in the kernel, load it.

```
# modprobe at91_adc
```

The driver create entries in the following location:

```
/sys/bus/iio/devices/iio:device0
```

The device(s) allow access to the raw value being read on the pin along with a scale. The product of the raw value and the scale provide a voltage reading in microvolts.

Access the value being read on the ADC3 pin.

```
# cat /sys/bus/iio/devices/iio\:device0/in_voltage3_raw
948
# cat /sys/bus/iio/devices/iio\:device0/in_voltage3_scale
3222.000000
```

The raw value (948) multiplied by the scale value (3222) is approximately equal to 3.0V.

FURTHER INFORMATION

Further information about the use of the AT91 ADC driver can be found here:

<http://www.at91.com/linux4sam/bin/view/Linux4SAM/lcioAdcDriver>

REVISION HISTORY

Revision	Date	Description	Approved By
1.0	24 Oct 2013	Initial Release	John Imboden
1.1	2 March 2014	Minor Edits	Dave Drogowski