MagAlpha Command Utility Line 2.2

User Guide 2015 REV. 1.0

GENERAL DESCRITPTION

The MagAlpha command line utility consists of two command line tools:

- *maread.exe*
- *mareg.exe*

Detailed assistance can be obtained by adding the *--help* option. *maread* is used to read data from the MagAlpha sensor; *mareg* is used to read, write, and OTP program[1] the MagAlpha sensor.

To run the MagAlpha Command Line Utility, unzip the contents of **MA_util.xxx.zip** (xxx is the version type number), for instance, **c:\sensima\MA_evk**, open a command line prompt by pressing **_WinKey = R_**, then type **cmd** and press *enter*. To access the MagAlpha Command Line Utility executables directory, type **cd c:\sensima\MA_evk** and press *enter.*

1. MAREAD.EXE

The *maread* tool can be used to record data sent by the MagAlpha sensor to the ICEstick through the provided flat ribbon cable. Recorded data can be displayed in the terminal or written to files. The output format and radix are configurable.

Syntax

maread

maread -x[RADIX] -s[NUM] -f[FILENAME] -e -a -o[-FORMAT]

maread -h

maread -v

The parameters can be written in any order.

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[1] The OTP option is currently unavailable. The Vflash pin is connected to the unused part of the flat ribbon cable.

Examples

To run a quick demo where 25 samples are read and displayed on the terminal:

> *maread*

To list all USB-SPI communication channels available on your PC:

> *maread -l*

To read 10,000 samples and append the output to data.txt with report enabled in hexadecimal CSV format:

> *maread -s10000 -f data.txt -a -e -xh -oc*

The options can be entered in short form (e.g., *-a*) or as an alias (e.g., *--append*). The resulting files are located in the same directory as the executable.

For example, the *data.txt.info* file may look like this:

> ****Info****
> 7500,d7e0,7b
> 7501,d7c0,9b

This indicates that the software detects an index discrepancy (repetition or missing data) at data point 7500 and data point 7501. This is limited by the memory size of the ICEstick, which is insufficient for storing all data provided by the MagAlpha sensor. Also, some data points are lost when the memory in ICEstick overflows.

General Options

-s   *[NUM]*

-t   *[TIME][UNIT]*

The number of samples can be specified with either the *-s[NUM]* or *-t[TIME]* option. Do NOT use these two options together. If both options are used, only the last specified option is considered.

The *-s* option specifies directly the number of samples to acquire. The syntax is *-s[NUM],* where *[NUM]* is the number of samples. For example, to acquire 200 samples write:

-s200

The *-t* option specifies the length of time which samples are taken. The syntax is *-t[TIME][UNIT]*, where *[TIME]* is an integer and *[UNIT]* is either *us*, *ms* or *s*. For example, to acquire data for a duration of 50 milliseconds write:

-t50ms

Options for Output Control

-f   [FILENAME]   alias: --file

Use the *--f* option to write the output data into the file specified by *[FILENAME]* instead of the terminal. Make sure you have write permission for the directory and the file to which you are writing. If you specify a relative or absolute path, the path specified must already exist. The file itself may or may not already exist.

WARNING: If the file you specified with the --file option already exists, the contents of the original file will be erased without any warning or notice. In order to preserve the original content of your file, please refer to the section "append to file."

For example, to write the results into a file named "MAdata.txt" in the current directory, use the option --file MAdata.txt

To write the results into a file in the directory "C:\data" (which already exists), use the option --file C:\data\MAdata.txt

If you have spaces in the path, surround the path with quotation marks: --file "C:\My Files\data.txt"

-e   alias: --report

The *--report* option outputs a list of all index discrepancies from the data read into a separate file. During normal operation, the indexes should be a series of successive integers, i.e., the index should increment from sample to sample without repetition or missing codes[2]. This can verify indirectly the accuracy of the data transmitted. If any two consecutive samples read by the *maread* utility do not follow this pattern, a discrepancy is recorded in the output report file.

The output report option is *--report*, which can only be used with the *--file* option. The output report option creates a file named FILENAME.info, where FILENAME is specified with the *--file* option. The output report has the same formatting options as the file output.

-a   alias: --append

Append to existing file. By default (if the file already exists), the new data will overwrite the file. With the **--append** option, the new data will be appended to the end of the file without changing its original content. This applies to both the output file and the report file. This option can be used only along with the *--file* option.

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[2]Depending on the exact configuration of the evaluation kit, it may not intend to sample all data from the MagAlpha sensor. In such cases, please do NOT use the output report function. For additional details, please refer to the evaluation kit documentation.

-o   ***[FORMAT]***   ***alias: --output[FORMAT]***

The output format of the data file can be specified with the **-o** (output) option.

There are three possible output formats: text, comma separated values (csv),or plain output. Use the option *--output-text*, *--output-csv,* or *--output-plain*, respectively. The plain output is a list of read values separated by commas without the index. This is useful when displaying values in another program without checking the accuracy of the values. The default option is text.

-x   ***[-RADIX]***   ***alias: --radix-[RADIX]***

The radix of the output can be specified with the ***-x(radix)*** option. There are five number representations to choose from: binary, decimal, hexadecimal, binary with the prefix '0b,' and hexadecimal with the prefix '0x.' To choose a specific radix use: *--radix-bin*, *--radix-dec, --radix-hex, --radix-bin-prefix*, or *--radix-hex-prefix,* respectively. The default option is binary.

Other Options

-l   *alias: --list*

--list returns a list of all USB-SPI channels available.

-h   *alias: --help*

To display help, use *--help*. This displays a complete list of help options and how to use them.

-v   *alias: --version*

To display version information of the software, use *--version*. This displays the current version of the software as well as the information regarding the tool chain used to build the utility.

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3. MAREG.EXE

The *mareg* tool can be used to read, write, and OTP program a MagAlpha sensor in the EvalKit, connected via the flat ribbon cable provided to the ICEstick.

Syntax

mareg

mareg {-l} [ACTION] [TARGET]

mareg –h

mareg –v

[ACTION] defines the behavior of the utility, and *[TARGET]* defines the registers that the utility will access. The *[ACTION]* parameter should always come BEFORE the *[TARGET]* parameter. However, multiple actions can be mixed with multiple targets; the actions and targets will be matched automatically according to their syntax.

Multiple arguments can be entered and MUST be separated with a space: *--read --write PWM=1 EDF 0 5*

Two types of targets are available: the register target, which refers to a register by its number, and a bitfield target, which designates a bitfield in a register. Multiple targets should be separated with spaces.

Targets can have value assignments. Value assignments use the operator '='. Value can be specified in decimal or hexadecimal (with the prefix '0x'). There must NOT be spaces around the equal sign, i.e., *PWM=1* is a valid target with a value assignment while *PWM = 1* is an illegal expression.

For names of bitfields, refer to the MagAlpha datasheet "registers" section. The only exception is the Z filed (zero setting), which is referred to as ZH (Z[11:4]) and ZL (Z[3:0]).

Examples

To read the values of all registers:

> *mareg*

To read the value of the EDF bit (in register 0) and register 5:

> *mareg --read EDF 5*

To enable PWM output, write ZH to the hex value 0x27 and verify the write operation:

> *mareg --write --verify PWM=1 ZH=0x27*

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General Options

-l

alias: --list

--list returns a list of all USB-SPI channels available.

-x   *[-RADIX]*

alias: --radix-[RADIX]

The radix of the output (which is a register content) can be specified with the *--x [RADIX]* option.

There are five number representations to chose from: binary, decimal, hexadecimal, binary with the prefix '0b,' and hexadecimal with the prefix '0x.' To choose a specific radix use: *--radix-bin*, *--radix-dec*, *--radix-hex*, *--radix-bin-prefix,* or *--radix-hex-prefix,* respectively.

Actions

-r *TARGET:*   *alias:--read*

[REGISTER] or   The *--read* option returns the value of the target. The targets of this option
[BITFIELD]   can be a register number and/or a bitfield, without any value assignments. If
the target is a register number, e.g.,

mareg –r0

the value of the complete register is returned. If the target is a bitfield,

mareg –rEDF

the value of the complete register in which the bitfield is located is returned.

-w *TARGET:*   *alias: --write*

[REGISTER] or   The *--write* option writes to the MagAlpha sensor the value of the
[BITFIELD]   target. The targets of this option can be register targets and/or bitfield
  =   targets, along with value assignments. The assigned value is a decimal
[VALUE]   number or a hexadecimal value starting with the prefix '0x,' e.g.,

mareg –w 4=33

-y   *alias: --verify*

The *--verify* option confirms that the data written to the MagAlpha sensor
is correct. This option can only be used with the *--write* option, e.g.,

mareg -w -y 4=33

-!   *alias:--OTP*

The *--OTP* option flashes the OTP memory of the MagAlpha sensor.
This option writes the MagAlpha register 9, which controls the
flashing.

Take extra care with this option since the OTP memory CANNOT be
changed once programmed. It is recommended that *--write and --verify* be
used BEFORE using the OTP program option.

For example, for flashing register 4:

mareg -! -w F4

*This option should only be used when the Vflash of the MA sensor is powered via an external 3.6V supply.

Help

-h   ***alias: --help***

To display help, use ***--help***. This displays a complete list of help options and how to use them.

-v   ***alias:--version***

To display version information of the software, use ***--version***. This displays the current version of the software as well as information regarding the tool chain used to build the utility.

Option	Argument	Default	Alias	Description
maread				
-c [CHANNEL]	Numeric	Auto	—	Communication Channel
-l	—	—	--list	Lists the Com Channels
-f [FILE]	String	—	--file [FILE]	Output to File
-e	—	—	--error-report	Enables Error Report
-a	—	—	--append	Append to End of File
-ot	—	Ot	--output-text	Output Format
-oc	—	—	--output-csv	
-op	—	—	--output-plain	
-xb	—	Xb	--radix-bin	Output Radix
-xd	—	—	--radix-dec	
-xh	—	—	--radix-hex	
-x0b	—	—	--radix-bin-prefix	
-x0x	—	—	--radix-hex-prefix	
-s [NUM]	Decimal	—	—	Sample Size
-t[TIME][UNIT]	Decimal + us, ms, s	—	—	Sample Time
-h	—	—	--help	Displays Help
-v	—	—	--version	Displays Software Version
mareg				
-c[CHANNEL]	Decimal	Auto		Communication Channel
-l	—	—	--list	Lists the Com Channels
-xb	—	Xb	--radix-bin	Output Radix
-xd	—	—	--radix-dec	
-xh	—	—	--radix-hex	
-x0b	—	—	--radix-bin-prefix	
-x0x	—	—	--radix-hex-prefix	
-r	Dec. or String	—	--read	Register Read
-w	Dec. or String = Dec. or Hex	—	--write	Register Write
-y	—	—	--verify	Register Verify
-!	—	—	--OTP	OTP Flash
-h	—	—	--help	Displays Help

-v	—	—	--version	Displays Software Version