

# TEI0015 - Programming guide: Interface or communication description

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## Communicating with module

To communicate with the module, a serial COM-port with a speed set to **115200** bits needs to be opened. Commands consists of a single **character** in **UTF-8** encoding. It is good practice to communication with the module following these steps:

- Open a serial COM-port
- Clear the PCs serial comport input buffer of the opened comport
- Send the desired commands, each one in a single write operation to the comport
- Close the serial comport as soon as possible

These steps apply also for read operations.

## Using the ADC for high speed consecutive measurements

The module provides a method to gather highly accurate consecutive ADC measurements in a single event. In this mode of operation, one mega sample of ADC values are performed and stored inside the modules SD-RAM.

The following step should be taken in this mode:

- Open a serial COM-port
- For TEI0015 and TEI0016: Send the command "1", "2", "4" or "8" for the ADC pre-amplification of 1, 2, 4, 8  
For TEI0023: Send the command "1", "2", "3", "4", "5", "6" or "7" for the ADC pre-amplification of 0.25, 0.5, 1, 2, 4, 8 and 16
- Send the command "t" to trigger the consecutive measurement.  
(The module always measures 1 MSample of data into its SD-RAM)
- Clear the PCs serial comport input buffer of the opened comport
- Send the command "+" or "" to the module, it then transmits 128 or 16384 Samples of ADC values
- Read the amount of ADC values in one chunk of 128 or 16384 samples from the PCs serial input buffer  
(Otherwise there is a high possibility of a misalignment of nibbles)
- Repeat the reading of chunks to a maximum of 1 mega sample
- Close the comport

After a trigger event, the one mega sample of data is stored until your retrigger. So processing the data can be done for each chunk individually or the whole one mega sample.

Convert the RAW ADC data into standard integer values.

## Brief ADC informations

### Module TEI0015 / AD4003BCPZ-RL7

Resolution: 18-bit in 5 nibbles  
Maximum sampling rate: 2 MSPS

Order of Values:

	Hex	Dec		Hex	Dec
Mid scale	0x00000	0			
Positive 1 LSB	0x00001	1	to full scale -1 LSB	0x1ffff	131071
Negative full scale	0x20000	131072	to -1 LSB	0x3FFFF	262143

The layout of the ADC circuit is further described in the Analog Devices circuit note [CN-0385](#).

## Module TEI0016 / ADAQ7988 or ADAQ7980

Resolution: 16-bit in 4 nibbles

Maximum sampling rate: 0.5 MSps / 1 MSps

Order of Values:

	Hex	Dec		Hex	Dec
Negative full scale is	0x0000	0	to -1 LSB	0x7fff	32767
Mid scale is	0x8000	32768			
Positive 1 LSB	0x8001	32769	to full scale	0xffff	65536

The layout of the ADC circuit is further described in the Analog Devices circuit note [CN-0393](#).

## Module TEI0023 / ADAQ4003BBCZ

Resolution: 18-bit in 5 nibbles

Maximum sampling rate: 2 MSPS

Order of Values:

	Hex	Dec		Hex	Dec
Mid scale	0x00000	0			
Positive 1 LSB	0x00001	1	to full scale -1 LSB	0x1ffff	131071
Negative full scale	0x20000	131072	to -1 LSB	0x3FFFF	262143