libximc

2.14.20

Generated by Doxygen 1.8.1.2

Thu Dec 28 2023 13:17:19

Contents

Chapter 1

libximc library

Documentation for libximc library.

Libximc is **thread safe**, cross-platform library for working with 8SMC4-USB and 8SMC5-USB controllers.

Full documentation about controllers is there

Full documentation about libximc API is available on the page ximc.h.

1.1 What the controller does

- Supports input and output synchronization signals to ensure the joint operation of multiple devices within a complex system ;.
- Works with all compact stepper motors with a winding current of up to 3 A, without feedback, as well as with stepper motors equipped with an encoder in the feedback circuit, including a linear encoder on the positioner.
- Manages controller using ready-made xilab software or using examples which allow rapid development using C++, C#, .NET, Delphi, Visual Basic, Xcode, Python, Matlab, Java, LabWindows and LabVIEW.

1.2 What can do libximc library

- Libximc manages controller using interfaces: USB 2.0, RS232 and Ethernet, also uses a common and proven virtual serial port interface, so you can work with motor control modules through this library under almost all operating systems, including Windows, Linux and MacOS X
- Libximc library supports plug/unplug on the fly. Each device can be controlled only by one program at once. **Multiple processes (programs) that control one device simultaneously are not allowed!**

Warning

Libximc library opens the controller in exclusive access mode. Any controller opened with libximc (XiLab also uses this library) needs to be closed before it may be used by another process. So at first check that you have closed XILab or other software dealing with the controller before trying to reopen the controller.

Please read the Introduction to start work with library.

To use libximc in your project please consult with How to use with...

1.3 Assistance

Many thanks to everyone who sends us `errors` and `suggestions`. We appreciate your suggestions and try to make our product better!

Chapter 2

Introduction

2.1 About library

This document contains all information about libximc library. It utilizes well known virtual COM-port interface, so you can use it on Windows, Linux, MacOS X for Intel and Apple Silicon (via Rosetta 2) including 64-bit versions. Multi-platform programming library supports plug/unplug on the fly.

Each device can be controlled only by one program at once. Multiple processes (programs) that control one device simultaneously are not allowed.

2.1.1 Supported OS and environment requirements:

- MacOS X 10.6 or newer
- Windows 2000 or newer
- Linux debian-based. DEB package is built against Debian Squeeze 7
- Linux debian-based ARM. DEB package is built on Ubuntu 14.04
- Linux rpm-based. RPM is built against OpenSUSE 12

Build requirements:

- Windows: Microsoft Visual C++ 2013 or newer, MATLAB, Code::Blocks, Delphi, Java, Python, cygwin with tar, bison, flex, curl, 7z mingw
- UNIX: gcc 4 or newer, gmake, doxygen, LaTeX, flex 2.5.30+, bison 2.3+, autotools (autoconf, autoheader, aclocal, automake, autoreconf, libtool)
- MacOS X: XCode 4 or newer, doxygen, mactex, autotools (autoconf, autoheader, aclocal, automake, autoreconf, libtool)

Chapter 3

How to rebuild library

3.1 Building on Windows

Requirements: 64-bit windows (build script builds both architectures), cygwin (must be installed to a default path).

Invoke a script:

```
./build.bat
```

Grab packages from ./deb/win32 and ./deb/win64

To build debug version of the library set environment variable "DEBUG" to "true" before running the build script.

3.2 Building on debian-based linux systems

Requirement: 64-bit and 32-bit debian system, ubuntu Typical set of packages:

```
sudo apt-get install build-essential make cmake curl git ruby1.9.1 autotools-
      dev automake autoconf libtool doxygen bison flex debhelper lintian texlive texlive
      -latex-extra texlive-latex texlive-fonts-extra texlive-lang-cyrillic java-1_7_0-
      openjdk java-1_7_0-openjdk-devel default-jre-headless default-jdk openjdk-6-jdk
      rpm-build rpm-devel rpmlint pkg-config check dh-autoreconf hardening-wrapper
      libfl-dev lsb-release
```

For ARM cross-compiling install gcc-arm-linux-gnueabihf from your ARM toolchain.

It's required to match library and host architecture: 32-bit library can be built only at 32-bit host, 64-bit library - only at 64-bit host. ARM library is built with armhf cross-compiler gcc-arm-linux-gnueabihf.

To build library and package invoke a script:

```
./build.sh libdeb
```

For ARM library replace 'libdeb' with 'libdebarm'.

Grab packages from ./ximc/deb and locally installed binaries from ./dist/local.

3.3 Building on MacOS X

To build and package a script invoke a script:

```
./build.sh libosx
```

Built library (classical and framework), examples (classical and .app), documentation are located at ./ximc/macosx, locally installed binaries from ./dist/local.

3.4 Building on generic UNIX

Generic version could be built with standard autotools.

```
./build.sh lib
```

Built files (library, headers, documentation) are installed to ./dist/local directory. It is a generic developer build. Sometimes you need to specify additional parameters to command line for your machine. Please look to following OS sections.

3.5 Building on redhat-based linux systems

Requirement: 64-bit redhat-based system (Fedora, Red Hat, SUSE) Typical set of packages:

```
sudo apt-get install build-essential make cmake curl git ruby1.9.1 autotools-
      dev automake autoconf libtool doxygen bison flex debhelper lintian texlive texlive
      -latex-extra texlive-latex texlive-fonts-extra texlive-lang-cyrillic java-1_7_0-
      openjdk java-1_7_0-openjdk-devel default-jre-headless default-jdk openjdk-6-jdk
      rpm-build rpm-devel rpmlint pkg-config check dh-autoreconf hardening-wrapper
      libfl-dev lsb-release
```

It's possible to build both 32- and 64-bit libraries on 64-bit host system. 64-bit library can't be built on 32-bit system.

To build library and package invoke a script:

```
./build.sh librpm
```

Grab packages from ./ximc/rpm and locally installed binaries from ./dist/local.

3.6 Source code access

The source codes of the libximc library can be found on github.

Chapter 4

How to use with...

To acquire the first skills of using the library, a simple testappeasy_C test application has been created. Languages other than C are supported using calls with conversion of arguments of the stdcall type. A simple C test application is located in the 'examples/test_C' directory, a C# project is located in 'examples/test_CSharp', on VB.NET - in 'examples/test_VBNET', for delphi 6 - in 'example/test_Delphi', for matlab - 'examples/test_MATLAB', for Java - 'examples/test_Java', for Python - 'examples/test_Python', for LabWindows - 'examples/test_LabWindows'. Libraries, header files and other necessary files are located in the directories 'ximc/win32', 'ximc/win64','ximc/macosx' and the like. The developer kit also includes already compiled examples: testapp and testappeasy x32 and x64 bits for windows and only x64 bits for macOS X, test_CSharp, test_VBNET, test_Delphi - only x32 bits, test_Java - cross-platform, test_MATLAB and test_Python do not require compilation, test_LabWindows - 64-bit build is installed by default.

Note

SDK requires Microsoft Visual C++ Redistributable Package (provided with SDK - vcredist_x86 or vcredist_x64)
On Linux both the libximc7_x.x.x and libximc7-dev_x.x.x target architecture in the specified order. For install packages, you can use the .deb command: dpkg -i filename.deb, where filename.deb is the name of the package (packages in Debian have the extension .deb). You must run dpkg with superuser privileges (root).

Testapp can be built using testapp.sln. Library must be compiled with MS Visual C++ too, mingw-library. Make sure that Microsoft Visual C++ Redistributable Package is installed.

Open solution examples/testapp/testapp.sln, build and run from the IDE.

In case of the 8SMC4-USB-Eth1 Ethernet adapter usage it is necessary to set correct IP address of the Ethernet adapter in testapp.c file before build (see enumerate_hints variable).

Testappeasy_C and testapp_C can be built using testappeasy_C.cbp and testapp_C.cbp respectively. Library must be compiled with MS Visual C++ too, mingw-library. Make sure that Microsoft Visual C++ Redistributable Package is installed. *

Open solution examples/test_C/testappeasy_C/testappeasy_C/testappeasy_C.cbp or examples/test_C/testapp_C/testapp_C.cbp, build and run from the IDE.

MinGW is a port of GCC to win32 platform. It's required to install MinGW package.

MinGW-compiled testapp can be built with MS Visual C++ or mingw library.

```
mingw32-make -f Makefile.mingw all
```

Then copy library libximc.dll to current directory and launch testapp.exe.

In case of the 8Eth1 Ethernet adapter usage it is necessary to set correct IP address of the Ethernet adapter in testapp.c file before build (see enumerate_hints variable).

First of all, you should create a library suitable for C++ Builder. **Visual C++ and Builder libraries are not compatible** Invoke:

```
implib libximc.lib libximc.def
```

Then compile test application:

```
bcc32 -I..\..\ximc\win32 -L..\..\ximc\win32 -DWIN32 -DNDEBUG -D_WINDOWS testapp
      .c libximc.lib
```

In case of the 8Eth1 Ethernet adapter usage it is necessary to set correct IP address of the Ethernet adapter in testapp.c file before build (see enumerate_hints variable).

There is also an unsupported example of using libximc in a C++ Builder project

testapp should be built with XCode project testapp.xcodeproj. Library is a MacOS X framework, and at example application it's bundled inside testapp.app

Then launch application testapp.app and check activity output in Console.app.

In case of the 8Eth1 Ethernet adapter usage it is necessary to set correct IP address of the Ethernet adapter in testapp.c file before build (see enumerate_hints variable). There is also an example of using the libximc library in a C++ Builder project, **but it is not supported**.

Make sure that libximc (rpm or deb) is installed at your system. Installation of package should be performed with a package manager of operating system. On MacOS X a framework is provided.

Note that user should belong to system group which allows access to a serial port (dip or serial, for example).

Test application can be built with the installed library with the following script:

```
make
```

In case of cross-compilation (target architecture differs from the current system architecture) feed -m64 or -m32 flag to compiler. On MacOS X it's needed to use -arch flag instead to build an universal binary. Please consult a compiler documentation.

Then launch the application as:

```
make run
```

Note: make run on MacOS X copies a library to the current directory. If you want to use library from the custom directory please be sure to specify LD_LIBRARY_PATH or DYLD_LIBRARY_PATH to the directory with the library.

In case of the 8SMC4-USB-Eth1 Ethernet adapter usage it is necessary to set correct IP address of the Ethernet adapter in testapp.c file before build (see enumerate_hints variable).

Wrapper assembly for libximc.dll is ximc/winX/wrappers/csharp/ximcnet.dll. It is provided with two different architectures. Tested on platforms .NET from 2.0 to 4.5.1

Test .NET applications for Visual Studio 2013 is located at test_CSharp (for C#) and test_VBNET (for VB.NET) respectively. Open solutions and build it.

In case of the 8SMC4-USB-Eth1 Ethernet adapter usage it is necessary to set correct IP address of the Ethernet adapter in testapp.cs or testapp.vb file (depending on programming language) before build (see enumerate_hints variable for C# or enum_hints variable for VB).

Wrapper for libximc.dll is a unit ximc/winX/wrappers/delphi/ximc.pas

Console test application for is located at test_Delphi. Tested on Delphi 6 and only 32-bit version.

Just compile, place .dll near the executable and run program.

In case of the 8Eth1 Ethernet adapter usage it is necessary to set correct IP address of the Ethernet adapter in test_Delphi.dpr file before build (see enum_hints variable).

How to run example on Linux. Go to to examples/test_Java/compiled-winX/ and run:

```
java -cp /usr/share/java/libjximc.jar:test_Java.jar ru.ximc.TestJava
```

How to run example on Windows. Go to to examples/test_Java/compiled-winX/. Then run:

```
java -classpath libjximc.jar -classpath test_Java.jar ru.ximc.TestJava
```

How to modify and recompile an example. Go to to examples/test_Java/compiled. Sources are embedded in a test_Java.jar. Extract them:

```
jar xvf test_Java.jar ru META-INF
```

Then rebuild sources:

```
javac -classpath /usr/share/java/libjximc.jar -Xlint ru/ximc/TestJava.java
```

or for Windows or MacOS X

```
javac -classpath libjximc.jar -Xlint ru/ximc/TestJava.java
```

Then build a jar:

```
jar cmf META-INF/MANIFEST.MF test_Java.jar ru
```

In case of the 8Eth1 Ethernet adapter usage it is necessary to set correct IP address of the Ethernet adapter in TestJava.java file before build (see ENUM_HINTS variable).

Change current directory to the examples/test_Python/xxxxtest. NB: For libximc usage, the example uses the wrapper module ximc/crossplatform/wrappers/python/libximc.

To run:

```
python xxxx.py
```

In case of the 8Eth1 Ethernet adapter usage, it's necessary to set correct IP address of the Ethernet adapter in test_Python.py file before launch (see enum_hints variable).

Sample MATLAB program testximc.m is provided at the directory examples/test_MATLAB. On windows copy ximc.h, libximc.dll, bindy.dll, xiwrapper.dll and contents of ximc/(win32,win64)/wrappers/matlab/ directory to the current directory.

Before launch:

On MacOS X: copy ximc/macosx/libximc.framework, ximc/macosx/wrappers/ximcm.h, ximc/ximc.h to the directory examples/test_MATLAB. Install XCode compatible with Matlab.

On Linux: install libximc*deb and libximc-dev*dev of target architecture. Then copy ximc/macosx/wrappers/ximcm.h to the directory examples/matlab. Install gcc compatible with Matlab.

For XCode and gcc version compatibility check document https://www.mathworks.com/content/dam/mathworks/mathwor
SystemRequirements-Release2014a_SupportedCompilers.pdf or similar.

On Windows before the start nothing needs to be done

Change current directory in the MATLAB to the examples/test_MATLAB. Then launch in MATLAB prompt:

```
testximc
```

In case of the 8Eth1 Ethernet adapter usage it is necessary to set correct IP address of the Ethernet adapter in testximc.m file before launch (see enum_hints variable).

4.1 Generic logging facility

If you want to turn on file logging, you should run the program that uses libximc library with the "XILOG" environment variable set to desired file name. This file will be opened for writing on the first log event and will be closed when the program which uses libximc terminates. Data which is sent to/received from the controller is logged along with port open and close events.

4.2 Required permissions

libximc generally does not require special permissions to work, it only needs read/write access to USB-serial ports on the system. An exception to this rule is a Windows-only "fix_usbser_sys()" function - it needs elevation and will produce null result if run as a regular user.

4.3 C-profiles

C-profiles are header files distributed with the libximc library. They enable one to set all controller settings for any of the supported stages with a single function call in a C/C++ program.

You may see how to use C-profiles in the example directory "examples/test_C/testprofile_C".

4.4 Python-profiles

Python-profiles are sets of configuration functions distributed with the libximc library. They allow to load the controller with settings of one of the supported stages using a single function call in a Python program.

You may see how to use Python-profiles in the example "examples/test_Python/profiletest/testpythonprofile.-py".

Chapter 5

Working with user units

In addition to working in basic units(steps, encoder value), the library allows you to work with user units. For this purpose are used:

- The structure of the conversion units calibration_t
- The functions of which have doubles for working with user units, data structures for these functions
- Coordinate correction table for more accurate positioning

5.1 The structure of the conversion units calibration_t

To specify conversion of the basic units in the user and back, calibration_t structure is used. With the help of coefficients A and MicrostepMode, specified in this structure, steps and microsteps which are integers are converted into the user value of the real type and back.

Conversion formulas:

- The conversion to user units.

```
user_value = A*(step + mstep/pow(2,MicrostepMode-1))
```

- Conversion from user units.

```
step = (int)(user_value/A)
mstep = (user_value/A - step)*pow(2,MicrostepMode-1)
```

5.2 Alternative functions for working with user units and data structures for them

Structures and functions for working with user units have the _calb postfix. The user using these functions can perform all actions in their own units without worrying about the computations of the controller. The data format of _calb structures is described in detail. For _calb functions particular descriptions are not used. They perform the same actions as the basic functions do. The difference between them and the basic functions is in the position, velocity, and acceleration of the data types defined as user-defined. If clarification for _calb functions is necessary, they are provided as notes in the description of the basic functions.

5.3 Coordinate correction table for more accurate positioning

Some functions for working with user units support coordinate transformation using a correction table. To load a table from a file, the load_correction_table() function is used. Its description contains the functions and their data supporting correction.

Note

For data fields which are corrected in case of loading of the table in the description of the field is written - corrected by the table.

File format:

- two columns separated by tabs;
- column headers are string;
- real type data, point is a separator;
- the first column is the coordinate, the second is the deviation caused by a mechanical error;
- the deviation between coordinates is calculated linearly;
- constant is equal to the deviation at the boundary beyond the range;
- maximum length of the table is 100 lines.

Sample file:

```
X  dX
0  0
5.0        0.005
10.0       -0.01
```

Chapter 6

Data Structure Documentation

6.1 accessories_settings_t Struct Reference

Deprecated.

Data Fields

- char MagneticBrakeInfo [25]

  The manufacturer and the part number of magnetic brake, the maximum string length is 24 characters.
- float MBRatedVoltage

  Rated voltage for controlling the magnetic brake (V).
- float MBRatedCurrent

  Rated current for controlling the magnetic brake (A).
- float MBTorque

  Retention moment ($mN * m$).
- unsigned int MBSettings

  Magnetic brake settings flags.
- char TemperatureSensorInfo [25]

  The manufacturer and the part number of the temperature sensor, the maximum string length: 24 characters.
- float TSMin

  The minimum measured temperature (degrees Celsius) Data type: float.
- float TSMax

  The maximum measured temperature (degrees Celsius) Data type: float.
- float TSGrad

  The temperature gradient (V/degrees Celsius).
- unsigned int TSSettings

  Temperature sensor settings flags.
- unsigned int LimitSwitchesSettings

  Temperature sensor settings flags.

6.1.1 Detailed Description

Deprecated.

Additional accessories' information.

See Also

set_accessories_settings
get_accessories_settings
get_accessories_settings, set_accessories_settings

6.1.2 Field Documentation

6.1.2.1 unsigned int LimitSwitchesSettings

Temperature sensor settings flags.

6.1.2.2 char MagneticBrakeInfo[25]

The manufacturer and the part number of magnetic brake, the maximum string length is 24 characters.

6.1.2.3 float MBRatedCurrent

Rated current for controlling the magnetic brake (A).

Data type: float.

6.1.2.4 float MBRatedVoltage

Rated voltage for controlling the magnetic brake (V).

Data type: float.

6.1.2.5 unsigned int MBSettings

Magnetic brake settings flags.

6.1.2.6 float MBTorque

Retention moment (mN $*$ m).

Data type: float.

6.1.2.7 char TemperatureSensorInfo[25]

The manufacturer and the part number of the temperature sensor, the maximum string length: 24 characters.

6.1.2.8 float TSGrad

The temperature gradient (V/degrees Celsius).

Data type: float.

6.1.2.9 float TSMax

The maximum measured temperature (degrees Celsius) Data type: float.

6.1.2.10 float TSMin

The minimum measured temperature (degrees Celsius) Data type: float.

6.1.2.11 unsigned int TSSettings

Temperature sensor settings flags.

6.2 analog_data_t Struct Reference

Analog data.

Data Fields

- unsigned int A1Voltage_ADC
  "Voltage on pin 1 winding A" raw data from ADC.
- unsigned int A2Voltage_ADC
  "Voltage on pin 2 winding A" raw data from ADC.
- unsigned int B1Voltage_ADC
  "Voltage on pin 1 winding B" raw data from ADC.
- unsigned int B2Voltage_ADC
  "Voltage on pin 2 winding B" raw data from ADC.
- unsigned int SupVoltage_ADC
  "Supply voltage of H-bridge's MOSFETs" raw data from ADC.
- unsigned int ACurrent_ADC
  "Winding A current" raw data from ADC.
- unsigned int BCurrent_ADC
  "Winding B current" raw data from ADC.
- unsigned int FullCurrent_ADC
  "Full current" raw data from ADC.
- unsigned int Temp_ADC
  Voltage from temperature sensor, raw data from ADC.
- unsigned int Joy_ADC
  Joystick raw data from ADC.
- unsigned int Pot_ADC
  Voltage on analog input, raw data from ADC.
- unsigned int L5_ADC
  USB supply voltage after the current sense resistor, raw data from ADC.
- unsigned int H5_ADC
  USB Power supply from ADC.
- int A1Voltage
  "Voltage on pin 1 winding A" calibrated data (in tens of mV).
- int A2Voltage
  "Voltage on pin 2 winding A" calibrated data (in tens of mV).
- int B1Voltage
  "Voltage on pin 1 winding B" calibrated data (in tens of mV).
- int B2Voltage
  "Voltage on pin 2 winding B" calibrated data (in tens of mV).

- int SupVoltage

  "Supply voltage on the top of H-bridge's MOSFETs" calibrated data (in tens of mV).
- int ACurrent

  "Winding A current" calibrated data (in mA).
- int BCurrent

  "Winding B current" calibrated data (in mA).
- int FullCurrent

  "Full current" calibrated data (in mA).
- int Temp

  Temperature, calibrated data (in tenths of degrees Celsius).
- int Joy

  Joystick, calibrated data.
- int Pot

  Analog input, calibrated data.
- int L5

  USB supply voltage after the current sense resistor (in tens of mV).
- int H5

  USB power supply (in tens of mV).
- unsigned int **deprecated**
- int R

  Motor winding resistance in mOhms (is only used with stepper motors).
- int L

  Motor winding pseudo inductance in uH (is only used with stepper motors).

6.2.1 Detailed Description

Analog data.

This structure contains raw analog data from the embedded ADC. These data are used for device testing and deep recalibration by the manufacturer only.

See Also

get_analog_data
get_analog_data

6.2.2 Field Documentation

6.2.2.1 int A1Voltage

"Voltage on pin 1 winding A" calibrated data (in tens of mV).

6.2.2.2 unsigned int A1Voltage_ADC

"Voltage on pin 1 winding A" raw data from ADC.

6.2.2.3 int A2Voltage

"Voltage on pin 2 winding A" calibrated data (in tens of mV).

6.2.2.4 unsigned int A2Voltage_ADC

"Voltage on pin 2 winding A" raw data from ADC.

6.2.2.5 int ACurrent

"Winding A current" calibrated data (in mA).

6.2.2.6 unsigned int ACurrent_ADC

"Winding A current" raw data from ADC.

6.2.2.7 int B1Voltage

"Voltage on pin 1 winding B" calibrated data (in tens of mV).

6.2.2.8 unsigned int B1Voltage_ADC

"Voltage on pin 1 winding B" raw data from ADC.

6.2.2.9 int B2Voltage

"Voltage on pin 2 winding B" calibrated data (in tens of mV).

6.2.2.10 unsigned int B2Voltage_ADC

"Voltage on pin 2 winding B" raw data from ADC.

6.2.2.11 int BCurrent

"Winding B current" calibrated data (in mA).

6.2.2.12 unsigned int BCurrent_ADC

"Winding B current" raw data from ADC.

6.2.2.13 int FullCurrent

"Full current" calibrated data (in mA).

6.2.2.14 unsigned int FullCurrent_ADC

"Full current" raw data from ADC.

6.2.2.15 int H5

USB power supply (in tens of mV).

6.2.2.16 int Joy

Joystick, calibrated data.
Range: 0..10000

6.2.2.17 unsigned int Joy_ADC

Joystick raw data from ADC.

6.2.2.18 int L

Motor winding pseudo inductance in uH (is only used with stepper motors).

6.2.2.19 int L5

USB supply voltage after the current sense resistor (in tens of mV).

6.2.2.20 unsigned int L5_ADC

USB supply voltage after the current sense resistor, raw data from ADC.

6.2.2.21 int Pot

Analog input, calibrated data.
Range: 0..10000

6.2.2.22 int R

Motor winding resistance in mOhms (is only used with stepper motors).

6.2.2.23 int SupVoltage

"Supply voltage on the top of H-bridge's MOSFETs" calibrated data (in tens of mV).

6.2.2.24 unsigned int SupVoltage_ADC

"Supply voltage of H-bridge's MOSFETs" raw data from ADC.

6.2.2.25 int Temp

Temperature, calibrated data (in tenths of degrees Celsius).

6.2.2.26 unsigned int Temp_ADC

Voltage from temperature sensor, raw data from ADC.

6.3 brake_settings_t Struct Reference

Brake settings.

Data Fields

- unsigned int t1
  Time in ms between turning on motor power and turning off the brake.
- unsigned int t2
  Time in ms between the brake turning off and moving readiness.
- unsigned int t3
  Time in ms between motor stop and the brake turning on.
- unsigned int t4
  Time in ms between turning on the brake and turning off motor power.
- unsigned int BrakeFlags
  Brake settings flags.

6.3.1 Detailed Description

Brake settings.

This structure contains brake control parameters.

See Also

set_brake_settings
get_brake_settings
get_brake_settings, set_brake_settings

6.3.2 Field Documentation

6.3.2.1 unsigned int BrakeFlags

Brake settings flags.

6.3.2.2 unsigned int t1

Time in ms between turning on motor power and turning off the brake.

6.3.2.3 unsigned int t2

Time in ms between the brake turning off and moving readiness.

All moving commands will execute after this interval.

6.3.2.4 unsigned int t3

Time in ms between motor stop and the brake turning on.

6.3.2.5 unsigned int t4

Time in ms between turning on the brake and turning off motor power.

6.4 calibration_settings_t Struct Reference

Calibration settings.

Data Fields

- float CSS1_A
  Scaling factor for the analog measurements of the A winding current.
- float CSS1_B
  Offset for the analog measurements of the A winding current.
- float CSS2_A
  Scaling factor for the analog measurements of the B winding current.
- float CSS2_B
  Offset for the analog measurements of the B winding current.
- float FullCurrent_A
  Scaling factor for the analog measurements of the full current.
- float FullCurrent_B
  Offset for the analog measurements of the full current.

6.4.1 Detailed Description

Calibration settings.

This structure contains calibration settings. These settings are used to convert bare ADC values to winding currents in mA and the full current in mA. Parameters are grouped into pairs, XXX_A and XXX_B, representing linear equation coefficients. The first one is the slope, the second one is the constant term. Thus, XXX_Current[mA] = XXX_A[mA/ADC]*XXX_ADC_CODE[ADC] + XXX_B[mA].

See Also

get_calibration_settings
set_calibration_settings
get_calibration_settings, set_calibration_settings

6.4.2 Field Documentation

6.4.2.1 float CSS1_A

Scaling factor for the analog measurements of the A winding current.

6.4.2.2 float CSS1_B

Offset for the analog measurements of the A winding current.

6.4.2.3 float CSS2_A

Scaling factor for the analog measurements of the B winding current.

6.4.2.4 float CSS2_B

Offset for the analog measurements of the B winding current.

6.4.2.5 float FullCurrent_A

Scaling factor for the analog measurements of the full current.

6.4.2.6 float FullCurrent_B

Offset for the analog measurements of the full current.

6.5 calibration_t Struct Reference

Calibration structure.

Data Fields

- double A

  is a conversion factor which is equal number of millimeters (or other units) per one step
- unsigned int MicrostepMode

  is a controller setting which is determine a step division mode

6.5.1 Detailed Description

Calibration structure.

6.6 chart_data_t Struct Reference

Additional device state.

Data Fields

- int WindingVoltageA

  In case of a step motor, it contains the voltage across the winding A (in tens of mV); in case of a brushless motor, it contains the voltage on the first coil; in case of a DC motor, it contains the only winding current.
- int WindingVoltageB

  In case of a step motor, it contains the voltage across the winding B (in tens of mV); in case of a brushless motor, it contains the voltage on the second winding; and in case of a DC motor, this field is not used.
- int WindingVoltageC

  In case of a brushless motor, it contains the voltage on the third winding (in tens of mV); in the case of a step motor and a DC motor, the field is not used.
- int WindingCurrentA

  In case of a step motor, it contains the current in the winding A (in mA); in case of a brushless motor, it contains the current in the winding A; and in case of a DC motor, it contains the only winding current.
- int WindingCurrentB

  In case of a step motor, it contains the current in the winding B (in mA); in case of a brushless motor, it contains the current in the winding B; and in case of a DC motor, the field is not used.
- int WindingCurrentC

  In case of a brushless motor, it contains the current in the winding C (in mA); in case of a step motor and a DC motor, the field is not used.
- unsigned int Pot

Analog input value, dimensionless.

- unsigned int Joy

  The joystick position, dimensionless.

- int DutyCycle

  PWM duty cycle.

6.6.1 Detailed Description

Additional device state.

This structure contains additional values such as winding's voltages, currents, and temperature.

See Also

get_chart_data
get_chart_data

6.6.2 Field Documentation

6.6.2.1 int DutyCycle

PWM duty cycle.

6.6.2.2 unsigned int Joy

The joystick position, dimensionless.

Range: 0..10000

6.6.2.3 unsigned int Pot

Analog input value, dimensionless.

Range: 0..10000

6.6.2.4 int WindingCurrentA

In case of a step motor, it contains the current in the winding A (in mA); in case of a brushless motor, it contains the current in the winding A; and in case of a DC motor, it contains the only winding current.

6.6.2.5 int WindingCurrentB

In case of a step motor, it contains the current in the winding B (in mA); in case of a brushless motor, it contains the current in the winding B; and in case of a DC motor, the field is not used.

6.6.2.6 int WindingCurrentC

In case of a brushless motor, it contains the current in the winding C (in mA); in case of a step motor and a DC motor, the field is not used.

6.6.2.7 int WindingVoltageA

In case of a step motor, it contains the voltage across the winding A (in tens of mV); in case of a brushless motor, it contains the voltage on the first coil; in case of a DC motor, it contains the only winding current.

6.6.2.8 int WindingVoltageB

In case of a step motor, it contains the voltage across the winding B (in tens of mV); in case of a brushless motor, it contains the voltage on the second winding; and in case of a DC motor, this field is not used.

6.6.2.9 int WindingVoltageC

In case of a brushless motor, it contains the voltage on the third winding (in tens of mV); in the case of a step motor and a DC motor, the field is not used.

6.7 control_settings_calb_t Struct Reference

User unit control settings.

Data Fields

- float MaxSpeed [10]
  Array of speeds used with the joystick and the button control.
- unsigned int Timeout [9]
  Timeout[i] is timeout in ms.
- unsigned int MaxClickTime
  Maximum click time (in ms).
- unsigned int Flags
  Control flags.
- float DeltaPosition
  Position shift (delta)

6.7.1 Detailed Description

User unit control settings.

```
This structure contains control parameters.
```

In case of CTL_MODE=1, the joystick motor control is enabled. In this mode, while the joystick is maximally displaced, the engine tends to move at MaxSpeed[i]. i=0 if another value hasn't been set at the previous usage. To change the speed index "i", use the buttons.

In case of CTL_MODE=2, the motor is controlled by the left/right buttons. When you click on the button, the motor starts moving in the appropriate direction at a speed MaxSpeed[0]. After Timeout[i], the motor moves at speed MaxSpeed[i+1]. At the transition between MaxSpeed[i] and MaxSpeed[i+1] the motor just accelerates/decelerates as usual.

See Also

set_control_settings_calb
get_control_settings_calb
get_control_settings, set_control_settings

6.7.2 Field Documentation

6.7.2.1 unsigned int Flags

Control flags.

6.7.2.2 unsigned int MaxClickTime

Maximum click time (in ms).

Until the expiration of this time, the first speed isn't applied.

6.7.2.3 float MaxSpeed[10]

Array of speeds used with the joystick and the button control.

6.7.2.4 unsigned int Timeout[9]

Timeout[i] is timeout in ms.

After that, max_speed[i+1] is applied. It's used with the button control only.

6.8 control_settings_t Struct Reference

Control settings.

Data Fields

- unsigned int MaxSpeed [10]
  Array of speeds (full step) used with the joystick and the button control.
- unsigned int uMaxSpeed [10]
  Array of speeds (in microsteps) used with the joystick and the button control.
- unsigned int Timeout [9]
  Timeout[i] is timeout in ms.
- unsigned int MaxClickTime
  Maximum click time (in ms).
- unsigned int Flags
  Control flags.
- int DeltaPosition
  Position Shift (delta) (full step)
- int uDeltaPosition
  Fractional part of the shift in micro steps.

6.8.1 Detailed Description

Control settings.

This structure contains control parameters.

In case of CTL_MODE=1, the joystick motor control is enabled. In this mode, while the joystick is maximally displaced, the engine tends to move at MaxSpeed[i]. i=0 if another value hasn't been set at the previous usage. To change the speed index "i", use the buttons.

In case of CTL_MODE=2, the motor is controlled by the left/right buttons. When you click on the button, the motor starts moving in the appropriate direction at a speed MaxSpeed[0]. After Timeout[i], motor moves at speed MaxSpeed[i+1]. At the transition between MaxSpeed[i] and MaxSpeed[i+1] the motor just accelerates/decelerates as usual.

See Also

set_control_settings
get_control_settings
get_control_settings, set_control_settings

6.8.2 Field Documentation

6.8.2.1 unsigned int Flags

Control flags.

6.8.2.2 unsigned int MaxClickTime

Maximum click time (in ms).

Until the expiration of this time, the first speed isn't applied.

6.8.2.3 unsigned int MaxSpeed[10]

Array of speeds (full step) used with the joystick and the button control.

Range: 0..100000.

6.8.2.4 unsigned int Timeout[9]

Timeout[i] is timeout in ms.

After that, max_speed[i+1] is applied. It's used with the button control only.

6.8.2.5 int uDeltaPosition

Fractional part of the shift in micro steps.

It's used with a stepper motor only. The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings).

6.8.2.6 unsigned int uMaxSpeed[10]

Array of speeds (in microsteps) used with the joystick and the button control.

The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings).

6.9 controller_name_t Struct Reference

Controller name and settings flags.

Data Fields

- char ControllerName [17]
  User controller name.
- unsigned int CtrlFlags
  Flags of internal controller settings.

6.9.1 Detailed Description

Controller name and settings flags.

See Also

get_controller_name, set_controller_name

6.9.2 Field Documentation

6.9.2.1 char ControllerName[17]

User controller name.

It may be set by the user. Max string length: 16 characters.

6.9.2.2 unsigned int CtrlFlags

Flags of internal controller settings.

6.10 ctp_settings_t Struct Reference

Control position settings (used with stepper motor only)

Data Fields

- unsigned int CTPMinError
  The minimum difference between the SM position in steps and the encoder position that causes the setting of the STATE_CTP_ERROR flag.
- unsigned int CTPFlags
  Position control flags.

6.10.1 Detailed Description

Control position settings (used with stepper motor only)

When controlling the step motor with the encoder (CTP_BASE=0), it is possible to detect the loss of steps. The controller knows the number of steps per revolution (GENG::StepsPerRev) and the encoder resolution (GFBS::IPT). When the control is enabled (CTP_ENABLED is set), the controller stores the

current position in the steps of SM and the current position of the encoder. Next, the encoder position is converted into steps at each step, and if the difference between the current position in steps and the encoder position is greater than CTPMinError, the flag STATE_CTP_ERROR is set.

Alternatively, the stepper motor may be controlled with the speed sensor (CTP_BASE 1). In this mode, at the active edges of the input clock, the controller stores the current value of steps. Then, at each revolution, the controller checks how many steps have been passed. When the difference is over the CTPMinError, the STATE_CTP_ERROR flag is set.

See Also

set_ctp_settings
get_ctp_settings
get_ctp_settings, set_ctp_settings

6.10.2 Field Documentation

6.10.2.1 unsigned int CTPFlags

Position control flags.

6.10.2.2 unsigned int CTPMinError

The minimum difference between the SM position in steps and the encoder position that causes the setting of the STATE_CTP_ERROR flag.

Measured in steps.

6.11 debug_read_t Struct Reference

Debug data.

Data Fields

- uint8_t DebugData [128]
  Arbitrary debug data.

6.11.1 Detailed Description

Debug data.

These data are used for device debugging by the manufacturer.

See Also

get_debug_read

6.11.2 Field Documentation

6.11.2.1 uint8_t DebugData[128]

Arbitrary debug data.

6.12 debug_write_t Struct Reference

Debug data.

Data Fields

- uint8_t DebugData [128]
  Arbitrary debug data.

6.12.1 Detailed Description

Debug data.

These data are used for device debugging by the manufacturer.

See Also

set_debug_write

6.12.2 Field Documentation

6.12.2.1 uint8_t DebugData[128]

Arbitrary debug data.

6.13 device_information_t Struct Reference

Controller information structure.

Data Fields

- char Manufacturer [5]
  Manufacturer.
- char ManufacturerId [3]
  Manufacturer id.
- char ProductDescription [9]
  Product description.
- unsigned int Major
  The major number of the hardware version.
- unsigned int Minor
  The minor number of the hardware version.
- unsigned int Release
  Release version.

6.13.1 Detailed Description

Controller information structure.

See Also

get_device_information
get_device_information_impl

6.13.2 Field Documentation

6.13.2.1 unsigned int Major

The major number of the hardware version.

6.13.2.2 unsigned int Minor

The minor number of the hardware version.

6.13.2.3 unsigned int Release

Release version.

6.14 device_network_information_t Struct Reference

Device network information structure.

Data Fields

- uint32_t ipv4
  IPv4 address, passed in network byte order (big-endian byte order)
- char nodename [16]
  name of the Bindy node which hosts the device
- uint32_t axis_state
  flags representing device state
- char locker_username [16]
  name of the user who locked the device (if any)
- char locker_nodename [16]
  Bindy node name, which was used to lock the device (if any)
- time_t locked_time
  time the lock was acquired at (UTC, microseconds since the epoch)

6.14.1 Detailed Description

Device network information structure.

6.15 edges_settings_calb_t Struct Reference

User unit edges settings.

Data Fields

- unsigned int BorderFlags
  Border flags.
- unsigned int EnderFlags
  Limit switches flags.

- float LeftBorder

  Left border position, used if BORDER_IS_ENCODER flag is set.
- float RightBorder

  Right border position, used if BORDER_IS_ENCODER flag is set.

6.15.1 Detailed Description

User unit edges settings.

This structure contains border and limit switches settings. Please load new engine settings when you change positioner, etc. Please note that wrong engine settings may lead to device malfunction, which can cause irreversible damage to the board.

See Also

set_edges_settings_calb
get_edges_settings_calb
get_edges_settings, set_edges_settings

6.15.2 Field Documentation

6.15.2.1 unsigned int BorderFlags

Border flags.

6.15.2.2 unsigned int EnderFlags

Limit switches flags.

6.15.2.3 float LeftBorder

Left border position, used if BORDER_IS_ENCODER flag is set.

Corrected by the table.

6.15.2.4 float RightBorder

Right border position, used if BORDER_IS_ENCODER flag is set.

Corrected by the table.

6.16 edges_settings_t Struct Reference

Edges settings.

Data Fields

- unsigned int BorderFlags

  Border flags.
- unsigned int EnderFlags

  Limit switches flags.

- int LeftBorder

  Left border position, used if BORDER_IS_ENCODER flag is set.
- int uLeftBorder

  Left border position in microsteps (used with stepper motor only).
- int RightBorder

  Right border position, used if BORDER_IS_ENCODER flag is set.
- int uRightBorder

  Right border position in microsteps.

6.16.1 Detailed Description

Edges settings.

This structure contains border and limit switches settings. Please load new engine settings when you change positioner, etc. Please note that wrong engine settings may lead to device malfunction, which can cause irreversible damage to the board.

See Also

set_edges_settings
get_edges_settings
get_edges_settings, set_edges_settings

6.16.2 Field Documentation

6.16.2.1 unsigned int BorderFlags

Border flags.

6.16.2.2 unsigned int EnderFlags

Limit switches flags.

6.16.2.3 int LeftBorder

Left border position, used if BORDER_IS_ENCODER flag is set.

6.16.2.4 int RightBorder

Right border position, used if BORDER_IS_ENCODER flag is set.

6.16.2.5 int uLeftBorder

Left border position in microsteps (used with stepper motor only).

The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings).

6.16.2.6 int uRightBorder

Right border position in microsteps.

Used with a stepper motor only. The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings).

6.17 emf_settings_t Struct Reference

EMF settings.

Data Fields

- float L
  Motor winding inductance.
- float R
  Motor winding resistance.
- float Km
  Electromechanical ratio of the motor.
- unsigned int BackEMFFlags
  Flags of auto-detection of characteristics of windings of the engine.

6.17.1 Detailed Description

EMF settings.

This structure contains the data for Electromechanical characteristics (EMF) of the motor. It determines the inductance, resistance, and Electromechanical coefficient of the motor. This data is stored in the flash memory of the controller. Please set new settings when you change the motor. Remember that improper EMF settings may damage the equipment.

See Also

set_emf_settings
get_emf_settings
get_emf_settings, set_emf_settings

6.17.2 Field Documentation

6.17.2.1 unsigned int BackEMFFlags

Flags of auto-detection of characteristics of windings of the engine.

6.17.2.2 float Km

Electromechanical ratio of the motor.

6.17.2.3 float L

Motor winding inductance.

6.17.2.4 float R

Motor winding resistance.

6.18 encoder_information_t Struct Reference

Deprecated.

Data Fields

- char Manufacturer [17]
  Manufacturer.
- char PartNumber [25]
  Series and PartNumber.

6.18.1 Detailed Description

Deprecated.

Encoder information.

See Also

set_encoder_information
get_encoder_information
get_encoder_information, set_encoder_information

6.18.2 Field Documentation

6.18.2.1 char Manufacturer[17]

Manufacturer.

Max string length: 16 chars.

6.18.2.2 char PartNumber[25]

Series and PartNumber.

Max string length: 24 chars.

6.19 encoder_settings_t Struct Reference

Deprecated.

Data Fields

- float MaxOperatingFrequency
  Maximum operation frequency (kHz).
- float SupplyVoltageMin

Minimum supply voltage (V).

- float SupplyVoltageMax

  Maximum supply voltage (V).

- float MaxCurrentConsumption

  Max current consumption (mA).

- unsigned int PPR

  The number of counts per revolution.

- unsigned int EncoderSettings

  Encoder settings flags.

6.19.1 Detailed Description

Deprecated.

Encoder settings.

See Also

set_encoder_settings
get_encoder_settings
get_encoder_settings, set_encoder_settings

6.19.2 Field Documentation

6.19.2.1 unsigned int EncoderSettings

Encoder settings flags.

6.19.2.2 float MaxCurrentConsumption

Max current consumption (mA).

Data type: float.

6.19.2.3 float MaxOperatingFrequency

Maximum operation frequency (kHz).

Data type: float.

6.19.2.4 float SupplyVoltageMax

Maximum supply voltage (V).

Data type: float.

6.19.2.5 float SupplyVoltageMin

Minimum supply voltage (V).

Data type: float.

6.20 engine_advansed_setup_t Struct Reference

EAS settings.

Data Fields

- unsigned int stepcloseloop_Kw
  Mixing ratio of the actual and set speed, range [0, 100], default value 50.
- unsigned int stepcloseloop_Kp_low
  Position feedback in the low-speed zone, range [0, 65535], default value 1000.
- unsigned int stepcloseloop_Kp_high
  Position feedback in the high-speed zone, range [0, 65535], default value 33.

6.20.1 Detailed Description

EAS settings.

This structure is intended for setting parameters of algorithms that cannot be attributed to standard Kp, Ki, Kd, and L, R, Km.

See Also

set_engine_advansed_setup
get_engine_advansed_setup
get_engine_advansed_setup, set_engine_advansed_setup

6.20.2 Field Documentation

6.20.2.1 unsigned int stepcloseloop_Kp_high

Position feedback in the high-speed zone, range [0, 65535], default value 33.

6.20.2.2 unsigned int stepcloseloop_Kp_low

Position feedback in the low-speed zone, range [0, 65535], default value 1000.

6.20.2.3 unsigned int stepcloseloop_Kw

Mixing ratio of the actual and set speed, range [0, 100], default value 50.

6.21 engine_settings_calb_t Struct Reference

Movement limitations and settings, related to the motor.

Data Fields

- unsigned int NomVoltage
  Rated voltage in tens of mV.
- unsigned int NomCurrent

Rated current (in mA).

- float NomSpeed

  Nominal speed.

- unsigned int EngineFlags

  Flags of engine settings.

- float Antiplay

  Number of pulses or steps for backlash (play) compensation procedure.

- unsigned int MicrostepMode

  Flags of microstep mode.

- unsigned int StepsPerRev

  Number of full steps per revolution (Used with stepper motor only).

6.21.1 Detailed Description

Movement limitations and settings, related to the motor.

In user units.

This structure contains useful motor settings. These settings specify the motor shaft movement algorithm, list of limitations and rated characteristics. All boards are supplied with the standard set of engine settings on the controller's flash memory. Please load new engine settings when you change the motor, encoder, positioner, etc. Please note that wrong engine settings may lead to the device malfunction, that may cause irreversible damage to the board.

See Also

set_engine_settings_calb
get_engine_settings_calb
get_engine_settings, set_engine_settings

6.21.2 Field Documentation

6.21.2.1 float Antiplay

Number of pulses or steps for backlash (play) compensation procedure.

Used if ENGINE_ANTIPLAY flag is set.

6.21.2.2 unsigned int EngineFlags

Flags of engine settings.

6.21.2.3 unsigned int MicrostepMode

Flags of microstep mode.

6.21.2.4 unsigned int NomCurrent

Rated current (in mA).

Controller will keep current consumed by motor below this value if ENGINE_LIMIT_CURR flag is set. Range: 15..8000

6.21.2.5 float NomSpeed

Nominal speed.

Controller will keep motor speed below this value if ENGINE_LIMIT_RPM flag is set.

6.21.2.6 unsigned int NomVoltage

Rated voltage in tens of mV.

Controller will keep the voltage drop on motor below this value if ENGINE_LIMIT_VOLT flag is set (used with DC only).

6.21.2.7 unsigned int StepsPerRev

Number of full steps per revolution (Used with stepper motor only).

Range: 1..65535.

6.22 engine_settings_t Struct Reference

Movement limitations and settings related to the motor.

Data Fields

- unsigned int NomVoltage
  Rated voltage in tens of mV.
- unsigned int NomCurrent
  Rated current (in mA).
- unsigned int NomSpeed
  Nominal (maximum) speed (in whole steps/s or rpm for DC and stepper motor as a master encoder).
- unsigned int uNomSpeed
  The fractional part of a nominal speed in microsteps (is only used with stepper motor).
- unsigned int EngineFlags
  Flags of engine settings.
- int Antiplay
  Number of pulses or steps for backlash (play) compensation procedure.
- unsigned int MicrostepMode
  Flags of microstep mode.
- unsigned int StepsPerRev
  Number of full steps per revolution (Used with stepper motor only).

6.22.1 Detailed Description

Movement limitations and settings related to the motor.

This structure contains useful motor settings. These settings specify the motor shaft movement algorithm, list of limitations and rated characteristics. All boards are supplied with the standard set of engine settings on the controller's flash memory. Please load new engine settings when you change the motor, encoder, positioner, etc. Please note that wrong engine settings may lead to device malfunction, which can lead to irreversible damage to the board.

See Also

set_engine_settings
get_engine_settings
get_engine_settings, set_engine_settings

6.22.2 Field Documentation

6.22.2.1 int Antiplay

Number of pulses or steps for backlash (play) compensation procedure.

Used if ENGINE_ANTIPLAY flag is set.

6.22.2.2 unsigned int EngineFlags

Flags of engine settings.

6.22.2.3 unsigned int MicrostepMode

Flags of microstep mode.

6.22.2.4 unsigned int NomCurrent

Rated current (in mA).

Controller will keep current consumed by motor below this value if ENGINE_LIMIT_CURR flag is set. Range: 15..8000

6.22.2.5 unsigned int NomSpeed

Nominal (maximum) speed (in whole steps/s or rpm for DC and stepper motor as a master encoder).

Controller will keep motor shaft RPM below this value if ENGINE_LIMIT_RPM flag is set. Range: 1..100000.

6.22.2.6 unsigned int NomVoltage

Rated voltage in tens of mV.

Controller will keep the voltage drop on motor below this value if ENGINE_LIMIT_VOLT flag is set (used with DC only).

6.22.2.7 unsigned int StepsPerRev

Number of full steps per revolution (Used with stepper motor only).

Range: 1..65535.

6.22.2.8 unsigned int uNomSpeed

The fractional part of a nominal speed in microsteps (is only used with stepper motor).

Microstep size and the range of valid values for this field depend on selected step division mode (see MicrostepMode field in engine_settings).

6.23 entype_settings_t Struct Reference

Engine type and driver type settings.

Data Fields

- unsigned int EngineType
  Flags of engine type.
- unsigned int DriverType
  Flags of driver type.

6.23.1 Detailed Description

Engine type and driver type settings.

Parameters

id	An identifier of a device
EngineType	engine type
DriverType	driver type

See Also

get_entype_settings, set_entype_settings

6.23.2 Field Documentation

6.23.2.1 unsigned int DriverType

Flags of driver type.

6.23.2.2 unsigned int EngineType

Flags of engine type.

6.24 extended_settings_t Struct Reference

EST settings This data is stored in the controller's flash memory.

Data Fields

- unsigned int **Param1**

6.24.1 Detailed Description

EST settings This data is stored in the controller's flash memory.

This structure is designed for the future. Currently, it is not in use.

See Also

set_extended_settings
get_extended_settings
get_extended_settings, set_extended_settings

6.25 extio_settings_t Struct Reference

EXTIO settings.

Data Fields

- unsigned int EXTIOSetupFlags
  External IO setup flags.
- unsigned int EXTIOModeFlags
  External IO mode flags.

6.25.1 Detailed Description

EXTIO settings.

This structure contains all EXTIO settings. By default, input events are signaled through a rising front, and output states are signaled by a high logic state.

See Also

get_extio_settings
set_extio_settings
get_extio_settings, set_extio_settings

6.25.2 Field Documentation

6.25.2.1 unsigned int EXTIOModeFlags

External IO mode flags.

6.25.2.2 unsigned int EXTIOSetupFlags

External IO setup flags.

6.26 feedback_settings_t Struct Reference

Feedback settings.

Data Fields

- unsigned int IPS
  The number of encoder counts per shaft revolution.
- unsigned int FeedbackType
  Feedback type.

- unsigned int FeedbackFlags
  Describes feedback flags.
- unsigned int CountsPerTurn
  The number of encoder counts per shaft revolution.

6.26.1 Detailed Description

Feedback settings.

This structure contains feedback settings.

See Also

get_feedback_settings, set_feedback_settings

6.26.2 Field Documentation

6.26.2.1 unsigned int CountsPerTurn

The number of encoder counts per shaft revolution.

Range: 1..4294967295. To use the CountsPerTurn field, write 0 in the IPS field, otherwise the value from the IPS field will be used.

6.26.2.2 unsigned int FeedbackFlags

Describes feedback flags.

6.26.2.3 unsigned int FeedbackType

Feedback type.

6.26.2.4 unsigned int IPS

The number of encoder counts per shaft revolution.

Range: 1..655535. The field is obsolete, it is recommended to write 0 to IPS and use the extended CountsPerTurn field. You may need to update the controller firmware to the latest version.

6.27 gear_information_t Struct Reference

Deprecated.

Data Fields

- char Manufacturer [17]
  Manufacturer.
- char PartNumber [25]
  Series and PartNumber.

6.27.1 Detailed Description

Deprecated.

Gear information.

See Also

set_gear_information
get_gear_information
get_gear_information, set_gear_information

6.27.2 Field Documentation

6.27.2.1 char Manufacturer[17]

Manufacturer.

Max string length: 16 chars.

6.27.2.2 char PartNumber[25]

Series and PartNumber.

Max string length: 24 chars.

6.28 gear_settings_t Struct Reference

Deprecated.

Data Fields

- float ReductionIn
  Input reduction coefficient.
- float ReductionOut
  Output reduction coefficient.
- float RatedInputTorque
  Maximum continuous torque (N ∗ m).
- float RatedInputSpeed
  Maximum speed on the input shaft (rpm).
- float MaxOutputBacklash
  Output backlash of the reduction gear (degree).
- float InputInertia
  Equivalent input gear inertia (g ∗ cm2).
- float Efficiency
  Reduction gear efficiency (%).

6.28.1 Detailed Description

Deprecated.

Gear settings.

See Also

set_gear_settings
get_gear_settings
get_gear_settings, set_gear_settings

6.28.2 Field Documentation

6.28.2.1 float Efficiency

Reduction gear efficiency (%).

Data type: float.

6.28.2.2 float InputInertia

Equivalent input gear inertia (g ∗ cm2).

Data type: float.

6.28.2.3 float MaxOutputBacklash

Output backlash of the reduction gear (degree).

Data type: float.

6.28.2.4 float RatedInputSpeed

Maximum speed on the input shaft (rpm).

Data type: float.

6.28.2.5 float RatedInputTorque

Maximum continuous torque (N ∗ m).

Data type: float.

6.28.2.6 float ReductionIn

Input reduction coefficient.

(Output = (ReductionOut / ReductionIn) ∗ Input) Data type: float.

6.28.2.7 float ReductionOut

Output reduction coefficient.

(Output = (ReductionOut / ReductionIn) ∗ Input) Data type: float.

6.29 get_position_calb_t Struct Reference

Position information.

Data Fields

- float Position
  The position in the engine.
- long_t EncPosition
  Encoder position.

6.29.1 Detailed Description

Position information.

A useful structure that contains position value in user units for stepper motor and encoder steps for all engines.

See Also

get_position

6.29.2 Field Documentation

6.29.2.1 long_t EncPosition

Encoder position.

6.29.2.2 float Position

The position in the engine.

Corrected by the table.

6.30 get_position_t Struct Reference

Position information.

Data Fields

- int Position
  The position of the whole steps in the engine.
- int uPosition
  Microstep position is only used with stepper motors.
- long_t EncPosition
  Encoder position.

6.30.1 Detailed Description

Position information.

A useful structure that contains position value in steps and microsteps for stepper motor and encoder steps for all engines.

See Also

get_position

6.30.2 Field Documentation

6.30.2.1 long_t EncPosition

Encoder position.

6.30.2.2 int uPosition

Microstep position is only used with stepper motors.

Microstep size and the range of valid values for this field depend on the selected step division mode (see MicrostepMode field in engine_settings).

6.31 globally_unique_identifier_t Struct Reference

Globally unique identifier.

Data Fields

- unsigned int UniqueID0
  Unique ID 0.
- unsigned int UniqueID1
  Unique ID 1.
- unsigned int UniqueID2
  Unique ID 2.
- unsigned int UniqueID3
  Unique ID 3.

6.31.1 Detailed Description

Globally unique identifier.

Manufacturer only.

See Also

get_globally_unique_identifier

6.31.2 Field Documentation

6.31.2.1 unsigned int UniqueID0

Unique ID 0.

6.31.2.2 unsigned int UniqueID1

Unique ID 1.

6.31.2.3 unsigned int UniqueID2

Unique ID 2.

6.31.2.4 unsigned int UniqueID3

Unique ID 3.

6.32 hallsensor_information_t Struct Reference

Deprecated.

Data Fields

- char Manufacturer [17]
  Manufacturer.
- char PartNumber [25]
  Series and PartNumber.

6.32.1 Detailed Description

Deprecated.

Hall sensor information.

See Also

set_hallsensor_information
get_hallsensor_information
get_hallsensor_information, set_hallsensor_information

6.32.2 Field Documentation

6.32.2.1 char Manufacturer[17]

Manufacturer.

Max string length: 16 chars.

6.32.2.2 char PartNumber[25]

Series and PartNumber.

Max string length: 24 chars.

6.33 hallsensor_settings_t Struct Reference

Deprecated.

Data Fields

- float MaxOperatingFrequency
  Maximum operation frequency (kHz).
- float SupplyVoltageMin

Minimum supply voltage (V).

- float SupplyVoltageMax

  Maximum supply voltage (V).

- float MaxCurrentConsumption

  Maximum current consumption (mA).

- unsigned int PPR

  The number of counts per revolution.

6.33.1 Detailed Description

Deprecated.

Hall sensor settings.

See Also

set_hallsensor_settings
get_hallsensor_settings
get_hallsensor_settings, set_hallsensor_settings

6.33.2 Field Documentation

6.33.2.1 float MaxCurrentConsumption

Maximum current consumption (mA).

Data type: float.

6.33.2.2 float MaxOperatingFrequency

Maximum operation frequency (kHz).

Data type: float.

6.33.2.3 float SupplyVoltageMax

Maximum supply voltage (V).

Data type: float.

6.33.2.4 float SupplyVoltageMin

Minimum supply voltage (V).

Data type: float.

6.34 home_settings_calb_t Struct Reference

Position calibration settings which use user units.

Data Fields

- float FastHome
  Speed used for first motion.
- float SlowHome
  Speed used for second motion.
- float HomeDelta
  Distance from break point.
- unsigned int HomeFlags
  Home settings flags.

6.34.1 Detailed Description

Position calibration settings which use user units.

This structure contains settings used in position calibrating. It specifies behavior of calibrating position.

See Also

get_home_settings_calb
set_home_settings_calb
command_home
get_home_settings, set_home_settings

6.34.2 Field Documentation

6.34.2.1 float FastHome

Speed used for first motion.

6.34.2.2 float HomeDelta

Distance from break point.

6.34.2.3 unsigned int HomeFlags

Home settings flags.

6.34.2.4 float SlowHome

Speed used for second motion.

6.35 home_settings_t Struct Reference

Position calibration settings.

Data Fields

- unsigned int FastHome
  Speed used for first motion (full steps).
- unsigned int uFastHome
  Fractional part of the speed for first motion, microsteps.
- unsigned int SlowHome
  Speed used for second motion (full steps).
- unsigned int uSlowHome
  Part of the speed for second motion, microsteps.
- int HomeDelta
  Distance from break point (full steps).
- int uHomeDelta
  Fractional part of the delta distance, microsteps.
- unsigned int HomeFlags
  Home settings flags.

6.35.1 Detailed Description

Position calibration settings.

This structure contains settings used in position calibration. It specify behavior of calibration procedure.

See Also

get_home_settings
set_home_settings
command_home
get_home_settings, set_home_settings

6.35.2 Field Documentation

6.35.2.1 unsigned int FastHome

Speed used for first motion (full steps).

Range: 0..100000.

6.35.2.2 int HomeDelta

Distance from break point (full steps).

6.35.2.3 unsigned int HomeFlags

Home settings flags.

6.35.2.4 unsigned int SlowHome

Speed used for second motion (full steps).

Range: 0..100000.

6.35.2.5 unsigned int uFastHome

Fractional part of the speed for first motion, microsteps.

The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings).

6.35.2.6 int uHomeDelta

Fractional part of the delta distance, microsteps.

The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings).

6.35.2.7 unsigned int uSlowHome

Part of the speed for second motion, microsteps.

The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings).

6.36 init_random_t Struct Reference

Random key.

Data Fields

- uint8_t key [16]
  Random key.

6.36.1 Detailed Description

Random key.

Manufacturer only.

Structure that contains a random key. It is used in the encryption of WKEY and SSER command contents.

See Also

get_init_random

6.36.2 Field Documentation

6.36.2.1 uint8_t key[16]

Random key.

6.37 joystick_settings_t Struct Reference

Joystick settings.

Data Fields

- unsigned int JoyLowEnd
  Joystick lower end position.
- unsigned int JoyCenter
  Joystick center position.
- unsigned int JoyHighEnd
  Joystick upper end position.
- unsigned int ExpFactor
  Exponential nonlinearity factor.
- unsigned int DeadZone
  Joystick dead zone.
- unsigned int JoyFlags
  Joystick flags.

6.37.1 Detailed Description

Joystick settings.

This structure contains joystick parameters. If joystick position falls outside the DeadZone limits, a movement begins. Speed is defined by the joystick position in the range of the DeadZone limit to the maximum deviation. Joystick positions inside the DeadZone limits correspond to zero speed (a soft stop of the motion), and positions beyond the Low and High limits correspond to MaxSpeed[i] or -MaxSpeed[i] (see command SCTL), where i = 0 by default and can be changed with left/right buttons (see command SCTL). If the next speed in the list is zero (both integer and microstep parts), the button press is ignored. The first speed in the list shouldn't be zero.

The relationship between the deviation and the rate is exponential, which allows for high mobility and accuracy without speed mode switching.

See Also

set_joystick_settings
get_joystick_settings
get_joystick_settings, set_joystick_settings

6.37.2 Field Documentation

6.37.2.1 unsigned int DeadZone

Joystick dead zone.

6.37.2.2 unsigned int ExpFactor

Exponential nonlinearity factor.

6.37.2.3 unsigned int JoyCenter

Joystick center position.

Range: 0..10000.

6.37.2.4 unsigned int JoyFlags

Joystick flags.

6.37.2.5 unsigned int JoyHighEnd

Joystick upper end position.

Range: 0..10000.

6.37.2.6 unsigned int JoyLowEnd

Joystick lower end position.

Range: 0..10000.

6.38 measurements_t Struct Reference

The buffer holds no more than 25 points.

Data Fields

- int Speed [25]

  Current speed in microsteps per second (whole steps are recalculated considering the current step division mode) or encoder counts per second.
- int Error [25]

  Current error in microsteps per second (whole steps are recalculated considering the current step division mode) or encoder counts per second.
- unsigned int Length

  Length of actual data in buffer.

6.38.1 Detailed Description

The buffer holds no more than 25 points.

The exact length of the received buffer is stored in the Length field.

See Also

measurements
get_measurements

6.38.2 Field Documentation

6.38.2.1 int Error[25]

Current error in microsteps per second (whole steps are recalculated considering the current step division mode) or encoder counts per second.

6.38.2.2 unsigned int Length

Length of actual data in buffer.

6.38.2.3 int Speed[25]

Current speed in microsteps per second (whole steps are recalculated considering the current step division mode) or encoder counts per second.

6.39 motor_information_t Struct Reference

Deprecated.

Data Fields

- char Manufacturer [17]
  Manufacturer.
- char PartNumber [25]
  Series and PartNumber.

6.39.1 Detailed Description

Deprecated.

motor information.

See Also

set_motor_information
get_motor_information
get_motor_information, set_motor_information

6.39.2 Field Documentation

6.39.2.1 char Manufacturer[17]

Manufacturer.

Max string length: 16 chars.

6.39.2.2 char PartNumber[25]

Series and PartNumber.

Max string length: 24 chars.

6.40 motor_settings_t Struct Reference

Deprecated.

Data Fields

- unsigned int MotorType
  Motor Type flags.

- unsigned int ReservedField

  Reserved.
- unsigned int Poles

  Number of pole pairs for DC or BLDC motors or number of steps per rotation for stepper motors.
- unsigned int Phases

  Number of phases for BLDC motors.
- float NominalVoltage

  Nominal voltage on winding (B).
- float NominalCurrent

  Maximum direct current in winding for DC and BLDC engines, nominal current in windings for stepper motors (A).
- float NominalSpeed

  Not used.
- float NominalTorque

  Nominal torque (mN ∗ m).
- float NominalPower

  Nominal power (W).
- float WindingResistance

  Resistance of windings for DC engines, of each of two windings for stepper motors, or of each of three windings for BLDC engines (Ohm).
- float WindingInductance

  Inductance of windings for DC engines, inductance of each of two windings for stepper motors, or inductance of each of three windings for BLDC engines (mH).
- float RotorInertia

  Rotor inertia (g ∗ cm2).
- float StallTorque

  Torque hold position for a stepper motor or torque at a motionless rotor for other types of engines (mN ∗ m).
- float DetentTorque

  Holding torque position with unpowered windings (mN ∗ m).
- float TorqueConstant

  Torque constant that determines the proportionality constant between the maximum rotor torque and current flowing in the winding (mN ∗ m / A).
- float SpeedConstant

  Velocity constant, which determines the value or the amplitude of the induced voltage on the motion of DC or BLDC motors (rpm / V) or stepper motors (steps/s / V).
- float SpeedTorqueGradient

  Speed torque gradient (rpm / mN ∗ m).
- float MechanicalTimeConstant

  Mechanical time constant (ms).
- float MaxSpeed

  The maximum speed for stepper motors (steps/s) or DC and BLDC motors (rmp).
- float MaxCurrent

  The maximum current in the winding (A).
- float MaxCurrentTime

  Safe duration of overcurrent in the winding (ms).
- float NoLoadCurrent

  The current consumption in idle mode (A).
- float NoLoadSpeed

  Idle speed (rpm).

6.40.1 Detailed Description

Deprecated.

Physical characteristics and limitations of the motor.

See Also

set_motor_settings
get_motor_settings
get_motor_settings, set_motor_settings

6.40.2 Field Documentation

6.40.2.1 float DetentTorque

Holding torque position with unpowered windings (mN ∗ m).

Data type: float.

6.40.2.2 float MaxCurrent

The maximum current in the winding (A).

Data type: float.

6.40.2.3 float MaxCurrentTime

Safe duration of overcurrent in the winding (ms).

Data type: float.

6.40.2.4 float MaxSpeed

The maximum speed for stepper motors (steps/s) or DC and BLDC motors (rmp).

Data type: float.

6.40.2.5 float MechanicalTimeConstant

Mechanical time constant (ms).

Data type: float.

6.40.2.6 unsigned int MotorType

Motor Type flags.

6.40.2.7 float NoLoadCurrent

The current consumption in idle mode (A).

Used for DC and BLDC motors. Data type: float.

6.40.2.8 float NoLoadSpeed

Idle speed (rpm).

Used for DC and BLDC motors. Data type: float.

6.40.2.9 float NominalCurrent

Maximum direct current in winding for DC and BLDC engines, nominal current in windings for stepper motors (A).

Data type: float.

6.40.2.10 float NominalPower

Nominal power (W).

Used for DC and BLDC engines. Data type: float.

6.40.2.11 float NominalSpeed

Not used.

Nominal speed (rpm). Used for DC and BLDC engines. Data type: float.

6.40.2.12 float NominalTorque

Nominal torque (mN $*$ m).

Used for DC and BLDC engines. Data type: float.

6.40.2.13 float NominalVoltage

Nominal voltage on winding (B).

Data type: float

6.40.2.14 unsigned int Phases

Number of phases for BLDC motors.

6.40.2.15 unsigned int Poles

Number of pole pairs for DC or BLDC motors or number of steps per rotation for stepper motors.

6.40.2.16 float RotorInertia

Rotor inertia (g $*$ cm2).

Data type: float.

6.40.2.17 float SpeedConstant

Velocity constant, which determines the value or the amplitude of the induced voltage on the motion of DC or BLDC motors (rpm / V) or stepper motors (steps/s / V).

Data type: float.

6.40.2.18 float SpeedTorqueGradient

Speed torque gradient (rpm / mN ∗ m).

Data type: float.

6.40.2.19 float StallTorque

Torque hold position for a stepper motor or torque at a motionless rotor for other types of engines (mN ∗ m).

Data type: float.

6.40.2.20 float TorqueConstant

Torque constant that determines the proportionality constant between the maximum rotor torque and current flowing in the winding (mN ∗ m / A).

Used mainly for DC motors. Data type: float.

6.40.2.21 float WindingInductance

Inductance of windings for DC engines, inductance of each of two windings for stepper motors, or inductance of each of three windings for BLDC engines (mH).

Data type: float.

6.40.2.22 float WindingResistance

Resistance of windings for DC engines, of each of two windings for stepper motors, or of each of three windings for BLDC engines (Ohm).

Data type: float.

6.41 move_settings_calb_t Struct Reference

User units move settings.

Data Fields

- float Speed

  Target speed.
- float Accel

  Motor shaft acceleration, steps/s^2 (stepper motor) or RPM/s (DC).
- float Decel

  Motor shaft deceleration, steps/s^2 (stepper motor) or RPM/s (DC).

- float AntiplaySpeed
  Speed in antiplay mode.
- unsigned int MoveFlags
  Flags of the motion parameters.

6.41.1 Detailed Description

User units move settings.

See Also

set_move_settings_calb
get_move_settings_calb
get_move_settings, set_move_settings

6.41.2 Field Documentation

6.41.2.1 float Accel

Motor shaft acceleration, steps/s^2 (stepper motor) or RPM/s (DC).

6.41.2.2 float AntiplaySpeed

Speed in antiplay mode.

6.41.2.3 float Decel

Motor shaft deceleration, steps/s^2 (stepper motor) or RPM/s (DC).

6.41.2.4 unsigned int MoveFlags

Flags of the motion parameters.

6.41.2.5 float Speed

Target speed.

6.42 move_settings_t Struct Reference

Move settings.

Data Fields

- unsigned int Speed
  Target speed (for stepper motor: steps/s, for DC: rpm).
- unsigned int uSpeed
  Target speed in microstep fractions/s.
- unsigned int Accel

Motor shaft acceleration, steps/s^2 (stepper motor) or RPM/s (DC).

- unsigned int Decel

  Motor shaft deceleration, steps/s^2 (stepper motor) or RPM/s (DC).
- unsigned int AntiplaySpeed

  Speed in antiplay mode, full steps/s (stepper motor) or RPM (DC).
- unsigned int uAntiplaySpeed

  Speed in antiplay mode, microsteps/s.
- unsigned int MoveFlags

  Flags of the motion parameters.

6.42.1 Detailed Description

Move settings.

See Also

set_move_settings
get_move_settings
get_move_settings, set_move_settings

6.42.2 Field Documentation

6.42.2.1 unsigned int Accel

Motor shaft acceleration, steps/s^2 (stepper motor) or RPM/s (DC).

Range: 1..65535.

6.42.2.2 unsigned int AntiplaySpeed

Speed in antiplay mode, full steps/s (stepper motor) or RPM (DC).

Range: 0..100000.

6.42.2.3 unsigned int Decel

Motor shaft deceleration, steps/s^2 (stepper motor) or RPM/s (DC).

Range: 1..65535.

6.42.2.4 unsigned int MoveFlags

Flags of the motion parameters.

6.42.2.5 unsigned int Speed

Target speed (for stepper motor: steps/s, for DC: rpm).

Range: 0..100000.

6.42.2.6 unsigned int uAntiplaySpeed

Speed in antiplay mode, microsteps/s.

The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings). Used with a stepper motor only.

6.42.2.7 unsigned int uSpeed

Target speed in microstep fractions/s.

The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings). Used with a stepper motor only.

6.43 network_settings_t Struct Reference

Network settings.

Data Fields

- unsigned int DHCPEnabled
  Indicates the method to get the IP-address.
- unsigned int IPv4Address [4]
  IP-address of the device in format x.x.x.x.
- unsigned int SubnetMask [4]
  The mask of the subnet in format x.x.x.x.
- unsigned int DefaultGateway [4]
  Default value of the gateway in format x.x.x.x.

6.43.1 Detailed Description

Network settings.

Manufacturer only. This structure contains network settings.

See Also

get_network_settings
set_network_settings
get_network_settings, set_network_settings

6.43.2 Field Documentation

6.43.2.1 unsigned int DefaultGateway[4]

Default value of the gateway in format x.x.x.x.

6.43.2.2 unsigned int DHCPEnabled

Indicates the method to get the IP-address.

It can be either 0 (static) or 1 (DHCP).

6.43.2.3 unsigned int IPv4Address[4]

IP-address of the device in format x.x.x.x.

6.43.2.4 unsigned int SubnetMask[4]

The mask of the subnet in format x.x.x.x.

6.44 nonvolatile_memory_t Struct Reference

Structure contains user data to save into the FRAM.

Data Fields

- unsigned int UserData [7]
  User data.

6.44.1 Detailed Description

Structure contains user data to save into the FRAM.

See Also

get_nonvolatile_memory, set_nonvolatile_memory

6.44.2 Field Documentation

6.44.2.1 unsigned int UserData[7]

User data.

It may be set by the user. Each element of the array stores only 32 bits of user data. This is important on systems where an int type contains more than 4 bytes. For example, on all amd64 systems.

6.45 password_settings_t Struct Reference

The web-page user password.

Data Fields

- char UserPassword [21]
  Password for the web-page that the user can change with a USB command or via web-page.

6.45.1 Detailed Description

The web-page user password.

Manufacturer only. This structure contains the user password.

See Also

get_password_settings
set_password_settings
get_password_settings, set_password_settings

6.45.2 Field Documentation

6.45.2.1 char UserPassword[21]

Password for the web-page that the user can change with a USB command or via web-page.

6.46 pid_settings_t Struct Reference

PID settings.

Data Fields

- unsigned int KpU
  Proportional gain for voltage PID routine.
- unsigned int KiU
  Integral gain for voltage PID routine.
- unsigned int KdU
  Differential gain for voltage PID routine.
- float Kpf
  Proportional gain for BLDC position PID routine.
- float Kif
  Integral gain for BLDC position PID routine.
- float Kdf
  Differential gain for BLDC position PID routine.

6.46.1 Detailed Description

PID settings.

This structure contains factors for PID routine. It specifies the behavior of the voltage PID routine. These factors are slightly different for different positioners. All boards are supplied with the standard set of PID settings in the controller's flash memory. Please load new PID settings when you change positioner. Please note that wrong PID settings lead to device malfunction.

See Also

set_pid_settings
get_pid_settings
get_pid_settings, set_pid_settings

6.47 power_settings_t Struct Reference

Step motor power settings.

Data Fields

- unsigned int HoldCurrent

  Holding current, as percent of the nominal current.
- unsigned int CurrReductDelay

  Time in ms from going to STOP state to the end of current reduction.
- unsigned int PowerOffDelay

  Time in s from going to STOP state to turning power off.
- unsigned int CurrentSetTime

  Time in ms to reach the nominal current.
- unsigned int PowerFlags

  Flags of power settings of stepper motor.

6.47.1 Detailed Description

Step motor power settings.

See Also

set_move_settings
get_move_settings
get_power_settings, set_power_settings

6.47.2 Field Documentation

6.47.2.1 unsigned int CurrentSetTime

Time in ms to reach the nominal current.

6.47.2.2 unsigned int CurrReductDelay

Time in ms from going to STOP state to the end of current reduction.

6.47.2.3 unsigned int HoldCurrent

Holding current, as percent of the nominal current.

Range: 0..100.

6.47.2.4 unsigned int PowerFlags

Flags of power settings of stepper motor.

6.47.2.5 unsigned int PowerOffDelay

Time in s from going to STOP state to turning power off.

6.48 secure_settings_t Struct Reference

This structure contains raw analog data from ADC embedded on board.

Data Fields

- unsigned int LowUpwrOff
  Lower voltage limit to turn off the motor, in tens of mV.
- unsigned int CriticalIpwr
  Maximum motor current which triggers ALARM state, in mA.
- unsigned int CriticalUpwr
  Maximum motor voltage which triggers ALARM state, in tens of mV.
- unsigned int CriticalT
  Maximum temperature, which triggers ALARM state, in tenths of degrees Celsius.
- unsigned int CriticalIusb
  Maximum USB current which triggers ALARM state, in mA.
- unsigned int CriticalUusb
  Maximum USB voltage which triggers ALARM state, in tens of mV.
- unsigned int MinimumUusb
  Minimum USB voltage which triggers ALARM state, in tens of mV.
- unsigned int Flags
  Flags of secure settings.

6.48.1 Detailed Description

This structure contains raw analog data from ADC embedded on board.

These data are used for device testing and deep recalibration by the manufacturer only.

See Also

get_secure_settings
set_secure_settings
get_secure_settings, set_secure_settings

6.48.2 Field Documentation

6.48.2.1 unsigned int CriticalIpwr

Maximum motor current which triggers ALARM state, in mA.

6.48.2.2 unsigned int CriticalIusb

Maximum USB current which triggers ALARM state, in mA.

6.48.2.3 unsigned int CriticalT

Maximum temperature, which triggers ALARM state, in tenths of degrees Celsius.

6.48.2.4 unsigned int CriticalUpwr

Maximum motor voltage which triggers ALARM state, in tens of mV.

6.48.2.5 unsigned int CriticalUusb

Maximum USB voltage which triggers ALARM state, in tens of mV.

6.48.2.6 unsigned int Flags

Flags of secure settings.

6.48.2.7 unsigned int LowUpwrOff

Lower voltage limit to turn off the motor, in tens of mV.

6.48.2.8 unsigned int MinimumUusb

Minimum USB voltage which triggers ALARM state, in tens of mV.

6.49 serial_number_t Struct Reference

The structure contains a new serial number, hardware version, and valid key.

Data Fields

- unsigned int SN
  New board serial number.
- uint8_t Key [32]
  Protection key (256 bit).
- unsigned int Major
  The major number of the hardware version.
- unsigned int Minor
  The minor number of the hardware version.
- unsigned int Release
  Number of edits this release of hardware.

6.49.1 Detailed Description

The structure contains a new serial number, hardware version, and valid key.

The SN and hardware version are changed and saved when the transmitted key matches the stored key. It can be used by the manufacturer only.

See Also

set_serial_number

6.49.2 Field Documentation

6.49.2.1 uint8_t Key[32]

Protection key (256 bit).

6.49.2.2 unsigned int Major

The major number of the hardware version.

6.49.2.3 unsigned int Minor

The minor number of the hardware version.

6.49.2.4 unsigned int Release

Number of edits this release of hardware.

6.49.2.5 unsigned int SN

New board serial number.

6.50 set_position_calb_t Struct Reference

User unit position information.

Data Fields

- float Position
  The position in the engine.
- long_t EncPosition
  Encoder position.
- unsigned int PosFlags
  Position setting flags.

6.50.1 Detailed Description

User unit position information.

A useful structure that contains position value in steps and microsteps for stepper motor and encoder steps of all engines.

See Also

set_position

6.50.2 Field Documentation

6.50.2.1 long_t EncPosition

Encoder position.

6.50.2.2 unsigned int PosFlags

Position setting flags.

6.50.2.3 float Position

The position in the engine.

6.51 set_position_t Struct Reference

Position information.

Data Fields

- int Position
  The position of the whole steps in the engine.
- int uPosition
  Microstep position is only used with stepper motors.
- long_t EncPosition
  Encoder position.
- unsigned int PosFlags
  Position setting flags.

6.51.1 Detailed Description

Position information.

A useful structure that contains position value in steps and microsteps for stepper motor and encoder steps for all engines.

See Also

set_position

6.51.2 Field Documentation

6.51.2.1 long_t EncPosition

Encoder position.

6.51.2.2 unsigned int PosFlags

Position setting flags.

6.51.2.3 int uPosition

Microstep position is only used with stepper motors.

Microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings).

6.52 stage_information_t Struct Reference

Deprecated.

Data Fields

- char Manufacturer [17]
  Manufacturer.
- char PartNumber [25]
  Series and PartNumber.

6.52.1 Detailed Description

Deprecated.

Stage information. Deprecated.

See Also

set_stage_information
get_stage_information
get_stage_information, set_stage_information

6.52.2 Field Documentation

6.52.2.1 char Manufacturer[17]

Manufacturer.

Max string length: 16 chars.

6.52.2.2 char PartNumber[25]

Series and PartNumber.

Max string length: 24 chars.

6.53 stage_name_t Struct Reference

Stage username.

Data Fields

- char PositionerName [17]
  User's positioner name.

6.53.1 Detailed Description

Stage username.

See Also

get_stage_name, set_stage_name

6.53.2 Field Documentation

6.53.2.1 char PositionerName[17]

User's positioner name.

It can be set by a user. Max string length: 16 characters.

6.54 stage_settings_t Struct Reference

Deprecated.

Data Fields

- float LeadScrewPitch
  Lead screw pitch (mm).
- char Units [9]
  Units for MaxSpeed and TravelRange fields of the structure (steps, degrees, mm, ...).
- float MaxSpeed
  Maximum speed (Units/c).
- float TravelRange
  Travel range (Units).
- float SupplyVoltageMin
  Minimum supply voltage (V).
- float SupplyVoltageMax
  Maximum supply voltage (V).
- float MaxCurrentConsumption
  Maximum current consumption (A).
- float HorizontalLoadCapacity
  Horizontal load capacity (kg).
- float VerticalLoadCapacity
  Vertical load capacity (kg).

6.54.1 Detailed Description

Deprecated.

Stage settings.

See Also

set_stage_settings
get_stage_settings
get_stage_settings, set_stage_settings

6.54.2 Field Documentation

6.54.2.1 float HorizontalLoadCapacity

Horizontal load capacity (kg).

Data type: float.

6.54.2.2 float LeadScrewPitch

Lead screw pitch (mm).
Data type: float.

6.54.2.3 float MaxCurrentConsumption

Maximum current consumption (A).
Data type: float.

6.54.2.4 float MaxSpeed

Maximum speed (Units/c).
Data type: float.

6.54.2.5 float SupplyVoltageMax

Maximum supply voltage (V).
Data type: float.

6.54.2.6 float SupplyVoltageMin

Minimum supply voltage (V).
Data type: float.

6.54.2.7 float TravelRange

Travel range (Units).
Data type: float.

6.54.2.8 char Units[9]

Units for MaxSpeed and TravelRange fields of the structure (steps, degrees, mm, ...).
Max string length: 8 chars.

6.54.2.9 float VerticalLoadCapacity

Vertical load capacity (kg).
Data type: float.

6.55 status_calb_t Struct Reference

User unit device's state.

Data Fields

- unsigned int MoveSts
  Flags of move state.
- unsigned int MvCmdSts
  Move command state.
- unsigned int PWRSts
  Flags of power state of stepper motor.
- unsigned int EncSts
  Encoder state.
- unsigned int WindSts
  Winding state.
- float CurPosition
  Current position.
- long_t EncPosition
  Current encoder position.
- float CurSpeed
  Motor shaft speed.
- int Ipwr
  Engine current, mA.
- int Upwr
  Power supply voltage, tens of mV.
- int Iusb
  USB current, mA.
- int Uusb
  USB voltage, tens of mV.
- int CurT
  Temperature, tenths of degrees Celsius.
- unsigned int Flags
  Status flags.
- unsigned int GPIOFlags
  Status flags of the GPIO outputs.
- unsigned int CmdBufFreeSpace
  This field is a service field.

6.55.1 Detailed Description

User unit device's state.

A useful structure that contains current controller state, including speed, position, and boolean flags.

See Also

get_status_impl

6.55.2 Field Documentation

6.55.2.1 unsigned int CmdBufFreeSpace

This field is a service field.

It shows the number of free synchronization chain buffer cells.

6.55.2.2 float CurPosition

Current position.

Corrected by the table.

6.55.2.3 float CurSpeed

Motor shaft speed.

6.55.2.4 int CurT

Temperature, tenths of degrees Celsius.

6.55.2.5 long_t EncPosition

Current encoder position.

6.55.2.6 unsigned int EncSts

Encoder state.

6.55.2.7 unsigned int Flags

Status flags.

6.55.2.8 unsigned int GPIOFlags

Status flags of the GPIO outputs.

6.55.2.9 int Ipwr

Engine current, mA.

6.55.2.10 int Iusb

USB current, mA.

6.55.2.11 unsigned int MoveSts

Flags of move state.

6.55.2.12 unsigned int MvCmdSts

Move command state.

6.55.2.13 unsigned int PWRSts

Flags of power state of stepper motor.

6.55.2.14 int Upwr

Power supply voltage, tens of mV.

6.55.2.15 int Uusb

USB voltage, tens of mV.

6.55.2.16 unsigned int WindSts

Winding state.

6.56 status_t Struct Reference

Device state.

Data Fields

- unsigned int MoveSts
  Flags of move state.
- unsigned int MvCmdSts
  Move command state.
- unsigned int PWRSts
  Flags of power state of stepper motor.
- unsigned int EncSts
  Encoder state.
- unsigned int WindSts
  Winding state.
- int CurPosition
  Current position.
- int uCurPosition
  Step motor shaft position in microsteps.
- long_t EncPosition
  Current encoder position.
- int CurSpeed
  Motor shaft speed in steps/s or rpm.
- int uCurSpeed
  Fractional part of motor shaft speed in microsteps.
- int Ipwr
  Engine current, mA.
- int Upwr
  Power supply voltage, tens of mV.
- int Iusb
  USB current, mA.
- int Uusb
  USB voltage, tens of mV.
- int CurT
  Temperature, tenths of degrees Celsius.

- unsigned int Flags
  Status flags.
- unsigned int GPIOFlags
  Status flags of the GPIO outputs.
- unsigned int CmdBufFreeSpace
  This field is a service field.

6.56.1 Detailed Description

Device state.

A useful structure that contains current controller state, including speed, position, and boolean flags.

See Also

get_status_impl

6.56.2 Field Documentation

6.56.2.1 unsigned int CmdBufFreeSpace

This field is a service field.

It shows the number of free synchronization chain buffer cells.

6.56.2.2 int CurPosition

Current position.

6.56.2.3 int CurSpeed

Motor shaft speed in steps/s or rpm.

6.56.2.4 int CurT

Temperature, tenths of degrees Celsius.

6.56.2.5 long_t EncPosition

Current encoder position.

6.56.2.6 unsigned int EncSts

Encoder state.

6.56.2.7 unsigned int Flags

Status flags.

6.56.2.8 unsigned int GPIOFlags

Status flags of the GPIO outputs.

6.56.2.9 int Ipwr

Engine current, mA.

6.56.2.10 int Iusb

USB current, mA.

6.56.2.11 unsigned int MoveSts

Flags of move state.

6.56.2.12 unsigned int MvCmdSts

Move command state.

6.56.2.13 unsigned int PWRSts

Flags of power state of stepper motor.

6.56.2.14 int uCurPosition

Step motor shaft position in microsteps.

The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings). Used with stepper motors only.

6.56.2.15 int uCurSpeed

Fractional part of motor shaft speed in microsteps.

The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings). Used with stepper motors only.

6.56.2.16 int Upwr

Power supply voltage, tens of mV.

6.56.2.17 int Uusb

USB voltage, tens of mV.

6.56.2.18 unsigned int WindSts

Winding state.

6.57 sync_in_settings_calb_t Struct Reference

User unit synchronization settings.

Data Fields

- unsigned int SyncInFlags
  Flags for synchronization input setup.
- unsigned int ClutterTime
  Input synchronization pulse dead time (us).
- float Position
  Desired position or shift.
- float Speed
  Target speed.

6.57.1 Detailed Description

User unit synchronization settings.

This structure contains all synchronization settings, modes, periods and flags. It specifies behavior of input synchronization. All boards are supplied with the standard set of these settings.

See Also

get_sync_in_settings_calb
set_sync_in_settings_calb
get_sync_in_settings, set_sync_in_settings

6.57.2 Field Documentation

6.57.2.1 unsigned int ClutterTime

Input synchronization pulse dead time (us).

6.57.2.2 float Position

Desired position or shift.

6.57.2.3 float Speed

Target speed.

6.57.2.4 unsigned int SyncInFlags

Flags for synchronization input setup.

6.58 sync_in_settings_t Struct Reference

Synchronization settings.

Data Fields

- unsigned int SyncInFlags
  Flags for synchronization input setup.
- unsigned int ClutterTime
  Input synchronization pulse dead time (us).
- int Position
  Desired position or shift (full steps)
- int uPosition
  The fractional part of a position or shift in microsteps.
- unsigned int Speed
  Target speed (for stepper motor: steps/s, for DC: rpm).
- unsigned int uSpeed
  Target speed in microsteps/s.

6.58.1 Detailed Description

Synchronization settings.

This structure contains all synchronization settings, modes, periods and flags. It specifies the behavior of the input synchronization. All boards are supplied with the standard set of these settings.

See Also

get_sync_in_settings
set_sync_in_settings
get_sync_in_settings, set_sync_in_settings

6.58.2 Field Documentation

6.58.2.1 unsigned int ClutterTime

Input synchronization pulse dead time (us).

6.58.2.2 unsigned int Speed

Target speed (for stepper motor: steps/s, for DC: rpm).

Range: 0..100000.

6.58.2.3 unsigned int SyncInFlags

Flags for synchronization input setup.

6.58.2.4 int uPosition

The fractional part of a position or shift in microsteps.

It is used with a stepper motor. The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings).

6.58.2.5 unsigned int uSpeed

Target speed in microsteps/s.

Microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings). Used a stepper motor only.

6.59 sync_out_settings_calb_t Struct Reference

Synchronization settings which use user units.

Data Fields

- unsigned int SyncOutFlags

  Flags of synchronization output.
- unsigned int SyncOutPulseSteps

  This value specifies the duration of output pulse.
- unsigned int SyncOutPeriod

  This value specifies the number of encoder pulses or steps between two output synchronization pulses when SYNCOUT_ONPERIOD is set.
- float Accuracy

  This is the neighborhood around the target coordinates, every point in which is treated as the target position.

6.59.1 Detailed Description

Synchronization settings which use user units.

This structure contains all synchronization settings, modes, periods and flags. It specifies the behavior of the output synchronization. All boards are supplied with the standard set of these settings.

See Also

get_sync_out_settings_calb
set_sync_out_settings_calb
get_sync_out_settings, set_sync_out_settings

6.59.2 Field Documentation

6.59.2.1 float Accuracy

This is the neighborhood around the target coordinates, every point in which is treated as the target position.

Getting in these points cause the stop impulse.

6.59.2.2 unsigned int SyncOutFlags

Flags of synchronization output.

6.59.2.3 unsigned int SyncOutPeriod

This value specifies the number of encoder pulses or steps between two output synchronization pulses when SYNCOUT_ONPERIOD is set.

6.59.2.4 unsigned int SyncOutPulseSteps

This value specifies the duration of output pulse.

It is measured microseconds when SYNCOUT_IN_STEPS flag is cleared or in encoder pulses or motor steps when SYNCOUT_IN_STEPS is set.

6.60 sync_out_settings_t Struct Reference

Synchronization settings.

Data Fields

- unsigned int SyncOutFlags

  Flags of synchronization output.
- unsigned int SyncOutPulseSteps

  This value specifies the duration of output pulse.
- unsigned int SyncOutPeriod

  This value specifies the number of encoder pulses or steps between two output synchronization pulses when SYNCOUT_ONPERIOD is set.
- unsigned int Accuracy

  This is the neighborhood around the target coordinates, every point in which is treated as the target position.
- unsigned int uAccuracy

  This is the neighborhood around the target coordinates in microsteps (used with a stepper motor only).

6.60.1 Detailed Description

Synchronization settings.

This structure contains all synchronization settings, modes, periods and flags. It specifies the behavior of the output synchronization. All boards are supplied with the standard set of these settings.

See Also

get_sync_out_settings
set_sync_out_settings
get_sync_out_settings, set_sync_out_settings

6.60.2 Field Documentation

6.60.2.1 unsigned int Accuracy

This is the neighborhood around the target coordinates, every point in which is treated as the target position.

Getting in these points cause the stop impulse.

6.60.2.2 unsigned int SyncOutFlags

Flags of synchronization output.

6.60.2.3 unsigned int SyncOutPeriod

This value specifies the number of encoder pulses or steps between two output synchronization pulses when SYNCOUT_ONPERIOD is set.

6.60.2.4 unsigned int SyncOutPulseSteps

This value specifies the duration of output pulse.

It is measured microseconds when SYNCOUT_IN_STEPS flag is cleared or in encoder pulses or motor steps when SYNCOUT_IN_STEPS is set.

6.60.2.5 unsigned int uAccuracy

This is the neighborhood around the target coordinates in microsteps (used with a stepper motor only).

The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings).

6.61 uart_settings_t Struct Reference

UART settings.

Data Fields

- unsigned int Speed
  UART baudrate (in bauds)
- unsigned int UARTSetupFlags
  UART parity flags.

6.61.1 Detailed Description

UART settings.

This structure contains UART settings.

See Also

get_uart_settings
set_uart_settings
get_uart_settings, set_uart_settings

6.61.2 Field Documentation

6.61.2.1 unsigned int UARTSetupFlags

UART parity flags.

Chapter 7

File Documentation

7.1 ximc.h File Reference

Header file for libximc library.

Data Structures

- struct calibration_t
  Calibration structure.
- struct device_network_information_t
  Device network information structure.
- struct feedback_settings_t
  Feedback settings.
- struct home_settings_t
  Position calibration settings.
- struct home_settings_calb_t
  Position calibration settings which use user units.
- struct move_settings_t
  Move settings.
- struct move_settings_calb_t
  User units move settings.
- struct engine_settings_t
  Movement limitations and settings related to the motor.
- struct engine_settings_calb_t
  Movement limitations and settings, related to the motor.
- struct entype_settings_t
  Engine type and driver type settings.
- struct power_settings_t
  Step motor power settings.
- struct secure_settings_t
  This structure contains raw analog data from ADC embedded on board.
- struct edges_settings_t
  Edges settings.
- struct edges_settings_calb_t
  User unit edges settings.
- struct pid_settings_t

PID settings.

- struct sync_in_settings_t

  Synchronization settings.
- struct sync_in_settings_calb_t

  User unit synchronization settings.
- struct sync_out_settings_t

  Synchronization settings.
- struct sync_out_settings_calb_t

  Synchronization settings which use user units.
- struct extio_settings_t

  EXTIO settings.
- struct brake_settings_t

  Brake settings.
- struct control_settings_t

  Control settings.
- struct control_settings_calb_t

  User unit control settings.
- struct joystick_settings_t

  Joystick settings.
- struct ctp_settings_t

  Control position settings (used with stepper motor only)
- struct uart_settings_t

  UART settings.
- struct network_settings_t

  Network settings.
- struct password_settings_t

  The web-page user password.
- struct calibration_settings_t

  Calibration settings.
- struct controller_name_t

  Controller name and settings flags.
- struct nonvolatile_memory_t

  Structure contains user data to save into the FRAM.
- struct emf_settings_t

  EMF settings.
- struct engine_advansed_setup_t

  EAS settings.
- struct extended_settings_t

  EST settings This data is stored in the controller's flash memory.
- struct get_position_t

  Position information.
- struct get_position_calb_t

  Position information.
- struct set_position_t

  Position information.
- struct set_position_calb_t

  User unit position information.
- struct status_t

  Device state.

- struct status_calb_t
  User unit device's state.
- struct measurements_t
  The buffer holds no more than 25 points.
- struct chart_data_t
  Additional device state.
- struct device_information_t
  Controller information structure.
- struct serial_number_t
  The structure contains a new serial number, hardware version, and valid key.
- struct analog_data_t
  Analog data.
- struct debug_read_t
  Debug data.
- struct debug_write_t
  Debug data.
- struct stage_name_t
  Stage username.
- struct stage_information_t
  Deprecated.
- struct stage_settings_t
  Deprecated.
- struct motor_information_t
  Deprecated.
- struct motor_settings_t
  Deprecated.
- struct encoder_information_t
  Deprecated.
- struct encoder_settings_t
  Deprecated.
- struct hallsensor_information_t
  Deprecated.
- struct hallsensor_settings_t
  Deprecated.
- struct gear_information_t
  Deprecated.
- struct gear_settings_t
  Deprecated.
- struct accessories_settings_t
  Deprecated.
- struct init_random_t
  Random key.
- struct globally_unique_identifier_t
  Globally unique identifier.

Macros

- #define XIMC_API
  Library import macro.
- #define XIMC_CALLCONV
  Library calling convention macros.
- #define XIMC_RETTYPE void*
  Thread return type.
- #define device_undefined -1
  Handle specified undefined device.

Result statuses

- #define result_ok 0
  success
- #define result_error -1
  generic error
- #define result_not_implemented -2
  function is not implemented
- #define result_value_error -3
  value error
- #define result_nodevice -4
  device is lost

Logging level

- #define LOGLEVEL_ERROR 0x01
  Logging level - error.
- #define LOGLEVEL_WARNING 0x02
  Logging level - warning.
- #define LOGLEVEL_INFO 0x03
  Logging level - info.
- #define LOGLEVEL_DEBUG 0x04
  Logging level - debug.

Enumerate devices flags

This is a bit mask for bitwise operations.

- #define ENUMERATE_PROBE 0x01
  Check if a device with an OS name is a XIMC device.
- #define ENUMERATE_ALL_COM 0x02
  Check all COM devices.
- #define ENUMERATE_NETWORK 0x04
  Check network devices.

Flags of move state

This is a bit mask for bitwise operations. Specify move states.

See Also

get_status
status_t::MoveSts, *get_status_impl*

- #define MOVE_STATE_MOVING 0x01
  This flag indicates that the controller is trying to move the motor.
- #define MOVE_STATE_TARGET_SPEED 0x02
  Target speed is reached, if flag set.
- #define MOVE_STATE_ANTIPLAY 0x04
  Motor is playing compensation, if flag set.

Flags of internal controller settings

This is a bit mask for bitwise operations.

See Also

set_controller_name
get_controller_name
controller_name_t::CtrlFlags, *get_controller_name*, *set_controller_name*

- #define EEPROM_PRECEDENCE 0x01
  If the flag is set, settings from external EEPROM override controller settings.

Flags of power state of stepper motor

This is a bit mask for bitwise operations. Specify power states.

See Also

get_status
status_t::PWRSts, *get_status_impl*

- #define PWR_STATE_UNKNOWN 0x00
  Unknown state, should never happen.
- #define PWR_STATE_OFF 0x01
  Motor windings are disconnected from the driver.
- #define PWR_STATE_NORM 0x03
  Motor windings are powered by nominal current.
- #define PWR_STATE_REDUCT 0x04
  Motor windings are powered by reduced current to lower power consumption.
- #define PWR_STATE_MAX 0x05
  Motor windings are powered by the maximum current driver can provide at this voltage.

Status flags

This is a bit mask for bitwise operations. Controller flags returned by device query. Contains boolean part of controller state. May be combined with bitwise OR.

See Also

get_status
status_t::Flags, *get_status_impl*

- #define STATE_CONTR 0x000003F
  Flags of controller states.
- #define STATE_ERRC 0x0000001
  Command error encountered.
- #define STATE_ERRD 0x0000002
  Data integrity error encountered.
- #define STATE_ERRV 0x0000004

Value error encountered.

- #define STATE_EEPROM_CONNECTED 0x0000010
  EEPROM with settings is connected.
- #define STATE_IS_HOMED 0x0000020
  Calibration performed.
- #define STATE_SECUR 0x1B3FFC0
  Security flags.
- #define STATE_ALARM 0x0000040
  The controller is in an alarm state, indicating that something dangerous has happened.
- #define STATE_CTP_ERROR 0x0000080
  Control position error (is only used with stepper motor).
- #define STATE_POWER_OVERHEAT 0x0000100
  Power driver overheat.
- #define STATE_CONTROLLER_OVERHEAT 0x0000200
  Controller overheat.
- #define STATE_OVERLOAD_POWER_VOLTAGE 0x0000400
  Power voltage exceeds safe limit.
- #define STATE_OVERLOAD_POWER_CURRENT 0x0000800
  Power current exceeds safe limit.
- #define STATE_OVERLOAD_USB_VOLTAGE 0x0001000
  USB voltage exceeds safe limit.
- #define STATE_LOW_USB_VOLTAGE 0x0002000
  USB voltage is insufficient for normal operation.
- #define STATE_OVERLOAD_USB_CURRENT 0x0004000
  USB current exceeds safe limit.
- #define STATE_BORDERS_SWAP_MISSET 0x0008000
  Engine stuck at the wrong edge.
- #define STATE_LOW_POWER_VOLTAGE 0x0010000
  Power voltage is lower than Low Voltage Protection limit.
- #define STATE_H_BRIDGE_FAULT 0x0020000
  Signal from the driver that fault happened.
- #define STATE_WINDING_RES_MISMATCH 0x0100000
  The difference between winding resistances is too large.
- #define STATE_ENCODER_FAULT 0x0200000
  Signal from the encoder that fault happened.
- #define STATE_ENGINE_RESPONSE_ERROR 0x0800000
  Error response of the engine control action.
- #define STATE_EXTIO_ALARM 0x1000000
  The error is caused by the external EXTIO input signal.

Status flags of the GPIO outputs

This is a bit mask for bitwise operations. GPIO state flags returned by device query. Contains boolean part of controller state. May be combined with bitwise OR.

See Also

get_status
status_t::GPIOFlags, *get_status_impl*

- #define STATE_DIG_SIGNAL 0xFFFF
  Flags of digital signals.
- #define STATE_RIGHT_EDGE 0x0001
  Engine stuck at the right edge.
- #define STATE_LEFT_EDGE 0x0002
  Engine stuck at the left edge.
- #define STATE_BUTTON_RIGHT 0x0004
  Button "right" state (1 if pressed).

- #define STATE_BUTTON_LEFT 0x0008
  Button "left" state (1 if pressed).
- #define STATE_GPIO_PINOUT 0x0010
  External GPIO works as out if the flag is set; otherwise, it works as in.
- #define STATE_GPIO_LEVEL 0x0020
  State of external GPIO pin.
- #define STATE_BRAKE 0x0200
  State of Brake pin.
- #define STATE_REV_SENSOR 0x0400
  State of Revolution sensor pin.
- #define STATE_SYNC_INPUT 0x0800
  State of Sync input pin.
- #define STATE_SYNC_OUTPUT 0x1000
  State of Sync output pin.
- #define STATE_ENC_A 0x2000
  State of encoder A pin.
- #define STATE_ENC_B 0x4000
  State of encoder B pin.

Encoder state

This is a bit mask for bitwise operations. Encoder state returned by device query.

See Also

get_status
status_t::EncSts, *get_status_impl*

- #define ENC_STATE_ABSENT 0x00
  Encoder is absent.
- #define ENC_STATE_UNKNOWN 0x01
  Encoder state is unknown.
- #define ENC_STATE_MALFUNC 0x02
  Encoder is connected and malfunctioning.
- #define ENC_STATE_REVERS 0x03
  Encoder is connected and operational but counts in other direction.
- #define ENC_STATE_OK 0x04
  Encoder is connected and working properly.

Winding state

This is a bit mask for bitwise operations. Motor winding state returned by device query.

See Also

get_status
status_t::WindSts, *get_status_impl*

- #define WIND_A_STATE_ABSENT 0x00
  Winding A is disconnected.
- #define WIND_A_STATE_UNKNOWN 0x01
  Winding A state is unknown.
- #define WIND_A_STATE_MALFUNC 0x02
  Winding A is short-circuited.
- #define WIND_A_STATE_OK 0x03
  Winding A is connected and working properly.
- #define WIND_B_STATE_ABSENT 0x00
  Winding B is disconnected.
- #define WIND_B_STATE_UNKNOWN 0x10
  Winding B state is unknown.

- #define WIND_B_STATE_MALFUNC 0x20
  Winding B is short-circuited.
- #define WIND_B_STATE_OK 0x30
  Winding B is connected and working properly.

Move command state

This is a bit mask for bitwise operations. Move command (command_move, command_movr, command_left, command_right, command_stop, command_home, command_loft, command_sstp) and its state (run, finished, error).

See Also

get_status
status_t::MvCmdSts, *get_status_impl*

- #define MVCMD_NAME_BITS 0x3F
  Move command bit mask.
- #define MVCMD_UKNWN 0x00
  Unknown command.
- #define MVCMD_MOVE 0x01
  Command move.
- #define MVCMD_MOVR 0x02
  Command movr.
- #define MVCMD_LEFT 0x03
  Command left.
- #define MVCMD_RIGHT 0x04
  Command rigt.
- #define MVCMD_STOP 0x05
  Command stop.
- #define MVCMD_HOME 0x06
  Command home.
- #define MVCMD_LOFT 0x07
  Command loft.
- #define MVCMD_SSTP 0x08
  Command soft stop.
- #define MVCMD_ERROR 0x40
  Finish state (1 - move command has finished with an error, 0 - move command has finished correctly).
- #define MVCMD_RUNNING 0x80
  Move command state (0 - move command has finished, 1 - move command is being executed).

Flags of the motion parameters

This is a bit mask for bitwise operations. Specify the motor shaft movement algorithm and list of limitations. Flags returned by the query of get_move_settings.

See Also

set_move_settings
get_move_settings
move_settings_t::MoveFlags, *get_move_settings*, *set_move_settings*

- #define RPM_DIV_1000 0x01
  This flag indicates that the operating speed specified in the command is set in milliRPM.

Flags of engine settings

This is a bit mask for bitwise operations. Specify the motor shaft movement algorithm and list of limitations. Flags returned by query of engine settings. May be combined with bitwise OR.

See Also

set_engine_settings
get_engine_settings
engine_settings_t::EngineFlags, *get_engine_settings*, *set_engine_settings*

- #define ENGINE_REVERSE 0x01
  Reverse flag.
- #define ENGINE_CURRENT_AS_RMS 0x02
  Engine current meaning flag.
- #define ENGINE_MAX_SPEED 0x04
  Max speed flag.
- #define ENGINE_ANTIPLAY 0x08
  Play compensation flag.
- #define ENGINE_ACCEL_ON 0x10
  Acceleration enable flag.
- #define ENGINE_LIMIT_VOLT 0x20
  Maximum motor voltage limit enable flag (is only used with DC motor).
- #define ENGINE_LIMIT_CURR 0x40
  Maximum motor current limit enable flag (is only used with DC motor).
- #define ENGINE_LIMIT_RPM 0x80
  Maximum motor speed limit enable flag.

Flags of microstep mode

This is a bit mask for bitwise operations. Specify settings for microstep mode. Used with step motors. Flags returned by query of engine settings. May be combined with bitwise OR

See Also

engine_settings_t::flags
set_engine_settings
get_engine_settings
engine_settings_t::MicrostepMode, *get_engine_settings*, *set_engine_settings*

- #define MICROSTEP_MODE_FULL 0x01
  Full step mode.
- #define MICROSTEP_MODE_FRAC_2 0x02
  1/2-step mode.
- #define MICROSTEP_MODE_FRAC_4 0x03
  1/4-step mode.
- #define MICROSTEP_MODE_FRAC_8 0x04
  1/8-step mode.
- #define MICROSTEP_MODE_FRAC_16 0x05
  1/16-step mode.
- #define MICROSTEP_MODE_FRAC_32 0x06
  1/32-step mode.
- #define MICROSTEP_MODE_FRAC_64 0x07
  1/64-step mode.
- #define MICROSTEP_MODE_FRAC_128 0x08
  1/128-step mode.
- #define MICROSTEP_MODE_FRAC_256 0x09
  1/256-step mode.

Flags of engine type

This is a bit mask for bitwise operations. Specify motor type. Flags returned by query of engine settings.

See Also

engine_settings_t::flags
set_entype_settings
get_entype_settings
entype_settings_t::EngineType, *get_entype_settings*, *set_entype_settings*

- #define ENGINE_TYPE_NONE 0x00
  A value that shouldn't be used.
- #define ENGINE_TYPE_DC 0x01
  DC motor.
- #define ENGINE_TYPE_2DC 0x02
  2 DC motors.
- #define ENGINE_TYPE_STEP 0x03
  Step motor.
- #define ENGINE_TYPE_TEST 0x04
  Duty cycle are fixed.
- #define ENGINE_TYPE_BRUSHLESS 0x05
  Brushless motor.

Flags of driver type

This is a bit mask for bitwise operations. Specify driver type. Flags returned by query of engine settings.

See Also

engine_settings_t::flags
set_entype_settings
get_entype_settings
entype_settings_t::DriverType, *get_entype_settings*, *set_entype_settings*

- #define DRIVER_TYPE_DISCRETE_FET 0x01
  Driver with discrete FET keys.
- #define DRIVER_TYPE_INTEGRATE 0x02
  Driver with integrated IC.
- #define DRIVER_TYPE_EXTERNAL 0x03
  External driver.

Flags of power settings of stepper motor

This is a bit mask for bitwise operations. Flags returned by query of engine settings. Specify power settings. Flags returned by query of power settings.

See Also

get_power_settings
set_power_settings
power_settings_t::PowerFlags, *get_power_settings*, *set_power_settings*

- #define POWER_REDUCT_ENABLED 0x01
  Current reduction is enabled after CurrReductDelay if this flag is set.
- #define POWER_OFF_ENABLED 0x02
  Power off is enabled after PowerOffDelay if this flag is set.
- #define POWER_SMOOTH_CURRENT 0x04
  Current ramp-up/down are performed smoothly during current_set_time if this flag is set.

Flags of secure settings

This is a bit mask for bitwise operations. Flags returned by query of engine settings. Specify secure settings. Flags returned by query of secure settings.

See Also

get_secure_settings
set_secure_settings
secure_settings_t::Flags, *get_secure_settings*, *set_secure_settings*

- #define ALARM_ON_DRIVER_OVERHEATING 0x01
  If this flag is set, enter the alarm state on the driver overheat signal.
- #define LOW_UPWR_PROTECTION 0x02
  If this flag is set, turn off the motor when the voltage is lower than LowUpwrOff.
- #define H_BRIDGE_ALERT 0x04
  If this flag is set then turn off the power unit with a signal problem in one of the transistor bridge.
- #define ALARM_ON_BORDERS_SWAP_MISSET 0x08
  If this flag is set, enter Alarm state on borders swap misset.
- #define ALARM_FLAGS_STICKING 0x10
  If this flag is set, only a STOP command can turn all alarms to 0.
- #define USB_BREAK_RECONNECT 0x20
  If this flag is set, the USB brake reconnect module will be enabled.
- #define ALARM_WINDING_MISMATCH 0x40
  If this flag is set, enter Alarm state when windings mismatch.
- #define ALARM_ENGINE_RESPONSE 0x80
  If this flag is set, enter the Alarm state on response of the engine control action.

Position setting flags

This is a bit mask for bitwise operations. Flags used in setting position.

See Also

get_position
set_position
set_position_t::PosFlags, *set_position*

- #define SETPOS_IGNORE_POSITION 0x01
  Will not reload position in steps/microsteps if this flag is set.
- #define SETPOS_IGNORE_ENCODER 0x02
  Will not reload encoder state if this flag is set.

Feedback type.

This is a bit mask for bitwise operations.

See Also

set_feedback_settings
get_feedback_settings
feedback_settings_t::FeedbackType, *get_feedback_settings*, *set_feedback_settings*

- #define FEEDBACK_ENCODER 0x01
  Feedback by encoder.
- #define FEEDBACK_EMF 0x04
  Feedback by EMF.
- #define FEEDBACK_NONE 0x05
  Feedback is absent.
- #define FEEDBACK_ENCODER_MEDIATED 0x06
  Feedback by encoder mediated by mechanical transmission (for example leadscrew).

Describes feedback flags.

This is a bit mask for bitwise operations.

See Also

set_feedback_settings
get_feedback_settings
feedback_settings_t::FeedbackFlags, *get_feedback_settings*, *set_feedback_settings*

- #define FEEDBACK_ENC_REVERSE 0x01
  Reverse count of encoder.
- #define FEEDBACK_ENC_TYPE_BITS 0xC0
  Bits of the encoder type.
- #define FEEDBACK_ENC_TYPE_AUTO 0x00
  Auto detect encoder type.
- #define FEEDBACK_ENC_TYPE_SINGLE_ENDED 0x40
  Single-ended encoder.
- #define FEEDBACK_ENC_TYPE_DIFFERENTIAL 0x80
  Differential encoder.

Flags for synchronization input setup

This is a bit mask for bitwise operations.

See Also

sync_in_settings_t::SyncInFlags, *get_sync_in_settings*, *set_sync_in_settings*

- #define SYNCIN_ENABLED 0x01
  Synchronization in mode is enabled if this flag is set.
- #define SYNCIN_INVERT 0x02
  Trigger on falling edge if flag is set, on rising edge otherwise.
- #define SYNCIN_GOTOPOSITION 0x04
  The engine is going to the position specified in Position and uPosition if this flag is set.

Flags of synchronization output

This is a bit mask for bitwise operations.

See Also

sync_out_settings_t::SyncOutFlags, *get_sync_out_settings*, *set_sync_out_settings*

- #define SYNCOUT_ENABLED 0x01
  The synchronization out pin follows the synchronization logic if the flag is set.
- #define SYNCOUT_STATE 0x02
  When the output state is fixed by the negative SYNCOUT_ENABLED flag, the pin state is in accordance with this flag state.
- #define SYNCOUT_INVERT 0x04
  The low level is active if the flag is set.
- #define SYNCOUT_IN_STEPS 0x08
  Use motor steps or encoder pulses instead of milliseconds for output pulse generation if the flag is set.
- #define SYNCOUT_ONSTART 0x10
  Generate a synchronization pulse when movement starts.
- #define SYNCOUT_ONSTOP 0x20
  Generate a synchronization pulse when movement stops.
- #define SYNCOUT_ONPERIOD 0x40
  Generate a synchronization pulse every SyncOutPeriod encoder pulses.

External IO setup flags

This is a bit mask for bitwise operations.

See Also

get_extio_settings
set_extio_settings
extio_settings_t::EXTIOSetupFlags, *get_extio_settings*, *set_extio_settings*

- #define EXTIO_SETUP_OUTPUT 0x01
  EXTIO works as output if the flag is set, works as input otherwise.
- #define EXTIO_SETUP_INVERT 0x02
  Interpret EXTIO state inverted if the flag is set.

External IO mode flags

This is a bit mask for bitwise operations.

See Also

extio_settings_t::extio_mode_flags
get_extio_settings
set_extio_settings
extio_settings_t::EXTIOModeFlags, *get_extio_settings*, *set_extio_settings*

- #define EXTIO_SETUP_MODE_IN_BITS 0x0F
  Bits of the behavior selector when the signal on input goes to the active state.
- #define EXTIO_SETUP_MODE_IN_NOP 0x00
  Do nothing.
- #define EXTIO_SETUP_MODE_IN_STOP 0x01
  Issue STOP command, ceasing the engine movement.
- #define EXTIO_SETUP_MODE_IN_PWOF 0x02
  Issue PWOF command, powering off all engine windings.
- #define EXTIO_SETUP_MODE_IN_MOVR 0x03
  Issue MOVR command with last used settings.
- #define EXTIO_SETUP_MODE_IN_HOME 0x04
  Issue HOME command.
- #define EXTIO_SETUP_MODE_IN_ALARM 0x05
  Set Alarm when the signal goes to the active state.
- #define EXTIO_SETUP_MODE_OUT_BITS 0xF0
  Bits of the output behavior selection.
- #define EXTIO_SETUP_MODE_OUT_OFF 0x00
  EXTIO pin always set in inactive state.
- #define EXTIO_SETUP_MODE_OUT_ON 0x10
  EXTIO pin always set in active state.
- #define EXTIO_SETUP_MODE_OUT_MOVING 0x20
  EXTIO pin stays active during moving state.
- #define EXTIO_SETUP_MODE_OUT_ALARM 0x30
  EXTIO pin stays active during the alarm state.
- #define EXTIO_SETUP_MODE_OUT_MOTOR_ON 0x40
  EXTIO pin stays active when windings are powered.

Border flags

This is a bit mask for bitwise operations. Specify types of borders and motor behavior on borders. May be combined with bitwise OR.

See Also

get_edges_settings
set_edges_settings
edges_settings_t::BorderFlags, *get_edges_settings*, *set_edges_settings*

- #define BORDER_IS_ENCODER 0x01
  Borders are fixed by predetermined encoder values, if set; borders are placed on limit switches, if not set.
- #define BORDER_STOP_LEFT 0x02
  The motor should stop on the left border.
- #define BORDER_STOP_RIGHT 0x04
  Motor should stop on right border.
- #define BORDERS_SWAP_MISSET_DETECTION 0x08
  Motor should stop on both borders.

Limit switches flags

This is a bit mask for bitwise operations. Specify electrical behavior of limit switches like order and pulled positions. May be combined with bitwise OR.

See Also

get_edges_settings
set_edges_settings
edges_settings_t::EnderFlags, *get_edges_settings*, *set_edges_settings*

- #define ENDER_SWAP 0x01
  First limit switch on the right side, if set; otherwise on the left side.
- #define ENDER_SW1_ACTIVE_LOW 0x02
  1 - Limit switch connected to pin SW1 is triggered by a low level on pin.
- #define ENDER_SW2_ACTIVE_LOW 0x04
  1 - Limit switch connected to pin SW2 is triggered by a low level on pin.

Brake settings flags

This is a bit mask for bitwise operations. Specify behavior of brake. May be combined with bitwise OR.

See Also

get_brake_settings
set_brake_settings
brake_settings_t::BrakeFlags, *get_brake_settings*, *set_brake_settings*

- #define BRAKE_ENABLED 0x01
  Brake control is enabled if this flag is set.
- #define BRAKE_ENG_PWROFF 0x02
  Brake turns the stepper motor power off if this flag is set.

Control flags

This is a bit mask for bitwise operations. Specify motor control settings by joystick or buttons. May be combined with bitwise OR.

See Also

get_control_settings
set_control_settings
control_settings_t::Flags, *get_control_settings*, *set_control_settings*

- #define CONTROL_MODE_BITS 0x03
  Bits to control the engine by joystick or buttons.

- #define CONTROL_MODE_OFF 0x00
  Control is disabled.
- #define CONTROL_MODE_JOY 0x01
  Control by joystick.
- #define CONTROL_MODE_LR 0x02
  Control by left/right buttons.
- #define CONTROL_BTN_LEFT_PUSHED_OPEN 0x04
  Pushed left button corresponds to the open contact if this flag is set.
- #define CONTROL_BTN_RIGHT_PUSHED_OPEN 0x08
  Pushed right button corresponds to open contact if this flag is set.

Joystick flags

This is a bit mask for bitwise operations. Control joystick states.

See Also

set_joystick_settings
get_joystick_settings
joystick_settings_t::JoyFlags, *get_joystick_settings*, *set_joystick_settings*

- #define JOY_REVERSE 0x01
  Joystick action is reversed.

Position control flags

This is a bit mask for bitwise operations. Specify control position settings. May be combined with bitwise OR.

See Also

get_ctp_settings
set_ctp_settings
ctp_settings_t::CTPFlags, *get_ctp_settings*, *set_ctp_settings*

- #define CTP_ENABLED 0x01
  The position control is enabled if the flag is set.
- #define CTP_BASE 0x02
  The position control is based on the revolution sensor if this flag is set; otherwise, it is based on the encoder.
- #define CTP_ALARM_ON_ERROR 0x04
  Set ALARM on mismatch if the flag is set.
- #define REV_SENS_INV 0x08
  Typically, the sensor is active when it is at 0, and inversion makes active at 1.
- #define CTP_ERROR_CORRECTION 0x10
  Correct errors that appear when slippage occurs if the flag is set.

Home settings flags

This is a bit mask for bitwise operations. Specify home command behavior. May be combined with bitwise OR.

See Also

get_home_settings
set_home_settings
command_home
home_settings_t::HomeFlags, *get_home_settings*, *set_home_settings*

- #define HOME_DIR_FIRST 0x001
  The flag defines the direction of the 1st motion after execution of the home command.
- #define HOME_DIR_SECOND 0x002

The flag defines the direction of the 2nd motion.

- #define HOME_MV_SEC_EN 0x004
  Use the second phase of calibration to the home position, if set; otherwise the second phase is skipped.
- #define HOME_HALF_MV 0x008
  If the flag is set, the stop signals are ignored during the first half-turn of the second movement.
- #define HOME_STOP_FIRST_BITS 0x030
  Bits of the first stop selector.
- #define HOME_STOP_FIRST_REV 0x010
  First motion stops by revolution sensor.
- #define HOME_STOP_FIRST_SYN 0x020
  First motion stops by synchronization input.
- #define HOME_STOP_FIRST_LIM 0x030
  First motion stops by limit switch.
- #define HOME_STOP_SECOND_BITS 0x0C0
  Bits of the second stop selector.
- #define HOME_STOP_SECOND_REV 0x040
  Second motion stops by revolution sensor.
- #define HOME_STOP_SECOND_SYN 0x080
  Second motion stops by synchronization input.
- #define HOME_STOP_SECOND_LIM 0x0C0
  Second motion stops by limit switch.
- #define HOME_USE_FAST 0x100
  Use the fast algorithm of calibration to the home position, if set; otherwise the traditional algorithm.

UART parity flags

This is a bit mask for bitwise operations.

See Also

uart_settings_t::UARTSetupFlags, *get_uart_settings*, *set_uart_settings*

- #define UART_PARITY_BITS 0x03
  Bits of the parity.
- #define UART_PARITY_BIT_EVEN 0x00
  Parity bit 1, if even.
- #define UART_PARITY_BIT_ODD 0x01
  Parity bit 1, if odd.
- #define UART_PARITY_BIT_SPACE 0x02
  Parity bit always 0.
- #define UART_PARITY_BIT_MARK 0x03
  Parity bit always 1.
- #define UART_PARITY_BIT_USE 0x04
  None parity.
- #define UART_STOP_BIT 0x08
  If set - one stop bit, else two stop bit.

Motor Type flags

This is a bit mask for bitwise operations.

See Also

motor_settings_t::MotorType, *get_motor_settings*, *set_motor_settings*

- #define MOTOR_TYPE_UNKNOWN 0x00
  Unknown type of engine.
- #define MOTOR_TYPE_STEP 0x01
  Step engine.

- #define MOTOR_TYPE_DC 0x02
  DC engine.
- #define MOTOR_TYPE_BLDC 0x03
  BLDC engine.

Encoder settings flags

This is a bit mask for bitwise operations.

See Also

encoder_settings_t::EncoderSettings, *get_encoder_settings*, *set_encoder_settings*

- #define ENCSET_DIFFERENTIAL_OUTPUT 0x001
  If the flag is set, the encoder has differential output, otherwise single-ended output.
- #define ENCSET_PUSHPULL_OUTPUT 0x004
  If the flag is set the encoder has push-pull output, otherwise open drain output.
- #define ENCSET_INDEXCHANNEL_PRESENT 0x010
  If the flag is set, the encoder has an extra indexed channel.
- #define ENCSET_REVOLUTIONSENSOR_PRESENT 0x040
  If the flag is set, the encoder has the revolution sensor.
- #define ENCSET_REVOLUTIONSENSOR_ACTIVE_HIGH 0x100
  If the flag is set, the revolution sensor's active state is high logic state; otherwise, the active state is low logic state.

Magnetic brake settings flags

This is a bit mask for bitwise operations.

See Also

accessories_settings_t::MBSettings, *get_accessories_settings*, *set_accessories_settings*

- #define MB_AVAILABLE 0x01
  If the flag is set, the magnetic brake is available.
- #define MB_POWERED_HOLD 0x02
  If this flag is set, the magnetic brake is on when powered.

Temperature sensor settings flags

This is a bit mask for bitwise operations.

See Also

accessories_settings_t::LimitSwitchesSettings, *get_accessories_settings*, *set_accessories_settings*

- #define TS_TYPE_BITS 0x07
  Bits of the temperature sensor type.
- #define TS_TYPE_UNKNOWN 0x00
  Unknown type of sensor.
- #define TS_TYPE_THERMOCOUPLE 0x01
  Thermocouple.
- #define TS_TYPE_SEMICONDUCTOR 0x02
  The semiconductor temperature sensor.
- #define TS_AVAILABLE 0x08
  If the flag is set, the temperature sensor is available.
- #define LS_ON_SW1_AVAILABLE 0x01
  If the flag is set, the limit switch connected to pin SW1 is available.
- #define LS_ON_SW2_AVAILABLE 0x02
  If the flag is set, the limit switch connected to pin SW2 is available.

- #define LS_SW1_ACTIVE_LOW 0x04
  If the flag is set, the limit switch connected to pin SW1 is triggered by a low level on the pin.
- #define LS_SW2_ACTIVE_LOW 0x08
  If the flag is set, the limit switch connected to pin SW2 is triggered by a low level on pin.
- #define LS_SHORTED 0x10
  If the flag is set, the limit switches are shorted.

Flags of auto-detection of characteristics of windings of the engine.

This is a bit mask for bitwise operations.

See Also

set_emf_settings
get_emf_settings
emf_settings_t::BackEMFFlags, *get_emf_settings*, *set_emf_settings*

- #define BACK_EMF_INDUCTANCE_AUTO 0x01
  Flag of auto-detection of inductance of windings of the engine.
- #define BACK_EMF_RESISTANCE_AUTO 0x02
  Flag of auto-detection of resistance of windings of the engine.
- #define BACK_EMF_KM_AUTO 0x04
  Flag of auto-detection of electromechanical coefficient of the engine.

Typedefs

- typedef unsigned long long **ulong_t**
- typedef long long **long_t**
- typedef int device_t
  Type describes device identifier.
- typedef int result_t
  Type specifies result of any operation.
- typedef uint32_t device_enumeration_t
  Type describes device enumeration structure.
- typedef struct calibration_t calibration_t
  Calibration structure.
- typedef struct device_network_information_t device_network_information_t
  Device network information structure.

Functions

Controller settings setup

Read and write functions for almost all controller settings.

- result_t XIMC_API set_feedback_settings (device_t id, const feedback_settings_t *feedback_settings)
  Feedback settings.
- result_t XIMC_API get_feedback_settings (device_t id, feedback_settings_t *feedback_settings)
  Feedback settings.
- result_t XIMC_API set_home_settings (device_t id, const home_settings_t *home_settings)
  Set home settings.
- result_t XIMC_API set_home_settings_calb (device_t id, const home_settings_calb_t *home_settings_calb, const calibration_t *calibration)
  Set user unit home settings.

- result_t XIMC_API get_home_settings (device_t id, home_settings_t *home_settings)
  Read home settings.
- result_t XIMC_API get_home_settings_calb (device_t id, home_settings_calb_t *home_settings_calb, const calibration_t *calibration)
  Read user unit home settings.
- result_t XIMC_API set_move_settings (device_t id, const move_settings_t *move_settings)
  Movement settings set command (speed, acceleration, threshold, etc.).
- result_t XIMC_API set_move_settings_calb (device_t id, const move_settings_calb_t *move_settings_calb, const calibration_t *calibration)
  User unit movement settings set command (speed, acceleration, threshold, etc.).
- result_t XIMC_API get_move_settings (device_t id, move_settings_t *move_settings)
  Movement settings read command (speed, acceleration, threshold, etc.).
- result_t XIMC_API get_move_settings_calb (device_t id, move_settings_calb_t *move_settings_calb, const calibration_t *calibration)
  User unit movement settings read command (speed, acceleration, threshold, etc.).
- result_t XIMC_API set_engine_settings (device_t id, const engine_settings_t *engine_settings)
  Set engine settings.
- result_t XIMC_API set_engine_settings_calb (device_t id, const engine_settings_calb_t *engine_settings_calb, const calibration_t *calibration)
  Set user unit engine settings.
- result_t XIMC_API get_engine_settings (device_t id, engine_settings_t *engine_settings)
  Read engine settings.
- result_t XIMC_API get_engine_settings_calb (device_t id, engine_settings_calb_t *engine_settings_calb, const calibration_t *calibration)
  Read user unit engine settings.
- result_t XIMC_API set_entype_settings (device_t id, const entype_settings_t *entype_settings)
  Set engine type and driver type.
- result_t XIMC_API get_entype_settings (device_t id, entype_settings_t *entype_settings)
  Return engine type and driver type.
- result_t XIMC_API set_power_settings (device_t id, const power_settings_t *power_settings)
  Set settings of step motor power control.
- result_t XIMC_API get_power_settings (device_t id, power_settings_t *power_settings)
  Read settings of step motor power control.
- result_t XIMC_API set_secure_settings (device_t id, const secure_settings_t *secure_settings)
  Set protection settings.
- result_t XIMC_API get_secure_settings (device_t id, secure_settings_t *secure_settings)
  Read protection settings.
- result_t XIMC_API set_edges_settings (device_t id, const edges_settings_t *edges_settings)
  Set border and limit switches settings.
- result_t XIMC_API set_edges_settings_calb (device_t id, const edges_settings_calb_t *edges_settings_calb, const calibration_t *calibration)
  Set border and limit switches settings in user units.
- result_t XIMC_API get_edges_settings (device_t id, edges_settings_t *edges_settings)
  Read border and limit switches settings.
- result_t XIMC_API get_edges_settings_calb (device_t id, edges_settings_calb_t *edges_settings_calb, const calibration_t *calibration)
  Read border and limit switches settings in user units.
- result_t XIMC_API set_pid_settings (device_t id, const pid_settings_t *pid_settings)
  Set PID settings.
- result_t XIMC_API get_pid_settings (device_t id, pid_settings_t *pid_settings)
  Read PID settings.
- result_t XIMC_API set_sync_in_settings (device_t id, const sync_in_settings_t *sync_in_settings)
  Set input synchronization settings.
- result_t XIMC_API set_sync_in_settings_calb (device_t id, const sync_in_settings_calb_t *sync_in_settings_calb, const calibration_t *calibration)
  Set input user unit synchronization settings.
- result_t XIMC_API get_sync_in_settings (device_t id, sync_in_settings_t *sync_in_settings)

Read input synchronization settings.

- result_t XIMC_API get_sync_in_settings_calb (device_t id, sync_in_settings_calb_t *sync_in_settings_calb, const calibration_t *calibration)
  Read input user unit synchronization settings.
- result_t XIMC_API set_sync_out_settings (device_t id, const sync_out_settings_t *sync_out_settings)
  Set output synchronization settings.
- result_t XIMC_API set_sync_out_settings_calb (device_t id, const sync_out_settings_calb_t *sync_out_settings_calb, const calibration_t *calibration)
  Set output user unit synchronization settings.
- result_t XIMC_API get_sync_out_settings (device_t id, sync_out_settings_t *sync_out_settings)
  Read output synchronization settings.
- result_t XIMC_API get_sync_out_settings_calb (device_t id, sync_out_settings_calb_t *sync_out_settings_calb, const calibration_t *calibration)
  Read output user unit synchronization settings.
- result_t XIMC_API set_extio_settings (device_t id, const extio_settings_t *extio_settings)
  Set EXTIO settings.
- result_t XIMC_API get_extio_settings (device_t id, extio_settings_t *extio_settings)
  Read EXTIO settings.
- result_t XIMC_API set_brake_settings (device_t id, const brake_settings_t *brake_settings)
  Set brake control settings.
- result_t XIMC_API get_brake_settings (device_t id, brake_settings_t *brake_settings)
  Read break control settings.
- result_t XIMC_API set_control_settings (device_t id, const control_settings_t *control_settings)
  Read motor control settings.
- result_t XIMC_API set_control_settings_calb (device_t id, const control_settings_calb_t *control_settings_calb, const calibration_t *calibration)
  Set motor control settings.
- result_t XIMC_API get_control_settings (device_t id, control_settings_t *control_settings)
  Read motor control settings.
- result_t XIMC_API get_control_settings_calb (device_t id, control_settings_calb_t *control_settings_calb, const calibration_t *calibration)
  Set calibrated motor control settings.
- result_t XIMC_API set_joystick_settings (device_t id, const joystick_settings_t *joystick_settings)
  Set joystick position.
- result_t XIMC_API get_joystick_settings (device_t id, joystick_settings_t *joystick_settings)
  Read joystick settings.
- result_t XIMC_API set_ctp_settings (device_t id, const ctp_settings_t *ctp_settings)
  Set control position settings (used with stepper motor only).
- result_t XIMC_API get_ctp_settings (device_t id, ctp_settings_t *ctp_settings)
  Read control position settings (used with stepper motor only).
- result_t XIMC_API set_uart_settings (device_t id, const uart_settings_t *uart_settings)
  Set UART settings.
- result_t XIMC_API get_uart_settings (device_t id, uart_settings_t *uart_settings)
  Read UART settings.
- result_t XIMC_API set_network_settings (device_t id, const network_settings_t *network_settings)
  Set network settings.
- result_t XIMC_API get_network_settings (device_t id, network_settings_t *network_settings)
  Read network settings.
- result_t XIMC_API set_password_settings (device_t id, const password_settings_t *password_settings)
  Sets the password.
- result_t XIMC_API get_password_settings (device_t id, password_settings_t *password_settings)
  Read the password.
- result_t XIMC_API set_calibration_settings (device_t id, const calibration_settings_t *calibration_settings)
  Set calibration settings.

- result_t XIMC_API get_calibration_settings (device_t id, calibration_settings_t *calibration_settings)
  Read calibration settings.
- result_t XIMC_API set_controller_name (device_t id, const controller_name_t *controller_name)
  Write user's controller name and internal settings to the FRAM.
- result_t XIMC_API get_controller_name (device_t id, controller_name_t *controller_name)
  Read user's controller name and internal settings from the FRAM.
- result_t XIMC_API set_nonvolatile_memory (device_t id, const nonvolatile_memory_t *nonvolatile_memory)
  Write user data into the FRAM.
- result_t XIMC_API get_nonvolatile_memory (device_t id, nonvolatile_memory_t *nonvolatile_memory)
  Read user data from FRAM.
- result_t XIMC_API set_emf_settings (device_t id, const emf_settings_t *emf_settings)
  Set electromechanical coefficients.
- result_t XIMC_API get_emf_settings (device_t id, emf_settings_t *emf_settings)
  Read electromechanical settings.
- result_t XIMC_API set_engine_advansed_setup (device_t id, const engine_advansed_setup_t *engine_advansed_setup)
  Set engine advanced settings.
- result_t XIMC_API get_engine_advansed_setup (device_t id, engine_advansed_setup_t *engine_advansed_setup)
  Read engine advanced settings.
- result_t XIMC_API set_extended_settings (device_t id, const extended_settings_t *extended_settings)
  Set extended settings.
- result_t XIMC_API get_extended_settings (device_t id, extended_settings_t *extended_settings)
  Read extended settings.

Group of commands movement control

- result_t XIMC_API command_stop (device_t id)
  Immediately stops the engine, moves it to the STOP state, and sets switches to BREAK mode (windings are short-circuited).
- result_t XIMC_API command_power_off (device_t id)
  Immediately power off the motor regardless its state.
- result_t XIMC_API command_move (device_t id, int Position, int uPosition)
  Move to position.
- result_t XIMC_API command_move_calb (device_t id, float Position, const calibration_t *calibration)
  Move to position using user units.
- result_t XIMC_API command_movr (device_t id, int DeltaPosition, int uDeltaPosition)
  Shift by a set offset.
- result_t XIMC_API command_movr_calb (device_t id, float DeltaPosition, const calibration_t *calibration)
  Shift by a set offset using user units.
- result_t XIMC_API command_home (device_t id)
  Moving to home position.
- result_t XIMC_API command_left (device_t id)
  Start continuous moving to the left.
- result_t XIMC_API command_right (device_t id)
  Start continuous moving to the right.
- result_t XIMC_API command_loft (device_t id)
  Upon receiving the command "loft", the engine is shifted from the current position to a distance Antiplay defined in engine settings.
- result_t XIMC_API command_sstp (device_t id)
  Soft stop the engine.

- result_t XIMC_API get_position (device_t id, get_position_t *the_get_position)
  Reads the value position in steps and microsteps for stepper motor and encoder steps for all engines.
- result_t XIMC_API get_position_calb (device_t id, get_position_calb_t *the_get_position_calb, const calibration_t *calibration)
  Reads position value in user units for stepper motor and encoder steps for all engines.
- result_t XIMC_API set_position (device_t id, const set_position_t *the_set_position)
  Sets position in steps and microsteps for stepper motor.
- result_t XIMC_API set_position_calb (device_t id, const set_position_calb_t *the_set_position_calb, const calibration_t *calibration)
  Sets any position value and encoder value of all engines.
- result_t XIMC_API command_zero (device_t id)
  Sets the current position to 0.

Group of save settings and load settings commands

- result_t XIMC_API command_save_settings (device_t id)
  Save all settings from the controller's RAM to the controller's flash memory, replacing previous data in the flash memory.
- result_t XIMC_API command_read_settings (device_t id)
  Read all settings from the controller's flash memory to the controller's RAM, replacing previous data in the RAM.
- result_t XIMC_API command_save_robust_settings (device_t id)
  Save important settings (calibration coefficients, etc.) from the controller's RAM to the controller's flash memory, replacing previous data in the flash memory.
- result_t XIMC_API command_read_robust_settings (device_t id)
  Read important settings (calibration coefficients, etc.) from the controller's flash memory to the controller's RAM, replacing previous data in the RAM.
- result_t XIMC_API command_eesave_settings (device_t id)
  Save settings from the controller's RAM to the stage's EEPROM.
- result_t XIMC_API command_eeread_settings (device_t id)
  Read settings from the stage's EEPROM to the controller's RAM.
- result_t XIMC_API command_start_measurements (device_t id)
  Start measurements and buffering of speed and the speed error (target speed minus real speed).
- result_t XIMC_API get_measurements (device_t id, measurements_t *measurements)
  A command to read the data buffer to build a speed graph and a speed error graph.
- result_t XIMC_API get_chart_data (device_t id, chart_data_t *chart_data)
  Return device electrical parameters, useful for charts.
- result_t XIMC_API get_serial_number (device_t id, unsigned int *SerialNumber)
  Read device serial number.
- result_t XIMC_API get_firmware_version (device_t id, unsigned int *Major, unsigned int *Minor, unsigned int *Release)
  Read the controller's firmware version.
- result_t XIMC_API service_command_updf (device_t id)
  The command switches the controller to update the firmware state.

Service commands

- result_t XIMC_API set_serial_number (device_t id, const serial_number_t *serial_number)
  Write device serial number and hardware version to the controller's flash memory.
- result_t XIMC_API get_analog_data (device_t id, analog_data_t *analog_data)
  Read the analog data structure that contains raw analog data from the embedded ADC.
- result_t XIMC_API get_debug_read (device_t id, debug_read_t *debug_read)
  Read data from firmware for debug purpose.
- result_t XIMC_API set_debug_write (device_t id, const debug_write_t *debug_write)
  Write data to firmware for debug purpose.

A group of EEPROM commands

- result_t XIMC_API set_stage_name (device_t id, const stage_name_t *stage_name)
  Write the user's stage name to EEPROM.
- result_t XIMC_API get_stage_name (device_t id, stage_name_t *stage_name)
  Read the user's stage name from the EEPROM.
- result_t XIMC_API set_stage_information (device_t id, const stage_information_t *stage_information)
  Deprecated.
- result_t XIMC_API get_stage_information (device_t id, stage_information_t *stage_information)
  Deprecated.
- result_t XIMC_API set_stage_settings (device_t id, const stage_settings_t *stage_settings)
  Deprecated.
- result_t XIMC_API get_stage_settings (device_t id, stage_settings_t *stage_settings)
  Deprecated.
- result_t XIMC_API set_motor_information (device_t id, const motor_information_t *motor_information)
  Deprecated.
- result_t XIMC_API get_motor_information (device_t id, motor_information_t *motor_information)
  Deprecated.
- result_t XIMC_API set_motor_settings (device_t id, const motor_settings_t *motor_settings)
  Deprecated.
- result_t XIMC_API get_motor_settings (device_t id, motor_settings_t *motor_settings)
  Deprecated.
- result_t XIMC_API set_encoder_information (device_t id, const encoder_information_t *encoder_information)
  Deprecated.
- result_t XIMC_API get_encoder_information (device_t id, encoder_information_t *encoder_information)
  Deprecated.
- result_t XIMC_API set_encoder_settings (device_t id, const encoder_settings_t *encoder_settings)
  Deprecated.
- result_t XIMC_API get_encoder_settings (device_t id, encoder_settings_t *encoder_settings)
  Deprecated.
- result_t XIMC_API set_hallsensor_information (device_t id, const hallsensor_information_t *hallsensor_information)
  Deprecated.
- result_t XIMC_API get_hallsensor_information (device_t id, hallsensor_information_t *hallsensor_information)
  Deprecated.
- result_t XIMC_API set_hallsensor_settings (device_t id, const hallsensor_settings_t *hallsensor_settings)
  Deprecated.
- result_t XIMC_API get_hallsensor_settings (device_t id, hallsensor_settings_t *hallsensor_settings)
  Deprecated.
- result_t XIMC_API set_gear_information (device_t id, const gear_information_t *gear_information)
  Deprecated.
- result_t XIMC_API get_gear_information (device_t id, gear_information_t *gear_information)
  Deprecated.
- result_t XIMC_API set_gear_settings (device_t id, const gear_settings_t *gear_settings)
  Deprecated.
- result_t XIMC_API get_gear_settings (device_t id, gear_settings_t *gear_settings)
  Deprecated.
- result_t XIMC_API set_accessories_settings (device_t id, const accessories_settings_t *accessories_settings)
  Deprecated.
- result_t XIMC_API get_accessories_settings (device_t id, accessories_settings_t *accessories_settings)
  Deprecated.

- result_t XIMC_API get_bootloader_version (device_t id, unsigned int *Major, unsigned int *Minor, unsigned int *Release)
  Read the controller's bootloader version.
- result_t XIMC_API get_init_random (device_t id, init_random_t *init_random)
  Read a random number from the controller.
- result_t XIMC_API get_globally_unique_identifier (device_t id, globally_unique_identifier_t *globally_unique_identifier)
  This value is unique to each individual device, but is not a random value.
- result_t XIMC_API goto_firmware (device_t id, uint8_t *ret)
  Reboot to firmware.
- result_t XIMC_API has_firmware (const char *uri, uint8_t *ret)
  Check for firmware on device.
- result_t XIMC_API command_update_firmware (const char *uri, const uint8_t *data, uint32_t data_size)
  Update firmware.
- result_t XIMC_API write_key (const char *uri, uint8_t *key)
  Write controller key.
- result_t XIMC_API command_reset (device_t id)
  Reset controller.
- result_t XIMC_API command_clear_fram (device_t id)
  Clear controller FRAM.

Boards and drivers control

Functions for searching and opening/closing devices

- typedef char * pchar
  Nevermind.
- typedef void(XIMC_CALLCONV * logging_callback_t)(int loglevel, const wchar_t *message, void *user_data)
  Logging callback prototype.
- device_t XIMC_API open_device (const char *uri)
  Open a device with OS uri and return identifier of the device which can be used in calls.
- result_t XIMC_API close_device (device_t *id)
  Close specified device.
- result_t XIMC_API load_correction_table (device_t *id, const char *namefile)
  Command of loading a correction table from a text file (this function is deprecated).
- result_t XIMC_API set_correction_table (device_t id, const char *namefile)
  Command of loading a correction table from a text file.
- result_t XIMC_API probe_device (const char *uri)
  Check if a device with OS uri uri is XIMC device.
- result_t XIMC_API set_bindy_key (const char *keyfilepath)
  Set network encryption layer (bindy) key.
- device_enumeration_t XIMC_API enumerate_devices (int enumerate_flags, const char *hints)
  Enumerate all devices that looks like valid.
- result_t XIMC_API free_enumerate_devices (device_enumeration_t device_enumeration)
  Free memory returned by enumerate_devices.
- int XIMC_API get_device_count (device_enumeration_t device_enumeration)
  Get device count.
- pchar XIMC_API get_device_name (device_enumeration_t device_enumeration, int device_index)
  Get device name from the device enumeration.

- result_t XIMC_API get_enumerate_device_serial (device_enumeration_t device_enumeration, int device_index, uint32_t *serial)

  Get device serial number from the device enumeration.
- result_t XIMC_API get_enumerate_device_information (device_enumeration_t device_enumeration, int device_index, device_information_t *device_information)

  Get device information from the device enumeration.
- result_t XIMC_API get_enumerate_device_controller_name (device_enumeration_t device_enumeration, int device_index, controller_name_t *controller_name)

  Get controller name from the device enumeration.
- result_t XIMC_API get_enumerate_device_stage_name (device_enumeration_t device_enumeration, int device_index, stage_name_t *stage_name)

  Get stage name from the device enumeration.
- result_t XIMC_API get_enumerate_device_network_information (device_enumeration_t device_enumeration, int device_index, device_network_information_t *device_network_information)

  Get device network information from the device enumeration.
- result_t XIMC_API reset_locks ()

  Resets the error of incorrect data transmission.
- result_t XIMC_API ximc_fix_usbser_sys (const char *device_uri)

  Fixing a USB driver error in Windows.
- void XIMC_API msec_sleep (unsigned int msec)

  Sleeps for a specified amount of time.
- void XIMC_API ximc_version (char *version)

  Returns a library version.
- void XIMC_API logging_callback_stderr_wide (int loglevel, const wchar_t *message, void *user_data)

  Simple callback for logging to stderr in wide chars.
- void XIMC_API logging_callback_stderr_narrow (int loglevel, const wchar_t *message, void *user_data)

  Simple callback for logging to stderr in narrow (single byte) chars.
- void XIMC_API set_logging_callback (logging_callback_t logging_callback, void *user_data)

  Sets a logging callback.
- result_t XIMC_API get_status (device_t id, status_t *status)

  Return device state.
- result_t XIMC_API get_status_calb (device_t id, status_calb_t *status, const calibration_t *calibration)

  Return device state.
- result_t XIMC_API get_device_information (device_t id, device_information_t *device_information)

  Return device information.
- result_t XIMC_API command_wait_for_stop (device_t id, uint32_t refresh_interval_ms)

  Wait for stop.
- result_t XIMC_API command_homezero (device_t id)

  Make home command, wait until it is finished and make zero command.

7.1.1 Detailed Description

Header file for libximc library.

7.1.2 Macro Definition Documentation

7.1.2.1 #define ALARM_ON_DRIVER_OVERHEATING 0x01

If this flag is set, enter the alarm state on the driver overheat signal.

7.1.2.2 #define BACK_EMF_INDUCTANCE_AUTO 0x01

Flag of auto-detection of inductance of windings of the engine.

7.1.2.3 #define BACK_EMF_KM_AUTO 0x04

Flag of auto-detection of electromechanical coefficient of the engine.

7.1.2.4 #define BACK_EMF_RESISTANCE_AUTO 0x02

Flag of auto-detection of resistance of windings of the engine.

7.1.2.5 #define BORDER_IS_ENCODER 0x01

Borders are fixed by predetermined encoder values, if set; borders are placed on limit switches, if not set.

7.1.2.6 #define BORDER_STOP_LEFT 0x02

The motor should stop on the left border.

7.1.2.7 #define BORDER_STOP_RIGHT 0x04

Motor should stop on right border.

7.1.2.8 #define BORDERS_SWAP_MISSET_DETECTION 0x08

Motor should stop on both borders.
Need to save motor then wrong border settings is set

7.1.2.9 #define BRAKE_ENABLED 0x01

Brake control is enabled if this flag is set.

7.1.2.10 #define BRAKE_ENG_PWROFF 0x02

Brake turns the stepper motor power off if this flag is set.

7.1.2.11 #define CONTROL_BTN_LEFT_PUSHED_OPEN 0x04

Pushed left button corresponds to the open contact if this flag is set.

7.1.2.12 #define CONTROL_BTN_RIGHT_PUSHED_OPEN 0x08

Pushed right button corresponds to open contact if this flag is set.

7.1.2.13 #define CONTROL_MODE_BITS 0x03

Bits to control the engine by joystick or buttons.

7.1.2.14 #define CONTROL_MODE_JOY 0x01

Control by joystick.

7.1.2.15 #define CONTROL_MODE_LR 0x02

Control by left/right buttons.

7.1.2.16 #define CONTROL_MODE_OFF 0x00

Control is disabled.

7.1.2.17 #define CTP_ALARM_ON_ERROR 0x04

Set ALARM on mismatch if the flag is set.

7.1.2.18 #define CTP_BASE 0x02

The position control is based on the revolution sensor if this flag is set; otherwise, it is based on the encoder.

7.1.2.19 #define CTP_ENABLED 0x01

The position control is enabled if the flag is set.

7.1.2.20 #define CTP_ERROR_CORRECTION 0x10

Correct errors that appear when slippage occurs if the flag is set.
It works only with the encoder. Incompatible with the flag CTP_ALARM_ON_ERROR.

7.1.2.21 #define DRIVER_TYPE_DISCRETE_FET 0x01

Driver with discrete FET keys.
Default option.

7.1.2.22 #define DRIVER_TYPE_EXTERNAL 0x03

External driver.

7.1.2.23 #define DRIVER_TYPE_INTEGRATE 0x02

Driver with integrated IC.

7.1.2.24 #define EEPROM_PRECEDENCE 0x01

If the flag is set, settings from external EEPROM override controller settings.

7.1.2.25 #define ENC_STATE_ABSENT 0x00

Encoder is absent.

7.1.2.26 #define ENC_STATE_MALFUNC 0x02

Encoder is connected and malfunctioning.

7.1.2.27 #define ENC_STATE_OK 0x04

Encoder is connected and working properly.

7.1.2.28 #define ENC_STATE_REVERS 0x03

Encoder is connected and operational but counts in other direction.

7.1.2.29 #define ENC_STATE_UNKNOWN 0x01

Encoder state is unknown.

7.1.2.30 #define ENDER_SW1_ACTIVE_LOW 0x02

1 - Limit switch connected to pin SW1 is triggered by a low level on pin.

7.1.2.31 #define ENDER_SW2_ACTIVE_LOW 0x04

1 - Limit switch connected to pin SW2 is triggered by a low level on pin.

7.1.2.32 #define ENDER_SWAP 0x01

First limit switch on the right side, if set; otherwise on the left side.

7.1.2.33 #define ENGINE_ACCEL_ON 0x10

Acceleration enable flag.

If it set, motion begins with acceleration and ends with deceleration.

7.1.2.34 #define ENGINE_ANTIPLAY 0x08

Play compensation flag.

If it is set, the engine makes backlash (play) compensation and reaches the predetermined position accurately at low speed.

7.1.2.35 #define ENGINE_CURRENT_AS_RMS 0x02

Engine current meaning flag.

If the flag is unset, then the engine's current value is interpreted as the maximum amplitude value. If the flag is set, then the engine current value is interpreted as the root-mean-square current value (for stepper) or as the current value calculated from the maximum heat dissipation (BLDC).

7.1.2.36 #define ENGINE_LIMIT_CURR 0x40

Maximum motor current limit enable flag (is only used with DC motor).

7.1.2.37 #define ENGINE_LIMIT_RPM 0x80

Maximum motor speed limit enable flag.

7.1.2.38 #define ENGINE_LIMIT_VOLT 0x20

Maximum motor voltage limit enable flag (is only used with DC motor).

7.1.2.39 #define ENGINE_MAX_SPEED 0x04

Max speed flag.

If it is set, the engine uses the maximum speed achievable with the present engine settings as its nominal speed.

7.1.2.40 #define ENGINE_REVERSE 0x01

Reverse flag.

It determines motor shaft rotation direction that corresponds to feedback counts increasing. If not set (default), motor shaft rotation direction under positive voltage corresponds to feedback counts increasing and vice versa. Change it if you see that positive directions on motor and feedback are opposite.

7.1.2.41 #define ENGINE_TYPE_2DC 0x02

2 DC motors.

7.1.2.42 #define ENGINE_TYPE_BRUSHLESS 0x05

Brushless motor.

7.1.2.43 #define ENGINE_TYPE_DC 0x01

DC motor.

7.1.2.44 #define ENGINE_TYPE_NONE 0x00

A value that shouldn't be used.

7.1.2.45 #define ENGINE_TYPE_STEP 0x03

Step motor.

7.1.2.46 #define ENGINE_TYPE_TEST 0x04

Duty cycle are fixed.

Used only manufacturer.

7.1.2.47 #define ENUMERATE_PROBE 0x01

Check if a device with an OS name is a XIMC device.

Be careful with this flag because it sends some data to the device.

7.1.2.48 #define EXTIO_SETUP_INVERT 0x02

Interpret EXTIO state inverted if the flag is set.

A falling front is treated as an input event and a low logic level as an active state.

7.1.2.49 #define EXTIO_SETUP_MODE_IN_ALARM 0x05

Set Alarm when the signal goes to the active state.

7.1.2.50 #define EXTIO_SETUP_MODE_IN_BITS 0x0F

Bits of the behavior selector when the signal on input goes to the active state.

7.1.2.51 #define EXTIO_SETUP_MODE_IN_HOME 0x04

Issue HOME command.

7.1.2.52 #define EXTIO_SETUP_MODE_IN_MOVR 0x03

Issue MOVR command with last used settings.

7.1.2.53 #define EXTIO_SETUP_MODE_IN_NOP 0x00

Do nothing.

7.1.2.54 #define EXTIO_SETUP_MODE_IN_PWOF 0x02

Issue PWOF command, powering off all engine windings.

7.1.2.55 #define EXTIO_SETUP_MODE_IN_STOP 0x01

Issue STOP command, ceasing the engine movement.

7.1.2.56 #define EXTIO_SETUP_MODE_OUT_ALARM 0x30

EXTIO pin stays active during the alarm state.

7.1.2.57 #define EXTIO_SETUP_MODE_OUT_BITS 0xF0

Bits of the output behavior selection.

7.1.2.58 #define EXTIO_SETUP_MODE_OUT_MOTOR_ON 0x40

EXTIO pin stays active when windings are powered.

7.1.2.59 #define EXTIO_SETUP_MODE_OUT_MOVING 0x20

EXTIO pin stays active during moving state.

7.1.2.60 #define EXTIO_SETUP_MODE_OUT_OFF 0x00

EXTIO pin always set in inactive state.

7.1.2.61 #define EXTIO_SETUP_MODE_OUT_ON 0x10

EXTIO pin always set in active state.

7.1.2.62 #define EXTIO_SETUP_OUTPUT 0x01

EXTIO works as output if the flag is set, works as input otherwise.

7.1.2.63 #define FEEDBACK_EMF 0x04

Feedback by EMF.

7.1.2.64 #define FEEDBACK_ENC_REVERSE 0x01

Reverse count of encoder.

7.1.2.65 #define FEEDBACK_ENC_TYPE_AUTO 0x00

Auto detect encoder type.

7.1.2.66 #define FEEDBACK_ENC_TYPE_BITS 0xC0

Bits of the encoder type.

7.1.2.67 #define FEEDBACK_ENC_TYPE_DIFFERENTIAL 0x80

Differential encoder.

7.1.2.68 #define FEEDBACK_ENC_TYPE_SINGLE_ENDED 0x40

Single-ended encoder.

7.1.2.69 #define FEEDBACK_ENCODER 0x01

Feedback by encoder.

7.1.2.70 #define FEEDBACK_ENCODER_MEDIATED 0x06

Feedback by encoder mediated by mechanical transmission (for example leadscrew).

7.1.2.71 #define FEEDBACK_NONE 0x05

Feedback is absent.

7.1.2.72 #define H_BRIDGE_ALERT 0x04

If this flag is set then turn off the power unit with a signal problem in one of the transistor bridge.

7.1.2.73 #define HOME_DIR_FIRST 0x001

The flag defines the direction of the 1st motion after execution of the home command.
The direction is to the right if the flag is set, and to the left otherwise.

7.1.2.74 #define HOME_DIR_SECOND 0x002

The flag defines the direction of the 2nd motion.
The direction is to the right if the flag is set, and to the left otherwise.

7.1.2.75 #define HOME_HALF_MV 0x008

If the flag is set, the stop signals are ignored during the first half-turn of the second movement.

7.1.2.76 #define HOME_MV_SEC_EN 0x004

Use the second phase of calibration to the home position, if set; otherwise the second phase is skipped.

7.1.2.77 #define HOME_STOP_FIRST_BITS 0x030

Bits of the first stop selector.

7.1.2.78 #define HOME_STOP_FIRST_LIM 0x030

First motion stops by limit switch.

7.1.2.79 #define HOME_STOP_FIRST_REV 0x010

First motion stops by revolution sensor.

7.1.2.80 #define HOME_STOP_FIRST_SYN 0x020

First motion stops by synchronization input.

7.1.2.81 #define HOME_STOP_SECOND_BITS 0x0C0

Bits of the second stop selector.

7.1.2.82 #define HOME_STOP_SECOND_LIM 0x0C0

Second motion stops by limit switch.

7.1.2.83 #define HOME_STOP_SECOND_REV 0x040

Second motion stops by revolution sensor.

7.1.2.84 #define HOME_STOP_SECOND_SYN 0x080

Second motion stops by synchronization input.

7.1.2.85 #define HOME_USE_FAST 0x100

Use the fast algorithm of calibration to the home position, if set; otherwise the traditional algorithm.

7.1.2.86 #define JOY_REVERSE 0x01

Joystick action is reversed.
The joystick deviation to the upper values corresponds to negative speed and vice versa.

7.1.2.87 #define LOW_UPWR_PROTECTION 0x02

If this flag is set, turn off the motor when the voltage is lower than LowUpwrOff.

7.1.2.88 #define MICROSTEP_MODE_FRAC_128 0x08

1/128-step mode.

7.1.2.89 #define MICROSTEP_MODE_FRAC_16 0x05

1/16-step mode.

7.1.2.90 #define MICROSTEP_MODE_FRAC_2 0x02

1/2-step mode.

7.1.2.91 #define MICROSTEP_MODE_FRAC_256 0x09

1/256-step mode.

7.1.2.92 #define MICROSTEP_MODE_FRAC_32 0x06

1/32-step mode.

7.1.2.93 #define MICROSTEP_MODE_FRAC_4 0x03

1/4-step mode.

7.1.2.94 #define MICROSTEP_MODE_FRAC_64 0x07

1/64-step mode.

7.1.2.95 #define MICROSTEP_MODE_FRAC_8 0x04

1/8-step mode.

7.1.2.96 #define MICROSTEP_MODE_FULL 0x01

Full step mode.

7.1.2.97 #define MOVE_STATE_ANTIPLAY 0x04

Motor is playing compensation, if flag set.

7.1.2.98 #define MOVE_STATE_MOVING 0x01

This flag indicates that the controller is trying to move the motor.

Don't use this flag to wait for the completion of the movement command. Use the MVCMD_RUNNING flag from the MvCmdSts field instead.

7.1.2.99 #define MOVE_STATE_TARGET_SPEED 0x02

Target speed is reached, if flag set.

7.1.2.100 #define MVCMD_ERROR 0x40

Finish state (1 - move command has finished with an error, 0 - move command has finished correctly).

This flag makes sense when MVCMD_RUNNING signals movement completion.

7.1.2.101 #define MVCMD_HOME 0x06

Command home.

7.1.2.102 #define MVCMD_LEFT 0x03

Command left.

7.1.2.103 #define MVCMD_LOFT 0x07

Command loft.

7.1.2.104 #define MVCMD_MOVE 0x01

Command move.

7.1.2.105 #define MVCMD_MOVR 0x02

Command movr.

7.1.2.106 #define MVCMD_NAME_BITS 0x3F

Move command bit mask.

7.1.2.107 #define MVCMD_RIGHT 0x04

Command rigt.

7.1.2.108 #define MVCMD_RUNNING 0x80

Move command state (0 - move command has finished, 1 - move command is being executed).

7.1.2.109 #define MVCMD_SSTP 0x08

Command soft stop.

7.1.2.110 #define MVCMD_STOP 0x05

Command stop.

7.1.2.111 #define MVCMD_UKNWN 0x00

Unknown command.

7.1.2.112 #define POWER_OFF_ENABLED 0x02

Power off is enabled after PowerOffDelay if this flag is set.

7.1.2.113 #define POWER_REDUCT_ENABLED 0x01

Current reduction is enabled after CurrReductDelay if this flag is set.

7.1.2.114 #define POWER_SMOOTH_CURRENT 0x04

Current ramp-up/down are performed smoothly during current_set_time if this flag is set.

7.1.2.115 #define PWR_STATE_MAX 0x05

Motor windings are powered by the maximum current driver can provide at this voltage.

7.1.2.116 #define PWR_STATE_NORM 0x03

Motor windings are powered by nominal current.

7.1.2.117 #define PWR_STATE_OFF 0x01

Motor windings are disconnected from the driver.

7.1.2.118 #define PWR_STATE_REDUCT 0x04

Motor windings are powered by reduced current to lower power consumption.

7.1.2.119 #define PWR_STATE_UNKNOWN 0x00

Unknown state, should never happen.

7.1.2.120 #define REV_SENS_INV 0x08

Typically, the sensor is active when it is at 0, and inversion makes active at 1.
That is, if you do not invert, it is normal logic - 0 is the activation.

7.1.2.121 #define RPM_DIV_1000 0x01

This flag indicates that the operating speed specified in the command is set in milliRPM.
Applicable only for ENCODER feedback mode and only for BLDC motors.

7.1.2.122 #define SETPOS_IGNORE_ENCODER 0x02

Will not reload encoder state if this flag is set.

7.1.2.123 #define SETPOS_IGNORE_POSITION 0x01

Will not reload position in steps/microsteps if this flag is set.

7.1.2.124 #define STATE_ALARM 0x0000040

The controller is in an alarm state, indicating that something dangerous has happened.
Most commands are ignored in this state. To reset the flag, a STOP command must be issued.

7.1.2.125 #define STATE_BORDERS_SWAP_MISSET 0x0008000

Engine stuck at the wrong edge.

7.1.2.126 #define STATE_BRAKE 0x0200

State of Brake pin.

Flag "1" - if the pin state brake is not powered (brake is clamped), "0" - if the pin state brake is powered (brake is unclamped).

7.1.2.127 #define STATE_BUTTON_LEFT 0x0008

Button "left" state (1 if pressed).

7.1.2.128 #define STATE_BUTTON_RIGHT 0x0004

Button "right" state (1 if pressed).

7.1.2.129 #define STATE_CONTR 0x000003F

Flags of controller states.

7.1.2.130 #define STATE_CONTROLLER_OVERHEAT 0x0000200

Controller overheat.

7.1.2.131 #define STATE_CTP_ERROR 0x0000080

Control position error (is only used with stepper motor).

The flag is set when the encoder position and step position are too far apart.

7.1.2.132 #define STATE_DIG_SIGNAL 0xFFFF

Flags of digital signals.

7.1.2.133 #define STATE_EEPROM_CONNECTED 0x0000010

EEPROM with settings is connected.

The built-in stage profile is uploaded from the EEPROM memory chip if the EEPROM_PRECEDENCE flag is set, allowing you to connect various stages to the controller with automatic setup.

7.1.2.134 #define STATE_ENC_A 0x2000

State of encoder A pin.

7.1.2.135 #define STATE_ENC_B 0x4000

State of encoder B pin.

7.1.2.136 #define STATE_ENGINE_RESPONSE_ERROR 0x0800000

Error response of the engine control action.

Motor control algorithm failure means that it can't make the correct decisions with the feedback data it receives. A single failure may be caused by a mechanical problem. A repeating failure can be caused by incorrect motor settings.

7.1.2.137 #define STATE_ERRC 0x0000001

Command error encountered.

The command received is not in the list of controller known commands. The most possible reason is the outdated firmware.

7.1.2.138 #define STATE_ERRD 0x0000002

Data integrity error encountered.

The data inside the command and its CRC code do not correspond. Therefore, the data can't be considered valid. This error may be caused by EMI in the UART/RS232 interface.

7.1.2.139 #define STATE_ERRV 0x0000004

Value error encountered.

The values in the command can't be applied without correction because they fall outside the valid range. Corrected values were used instead of the original ones.

7.1.2.140 #define STATE_EXTIO_ALARM 0x1000000

The error is caused by the external EXTIO input signal.

7.1.2.141 #define STATE_GPIO_LEVEL 0x0020

State of external GPIO pin.

7.1.2.142 #define STATE_GPIO_PINOUT 0x0010

External GPIO works as out if the flag is set; otherwise, it works as in.

7.1.2.143 #define STATE_IS_HOMED 0x0000020

Calibration performed.

This means that the relative position scale is calibrated against a hardware absolute position sensor, like a limit switch. Drops after loss of calibration, like harsh stops and possibly skipped steps.

7.1.2.144 #define STATE_LEFT_EDGE 0x0002

Engine stuck at the left edge.

7.1.2.145 #define STATE_LOW_USB_VOLTAGE 0x0002000

USB voltage is insufficient for normal operation.

7.1.2.146 #define STATE_OVERLOAD_POWER_CURRENT 0x0000800

Power current exceeds safe limit.

7.1.2.147 #define STATE_OVERLOAD_POWER_VOLTAGE 0x0000400

Power voltage exceeds safe limit.

7.1.2.148 #define STATE_OVERLOAD_USB_CURRENT 0x0004000

USB current exceeds safe limit.

7.1.2.149 #define STATE_OVERLOAD_USB_VOLTAGE 0x0001000

USB voltage exceeds safe limit.

7.1.2.150 #define STATE_POWER_OVERHEAT 0x0000100

Power driver overheat.

Motor control is disabled until some cooldown occurs. This should not happen with boxed versions of the controller. This may happen with the bare-board version of the controller with a custom radiator. Redesign your radiator.

7.1.2.151 #define STATE_REV_SENSOR 0x0400

State of Revolution sensor pin.

7.1.2.152 #define STATE_RIGHT_EDGE 0x0001

Engine stuck at the right edge.

7.1.2.153 #define STATE_SECUR 0x1B3FFC0

Security flags.

7.1.2.154 #define STATE_SYNC_INPUT 0x0800

State of Sync input pin.

7.1.2.155 #define STATE_SYNC_OUTPUT 0x1000

State of Sync output pin.

7.1.2.156 #define STATE_WINDING_RES_MISMATCH 0x0100000

The difference between winding resistances is too large.

This usually happens with a damaged stepper motor with partially short-circuited windings.

7.1.2.157 #define SYNCIN_ENABLED 0x01

Synchronization in mode is enabled if this flag is set.

7.1.2.158 #define SYNCIN_GOTOPOSITION 0x04

The engine is going to the position specified in Position and uPosition if this flag is set.

And it is shifting on the Position and uPosition if this flag is unset

7.1.2.159 #define SYNCIN_INVERT 0x02

Trigger on falling edge if flag is set, on rising edge otherwise.

7.1.2.160 #define SYNCOUT_ENABLED 0x01

The synchronization out pin follows the synchronization logic if the flag is set.

Otherwise, it is governed by the SYNCOUT_STATE flag.

7.1.2.161 #define SYNCOUT_IN_STEPS 0x08

Use motor steps or encoder pulses instead of milliseconds for output pulse generation if the flag is set.

7.1.2.162 #define SYNCOUT_INVERT 0x04

The low level is active if the flag is set.

Otherwise, the high level is active.

7.1.2.163 #define SYNCOUT_ONPERIOD 0x40

Generate a synchronization pulse every SyncOutPeriod encoder pulses.

7.1.2.164 #define SYNCOUT_ONSTART 0x10

Generate a synchronization pulse when movement starts.

7.1.2.165 #define SYNCOUT_ONSTOP 0x20

Generate a synchronization pulse when movement stops.

7.1.2.166 #define SYNCOUT_STATE 0x02

When the output state is fixed by the negative SYNCOUT_ENABLED flag, the pin state is in accordance with this flag state.

7.1.2.167 #define UART_PARITY_BITS 0x03

Bits of the parity.

7.1.2.168 #define WIND_A_STATE_ABSENT 0x00

Winding A is disconnected.

7.1.2.169 #define WIND_A_STATE_MALFUNC 0x02

Winding A is short-circuited.

7.1.2.170 #define WIND_A_STATE_OK 0x03

Winding A is connected and working properly.

7.1.2.171 #define WIND_A_STATE_UNKNOWN 0x01

Winding A state is unknown.

7.1.2.172 #define WIND_B_STATE_ABSENT 0x00

Winding B is disconnected.

7.1.2.173 #define WIND_B_STATE_MALFUNC 0x20

Winding B is short-circuited.

7.1.2.174 #define WIND_B_STATE_OK 0x30

Winding B is connected and working properly.

7.1.2.175 #define WIND_B_STATE_UNKNOWN 0x10

Winding B state is unknown.

7.1.2.176 #define XIMC_API

Library import macro.

Macros allows to automatically import function from shared library. It automatically expands to dllimport on msvc when including header file.

7.1.3 Typedef Documentation

7.1.3.1 typedef void(**XIMC_CALLCONV** * logging_callback_t)(int loglevel, const wchar_t *message, void *user_data)

Logging callback prototype.

Parameters

loglevel	a loglevel
message	a message

7.1.4 Function Documentation

7.1.4.1 **result_t XIMC_API** close_device (**device_t** * id)

Close specified device.

Parameters

id	an identifier of device

Note

The id parameter in this function is a C pointer, unlike most library functions that use this parameter

7.1.4.2 **result_t XIMC_API** command_clear_fram (**device_t** id)

Clear controller FRAM.

Can be used by manufacturer only

Parameters

id	an identifier of device

7.1.4.3 **result_t XIMC_API** command_eeread_settings (**device_t** id)

Read settings from the stage's EEPROM to the controller's RAM.

This operation is performed automatically at the connection of the stage with an EEPROM to the controller. Can be used by the manufacturer only.

Parameters

id	An identifier of a device

7.1.4.4 **result_t XIMC_API** command_eesave_settings (**device_t** id)

Save settings from the controller's RAM to the stage's EEPROM.

Can be used by the manufacturer only.

Parameters

id	An identifier of a device

7.1.4.5 **result_t XIMC_API** command_home (**device_t** id)

Moving to home position.

Moving algorithm:

1) Moves the motor according to the speed FastHome, uFastHome and flag HOME_DIR_FAST until the limit switch if the HOME_STOP_ENDS flag is set. Or moves the motor until the input synchronization signal occurs if the flag HOME_STOP_SYNC is set. Or moves until the revolution sensor signal occurs if the flag HOME_STOP_REV_SN is set.

2) Then moves according to the speed SlowHome, uSlowHome and flag HOME_DIR_SLOW until the input clock signal occurs if the flag HOME_MV_SEC is set. If the flag HOME_MV_SEC is reset, skip this step.

3) Then shifts the motor according to the speed FastHome, uFastHome and the flag HOME_DIR_SLOW by HomeDelta distance, uHomeDelta.

See GHOM/SHOM commands' description for details on home flags.

Moving settings can be set by set_home_settings/set_home_settings_calb.

Parameters

id	An identifier of a device

See Also

home_settings_t
get_home_settings
set_home_settings

7.1.4.6 **result_t XIMC_API** command_homezero (**device_t** id)

Make home command, wait until it is finished and make zero command.

This is a convinient way to calibrate zero position.

Parameters

	id	an identifier of device
out	*ret*	RESULT_OK if controller has finished home & zero correctly or result of first controller query that returned anything other than RESULT_OK.

7.1.4.7 **result_t XIMC_API** command_left (**device_t** id)

Start continuous moving to the left.

Parameters

id	An identifier of a device

7.1.4.8 **result_t XIMC_API** command_loft (**device_t** id)

Upon receiving the command "loft", the engine is shifted from the current position to a distance Antiplay defined in engine settings.

Then moves to the initial position.

Parameters

id	An identifier of a device

7.1.4.9 **result_t XIMC_API** command_move (**device_t** id, int Position, int uPosition)

Move to position.

Upon receiving the command "move" the engine starts to move with pre-set parameters (speed, acceleration, retention), to the point specified by Position and uPosition. uPosition sets the microstep position of a stepper motor. In the case of DC motor, this field is ignored.

Parameters

id	An identifier of a device
Position	position to move.
uPosition	the fractional part of the position to move, in microsteps. The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings).

7.1.4.10 **result_t XIMC_API** command_move_calb (**device_t** id, float Position, const **calibration_t** * calibration)

Move to position using user units.

Upon receiving the command "move" the engine starts to move with preset parameters (speed, acceleration, retention), to the point specified by Position.

Parameters

id	An identifier of a device
Position	position to move.
calibration	user unit settings

Note

The parameter Position is adjusted by the correction table.

7.1.4.11 **result_t XIMC_API** command_movr (**device_t** id, int DeltaPosition, int uDeltaPosition)

Shift by a set offset.

Upon receiving the command "movr", the engine starts to move with preset parameters (speed, acceleration, hold) left or right (depending on the sign of DeltaPosition). It moves by the number of steps specified in the fields DeltaPosition and uDeltaPosition. uDeltaPosition sets the microstep offset for a stepper motor. In the case of a DC motor, this field is ignored.

Parameters

DeltaPosition	shift from initial position.
uDeltaPosition	the fractional part of the offset shift, in microsteps. The microstep size and the range of valid values for this field depend on the selected step division mode (see the MicrostepMode field in engine_settings).
id	An identifier of a device

7.1.4.12 result_t XIMC_API command_movr_calb (device_t id, float DeltaPosition, const calibration_t * calibration)

Shift by a set offset using user units.

Upon receiving the command "movr", the engine starts to move with preset parameters (speed, acceleration, hold) left or right (depending on the sign of DeltaPosition). It moves by the distance specified in the field DeltaPosition.

Parameters

DeltaPosition	shift from initial position.
id	An identifier of a device
user	unit calibration settings

Note

The final coordinate is calculated using DeltaPosition and adjusted by the correction table. However, the correction cannot be done if the motor moves. movr sets the target position equal to the current target position, shifted by delta. But the library can't determine the current target position while moving. So there is no possibility of calculating the final position and correcting it with the correction table.

7.1.4.13 result_t XIMC_API command_power_off (device_t id)

Immediately power off the motor regardless its state.

Shouldn't be used during motion as the motor could be powered on again automatically to continue movement. The command is designed to manually power off the motor. When automatic power off after stop is required, use the power management system.

Parameters

id	An identifier of a device

See Also

get_power_settings
set_power_settings

7.1.4.14 result_t XIMC_API command_read_robust_settings (device_t id)

Read important settings (calibration coefficients, etc.) from the controller's flash memory to the controller's RAM, replacing previous data in the RAM.

Manufacturer only.

Parameters

id	An identifier of a device

7.1.4.15 result_t XIMC_API command_read_settings (device_t id)

Read all settings from the controller's flash memory to the controller's RAM, replacing previous data in the RAM.

Parameters

id	An identifier of a device

7.1.4.16 **result_t XIMC_API** command_reset (**device_t** id)

Reset controller.

Can be used by manufacturer only

Parameters

id	an identifier of device

7.1.4.17 **result_t XIMC_API** command_right (**device_t** id)

Start continuous moving to the right.

Parameters

id	An identifier of a device

7.1.4.18 **result_t XIMC_API** command_save_robust_settings (**device_t** id)

Save important settings (calibration coefficients, etc.) from the controller's RAM to the controller's flash memory, replacing previous data in the flash memory.

Manufacturer only.

Parameters

id	An identifier of a device

7.1.4.19 **result_t XIMC_API** command_save_settings (**device_t** id)

Save all settings from the controller's RAM to the controller's flash memory, replacing previous data in the flash memory.

Parameters

id	An identifier of a device

7.1.4.20 **result_t XIMC_API** command_sstp (**device_t** id)

Soft stop the engine.

The motor is slowing down with the deceleration specified in move_settings.

Parameters

id	An identifier of a device

7.1.4.21 **result_t XIMC_API** command_start_measurements (**device_t** id)

Start measurements and buffering of speed and the speed error (target speed minus real speed).

Parameters

id	An identifier of a device

7.1.4.22 **result_t XIMC_API** command_stop (**device_t** id)

Immediately stops the engine, moves it to the STOP state, and sets switches to BREAK mode (windings are short-circuited).

The holding regime is deactivated for DC motors, keeping current in the windings for stepper motors (to control it, see Power management settings).

When this command is called, the ALARM flag is reset.

Parameters

id	An identifier of a device

7.1.4.23 **result_t XIMC_API** command_update_firmware (const char * uri, const uint8_t * data, uint32_t data_size)

Update firmware.

Manufacturer only. Service command

Parameters

uri	a uri of device
data	firmware byte stream
data_size	size of byte stream

7.1.4.24 **result_t XIMC_API** command_wait_for_stop (**device_t** id, uint32_t refresh_interval_ms)

Wait for stop.

Parameters

	id	an identifier of device
	refresh_interval_ms	Status refresh interval. The function waits this number of milliseconds between get_status requests to the controller. Recommended value of this parameter is 10 ms. Use values of less than 3 ms only when necessary - small refresh interval values do not significantly increase response time of the function, but they create substantially more traffic in controller-computer data channel.
out	*ret*	RESULT_OK if controller has stopped and result of the first get_status command which returned anything other than RESULT_OK otherwise.

7.1.4.25 **result_t XIMC_API** command_zero (**device_t** id)

Sets the current position to 0.

Sets the target position of the move command and the movr command to zero for all cases except for movement to the target position. In the latter case, the target position is calculated so that the absolute position of the destination stays the same. For example, if we were at 400 and moved to 500, then the command Zero makes the current position 0 and the position of the destination 100. It does not change the mode of movement. If the motion is carried, it continues, and if the engine is in the "hold", the type of retention remains.

Parameters

id	An identifier of a device

7.1.4.26 **device_enumeration_t XIMC_API** enumerate_devices (int enumerate_flags, const char * hints)

Enumerate all devices that looks like valid.

Parameters

in	*enumerate_flags*	enumerate devices flags
in	*hints*	extended information

hints is a string of form "key=value \n key2=value2". *Unrecognized key-value pairs are ignored.* Key list: addr - used together with ENUMERATE_NETWORK flag. Non-null value is a remote host name or a comma-separated list of host names which contain the devices to be found, absent value means broadcast discovery. adapter_addr - used together with ENUMERATE_NETWORK flag. Non-null value is a IP address of network adapter. Remote ximc device must be on the same local network as the adapter. When using the adapter_addr key, you **must set** the addr key. Example: "addr= \n adapter_addr=192.168.0.100".

7.1.4.27 **result_t XIMC_API** free_enumerate_devices (**device_enumeration_t** device_enumeration)

Free memory returned by *enumerate_devices*.

Parameters

in	*device_enumeration*	opaque pointer to an enumeration device data

7.1.4.28 **result_t XIMC_API** get_accessories_settings (**device_t** id, **accessories_settings_t** * accessories_settings)

Deprecated.

Read additional accessory information from the EEPROM.

Parameters

	id	An identifier of a device
out	*accessories_settings*	structure contains information about additional accessories

7.1.4.29 **result_t XIMC_API** get_analog_data (**device_t** id, **analog_data_t** * analog_data)

Read the analog data structure that contains raw analog data from the embedded ADC.

This function is used for device testing and deep recalibration by the manufacturer only.

Parameters

	id	An identifier of a device
out	*analog_data*	analog data coefficients

7.1.4.30 **result_t XIMC_API** get_bootloader_version (**device_t** id, unsigned int * Major, unsigned int * Minor, unsigned int * Release)

Read the controller's bootloader version.

Parameters

	id	An identifier of a device
out	*Major*	major version
out	*Minor*	minor version
out	*Release*	release version

7.1.4.31 **result_t XIMC_API** get_brake_settings (**device_t** id, **brake_settings_t** * brake_settings)

Read break control settings.

Parameters

	id	An identifier of a device
out	*brake_settings*	structure contains settings of brake control

7.1.4.32 **result_t XIMC_API** get_calibration_settings (**device_t** id, **calibration_settings_t** * calibration_settings)

Read calibration settings.

Manufacturer only. This function reads the structure with calibration settings. These settings are used to convert bare ADC values to winding currents in mA and the full current in mA. Parameters are grouped into pairs, XXX_A and XXX_B, representing linear equation coefficients. The first one is the slope, the second one is the constant term. Thus, XXX_Current[mA] = XXX_A[mA/ADC]*XXX_ADC_CODE[ADC] + XXX_B[mA].

See Also

calibration_settings_t

Parameters

	id	An identifier of a device
out	*calibration_settings*	calibration settings

7.1.4.33 **result_t XIMC_API** get_chart_data (**device_t** id, **chart_data_t** * chart_data)

Return device electrical parameters, useful for charts.

A useful function that fills the structure with a snapshot of the controller voltages and currents.

See Also

chart_data_t

Parameters

	id	An identifier of a device
out	*chart_data*	structure with a snapshot of controller parameters.

7.1.4.34 **result_t XIMC_API** get_control_settings (**device_t** id, **control_settings_t** * control_settings)

Read motor control settings.

In case of CTL_MODE=1, joystick motor control is enabled. In this mode, while the joystick is maximally displaced, the engine tends to move at MaxSpeed[i]. i=0 if another value hasn't been set at the previous usage. To change the speed index "i", use the buttons.

In case of CTL_MODE=2, the motor is controlled by the left/right buttons. When you click on the button, the motor starts moving in the appropriate direction at a speed MaxSpeed[0]. After Timeout[i], motor moves at speed MaxSpeed[i+1]. At the transition between MaxSpeed[i] and MaxSpeed[i+1] the motor just accelerates/decelerates as usual.

Parameters

	id	An identifier of a device
out	*control_settings*	structure contains settings motor control by joystick or buttons left/right.

7.1.4.35 **result_t XIMC_API** get_control_settings_calb (**device_t** id, **control_settings_calb_t** * control_settings_calb, const **calibration_t** * calibration)

Set calibrated motor control settings.

In case of CTL_MODE=1, the joystick motor control is enabled. In this mode, while the joystick is maximally displaced, the engine tends to move at MaxSpeed[i]. i=0 if another value hasn't been set at the previous usage. To change the speed index "i", use the buttons.

In case of CTL_MODE=2, the motor is controlled by the left/right buttons. When you click on the button, the motor starts moving in the appropriate direction at a speed MaxSpeed[0]. After Timeout[i], motor moves at speed MaxSpeed[i+1]. At the transition between MaxSpeed[i] and MaxSpeed[i+1] the motor just accelerates/decelerates as usual.

Parameters

	id	An identifier of a device
out	*control_settings_calb*	structure contains user unit motor control settings.
	calibration	user unit settings

7.1.4.36 **result_t XIMC_API** get_controller_name (**device_t** id, **controller_name_t** * controller_name)

Read user's controller name and internal settings from the FRAM.

Parameters

	id	An identifier of a device
out	*controller_name*	structure contains previously set user controller name

7.1.4.37 **result_t XIMC_API** get_ctp_settings (**device_t** id, **ctp_settings_t** * ctp_settings)

Read control position settings (used with stepper motor only).

```
When controlling the step motor with an encoder (CTP_BASE=0), it is possible to detect the loss of steps. The controller knows
```

Alternatively, the stepper motor may be controlled with the speed sensor (CTP_BASE 1). In this mode, at the active edges of the input clock, the controller stores the current value of steps. Then, at each revolution, the controller checks how many steps have been passed. When the difference is over the CTPMinError, the STATE_CTP_ERROR flag is set.

Parameters

	id	An identifier of a device
out	*ctp_settings*	structure contains position control settings.

7.1.4.38 **result_t XIMC_API** get_debug_read (**device_t** id, **debug_read_t** * debug_read)

Read data from firmware for debug purpose.

Manufacturer only. Its use depends on context, firmware version and previous history.

Parameters

	id	An identifier of a device
out	*debug_read*	Debug data.

7.1.4.39 int **XIMC_API** get_device_count (**device_enumeration_t** device_enumeration)

Get device count.

Parameters

in	*device_enumeration*	opaque pointer to an enumeration device data

7.1.4.40 **result_t XIMC_API** get_device_information (**device_t** id, **device_information_t** * device_information)

Return device information.

All fields must point to allocated string buffers with at least 10 bytes. Works with both raw or initialized device.

Parameters

	id	an identifier of device
out	*device_information*	device information Device information.

See Also

get_device_information

7.1.4.41 **pchar XIMC_API** get_device_name (**device_enumeration_t** device_enumeration, int device_index)

Get device name from the device enumeration.

Returns *device_index* device name.

Parameters

in	*device_enumeration*	opaque pointer to an enumeration device data
in	*device_index*	device index

7.1.4.42 **result_t XIMC_API** get_edges_settings (**device_t** id, **edges_settings_t** * edges_settings)

Read border and limit switches settings.

See Also

set_edges_settings

Parameters

	id	An identifier of a device
out	*edges_settings*	edges settings, types of borders, motor behavior and electrical behavior of limit switches

7.1.4.43 **result_t XIMC_API** get_edges_settings_calb (**device_t** id, **edges_settings_calb_t** * edges_settings_calb, const **calibration_t** * calibration)

Read border and limit switches settings in user units.

See Also

set_edges_settings_calb

Parameters

	id	An identifier of a device
out	*edges_settings_calb*	edges settings, types of borders, motor behavior and electrical behavior of limit switches
	calibration	user unit settings

Note

Attention! Some parameters of the edges_settings_calb structure are corrected by the coordinate correction table.

7.1.4.44 result_t XIMC_API get_emf_settings (device_t id, emf_settings_t * emf_settings)

Read electromechanical settings.

The settings are different for different stepper motors.

See Also

set_emf_settings

Parameters

	id	An identifier of a device
out	*emf_settings*	EMF settings

7.1.4.45 result_t XIMC_API get_encoder_information (device_t id, encoder_information_t * encoder_information)

Deprecated.

Read encoder information from the EEPROM.

Parameters

	id	An identifier of a device
out	*encoder_information*	structure contains information about encoder

7.1.4.46 result_t XIMC_API get_encoder_settings (device_t id, encoder_settings_t * encoder_settings)

Deprecated.

Read encoder settings from the EEPROM.

Parameters

	id	An identifier of a device
out	*encoder_settings*	structure contains encoder settings

7.1.4.47 result_t XIMC_API get_engine_advansed_setup (device_t id, engine_advansed_setup_t * engine_advansed_setup)

Read engine advanced settings.

See Also

set_engine_advansed_setup

Parameters

	id	An identifier of a device
out	*engine_advansed_setup*	EAS settings

7.1.4.48 result_t XIMC_API get_engine_settings (device_t id, engine_settings_t * engine_settings)

Read engine settings.

This function reads the structure containing a set of useful motor settings stored in the controller's memory. These settings specify motor shaft movement algorithm, list of limitations and rated characteristics.

See Also

set_engine_settings

Parameters

	id	An identifier of a device
out	*engine_settings*	engine settings

7.1.4.49 result_t XIMC_API get_engine_settings_calb (device_t id, engine_settings_calb_t * engine_settings_calb, const calibration_t * calibration)

Read user unit engine settings.

This function reads the structure containing a set of useful motor settings stored in the controller's memory. These settings specify the motor shaft movement algorithm, list of limitations and rated characteristics.

See Also

set_engine_settings

Parameters

	id	An identifier of a device
out	*engine_settings_calb*	engine settings
	calibration	user unit settings

7.1.4.50 result_t XIMC_API get_entype_settings (device_t id, entype_settings_t * entype_settings)

Return engine type and driver type.

Parameters

	id	An identifier of a device
out	*entype_settings*	structure contains motor type and power driver type settings

7.1.4.51 **result_t XIMC_API** get_enumerate_device_controller_name (**device_enumeration_t** device_enumeration, int device_index, **controller_name_t** * controller_name)

Get controller name from the device enumeration.

Returns *device_index* device controller name.

Parameters

in	*device_enumeration*	opaque pointer to an enumeration device data
in	*device_index*	device index
out	*controller_name*	controller name

7.1.4.52 **result_t XIMC_API** get_enumerate_device_information (**device_enumeration_t** device_enumeration, int device_index, **device_information_t** * device_information)

Get device information from the device enumeration.

Returns *device_index* device information.

Parameters

in	*device_enumeration*	opaque pointer to an enumeration device data
in	*device_index*	device index
out	*device_information*	device information data

7.1.4.53 **result_t XIMC_API** get_enumerate_device_network_information (**device_enumeration_t** device_enumeration, int device_index, **device_network_information_t** * device_network_information)

Get device network information from the device enumeration.

Returns *device_index* device network information.

Parameters

in	*device_enumeration*	opaque pointer to an enumeration device data
in	*device_index*	device index
out	*device_network_information*	device network information data

7.1.4.54 **result_t XIMC_API** get_enumerate_device_serial (**device_enumeration_t** device_enumeration, int device_index, uint32_t * serial)

Get device serial number from the device enumeration.

Returns *device_index* device serial number.

Parameters

in	*device_enumeration*	opaque pointer to an enumeration device data

in	*device_index*	device index
out	*serial*	device serial number

7.1.4.55 result_t XIMC_API get_enumerate_device_stage_name (device_enumeration_t device_enumeration, int device_index, stage_name_t * stage_name)

Get stage name from the device enumeration.

Returns *device_index* device stage name.

Parameters

in	*device_enumeration*	opaque pointer to an enumeration device data
in	*device_index*	device index
out	*stage_name*	stage name

7.1.4.56 result_t XIMC_API get_extended_settings (device_t id, extended_settings_t * extended_settings)

Read extended settings.

Currently, it is not in use.

See Also

set_extended_settings

Parameters

	id	An identifier of a device
out	*extended_settings*	EST settings

7.1.4.57 result_t XIMC_API get_extio_settings (device_t id, extio_settings_t * extio_settings)

Read EXTIO settings.

This function reads a structure with a set of EXTIO settings from the controller's memory.

See Also

set_extio_settings

Parameters

	id	An identifier of a device
out	*extio_settings*	EXTIO settings

7.1.4.58 **result_t XIMC_API** get_feedback_settings (**device_t** id, **feedback_settings_t** * feedback_settings)

Feedback settings.

Parameters

	id	An identifier of a device
out	*IPS*	number of encoder counts per shaft revolution. Range: 1..65535. The field is obsolete, it is recommended to write 0 to IPS and use the extended CountsPerTurn field. You may need to update the controller firmware to the latest version.
out	*FeedbackType*	type of feedback
out	*FeedbackFlags*	flags of feedback
out	*CountsPerTurn*	number of encoder counts per shaft revolution. Range: 1..4294967295. To use the CountsPerTurn field, write 0 in the IPS field, otherwise the value from the IPS field will be used.

7.1.4.59 **result_t XIMC_API** get_firmware_version (**device_t** id, unsigned int * Major, unsigned int * Minor, unsigned int * Release)

Read the controller's firmware version.

Parameters

	id	An identifier of a device
out	*Major*	major version
out	*Minor*	minor version
out	*Release*	release version

7.1.4.60 **result_t XIMC_API** get_gear_information (**device_t** id, **gear_information_t** * gear_information)

Deprecated.

Read gear information from the EEPROM.

Parameters

	id	An identifier of a device
out	*gear_information*	structure contains information about step gearhead

7.1.4.61 **result_t XIMC_API** get_gear_settings (**device_t** id, **gear_settings_t** * gear_settings)

Deprecated.

Read gear settings from the EEPROM.

Parameters

	id	An identifier of a device
out	*gear_settings*	structure contains step gearhead settings

7.1.4.62 **result_t XIMC_API** get_globally_unique_identifier (**device_t** id, **globally_unique_identifier_t** * globally_unique_identifier)

This value is unique to each individual device, but is not a random value.

Manufacturer only. This unique device identifier can be used to initiate secure boot processes or as a serial number for USB or other end applications.

Parameters

	id	An identifier of a device
out	*globally_unique_identifier*	the result of fields 0-3 concatenated defines the unique 128-bit device identifier.

7.1.4.63 **result_t XIMC_API** get_hallsensor_information (**device_t** id, **hallsensor_information_t** * hallsensor_information)

Deprecated.

Read hall sensor information from the EEPROM.

Parameters

	id	An identifier of a device
out	*hallsensor_information*	structure contains information about hall sensor

7.1.4.64 **result_t XIMC_API** get_hallsensor_settings (**device_t** id, **hallsensor_settings_t** * hallsensor_settings)

Deprecated.

Read hall sensor settings from the EEPROM.

Parameters

	id	An identifier of a device
out	*hallsensor_settings*	structure contains hall sensor settings

7.1.4.65 **result_t XIMC_API** get_home_settings (**device_t** id, **home_settings_t** * home_settings)

Read home settings.

This function reads the structure with home position settings.

See Also

home_settings_t

Parameters

	id	An identifier of a device
out	*home_settings*	calibrating position settings

7.1.4.66 **result_t XIMC_API** get_home_settings_calb (**device_t** id, **home_settings_calb_t** * home_settings_calb, const **calibration_t** * calibration)

Read user unit home settings.

This function reads the structure with home position settings.

See Also

home_settings_calb_t

Parameters

	id	An identifier of a device
out	*home_settings_calb*	calibrating position settings
	calibration	user unit settings

7.1.4.67 **result_t XIMC_API** get_init_random (**device_t** id, **init_random_t** * init_random)

Read a random number from the controller.

Manufacturer only.

Parameters

	id	An identifier of a device
out	*init_random*	random sequence generated by the controller

7.1.4.68 **result_t XIMC_API** get_joystick_settings (**device_t** id, **joystick_settings_t** * joystick_settings)

Read joystick settings.

If joystick position falls outside DeadZone limits, a movement begins. The speed is defined by the joystick's position in the range of the DeadZone limit to the maximum deviation. Joystick positions inside DeadZone limits correspond to zero speed (a soft stop of the motion), and positions beyond Low and High limits correspond to MaxSpeed[i] or -MaxSpeed[i] (see command SCTL), where i = 0 by default and can be changed with the left/right buttons (see command SCTL). If the next speed in the list is zero (both integer and microstep parts), the button press is ignored. The first speed in the list shouldn't be zero. See the Joystick control section on https://doc.xisupport.com for more information.

Parameters

	id	An identifier of a device
out	*joystick_settings*	structure contains joystick settings

7.1.4.69 **result_t XIMC_API** get_measurements (**device_t** id, **measurements_t** * measurements)

A command to read the data buffer to build a speed graph and a speed error graph.

Filling the buffer starts with the command "start_measurements". The buffer holds 25 points; the points are taken with a period of 1 ms. To create a robust system, read data every 20 ms. If the buffer is full, it is recommended to repeat the readings every 5 ms until the buffer again becomes filled with 20 points.

To stop measurements just stop reading data. After buffer overflow measurements will stop automatically.

See Also

measurements_t

Parameters

	id	An identifier of a device
out	*measurements*	structure with buffer and its length.

7.1.4.70 result_t XIMC_API get_motor_information (device_t id, motor_information_t * motor_information)

Deprecated.

Read motor information from the EEPROM.

Parameters

	id	An identifier of a device
out	*motor_information*	structure contains motor information

7.1.4.71 result_t XIMC_API get_motor_settings (device_t id, motor_settings_t * motor_settings)

Deprecated.

Read motor settings from the EEPROM.

Parameters

	id	An identifier of a device
out	*motor_settings*	structure contains motor settings

7.1.4.72 result_t XIMC_API get_move_settings (device_t id, move_settings_t * move_settings)

Movement settings read command (speed, acceleration, threshold, etc.).

Parameters

	id	An identifier of a device
out	*move_settings*	structure contains move settings: speed, acceleration, deceleration etc.

7.1.4.73 result_t XIMC_API get_move_settings_calb (device_t id, move_settings_calb_t * move_settings_calb, const calibration_t * calibration)

User unit movement settings read command (speed, acceleration, threshold, etc.).

Parameters

	id	An identifier of a device
out	*move_settings_calb*	structure contains move settings: speed, acceleration, deceleration etc.

	calibration	user unit settings

7.1.4.74 **result_t XIMC_API** get_network_settings (**device_t** id, **network_settings_t** * network_settings)

Read network settings.

Manufacturer only. This function returns the current network settings.

See Also

net_settings_t

Parameters

DHCPEnabled	DHCP enabled (1) or not (0)
IPv4Address[4]	Array[4] with an IP address
SubnetMask[4]	Array[4] with a subnet mask address
Default-Gateway[4]	Array[4] with a default gateway address

7.1.4.75 **result_t XIMC_API** get_nonvolatile_memory (**device_t** id, **nonvolatile_memory_t** * nonvolatile_memory)

Read user data from FRAM.

Parameters

	id	An identifier of a device
out	*nonvolatile_-memory*	structure contains previously set user data.

7.1.4.76 **result_t XIMC_API** get_password_settings (**device_t** id, **password_settings_t** * password_settings)

Read the password.

Manufacturer only. This function reads the user password for the device's web-page.

See Also

pwd_settings_t

Parameters

User-Password[20]	Password for web-page

7.1.4.77 **result_t XIMC_API** get_pid_settings (**device_t** id, **pid_settings_t** * pid_settings)

Read PID settings.

This function reads the structure containing a set of motor PID settings stored in the controller's memory. These settings specify the behavior of the PID routine for the positioner. These factors are slightly different for different positioners. All boards are supplied with the standard set of PID settings in the controller's flash memory.

See Also

set_pid_settings

Parameters

	id	An identifier of a device
out	*pid_settings*	PID settings

7.1.4.78 **result_t XIMC_API** get_position (**device_t** id, **get_position_t** * the_get_position)

Reads the value position in steps and microsteps for stepper motor and encoder steps for all engines.

Parameters

	id	An identifier of a device
out	*the_get_position*	structure contains motor position.

7.1.4.79 **result_t XIMC_API** get_position_calb (**device_t** id, **get_position_calb_t** * the_get_position_calb, const **calibration_t** * calibration)

Reads position value in user units for stepper motor and encoder steps for all engines.

Parameters

	id	An identifier of a device
out	*the_get_position_calb*	structure contains motor position.
	calibration	user unit settings

Note

Attention! Some parameters of the get_position_calb structure are corrected by the coordinate correction table.

7.1.4.80 **result_t XIMC_API** get_power_settings (**device_t** id, **power_settings_t** * power_settings)

Read settings of step motor power control.

Used with a stepper motor only.

Parameters

	id	An identifier of a device
out	*power_settings*	structure contains settings of step motor power control

7.1.4.81 **result_t XIMC_API** get_secure_settings (**device_t** id, **secure_settings_t** * secure_settings)

Read protection settings.

Parameters

	id	An identifier of a device
out	*secure_settings*	critical parameter settings to protect the hardware

See Also

status_t::flags

7.1.4.82 **result_t XIMC_API** get_serial_number (**device_t** id, unsigned int * SerialNumber)

Read device serial number.

Parameters

	id	An identifier of a device
out	*SerialNumber*	serial number

7.1.4.83 **result_t XIMC_API** get_stage_information (**device_t** id, **stage_information_t** * stage_information)

Deprecated.

Read stage information from the EEPROM.

Parameters

	id	An identifier of a device
out	*stage_information*	structure contains stage information

7.1.4.84 **result_t XIMC_API** get_stage_name (**device_t** id, **stage_name_t** * stage_name)

Read the user's stage name from the EEPROM.

Parameters

	id	An identifier of a device
out	*stage_name*	structure contains the previously set user's stage name.

7.1.4.85 **result_t XIMC_API** get_stage_settings (**device_t** id, **stage_settings_t** * stage_settings)

Deprecated.

Read stage settings from the EEPROM.

Parameters

	id	An identifier of a device
out	*stage_settings*	structure contains stage settings

7.1.4.86 result_t XIMC_API get_status (device_t id, status_t * status)

Return device state.

Parameters

	id	an identifier of device
out	*status*	structure with snapshot of controller status Device state. Useful structure that contains current controller status, including speed, position and boolean flags.

See Also

get_status

7.1.4.87 result_t XIMC_API get_status_calb (device_t id, status_calb_t * status, const calibration_t * calibration)

Return device state.

Parameters

	id	an identifier of device
out	*status*	structure with snapshot of controller status
	calibration	user unit settings Calibrated device state. Useful structure that contains current controller status, including speed, position and boolean flags.

See Also

get_status

7.1.4.88 result_t XIMC_API get_sync_in_settings (device_t id, sync_in_settings_t * sync_in_settings)

Read input synchronization settings.

This function reads the structure with a set of input synchronization settings, modes, periods and flags that specify the behavior of input synchronization. All boards are supplied with the standard set of these settings.

See Also

set_sync_in_settings

Parameters

	id	An identifier of a device
out	*sync_in_settings*	synchronization settings

7.1.4.89 **result_t XIMC_API** get_sync_in_settings_calb (**device_t** id, **sync_in_settings_calb_t** * sync_in_settings_calb, const **calibration_t** * calibration)

Read input user unit synchronization settings.

This function reads the structure with a set of input synchronization settings, modes, periods and flags that specify the behavior of input synchronization. All boards are supplied with the standard set of these settings.

See Also

set_sync_in_settings_calb

Parameters

	id	An identifier of a device
out	*sync_in_settings_calb*	synchronization settings
	calibration	user unit settings

7.1.4.90 **result_t XIMC_API** get_sync_out_settings (**device_t** id, **sync_out_settings_t** * sync_out_settings)

Read output synchronization settings.

This function reads the structure containing a set of output synchronization settings, modes, periods and flags that specify the behavior of output synchronization. All boards are supplied with the standard set of these settings.

See Also

set_sync_out_settings

Parameters

	id	An identifier of a device
out	*sync_out_settings*	synchronization settings

7.1.4.91 **result_t XIMC_API** get_sync_out_settings_calb (**device_t** id, **sync_out_settings_calb_t** * sync_out_settings_calb, const **calibration_t** * calibration)

Read output user unit synchronization settings.

This function reads the structure containing a set of output synchronization settings, modes, periods and flags that specify the behavior of output synchronization. All boards are supplied with the standard set of these settings.

See Also

set_sync_in_settings_calb

Parameters

	id	An identifier of a device
out	*sync_out_settings_calb*	synchronization settings
	calibration	user unit settings

7.1.4.92 **result_t XIMC_API** get_uart_settings (**device_t** id, **uart_settings_t** * uart_settings)

Read UART settings.

This function reads the structure containing UART settings.

See Also

uart_settings_t

Parameters

	Speed	UART speed
out	*uart_settings*	UART settings

7.1.4.93 **result_t XIMC_API** goto_firmware (**device_t** id, uint8_t * ret)

Reboot to firmware.

Parameters

	id	an identifier of device
out	*ret*	RESULT_OK, if reboot to firmware is possible. Reboot is done after reply to this command. RESULT_NO_FIRMWARE, if firmware is not found. RESULT_ALREADY_IN_FIRMWARE, if this command was sent when controller is already in firmware.

7.1.4.94 **result_t XIMC_API** has_firmware (const char * uri, uint8_t * ret)

Check for firmware on device.

Parameters

	uri	a uri of device
out	*ret*	non-zero if firmware existed

7.1.4.95 **result_t XIMC_API** load_correction_table (**device_t** * id, const char * namefile)

Command of loading a correction table from a text file (this function is deprecated).

Use the function set_correction_table(device_t id, const char* namefile). The correction table is used for position correction in case of mechanical inaccuracies. It works for some parameters in _calb commands.

Parameters

	id	an identifier the device
in	*namefile*	- the file name must be fully qualified. If the short name is used, the file must be located in the application directory. If the file name is set to NULL, the correction table will be cleared. File format: two tab-separated columns. Column headers are string. Data is real, the point is a determiter. The first column is a coordinate. The second one is the deviation caused by a mechanical error. The maximum length of a table is 100 rows.

Note

The id parameter in this function is a C pointer, unlike most library functions that use this parameter

See Also

command_move
get_position_calb
get_position_calb_t
get_status_calb
status_calb_t
get_edges_settings_calb
set_edges_settings_calb
edges_settings_calb_t

7.1.4.96 void **XIMC_API** logging_callback_stderr_narrow (int loglevel, const wchar_t * message, void * user_data)

Simple callback for logging to stderr in narrow (single byte) chars.

Parameters

loglevel	a loglevel
message	a message

7.1.4.97 void **XIMC_API** logging_callback_stderr_wide (int loglevel, const wchar_t * message, void * user_data)

Simple callback for logging to stderr in wide chars.

Parameters

loglevel	a loglevel
message	a message

7.1.4.98 void **XIMC_API** msec_sleep (unsigned int msec)

Sleeps for a specified amount of time.

Parameters

msec	time in milliseconds

7.1.4.99 **device_t XIMC_API** open_device (const char * uri)

Open a device with OS *uri* and return identifier of the device which can be used in calls.

Parameters

in	*uri*	- a device URI. Device URI has a form of "xi-com:port" or "xi-net://host/serial" or "xi-emu:///abs_path_to_file". For POSIX systems one can ommit root-slash in abs_path_to_file; for example, "xi-emu:///home/user/virt_controller.bin". In case of USB-COM port, the "port" is the OS device URI. For example, "xi-com:\\\\.\\COM3" in Windows (note that double-backslash will be transformed to single-backslash) or "xi-com:///dev/ttyACM0" in Linux/Mac. In case of network device, the "host" is an IPv4 address or fully qualified domain URI (FQDN), "serial" is the device serial number in hexadecimal system. For example, "xi-net://192.168.0.1/00001234" or "xi-net://hostname.com/89ABCDEF". In case of UDP protocol, use "xi-udp://<ip/host>:<port>. For example, "xi-udp://192.168.0.1:1818". In case of virtual device, the "abs_file_to_file" is the full path to the virtual device's file. If it doesn't exist, then it is created and initialized with default values. For example, "xi-emu:///C:/dir/file.bin" in Windows or "xi-emu:///home/user/file.bin" in Linux/Mac.

7.1.4.100 **result_t XIMC_API** probe_device (const char * uri)

Check if a device with OS uri *uri* is XIMC device.

Be carefuly with this call because it sends some data to the device.

Parameters

in	*uri*	- a device uri

7.1.4.101 **result_t XIMC_API** service_command_updf (**device_t** id)

The command switches the controller to update the firmware state.

Manufacturer only. After receiving this command, the firmware board sets a flag (for loader), sends an echo reply, and restarts the controller.

7.1.4.102 **result_t XIMC_API** set_accessories_settings (**device_t** id, const **accessories_settings_t** * accessories_settings)

Deprecated.

Set additional accessories' information to the EEPROM. Can be used by the manufacturer only.

Parameters

	id	An identifier of a device
in	*accessories_settings*	structure contains information about additional accessories

7.1.4.103 **result_t XIMC_API** set_bindy_key (const char * keyfilepath)

Set network encryption layer (bindy) key.

Parameters

in	*keyfilepath*	full path to the bindy keyfile When using network-attached devices this function must be called before enumerate_devices and open_device functions.

7.1.4.104 **result_t XIMC_API** set_brake_settings (**device_t** id, const **brake_settings_t** * brake_settings)

Set brake control settings.

Parameters

	id	An identifier of a device
in	*brake_settings*	structure contains brake control settings

7.1.4.105 **result_t XIMC_API** set_calibration_settings (**device_t** id, const **calibration_settings_t** * calibration_settings)

Set calibration settings.

Manufacturer only. This function sends the structure with calibration settings to the controller's memory. These settings are used to convert bare ADC values to winding currents in mA and the full current in mA. Parameters are grouped into pairs, XXX_A and XXX_B, representing linear equation coefficients. The first one is the slope, the second one is the constant term. Thus, XXX_Current[mA] = XXX_A[mA/ADC]*XXX_ADC_CODE[ADC] + XXX_B[mA].

See Also

calibration_settings_t

Parameters

	id	An identifier of a device
in	*calibration_settings*	calibration settings

7.1.4.106 **result_t XIMC_API** set_control_settings (**device_t** id, const **control_settings_t** * control_settings)

Read motor control settings.

In case of CTL_MODE=1, joystick motor control is enabled. In this mode, the joystick is maximally displaced, the engine tends to move at MaxSpeed[i]. i=0 if another value hasn't been set at the previous usage. To change the speed index "i", use the buttons.

In case of CTL_MODE=2, the motor is controlled by the left/right buttons. When you click on the button, the motor starts moving in the appropriate direction at a speed MaxSpeed[0]. After Timeout[i], motor moves at speed MaxSpeed[i+1]. At the transition between MaxSpeed[i] and MaxSpeed[i+1] the motor just accelerates/decelerates as usual.

Parameters

	id	An identifier of a device
in	*control_settings*	structure contains motor control settings.

7.1.4.107 **result_t XIMC_API** set_control_settings_calb (**device_t** id, const **control_settings_calb_t** * control_settings_calb, const **calibration_t** * calibration)

Set motor control settings.

In case of CTL_MODE=1, joystick motor control is enabled. In this mode, while the joystick is maximally displaced, the engine tends to move at MaxSpeed[i]. i=0 if another value hasn't been set at the previous usage. To change the speed index "i", use the buttons.

In case of CTL_MODE=2, the motor is controlled by the left/right buttons. When you click on the button, the motor starts moving in the appropriate direction at a speed MaxSpeed[0]. After Timeout[i], motor moves at speed MaxSpeed[i+1]. At the transition between MaxSpeed[i] and MaxSpeed[i+1] the motor just accelerates/decelerates as usual.

Parameters

	id	An identifier of a device
in	*control_settings_calb*	structure contains motor control settings.
	calibration	user unit settings

7.1.4.108 **result_t XIMC_API** set_controller_name (**device_t** id, const **controller_name_t** * controller_name)

Write user's controller name and internal settings to the FRAM.

Parameters

	id	An identifier of a device
in	*controller_name*	structure contains the previously set user's controller name

7.1.4.109 **result_t XIMC_API** set_correction_table (**device_t** id, const char * namefile)

Command of loading a correction table from a text file.

The correction table is used for position correction in case of mechanical inaccuracies. It works for some parameters in _calb commands.

Parameters

	id	an identifier the device
in	*namefile*	- the file name must be either a full path or a relative path. If the file name is set to NULL, the correction table will be cleared. File format: two tab-separated columns. Column headers are strings. Data is real, the dot is a delimiter. The first column is a coordinate. The second one is the deviation caused by a mechanical error. The maximum length of a table is 100 rows. Coordinate column must be sorted in ascending order.

See Also

command_move
get_position_calb
get_position_calb_t
get_status_calb
status_calb_t
get_edges_settings_calb

set_edges_settings_calb
edges_settings_calb_t

7.1.4.110 **result_t XIMC_API** set_ctp_settings (**device_t** id, const **ctp_settings_t** * ctp_settings)

Set control position settings (used with stepper motor only).

When controlling the step motor with the encoder (CTP_BASE=0), it is possible to detect the loss of steps. The controller knows the number of steps per revolution (GENG::StepsPerRev) and the encoder resolution (GFBS::IPT). When the control is enabled (CTP_ENABLED is set), the controller stores the current position in the steps of SM and the current position of the encoder. Next, the encoder position is converted into steps at each step, and if the difference between the current position in steps and the encoder position is greater than CTPMinError, the flag STATE_CTP_ERROR is set.

Alternatively, the stepper motor may be controlled with the speed sensor (CTP_BASE 1). In this mode, at the active edges of the input clock, the controller stores the current value of steps. Then, at each revolution, the controller checks how many steps have been passed. When the difference is over the CTPMinError, the STATE_CTP_ERROR flag is set.

Parameters

	id	An identifier of a device
in	*ctp_settings*	structure contains position control settings.

7.1.4.111 **result_t XIMC_API** set_debug_write (**device_t** id, const **debug_write_t** * debug_write)

Write data to firmware for debug purpose.

Manufacturer only.

Parameters

	id	An identifier of a device
in	*debug_write*	Debug data.

7.1.4.112 **result_t XIMC_API** set_edges_settings (**device_t** id, const **edges_settings_t** * edges_settings)

Set border and limit switches settings.

See Also

get_edges_settings

Parameters

	id	An identifier of a device
in	*edges_settings*	edges settings, specify types of borders, motor behavior and electrical behavior of limit switches

7.1.4.113 **result_t XIMC_API** set_edges_settings_calb (**device_t** id, const **edges_settings_calb_t** * edges_settings_calb, const **calibration_t** * calibration)

Set border and limit switches settings in user units.

See Also

get_edges_settings_calb

Parameters

	id	An identifier of a device
in	*edges_settings_calb*	edges settings, specify types of borders, motor behavior and electrical behavior of limit switches
	calibration	user unit settings

Note

Attention! Some parameters of the edges_settings_calb structure are corrected by the coordinate correction table.

7.1.4.114 **result_t XIMC_API** set_emf_settings (**device_t** id, const **emf_settings_t** * emf_settings)

Set electromechanical coefficients.

The settings are different for different stepper motors. Please set new settings when you change the motor.

See Also

get_emf_settings

Parameters

	id	An identifier of a device
in	*emf_settings*	EMF settings

7.1.4.115 **result_t XIMC_API** set_encoder_information (**device_t** id, const **encoder_information_t** * encoder_information)

Deprecated.

Set encoder information to the EEPROM. Can be used by the manufacturer only.

Parameters

	id	An identifier of a device
in	*encoder_information*	structure contains information about encoder

7.1.4.116 **result_t XIMC_API** set_encoder_settings (**device_t** id, const **encoder_settings_t** * encoder_settings)

Deprecated.

Set encoder settings to the EEPROM. Can be used by the manufacturer only.

Parameters

	id	An identifier of a device
in	*encoder_settings*	structure contains encoder settings

7.1.4.117 **result_t XIMC_API** set_engine_advansed_setup (**device_t** id, const **engine_advansed_setup_t** * engine_advansed_setup)

Set engine advanced settings.

See Also

get_engine_advansed_setup

Parameters

	id	An identifier of a device
in	*engine_advansed_setup*	EAS settings

7.1.4.118 **result_t XIMC_API** set_engine_settings (**device_t** id, const **engine_settings_t** * engine_settings)

Set engine settings.

This function sends a structure with a set of engine settings to the controller's memory. These settings specify the motor shaft movement algorithm, list of limitations and rated characteristics. Use it when you change the motor, encoder, positioner, etc. Please note that wrong engine settings may lead to device malfunction, which can cause irreversible damage to the board.

See Also

get_engine_settings

Parameters

	id	An identifier of a device
in	*engine_settings*	engine settings

7.1.4.119 **result_t XIMC_API** set_engine_settings_calb (**device_t** id, const **engine_settings_calb_t** * engine_settings_calb, const **calibration_t** * calibration)

Set user unit engine settings.

This function sends a structure with a set of engine settings to the controller's memory. These settings specify the motor shaft movement algorithm, list of limitations and rated characteristics. Use it when you change the motor, encoder, positioner etc. Please note that wrong engine settings may lead to device malfunction, which can cause irreversible damage to the board.

See Also

get_engine_settings

Parameters

	id	An identifier of a device
in	*engine_settings_calb*	engine settings
	calibration	user unit settings

7.1.4.120 **result_t XIMC_API** set_entype_settings (**device_t** id, const **entype_settings_t** * entype_settings)

Set engine type and driver type.

Parameters

	id	An identifier of a device
in	*entype_settings*	structure contains motor type and power driver type settings

7.1.4.121 **result_t XIMC_API** set_extended_settings (**device_t** id, const **extended_settings_t** * extended_settings)

Set extended settings.

Currently, it is not in use.

See Also

get_extended_settings

Parameters

	id	An identifier of a device
in	*extended_settings*	EST settings

7.1.4.122 **result_t XIMC_API** set_extio_settings (**device_t** id, const **extio_settings_t** * extio_settings)

Set EXTIO settings.

This function sends the structure with a set of EXTIO settings to the controller's memory. By default, input events are signaled through a rising front, and output states are signaled by a high logic state.

See Also

get_extio_settings

Parameters

	id	An identifier of a device
in	*extio_settings*	EXTIO settings

7.1.4.123 **result_t XIMC_API** set_feedback_settings (**device_t** id, const **feedback_settings_t** * feedback_settings)

Feedback settings.

Parameters

	id	An identifier of a device
in	*IPS*	number of encoder counts per shaft revolution. Range: 1..65535. The field is obsolete, it is recommended to write 0 to IPS and use the extended CountsPerTurn field. You may need to update the controller firmware to the latest version.
in	*FeedbackType*	type of feedback
in	*FeedbackFlags*	flags of feedback
in	*CountsPerTurn*	number of encoder counts per shaft revolution. Range: 1..4294967295. To use the CountsPerTurn field, write 0 in the IPS field, otherwise the value from the IPS field will be used.

7.1.4.124 **result_t XIMC_API** set_gear_information (**device_t** id, const **gear_information_t** * gear_information)

Deprecated.

Set gear information to the EEPROM. Can be used by the manufacturer only.

Parameters

	id	An identifier of a device
in	*gear_information*	structure contains information about step gearhead

7.1.4.125 **result_t XIMC_API** set_gear_settings (**device_t** id, const **gear_settings_t** * gear_settings)

Deprecated.

Set gear settings to the EEPROM. Can be used by the manufacturer only.

Parameters

	id	An identifier of a device
in	*gear_settings*	structure contains step gearhead settings

7.1.4.126 **result_t XIMC_API** set_hallsensor_information (**device_t** id, const **hallsensor_information_t** * hallsensor_information)

Deprecated.

Set hall sensor information to the EEPROM. Can be used by the manufacturer only.

Parameters

	id	An identifier of a device
in	*hallsensor_information*	structure contains information about hall sensor

7.1.4.127 **result_t XIMC_API** set_hallsensor_settings (**device_t** id, const **hallsensor_settings_t** * hallsensor_settings)

Deprecated.

Set hall sensor settings to the EEPROM. Can be used by the manufacturer only.

Parameters

	id	An identifier of a device
in	*hallsensor_settings*	structure contains hall sensor settings

7.1.4.128 **result_t XIMC_API** set_home_settings (**device_t** id, const **home_settings_t** * home_settings)

Set home settings.

This function sends home position structure to the controller's memory.

See Also

home_settings_t

Parameters

	id	An identifier of a device
in	*home_settings*	calibrating position settings

7.1.4.129 **result_t XIMC_API** set_home_settings_calb (**device_t** id, const **home_settings_calb_t** * home_settings_calb, const **calibration_t** * calibration)

Set user unit home settings.

This function sends home position structure to the controller's memory.

See Also

home_settings_calb_t

Parameters

	id	An identifier of a device
in	*home_settings_calb*	calibrating position settings
	calibration	user unit settings

7.1.4.130 **result_t XIMC_API** set_joystick_settings (**device_t** id, const **joystick_settings_t** * joystick_settings)

Set joystick position.

If joystick position falls outside DeadZone limits, a movement begins. The speed is defined by the joystick's position in the range of the DeadZone limit to the maximum deviation. Joystick positions inside DeadZone limits correspond to zero speed (a soft stop of motion), and positions beyond Low and High limits correspond

to MaxSpeed[i] or -MaxSpeed[i] (see command SCTL), where i = 0 by default and can be changed with the left/right buttons (see command SCTL). If the next speed in the list is zero (both integer and microstep parts), the button press is ignored. The first speed in the list shouldn't be zero. See the Joystick control section on https://doc.xisupport.com for more information.

Parameters

	id	An identifier of a device
in	*joystick_settings*	structure contains joystick settings

7.1.4.131 void **XIMC_API** set_logging_callback (**logging_callback_t** logging_callback, void * user_data)

Sets a logging callback.

Call resets a callback to default (stderr, syslog) if NULL passed.

Parameters

logging_callback	a callback for log messages

7.1.4.132 **result_t XIMC_API** set_motor_information (**device_t** id, const **motor_information_t** * motor_information)

Deprecated.

Set motor information to the EEPROM. Can be used by the manufacturer only.

Parameters

	id	An identifier of a device
in	*motor_information*	structure contains motor information

7.1.4.133 **result_t XIMC_API** set_motor_settings (**device_t** id, const **motor_settings_t** * motor_settings)

Deprecated.

Set motor settings to the EEPROM. Can be used by the manufacturer only.

Parameters

	id	An identifier of a device
in	*motor_settings*	structure contains motor information

7.1.4.134 **result_t XIMC_API** set_move_settings (**device_t** id, const **move_settings_t** * move_settings)

Movement settings set command (speed, acceleration, threshold, etc.).

Parameters

	id	An identifier of a device
in	*move_settings*	structure contains move settings: speed, acceleration, deceleration etc.

7.1.4.135 **result_t XIMC_API** set_move_settings_calb (**device_t** id, const **move_settings_calb_t** * move_settings_calb, const **calibration_t** * calibration)

User unit movement settings set command (speed, acceleration, threshold, etc.).

Parameters

	id	An identifier of a device
in	*move_settings_calb*	structure contains move settings: speed, acceleration, deceleration etc.
	calibration	user unit settings

7.1.4.136 **result_t XIMC_API** set_network_settings (**device_t** id, const **network_settings_t** * network_settings)

Set network settings.

Manufacturer only. This function sets the desired network settings.

See Also

net_settings_t

Parameters

DHCPEnabled	DHCP enabled (1) or not (0)
IPv4Address[4]	Array[4] with an IP address
SubnetMask[4]	Array[4] with a subnet mask address
DefaultGateway[4]	Array[4] with a default gateway address

7.1.4.137 **result_t XIMC_API** set_nonvolatile_memory (**device_t** id, const **nonvolatile_memory_t** * nonvolatile_memory)

Write user data into the FRAM.

Parameters

	id	An identifier of a device
in	*nonvolatile_memory*	user data.

7.1.4.138 **result_t XIMC_API** set_password_settings (**device_t** id, const **password_settings_t** * password_settings)

Sets the password.

Manufacturer only. This function sets the user password for the device's web-page.

See Also

pwd_settings_t

Parameters

User-Password[20]	Password for web-page

7.1.4.139 **result_t XIMC_API** set_pid_settings (**device_t** id, const **pid_settings_t** * pid_settings)

Set PID settings.

This function sends the structure with a set of PID factors to the controller's memory. These settings specify the behavior of the PID routine for the positioner. These factors are slightly different for different positioners. All boards are supplied with the standard set of PID settings in the controller's flash memory. Please use it for loading new PID settings when you change positioner. Please note that wrong PID settings lead to device malfunction.

See Also

get_pid_settings

Parameters

	id	An identifier of a device
in	*pid_settings*	PID settings

7.1.4.140 **result_t XIMC_API** set_position (**device_t** id, const **set_position_t** * the_set_position)

Sets position in steps and microsteps for stepper motor.

Sets encoder position for all engines.

Parameters

	id	An identifier of a device
out	*the_set_position*	structure contains motor position.

7.1.4.141 **result_t XIMC_API** set_position_calb (**device_t** id, const **set_position_calb_t** * the_set_position_calb, const **calibration_t** * calibration)

Sets any position value and encoder value of all engines.

In user units.

Parameters

	id	An identifier of a device
out	*the_set_position_calb*	structure contains motor position.
	calibration	user unit settings

7.1.4.142 **result_t XIMC_API** set_power_settings (**device_t** id, const **power_settings_t** * power_settings)

Set settings of step motor power control.

Used with a stepper motor only.

Parameters

	id	An identifier of a device
in	*power_settings*	structure contains settings of step motor power control

7.1.4.143 **result_t XIMC_API** set_secure_settings (**device_t** id, const **secure_settings_t** * secure_settings)

Set protection settings.

Parameters

id	An identifier of a device
secure_settings	structure with secure data

See Also

status_t::flags

7.1.4.144 **result_t XIMC_API** set_serial_number (**device_t** id, const **serial_number_t** * serial_number)

Write device serial number and hardware version to the controller's flash memory.

Along with the new serial number and hardware version, a "Key" is transmitted. The SN and hardware version are changed and saved when keys match. Can be used by the manufacturer only.

Parameters

	id	An identifier of a device
in	*serial_number*	structure contains new serial number and secret key.

7.1.4.145 **result_t XIMC_API** set_stage_information (**device_t** id, const **stage_information_t** * stage_information)

Deprecated.

Set stage information to the EEPROM. Can be used by the manufacturer only.

Parameters

	id	An identifier of a device
in	*stage_information*	structure contains stage information

7.1.4.146 **result_t XIMC_API** set_stage_name (**device_t** id, const **stage_name_t** * stage_name)

Write the user's stage name to EEPROM.

Parameters

	id	An identifier of a device
in	*stage_name*	structure contains the previously set user's stage name.

7.1.4.147 **result_t XIMC_API** set_stage_settings (**device_t** id, const **stage_settings_t** * stage_settings)

Deprecated.

Set stage settings to the EEPROM. Can be used by the manufacturer only

Parameters

	id	An identifier of a device
in	*stage_settings*	structure contains stage settings

7.1.4.148 **result_t XIMC_API** set_sync_in_settings (**device_t** id, const **sync_in_settings_t** * sync_in_settings)

Set input synchronization settings.

This function sends the structure with a set of input synchronization settings that specify the behavior of input synchronization to the controller's memory. All boards are supplied with the standard set of these settings.

See Also

get_sync_in_settings

Parameters

	id	An identifier of a device
in	*sync_in_settings*	synchronization settings

7.1.4.149 **result_t XIMC_API** set_sync_in_settings_calb (**device_t** id, const **sync_in_settings_calb_t** * sync_in_settings_calb, const **calibration_t** * calibration)

Set input user unit synchronization settings.

This function sends the structure with a set of input synchronization settings that specify the behavior of input synchronization to the controller's memory. All boards are supplied with the standard set of these settings.

See Also

get_sync_in_settings_calb

Parameters

	id	An identifier of a device
in	*sync_in_-settings_calb*	synchronization settings
	calibration	user unit settings

7.1.4.150 **result_t XIMC_API** set_sync_out_settings (**device_t** id, const **sync_out_settings_t** * sync_out_settings)

Set output synchronization settings.

This function sends the structure with a set of output synchronization settings that specify the behavior of output synchronization to the controller's memory. All boards are supplied with the standard set of these settings.

See Also

get_sync_out_settings

Parameters

	id	An identifier of a device
in	*sync_out_settings*	synchronization settings

7.1.4.151 **result_t XIMC_API** set_sync_out_settings_calb (**device_t** id, const **sync_out_settings_calb_t** * sync_out_settings_calb, const **calibration_t** * calibration)

Set output user unit synchronization settings.

This function sends the structure with a set of output synchronization settings that specify the behavior of output synchronization to the controller's memory. All boards are supplied with the standard set of these settings.

See Also

get_sync_in_settings_calb

Parameters

	id	An identifier of a device
in	*sync_out_settings_calb*	synchronization settings
	calibration	user unit settings

7.1.4.152 **result_t XIMC_API** set_uart_settings (**device_t** id, const **uart_settings_t** * uart_settings)

Set UART settings.

This function sends the structure with UART settings to the controller's memory.

See Also

uart_settings_t

Parameters

	Speed	UART speed
in	*uart_settings*	UART settings

7.1.4.153 **result_t XIMC_API** write_key (const char * uri, uint8_t * key)

Write controller key.

Can be used by manufacturer only

Parameters

	uri	a uri of device
in	*key*	protection key. Range: 0..4294967295

7.1.4.154 **result_t XIMC_API** ximc_fix_usbser_sys (const char * device_uri)

Fixing a USB driver error in Windows.

The USB-COM subsystem in the Windows OS does not always work correctly. During operation, the following malfunctions are possible: All attempts to open the device fail. The device can be opened and data can be sent to it, but the response data is not received. These problems are fixed by reconnecting the device or reinitializing it in the Device Manager. The ximc_fix_usbser_sys() function automates the deletion detection process.

7.1.4.155 void **XIMC_API** ximc_version (char * version)

Returns a library version.

Parameters

version	a buffer to hold a version string, 32 bytes is enough

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