THE UNIDEX® 600 SERIES
MOTION CONTROLLER

LIBRARY REFERENCE MANUAL

P/N: EDU156 (V1.4)

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PREFACE

The Preface gives the reader an overview of topics covered in each of chapter and conventions used in this manual. The following topics are contained in this manual:

CHAPTER 1: INTRODUCTION

Chapter 1 contains an overview of the UNIDEX 600 reference library manual.
Section 1.4. is a Visual Basic Quick Start guide.
Section 1.5. is a C Language Programming Quick Start section.
Section 1.6. is a LabView Programming Quick Start section.

CHAPTER 2: AUTOMATION PROGRAM FUNCTIONS

This chapter describes the routines used within the MMI600 for the Program Automation feature (i.e., the auto running and auto including programs).

CHAPTER 3: AUXILIARY TABLE FUNCTIONS

This chapter contains information about the auxiliary table functions that fire the auxiliary outputs based on the position of a given axis. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 4: AXIS CALIBRATION FUNCTIONS

Information about the axis calibration functions that apply correction values to a given axis based on another axis' position are given in Chapter 3. These functions typically produce an error look-up table from an accurate position measurement device, such as a laser interferometer, to correct inaccuracies of a mechanical device, like a ball screw. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 5: ELECTRONIC CAMMING FUNCTIONS

This chapter supplies information about the electronic camming functions that allow the user to synchronize slave axes to the motion of a master axis. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 6: COMPILER FUNCTIONS

Chapter 5 provides information on the compiler functions that accept CNC program lines and entire programs. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 7: AXIS CONFIGURATION FUNCTIONS

This chapter contains information about the axis configuration functions that allow the controller's axes to be configured for various resolutions and feedback devices. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 8: DATA CENTER FUNCTIONS

Functions for retrieving blocks of axis and task data are detailed in the Data Center functions chapter. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 9: ERROR FUNCTIONS

This chapter contains information on the error functions that allow the programmer to access ASCII error strings for the defined error codes. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 10: EVENT FUNCTIONS

Provided in this chapter is information on event functions that the UNIDEX 600 series controllers use to communicate back to the application running on the host PC. Provided with each function is the prototype and a list of applicable parameters.

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This chapter contains information on the memory functions that read, write, or query memory on the axis processor card. Provided with each function is the prototype and a list of applicable parameters.

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The Profiling Functions give the programmer low-level access to derive their own profile motion. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 16: PROGRAMMING ERROR FUNCTIONS

This chapter provides information on the program functions that return data regarding programming errors or ASCII strings. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 17: PROGRAM FUNCTIONS

This chapter contains information on functions that allow the caller to obtain information about, and set associated parameters for a program already residing on the axis processor card.

CHAPTER 18: PSO (LASER) FUNCTIONS

Information on the PSO laser functions, which permit Aerotech's Position Synchronized Output (PSO) card to be configured for tracking up to three axes of motion and generating an output signal to fire the laser, are provided in Chapter 17. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 19: REGISTRY FUNCTIONS

This chapter contains information on the registry functions that are used to configure the UNIDEX 600 series controllers for either Windows 95 or Windows NT Operating System. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 20: STRIP CHARTING FUNCTIONS

This chapter contains information on the strip charting functions that provide an interface for single or multiple axis data collection. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 21: SYSTEM FUNCTIONS

This chapter provides information on the system functions used to initialize, configure, and control the UNIDEX 600 series controllers. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 22: TASK FUNCTIONS

This chapter contains information about functions that allow the user to execute and control the execution of CNC programs already residing on the axis processor.

CHAPTER 23: TOOL FUNCTIONS

This chapter contains information about functions that are responsible for managing Tool Files and Tool Tables on the axis processor.

CHAPTER 24: TORQUE FUNCTIONS

Contained in this chapter is information on the torque functions that allow constant torque to be maintained on an axis independent of speed. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 25: UTILITY FUNCTIONS

This chapter contains information on the utility functions that are a miscellaneous group of functions. Provided with each function is the prototype and a list of applicable parameters.

CHAPTER 26: VARIABLE FUNCTIONS

This chapter contains information about variable functions that read and write to the user variables within the UNIDEX 600 Series controllers.

CHAPTER 27: VERSION FUNCTIONS

This chapter contains information on the version functions that provide information about the current version of the UNIDEX 600 series controller firmware and library (AerSys.DLL) executing on the system. Provided with each function is the prototype and list of applicable parameters.

CHAPTER 28: VIRTUAL I/O FUNCTIONS

This chapter contains information on the Virtual I/O functions that read and write to the virtual I/O of the UNIDEX 600 Series controllers.

APPENDIX A: CONSTANTS FOR C LANGUAGE AND LABVIEW USERS

Appendix A contains definitions of all the constants used within the library's (AerSys.DLL).

APPENDIX B: VISUAL BASIC CONSTANTS

Appendix B contains definitions of all the constants used within the library's (AerSys.DLL).

APPENDIX C: STRUCTURES AND DATA TYPES

Appendix C contains definitions of all the structures used within the library (AerSys.DLL).

APPENDIX D: WARRANTY AND FIELD SERVICE

Appendix D contains the warranty and field service policy for Aerotech products.

INDEX

The index contains a page number reference of topics discussed in this manual. Locator page references in the index contain the chapter number (or appendix letter) followed by the page number of the reference.

REVISION HISTORY

This section lists the changes made for the current revision.

CUSTOMER SURVEY FORM

A customer survey form is included at the end of this manual for the reader's comments and suggestions about this manual. Reader's are encouraged to critique the manual and offer their feedback by completing the form and either mailing or faxing it to Aerotech.

Throughout this manual the following conventions are used:

- The terms UNIDEX 600, UNIDEX 620, U600, and U620 are used interchangeably throughout this manual.
- Most functions have a "C" and Visual Basic (VB) prototype below them and a symbol in the outer margin indicates which type it is, see right margin.
- All Aerotech functions available to the user have the prefix "Aer." The word following the prefix refers to the logical group the function belongs (e.g., all configuration functions are prefixed with "AerConfig".
- All Aerotech functions that are only intended for internal use have a prefix of "aer" (e.g., the function *AerCamTableGetStatus* function calls the internal function *aerCamTableGetStatusPacket*. These functions may or may not be retrievable from outside the AERSYS.DLL depending on the context.
- Some cases in the manual refer to a whole group of functions using the suffix "xxxx" (e.g., *AerCmplrxxxx*) to indicate generality. See *AerSyncxxxx* functions, means that the text is relevant to all functions beginning with "AerSync."
- *Italic font* is used to illustrate functions and parameters (e.g., *AerCamTableGetStatus*, *FAULTMASK*, AERERR_CODE AerAxisCalSet(HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wTable*, DWORD *dwInput*, DWORD *dwScale*);).
- "Axis processor" refers to the Intel 80960 RISC processor within UNIDEX 600, and the 620 system that perform all the motion and CNC program execution.
- "Front-end" is used to refer to any application running on the host PC that communicates with the axis processor.
- This manual uses the symbol "∇ ∇ ∇" to indicate the end of a chapter.

Indicates C prototype

C

Indicates Visual Basic Prototype

VB

Although every effort has been made to ensure consistency, subtle differences may exist between the illustrations in this manual and the component and/or software screens that they represent.

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CHAPTER 1: INTRODUCTION

In This Section:

1.1. Overview

MS Visual Basic and LabView programmers are strongly recommended to purchase our SDK600-NT, instead of using the library calls contained in this manual. Using the SDK600-NT will simplify and speed up the application development process. These ActiveX objects are proven integral parts of Aerotech's MMI600 CNC application and utilities. For documentation on the SDK600-NT, visit our website at www.aerotech.com and download the U600 SDK help file.

IMPORTANT

The UNIDEX 600 software is designed to run in Microsoft's Win32 environment. This includes Windows 95 and Windows NT. No effort has been made to support Win32s. Due to the nature of Win32, a device driver is necessary for hardware communications. The basic components necessary for running an application on the U600 Series controller includes the following: an image (or firmware) file, a device driver, and the Aerotech System DLLs. The image file is the operating system of the controller. The device driver is responsible for communications between the PC and controller. The System DLLs are responsible for communications between the user application and device driver. The image files and Aerotech System DLLs are operating system independent; the device driver is operating system dependent.

As a programmer, the Aerotech System DLL is the component that is used for all communications. This is the only interface available to the programmer. In fact, it is the ONLY interface that Aerotech uses to communicate to the U600 Series controller. It is the building block of all U600 software components, including the software development kit (SDK600-NT).

The U600 software does not have any built in multitasking limitations. Any Aerotech utility program, the U600 MMI, and any user application should be able to be run together. The controller only relies on the device driver and system libraries to feed it commands. Once a command is sent to the controller, it will run until completion unless a fault occurs or otherwise directed by the user.

1.1.1. Developing an Application

The following steps are necessary for developing an application:

1. Install the UNIDEX 600 Series Libraries and Utilities.

These disks have all the necessary DLLs, libraries, image files, and device drivers. They also have all the example programs that are referenced in this manual. The installation program also configures the registry.

2. Develop the application, with error handling.

Error Codes

All functions return an AERERR_CODE. This is a 32 bit value. See Section 1.8.: *Error Handling* and Chapter 8: *Error Functions* for more detail. These may indicate programming faults, but do not indicate axis faults (see step **6** below and Section 1.8.3: *Faults*).

The return code for the library functions should always be tested for errors.

3. Establish communications.

Every application needs to establish communications with the device driver. This is done by calling *AerSysOpen*. This establishes the link between the libraries, device driver, and image files. This function returns a handle, referred to as an HAERCTRL (read H-Aer-Control), which is passed to all functions that require communications to the device driver and ultimately the controller.

4. Begin execution of the image (firmware), and configure the controller.

The firmware is the operating system of the controller. It is required for execution before any commands are sent to the controller. This is accomplished by calling *AerSysInitSystem*.

It is not necessary to download the image file each time an application starts up. It is only required once per power-up. This allows for configuration and setup from utility applications at various stages if desired. In fact, the download will fail if the image is already executing. See *AerSysReset* to halt execution of the image file.

Configure the controller via its .INI files stored in the \U600\INI folder. The *U600 Series User's Guide, P/N EDU157* contains additional information on the steps involved in axis configuration. See the *Axis Configuration* and *Parameter Functions* in this manual to setup an axis programmatically.

5. Make motion.

At this point, the user has many options in making motion.

For asynchronous motion see the *Move Functions*.

For executing CNC G-Code programs see the *Compiler, Program,* and *Task Functions*.

For master-slave motion see the *Electronic Camming Functions*.

6. Monitoring status, IO, and retrieving current information.

Most status information is available through the various parameters. This includes feedback information (position, velocity, position command, etc.) and fault information. The *U600 Series User's Guide, P/N EDU157* contains detailed information on all the available parameters. See the *Parameter Functions* for details on getting and setting these values.

Fault conditions can be monitored by polling of the FAULT axis parameter, TaskFault task parameter, or the use of a callback event. For more general information on the callback mechanism, see the *U600 Series User's Guide, P/N EDU157*. See the *Event Functions* for programming information.

I/O can be manipulated by using the *Virtual I/O Functions*. These allow for integrating foreign I/O into the controller.

To manipulate variables associated with a CNC program, see the *Variable Functions*.

7. Close communications.

When finished, do not forget to close the communications channel. This will ensure that system resources are properly cleaned up. See *AerSysClose* for more details.

8. Redistribute the application and the registry.

After creating the application, the user may have to move it to another machine. Keep in mind that not only are Aerotech DLLs, image files, and device drivers needed, but the user also needs to configure the registry.

The AerReg utility allows the user to setup or change the system registry. This utility can be used to configure machines appropriately or see the *Registry Functions* to configure the registry programmatically.

Although the information can be manipulated directly through the operating system or with the Win32 Registry functions, we strongly recommend using the provided functions or utilities. The UNIDEX 600 registry is setup differently between Windows NT and Windows 95, these functions automatically take into account these differences.

1.2. Building

The user should ALWAYS build applications with exception handling enabled, so the routines can properly detect errors. The user must include the Aerotech-provided header file: AERSYS.H in files that call Aerotech functions. This header file will include all other Aerotech provided header files that must be in the same directory as the AERSYS.H file. The user must link with the Aerotech provided libraries AERSYS.LIB and AERERR.LIB. In addition, if making *AerCompilerxxxx* calls, the user must also link with AERCMPLR.LIB.

At execution time, the Aerotech provided DLLs AERSYS.DLL and AERERR.DLL must be within the system file search path. In addition, if making "*AerCompilerxxxx*" calls, the user must have the files: AERCMPLR.DLL, SSSCAN.DFA, and SSSCAN.LLR files within the path also.

> The example programs referenced in this manual are distributed with the software and installed in an "examples" subdirectory in the user's machine.

1.3. Calling

Almost all Aerotech functions require the first parameter to be of type HAERCTRL. This is a handle to the controller. These functions send and sometimes receive data from the controller. The user must use an *AerSysOpen* call to obtain a valid HAERCTRL before calling any function requiring controller communication. However, some functions do not communicate to the controller (for example *AerErrGetMessage*, which returns an error string for the specified error code). These functions do not have an HAERCTRL argument.

1.4. Visual Basic Programming Quick Start

Using Aerotech's defines within VisualBasic, requires adding the Aerotech Type Library to VisualBasic. This is done by selecting the Project Menu and the References Menu selection. Many Aerotech functions require these defines.

If the Aerotech System Type library is shown, click its checkbox, then click OK. Otherwise, click the browser button and locate AerSys.dll, usually found in the \U600\Bin folder – click its check box and click OK.

You may now press F2 in VisualBasic or select the Object Browser from the View menu to see the programming defines within he Aerotech System Type Library.

1.4.1. Developing an Application

See \U600\Samples\Lib\VisualBasic\RunPgm.VBP

See \U600\Samples\ReadMe.Txt for the latest information on examples. Be sure to read Section 1.7 Debugging for information on debugging your application.

1.5. C/C++ Language Programming Quick Start

Add the following folders to your include file path:

\U600\Include
\U600\ACL (C++ Only)

Add the following files to your lib file path:

\U600\Lib

1.5.1. Developing an Application

\U600\Samples\Lib\AexAux*.c	\\ auxiliary tables
\U600\Samples\Lib\AexCal*.c	\\ axis calibration
\U600\Samples\Lib\AexCam*.c	\\ electronic camming
\U600\Samples\Lib\AexCfg*.c	\\ axis configuration
\U600\Samples\Lib\AexCmplr*.c	\\ compiling a CNC program
\U600\Samples\Lib\AexHand*.c	\\ handwheel
\U600\Samples\Lib\AexMove*.c	\\ AerMove functions
\U600\Samples\Lib\AexProbe*.c	\\ touch probe
\U600\Samples\Lib\AexProf*.c	\\ profile queue
\U600\Samples\Lib\AexProg*.c	\\ run a CNC program
\U600\Samples\Lib\AexPSO*.c	\\ (PSO) laser firing
\U600\Samples\Lib\AexStrip*.c	\\ strip charting (AerTune, AerPlot)
\U600\Samples\Lib\AexSys*.c	\\ controller initialization
\U600\Samples\Lib\AexTask*.c	\\ program task control
\U600\Samples\Lib\AexTool*.c	\\ tool tables
\U600\Samples\Lib\AexVirt*.c	\\ virtual I/O (binary I/O)

See \U600\Samples\ReadMe.Txt for the latest information on examples.

Be sure to read Section 1.7 Debugging, for information on debugging your application.

1.5.2. C++ Language Example Programs

\U600\Samples\Lib\AexEvent*.cpp

\U600\Samples\AerCBack*.cpp

See \U600\Samples\ReadMe.Txt for the latest information on examples.

Be sure to read Section 1.7 Debugging for information on debugging your application.

1.6. LabView Programming Quick Start

LabView programmers should use the C language function definitions and their respective constants in the C Language Constants Appendix.

1.6.1. LabView Library Example Programs

These example .VI's illustrate to the end user, how to call Aerotech library functions from within LabView. You will notice that all of the Library .vi names correspond to a function call in the Library Reference manuals, EDU156, which is the reference point for all of the .vi's and their parameters.

There are many examples in the \U600\Samples\LabView\Lib folder. Open one of the following .vi's as a starting point for the example's:

Simple .vi's:

ExGlobalVarReadWrite.vi	; Read/write global variable's
ReadWriteRegisters.vi	; Read/write registers
ReadWriteDoubleandString.vi	; Read/write globals & strings

Complex .vi's:

Aer_Control.vi	; Main .vi that allows the 30 AerXxx
	; library functions to be executed (called)

The examples in the \U600\Samples\LabView\SDK folder require the SDK600 software package, but, are simpler and easier to use than those in the Lib folder, which is why they are recommended, particularly for new programmers.

See \U600\Samples\ReadMe.Txt for the latest information on examples.

Be sure to read Section 1.7 Debugging for information on debugging your application.

1.7. Debugging

MS Visual Basic and LabView programmers are strongly recommended to purchase our SDK600-NT, instead of using the library calls contained in this manual. Following this suggestion will simplify and speed up the application development process. These ActiveX objects are proven integral parts of Aerotech's MMI600 application and utilities. For documentation on the SDK600-NT, visit our website at www.aerotech.com and download the U600 SDK help file.

IMPORTANT

Debugging User Applications (VB, C, C++) and LabView

1. To debug your application, we recommend purchasing our MMI600 CNC application and/or using the AerDebug.exe and AerStat.exe utilities provided with UNIDEX 600, to verify the operation of your application. See below for more details.

2. There are a number of different types of errors that the controller may return. Such as:

   a. CNC Compiler errors - A CNC program has a syntax error, use the AerCompilerErr( ) functions to determine the cause of the error(s). Or, use the MMI600 to compile the program manually, and view the errors. Aerdebug.exe will also compile programs and show errors (see AerDebug.exe quick guide below).

   b. Return Code errors - These come back as an error code in a SDK/library call. They occur when an error is detected before the command could be executed by the U600. It is very important to examine the return code from the Aerotech SDK/library calls to determine problems within your application! You can translate any error code into text, by using AerErrGetMessage() within your application, or use the following method in AerDebug.exe:

      For example, the error number 3758628868 (or 0xE0082004) may be converted to text within AerDebug as follows:

      ```
      SET T TASKFAULT 3758628868     ; decimal format
      TSKI                           ; display task information
      ```

      or

      ```
      SET T TASKFAULT 0xE0082004     ; hexadecimal format
      TSKI                           ; display task information
      ```

      Then the TSKI command will display a text message for the numeric error, as follows:

      ```
      ..
      Fault:     0xE0082004          ERROR: Drive is disabled
      ..
      ```

   c. Axis/Task faults - These occur during command execution. The MMI600 will indicate these errors on the manual/run pages. You can also use the TSKI AerDebug command, to view axis/task faults. But AerStat.exe, will graphically display the axis faults in detail (select the "FAULT" tab). See the U600 help file, under "faults" for more details on when axis/task faults occur.

3. The MMI600 offers functionality in a easy-to-understand Windows format. AerDebug is equally as functional as a debugger for your application, but AerDebug.exe is a command line interface, and so you need to know the commands.

1.7.1. AerDebug

The *AerDebug* application is the main debugging tool available to the user. Virtually every library function capability, including direct read/write access to the controller memory, can be tested in *AerDebug*. *AerDebug* is a “console” Windows application, operated by simple one-line commands. It can safely run simultaneously with any other application that communicates with the controller. Refer to the *U600 Series User’s Guide, P/N EDU157*, for a cross listing of which *AerDebug* commands execute which library functions. Here is a quick guide to the most useful AerDebug commands:

RDO	-	Resets the U600 controller, downloads the image.
Q	-	Quits AerDebug.exe
TSKI	-	Shows useful status and axis/task faults for the "current" task
SET/GET	-	For getting and setting parameter values for the "current" axis or task.
TKn	-	Changes "current" task to "n" (AerDebug always starts in task 1, so you don't need this if you only use task 1)
Axn	-	Changes "current" axis to "n" (AerDebug always starts in axis 1)
DIR	-	Shows names of all programs currently on the controller, and their status.
EXEP	-	Compiles, downloads, associates and runs a program on the current task. (see the commands below for manually and sequentially executing these steps)
PRGC	-	Compiles a program.
PRGE	-	Shows compile errors in a program (if any) after a compile.
PRGL	-	Downloads a program.
TSKI	-	Associates a program to a task
TSKP	-	Runs an associated program.

1.8. Error Handling

Error processing from Aerotech library functions falls under three broad categories: Error Returns, Programming Errors, and Faults. This subject is complex due to the presence of two processors (the host PC and the controller) and the many options available.

1.8.1. Error Returns

All Aerotech library functions return an error code of type “AERERR_CODE” (this and all other AERERR_xxxx constants are defined in AERCODE.H and in the appendices of this manual). The user can obtain more information for a given error code by calling the *AerErrGetMessage* function. All Aerotech functions return the constant: AERERR_NOERR (which is 0) for successful execution.

To get the text description of an error code, call *AerErrGetMessage*.

1.8.2. Programming Errors

If the library function does not communicate with the controller (first parameter is not of type HAERCTRL) then the error will be indicated in this return code. In these cases, when testing for an error, it is sufficient just to test the function return code.

However, if the function does communicate with the controller (most functions do), then the return value may indicate no error when an error actually occurred, if the programming error wait mode is false (see *AerProgErrWaitModeSet*). Note that the default condition for the programming error wait code is true, so normally this is not an issue (see *AerProgErrWaitModeSet*).

1.8.3. Faults

Faults are a third way errors in library calls can communicate back to the calling application (in addition to Return Codes and Programming Errors). However, the fault mechanism traps more than just bad library calls (called programming errors), in fact programming errors are only one of the sixteen types of axis faults that can occur (refer to the FLT_ xxxx constants). Many error conditions (such as position error) are not directly related to any library call and cannot be considered programming errors.

Using the *FAULTMASK* and *INTMASK* axis parameters, the programmer can make the controller generate interrupts when faults occur that the front-end can detect and process, if desired. As an error detection mechanism for bad library calls, this method has a speed advantage. The library does not need to wait for function completion, since the controller finds the error. This makes maximum or “parallel” use of the two processors. However, faults may make it difficult to diagnose the cause of the library call error (the interrupt will occur at some indeterminable time after the library call completes).

If the front-end application is not set up to receive interrupts, they are ignored. Refer to the *AerEvent* chapter, as well as the *FAULTMASK* and *INTMASK* axis parameters, to see how to receive interrupts.

There are two types of faults: axis faults and task faults. Task faults are fatal errors in CNC program execution, such as when a CNC program tries to divide by zero. Axis faults are motion related problems, such as a position error. Please see the *TaskFault* task parameter for more details, or the U600MMI.hlp file.

After a task fault is detected, the front-end application may examine the *TaskFault* task parameter to determine which fault occurred. The *TaskFault* parameter is an *AER960RET_xxxx* error code, whose textual meaning can be retrieved via an *AerErrGetMessage* call.

Axis faults may or may not affect motion or cause interrupts based on the *FAULTMASK* axis parameter setting. It is **extremely important** that the programmer makes certain that the *FAULTMASK* (and associated mask parameters) are set properly for the application to ensure safe operation of the system.

The user can obtain information on an axis fault by looking at the *FAULT* axis parameter. This parameter is a bitmask, where the bits are FLT_xxxx constants and are detailed in Appendix A and Appendix B. Please see the *FAULT* axis parameter for more details, or the U600MMI.hlp file.

The user has the capability of suppressing certain axis faults or specifying that certain actions be performed for certain faults, such as disabling or stopping a motor. The axis parameter *FAULTMASK* determines if a fault will be acted upon. It has the same bit definitions as the *FAULT* parameter. If a bit in *FAULTMASK* is set TRUE (on), that fault will be acted upon. If acted upon, then the *INTMASK* axis parameter determines whether to generate an interrupt back to the front-end application. It has the same bitmask as the *FAULT* and *FAULTMASK* parameters.

Regardless of whether an interrupt is generated, the user can specify certain emergency actions be performed when an axis fault occurs. The axis parameters *ABORTMASK*, *AUXMASK*, *BRAKEMASK*, *DISABLEMASK*, and *HALTMASK* are all bitmasks like the *FAULT* parameter and perform their action on the axis generating the fault based upon the bits set. These actions are very high speed as they occur only in the controller and require no communication to the front-end. We recommend that disabling axes based on faults be handled through these masks rather than relying on the interrupt response time of the front-end processor.

See the U600MMI.hlp file for a thorough description of Fault masks.

1.9. Examples

Example C code can be found in the \samples\LIB sub directories of U600 software. Example Visual Basic code can be found in the \U600\Samples\Lib\VisualBasic folder.

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CHAPTER 2: AUTOMATION PROGRAM FUNCTIONS

In This Section:

2.1. Overview

The Automation Program functions (AerAutoProgXXX) are responsible for managing the program automation file. By default, this file is U600Auto.ini and can be queried from the system by using AerRegGetFileName. This function can be used in conjunction with the AerCompilerAutoIncludeEx and AerCompilerAutoRun functions. The U600MMI uses the functions to support its Program Automation feature.

The purpose of program automation is to be used as part of the initialization sequence to initialize any compiler handles (HCOMPILER) and to download/execute any programs necessary.

There are several different types of Automated Programs:

> INCLUDE – Program is a define file. When loaded, it is automatically included with every program that is compiled, see *AerCompilerAutoIncludeEx*.
>
> DOWNLOAD_ONLY – Program is downloaded. This is generally a subroutine file, and not actually executed.
>
> RUN_SILENT, RUN – Program is downloaded and then executed on the given task.
>
> RUN_IMMEDIATE – Program is run immediately. It can only contain valid immediate commands.
>
> LOAD – Program is downloaded and associated to the given task (ready to run); however, it is not executed.

The *AerCompilerAutoIncludeEx* and *AerCompilerAutoRun* functions are used to execute the programs according to their automation type.

2.2. AerAutoProgGetNumPrograms

AERERR_CODE AerAutoProgGetNumPrograms (LPCTSTR *pszFile*, PDWORD *pdwNumPrograms*)

Declare Function AerAutoProgGetNumPrograms Lib "AERSYS.DLL" (ByRef *pszFile* As String, ByRef *pdwLastLineLoaded* As Long) As Long

Parameters

pszFile	Automation File.
pdwNumPrograms	Number of programs in the automation file.

This function returns the number of programs that are in the program automation file.

The name of the Automation file can be retrieved with *AerRegGetFileName*.

C Language and LabView Constants

AERREGID_AutomationFile

VB Constants

aerRegIDAutomationFile

See Also

AerCompilerAutoIncludeEx
AerCompilerAutoRun
AerRegGetFileName

2.3. AerAutoProgGetProgram

AERERR_CODE AerAutoProgGetProgram (LPCTSTR *pszFile*, DWORD *dwProg*, PDWORD *pdwSystem*, LPTSTR *pszProg*, PDWORD *pdwType*, PTASKMASK *pmTask*)

Declare Function AerAutoProgGetProgram Lib “AERSYS.DLL” (ByRef *pszFile* As String, ByVal *dwProg* As Long, ByRef *pdwSystem* As Long, ByRef *pszProg* As String, ByRef *pdwType* As Long, ByRef *pdwTaskMask* As Long) As Long

Parameters

pszFile	Automation File.
dwProg	Which program to retrieve from file (0-Based).
pdwSystem	Is this a system file or user file (see constants)
pszProg	Name of the program.
pdwType	What type of program (see constants)
pdwTaskMask	Which tasks the program should be applied to

This function returns the automation information for the given program.

The *pdwSystem* specifies whether the program is a system or user file (see constants). A system file identifies a file that Aerotech added to the automation file. This includes (AerParam.pgm and Mcode.pgm). These files are treated no different from any other automation files except for the fact that the U600 MMI does not allow the removing of these files from the automation file.

The name of the Automation file can be retrieved with *AerRegGetFileName*.

C Language and LabView Constants

AUTOPROG_SYSTEM_XXXX
AUTOPROG_TYPE_XXXX

VB Constants

aerAutoProgTypeXXXX
aerAutoProgSystemXXXX

See Also

AerCompilerAutoIncludeEx
AerCompilerAutoRun
AerRegGetFileName

2.4. AerAutoProgSetProgram

AERERR_CODE AerAutoProgSetProgram (LPCTSTR *pszFile*, DWORD *dwProg*, DWORD *dwSystem*, LPCTSTR *pszProg*, DWORD *dwType*, TASKMASK *mTask*)

Declare Function AerAutoProgSetProgram Lib “AERSYS.DLL” (ByRef *pszFile* As String, ByVal *dwProg* As Long, ByVal *dwSystem* As Long, ByVal *pszProg* As String, ByVal *dwType* As Long, ByVal *dwTaskMask* As Long) As Long

Parameters

pszFile	Automation File.
dwProg	Which program to retrieve from file (0-Based).
dwSystem	Is this a system file or user file (see constants)
pszProg	Name of the program.
dwType	What type of program (see constants)
dwTaskMask	Which tasks the program should be applied to

This function sets the information for the specified program. An error will occur if *dwProg* is not a valid program number. A valid program number is 0..NumPrograms: 0..NumPrograms-1 will update the specified program in the Automation File. If *dwProg* equals NumPrograms then the program is added to the Automation file with *AerAutoProgAddProgram*.

C Language and LabView Constants

AUTOPROG_SYSTEM_XXXX
AUTOPROG_TYPE_XXXX

VB Constants

aerAutoProgTypeXXXX
aerAutoProgSystemXXXX

See Also

AerCompilerAutoIncludeEx
AerCompilerAutoRun
AerRegGetFileName

2.5. AerAutoProgAddProgram

AERERR_CODE AerAutoProgAddProgram (LPCTSTR *pszFile*, DWORD *dwSystem*,
LPCTSTR *szProg*, DWORD *dwType*, TASKMASK *mTask*)

Declare Function AerAutoProgAddProgram Lib "AERSYS.DLL" (ByRef *pszFile* As String, ByVal *dwSystem* As Long, ByVal *pszProg* As String, ByVal *dwType* As Long, ByVal *dwTaskMask* As Long) As Long

Parameters

pszFile	Automation File.
dwSystem	Is this a system file or user file (see constants)
pszProg	Name of the program.
dwType	What type of program (see constants)
dwTaskMask	Which tasks the program should be applied to

This function adds a new program to the Automation File.

The name of the Automation file can be retrieved with *AerRegGetFileName*.

C Language and LabView Constants

AUTOPROG_SYSTEM_XXXX
AUTOPROG_TYPE_XXXX

VB Constants

aerAutoProgTypeXXXX
aerAutoProgSystemXXXX

See Also

AerCompilerAutoIncludeEx
AerCompilerAutoRun
AerRegGetFileName

2.6. AerAutoProgRemoveProgram

AERERR_CODE AerAutoProgRemoveProgram (LPCTSTR *pszFile*, DWORD *dwProg*)

Declare Function AerAutoProgRemoveProgram Lib "AERSYS.DLL" (ByRef *pszFile* As String, ByVal *dwProg* As Long) As Long

Parameters

pszFile	Automation File.
dwProg	Which program to retrieve from file (0-Based).

This function removes the specified program from the Automation File.

The name of the Automation file can be retrieved with *AerRegGetFileName*.

See Also

AerCompilerAutoIncludeEx
AerCompilerAutoRun
AerRegGetFileName

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CHAPTER 3: AUXILIARY TABLE FUNCTIONS

In This Section:

3.1. Introduction

Auxiliary tables set the auxiliary (mode) binary output based on the position of a given axis. This provides the user with a very tightly coupled motion and I/O capability. The value of the auxiliary output is also reflected in the value of the *AUX* axis parameter. An axis is specified with the range of positions along this axis where the firing is done. With each position range specified, a logic level (0 or 1) is set to determine the state of the auxiliary output when the axis position is within that range. More details on how positions fire the auxiliary outputs is in the *AerAuxTableSetPoint* function description.

For appropriate information on connecting user hardware for interfacing to the auxilliary outputs, refer to the *U600 Hardware Manual, P/N EDU154.* The active state of the auxiliary output when Aux = 1 is determined by the *IOLEVEL* axis parameter.

The interface to the auxiliary tables is similar to that of the *cam tables.* For that reason, the axis that an auxiliary table is linked to is often called a "master axis."

There are five basic steps required to utilize Auxiliary table output capabilities – they are:

- Connect user-supplied hardware to the auxiliary output and ensure the *IOLEVEL* axis parameter indicates the appropriate output for the desired logic level settings.
- Allocate space for the table (see *AerAuxTableAllocate*)
- Load the auxiliary table (see *AerAuxTableSetPoint*, and *AerAuxTableSetMultPoints*
- Configure a master axis (see *AerConfigMaster*)
- Associate the table to an axis (see *AerAuxTableSetMode*)

3.2. AerAuxTableAllocate

C

AERERR_CODE AerAuxTableAllocate(HAERCTRL *hAerCtrl*, WORD *wTable*,
DWORD *dwSize*);

VB

Declare Function AerAuxTableAllocate Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByVal *wTable* As Integer, ByVal *dwSize* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
wTable	Number referencing this table.
dwSize	Maximum number of points that will be in the table.

This function allocates storage on the controllerfor user auxiliary output tables. Each point in the auxiliary table requires 6 bytes of memory on the controller. Table numbers may be from zero up to the maximum number returned by *AerAuxTableGetTables*.

See Also

AerAuxTableFree

Example

samples\lib\AexAux.c

3.3. AerAuxTableFree

AERERR_CODE AerAuxTableFree(HAERCTRL *hAerCtrl*, WORD *wTable*);

C
VB

Declare Function AerAuxTableFree Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByVal *wTable* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
wTable	Table number of table to free.

This function frees the specified auxiliary table. Table numbers may range from zero up to the maximum number returned by *AerAuxTableGetTables.*

See Also

AerAuxTableAllocate
AerAuxTableGetTables

Example

samples\lib\AexAux.c

3.4. AerAuxTableGetMode

AERERR_CODE AerAuxTableGetMode(HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PWORD *pwTable*, PWORD *pwMode*);

Declare Function AerAuxTableGetMode Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByRef *pwTable* As Integer, ByRef *pwMode* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
iAxis	Axis to get the mode of.
pwTable	Pointer to word to receive table number.
pwMode	Pointer to word to receive table mode.

This function returns the table number and mode (0=inactive, 1=active) of an auxiliary table associated with a given axis. If the axis is not associated to an auxiliary table, both the table number and mode return as zero.

See Also

AerAuxTableSetMode

Example

samples\lib\AexAux.c

3.5. AerAuxTableGetPoint

AERERR_CODE AerAuxTableGetPoint(HAERCTRL *hAerCtrl*, WORD *wTable*, DWORD *dwPoint*, PLONG *plMaster*, PWORD *pwLevel*);

Declare Function AerAuxTableGetPoint Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wTable* As Integer, ByVal *dwPoint* As Long, ByRef *plMaster* as Long, ByRef *pwLevel* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
wTable	Table number.
dwPoint	Point number in this table.
plMaster	Pointer to long value to receive coordinate value (in machine counts).
pwLevel	Pointer to word to receive level to set the auxiliary output.

AerAuxTableGetPoint returns the data for a point in the specified auxiliary table. Table numbers may range from zero up to the maximum number returned by *AerAuxTableGetTables.* Point numbers may range from zero up to size-1, where size is the number of points allocated in the table.

See Also

AerAuxTableSetPoint

Example

samples\lib\AexAux.c

3.6. AerAuxTableGetMultPoints

AERERR_CODE AerAuxTableGetMultPoints (HAERCTRL *hAerCtrl*, WORD *wTable*, DWORD *dwStart*, DWORD *dwNumPoints*, PAER_AUX_POINT *pPoint*);

Parameters

hAerCtrl	Handle to the controller.
wTable	Table number.
dwStart	Starting point number.
dwNumPoints	Number of points to get.
pPoint	Pointer to the first structure in an array of structures that will receive the data for each point. See Appendix C: Structures for details on the AER_AUX_POINT structure.

This function returns multiple points from an auxiliary table. Table numbers may be from zero up to the maximum number returned by *AerAuxTableGetTables*. It is the users responsibility to insure that *pPoint* actually points to an array of AER_AUX_POINT structures, of size *dwNumPoints*, or unexpected results may occur.

See Also

AerAuxTableSetMultPoints

Example

samples\lib\AexAux.c

3.7. AerAuxTableGetStatus

AERERR_CODE AerAuxTableGetStatus(HAERCTRL *hAerCtrl*, WORD *wTable*,
PDWORD *pdwSize*, PWORD *pwStatus*);

Declare Function AerAuxTableGetStatus Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wTable* As Integer, ByRef *pdwSize* As Long, ByRef *pwStatus* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
wTable	Table number.
pdwSize	Pointer to double word to receive the number of points in the table.
pwStatus	Pointer to word to receive the Status of this auxiliary table.

Table numbers may range from zero up to the maximum number returned by *AerAuxTableGetTables.* If the specified table has not been allocated, or is out of range, then both the size and the status return as zero. The table status returns as one of the following values:

0	; Table has not been allocated.
1	; Table has been successfully allocated.

This function does not determine if the table is associated to an axis. (see *AerAuxTableGetMode*)

See Also

AerAuxTableGetMode

Example

samples\lib\AexAux.c

3.8. AerAuxTableGetTables

AERERR_CODE AerAuxTableGetTables(HAERCTRL *hAerCtrl*, PWORD *pwNumTables*);

Declare Function AerAuxTableGetTables Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByRef *pwNumTables* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
pwNumTables	Pointer to word to hold the number of tables currently allocated.

This function returns the absolute maximum number of tables allowed on the controller. In reality, the user may have fewer tables available, based on the controller's available memory and the number of points in each table.

Multiple auxiliary tables per axis are allowed.

See Also

AerAuxTableAllocate

Example

samples\lib\AexAux.c

3.9. AerAuxTableSetMode

AERERR_CODE AerAuxTableSetMode(HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wTable*, WORD *wMode*);

Declare Function AerAuxTableSetMode Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *wTable* As Integer, ByVal *wMode* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
iAxis	Axis to associate the table to.
wTable	Table number.
wMode	Mode to activate.

Auxiliary tables are associated with axes with the *AerAuxTableSetMode* command. The mode of operation for multiple axes can be defined simultaneously and table numbers may be from zero up to the maximum number returned by *AerAuxTableGetTables*. The mode parameter must be in the range of minus sixteen (-16) through one (1). A mode of zero (0) disassociates a table from an axis. A mode of one (1) associates the table to an axis. A value of 1 through –16 associates the table and defines a binary output (0 through 15, respectively) on the U600 card to be used in place of the MODE output. Binary outputs are only supported on the U600 card, not the PSO-PC or 4EN-PC cards due to speed issues.

> Auxiliary tables are not allocated to any specific axis.

See Also

AerAuxTableGetMode

Example

samples\lib\AexAux.c

3.10. AerAuxTableSetPoint

AERERR_CODE AerAuxTableSetPoint(HAERCTRL *hAerCtrl*, WORD *wTable*,
DWORD *dwPoint*, LONG *lMaster*, WORD *wLevel*);

Declare Function AerAuxTableSetPoint Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wTable* As Integer, ByVal *dwPoint* As Long, ByVal *lMaster* As Long, ByVal *wLevel* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
wTable	Table number.
dwPoint	Point number in this table.
lMaster	Coordinate value (in machine counts).
wLevel	Level to set the auxiliary output.

*AerAuxTableSetPoint s*ets a point in a particular auxiliary table. Points can be written in any order, and can be overwritten, but cannot be changed while a table is associated with a particular axis (see *AerAuxTableSetMode*). Table numbers may be from zero up to the maximum number returned by *AerAuxTableGetTables*. Point numbers may be from zero to size-1, where size is the number of points allocated in the table. Coordinate values must be monotonicaly increasing with point number. The specified level must be zero or one.

Whenever a table is associated with an axis and the master position is at the given coordinate value, or between the given coordinate value and the coordinate value of the next point in the table, the level for the given point is set on the auxiliary output. This means that for all master positions above the last point (the last point set by the user) the auxiliary output will be set to the level specified for the last point in the table. Similarly, for all master positions less than the coordinate value of the first point (point 0) in the table, the auxiliary output is set to the level assigned to the first point.

IMPORTANT

It is assumed that the user has defined values for all of the points that have been allocated. If this is not true, the result is unpredictable.

See Also

AerAuxTableGetPoint
AerAuxTableSetMultPoints

Example

samples\lib\AexAux.c

3.11. AerAuxTableSetMultPoints

AERERR_CODE AerAuxTableSetMultPoints(HAERCTRL *hAerCtrl*, WORD *wTable*, DWORD *dwStart*, DWORD *dwCount*, PAER_AUX_POINT *pPoint*);

Parameters

hAerCtrl	Handle to the controller.
wTable	Table number.
dwStart	Starting point number.
dwCount	Number of points to set.
pPoint	Pointer to the first structure in an array of structures that contain the data for each point. Refer to Appendix C: Structures for details on the AER_AUX_POINT structure.

This function writes multiple points to a particular table, assigning each point consecutive point numbers starting with the point number indicated by *dwStart*. It is slightly faster than setting single points. Table numbers may be from zero up to the maximum number returned by *AerAuxTableGetTables.* It is the user's responsibility to insure that *pPoint* actually points to an array of AER_AUX_POINT structures of size *dwNumPoints*.

See Also

AerAuxTableGetPoints
AerAuxTableSetPoint

Example

samples\lib\AexAux.c

3.12. Related Axis Parameters

See the U600MMI.hlp file for more information on these parameters.

AUXOFFSET - This parameter is added to the master position before doing the auxiliary table lookup. For example, if the table covers master positions from 0 to 360 degrees, and the actual master position is 2 degrees, the *AUXOFFSET* parameter is 3 degrees, then the controlleruses the value of 5 degrees as the master position to look up in the table.

IOLEVEL - A bit within this parameter may be used to determine the active state of the auxiliary (mode) line.

MASTERLENGTH - This parameter causes the master axis position to “roll over” every *MASTERLENGTH* count. If *MASTERLENGTH* was set at 10000 counts, then the master axis position would assume the following sequence: 9998-9999-0000-0001. This would, in effect, cause the firing pattern specified by the auxiliary table to repeat every 10,000 counts. If the *MASTERLENGTH* is not specified, then the auxiliary output does not change when the master axis position is no longer within the range specified by the maximum and minimum master position table points.

MASTERPOS - This parameter is the position used to affect the auxiliary output. The user can direct that either the master axis’ actual position or the master axis’ commanded position be used for the slave’s *MASTERPOS* parameter (see the *AerConfigMaster* function).

The *MASTERPOS* is affected by the *MASTERLENGTH* parameter.

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CHAPTER 4: AXIS CALIBRATION FUNCTIONS

In This Section:

4.1. Introduction

Axis calibration tables apply correction values to a given axis' position based on its own or another axis' position. These functions are typically used after producing an error lookup table from an accurate position measurement device such as a laser interferometer. These tables are used to correct for mechanical inaccuracies of a mechanical device like a ball screw. The lookup table will allow the mechanical device to be positioned to a much higher degree of accuracy.

The axis to which the position adjustment is made is called the "corrected" axis. The axis whose position is used to lookup a correction value is called the "master" axis. In most applications, the master axis and the corrected axis are the same, meaning the axis uses its own position to determine the correction value at that position. However, in some cases, such as in orthogonality correction, the master axis can be a different axis. In any case, the axis correction table is a series of master positions and corresponding correction values. The servo loop continually reads the current master axis position, uses this to obtain a correction value, and adds the correction value to the corrected axis' position.

All table entries consist of a master position and a correction value, where no two table entries can have the same master position (see *AerAxisCalSetPoint* for more details on table entries). If the current master axis position is equal to a table entry master position, the correction value for that table entry is used as the current correction value. If, however, the current master axis position lies in-between two master positions listed in the table, then linear interpolation is used to find a correction value between the two correction values listed in the table. Finally, if the current master position lies outside of the table, that is, all table entry master positions are either greater or less than the current master axis position, then the nearest “end point” of the table is used to obtain the correction value. For example, if the lowest master position in the table is 3, with a correction value of 5, then the correction value is 5 for all master positions from 3 to minus infinity. This means that normally the user would insure zero axis calibration outside the desired range, by placing a zero calibration point on either end of the table.

Once the perturbation or correction value for the corrected axis has been determined by table lookup, this value is added onto the raw position as seen from the encoder, and used as the “actual” position of the axes. The position command (target position) is unaffected by calibration (raw position is the *RAWPOS* axis parameter, actual position is the *POS* axis parameter, and position command is the *POSCMD* axis parameter). Therefore, a positive correction factor will cause the axis to stop short of its commanded position, while a negative correction factor will cause motion beyond the commanded position. All corrections are bi-directional; that is, the correction value applied will be the same regardless of the sign or value of the velocity.

Note that when running under calibration, the position values are different than may be expected at first. The actual position (POS) is unchanged by calibration, but the reverse of the calibration value is reflected in the raw position (RAWPOS). This is because under negligible position error, the servo loop forces actual position to track position command, which is unaffected by the calibration. So regardless of how axis correction alters position, the servo loop will shift the position so that it equals the position command. But the raw position on the encoder will be different under axis calibration, given the same position command and a zero position error. As a result of this behavior, the velocity reported by the controller will be unchanged by axis calibration because velocity is computed from position, not raw position.

Multiple correction tables can be applied to a single corrected axis. The effect of each table is additive. Each table comes up with its own correction value independently from the other tables and the final correction value is the sum of the values from all the tables. Up to eight tables can be used to a correct an axis. There is a maximum of 100 tables for the entire system.

Axis calibration is “activated” or in place immediately after the *AerAxisCalSetMode* call. Users can check whether axis correction is activated for a particular axis by checking the “Error mapping enabled” bit of the SERVOSTATUS Axis Parameter for that axis (use *AerStat* for this). Alternatively, users can access the U600 MMI and look for a “C” in the status column immediately to the right of the axis name. Note that axis calibration is used in all motion, including jogging and homing. The user must take care that the master axis is homed before activation so that the range of calibration is accurate or synchronized.

Axis calibration has no effect on a virtual axis (axes with null feedback).

There are eight steps to using axis calibration tables. These steps are listed below along with the function(s) detailing that step (Table 4-1). Note that AerAxisCalDownloadFile will perform steps 1 through 4 in one step.

Note that AerAxisCalDownloadFile will perform steps 1 through 4 in one step.

Table 4-1. Axis Calibration

Axis Calibration Steps	Function
1. Allocate axis calibration table	Refer to *AerAxisCalAllocateTable* function.
2. Fill the table with the error data	Refer to *AerAxisCalSetPoint* or *AerAxisCalDownloadFile* functions.
3. Associate a table to an axis	Refer to *AerAxisCalSet* function.
4. Enable the axis calibration table	Refer to *AerAxisCalSetMode* function.
5. Perform the calibrated motion:	
Enable the drive	Refer to *AerParmSet* function.
Home the axis	Refer to *AerMoveHome*xxxx functions.
Execute the motion	Refer to *AerMove*xxxx functions.
Disable the drive	Refer to *AerParmSet* function.
6. Disable the axis calibration table	Refer to *AerAxisCalSetMode* function.
7. Disassociate calibration table from axis	See *AerAxisCalReset* function.
8. Free axis calibration table	Refer to *AerAxisCalFreeTable* function.

Users are not allowed to set the position of an axis manually when in axis correction mode.

C

VB

4.2. AerAxisCalAllocateTable

AERERR_CODE AerAxisCalAllocateTable (HAERCTRL *hAerCtrl*, WORD *wTable*, WORD *wSize*);

Declare Function AerAxisCalAllocateTable Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wTable* As Integer, ByVal *wSize* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
wTable	Error table number (first table is zero index).
wSize	Number of entries or points that will be in the table.

This function allocates storage space on the controllerfor an axis calibration table. The maximum number and size of axis calibration tables permitted depends on the amount of available memory on the axis processor. The maximum per axis is 8. There are 100 tables permitted for use among all axes.

See Also

AerAxisCalGetStatus
AerAxisCalGetStatusPacket
AerAxisCalFreeTable
AerAxisCalSetPoint
AerAxisCalGetPoint
AerAxisCalReset
AerAxisCalSetMode
AerAxisCalGetMode
AerAxisCalGetRawPosition
AerAxisCalSet
AerAxisCalGetItems
AerAxisCalGet
AerAxisCalGetPacket

Example

Samples\LIB\AexCal\AexCal.c

4.3. AerAxisCalFileDownload

AERERR_CODE AerAxisCalFileDownload (HAERCTRL *hAerCtrl*, AXISINDEX *iCorrectedAxis*, AXISINDEX *iMasterAxis*, LPCTSTR *pszFileName*);

Declare Function AerAxisCalFileDownload Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iCorrectedAxis* As Long, ByVal *iMasterAxis* As Long, ByVal *pszFileName* As String) As Long

Parameters

hAerCtrl	Handle to controller.
iCorrectedAxis	Index to axis to be corrected.
iMasterAxis	Master axis.
pszFileName	Filename holding axis data.

This function reads an ASCII file containing calibration data, forms a calibration table, and attaches it to the given axis. The master axis is the axis from which the lookup position that is used in the table is obtained. The user can attach multiple tables to a single axis and the effect of the various tables is summed together for a final calibration value.

The format of the ASCII file is described in the paragraphs below.

> See the U600MMI.hlp file for an example.

The file must consist of data lines and comment lines. A line is defined as a string of characters terminated by any number of consecutive line terminator characters. A line terminator character is a carriage return or a line feed.

Data lines are those whose first "non-whitespace" character is a "number." All other lines are comment lines. "Whitespace" characters are the tab, formfeed, comma, or space characters. A "number" character is a digit, decimal point, or minus sign.

After the first data line is read-in, the program will continue reading in data lines until an End of File or comment line is seen. Then the file is closed.

COMMENT LINES

The file must contain comment lines, preceding the first data line, providing three pieces of information:

- Number of points in the file
- Units of the position values
- Units and scale of the calibration values

> Note that the axis to which the correction is applied is not specified in the file. It is specified when the filename is given in the axis configuration wizard of the MMI600 program, or this function.

These three required header values must be preceded (on the same line) by certain keywords. These keywords may appear on any comment line (that precede the first data line) and may appear anywhere on the line. Identification of the keyword is case insensitive.

The number of target points must be preceded by the keyword "Number of Target Positions." The first number character after this keyword will begin the number read-in as the number of target positions. The program must read-in exactly the number of data lines given by the "Number of Target Positions."

The units of the position values must be preceded by the keyword "Pos. Value." The first non-whitespace character that is not "(" after the keyword, begins the position units descriptor. Units descriptors can be "nanometers," "deg," "degrees," "mm," "in," "microns," "millimeters," or "inches." Identification of the position units descriptor is case insensitive.

The units and scale factor of the compensation values must be preceded by the keyword "Compensation (." The first non-whitespace character which is not "(" after the keyword, begins the scale factor. The first non-whitespace character after the scale factor must be the compensation units descriptor. Compensation Units descriptors can be "nanometers," "deg," "degrees," "mm," "in," "microns," "millimeters," or "inches." Identification of the compensation units descriptor is case insensitive.

DATA LINES

Each data line must have three numbers, the first of which must be an integer. All text following the first three numbers is ignored. One or more whitespace characters must separate the numbers.

The first number is the point number. It must be a positive integer. These numbers are not used.

The second number is the position value. This value is assumed to be in the units specified in the comment lines at the beginning of the file. Position values must be monotonically increasing or decreasing throughout the file but need not be evenly spaced.

The third number is the compensation value that goes with the position value. It is assumed to be in the units specified in the comment lines at the beginning of the file (i.e. if the value read-in is -2 and the compensation read-in was .25 microns, then the actual compensation value is -.5 microns). Compensation values are always measured relative to the zero compensation value, that is, the position command that would exist if no compensation were being performed.

See Also

AerAxisCalRemoveAll

Example

Ini\AexCal.c
U600MMI.hlp file

4.4. AerAxisCalFreeTable

AERERR_CODE AerAxisCalFreeTable (HAERCTRL *hAerCtrl*, WORD *wTable*);

Declare Function AerAxisCalFreeTable Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wTable* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
wTable	Error table number (first table is 0).

This function deallocates an axis calibration table on the axis processor, freeing the memory. If the table is currently in use or not allocated, an error returns.

See Also

AerAxisAllocateTable
AerAxisCalGetStatus
AerAxisCalGetStatusPacket
AerAxisCalSetPoint
AerAxisCalGetPoint
AerAxisCalReset
AerAxisCalSetMode
AerAxisCalGetMode
AerAxisCalGetRawPosition
AerAxisCalSet
AerAxisCalGetItems
AerAxisCalGet
AerAxisCalGetPacket

Example

Samples\LIB\AexCal\AexCal.c

4.5. AerAxisCalGet

AERERR_CODE AerAxisCalGet (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wItem*, PWORD *pwTable*, PDWORD *pdwInput*, PDWORD *pdwScale*);

Declare Function AerAxisCalGet Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *wItem* As Long, ByRef p*wTable* As Integer, ByRef *pdwInput* As Long, ByRef *pdwScale* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
iAxis	Axis being corrected (see constants).
wItem	Item number associated with the axis (first table is index 0).
pwTable	Pointer to receive the table number.
pdwInput	Pointer to receive the axis mask of the “master” axis.
pdwScale	Pointer to receive the scale of the correction errors.

This function returns pointers to the table status for the specified axis and specified item. Note that the function, *AerAxisCalGetItems,* can be used to return the number of items in the table. The *pwTable* variable is the table number. The *pdwInput* variable is the “master” axis. The *pdwScale* variable is the scale of the axis correction error.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerAxisAllocateTable
AerAxisCalGetStatus
AerAxisCalGetStatusPacket
AerAxisCalFreeTable
AerAxisCalSetPoint
AerAxisCalGetPoint
AerAxisCalReset
AerAxisCalSetMode
AerAxisCalGetMode
AerAxisCalGetRawPosition
AerAxisCalSet
AerAxisCalGetItems
AerAxisCalGetPacket

Example

Samples\LIB\AexCal\AexCal.c

4.6. AerAxisCalGetItems

C

AERERR_CODE AerAxisCalGetItems (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
PWORD *pwItems*);

VB

Declare Function AerAxisCalGetItems Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByVal *iAxis* As Long, ByRef *pwItems* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
iAxis	Axis number (see constants).
pwItems	Pointer to receive the number of items or axis calibration tables active for the specified axis.

This function returns a pointer to the number of items or axis calibration tables associated to the specified axis. To determine the table number associated with an item call *AerAxisCalGetPacket*.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerAxisAllocateTable
AerAxisCalGetStatus
AerAxisCalGetStatusPacket
AerAxisCalFreeTable
AerAxisCalSetPoint
AerAxisCalGetPoint
AerAxisCalReset
AerAxisCalSetMode
AerAxisCalGetMode
AerAxisCalGetRawPosition
AerAxisCalSet
AerAxisCalGet
AerAxisCalGetPacket

Example

Samples\LIB\AexCal\AexCal.c

4.7. AerAxisCalGetMode

AERERR_CODE AerAxisCalGetMode (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PWORD *pwMode*);

Declare Function AerAxisCalGetModeLib Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByRef *pwMode* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
iAxis	Axis index (see constants).
pwMode	Pointer to receive the state of the axis calibration tables.

This function returns the state of the axis calibration tables for the specified axis. The *pwMode* returned will be 1 if axis calibration is enabled, or 0 if it is disabled.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerAxisAllocateTable
AerAxisCalGetStatus
AerAxisCalGetStatusPacket
AerAxisCalFreeTable
AerAxisCalSetPoint
AerAxisCalGetPoint
AerAxisCalReset
AerAxisCalSetMode
AerAxisCalGetRawPosition
AerAxisCalSet
AerAxisCalGetItems
AerAxisCalGet
AerAxisCalGetPacket

Example

Samples\LIB\AexCal\AexCal.c

4.8. AerAxisCalGetPacket

AERERR_CODE AerAxisCalGetPacket (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
WORD *wItem*, PAER_AXISCAL_PACKET *pEMap*);

Parameters

hAerCtrl	Handle to the controller.
iAxis	Axis number being corrected (see constants).
wItem	Item number associated with the axis (0 through n-1).
pEMap	Pointer to a structure of type AER_AXISCAL_PACKET.

This function returns a pointer to a structure of type AER_AXISCAL_PACKET indicating the table status for the specified axis. The function *AerAxisCalGetItems* returns the number of items, where each item has a table associated with it. The *wTable* variable within the structure is the table number. The *dwInput* variable within the structure is the axis number causing the errors or the axis whose positions are specified in the axis correction table.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

See Also

AerAxisAllocateTable
AerAxisCalGetStatus
AerAxisCalGetStatusPacket
AerAxisCalFreeTable
AerAxisCalSetPoint
AerAxisCalGetPoint
AerAxisCalReset
AerAxisCalSetMode
AerAxisCalGetMode
AerAxisCalGetRawPosition
AerAxisCalSet
AerAxisCalGetItems
AerAxisCalGet

Example

Samples\LIB\AexCal\AexCal.c

4.9. AerAxisCalGetPoint

AERERR_CODE AerAxisCalGetPoint (HAERCTRL *hAerCtrl*, WORD *wTable*, WORD *wPoint*, PLONG *plPosition*, PLONG *plCorrection*, PWORD *pwStatus*);

Declare Function AerAxisCalGetPoint Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wTable* As Integer, ByVal *wPoint* As Integer, ByRef *plPosition* As Long, ByRef *plCorrection* As Long, ByRef *pwStatus* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
wTable	Pointer to the error table number (first table is 0).
wPoint	Table entry number.
plPosition	Pointer to receive the absolute position in machine steps.
plCorrection	Pointer to receive the correction value at specified position, in machine steps.
pwStatus	Pointer to the status of the error correction point.

This function retrieves an entry within the specified axis calibration table on the axis processor. The *lPosition* indicates the absolute position corrected in machine steps referenced to the home position (See *AerMoveHomexxxx* functions) by the *lCorrection* value. The *lCorrection* is an absolute value in machine steps to be added to the commanded position to reach the desired absolute position. The "*pwStatus*" parameter will be 1 if the entry is a valid point in the table otherwise it is 0.

Axis calibration tables are not enabled until after the axis has been homed.

See Also

AerAxisAllocateTable
AerAxisCalGetStatus
AerAxisCalGetStatusPacket
AerAxisCalFreeTable
AerAxisCalSetPoint
AerAxisCalReset
AerAxisCalSetMode
AerAxisCalGetMode
AerAxisCalGetRawPosition
AerAxisCalSet
AerAxisCalGetItems
AerAxisCalGet
AerAxisCalGetPacket

Example

Samples\LIB\AexCal\AexCal.c

4.10. AerAxisCalGetRawPosition

AERERR_CODE AerAxisCalGetRawPosition (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PLONG *plPos*);

Declare Function AerAxisCalRawPosition Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByRef *plPos* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
iAxis	Axis to return state of axis calibration (see constants).
plPos	Pointer to the uncorrected absolute position of the axis.

This function returns the true absolute position of the specified axis before axis calibration is applied.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerAxisAllocateTable
AerAxisCalGetStatus
AerAxisCalGetStatusPacket
AerAxisCalFreeTable
AerAxisCalSetPoint
AerAxisCalGetPoint
AerAxisCalReset
AerAxisCalSetMode
AerAxisCalGetMode
AerAxisCalSet
AerAxisCalGetItems
AerAxisCalGet
AerAxisCalGetPacket

Example

Samples\LIB\AexCal\AexCal.c

4.11. AerAxisCalGetStatus

AERERR_CODE AerAxisCalGetStatus (HAERCTRL *hAerCtrl*, WORD *wTable*,
PWORD *pwSize*, PWORD *pwStatus*);

Declare Function AerAxisCalGetStatus Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByVal *wTable* As Integer, ByRef *pwSize* As Integer, ByRef *pwStatus*
As Integer) As Long

Parameters

hAerCtrl Handle to the controller.
wTable Error table number (first table is 0).
pwSize Pointer to receive the number of entries in the table.
pwStatus Pointer to receive the status of error table.

This function returns the status of an axis calibration table on the axis processor. The *pwSize* parameter indicates the number of entries in the specified axis calibration table. The *pwStatus* parameter is 1 if the table has been previously allocated otherwise it is 0. If *pwStatus* is returned as 0, then the number of entries and status are also returned as 0.

If the table has not been allocated, both *pwSize* and *pwStatus* will be zero.

See Also

AerAxisAllocateTable
AerAxisCalGetStatusPacket
AerAxisCalFreeTable
AerAxisCalSetPoint
AerAxisCalGetPoint
AerAxisCalReset
AerAxisCalSetMode
AerAxisCalGetMode
AerAxisCalGetRawPosition
AerAxisCalSet
AerAxisCalGetItems
AerAxisCalGet
AerAxisCalGetPacket

Example

Samples\LIB\AexCal\AexCal.c

4.12. AerAxisCalGetStatusPacket

AERERR_CODE AerAxisCalGetStatusPacket(HAERCTRL *hAerCtrl*, WORD *wTable*,
PAER_AXISCAL_STATUS_PACKET *pStatus*);

Parameters

hAerCtrl	Handle to the controller.
wTable	Error table number (first table is 0).
pStatus	Pointer to a structure of type *AER_AXISCAL_STATUS_PACKET* . indicating the status of the specified error table.

This function returns the status of the specified axis calibration table on the axis processor. The structure of type *AER_AXISCAL_STATUS_PACKET* contains two elements indicating the size of the axis correction table and the status of the table; 1 if allocated, else 0.

See Also

AerAxisAllocateTable
AerAxisCalGetStatus
AerAxisCalFreeTable
AerAxisCalSetPoint
AerAxisCalGetPoint
AerAxisCalReset
AerAxisCalSetMode
AerAxisCalGetMode
AerAxisCalGetRawPosition
AerAxisCalSet
AerAxisCalGetItems
AerAxisCalGet
AerAxisCalGetPacket

Example

Samples\LIB\AexCal\AexCal.c

4.13. AerAxisCalRemoveAll

AERERR_CODE AerAxisCalRemoveAll(HAERCTRL *hAerCtrl*, AXISINDEX *iCorrectedAxis*);

Declare Function AerAxisCalRemoveAll Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iCorrectedAxis* As Long) As Long

Parameters

hAerCtrl	Handle to controller.
iCorrectedAxis	Index of axis to have all correction tables removed from (see constants).

This function removes all calibration tables that are currently affecting the given axis. The tables, if any, are removed from the controller's memory.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerAxisCalAllocateTable

4.14. AerAxisCalReset

AERERR_CODE AerAxisCalReset (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

Declare Function AerAxisCalReset Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByVal *iAxis* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
iAxis	Axis to deactivate axis calibration for (see constants).

This function disassociates all items or axis calibration tables for the specified axis. The axis correction table must be disabled or an error returns. This function does not deallocate the table from memory. The *AerAxisCalFreeTable* function is used for this purpose.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerAxisAllocateTable
AerAxisCalGetStatus
AerAxisCalGetStatusPacket
AerAxisCalFreeTable
AerAxisCalSetPoint
AerAxisCalGetPoint
AerAxisCalSetMode
AerAxisCalGetMode
AerAxisCalGetRawPosition
AerAxisCalSet
AerAxisCalGetItems
AerAxisCalGet
AerAxisCalGetPacket

Example

Samples\LIB\AexCal\AexCal.c

4.15. AerAxisCalSet

AERERR_CODE AerAxisCalSet (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wTable*, DWORD *dwInput*, DWORD *dwScale*);

Declare Function AerAxisCalSet Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *wTable* As Long, ByVal *dwInput* As Long, ByVal *dwScale* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
iAxis	Axis to correct (see constants).
wTable	Table number (first table is zero index).
dwInput	Mask of the axes causing correction.
dwScale	Scale for linear correction.

This function associates an axis correction table to a physical axis. The "*dwScale*" parameter is a scale factor in machine steps to multiply the axis error correction value by, before applying it to the axis. The maximum number of tables that can be attached to one axis is eight. A scale factor of zero disables scaling; (i.e. it is equivalent to providing a scaling factor of one). For example, axis correction table #3 contains correction values for axis #1 as a result of change in position of axis #4. The proper use of the function for this assignment would be:

C	*AerAxisCalSet (hAerCtrl, AXISINDEX_1, 3, AXISMASK_4, 0);*
VB	*AerAxisCalSet (hAerCtrl, aerAxisIndex1, 3, aerAxisMask4, 0)*

where *hAerCtrl* is the handle to the controller. *AXISINDEX_1* represents the axis index for the axis to correct. The *3* is the table number, *AXISMASK_4* represents axis #4, and *0* is the scale for the correction factor. Following this function, a call should be made to *AerAxisCalSetMode* to enable axis calibration for the specified axis.

C Language and LabView Constants

AXISINDEX_1	*AXISMASK_1*
to	*to*
AXISINDEX_16	*AXISMASK_16*

VB Constants

aerAxisIndex1	*aerAxisMask1*
to	*to*
aerAxisIndex16	*aerAxisMask16*

See Also

AerAxisAllocateTable	*AerAxisCalGetPoint*	*AerAxisCalGetRawPosition*
AerAxisCalGetStatus	*AerAxisCalReset*	*AerAxisCalGetItems*
AerAxisCalGetStatusPacket	*AerAxisCalSetMode*	*AerAxisCalGet*
AerAxisCalFreeTable	*AerAxisCalGetMode*	*AerAxisCalGetPacket*
AerAxisCalSetPoint		

Example

Samples\LIB\AexCal\AexCal.c

4.16. AerAxisCalSetMode

AERERR_CODE AerAxisCalSetMode (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
WORD *wMode*);

Declare Function AerAxisCalSetMode Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByVal *iAxis* As Long, ByVal *wMode* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
iAxis	Axis number to deactivate axis calibration for (see constants).
wMode	Enable or disable axis calibration tables for the specified axis.

This function enables/disables all axis calibration tables for the specified axis. The *wMode* parameter is set to 1 to enable axis calibration or 0 to disable axis calibration. The specified axis must be disabled (drive axis parameter off) or an error occurs. If the axis is already in the specified mode, no action is taken and no error is delivered.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerAxisAllocateTable
AerAxisCalGetStatus
AerAxisCalGetStatusPacket
AerAxisCalFreeTable
AerAxisCalSetPoint
AerAxisCalGetPoint
AerAxisCalReset
AerAxisCalGetMode
AerAxisCalGetRawPosition
AerAxisCalSet
AerAxisCalGetItems
AerAxisCalGet
AerAxisCalGetPacket

Example

Samples\LIB\AexCal\AexCal.c

4.17. AerAxisCalSetPoint

AERERR_CODE AerAxisCalSetPoint (HAERCTRL *hAerCtrl*, WORD *wTable*, WORD *wPoint*, LONG *lPosition*, LONG *lCorrection*);

Declare Function AerAxisCalSetPoint Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wTable* As Integer, ByVal *wPoint* As Integer, ByVal *lPosition* As Long, ByVal *lCorrection* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
wTable	Pointer to the error table number (0 is first error table).
wPoint	Table entry number (0 is first point).
lPosition	Absolute position in machine steps to correct at.
lCorrection	Correction value at specified position, in machine steps.

This function sets an entry within the specified axis calibration table on the axis processor. The *lPosition* to correct at is an absolute position in machine steps referenced from the home position (See *AerMoveHomexxxx* functions) and the *lCorrection* value is an absolute value in machine steps to be added to the position to reach the desired absolute position. Axis calibration tables are not enabled until the axis has been homed.

Points must be monotonically ordered by *lPosition* value, with no two points having the same *lPosition* value. Points must also be ascending in *lPosition* value

Users can assign points to tables that are associated already. The functions *AerAxisCalSet* and *AerAxisCalSetMode* are used to assign the table to a physical axis and activate the table(s) for that axis.

See Also

AerAxisAllocateTable
AerAxisCalGetStatus
AerAxisCalGetStatusPacket
AerAxisCalFreeTable
AerAxisCalGetPoint
AerAxisCalReset
AerAxisCalSetMode
AerAxisCalGetMode
AerAxisCalGetRawPosition
AerAxisCalSet
AerAxisCalGetItems
AerAxisCalGet
AerAxisCalGetPacket

Example

Samples\LIB\AexCal\AexCal.c

4.18. 2D Calibration

Two dimensional (2D) axis calibration is similar to axis calibration, however it allows up to 3 axes to be corrected against the position of 2 axes. The 2D Axis calibration has the following syntax:

- Generic delimiter: no enforced structure and spaces, tabs, commas acceptable between data
- Comments are written between ';' and next CRLF.
- All tables will assume 3D therefore correction for z will always be 0 if 2D
- Step size of data to be defined
- # elements are not pre-defined, but # columns are
- Error data is "absolute" not "relative"

:MULTI
; input axis 1
; 2
; output axis 1
; 2
; 3
; axis 1 sample distance; axis 2 sample distance
; axis 1 offset into table; axis 2 offset into table
; # columns (# points / row); # rows to be computed from total elements
; $[\varepsilon_{out1}\ \varepsilon_{out2}\ \varepsilon_{out3}]_{i\ j}$ . . .

Actual Table File Example

```
:MULTI      ; Designator for multidimensional table information
1 2         ; input axes are #1 and #2
1 2 3       ; output axes are #1, #2, #3, entering '0' if no third axis
1000 1000   ; 1000 machine steps between samples for #1, same for #2
0 0         ; no offset either axes (used as pointer in table to resolve marker location)
5           ; 5 points/row, therefore columns need not be specified.
1 1 0  2 2 0   3 3 0   2 2 0  3 3 0  ; data reflects 2D correction since element #3 is 0.
2 1 0  3 2 0   3 2 0   3 2 0  2 3 0
```

Note that the above format is for readability only. Actual data may look like:

1 2 1 2 3 1000 1000 0 0 5 1 1 0 2 2 0 3 3 0 2 2 0 3 3 0 2 1 0 3 2 0 3 2 0 3 2 0 2 3 0

A physical representation of the data follows in row and column format for readability and reconciliation with the stage orientation:

$[\text{correction values}]_{\text{'x' coordinate (i*sample distance), 'y' coordinate (j*sample distance)}}$

$[110]_{1000,1000}$	$[220]_{2000,1000}$	$[330]_{3000,1000}$	$[220]_{4000,1000}$	$[330]_{5000,1000}$
$[210]_{1000,2000}$	$[320]_{2000,2000}$	$[320]_{3000,2000}$	$[320]_{4000,2000}$	$[230]_{5000,2000}$

See the U600MMI.hlp file for more information.

4.19. AerAxisCal2DAllocateTable

AERERR_CODE AerAxisCal2DAllocateTable (HAERCTRL *hAerCtrl*, WORD *wRows*, WORD *wCols*);

Declare Function AerAxisCal2DAllocateTable Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *wRows* As Integer, ByVal *wCols* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
wRows	Number of rows in calibration table.
wCols	Number of columns in each row of the calibration table.

This function allocates a 2D calibration table. The size of the table is specified by the *wRows* × *wCols.*

See Also

AerAxisCal2DfreeTable

4.20. AerAxisCal2DFileDownload

AERERR_CODE AerAxisCal2DFileDownload (HAERCTRL *hAerCtrl*, LPCTSTR *pszFile*);

Declare Function AerAxisCal2DFileDownload Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *pszFile* As String) As Long

Parameters

hAerCtrl Handle to the controller.
pszFile 2D-Axis Calibration file.

This function downloads the specified axis calibration file to the controller.

C

VB

4.21. AerAxisCal2DFreeTable

AERERR_CODE AerAxisCal2DFreeTable (HAERCTRL *hAerCtrl*);

Declare Function AerAxisCal2DFreeTable Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to the controller.

This function frees the 2D calibration table.

See Also

AerAxisCal2DAllocateTable

4.22. AerAxisCal2DGetData

AERERR_CODE AerAxisCal2DGetData (HAERCTRL *hAerCtrl*, PAXISINDEX *piIn1*, PAXISINDEX *piIn2*, PDWORD *pdwIncr1*, PDWORD *pdwIncr2*, PAXISINDEX *piOut1*, PAXISINDEX *piOut2*, PAXISINDEX *piOut3*, PDWORD *pdwNumRows*, PDWORD *pdwNumCols*);

Declare Function AerAxisCal2DGetData Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByRef *piIn1* As Long, ByRef *piIn2* As Long, ByRef *pdwIncr1* As Long, ByRef *pdwIncr2* As Long, ByRef *piOut1* As Long, ByRef *piOut2* As Long, ByRef *piOut3* As Long, ByRef *pdwNumRows* As Long, ByRef *pdwNumCols* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
piIn1	Input axis 1 (see constants).
piIn2	Input axis 2 (see constants).
pdwIncr1	Increment distance between samples for axis 1.
pdwIncr2	Increment distance between samples for axis 2.
piOut1	Output axis 1 (see constants).
piOut2	Output axis 2 (see constants).
piOut3	Output axis 3 (see constants).
pdwNumRows	Number of rows.
pdwNumCols	Number of cols.

This function returns the information associated with the 2D calibration table allocated on the controller.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerAxisCal2DSetData

4.23. AerAxisCal2DGetMode

AERERR_CODE AerAxisCal2DGetMode (HAERCTRL *hAerCtrl*, PWORD *pwMode*);

Declare Function AerAxisCal2DGetMode Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByRef *pwMode* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
pwMode	Current mode of 2D calibration table (0-disabled, 1-enabled).

This function returns the current state of the 2D Calibration Table.

See Also

AerAxisCal2DSetMode

4.24. AerAxisCal2DGetPoint

AERERR_CODE AerAxisCal2DGetPoint (HAERCTRL *hAerCtrl*, WORD *wRow*,
WORD *wCol*, PDWORD *pdwX*, PDWORD *pdwY*, PDWORD *pdwZ*);

Declare Function AerAxisCal2DGetPoint Lib "AERSYS.DLL" (ByVal *hAerCtrl* As
Long, ByVal *wRow* As Integer, ByVal *wCol* As Integer, ByRef *pdwX*
As Long, ByRef *pdwY* As Long, ByRef *pdwZ* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
wRow	Which row in calibration table to retrieve.
wCol	Which column in calibration table to retrieve.
pdwX	Correction value for axis 1.
pdwY	Correction value for axis 2.
pdwZ	Correction value for axis 3.

This function returns the correction values for a given row and column.

See Also

AerAxisCal2DSetPoint

4.25. AerAxisCal2DSetData

AERERR_CODE AerAxisCal2DSetData (HAERCTRL *hAerCtrl*, AXISINDEX *iIn1*, AXISINDEX *iIn2*, DWORD *dwIncr1*, DWORD *dwIncr2*, AXISINDEX *iOut1*, AXISINDEX *iOut2*, AXISINDEX *iOut3*);

Declare Function AerAxisCal2DSetData Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *iIn1* As Long, ByVal *iIn2* As Long, ByVal *dwIncr1* As Long, ByVal *dwIncr2* As Long, ByVal *iOut1* As Long, ByVal *iOut2* As Long, ByVal *iOut3* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
iIn1	Input axis 1 (see constants).
iIn2	Input axis 2 (see constants).
dwIncr1	Increment distance between samples for axis 1.
dwIncr2	Increment distance between samples for axis 2.
iOut1	Output axis 1 (see constants).
iOut2	Output axis 2 (see constants).
iOut3	Output axis 3 (see constants).

This function sets up all the necessary input parameters for the 2D calibration table.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerAxisCal2DGetData

4.26. AerAxisCal2DSetMode

AERERR_CODE AerAxisCal2DSetMode (HAERCTRL *hAerCtrl*, WORD *wMode*);

Declare Function AerAxisCal2DSetMode Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *wMode* As Integer) As Long

Parameters

hAerCtrl Handle to the controller.
wMode Set mode of 2D calibration table (0-disabled, 1-enabled).

This function sets the current state of the 2D Calibration Table.

See Also

AerAxisCal2DGetMode

4.27. AerAxisCal2DSetPoint

AERERR_CODE AerAxisCal2DSetPoint (HAERCTRL *hAerCtrl*, WORD *wRow*,
WORD *wCol*, DWORD *dwX*, DWORD *dwY*, DWORD *dwZ*);

Declare Function AerAxisCal2DSetPoint Lib "AERSYS.DLL" (ByVal *hAerCtrl* As
Long, ByVal *wRow* As Integer, ByVal *wCol* As Integer, ByVal *dwX* As
Long, ByVal *dwY* As Long, ByVal *dwZ* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
wRow	Which row in calibration table to retrieve.
wCol	Which column in calibration table to retrieve.
dwX	Correction value for axis 1.
dwY	Correction value for axis 2.
dwZ	Correction value for axis 3.

This function sets the correction values for a given row and column.

See Also

AerAxisCal2DGetPoint

4.28. Related Axis Parameters

DRIVE -This parameter enables and disables the motor's torque associated with an axis. A zero disables the drive, while a 1 enables it.

REVERSALMODE - This parameter allows the user to specify the number of machine steps required to compensate for any backlash present in the system. Backlash occurs when the ball screw changes direction and moves a fixed distance before the stage begins to move in the new direction. This parameter specifies the distance in machine steps. Zero counts disables backlash compensation.

REVERSALVALUE - This parameter is the current correction value (in machine counts) for the reversal mode (backlash compensation).

> See the U600MMI.hlp file for more information on these parameters.

∇ ∇ ∇

CHAPTER 5: ELECTRONIC CAMMING FUNCTIONS

In This Section:

5.1. Introduction

Electronic camming (master/slave) functions allow the user to command master/slave motion. Master/slave motion is the most general form of motion allowing the user to command a single axis to move with virtually any position or velocity profile. Furthermore, by synchronizing multiple slave axes to a common master, the user can move multiple axes in fully synchronized motion. Master/slave motion, originally developed for grinding cam shafts, has many other uses like forcing an axis to follow a handwheel. For historical reasons, master/slave motion is alternately referred to as "camming." However, there is a drawback to the master/slave motion, the programmer must understand and do more to achieve the proper results.

Two axes are involved in any master/slave motion, the axis that executes the desired motion is called the "slave" axis and a user provided "master" axis is used to direct the slave. The slave is commanded by the master axis' commanded position (refer to *AerConfigMaster*).

For each master/slave relationship, the programmer must provide a table of coordinates (a cam table) that specifies slave axis positions for each master axis position. Refer to Figure 5-1.

See the U600MMI.hlp file for more information on camming.

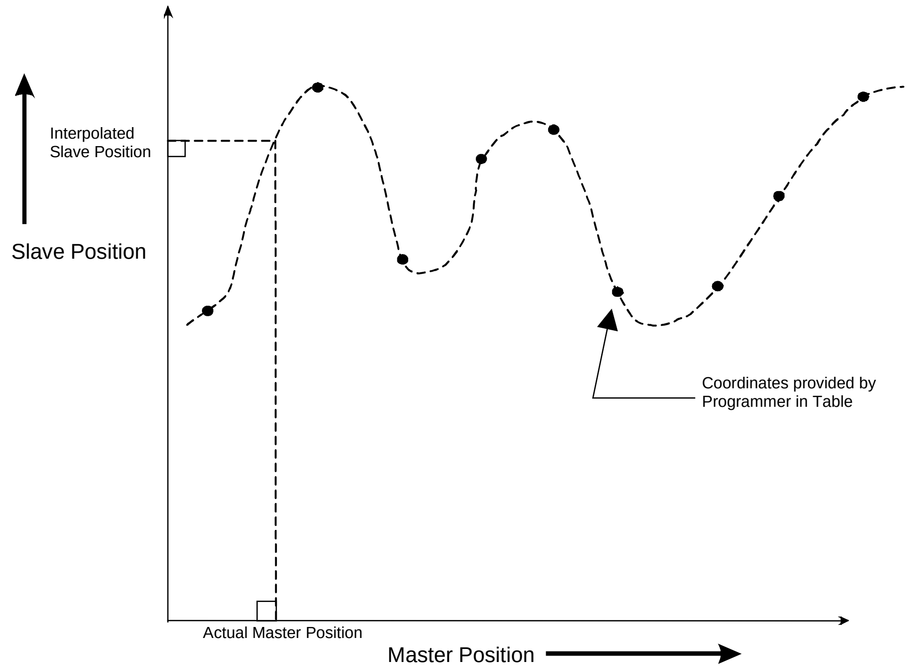


Figure 5-1. Master/Slave Profile

When the current position of the master axis is a value specified in one of the above points, then the slave axis position will take on the corresponding slave value of the point. If the current master position lies in between points specified in the table, then the slave position is found by either linear or spline interpolation of the adjacent points, (see *the* SYNC command). However, if the current position of the master is outside the range of the master values provided by the user, then the current master position will be "wrapped" so as to fall within the specified values in the table. For example, if the master points in the table range from 0 to 10, and the master axis is currently at position 12, then the master point for value 2 will be used. Therefore, if the master axis is not rotary, the user should provide points for the entire range of potential master motion.

The slave axis can act as a master to another axis, allowing the user to direct multiple axes in master/slave motion. In addition, the programmer can specify slave axis velocities for given master axis positions (see *AerCamTableSetMode*).

One can also add an "infeed" onto the slave while it is camming. The infeed is specified as a position and speed, (see *AerMoveInfeedSlave* function) and the required motion produced by the infeed will be added onto the cam directed motion.

5.1.1. Required Camming Steps

The five steps needed to direct master/slave motion are listed below with the function(s) detailing that step.

1.	Allocate cam table	Refer to *AerCamTableAllocate* function.
2.	Load cam table	Refer to *AerCamTable* functions.
3.	Configure master/slave axis	Refer to *AerConfigMaster* function.
4.	Synchronize an axis	Refer to *AerCamTableSetMode* function.
5.	Initiate master motion	Refer to Parameters section.

> The axis needs to be enabled before step 4 in the above procedure.

For help on important related issues see the following sections: Note that some of this information is contained in other chapters.

interpolation	Refer to *AerCamTableCalcCoeff*.
table entry/exit	Refer to *AerCamTableSetMode* and all related axis parameters.
infeeding	Refer to *AerMoveInfeedSlave*.
master position	Refer to *AerConfigMaster* and all related axis parameters.

> Care should be taken when engaging cam table motion as its incorrect application may result in abrupt changes in slave velocity. Make sure that the master axis is stationary when engaging or disengaging cam table motion for best results.

Example

Samples\LIB\AexCam\AexCam.c

5.2. AerCamTableAllocate

AERERR_CODE AerCamTableAllocate (HAERCTRL *hAerCtrl*, WORD *wTable*,
DWORD *dwSize*);

Declare Function AerCamTableAllocate Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long,
ByVal *wTable* As Integer, ByVal *dwSize* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wTable	Cam table number.
dwSize	Number of points in the table.

This function allocates memory on the axis processor card in order to store a cam table. Table numbers may range from 0 through 99 and can not be dynamically reallocated - they must be freed before reallocating to a different size. Each cam table point occupies 24 bytes of memory on the axis processor and all points allocated will be filled with zeros after allocation.

See Also

AerCamTableFree

Example

Samples\LIB\AexCam\AexCam.c

5.3. AerCamTableCalcCoeff

AERERR_CODE AerCamTableCalcCoeff (HAERCTRL *hAerCtrl*, WORD *wTable*, DWORD *dwWait*);

Declare Function AerCamTableCalcCoeff Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *wTable* As Integer, ByVal *dwWait* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wTable	Cam Table number.
dwWait	Maximum amount of time in milliseconds to wait until the coefficients are calculated.

This function computes the coefficients necessary to interpolate between the points specified in the cam table. Coefficients must be calculated before performing master/slave motion because each point has its own coefficients. The user can specify two types of interpolation: linear or spline for each point. The type of interpolation is specified when adding the point to the table (refer to *AerCamTableSetPoint*).

Coefficients cannot be calculated for a table that has not been allocated or has an axis currently synchronized to it, (refer to *AerCamTableSetMode*). The interpolation can be linear or cubic spline (set by *AerCamSetPoint*) where cubic spline is used for maximum "smoothness," and linear for minimum "rippling." The splines are 3rd order, but are not true Bsplines. In true Bsplines, an entire n by n matrix (where n is the number of points) must be solved to obtain values for all the points. Instead, for speed and memory optimization, a 2 by 2 matrix for each pair of points is solved, carrying the resultant derivatives over to the adjacent pair as the boundary conditions for the next splining point. The results are nearly identical to true Bsplines and in some cases are preferable.

Computing coefficients can take up a significant amount of axis processor time. The *dwWait* parameter specifies whether the caller wants to wait for computation completion before returning. If *dwWait* is set to zero, the function returns immediately and the programmer must later call *AerCamTableGetStatus* to insure that the computation is done. If *dwWait* is non-zero, the function will wait a maximum of *dwWait* milliseconds for the coefficient calculations to complete. If the calculation has not completed within this time, the function will return AERERR_CAMTABLE_TIMEOUT. In C language, this define can be used. However, in VB or C, the AerErrGetMessage function may be called to translate an error number to a text error message.

The cam table coefficients for each point are zeroed when the point is loaded into the table.

See Also

AerCamTableSetMode
AerCamTableGetStatus
AerCamTableSetPoint

Example

Samples\LIB\AexCam\AexCam.c

5.4. AerCamTableFileDownload

AERERR_CODE AerCamTableFileDownload (HAERCTRL *hAerCtrl*, DWORD *dwTable*, AXISINDEX *iMasterAxis*, AXISINDEX *iSlaveAxis*, WORD *wInterpolationType*, LPTSTR *pszFileName*);

AERERR_CODE AerCamTableFileDownload Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwTable* As Long, ByVal *iMasterAxis* As Long, ByVal *iSlaveAxis* As Long, ByVal *wInterpolationType* As Integer, ByRef *pszFileName* As String) As Long

Parameters

hAerCtrl	Handle to the Axis Processor card.
iMasterAxis	Axis index of master axis (see constants).
iSlaveAxis	Axis index of slave axis (see constants).
dwTable	Table number.
wInterpolationType	Interpolation type (see constants).
pszFileName	Pointer to file containing cam table data.

This function reads an ASCII file containing cam table data, forms a cam table, and configures the master of the given slave axis to the given master axis. The master axis is the axis from which the lookup position that is used in the table is obtained. Once the position for the slave axis has been determined by table lookup, this value is the "command" position of the slave axis. However, camming is only activated or in place immediately after the *AerCamTableSetMode* call (use *AerCamTableSetMode* to turn camming off). Therefore, the programmer should first use *AerCamTableFileDownload* as a setup action before running any programs and only use *AerCamTableSetMode* when the desire is to actually do cam motion. Check whether camming is "synced" for a particular axis, by checking the sync mode bit of the axis status for that axis (use *AerStat* for this).

The format of the ASCII file is described in the following paragraphs.

The file must consist of data lines and comment lines. A line is defined as a string of characters terminated by any number of consecutive line terminator characters. A line terminator character is a carriage return or a line feed.

Data lines are those whose first "non-whitespace" character is a "number" character. All other lines are comment lines. Whitespace characters are the tab, formfeed, comma, or space character. A number character is a digit, decimal point, or minus sign.

After the first data line is read-in, the program will continue reading-in data lines until an End of File or comment line is seen. Then the file is closed.

COMMENT LINES

The file must contain comment lines, preceding the first data line, providing three pieces of information:

- Number of points in the file
- Units of the master position values
- Units of the slave position values

The number of target points must be preceded by the keyword “Number of Points.” The first number character after this keyword will begin the number read-in as the number of target positions. The program must read-in exactly the number of data lines given by the “Number of Target Positions.”

The units of the position values must be preceded by the keyword “Master Units.” The first non-whitespace character that is not “(” after the keyword, begins the master position units descriptor. Units descriptors can be “nanometers,” “mm,” “in,” “microns,” “millimeters,” or “inches.” Identification of the master position units descriptor is case insensitive.

The units and scale factor of the slave position values must be preceded by the keyword: “Slave Units(.” The first non-whitespace character that is not “(” after the keyword, begins the slave scale factor (the slave scale factor is optional and if not specified assummed to be one). The first non-whitespace character after the slave scale factor must be the slave position units descriptor. Slave position units descriptors can be “nanometers,” “mm,” “in,” “microns,” “millimeters,” or “inches.” Identification of the slave position units descriptor is case insensitive.

DATA LINES

Each data line must have three numbers, the first of which must be an integer. All text following the first three numbers is ignored. The numbers must be separated by one or more whitespace characters.

The first number is the point number. It must be a positive integer. These numbers are not used.

The second number is the position value. This value is assumed to be in the units specified in the comment lines at the beginning of the file. Position values must be monotonically increasing or decreasing throughout the file but need not be evenly spaced.

The third number is the compensation value that goes with the position value. It is assumed to be in the units specified in the comment lines at the beginning of the file (i.e. if the value read-in is -2, and the compensation read-in was .25 microns, then the actual compensation value is -.5 microns). Compensation values are always measured relative to the zero compensation value, that is, the position command that would exist if no compensation were being performed.

All table entries consist of a master position and a slave value, where no two table entries have the same master position (see *AerCamTableSetPoint* for more details on table entries). If the current master position is equal to a table entry master position, then the slave value for that table entry is used as the current slave value. If, however, the current master position lies in-between two master positions listed in the table, then either linear or spline interpolation (see *wInterpolationType* parameter) is used to find a slave value between the two slave values listed in the table. However, if the current position of the master is outside the range of the master values provided by the user, then the current master position will be “wrapped” so as to fall within the specified values in the table. For example, if the master points in the table range from 0 to 10, and the master axis is currently at position 12, then the master point for value 2 will be used. Therefore, if the master axis is not rotary, the user should provide points for the entire range of potential master motion.

Master position values listed in the file must be in ascending order of position (after the position is translated into counts, they can have a descending order of position in the file if the *CntsPerInch*/*CntsPerDeg* machine parameter is negative).

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

AERCAM_XXXX

VB Constants

aerAxisIndex1
to
aerAxisIndex16

aerCamXXXX

See Also

AerCamTableAllocate
AerCamTableGetStatus
AerCamTableFree
AerCamTableSetPoint
AerCamTableGetPoint
AerCamTableSetMode
AerCamTableGetMultPoints
AerCamTableGetMode

Example

Samples\LIB\AexCam\AexCam.c

5.5. AerCamTableFree

AERERR_CODE AerCamTableFree (HAERCTRL *hAerCtrl*, WORD *wTable*);

Declare Function AerCamTableFree Lib "AERSYS.DLL" (ByVal *hAerCtr*l As Long,
ByVal *wTable* As Integer) As Long

Parameters

hAerCtrl Handle to the axis processor card.
wTable Cam Table number.

This function de-allocates memory on the axis processor card that was used to store a cam table.

See Also

AerCamTableSetMode
AerCamTableAllocate

Example

Samples\LIB\AexCam\AexCam.c

C

VB

5.6. AerCamTableGetMode

AERERR_CODE AerCamTableGetMode (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
PWORD *pwTable*, PWORD *pwMode*);

Declare Function AerCamTableGetMode Lib "AERSYS.DLL" (ByVal *hAerCtrl* As
Long, ByRef *iAxis* As Long, ByRef *pwTable* As Integer, ByRef
pwMode As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	A physical axis index, representing the slave axis (see constants).
wTable	Cam table number.
wMode	Pointer to WORD to receive desired mode (see constants).

This function returns the current synchronization mode of the slave axis. If the specified axis is not synchronized to a table, then zero is returned for both the table and the mode.

Refer to *AerCamTableSetMode* for a more detailed description of the parameters to this function.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

AERCAM_XXXX

VB Constants

aerAxisIndex1
to
aerAxisIndex16

aerCamXXXX

See Also

AerCamTableSetMode

Example

Samples\LIB\AexCam\AexCam.c

5.7. AerCamTableGetMultPoints

AERERR_CODE AerCamTableGetMultPoints (HAERCTRL *hAerCtrl*, WORD *wTable*, DWORD *dwStart*, DWORD *dwCount*, PAER_CAM_GETPOINT *pPoint*);

Parameters

hAerCtrl	Handle to the axis processor card.
wTable	Cam Table number.
dwStart	Starting point number.
dwCount	Number of points to set.
pPoint	Pointer to array of structures to receive point data.

This function allows the user to read multiple points simultaneously and is faster than single reads, since it requires less calling overhead. The *pPoint* must point to an array of AER_CAM_GETPOINT structures, each filled with data for one point. The points will be retrieved consecutively starting with the point indicated by *dwStart*. The caller must insure that *dwCount* number of structures exist, pointed to by *pPoint*. The AER_CAM_GETPOINT structure is identical to the arguments described in the *AerCamGetPoint* function description. Refer to Appendix C: Structures.

This function is identical to *AerCamTableGetPoint*.

See Also

AerCamTableGetPoint
AerCamTableSetMultPoints

Example

Samples\LIB\AexCam\AexCam.c

5.8. AerCamTableGetPoint

C

AERERR_CODE AerCamTableGetPoint (HAERCTRL *hAerCtrl*, WORD *wTable*, DWORD *dwPoint*, PLONG *plMaster*, PLONG *plSlave*, PLONG *plCoeffA*, LONG *plCoeffB*, PLONG *plCoeffC*, PWORD *pwStatus*);

VB

Declare Function AerCamTableGetPoint Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *wTable* As Integer, ByVal *dwPoint* As Long, ByRef *plMaster* As Long, ByRef *plSlave* As Long, ByRef *plCoeffA* As Long, ByRef *plCoeffB* As Long, ByRef *plCoeffC* As Long, ByRef *pwStatus* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wTable	Cam Table number.
dwPoint	Point number.
plMaster	Pointer to Master position.
plSlave	Pointer to Slave position.
plCoeffA	Pointer to "A" coefficient.
plCoeffB	Pointer to "B" coefficient.
plCoeffC	Pointer to "C" coefficient.
pwStatus	Pointer to status of point. Is equal to 256 if that point has been loaded, else it is 0.

This function returns pointers to all relevant information concerning a point in a cam table. Points can be read from a table that has an axis currently synchronized to it (see *AerCamTableSetMode*). Points can be specified from -1 to the number-of-cam-table-points+1, where the number-of-cam-table-points is the number provided in the *AerCamTableAllocate* function.

For the meaning of any of the values returned in the Pointers (all arguments after *dwPoint*) see *AerCamTableSetPoint*.

Interpretation of the coefficients is as follows: $y = Ax^3 + Bx^2 + Cx$; where x is the current master position and y the interpolated slave position. For linear interpolation, the A and B coefficients are set to zero.

See Also

AerCamTableSetPoint
AerCamTableSetMode

Example

Samples\LIB\AexCam\AexCam.c

5.9. AerCamTableGetStatus

AERERR_CODE AerCamTableGetStatus (HAERCTRL *hAerCtrl*, WORD *wTable*, PDWORD *pdwSize*, PWORD *pwStatus*);

Declare Function AerCamTableGetStatus Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wTable* As Integer, ByRef *pdwSize* As Long, ByRef *pwStatus* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wTable	Cam Table number.
pdwSize	Pointer to DWORD to receive cam table size.
pwStatus	Pointer to word to receive the mask of the status (see constants).

This function returns the size of a cam table and its current status. The size is the number provided in the *AerCamTableAllocate* function. If the given table was never allocated, or is out of range (more than 99), then a zero is returned for both the size and the status. The pwStatus value returned is a mask of AERCAM_STAT_xxxx values. The possible status values that can be returned and their meanings are defined below, with the constants.

This function will not inform the user if a table has an axis synchronized to it. Use *AerCamTableGetMode* for this. The user cannot synchronize an axis to a table (refer to *AerCamTableSetMode*) unless the table is in relative mode.

C Language and LabView Constants

AERCAM_STAT_ALLOCATED	; Table Allocated.
AERCAM_STAT_COEFFS_DONE	; Coefficients have been calculated.
AERCAM_STAT_COEFFS_BUSY	; Coefficients being calculated.

VB Constants

aerCamStatAllocated	; cam table allocated
aerCamStatCoeffsDone	; cam coefficients done and ready
aerCamStatCoeffsBusy	; coefficients being calculated
aerCmplrDefault	; Uses object files, only recompile ; when necessary, don't make listing
aerCmplrPreprocOnly	; Only run preprocessor (use with ; MAKE_LISTING)
aerCmplrNoReadObj	; Always recompile it from source.
aerCmplrNoUseSrc	; Read object (no source code ; available)
aerCmplrMakeListing	; Puts preprocessor output in file
aerCmplrSrcWithObj	; Reads source too, when reading ; from object
aerCmplrNoWriteObj	; Never writes objects

aerCamPointLinear
aerCamPointCubic

aerTaskMask1
aerTaskMask2
aerTaskMask3
aerTaskMask4
aerTaskMaskAll

aerCamModeOff
aerCamModeRelative
aerCamModeAbsolute
aerCamModeVelocity

See Also

AerCamTableCalcCoeff
AerCamTableSetMode

Example

Samples\LIB\AexCam\AexCam.c

5.10. AerCamTableGetTrack

AERERR_CODE AerCamTableGetTrack (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PDWORD *pdwMStart*, PDWORD *pdwMAccel*, PDWORD *pdwSAccel*);

Declare Function AerCamTableGetTrack Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByRef *pdwMStart* As Long, ByRef *pdwMAccel* As Long, ByRef *pdwSAccel* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
iAxis	The axis that is to begin tracking the master's position (see constants).
pdwMStart	Starting master position.
pdwMAccel	Distance in master axis counts.
pdwSAccel	Distance in slave axis counts.

This function returns the current values of the parameters used for the Track command.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerCamTableSetTrack

5.11. AerCamTableSetMode

AERERR_CODE AerCamTableSetMode (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wTable*, WORD *wMode*);

Declare Function AerCamTableSetMode Lib "AERSYS.DLL"(ByVal *hAerCtrl* As Long, ByRef *iAxis* As Long, ByVal *wTable* As Integer, ByVal *wMode* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	A physical axis index, representing the slave axis (see constants).
wTable	Cam Table number.
wMode	Desired mode (see constants).

This function activates or deactivates the synchronization of a master to a slave. Prior to synchronizing, the cam table is inactive (master motion does not cause slave motion). Immediately after synchronizing, master motion will cause slave motion. In addition, this function defines the mode in which the slave values are interpreted. The *iAxis* parameter is an axis index that specifies a physical axis. If the synchronization modes are changed while the master or slave is moving, abrupt changes in motion may occur. The user is cautioned that synchronizing an axis and the camming behavior can be complex and the following description along, with the description of the related axis parameters must be fully understood to produce the desired results.

After synchronizing a slave to a master, the slave motion is linked to master motion through the specified cam table. After a slave axis synchronization mode is deactivated, the slaves motion no longer follows the master axis. The user must provide a synchronization mode. AERCAM_MODE_OFF deactivates the synchronization mode of a slave axis from a cam table. AERCAM_MODE_RELATIVE engages relative cam table mode. The slave axis is assumed to be in the correct position relative to the current master axis position. AERCAM_MODE_ABSOLUTE engages absolute cam table mode. The current slave position is checked against the slave position specified by the current master position. If they are different, then an axis move is generated to place the slave position in alignment with the corresponding master position as defined in the cam table. Camming begins immediately and the move is made at the speed specified by the *SYNCSPEED* parameter. The motion generated by this move will be added to the generated cam table motion.

AERCAM_MODE_VELOCITY is velocity table mode that specifies a slave axis velocity in counts/sec vs. a master axis position. AERCAM_MODE_VELOCITY also provides "smoothing" when synchronizing to a table (refer to the *MAXCAMACCEL* parameter at the end of this chapter, or in the U600MMI.hlp file).

> The axis needs to be enabled before engaging sync mode.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

AERCAM_MODE_XXXX

VB Constants

aerAxisIndex1
to
aerAxisIndex16

aerCamModeXXXX

See Also

AerCamTableGetMode

Example

Samples\LIB\AexCam\AexCam.c

5.12. AerCamTableSetMultPoints

AERERR_CODE AerCamTableSetMultPoints (HAERCTRL *hAerCtrl*, WORD *wTable*, DWORD *dwStart*, DWORD *dwCount*, PAER_CAM_SETPOINT *pPoint*);

Parameters

hAerCtrl	Handle to the axis processor card.
wTable	Cam Table number.
dwStart	Starting point number.
dwCount	Number of points to set.
pPoint	Pointer to array of structures containing point data.

This function allows the user to set a number of points simultaneously, assigning to points consecutively increasing, starting with the point indicated by *dwStart*. This is faster than single sets, since it requires less calling overhead. The *pPoint* must point to an array of AER_CAM_SETPOINT structures, each containing data specifying one point. The caller must insure that *dwCount* number of structures exist, pointed to by *pPoint*.

The AER_CAM_SETPOINT structure is identical to the arguments described in the *AerCamSetPoint* function, refer to Appendix C: Structures for its description. This function is similar to *AerCamSetPoint*.

See Also

AerCamTableSetPoint

Example

Samples\LIB\AexCam\AexCam.c

5.13. AerCamTableSetPoint

AERERR_CODE AerCamTableSetPoint (HAERCTRL *hAerCtrl*, WORD *wTable*,
DWORD *dwPoint*, LONG *lMaster*, LONG *lSlave*, WORD *wType*);

Declare Function AerCamTableSetPoint Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wTable* As Integer, ByVal *dwPoint* As Long, ByVal *lMaster* As Long, ByVal *lSlave* As Long, ByVal *wType* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wTable	Cam Table number.
dwPoint	Point number.
lMaster	Master position.
lSlave	Slave position.
wType	Interpolation type (see constants).

This function loads a cam table point into a cam table. Points cannot be specified for a table which has not been allocated or currently has an axis synchronized to it (refer to *AerCamTableSetMode*). Points can be specified in the range between -1 to the number of cam table points+1, where the number of cam table points is the number provided in the *AerCamTableAllocate* function. The *lSlave* and *lMaster* values define the master and slave position relationship. The interpolation type must be one of the constants below.

The -1 and (cam_table_points +1) points are only used in spline mode to determine the slope of the spline curve at the end points of the curve (see curve in Figure 4-1). If these points are not provided, then the slope is assumed 0 through the end points (this is the case in Figure 4-1).

The master coordinate values must be in a monotonically increasing sequence. Use the *CAMOFFSET* axis parameter to change the alignment between the master position and the slave position specified in the table.

C Language and LabView Constants

AERCAM_POINT_XXXX

VB Constants

aerCamPointXXXX

See Also

AerCamTableAllocate
AerCamTableCalcCoeff
AerCamTableGetPoint
AerCamTableSetMode

Example

Samples\LIB\AexCam\AexCam.c

5.14. AerCamTableSetTrack

AERERR_CODE AerCamTableSetTrack (HAERCTRL *hAerCtrl*, AXISINDEX iAxis, DWORD *dwMStart*, DWORD *dwMAccel*, DWORD *dwSAccel*);

Declare Function AerCamTableSetTrack Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *dwMStart* As Long, ByVal *dwMAccel* As Long, ByVal *dwSAccel* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
iAxis	The axis that is to begin tracking the master's position (see constants).
dwMStart	Starting master position.
dwMAccel	Distance in master axis counts (see below)
dwSAccel	Distance in slave axis counts (see below)

The *iAxis* parameter specifies the axis that is to begin tracking its master's position. The axis must not be moving when this command is executed (the master axis can be moving).

The *dwMStart* parameter specifies the starting master position, in master axis encoder counts, to begin tracking. If the current master position exceeds *dwMStart* when *dwMAccel* is positive, or is less than *dwMStart* when *dwMAccel* negative, then tracking will begin immediately.

The *dwMAccel* parameter specifies the distance, in master axis encoder counts, over which the master will travel as the slave accelerates from zero speed to the desired tracking ratio. This distance can be positive or negative. The sign of the number determines the direction of travel of the master axis.

The *dwSAccel* parameter specifies the distance, in slave axis encoder counts, over which the slave will travel as it accelerates from zero speed to the desired tracking ratio.

This command is used to have a stationary slave axis begin tracking a moving master axis. Typical applications include gantry type axes (slave axis) that must begin tracking the motion of a moving conveyor belt (master axis). The command specifies the starting master position to begin tracking along with the master and slave distance over which the slave axis will accelerate. The ratio of the acceleration distances defines the ratio of the final speed of the slave axis. The axis final velocity can be determined by the equation:

SLAVE_VEL = [(MASTR_VEL)**dwSAccel**2] / [dwMAccel]

Therefore, if the slave axis is to match the master axis velocity then *dwSAccel* should be one-half *dwMAccel* (assuming the master and slave axes have the same resolution). This relationship arises from the fact that while the master axis is moving at constant speed and the slave axis accelerates from zero velocity to match the master velocity, the master axis will have traveled twice as far as the slave. Note that all distances are specified in encoder counts and not in inches or millimeters.

C Language and LabView Constants	**VB Constants**
AXISINDEX_1	*aerAxisIndex1*
to	*to*
AXISINDEX_16	*aerAxisIndex16*

See Also

AerCamTableGetTrack

5.15. Related Axis Parameters

CAMADVANCE - This parameter is used as a master offset advance that is a function of the velocity of the master axis. The units are in counts/(counts/millisecond).

MAXCAMACCEL - Mode 3 offers acceleration/deceleration protection that can be used when synchronizing on the fly (without desynchronizing in-between with the SYNC mode). If this parameter is a non-zero, the slave axis will not exceed the specified acceleration while camming. This acceleration is in units of user-units per millisecond squared. This parameter is not used in synchronization modes 1 and 2. To deactivate this feature, set the parameter value to 0.

CAMOFFSET - This parameter is added to the master position before doing the table lookup. For example, if the table covers master positions from 0° to 360°, the actual master position is 2° and *CAMOFFSET* is 3°, then the CNC will use the value of 5° as the master position to look up in the table.

MASTERLENGTH - If upon synchronizing the actual master position lies outside of the master coordinates in the table, the table master coordinates will be pushed up or down in units of *MASTERLENGTH* until it lies within the table. For example, if the table covers from 0° to 359° (the master is rotational) and the current master coordinate is 361°, the axis processor uses the 1° entry in the table to direct the slave.

> The *MASTERLENGTH* parameter should not be used if the master axis position will exceed the *MASTERLENGTH* parameter. Doing so causes the slave axis to abruptly reverse position to maintain alignment with the master position.

MASTERPOS - This parameter is the master position, as seen by the slave. This is the actual value used to look up in the table. The *MASTERPOS* parameter can only be set while the axis is not in sync mode. Once the axis is in sync mode, the *MASTERPOS* is maintained relative to the master axis position by integrating the master axis velocity and adding it to the initial *MASTERPOS* parameter. Note that the user can direct either the master axis' actual position, or the master axis' commanded position be used to derive the slave’s *MASTERPOS* parameter. (see the *AerConfigMaster* function). If the *MASTERLEN* is non-zero, then every time the *MASTERPOS* exceeds the *MASTERLEN* value, it is reset to 0. Any changes in the master axis's position will still be reflected in the slave axis's *MASTERPOS* value, but the *MASTERPOS* value will now be *MASTERLEN* lower than the master axis's position. This jump in *MASTERPOS* causes a jump in the cam table output for the slave, which may cause abrupt motion in the slave. To understand how this parameter works, the reader must be familiar with the operation of synchronized motion through the use of CAM tables on the U600 Series controller. While operating in this mode, axis motion relates directly to motion on the master axis (the axis designated by the user). The basis of this relationship is dependent on the currently active CAM table. Each CAM table entry contains two position types: a master position and a slave position. As the master axis approaches the positions found within the CAM table, the slave axis moves to the corresponding slave position. Interpolation occurs between the CAM points.

The first CAM table entry for the master position must be a zero. Two rules apply to all master positions following the first entry: they must always increase and they must never repeat.

See the U600MMI.hlp file for more information on these parameters.

∇ ∇ ∇

CHAPTER 6: COMPILER FUNCTIONS

In This Section:

6.1. Introduction

The Aerotech CNC Compiler allows the programmer to compile and download CNC lines and programs containing G codes, etc. These codes do not cause the controller to execute the programs or CNC line. The AerTaskXXXX functions are used for that purpose (see Chapter 22). These functions also allow the programmer to obtain data on CNC program errors, monitor the status of CNC compiling/downloading, and obtain CNC program information (i.e. compile warnings, time of compile, number of lines compiled). Please see the *UNIDEX 600 Series CNC Programming Manual, P/N EDU158* for details on valid CNC program text.

The following remarks apply to all *AerCompiler* function calls. See Samples\LIB\AexProg\AexProg.c for a C example on compiling and running a program.

- All line, character, and error indices passed in and returned are zero-based. This means the first line is indicated by the line number “0”, and so on. However, counts returned are one-based. For example, if a CNC program has two errors, a call to the function “*AerCompilerGetNumOfErrs*” will yield “2”. To get information on the two errors, the programmer must call the function “*AerCompilerGetErrData*,” passing it the indices “0” and “1” respectively.
- Line and character numbers returned as the constant -1 indicate a NULL, or invalid number.
- Functions with "*Get*" in their name write data into a location indicated by a pointer that is passed in the argument list. For example, the function “*AerCompilerGetErrText*” returns error text information in a “*char**” pointer or string variable passed in the argument list. If the passed pointer is detected as being bad (NULL or points out of the user sector) the routine returns AERCMPLR_GENERAL_BAD_ PASSED_BUFFER, which can be tested for in C language. In VB and C, the error return code can be passed to AerErrGetMessage function, which will return a text message for the error code. In this case, do not use

the passed pointer, or the program may crash. The user should never get this error, unless an error was made using or writing the program.

- Error data consists of two parts, the error condition data, and error location data. Error condition data describes the error. Error location data consists of the line number, char number, file, etc., where the error occurs. See the description of the COMPILE_ERROR_DATA structure for more details (in Appendix C: Structures). Both location and condition error data can be returned in formatted strings, or as values.

Either a file or a string can be compiled as a program and once the compilation is complete, the program can be downloaded as a regular program, or an infinite-size queued program. After downloading, you must associate before running the program (see Samples\LIB\AexProg\AexProg.c, or the beginning of the AerTask chapter). The compile object holds data concerning the program text, the program object (its compiled form), and data concerning compile errors or warnings in memory. After a compile, the user can make calls to the compile object to obtain text lines, or error data. Object files can be written or read to the hard drive, based on the mode bits passed. In the default mode, the compiler automatically manages the object files (.ogm), only recompiling when the source code changes.

A pseudo-code example of the steps required to compile a CNC program is shown below. Please see the Samples\LIB\AexProg\AexProg.c file for more detailed examples, including examples on how to compile a single line, and how to download program queues.

```
AerCompilerCreate()                     ; 1.  Initialize the compiler
AerCompilerLoadAxisNames()              ; Load user axis names
AerCompilerAutoIncludeEx()              ; Add include files (AerParam.pgm and
                                        ; Mcode.pgm)
AerCompilerCompileFile()                ; 2.  Compile the program
If ( ERRORS )                           ; any errors?
{
        AerCompilerErrsGetNumOf()       ; 3. Get number of compiler errors
        for ( ALL_ERRORS )              ; show all compile errors   (optional)
        {
            AerCompilerErrGetCode()     ; Get error code
            AerCompilerErrGetText()     ; Get error text
            AerCompilerErrGetData()     ; Get error data
            AerCompilerErrGetLocText()  ; Get bad CNC text string
            AerCompilerGetLineText()    ; Get bad CNC program line
                                        ;  display the error message
        }
}
else                                    ; compile is okay!
{
        AerCompilerDownload()           ; 4. Load program into axis processor
}
AerCompilerDestroy()                    ; 5. kill the compiler  (DON'T FORGET
                                        ; THIS, OR YOU GET MEMORY LEAKS)
```

See “Task Functions” to execute programs.

Some compiler features that may be of interest include the following:

1. Automatic detection of out-of-date objects, including checking of all included files.
2. High-speed “one pass” operation (compiles from source in a few milliseconds per line).
3. “Infinite program size” compilation (see *AerCompilerSetQueueMode*).

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

6.2. AerCompilerAbort

AERERR_CODE AerCompilerAbort (HCOMPILER *hCompile*);

Declare Function AerCompilerAbort Lib "AERSYS.DLL" (ByVal *hCompile* As Long) As Long

Parameters

hCompile Handle to an Aerotech compiler session.

This function aborts any current compile or download for this compile session.

6.3. AerCompilerAddDefinesFile

AERERR_CODE AerCompilerAddDefinesFile (HCOMPILER *hCompile*, LPCTSTR *pszFileName*);

Declare Function AerCompilerAddDefinesFile Lib "AERSYS.DLL" (ByVal *hCompile* As Long, ByVal *pszFileName* As String) As Long

Parameters

hCompile	Handle to an Aerotech compiler session.
pszFileName	Path and name of file to add.

This function adds a "defines file" to the compiler. A defines file is a file that consists of all *#define* statements. This gives the capability to *teach* the compiler new commands. If a file is added to the compiler session with this statement, then it is not necessary to include files directly in the program with the *#include* statement.

The following two files are normally "added" via this function:

The AERPARAM.PGM is a standard file that Aerotech distributes to handle all parameter definitions.

The MCODE.PGM is a standard file that Aerotech distributes to handle all M Code definitions.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

Example

Samples\Lib\VisualBasic\RunPgm.vbp

6.4. AerCompilerAutoIncludeEx

AERERR_CODE AerCompilerAutoIncludeEx (HCOMPILER *hCompile*, TASKMASK *mTask*, LPCTSTR *pszAutomationFile*);

Declare Function AerCompilerAutoIncludeEx Lib "AERCMPLR.DLL" (ByVal *hCompile* As Long, ByVal m*Task* As Long, ByVal *pszAutomationFile* As String) As Long

AERERR_CODE AerCompilerAutoInclude (HCOMPILER *hCompile*, LPCTSTR *pszAutomationFile*);

Declare Function AerCompilerAutoInclude Lib "AERCMPLR.DLL" (ByVal *hCompile* As Long, ByVal *pszAutomationFile* As String) As Long

Parameters

hCompile	Handle to an Aerotech compiler session.
mTask	Task mask that species which task(s) to use (see constants).
pszAutomationFile	Program Automation File (May be NULL)

This function loads the Automation File and calls *AerCompilerAddDefinesFile* on the *hCompile* for each program that is specified as "Auto Include".

If *pszAxisCfgFile* is NULL, the program automation file is automatically retrieved with *pszAutomationFile*, normally: \U600\Ini\U600Auto.Ini

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

The *AerCompilerAutoInclude* is maintained for backward compatibility and calls *AerCompilerAutoIncludeEx as follows:*

```
AerCompilerAutoIncludeEx (hCompile, TASK_MASK, pszAutomationFile);
```

The name of the Automation file can be retrieved with *AerRegGetFileName*.

C Language and LabView Constants

TASKMASK_1
to
TASKMASK_4

VB Constants

aerTaskMask1
to
aerTaskMask4

See Also

AerAutoProgAddProgram
AerCompilerAddDefinesFile
AerCompilerAutoRun
AerRegGetFileName

6.5. AerCompilerAutoRun

AERERR_CODE AerCompilerAutoRun (HCOMPILER *hCompile*, HAERCTRL *hAerCtrl*, LPCTSTR *pszAutomationFile*);

Declare Function AerCompilerAutoRun Lib "AERCMPLR.DLL" (ByVal *hCompile* As Long, ByVal *hAerCtrl* As Long, ByVal pszAutomationFile As String) As Long

Parameters

hCompile	Handle to an Aerotech compiler session (may be NULL).
hAerCtrl	Handle to the axis processor card.
PszAutomationFile	Program Automation File (may be NULL).

This function loads the Automation file (\U600\Ini\U600Auto.Ini) plus downloads and executes all necessary programs.

If *hCompile* is NULL, a default compiler handle is created and then discarded.

If *pszAxisCfgFile* is NULL, the axis configuration file is automatically retrieved with *pszAutomationFile*, (\U600\Ini\U600AxisCfg.Ini).

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

DIM sGlobStr as STRING * 50 ; 50 characters long

The code for the function follows:

```
AERERR_CODE AERCMPL_DLLENTRY AerCompilerAutoRun (HCOMPILER hCompile,
                                                 HAERCTRL hAerCtrl,
                                                 LPCTSTR pszFile  )
{
   AFX_MANAGE_STATE (AfxGetStaticModuleState() );

   TCHAR       szFile[MAX_TEXT_LEN];
   TCHAR       szProg[MAX_TEXT_LEN];
   TCHAR       szHandle[MAX_PROG_NAME_LEN];
   TCHAR       szAuto[MAX_TASKS][512];
   TCHAR       szFarcall[MAX_TEXT_LEN];
   TASKINDEX   iTask;
   TASKMASK    mTask;
   DWORD       dwSystem;
   DWORD       dwType;
   DWORD       dwNumPrograms;
   DWORD       iProg;
   DWORD       mBit;
```

```
BOOL        bCloseCompiler = FALSE;
AERERR_CODE eRc;

if( (pszFile == NULL) || (*pszFile == '\0') )
{
   eRc = ::AerRegGetFileName( AER_UNIDEX_DEFAULT, AER_CARD_DEFAULT,
                              AERREGID_AutomationFile, szFile );
}
else
{
   STRCPY( szFile, pszFile );
}

//
// kill all motion on the tasks
for( iTask = TASKINDEX_1; iTask < MAX_TASKS; iTask++ )
{
   AerTaskProgramAbort( hAerCtrl, iTask );
   AerTaskReset( hAerCtrl, iTask );

   *szAuto[iTask] = '\0';
}

//
// Create a compiler if none was passed to us
if( hCompile == NULL )
{
   //
   // Create a new compiler
   eRc = AerCompilerOpen( &hCompile );
   RETURN_ON_ERR( eRc );

   // we need to close the compiler since we're creating it
   bCloseCompiler = TRUE;

   // make sure we're using axis names
   eRc = AerCompilerLoadAxisNames( hCompile, NULL );
   JUMP_ON_ERR( eRc, problems );

   //
   // Add auto include information to new compiler
   eRc = AerCompilerAutoInclude( hCompile, szFile );
   JUMP_ON_ERR( eRc, problems );
}

//
// Get the number of programs
eRc = AerAutoProgGetNumPrograms( szFile, &dwNumPrograms );
RETURN_ON_ERR( eRc );

for( iProg = 0; iProg < dwNumPrograms; iProg++ )
{
   //
   // get program info from ini file
   eRc = AerAutoProgGetProgram( szFile, iProg, &dwSystem, szProg,
                                &dwType, &mTask );
   BREAK_ON_ERR( eRc );

   //
   // if it is an auto-include get next automation file
```

```
if( dwType == AUTOPROG_TYPE_INCLUDE )
{
   continue;
}

//
// compile the file
eRc = AerCompilerCompileFile( hCompile, szProg,
                              AERCMPLR_DEFAULT );
BREAK_ON_ERR( eRc );

switch( dwType )
{
   case AUTOPROG_TYPE_RUN_IMMEDIATE:
   {
      mBit = 0x01;
      for( iTask = TASKINDEX_1; iTask < MAX_TASKS; iTask++ )
      {
         if( mBit & mTask )
         {
            eRc = runImmediate( hAerCtrl, hCompile, iTask );
            BREAK_ON_ERR( eRc );
         }

         mBit <<= 1;
      }
   }
   break;

   case AUTOPROG_TYPE_DOWNLOAD_ONLY:
   case AUTOPROG_TYPE_RUN:
   case AUTOPROG_TYPE_RUN_SILENT:
   case AUTOPROG_TYPE_LOAD:
   {
      AerCompilerFileNameToHandle( szProg, szHandle );

      eRc = AerCompilerDownload( hCompile, hAerCtrl,
                                 szHandle, 0 );
      BREAK_ON_ERR( eRc );

      if( dwType == AUTOPROG_TYPE_DOWNLOAD_ONLY )
      {
         break;
      }

      mBit = 0x1;
      for( iTask = TASKINDEX_1; iTask < MAX_TASKS; iTask++ )
      {
         if( mBit & mTask )
         {
            if( dwType == AUTOPROG_TYPE_LOAD )
            {
               eRc = AerTaskProgramAssociate( hAerCtrl, iTask,
                                    (PAER_PROG_HANDLE) szHandle );
               JUMP_ON_ERR( eRc, problems );
            }
            else
            {
               SPRINTF( szFarcall, "FARCALL \"%s\" \r\n",
                        szHandle );
               STRCAT( szAuto[iTask],  szFarcall );
```

```
                }
             }

             mBit <<= 1;
          }
       }
       break;

    }
 }

 for( iTask = TASKINDEX_1; iTask < MAX_TASKS; iTask++ )
 {
    if( *szAuto[iTask] != '\0' )
    {
       sprintf( szHandle, "AUTOPROG%d", iTask + 1 );

       eRc = AerCompilerCompileLine( hCompile, szAuto[iTask],
                                     AERCMPLR_DEFAULT );
       BREAK_ON_ERR( eRc );

       eRc = AerTaskProgramDeAssociate( hAerCtrl, iTask );
       BREAK_ON_ERR( eRc );

       eRc = AerCompilerDownload( hCompile, hAerCtrl, szHandle, 0 );
       BREAK_ON_ERR( eRc );

       eRc = AerTaskProgramAssociate( hAerCtrl, iTask,
                                      (PAER_PROG_HANDLE) szHandle );
       BREAK_ON_ERR( eRc );

       eRc = AerTaskProgramExecute( hAerCtrl, iTask, TASKEXEC_RUN );
       BREAK_ON_ERR( eRc );
    }

 }

problems:

 if( bCloseCompiler )
 {
    AerCompilerClose( hCompile );
 }

 return( eRc );
}
```

See Also

AerAutoProgAddProgram
AerCompilerAddDefinesFile
AerCompilerAutoIncludeEx
AerRegGetFileName

C
VB

6.6. AerCompilerClose (AerCompilerDestroy)

AERERR_CODE AerCompilerClose (HCOMPILER *hCompiler*);

Declare Function AerCompilerClose Lib “AERCMPLR.DLL” (ByVal *hCompiler* As Long) As Long

Parameters

hCompiler Handle to an Aerotech Compiler session.

This function was formerly *AerCompilerDestroy*. The function frees all memory associated with a compiler session. The compile handle is no longer valid after a call to this function.

This function does not free memory on the axis processor that may be associated with a program downloaded from an *AerCompilerDownload* call. If a program has been downloaded successfully with this *hCompiler* handle, then this program will remain on the axis processor after a call to *AerCompilerClose* with the *hCompiler* handle.

See AerProgramFree to unload the CNC program and free the memory on the controller.

See Also

AerCompilerOpen

Example

Samples\Lib\VisualBasic\RunPgm.vbp

6.7. AerCompilerCompileFile

AERERR_CODE AerCompilerCompileFile (HCOMPILER *hCompiler*, LPCTSTR *pszFileName*, DWORD *dwMode*);

Declare Function AerCompilerCompileFile Lib "AERCMPLR.DLL" (ByVal *hCompiler* As Long, ByVal *pszFileName* As String, ByVal *dwMode* As Long) As Long

Parameters

hCompiler	Handle to an Aerotech compiler session.
pszFileName	Pointer to a null-terminated character string, where the string is the name of the file to compile.
dwMode	Mode (see constants).

This function compiles a file containing CNC program text. Refer to the *UNIDEX 600 Series CNC Programming Manual, P/N EDU158* for a description of valid CNC syntax. The file must be in ASCII format and the following pair of consecutive characters must terminate each line: CR and LF.

This function does not download the compiled file (.ogm) to the axis processor. The compiled program can be downloaded to the axis processor via a call to *AerCompilerDownload*. *AerCompilerCompileFile* may or may not write an object file (.ogm) containing the compiled text to the hard drive depending on the mode parameters set.

AerCompilerCompileFile returns either AERERR_NOERR or AERCMPLR_FILE_GENERIC_ERR. Sometimes the compiler generates warnings, but it still returns AERERR_NOERR if the program has warnings and no errors. Information on all errors and warnings can be obtained from the *AerCompilerErrxxxx* functions.

The *dwMode* parameter is a mask that controls certain features of the compile process. The user can set (using the logical 'or' operator) any combination of the following bits into the mode. If the user passes zero, all of these bits are off.

The compile consists of a precompile phase and a compile phase that executes in sequence. The precompiler is responsible for performing the "*#define*" and "*#include*" statements. The output of the precompiler is given to the compiler and if the compiler completes with no error, then it generates an object file. The object file is the binary program that can be downloaded to the axis processor.

If AERCMPLR_PREPROC_ONLY is set, only the precompilation is done. The user can then look at the precompiler output via *AerCompilerGetLineText* and *AerCompilerGetNumOfLines* calls. Or the user can deliver the listing to a file by specifying the AERCMPLR_MAKE_LISTING bit in the mode parameter. However, the user cannot download the program, since it was not fully compiled.

The compiler normally writes the object file to disk using the same name as the filename passed, but with the file extension "OGM." If *AerCompilerCompileFile* is called at a later time, the compiler compares the dates of the object file (if any) and the program files - (there may be multiple files if there are include statements). If the object file was written later than the entire program files, the compiler uses the object file instead of recompiling the source files. Using the object file results in a significant saving of time - compilation is often five or more times faster. However, object files waste disk space. An object file takes up five to twenty times the disk space as the original source code.

If AERCMPLR_NO_READ_OBJ is set, the compiler will not read an object file. In this mode the compiler has to recompile the file every time *AerCompilerCompileFile* is called so there is no timesavings with repeated compiles. Also, this bit has no effect if AERCMPLR_PREPROC_ONLY is set.

If AERCMPLR_NO_WRITE_OBJ is set, the compiler will not write an object file. Also, this bit has no effect if AERCMPLR_PREPROC_ONLY is set.

If AERCMPLR_NO_USE_SRC is set, the compiler will only look for an object file, regardless of whether a source file is present or not. This bit has no effect if AERCMPLR_PREPROC_ONLY is also set.

If AERCMPLR_MAKE_LISTING is set, then the output of the precompiler will be dumped to a disk file. The file will have the same name as the source file, but with a file extension of ".LGM." Normally, when the compiler reads an object file, it does not look for and read any associated source text. Subsequent calls to *AerCompilerGetLineText* will return the error "No Source Available."

Set AERCMPLR_SRC_WITH_OBJ to force the compiler to read in source code when reading in the object file. Keep in mind that this increases compile time by a factor of ten when reading object files. Note that error data is always available, regardless of this flag setting.

C Language and LabView Constants

AERCMPLR_PREPROC_ONLY	; Only runs the preprocessor. No compile
AERCMPLR_NO_READ_OBJ	; Forced recompile, never reads an object file
AERCMPLR_NO_USE_SRC	; Uses only the object file, not the source on ; disk
AERCMPLR_MAKE_LISTING	; Make a listing file
AERCMPLR_SRC_WITH_OBJ	; Read source when reading object
AERCMPLR_NOWRITE_OBJ	; Never writes an object
AERCMPLR_XXXX	

VB Constants

aerComplrPreprocOnly
aerComplrNoReadObj
aerComplrNoUseSrc
aerComplrMakeListing
aerComplrSrcWithObj
aerComplrNoWriteObj
aerComplrXXXX

See Also

AerCompilerCompileLine
AerCompilerDownload

Example

Samples\Lib\VisualBasic\RunPgm.vbp

6.8. AerCompilerCompileLine

AERERR_CODE AerCompilerCompileLine (HCOMPILER *hCompiler*, LPCTSTR *pszLine*, DWORD *dwMode*);

Declare Function AerCompilerCompileLine Lib "AERCMPLR.DLL" (ByVal *hCompiler* As Long, ByVal *pszLine* As String, ByVal *dwMode* As Long) As Long

Parameters

hCompiler	Handle to an Aerotech Compiler session.
pszLine	Pointer to CNC text.
dwMode	Mode (refer to the following description).

This function compiles a string containing CNC program text. Please see the *UNIDEX 600 Series CNC Programming Manual, P/N EDU158* for a description of valid CNC syntax. The string must be null terminated and can contain multiple lines separated by a CR/LF pair.

This function behaves similarly to the *AerCompilerCompileFile* function, except that the text input is from a string, not a file. Therefore, this documentation will only discuss the differences between *AerCompilerCompileFile* and *AerCompilerCompileLine*. Please see *AerCompilerCompileFile* for a full description.

The compiler will not generate an object file in this function, nor will it read an object file. The AERCMPLR_NOOBJ_READ and AERCMPLR_NOOBJ_WRITE bits are ignored if set in the mode parameter. Otherwise, the mode bits behave as described in *AerCompilerCompileFile.*

It is important to emphasize that compilation of a line is identical to that of a file, except for the source. For example, if the user compiles the line, "#include a.pgm," then the resulting object would be identical to the user doing an *AerCompilerCompileFile* of the file "a.pgm."

See Also

AerCompilerCompileFile
AerCompilerDownload

Example

Samples\Lib\VisualBasic\RunPgm.vbp

6.9. AerCompilerDownload

AERERR_CODE AerCompilerDownload (HCOMPILER *hCompile*, HAERCTRL *hAerCtrl*, LPCTSTR *psz960Name*, DWORD *dwFirstUserLineNumber*);

Declare Function AerCompilerDownload Lib “AERSYS.DLL” (ByVal *hCompile* As Long, ByVal *hAerCtrl* As Long, ByVal *psz960Name* As String, ByVal *dwFirstUserLineNumber* As Long) As Long

Parameters

hCompile	Handle to an Aerotech Compiler session.
hAerCtrl	Handle to the axis processor card.
psz960Name	Pointer to a null-terminated character string, which is the name under which the axis processor will store the downloaded program.
dwFirstUserLineNumber	Line number of the first user line number to download.

This function is included for backward compatibility. This function calls the *AerCompilerDownloadEx* function as follows:

AerCompilerDownloadEx (*hCompile*, *hAerCtrl*, *psz960Name*, 0, *dwFirstUserLineNumber*, (DWORD) -1, (PDWORD) NULL, (PDWORD) NULL)

This function can be used for downloading programs in normal (non-queue) mode. The *dwFirstUserLineNumber* is typically 0.

See Also

AerCompilerDownloadEx
AerCompilerSetQueueMode
AerCompilerGetQueueMode
AerCompilerRunImmediate
AerCompilerCompileFile

Example

Samples\Lib\VisualBasic\RunPgm.vbp

6.10. AerCompilerDownloadEx

AERERR_CODE AerCompilerDownloadEx (HCOMPILER *hCompile*, HAERCTRL *hAerCtrl*, LPCTSTR *psz960Name*, DWORD *dwStartPacket*, DWORD *dwStartUserLine*, DWORD *dwNumPackets*, PDWORD *pdwNumDownloaded*, PDWORD *pdwUserLine*);

Declare Function AerCompilerDownloadEx Lib "AERSYS.DLL" (ByVal *hCompile* As Long, ByVal *hAerCtrl* As Long, ByVal *psz960Name* As String, ByVal *dwStartPacket* As Long, ByVal *dwStartUserLine* As Long, ByVal *dwNumPackets* As Long, ByRef *pdwNumDownloaded* As Long, ByRef *pdwUserLine* As Long) As Long

Parameters

hCompile	Handle to an Aerotech compiler session.
hAerCtrl	Handle to the axis processor card.
psz960Name	Name (program handle) for the downloaded file.
dwStartPacket	Which compiler (object) packet to start downloading.
dwStartUserLine	Beginning user line for *dwStartPacket*.
dwNumPackets	Number of packets to download (-1 for all).
pdwNumDownloaded	Total number of packets actually downloaded (can be NULL).
pdwUserLine	Last user line downloaded (can be NULL).

This function downloads a compiled program that was created by a call to *AerCompilerCompileFile* or *AerCompilerCompileLine*. It does not know or care about the original program source. The function takes the compiled program and downloads it to the axis processor.

The user can provide a name for the compiled file that will be used by the axis processor to identify the file (referred to as a "program handle") with *psz960Name*. If *psz960Name* is NULL, then the compiler will use a default name. If the source originated from a file, then the default name is the name of the original source code file, without a path specification. If the source was compiled from a string, then the default name is "?".

For normal downloads (non-queue mode), the typical call is as follows:

AerCompilerDownloadEx(*hCompile*, *hAerCtrl*, *psz960Name*, 0, 1, (DWORD) -1, (PDWORD) NULL, (PDWORD) NULL)

Sometimes a program cannot fit into memory on the axis processor card or the CNC program is being fed across a communications link to the controller as it is running. In these cases it is necessary to place the compiler in "queue mode" or "infinite download mode." This can be accomplished with the *AerCompilerSetQueueMode* function. When a program is placed in queue mode, only a specified number of lines are allocated. Therefore, in most cases, the whole program cannot be downloaded at once. An error code is returned-in this case: AER960RET_PROG_QUEUE_FULL. It is the user's responsibility to continue to download lines to the axis processor as the queue empties.

Generally, downloading lines is accomplished by the following sequence of events:

```
….
// at some point our compiler is set into Queue mode
eRc = AerCompilerSetQueueMode ( hCompile, TRUE, 1000, 0, FALSE)
….

// at some point the downloading process is begun
dwStartPacket = 0;
dwStartUserLine = 1;
dwNumPackets = -1;  // try to download everything

while( TRUE )
{
   eRc = AerCompilerDownloadEx( hCompile, hAerCtrl, psz960Name,
                                dwStartPacket, dwStartUserLine, dwNumPackets,
                                &dwNumDownloaded, &dwUserLine );

      if( eRc == AERERR_NOERR )
      {
         break;  // we're done downloading
      }

      if( eRc != AER960RET_PROG_QUEUE_FULL )
      {
         break;  // we've encountered an unknown error
      }

      // our queue is full, so we will just wait and try again with more lines
      dwStartPacket = dwStartPacket + dwNumDownloaded;
      dwStartUserLine = dwUserLine;

      // hold off execution for a bit, do some other process and comeback
      //  Typically the download process is on a separate thread so that we can just
                                                  // sleep,
      //  give up our task slice, and try again later
      Sleep(500);
}
```

It is also important to know that since the download does not care where the source file existed, *AerCompilerDownloadEx* can download multiple files or compiled text to the same program queue. This is accomplished by specifying the same *psz960Name* for different compiler handles or downloading a newly compiled file/text with the same compile handle.

See Also

AerCompilerDownload
AerCompilerSetQueueMode
AerCompilerGetQueueMode
AerCompilerRunImmediate
AerCompilerCompileFile

6.11. AerCompilerDownloadImmediate

AERERR_CODE AerCompilerDownloadImmediate (HCOMPILER *hCompile*, HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, PDWORD *pdwLastLineLoaded*);

Declare Function AerCompilerDownloadEx Lib "AERCMPLR.DLL" (ByVal *hCompile* As Long, ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByRef *pdwLastLineLoaded* As Long) As Long

Parameters

hCompile	Handle to an Aerotech compiler session.
hAerCtrl	Handle to the axis processor card.
iTask	Task to download immediate command (see constants).
pdwLastLineLoaded	Last user line downloaded (can be NULL).

This function downloads a compiled program that was created by a call to *AerCompilerCompileFile* or *AerCompilerCompileLine*. It does not know or care about the original program source. The function takes the compiled program and downloads it to the axis processor. The program should only contain only Immediate Mode commands: Variable/Parameter/IO assignments, Asynchronous motion commands, offset commands, and spindle commands. Immediate commands are further defined in the U600MMI.hlp file.

For normal downloads, the typical call is as follows:

AerCompilerDownloadImmediate(*hCompile*, *hAerCtrl*, *iTask*, *(PDWORD) NULL*)

Generally, an immediate command is executed immediately and another command can be sent right away. However, the DWELL (G4) and WAIT commands are exceptions to this rule. To properly handle this situation the *pdwLastLineLoaded* parameter must be used.

Ordinarily, immediate downloading lines is accomplished by with the following sequence of events:

```
      ….
dwLastLineLoaded = 0;
while( TRUE )
{
   eRc = AerCompilerDownloadImmediate( hCompiler, hAerCtrl, GetTask(),

&dwLastLineLoaded );
   if( eRc == AERERR_NOERR || IsStopRequested() )
   {
      break;
   }

   if( eRc == AER960RET_TASKIMMED_EXECUTING )
   {
      // We must be able to execute first one
      if( dwLastLineLoaded != 0 )
      {
         eRc = AERERR_NOERR;
      }
   }
   BREAK_ON_ERR( eRc );

            // hold off execution for a bit, do some other process and
comeback
            //  Typically the download process is on a separate thread so
that we can just sleep,
            //  give up our task slice, and try again later
  Sleep(250);
}
```

C Language and LabView Constants

TASKINDEX_1
to
TASKINDEX_4

VB Constants

aerTaskIndex1
to
aerTaskIndex4

See Also

AerCompilerDownloadEx
AerCompilerCompileFile
AerCompilerCompileLine

6.12. AerCompilerErrGetCode

AERERR_CODE AerCompilerErrGetCode (HCOMPILER *hCompiler*, DWORD *dwErrNum*, PDWORD *pdwErrorCode*);

C

Declare Function AerCompilerErrGetCode Lib "AERCMPLR.DLL" (ByVal *hCompiler* As Long, ByVal *dwErrNum* As Long, ByRef *pErrorCode* As Long) As Long

VB

Parameters

hCompiler Handle to an Aerotech compiler session.
dwErrNum Index of the error (zero based).
pdwErrorCode Pointer to receive the error code.

This function returns the error code for a particular compiler error. The *AerCompilerErrsGetNumOf* returns the number of compiler errors. These errors are zero based, if there are five errors, the error numbers are 0-4. Each of these error numbers would be passed to this function, which returns an error code. If there are no program compiler errors, this function returns an error code. The *dwErrNum* parameter is an index to the compiler error and can range from zero to one less than the value returned by *AerCompilerErrGetNumof* function.

After receiving the error code, the user can use the *AerErrGetMessage* function to obtain the error text. However, this text will not have any substitutions in the text line because only the error code is known. We recommend the user use *AerCompilerErrGetText* to get the complete text of the error. For example, if the user tries to compile the nonexistent file "fake.pgm", the compile error is AERERR_FILE_NOT_FOUND and a call to *AerCompilerErrGetCode*, followed by a *AerErrGetMessage* call on the result will yield the string: "File not found: %s". However, a call to *AerCompilerErrGetText* will yield the more informative string: "File not found: fake.pgm".

The value returned by this function is the error code for this function (if any), not the compiler error.

Example

Samples\Lib\AexProg.C

6.13. AerCompilerErrGetData

AERERR_CODE AerCompilerErrGetData(HCOMPILER *hCompiler*, DWORD *dwErrNum*, PAER_COMPILE_ERROR_DATA *pData*);

Parameters

hCompiler Handle to an Aerotech compiler session.
dwErrNum Index of the error (zero based).
pData Pointer to structure to receive the error data.

This function returns the full set of data that the compiler maintains concerning a particular error.

If no program has been compiled, the function returns an error code. The *dwErrNum* parameter is an index to the compiler error and can range from zero to one less than the value returned by *AerCompilerErrGetNumof* function.

The data returned is in the form of a structure, whose meaning is described in the Appendix C: Structures and Data Types (under AER_COMPILE_ERROR_DATA).

The value returned by this function is the error code for this function (if any), not the compiler error.

See Also

AerCompilerErrGetCode

Example

Samples\Lib\AexProg.C

6.14. AerCompilerErrGetLocText

AERERR_CODE AerCompilerErrGetLocText (HCOMPILER *hCompiler*, DWORD *dwErrNum*, LPTSTR *pszBuffer*, DWORD *dwBufferSize*);

Declare Function AerCompilerErrGetLocText Lib "AERCMPLR.DLL" (ByVal *hCompiler* As Long, ByVal *dwErrNum* As Long, ByVal *pszBuffer* As String, ByVal *dwBufferSize* As Long) As Long

Parameters

hCompiler	Handle to an Aerotech compiler session.
dwErrNum	Index of the error (zero based).
pszBuffer	Pointer to a character array to receive a copy of the error location text.
dwBufferSize	Size of *pszBuffer*.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

This function returns a text string indicating the location of the offending string that caused the error. This string will contain text showing the file, line in the file, and range of characters on the line that caused the error. The line number and character indexes in the text are one-based. If no program has been compiled, the user receives an error. The *dwErrNum* parameter is an index to the error, it can range from zero to one less than the value returned by *AerCompilerErrGetNumof* function.

The value returned by this function is the error code for this function (if any), not the compiler error. The maximum number of characters copied to *pszBuffer* is 196 characters.

See Also

AerCompilerErrGetData

Example

Samples\Lib\AexProg.C

6.15. AerCompilerErrsGetNumOf

AERERR_CODE AerCompilerErrsGetNumOf (HCOMPILER *hCompiler*, DWORD *dwLowestSeverityOf*, PDWORD *pdwNErrs*);

Declare Function AerCompilerErrsGetNumOf Lib "AERCMPLR.DLL" (ByVal *hCompiler* As Long, ByVal *dwLowestSeverityOf* As Long, ByRef *pdwNErrs* As Long) As Long

Parameters

hCompiler	Handle to an Aerotech compiler session.
dwLowestSeverityOf	Returns number of all errors "more serious" than this.
pdwNErrs	Pointer to double word to receive the number of errors.

This function returns the number of errors from a compiler session supplied by the user using the *dwLowestSeverityOf* parameter that instructs what kind of errors to count. The severities are listed in the constants section below in ascending order or seriousness.

For example, providing *dwLowestSeverityOf* as AERERR_TYPE_WARN counts everything but messages, while a value of AERERR_TYPE_MSG counts all of them. By far the most useful setting for *dwLowestSeverityOf* is AERERR_TYPE_ERROR that counts the number of errors that can abort the compile. With *dwLowestSeverityOf* equal to AERERR_TYPE_ERROR and *dwNErrs* is returned as zero, then the compile succeeded and the user can now download the program. Otherwise, if *dwNErrs* is returned as non-zero the compile was unsuccessful. If the compile is unsuccessful, then the user can use the *AerCompilerErrGetText* or *AerCompilerErrGetData* functions to get more data on the errors.

If no program has been compiled, the user receives an error. The value returned by this function is the error code for this function (if any), not the compiler error.

C Language and LabView Constants

AERERR_TYPE_MSG
AERERR_TYPE_WARN
AERERR_TYPE_ERROR
AERERR_TYPE_NONE

VB Constants

aerErrTypeMsg
aerErrTypeWarn
aerErrTypeError
aerErrTypeNone

See Also

AerCompilerErrGetData

Example

Samples\Lib\AexProg.C

6.16. AerCompilerErrGetText

AERERR_CODE AerCompilerErrGetText (HCOMPILER *hCompiler*, DWORD *dwErrNum*, LPTSTR *pszBuffer*, DWORD *dwBufferSize*);

Declare Function AerCompilerErrGetText Lib "AERCMPLR.DLL" (ByVal *hCompiler* As Long, ByVal *dwErrNum* As Long, ByVal *pszBuffer* As String, ByVal *dwBufferSize* As Long) As Long

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

Parameters

hCompiler	Handle to an Aerotech Compiler session.
dwErrNum	Index of the error (zero based).
pszBuffer	Pointer to a character array to receive a copy of the error text.
dwBufferSize	Size of *pszBuffer*.

This function returns a copy of the error text for a particular compiler error. The *dwErrNum* parameter is an index to the error number, not the error code, and can range from zero to one less than the value returned by *AerCompilerErrGetNumof* function.

The value returned by this function is the error (if any) in obtaining the compiler error data - the return has no relationship to any compiler error. The maximum number of characters copied to *pszBuffer* is determined by, MAX_TEXT_LEN.

C Language and LabView Constants

MAX_TEXT_LEN

VB Constants

aerMaxTextLength

See Also

AerCompilerErrGetData

Example

Samples\Lib\AexProg.C

6.17. AerCompilerFileNameToHandle

C

VB

AERERR_CODE AerCompilerFileNameToHandle (LPCTSTR *pszFileName*, LPTSTR *pszHandle*);

Declare Function AerCompilerFileNameToHandle Lib "AERCMPLR.DLL" (ByVal pszFileName As String, ByVal pszHandle As String) As Long

Parameters

pszFileName	Filename (may include fully qualified path)
pszHandle	Pointer to the value to hold the Handle name

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50      ; 50 characters long
```

This function converts a filename to a "short handle" name. It simply strips all path info from the filename and returns the NAME.EXT.

For Example:

c:\u600\programs\test.pgm ➔ TEST.PGM

.\programs\test2.pgm ➔ TEST2.PGM

test3.pgm ➔ TEST.PGM

6.18. AerCompilerGetLineText

AERERR_CODE AerCompilerGetLineText (HCOMPILER *hCompiler*, DWORD *dwLineNum*, LPTSTR *pszBuffer*, DWORD *dwBufferSize*);

Declare Function AerCompilerGetLineText Lib "AERCMPLR.DLL" (ByVal *hCompiler* As Long, ByVal *dwLineNum* As Long, ByVal *pszBuffer* As String, ByVal *dwBufferSize* As Long) As Long

Parameters

hCompiler	Handle to an Aerotech compiler session.
dwLineNum	Index of the line (zero based).
pszBuffer	Pointer to a character array to receive a copy of the line.
dwBufferSize	Size of *pszBuffer*.

> All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;
>
> DIM sGlobStr as STRING * 50 ; 50 characters long

This function returns a copy of the text of a compiled line. If no program has been compiled, the user receives an error. The maximum number of characters that will be copied to *pszBuffer* is indeterminate, since the compiler has no limitations on the length of a text line. It is the user's responsibility to insure that *pszBuffer* is large enough to hold the largest file line.

The lines returned are those after preprocessing ("#defines" and "#includes" processed), but before any compiling.

The first line's index is 0. The line numbering does not count those lines in included files, nor does it count define statements.

Example

Samples\Lib\AexProg.C

6.19. AerCompilerGetNumOfLines

AERERR_CODE AerCompilerGetNumOfLines (HCOMPILER *hCompiler*, PDWORD *pdwNLines*);

Function AerCompilerGetNumOfLines Lib "AERCMPLR.DLL" (ByVal *hCompiler* As Long, ByRef *pdwNLines* As Long) As Long

Parameters

hCompiler	Handle to an Aerotech compiler session.
pdwNLines	Pointer to double word to receive the number of lines in the compiled text.

This function returns the number of lines in the file. The lines returned are those after preprocessing ("#defines" and "#includes" processed), but before compiling.

This function does not count lines in include files, nor does it count defines from preprocessor statements.

If no program has been compiled, the user receives an error.

Example

Samples\Lib\AexProg.C

6.20. AerCompilerGetProgVarByName

AERERR_CODE AerCompilerGetProgVarByName (HCOMPILER *hCompile*, LPCTSTR *pszVarName*, PLONG *plProgVarNum*, PLONG *plProgVarSize*);

Declare Function AerCompilerGetProgVarByName Lib "AERSYS.DLL" (ByVal *hCompile* As Long, ByVal *pszVarName* As String, ByRef *plProgVarNum* As Long, ByRef *plProgVarSize* As Long) As Long

Parameters

hCompile	Handle to an Aerotech compiler session.
pszVarName	Name of variable to retrieve.
plProgVarNum	Pointer to return the number associated with the specified program variable.
plProgVarSize	Pointer to return the size allocated for the variable (greater than 1 if dimensioned as an array).

This function retrieves the number that is used to reference the user defined (DVAR command) program variable. In normal circumstances, *plProgVarSize* is 1. If the variable was dimensioned as an array, then *plProgVarSize* will return the size of the array. If the name cannot be found, then *plProgVarSize* is –1. See *AerCompilerGetProgVarTotal* for a description of program variables.

See Also

AerCompilerGetProgVarTotal

6.21. AerCompilerGetProgVarByNumber

AERERR_CODE AerCompilerGetProgVarByNumber (HCOMPILER *hCompile*, LONG *lProgVarNum*, LPTSTR *pszVarName*);

Declare Function AerCompilerGetProgVarByNumber Lib “AERSYS.DLL” (ByVal *hCompile* As Long, ByVal *lProgVarNum* As Long, ByRef *pszVarName* As String) As Long

Parameters

hCompile	Handle to an Aerotech compiler session.
lProgVarNum	The Number of the specified program variable to lookup.
pszVarName	Pointer to string to hold the variable name.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

Given the program variable number, this function will lookup the name of the variable. See *AerCompilerGetProgVarTotal* for a description of program variables.

See Also

AerCompilerGetProgVarTotal

6.22. AerCompilerGetProgVarTotal

AERERR_CODE AerCompilerGetProgVarTotal (HCOMPILER *hCompile*, PLONG *plTotalVars*);

Declare Function AerCompilerGetProgVarTotal Lib "AERSYS.DLL" (ByVal *hCompile* As Long, ByRef *plTotalVars* As Long) As Long

Parameters

hCompile	Handle to an Aerotech compiler session.
plTotalVars	Total number of variables defined in compiled program.

This function returns the total number of program variables (DVAR command) that were allocated in a specified program. Included are only those variables that were allocated with the *DVAR* CNC statement.

Program variables are stored on the axis processor by number. To set or get a program variable on the card, the *AerVarProgramGetDouble / AerVarProgramSetDouble* functions need to be used and these only accept the program variable number.

Arrays are always stored consecutively. If a variable called "array" was allocated with 10 elements (i.e. DVAR $array[10]) and the "array" begins at program variable 10, then the array elements within "array" begin at variable 10 and end at 19.

See Also

AerVarProgramGetDouble
AerVarProgramSetDouble

6.23. AerCompilerGetQueueMode

AERERR_CODE AerCompilerGetQueueMode (HCOMPILER *hCompile*, PBOOL *pbQueue*, PBOOL *pbAllocated*, PDWORD *pdwQueueSize*, PDWORD *pdwQueueRetain*);

Declare Function AerCompilerGetQueueMode Lib "AERSYS.DLL" (ByVal *hCompile* As Long, ByRef *pbQueue* As Long, ByRef *pbAllocated* As Long, ByRef *pdwQueueSize* As Long, ByRef *pdwQueueRetain* As Long) As Long

Parameters

hCompile	Handle to an Aerotech compiler session.
pbQueue	Is the compiler session setup for queue mode?
pbAllocated	Has the queue been allocated on the axis processor yet by this compiler session?
pdwQueueSize	The Number of lines in queue.
pdwQueueRetain	Number of lines to retain in the queue (typically 0).

This function returns the current state of queue-specific variables for the compiler session. See *AerCompilerSetQueueMode* for more details. The pbQueue and pbAllocated parameters return TRUE or FALSE.

See Also

AerCompilerSetQueueMode

6.24. AerCompilerGetStatus

AERERR_CODE AerCompilerGetStatus (HCOMPILER *hCompiler*,
PAER_COMPILE_STATUS_DATA *pData*);

Parameters

hCompiler	Handle to an Aerotech compiler session.
pData	Pointer to structure to receive the status data.

The data returned is in the form of a structure, whose meaning is described under the structure documentation for AER_COMPILE_STATUS_DATA.

Example

Samples\Lib\AexProg.C

C

VB

6.25. AerCompilerGetUniqueID

AERERR_CODE AerCompilerGetUniqueID (HCOMPILER *hCompile*, PDWORD *pdwID*);

Declare Function AerCompilerGetUniqueID Lib "AERSYS.DLL" (ByVal *hCompile* As Long, ByRef *pdwID* As Long) As Long

Parameters

hCompile	Handle to an Aerotech compiler session.
pdwID	Pointer to hold the compiler ID.

Whenever a file is compiled, a unique ID is stored in the object file. This ID is also downloaded to the axis processor with the program. This is a way to determine if the file on the host PC matches the file that is downloaded on the card. The ID for the file can be retrieved from the axis processor with the *AerProgramGetHeader* function.

See Also

AerProgramGetHeader

6.26. AerCompilerLoadAxisNames

C
VB

AERERR_CODE AerCompilerLoadAxisNames (HCOMPILER *hCompile*, LPCTSTR *pszAxisCfgFile*);

Declare Function AerCompilerLoadAxisNames Lib "AERCMPLR.DLL" (ByVal *hCompile* As Long, ByVal *pszAxisCfgFile* As String) As Long

Parameters

hCompile	Handle to an Aerotech compiler session.
pszAxisCfgFile	Program Axis Configuration File (may be NULL)

This function loads the Axis Configuration file and assigns the names of the axes to the compiler session. If *pszAxisCfgFile* is NULL, the axis configuration file is automatically retrieved with *AerRegGetFileName.*

The name of the Automation file can be retrieved with *AerRegGetFileName*.

See Also

AerRegGetFileName

6.27. AerCompilerOpen (AerCompilerCreate)

AERERR_CODE AerCompilerOpen (HCOMPILER *phCompile*);

Declare Function AerCompilerOpen Lib "AERCMPLR.DLL" (ByRef *phCompile* As Long) As Long

Parameters

phCompile Pointer to a handle to an Aerotech compiler session.

This function was formerly *AerCompilerCreate*. It initializes a compile session, but does not compile anything - it merely returns a pointer to a compiler object (called a handle). *AerCompilerOpen* must be called prior to any compiling and the object pointer returned by this function must be passed to every other *AerCompiler* function call as the first parameter.

> Each *AerCompilerOpen* call must be paired with a call to *AerCompilerClose* or memory leaks will result.

See Also

AerCompilerClose
AerCompilerOpenEx

Example

Samples\Lib\\VisualBasic\RunPgm.vbp

6.28. AerCompilerOpenEx

AERERR_CODE AerCompilerOpenEx (HCOMPILER *hCompile*);

Declare Function AerCompilerOpenEx Lib "AERSYS.DLL" (ByVal *hCompile* As Long) As Long

Parameters

hCompile Handle to an Aerotech compiler session.

This function increments a reference count for the compiler session. The *hCompile* will not actually be destroyed by a call to *AerCompilerClose* unless its reference count is 0, indicating all other processes (threads) are also done with the compiler session. In multithreaded applications, where each thread has a copy of the *hCompile* handle, the *AerCompilerOpenEx* function can be called within each thread to prevent any one thread from destroying the data associated with *hCompile*.

All calls to *AerCompilerOpenEx* should be matched by a call to *AerCompilerClose*.

See Also

AerCompilerClose
AerCompilerOpen

6.29. AerCompilerRemoveDefinesFile

AERERR_CODE AerCompilerRemoveDefinesFile (HCOMPILER *hCompile*, LPCTSTR *pszFileName*);

Declare Function AerCompilerRemoveDefinesFile Lib "AERSYS.DLL" (ByVal *hCompile* As Long, ByVal *pszFileName* As String) As Long

Parameters

hCompile	Handle to an Aerotech compiler session.
pszFileName	Name of file to remove.

This function removes the file from the specified compiler session. See *AerCompilerAddDefinesFile* for more information.

See Also

AerCompilerAddDefinesFile

6.30. AerCompilerRunImmediate

AERERR_CODE AerCompilerRunImmediate (HCOMPILER *hCompiler*, HAERCTRL *hAerCtrl*, LPTSTR *pszTextLine*, DWORD *iTask*);

Declare Function AerCompilerRunImmediate Lib “AERCMPLR.DLL” (ByVal *hCompiler* As Long, ByVal *hAerCtrl* As Long, ByVal *pszTextLine* As String, ByVal *iTask* As Long) As Long

Parameters

hCompiler	Handle to an Aerotech compiler session.
iTask	Task number to run program on.
hAerCtrl	Handle to the axis processor card.
pszTextLine	Text to compile.

This function compiles the program text and runs it on the given task in “immediate mode”. The string must be null terminated and contain multiple lines, each separated by a CR/LF pair. The axis processor does not retain any information on the program after it executes. The program is executed by the axis processor one line at a time. This call will not download any labels or program variable definitions to the axis processor related to the program.

Immediate mode commands are full defined in the U600MMI.hlp file.

Immediate Mode is intended to allow the user to execute single commands while a program is running on the same task. However, it can be used with no program currently running. Immediate mode also has many limitations. Immediate mode will not allow you to run G1, G2, or G0 motion. When using this function, you don not need to go through the multiple steps of compile, download, and associate – everything is done in one step.

Immediate commands are guaranteed to be executed each “task cycle.” These are variable in execution time (see the “AvgPollTimeSec” global parameter for more info.).

Many CNC statements are illegal in this mode. This function returns an error if the program contains such a statement. For example, program jumps and synchronous motion commands are illegal in this mode, but assignments are legal. Assignments to CNC program variables must be treated with caution, because if the task is currently associated to a different program, then the assignments passed down will refer to other program variables, not the program variables of the current program (because no program variables are downloaded in this mode). Synchronous motion commands are defined as the commands that the axis processor waits for to complete. Asynchronous commands are the commands the axis processor begins execution and continues with the next program block, such as the axis STRM CNC command.

C Language and LabView Constants

TASKINDEX_1
to
TASKINDEX_4

VB Constants

aerTaskIndex1
to
aerTaskIndex4

See Also

AerCompilerDownload

Example

Samples\Lib\AexProg.C

6.31. AerCompilerSetQueueMode

AERERR_CODE AerCompilerSetQueueMode (HCOMPILER *hCompile*, BOOL *bQueue*, DWORD *dwQueueSize*, DWORD *dwQueueRetain*, BOOL *bForceQueueAllocate*);

Declare Function AerCompilerSetQueueMode Lib “AERSYS.DLL” (ByVal *hCompile* As Long, ByVal *bQueue* As Long, ByVal *dwQueueSize* As Long, ByVal *dwQueueRetain* As Long, ByVal *bForceQueueAllocate* As Long) As Long

Parameters

hCompile	Handle to an Aerotech compiler session.
bQueue	TRUE to set queue mode, FALSE otherwise.
dwQueueSize	Number of queue lines to allocate on axis processor.
dwQueueRetain	Number of lines to retain in the queue (typically 0).
bForceQueueAllocate	Should allocation of the queue on the axis processor be forced?

Used in conjunction with *AerCompilerDownloadEx*, this function allows for executing programs of unlimited size. Any program can be downloaded as a queue, independent of whether other programs are loaded as a queue or not.

The main difference between queue and non-queue operation is that in queue mode the axis processor discards lines as it executes them. If lines are loaded at the same rate that they are executed, the user can execute programs of infinite size. See *AerCompilerDownloadEx* for the sequence of events to download a program in queue mode.

If *bQueue* is set to TRUE, the program will be downloaded in queue mode. The d*wQueueSize* parameter specifies the maximum number of lines to allocate on the axis processor. The *dwQueueRetain* parameter is typically 0.

If the *bForceQueueAllocate* is set to TRUE, the program queue will be reallocated. If this parameter is FALSE and the program was already allocated as a queue, no allocation takes place. This is useful if more than one program is feeding the same queue.

The *bQueue* can be set to FALSE to turn off queue mode downloading. The next download will then overwrite all program information on the axis processor. In this case, all other arguments are ignored. The non-queue mode is the default, so the user does not need to call *AerCompilerSetQueueMode* with FALSE, unless *AerCompilerSetQueueMode* was previously called with TRUE for that program.

As a program in queue mode executes each line, the line is discarded from the queue. The *dwQueueRetain* effects this behavior. This parameter keeps up to *dwQueueRetain* lines in the beginning of the queue. This allows for jumping backward within a queued program. CNC statements which could cause a jump are IF, WHILE, REPEAT, JUMP, etc.

There are side effects to jumping within a queued program. If the line that is being jumped to is not currently in the queue, then a task fault is generated. Generally, queued programs should not contain jumps. If they do, then the distance of the jump should be minimal or very predictable (i.e., simple IF..THEN..ELSE..ENDIF statements or tight REPEAT/WHILE loops.) A queued program cannot execute a CALL statement (FARCALL is possible).

See Also

AerCompilerDownload
AerCompilerGetQueueMode

Example

Samples\Lib\AexProg.C

∇ ∇ ∇

CHAPTER 7: AXIS CONFIGURATION FUNCTIONS

In This Section:

7.1. Introduction

Configuring an axis assigns an output command channel (DAC), configures a feedback channel, and assigns them to an axis. After configuration, the servo loop software will use the specified feedback (along with other parameters) to generate a current (or velocity) command. Each axis can have both feedback and Digital-to-Analog Converter (D/A or DAC) information defined. Configuration essentially defines the feedback inputs and the command outputs used by each axis, similar to the functionality provided by the axis configuration wizard in the MMI600 or the SetupWiz utility.

The heart of axis configuration is the AER_CFG_PACKET structure that contains all the data required to configure an axis. Any configuration can be achieved by properly filling one of these structures and calling *AerConfig*. Likewise, any axis configuration can be read by calling *AerConfigGet* and examining the returned AER_CFG_PACKET structure. For the user's convenience, some specialized configuration functions are provided that only accepts the data necessary (i.e., encoder, Hall effect, or resolver).

Both feedback and D/A configuration require a channel number. The channels on the U600 board correspond to channels 1 through 4. Additional channels are dependent upon the board number of the encoder expansion card. Expansion card 1 would be channels 5 through 8, card 2 would be 9 through 12, etc., through all 16 channels.

Axis-specific I/O (CCW/CW, encoder fault, drive fault, AUX out, and drive enable) for encoder-based axes, is associated with the specified encoder channel number. For resolver axes, the axis I/O are associated with the specified D/A channel. The following are examples.

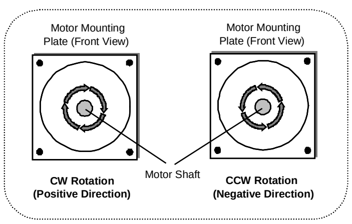
1. Axis 3 is configured to use encoder channel 2 and D/A channel 1. The limits, drive fault, AUX output, and drive enable would be connected to channel 2 (the specified encoder channel) on the BB500/BB501/DR500.
2. Axis 3 is configured to use resolver channel 1 and D/A channel 4. The limits, drive fault, AUX output, and drive enable would be connected to channel 4 (the specified D/A channel) on the BB500/BB501/DR500.
3. Axis 3 is configured for NULL feedback and D/A channel 2 (open loop spindle operation). There would be no encoder feedback or limit switch, etc. inputs. The axis FAULTMASK axis parameter will need to have these bits cleared to prevent erroneous faults. See the U600MMI.hlp file for more information on faults or FAULTMASKS.

7.1.1. Encoder and Resolver/Inductosyn Board Resolution

All of Aerotech's equipment electronically multiplies the effective line resolution of the encoder (rotary or linear) signal 4 times, additionally, multiplied by any multiplication provided by a MX / MXH multiplier.. All parameters specifying encoder lines per revolution should be specified appropriately after the multiplication. For example, Aerotech's BM brushless motors typically have a 1000 line per revolution rotary encoder mounted on the back of the motor. Any references to this encoder would be as though it were a 4000 line per revolution encoder. This does not apply to resolver (R/D) boards.

Aerotech's resolver cards may be software configured for 10, 12, 14, or 16 bit resolution, which employ 8,192, 16,384, 32,768 or 65,536 steps per revolution of the resolver. However, the board must also have the respective hardware for that axis configured for the proper resolution by installing the proper RCN (Resistor - Capacitor Network) values.

The UNIDEX 600/620 controllers have a 16 bit D/A converter. Each controller has this analog signal from the DAC scaled to provide a +/- 10 volt command to the drive.



Proper motor and feedback device phasing for UNIDEX 600/620 is achieved when a negative command from the DAC produces clockwise (CW) rotation of the motor (as viewed looking into the front motor shaft). This causes the position and velocity feedback from the motor's feedback device to produce a positive increase in position as the shaft rotates CW. Meeting these two conditions guarantees a properly phased servo loop that does not provide positive feedback, causing an unsafe run-away condition. The *ICMDPOLARITY* axis parameter can be used to invert the current command generated by the servo loop. For more information, refer to the controller's hardware manual.

All of the axis *AerConfigxxxx* functions require an axis index. Use the *AXISINDEX_n* C constants - the first *AXISINDEX* is *AXISINDEX_1*, (or the VB constants – the first axisindex is *aerAxisIndex1*).

7.1.2. Axis Configuration File Format

Aerotech's axis configuration file is a text-based INI file. Two available functions to read and write the configuration file are *AerConfigReadPacket* and *AerConfigWritePacket*. The configuration file is a text file and can hold as many configurations as desired. The format of the file is as follows (below).

Note that each group shows one feedback type, so not all of these are present simultaneously.

```
[AxisConfig.{AXISINDEX_xxxx+1}]

FBType={Null,Encoder,EncoderHall,Resolver,ResolverHall}
IOType={Null,D2A}
Sp1Type={Null,Encoder,Resolver}
Sp2Type={Null}

;If FBType is Null Then the following values would be present
FBType.Null.Lines=

;If FBType is Encoder Then the following values would be present
FBType.Encoder.Channel=
FBType.Encoder.Lines=
FBType.Encoder.Bounded=

;If FBType is EncoderHall Then the following values would be present
FBType.EncoderHall.Channel=
FBType.EncoderHall.Lines=
FBType.EncoderHall.HallLines=
FBType.EncoderHall.CommOffset=
FBType.EncoderHall.CommChannel=
FBType.EncoderHall.Bounded=

;If FBType is Resolver Then the following values would be present
FBType.Resolver.Channel=
FBType.Resolver.Resolution=
FBType.Resolver.Poles=
FBType.Resolver.CommOffset=
FBType.Resolver.Bounded=

;If FBType is ResolverHall Then the following values would be present
FBType.ResolverHall.Channel=
FBType.ResolverHall.Resolution=
FBType.ResolverHall.HallLines=
FBType.ResolverHall.CommOffset=
FBType.ResolverHall.CommChannel=
FBType.ResolverHall.Bounded=

;There are no values for IOType Null
;IOType.Null

;If IOType is D2A Then the following values would be present
IOType.D2A.Channel=

;There are no values for Sp1Type Null
;Sp1Type.Null

;If Sp1Type is Resolver Then the following values would be present
```

```
Sp1Type.Resolver.Type=5 (AER_SPARETYPE1_RESOLVER)
Sp1Type.Resolver.Channel=
Sp1Type.Resolver.Resolution=
Sp1Type.Resolver.Poles=
Sp1Type.Resolver.CommOffset=
Sp1Type.Resolver.CommOnly=


;If Sp1Type is Encoder Then the following values would be present
Sp1Type.Encoder.Type=3 (AER_SPARETYPE1_ENCODER),
                     4 (AER_SPARETYPE1_ENCODER_SLAVE)
Sp1Type.Encoder.Channel=
Sp1Type.Encoder.Lines=
Sp1Type.Encoder.VelHomeFlag= BIT MASK: 0x01→Use velocity marker for home.
                                       0x02→Use limits from velocity channel.

;There are no values for Sp2Type Null
;Sp2Type.Null
```

Although the configuration file can be edited manually with a text editor, it is strongly suggested that the user use the utilities provided to edit and maintain the axis configuration information.

```
//// example      /////
//// AxisCfg.ini  ////

[AxisConfig.1]
FBType=ResolverHall
IOType=D2A
Sp1Type=Null
Sp2Type=Null
FBType.ResolverHall.Channel=1
FBType.ResolverHall.Resolution=14
FBType.ResolverHall.HallLines=125000
FBType.ResolverHall.CommOffset=0
FBType.ResolverHall.CommChannel=4
FBType.ResolverHall.Bounded=1
IOType.D2A.Channel=1

[AxisConfig.2]
FBType=Encoder
IOType=D2A
Sp1Type=Null
Sp2Type=Null
FBType.Encoder.Channel=2
FBType.Encoder.Lines=4000
FBType.Encoder.Bounded=1
IOType.D2A.Channel=2
```

7.2. AerConfig

AERERR_CODE AerConfig (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
PAER_CFG_PACKET *pCfg*);

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index to specify which axis to configure. (AXISINDEX_xxxx constants).
pCfg	Pointer to AER_CFG_PACKET which contains the configuration information.

This function configures the axis specified in the axis index to the configuration passed in structure *pCfg*. For the meaning of the configuration packet members, refer to AER_CFG_PACKET in the structures chapter, or see the specific items under the more specialized functions below (see *AerConfigEncoder* for description of items needed for configuring encoders, *AerConfigResolver* for resolvers, etc.).

See Also

AerConfigGet

Example

samples\lib\AexCfg.C

7.3. AerConfigDownloadFile

C

VB

AERERR_CODE AerConfigDownloadFile (HAERCTRL *hAerCtrl*, LPCTSTR *pszFile*, AXISMASK *mAxis*);

Declare Function AerConfigDownloadFile Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *pszFile* As String, ByVal *mAxis* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
pszFile	File to download.
mAxis	Mask of the axis parameters to download.

This function downloads the axis configuration file to the motion control card. The filename currently in use by the user can be retrieved with the *AerRegGetFileName* function. Note that it is recommended that the AerSysInitSystem function be used instead of this one.

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

VB Constants

aerAxisMask1
to
aerAxisMask16

See Also

aerRegGetFileName

7.4. AerConfigEncoder

AERERR_CODE AerConfigEncoder (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
WORD *wEncoderChannel*, WORD *wD2AChannel*, DWORD *dwLines*,
WORD *wBounded*);

Declare Function AerConfigEncoder Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long,
ByVal *iAxis* As Long, ByVal *wEncoderChannel* As Integer, ByVal
wD2AChannel As Integer, ByVal *dwLines* As Long, ByVal *wBounded*
As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index to specify which axis to configure (see constants below).
wEncoderChannel	Channel number for encoder feedback.
wD2AChannel	Channel this axis receives its current/velocity command from.
dwLines	Number of lines per revolution on the encoder after x4 (and MX/MXH multiplication.
wBounded	1 to activate software travel limits, 0 to disable them.

AerConfigEncoder configures an axis with encoder feedback. The *wBounded* parameter enables software limits that generate a fault if the axis is commanded outside the software limits defined by the *CWEOT* and *CCWEOT* axis parameters. In addition, the *SOFTLIMITMODE* axis parameter defines the mode of the software limits. Axis limits, drive faults, drive enable, and AUX I/O are associated with the specified *wEncoderChannel*.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

aerConfigGetEncoder

Example

samples\lib\AexCfg.C

7.5. AerConfigEncoderHall

AERERR_CODE AerConfigEncoderHall (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wEncoderChannel*, WORD *wD2AChannel*, DWORD *dwLines*, WORD *wCommChannel*, DWORD *dwCycleLines*, WORD *wCommOffset*, WORD *wBounded*);

Declare Function AerConfigEncoderHall Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *wEncoderChannel* As Integer, ByVal *wD2Achannel* As Integer, ByVal *dwLines* As Long, ByVal *wCommChannel* As Integer, ByVal *dwCycleLines* As Long, ByVal *wCommOffset* As Integer, ByVal *wBounded* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index to specify which axis to configure (see constants).
wEncoderChannel	Channel number for encoder feedback.
wD2AChannel	Channel this axis receives its current/velocity command from.
dwLines	Number of lines per revolution on the encoder (after x4 and MX/MXH multiplication).
wCommChannel	Channel this axis looks for Hall effect feedback.
dwCycleLines	Number of encoder lines per electrical cycle (Hall effect) after all multiplication.
wCommOffset	Commutation offset.
wBounded	1 to activate software travel limits, 0 to disable them.

The *AerConfigEncoderHall* configures a brushless motor axis with encoder and Hall effect (Hall effect is for commutation only) feedback. The *dwLines* parameter specifies the number of lines per revolution of the motor (after multiplication). The *dwCycleLines* parameter specifies the number of encoder lines (after multiplication) that is equivalent to one electrical cycle of the brushless motor. The *wBounded* parameter enables software limits to generate a fault if the axis is commanded outside the software limits defined by the *CWEOT* and *CCWEOT* axis parameters. Also, the *SOFTLIMITMODE* axis parameter defines the mode of the software limits. Axis limits, drive faults, drive enable, and AUX I/O are associated with the specified *wEncoderChannel*. The *wCommOffset* parameter specifies a commutation offset in counts (1,024 counts = 360°) that is added to the motor commutation angle, to align the motor's rotor to the hall sequence specified in the U600MMI.hlp file.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerConfigGetEncoderHall

Example

Samples\Lib\AexCfg.C

7.6. AerConfigGet

AERERR_CODE AerConfigGet (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
PAER_CFG_PACKET *pCfg*);

C

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis on which to obtain data on (AXISINDEX_xxxx constants).
pCfg	Pointer to AER_CFG_PACKET which will return the configuration information.

This function returns the configuration data structure for a given axis. For the meaning of the configuration packet members, refer to AER_CFG_PACKET in Appendix C: Structures, or see the specific items under the more specialized function below (refer to *AerConfigEncoder* for description of items used for configuring encoders, *AerConfigResolver* for resolvers, etc.)

See Also

AerConfig

Example

samples\lib\AexCfg.C

7.7. AerConfigGetEncoder

C

AERERR_CODE AerConfigGetEncoder (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PWORD *pwEncoderChannel*, PWORD *pwD2AChannel*, PDWORD *pdwLines*, PWORD *pwBounded*);

VB

Declare Function AerConfigGetEncoder Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByRef *pwEncoderChannel* As Integer, ByRef *pwD2Achannel* As Integer, ByRef *pdwLines* As Long, ByRef *pwBounded* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis on which to obtain data on (see constants).
pwEncoderChannel	Pointer to channel number for encoder feedback.
pwD2AChannel	Pointer to channel this axis receives its current/velocity command from.
pdwLines	Pointer to Number of lines per revolution on the encoder after MX/MXH and controller ×4 multiplication.
pwBounded	1 to activate software travel limits, 0 to disable them.

The *AerConfigGetEncoder* function obtains configuration data on an axis with encoder feedback. The *wBounded* parameter enables software limits that generate a fault if the axis is commanded outside the software limits defined by the *CWEOT* and *CCWEOT* axis parameters. Also, the S*OFTLIMITMODE* axis parameter defines the mode of the software limits.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerConfigEncoder

Example

Samples\lib\AexCfg.C

7.8. AerConfigGetEncoderHall

AERERR_CODE AerConfigGetEncoderHall (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PWORD *pwEncoderChannel*, PWORD *pwD2AChannel*, PDWORD *pdwLines*, PWORD *pwCommChannel*, PDWORD *pdwCycleLines*, PWORD *pwCommOffset*, PWORD *pwBounded*);

Declare Function AerConfigGetEncoderHall Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByRef *pwEncoderChannel* As Integer, ByRef *pwD2AChannel* As Integer, ByRef *pdwLines* As Long, ByRef *pwCommChannel* As Integer, ByRef *pdwCycleLines* As Long, ByRef *pwCommOffset* As Integer, ByRef *pwBounded* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis on which to obtain data on (see constants).
pwEncoderChannel	Pointer to channel number for encoder feedback.
pwD2AChannel	Pointer to channel this axis receives its current/velocity command from.
pdwLines	Pointer to Number of lines per revolution of the encoder after after MX / MXH and controller x4 multiplication.
pwCommChannel	Pointer to channel this axis looks for Hall effect feedback.
pdwCycleLines	Pointer to Number of counts per electrical cycle (Hall effect) after MX / MXH and controller x4 multiplication.
pwCommOffset	Pointer to commutation offset.
pwBounded	Pointer to bound, 1 to activate software travel limits, 0 to disable them.

The *AerConfigGetEncoderHall* obtains configuration data on an axis with encoder and Hall effect (for motor commutation only) feedback. The *wBounded* parameter enables software limits that generate a fault if the axis is commanded outside the software limits defined by the *CWEOT* and *CCWEOT* axis parameters. Also, the *SOFTLIMITMODE* axis parameter defines the mode of the software limits.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

aerConfigEncoderHall

Example

Samples\Lib\AexCfg.C

7.9. AerConfigGetHallPolePairs

C

AERERR_CODE AerConfigGetHallPolePairs(HAERCTRL hAerCtrl, AXISINDEX iAxis, PWORD pwChannel, PWORD pwD2AChannel, PDWORD pdwLines, PWORD pwCommChannel, PDWORD pdwLinesRev, PWORD pwPolePairs, PWORD pwCommOffset, PWORD pwBound);

VB

Declare Function AerConfigGetHallPolePairs Lib "AerSys.Dll" (ByVal hAerCtrl as Long, ByVal iAxis as Long, ByRef pwChannel as Short, ByRef pwD2AChannel as Short, ByRef pdwLines as Short, ByRef pwCommChannel as Short, ByRef pdwLinesRev as Long, ByRef pwPolePairs as Short, ByRef pwCommOffset as Short, ByRef pwBound as Short) as Long

Parameters

hAerCtrl	Handle to an Aerotech control
iAxis	Axis Index whose configuration to read (See constants below)
pwChannel	Encoder feedback channel this axis is configured for
pwD2Achannel	DAC channel for the command output this axis is configured for
pdwLines	Returns the number of lines per revolution of the encoder after multiplication by the MXH and/or controller.
pwCommChannel	Returns the channel number for the Hall effect feedback signals
pdwLinesRev	Returns the number of lines per electrical cycle of the motor after multiplication by the MXH and/or controller.
PwPolePairs	Returns the number of pairs of poles of the motor
PwCommOffset	Returns the commutation offset, where; 360°=1,024
PwBound	Returns 1 if software limits are enabled, 0 if they are disabled

This function will return the configuration of an axis with encoder and Hall effect (Hall effect is for commutation only) feedback, where the number of lines per electrical cycle is not an integer. The dwLines parameter specifies the number of lines per revolution of the motor (after the X4 multiplication of the controller). The dwLinesRev parameter specifies the number of encoder lines (after X4 multiplication of the controller) that is equivalent to one revolution of the motor. The wBounded parameter enables software limits that generate a fault if the axis is commanded outside the software limits defined by the CWEOT and CCWEOT axis parameters. Also, the SOFTLIMITMODE axis parameter defines the mode of the software limits. Axis limits, drive faults, drive enable, and AUX I/O are associated with the specified wChannel. The wCommOffset parameter specifies a commutation offset, where 1024=360 degrees, that is added to the motor commutation angle.

C and LabView Constants

AXISINDEX#

VB Constants

aerAxisIndex#

See Also

AerConfigHallPolePairs

7.10. AerConfigGetMaster

AERERR_CODE AerConfigGetMaster (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
PAER_CFG_MASTER_PACKET *pMaster*);

Parameters

hAerCtrl Handle to the axis processor card.
iAxis Axis on which to obtain data on (AXISINDEX_xxxx constants).
pMaster Pointer to AER_CFG_MASTER PACKET which contains the master/slave information.

The *AerConfigGetMaster* obtains master configuration data for the specified axis. This function is the same as the *AerConfigGetMasterAxis* function, except this function uses a structure as opposed to individual parameters.

See Also

AerConfigGetMasterAxis
AerConfigMaster
AerConfigMasterAxis
AerCamTablexxxx

Example

samples\lib\AexCam.C

7.11. AerConfigGetMasterAxis

AERERR_CODE AerConfigGetMasterAxis(HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
PWORD *pwType*, PWORD *pwChannel*, PDWORD *pdwData*);

Declare Function AerConfigGetMasterAxis Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByRef *pwType* As Integer, ByRef *pwChannel* As Integer, ByRef *pdwData* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index to specify which axis to configure (see constants below).
pwType	Pointer to type of feedback (resolver, encoder, virtual or null, see constants below).
pwChannel	Pointer to feedback channel number (1, 2, …16).
pdwData	Pointer to feedback resolution (lines/rev or 10, 12, 14, 16 resolver bits).

The *AerConfigGetMasterAxis* obtains master configuration data for the specified axis. This function is the same as the *AerConfigGetMaster* function, except this function uses individual parameters as opposed to a structure for retrieving the master axis configuration. See the appendices for Constants and Data Types and Appendix C: Structures for the definitions of the *pwType* parameter.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

AER_MFBTYPE_XXXX

VB Constants

aerAxisIndex1
to
aerAxisIndex16

aerMFBTypexxxx

See Also

AerConfigGetMaster
AerConfigMaster
AerConfigMasterAxis
AerCamTablexxxx

Example

Samples\Lib\AexCfg.C

7.12. AerConfigGetResolver

AERERR_CODE AerConfigGetResolver (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PWORD *pwResolverChannel*, PWORD *pwD2AChannel*, PWORD *pwResolution*, PWORD *pwPoles*, PWORD *pwCommOffset*, PWORD *pwBounded*);

Declare Function AerConfigGetResolver Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByRef *pwResolverChannel* As Integer, ByRef *pwD2AChannel* As Integer, ByRef *pwResolution* As Integer, ByRef *pwPoles* As Integer, ByRef *pwCommOffset* As Integer, ByRef *pwBounded* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis on which to obtain data on (see constants).
pwResolverChannel	Pointer to channel number for resolver feedback.
pwD2AChannel	Pointer to channel this axis receives its current/velocity command from.
pwResolution	Pointer to resolution of resolver (number of bits in R/D converter, will be 10, 12 14, 16, based on R/D converter hardware used).
pwPoles	Pointer to number of motor poles (must be even, use 0 for a DC motor).
pwCommOffset	Pointer to commutation offset (1,024 = 360°).
pwBounded	Pointer to bounded, 1 to activate software travel limits, 0 to disable them.

AerConfigGetResolver obtains configuration data on an axis with resolver feedback. The *wBounded* parameter enables software limits that generate a fault if the axis is commanded outside the software limits defined by the *CWEOT* and *CCWEOT* axis parameters. In addition, the *SOFTLIMITMODE* axis parameter defines the mode of the software limits.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerConfigResolver
AerConfigResolverHall
AerConfigGetResolverHall

Example

Samples\Lib\AexCfg.C

7.13. AerConfigGetResolverHall

AERERR_CODE AerConfigGetResolverHall (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PWORD *pwResolverChannel*, PWORD *pwD2AChannel*, PWORD *pwResolution*, PWORD *pwCommChannel*, PDWORD *pdwCycleLines*, PWORD *pwCommOffset*, PWORD *pwBounded*);

Declare Function AerConfigGetResolverHall Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByRef *pwResolverChannel* As Integer, ByRef *pwD2Achannel* As Integer, ByRef *pwResolution* As Integer, ByRef *pwCommChannel* As Integer, ByRef *pdwCycleLines* As Long, ByRef *pwCommOffset* As Integer, ByRef *pwBounded* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis on which to obtain data on (see constants).
pwResolverChannel	Pointer to channel number for resolver feedback.
pwD2AChannel	Pointer to channel this axis receives its current/velocity command from.
PwResolution	Pointer to resolution of resolver (number of bits in R/D converter, must be 10, 12 14, 16, based on R/D converter hardware used).
pwCommChannel	Pointer to channel. This axis looks for Hall effect feedback.
pdwCycleLines	Pointer to number of lines per electrical cycle (Hall effect) after MX/MXH and controller ×4 multiplication.
pwCommOffset	Pointer to commutation offset.
pwBounded	Pointer to bounded, 1 to activate software travel limits, 0 to disable them.

The *AerConfigGetResolverHall* obtains configuration data on an axis with resolver and Hall effect (commutation only) feedback. The *wBounded* parameter enables software limits that generate a fault if the axis is commanded outside the software limits defined by the *CWEOT* and *CCWEOT* axis parameters. Also, the *SOFTLIMITMODE* axis parameter defines the mode of the software limits.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerConfigResolverHall

Example

Samples\Lib\AexCfg.C

7.14. AerConfigHallPolePairs

AERERR_CODE AerConfigHallPolePairs(HAERCTRL hAerCtrl, AXISINDEX iAxis, WORD wChannel, WORD wD2AChannel, DWORD dwLines, WORD wCommChannel, DWORD dwLinesRev, WORD wPolePairs, WORD wCommOffset, WORD wBound);

Declare Function AerConfigHallPolePairs Lib "AerSys.Dll" (ByVal hAerCtrl as Long, ByVal iAxis as Long, ByVal wChannel as Short, ByVal wD2AChannel as Short, ByVal dwLines as Long, ByVal wCommChannel as Short, ByVal dwLinesRev Long, ByVal wPolePairs as Short, ByVal wCommOffset as Short, ByVal wBound as Short) as Long

Parameters

hAerCtrl	Handle to an Aerotech control
iAxis	Axis Index to specify the axis to configure (See constants below)
wChannel	Encoder feedback channel for this axis
wD2Achannel	DAC channel for the command output to the axis
dwLines	Number of lines per revoution of the encoder after multiplication by the MXH and/or controller.
wCommChannel	The channel number for the Hall effect feedback signals
wLinesRev	The number of lines per revolution of the motor after multiplication by the MXH and/or controller.
wPolePairs	The number of pairs of poles of the the motor
wCommOffset	the commutation offset, where; 360 degrees=1024
wBound	1 to enable software limits, 0 disables them

This function will configures an axis with encoder and Hall effect (Hall effect is for commutation only) feedback, where the number of lines per electrical cycle is not an integer. The dwLines parameter specifies the number of lines per revolution of the motor (after the X4 multiplication of the controller). The dwLinesRev parameter specifies the number of encoder lines (after X4 multiplication of the controller) that is equivalent to one revolution of the motor. The wBounded parameter enables software limits that generate a fault if the axis is commanded outside the software limits defined by the CWEOT and CCWEOT axis parameters. Also, the SOFTLIMITMODE axis parameter defines the mode of the software limits. Axis limits, drive faults, drive enable, and AUX I/O are associated with the specified wChannel. The wCommOffset parameter specifies a commutation offset, where 1,024=360°, that is added to the motor commutation angle.

C and LabView Constants

AXISINDEX#

VB Constants

aerAxisIndex#

See Also

AerConfigGetHallPolePairs

7.15. AerConfigMaster

AERERR_CODE AerConfigMaster (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
PAER_CFG_MASTER_PACKET *pMaster*);

There is no VB function for AerConfigMaster, see Section 7.16. AerConfigMasterAxis (page 7-19) for VB information.

Parameters

hAerCtrl Handle to the axis processor card.

iAxis Axis index to specify which axis (slave) is to have its master configured (AXISINDEX_xxxx constants).

pMaster Pointer to AER_CFG_MASTER PACKET which contains the master/slave information.

This function is used in a number of contexts, such as cam table motion, auxiliary tables, and strip charts. It defines how a particular axis will fill its “master position.” Unless this function is called, an axis’ master position remains at zero. After this function is called, the master position will be updated each servo cycle to be the actual or commanded position of a specified axis. The axis (where the position is derived from) may be the same as or different than that specified by the *iAxis* parameter.

> By configuring *iAxis* as virtual, the commanded rather than actual position is used as the master position.

For cam tables, the master position is used as the command for the slave to follow. The slave (*iAxis*) interprets this command in the same way that a “normal” axis interprets its own command. Therefore, similar to the “normal” axis, the slave needs to know the channel to obtain the feedback and the conversion information needed to convert the feedback into a position. This data must be placed into the structure pointed to by *pMaster*.

> It is possible to define a master configuration for a slave, different than the master axis’ actual configuration. Normally, one would call *AerConfigGet* to retrieve the master axis’ configuration and copy the required data into the master packet passed to *AerConfigMaster*.

This function is also used by auxiliary tables to specify which axis gets positioned and monitored for firing of the auxiliary output. In this case, the master configuration would normally be set to the same setting as *iAxis*. Thus, the master position of *iAxis* will be the same as the position of *iAxis*.

See Also

AerAuxTablexxxx
AerCamTablexxxx
AerConfigGetMaster
AerConfigGetMasterAxis
AerConfigMasterAxis

Example

Samples\Lib\ AexCam.C

7.16. AerConfigMasterAxis

AERERR_CODE AerConfigMasterAxis (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wType*, WORD *wChannel*, DWORD *dwData*);

Declare Function AerConfigMasterAxis Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *wType* As Integer, ByVal *wChannel* As Integer, ByVal *dwData* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index to specify which axis (slave) to configure its master (see constants).
wType	Type of feedback (resolver, encoder, virtual or null, or see constants).
wChannel	Feedback channel number (1, 2,…, 16) or axis index of master, if wType = virtual.
dwData	Resolution of feedback device (lines/rev. after MX/MXH and controller x4 multiplication or 10, 12, 14, or 16 resolver bits).

This function is used in a number of contexts, such as cam table motion, auxiliary tables, and strip charts. Its purpose is to define how this axis is to fill its “master position.” Unless this function is called, an axis’ master position remains at zero. After this function is called, the master position will be updated each servo cycle to be the actual or commanded position of a specified axis. The axis (where the position is derived from) may be the same as or different than that specified by the *iAxis* parameter.

By configuring *iAxis* as virtual, the commanded rather than actual position is used as the master position.

For cam tables the master position is used as the command for the slave to follow. The slave (*iAxis*) interprets this command in the same way that a “normal” axis interprets its own command. Therefore, similar to the “normal” axis, the slave needs to know the channel to obtain the feedback and the conversion information needed to convert the feedback into a position. This is indicated by the *wChannel* parameter.

It is possible to define a master configuration for a slave different than the master axis’s actual configuration. Normally, one would call *AerConfigGet* to retrieve the master axis’s configuration and copy the required data into the master packet passed to *AerConfigMaster*.

This function is used by auxiliary tables to specify which axis to monitor its position to fire the auxiliary output. In this case, the master configuration would normally be set to the same setting as *iAxis*. Thus, the master position of *iAxis* will be the same as the position of *iAxis*.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

AER_MFBTYPE_XXXX

VB Constants

aerAxisIndex1
to
aerAxisIndex16

aerMFBTypexxxx

See Also

AerAuxTablexxxx
AerCamTablexxxx
AerConfigGetMaster
AerConfigGetMasterAxis
AerConfigMaster

Example

samples\lib\AexCfg.C

7.17. AerConfigMasterAuto

AERERR_CODE AerConfigMasterAuto (HAERCTRL *hAerCtrl*, BOOL *bUseCommand*, AXISINDEX *iMaster*, AXISINDEX *iSlave*);

Declare Function AerConfigMasterAuto Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *bUseCommand* As Long, ByVal *iMaster* As Long, ByVal *iSlave* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
bUseCommand	Always equal to FALSE.
iMaster	Axis index to specify the master axis (see constants).
iSlave	Axis index to specify the slave axis (see constants).

This function is used to define how the slave axis will obtain its "master position" from the master axis.

If bUseCommand is equal to true, the command rather than the actual position is used as the master position.

If the master axis is configured as a stepper or virtual, the commanded position is used as the master position.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

7.18. AerConfigReadPacket

AERERR_CODE AerConfigReadPacket (LPCTSTR *pszFile*, AXISINDEX *iAxis*,
PAER_CFG_USER_INFO *pUserCfg*);

Parameters

pszFile	Name of axis configuration file.
iAxis	Axis index to retrieve axis configuration info (AXISINDEX_xxxx constant).
pUserCfg	Pointer to AER_CFG_USER_INFO which will hold the configuration information.

This function reads the specified configuration file and returns the configuration packet for the given axis. The AER_CFG_USER_INFO is compatible with an AER_CFG_PACKET. It can be passed to any function that accepts AER_CFG_PACKET. See Section 7.1.2.: Axis Configuration File Format, for details on the layout of the file.

See Also

AerConfig
AerConfigWritePacket
AerConfigReadPacketEx

7.19. AerConfigReadPacketEx

AERERR_CODE AerConfigReadPacketEx (LPCTSTR *pszFile*, BOOL *bTemplate*,
AXISINDEX *iTemplateAxis*, AXISINDEX iAxis,
PAER_CFG_USER_INFO *pUserCfg*);

Parameters

pszFile	Name of axis configuration file.
bTemplate	Determines if the configuration packet should be read back as a template.
iTemplateAxis	Axis to use as a template (AXISINDEX_xxxx constant).
iAxis	Axis index to retrieve axis configuration information (AXISINDEX_xxxx constant).
pUserCfg	Pointer to AER_CFG_USER_INFO which will hold the configuration information.

This function reads the specified configuration file and returns the configuration packet for the given axis. If *bTemplate* is TRUE, then the axis configuration specified by *iTemplateAxis* is used. In this situation, any channel information defaults to the axis specified by *iAxis*. This is a way to make copies of an existing axis configuration from a file.

The AER_CFG_USER_INFO is compatible with an AER_CFG_PACKET. It can be passed to any function that accepts and AER_CFG_PACKET. See Section 7.1.2.: Axis Configuration File Format for details on the layout of the file.

See Also

AerConfigReadPacket

7.20. AerConfigResolver

AERERR_CODE AerConfigResolver (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wResolverChannel*, WORD *wD2AChannel*, WORD *wResolution*, WORD *wPoles*, WORD *wCommOffset*, WORD *wBounded*);

Declare Function AerConfigResolver Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *wResolverChannel* As Integer, ByVal *wD2Achannel* As Integer, ByVal *wResolution* As Integer, ByVal *wPoles* As Integer, ByVal *wCommOffset* As Integer, ByVal *wBounded* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index to specify which axis to configure (see constants below).
wResolverChannel	Channel number for resolver feedback.
wD2AChannel	Channel this axis receives its current/velocity command from.
wResolution	Resolution of resolver (number of bits in R/D converter, must be 10, 12, 14, 16, based on R/D converter hardware used).
wPoles	Number of poles (Must be even - use 0 for DC motor).
wCommOffset	Commutation offset (1,024 = 360°).
wBounded	1 to activate software travel limits, 0 to disable them.

AerConfigResolver configures an axis with a resolver. The *wBounded* parameter enables software limits that generate a fault if the axis is commanded outside the software limits defined by the *CWEOT* and *CCWEOT* axis parameters. In addition, the *SOFTLIMITMODE* axis parameter defines the mode of the software limits. Axis limits, drive fault, drive enable, and AUX I/O are associated with the specified *wD2AChannel*. The *wCommOffset* parameter is subtracted from the current resolver value before the resolver position is used to commutate the motor.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerConfigGetResolver
AerConfigResolverHall
AerConfigGetResolverHall

Example

Samples\Lib\AexCfg.C

7.21. AerConfigResolverHall

AERERR_CODE AerConfigResolverHall (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wResolverChannel*, WORD *wD2AChannel*, WORD *wResolution*, WORD *wCommChannel*, DWORD*dwCycleLines*, WORD *wCommOffset*, WORD *wBounded*);

Declare Function AerConfigResolverHall Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *wResolverChannel* As Integer, ByVal *wD2Achannel* As Integer, ByVal *wResolution* As Integer, ByVal *wCommChannel* As Integer, ByVal *dwCycleLines* As Long, ByVal *wCommOffset* As Integer, ByVal *wBounded* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index to specify which axis to configure (see constants below).
wResolverChannel	Channel number for resolver feedback.
wD2AChannel	Channel this axis receives its current/velocity command from.
wResolution	Resolution of resolver (number of bits in R/D converter, must be 10, 12, 14, 16, based on R/D converter hardware used).
wCommChannel	Hall effect feedback channel number.
dwCycleLines	Number of lines per electrical cycle.
wCommOffset	Commutation offset.
wBounded	1 to activate software travel limits, 0 to disable them.

The *AerConfigResolverHall* configures an axis with resolver and Hall effect (commutation only) feedback. The *wBounded* parameter enables software limits that will generate a fault if the axis is commanded outside the software limits defined by the *CWEOT* and *CCWEOT* axis parameters. Also, the *SOFTLIMITMODE* axis parameter defines the mode of the software limits. Axis limits, drive fault, drive enable, and AUX I/O are associated with the specified *wD2AChannel*. The *wCommOffset* parameter specifies a commutation offset in counts (1,024 counts = 360°) that is added to the motor commutation angle.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerConfigGetResolverHall

Example

Samples\Lib\AexCfg.C

7.22. AerConfigWritePacket

AERERR_CODE AerConfigWritePacket (LPTSTR *pszFile*, AXISINDEX *iAxis*,
PAER_CFG_PACKET *pCfg*);

Parameters

pszFile	Name of file that holds configuration information.
iAxis	Axis on which to save information (*AXISINDEX_xxxx* constants).
pCfg	Pointer to AER_CFG_PACKET which holds the configuration information.

This function writes the specified configuration packet to the specified configuration file for the given axis. See Section 7.1.2.: Axis Configuration File Format for details on the layout of the file.

See Also

AerConfig
AerConfigReadPacket

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CHAPTER 8: DATA CENTER FUNCTIONS

In This Section:

8.1. Introduction

The Data Center functions are a convenient way of retrieving blocks of axis and task data.

8.2. AerDCGetAxisDirectEx

AERERR_CODE AerDCGetAxisDirectEx (HAERCTRL *hAerCtrl*, AXISMASK *mAxis*,
PAER_AXIS_DATA_EX *pData*);

Parameters

hAerCtrl	Handle to axis processor card.
mAxis	Axis mask of axes to retrieve.
pData	Pointer to an array of AER_AXIS_DATA_EX structures.

This function retrieves axis information for all axes specified in *mAxis*. The *pData* parameter must be allocated for the axes that need to be retrieved.

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

8.3. AerDCGetTaskDirect

AERERR_CODE AerDCGetTaskDirect (HAERCTRL *hAerCtrl*, TASKMASK *mTask*,
PAER_TASK_DATA *pData*);

Parameters

hAerCtrl	Handle to axis processor card.
mTask	Task mask of task data to retrieve.
pData	Pointer to an array of AER_TASK_DATA structures.

This function retrieves axis information for all tasks specified in *mTask*. The *pData* parameter must be allocated for the axes that need to be retrieved.

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

∇ ∇ ∇

CHAPTER 9: ERROR FUNCTIONS

In This Section:

9.1. Introduction

The design of these routines is almost foolproof. There are very few cases that cause them to crash. A number of exceptions can occur during error string retrieval (i.e., a bad sprintf substitution). In these cases, the routine attempts to continue anyway (for a bad substitution it simply returns the string with no substitution). However, in some cases there is no rational continuation (pointer to buffer to receive string is NULL). In these cases, a message box appears explaining the problem and writes to the error log if it is open.

9.2. AERERRGETMESS

LPTSTR AERERRGETMESS (DWORD *dwMessID*, LPSTR *pszStr*, WORD *wSeverity*, WORD *wlastArg*, BOOL *bLongForm*);

Parameters

dwMessID	Error code to return message string for.
pszStr	Pointer to buffer to receive text corresponding to error code.
wSeverity	Severity of error message (see constants below).
wlastArg	Name of last fixed-argument in calling routines argument list.
bLongForm	If TRUE the "long" form of the message will be returned.

AERERRGETMESS is a macro that must be called if the user wants to call *AerErrGetMessage* or *AerErrGetMessage* from a function that receives a variable number of arguments. However, any function can call it.

If it cannot write to *pszStr* for any reason, it displays a message box indicating the problem, and the file and line in which the offending *AERERRGETMESS* call was made.

This macro has no return value and is similar to *AerErrGetMessage*.

C Language and LabView Constants

AERERR_TYPE_MSG
AERERR_TYPE_WARN
AERERR_TYPE_ERROR
AERERR_TYPE_NONE

VB Constants

aerErrTypeMsg
aerErrTypeWarn
aerErrTypeError
aerErrTypeNone

See Also

AerErrGetMessage

Example

samples\lib\AexSys.C

9.3. AerErrGetMessage and AerErrGetMessageEx

LPTSTR AerErrGetMessage (DWORD *dwMessID*, LPTSTR *pszStr*, LONG *lStrSize*, BOOL *bLongForm*,...);

Declare Function AerErrGetMessageEx Lib "AERERR.DLL" (ByVal *dwMessID* As Long, ByVal *pszStr* As String, ByVal *lStrSize* As Long, ByVal *bLongForm* As Long) As String

Parameters

dwMessID	Error code to retrieve string for.
pszStr	Pointer to buffer to receive text corresponding to error code.
lStrSize	Size of passed *pszStr* buffer.
bLongForm	If TRUE, returns the "long" form of the message.
...	Extra arguments (optional), to be substituted into the string (C language only).

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

These functions retrieve error strings when given an error code. The C functions take a variable number of arguments, and perform "sprintf-type" substitutions of any additional parameters passed (following the *bLongForm* argument) into the error strings. For example, if the message is, "Here it is: %s", and a string is passed after the *bLongForm* argument, then %s is replaced with the passed string. If the number or type of extra parameters passed does not match those in the string, then the substitution may not be performed, or "junk" values may appear within the substitution's - it will not crash. If the user does not pass any extra parameters, no substitution occurs.

This function echoes the string to the error log, if an error log is open. If successful, it returns a pointer to the *pszStr* argument. If unsuccessful, it returns NULL. In most failures (such as a message corresponding to the error code), it places a string describing the error in the passed *pszStr*. In the worst case, when it cannot write to *pszStr* it displays a message box describing the failure.

If *bLongForm* is TRUE, it will prefix the string with information indicating the passed severity, the error number, and the Aerotech name. If *bLongForm* is false, the user will only receive in the string the text of the message and the severity. However, if the error is AERERR_NOERR, (and *bLongForm* is FALSE), the user will not receive the severity.

See Also

AERERRGETMESS
aerERRLogFileOpen

Example

Samples\Lib\AexSys.C
Samples\Lib\VisualBasic\RunPgm.vbp

C

VB

9.4. AerErrGetSeverity

LPTSTR AerErrGetSeverity (AERERR_CODE *dwCode*);

Declare Function AerErrGetSeverity Lib "AERERR.DLL" (ByVal *dwCode* As Long) As String

Parameters

dwCode Error code passed in.

AerErrGetSeverity returns the severity for an error code. See the AERERR_TYPE_xxxx constants in the appendices, for details on the types of severity.

C Language and LabView Constants

AERERR_TYPE_xxxx

VB Constants

aerErrTypexxxx

See Also

AerErrGetMessage

Example

samples\lib\AexSys.C

9.5. AerErrLogError

AERERR_CODE AerErrLogError (LPCTSTR *pszStr*);

Declare Function AerErrLogError Lib "AERERR.DLL" (ByVal *pszStr* As String) As Long

Parameters

pszStr The error string to write to the file.

AerErrLogError writes the given string to the error file. If successfully written to the file, the routine returns *AERERR_NOERR*. If it fails, it returns an appropriate error code.

> All calls to *AerErrGetMessage* echo the returned string into the log file.

C Language and LabView Constants

AERERR_NOERR

VB Constants

aerNoErr

See Also

AerErrLogFileOpen
AerErrLogFileClose

Example

samples\lib\AexSys.C

9.6. AerErrLogFileClose

void AerErrLogFileClose (void);

Declare Function AerErrLogFileClose Lib “AERERR.DLL” (void) As Void

Parameters

NONE

AerErrLogFileClose closes the error log file named "AERERR.LOG" in the current directory. There is no return code and if no log file is open, it does nothing.

See Also

AerErrLogFileOpen
AerErrLogError

Example

samples\lib\AexSys.C

9.7. AerErrLogFileOpen

LPTSTR AerErrLogFileOpen (void);

Declare Function AerErrLogFileOpen Lib "AERERR.DLL" (void) As String

Parameters
NONE

AerErrOpenLogFile opens up the log file named "AERERR.LOG" in the current directory, and activates error logging. All subsequent calls to *AerErrGetMessage* echo the message to that file. If the log file is opened successfully, the routine returns NULL. If it fails, it returns a pointer to the appropriate error string.

See Also
AerErrLogFileClose
AerErrLogError

Example
samples\lib\AexSys.C

9.8. AerErrMessageBox

void AerErrMessageBox (DWORD *dwMessID*, WORD *wSeverity*, ...);

Declare Function AerErrMessageBox Lib “AERERR.DLL” (ByVal *dwMessID* As Long, ByVal *wSeverity* As Integer) As String

Parameters

dwMessID	Error code passed in.
wSeverity	Severity of error message (see constants below).
...	String substitution parameters, as required (C language only).

AerErrMessageBox retrieves an error string for the specified error code and displays a message box indicating the error. If WIN95 is not defined it will write the message string to the error log (if it is open). It requires a variable number of arguments, and performs "sprintf-type" substitutions of any additional parameters passed (past the *wSeverity*) into the error strings. Refer to *AerErrGetMessage* for details on formatting.

It is identical to *AerErrGetMessage*, except that instead of returning a pointer to the message, it displays the message in a message box. If errors are encountered while retrieving the error message or allocating space, then a message box describing the problem appears.

C Language and LabView Constants

AERERR_TYPE_MSG
AERERR_TYPE_WARN
AERERR_TYPE_ERROR
AERERR_TYPE_NONE

VB Constants

aerErrTypeMsg
aerErrTypeWarn
aerErrTypeError
aerErrTypeNone

See Also

AerErrGetMessage
AerErrLogFileOpen

Example

samples\lib\AexSys.C

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CHAPTER 10: EVENT FUNCTIONS

In This Section:

10.1. Introduction

Events are the method by which the UNIDEX 600 Series controllers communicate back to the application running on the host PC. This communication is done via ISA bus interrupts (for UNIDEX 600, the interrupt is defined in the registry and through jumpers on the card, refer to *AerRegxxxx* functions, see Chapter 19 for additional information).

The use of events requires the user to be able to use the Win32 calls for defining threads and blocking (waiting) on threads (see the ExEvent.c example).

When the axis processor generates the interrupt, the device driver receives the interrupt, determines its associated event, and the event that is set for that particular interrupt is “pulsed”. The state is changed from non-signaled to signaled to non-signaled. Therefore, any application thread that is “blocking” on this event is released.

When the axis processor wants to generate an interrupt, it writes to a specific location in its memory map, generates the PC interrupt, and continues processing. It does not wait to see if the device driver has received it. The device driver receives the interrupt via the PC bus and signals any events “blocking” for the given interrupt notifying the axis processor that it received the interrupt. However, if the axis processor generates another interrupt before the device driver acknowledges the first, the axis processor will delay the interrupt until the device driver does acknowledge the first. This “interrupt queuing” will not queue more than one interrupt of the same type, the later interrupts will be discarded. The types of interrupts include both axis and task numbers (i.e., if two faults are generated on axis 1 and one on axis 2, only the second axis 1 fault will be discarded).

Shown below are the four basic steps for creating an event.

1. Create event (*AerEventCreateEvent*)
2. Spawn a thread (Win32 function *Create*).
3. Block thread (Win32 function *WaitForSingleObject* [multiple]).
4. Close event.

10.2. AerEventCloseEvent

AERERR_CODE AerEventCloseEvent(HAERCTRL *hAerCtrl*, HANDLE *hEvent*, DWORD *dwEvent*, DWORD *dwNum*);

Declare Function AerEventCloseEvent Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *hEvent* As Long, ByVal *dwEvent* As Long, ByVal *dwNum* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
hEvent	Handle to event (obtained from an *AerEventCreateEvent* call).
dwEvent	AER_EVENT_xxxx constant.
dwNum	Specifies an axis or task number.

This function closes the event associated with the specified event handle. The *dwNum* argument is only used if the specified interrupt is an axis or task interrupt.

C Language and LabView Constants

AER_EVENT_XXXX

VB Constants

aerEventxxxx

See Also

AerEventCreateEvent

10.3. AerEventCreateEvent

AERERR_CODE AerEventCreateEvent (HAERCTRL *hAerCtrl*, DWORD *dwEvent*, DWORD *dwNum*, LPCTSTR *pszEventName*, PHANDLE *phEvent*);

Declare Function AerEventCreateEvent Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwEvent* As Long, ByVal *dwNum* As Long, ByVal *psEventName* As String, ByRef *phEvent*) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwEvent	AER_EVENT_xxxx constant (see constants below).
dwNum	Axis or task number (see constants below).
pszEventName	Name of event or Null.
phEvent	Pointer to variable to hold a Win32 event handle.

The *dwNum* argument is only used if the specified interrupt is an axis or task interrupt. Table 10-1 shows the interrupts that can be generated by the axis processor.

Table 10-1. Axis Processor Generated Interrupts

Type	AER_EVENT_xxxx code	Explanation
Task Fault	TASK_FAULT	A task related fault has occurred (i.e. bad CNC line encountered).
Axis Fault	AXIS_FAULT	An axis related fault has occurred (i.e. position error).
Interrupt Failure	UNKNOWN_EVENT	Interrupt occurred, but no data found.
Task Callback	TASK_CALLBACK	A task callback has occurred.
Joystick	JOYSTICK	A joystick event has occurred.

The Unknown event interrupt occurs when a process other than the axis processor triggers an interrupt. The callback interrupt is a “miscellaneous” category for operations that the axis processor requires an operation from the host processor. A ‘task callback’ includes file operations (axis processor wants to read/write to a file), display operations (axis processor wants to display a Window under control of the users CNC program). The secondary loop interrupt allows the user to define a variable timer interrupt to the “front-end” application.

Some of the faults have additional data associated with them. It is guaranteed that when the interrupt is received, that the associated data exists. The way to access the additional data varies with the type of interrupt. When an axis or task interrupt is triggered, the user can check the *FAULT* parameter for the axis or task respectively, to determine the fault code. Interrupt failures have no additional data.

The user can attach multiple interrupts to the same event. Just use the same *pszEventname* and the interrupts will be added.

Multiple executables can also monitor the same interrupt. However, each executable must create its own event and use the same name to reference that event. Even if some of the processes creating the event close, the remaining events will be triggered by the interrupt.

The user may also reference an event at the Win32 level. Under Windows 95/NT the event is created via the Win32 function *CreateEvent*. A code fragment for the *AerEventCreateEvent* function follows:

```
// Create a Win32 Manual-Reset Event that is Non-Signaled
hEvent = CreateEvent( NULL, TRUE, FALSE, pszEventName );
// pass handle on to device driver
....
// return event handle to user
*phEvent = hEvent;
```

In this case, if the above process closes, the other processes monitoring the event will not see the close.

C Language and LabView Constants

AER_EVENT_XXXX

TASKINDEX_1
to
TASKINDEX_4

AXISMASK_1
to
AXISMASK_16

VB Constants

aerEventxxxx

aerTaskIndex1
to
aerTaskIndex4

aerAxisMask1
to
aerAxisMask16

See Also
AerEventCloseEvent

10.4. AerEventGenerateInt

AERERR_CODE AerEventGenerateInt (HAERCTRL *hAerCtrl*, DWORD *dwEvent*,
DWORD *dwNum*);

Declare Function AerEventGenerateInt Lib "AERSYS.DLL"(ByVal *hAerCtrl* As Long,
ByVal *dwEvent* As Long, ByVal *dwNum* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwEvent	AER_EVENT_xxxx constant (see constants below).
dwNum	Axis or task number.

This function will manually generate the specified interrupt on the axis processor. Normally, the axis processor would generate an interrupt at the proper time. The d*wNum* argument is only used if the specified interrupt is an axis or task interrupt. This function is intended for test purposes only.

C Language and LabView Constants

AER_EVENT_XXXX

VB Constants

aerEventxxxx

See Also

AerEventTest

C

VB

10.5. AerEventTest

AERERR_CODE AerEventTest (HAERCTRL *hAerCtrl*, DWORD *dwEvent*, DWORD *dwNum*, DWORD *dwWaitMSec*);

Declare Function AerEventTest Lib "AERSYS.DLL"(ByVal *hAerCtrl* As Long, ByVal *dwEvent* As Long, ByVal *dwNum* As Long, ByVal *dwWaitMSec* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwEvent	AER_EVENT_xxxx constant.
dwNum	Specifies an axis or task number.
dwWaitMSec	Time-out value to wait for interrupt.

This function is supplied as a means to test the event and interrupt operation. This function will create the desired event, generate an interrupt, start a separate thread of execution and block on that event for the specified time period or until the interrupt occurs, and close the event. If the interrupt is properly received, it returns *AERERR_NOERR*. Otherwise, it returns an error code indicating the problem. The *dwNum* argument is only used if the specified interrupt is an axis or task interrupt.

C Language and LabView Constants

AER_EVENT_XXXX

AERERR_NOERR

VB Constants

AerEventxxxx

aerNoErr

See Also

AerEventGenerateInt

∇ ∇ ∇

CHAPTER 11: MEMORY FUNCTIONS

In This Section:

11.1. Introduction

These functions return the total amount of memory on the axis processor card and the amount of free memory available.

11.2. AerMemCheck

AERERR_CODE AerMemCheck (HAERCTRL *hAerCtrl*, PDWORD *pdwMemSize*);

Declare Function AerMemCheck Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByRef *pdwMemSize* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
pdwMemSize	Pointer to returned size of memory.

This function returns the size of the installed memory on the axis processor card in the *pdwMemSize* pointer. The firmware will occupy some of this memory, see *AerMemGetFree* for the amount of free memory.

See Also

AerSysDownload
AerMemGetFree

Example

samples\lib\AexSys.C

11.3. AerMemGetFree

AERERR_CODE AerMemGetFree (HAERCTRL *hAerCtrl*, PDWORD *pdwTotal*,
PDWORD *pdwLargest*)

Declare Function AerMemGetFree Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByRef *pdwTotal* As Long, ByRef *pdwLargest* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
pdwTotal	A pointer to the total free memory on the axis processor card.
pdwLargest	A pointer to the largest contiguous block of free memory.

This function returns the amount of free memory currently available on the Unidex 600 series axis card. The total free memory is returned by *pdwTotal* and the largest contiguous free memory block is returned by *pdwLargest*.

See Also

AerMemCheck

Example

samples\lib\AexSys.C

∇ ∇ ∇

CHAPTER 12: MOVE FUNCTIONS

In This Section:

12.1. Introduction

The *AerMove* and *AerJog* library functions implement basic motion, jogging, and homing functions. Homing is the process of seeking an accurate, absolute reference point for a system that uses incremental position feedback. The various motion functions provide absolute, incremental, queued, linear, and axes freerun motion, similar to that provided by the asynchronous move command (STRM, MOVETO, HOME, etc.) and G1 CNC commands. See the U600MMI.hlp file for more information.

AerMove functions DO NOT wait until the motion is done; the function will return immediately after the motion is started. You must use the “AerMoveWaitDone” functions to wait until motion is actually completed.

Most of the move functions in this chapter allow the user to specify movement on a single axis, or a group of axes. Functions with an “*AerMoveM*” prefix accept an axis mask that specifies a set of axes to move. Functions with an “*AerMove*” prefix can only generate movement on the single axis number provided (except AerMoveLinear() which can move multiple axes at once).

The *AerMove* and *AerMoveM* functions are implemented as macros of *AerMoveAxis* and *AerMoveMulti* functions.

VB

For the Visual Basic programmer, the AerMoveAxis and AerMoveMulti functions must be used directly.

All functions in this chapter require speeds with distances given in machine steps. Therefore, the programmer must do the necessary conversion from inches, millimeters, or degrees to machine counts. For this reason, it is recommended that these functions not be used, since the machine, global and task parameters have no effect, only the axis parameters do. See the AerTaskxxxx or AerProgramxxxx functions instead.

12.2. AerJogGetMode

AERERR_CODE AerJogGetMode (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PWORD *pwMode*, PDWORD *pdwSpeed*, PWORD *pwEnableBit*, PWORD *pwDirBit*);

Declare Function AerJogGetMode Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByRef *pwMode* As Integer, ByRef *pdwSPeed* As Long, ByRef *pwEnableBit* As Integer, ByRef *pwDirBit* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (see constants).
pwMode	Pointer returning jog state, enabled/disabled (1/0) for the specified axis.
pdwSpeed	Pointer returning velocity in machine steps per second.
pwEnableBit	Pointer to the I/O bit number that will jog the axis.
pwDirBit	Pointer to the I/O bit number controlling the direction of the axis.

This function returns the state of the jog mode that allows the axes to be jogged from an external device connected to digital I/O of the controller. The *iAxis* parameter specifies the axis number. The *pwEnableBit* and *pwDirBit* parameters return the I/O bit numbers that are used as the enable and direction inputs. These I/O numbers are virtual bit numbers for UNIDEX 600/620.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerConfig
AerJogSetMode

Example

Samples\Lib\AexMove.C

12.3. AerJogSetMode

C

AERERR_CODE AerJogSetMode (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wMode*, DWORD *dwSpeed*, WORD *wEnableBit*, WORD *wDirBit*);

VB

Declare Function AerJogSetMode Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *wMode* As Integer, ByVal *dwSpeed* As Long, ByVal *wEnableBit* As Integer, ByVal *wDirBit* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (see constants below).
wMode	Enable/disable (1/0) jog mode for the specified axis.
dwSpeed	Velocity in machine steps per second.
wEnableBit	I/O bit number that will jog the axis.
wDirBit	I/O bit number that controls the direction of the axis.

This function allows the axes to be jogged from an external device connected to the user inputs of the controller. The axis may not be in the sync mode or a programming error will occur. The *iAxis* parameter specifies the axis. The I/O bit numbers representing the *wEnableBit* and *wDirBit* parameters, are specified as virtual bit numbers for UNIDEX 600/620. A logic level one on the direction bit will result in positive (CW) motor rotation.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerConfig
AerJogGetMode

Example

Samples\Lib\AexMove.C

12.4. AerMoveAbort, AerMoveMAbort

AERERR_CODE AerMoveAbort (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

C

The *AerMoveMAbort* function is identical to *AerMoveAbort*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMAbort (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*);

C

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

VB

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask (combination of AXISMASK_xxxx constants).

This function will command the specified axis to come to an abrupt stop by setting the commanded position equal to the current position. The commanded deceleration will be instantaneous. However, the actual deceleration will be some finite value, based on the inertia of the system and therefore, in reality, there will be some position overshoot.

See Also

AerMoveAxis
AerMoveHalt

Example

Samples\Lib\AexMove.C

12.5. AerMoveAbsolute, AerMoveMAbsolute

AERERR_CODE AerMoveAbsolute (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, LONG *lTarg*, DWORD *dwSpeed*);

AerMoveMAbsolute is identical to *AerMoveAbsolute*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMAbsolute (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*, PLONG *plMoveArray*, PDWORD *pdwSpeedArray*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask (combination of AXISMASK_xxxx constants).
lTarg	Absolute position (+/-) in machine steps to move to.
dwSpeed	Speed in machine steps per second.
plMoveArray	Array of move values specified in machine steps.
pdwSpeedArray	Array of speeds in machine steps.

This function will move the specified axis to the desired absolute position at the given velocity. Target and speed are in machine units. The axis will accelerate and decelerate using the current accel/decel axis parameters (ACCEL, DECEL, etc.). Any motion command currently executing on the specified axis/axes will be aborted and the axis will immediately begin moving to the specified absolute position. This will allow the destination to be changed during the move, calling this function while an absolute move from a previous function call is in progress. If motion is begun on a different axis, the current motion will not be affected. The specified drive must be enabled and the axis must not be in the sync mode or a programming error will occur.

With the *AerMoveMAbsolute* function, unpredictable results occur if the number of elements in either array is less than the number of bits set in *mAxes*. The specified drives must be enabled and the axes must not be in the sync mode or a programming error will occur.

See Also

AerMoveAbsolute
AerMoveAxis
AerConfig
AerMoveMulti
AerMoveIncremental
AerMoveQueueAbsolute
AerMoveQueueIncremental

Example

Samples\Lib\AexMove.C

12.6. AerMoveAxis

AERERR_CODE AerMoveAxis (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, DWORD *dwMoveCmd*, LONG *lDistOrTarget*, DWORD *dwSpeed*);

Declare Function AerMoveAxis Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *dwMoveCmd* As Long, ByVal *lDistOrTarget* As Long, ByVal *dwSpeed* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Index of axis to move (see constants below).
dwMoveCmd	Type of move command (see constants below).
lDistOrTarget	Depends on the dwMoveCmd. - Distances/targets are specified in machine steps. Direction is either (+/-) 1 for positive/negative direction.
dwSpeed	Speed is specified in machine steps per second.

The *AerMoveAxis* function implements basic asynchronous motion and homing functions. Homing is the process of seeking an accurate absolute reference point for a system that uses incremental position feedback. The various motion functions provide absolute, incremental, queued, linear, and axes freerun motion. Most of the AerMove functions are implemented as macros of *AerMoveAxis* or *AerMoveMulti*. See Table 12-1. This function will not wait until motion is complete (see AerMoveWaitDone() for that).

Table 12-1. AerMove Functions

MoveCmd (VB see below)	Macro	Parameter 1	Parameter 2
AERMOVE_ABSOLUTE	AerMoveAbsolute	Target	Speed
AERMOVE_HOME	AerMoveHome	Direction	Speed
AERMOVE_INCREMENTAL	AerMoveIncremental	Distance	Speed
AERMOVE_FREERUN	AerMoveFreerun	Direction	Speed
AERMOVE_INFEEDSLAVE	AerMoveInfeedSlave	Distance	Speed
AERMOVE_QINCREMENTAL	AerMoveQueue-Incremental	Distance	Speed
AERMOVE_QABSOLUTE	AerMoveQueueAbsolute	Target	Speed
AERMOVE_HOMEQUICK	AerMoveHomeQuick	Direction	Speed
AERMOVE_HOMEALT_REV	AerMoveHomeAlt AerMoveHomeQuick	Direction	Speed
AERMOVE_HOMENOLIMIT	AerMoveHomeNoLimit	Direction	Speed
AERMOVE_OSCILLATE	AerMoveOscillate	Distance	Speed
AERMOVE_HALT	AerMoveHalt	N/A	N/A
AERMOVE_ABORT	AerMoveAbort	N/A	N/A
AERMOVE_FEEDHOLD	AerMoveFeedHold	N/A	N/A
AERMOVE_RELEASE	AerMoveRelease	N/A	N/A
AERMOVE_QFLUSH	AerMoveQueueFlush	N/A	N/A
AERMOVE_QHOLD	AerMoveQueueHold	N/A	N/A
AERMOVE_QRELEASE	AerMoveQueueRelease	N/A	N/A
AERMOVE_LINEAR	see AerMoveLinear		

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

AERMOVE_XXXX

VB Constants

aerAxisIndex1
to
aerAxisIndex16

aerMovexxxx

See Also

AerConfig
AerMoveMulti
AerMoveWaitDone

Example

Samples\Lib\AexMove.C

12.7. AerMoveFeedhold, AerMoveMFeedhold

The *AerMoveMFeedhold* function is identical to *AerMoveFeedhold*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMFeedhold (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask (combination of AXISMASK_xxxx constants).

This function will feedhold the motion in progress on the specified axis by decelerating the axis to a stop in the current mode (linear/sinusoidal, rate/time). The current mode is determined by the DECELMODE axis parameter. The DECELRATE and DECEL axis parameters determine the current deceleration rate or time, respectively. To restart the move that was in progress, the *AerMoveRelease* function should be called in order to accelerate the axis back up to the programmed velocity based upon the axis acceleration parameters. This function will cause any motion commands issued to the specified axis before the function is called to be placed into a queue that is one level deep. After the feedhold is released, the last commanded move will be executed and any others ignored.

See Also

AerMoveAxis
AerMoveRelease

Example

Samples\Lib\AexMove.C

12.8. AerMoveFreerun, AerMoveMFreerun

AERERR_CODE AerMoveFreerun (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, LONG *lDir*, DWORD *dwSpeed*);

AerMoveMFreerun is identical to *AerMoveFreerun*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMFreerun (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*, PLONG *plMoveArray*, PDWORD *pdwSpeedArray*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask. (combination of AXISMASK_xxxx constants).
lDir	Direction (+/- = 1/0) to move.
dwSpeed	Speed in machine steps per second.
plMoveArray	Array of direction values.
pdwSpeedArray	Array of speeds in machine steps.

This function will start the specified axis moving in a specified direction at the specified velocity. The function is typically used to start continuous motion such as a spindle, where only velocity and direction are of significance. The velocity is specified in machine units per second. The axis will accelerate and decelerate using the current accel/decel axis parameters (ACCEL, DECEL, etc.). The specified drive must be enabled and the axis must not be in the sync mode or a programming error will occur. If distance and velocity are zero, and the axis is already executing an asynchronous move, the axis will stop.

With the *AerMoveMFreerun* function, unpredictable results will be obtained if the number of elements in either array is less than the number of bits set in *mAxes*. The specified drives must be enabled and the axes must not be in the sync mode or a programming error will occur.

See Also

AerMoveAxis
AerConfig
AerMoveHalt
AerMoveInfeedSlave
AerMoveMultiple

Example

Samples\Lib\AexMove.C

12.9. AerMoveHalt, AerMoveMHalt

AERERR_CODE AerMoveHalt (HAERCTRL *hAerCtrl*, AXSINDEX *iAxis*);

The *AerMoveMHalt* function is identical to *AerMoveHalt*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMHalt (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask (combination of AXISMASK_xxxx constants).

This function will decelerate the specified axis to zero velocity using the current deceleration mode (linear/sinusoidal). The deceleration mode is dependent upon the setting of the DECELMODE axis parameter. The deceleration rate is defined by the DECELRATE axis parameter and the deceleration time is set by the DECEL axis parameter.

See Also

AerMoveAxis
AerMoveAbort

Example

See Samples\Lib\AexMove.C

12.10. AerMoveHome, AerMoveMHome

AERERR_CODE AerMoveHome (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, LONG *lDir*, DWORD *dwSpeed*);

The *AerMoveMHome* function is identical to *AerMoveHome*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMHome (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*, PLONG *plMoveArray*, PDWORD *pdwSpeedArray*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask (combination of AXISMASK_xxxx constants).
lDir	Direction (+/- = 1/0) to home.
dwSpeed	Home speed in machine steps per second.
plMoveArray	Array of direction values.
pdwSpeedArray	Array of speeds in machine steps.

This function performs the “HomeType=0” homing procedure (see the *HomeType* machine parameter). Refer to the *U600 Series User’s Guide, P/N EDU157* for more information, or the U600MMI.hlp file.

The specified drive must be enabled and the axis must not be in the sync mode or a programming error will occur.

For *AerMoveMHome* , unpredictable results will be obtained if the number of elements in the either array is less than the number of bits set in *mAxes*. The specified drives must be enabled and the axes must not be in the sync mode or a programming error will occur.

See Also

AerMoveAxis
AerConfig
AerMoveHomeNoLimit
AerMoveHomeQuick
AerMoveHomeRev
AerMoveMHomeNoLimit
AerMoveMHomeQuick
AerMoveMHomeRev

Example

Samples\Lib\AexMove.C

12.11. AerMoveHomeNoLimit, AerMoveMHomeNoLimit

AERERR_CODE AerMoveHomeNoLimit (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, LONG *lDir*, DWORD *dwSpeed*);

The *AerMoveMHomeNoLimit* function is identical to *AerMoveHomeNoLimit*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMHomeNoLimit (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*, PLONG *plMoveArray*, PDWORD *pdwSpeedArray*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask. (combination of AXISMASK_xxxx constants).
lDir	Direction (+/- = 1/0) to move.
dwSpeed	Speed in machine steps per second to move at.
plMoveArray	Array of direction values.
pdwSpeedArray	Array of speeds in machine steps.

This function performs the “HomeType=2” homing procedure (see the *HomeType* machine parameter). Refer to the *U600 Series User’s Guide, P/N EDU157* for more information, or the U600MMI.hlp file.

The specified drive must be enabled and the axis must not be in the sync mode or a programming error will occur.

With the *AerMoveMHomeNoLimit* function, unpredictable results will be obtained if the number of elements in either array is less than the number of bits set in *mAxes*. The specified drives must be enabled and the axes must not be in the sync mode or a programming error will occur.

See Also

AerMoveAxis
AerConfig
AerMoveHome
AerMoveHomeQuick
AerMoveHomeRev
AerMoveMHome
AerMoveMHomeQuick
AerMoveMHomeRev

Example

Samples\Lib\AexMove.C

12.12. AerMoveHomeQuick, AerMoveMHomeQuick

AERERR_CODE AerMoveHomeQuick (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, LONG *lDir*, DWORD *dwSpeed*);

AerMoveMHomeQuick is identical to *AerMoveHomeQuick*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMHomeQuick (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*, PLONG *plMoveArray*, PDWORD *pdwSpeedArray*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask. (combination of AXISMASK_xxxx constants).
lDir	Direction (+/- = 1/0) to move.
dwSpeed	Speed in machine steps per second to move at.
plMoveArray	Array of direction values.
pdwSpeedArray	Array of speeds in machine steps.

This function performs the "HomeType=3" homing procedure (see the *HomeType* machine parameter). Refer to the *U600 Series User's Guide, P/N EDU157* for more information, or the U600MMI.hlp file.

The velocity is specified in machine units per second. The axis will accelerate and decelerate at the currently selected modes (linear/sinusoidal) and rates/times. The specified drive must be enabled and the axis must not be in the sync mode or a programming error will occur.

For the *AerMoveMHomeQuick* function, unpredictable results will be obtained if the number of elements in either array is less than the number of bits set in *mAxes*. The specified drives must be enabled and the axes must not be in the sync mode or a programming error will occur.

See Also

AerMoveAxis
AerConfig
AerMoveHome
AerMoveHomeNoLimit
AerMoveHomeRev
AerMoveMHome
AerMoveMHomeNoLimit
AerMoveMHomeRev

Example

Samples\Lib\AexMove.C

12.13. AerMoveHomeRev, AerMoveMHomeRev, AerMoveHomeAlt, AerMoveMHomeAlt

AERERR_CODE AerMoveHomeRev (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
LONG *lDir*, DWORD *dwSpeed*);

AerMoveMHomeRev is identical to *AerMoveHomeRev*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMHomeRev (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*,
PLONG *plMoveArray*, PDWORD *pdwSpeedArray*);

AerMoveHomeAlt and *HomeMoveMHomeAlt* have different names but duplicate the functionality of *AerMoveHomeRev* and *AerMoveMHomeRev*.

AERERR_CODE AerMoveHomeAlt (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
PLONG *lDir*, PDWORD *dwSpeed*);

AERERR_CODE AerMoveMHomeAlt (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*,
PLONG *plMoveArray*, PDWORD *pdwSpeedArray*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (see constants below).
mAxes	Axis mask (see constants below).
lDir	Direction (+/- = 1/0) to move.
dwSpeed	Speed in machine steps per second to move at.
plMoveArray	Array of direction values (+/- = 1/0) to move.
pdwSpeedArray	Array of speeds in machine steps.

These functions perform the “HomeType=1” homing procedure (see the *HomeType* machine parameter). Refer to the *U600 Series User’s Guide, P/N EDU157* for more information, or the U600MMI.hlp file.

The velocity is specified in machine units per second. The axis will accelerate and decelerate at the currently selected modes (linear/sinusoidal) and rates/times. The specified drive must be enabled and the axis must not be in the sync mode or a programming error will occur.

For the *AerMoveMHomeRev* and *AerMoveMHomeAlt* functions, unpredictable results will be obtained if the number of elements in either the *plMoveArray* or the *pdwSpeedArray* parameter is less than the number of bits set in *mAxes*. The specified drives must be enabled and the axes must not be in the sync mode or a programming error will occur.

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisMask1
to
aerAxisMask16

aerAxisIndex1
to
aerAxisIndex16

See Also

AerMoveAxis
AerConfig
AerMoveHome, AerMoveMHome
AerMoveHomeNoLimit, AerMoveMHomeNoLimit
AerMoveHomeQuick, AerMoveMHomeQuick

Example

Samples\Lib\AexMove.C

12.14. AerMoveIncremental, AerMoveMIncremental

AERERR_CODE AerMoveIncremental (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
LONG *lLen*, DWORD *dwSpeed*);

AerMoveMIncremental is identical to *AerMoveIncremental*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMIncremental (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*,
PLONG *plMoveArray*, PDWORD *pdwSpeedArray*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask. (combination of AXISMASK_xxxx constants).
lLen	Length (+/-) of move in machine steps.
dwSpeed	Speed in machine steps per second to move at.
plMoveArray	Array of move values specified in machine steps.
pdwSpeedArray	Array of speeds in machine steps.

This function will start a specified axis moving in a specified direction at a specified velocity. The specified move increment will override any currently executing move, beginning a new incremental move from the current position at which this function was called (not recommended). If motion is begun on a different axis, the current motion will not be affected. A move currently executing will immediately take on the new velocity. The velocity is specified in machine units per second. The axis will accelerate and decelerate based on the current accel/decel axis parameters (ACCEL, DECEL, etc.). The specified drive must be enabled and the axis must not be in the sync mode or a programming error will occur.

For the *AerMoveIncremental* function, unpredictable results will be obtained if the number of elements in either array is less than the number of bits set in *mAxes*. The specified drives must be enabled and the axes must not be in the sync mode or a programming error will occur.

See Also

AerMoveAxis
AerConfig
AerMoveMAbsolute

Example

Samples\Lib\AexMove.C

12.15. AerMoveInfeedSlave, AerMoveMInfeedSlave

AERERR_CODE AerMoveInfeedSlave (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
LONG *lDist*, DWORD *dwSpeed*);

The *AerMoveMInfeedSlave* function is identical to *AerMoveInfeedSlave*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMInfeedSlave (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*,
PLONG *plMoveAry*, PDWORD *pdwSpeedAry*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask (combination of AXISMASK_xxxx constants).
lDist	Distance(+/-) to move to in machine steps.
dwSpeed	Speed in machine steps per second to move at.
plMoveAry	Array of move values specified in machine steps.
pdwSpeedAry	Array of speed values specified in machine steps.

This function will start a specified axis moving a specified distance at a specified velocity. A move currently executing will have its move increment summed with the distance specified in this function. The velocity is specified in machine units per second. The axis will accelerate and decelerate based on the current accel/decel axis parameters (ACCEL, DECEL, etc.). The specified drive must be enabled and the axis must be in the sync mode or a programming error will occur.

This function should be used only on axes that are in sync or cam table mode. The motion generated by this command will be added to the motion output by the cam table.

See Also

AerConfig
AerCam...

Example

Samples\Lib\AexMove.C

12.16. AerMoveLinear

AERERR_CODE AerMoveLinear (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*, PLONG *plTargetArray*, DWORD *dwSpeed*);

Declare Function AerMoveLinear Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *mAxes* As Double, ByRef *plTargetArray* As Long, ByVal *dwSPeed* As Long) As Long

C
VB

Parameters

hAerCtrl	Handle to the axis processor card.
mAxes	Axis mask. (see constants below).
plTargetArray	Pointer to an array of axes move distances.
dwSpeed	Vectorial machine steps per second velocity.

This function is used to start the linear coordinated motion of the specified axes. Coordinated motion is identical to a G1 CNC motion (see the U600MMI.hlp help file for details). AerMoveLinear(), like all other AerMove() functions, however, will return immediately, not waiting for the motion to complete (G1 waits for motion to complete). See the AerMoveWaitDone function to wait for completion. The *mAxes* parameter specifies the axes to move by setting their respective bit true with the first axis represented by bit 0. Each axis specified within the *mAxes* bitmask will start and stop at the same time using the current acceleration and deceleration modes and rates. The vector direction and speed are specified in machine units. The distances specified in the *plTargetArray* are 'packed' (i.e. an AxisMask of 0x09 - AXISMASK_1 | AXISMASK_4 - would have the target distance for Axis 1 in *plTargetArray*[0] and Axis 4 would be specified in *plTargetArray*[1]). The specified drives must be enabled or a programming error will occur.

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

VB Constants

aerAxisMask1
to
aerAxisMask16

See Also

AerConfig
AerMoveWaitDone

Example

Samples\Lib\AexMove.C

12.17. AerMoveMulti

C

AERERR_CODE AerMoveMulti (HAERCTRL *hAerCtrl*, AXISMASK m*Axis*, DWORD *dwMoveCmd*, PLONG p*lMoveArray*, PDWORD *pdwSpeedArray*);

VB

Declare Function AerMoveMulti Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long ByVal *mAxis* As Double, ByVal *dwMoveCmd* As Long, ByRef *plMoveArray* As Long, ByRef *pdwSpeedArray* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
mAxis	Mask of axis to move (see constants below).
dwMoveCmd	Type of move command (see constants below).
plMoveArray	Array of Move-commands. Depends on the dwMoveCmd. - Distances/targets are specified in machine steps. Direction is either (+/-) 1 for positive/negative direction.
pdwSpeedArray	Array of speeds in machine steps.

The *AerMoveMulti* function implements the basic asynchronous motion commands for multiple axes. It is a direct counterpart to *AerMoveAxis*. The input arrays must have one element per axis. See Table 12-2. This function will not wait until motion is complete (see AerMoveWaitDoneMulti() for that).

Table 12-2. AerMoveMulti Functions

MoveCmd (VB, see below)	Macro	*plMoveArray* Parameter	*pdwSpeedArray* Parameter
AERMOVE_ABORT	AerMoveMAbort	N/A	N/A
AERMOVE_ABSOLUTE	AerMoveMAbsolute	Target	Speed
AERMOVE_FEEDHOLD	AerMoveMFeedHold	N/A	N/A
AERMOVE_FREERUN	AerMoveMFreerun	Direction	Speed
AERMOVE_HALT	AerMoveMHalt	N/A	N/A
AERMOVE_HOME	AerMoveMHome	Direction	Speed
AERMOVE_HOMEALT_REV	AerMoveMHomeAlt AerMoveMHomeQuick	Direction	Speed
AERMOVE_HOMENOLIMIT	AerMoveMHomeNoLimit	Direction	Speed
AERMOVE_HOMEQUICK	AerMoveMHomeQuick	Direction	Speed
AERMOVE_INCREMENTAL	AerMoveMIncremental	Distance	Speed
AERMOVE_INFEEDSLAVE	AerMoveMInfeedSlave	Distance	Speed
AERMOVE_LINEAR	see AerMoveLinear		
AERMOVE_OSCILLATE	AerMoveMOscillate	Distance	Speed
AERMOVE_QABSOLUTE	AerMoveMQueueAbsolute	Target	Speed
AERMOVE_QINCREMENTAL	AerMoveMQueue-Incremental	Distance	Speed
AERMOVE_QFLUSH	AerMoveMQueueFlush	N/A	N/A
AERMOVE_QHOLD	AerMoveMQueueHold	N/A	N/A
AERMOVE_QRELEASE	AerMoveMQueueRelease	N/A	N/A
AERMOVE_RELEASE	AerMoveMRelease	N/A	N/A

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

AERMOVE_XXXX

VB Constants

aerAxisMask1
to
aerAxisMask16

aerMovexxxx

See Also

AerConfig
AerMoveMulti
AerMoveWaitDoneMulti

Example

Samples\Lib\AexMove.C

12.18. AerMoveOscillate, AerMoveMOscillate

AERERR_CODE AerMoveOscillate (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, LONG *lDistance*, DWORD *dwSpeed*);

The *AerMoveMOscillate* function is identical to *AerMoveOscillate*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMOscillate (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*, PLONG *plMoveAry*, PDWORD *pdwSpeedAry*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask (combination of AXISMASK_xxxx constants).
lDistance	The distance of the moves (sign is initial direction).
dwSpeed	The speed at which the axis will move (specified in user units/min). Refer to “v” in Figure 12-1.
plMoveAry	Array of move values specified in machine steps.
pdwSpeedAry	Array of speed values specified in machine steps.

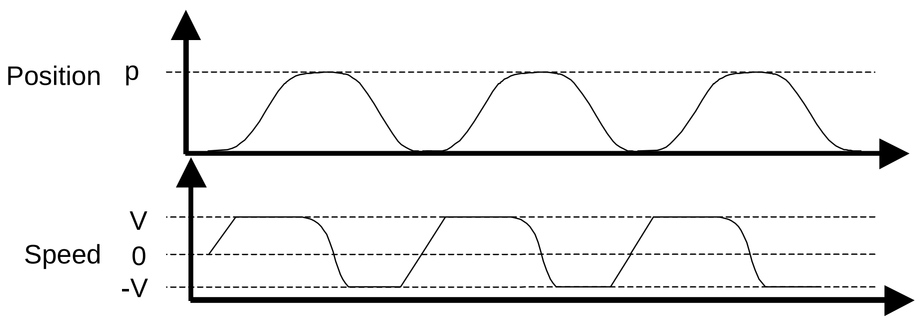

Figure 12-1. Graph of Position and Speed

This asynchronous motion command causes the specified axis to oscillate (cycle) the specified relative distance at the specified speed. The sign (+ or -) of the distance determines the initial direction of the move and is in user units. The speed is in user units per minute. The arithmetic sign of the speed parameter is ignored. The controller chooses whatever sign of the speed is appropriate to achieve a specified distance. To halt the axis, specify a zero feedrate or distance in subsequent uses of this command, or execute an ENDM CNC command on that axis.

Each move of the oscillation is a separate INDEX move. An *AerMoveOscillate* is equivalent to:

```
While FOREVER
        AerMoveIndex (positive direction)
        AerMoveIndex (negative direction)
EndWhile
```

Each “leg” (INDEX in the example above) of the oscillate command will have its own acceleration and deceleration, as determined by the acceleration/deceleration axis parameters (ACCEL, DECEL, etc.). Thus the shape of the oscillation profile is effected by the ACCEL and DECEL parameters. In Figure 12-1 is a velocity profile given a linear ACCEL, but a sinusoidal DECEL.

12.19. AerMoveQueueAbsolute, AerMoveMQueueAbsolute

AERERR_CODE AerMoveQueueAbsolute (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
LONG *lTarg*, DWORD *dwSpeed*);

The *AerMoveMQueueAbsolute* function is identical to *AerMoveQueueAbsolute*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMQueueAbsolute (HAERCTRL *hAerCtrl*, AXISMASK
mAxes, PLONG *plMoveAry*, PDWORD *pdwSpeedAry*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask (combination of AXISMASK_xxxx constants).
lTarg	Absolute position (+/-) to move to in machine steps.
dwSpeed	Speed in machine steps per second to move at.
plMoveAry	Array of move values specified in machine steps.
pdwSpeedAry	Array of speed values specified in machine steps.

This function is a queued version of the *AerMoveAbsolute* function. There is a 16 level queue for each axis. If a move is in progress, the queued move will not begin to execute until the current move is completed. If the queue is empty the move will begin immediately. The specified *iAxis* will move to the *lTarg* absolute position at the specified *dwSpeed*. The velocity is specified in machine units per second. The axis will accelerate and decelerate at the currently selected modes (linear/sinusoidal) and rates/times. The specified drive must be enabled and the axis must not be in the sync mode or a programming error will occur.

See Also

AerConfig
AerMoveAbsolute
AerMoveIncremental
AerMoveQueueIncremental

Example

Samples\Lib\AexMove.C

12.20. AerMoveQueueFlush, AerMoveMQueueFlush

AERERR_CODE AerMoveQueueFlush (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

The *AerMoveMQueueFlush* function is identical to *AerMoveQueueFlush*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMQueueFlush (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask (combination of AXISMASK_xxxx constants).

This function will clear the 16 level deep axis queue for the specified axis. All commands that were in the queue will not be executed.

See Also

AerMoveQueueHold
AerMoveQueueRelease

Example

Samples\Lib\AexMove.C

12.21. AerMoveQueueHold

AERERR_CODE AerMoveQueueHold (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

The *AerMoveMQueueHold* function is identical to *AerMoveQueueHold*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMQueueHold (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask (combination of AXISMASK_xxxx constants).

This function places the queue for the specified axis into the hold state upon completion of the current motion command. The current command will be completed and the queue can be restarted by using the *AerMoveQueueRelease* function.

See Also

AerMoveQueueRelease

Example

Samples\Lib\AexMove.C

12.22. AerMoveQueueIncremental, AerMoveMQueueIncremental

AERERR_CODE AerMoveQueueIncremental (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, LONG l*Len*, DWORD *dwSpeed*);

The *AetMoveMQueueIncremental* function is identical to *AerMoveQueueIncremental*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMQueueIncremental (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*, PLONG *plMoveAry*, PDWORD *pdwSpeedAry*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis number for the specified motion (AXISINDEX_XXXX constants).
mAxes	Axis mask (combination of AXISMASK_XXXX constants).
lLen	Length (+/-) of move in machine steps.
dwSpeed	Speed in machine steps per second to move at.
plMoveAry	Array of move values specified in machine steps.
pdwSpeedAry	Array of speed values, specified in machine steps.

This function is a queued version of the *AerMoveIncremental* function. There is a 16 level queue for each axis. If a move is in progress, the queued move will not begin to execute until the current move is complete. If the queue is empty the move will begin immediately. The specified *iAxis* will move the specified l*Len* increment at the specified *dwSpeed*. The velocity is specified in machine units per second. The axis will accelerate and decelerate at the currently selected modes (linear/sinusoidal) and rates/times. The specified drive must be enabled and the axis must not be in the sync mode or a programming error will occur.

See Also

AerConfig
AerMoveAbsolute
AerMoveIncremental
AerMoveQueueAbsolute

Example

Samples\Lib\AexMove.C

12.23. AerMoveQueueRelease, AerMoveMQueueRelease

AERERR_CODE AerMoveQueueRelease (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

The *AerMoveMQueueRelease* function is identical to *AerMoveQueueRelease*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMQueueRelease (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask (combination of AXISMASK_xxxx constants)

This function restarts the specified axis queue that had been halted from executing motion commands contained within its 16 level deep queue by the *AerMoveQueueHold* function.

See Also

AerMoveQueueHold

Example

Samples\Lib\AexMove.C

12.24. AerMoveRelease, AerMoveMRelease

AERERR_CODE AerMoveRelease (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

The *AerMoveMRelease* function is identical to *AerMoveRelease*, except that it operates over a set of axes, rather than just one axis.

AERERR_CODE AerMoveMRelease (HAERCTRL *hAerCtrl*, AXISMASK *mAxes*);

For Visual Basic programming, see *AerMoveAxis* and *AerMoveMulti*.

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (AXISINDEX_xxxx constant).
mAxes	Axis mask (combination of AXISMASK_xxxx constants).

This function resumes the motion that was in progress on the specified axis before calling the *AerMoveFeedhold* function. This is done by accelerating the axis to the programmed velocity in the current mode (linear/sinusoidal, rate/time). The current mode is determined by the *accelmode* axis parameter. The current acceleration rate and time is determined by the *accelrate* and *accel* axis parameters respectively. This function will have no effect on an axis that is not in the feedhold mode.

See Also

AerMoveFeedhold

Example

Samples\Lib\AexMove.C

12.25. AerMoveWaitDone

AERERR_CODE AerMoveWaitDone (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
DWORD *dwTimeOutMsec*, LONG *flags*,);

Declare Function AerMoveWaitDone Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long ByVal *iAxis* As Double, ByVal *dwTimeOutMsec* As Long, ByVal *flags* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Index of axis to move (see constants below).
dwTimeOutMsec	Timeout value (10 millisecond units).
flags	1 waits for "in-position bit" (STATUS axis parameter) to turn on. 0 waits for "done bit" (STATUS axis parameter) to turn on.

This function waits until motion is complete on the given axis or an axis fault occurs on that axis. If the passed timeout value is exceeded before motion is done, it returns the error: AER960_RET_TIMEOUT (532,486 decimal or 0x82006). Pass dwTimeOutMsec as 0 to wait forever. This function sleeps for 10 msec, after each check. Therefore, dwTimeOutMsec is in units of 10 milliseconds (i.e., dwTimeOutMsec = 1, indicates a timeout value of 10 milliseconds).

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerMoveAxis

Example

Samples\Lib\AexMove.C

12.26. AerMoveWaitDoneMulti

AERERR_CODE AerMoveWaitDoneMulti (HAERCTRL *hAerCtrl*, AXISMASK *mAxis*, DWORD *dwTimeOutMsec*, LONG *flags*,);

Declare Function AerMoveWaitDoneMulti Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *mAxis* As Double, ByVal *dwTimeOutMsec* As Long, ByVal *flags* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
mAxis	Mask of axes to move (see constants below).
dwTimeOutMsec	Timeout value (10 millisecond units).
flags	1 waits for "in-position bit" (STATUS axis parameter) to turn on. 0 waits for "done bit" (STATUS axis parameter) to turn on.

This function waits until motion is complete on all of the given axes or an axis fault occurs. If the passed timeout value is exceeded before motion is done, it returns the error: AER960_RET_TIMEOUT (532,486 decimal 0x82006). Pass dwTimeOutMsec as 0 to wait forever. This function sleeps for 10 msec, after each check. Therefore, dwTimeOutMsec is in units of 10 milliseconds (i.e., dwTimeOutMsec = 1, indicates a timeout value of 10 milliseconds).

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

VB Constants

aerAxisMask1
to
aerAxisMask16

See Also

AerMoveAxis

Example

Samples\Lib\AexMove.C

∇ ∇ ∇

CHAPTER 13: PARAMETER FUNCTIONS

In This Section:

13.1. Introduction

The *AerParm* functions perform the reading and writing of parameter values, determining the number of parameters in each parameter group, and provide textual as well as min/max settings for each parameter. The parameters are divided into four groups, refer to Table 13-1.

Table 13-1. AerParm Groups (see constants below)

Group	Scope	Type
Axis	Relate only to the given axis	Integer
Machine	Relate only to the given axis	Floating point
Task	Relate only to the given task	Floating point
Global	Relate to the entire controller	Floating point

These functions refer to the parameters by number. The base define for the parameter groups is given below, where XXXX is the parameter name. For example, the KP axis parameter is referred to by the constant AXISPARM_KP (C Language) or aerAxisParmKP (VB).

Some task and global parameters listed above as floating point values have a valid range for integers only, but are returned in a double data type (floating point). However, if some parameters in a group are floating point, then for generality they must all be floating point. For example, the task parameter *TASKPARM_NumTaskDoubles* is clearly an integer, although it is returned and set by a double data type variable.

The "get" and "set" functions download and upload from the controller respectively. The "download" functions automatically read ASCII text .INI files on disk that contains parameter assignments, and downloads these to the controller. The "read" and "write" functions read and write, respectively, ASCII text on parameters to disk .INI files. In functions that interact with disk files ("read," "write," "download"), if the file name is passed as NULL, it retrieves the filename from the "project file" INI\U600.INI.

C Language and LabView Constants	VB Constants
AXISPARM_XXXX	*aerAxisParmXXXX*
MACHPARM_XXXX	*aerMachParmXXXX*
TASKPARM_XXXX	*aerTaskParmXXXX*
GLOBPARM_XXXX	*aerAxisparmXXXX*

13.2. AerParmAxisDownloadFile

AERERR_CODE AerParmAxisDownloadFile (HAERCTRL *hAerCtrl*, LPCTSTR *pszFile*, AXISMASK *mAxis*);

Declare Function AerParmAxisDownloadFile Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *pszFile*, ByVal *mAxis*) As Long

Parameters

hAerCtrl	Handle to axis processor card.
pszFile	File to download (can be Null or an Empty String).
mAxis	Mask of the Axis to download parameters for (see constants below).

The *AerParmAxisDownloadFile* function downloads the axis parameters to the controller, for the specified axes. If the file name is passed as NULL, it retrieves the filename from the "project file" INI\U600.INI. The default filename currently in use by the user can be retrieved with the *AerRegGetFileName* function.

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

VB Constants

aerAxisMask1
to
aerAxisMask16

See Also

AerRegGetFileName

13.3. AerParmAxisGetCount

AERERR_CODE AerParmAxisGetCount (HAERCTRL *hAerCtrl*, PDWORD *pdwCount*);

Declare Function AerParmAxisGetCount Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByRef *pdwCount* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
pdwCount	Pointer to double word to receive the number of axis parameters.

This function returns the number of axis parameters.

See Also

AerParmAxisGetValue

Example

Samples\Lib\AexSys.C

13.4. AerParmAxisGetInfo

AERERR_CODE AerParmAxisGetInfo (HAERCTRL *hAerCtrl*, DWORD *dwParm*, PAER_PARM_INFO *pInfo*);

AERERR_CODE AerParmAxisGetInfoEx (HAERCTRL *hAerCtrl*, DWORD *dwParm*, LPTSTR *pszName*, PDOUBLE *pdMin*, PDOUBLE *pdMax*, PWORD *pwAttr*);

AERERR_CODE AerParmAxisGetInfoEx2 (HAERCTRL *hAerCtrl*, DWORD *dwParm*, LPTSTR *pszName*, PDOUBLE *pdMin*, PDOUBLE *pdMax*, PWORD *pwAttr*, PDOUBLE *pdDefault*, PDWORD *pdwDisplaySubGroup*);

Declare Function AerParmAxisGetInfoEx Lib “AERSYS.DLL” (ByVal *hAerCtr*l As Long, ByVal *dwParm* As Long, ByVal *pszName* As String, ByRef *pdMin* As Double, ByRef *pdMax* As Double, ByRef *pwAtt*r As Integer) As Long

Declare Function AerParmAxisGetInfoEx2 Lib “AERSYS.DLL” (ByVal *hAerCtr*l As Long, ByVal *dwParm* As Long, ByVal *pszName* As String, ByRef *pdMin* As Double, ByRef *pdMax* As Double, ByRef *pwAtt*r As Integer, ByRef *pdDefault* as Double, ByRef *pdwDisplaySubGroup* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwParm	Parameter number, (see constants below).
pInfo	Pointer to structure to receive the parameter information (C Language Only, see AER_PARM_INFO in Appendix C: Structures).
pszName	Pointer to buffer to hold name of parameter.
pdMin	Pointer to hold Minimum value of parameter.
pdMax	Pointer to hold Maximum value of parameter.
pwAttr	Pointer to hold parameter attribute (see constants below).
pdDefault	Pointer to hold the Default value of parameter
pdwDisplaySubGroup	Pointer to hold the subgroup to display the parameter in the parameter editor.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

This function returns data concerning an axis parameter. If the parameter number you provide is not a valid number, the function will still return with no error code. In this case, the "*wAttr*" mask of the *pInfo* structure will not have the VALID bit set. See example for details.

C Language and LabView Constants

AXISPARM_XXXX

AXIS_ATTR_XXXX

VB Constants

aerAxisParmXXXX

aerAxisAttrXXXX

Example

Samples\Lib\AexSys.C

13.5. AerParmAxisGetValue

AERERR_CODE AerParmAxisGetValue (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, DWORD *dwParm*, PDWORD *pdwValue)*;

Declare Function AerParmAxisGetValue Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *dwParm* As Long, ByRef *pdwValue* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Physical axis index, (see constants below).
dwParm	Parameter number, (see constants below).
pdwValue	Pointer to double word to receive the current parameter value.

This function returns the value of an axis parameter, from the controller.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

AXISPARM_XXXX

VB Constants

aerAxisIndex1
to
aerAxisIndex16

aerAxisParmXXXX

See Also

AerParmAxisSetValue

Example

Samples\Lib\AexSys.C
Samples\Lib\VisualBasic\RunPgm.vbp

13.6. AerParmAxisReadValue

AERERR_CODE AerParmAxisReadValue (LPCTSTR *pszFile*, AXISINDEX *iAxis*,
LPCTSTR *pszName*, PDWORD *pdwValue*, PDWORD *pdwDefValue*);

Declare Function AerParmAxisReadValue Lib "AERSYS.DLL" (ByVal *pszFile* As String, ByVal *iAxis* As Long, ByVal *pszName* As String, ByRef *pdwValue* As Long, ByRef *pdwDefValue* As Long)As Long

Parameters

pszFile	Pointer to name of axis parameter file (can be NULL or empty string).
iAxis	Which axis to retrieve from file (see constants below).
pszName	Name of axis parameter to read.
pdwValue	Pointer to hold value read from file.
pdwDefValue	Pointer to value holding the default value (may be NULL).

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

DIM sGlobStr as STRING * 50 ; 50 characters long

This function retrieves the value of the specified axis parameter from its .INI file. If the file name is passed as NULL, it retrieves the filename from the "project file" INI\U600.INI. If a default value is specified, then this value is returned as the value if the parameter could not be found in the file.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerRegGetFileName

13.7. AerParmAxisSetValue

AERERR_CODE AerParmAxisSetValue (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, DWORD *dwParm*, DWORD *dwValue)*;

Declare Function AerParmAxisSetValue Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *dwParm* As Long, ByVal *dwValue* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Physical axis index (see constants below).
dwParm	Parameter number, (see constants below).
dwValue	New value for the parameter.

AerParmAxisSetValue sets an axis parameter value on the controller. A programming error will occur if there is a problem setting the parameter. In addition, some parameters are read-only. Use *AerParmAxisGetInfo* to find out the minimum, maximum, and other characteristics of the parameter.

> Parameters do have minimum and maximum allowed values.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

AXISPARM_XXXX

VB Constants

aerAxisIndex1
to
aerAxisIndex16

aerAxisParmXXXX

See Also

AerParmAxisGetValue
AerParmAxisGetInfo

Example

Samples\Lib\AexSys.C

13.8. AerParmAxisWriteValue

AERERR_CODE AerParmAxisWriteValue (LPCTSTR *pszFile*, AXISINDEX *iAxis*,
LPCTSTR *pszName*, DWORD *dwValue*);

Declare Function AerParmAxisWriteValue Lib "AERSYS.DLL" (ByVal *pszFile* As
String, ByVal *iAxis* As Long, ByVal *pszName* As String, ByVal
dwValue As Long); As Long

Parameters

pszFile Name of Axis Parameter file (can be Null or Empty String).
iAxis Which axis to retrieve from file (see constants below).
pszName Name of axis parameter to write.
dwValue Value to write to file.

This function writes the value of the specified axis parameter to its .INI file. If the file name is passed as NULL, it retrieves the filename from the "project file" INI\U600.INI.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerRegGetFileName

13.9. AerParmGlobalDownloadFile

AERERR_CODE AerParmGlobalDownloadFile (HAERCTRL *hAerCtrl*, LPCTSTR *pszFile*);

Declare Function AerParmGlobalDownloadFile Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *pszFile* As String) As Long

Parameters

hAerCtr	Handle to axis processor card.
pszFile	File to download (can be Null or Empty String).

This function downloads the global parameter file to the motion control card If the file name is passed as NULL, it retrieves the filename from the "project file" INI\U600.INI. The default filename currently in use by the user can be retrieved with the *AerRegGetFileName* function.

See Also

AerRegGetFileName

13.10. AerParmGlobalGetCount

AERERR_CODE AerParmGlobalGetCount (HAERCTRL *hAerCtrl*, PDWORD *pdwCount*);

Declare Function AerParmGlobalGetCount Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByRef *pdwCount* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
pdwCount	Pointer to double word to receive the number of global parameters.

Returns the number of global parameters.

See Also

AerParmGlobalGetValue

Example

Samples\Lib\AexSys.C

13.11. AerParmGlobalGetInfo

AERERR_CODE AerParmGlobalGetInfo (HAERCTRL *hAerCtrl*, DWORD *dwParm*, PAER_PARM_INFO *pInfo*);

AERERR_CODE AerParmGlobalGetInfoEx (HAERCTRL *hAerCtrl*, DWORD *dwParm*, LPTSTR *pszName*, PDOUBLE *pdMin*, PDOUBLE *pdMax*, PWORD *pwAttr*);

AERERR_CODE AerParmGlobalGetInfoEx2 (HAERCTRL *hAerCtrl*, DWORD *dwParm*, LPTSTR *pszName*, PDOUBLE *pdMin*, PDOUBLE *pdMax*, PWORD *pwAttr*, PDOUBLE *pdDefault*, PDWORD *pdwDisplaySubGroup*);

Declare Function AerParmGlobalGetInfoEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwParm* As Long, ByVal *pszName* As String, ByRef *pdMin* As Double, ByRef *pdMax* As Double, ByRef *pwAttr* As Integer) As Long;

Declare Function AerParmGlobalGetInfoEx2 Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwParm* As Long, ByVal *pszName* As String, ByRef *pdMin* As Double, ByRef *pdMax* As Double, ByRef *pwAttr* As Integer, ByRef *pdDefault* as Double, ByRef *pdwDisplaySubGroup* As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwParm	Parameter number, (see constants below).
pInfo	Pointer to structure to receive the parameter information (C Language Only, refer to AER_PARM_INFO in Appendix C: Structures).
pszName	Pointer to buffer to hold name of parameter.
pdMin	Pointer to hold minimum value of parameter.
pdMax	Pointer to hold maximum value of parameter.
pwAttr	Pointer to hold parameter attribute (see constants below).
pdDefault	Pointer to hold the Default value of parameter
pdwDisplaySubGroup	Pointer to hold the subgroup to display the parameter in the parameter editor.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

This function returns data concerning a global parameter. If the parameter number provided by the user is not a valid number, the function will still return with no error code. In this case, the "*wAttr*" mask of the *pInfo* structure will not have the VALID bit set.

C Language and LabView Constants

GLOBPARM_XXXX

PARM_ATTR_XXXX

VB Constants

aerGlobParmXXXX

aerParmAttrXXXX

Example

Samples\Lib\AexSys.C

13.12. AerParmGlobalGetValue

C

AERERR_CODE AerParmGlobalGetValue (HAERCTRL *hAerCtrl*, DWORD *dwParm*, PDOUBLE *pfdValue*);

VB

Declare Function AerParmGlobalGetValue Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *dwParm* As Long, ByRef *pfdValue* As Double) As Long

Parameters

hAerCtrl Handle to the axis processor card.
dwParm Parameter number, (see constants below).
pfdValue Pointer to double floating point to receive the current parameter value.

Returns the value of a global parameter from the controller.

C Language and LabView Constants

GLOBPARM_XXXX

VB Constants

aerGlobParmXXXX

See Also

AerParmGlobalSetValue

Example

Samples\Lib\AexSys.C

13.13. AerParmGlobalReadValue

AERERR_CODE AerParmGlobalReadValue (LPCTSTR *pszFile*, LPCTSTR *pszName*, PDOUBLE *pdValue*, PDOUBLE *pdDefValue*);

Declare Function AerParmGlobalReadValue Lib "AERSYS.DLL" (ByVal *pszFile* As String, ByVal *pszName* As String, ByRef *pdValue* As Double, ByRef *pdDefValue* As Double) As Long

Parameters

pszFile	Name of global parameter file (can be Null or Empty String).
pszName	Name of global parameter to read.
pdValue	Pointer to hold value read from file.
pdDefValue	Pointer to value holding the default value (may be NULL).

This function retrieves the value of the specified global parameter from its .INI file. If the file name is passed as NULL, it retrieves the filename from the "project file" INI\U600.INI. If a default value is specified, then this value is returned as the value if the parameter could not be found in the file.

See Also

AerRegGetFileName

13.14. AerParmGlobalSetValue

C

AERERR_CODE AerParmGlobalSetValue(HAERCTRL *hAerCtrl*, DWORD *dwParm*, DOUBLE *fdValue*);

VB

Declare Function AerParmGlobalSetValue Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *dwParm* As Long, ByVal *fdValue* As Double) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwParm	Parameter number, (see the constants below).
fdValue	New value for the parameter.

AerParmGlobalSetValue sets a global parameter value on the controller. An error code will be returned if there is a problem modifying the parameter. Also, some parameters are read-only. Use *AerParmGlobalGetInfo* to find out the minimum, maximum, and other characteristics of the parameter.

Parameters do have minimum and maximum allowed values.

C Language and LabView Constants

GLOBPARM_XXXX

VB Constants

aerGlobParmXXXX

See Also

AerParmGlobalGetValue
AerParmGlobalGetInfo

Example

Samples\Lib\AexSys.C

13.15. AerParmGlobalWriteValue

AERERR_CODE AerParmGlobalWriteValue(LPCTSTR *pszFile*, LPCTSTR *pszName*, DOUBLE *dValue*);

Declare Function AerParmGlobalWriteValue Lib "AERSYS.DLL" (ByVal *pszFile* As String, ByVal *pszName* As String, ByVal *dValue* As Double) As Long

Parameters

pszFile	Name of global parameter file (can be Null or Empty String).
pszName	Name of global parameter to write.
dValue	Value to write to file.

This function writes the value of the specified task parameter to its .INI file. If the file name is passed as NULL, it retrieves the filename from the "project file" INI\U600.INI.

See Also

AerRegGetFileName

13.16. AerParmMachineDownloadFile

AERERR_CODE AerParmMachineDownloadFile (HAERCTRL *hAerCtrl*, LPCTSTR *pszFile*, AXISMASK *mAxis*);

AERERR_CODE AerParmMachineDownloadFile Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *pszFile* As String, ByVal *mAxis* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
pszFile	File to download (can be Null or Empty String).
mAxis	Mask of the axis to download parameters for (see constants below).

This function downloads the machine parameters to the controller for the specified axes. If the file name is passed as NULL, it retrieves the filename from the "project file" INI\U600.INI. The default filename currently in use by the user can be retrieved with the *AerRegGetFileName* function.

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

VB Constants

aerAxisMask1
to
aerAxisMask16

See Also

AerRegGetFileName

13.17. AerParmMachineGetCount

AERERR_CODE AerParmMachineGetCount(HAERCTRL *hAerCtrl*, PDWORD *pdwCount*);

C VB

Declare Function AerParmMachineGetCount Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByRef *pdwCount* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
pdwCount	Pointer to double word to receive the number of machine parameters.

Returns the number of machine parameters.

See Also

AerParmMachineGetValue

Example

Samples\Lib\AexSys.C

13.18. AerParmMachineGetInfo

AERERR_CODE AerParmMachineGetInfo (HAERCTRL *hAerCtrl*, DWORD *dwParm*, PAER_PARM_INFO *pInfo*);

AERERR_CODE AerParmMachineGetInfoEx (HAERCTRL *hAerCtrl*, DWORD *dwParm*, LPTSTR *pszName*, PDOUBLE *pdMin*, PDOUBLE *pdMax*, PWORD *pwAttr*);

AERERR_CODE AerParmMachineGetInfoEx2 (HAERCTRL *hAerCtrl*, DWORD *dwParm*, LPTSTR *pszName*, PDOUBLE *pdMin*, PDOUBLE *pdMax*, PWORD *pwAttr*, PDOUBLE *pdDefault*, PDWORD *pdwDisplaySubGroup*);

Declare Function AerParmMachineGetInfoEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwParm* As Long, ByVal *pszName* As String, ByRef *pdMin* As Double, ByRef *pdMax* As Double, ByRef *pwAttr* As Integer) As Long;

Declare Function AerParmMachineGetInfoEx2 Lib "AERSYS.DLL" (ByVal *hAerCtr*l As Long, ByVal *dwParm* As Long, ByVal *pszName* As String, ByRef *pdMin* As Double, ByRef *pdMax* As Double, ByRef *pwAtt*r As Integer, ByRef *pdDefault* as Double, ByRef *pdwDisplaySubGroup* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwParm	Parameter number, (see constants below).
pInfo	Pointer to structure to receive the parameter information (C Language Only, refer to AER_PARM_INFO in Appendix C: Structures).
pszName	Pointer to buffer to hold name of parameter.
pdMin	Pointer to hold minimum value of parameter.
pdMax	Pointer to hold maximum value of parameter.
pwAttr	Pointer to hold parameter attribute (see constants below).
pdDefault	Pointer to hold the Default value of parameter
pdwDisplaySubGroup	Pointer to hold the subgroup to display the parameter in the parameter editor.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

This function returns data concerning a machine parameter. If the parameter number provided by the user is not a valid number, the function will still return with no error code. But in this case, the "*wAttr*" mask of the *pInfo* structure will not have the VALID bit set.

C Language and LabView Constants

MACHPARM_XXXX

PARM_ATTR_XXXX

VB Constants

AerMachParmXXXX

aerParmAttrXXXX

Example

Samples\Lib\AexSys.C

13.19. AerParmMachineGetValue

AERERR_CODE AerParmMachineGetValue (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, DWORD *dwParm*, PDOUBLE *pfdValue*);

Declare Function AerParmMachineGetValue Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *dwParm* As Long, ByRef *pfdValue* As Double) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Physical axis index (see constants below).
dwParm	Parameter number, (see constants below).
pfdValue	Pointer to double word to receive the current parameter value.

Returns a machine parameter value from the controller.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

MACHPARM_XXXX

VB Constants

aerAxisIndex1
to
aerAxisIndex16

aerMachParmXXXX

See Also

AerParmMachineSetValue

Example

Samples\Lib\AexSys.C
Samples\Lib\VisualBasic\RunPgm.vbp

13.20. AerParmMachineReadValue

AERERR_CODE AerParmMachineReadValue (LPCTSTR *pszFile*, AXISINDEX *iAxis*, LPCTSTR *pszName*, PDOUBLE *pdValue*, PDOUBLE *pdDefValue*);

C

Declare Function AerParmMachineReadValue Lib "AERSYS.DLL" (ByVal *pszFile* As String, ByVal *iAxis* As Long, ByVal *pszName* As String, ByRef *pdValue* As Double, ByRef *pdDefValue* As Double) As Long

VB

Parameters

pszFile	Name of machine parameter file (can be Null or Empty String).
iAxis	Which axis to retrieve from file (see constants below).
pszName	Name of machine parameter to read.
pdValue	Pointer to hold value read from file.
pdDefValue	Pointer to value holding the default value (may be NULL).

This function retrieves the value of the specified machine parameter from its .INI file. If the file name is passed as NULL, it retrieves the filename from the "project file" INI\U600.INI. If a default value is specified, then this value is returned as the value if the parameter could not be found in the file.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerRegGetFileName

13.21. AerParmMachineSetValue

AERERR_CODE AerParmMachineSetValue (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, DWORD *dwParm*, DOUBLE *fdValue*);

Declare Function AerParmMachineSetValue Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *dwParm* As Long, ByVal *fdValue* As Double) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Physical axis index (see constants below).
dwParm	Parameter number, (see constants below).
fdValue	New value for the parameter.

AerParmMachineSetValue sets a machine parameter value on the controller. An error code will be returned if there is a problem setting the parameter. In addition, some parameters are read-only. Use *AerParmMachineGetInfo* to find out the minimum, maximum, and other characteristics of the parameter.

> Parameters do have minimum and maximum allowed values.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

MACHPARM_XXXX

VB Constants

aerAxisIndex1
to
aerAxisIndex16

aerMachParmXXXX

See Also

AerParmMachineGetValue
AerParmMachineGetInfo

Example

Samples\Lib\AexSys.C

13.22. AerParmMachineWriteValue

AERERR_CODE AerParmMachineWriteValue (LPCTSTR *pszFile*, AXISINDEX *iAxis*, LPCTSTR *pszName*, DOUBLE *dValue*);

Declare Function AerParmMachineWriteValue Lib “AERSYS.DLL” (ByVal *pszFile* As String, ByVal *iAxis* As Long, ByVal *pszName* As String, ByVal *dValue* As Double) As Long

Parameters

pszFile	Name of machine parameter file (can be Null or Empty String).
iAxis	Which axis to retrieve from file (see constants below).
pszName	Name of machine parameter to write.
dValue	Value to write to file.

This function writes the value of the specified machine parameter to its .INI file. If the file name is passed as NULL, it retrieves the filename from the “project file” INI\U600.INI.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to

aerAxisIndex16

See Also

AerRegGetFileName

13.23. AerParmMAxisGetValue

AERERR_CODE AerParmMAxisGetValue(HAERCTRL *hAerCtrl*, AXISMASK *mAxis*, DWORD *dwParm*, PDWORD *pdwValueArray*);

Declare Function AerParmMAxisGetValue Lib “AERSYS.DLL” Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *mAxis* As Long, ByVal *dwParm* As Long, ByRef *pdwValueArray* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
mAxis	Axis mask of axes to set value (see constants below).
dwParm	Which axis parameter to set (see constants below).
pdwValueArray	Pointer to array of DWORD to hold value parameters.

This function gets the axis parameter specified by *dwParm* for all axes in *mAxis* from the controller. The values are returned in *pdwValueArray*. The array is packed; it only needs to be allocated for each of the axes specified in *mAxis*.

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

AXISPARM_XXXX

VB Constants

aerAxisMask1
to
aerAxisMask16

aerAxisParmXXXX

13.24. AerParmMAxisSetValue

AERERR_CODE AerParmMAxisSetValue (HAERCTRL *hAerCtrl*, AXISMASK *mAxis*, DWORD *dwParm*, DWORD *dwValue*);

Declare Function AerParmMAxisSetValue Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *mAxis* As Long, ByVal *dwParm* As Long, ByVal *dwValue* As Long) As Long

Parameters

hAerCtrl Handle to the axis processor card.
mAxis Axis mask of axes to set value (see constants below).
dwParm Which axis parameter to set (see constants below).
dwValue Value to set parameters.

This function sets the axis parameter specified by *dwParm* to *dwValue* for all the axes specified in *maxis*, on the controller.

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

AXISPARM_XXXX

VB Constants

aerAxisMask1
to
aerAxisMask16

aerAxisParmXXXX

13.25. AerParmTaskDownloadFile

AERERR_CODE AerParmTaskDownloadFile (HAERCTRL *hAerCtrl*, LPCTSTR *pszFile*, TASKMASK *mTask*);

Declare Function AerParmTaskDownloadFile Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *pszFile*, TASKMASK *mTask*) As Long

Parameters

hAerCtrl	Handle to axis processor card.
pszFile	File to download (can be Null or Empty String).
mTask	Mask of the tasks to download parameters for.

The *AerParmTaskDownloadFile* function downloads the task parameters to the controller for the specified tasks. If the file name is passed as NULL, it retrieves the filename from the “project file” INI\U600.INI. The default filename currently in use by the user can be retrieved with the *AerRegGetFileName* function.

C Language and LabView Constants

TASKMASK_1
to
TASKMASK_4

VB Constants

aerTaskMask1
to
aerTaskMask4

See Also

AerRegGetFileName

13.26. AerParmTaskGetCount

AERERR_CODE AerParmTaskGetCount (HAERCTRL *hAerCtrl*, PDWORD *pdwCount*);

Declare Function AerParmTaskGetCount Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByRef *pdwCount* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
pdwCount	Pointer to double word to receive the number of task parameters.

Returns the number of task parameters.

See Also

AerParmTaskGetValue

13.27. AerParmTaskGetInfo

AERERR_CODE AerParmTaskGetInfo (HAERCTRL *hAerCtrl*, DWORD *dwParm*, PAER_PARM_INFO *pInfo*);

AERERR_CODE AerParmTaskGetInfoEx (HAERCTRL *hAerCtrl*, DWORD *dwParm*, LPTSTR *pszName*, PDOUBLE *pdMin*, PDOUBLE *pdMax*, PWORD *pwAttr*);

AERERR_CODE AerParmTaskGetInfoEx2 (HAERCTRL *hAerCtrl*, DWORD *dwParm*, LPTSTR *pszName*, PDOUBLE *pdMin*, PDOUBLE *pdMax*, PWORD *pwAttr*, PDOUBLE *pdDefault*, PDWORD *pdwDisplaySubGroup*);

Declare Function AerParmTaskGetInfoEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwParm* As Long, ByVal *pszName* As String, ByRef *pdMin* As Double, ByRef *pdMax* As Double, ByRef *pwAttr* As Integer) As Long

Declare Function AerParmTaskGetInfoEx2 Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwParm* As Long, ByVal *pszName* As String, ByRef *pdMin* As Double, ByRef *pdMax* As Double, ByRef *pwAttr* As Integer, ByRef *pdDefault* as Double, ByRef *pdwDisplaySubGroup* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwParm	Parameter number, (see constants below).
pInfo	Pointer to structure to receive the parameter information (C Language Only, refer to AER_PARM_INFO in Appendix C: Structures).
pszName	Pointer to buffer to hold name of parameter.
pdMin	Pointer to hold minimum value of parameter.
pdMax	Pointer to hold maximum value of parameter.
pwAttr	Pointer to hold parameter attribute (see constants below).
pdDefault	Pointer to hold the Default value of parameter
pdwDisplaySubGroup	Pointer to hold the subgroup to display the parameter in the parameter editor.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

DIM sGlobStr as STRING * 50 ; 50 characters long

This function returns data concerning a task parameter. If the parameter number provided by the user is not a valid number, the function will still return with no error code. In this case, the "*wAttr*" mask of the *pInfo* structure will not have the VALID bit set.

C Language and LabView Constants

TASKPARM_XXXX

PARM_ATTR_XXXX

VB Constants

aerTaskParmXXXX

aerParmAttrXXXX

Example

Samples\Lib\AexSys.C

13.28. AerParmTaskGetValue

AERERR_CODE AerParmTaskGetValue(HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, DWORD *dwParm*, PDOUBLE *pfdValue*);

Declare Function AerParmTaskGetValue Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *dwParm* As Long, ByRef *pfdValue* As Double) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Task index (see constants below).
dwParm	Parameter number (see constants below).
pfdValue	Pointer to double word to receive the current parameter value.

This function returns a task parameter value from the controller.

C Language and LabView Constants

TASKINDEX_1
to
TASKINDEX_4

TASKPARM_XXXX

VB Constants

aerTaskIndex1
to
aerTaskIndex4

aerTaskParmXXXX

See Also

AerParmTaskSetValue

Example

Samples\Lib\AexSys.C

13.29. AerParmTaskReadValue

AERERR_CODE AerParmTaskReadValue (LPCTSTR *pszFile*, TASKINDEX *iTask*,
LPCTSTR *pszName*, PDOUBLE *pdValue*, PDOUBLE *pdDefValue*);

Declare Function AerParmTaskReadValue Lib "AERSYS.DLL" (ByVal *pszFile* As String, ByVal *iTask* As Long, ByVal *pszName* As String, ByRef *pdValue* As Double, ByRef *pdDefValue* As Double) As Long

Parameters

pszFile	Name of task parameter file (can be Null or Empty String).
iTask	Which task to retrieve from file (see constants below).
pszName	Name of task parameter to read.
pdValue	Pointer to hold value read from file.
pdDefValue	Pointer to value holding the default value (may be NULL).

This function retrieves the value of the specified task parameter from the .INI file. If the file name is passed as NULL, it retrieves the filename from the "project file" INI\U600.INI. If a default value is specified, then this value is returned as the value if the parameter could not be found in the file.

C Language and LabView Constants

TASKINDEX_1
to
TASKINDEX_4

VB Constants

aerTaskIndex1
to
aerTaskIndex4

See Also

AerRegGetFileName

13.30. AerParmTaskSetValue

C
VB

AERERR_CODE AerParmTaskSetValue (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, DWORD *dwParm*, DOUBLE *fdValue*);

Declare Function AerParmTaskSetValue Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *dwParm* As Long, ByVal *fdValue* As Double) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Task index (see constants below).
dwParm	Parameter number, (see constants below).
fdValue	New value for the parameter.

AerParmTaskSetValue sets a task parameter value on the controller. An error code will be returned if there is a problem setting the parameter. In addition, some parameters are read-only. Use *AerParmTaskGetInfo* to find the minimum, maximum, and other characteristics of the parameter.

Parameters do have minimum and maximum allowed values.

C Language and LabView Constants

TASKINDEX_1
to
TASKINDEX_4

TASKPARM_XXXX

VB Constants

aerTaskIndex1
to
aerTaskIndex4

aerTaskParmXXXX

See Also

AerParmTaskGetValue
AerParmTaskGetInfo

Example

Samples\Lib\AexSys.C

13.31. AerParmTaskWriteValue

AERERR_CODE AerParmTaskWriteValue (LPCTSTR *pszFile*, TASKINDEX *iTask*, LPCTSTR *pszName*, DOUBLE *dvalue*);

Declare Function AerParmTaskWriteValue Lib "AERSYS.DLL" (ByVal *pszFile* As String, ByVal *iTask* As Long, ByVal *pszName* As String, ByVal *dValue* As Double) As Long

Parameters

pszFile	Name of task parameter file (can be Null or Empty String).
iTask	Which task to write to file (see constants below).
pszName	Name of task parameter to write.
dValue	Value to write to file.

This function writes the value of the specified task parameter to its .INI file. If the file name is passed as NULL, it retrieves the filename from the "project file" INI\U600.INI.

C Language and LabView Constants

TASKINDEX_1
to
TASKINDEX_4

VB Constants

aerTaskIndex1
to
aerTaskIndex4

See Also

AerRegFetFileName

∇ ∇ ∇

CHAPTER 14: PROBE FUNCTIONS

In This Section:

14.1. Introduction

The Probe functions give the programmer access to a binary input for latching position information. This is usually done to “touch off” a part via a sensitive touch sensor, such as a precision touch probe. This chapter provides functionality similar to he PROBE and G_ CNC commands (see the U600MMI.hlp file for more information).

14.2. AerProbeDisable

AERERR_CODE AerProbeDisable (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

Declare Function AerProbeDisable Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
iAxis	Axis to enable probe (see constants below).

The *AerProbeDisable* function disables the probe.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

Example

See Section 14.7.

14.3. AerProbeEnable

AERERR_CODE AerProbeEnable (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

Declare Function AerProbeEnable Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long,
ByVal *iAxis* As Long) As Long

Parameters

hAerCtrl Handle to axis processor card.
iAxis Axis to enable probe (see constants below).

This function will enable the probe. The probe status then indicate AER_PROBESTATUS_ARMED (C Language), aerProbeStatusArmed (VB).

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

Example

See Section 14.7.

14.4. AerProbeGetPosition

AERERR_CODE AerProbeGetPosition (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PAER_PROBE_POS_PACKET *pPos*);

AERERR_CODE AerProbeGetPositionEx (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PWORD *pwStatus*, PDWORD *pdwPos*);

Declare Function AerProbeGetPositionEx Lib "AERSYS.DLL" (ByVal *hAerCtrl As Long*, ByVal *iAxis* As Long, ByRef *pwStatus* As Integer, ByRef *pdwPos* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
iAxis	Axis to get position.
pPos	Pointer to AER_PROBE_POS_PACKET to receive information.
pwStatus	Pointer to hold probe status word (AER_PROBESTATUS_xxxx constant).
pdwPos	Pointer to hold current position.

This function gets the position when the probe was hit. If valid, *pwStatus* will have AER_PROBESTATUS_VALIDPOS.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

AER_PROBESTATUS_XXXX

VB Constants

aerAxisIndex1
to
aerAxisIndex16

aerProbeStatusXXXX

Example

See Section 14.7.

14.5. AerProbeGetStatus

AERERR_CODE AerProbeGetStatus (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PAER_PROBE_STATUS_PACKET *pStatus*);

AERERR_CODE AerProbeGetStatusEx (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PWORD *pwStatus*, PWORD *pwInput*, PWORD *pwLevel*);

Declare Function AerProbeGetStatusEx Lib "AERSYS.DLL" (ByVal hAerCtrl As Long, ByVal *iAxis* As Long, ByRef *pwStatus* As Integer, ByRef *pwInput* As Integer, ByRef *pwLevel* As Integer) As Long

Parameters

hAerCtrl	Handle to axis processor card.
iAxis	Axis to get status (see constants below).
pStatus	Pointer to AER_PROBE_STATUS_PACKET to receive information (C Language Only).
pwStatus	Pointer to hold probe status word (see constants below).
pwInput	Pointer to current input setting.
pwLevel	Pointer to current logic level.

This function gets the current probe status for an axis.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

AER_PROBESTATUS_XXXX

VB Constants

aerAxisIndex1
to
aerAxisIndex16

aerProbeStatusXXXX

Example

See Section 14.7.

14.6. AerProbeSetInput

AERERR_CODE AerProbeSetInput (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wInput*, WORD *wLevel*);

Declare Function AerProbeSetInput Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *wInput* As Integer, ByVal *wLevel* As Integer) As Long

Parameters

hAerCtrl	Handle to axis processor card.
iAxis	Axis to check for probe hit (see constants below).
wInput	Which binary input to use for probe (0 to 15 for standard input, -1 for high speed position latch).
wLevel	Logic level to trigger probe hit. If 0, triggered when input is low. If 1, triggered when input is high.

The *AerProbeSetInput* function sets an input to an axis for the probe condition.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

Example

See Section 14.7

14.7. Example Code Fragment to Use Probe Functions

The following code fragment shows how to use the probe functions.

```
HAERCTRL    hAerCtrl;
WORD        wInput = 8;        // using Binary Input 8
WORD        wLevel = 0;       // Input is active - low
AXISINDEX   iProbeAxis = AXISINDEX_4;  // Looking for
                                       //probe on axis 4
AERERR_CODE eRc;

//
// Open communication to card
eRc = AerSysOpen( AER_UNIDEX_DEFAULT, AER_CARD_DEFAULT,
                  &hAerCtrl );
RETURN_ON_ERR( eRc );

//
// Setup the probe input
eRc = AerProbeSetInput( hAerCtrl, iProbeAxis, wInput,
                        wLevel );
   ....

///// The following are the steps necessary to move a set
///// of axes and to enable the probe.

LONG  lTargetArray[3];  // array of targets
DWORD dwPos;
WORD  wStatus;

//
// Move the XYZ Axis in coordinated move to (1000, 3000,
// 1000) counts at 1000 counts/sec
lTargetArray[0] = 1000;
lTargetArray[1] = 3000;
lTargetArray[2] = 1000;
eRc = AerMoveLinear( hAerCtrl, AXISMASK_1 | AXISMASK_2 |
AXISMASK_3, &lTargetArray[0], 1000 );

//
// Arm the Probe
eRc = AerProbeEnable( hAerCtrl, iProbeAxis );

//
// Start moving the axis
eRc = AerMoveFreerun( hAerCtrl, iProbeAxis, 1, 100 );

AerProbeGetPositionEx( hAerCtrl, iProbeAxis, &wStatus,
&dwPos );

// wait until we get a hit
while( !(wStatus & AER_PROBESTATUS_VALIDPOS) )
{
   AerProbeGetPositionEx( hAerCtrl, iProbeAxis, &wStatus,
    &dwPos );
   Sleep(100);
```

```
}

//
// To account for decel, make a move back to position
// where probe hit
eRc=AerMoveAbsolute( hAerCtrl, iProbeAxis, dwPos, 100 );
....

AerSysClose( hAerCtrl );
```

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CHAPTER 15: PROFILE FUNCTIONS

In This Section:

15.1. Introduction

The Profiling Functions give the programmer low level access to derive their own profile motion similar to the PVT CNC command. See the U600MMI.hlp file for more information. Each axis has its own “profile queue.” As profile data is added to the queue for a specified axis, the information is processed and the motion is generated. The profiling data consists of a *target position*, the *time* it should take to reach the target position, *starting velocity*, and the *ending velocity* that should be reached at the *target position*.

The profile queue for each axis is limited in size. This size is specified by the axis parameter *PROFQSIZE*. As the profiling data is executed, it is removed from the queue so that more profiling data can be added. The current depth of the queue can be determined by the axis parameter *PROFQDEPTH*. The depth cannot exceed the size.

15.2. AerProfileFlushQueue

AERERR_CODE AerProfileFlushQueue (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

Declare Function AerProfileFlushQueue Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long) As Long

Parameters

hAerCtrl Handle to the axis processor card.
iAxis Which axis to flush the profile queue (see constants below).

The *AerProfileFlushQueue* function flushes the profiling queue for the specified axis.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

Example

Samples\Lib\AexProf\AexProf.C

15.3. AerProfileFlushQueueMulti

C
VB

AERERR_CODE AerProfileFlushQueueMulti (HAERCTRL *hAerCtrl*, AXISINDEX *mAxis*);

Declare Function AerProfileFlushQueueMulti Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *mAxis* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
mAxis	Axis mask specifying which axes to flush the profile queue (see constants below).

This function flushes the profiling queue for the specified axes.

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

VB Constants

aerAxisMask1
to
aerAxisMask16

Example

Samples\Lib\AexProf\AexProf.C

15.4. AerProfileLoadQueue

AERERR_CODE AerProfileLoadQueue (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PAER_PROFILE *pProf*);

AERERR_CODE AerProfileLoadQueueEx (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, LONG *lPoint*, DWORD *dwTime*, LONG *lVelStart*, LONG *lVelEnd*);

Declare Function AerProfileLoadQueueEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *lPoint* As Long, ByVal *dwTime* As Long, ByVal *lVelStart* As Long, ByVal *lVelEnd* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Which axis to profile (see constants below).
pProf	Pointer to the profiling information for the axis specified in *iAxis.*
lPoint	Target position in counts.
dwTime	Motion time in msec.
lVelStart	Starting velocity in msec/sec.
lVelEnd	Ending velocity in msec/sec.

This function loads the specified profile information into the profile queue. The profile information is added to the queue for the axis specified in *iAxis*.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

Example

Samples\Lib\AexProf\AexProf.C

15.5. AerProfileLoadQueueMulti

AERERR_CODE AerProfileLoadQueueMulti (HAERCTRL *hAerCtrl*, AXISMASK *mAxis*, PAER_PROFILE *pProfArray*);

AERERR_CODE AerProfileLoadQueueMultiEx (HAERCTRL *hAerCtrl*, AXISMASK *mAxis*, PLONG *plPosArray*, PDWORD *pdwTimeArray*, PLONG *plVelStartArray*, PLONG *plVelEndArray*);

Declare Function AerProfileLoadQueueMultiEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *mAxis* As Long, ByRef *plPosArray* As Long, ByRef *pdwTimeArray* As Long, ByRef *plVelStartArray* As Long, ByRef *plVelEndArray* As Long) As Long

C

C

VB

Parameters

hAerCtrl	Handle to the axis processor card.
mAxis	Axis mask specifying which axes to profile (see constants below).
pProfArray	Pointer to an array containing the profiling information for each axis specified in *plPosArray* – Array of target positions in counts (C Language Only).
pdwTimeArray	Array of motion times in msec.
plVelStartArray	Array of starting velocities in msec/sec.
plVelEndArray	Array of ending velocities in msec/sec.

This function loads the specified profile information into the profile queue. The profile information is added to the queue for each axis specified in *mAxis*. The motion between the specified axes will be coordinated.

All arrays are packet arrays. The *pProfArray* is a pointer to an array of AER_PROFILE points. If three axes are specified in the axis mask, then the first three elements in the arrays are applied to each axis in order.

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

VB Constants

aerAxisMask1
to
aerAxisMask16

Example

Samples\Lib\AexProf\AexProf.C

15.6. AerProfileStartQueue

AERERR_CODE AerProfileStartQueue (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

Declare Function AerProfileStartQueue Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByVal *iAxis* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Which axis to start the profile queue (see constants only).

This function starts the profiling queue for the specified axis.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

15.7. AerProfileStartQueueMulti

C
VB

AERERR_CODE AerProfileStartQueueMulti (HAERCTRL *hAerCtrl*, AXISMASK *mAxis*);

Declare Function AerProfileStartQueueMulti Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *mAxis* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
mAxis	Axis mask specifying which axes to start the profile queue (see constants below).

This function starts the profiling queue for the specified axes.

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

VB Constants

aerAxisMask1
to
aerAxisMask16

15.8. AerProfileStopQueue

AERERR_CODE AerProfileStopQueue (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

Declare Function AerProfileStopQueue Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long) As Long

Parameters

hAerCtrl Handle to the axis processor card.
iAxis Which axis to stop the profile queue for (see constants below).

The *AerProfileStopQueue* function stops the profiling queue for the specified axis.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

15.9. AerProfileStopQueueMulti

AERERR_CODE AerProfileStopQueueMulti (HAERCTRL *hAerCtrl*, AXISMASK *mAxis*);

Declare Function AerProfileStopQueueMulti Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *mAxis*) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
mAxis	Axis mask specifying which axes to stop the profile queue (see constants below).

This function stops the profiling queue for the specified axes.

C Language and LabView Constants

AXISMASK_1
to
AXISMASK_16

VB Constants

aerAxisMask1
to
aerAxisMask16

∇ ∇ ∇

CHAPTER 16: PROGRAMMING ERROR FUNCTIONS

In This Section:

16.1. Introduction

These functions return data about programming errors (defined by axis parameters), or return strings. Refer to *AerProgErrErrWaitModeSet* or the introduction in Chapter 9: Error Functions, for details on programming errors.

16.2. AerProgErrFlush

AERERR_CODE AerProgErrFlush (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

Declare Function AerProgErrFlush Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index specifying the axis whose fault to clear (see constants).

This function is used to clear the programming errors stored on the axis processor. Each axis stores it's own programming errors. Error strings for each programming error are stored on the axis processor. Clearing the program errors will free memory on the axis processor.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerProgErrGet
AerProgErrGetMessage

Example

Samples\Lib\AexProg.C

16.3. AerProgErrGet

AERERR_CODE AerProgErrGet (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
PAER_PROG_FAULT *pFault*);

Parameters

hAerCtrl Handle to the axis processor card.
iAxis Axis index specifying the axis to retrieve its fault axis (use the AXISINDEX_xxxx constants).
pFault Pointer to a AER_PROG_FAULT structure for an Aerotech program error.

This function retrieves the information about the command that caused the last programming error condition for the specified axis.

See Also

AerProgErrFlush
AerProgErrGetMessage
AerProgErrSetUserFault

Example

Samples\Lib\AexProg.C

16.4. AerProgErrGetAltStatusMessage

C
VB

AERERR_CODE AerProgErrGetAltStatusMessage (HAERCTRL *hAerCtrl*, WORD *wMsg*, LPTSTR *pszMsg*);

Declare Function AerProgErrGetAltStatusMessage Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *wMsg* As Integer, ByVal *pszMsg* As String) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wMsg	Message number to retrieve.
pszMsg	Pointer to the message string.

This function retrieves an ALTSTATUS axis parameter message ASCII text string that defines the 32 bits of the axis status. The messages are permanently stored within the memory of the UNIDEX 600 series controller card.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

See Also

AerProgErrGetMessage
AerProgErrGetStatusMessage
AerProgErrGetServoMessage
AerProgErrGetMotionMessage
AerProgErrGetAltStatusMessage

Example

Samples\Lib\AexProg.C

16.5. AerProgErrGetFaultMessage

AERERR_CODE AerProgErrGetFaultMessage (HAERCTRL *hAerCtrl*, WORD *wMsg*, LPTSTR *pszMsg*);

Declare Function AerProgErrGetFaultMessage Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wMsg* As Integer, ByVal *pszMsg* As String) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wMsg	Message number to retrieve.
pszMsg	Pointer to the message string.

This function retrieves a FAULT axis parameter message (as an ASCII text string) that defines the function of the 32 bits of the system fault status. The messages are stored within the memory of the axis processor card. The message number is in the range of 0 through 31 as represented by the fault status bits.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

See Also

AerProgErrGetFaultMessage
AerProgErrGetStatusMessage
AerProgErrGetServoMessage
AerProgErrGetMotionMessage
AerProgErrGetAltStatusMessage

Example

Samples\Lib\AexProg.C

16.6. AerProgErrGetMessage

AERERR_CODE AerProgErrGetMessage (HAERCTRL *hAerCtrl*, WORD *wSubCode*,
WORD *wMsg*, LPTSTR *pszMsg*);

Declare Function AerProgErrGetMessage Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wSubCode* As Integer, ByVal *wMsg* As Integer, ByVal *pszMsg* As String) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wSubCode	Sub-Code 0 - 4 determining the type of message to return.
wMsg	Message number to retrieve.
pszMsg	Pointer to the message string.

This function retrieves a message text string stored on the axis processor. Several convenient "wrapper functions" are available that automatically use the appropriate *wSubCode* to retrieve the correct type of message.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50      ; 50 characters long
```

Message Type (axis parameter)	*wSubCode* value	Wrapper function Name
FAULT	0	*AerProgErrGetFaultMessage*
STATUS	1	*AerProgErrGetStatusMessage*
SERVOSTATUS	2	*AerProgErrGetServoMessage*
MOTIONSTATUS	3	*AerProgErrGetMotionMessage*
ALTSTATUS	4	*AerProgErrGetAltStatusMessage*

For these macro functions, simply omit the *wSubcode* argument. Please see the documentation for the wrapper functions listed above, for details on the messages returned.

See Also

AerProgErrGetFaultMessage
AerProgErrGetStatusMessage
AerProgErrGetServoMessage
AerProgErrGetMotionMessage
AerProgErrGetAltStatusMessage

Example

Samples\Lib\AexProg.C

16.7. AerProgErrGetMotionMessage

AERERR_CODE AerProgErrGetMotionMessage (HAERCTRL *hAerCtrl*, WORD *wMsg*, LPTSTR *pszMsg*);

Declare Function AerProgErrGetMotionMessage Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wMsg* As Integer, ByVal *pszMsg* As String) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wMsg	Message number to retrieve.
pszMsg	Pointer to the message string.

This function retrieves a motion status message as an ASCII text string that defines the 32 bits of the system MOTIONSTATUS axis parameter. The messages are stored within the memory of the axis processor card. The message number is in the range of 0 through 31 as represented by the motion status bits.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50      ; 50 characters long
```

See Also

AerProgErrGetFaultMessage
AerProgErrGetStatusMessage
AerProgErrGetServoMessage
AerProgErrGetMotionMessage
AerProgErrGetAltStatusMessage

Example

Samples\Lib\AexProg.C

16.8. AerProgErrGetServoMessage

C
VB

AERERR_CODE AerProgErrGetServoMessage (HAERCTRL *hAerCtrl*, WORD *wMsg*, LPTSTR *pszMsg*);

Declare Function AerProgErrGetServoMessage Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wMsg* As Integer, ByVal *pszMsg* As String) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wMsg	Message number to retrieve.
pszMsg	Pointer to the message string.

This function retrieves a servo status message as an ASCII text string that defines the 32 bits of the system SERVOSTATUS axis parameter. The messages are stored within the memory of the axis processor card. The message number is in the range of 0 through 31 as represented by the axis servo status parameter bits.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

See Also

AerProgErrGetFaultMessage
AerProgErrGetStatusMessage
AerProgErrGetServoMessage
AerProgErrGetMotionMessage
AerProgErrGetAltStatusMessage

Example

Samples\Lib\AexProg.C

16.9. AerProgErrGetStatusMessage

AERERR_CODE AerProgErrGetStatusMessage (HAERCTRL *hAerCtrl*, WORD *wMsg*, LPTSTR *pszMsg*);

Declare Function AerProgErrGetStatusMessage Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wMsg* As Integer, ByVal *pszMsg* As String) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wMsg	Message number to retrieve.
pszMsg	Pointer to the message string.

This function retrieves a STATUS axis parameter message as an ASCII text string that defines the 32 bits of the system status. The messages are stored within the memory of the axis processor card. The message number is in the range of 0 through 31 as represented by the axis status bits.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50      ; 50 characters long
```

See Also

AerProgErrGetFaultMessage
AerProgErrGetStatusMessage
AerProgErrGetServoMessage
AerProgErrGetMotionMessage
AerProgErrGetAltStatusMessage

Example

Samples\Lib\AexProg.C

16.10. AerProgErrSetUserFault

C
VB

AERERR_CODE AerProgErrSetUserFault (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

Declare Function AerProgErrSetUserFault Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long) As Long

Parameters

hAerCtrl Handle to the axis processor card.
iAxis The axis number to generate a user fault for (see constants below).

This function generates a user-programming fault for the specified *iAxis*.

C Language and LabView Constants

AXISINDEX_1
to
AXISINDEX_16

VB Constants

aerAxisIndex1
to
aerAxisIndex16

See Also

AerProgErrGetFault

Example

Samples\Lib\AexProg.C

16.11. AerProgErrWaitModeGet

AERERR_CODE AerProgErrWaitModeGet (HAERCTRL *hAerCtrl*, PBOOL *pbWait*);

C
VB

Declare Function AerProgErrWaitModeGet Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByRef *pbSet* AS Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
pbWait	Returns the state of the library error code return state.

This function returns the current wait mode. See *AerProgErrWaitModeSet* for more details.

See Also

AerProgErrWaitModeSet

Example

Samples\Lib\AexProg.C

16.12. AerProgErrWaitModeSet

AERERR_CODE AerProgErrWaitModeSet (HAERCTRL *hAerCtrl*, BOOL *bWait*);

Declare Function AerProgErrWaitModeSet Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *bSet* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
bWait	Set True to hold function return until function completion.

The wait mode should be set to 1 for maximum error checking, or to 0 for maximum library function execution speed. In the wait mode, every library function that communicates with the axis processor will wait until the axis processor has fully completed the function before that library function returns. If the axis processor finds an error while processing, the programming error code for that error returns in the library function call (all these errors are in the form AER_960PROG_xxxx).

In "non-wait" mode, the library function will not wait until the axis processor completes the function before returning (unless the library function is requesting data back from the axis processor, in which case it always waits). This mode allows the front-end application to continue processing while the axis processor completes the function. In non-wait mode the user must read the programming errors manually to check for an error.

Also, in the non-wait mode, the library will wait for and return an error in some cases. If the axis processor never acknowledges the command, the function will return an AERERR_DRV_xxxx error code.

If the library function is requesting data from the axis processor and the axis processor does not return the correct amount of data, then the library will return an AERERR_DRV_RECV_LENGTH error.

The default is with the wait mode on (=1). Users can examine the current wait mode by typing "INFO" at an AERDEBUG prompt.

See Also

AerProgErrWaitModeGet

Example

Samples\Lib\AexProg.C

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CHAPTER 17: PROGRAM FUNCTIONS

In This Section:

17.1. Introduction

These functions allow the user to obtain information about, and set associated parameters for a program residing on the axis processor card. Please see the *Win NT/95 U600 Series Users Guide, P/N EDU157*, under CNC Program Execution for descriptions of programs and program execution.

These functions do not allow the user to upload or download CNC programs to the controller. This functionality is packaged in the CNC compiler and is not available at the C library level.

These functions do not allow the user to execute, or manipulate the execution of, a CNC program. See the *AerTaskProgramXXXX* functions for these capabilities.

These functions are used by the CNC compiler and MMI and are not normally useful to the application programmer.

Many of these functions require a parameter of type AER_PROG_HANDLE. The programmer must define this structure before calling such functions. The main element of this structure is the program name, by which the axis processor identifies the program.

17.2. AerProgramFree

AERERR_CODE AerProgramFree (HAERCTRL *hAerCtrl*, PAER_PROG_HANDLE *pHandle*);

Declare Function AerProgramFree Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *pName* As String) As Long

Parameters

hAerCtrl	Handle to an Aerotech control.
pHandle	Pointer to a program handle (see AER_PROG_HANDLE structure) (C Language Only).
pName	A string variable passed ByVal, indicating the name of the CNC program (VB Only).

This function will free the memory on the axis processor card that is currently being used to store the program specified by the *pHandle* parameter. This will allow the memory to be reallocated for other uses. The programmer must provide a program name through the *pName*/*pHandle* parameter.

See Also

AerProgramAllocate
AerProgramGetHandle

17.3. AerProgramGetBreakPoint

AERERR_CODE AerProgramGetBreakPoint (HAERCTRL *hAerCtrl*, PAER_PROG_HANDLE *pHandle*, DWORD *dwLineUser*, PBOOL *pbOn*);

C

Declare Function AerProgramGetBreakPoint Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *pName* As String, ByVal *dwLineUser* As Long, ByRef *pbOn* As Long) As Long

VB

Parameters

hAerCtrl	Handle to an Aerotech control.
pHandle	String variable containing the program handle (see AER_PROG_HANDLE) (C Language Only).
pName	A string variable passed ByVal, indicating the name of the CNC program (VB Only).
dwLineUser	The line number to get the breakpoint status of.
pbOn	A pointer to receive the breakpoint status of the program line.

This function will return the state of the breakpoint status for the specified user line number in the specified program handle. The *pbOn* parameter will be set to AER_BP_ON (true) if a break point is set on the line or AER_BP_OFF (false) if no breakpoint is set on the line. The programmer must provide the program name through the *pHandle*/*pHandle* parameter.

C Language and LabView Constants

AER_BP_XXXX

VB Constants

aerBrkPntXXXX

See Also

AerProgramSetBreakPoint
AerProgramGetLine

17.4. AerProgramGetHandle

AERERR_CODE AerProgramGetHandle (HAERCTRL *hAerCtrl*, DWORD *dwNum*, PAER_PROG_HANDLE *pHandle*);

Declare Function AerProgramGetHandle Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *dwNum* As Long, ByVal *pName* As String) As Long

Parameters

hAerCtrl	Handle to an Aerotech control.
dwNum	Program index.
pHandle	String variable that will receive the program handle (see AER_PROG_HANDLE) (C Language Only).
pName	A string variable passed ByVal, indicating the name of the CNC program (VB Only).

This function will return the program handle from the program index specified by *dwNum*. The program indices are zero-based. Passing a dwNum program index greater than the number of programs present (-1) will return a null (empty) string, with the function error return code equal to zero.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

See Also

AerProgramGetNumber

17.5. AerProgramGetHeader

AERERR_CODE AerProgramGetHeader (HAERCTRL *hAerCtrl*,
PAER_PROG_HANDLE *pHandle*, PAER_PROG_HEADER *pHeader*)

Parameters

hAerCtrl	Handle to an Aerotech control.
pHandle	Address of the variable that will receive AER_PROG_HANDLE.
pHeader	Address of the variable that will receive AER_PROG_HEADER.

This function retrieves header information for the specified program handle.

See Also

AerProgramGetInfo

17.6. AerProgramGetInfo

AERERR_CODE AerProgramGetInfo (HAERCTRL *hAerCtrl*, PAER_PROG_HANDLE *pHandle*, PAER_PROG_INFO *pInfo*);

Parameters

hAerCtrl	Handle to an Aerotech control.
pHandle	Pointer to completed AER_PROG_HANDLE structure.
pInfo	Address of the variable that will receive AER_PROG_INFO.

This function returns information about a program residing on the axis processor card. The information returned in the *pInfo* structures includes data such as number of lines, number of labels, number of variables, and line (if any) currently being executed. The programmer must provide the program name through the *pHandle* parameter.

See Also

AerProgramAllocate
AerProgramGetHandle

17.7. AerProgramGetNumber

AERERR_CODE AerProgramGetNumber (HAERCTRL *hAerCtrl*,
PAER_PROG_HANDLE *pHandle*, PDWORD *pdw960ProgNum*);

Declare Function AerProgramGetNumber Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *pHandle* As String, ByRef *pdw960ProgNum* As Long) As Long

Parameters

hAerCtrl	Handle to an Aerotech control.
pHandle	Pointer to string containing a program handle string variable to receive the program handle (see AER_PROG_HANDLE).
pdw960ProgNum	Pointer to receive the program number on the axis processor card.

This function will return the program number for the specified program handle (AER_PROG_HANDLE). The programmer must provide the program name through the *pHandle* parameter. It will return an error if the passed handle does not specify an existing program on the axis processor.

See Also

AerProgramGetHandle

17.8. AerProgramSetBreakPoint

AERERR_CODE AerProgramSetBreakPoint (HAERCTRL *hAerCtrl*, PAER_PROG_HANDLE *pHandle*, DWORD *dwLineUser*, DWORD *dwOn_Off*);

Declare Function AerProgramSetBreakPoint Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *pName* As String, ByVal *dwLineUser* As Long, ByVal *dwOn_Off* As Long) As Long

Parameters

hAerCtrl	Handle to an Aerotech control.
pHandle	Pointer to completed AER_PROG_HANDLE structure (C Language).
PName	String containing program name (VB Only)
dwLineUser	Program user line index.
dwOn_Off	Break point on/off.

This function allows a breakpoint to be set at the specified user line number in the specified program handle. The *dwOn_Off* parameter may be set equal to AER_BP_ON, AER_BP_OFF, or AER_BP_TOGGLE. The toggle value changes the value from its current state; for example sets it to on if it is currently off. The programmer must provide the program name through the *pName*/*pHandle* parameter.

C Language and LabView Constants

AER_BP_XXXX

VB Constants

aerBrkPntXXXX

See Also

AerProgramGetLine
AerProgramSetBreakPoint

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CHAPTER 18: PSO (LASER) FUNCTIONS

In This Section:

18.1. Introduction

The AerPSO library functions allow Aerotech's Position Synchronized Output (PSO) or Laser Firing Card to be configured for tracking up to three axes of motion and generating an output signal to fire a laser. This signal may be in several forms. The PSO card will generate a firing pulse output with programmable frequency and duration as well as more sophisticated pulse duration control. In addition, an analog output (+/-10 volts) may be used to generate a voltage that is proportional to velocity, position, or varied as desired by the user.

The four basic steps (some optional) to using the PSO card are:

1.	Define firing pulse (or analog output)	Refer to *AerPSOSetPulse*
2.	Define firing distance	Refer to *AerPSOSetFiringDistance*
3.	Define axes to track	Refer to *AerPSOSetTracking*
	Begin motion	Refer to *AerMovexxxx*
4.	Disable firing	Refer to *AerPSOStopFiring*

18.2. AerPSOAllocateFiringTable

AERERR_CODE AerPSOAllocateFiringTable (HAERCTRL *hAerCtrl*, WORD *wPSOCard*, WORD *wType*, DWORD *dwNumPoints*);

Declare Function AerPSOAllocateFiringTable Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wPSOCard* As Integer, ByVal *wType* As Integer, ByVal *dwNumPoints* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wPSOCard	The number of the PSO Card to be addressed.
wType	Indicates Abs/Incr. table positions (see constants below).
dwNumPoints	Number of points in table (<= 400 decimal).

This function implements the CNC PSOD,6 command that allocates memory for a table of firing points and defines them as absolute or incremental distances. This is a precursor to writing the points to the table with the CNC PSOD,1,2 command (*AerPSOWriteMultFiringPoints*). The table may have a maximum of 400 points. Currently only one board is supported, *wPSOCard* == 0.

C Language and LabView Constants

PSO_TABLE_XXXX

VB Constants

aerPSOTableXXXX

See Also

AerPSOFirePulse
AerPSOSetDigitalOutput
AerPSOSetFiringDistance
AerPSOSetMultAnalogOutput
AerPSOSetPulse
AerPSOSetTracking
AerPSOStopFiring
AerPSOWriteMultFiringPoints

Example

Samples\Lib\AexPSO\AexPSO.C

18.3. AerPSOFirePulse

AERERR_CODE AerPSOFirePulse (HAERCTRL *hAerCtrl*, WORD *wPsoCard*,
DWORD *dwCount*);

Declare Function AerPSOFirePulse Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long,
ByVal *wPSOCard* As Integer, ByVal *dwCount* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wPSOCard	The number of the PSO Card to be addressed.
dwCount	The number of pulse train sequences to output. (0 = indefinitely).

This function implements the CNC PSOF,1 and PSOF,2 commands that activate the output firing pulse train defined by the CNC PSOP command (*AerPSOSetPulse*) for the specified *dwCount* times. If *dwCount* is zero the pulse train will repeat indefinitely. No position tracking occurs in this mode. Currently only one board is supported, *wPSOCard* == 0.

See Also

AerPSOAllocateFiringTable
AerPSOSetDigitalOutput
AerPSOSetFiringDistance
AerPSOSetMultAnalogOutput
AerPSOSetPulse
AerPSOSetTracking
AerPSOStopFiring
AerPSOWriteMultFiringPoints

Example

Samples\Lib\AexPSO\AexPSO.C

18.4. AerPSOSetDigitalOutput

C

AERERR_CODE AerPSOSetDigitalOutput (HAERCTRL *hAerCtrl*, WORD *wPsoCard*, DWORD *dwMask*, DWORD *dwData*);

VB

Declare Function AerPSOSetDigitalOutput Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wPSOCard* As Integer, ByVal *dwMask* As Integer, ByVal *dwData* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wPSOCard	The number of the PSO Card to be addressed.
dwMask	Bit mask of the bits to change the state of.
dwData	State of bits to write to PSO digital outputs.

This function will set the specified bits on the PSO card outputs by setting the bits set true (logic 1) in the *dwMask* to the value of the bit specified in the *dwData* word. Bits set to zero in the *dwMask* will not be changed. This implements the CNC PSOT,0 command.

See Also

AerPSOAllocateFiringTable
AerPSOFirePulse
AerPSOSetFiringDistance
AerPSOSetMultAnalogOutput
AerPSOSetPulse
AerPSOSetTracking
AerPSOStopFiring
AerPSOWriteMultFiringPoints

Example

Samples\Lib\AexPSO\AexPSO.C

18.5. AerPSOSetFiringDist

AERERR_CODE AerPSOSetFiringDist (HAERCTRL *hAerCtrl*, WORD *wPsoCard*,
DWORD *dwDist*);

Declare Function AerPSOSetFiringDist Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByVal *wPSOCard* As Integer, ByVal *dwDist* As Long) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
wPSOCard	The number of the PSO Card to be addressed.
dwDist	The incremental firing distance in machine steps.

This function implements the CNC PSOD,0 command that activate the output firing pulse every incremental *dwDist* machine steps. Currently only one board is supported, wPSOCard == 0. This command is used in conjunction with the CNC PSOF,3 (*AerPSOSetTracking*) command.

See Also

AerPSOAllocateFiringTable
AerPSOFirePulse
AerPSOSetDigitalOutput
AerPSOSetMultAnalogOutput
AerPSOSetPulse
AerPSOSetTracking
AerPSOStopFiring
AerPSOWriteMultFiringPoints

Example

Samples\Lib\AexPSO\AexPSO.C

18.6. AerPSOSetMultAnalogOutput

AERERR_CODE AerPSOSetMultAnalogOutput (HAERCTRL *hAerCtrl*, WORD *wPsoCard*, WORD *wType*, WORD *wMode*, WORD *wNumChans*, PAER_PSO_D2A *pD2A*);

Parameters

hAerCtrl	Handle to the axis processor card.
wPSOCard	The number of the PSO Card to be addressed.
wType	Always Zero (wType == 0).
wMode	Analog output mode.
wNumChans	Analog output channel specifier.
pD2A	Pointer to structure of type *AER_PSO_D2A*.

This function allows the 2 analog outputs on a PSO card (currently only one board is supported, *wPSOCard* == 0) to be set to a value or to begin tracking an axis, as defined by the CNC PSOT, 2, 4, or 6 commands. The DAC is specified by the *wNumChans* parameter (0-1). The *wType* parameter is always zero to specify a bipolar DAC.

The *wMode* parameter specifies the analog output mode (see the constants, shown below).

Setting the DAC to a fixed value (*wType* = 0) allows the DAC to be set to a fixed value between +/- 10 volts in .3 millivolt increments. *wType* 1 allows the specified DAC to proportionally track the axes velocity. A minimum DAC voltage may be specified as well as the DAC voltage at a specified target velocity. The velocity is specified in machine steps per millisecond. *wType* 2 allows the specified DAC to proportionally track the axes position as *wType* 1 tracks axes velocity, a DAC minimum voltage and DAC voltage at the specified target position. The *wNumChans* parameter specifies the analog output channel, 0 or 1. The pointer to the AER_PSO_DATA structure provides all other parameters for the function.

C Language and LabView Constants

PSO_MODE_XXXX

VB Constants

aerPSOModeXXXX

See Also

AerPSOAllocateFiringTable
AerPSOFirePulse
AerPSOSetDigitalOutput
AerPSOSetFiringDistance
AerPSOSetPulse
AerPSOSetTracking
AerPSOStopFiring
AerPSOWriteMultFiringPoints

Example

Samples\Lib\AexPSO\AexPSO.C

18.7. AerPSOSetPulse

AERERR_CODE AerPSOSetPulse (HAERCTRL *hAerCtrl*, WORD *wPsoCard*, WORD *wType*, PVOID *pvPulse*);

AERERR_CODE AerPSOSetPulseExWidth (HAERCTRL *hAerCtrl*, WORD *wPSOCard*, WORD *wType*, DWORD *dwWidth*);

AERERR_CODE AerPSOSetPulseExDefine (HAERCTRL *hAerCtrl*, WORD *wPSOCard*, DWORD *dwLead*, DWORD *dwWidth*, DWORD *dwTail*);

AERERR_CODE AerPSOSetPulseExRamp (HAERCTRL *hAerCtrl*, WORD *wPSOCard*, DWORD *dwLead*, DWORD *dwWidth*, DWORD *dwTail*, WORD *wRampTime*, WORD *wRampInterval*);

Parameters

hAerCtrl	Handle to the axis processor card.
wPSOCard	The number of the PSO Card to be addressed.
wType	Indicates type of data in *pvPulse* (see constants below).
pvPulse	Pointer to structure used to characterize the firing pulse (AER_PULSE_xxxx) (C Language Only).
dwLead	De-assertion time preceding ramp-up
dwWidth	Assertion time at ramp completion
dwTail	De-assertion time following ramp down
wRampTime	Pulse ramp increment
wRampInterval	Interval between ramp increments

This function allows the firing pulse of a PSO laser firing card (currently only one board is supported, *wPSOCard* == 0) to be configured the same as the CNC PSOP,0-2 and 4 commands.

The *wType* must be one of the PULSE_XXXX (C Language) or aerPulseWidthXXX (VB) constants

The *wType* 0 and 1 commands allow the pulse output to be defined in milliseconds and microseconds respectively. The *wType* 2 command allows the pulse lead, width, and trail to be specified in tenths of milliseconds. The *wType* 3 command is similar to the *wType* 2 with the addition of specifying the ramp up/down and pulse gap characteristics in tenths of milliseconds. The pulse width begins at the ramp up/down pulse width and increments this pulse width until it reaches the specified pulse width. Once it does, the pulse width begins decreasing at the rate it increased down to the starting pulse width. The pulse gaps may be a fixed width (gap >0) or may ramp up/down to match the size of the pulse width (gap = 0).

For the C language function, the pointer *pvPulse* structure is dependent upon the *wType* parameter. *wType* 0 and 1 use the structure type AER_PULSE_WIDTH, *wType* 2 uses the structure AER_PULSE_DEFINE, and *wType* 3 uses the structure AER_PULSE_DEFINE_RAMP to configure the laser firing pulse output.

C Language and LabView Constants

#define	PULSE_WIDTH_MSEC	0x00	// Define Pulse Width in mSec	PSOP,0
#define	PULSE_WIDTH_USEC	0x01	// Define Pulse Width in uSec	PSOP,4
#define	PULSE_DEFINE	0x02	// Define 3 Phase Pulse	PSOP,1
#define	PULSE_DEFINE_RAMP	0x03	// Define 3 Phase Pulse & Ramp	PSOP,2

VB Constants

aerPulseWidthXXXX

See Also

AerPSOAllocateFiringTable
AerPSOFirePulse
AerPSOSetDigitalOutput
AerPSOSetFiringDistance
AerPSOSetMultAnalogOutput
AerPSOSetTracking
AerPSOStopFiring
AerPSOWriteMultFiringPoints

Example

Samples\Lib\AexPSO\AexPSO.C

18.8. AerPSOSetTracking

AERERR_CODE AerPSOSetTracking (HAERCTRL *hAerCtrl*, WORD *wPsoCard*, AXISMASK *mChannel*);

Declare Function AerPSOSetTracking Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *wPSOCard* As Integer, ByVal *mChannel* As Long) As Long

Parameters

hAerCtrl Handle to the axis processor card.
wPSOCard The number of the PSO card to be addressed.
mChannel Channel bitmask to define the PSO channel numbers to track for firing.

This function implements the CNC PSOF,3 command that allows up to three axes to be defined for tracking. Currently only one board is supported, *wPSOCard* == 0. *mChannel* defines up to three channels to track with bit 0 representing the first channel.

See Also

AerPSOAllocateFiringTable
AerPSOFirePulse
AerPSOSetDigitalOutput
AerPSOSetFiringDistance
AerPSOSetMultAnalogOutput
AerPSOSetPulse
AerPSOStopFiring
AerPSOWriteMultFiringPoints

Example

Samples\Lib\AexPSO\AexPSO.C

18.9. AerPSOStopFiring

AERERR_CODE AerPSOStopFiring (HAERCTRL *hAerCtrl*, WORD *wPsoCard*);

Declare Function AerPSOStopFiring Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByVal *wPSOCard* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wPSOCard	The number of the PSO Card to be addressed.

This function disables firing and tracking for the selected PSO card similar to the CNC PSOF,0 command. Currently only one board is supported, *wPSOCard* == 0.

See Also

AerPSOAllocateFiringTable
AerPSOFirePulse
AerPSOSetDigitalOutput
AerPSOSetFiringDistance
AerPSOSetMultAnalogOutput
AerPSOSetPulse
AerPSOSetTracking
AerPSOWriteMultFiringPoints

Example

Samples\Lib\AexPSO\AexPSO.C

18.10. AerPSOWriteMultFiringPoints

AERERR_CODE AerPSOWriteMultFiringPoints (HAERCTRL *hAerCtrl*, WORD *wPsoCard*, DWORD *dwStart*, WORD *wNumPoints*, PDWORD *pdwPoints*);

Declare Function AerPSOWriteMultFiringPoints Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *wPSOCard* As Integer, ByVal *dwStart* As Long, ByVal *wNumPoints* As Integer, ByRef *pdwPoints* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
wPSOCard	The number of the PSO Card to be addressed.
dwStart	Starting point in table to write points to.
dwNumPoints	Number of points in table (<= 400 decimal).
pdwPoints	Pointer to values to write to the table.

This function implements the CNC PSOD,1,2 commands that allow a table of firing points to be created for tracking/firing based upon the axes absolute or incremental distances. The table must have memory allocated by the *AerPSOAllocateFiringTable* function (PSOD,6 command) and may have a maximum of 400 points. Currently only one board is supported, *wPSOCard* == 0.

See Also

AerPSOAllocateFiringTable
AerPSOFirePulse
AerPSOSetDigitalOutput
AerPSOSetFiringDistance
AerPSOSetMultAnalogOutput
AerPSOSetPulse
AerPSOSetTracking
AerPSOStopFiring

Example

Samples\Lib\AexPSO\AexPSO.C

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CHAPTER 19: REGISTRY FUNCTIONS

In This Section:

19.1. Introduction

The Windows registry is used by the UNIDEX 600 series controllers to store system information such as interrupt numbers and I/O address. The stored values may be slightly different depending on the operating system. The registry is automatically configured during setup of the U600 software. Aerotech also provides AerReg.exe to add or update current registry settings. The *AerReg* functions provide a way to set and query registry information about the controller.

Configuration allows for more than one device and one card to be setup in a system. The device is identified by its Device ID (AER_UNIDEX_xxxx constant) and a card number (AER_CARD_xxxx constant). The communications to a device is established based on this Device ID-Card combination (Refer to *AerSysOpen*). All information is stored in the registry based on this combination. This information is stored differently for Windows 95 and Windows NT. The registry should not be manipulated directly by the user either programmatically (Win32 registry functions) or through the use of Windows Regedit.exe/Regedt32.exe. The *AerReg* functions and utility have been provided so that a consistent interface is provided and compatibility is guaranteed. Use of Win32 registry functions may not be compatible from device to device, OS to OS, or version to version.

The following table provides a chart for the default values that are used by Aerotech Inc. to configure the various devices. If it is indicated that an item is “set by Aerotech,” then the indicated value is the value that must always be used. The value of the defaults as well as other valid settings can be found in the controller’s hardware manual.

Table 19-1. Device Default Values

	U600-Win95/NT	
	C Language	**VB**
ATWindow	AER_DRV600_DEFAULT_ATWIN	AerDrv600DefaultATWin
IOBase	AER_DRV600_DEFAULT_IO	AerDrv600DefaultIO
IRQ	AER_DRV600_DEFAULT_IRQ	AerDrv600DefaultIRQ
VMEAddress	NA	NA
DSC	AER_DRV600_DEFAULT_DSC	AerDrv600DefaultDSC
BootImage	PC960BT.IMG	
Image	PC960.IMG	
SymbolicName[1]	U600.VXD (Win95) U600 (WinNT)	

1. The SymbolicName is used to establish communications through the device driver. Under Windows 95, this is the name of the device driver (with path). Under Windows NT, this is the name exported by the device driver. This value is “U600” (or AER_DEFAULT_SYMBOLIC_NAME) for both the U600/U620 controllers.

19.2. AerRegGetDefDevice

AERERR_CODE AerRegGetDefDevice (PDWORD *pdwDeviceID*, PDWORD *pdwCard*);

Declare Function AerRegGetDefDevice Lib "AERSYS.DLL" (ByRef *pdwDeviceID* As Long, ByRef *pdwCard* As Long) As Long

Parameters

pdwDeviceID	Address of variable to hold Device identifier (see constants).
pdwCard	Address of variable to hold Card identifier (see constants).

This function queries the system registry and retrieves the default device and card identifiers. Refer to *Aerotech Registry* for further details on how the registry is setup and configured.

These values can then be passed to *AerSysOpen* or any other function that requires a device or card identifier.

C Language and LabView Constants

AER_DRV600_DEFAULT_XXXX
AER_UNIDEX_XXXX
AER_CARD_XXXX

VB Constants

aerDrv600DefaultXXXX
aerCardXXXX
aerDeviceIDXXXX

See Also

AerRegSetDefDevice

19.3. AerRegGetDefDeviceInfo

AERERR_CODE AerRegGetDefDeviceInfo (DWORD *dwDeviceID*,
PAER_REG_DEVICE_INFO *pInfo*);

Parameters

dwDeviceID	Device identifier. (AER_UNIDEX_XXXX constant).
pInfo	Pointer to the variable that will receive AER_REG_DEVICE_INFO.

This function returns the default information associated with a given device. This provides the user a way to fill in an AER_REG_DEVICE_INFO packet with default values.

See Also

AerRegGetDefDevice
AerRegGetDeviceInfo

19.4. AerRegGetDeviceInfo

AERERR_CODE AerRegGetDeviceInfo (DWORD *dwDeviceID*, DWORD *dwCard* PAER_REG_DEVICE_INFO *pInfo*);

AERERR_CODE AerRegGetDeviceInfoEx (DWORD *dwDeviceID*, DWORD *dwCard* LPTSTR *pszBootImage*, LPTSTR *pszImage*, LPTSTR *pszSymbolicName*, PDWORD *pdwATWindow*, PDWORD *pdwIOBase*, PDWORD *pdwIRQ*);

Declare Function AerRegGetDeviceInfoEx Lib “AERSYS.DLL” (ByVal *dwDeviceID* As Long, ByVal *dwCard* As Long, ByRef *psBootImage* As String, ByRef *psImage* As String, ByRef *psSymbolic* As String, ByRef *dwATWindow* As Long, ByRef *pdwIOBase* As Long, ByRef *pdwIRQ* As Long) As Long

Parameters

dwDeviceID	Device identifier (see constants).
dwCard	Card identifier. (see constants).
psBootImage	String returning the Boot Image filename (*.IMG).
psImage	String returning the Main Image filename (*.IMG).
psSymbolic	String returning the symbolic name in the registry.
pdwATWindow	Returns the PC-AT memory window address.
pdwIOBase	Returns the I/O base address of the UNIDEX 600.
pdwIRQ	Returns the IRQ number of the UNIDEX 600.
pInfo	Pointer to the variable that will receive AER_REG_DEVICE_INFO (see AER_REG_DEVICE_INFO in Appendix C: Structures).

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

This function queries the operating system registry based on the supplied device identifier and retrieves information about how the device is configured. Refer to *Aerotech Registry* for further details on how the registry is setup and configured.

This information is used to determine the location of the device driver and image files so that communication can be established. This information is primarily used by *AerSysOpen* and *AerSysDownLoad*.

The following "wrapper" functions are also available. They can be used to set a smaller subset of data.

// wrapper only gets base device information

// must call device specific function to get device specific info when using wrapper

AERERR_CODE AerRegGetU600DeviceInfoEx (DWORD *dwCard*, PDWORD *pdwDSC*);

Declare Function AerRegGetU600DeviceInfoEx Lib "AERSYS.DLL" (ByVal *dwCard* As Long, ByRef *pdwDSC* As Long) As Long

C Language and LabView Constants

AER_UNIDEX_XXXX
AER_CARD_XXXX

VB Constants

aerCardXXXX
aerDeviceIDXXXX

See Also

AerRegSetDeviceInfo

Example

Samples\Lib\VisualBasic\RunPgm.vbp

19.5. AerRegGetFileName

AERERR_CODE AerRegGetFileName (DWORD *dwDeviceID*, DWORD *dwCard*, DWORD *dwRegId*, LPTSTR *pszFile*);

Declare Function AerRegGetFileName Lib "AERSYS.DLL" (ByVal *dwDeviceID* As Long, ByVal *dwCard* As Long, ByVal *dwRegId* As Long, ByRef *pszFile* As String) As Long

Parameters

dwDeviceID	Device identifier (see constants below).
dwCard	Card identifier (see constants below).
dwRegId	File to get from registry (see constants below).
pszFile	Pointer to string to hold file name.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

This function gets the name of the desired file from the registry. The filenames are fully qualified file paths (i.e. c:\u600\ini\AxisParm.ini). The directory names are path names that can be used to determine where the software has been installed. The installation program for the U600 libraries and utilities initializes the registry with the install paths.

The UNIDEX 600 MMI and other utilities use this information to determine which files it needs to use for initializing the system and saving/restoring relative data.

C Language and LabView Constants

AER_UNIDEX_XXXX
AER_CARD_XXXX
AERREGID_XXXX

VB Constants

aerCardXXXX
aerDeviceIDXXXX
aerRegIDXXXX

See Also

AerRegSetFileName

Example

Samples\Lib\VisualBasic\RunPgm.vbp

19.6. AerRegQueryCardCount

AERERR_CODE AerRegQueryCardCount (DWORD *dwDeviceID*, PDWORD *pdwCount*);

Declare Function AerRegQueryCardCount Lib "AERSYS.DLL" (ByVal *dwDeviceID* As Long, ByRef *pdwCount* As Long) As Long

Parameters

dwDeviceID	Device identifier (see constants below).
pdwCount	Address of variable to hold number of possible card configurations.

This function queries the system registry and retrieves the number of cards that have been setup for a device. Refer to *Aerotech Registry* for further details on how the registry is setup and configured.

C Language and LabView Constants

AER_UNIDEX_XXXX

VB Constants

aerDeviceIDXXXX

See Also

AerRegQueryCardList

19.7. AerRegQueryCardList

AERERR_CODE AerRegQueryCardList (DWORD *dwDeviceID*, DWORD *dwCount*, PDWORD *pdwList*);

Declare Function AerRegQueryCardList Lib "AERSYS.DLL" (ByVal *dwDeviceID* As Long, ByVal *dwCount* As Long, ByRef *pdwList* As Long) As Long

Parameters

dwDeviceID	Device identifier (see constants below).
dwCount	Maximum number of values that *pdwList* can hold.
pdwList	Pointer to an array that can hold *dwCount* card numbers.

This function queries the system registry and retrieves the number of each card that has been setup for a device. Refer to *Aerotech Registry* for further details on how the registry is setup and configured.

It is possible to have a system configured for one or more cards. These cards do not have to be in any particular order. A system can be set up using a single U600 card and be identified as Card3. The values returned in *pdwList* can then be passed to *AerRegGetDeviceInfo* to determine how a particular card is configured.

C Language and LabView Constants

AER_UNIDEX_XXXX

VB Constants

aerDeviceIDXXXX

See Also

AerRegQueryCardCount
AerRegGetDeviceInfo

C
VB

19.8. AerRegSetDefDevice

AERERR_CODE AerRegSetDefDevice (DWORD *dwDeviceID*, DWORD *dwCard*);

Declare Function AerRegSetDefDevice Lib "AERSYS.DLL" (ByVal *dwDeviceID* As Long, ByVal *dwCard* As Long) As Long

Parameters

dwDeviceID	Device identifier to use as the default value (see constants below).
dwCard	Card identifier to use as the default value.

This function adds the default device and card information to the system registry. Refer to *Aerotech Registry* for further details on how the registry is setup and configured.

If the default entry does not exist, it is created. If the entry exists, the old information is overwritten.

C Language and LabView Constants

AER_UNIDEX_XXXX

VB Constants

aerDeviceIDXXXX

See Also

AerRegGetDefDevice

19.9. AerRegSetDeviceInfo

AERERR_CODE AerRegSetDeviceInfo (DWORD *dwCard*,
AER_REG_DEVICE_INFO *pInfo*);

AERERR_CODE AerRegSetDeviceInfoEx (DWORD *dwDeviceID*, DWORD *dwCard*,
LPTSTR *psBootImage*, LPTSTR *psImage*, LPTSTR *psSymbolic*,
DWORD *dwATWindow*, DWORD *dwIOBase*, DWORD *dwIRQ*);

Declare Function AerRegSetDeviceInfoEx Lib “AERSYS.DLL” (ByVal *dwDeviceID* As Long, ByVal *dwCard* As Long, ByVal *psBootImage* As String, ByVal *psImage* As String, ByVal *psSymbolic* As String, ByVal *dwATWindow* As Long, ByVal *dwIOBase* As Long, ByVal *dwIRQ* As Long) As Long

Parameters

dwDeviceID	Device identifier (see constants below).
dwCard	Card identifier. (see constants below).
psBootImage	String defining the Boot Image filename (*.IMG).
psImage	String defining the Main Image filename (*.IMG).
psSymbolic	The symbolic name in the registry.
dwATWindow	Defines the PC-AT memory window address.
dwIOBase	Defines the I/O base address of the UNIDEX 600.
dwIRQ	Defines the IRQ number of the UNIDEX 600.
pInfo	Pointer to a AER_REG_DEVICE_INFO structure that contains the device information (see AER_REG_DEVICE_INFO in Appendix C: Structures.

This function adds the device information to the operating system registry based on the card identifier and device identifier specified. Refer to *Aerotech Registry* for further details on how the registry is setup and configured.

If the entry for the device does not exist, it is created. If the entry exists, the previous information is overwritten.

The following wrapper functions are also available.

// wrapper only sets base device information

// must call device specific function to setup device specific info when using wrapper

AERERR_CODE AerRegSetU600DeviceInfoEx (DWORD *dwCard*, DWORD *dwDSC*);

Declare Function AerRegSetU600DeviceInfoEx Lib “AERSYS.DLL” (ByVal *dwCard* As Long, ByVal *dwDSC* As Long) As Long

C Language and LabView Constants

AER_UNIDEX_XXXX
AER_CARD_XXXX

VB Constants

aerCardXXXX
aerDeviceIDXXXX

See Also

AerRegGetDeviceInfo

19.10. AerRegSetFileName

AERERR_CODE AerRegSetFileName (DWORD *dwDeviceID*, DWORD *dwCard*, DWORD *dwRegId*, LPCTSTR *pszFile*);

Declare Function AerRegSetFileName Lib “AERSYS.DLL” (ByVal *dwDeviceID* As Long, ByVal *dwCard* As Long, ByVal *dwRegId* As Long, ByVal *pszFile* As String) As Long

Parameters

dwDeviceID	Device identifier (see constants below).
dwCard	Card identifier (see constants below).
dwRegId	File to get from registry (see constants below).
pszFile	Pointer to file name.

This function sets the name of the desired file from the registry. The filenames are fully qualified file paths (i.e., c:\u600\ini\AxisParm.ini). The directory names are path names that can be used to determine where the software has been installed. The installation program for the U600 libraries and utilities initializes the registry with the install paths.

The UNIDEX 600 MMI and other utilities use this information to determine which files it needs to use for initializing the system and saving/restoring relative data.

C Language and LabView Constants

AER_UNIDEX_XXXX
AER_CARD_XXXX
AERREGID_XXXX

VB Constants

aerCardXXXX
aerDeviceIDXXXX
aerRegIDXXXX

See Also

AerRegGetFileName

∇ ∇ ∇

CHAPTER 20: STRIP FUNCTIONS

In This Section:

20.1. Introduction

The *AerStrip* functions provide an interface for single or multiple axis data collection similar to the AerTune and AerPlot utilities. The user can collect data on position/velocity (actual, commanded, or error) plus acceleration or torque. Data is collected at user specified, evenly spaced intervals of time. The collection will not effect the speed of the operation of the servo-loop. It could however, effect the rate of operation of background tasks such as the CNC tasks. The strip chart functions can require significant amounts of axis processor memory depending on the number of samples and axes requested. The data is stored in the axis processor during the collection process and can later be uploaded to the host for display upon completion.

Data collection can be started immediately, or can be triggered to start at a given position or velocity. There several other miscellaneous trigger conditions that can be defined (see *AerStripSetTrigger* or *AerStripGlobalSetTrigger*).

There are two kinds of strip charting: "axis" and "global." These differ in three important ways. First, the trigger conditions are different between the two modes. Second, the axis strip charting is performed on a single axis basis, while the global charting can be done on multiple axes simultaneously. Finally, the regular strip charting collects only position, position command, accel, and torque data. The global strip charting, in addition, collects command and actual velocity, acceleration, and master position.

Global and axis strip charting can be performed independently because they use different parts of the axis processor memory for data storage. The *AerStripGlobalxxxx* functions perform global charting, while all other *AerStripxxxx* functions perform axis charting.

There are five steps to collecting data with the strip chart functions:

AerStripAllocate	; Allocate controller memory to hold data
AerStripSetTrigger	; Define trigger conditions, number of samples, etc.
While (*AerStripGetStatus* != STRIP_STATUS_DONE)	; Wait for completion
AerStripGetSample	; Read data from controller
	; Display samples
AerStripFree	; Free memory allocated on controller

20.2. AerStripAllocate

AERERR_CODE AerStripAllocate (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wSize*);

Declare Function AerStripAllocate Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *wSize* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
iAxis	Index of a physical axis (see constants below).
wSize	Number of samples to be allocated.

This function allocates memory on the controller for storing a strip chart. Each sample uses 14 bytes of memory. If the axis processor fails to allocate the space, a programming error occurs.

C Language and LabView Constants

AXISINDEX_XXXX

VB Constants

aerAxisIndex#

See Also

AerStripGlobalAllocate
AerStripFree

Example

Samples\Lib\AexStrip.C

20.3. AerStripFree

AERERR_CODE AerStripFree (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

Declare Function AerStripFree Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
iAxis	Index of a physical axis (see constants below).

This function frees the memory allocated by a previous *AerStripAllocate* command. This function does nothing if no strip is allocated. If triggering is currently active or armed, then collection is halted first.

C Language and LabView Constants

AXISINDEX_XXXX

VB Constants

aerAxisIndex#

See Also

AerStripAllocate

Example

Samples\Lib\AexStrip.C

20.4. AerStripGetIOPosLatchStatus

AERERR_CODE AerStripGetIOPosLatchStatus (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, PWORD *pwMode*, PWORD *pwType*, PWORD *pwBit*, PWORD *pwLevel*);

Declare Function AerStripGetIOPosLatchStatus Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByRef *pwMode* As Integer, ByRef *pwType* As Integer, ByRef *pwBit* As Integer, ByRef *pwLevel* As Integer) As Long

Parameters

hAerCtrl	Handle to the processor card.
iAxis	Index of a physical axis (see constants below).
pwMode	Pointer to receive Trigger mode (see constants below).
pwType	Pointer to receive Type of I/O to trigger on (see constants below).
pwBit	Pointer to receive Bit number (0 is the first bit) to trigger on.
pwLevel	Pointer to receive Level of input to trigger on (0 or 1).

This function gets the status of the high-speed position latch.

At the present time the returned value, *pwBit*, may not necessarily be equal to the *wBit* set in the *AerStripSetIOPosLatch* command.

C Language and LabView Constants

AXISINDEX_XXXX
STRIP_IOPOSLATCH_XXXX

VB Constants

aerAxisIndex#
aerStripIOPosLatchXXXX

See Also

AerStripSetIOPosLatch

20.5. AerStripGetSample

AERERR_CODE AerStripGetSample (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
WORD *wStart*, WORD *wCount*, PAER_STRIP_SAMPLE *pData*);

C

Parameters

hAerCtrl	Handle to the controller.
iAxis	Index of a physical axis (use the AXISINDEX_xxxx constants).
wStart	First point of samples to get (0 is first point).
wCount	Number of samples to get.
pData	Pointer to array of AER_STRIP_SAMPLE structures, to receive the data.

This function returns the collected data starting at the specified position in the strip chart. More than one sample may be read at a time. The values are put into the array pointed at by *pData*. It is the user's responsibility to insure that enough space is allocated in *pData* to hold all the points. Refer to Appendix C: Structures under AER_STRIP_SAMPLE.

See Also

AerStripAllocate

Example

Samples\Lib\AexStrip.C

20.6. AerStripGetStatus

AERERR_CODE AerStripGetStatus(HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*,
PWORD *pwStatus*, PWORD *pwAllocated*, PWORD *pwSize*,
PWORD *pwCollected*);

Declare Function AerStripGetStatus Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByVal *iAxis* As Long, ByRef *pwStatus* As Integer, ByRef *pwAllocated*
As Integer, ByRef *pwSize* As Integer, ByRef *pwCollected* As Integer)
As Long

Parameters

hAerCtrl	Handle to the controller.
iAxis	Index of physical axis (see constants below).
pwStatus	Pointer to receive the status (see constants below).
pwAllocated	Pointer to receive number of points allocated.
pwSize	Pointer to receive number of points collected last.
pwCollected	Pointer to receive number of points collected so far.

This function returns data concerning the current data collection. Status is a bit-wise word defining the current state of the data collection.

If the status returned is 0, then no data collection array has been allocated (see *AerStripAllocate*). Otherwise, the status will be a mask of STRIP_STATUS_xxxx constants. The *pwSize* parameter reflects how many points were specified to be collected by the last call to *AerStripSetTrigger*. The *pwCollected* parameter refers to how many points were collected. *pwCollected* is reset to zero when *AerStripSetTrigger* is called and will begin increasing to *pwSize* when data collection is triggered.

C Language and LabView Constants

AXISINDEX_XXXX
STRIP_STATUS_XXXX

VB Constants

aerAxisIndex#
aerStripStatusXXXX

See Also

AerStripSetTrigger
AerStripAllocate

Example

Samples\Lib\AexStrip.C

20.7. AerStripGlobalAllocate

AERERR_CODE AerStripGlobalAllocate (HAERCTRL *hAerCtrl*, AXISMASK *mAxis*, WORD *wSize*);

Declare Function AerStripGlobalAllocate Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *mAxis* As Double, ByVal *wSize* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
mAxis	A mask of axes.
wSize	Number of global samples to be allocated.

This function allocates memory on the controller for storing a global strip chart. Each global sample occupies (n*24 + 24) bytes of memory, where n is the number of axes from which data is being collected. *mAxis* is the mask of the axis that the user will be collecting data on. If the axis processor cannot allocate sufficient space, a programming error is generated.

C Language and LabView Constants

AXISMASK_#

VB Constants

aerAxisMask#

See Also

AerStripGlobalSetTrigger
AerStripGlobalGetSample
AerStripGlobalFree

Example

Samples\Lib\AexStrip.C

20.8. AerStripGlobalAllocateTrigger

AERERR_CODE AerStripGlobalAllocateTrigger (HAERCTRL *hAerCtrl*, WORD *wSize*);

Declare Function AerStripGlobalAllocateTrigger Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wSize* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
wSize	Number of trigger points to be allocated.

This function allocates memory on the controller for storing axis positions that will be used as a trigger to begin data collection. This command is only used for position based triggering modes. Each point occupies 8 bytes of storage. If the axis processor fails to allocate memory, a programming error is generated.

See Also

AerStripGlobalSetTrigger
AerStripGlobalGetSample

Example

Samples\Lib\AexStrip.C

20.9. AerStripGlobalFree

AERERR_CODE AerStripGlobalFree (HAERCTRL *hAerCtrl*);

Declare Function AerStripGlobalFree Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to the controller.

AerStripGlobalFree frees the memory allocated by a previous *AerStripGlobalAllocate* call. This function does nothing if no strip is allocated. If triggering is currently active or armed, then collection is halted first.

See Also

AerStripGlobalAllocate

Example

Samples\Lib\AexStrip.C

20.10. AerStripGlobalFreeTrigger

AERERR_CODE AerStripGlobalFreeTrigger (HAERCTRL *hAerCtrl*);

Declare Function AerStripGlobalFreeTrigger Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to the controller.

This function is used to free memory used by the trigger table.

See Also

AerStripGlobalAllocate

Example

Samples\Lib\AexStrip.C

20.11. AerStripGlobalGetImmediate

AERERR_CODE AerStripGlobalGetImmediate (HAERCTRL *hAerCtrl*, AXISMASK *mAxis*, PAER_GSTRIP_SAMPLE *pData*, DWORD *dwParm1*, PDWORD *pStatus1*, DWORD *dwParm2*, PDWORD *pStatus2*);

Parameters

hAerCtrl	Handle to the processor card.
mAxis	Axis mask (use the AXISMASK_# constants).
pData	Pointer to an AER_GSTRIP_SAMPLE structure to receive the data.
dwParm1	Axis Parameter number (use AXISPARM_xxxx constants).
pStatus1	Pointer to an array containing the value of *dwParm1* for all the desired axes specified by mAxis.
dwParm2	Axis Parameter number (use AXISPARM_xxxx constants).
pStatus2	Pointer to an array containing the value of *dwParm2* for all the desired axes specified by *mAxis*.

This function is similar in operation to *AerStripGlobalGetQueue* and *AerStripGlobalGetQueueRecent* except that it only returns the global strip data for the most recently completed sample. This function also returns the values of two axis parameters for all the selected axes.

See Also

AerStripGlobalGetQueue
AerStripGlobalGetQueueRecent

20.12. AerStripGlobalGetQueue

AERERR_CODE AerStripGlobalGetQueue (HAERCTRL *hAerCtrl*, AXISMASK *mAxis*, WORD *wReq*, PAER_GSTRIP_SAMPLE *pData*, PWORD *pwRec*);

Parameters

hAerCtrl	Handle to the controller.
mAxis	A mask of axes (use the AXISMASK_# constants).
wReq	Number of points requested (no more than 40).
pData	Pointer to an AER_GSTRIP_SAMPLE structure, to receive the data.
pwRec	Pointer to *WORD* to receive number of points actually delivered.

This function is the analog of *AerStripGlobalGetSample* when the data collection has been triggered in queue mode. It returns the *pwRec* number of points, oldest first, that are in the circular queue maintained in the strip chart.

> *pwRec* can be less than *wReq* when the number of points in the queue is less than the number of points requested.

> The mAxis mask passed here must be the same as the mask passed in the *AerStripGlobalAllocate* call.

> The user cannot use this function when the trigger mode was non-queue. For this case, see *AerStripGlobalGetSample*.

See Also

AerStripGlobalGetSample
AerStripGlobalSetTrigger

Example

Samples\Lib\AexStrip.C

20.13. AerStripGlobalGetQueueDecimate

AERERR_CODE AerStripGlobalGetQueueDecimate (HAERCTRL *hAerCtrl*, AXISMASK *mAxis*, WORD *wUserNumReq*, PAER_GSTRIP_SAMPLE *pData*, PWORD *pwNumRec*, WORD *wStep*, WORD *wType*);

Parameters

hAerCtrl	Handle to the processor card.
mAxis	Axis mask (use the AXISMASK_# constants).
wUserNumReq	Number of points requested (always a positive number).
pData	Pointer to an AER_GSTRIP_SAMPLE structure to receive the data.
pwNumRec	Pointer to *WORD* to receive the number of points actually delivered.
wStep	Step size to step through the sampled data (get every nth point).
wType	Get the oldest or most recent data (use the STRIPGLOBAL_xxxx constants). STRIPGLOBAL_GET_OLDEST STRIPGLOBAL_GET_RECENT

This function is similar in operation to *AerStripGlobalGetQueue* and *AerStripGlobalGetQueueRecent*. However, it returns every (*wStep*)th point. This function can either get the *wUserNumReq* points from the oldest data or the most recent data from the queue.

Operation of this function can produce unexpected results if (*wUserNumReq* * *wStep*) ≥ total number of points in the queue. In addition, when this function is evoked in the “RECENT” mode, this function does not affect the pointers in the queue. Therefore, two consecutive function calls may output overlapping data.

20.14. AerStripGlobalGetQueueRecent

AERERR_CODE AerStripGlobalGetQueueRecent (HAERCTRL *hAerCtrl*, AXISMASK *mAxis*, WORD *wUserNumReq*, PAER_GSTRIP_SAMPLE *pData*, PWORD *pwNumRec*);

Parameters

hAerCtrl	Handle to the processor card.
mAxis	Axis mask (use the AXISMASK_# constants)..
wUserNumReq	Number of points requested (always a positive number).
pData	Pointer to an AER_GSTRIP_SAMPLE structure to receive the data.
pwNumRec	Pointer to *WORD* to receive the number of points actually delivered.

This function is similar in operation to *AerStripGlobalGetQueue*. It returns the *pwNumRec* number of points starting from *pwNumRec* points before the most recent sample, up to the most recent sample from the data stored in the circular queue.

This function does not affect the pointers in the queue. Therefore, two consecutive function calls may output overlapping data.

See Also

AerStripGlobalGetQueue

20.15. AerStripGlobalGetSample

AERERR_CODE AerStripGlobalGetSample (HAERCTRL *hAerCtrl*, WORD *wFirst*, WORD *wCount*, AXISMASK *mAxis*, PAER_GSTRIP_SAMPLE *pData*);

Parameters

hAerCtrl	Handle to the controller.
wStart	First point of samples to collect (0 is first point).
wCount	Number of samples to get.
mAxis	A mask of axes (use the AXISMASK_# constants).
pData	Pointer to array of AER_STRIP_SAMPLE structures, to receive the data.

This function returns the values collected, starting at the specified position in the strip chart. More than one sample may be read at a time and the values are put into the structure pointed to by *pData*. This structure, AER_GSTRIP_SAMPLE, consists of pointers to other structures, one to receive the global data and the other is an array of pointers, each pointing to the data for one axis. Refer to Appendix C: Structures, under AER_GSTRIP_SYSTEM_DATA and AER_GSTRIP_AXIS_DATA for a complete description of the system and axis data collected. It is the user's responsibility to insure that enough memory is allocated in the structures pointed to by *pData*.

If the user passes a zero mAxis mask, no axis data will be retrieved. Otherwise, it represents a mask of the axes to collect data on.

The user cannot use this function to retrieve points when the trigger was queue mode or *QUEUE_HOLD* mode. Use *AerStripGlobalGetQueue* to get points that have been triggered in queue mode.

See Also

AerStripGlobalSetSample
AerStripGlobalGetQueue

Example

Samples\Lib\AexStrip.C

20.16. AerStripGlobalGetStatus

AERERR_CODE AerStripGlobalGetStatus (HAERCTRL *hAerCtrl*, PWORD *pwStatus*, PWORD *pwAllocated*, PWORD *pwSize*, WORD *pwCollected*, PAXISMASK *pmAxis*);

Declare Function AerStripGlobalGetStatus Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByRef *pwStatus* As Integer, ByRef *pwAllocated* As Integer, ByRef *pwSize* As Integer, ByRef *pwCollected* As Integer, ByRef *pmAxis* As Double) As Long

Parameters

hAerCtrl	Handle to the controller.
pwStatus	Pointer to receive the status of the global strip chart (see constants below).
pwAllocated	Pointer to word to receive the number of points allocated.
pwSize	Pointer to receive the number of samples to capture.
pwCollected	Pointer to receive the number of samples currently stored.
pmAxis	Pointer to receive the mask of the axes whose data is/will be captured (see constants below).

The *AerStripGlobalGetStatus* function obtains global strip chart status information. If the status returned is zero, then no storage has been allocated yet (see *AerGlobalAllocateStrip*). Otherwise, the status is a mask of the constants (below).

The *pwAllocated* parameter returns the current number of points allocated. *pwSize* indicates the number of data points to be collected. *pwCollected* returns the number of points collected at this time and *pmAxis* indicates which axes are being sampled.

C Language and LabView Constants

AXISMASK_#
STRIPGLOBAL_STATUS_XXXX

VB Constants

aerAxisMask#
aerGStripStatusXXXX

See Also

AerStripGlobalSetTrigger
AerStripGlobalGetSample
AerGlobalAllocateStrip

Example

Samples\Lib\AexStrip.C

20.17. AerStripGlobalGetTriggerPoint

AERERR_CODE AerStripGlobalGetTriggerPoint (HAERCTRL *hAerCtrl*, WORD *wPoint*, PLONG *plData*, PWORD *pwStatus*);

Declare Function AerStripGlobalGetTriggerPoint Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wPoint* As Integer, ByRef *plData* As Long, ByRef *pwStatus* As Integer) As Long

Parameters

hAerCtrl	Handle to the controller.
wPoint	An entry number in trigger list (0 is first entry).
plData	Pointer to long word to receive axis trigger position.
pwStatus	Pointer to receive the status of global trigger points.

This function obtains a trigger point that was previously set by an *AerStripGlobalSetTrigger* function call. The status returned is not the strip status, but the status of the trigger point. Currently, this status is not used and is always 1.

See Also

AerStripGlobalSetTrigger
AerStripGlobalAllocateTrigger

Example

Samples\Lib\AexStrip.C

C
VB

20.18. AerStripGlobalGetTriggerStatus

AERERR_CODE AerStripGlobalGetTriggerStatus (HAERCTRL *hAerCtrl*, PWORD *pwStatus*, PWORD *pwSize*);

Declare Function AerStripGlobalGetTriggerStatus Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByRef *pwStatus* As Integer, ByRef *pwSize* As Integer) As Long

Parameters

hAerCtrl Handle to the controller.
pwStatus Pointer to receive the status of global trigger points (see constants below).
pwSize Pointer to receive the number of samples to capture.

This function obtains status information on the current global strip chart. The *wStatus* parameter returns the strip status (the same status value as returned by *AerStripGlobalGetStatus*). *wSize* returns the number of trigger points allocated.

C Language and LabView Constants

STRIPGLOBAL_STATUS_XXXX

VB Constants

aerGStripStatusXXXX

See Also

AerStripGlobalGetTriggerPoint
AerStripGlobalGetStatus

Example

Samples\Lib\AexStrip.C

20.19. AerStripGlobalHalt

AERERR_CODE AerStripGlobalHalt (HAERCTRL *hAerCtrl*);

Declare Function AerStripGlobalHalt Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to the controller.

Terminates global data capture. The user cannot restart data collection after halting it. To restart collection the user must reissue an *AerStripGlobalSetTrigger*.

See Also

AerStripGlobalRelease

Example

Samples\Lib\AexStrip.C

20.20. AerStripGlobalHold

AERERR_CODE AerStripGlobalHold (HAERCTRL *hAerCtrl*);

Declare Function AerStripGlobalHold Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to the controller.

This function is used to suspend data capture mode until a subsequent *AerStripGlobalRelease* is called.

See Also

AerStripGlobalRelease

Example

Samples\Lib\AexStrip.C

20.21. AerStripGlobalRelease

AERERR_CODE AerStripGlobalRelease (HAERCTRL *hAerCtrl*);

Declare Function AerStripGlobalRelease Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to the controller.

This function is used to resume the data capture mode previously suspended using *AerStripGlobalHold*.

See Also

AerStripGlobalHold

Example

Samples\Lib\AexStrip.C

20.22. AerStripGlobalSetTrigger

AERERR_CODE AerStripGlobalSetTrigger (HAERCTRL *hAerCtrl*, WORD *wMode*, WORD *wTime*, WORD *wSize*, LONG *lParm1*, LONG *lParm2*);

Declare Function AerStripGlobalSetTrigger Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *wMode* As Integer, ByVal *wTime* As Integer ByVal *wSize* As Integer, ByVal *lParm1* As Long, ByVal *lParm2* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
wMode	Trigger mode (use constants, see below).
wTime	Time between samples (units are in milliseconds).
wSize	Number of samples to collect (this trigger).
lParm1	Additional trigger data (see below).
lParm2	Additional trigger data (see below).

This function "arms," or sets the strip chart operation to begin when the given condition is set. The mode determines the condition. Possible mode values are listed below.

In STRIPGLOBAL_MODE_TIME (C Language) / aerGStripModeTime (VB) mode, data collection starts immediately.

In STRIPGLOBAL_MODE_POSITION (C) / aerGStripModePosition (VB) mode, the sampling is not performed at regular time intervals, rather, a sample is collected every time the position of a given axis crosses over a given trigger value. The user must form a list of monotonically increasing trigger values prior to initiating this mode (refer to *AerStripGlobalSetTriggerPoint*). The sample is triggered when the position crosses into the area covered by the trigger list. Every time the position crosses over a value in the trigger list, regardless of the direction of movement, a data point is collected. Here *lParm1* is an axis mask that must have only one axis represented in it, representing the axis whose position should be watched. For STRIPGLOBAL_MODE_POSITION (C) / aerGStripModePosition (VB) mode, a trigger table must have been previously allocated via an *AerStripGlobalAllocateTrigger* call.

Mode STRIPGLOBAL_MODE_QUEUE (C) / aerGStripModeQueue (VB) is used for continuous data collection. The axis processor will continue collecting data until an *AerStripGlobalHold* is performed. The axis processor will treat the allocated table space as a circular queue. When it fills the strip memory, it resets to the first point and continues collecting. With queue mode, when the user gets "n" samples, the user gets the last "n" samples.

Mode STRIPGLOBAL_MODE_QUEUE_HOLD (C) / aerGStripModeQueueHold (VB) is the same as STRIPGLOBAL_MODE_QUEUE (C) / aerGStripModeQueue (VB) mode, but it starts "held," meaning data collection will only start when an explicit *AerStripGlobalRelease* is performed.

Mode STRIPGLOBAL_MODE_IO (C) / aerGStripModeIO (VB) is the same as mode STRIPGLOBAL_MODE_TIME (C) / aerGStripModeTime (VB), except that collection is started only when a particular binary input is set. Pass the virtual I/O bit number in *lParm1*.

This function does nothing if the strip chart is already triggered or armed.

C Language and LabView Constants

STRIPGLOBAL_MODE_XXXX
AXISMASK_#

VB Constants

aerGStripModeXXXX
aerAxisMask#

See Also

AerStripGlobalGetTrigger

Example

Samples\Lib\AexStrip.C

20.23. AerStripGlobalSetTriggerPoint

AERERR_CODE AerStripGlobalSetTriggerPoint (HAERCTRL *hAerCtrl*, WORD *wPoint*, LONG *lData*);

Declare Function AerStripGlobalSetTriggerPoint Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *wPoint* As Integer, ByVal *lData* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
wPoint	An entry number to table.
lData	Axis trigger position.

This function is used to enter position data in the trigger table allocated by *AerStripGlobalAllocateTrigger*. The *wPoint* parameter specifies the entry number in the table. The *lData* parameter specifies the axis trigger position. This function is only used if the trigger mode (see *AerStripGlobalSetTrigger*) is STRIPGLOBAL_MODE_POSITION (C) / aerGStripModePos (VB).

See Also

AerStripGlobalAllocateTrigger
AerStripGlobalSetTrigger

Example

Samples\Lib\AexStrip.C

20.24. AerStripHalt

AERERR_CODE AerStripHalt (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

Declare Function AerStripHalt Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long) As Long

Parameters

hAerCtrl Handle to the controller.
iAxis Index of a physical axis (see constants below).

This function is used to terminate data capture. After halting, the status indicates that the "done" state (constants shown below) *AerStripSetTrigger* can be used to restart data capture.

C Language and LabView Constants

STRIP_STATUS_DONE
AXISINDEX_XXXX

VB Constants

aerStripDone
aerAxisIndex#

See Also

AerStripSetTrigger
AerStripGetSample
AerStripGetStatus

Example

Samples\Lib\AexStrip.C

20.25. AerStripSetIOPosLatch

AERERR_CODE AerStripSetIOPosLatch (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wMode*, WORD *wType*, WORD *wBit*, WORD *wLevel*);

Declare Function AerStripSetIOPosLatch Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *wMode* As Integer, ByVal *wType* As Integer, ByVal *wBit* As Integer, ByVal *wLevel* As Integer) As Long

Parameters

hAerCtrl	Handle to the processor card.
iAxis	Index of a physical axis (see constants below).
wMode	Trigger mode (see constants below).
wType	Type of I/O to trigger on (see constants below).
wBit	Bit number (0 is the first bit) to trigger on (see constants below).
wLevel	Level of input to trigger on (0 or 1).

This function arms the position latch. The latch is triggered from the status of either the axis I/O inputs (CW limit, CCW limit, Home, etc.) or one of the Virtual I/O digital inputs (Binary Input [BI], 0 through 511). When the trigger condition is met, this function will latch the current position of the axis into the *HOMESWITCHPOS* axis parameter. The latch may be set up in two configurations: one shot mode or continuous mode. In one shot mode, once the latch is triggered the mode is then set to *STRIP_IOPOSLATCH_DISABLE* to disable further triggers. In continuous mode, the function will continue placing the current position into the *HOMESWITCHPOS* axis parameter as long as the trigger condition is met.

C Language and LabView Constants

AXISINDEX_XXXX
See Also Table 20-1

VB Constants

aerAxisIndex#
See Also Table 20-1

Table 20-1. STRIP_IOPOSLATCHXXXX (aerStripIOPosLatchXXXX) Constants

The trigger mode (*wMode*) allows the following options:		
C Language	**Description**	**VB**
STRIP_IOPOSLATCH_DISABLE	I/O position latch disable	aerStripIOPosLatchDisable
STRIP_IOPOSLATCH_ONESHOT	One shot operation	aerStripIOPosLatchOneshot
STRIP_IOPOSLATCH_CONTINUOUS	Continuous trigger	aerStripIOPosLatchContinuous
The type of I/O to trigger (*wType*) has the following choices:		
C Language	**Description**	**VB**
STRIP_IOPOSLATCH_AXISIO	Use axis I/O	aerStripIOPosLatchAxisIO
STRIP_IOPOSLATCH_VIRTUALIO	Use virtual I/O bit	aerStripIOPosLatchVirtualIO
For axis I/O bit number, the following constants for (*wBit*) may be used:		
C Language	**Description**	**VB**
STRIP_IOPOSLATCH_BITCCW	Use CCW input	aerStripIOPosLatchBitCCW
STRIP_IOPOSLATCH_BITCW	Use CW input	aerStripIOPosLatchBitCW
STRIP_IOPOSLATCH_BITHOME	Use home input	aerStripIOPosLatchBitHome
STRIP_IOPOSLATCH_BITENCFLT	Use encoder fault input	aerStripIOPosLatchBitEncFLT
STRIP_IOPOSLATCH_BITFLT	Use drive fault input	aerStripIOPosLatchBitFLT
STRIP_IOPOSLATCH_BITHALLA	Use Hall A input	aerStripIOPosLatchBitHallA
STRIP_IOPOSLATCH_BITHALLB	Use Hall B input	aerStripIOPosLatchBitHallB
STRIP_IOPOSLATCH_BITHALLC	Use Hall C input	aerStripIOPosLatchBitHallC
For Virtual I/O just enter the number of the Virtual I/O input for *wBit* (0 through 511)		

20.26. AerStripSetTrigger

AERERR_CODE AerStripSetTrigger (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wMode*, WORD *wTime*, WORD *wSize*, LONG *lParm1*, LONG *lParm2*);

Declare Function AerStripSetTrigger Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *wMode* As Integer, ByVal *wTime* As Integer, ByVal *wSize* As Integer, ByVal *lParm1* As Long, ByVal *lParm2* As Long) As Long

Parameters

hAerCtrl	Handle to the controller.
iAxis	Index of a physical axis (see constants below).
wMode	Trigger mode (see constants below).
wTime	Time between samples (units are in milliseconds).
wSize	Number of samples to collect (this trigger).
lParm1	Additional trigger data (used in STRIP_TRIGGER_MASTER_POS mode and STRIP_TRIGGER_TORQUE mode only).
lParm2	Additional trigger data (used in STRIP_TRIGGER_MASTER_POS mode).

This function "arms," or sets the strip chart operation to begin when the given condition is set. The mode determines the condition. Valid modes are listed below.

In STRIP_TRIGGER_IMMEDIATE mode, a data collection starts immediately.

If in STRIP_TRIGGER_MASTER_POS mode and *lParm2* is zero, then the collection will start when the master position of iAxis is below the position specified in *lParm1*. If in STRIP_TRIGGER_MASTER_POS mode and *lParm2* is not zero, collection will start when the master position of iAxis exceeds the value in *lParm1*.

In STRIP_TRIGGER_POINT0 mode, the triggering is synchronized with cam table or profile points. The collection is triggered when the cam or profile table pointer moves off of the first point.

STRIP_TRIGGER_TORQUE mode will start collection when the torque exceeds the given value (in *lParm1*). Note that *lParm1* is interpreted as a signed value. Torque units are defined by the IMAX axis parameter.

STRIP_TRIGGER_EXTERNAL mode is for triggering from within the application program (see *AerStripTrigger*).

This function does nothing if the strip chart is already triggered or armed.

C Language and LabView Constants	**VB Constants**
AXISINDEX_XXXX	*aerAxisIndex#*
STRIP_TRIGGER_XXXX	*aerStripTriggerXXXX*

See Also

AerStripAllocate
AerStripGetSample

Example

Samples\Lib\AexStrip.C

20.27. AerStripTrigger

AERERR_CODE AerStripTrigger (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

Declare Function AerStripTrigger Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByVal *iAxis* As Long) As Long

Parameters

hAerCtrl Handle to the controller.
iAxis Index of a physical axis (see constants below).

This function begins the data collection process when the trigger mode is set for STRIP_TRIGGER_EXTERNAL (external trigger).

C Language and LabView Constants

AXISINDEX_XXXX

VB Constants

aerAxisIndex#

See Also

AerStripSetTrigger

Example

Samples\Lib\AexStrip.C

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CHAPTER 21: SYSTEM FUNCTIONS

In This Section:

21.1. Introduction

The Aerotech System functions are for the initialization, configuration and control of UNIDEX 600 Series controllers. Various functions exist to open paths of communication to each card in a system as well as reset the card and download firmware.

There are two steps to initializing the axis processor card for a single-threaded application (see *AerSysxxxxEx* functions in this chapter for multi-threaded applications).

AerSysOpen	;Open communications to the device driver
AerSysInitSystem	;Download firmware, parameter files, and configure axes
:	;Execute motion
:	
AerSysClose	;Close communications

21.2. AerSysClose

AERERR_CODE AerSysClose (HAERCTRL *hAerCtrl*);

Declare Function AerSysClose Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to the axis processor card.

This function closes communications to the hardware specified by the Aerotech handle. If the reference count of the handle is 0 (refer to *AerSysOpenEx*), the Aerotech handle (*hAerCtrl*) is no longer valid. If the handle is referenced, the reference count will decrease by 1 and an error code is returned notifying the user that the *hAerCtrl* is still open (and valid), indicating that it is in use by another thread.

See Also

AerSysOpen
AerSysOpenEx
AerSysCloseAll

Example

Samples\Lib\AexSys.C
Samples\Lib\VisualBasic\RunPgm.vbp

21.3. AerSysCloseAll

AERERR_CODE AerSysCloseAll (HAERCTRL *hAerCtrl*);

Declare Function AerSysCloseAll Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to the axis processor card.

AerSysCloseAll closes all communications to a device regardless of the current reference count. The Aerotech handle is invalid after a call to this function.

> Use extreme caution if calling this function and using the handle elsewhere in a program that is relying on the reference counting (such as in multi-thread applications).

IMPORTANT

See Also

AerSysOpen
AerSysOpenEx
AerSysCloseAll

Example

Samples\Lib\AexSys.C

21.4. AerSysDownLoad

AERERR_CODE AerSysDownLoad (HAERCTRL *hAerCtrl*);

Declare Function AerSysDownLoad Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to the controller.

The AerSysInitSystem function should be used instead of this function because it will download all parameter files and configure the axes.

AerSysDownLoad downloads the firmware (image) to the controller. The names of the files to download are retrieved from the system registry. Refer to the *AerReg* functions for further details on how the registry is setup and configured.

This function will return an error code if the firmware is already executing on the axis processor. If the image file is to be downloaded, regardless of the current status, then *AerSysReset* should be called prior to *AerSysDownLoad*.

If the system is configured for a PSO card, then the PSO firmware is automatically downloaded in this call.

See Also

AerSysReset
AerSysInitSystem

Example

Samples\Lib\AexSys.C

21.5. AerSysFaultAck

AERERR_CODE AerSysFaultAck (HAERCTRL *hAerCtrl*, AXISMASK *mAxis*,
TASKMASK *mTask*);

Declare Function AerSysFaultAck Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long,
ByVal *mAxis* As Long, ByVal *mTask* As Long) As Long

C
VB

Parameters

hAerCtrl	Handle to the axis processor card.
mAxis	Mask of axes to acknowledge faults (see constants).
mTask	Mask of tasks to acknowledge faults (see constants).

The *AerSysFaultAck* function attempts to clear the faults for the specified axes and tasks. The function sets the *FAULT* axis parameter to –1 for each specified axis and sets the TaskFault and TaskWarning task parameters to 0 for each specified task. Axis faults, such as feedback and drive faults, cannot be cleared by this function. See the FAULT axis parameter in the U600MMI.hlp file for more information.

C Language and LabView Constants

TASKMASK_#
AXISMASK_#

VB Constants

aerTaskMask#
aerAxisMask#

21.6. AerSysGetDeviceID

AERERR_CODE AER_DLLENTRY AerSysGetDeviceID (HAERCTRL *hAerCtrl*,
PDWORD *pdwDeviceID*, PDWORD *pdwCard*);

Declare Function AerSysGetDeviceID Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByRef *pdwDeviceID* As Long, ByRef *pdwCard* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
pdwDeviceID	Pointer returning the device identification (see constants below).
pdwCard	Pointer returning the card number (see constants below).

This function will return the device identification from the operating system registry.

C Language and LabView Constants

AER_UNIDEX_XXXX
AER_CARD_XXXX

VB Constants

aerDeviceIDXXXX
aerCardXXXX

See Also

AerSysReset

Example

Samples\Lib\AexSys.C

21.7. AerSysInitSystem

AERERR_CODE AerSysInitSystem (HAERCTRL *hAerCtrl*, BOOL *bReset*, AXISMASK *mAxis*, TASKMASK *mTask*);

Declare Function AerSysInitSystem Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *bReset* As Long, ByVal *mAxis* As Long, ByVal *mTask* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
bReset	Should the U600 be reset and firmware automatically downloaded?
mAxis	Mask of axes to download axis and machine parameters (see constants).
mTask	Mask of tasks to download task parameters (see constants).

This function initializes the U600 card with the firmware and all parameter files. It reads the INI\U600.INI file to determine the names of the files to use. The sequence of initializing the system is as follows:

```
If bReset Then
// reset the card if requested
AerSysReset
End If

// Download the firmware
AerSysDownLoad

// Download the axis parameter file
AerParmAxisDownLoadFile

// Download the machine parameter file
AerParmMachineDownLoadFile

// Download the axis configuration file
AerConfigDownLoadFile

// Download the task parameter file
AerParmTaskDownLoadFile

// Download the global parameter file
AerParmGlobalDownLoadFile

// Download 2D calibration table (if present)
AerAxisCal2DfileDownload

// Acknowledge any faults
AerSysFaultAck
```

C Language and LabView Constants	**VB Constants**
TASKMASK_#	*aerTaskMask#*
AXISMASK_#	*aerAxisMask#*

Example

Samples\Lib\VisualBasic\RunPgm.vbp

21.8. AerSysOpen

C
VB

AERERR_CODE AerSysOpen (DWORD *dwDeviceID*, DWORD *dwCard*,
PHAERCTRL *phAerCtrl*);

Declare Function AerSysOpen Lib "AERSYS.DLL" (ByVal *dwDeviceID* As Long,
ByVal *dwCard* As Long, ByRef *phAerCtrl* As Long) As Long

Parameters

dwDeviceID	Device identifier (see constants).
dwCard	Card identifier (see constants).
phAerCtrl	Points to a memory location to hold a *HAERCTRL*.

This function establishes communications to the specified device by creating an Aerotech Handle (*HAERCTRL*). The Device ID and Card is searched for in the system registry to find the appropriate values to determine how to configure the hardware. Refer to *Aerotech Registry* for further details on how the registry is setup and configured.

All calls to *AerSysOpen* should be matched by a call to *AerSysClose*.

The *HAERCTRL* is a handle that contains information that is necessary to communicate with the device. It is an internally maintained structure and is passed to any function that requires communication to the hardware. This handle should not be directly manipulated.

C Language and LabView Constants

AER_UNIDEX_XXXX
AER_CARD_XXXX

VB Constants

aerDeviceIDXXXX
aerCardXXXX

See Also

AerSysOpenEx
AerSysClose

Example

Samples\Lib\AexSys.C
Samples\Lib\VisualBasic\RunPgm.vbp

21.9. AerSysOpenEx

AERERR_CODE AerSysOpenEx (HAERCTRL *hAerCtrl*);

Declare Function AerSysOpenEx Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to the axis processor card.

AerSysOpenEx increments a reference count for the *hAerCtrl*. The *hAerCtrl* will not actually be destroyed by a call to *AerSysClose* unless its reference count is 0. In multi-threaded applications where each thread has a copy of the *hAerCtrl* structure, the *AerSysOpenEx* can be called within each thread to prevent any one thread from destroying the data associated with *hAerCtrl*.

All calls to *AerSysOpenEx* should be matched by a call to *AerSysClose*.

See Also

AerSysOpen
AerSysClose
AerSysCloseAll

Example

Samples\Lib\AexSys.C

21.10. AerSysReset

AERERR_CODE AerSysReset (HAERCTRL *hAerCtrl*);

Declare Function AerSysReset Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to the axis processor card.

AerSysReset resets the axis processor and stops execution of firmware. The firmware must be reloaded using *AerSysDownLoad*.

See Also

AerSysDownLoad

Example

Samples\Lib\AexSys.C

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CHAPTER 22: TASK FUNCTIONS

In This Section:

22.1. Introduction

These functions allow the user to execute and control CNC programs already residing on the controller. They have two main purposes:

1). AerTask*( ) functions
2). AerTaskCallBack functions (allow the user to execute functions on the PC in CNC programs running on the controller).

These functions do not allow the caller to read or write actual CNC program code to or from the axis processor card. This functionality is packaged in the CNC compiler, and is only available at the C library level through the *AerCmplrxxxx* functions.

There are four stages of relationship of a program to a task: none, associated, active, and executing. One must pass through these phases sequentially (i.e. a program can not become active unless it is already associated and cannot be disassociated if it is active). The *AerTaskProgramxxxx* functions allow the user to move between these stages.

Only in the executing stage, is the program "running," and advancing the active line number as it finishes each program step. Though the user can also set the active line number, this can only be done when the program is in the associated stage.

CNC programs need to be compiled and downloaded before execution. Please see samples\lib\AexProg for an example on how to compile and run a program/line.

Here is a pseudo-code example of a possible string of legal actions:

```
AerTaskProgramAbort()               ; Abort current CNC program, if any
AerTaskProgramReset()               ; reset current CNC program, if any
AerTaskProgramDeassociate()         ; disassociate current CNC program, if any
AerTaskProgramAssociate(x)          ; Associate program x to task
AerTaskProgramSetLineUser(1)        ; Optional, sets program to start at line
                                    ; other than the 1st line
AerTaskProgramExecute()             ; Makes program active AND executing
AerTaskProgramStop()                ; Stops executing, now positioned at end of
                                    ; current line stopped at (optional).
AerTaskProgramReset()               ; Makes program inactive (but still associated)
AerTaskProgramSetLineUser(1000)     ; Sets program to restart at line 1000
AerTaskProgramExecute()             ; Begins executing at line 1000
AerTaskProgramAbort()               ; clean up to run new CNC program
AerTaskProgramReset()               ; clean up to run new CNC program
AerTaskProgramDeassociate()         ; clean up to run new CNC program
```

Many of these functions require a parameter of type AER_PROG_HANDLE. The programmer must define this structure before calling such functions. The main element of this structure is the program name, by which the axis processor identifies the program.

22.1.1. Task Callback Functions

A “task callback” describes the mechanism that a U600 CNC program uses to request information or an action from the host computer. The task callback has the following procedure:

1. The U600 recognizes the callback command and pauses program execution on that line.
2. The U600 card generates an interrupt.
3. The device driver detects the interrupt and signals an event to notify that a task callback has been requested.
4. A waiting process on the PC detects the signaled event and requests additional data concerning the callback command from the U600 card (*AerTaskCallBackGetData*).
5. The process that detected the event carries out the appropriate function.
6. The process tells the U600 to continue (*AerTaskCallBackContinue*).
7. The U600 executes the next program line.

The callback mechanism is complex, however it allows for a great deal of customizing of the U600 CNC language. This mechanism has been greatly simplified by the U600MMI and allows for much easier customization of the CNC language. The functions described in this section deal with steps 5 and 6.

Step 3 requires creating a “task callback event.” An event must be setup by using the Event functions. Steps 4 through 6 require that the programmer start a thread.

22.1.2. Extending the CNC with a CALLDLL Statement

The process of writing a function in a DLL and calling a function in the DLL from within the CNC program is described in Technical Note #4 in the U600MMI.hlp file..

22.2. AerTaskCallBackContinue

AERERR_CODE AerTaskCallBackContinue (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, PCALLBACK_VALUE *pValue*, AERERR_CODE *e960Rc*, AERERR_CODE *eTaskRc*, DOUBLE *dCNCReturnValue*);

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Task to retrieve callback information from (see constants).
pValue	Pointer to structure holding callback data.
*e960R*c	Set to non-zero to generate a task fault, if desired.
eTaskRc	Value to be set into Task Parameter ErrCode.
dCNCReturnValue	Value to set into a returned CNC variable.

This function is for backward compatibility. This function is the same as calling *AerTaskCallBackReturnSetDouble* then *AerTaskCallBackContinueEx*. See these functions for more information.

C Language and LabView Constants

TASKINDEX_#

See Also

AerTaskCallBackReturnSetDouble
AerTaskCallBackReturnSetString
AerTaskCallBackContinueEx

22.3. AerTaskCallBackContinueEx

AERERR_CODE AerTaskCallBackContinueEx (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, PCALLBACK_VALUE *pValue*, AERERR_CODE *e960Rc*, AERERR_CODE *eTaskRc*);

Parameters

hAerCtrl	Handle to the controller.
iTask	Task to retrieve callback information from see constants below).
pValue	Pointer to structure to holding callback data.
e960Rc	Set to non-zero to generate a task fault, if desired.
eTaskRc	Value to be set into Task Parameter ErrCode.

This function tells the axis processor card to continue whenever a callback function is complete. The *pValue* parameter is the same parameter passed/returned from the *AerTaskCallBackGetData* function. The *e960Rc* is an error code that will generate a task fault if it is non-zero. The *eTaskRc* will be set into the task parameter RetCode.

To set a value into a return variable, the *AerTaskCallBackReturnSetxxxx* function needs to be called first.

C Language and LabView Constants

TASKINDEX_#

See Also

AerTaskCallBackReturnSetDouble
AerTaskCallBackReturnSetString

22.4. AerTaskCallBackGetData

AERERR_CODE AerTaskCallBackGetData (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, PCALLBACK_VALUE *pValue*);

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Task to retrieve callback information from (see constants).
pValue	Pointer to structure to hold callback data.

When a callback event has occurred, it must get the data from the U600 card. The U600 stores all necessary data in the CALLBACK_VALUE structure. Due to the nature of the callback, the data cannot be defined until runtime. The CALLBACK_VALUE structure is a variable-binary object that stores the various data types to the callback function. The data contained in the CALLBACK_VALUE structure should be accessed using the *AerTaskCallBackValuexxxx* functions.

C Language and LabView Constants

TASKINDEX_#

See Also

AerTaskCallBackValuexxxx functions

22.5. AerTaskCallBackReturnSetDouble

AERERR_CODE AerTaskCallBackReturnSetDouble (HAERCTRL *hAerCtrl*,
PCALLBACK_VALUE *pValue*, DOUBLE *dCNCReturnValue*);

Parameters

hAerCtrl	Handle to the axis processor card.
pValue	Pointer to structure to holding callback data.
dCNCReturnValue	Numeric value to set into CNC return variable.

This function sets the value of the user-supplied CNC return variable. It is used to set a callback return value just prior to doing an *AerTaskCallBackContinueEx* call. If no return value was supplied in the callback statement, or if it is of the wrong type (non-numeric), then an error is returned.

See Also

AerTaskCallBackContinueEx
AerTaskCallBackReturnSetString

Example

If the callback was initiated with a CALLDLL as follows:

$GLOBAL5=CALLDLL “file.dll” “function A” …,

then this function could be used to set $GLOBAL5.

22.6. AerTaskCallBackReturnSetString

AERERR_CODE AerTaskCallBackReturnSetString (HAERCTRL *hAerCtrl*,
PCALLBACK_VALUE *pValue*, LPCTSTR *pszCNCReturnValue*);

Parameters

hAerCtrl	Handle to the axis processor card.
pValue	Pointer to structure to holding callback data.
pszCNCReturnValue	String value to set into CNC return variable.

This function sets the value of the user supplied CNC return variable. It is used to set a callback return value just prior to doing an *AerTaskCallBackContinueEx* call. If no return value was supplied in the callback command, or if it is of the wrong type (non-string), then an error is returned.

See Also

AerTaskCallBackContinueEx
AerTaskCallBackReturnSetDouble

Example

If the callback was initiated with a CALLDLL as follows:

$STRGLOBAL5=CALLDLL “file.dll” “function A” …,

then this function could be used to set string global variable 5.

22.7. AerTaskCallBackValueGetDouble

AERERR_CODE AerTaskCallBackValueGetDouble (HAERCTRL *hAerCtrl*, PCALLBACK_VALUE *pValue*, DWORD *dwArg*, PDOUBLE *pdValue*);

Parameters

hAerCtrl	Handle to the axis processor card.
pValue	Pointer to CALLBACK_VALUE data returned from *AerTaskCallBackGetData.*
dwArg	Parameter number of parameter to retrieve (zero-based).
pdValue	Pointer to hold the retrieved double value.

This function reads the double (numeric) value that was passed to the callback function. If a variable was passed as the argument, the current value of the variable is returned to the callback. This function will fail (return an error code) if a nonnumeric data type was passed to the callback, as the specified parameter.

The programmer should keep in mind that in a CALLDLL callback statement, the first two arguments are always the dll name and dll function name, respectively. Therefore, the remaining arguments always start at *dwArg* = 2.

See Also

AerTaskCallBackValueGetDWORD
AerTaskCallBackValueGetString

22.8. AerTaskCallBackValueGetDWORD

AERERR_CODE AerTaskCallBackValueGetDWORD (HAERCTRL *hAerCtrl*, PCALLBACK_VALUE *pValue*, DWORD *dwArg*, PDWORD *pdwValue*);

Parameters

*hAerCtr*l	Handle to the axis processor card.
pValue	Pointer to CALLBACK_VALUE data returned from *AerTaskCallBackGetData.*
dwArg	Parameter number of parameter to retrieve (zero-based).
pdwValue	Pointer to hold the retrieved DWORD (integer) value.

This function returns an integer value passed to the callback function. If a variable was passed as the argument, the current value of the variable is returned. Any floating-point value is truncated. This function will fail (return an error code) if a nonnumeric data type was passed, as the specified parameter.

The programmer should keep in mind that in a CALLDLL callback statement, the first two arguments are always the dll name and dll function name, respectively. Therefore, the remaining arguments always start at *dwArg* = 2.

See Also

AerTaskCallBackValueGetDouble
AerTaskCallBackValueGetString

22.9. AerTaskCallBackValueGetString

AERERR_CODE AerTaskCallBackValueGetString (HAERCTRL *hAerCtrl*, PCALLBACK_VALUE *pValue*, DWORD *dwArg*, LPTSTR *pszValue*, DWORD *dwMaxBytes*);

Parameters

hAerCtrl	Handle to the axis processor card.
pValue	Pointer to CALLBACK_VALUE data returned from *AerTaskCallBackGetData*.
dwArg	Parameter number to retrieve (zero-based).
pszValue	Pointer to hold the retrieved string value.
dwMaxBytes	Maximum size of string to retrieve.

This function returns the string value passed to the callback function. If a variable was passed as the argument, the current value of the variable is returned. This function will fail (return an error code) if a non-string data type was passed as the specified parameter.

The programmer should keep in mind that in a CALLDLL callback statement, the first two arguments are always the dll name and dll function name, respectively. Therefore, the remaining arguments always start at *dwArg* = 2.

See Also

AerTaskCallBackValueGetDouble
AerTaskCallBackValueGetDWORD

22.10. AerTaskCallBackValueMakeString

AERERR_CODE AerTaskCallBackValueMakeString (HAERCTRL *hAerCtrl*,
PCALLBACK_VALUE *pValue*, DWORD *dwArg*, LPTSTR *pszValue*,
DWORD *dwMaxBytes*);

Parameters

hAerCtrl	Handle to the axis processor card.
pValue	Pointer to CALLBACK_VALUE data returned from *AerTaskCallBackGetData*.
dwArg	Parameter number to retrieve (zero-based).
pszValue	Pointer to hold the retrieved string value.
dwMaxBytes	Maximum size of string to retrieve.

This function will generate one string from all arguments, starting with *dwArg*.

The programmer should keep in mind that in a CALLDLL callback statement, the first two arguments are always the dll name and dll function name, respectively. Therefore, the remaining arguments always start at *dwArg* = 2.

See Also

AerTaskCallBackGetData

22.11. AerTaskCallBackValueSetDouble

C

AERERR_CODE AerTaskCallBackValueSetDouble (HAERCTRL *hAerCtrl*, PCALLBACK_VALUE *pValue*, DWORD *dwArg*, DOUBLE *dValue*);

Parameters

hAerCtrl	Handle to the axis processor card.
pValue	Pointer to CALLBACK_VALUE data returned from *AerTaskCallBackGetData*.
dwArg	Parameter number of parameter to set (zero-based).
dValue	Value to set into specified variable.

This function sets the double (numeric) value of the variable that was passed to the callback function. The variable can either be a local, task, or global variable, as well as a binary input/output or register input/output parameter, etc. This function will fail (return an error code) if a double variable was not passed as the specified parameter.

The programmer should keep in mind that in a CALLDLL callback statement, the first two arguments are always the dll name and dll function name, respectively. Therefore, the remaining arguments always start at *dwArg* = 2.

See Also

AerTaskCallBackGetData
AerTaskCallBackValueSetDWORD
AerTaskCallBackValueSetString

22.12. AerTaskCallBackValueSetDWORD

AERERR_CODE AerTaskCallBackValueSetDWORD (HAERCTRL *hAerCtrl*, PCALLBACK_VALUE *pValue*, DWORD *dwArg*, DWORD *dwValue*);

Parameters

hAerCtrl	Handle to the axis processor card.
pValue	Pointer to CALLBACK_VALUE data returned from *AerTaskCallBackGetData*.
dwArg	Parameter number to set (zero-based).
dwValue	Value to set into specified variable.

This function sets the integer value to the variable that was passed to the callback function. The variable can either be a local, task, or global variable, as well as a binary input/output or register input/output parameter, etc. This function will fail (return an error code) if a DWORD variable was not passed as the specified parameter.

The programmer should keep in mind that in a CALLDLL callback statement, the first two arguments are always the dll name and dll function name, respectively. Therefore, the remaining arguments always start at *dwArg* = 2.

See Also

AerTaskCallBackGetData
AerTaskCallBackValueSetDouble
AerTaskCallBackValueSetString

22.13. AerTaskCallBackValueSetString

AERERR_CODE AerTaskCallBackValueSetString (HAERCTRL *hAerCtrl*, PCALLBACK_VALUE *pValue*, DWORD *dwArg*, LPTSTR *pszValue*);

Parameters

hAerCtrl	Handle to the axis processor card.
pValue	Pointer to CALLBACK_VALUE data returned from *AerTaskCallBackGetData*.
dwArg	Parameter number to set (zero-based).
pszValue	Value to set into specified variable.

This function sets the string value of the variable that was passed to the callback function. The variable can be any valid string variable. This function will fail (return an error code) if a nonnumeric data type or constant was passed as the specified parameter.

The programmer should keep in mind that in a CALLDLL callback statement, the first two arguments are always the dll name and dll function name, respectively. Therefore, the remaining arguments always start at *dwArg* = 2.

See Also

AerTaskCallBackGetData
AerTaskCallBackValueSetDouble
AerTaskCallBackValueSetDWORD

22.14. AerTaskCallBackValueValidateNumArgs

AERERR_CODE AerTaskCallBackValueValidateNumArgs (PCALLBACK_VALUE *pValue*, DWORD *dwMin*, DWORD *dwMax*);

Parameters

pValue	Pointer to CALLBACK_VALUE data returned from *AerTaskCallBackGetData*.
dwMin	Minimum number of parameters for callback.
dwMax	Maximum number of parameters for callback.

This function is supplied so that the writer of a callback function can quickly validate the number of parameters that were passed to the function. This function simply checks the min and max against the actual number passed (the *dwArgs* member of the *pValue* structure). The actual number must be within the minimum and maximum values (inclusive) or an appropriate error is returned. The argument count does not include the DLL or function name.

See Also

AerTaskCallBackGetData

22.15. AerTaskGetPhysAxisFromTaskAxis

AERERR_CODE AerTaskGetPhysAxisFromTaskAxis (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, TASKAXISINDEX *iTaskAxis*, PPHYSAXISINDEX *piPhysAxis*);

Declare Function AerTaskGetPhysAxisFromTaskAxis Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByVal *iTaskAxis* As Double, ByRef *piPhysAxis* As Double) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
iTask	Task Index (see constants below).
iTaskAxis	Task Axis Index to find physical axis (see constants).
piPhysAxis	Physical axis index (returned by this function) (see constants).

This function returns the physical axis number mapped to the given task axis number for the given task. Each task can have its own independent mapping. By default, for each task, the axes are mapped so the task and axes numbers are the same. Physical axis 0 is mapped to task axis 0, and so on.

Please see the *U600 Series Users Guide Manual, P/N EDU157*, under Axis Arbitration for details on mapping axes.

C Language and LabView Constants

TASKAXISINDEX_#
AXISINDEX_#
PHYSAXISINDEX_#

VB Constants

aerTaskIndex#
aerTaskAxisIndex#
aerPhysAxisIndex#

See Also

AerTaskProgramGetTaskAxisFromPhysAxis
AerTaskProgramImmediateMapAxis

22.16. AerTaskGetTaskAxisFromPhysAxis

AERERR_CODE AerTaskGetTaskAxisFromPhysAxis (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, PHYSAXISINDEX *iPhysAxis*, PTASKAXISINDEX *piTaskAxis*);

Declare Function AerTaskGetTaskAxisFromPhysAxis Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByRef *iPhysAxis* As Double, ByRef *piTaskAxis* As Double) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
iTask	Task index (see constants below).
piTaskAxis	Task axis index mapped to this physical axis.
iPhysAxis	Physical axis index to find the Task Index of.

This function returns the task axis number mapped to the given physical axis number. Each task can have its own independent mapping. By default, for each task, the axes are mapped so the task and axes numbers are the same: physical axis 0 is mapped to task axis 0, and so on.

Please see the *U600 Series Users Guide manual, P/N EDU157*, under Axis Arbitration for details on mapping axes.

C Language and LabView Constants

TASKAXISINDEX_#
AXISINDEX_#
PHYSAXISINDEX_#

VB Constants

aerTaskIndex#
aerTaskAxisIndex#
aerPhysAxisIndex#

See Also

AerTaskProgramGetPhysAxisFromTaskAxis
AerTaskProgramImmediateMapAxis

22.17. AerTaskImmediateBindAxis

C
VB

AERERR_CODE AerTaskImmediateBindAxis (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, TASKAXISINDEX *iTaskAxis*);

Declare Function AerTaskImmediateBindAxis Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByVal *iTaskAxis* As Double) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
iTask	Task Index to bind the axis to (see constants below).
iTaskAxis	Task Axis Index to bind.

This function binds the axis to the task. This function is functionally equivalent to executing the CNC command: BIND. Please see the *U600 Series Users Guide manual, P/N EDU157*, under Axis Arbitration for details on binding (although the axes are bound via the definitions in the \INI\AxisCfg.INI file).

C Language and LabView Constants

TASKAXISINDEX_#
TASKINDEX_#

VB Constants

aerTaskIndex#
aerTaskAxisIndex#

See Also

AerTaskImmediateFreeAxis
AerTaskImmediateCaptureAxis
AerTaskImmediateMapAxis

22.18. AerTaskImmediateCaptureAxis

AERERR_CODE AerTaskImmediateCaptureAxis (HAERCTRL *hAerCtrl*, TASKINDEX iTask, TASKAXISINDEX *iTaskAxis*);

Declare Function AerTaskImmediateCaptureAxis Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByVal *iTaskAxis* As Double) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
iTask	Task Index to capture the axis (see constants below).
iTaskAxis	Task Axis Index of axis to capture (see constants below).

This function captures the axis on the given task. This function is equivalent to executing the CNC command: CAPTURE. Please see the *U600 Series Users Guide manual*, *P/N EDU157*, under CNC G Code Programming for details on capturing axes (although the axes are captured via the definitions in the \INI\AxisCfg.INI file).

C Language and LabView Constants

TASKAXISINDEX_#
TASKINDEX_#

VB Constants

aerTaskIndex#
aerTaskAxisIndex#

See Also

AerTaskImmediateFreeAxis
AerTaskImmediateBindAxis
AerTaskImmediateMapAxis

22.19. AerTaskImmediateFreeAxis

C

AERERR_CODE AerTaskImmediateFreeAxis (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, TASKAXISINDEX *iTaskAxis*);

VB

Declare Function AerTaskImmediateFreeAxis Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByVal *iTaskAxis* As Double) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
iTask	Task index to free the axis from (see constants below).
iTaskAxis	Task Axis Index of axis to free (see constants below).

This function frees the axis from the given task. This function is functionally equivalent to executing the CNC command: FREE. Please see the *U600 Series Users Guide manual, P/N EDU157*, under Axis Arbitration for details on freeing axes (if required by your application).

C Language and LabView Constants

TASKAXISINDEX_#
TASKINDEX_#

VB Constants

aerTaskIndex#
aerTaskAxisIndex#

See Also

AerTaskImmediateBindAxis
AerTaskImmediateCaptureAxis
AerTaskImmediateMapAxis

22.20. AerTaskImmediateMapAxis

AERERR_CODE AerTaskImmediateMapAxis (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, TASKAXISINDEX *iTaskAxis*, PHYSAXISINDEX *iPhysAxis*);

Declare Function AerTaskImmediateMapAxis Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByVal *iTaskAxis* As Double, ByVal *iPhysAxis* As Double) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
iTask	Task Index to map axis to (see constants below).
iTaskAxis	Task Axis Index to map (see constants below).
iPhysAxis	Physical axis inedx to map to (see constants below).

This function maps an axis to a task. This function is functionally equivalent to executing the CNC command: MAP. Please see the *U600 Series Users Guide manual, P/N EDU157*, under Axis Arbitration for details on mapping axes (axes are mapped via the \INI\AxisCfg.INI file).

C Language and LabView Constants

TASKAXISINDEX_#
AXISINDEX_#
PHYSAXISINDEX_#

VB Constants

aerTaskIndex#
aerTaskAxisIndex#
aerPhysAxisIndex#

See Also

AerTaskImmediateFreeAxis
AerTaskImmediateCaptureAxis
AerTaskImmediateBind

22.21. AerTaskModeGetName

AERERR_CODE AerTaskModeGetName (HAERCTRL *hAerCtrl*, DWORD *dwBit*, LPTSTR *pszName*);

Declare Function AerTaskModeGetName Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwBit* As Long, ByVal *pszName* As String) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
dwBit	Bit number (zero-based) to get the name of.
pszName	String to return the mode name.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

This function copies the name associated with the bit of the task mode word that the user indicated. The *pszName* must point to a buffer allocated to at least MAX_PARM_NAME_LEN+1 bytes.

The bit numbering is zero-based, with the zero bit corresponding to the ones placed in the binary mask representation of the mode word. There are 32 bits in the task mode word, indicated by the constants (below) for VB. The valid *dwBit* values are from 0 to 31. If the passed bit number is invalid, it copies the string "Invalid Bit" into the passed buffer.

C Language and LabView Constants

No Constants

VB Constants

aerBit#

See Also

AerTaskStatusGetName

22.22. AerTaskProgramAbort

AERERR_CODE AerTaskProgramAbort (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*);

Declare Function AerTaskProgramAbort Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
iTask	Task index (see constants below).

This function immediately stops execution of the CNC program. If the task is not associated, active, and executing at the time this function is called, then this function does nothing and returns no error code. If a program is executing at the time this function is called, the task will abort the current CNC statement and exit executing mode. However, the task will remain in active mode after execution of this function. This function will also halt any immediate command that is running on the task.

In contrast to *AerTaskProgramStop* this function does not increment the current line number to the next line. Therefore, if the user performs an *AerTaskProgramExecute* after executing this function (with no intervening *AerTaskProgramSetLineUser*), then the program will begin execution at the beginning of the line that was aborted.

> This function will cause an abrupt stop of any current CNC G-code-type or synchronous motion without deceleration.

IMPORTANT

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

AerTaskIndex#

See Also

AerTaskProgramExecute
AerTaskProgramStop
AerMoveAbort
AerMoveHalt

Example

Samples\Lib\VisualBasic\RunPgm.vbp

22.23. AerTaskProgramAssociate

AERERR_CODE AerTaskProgramAssociate (HAERCTRL *hAerCtrl*, TASKINDEX iTask, PAER_PROG_HANDLE *pHandle*);

Declare Function AerTaskProgramAssociate Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByVal *pName* As String) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
iTask	Task index (see constants below).
pHandle	Pointer to completed AER_PROG_HANDLE structure.
pName	String containing the CNC program handle.

This function will associate a user CNC program with a task. Programs must be associated with a task before they can be made active, or be executed by the axis processor card. The programmer must provide the program name via the *pName*/*pHandle* parameters. Use *AerTaskProgramDeAssociate* to disassociate programs from a task.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

AerTaskIndex#

See Also

AerTaskProgramDeAssociate
AerTaskProgramAbort
AerTaskProgramReset

Example

Samples\Lib\AexProg.C
Samples\Lib\VisualBasic\RunPgm.vbp

22.24. AerTaskProgramDeAssociate

AERERR_CODE AerTaskProgramDeAssociate (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*);

Declare Function AerTaskProgramDeAssociate Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long) As Long

C
VB

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Index of task to use (see constants below).

This function de-associates a CNC program from the specified task. It will fail if the state of the program on the given task is executing or active.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

AerTaskIndex#

See Also

AerTaskProgramAbort
AerTaskProgramAssociate
AerTaskProgramReset

Example

Samples\Lib\VisualBasic\RunPgm.vbp

22.25. AerTaskProgramExecute

AERERR_CODE AerTaskProgramExecute (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, DWORD *dwType*);

Declare Function AerTaskProgramExecute Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByVal *dwType* As Long) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
iTask	Task index (see constants below).
dwType	See constants below.

This function begins executing an associated program and makes the program active. It begins executing at the current user line number. A program must be associated to the task before it can be executed. The program may be active. If the program is executing, no operation takes place, and no error is returned.

There is no *AerTaskProgramContinue* function; this function should be used for the initial execution of a program and for continuing execution after a stop or abort.

C Language and LabView Constants

TASKINDEX_XXXX
TASKEXEC_XXXX

VB Constants

aerTaskIndex#
aerTaskExecXXXX

See Also

AerTaskProgramSetLineUser
AerTaskProgramAbort
AerTaskProgramStop
AerTaskProgramAssociate
AerTaskProgramContinue

Example

Samples\Lib\AexProg.C
Samples\Lib\VisualBasic\RunPgm.vbp

22.26. AerTaskProgramGetLineUser

C
VB

AERERR_CODE AerTaskProgramGetLineUser (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, PDWORD *pdwLineUser*);

Declare Function AerTaskProgramGetLineUser Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByRef *pdwLineUser* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Index of task to use (see constants below).
pdwLineUser	Pointer to variable to hold current line number.

This function returns the current user line number of the associated program that the task is executing.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

aerTaskIndex#

See Also

AerTaskProgramSetLineUser

22.27. AerTaskProgramReset

AERERR_CODE AerTaskProgramReset (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*);

Declare Function AerTaskProgramReset Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
iTask	Task index (see constants below).

This function resets a miscellany of data that may have been set due to program execution, back to their initial or nominal state:

1. The task is made inactive (if active and not executing).
2. The axis processor stops waiting for a “callback” response, if it was waiting.
3. The axis processor drops the “move interrupted” state, which may have been active if it was interrupted by an ONGOSUB statement, “Jog and Return,” or “Jog and Offset” commands.

The user can only perform an *AerTaskProgramReset* if the task is not executing a program. If a task is executing a program when this function is called, it does nothing and returns an error code. If the task is not associated to a program or active when this function is called, it does nothing and does not return an error code.

One common use of this function allows the user to use *AerTaskProgramSetLineUser* to reset the current line, after a program halt or abort.

The values of task variables are not altered by this function.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

AerTaskIndex#

See Also

AerTaskProgramExecute
AerTaskProgramSetLineUser
AerTaskReset

Example

Samples\Lib\VisualBasic\RunPgm.vbp

22.28. AerTaskProgramSetLineUser

C

AERERR_CODE AerTaskProgramSetLineUser (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, DWORD *dwLineUser*);

VB

Declare Function AerTaskProgramSetLineUser Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByVal *dwLineUser* As Long) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
iTask	Task index (see constants below).
dwLineUser	Program user line index.

This function sets the "current" CNC program line to be executed. This is the line that will be the first one executed on the next call to *AerTaskProgramExecute*. In order to set the current user line number, a program must be associated to a task but not be active and not currently executing.

This function should be used prior to beginning a program execution or after a program stop or abort in order to change the current line before continuing execution again.

In order to use this function properly, the user must understand that the axis processor recognizes two line numbering systems called "960" and "user." This function expects a user line number as its input.

The 960 line numbering system is zero-based and each incoming CNC program line is simply assigned unique consecutive numbers (for that program).

The user line number is part of the "code packet" passed down to the axis processor for each CNC line. The axis processor does not determine or make any checks on the validity of the user line number passed down in the packet. Therefore, there can be (and often are, if the Aerotech CNC compiler has downloaded the packet) multiple 960 lines in the same program with the same user line number. In performing an *AerTaskProgramSetLineUser* call, the axis processor will look for the first CNC line (with the lowest 960 line number) that has the given user line number.

The first time a program is downloaded to the controller, it is given a default user line number that corresponds to the first 960 line in the program. Therefore, the user does not need to call this function in order to begin execution at the first line. However, if another (or the same) program is downloaded again, the axis processor will not reset the current user line number. It remains at whatever value it had in the original program. Consequently, it is strongly advised that programmers call this function even before the first execution of a program.

The user should be cautioned when using this function: undesirable or unexpected results could occur if the line is changed into or out of a block statement. For example, suppose the user changes to a line in a subroutine, thereby bypassing the call statement. When the program reaches the return statement of the subroutine, it finds it has no place to return. Similar problems can happen when jumping into an if-endif, or while-endwhile block of statements.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

AerTaskIndex#

See Also

AerTaskProgramAssociate
AerTaskProgramExecute
AerTaskProgramStop

22.29. AerTaskProgramStop

AERERR_CODE AerTaskProgramStop (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*);

Declare Function AerTaskProgramStop Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
iTask	Task index (see constants below).

This function stops execution of the CNC program at the end of the current block. If the task is not associated, active, and executing at the time this function is called, then this function does nothing and returns no error code. If a program is executing at the time this function is called, the task will finish the current CNC statement, set the current line number to the next user line and exit executing mode. However, the task will remain in active mode after execution of this function.

This function will not affect any current CNC G-code type motion, because the CNC G-code block only finishes after the move is complete. Therefore, G-code movement will complete normally before the program stops execution.

It is important to realize that all other forms of motion are not effected by a program stop. If the programmer begins asynchronous motion during a program and then executes this function, the asynchronous motion will continue on. The user must use the *AerTaskProgramAbort*, *AerMoveAbort,* or *AerMoveStop* functions to stop asynchronous motion.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

AerTaskIndex#

See Also

AerTaskProgramExecute
AerTaskProgramAbort
AerMoveAbort
AerMoveHalt

22.30. AerTaskReset

AERERR_CODE AerTaskReset (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*);

Declare Function AerTaskReset Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long) As Long

Parameters

hAerCtrl Handle to an Aerotech Control.
iTask Task index (see constants below).

This function resets a miscellany of task data. It can be viewed as a harder reset than the *AerTaskProgramReset* function. The following is performed:

1. The task is de-associated from any program.
2. Any task fault is cleared.
3. The program call stack is cleared, along with any interrupted move data.
4. R-Theta transformations, if any, are removed.
5. The priority is reset to NORMAL (if an ONGOSUB statement raised it).
6. Any fixture offsets are removed.

The user can only perform a task reset if the task is not executing a program. If a task is executing a program when this function is called, it does nothing and returns an error code. If the task is active when this function is called, this function will first automatically perform an *AerTaskProgramReset*, and then perform as described above. If the task is not associated when this function is called, it does nothing and does not return an error code.

One common use of this function is to clear any residual settings due to previous program execution before associating and running another program.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

AerTaskIndex#

See Also

AerTaskProgramReset

22.31. AerTaskSetExecuteMode

AERERR_CODE AerTaskSetExecuteMode (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, DWORD *dwMode*);

Declare Function AerTaskSetExecuteMode Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByVal *dwMode* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Index of task to use (see constants below).
dwMode	Mode of execution (see constants below).

The *AerTaskSetExecuteMode* function sets the default mode of execution for *AerTaskProgramExecute*.

C Language and LabView Constants

TASKINDEX_XXXX
TASKEXEC_XXXX

VB Constants

aerTaskIndex#
aerTaskExecXXXX

See Also

AerTaskProgramExecute

22.32. AerTaskSetRetraceMode

AERERR_CODE AerTaskSetRetraceMode (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, DWORD *dwMode*);

Declare Function AerTaskSetRetraceMode Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByVal *dwMode* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Index of task to use (see constants below).
dwMode	Set to 0 to disable retrace mode, 1-enables retrace mode.

This function sets/resets retrace mode for the specified task. If a program is executing, a program stop command is issued. It is necessary to issue the execute command to get the program running again. See the U600MMI.hlp file for more information on the retrace mode.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

AerTaskIndex#

22.33. AerTaskSetSlewMode

AERERR_CODE AerTaskSetSlewMode (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, DWORD *dwMode*);

Declare Function AerTaskSetSlewMode Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Long, ByVal *dwMode* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Index of task to use (TASKINDEX_xxxx constant).
dwMode	Set 0 to turn off slew Mode, 1 to turn on.

This function enables the joystick slew mode on the specified task. By enabling slew mode, this function enables the joystick. The Joystick then works as configured by the following task parameters: JoyStickPort and SlewPair1 through SlewPair8. These parameters must be set appropriately before enabling slew mode. See the U600MMI.hlp file for more information on the joystick.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

aerTaskIndex#

22.34. AerTaskStatusGetName

AERERR_CODE AerTaskStatusGetName (HAERCTRL *hAerCtrl*, DWORD *dwBit*, LPTSTR *pszName*);

Declare Function AerTaskStatusGetName Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwBit* As Long, ByVal *pszName* As String) As Long

Parameters

hAerCtrl	Handle to an Aerotech Control.
dwBit	Bit number (zero-based) to get the name of (see constants).
pszName	Pointer to the String to return the task name.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

This function copies the name associated with the bit of the task status word that the user indicated. The *pszName* must point to a buffer allocated to at least MAX_PARM_NAME_LEN+1 bytes.

The bit numbering is zero-based, with the zero bit corresponding to the one's place in the binary mask representation of the first status word (there are three task status words (Status1, Status2, and Status3), each 32 bits long). The second and third task status words are accessed by adding 32 or 64 respectively, to the desired bit number in that word. There are 32 bits in each task status word and the valid *dwBit* values are from 0 to 95. If the passed bit number is invalid, it copies the string "Invalid Bit" into the passed buffer. See the U600MMI.hlp file for more information on the task status parameters.

C Language and LabView Constants

No Constants

VB Constants

aerBit#

See Also

AerTaskModeGetName

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CHAPTER 23: TOOL FUNCTIONS

In This Section:

23.1. Introduction

The Tool Functions are responsible for managing both the Tool Files (AerToolFileXXX) and the Tool Tables (AerToolTableXXX).

The Tool Table is used in conjunction with the CNC programming language. Tool Tables are designed to work with the following groups GCODES/CNC commands: **G1/G2/G3, G40/G41/G42, G43, G143/G144/G149,** and the **T-Word**.

The Tool File and Table functions rely on the AER_TOOL structure:

```
typedef struct tagAER_TOOL
{
  DWORD   mFlags;          // AERTOOL_F_xxx Constants
  DOUBLE  dCutterRadius;   // TaskParm: CutterRadius
  DOUBLE  dCutterLength;   // TaskParm: CutterLength
  DOUBLE  dCutterWear;     // TaskParm: CutterWear
  DOUBLE  dOffsetX;        // TaskParm: CutterOffsetX
  DOUBLE  dOffsetY;        // TaskParm: CutterOffsetY
  DOUBLE  dFWord;          // if <> 0 Then F=dFWord
  DOUBLE  dSWord;          // if <> 0 Then S=dSWord
  CHAR  szName[MAX_TOOL_NAME_LEN] ;// Tool Description
  } AER_TOOL;
  typedef AER_TOOL  *PAER_TOOL;
```

The following flag values are available:

AERTOOL_F_ENGLISH

All Cutter and Offset values are specified in Inches. Otherwise units are metric (mm).

AERTOOL_F_INUSE

A tool can be marked as “not in use”. The system won’t allow the Tool to be made active.

AERTOOL_F_FORCE_UNITS

The CNC program must be in the same units as the tool. If units are specified in English (AERTOOL_F_ENGLISH) and a CNC program is in metric (G71), then the system will not allow the Tool to become active if this value is set. If this bit is not set, the values will be converted from English units to Metric units and the tool will be made active.

AERTOOL_F_USER_DIAMETER

This item is for display/user input purposes only. The User expects values to be entered/displayed as diameters. The interface should multiply/divide the CutterRadius value by 2 when displaying/setting the value.

AERTOOL_F_VALID

This internal bit is set in the tool table after an individual tool has been successfully set with *AerToolTableSetTool*.

The Tool File functions manage the storing and retrieving of the AER_TOOL structure to a file. The Tool Table functions manage the tools on the controller.

23.2. AerToolFileDownload

AERERR_CODE AerToolFileDownload (HAERCTRL *hAerCtrl*, LPCTSTR *pszFile*)

Declare Function AerToolFileDownload Lib "AERSYS.DLL" (ByVal hAerCtrl As Long, ByVal *pszFile* As String) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
pszFile	Tool File.

This function allocates memory on the controller and downloads the specified Tool File.

The name of the Tool file can be retrieved with *AerRegGetFileName*.

The code for the function follows:

```
AERERR_CODE AER_DLLENTRY AerToolFileDownload (HAERCTRL hAerCtrl, LPCTSTR
                                             pszFile)
{
   AER_TOOL    tTool;
   DWORD       dwNumTools;
   DWORD       dwTool;
   AERERR_CODE eRc;

   // get number of tools from file
   eRc = AerToolFileGetNumTools( pszFile, &dwNumTools );
   RETURN_ON_ERR( eRc );

   // free tool table on card
   eRc = AerToolTableFree( hAerCtrl );
   RETURN_ON_ERR( eRc );

   // allocate the number of tools on card
   eRc = AerToolTableAllocate( hAerCtrl, dwNumTools );
   RETURN_ON_ERR( eRc );

   for( dwTool = 0; dwTool < dwNumTools; dwTool++ )
   {
      // read the tool from the file
      eRc = AerToolFileGetTool( pszFile, dwTool, &tTool );
      BREAK_ON_ERR( eRc );

      // write the tool to the card
      eRc = AerToolTableSetTool( hAerCtrl, dwTool, &tTool );
      BREAK_ON_ERR( eRc );
   }

   return( eRc );
}
```

See Also

AerRegGetFileName

23.3. AerToolFileGetNumTools

AERERR_CODE AerToolFileGetNumTools (LPCTSTR *pszFile*, PDWORD *pdwNumTools*)

Parameters

pszFile	Tool File.
pdwNumTools	Number of Tools in the tool file.

This function returns the number of tools that are in the tool file.

The name of the Tool file can be retrieved with *AerRegGetFileName* (AERREGID_ToolFile).

See Also

AerRegGetFileName
AerToolFileDownload

23.4. AerToolFileGetTool

AERERR_CODE AerToolFileGetTool (LPCTSTR *pszFile*, DWORD dwTool,
PAER_TOOL *pTool*)

Parameters

pszFile	Tool File.
dwTool	Which tool to retrieve from file (0-Based).
pTool	Pointer to AER_TOOL structure to hold tool info.

This function returns the tool information for the given tool.

The name of the Tool file can be retrieved with *AerRegGetFileName* (AERREGID_ToolFile).

See Also

AerRegGetFileName
AerToolFileDownload
AerToolFileSetTool

23.5. AerToolFileSetTool

AERERR_CODE AerToolFileSetTool (LPCTSTR *pszFile*, DWORD *dwTool*,
PAER_TOOL *pTool*)

Parameters

pszFile	Tool File.
dwTool	Which tool to retrieve from file (0-Based).
pTool	Pointer to AER_TOOL structure to hold tool info.

This function sets the information for the specified tool. An error will occur if *dwTool* is not a valid tool number. A valid tool number is 0..(NumTools-1). 0..(NumTools-1) will update the specified tool in the Tool File. If *dwTool* equals NumTools then the tool is added to the Tool file with *AerToolFileAddTool.*

The name of the Tool file can be retrieved with *AerRegGetFileName* (AERREGID_ToolFile).

See Also

AerRegGetFileName
AerToolFileAddTool
AerToolFileDownload
AerToolFileGetTool

23.6. AerToolFileAddTool

AERERR_CODE AerToolFileAddTool (LPCTSTR *pszFile*, DWORD *dwTool*,
PAER_TOOL *pTool*)

Parameters

pszFile	Tool File.
dwTool	Which tool to retrieve from file (0-Based).
pTool	Pointer to AER_TOOL structure to hold tool info.

This function adds a new tool to the Tool File.

The name of the Tool file can be retrieved with *AerRegGetFileName* (AERREGID_ToolFile).

See Also

AerRegGetFileName
AerToolFileDownload
AerToolFileRemoveTool

23.7. AerToolFileRemoveTool

AERERR_CODE AerToolFileRemoveTool (LPCTSTR *pszFile*, DWORD *dwTool*)

Parameters

pszFile	Tool File.
dwTool	Which tool to retrieve from file (0-Based).

This function removes the specified tool from the Tool File.

The name of the Tool file can be retrieved with *AerRegGetFileName* (AERREGID_ToolFile).

See Also

AerRegGetFileName
AerToolFileAddTool
AerToolFileDownload

23.8. AerToolTableAllocate

AERERR_CODE AerToolTableAllocate (HAERCTRL *hAerCtrl*, DWORD *dwNumTools*)

Parameters

hAerCtrl	Handle to the axis processor card.
dwNumTools	Number of tools that the table will hold.

This function allocates memory on the axis processor for the specified number of tools. All allocated tools are marked as invalid until the tool is properly set with *AerToolTableSetTool*.

See Also

AerToolFileDownload
AerToolTableFree
AerToolTableSetTool

23.9. AerToolTableFree

AERERR_CODE AerToolTableFree (HAERCTRL *hAerCtrl*)

Parameters

hAerCtrl Handle to the axis processor card.

This function frees the memory on the axis processor associated with the tool table.

See Also

AerToolFileDownload
AerToolTableAllocate

23.10. AerToolTableGetNumTools

AERERR_CODE AerToolTableGetNumTools (HAERCTRL *hAerCtrl*, PDWORD p*dwNumTools*)

Parameters

hAerCtrl	Handle to the axis processor card.
pdwNumTools	Number of tools that have been allocated in the tool table.

This function returns the number of tools that have been allocated in the tool table.

See Also

AerToolFileDownload
AerToolTableAllocate

23.11. AerToolTableSetTool

AERERR_CODE AerToolTableSetTool (HAERCTRL *hAerCtrl*, DWORD *dwTool*,
PAER_TOOL *pTool*)

Parameters

hAerCtrl	Handle to the axis processor card.
dwTool	Which tool to retrieve from tool table (0-Based).
pTool	Pointer to AER_TOOL structure to hold tool info.

This function sets the information for the specified tool. An error will occur if *dwTool* is not a valid tool number. A valid tool number is 0..NumToolsAllocated-1.

A tool remains invalid until it has been set in the tool table. The *mFlag* parameter of *pTool* will reflect AERTOOL_F_VALID on subsequent calls to *AerToolTableGetTool*.

C Language and LabView Constants

AERTOOL_F_XXXX

See Also

AerToolFileDownload
AerToolTableAllocate
AerToolTableGetTool

23.12. AerToolTableGetTool

AERERR_CODE AerToolTableGetTool (HAERCTRL *hAerCtrl*, DWORD *dwTool*,
PAER_TOOL *pTool*)

Parameters

hAerCtrl	Handle to the axis processor card.
dwTool	Which tool to retrieve from tool table (0-Based).
pTool	Pointer to AER_TOOL structure to hold tool info.

This function returns the information for the specified tool. An error will occur if *dwTool* is not a valid tool number. A valid tool number is 0..NumToolsAllocated-1.

See Also

AerToolFileDownload
AerToolTableAllocate
AerToolTableSetTool

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CHAPTER 24: TORQUE FUNCTIONS

In This Section:

24.1. Introduction

The torque mode functions provide axis control seeking to maintain a constant torque on an axis, independent of speed and thermal effects. This method of operation can be used in winding applications where a constant tension must be applied to the material as it is being collected onto a reel.

24.2. AerTorqueGetMode

AERERR_CODE AerTorqueGetMode (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *pwMode*, WORD *pwChannel*, FLOAT *pdAmpsVel*, FLOAT *pdAmpsTemp*, WORD *pwNomTemp*);

Declare Function AerTorqueGetMode Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByRef *pwMode* As Integer, ByRef *pwChannel* As Integer, ByRef *pdAmpsVel* As Single, ByRef *pdAmpsTemp* As Single, ByRef *pwNomTemp* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (see constants below).
pwMode	Returns 0/1 to disable/enable torque mode.
pwChannel	Returns A/D channel for temperature sensor (see constants below).
pdAmpsVel	Returns velocity compensation term expressed in D/A bits per count/sec.
pdAmpsTemp	Returns temperature compensation term.
pwNomTemp	Returns nominal operating temperature expressed in A/D bits.

This function returns the state of the constant torque mode of an axis. The parameters of the function are as follows:

pwMode 0/1 to indicates torque mode

pwChannel A/D channel for temperature sensor (see constants below)
UNIDEX 600 card ch's 1-4
Encoder Exp. card 1 ch's 5-8
Encoder Exp. card 2 ch's 9-12
Encoder Exp. card 3 ch's 13-16

pdAmpsVel Velocity compensation term expressed in D/A bits per count/sec.

For example, given a full scale current output of 50 amps and a desired velocity compensation of 0.01 amp / (cnt/sec.), the following constant would be used:

32767 * .01 / 50 = 6.5534

pdAmpsTemp Temperature compensation in units of (% current increase / temp_change) / (100 * A/D_bits / degree_celsius).

For example, given a bipolar 12 bit +/- 10 volt A/D, with 0 - 10 volts corresponding to a 125 degree increase in temperature and a change in the motor torque constant of 17% over a 75 degree increase in temperature:

(17 / 75) / (100 * 2047 / 125) = .000138414

pwNomTemp Nominal (room) operating temperature expressed in A/D bits. The *wNomTemp* value can be determined by reading the A/D card at the nominal operating temperature.

C Language and LabView Constants	VB Constants
AXISINDEX_#	*aerAxisIndex#*
ANALOGINDEX_#	*aerAnalogIndex#*

See Also

AerTorqueSetMode

24.3. AerTorqueSetMode

AERERR_CODE AerTorqueSetMode (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wMode*, WORD *wChannel*, FLOAT *dAmpsVel*, FLOAT *dAmpsTemp*, WORD *wNomTemp*);

Declare Function AerTorqueSetMode Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal iAxis As Long, ByVal *wMode* As Integer, ByVal *wChannel* As Integer, ByVal *dAmpsVel* As Single, ByVal *dAmpsTemp* As Single, ByVal *wNomTemp* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	Axis index (see constants below).
wMode	0/1 to disable/enable torque mode.
wChannel	A/D channel for temperature sensor (see constants below).
dAmpsVel	Velocity compensation term expressed in D/A bits per count/sec..
dAmpsTemp	Temperature compensation term.
wNomTemp	Nominal operating temperature expressed in A/D bits.

This function allows a constant output torque to be applied to an axis by compensating for changes in the motor torque constant due to thermal effects and frictional losses. This function has applications in winding where a constant tension must be applied while winding. Setting the IMAX axis parameter of the desired axis attains the torque set point. The value of *IMAX* can be calculated as follows:

IMAX = 32767 / full_scale_current * desired_torque / motor_torque_constant

where:

full_scale_current is the current output from the amplifier for a 10 volt command from the DAC. Motor_torque_constant is in units of torque per ampere of current.

The parameters of the function are as follows:

WMode 0/1 to disable/enable torque mode

wChannel A/D channel for temperature sensor

- UNIDEX 600 card channels 1-4
- Encoder Exp. card 1 channels 5-8
- Encoder Exp. card 2 channels 9-12
- Encoder Exp. card 3 channels 13-16

DAmpsVe Velocity compensation term expressed in D/A bits per count/sec

For example, given a full scale current output of 50 amps and a desired velocity compensation of 0.01 amp / (count/sec.), the following constant would be used:

32767 * .01 / 50 = 6.5534

dAmpsTemp Temperature compensation in units of (% current increase / temp_change) / (100 * A/D_bits / degree_celsius).

For example given a bipolar 12 bit +/- 10 volt A/D, with 0 - 10 volts corresponding to a 125 degree increase in temperature and a change in the motor torque constant of 17% over a 75 degree increase in temperature:

(17 / 75) / (100 * 2047 / 125) = .000138414

wNomTemp Nominal (room) operating temperature expressed in A/D bits. The *wNomTemp* value can be determined by reading the A/D card at the nominal operating temperature.

C Language and LabView Constants

AXISINDEX_#
ANALOGINDEX_#

VB Constants

aerAxisIndex#
aerAnalogIndex#

See Also

AerTorqueGetMode

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CHAPTER 25: UTILITY FUNCTIONS

In This Section:

25.1. Introduction

The AerUtil group serves as a miscellaneous category for Aerotech library functions. These functions accomplish a variety of tasks.

25.2. AerUtilAlignMaster

AERERR_CODE AerUtilAlignMaster (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*);

Declare Function AerUtilAlignMaster Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	The axis number to align (see constants below).

This function sets the *MASTERPOS* axis parameter for the axis equal to its *RAWPOS* parameter.

C Language and LabView Constants

AXISINDEX_XXXX

VB Constants

aerAxisIndex#

25.3. AerUtilHitWatchdogTimer

AERERR_CODE AerUtilHitWatchdogTimer (HAERCTRL *hAerCtrl*);

Declare Function AerUtilHitWatchdogTimer Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to the axis processor card.

This function will strobe the watchdog timer preventing a fatal error from occurring and shutting down the axis processor card.

25.4. AerUtilMotorSet

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VB

AERERR_CODE AerUtilMotorSet (HAERCTRL *hAerCtrl*, AXISINDEX *iAxis*, WORD *wSet*);

Declare Function AerUtilMotorSet Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iAxis* As Long, ByVal *wSet* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iAxis	An physical axis index, representing the torque vector to set (see constants below).
wSet	The electrical angle to output (360° = 1,024).

This function will enable the specified drive and set the Sin and Sin+120 current command outputs to the specified angle causing the AC brushless motor's rotor to rotate to the specified electrical angle. The amplitude of the torque vector is determined by the setting of its IAVGLIMIT axis parameter. This parameter should be set before calling this function by the *AerParmAxisSetValue* function to a value less than or equal to the motor's continuous current rating to ensure the motor is not damaged. This function is useful in determining a required commutation offset for proper phasing of the feedback device. The electrical vector may be removed by disabling the drive. This can be accomplished with the *AerParmAxisSetValue* function.

C Language and LabView Constants

AXISINDEX_XXXX

VB Constants

aerAxisIndex#

See Also

AerConfig
AerParmAxisSetValue

25.5. AerUtilSet1khzServoLoop

AERERR_CODE AerUtilSet1khzServoLoop (HAERCTRL *hAerCtrl*);

Declare Function AerUtilSet1khzServoLoop Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to a axis processor communication channel.

This function will define the servo loop update rate all of the axes to be 1,000 Hertz (1 msec.) in the same manner as the G130 RS274 command. This servo loop is responsible for sampling the feedback from the motor and calculating the new motor command from the axis gains.

See the Enable1kHzservo global parameter in the U600MMI.hlp file for more information.

See Also

AerUtilSet4khzServoLoop

25.6. AerUtilSet4khzServoLoop

AERERR_CODE AerUtilSet4khzServoLoop (HAERCTRL *hAerCtrl*);

Declare Function AerUtilSet4khzServoLoop Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long) As Long

Parameters

hAerCtrl Handle to the axis processor card.

This function will define the servo loop update rate to be 4000 Hertz (.25 Msec.) in the same manner as the G131 RS274 command. This servo loop is responsible for sampling the feedback from the motor and calculating the new motor command from the axis gains.

See the Enable1kHzservo global parameter in the U600MMI.hlp file for more information.

See Also

AerUtilSet1khzServoLoop

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CHAPTER 26: VARIABLE FUNCTIONS

In This Section:

26.1. Introduction

The Variable functions read and write to the user variables within the UNIDEX 600 Series controllers.

26.2. AerVarAnalogGetDouble

AERERR_CODE AerVarAnalogGetDouble (HAERCTRL *hAerCtrl*, ANALOGINDEX *iAnalog*, PDOUBLE *pdValue*);

Declare Function AerVarAnalogGetDouble Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *iAnalog* As Long, ByRef *pdValue* As Double) As Long

Parameters

hAerCtrl	Handle to axis processor card.
iAnalog	Which analog input to read (see constants below).
pdValue	Pointer to variable to hold value of analog input.

This function reads the current value of the specified analog input from the UNIDEX 600 card. The U600 card has 4 analog inputs. Four additional analog inputs can be accessed on each 4-EN PC (encoder card) card.

C Language and LabView Constants

ANALOGINDEX_XXXX

VB Constants

aerAnalogIndex#

26.3. AerVarGlobalGetDouble

AERERR_CODE AerVarGlobalGetDouble (HAERCTRL *hAerCtrl*, DWORD *dwNum*, PDOUBLE *pfdValue*);

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VB

Declare Function AerVarGlobalGetDouble Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwNum* As Long, ByRef *pfdValue* As Double) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwNum	Index of global variables to read (zero-based).
pfdValue	Address of variable to receive value.

This function will return the value of a global double precision variable within the controller. The number of global variables is determined by the global parameter '*NumGlobalDoubles*', which has a default value of 10. The range of global double variables is that of a double precision number, +/- $1.7E^{308}$. These global variables are numbered 0 through *NumGlobalDoubles*-1.

See Also

AerVarGlobalSetDouble

26.4. AerVarGlobalGetString

AERERR_CODE AerVarGlobalGetString (HAERCTRL *hAerCtrl*, DWORD *dwNum*,
LPSTR *pszString*);

Declare Function AerVarGlobalGetString Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwNum* As Long, ByRef *pszString* As String) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwNum	Index of global variables (zero-based).
pszString	Address of variable to receive string.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50      ; 50 characters long
```

This function will return the contents of a global string variable within the controller. The number of global string variables is determined by the global parameter '*NumGlobalStrings*', which has a default value of 10. The maximum length of global string variables is 127 characters. These string variables are numbered 0 through *NumGlobalStrings*-1.

See Also

AerVarGlobalSetString

26.5. AerVarGlobalSetDouble

AERERR_CODE AerVarGlobalSetDouble (HAERCTRL *hAerCtrl*, DWORD *dwNum*, DOUBLE *fdValue*);

Declare Function AerVarGlobalSetDouble Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwNum* As Long, ByVal *fdValue* As Double) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwNum	Index of global variables to set (zero-based).
fdValue	Double value to write.

This function will set the value of a global double precision variable within the controller. The number of global variables is determined by the global parameter '*NumGlobalDoubles*', which has a default value of 10. The range of global double variables is that of a double precision number, +/- $1.7E^{308}$. These global variables are numbered 0 through *NumGlobalDoubles*-1.

See Also

AerVarGlobalGetDouble

26.6. AerVarGlobalSetString

C

AERERR_CODE AerVarGlobalSetString (HAERCTRL *hAerCtrl*, DWORD *dwNum*, LPSTR *pszString*);

VB

Declare Function AerVarGlobalSetString Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwNum* As Long, ByVal *pszString* As String) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwNum	Index of global string variables (zero-based).
pszString	Address of string to write.

This function will set the value of a global string variable within the controller. The number of global string variables is determined by the global parameter '*NumGlobalStrings*', which has a default value of 10. The maximum length of global string variables is 127 characters. These string variables are numbered 0 through *NumGlobalStrings*-1.

See Also

AerVarGlobalGetString

26.7. AerVarProgramGetDouble

AERERR_CODE AerVarProgramGetDouble (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, DWORD *dwNum*, PDOUBLE *pfdValue*);

Declare Function AerVarProgramGetDouble Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Double, ByVal *dwNum* As Long, ByRef *pfdValue* As Double) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Task index (see constants below).
dwNum	Index of variable (zero-based).
pfdValue	Address of variable to receive value.

This function will return the value of a user-defined double precision variable, defined within a user CNC program. The number of variables is determined by the number defined by the user in their CNC program, by the DVAR command, which is limited by the amount of free memory on the controller. The range of variables is that of a double precision number, +/- $1.7E^{308}$. These variables are numbered 0 through the maximum number -1. These variables will be sequentially numbered in the order in which the user defined them.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

aerTaskIndex#

See Also

AerVarProgramSetDouble
AerCompilerGetProgVarTotal
AerCompilerGetProgVarByName
AerCompilerGetProgVarByNumber

26.8. AerVarProgramSetDouble

AERERR_CODE AerVarProgramSetDouble (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, DWORD *dwNum*, DOUBLE *fdValue*);

Declare Function AerVarProgramSetDouble Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Double, ByVal *dwNum* As Long, ByVal *fdValue* As Double) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Task index (see constants below).
dwNum	Index of program variable number to set (zero-based).
fdValue	Double value to write.

This function will set the value of a user-defined double precision variable, defined within a user CNC program. The number of variables is determined by the number defined by the user in their CNC program, by the DVAR command, which is limited by the amount of free memory on the axis processor. The range of variables is that of a double precision number, +/- $1.7E^{308}$. These variables are numbered 0 through the maximum number -1. These variables will be sequentially numbered in the order in which the user defined them.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

aerTaskIndex#

See Also

AerVarProgramGetDouble
AerCompilerGetProgVarTotal
AerCompilerGetProgVarByName
AerCompilerGetProgVarByNumber

26.9. AerVarStackGetDouble

AERERR_CODE AerVarStackGetDouble (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, CSPARMINDEX *iCSParm*, PDOUBLE *pfdValue*);

Declare Function AerVarStackGetDouble Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Double, ByVal *iCSParm* As Double, ByRef *pfdValue* As Double) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Task index (see constants below).
iCSParm	Index of call stack parameters (zero-based).
pfdValue	Address of variable to receive value.

This function will return the value of a stack double precision variable used by the user's CNC program for subroutine and program calls on the axis processor. The number of stack variables is determined by the task parameter '*MaxCallStack*', which has a default value of 10. The range of stack double variables is that of a double precision number, +/- $1.7E^{308}$. These stack variables are numbered 0 through *MaxCallStack*-1.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

aerTaskIndex#

See Also

AerVarStackSetDouble

26.10. AerVarStackSetDouble

AERERR_CODE AerVarStackSetDouble (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, CSPARMINDEX *iCSParm*, DOUBLE *fdValue)*;

Declare Function AerVarStackSetDouble Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Double, ByVal *iCSParm* As Double, ByVal *fdValue* As Double) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Task index (see constants below).
iCSParm	Index of call stack parameters (zero-based).
fdValue	Double value to write.

This function will set the value of a stack double precision variable used by the user's CNC program for subroutine and program calls on the axis processor. The number of stack variables is determined by the task parameter '*MaxCallStack*', which has a default value of 10. The range of stack double variables is that of a double precision number, +/- $1.7E^{308}$. These stack variables are numbered 0 through *MaxCallStack*-1.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

aerTaskIndex#

See Also

AerVarStackGetDouble

26.11. AerVarTaskGetDouble

C
VB

AERERR_CODE AerVarTaskGetDouble (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*,
DWORD *dwNum*, PDOUBLE *pfdValue*);

Declare Function AerVarTaskGetDouble Lib "AERSYS.DLL" (ByVal *hAerCtrl* As
Long, ByVal *iTask* As Double, ByVal *dwNum* As Long, ByRef
pfdValue As Double) As Long

Parameters

hAerCtrl	Handle to the Axis Processor card.
iTask	Task index (see constants below).
dwNum	Index of task variables to read (zero-based).
pfdValue	Address of variable to receive data.

This function will return the value of a task double precision variable on the specified task. The number of task variables is determined by the task parameter '*NumTaskDoubles*', which has a default value of 10. The range of task double variables is that of a double precision number, +/- $1.7E^{308}$. These task variables are numbered 0 through *NumTaskDoubles*-1.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

aerTaskIndex#

See Also

AerVarTaskSetDouble

26.12. AerVarTaskGetString

AERERR_CODE AerVarTaskGetString (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, DWORD *dwNum*, LPSTR *pszString*);

Declare Function AerVarTaskGetString Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Double, ByVal *dwNum* As Long, ByRef *pszString* As String) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Task index (see constants below).
dwNum	Index of task string variables (zero-based).
pszString	Address of variable to receive string.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

This function will return the contents of a task string variable used within a user CNC program. The number of task string variables is determined by the task parameter '*NumTaskStrings*', which has a default value of 10. The maximum length of task string variables is 127 characters. These string variables are numbered 0 through *NumTaskStrings*-1.

See Also

AerVarTaskSetString

26.13. AerVarTaskSetDouble

AERERR_CODE AerVarTaskSetDouble (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*,
DWORD *dwNum*, DOUBLE fdValue);

Declare Function AerVarTaskSetDouble Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByVal *iTask* As Double, ByVal *dwNum* As Long, ByVal *fdValue* As
Double) As Long

C

VB

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Task index (see constants below).
dwNum	Index of task variables to set (zero-based).
fdValue	Double value to write.

This function will set the value of a task double precision variable used on the specified task. The number of task variables is determined by the task parameter '*NumTaskDoubles*', which has a default value of 10. The range of task double variables is that of a double precision number, +/- $1.7E^{308}$. These task variables are numbered 0 through *NumTaskDoubles*-1.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

aerTaskIndex#

See Also

AerVarTaskGetDouble

26.14. AerVarTaskSetString

C
VB

AERERR_CODE AerVarTaskSetString (HAERCTRL *hAerCtrl*, TASKINDEX *iTask*, DWORD *dwNum*, LPSTR *pszString*);

Declare Function AerVarTaskSetString Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *iTask* As Double, ByVal *dwNum* As Long, ByVal *pszString* As String) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
iTask	Task index (see constants below).
dwNum	Index of task string variables (zero-based).
pszString	Address of string to write.

This function will set the value of a task string variable used within a user CNC program on the axis processor. The number of task string variables is determined by the task parameter '*NumTaskStrings*', which has a default value of 10. The maximum length of task string variables is 127 characters. These string variables are numbered 0 through *NumTaskStrings*-1.

C Language and LabView Constants

TASKINDEX_XXXX

VB Constants

aerTaskIndex#

See Also

AerVarTaskGetString

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CHAPTER 27: VERSION FUNCTIONS

In This Section:

27.1. Introduction

The version functions provide information about the current version of the UNIDEX 600 Series controller firmware and library (AerSys.DLL) executing on the user's system.

27.2. AerVerGetBootVersion

AERERR_CODE AerVerGetBootVersion (HAERCTRL *hAerCtrl*, PAER_VERSION *pVersion*);

Parameters

hAerCtrl Handle to the axis processor card.
pVersion Pointer to a structure that version data is written to.

This function returns the identical result as *AerVerGetImgVersion*. The image (firmware) must be running for this function to return successfully.

See Also

AerVerGetImgVersion
AerVerGetCpuStatus

27.3. AerVerGetCpuStatus

AERERR_CODE AerVerGetCpuStatus (HAERCTRL *hAerCtrl*, PWORD *pwStat*);

Declare Function AerVerGetCpuStatus Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long,
ByRef *pwStat* As Short) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
pwStat	Pointer to a WORD to receive status.

This function returns a status value indicating the current state of the axis processor board. These states are constants as defined below.

C Language and LabView Constants

AER_CPUSTATXXXX

VB Constants

aerCPUStatusXXXX

See Also

AerSysDownload

27.4. AerVerGetDrvVersion

AERERR_CODE AerVerGetDrvVersion (PAER_VERSION *pVersion*);

AERERR_CODE AerVerGetDrvVersionEx (HAERCTRL *hAerCtrl*, PWORD *pwUnidex*, PWORD *pwMajor*, PWORD *pwMinor*, PWORD *pwBuild*);

Declare Function AerVerGetDrvVersionEx Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByRef *pwUnidex* As Integer, ByRef *pwMajor* As Integer, ByRef *pwMinor* As Integer, ByRef *pwBuild* As Integer) As Long

AERERR_CODE AerVerGetDrvVersionString (HAERCTRL *hAerCtrl*, LPTSTR *pszVersion*);

Declare Function AerVerGetDrvVersionString Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByRef *pszVersion* As String) As Long

Parameters

pVersion	Pointer to a structure that version data is written.
pwUnidex	Pointer to WORD to hold UNIDEX Number.
pwMajor	Pointer to WORD to hold Major Number.
pwMinor	Pointer to WORD to hold Minor Number.
pwBuild	Pointer to WORD to hold Build Number.
pszVersion	Pointer to string to hold Version string.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

DIM sGlobStr as STRING * 50 ; 50 characters long

This function returns the version number of the device driver.

WARNING

This may not be the same device driver as seen on the hard drive, unless a reboot has been performed since the new device driver was placed on the hard drive.

The “String” form of this function returns the version information as a NULL terminated string in the *pszVersion* parameter.

See Also

AerVerGetImgVersion

Example

Samples\Lib\AexSys.C

27.5. AerVerGetImgVersion

AERERR_CODE AerVerGetImgVersion (HAERCTRL *hAerCtrl*, PAER_VERSION *pVersion*);

AERERR_CODE AerVerGetImgVersionEx (HAERCTRL *hAerCtrl*, PWORD *pwUnidex*, PWORD *pwMajor*, PWORD *pwMinor*, PWORD *pwBuild*);

Declare Function AerVerGetImgVersionEx Lib "AERSYS.DLL" (ByVal hAerCtrl As Long, ByRef *pwUnidex* As Integer, ByRef *pwMajor* As Integer, ByRef *pwMinor* As Integer, ByRef *pwBuild* As Integer) As Long

AERERR_CODE AerVerGetImgVersionString (HAERCTRL *hAerCtrl*, LPTSTR *pszVersion*);

Declare Function AerVerGetImgVersionString Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByRef *pszVersion* As String) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
pVersion	Pointer to a structure that version data is written.
pwUnidex	Pointer to WORD to hold UNIDEX Number.
pwMajor	Pointer to WORD to hold Major Number.
pwMinor	Pointer to WORD to hold Minor Number.
pwBuild	Pointer to WORD to hold Build Number.
pszVersion	Pointer to string to hold Version string.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

This function returns version information about the axis processor image (firmware) code that is currently running on the axis processor.

This may not be the same image present on the hard drive, unless a download has been performed after the image was placed on the hard drive.

WARNING

The image must be running for this function to return successfully.

The "String" form of this function returns the version information as a (NULL terminated) string in the *pszVersion* parameter.

See Also

AerVerGetBootVersion

27.6. AerVerGetLibVersion

AERERR_CODE AerVerGetLibVersion (PAER_VERSION *pVersion*);

AERERR_CODE AerVerGetLibVersionEx (PWORD *pwUnidex*, PWORD *pwMajor*, PWORD *pwMinor*, PWORD *pwBuild*);

Declare Function AerVerGetLibVersionEx Lib “AERSYS.DLL” (ByRef *pwUnidex* As Integer, ByRef *pwMajor* As Integer, ByRef *pwMinor* As Integer, ByRef *pwBuild* As Integer) As Long

AERERR_CODE AerVerGetLibVersionString (LPTSTR *pszVersion*);

Declare Function AerVerGetLibVersionString Lib “AERSYS.DLL” (ByRef *pszVersion* As String) As Long

Parameters

pVersion	Pointer to a structure that version data is written.
pwUnidex	Pointer to WORD to hold UNIDEX Number.
pwMajor	Pointer to WORD to hold Major Number.
pwMinor	Pointer to WORD to hold Minor Number.
pwBuild	Pointer to WORD to hold Build Number.
pszVersion	Pointer to string to hold Version string.

All string variables in MS Visual Basic, passed by reference (ByRef), must be declared as fixed length strings within your program, long enough to hold the string value returned by the function. Also, those string variables which are passed, with another parameter indicating the length of the string variable, must also be fixed length strings, otherwise, you would not be able to pass the length of the string. For example, to declare a fixed length string;

```
DIM sGlobStr as STRING * 50       ; 50 characters long
```

This function returns the version number of the library (AerSys.DLL) that is currently running on the front-end processor.

WARNING

This may not be the same DLL library that is on the hard drive, unless the application was started (and the DLL loaded into memory) after the library was installed on the hard drive.

The “String” form of this function returns the version information as a (NULL terminated) string in the *pszVersion* parameter.

See Also

AerVerGetImgVersion

Example

samples\lib\AexSys.C

27.7. AerVerGetOS

AERERR_CODE AerVerGetOS (PDWORD *pdwOS*);

Declare Function AerVerGetOS Lib “AERSYS.DLL” (ByRef *pdwOS* As Long) As Long

Parameters

pdwOS Pointer to a word that will return a constant indicating the operating system (see constants below).

This function returns the current operating system (i.e. Windows 95, Windows NT). The value is an AEROS_xxxx constant.

C Language and LabView Constants

AEROS_XXXX

VB Constants

aerOSXXXX

Example

Samples\Lib\AexSys.C

27.8. AerVerStringToVersion

AERERR_CODE AerVerStringToVersion (LPTSTR *pszVersion*, PAER_VERSION *pVersion*);

Parameters

pszVersion	String with version information.
pVersion	Pointer to structure to hold Aerotech version information.

This function converts a version string to the PAER_VERSION version structure. The string should be in an XXX.YYY.ZZ.UUU where X represents the UNIDEX number, Y represents the major number, Z represents the minor number and U represents the build number.

27.9. AerVerToString

AERERR_CODE AerVerToString (PAER_VERSION *pVersion*, LPTSTR *pszVersion*);

Parameters

pVersion	Pointer to version Aerotech information.
pszVersion	String to hold version information.

The *AerVerToString* function converts a PAER_VERSION version structure to a string. The format is XXX.YY.ZZ.UUU where X represents the UNIDEX Number, Y represents the Major Number, Z represents the Minor Number, and U represents the Build Number.

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CHAPTER 28: VIRTUAL I/O FUNCTIONS

In This Section:

28.1. Introduction

The Virtual I/O functions read and write to the virtual I/O of the UNIDEX 600 Series controllers. The virtual I/O space on the UNIDEX 600 card is comprised of four separate I/O spaces: 512 binary inputs, 512 binary outputs, 128 register inputs, and 128 register outputs. The U600 allows you to interact with these spaces in different block sizes using three function name styles: regular, “Ex”, and “Array.” For example, AerVirtGetBinaryInput() = regular, AerVirtGetInputByte**Ex**() = “Ex”, and AerVirtSetRegisterInput**Array**() = “Array”.

For information on connecting Virtual I/O to hardware, refer to the U600 User’s Guide (Chapter 2, in the Digital I/O section).

A regular function (one that doesn’t end in “Ex” or “Array”) reads I/O by bit (also called binary) or register size (a block of 16 bits). The “Ex” functions give the user the limited ability to define the block size (Bytes, Words, or Dwords – 8, 16, or 32 bits, respectively). The “Array” function gives the user the ability to define even larger block sizes to get or set.

For example, AerVirtGetBinaryInput() reads a bit from the binary input space while AerVirtGetInputByteEx() reads from the same binary input space and returns a block of eight consecutive bits (a byte) instead. AerVirtGetRegisterInputArray returns a series of (16 bit) registers from the register input space. The number of registers being determined by the parameters to the function.

28.2. AerVirtGetBinaryInput

AERERR_CODE AerVirtGetBinaryInput (HAERCTRL *hAerCtrl*, DWORD *dwNum*, PBOOL *pbValue*);

Declare Function AerVirtGetBinaryInput Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwNum* As Long, ByRef *pbValue* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwNum	Binary input bit number to read.
pbValue	Address of variable to receive value of the specified bit.

This function will read the state of a binary input (1 bit) from the UNIDEX 600 Series controller's virtual I/O space. There are 512 binary inputs, numbered 0 through 511.

See Also

AerVirtGetBinaryInputByteEx

Example

Samples\Lib\VisualBasic\RunPgm.vbp

28.3. AerVirtGetBinaryInputByteEx

AERERR_CODE AerVirtGetBinaryInputByteEx (HAERCTRL *hAerCtrl*, DWORD *dwByte*, PBYTE *pbyData*);

Declare Function AerVirtGetBinaryInputByteEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwByte* As Long, ByRef *pbyData* As Byte) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwByte	Binary input byte number.
pbyData	Address of variable to receive value of the specified byte.

This function will read 8 bits (1 byte) of data from the UNIDEX 600 Series controller's virtual I/O space. There are 512 binary inputs, numbered 0 through 511, contained in bytes 0 through 64. Byte 0 would return the values of binary inputs 0 through 7, byte 1 would return the values of binary inputs 8 through 15, etc.

See Also

AerVirtGetBinaryInput

28.4. AerVirtGetBinaryInputDWordEx

C

AERERR_CODE AerVirtGetBinaryInputDWordEx (HAERCTRL *hAerCtrl*, DWORD *dwDWord*, PDWORD *pdwData*);

VB

Declare Function AerVirtGetBinaryInputDWordEx Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *dwDWord* As Long, ByRef *pdwData* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
dwDWord	Which binary input DWORD (32 bit quantity) to read.
pdwData	Pointer to a DWORD to hold 32 bits of data.

This function reads 32-bits (1 DWORD) of data from the virtual input space.

DWORD 0 would return the values of binary inputs 0 – 31.
DWORD 1 would return the values of binary inputs 32 – 63, etc.

28.5. AerVirtGetBinaryInputWordArray

AERERR_CODE AerVirtGetBinaryInputWordArray (HAERCTRL *hAerCtrl*, DWORD *dwStartWord*, PWORD *pwArray*, DWORD *dwNumWords*);

Declare Function AerVirtGetBinaryInputWordArray Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *dwStartWord* As Long, ByRef *pwArray* As Integer, ByVal *dwNumWords* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card
dwStartWord	Which binary input WORD (16 bit quantity) to read from.
pwArray	An array of 16 bit data words to hold the binary inputs.
dwNumWords	The number of 16 bit data words to read.

This function reads the specified number of binary input words from the Virtual Input space into the given array space.

WORD 0 would return the values of binary inputs 0 – 15.
WORD 1 would return the values of binary inputs 16 – 31, etc.

28.6. AerVirtGetBinaryInputWordEx

AERERR_CODE AerVirtGetBinaryInputWordEx (HAERCTRL *hAerCtrl*, DWORD *dwWord*, PWORD *pwData*);

Declare Function AerVirtGetBinaryInputWordEx Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *dwWord* As Long, ByRef *pwData* As Integer) As Long

Parameters

hAerCtrl Handle to axis processor card.
dwWord Which binary input WORD (16 bit quantity) to read.
pwData Pointer to a WORD to hold 16 bits of data.

This function reads 16 bits (1 WORD) of data from the virtual input space. The valid binary input words are 0-31 (where 0 returns the value of bits 0-15, 1 returns the value of bits 16-31, 2 returns the value of bits 32-47, etc.).

28.7. AerVirtGetBinaryIO

AERERR_CODE AerVirtGetBinaryIO (HAERCTRL *hAerCtrl*,
PAERVIRT_BINARY_DATA *pInputs*,
PAERVIRT_BINARY_DATA *pOutputs*);

Parameters

hAerCtrl Handle to axis processor card.
pInputs Pointer to AERVIRT_BINARY_DATA to hold the binary input data.
pOutputs Pointer to AERVIRT_BINARY_DATA to hold the binary output data.

This function retrieves the current state of all the virtual binary inputs and outputs on the U600 card. One of the parameters, *pInputs* or *pOutputs*, may be NULL if both are not desired.

28.8. AerVirtGetBinaryOutput

C

AERERR_CODE AerVirtGetBinaryOutput (HAERCTRL *hAerCtrl*, DWORD *dwNum*, PBOOL *pbValue*);

VB

Declare Function AerVirtGetBinaryOutput Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *dwNum* As Long, ByRef *pbValue* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwNum	Binary output bit number to read.
pbValue	Address of variable to receive value of the specified bit.

This function will read the state of a binary output (1 bit) from the UNIDEX 600 Series controller’s virtual I/O space. There are 512 binary outputs, numbered 0 through 511.

See Also

AerVirtGetBinaryOutputByteEx

28.9. AerVirtGetBinaryOutputByteEx

AERERR_CODE AerVirtGetBinaryOutputByteEx (HAERCTRL *hAerCtrl*, DWORD *dwByte*, PBYTE *pbyData*);

Declare Function AerVirtGetBinaryOutputByteEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwByte* As Long, ByRef *pbyData* As Byte) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwByte	Binary output byte number.
pbyData	Address of variable to receive value of the specified byte.

This function will read 8 bits (1 byte) of data from the UNIDEX 600 Series controller's virtual I/O space. There are 512 binary outputs, numbered 0 through 511, contained in bytes 0 through 64. Byte 0 would return the values of binary outputs 0 through 7, byte 1 would return the values of binary outputs 8 through 15, etc.

See Also

AerVirtGetBinaryOutput

28.10. AerVirtGetBinaryOutputDWordEx

C

VB

AERERR_CODE AerVirtGetBinaryOutputDWordEx (HAERCTRL *hAerCtrl*, DWORD *dwDWord*, PDWORD *pdwData*);

Declare Function AerVirtGetBinaryOutputDWordEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwDWord* As Long, ByRef *pdwData* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
dwDWord	Which binary output DWORD (32 bit quantity) to read.
pdwData	Pointer to a DWORD to hold 32 bits of data.

This function reads 32 bits (1 DWORD) of data from the Virtual Output space.
DWORD 0 would return the values of binary outputs 0 – 31.
DWORD 1 would return the values of binary outputs 32 – 63, etc.

28.11. AerVirtGetBinaryOutputWordArray

AERERR_CODE AerVirtGetBinaryOutputWordArray (HAERCTRL *hAerCtrl*, DWORD *dwStartWord*, PWORD *pwArray*, DWORD *dwNumWords*);

Declare Function AerVirtGetBinaryOutputWordArray Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwStartWord* As Long, ByRef *pwArray* As Integer, ByVal *dwNumWords* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
dwStartWord	Which binary output WORD (16 bit quantity) to start reading from.
pwArray	An array of 16 bit data WORDS to hold the binary inputs.
dwNumWords	The number of 16 bit data WORDS to read.

This function reads the specified number of binary output words from the virtual output space into the given array space.

WORD 0 would return the values of binary outputs 0 – 15.
WORD 1 would return the values of binary outputs 16 – 31, etc.

28.12. AerVirtGetBinaryOutputWordEx

AERERR_CODE AerVirtGetBinaryOutputWordEx (HAERCTRL *hAerCtrl*, DWORD *dwWord*, PWORD *pwData*);

Declare Function AerVirtGetBinaryOutputWordEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwWord* As Long, ByRef *pwData* As Integer) As Long

Parameters

hAerCtrl Handle to axis processor card.
dwWord Which binary output WORD (16 bit quantity) to read.
pwData Pointer to a WORD to hold 16 bits of data.

This function reads 16-bits (1 WORD) of data from the virtual output space. The valid binary output words are 0 – 31 (where 0 returns the value of bits 0 – 15; 1 returns the value of bits 16 – 31; 2 returns the values of bits 32 – 47, etc.).

28.13. AerVirtGetRegisterInput

AERERR_CODE AerVirtGetRegisterInput (HAERCTRL *hAerCtrl*, DWORD *dwNum*, PWORD *pwValue*);

Declare Function AerVirtGetRegisterInput Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwNum* As Long, ByRef *pwValue* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwNum	Register number to read.
pwValue	Address of variable to receive value from the specified register.

This function will read a register from within the UNIDEX 600 Series controller's virtual input register space. There are 128, 16 bit registers, numbered 0 through 127.

See Also

AerVirtGetRegisterInputEx

28.14. AerVirtGetRegisterInputArray

AERERR_CODE AerVirtGetRegisterInputArray (HAERCTRL *hAerCtrl*, DWORD *dwStartReg*, PWORD *pwArray*, DWORD *dwNumReg*);

Declare Function AerVirtGetRegisterInputArray Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwStartReg* As Long, ByRef *pwArray* As Integer, ByVal *dwNumReg* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
dwStartReg	Which register input WORD (16 bit quantity) to start reading from.
pwArray	An array of WORDS to read the registers into.
dwNumReg	The number of 16 bit register WORDS to read.

The *AerVirtGetRegisterInputArray* function reads the specified number of register input WORDS from the virtual register input space into the given array. There are 128 register inputs, numbered 0 – 127.

28.15. AerVirtGetRegisterInputEx

AERERR_CODE AerVirtGetRegisterInputEx (HAERCTRL *hAerCtrl*, DWORD *dwReg*, PWORD *pwData*);

Declare Function AerVirtGetRegisterInputEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwReg* As Long, ByRef *pwData* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwReg	Register number to read.
pwData	Address of variable to receive value from the specified register.

This function will read a register from within the UNIDEX 600 Series controller's virtual input register space. There are 128, 16 bit registers, numbered 0 through 127.

See Also

AerVirtGetRegisterInput

28.16. AerVirtGetRegisterIO

AERERR_CODE AerVirtGetRegisterIO (HAERCTRL *hAerCtrl*,
PAERVIRT_REGISTER_DATA *pInputs*,
PAERVIRT_REGISTER_DATA *pOutputs*);

Parameters

hAerCtrl	Handle to axis processor card.
pInputs	Pointer to AERVIRT_REGISTER_DATA to hold the register input data (may be NULL).
pOutputs	Pointer to AERVIRT_REGISTER_DATA to hold the register output data (may be NULL).

This function retrieves the current state of all the virtual register inputs and outputs on the U600 card. One of the parameters, *pInputs* and *pOutputs*, may be NULL if both types of register data is not required.

28.17. AerVirtGetRegisterOutput

AERERR_CODE AerVirtGetRegisterOutput (HAERCTRL *hAerCtrl*, DWORD *dwNum*, PWORD *pwValue*);

Declare Function AerVirtGetRegisterOutput Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwNum* As Long, ByRef *pwValue* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwNum	Register number to read.
pwValue	Address of variable to receive value from the specified register.

This function will read a register from within the UNIDEX 600 Series controllers virtual output register space. There are 128, 16 bit registers, numbered 0 through 127.

See Also

AerVirtGetRegisterOutputEx

28.18. AerVirtGetRegisterOutputArray

AERERR_CODE AerVirtGetRegisterOutputArray (HAERCTRL *hAerCtrl*, DWORD *dwStartReg*, PWORD *pwArray*, DWORD *dwNumReg*);

Declare Function AerVirtGetRegisterOutputArray Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *dwStartReg* As Long, ByRef *pwArray* As Integer, ByVal *dwNumReg* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
dwStartReg	Which register output WORD (16 bit quantity) to start reading from.
pwArray	An array of WORDS to read the registers into.
dwNumReg	The number of 16 bit register WORDS to read.

This function reads the specified number of register output WORDS from the virtual register output space into the given array. There are 128 register outputs numbered 0 – 127.

28.19. AerVirtGetRegisterOutputEx

AERERR_CODE AerVirtGetRegisterOutputEx (HAERCTRL *hAerCtrl*, DWORD *dwReg*, PWORD *pwData*);

Declare Function AerVirtGetRegisterOutputEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwReg* As Long, ByRef *pwData* As Integer) As Long

C

VB

Parameters

hAerCtrl	Handle to the axis processor card.
dwReg	Register number to read.
pwData	Address of variable to receive value from the specified register.

This function will read a register from within the UNIDEX 600 Series controllers virtual output register space. There are 128, 16 bit registers, numbered 0 through 127.

See Also

AerVirtGetRegisterOutput

28.20. AerVirtSetBinaryInput

AERERR_CODE AerVirtSetBinaryInput (HAERCTRL *hAerCtrl*, DWORD *dwNum*, BOOL *bValue*);

Declare Function AerVirtSetBinaryInput Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwNum* As Long, ByVal *bValue* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwNum	Binary input bit number to set.
bValue	Value to write.

This function will write data to the UNIDEX 600 Series controller's virtual binary input space. There are 512 binary inputs, numbered 0 through 511. Writing to any virtual inputs that are mapped to physical inputs will be over-written by the state of the physical input on the next update of the virtual I/O by the axis processor card.

See Also

AerVirtSetBinaryInputByteEx

28.21. AerVirtSetBinaryInputByteEx

AERERR_CODE AerVirtSetBinaryInputByteEx (HAERCTRL *hAerCtrl*, DWORD *dwByte*, BYTE *byData*);

Declare Function AerVirtSetBinaryInputByteEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwByte* As Long, ByVal *byData* As Byte) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwByte	Binary output byte number to set.
byData	Byte of data to write.

This function will write 8 bits (1 byte) of data to the UNIDEX 600 Series controller's virtual binary input space. There are 512 binary inputs, numbered 0 through 511, contained in bytes 0 through 64. Byte 0 would return the values of binary outputs 0 through 7, byte 1 would return the values of binary outputs 8 through 15, etc. Writing to any virtual inputs that are mapped to physical inputs will be over-written by the state of the physical input on the next update of the virtual I/O by the axis processor card.

See Also

AerVirtSetBinaryInput

28.22. AerVirtSetBinaryInputDWordEx

AERERR_CODE AerVirtSetBinaryInputDWordEx (HAERCTRL *hAerCtrl*, DWORD *dwDWord*, DWORD *dwData*);

Declare Function AerVirtSetBinaryInputDWordEx Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *dwDWord* As Long, ByVal *dwData* As Long) As Long

Parameters

hAerCtr Handle to axis processor card.
dwWord Which binary input DWORD (32 bit quantity) to write to.
dwData A 32 bit data WORD to write.

This function writes 32 bits (1 DWORD) of data to the virtual input space.

DWORD 0 would write to binary inputs 0 – 31.
DWORD 1 would write to binary inputs 32 – 63, etc.

28.23. AerVirtSetBinaryInputWordArray

AERERR_CODE AerVirtSetBinaryInputWordArray (HAERCTRL *hAerCtrl*, DWORD *dwStartWord*, PWORD *pwArray*, DWORD *dwNumWords*);

Declare Function AerVirtSetBinaryInputWordArray Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwStartWord* As Long, ByRef *pwArray* As Integer, ByVal *dwNumWords* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
dwStartWord	Which binary input WORD (16 bit quantity) to start writing to.
pwArray	An array of 16 bit data WORDS to write.
dwNumWords	The number of 16 bit data WORDS to write.

This function writes the specified number of binary input WORDS to the virtual input space from the given array.

WORD 0 would write to binary inputs 0 – 15.
WORD 1 would write to binary inputs 16 – 31, etc.

28.24. AerVirtSetBinaryInputWordEx

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AERERR_CODE AerVirtSetBinaryInputWordEx (HAERCTRL *hAerCtrl*, DWORD *dwWord*, WORD *wData*);

Declare Function AerVirtSetBinaryInputWordEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwWord* As Long, ByVal *wData* As Integer) As Long

Parameters

hAerCtrl	Handle to axis processor card.
dwWord	Which binary input WORD (16 bit quantity) to write.
wData	A 16 bit data WORD to write.

This function writes 16 bits (1 WORD) of data to the virtual input space.

WORD 0 would write to binary inputs 0 – 15.
WORD 1 would write to binary inputs 16 – 31, etc.

28.25. AerVirtSetBinaryIO

AERERR_CODE AerVirtSetBinaryIO (HAERCTRL *hAerCtrl*,
PAERVIRT_BINARY_DATA *pInputs*,
PAERVIRT_BINARY_DATA *pOutputs*);

Parameters

hAerCtrl	Handle to axis processor card.
pInputs	Pointer to AERVIRT_BINARY_DATA with the binary input data.
pOutputs	Pointer to AERVIRT_BINARY_DATA with the binary output data.

This function sets the current state of all the virtual binary inputs and outputs on the U600 card. One of the parameters, *pInputs* and *pOutputs*, may be NULL if both types do not need to be written.

28.26. AerVirtSetBinaryOutput

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AERERR_CODE AerVirtSetBinaryOutput (HAERCTRL *hAerCtrl*, DWORD *dwNum*, BOOL *bValue*);

Declare Function AerVirtSetBinaryOutput Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *dwNum* As Long, ByVal *bValue* As Long) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwNum	Binary output bit number to set.
bValue	Value to write.

This function will write data to the UNIDEX 600 Series controller’s virtual binary output space. There are 512 binary outputs, numbered 0 through 511.

See Also

AerVirtSetBinaryOutputByteEx

Example

Samples\Lib\VisualBasic\RunPgm.vbp

28.27. AerVirtSetBinaryOutputByteEx

AERERR_CODE AerVirtSetBinaryOutputByteEx (HAERCTRL *hAerCtrl*, DWORD *dwByte*, BYTE *byData*);

Declare Function AerVirtSetBinaryOutputByteEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwByte* As Long, ByVal *byData* As Byte) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwByte	Binary output byte number to set.
byData	Byte of data to write.

This function will write 8 bits (1 byte) of data to the UNIDEX 600 Series controllers virtual binary output space. There are 512 binary outputs, numbered 0 through 511, contained in bytes 0 through 64. Byte 0 would set the values of binary outputs 0 through 7, byte 1 would set the values of binary outputs 8 through 15, etc.

See Also

AerVirtSetBinaryOutput

28.28. AerVirtSetBinaryOutputDWordEx

AERERR_CODE AerVirtSetBinaryOutputDWordEx (HAERCTRL *hAerCtrl*, DWORD *dwDWord*, DWORD *dwData*);

Declare Function AerVirtSetBinaryOutputDWordEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwDWord* As Long, ByVal *wData* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
dwWord	Which binary output DWORD (32 bit quantity) to write to.
wData	A 32 bit data WORD to write.

This function writes 32 bits (1 DWORD) of data to the virtual output space.

DWORD 0 would write to binary inputs 0 – 31.
DWORD 1 would write to binary inputs 32 – 63, etc.

28.29. AerVirtSetBinaryOutputWordArray

AERERR_CODE AerVirtSetBinaryOutputWordArray (HAERCTRL *hAerCtrl*, DWORD *dwStartWord*, PWORD *pwArray*, DWORD *dwNumWords*);

Declare Function AerVirtSetBinaryOutputWordArray Lib “AERSYS.DLL” (ByVal *hAerCtrl* As Long, ByVal *dwStartWord* As Long, ByRef *pwArray* As Integer, ByVal *dwNumWords* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
dwStartWord	Which binary output WORD (16 bit quantity) to start writing to.
pwArray	An array of 16 bit data WORDS to write.
dwNumWords	The number of 16 bit data WORDS to write.

This function writes the specified number of binary output WORDS to the virtual output space from the given array.

WORD 0 would write to binary inputs 0 – 15.
WORD 1 would write to binary inputs 16 – 31, etc.

28.30. AerVirtSetBinaryOutputWordEx

C

AERERR_CODE AerVirtSetBinaryOutputWordEx (HAERCTRL *hAerCtrl*, DWORD *dwWord*, WORD *wData*);

VB

Declare Function AerVirtSetBinaryOutputWordEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwWord* As Long, ByVal *wData* As Integer) As Long

Parameters

hAerCtrl	Handle to axis processor card.
dwWord	Which binary output WORD (16 bit quantity) to write.
wData	A 16 bit data WORD to write.

This function writes 16 bits (1 WORD) of data to the virtual output space.

WORD 0 would write to binary inputs 0 – 15.
WORD 1 would write to binary inputs 16 – 31, etc.

28.31. AerVirtSetRegisterInput

AERERR_CODE AerVirtSetRegisterInput (HAERCTRL *hAerCtrl*, DWORD *dwNum*, WORD *wValue*);

Declare Function AerVirtSetRegisterInput Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwNum* As Long, ByVal *wValue* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwReg	Register number to write.
wValue	Value to write.

This function will write a value to a register within the UNIDEX 600 Series controller's virtual input register space. There are 128, 16 bit registers, numbered 0 through 127.

See Also

AerVirtSetRegisterInputEx

28.32. AerVirtSetRegisterInputArray

C

AERERR_CODE AerVirtSetRegisterInputArray (HAERCTRL *hAerCtrl*, DWORD *dwStartReg*, PWORD *pwArray*, DWORD *dwNumReg*);

VB

Declare Function AerVirtSetRegisterInputArray Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwStartReg* As Long, ByRef *pwArray* As Integer, ByVal *dwNumReg* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
dwStartReg	Which register input WORD (16 bit quantity) to start writing to.
pwArray	An array of 16 bit register WORDS to write.
dwNumReg	The number of 16 bit register WORDS to write.

This function writes the specified number of register input WORDS to the virtual register input space from the given array space. There are 128 (16 bit registers) numbered 0 – 127.

28.33. AerVirtSetRegisterInputEx

AERERR_CODE AerVirtSetRegisterInputEx (HAERCTRL *hAerCtrl*, DWORD *dwReg*, WORD *wData*);

Declare Function AerVirtSetRegisterInputEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwReg* As Long, ByVal; *pwData* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwReg	Register number to write.
wData	Value to write.

This function will write a value to a register within the UNIDEX 600 Series controller's virtual input register space. There are 128, 16 bit registers, numbered 0 through 127.

See Also

AerVirtSetRegisterInput

28.34. AerVirtSetRegisterIO

AERERR_CODE AerVirtSetRegisterIO (HAERCTRL *hAerCtrl*,
PAERVIRT_REGISTER_DATA *pInputs*,
PAERVIRT_REGISTER_DATA *pOutputs*);

Parameters

hAerCtrl	Handle to axis processor card.
pInputs	Pointer to AERVIRT_REGISTER_DATA with the register input data (may be NULL).
pOutputs	Pointer to AERVIRT_REGISTER_DATA with the register output data (may be NULL).

This function sets the current state of all the virtual register inputs and outputs on the U600 card. One of the parameters, *pInputs* and *pOutputs*, may be NULL if both types of data are not required.

28.35. AerVirtSetRegisterOutput

AERERR_CODE AerVirtSetRegisterOutput (HAERCTRL *hAerCtrl*, DWORD *dwNum*, WORD *wValue*);

Declare Function AerVirtSetRegisterOutput Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwNum* As Long, ByVal *wValue* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwReg	Register number to write to.
wData	Data to write to the specified output register.

This function will write a value to an output register within the UNIDEX 600 Series controllers virtual output register space. There are 128, 16 bit registers, numbered 0 through 127.

See Also

AerVirtSetRegisterOutputEx

28.36. AerVirtSetRegisterOutputArray

C

AERERR_CODE AerVirtSetRegisterOutputArray (HAERCTRL *hAerCtrl*, DWORD *dwStartReg*, PWORD *pwArray*, DWORD *dwNumReg*);

VB

Declare Function AerVirtSetRegisterOutputArray Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwStartReg* As Long, ByRef *pwArray* As Integer, ByVal *dwNumReg* As Long) As Long

Parameters

hAerCtrl	Handle to axis processor card.
dwStartReg	Which register output WORD (16 bit quantity) to start writing to.
pwArray	An array of 16 bit WORDS to write.
dwNumReg	The number of 16 bit register WORDS to write.

This function writes the specified number of values to the virtual register output space from the given array.

28.37. AerVirtSetRegisterOutputEx

AERERR_CODE AerVirtSetRegisterOutputEx (HAERCTRL *hAerCtrl*, DWORD *dwReg*, WORD *wData*);

Declare Function AerVirtSetRegisterOutputEx Lib "AERSYS.DLL" (ByVal *hAerCtrl* As Long, ByVal *dwReg* As Long, ByVal *wData* As Integer) As Long

Parameters

hAerCtrl	Handle to the axis processor card.
dwReg	Register number to write to.
wData	Data to write to the specified output register.

This function will write a value to an output register within the UNIDEX 600 Series controllers virtual output register space. There are 128, 16 bit registers, numbered 0 through 127.

See Also

AerVirtSetRegisterOutput

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APPENDIX A: CONSTANTS FOR C LANGUAGE AND LABVIEW USERS

In This Section:

A.1. Description

The following section provides a quick reference of all the constants used within the library's (AerSys.DLL, AerErr.DLL, and AerCmplr.DLL).

A.2. AER_BP

These constants are used for defining breakpoints, on, off and toggling the break point.

Constants

```
AER_BP_TOGGLE            (DWORD) -1
AER_BP_OFF                0
AER_BP_ON                 1
```

A.3. AER_CARD

These constants are used to register a card with the system and to establish communications with the card during device initialization. The Aerotech device driver can communicate with up to four cards simultaneously.

Constants

```
AER_CARD_NONE          -1
AER_CARD_DEFAULT        0
AER_CARD_1              1
AER_CARD_2              2
AER_CARD_3              3
AER_CARD_4              4
```

Used by

AerRegxxxx
AerSysOpen

A.4. AER_CPUSTAT

These indicate the state of the controller.

Constants

```
AER_CPUSTAT_BOOT_EXECUTE      1  // The CPU is booting itself up
AER_CPUSTAT_IMG_EXECUTE       2  // The CPU is currently running
                                 // an image file
AER_CPUSTAT_FATAL             3  // The CPU is in an erroneous
                                 // or unknown state
```

Used by

AerVerGetCpuStatus

A.5. AER_DRV600_DEFAULT

These constants are used for defining the default values of the device driver to communicate with the controller. They are AT Window, 0xdc00 0000, I/O base address 0x220, IRQ 5 and DRAM Size Code, 2 Megabytes.

Constants

```
AER_DRV600_DEFAULT_ATWIN       0xdc00 0000  // AT window
AER_DRV600_DEFAULT_IO          0x220        // I/O address
AER_DRV600_DEFAULT_IRQ         5            // IRQ 5
AER_DRV600_DEFAULT_DSC         2            // 2 megabytes
```

A.6. AER_EVENT

These constants are used to for determining the state of the active tasks on the Axis Processor card.

Constants

```
AER_EVENT_TASK_FAULT      0x00008002  // A task related fault has
                                      // occurred
                                      // (i.e. bad CNC line seen)
AER_EVENT_AXIS_FAULT      0x00008003  // An axis related fault
                                      // has occurred
                                      // (i.e. position error)
AER_EVENT_TASK_CALLBACK   0x00008006  // Axis processor requests
                                      // a 'task operation'
AER_EVENT_VIRTIO_UPDATE   0x00008005  // The controller wants to
                                      // change the value of an
                                      // external output.
AER_EVENT_SERIAL          0x00008004  // Serial port on Axis
                                      // processor input seen
AER_EVENT_AXIS_FAIL                   // Interrupt seen, but no
                                      // data found.
AER_EVENT_IRQ2_TIMER                  // Secondary loop interrupt
                                      // (U631 only)
```

Used by

AerEventCreateEvent

A.7. AER_FBTYPE_XXXX

An axis feedback type definition.

Constants

```
AER_FBTYPE_NULL                 0   // no feedback
AER_FBTYPE_RESOLVER             1   // resolver or inductosyn
                                    // feedback
AER_FBTYPE_ENCODER              2   // encoder feedback
AER_FBTYPE_ENCODER_HALL         3   // brushless motor with
                                    // encoder/hall
AER_FBTYPE_HPVME                4   // HP VME laser feedback
AER_FBTYPE_NEW_EXT_ENCODER      5   // spare
AER_FBTYPE_RESOLVER_HALL        6   // resolver with hall
                                    // feedback
AER_FBTYPE_STEPPER              7   // open loop stepper motor
AER_FBTYPE_HALL_POLE            10  // Encoder Hall (pole pairs)
```

Used by

AerConfigXXXX

A.8. AER_IOTYPE_XXXX

An axis IO type definition.

Constants

```
AER_IOTYPE_NULL      0      // no IO type
AER_IOTYPE_D2A       1      // IO type is D2A
```

Used by

AerConfigXXXX

A.9. AER_PROBESTATUS_XXXX

These constants are used to determine the status of the probe.

Constants

```
AER_PROBESTATUS_ARMED        0x01  // Probe is armed
AER_PROBESTATUS_VALIDPOS     0x02  // Position is valid
AER_PROBESTATUS_INPUT        0x04  // Has been configured
AER_PROBESTATUS_HIGHSPEED    0x08  // Using High speed position
                                   // latch
```

Used By

Probe Functions

A.10. AER_MFBTYPE_XXXX

An axis master feedback type definition.

Constants

```
AER_MFBTYPE_NULL         0    // No master feedback
AER_MFBTYPE_RESOLVER     1    // Resolver master feedback
AER_MFBTYPE_ENCODER      2    // Encoder master feedback
AER_MFBTYPE_VIRTUAL      3    // Virtual master feedback
AER_MFBTYPE_AUXENCODER   4
```

Used by

AerConfigXXXX

A.11. AER_SPARETYPE1_XXXX

A spare axis feedback type definition.

Constants

```
AER_SPARETYPE1_NULL            0   // Spare NULL feedback
                                   // definition
AER_SPARETYPE1_ENCODER         3   // Spare encoder feedback
                                   // definition
AER_SPARETYPE1_ENCODER_SLAVE   4   // Spare encoder slave
                                   // definition
AER_SPARETYPE1_RESOLVER        5   // Spare resolver feedback
                                   // definition
```

Used by

AerConfigXXXX

A.12. AER_SPARETYPE2_XXXX

A spare feedback type definition, defined as 0.

Constants

```
AER_SPARETYPE2_NULL      0
AER_SPARETYPE2_ANALOG    1
```

Used by

AerConfigXXXX

A.13. AER_UNIDEX

These constants are used to specify to the device driver, the type of Aerotech controller hardware that it will be communicating with. They are used when registering the system in the Win32 registry.

Constants

```
AER_UNIDEX_NONE          -1          // Reserved for Aerotech use
AER_UNIDEX_DEFAULT       0           // Default machine
AER_UNIDEX_600PC         600         // U600 (AT bus)
```

Used by

AerRegxxxx
AerSysOpen

A.14. AERCAM

These constants are used by the various camming functions.

Constants

```
AERCAM_POINT_LINEAR        0  // Linear interpolation
AERCAM_POINT_CUBIC         1  // Cubic interpolation
```

Used by

AerCamTableSetPoint
AerCamTableGetPoint

Constants

```
AERCAM_MODE_OFF            0  // Turn off synchronization
AERCAM_MODE_RELATIVE       1  // Relative camtable mode
AERCAM_MODE_ABSOLUTE       2  // Absolute camtable mode
AERCAM_MODE_VELOCITY       3  // Velocity camtable mode
```

Used by

AerCamTableGetStatus
AerCamTableGetMode

Constants

```
AERCAM_STAT_ALLOCATED      1  // Cam table allocated
AERCAM_STAT_COEFFS_DONE    2  // Coefficients have been
                              // calculated
AERCAM_STAT_COEFFS_BUSY    4  // Coefficients being calculated
```

Used by

AerCamTableGetStatus

A.15. AERCMPLR

These constants control the CNC compilation, combine the desired flags together passing as the *dwMode* parameter to *AerCompilerCompileLine* or *AerCompilerCompilFile*. Some combinations may not be legal (in these cases an error will be returned) or some options may be ignored (if AERCMPL_PREPROC_ONLY is set, AERCMPLR_NO_USE_OBJ is ignored).

Constants

```
AERCMPLR_DEFAULT        0x0   // Uses object files, only
                              // recompile when necessary,
                              // don't make listing
AERCMPLR_PREPROC_ONLY   0x1   // Only run preprocessor (use
                              // with MAKE_LISTING)
AERCMPLR_NO_READ_OBJS   0x2   // Always recompile it, don't
                              // write obj.
AERCMPLR_NO_USE_SRC     0x4   // Read object (no source code
                              // available)
AERCMPLR_MAKE_LISTING   0x8   // Puts preprocessor output in file
AERCMPLR_SRC_WITH_OBJ   0x10
AERCMPLR_WRITE_OBJ      0x20
```

Used by

AerCompilerCompileLine
AerCompilerCompileFile

A.16. AERERR_TYPE

These constants specify the type of warning message (Message Only, Warning Message, Error Message or No Message).

Constants

```
AERERR_TYPE_MSG          0
AERERR_TYPE_WARN         1
AERERR_TYPE_ERROR        2
AERERR_TYPE_NONE         3
```

A.17. AERREGID

Constants

```
// these values are used to get values (AerRegGet/SetFilename())

AERREGID_AxisCfgFile      0     // <iniDir>\AxisCfg.ini
AERREGID_AxisWizFile      1     // <iniDir>\AxisCfg.wiz
AERREGID_AxisParmFile     2     // <iniDir>\AxisParm.ini
AERREGID_MachParmFile     3     // <iniDir>\MachParm.ini
AERREGID_TaskParmFile     4     // <iniDir>\TaskParm.ini
AERREGID_GlobParmFile     5     // <iniDir>\GlobParm.ini
AERREGID_ParmDefFile      6     // <iniDir>\ParmDef.ini
AERREGID_InstallDir       7     // c:\u600(created by setup)
AERREGID_ProgramDir       8     // <installDir>\Programs
AERREGID_IniDir           9     // <installDir>\Ini
AERREGID_BinDir           10    // <installDir>\Bin
AERREGID_ImageFile        11    // <binDir>\PC960.img
AERREGID_BootImageFile    12    // <binDir>\PC960BT.img
AERREGID_SymbolicName     13    // U600/<binDir>\U600.vxd
AERREGID_Cal2DFile        14    // 2D Calibration File
AERREGID_AutomationFile   15    // U600auto.ini (Program
                                // Automation File)
AERREGID_ToolFile         16    // tool.ini  (ToolTable file)
AERREGID_VirtIOFile       17    // VirtIO file
AERREGID_U600IniFile      18    // U600mmi.ini (U600 init File)
AERREGID_U600PosFile      19    // U600pos.ss  (U600 positions
                                // display file)
AERREGID_U600File         20    // U600.ini  (U600 filenames)
AERREGID_Max              21
```

Used By

AerRegGetFilename()
AerRegSetFilename()

A.18. AERTOOL

Constants

```
AERTOOL_F_ENGLISH        0x0000001   // units are english
AERTOOL_F_INUSE          0x0000002   // tool can be used
AERTOOL_F_FORCE_UNITS    0x0000004   // when tool is activated, it
                                     // must be in proper units
AERTOOL_F_USER_DIAMETER  0x0008000   // used by Interface/Display
                                     // only. Values
                                     // (Radius/Wear) are
                                     // diameter
AERTOOL_F_VALID          0x8000000   // internal – the tool has
                                     // been loaded
```

A.19. ALT_STAT

To determine the other (alternate) motion status words of an axis.

Constants

```
// Alternate Status word returned by

ALT_STAT_LAST_MVE        0x00000001  // mask for final move into
                                     // home
ALT_STAT_ALT_HME         0x00000002  // mask for alternate home
ALT_STAT_PWR_HME         0x00000004  // mask for mask for home start
                                     // in limit
ALT_STAT_FND_HME         0x00000008  // mask for home limit detected
ALT_STAT_TRQ_SET         0x00000010  // mask for valid torque
                                     // parameters
ALT_STAT_TRQ_EN          0x00000020  // mask for torque enable
ALT_STAT_HALL_COMM       0x00000040  // mask for hall effect
                                     // commutation
ALT_STAT_HALL_EDGE       0x00000080  // mask for first edge received
ALT_STAT_DUAL_LOOP       0x00000100  // mask for dual loop feedback
ALT_STAT_VME_JOG         0x00000200  // mask for vme jog mode
ALT_STAT_LST_DIR         0x00000400  // mask for ccw motion in hall
                                     // commutation
ALT_STAT_JOG_DIR         0x00000800  // mask for positive jog
                                     // direction
ALT_STAT_EXT_RES         0x00001000  // mask for external resolver
                                     // feedback
ALT_STAT_REV_ERROR_ON    0x00002000  // reversal error enabled
ALT_STAT_LAST_REV_POS    0x00004000  // last reversal in pos dir
ALT_STAT_LAST_REV_NEG    0x00008000  // last reversal in neg dir
ALT_STAT_SAFE_ENABLE     0x00010000  // safe zone enabled
ALT_STAT_SAFE_OUTSIDE    0x00020000  // safe zone is outside region
ALT_STAT_SIMULATION      0x00040000  // feedrate override
ALT_STAT_HOME_VELOCITY   0x00080000  // home off the velocity
                                     // transducer
ALT_STAT_ACCEL_RATE      0x00100000  // accel rate
ALT_STAT_DECEL_RATE      0x00200000  // decel rate
ALT_STAT_PHASE_MODE      0x00400000  // mask for phase advance
ALT_STAT_HOME_COMPLETE   0x00800000  //
ALT_STAT_LIMIT_OVERRIDE  0x01000000  // always check soft limits if
                                     // reset
ALT_STAT_SLAVE_ENCODER   0x02000000  // slave encoder
ALT_STAT_QUE_CAM         0x04000000  // cam table queued
ALT_STAT_HOME_NOLIM      0x08000000  // home without home limit
ALT_STAT_SPEED_OUTPUT    0x10008000  //
ALT_STAT_STEPR           0x20000000  // mask for stepper motor
ALT_STAT_NORMAL_OUT      0x40000000  // set for negative current
                                     // output
ALT_STAT_MFB_ENCODER     0x80000000  // set for encoder for master
                                     // feedback
```

Used by

Axis parameter ALT_STATUS

A.20. ANALOGINDEX

Specifies an analog channel.

Constants

ANALOGINDEX_xxx is an analog index in the range of 1-16, having a value of 0 to 15.

Used by

ANALOGINDEX variable

A.21. AXISINDEX

Physical axis index numbers.

Constants

AXISINDEX_n where n is the axis number in the range of 1-16, having a value of 0 to 15.

Used by

AerParmAxisGetValue, ...

A.22. AXISMASK

These constants specify multiple axes. They are added (summed) together to produce one parameter specifying multiple axes within one parameter.

Constants

```
AXISMASK_1                0x00000001L
AXISMASK_2                0x00000002L
AXISMASK_3                0x00000004L
AXISMASK_4                0x00000008L
AXISMASK_5                0x00000010L
AXISMASK_6                0x00000020L
AXISMASK_7                0x00000040L
AXISMASK_8                0x00000080L
AXISMASK_9                0x00000100L
AXISMASK_10               0x00000200L
AXISMASK_11               0x00000400L
AXISMASK_12               0x00000800L
AXISMASK_13               0x00001000L
AXISMASK_14               0x00002000L
AXISMASK_15               0x00004000L
AXISMASK_16               0x00008000L
```

A.23. AXISPARM

Axis Parameter numbers

Constants

```
AXISPARM_STATUS          1
AXISPARM_POS             2
AXISPARM_ECHO            3
AXISPARM_CLOCK           4
AXISPARM_RESOLVER        5
AXISPARM_RAWPOS          6
AXISPARM_POSCMD          7
AXISPARM_POSERR          8
AXISPARM_POSTOGO         9
AXISPARM_POSTARGET       10
AXISPARM_IVEL            11
AXISPARM_AVGVEL          12
AXISPARM_AVGVELTIME      13
AXISPARM_RESERVED2       15         // used to be PERR_TRAP
AXISPARM_KI              16
AXISPARM_KP              17
AXISPARM_PGAIN           18
AXISPARM_VFF             19
AXISPARM_DRIVE           20
AXISPARM_AUX             21
AXISPARM_RESERVED3       22         // used to be KIFACTOR
AXISPARM_RESERVED4       23         // used to be KPFACTOR
AXISPARM_AFFGAIN         24
AXISPARM_RESERVED5       25         // used to be KD
AXISPARM_RESERVED6       26
AXISPARM_RESERVED7       27
AXISPARM_RESERVED38      28         // used to be BLOCKMOTION
AXISPARM_REVERSALMODE    29
AXISPARM_REVERSALVALUE   30
AXISPARM_IAVG            31
AXISPARM_IMAX            32
AXISPARM_IAVGLIMIT       33
AXISPARM_IAVGTIME        34
AXISPARM_ICMD            35
AXISPARM_POSERRLIMIT     36
AXISPARM_INPOSLIMIT      37
AXISPARM_CWEOT           38
AXISPARM_CCWEOT          39
AXISPARM_RESERVED36      40
AXISPARM_VELCMDTRAP      41
AXISPARM_VELPOSITION     42
AXISPARM_FBWINDOW        43
AXISPARM_SAFEZONECW      44
AXISPARM_SAFEZONECCW     45
AXISPARM_SAFEZONEMODE    46
AXISPARM_SIMULATION      47
AXISPARM_ACCEL           48
AXISPARM_DECEL           49
AXISPARM_ACCELMODE       50
AXISPARM_DECELMODE       51
AXISPARM_FEEDRATEMODE    52
AXISPARM_ACCELRATE       53
AXISPARM_DECELRATE       54
AXISPARM_RESERVED8       55
AXISPARM_HOMESWITCHPOS   56
AXISPARM_HOMESWITCHTOL   57
AXISPARM_SYSTEMCLOCK     58
```

```
AXISPARM_RESERVED9        59
AXISPARM_RESERVED10       60
AXISPARM_RESERVED11       61
AXISPARM_RESERVED12       62
AXISPARM_RESERVED13       63
AXISPARM_FAULT            64
AXISPARM_FAULTMASK        65
AXISPARM_DISABLEMASK      66
AXISPARM_INTMASK          67
AXISPARM_AUXMASK          68
AXISPARM_HALTMASK         69
AXISPARM_IOLEVEL          70
AXISPARM_AUXOFFSET        71
AXISPARM_ABORTMASK        72
AXISPARM_RESERVED14       73
AXISPARM_RESERVED15       74
AXISPARM_RESERVED16       75
AXISPARM_RESERVED17       76
AXISPARM_RESERVED18       77
AXISPARM_CAMPOSITION      78
AXISPARM_CAMPOINT         79
AXISPARM_MASTERPOS        80
AXISPARM_MASTERRES        81
AXISPARM_MASTERLEN        82
AXISPARM_RESERVED37       83
AXISPARM_CAMOFFSET        84
AXISPARM_SYNCSPEED        85
AXISPARM_RESERVED19       86          // PROFILETIME
AXISPARM_PROFQDEPTH       87
AXISPARM_PROFQSIZE        88
AXISPARM_MOVEQDEPTH       89
AXISPARM_MOVEQSIZE        90
AXISPARM_RESERVED20       91
AXISPARM_RESERVED21       92
AXISPARM_RESERVED22       93
AXISPARM_RESERVED23       94
AXISPARM_OFFSET           95
AXISPARM_RESERVED24       96          // ALIGN
AXISPARM_MOTIONSTATUS     97
AXISPARM_SERVOSTATUS      98
AXISPARM_RESERVED25       99
AXISPARM_RESERVED26       100
AXISPARM_RESERVED27       101
AXISPARM_RESERVED28       102
AXISPARM_RESERVED29       103
AXISPARM_RESERVED30       104
AXISPARM_RESERVED31       105
AXISPARM_RESERVED32       106
AXISPARM_CSUM             107
AXISPARM_RESERVED34       108         // CSUM_WRITE
AXISPARM_EXTR2DSCL        109
AXISPARM_BASE_SPEED       110
AXISPARM_MAX_PHASE        111
AXISPARM_PHASE_SPEED      112
AXISPARM_ALT_STATUS       113
AXISPARM_RESERVED35       114         // FORCE_LINES
AXISPARM_SOFTLIMITMODE    115
AXISPARM_HOMEVELMULT      116
AXISPARM_CAMADVANCE       117
AXISPARM_VGAIN            118
AXISPARM_ALPHA            119
AXISPARM_VELTIMECONST     120
AXISPARM_MAXCAMACCEL      121
```

```
AXISPARM_HOMEOFFSET        122
AXISPARM_ICMDPOLARITY      123
AXISPARM_BRAKEMASK         124
AXISPARM_DACOFFSET         125
AXISPARM_B0                126
AXISPARM_B1                127
AXISPARM_B2                128
AXISPARM_A1                129
AXISPARM_A2                130
AXISPARM_POSTOGOIRQ        131
AXISPARM_AUXDELAY          132
AXISPARM_SCALEPGAIN        133
AXISPARM_POSMODULO         134
AXISPARM_NEGMODULO         135
AXISPARM_MODULOMODE        136
AXISPARM_IMAXPLUS          137
AXISPARM_IMAXMINUS         138
AXISPARM_AUXLEVEL          139
AXISPARM_GEARSLAVE         140
AXISPARM_GEARMASTER        141
AXISPARM_GEARMODE          142
AXISPARM_AUXVELCMD         143
AXISPARM_POSITION_TOL      144
AXISPARM_POSITIONTOL_TIME  145
AXISPARM_GANTRYMODE        146
AXISPARM_GANTRYOFFSET      147
AXISPARM_GANTRYMASTER      148
AXISPARM_PHASEAOFFSET      149
AXISPARM_PHASEBOFFSET      150
AXISPARM_DATAPLOT_MODE     151
AXISPARM_BB0               152
AXISPARM_BB1               153
AXISPARM_BB2               154
AXISPARM_AA1               155
AXISPARM_AA2               156
MAX_AXISPARMS              157
```

Used by

AerParmAxisxxxx

A.24. AXISTYPE

These constants specify the type of axis.

Constants

```
AXISTYPE_LINEAR             0   // Axis is linear
ASXISTYPE_ROTARY_MODULO     1   // Axis is rotary w/ rollover
AXISTYPE_ROTARY_NONMODULO   2   // Axis is rotary
```

Used by

Machine parameter – Type

A.25. CSPARMINDEX

Call stack parameter index numbers.

Constants

CSPARMINDEX_n where n is the call stack parameter number in the range of 1-26 having a value of 0 to 25. These numbers correspond to the parameters passed by calls in the CNC program.

Used by

CSPARMINDEX variables
Compiler

A.26. FLT

To determine which fault is active.

Constants

```
FLT_POSITION_ERROR      0x00000001 // excess position error
FLT_I_AVERAGE           0x00000002 // excess RMS current error
FLT_CW_HARD_LIMIT       0x00000004 // CW hardware limit error
FLT_CCW_HARD_LIMIT      0x00000008 // CCW hardware limit error
FLT_CW_SOFT_LIMIT       0x00000010 // CW software limit error
FLT_CCW_SOFT_LIMIT      0x00000020 // CCW software limit error
FLT_DRIVE               0x00000040 // drive fault error
FLT_FEEDBACK            0x00000080 // feedback failure error
FLT_PROGRAMMING         0x00000100 // programming error
FLT_MASTER_FEEDBACK     0x00000200 // master feedback failure
FLT_HOMING              0x00000400 // homing fault
FLT_USER                0x00000800 // user trigger
FLT_VEL_TRAP            0x00001000 // velocity trap
FLT_VEL_COMMAND_TRAP    0x00002000 // velocity command trap
FLT_HOME_TOLERENCE      0x00004000 // home fault tolerance
FLT_PROBE               0x00008000 // probe input fault
FLT_TASK                0x00010000 // Task fault
FLT_EXTERNAL_FEEDBACK   0x00020000 // external feedback failure
FLT_SAFEZONE            0x00040000 // safe zone fault
```

Used by

Axis parameter FAULT

A.27. GLOBPARM

Global parameter names.

Constants

```
GLOBPARM_AvgPollTimeSec              0
GLOBPARM_Version                     1
GLOBPARM_NumGlobalDoubles            2
GLOBPARM_NumGlobalStrings            3
GLOBPARM_NumGlobalAxisPts            4
GLOBPARM_EstopEnabled                5
GLOBPARM_CallBackTimeoutSec          6
GLOBPARM_Interrupt2TimeSec           7
GLOBPARM_Enable1KhzServo             8
GLOBPARM_BuildNumber                 9
GLOBPARM_UserMode                    10
GLOBPARM_ThrowTaskWarningsAsFaults   11
GLOBPARM_SystemStatus                12
GLOBPARM_Enable2Dcalibration         13
GLOBPARM_NumCannedFunctions          14
GLOBPARM_CompatibilityMode           15
GLOBPARM_NumDecimalsCompare          16
GLOBPARM_MeasurementMode             17
```

Used by

AerParmGlobalxxxx

C

A.28. HOMETYPE

Specifies the type of home routine to perform by the CNC home command.

Constants

```
HOMETYPE_NORMAL       0    // Specifies a normal home cycle.
HOMETYPE_REVERSE      1    // Specifies a reverse to marker home
                           // cycle.
HOMETYPE_NOLIMIT      2    // Specifies a home cycle with no
                           // limits.
HOMETYPE_QUICK        3    // Specifies a quick home cycle.
HOMETYPE_VIRTUAL      4    // Home at correct position
```

Used by

*MACHPARM*_HomeType

A.29. MACHPARM

Machine Parameter names.

Constants

```
MACHPARM_Type                0
MACHPARM_CntsPerInch         1
MACHPARM_CntsPerDeg          2
MACHPARM_MaxFeedRateIPM      3
MACHPARM_MaxFeedRateRPM      4
MACHPARM_RapidFeedRateIPM    5
MACHPARM_RapidFeedRateRPM    6
MACHPARM_HomeType            7
MACHPARM_HomeDirection       8
MACHPARM_HomeFeedRateIPM     9
MACHPARM_HomeFeedRateRPM     10
MACHPARM_HomeOffsetInch      11
MACHPARM_HomeOffsetDeg       12
MACHPARM_NumDecimalsEnglish  13
MACHPARM_NumDecimalsMetric   14
MACHPARM_AxisState           15
MACHPARM_ControllingTask     16
MACHPARM_PositionUnits       17
MACHPARM_PositionCmdUnits    18
MACHPARM_PresetCmdUnits      19
MACHPARM_AvgVelUnits         20
MACHPARM_FixtureOffset       21
MACHPARM_ScaleFactor         22
MACHPARM_PresetUnits         23
MACHPARM_FixtureOffset2      24
MACHPARM_FixtureOffset3      25
MACHPARM_FixtureOffset4      26
MACHPARM_FixtureOffset5      27
MACHPARM_FixtureOffset6      28
MACHPARM_JogDistanceInch     29
MACHPARM_JogDistanceDeg      30
MACHPARM_JogVelocityIPM      31
MACHPARM_JogVelocityRPM      32
MACHPARM_UnusedAxis          33
MACHPARM_ReverseSlewDir      34
```

Used by

AerParmMachinexxxx

A.30. MAX

These constants specify various maximum lengths of data used by the functions.

Constants

```
MAX_PATH                261
MAX_TEXT_LEN            255
MAX_PARM_NAME_LEN       32      // maximum parameter name lengths
MAX_TOOL_NAME_LEN       32      // maximum tool name lengths
```

A.31. MOTION

To determine the motion status of an axis.

Constants

```
// Alternate Status word returned
MOTION_STAT_MOVE_DIR     0x00000001  // move direction
MOTION_STAT_MOVING       0x00000002  // moving
MOTION_STAT_ACCEL        0x00000004  // axis in accel phase
MOTION_STAT_DECEL        0x00000008  // axis in decel phase
MOTION_STAT_HOMING       0x00000010  // axis homing
MOTION_STAT_FEED_OVER    0x00000020  // feedrate override
MOTION_STAT_PROFILE      0x00000040  // axis in profile mode
MOTION_STAT_SYNC         0x00000080  // axis in sync mode
MOTION_STAT_CAM_TABLE    0x00000100  // cam table enabled
MOTION_STAT_HOME_DIR     0x00000200  // home direction
MOTION_STAT_CONT_MOVE    0x00000400  // continuous move
MOTION_STAT_QUEUE        0x00000800  // motion queue active
MOTION_STAT_HOLD         0x00001000  // hold active
MOTION_STAT_AUX_MODE     0x00002000  // aux mode
MOTION_STAT_BLOCK        0x00004000  // block motion
MOTION_STAT_HOLD_QUEUE   0x00008000  // hold queue
MOTION_STAT_DISABLE      0X00010000  // disable command
MOTION_STAT_HALT         0x00020000  // halt command
MOTION_STAT_ABORT        0x00040000  // abort command
MOTION_STAT_ACCEL_ON     0x00080000  // accel command
MOTION_STAT_DECEL_ON     0x00100000  // decel enabled
MOTION_STAT_ACCEL_SIGN   0x00200000  // accel sign used for dir
                                     // change
MOTION_STAT_CONST_ACCEL  0x00400000  // linear/1-cosine accel flag
MOTION_STAT_CONST_DECEL  0x00800000  // linear/1-cosine decel flag
MOTION_STAT_BOUNDED      0x01000000  // bounded i.e., use soft limits
MOTION_STAT_SETUP_PEND   0x02000000  // setup command pending
MOTION_STAT_CHCKR_FLAG   0x04000000  // set along with setup_pend &
                                     // cleared when checker runs
MOTION_STAT_QUICK_HOME   0x08000000  // quick home active
MOTION_STAT_IRQ_PENDING  0x10000000  // interrupt pending
MOTION_STAT_PENDANT_JOG  0x20000000  // pendant jog mode active
MOTION_STAT_MRKR_ARMED   0x40000000  // marker armed
MOTION_STAT_JOG          0x80000000  // Jog
```

Used by

Axis parameter MOTIONSTATUS

A.32. PARM_ATTR

These values can be binary "anded" with the attribute mask returned by the *AerParmxxxxGetInfo* functions, to determine if the conditions listed in the comments below are true or not.

Constants

```
PARM_ATTR_VALID    0x0001 // This is a valid parameter
PARM_ATTR_READ     0x0002 // This parameter can be read (Get can
                          // be done)
PARM_ATTR_WRITE    0x0004 // This parameter can be written (Set
                          // can be done)
PARM_ATTR_UPDATE   0x0008 // The axis processor may change this
                          // value. For example, CLOCK is
                          // updated continuously
PARM_ATTR_NOLIMIT  0x0200 // This parameter has no minimum and
                          // maximum values
PARM_ATTR_TEST     0x0020 // Reserved for internal use, this bit
                          // has no meaning to the customer.
PARM_ATTR_INTEGER  0x0040 // This parameter is a DWORD or double
                          // word integer (other wise its a
                          // double, or floating point)
PARM_ATTR_ENGLISH  0x0100 // Value is in units of English units
                          // (inches) as opposed to metric
                          // (mil). This mask is only relevant
                          // for position, velocities etc. and
                          // it is also zero if the metric/Eng
                          // designation is not relevant to the
                          // parameter (i.e. NUM_DOUBLES)
PARM_ATTR_UNSIGNED 0x0010 // value is an unsigned quantity
PARM_ATTR_BITMASK  0x0400 // display as bit mapped
PARM_ATTR_CHOICE   0x0800 // display as choice
PARM_ATTR_HEX      0x1000 // display as a HEX value
```

Used by

AerParmAxisGetInfo
AerParmMachineGetInfo
AerParmGlobalGetInfo
AerParmTaskGetInfo

A.33. PHYSAXISINDEX

These constants specify a physical axis index.

Constants

PHYSAXISINDEX_1	0
PHYSAXISINDEX_2	1
PHYSAXISINDEX_3	2
PHYSAXISINDEX_4	3
PHYSAXISINDEX_5	4
PHYSAXISINDEX_6	5
PHYSAXISINDEX_7	6
PHYSAXISINDEX_8	7
PHYSAXISINDEX_9	8
PHYSAXISINDEX_10	9
PHYSAXISINDEX_11	10
PHYSAXISINDEX_12	11
PHYSAXISINDEX_13	12
PHYSAXISINDEX_14	13
PHYSAXISINDEX_15	14
PHYSAXISINDEX_16	15

A.34. PROGTYPE

Specifies the type of program to allocate.

Constants

```
PROGTYPE_NORMAL    0   // Normal program. All the program lines
                       // and labels must be loaded before the
                       // program can be executed. This type of
                       // program can be called by other
                       // programs or subroutines. There are
                       // limitations on the types of program
                       // lines allowed. The program remains
                       // intact on the controller until it is
                       // freed.
PROGTYPE_QUEUE     1   // Queue program. This type of program
                       // can only be executed on one task at a
                       // time. No calls can be made to a queue
                       // program. There are limitations on the
                       // type of program lines allowed. Once
                       // executed the program line is lost.
                       // This type of program is used most
                       // often for MDI, serial/ethernet
                       // communication, or extremely large
                       // programs that cannot be completely
                       // allocated on the controller.
```

Used by

AerProgramAllocate

A.35. PSO_CHANNEL_MASK

These constants are used for defining the channels that the PSO-PC card will track for generating the firing pulse, etc.

Constants

```
PSO_CHANNEL_MASK1     0x01      // PSO channel 1
PSO_CHANNEL_MASK2     0x02      // PSO channel 2
PSO_CHANNEL_MASK3     0x04      // PSO channel 3
PSO_CHANNEL_MASK4     0x08      // PSO channel 4
```

A.36. PSO_MODE

These constants are used for defining the mode of the PSO-PC card.

Constants

```
PSO_MODE_IMMEDIATE      0x00    // write output value NOW
PSO_MODE_VELTRACKING    0x01    // track velocity
PSO_MODE_POSTRACKING    0x02    // track position
```

A.37. PSO_TABLE

These constants are used for defining the mode of the PSO-PC table based commands.

Constants

```
PSO_TABLE_INCDIST   0x00      // incremental distances
PSO_TABLE_ABSDIST   0x01      // absolute distances
PSO_TABLE_INVALID   0xFFFF    // invalid firing table type
```

A.38. PULSE_

These constants are used for defining the mode of the PSO CNC command.

Constants

```
PULSE_WIDTH_INCDIST   0x00   // define pulse width in mSec (PSOP 0)
PULSE_WIDTH_ABSDIST   0x01   // define pulse width in uSec (PSOP 4)
PULSE_DEFINE_INVALID  0xFFFF // define 3 phase pulse (PSOP 1)
PULSE_DEFINE_RAMP     0xFFFF // define 3 phase pulse w/ ramp (PSOP 2)
PULSE_TOGGLE          0xFFFF // (PSOP 5)
```

A.39. SERVO

These constants are used to test the state of the SERVOSTAT axis parameter, by sequentially (as required) ANDing one of these constants with the value of the parameter and testing for the result to be TRUE.

Constants

```
// Servo Status word

SERVO_STAT_DRIVE         0x00000001  // drive on,off
SERVO_STAT_AUX           0x00000002  // auxiliary output on, off
SERVO_STAT_CW_LIMIT      0x00000004  // cw limit switch on,off
SERVO_STAT_CCW_LIMIT     0x00000008  // ccw limit switch on, off
SERVO_STAT_HOME          0x00000010  // home switch on, off
SERVO_STAT_DRIVE_FLT     0x00000020  // drive fault status
SERVO_STAT_ATHOME        0x00000040  // axis at home position
SERVO_STAT_DONE          0x00000080  // motion done
SERVO_STAT_INPOS         0x00000100  // axis in position
SERVO_STAT_FAULTED       0x00000200  // axis is faulted
SERVO_STAT_PROBE_INPUT   0x00000400  // probe input active
SERVO_STAT_MARKER        0x00000800  // marker
SERVO_STAT_HALL1         0x00001000  // hall input 1
SERVO_STAT_HALL2         0x00002000  // hall input 2
SERVO_STAT_HALL3         0x00004000  // hall input 3
SERVO_STAT_HALL4         0x00008000  // hall input 4
SERVO_STAT_INEG_LIMIT    0x00010000  // in integral negative limit
SERVO_STAT_IPOS_LIMIT    0x00020000  // in integral positive limit
SERVO_STAT_VFF           0x00040000  // VFF Enabled
SERVO_STAT_BRAKE         0x00080000  // brake output active
SERVO_STAT_ALIVE         0x00100000  // axis has been configured
SERVO_STAT_VVF_0ATC      0x00200000  // VFF or position loop zero
SERVO_STAT_FEEDBACK_IN   0x00400000  // Feedback fault input
SERVO_STAT_MFEEDBACK_IN  0x00800000  // Mst Feedback fault input
SERVO_STAT_HPVME_LASER   0x01000000  // HP VME Laser
SERVO_STAT_SCALE_PGAIN   0x02000000  // SCALPGAIN axis parameter
SERVO_STAT_AC            0x04000000  // AC motor selected
SERVO_STAT_MSET          0x08000000  // Axis in MSET mode
SERVO_STAT_HOMED         0x10000000  // Axis has been homed
SERVO_STAT_ENCODER       0x20000000  // Axis has encoder feedback
SERVO_STAT_ERROR_MAP     0x40000000  // Error mapping enabled
SERVO_STAT_PLOOP_ONLY    0x80000000  // position loop only
```

Used by

Axis parameter SERVOSTATUS

A.40. SPINDLEINDEX

Spindle index numbers.

Constants

SPINDLEINDEX_n where n is the spindle number in the range of 1-4, having a value of 0 to 3.

Used by

SPINDLEINDEX variables
Compiler

A.41. STAT

To determine the state of the axis processor.

Constants

```
// Axis status bits defined

STAT_DRIVE           0x00000001   // drive on,off
STAT_AUX             0x00000002   // auxiliary output on, off
STAT_CW_LIMIT        0x00000004   // cw limit switch on, off
STAT_CCW_LIMIT       0x00000008   // ccw limit switch on, off
STAT_HOME            0x00000010   // home switch on, off
STAT_DRIVE_FLT       0x00000020   // drive fault status
STAT_ATHOME          0x00000040   // axis at home position
STAT_DONE            0x00000080   // motion done
STAT_INPOS           0x00000100   // axis in position
STAT_FAULTED         0x00000200   // axis is faulted
STAT_PROBE_INPUT     0x00000400   // probe input active
STAT_MARKER          0x00000800   // marker
STAT_HALL1           0x00001000   // hall input 1
STAT_HALL2           0x00002000   // hall input 2
STAT_HALL3           0x00004000   // hall input 3
STAT_HALL4           0x00008000   // hall input 4
STAT_MOVE_DIR        0x00010000   // move direction
STAT_MOVING          0x00020000   // moving
STAT_ACCEL           0x00040000   // axis in accel phase
STAT_DECEL           0x00080000   // axis in decel phase
STAT_HOMING          0x00100000   // axis homing
STAT_FEED_OVER       0x00200000   // feedrate override
STAT_PROFILE         0x00400000   // axis in profile mode
STAT_SYNC            0x00800000   // axis in sync mode
STAT_CAM_TABLE       0x01000000   // cam table enabled
STAT_HOME_DIR        0x02000000   // home direction
STAT_CONT_MOVE       0x04000000   // continuous move
STAT_QUEUE           0x08000000   // motion queue a active
STAT_HOLD            0x10000000   // hold active
STAT_AUX_MODE        0x20000000   // aux mode
STAT_BLOCK_MOTION    0x40000000   // block motion
STAT_HOLD_QUEUE      0x80000000   // hold queue
```

STAT_DONE is set true after the commanded move is complete. This does not indicate that the actual velocity is zero due to the following errors, which may be present (see the POSERR axis parameter).

STAT_INPOS is set true after the completion of the move and when the axis is within the range defined by the INPOSLIMIT axis parameter.

Used by

Axis parameter STATUS

A.42. STRIP_IOPOSLATCH

These constants are position latch triggers.

Constants

```
// trigger mode (wMode)

STRIP_IOPOSLATCH_DISABLE        0  // IO position latch disable
STRIP_IOPOSLATCH_ONESHOT        1  // One-shot operation
STRIP_IOPOSLATCH_CONTINUOUS     2  // Continuous trigger

// type of I/O to trigger (wType)

STRIP_IOPOSLATCH_AXISIO         0  // Use axis I/O
STRIP_IOPOSLATCH_VIRTUALIO      1  // Use virtual I/O bit

// axis I/O bit number(wBit)

STRIP_IOPOSLATCH_BITCCW         0  // Use CCW input
STRIP_IOPOSLATCH_BITCW          1  // Use CW input
STRIP_IOPOSLATCH_BITHOME        2  // Use home input
STRIP_IOPOSLATCH_BITENCFLT      3  // Use encoder fault input
STRIP_IOPOSLATCH_BITFLT         4  // Use drive fault input
STRIP_IOPOSLATCH_BITHALLA       5  // Use Hall A input
STRIP_IOPOSLATCH_BITHALLB       6  // Use Hall B input
STRIP_IOPOSLATCH_BITHALLC       7  // Use Hall C input
```

Used by

AerSripSetIOPosLatch

A.43. STRIP_STATUS

These constants are used to determine the status of the strip chart.

Constants

```
STRIP_STATUS_ALLOCATED  0x01  // Allocated
STRIP_STATUS_ARMED      0x02  // Armed (See AerStripSetTrigger)
STRIP_STATUS_TRIGGERED  0x04  // Triggered (collecting)
STRIP_STATUS_DONE       0x08  // Done collecting
STRIP_STATUS_OVERFLOW   0x10  // Strip chart overflow
```

Used By

AerStripGetStatus

A.44. STRIP_TRIGGER

These constants specify the different modes for triggering the strip chart.

Constants

```
STRIP_TRIGGER_IMMEDIATE   0  // Enables immediate trigger
                             // (collection starts now)
STRIP_TRIGGER_MASTER_POS  1  // Master position trigger (starts
                             // if master position is above or
                             // below a value)
STRIP_TRIGGER_POINT0      2  // Trigger with table
STRIP_TRIGGER_TORQUE      3  // Trigger with torque
STRIP_TRIGGER_EXTERNAL    4  // Program trigger
```

Used By

AerStripSetTrigger

A.45. STRIPGLOBAL_MODE

These constants specify the different modes for triggering the global strip chart.

Constants

```
STRIPGLOBAL_MODE_TIME                 0  // Start immediately
STRIPGLOBAL_MODE_TIME_SPEED_OVERRIDE  1  // Use analog input
STRIPGLOBAL_MODE_POSITION             2  // Trigger on position
STRIPGLOBAL_MODE_QUEUE                3  // Continuous data
                                         // collection
STRIPGLOBAL_MODE_QUEUE_HOLD           4  // Wait for release
                                         // before collection
STRIPGLOBAL_MODE_EVENT_COUNT          5  // Triggered by Probe
STRIPGLOBAL_MODE_EVENT_QUEUE          6  // Continuous data,
                                         // triggered by Probe
STRIPGLOBAL_MODE_IO                   7  // Triggered by virtual
                                         // input
STRIPGLOBAL_MODE_IO_QUEUE             8  // Continuous data,
                                         // triggered by virtual
                                         // input
```

Used by

AerStripGlobalSetTrigger

C

A.46. STRIPGLOBAL_STATUS

Used to determine the status of the global strip chart.

Constants

```
STRIPGLOBAL_STATUS_ALLOCATED      0x0001 // Allocated (see
                                         // AerStripGlobalAllocate)
STRIPGLOBAL_STATUS_ARMED          0x0002 // Armed (see
                                         // AerStripGlobalSetTrigger)
STRIPGLOBAL_STATUS_TRIGGERED      0x0004 // Triggered (collecting)
STRIPGLOBAL_STATUS_DONE           0x0008 // Done collecting
STRIPGLOBAL_STATUS_OVERFLOW       0x0010 // Strip chart overflow
STRIPGLOBAL_STATUS_FR_MODE        0x0020 // Sample time based on
                                         // analog input #8
STRIPGLOBAL_STATUS_HOLD           0x0040 // Queue is currently is held
STRIPGLOBAL_STATUS_TABLE_MODE     0x0080 // Triggered (in list mode)
STRIPGLOBAL_STATUS_TRIG_ALLOCATED 0x0100 // Trigger list is allocated
STRIPGLOBAL_STATUS_QUEUE_MODE     0x0200 // In queue mode (see
                                         // AerStripGlobalSetTrigger)
STRIPGLOBAL_STATUS_ABORTED        0x0400
STRIPGLOBAL_STATUS_EVENT_MODE     0x0800
STRIPGLOBAL_STATUS_UPLOADING      0x1000
STRIPGLOBAL_STATUS_LOGIC_TIME     0x2000
STRIPGLOBAL_STATUS_LOGIC_LEVEL    0x4000
STRIPGLOBAL_STATUS_4KHZ           0x8000
```

Used by

AerStripGlobalGetStatus

A.47. TASKAXISINDEX

Task axis index numbers.

Constants

TASKAXISINDEX_xxxx where xxxx is the task axis index number in the range of 1-16, having a value of 0 to 15. Task axes are mapped to physical axes by the MAP CNC command. These constants are used for *TASKAXIS* variables.

Used by

TASKAXISINDEX variables

A.48. TASKEXEC

Specifies the type of program execution to begin.

Constants

```
TASKEXEC_RUN / TASKEXEC_RUN_INTO  0   // The task will execute
                                      // the program continuously.

TASKEXEC_STEP_INTO                1   // The task will execute one
                                      // user line of code. Calls
                                      // are treated as multiple
                                      // lines. Program execution
                                      // will stop after entering
                                      // the called subroutine.
TASKEXEC_STEP_OVER                2   // The task will execute one
                                      // user line of code. Calls
                                      // are treated as a single
                                      // line. Program execution
                                      // will continue after
                                      // entering the called
                                      // subroutine until
                                      // program flow returns to
                                      // the original call
                                      // statement.
TASKEXEC_RUN_OVER                 3   // Will execute subroutines
                                      // as though they were a
                                      // single command, displaying
                                      // only the call subroutine
                                      // command line
```

Used by

AerTaskProgramExecute

A.49. TASKINDEX

Task index numbers.

Constants

TASKINDEX_n where n is the task number in the range of 1-4, having a value of 0 to 3.

Used by

TASKINDEX *variables*
AerTaskxxx *functions*

C

A.50. TASKMODE

To determine which task mode is active. Parentheses indicate the interpretation of the mode when it is not active.

Constants

```
TASKMODE1_English               0  // English units (metric) G70
                                   // (G71)
TASKMODE1_Absolute              1  // Absolute mode (incremental)
                                   // G90 (G91)
TASKMODE1_AccelModeLinear       2  // Linear accel/decel
                                   // (sinusoidal) G64 (G63)
TASKMODE1_AccelModeRate         3  // Rate based accel/decel
                                   // (time) G68 (G67)
TASKMODE1_RotaryDominant        4  // Rotary feedrate dominant
                                   // (linear) G98 (G99)
TASKMODE1_MotionContinuous      5  // Continuous motion between
                                   // blocks(decel) G108 (G109)
TASKMODE1_InverseCircular       6  // Inversed circular direction
                                   // (normal) G111 (G110)
TASKMODE1_SpindleShutDown       7  // Enable shutdown spindle on
                                   // program halt G101 (G100)
TASKMODE1_BlockDelete           8  // Program block deletes are
                                   // used (ignored)
TASKMODE1_OptionalStop          9  // Program optional stops are
                                   // used (ignored)
TASKMODE1_BreakPoint            10 // Program break points are
                                   // used (ignored)
TASKMODE1_MFOLock               11 // MFO is locked - can not be
                                   // changed M48 (locked) M49
                                   // (unlocked)
TASKMODE1_MSOLock               12 // MSO is locked - can not be
                                   // changed M50 (locked) M51
                                   // (unlocked)
TASKMODE1_DryRunFeedRate        13 // Vector feedrate is limited
                                   // by axes
TASKMODE1_Retrace               14
TASKMODE1_AutoMode              15
TASKMODE1_ProgramFeedRateMPU    16
TASKMODE1_ProgramFeedRateUPR    17
TASKMODE1_ProgramSFeedRateSurf1 18
TASKMODE1_ProgramSFeedRateSurf2 19
TASKMODE1_ProgramSFeedRateSurf3 20
TASKMODE1_ProgramSFeedRateSurf4 21
TASKMODE1_BlockDelete2          22
TASKMODE1_RunOverMode           23
TASKMODE1_MultiBlockLookAhead   24
TASKMODE1_MachineLock           25
TASKMODE1_HighSpeedBuffering    26
TASKMODE1_WaitForInPos          27
```

Used by

AerTaskGetModeName
AER_TASK_MODE

A.51. TASKPARM

Task Parameter names.

Constants

```
TASKPARM_Number                    0
TASKPARM_TaskFault                 1
TASKPARM_TaskWarning               2
TASKPARM_MaxCallStack              3
TASKPARM_MaxModeStack              4
TASKPARM_NumTaskDoubles            5
TASKPARM_NumTaskStrings            6
TASKPARM_NumTaskAxisPts            7
TASKPARM_EstopInput                8
TASKPARM_FeedHoldInput             9
TASKPARM_FeedHoldEdgeInput         10
TASKPARM_S1_Index                  11
TASKPARM_S1_RPM                    12
TASKPARM_S2_Index                  13
TASKPARM_S2_RPM                    14
TASKPARM_S3_Index                  15
TASKPARM_S3_RPM                    16
TASKPARM_S4_Index                  17
TASKPARM_S4_RPM                    18
TASKPARM_RotateX                   19
TASKPARM_RotateY                   20
TASKPARM_RotateAngleDeg            21
TASKPARM_RthetaX                   22
TASKPARM_RthetaY                   23
TASKPARM_RthetaR                   24
TASKPARM_RthetaT                   25
TASKPARM_RthetaRadiusInch          26
TASKPARM_RthetaEnabled             27
TASKPARM_UpdateTimeSec             28
TASKPARM_AccelTimeSec              29
TASKPARM_DecelTimeSec              30
TASKPARM_AccelRateIPS2             31
TASKPARM_DecelRateIPS2             32
TASKPARM_AccelRateDPS2             33
TASKPARM_DecelRateDPS2             34
TASKPARM_LinearFeedRate            35
TASKPARM_RotaryFeedRate            36
TASKPARM_MFO                       37
TASKPARM_MSO                       38
TASKPARM_Coord1X                   39
TASKPARM_Coord1Y                   40
TASKPARM_Coord1Z                   41
TASKPARM_Coord1Plane               42
TASKPARM_Coord2X                   43
TASKPARM_Coord2Y                   44
TASKPARM_Coord2Z                   45
TASKPARM_Coord2Plane               46
TASKPARM_CutterX                   47
TASKPARM_CutterY                   48
TASKPARM_CutterRadiusInch          49
TASKPARM_NormalcyX                 50
TASKPARM_NormalcyY                 51
TASKPARM_NormalcyAxis              52
TASKPARM_UserFeedRateMode          53
TASKPARM_MaxMonitorData            54
TASKPARM_MaxOnGosubData            55
TASKPARM_AnalogMFOInput            56
```

TASKPARM_FeedHold	57
TASKPARM_MaxRadiusError	58
TASKPARM_Status1	59
TASKPARM_Status2	60
TASKPARM_Status3	61
TASKPARM_Mode1	62
TASKPARM_AnalogMSOInput	63
TASKPARM_ErrCode	64
TASKPARM_GlobalEStopDisable	65
TASKPARM_LinearFeedRateActual	66
TASKPARM_RotaryFeedRateActual	67
TASKPARM_HaltTaskOnAxisFault	68
TASKPARM_InterruptMotion	69
TASKPARM_InterruptMotionReturnType	70
TASKPARM_S2_AnalogMSOInput	71
TASKPARM_S3_AnalogMSOInput	72
TASKPARM_S4_AnalogMSOInput	73
TASKPARM_S2_MSO	74
TASKPARM_S3_MSO	75
TASKPARM_S4_MSO	76
TASKPARM_ROReq1	77
TASKPARM_RIAction1	78
TASKPARM_ROAction1	79
TASKPARM_JoyStickPort	80
TASKPARM_SlewPair1	81
TASKPARM_SlewPair2	82
TASKPARM_SlewPair3	83
TASKPARM_SlewPair4	84
TASKPARM_SlewPair5	85
TASKPARM_SlewPair6	86
TASKPARM_SlewPair7	87
TASKPARM_SlewPair8	88
TASKPARM_RIActionOpCode	89
TASKPARM_RIActionAxis	90
TASKPARM_RIActionParm1	91
TASKPARM_RIActionParm2	92
TASKPARM_S1_SpindleRadialAxis	93
TASKPARM_S2_SpindleRadialAxis	94
TASKPARM_S3_SpindleRadialAxis	95
TASKPARM_S4_SpindleRadialAxis	96
TASKPARM_BlendMaxAccelLinearIPS2	97
TASKPARM_BlendMaxAccelRotaryDPS2	98
TASKPARM_BlendMaxAccelCircleIPS2	99
TASKPARM_UNUSED1	100
TASKPARM_ActiveFixtureOffset	101
TASKPARM_ExecuteNumLines	102
TASKPARM_JogPair1EnableIn	103
TASKPARM_JogPair1Mode	104
TASKPARM_JogPair1Axis1	105
TASKPARM_JogPair1Axis1PlusIn	106
TASKPARM_JogPair1Axis1MinusIn	107
TASKPARM_JogPair1Axis2	108
TASKPARM_JogPair1Axis2PlusIn	109
TASKPARM_JogPair1Axis2MinusIn	110
TASKPARM_JogPair2EnableIn	111
TASKPARM_JogPair2Mode	112
TASKPARM_JogPair2Axis1	113
TASKPARM_JogPair2Axis1PlusIn	114
TASKPARM_JogPair2Axis1MinusIn	115
TASKPARM_JogPair2Axis2	116
TASKPARM_JogPair2Axis2PlusIn	117
TASKPARM_JogPair2Axis2MinusIn	118
TASKPARM_DryRunLinearFeedRateIPM	119

```
TASKPARM_DryRunRotaryFeedRateRPM     120
TASKPARM_MaxLookAheadMoves           121
TASKPARM_LineNumberUser              122
TASKPARM_LineNumber960               123
TASKPARM_CannedFunctionID            124
TASKPARM_DecelOnProgramAbortMask     125
TASKPARM_IgnoreAxesMask              126
TASKPARM_ChordicalToleranceInch      127
TASKPARM_ROReq1Mask                  128
TASKPARM_NormalcyToleranceDeg        129
TASKPARM_ChordicalSlowdownMsec       130
TASKPARM_CommandVelocityVariance     131
TASKPARM_CutterToleranceDeg          132
TASKPARM_CutterZ                     133
TASKPARM_CutterLength                134
TASKPARM_CutterWear                  135
TASKPARM_CutterOffsetX               136
TASKPARM_CutterOffsetY               137
TASKPARM_CutterRadius                138
TASKPARM_CutterActive                139
TASKPARM_RthetaRadius                140
TASKPARM_AccelRate                   141
TASKPARM_DecelRate                   142
TASKPARM_MaxRadiusAdjust             143
TASKPARM_UpdateNumEntries            144
TASKPARM_MaxCornerRoundErr           145
TASKPARM_Group1GcodeMode             146
TASKPARM_ExecuteNumMonitors          147
TASKPARM_ExecuteNumSpindles          148
TASKPARM_ProfileAxesZeroVel          149
TASKPARM_ProfileAxesInpos            150
```

Used by

AerParmTaskxxxx

A.52. TASKSTATUS

To determine which task status is active. TaskStatus, which is a result of a G-code, is identified with the appropriate status bit.

Constants

```
TASKSTATUS1_ProgramAssociated       0  // At least one program is
                                       // with the task
TASKSTATUS1_ProgramActive           1  // The task is active –
                                       // program execution was
                                       // started
TASKSTATUS1_ProgramExecuting        2  // The task is currently
                                       // executing a program
TASKSTATUS1_ImmediateCodeExecuting  3  // The task is currently
                                       // executing an
                                       // immediate code
TASKSTATUS1_ReturnMotionExecuting   4  // The task is currently
                                       // executing a return motion
TASKSTATUS1_NotUsed                 5  //
TASKSTATUS1_SingleStepInto          6  // The task is executing a
                                       // STEP_INTO
TASKSTATUS1_SingleStepOver          7  // The task is executing a
                                       // STEP_OVER
TASKSTATUS1_InterruptFaultPending   8  // A fault interrupt is
                                       // pending
TASKSTATUS1_InterruptCallBackPending 9 // A program callback
                                       // interrupt is pending
TASKSTATUS1_EStopInputActive        10 // The task estop is on
TASKSTATUS1_FeedHoldInputActive     11 // The task feedhold is on
TASKSTATUS1_CallBackHoldActive      12 // The task is waiting for a
                                       // program callback to complete
TASKSTATUS1_CallBackResponding      13 // The front-end is
                                       // responding to a
                                       // program callback
TASKSTATUS1_ProgramCleanup          14 // The task is cleaning up
                                       // the currently executing
                                       // program due to an abort or
                                       // interrupt
TASKSTATUS1_ProgramCodeCleanup      15 // The task is cleaning up
                                       // the currently executing
                                       // program line due to an
                                       // abort or interrupt
TASKSTATUS1_OnGosubPending          16 // An interrupt due to a
                                       // ONGOSUB is pending
TASKSTATUS1_FeedHoldInputLatch      17
TASKSTATUS1_ProbeCycle              18
TASKSTATUS1_Retrace                 19
TASKSTATUS1_InsertLinkMove          20
TASKSTATUS1_InterruptActive         21
TASKSTATUS1_SlewActive              22
TASKSTATUS1_CornerRounding          23
TASKSTATUS1_ROReq1Active            24
TASKSTATUS1_CannedFunctionPending   25
TASKSTATUS1_CannedFunctionActive    26
TASKSTATUS1_CannedFunctionExecuting 27
TASKSTATUS1_ProgramReset            28

TASKSTATUS2_SpindleActive1          0  // The first task spindle is
                                       // active
TASKSTATUS2_SpindleActive2          1  // The second task spindle is
                                       // active
TASKSTATUS2_SpindleActive3          2  // The third task spindle is
```

```
                                     // active
TASKSTATUS2_SpindleActive4          3  // The fourth task spindle is
                                     // active
TASKSTATUS2_MSOChange               4  // The MSO has changed
TASKSTATUS2_SpindleFeedHoldActive   5  // The spindle feedhold is on
TASKSTATUS2_AsyncFeedHoldActive     6  // The asynch feedhold is on
TASKSTATUS2_CutterEnabling          7
TASKSTATUS2_CutterDisabling         8
TASKSTATUS2_CutterOffsetsEnablingPos 9
TASKSTATUS2_CutterOffsetsEnablingNeg 10
TASKSTATUS2_CutterOffsetsDisabling  11


TASKSTATUS3_RotationActive          0  // Parts rotation is active
TASKSTATUS3_RthetaPolarActive       1  // Polar R-Theta
                                     // transformation is active
TASKSTATUS3_RthetaCylindricalActive 2  // Cylindrical R-Theta
                                     // transformation is active
TASKSTATUS3_OffsetPresetActive      3  // Preset offsets are active
TASKSTATUS3_OffsetFixtureActive     4  // Fixture offsets are active
TASKSTATUS3_OffsetManualActive      5  // Manual offsets are active
                                     // (from interrupt and
                                     // offset)
TASKSTATUS3_MotionType1             6  // (G0) - Point to Point
TASKSTATUS3_MotionType2             7  // (G1) - Contour Motion
TASKSTATUS3_MotionActive            8  // Contour/Pt-to-Pt motion is
                                     // executing
TASKSTATUS3_MotionContinuous        9  // Continuous motion is
                                     // active
                                     // for the current block (G8
                                     // is on (G9 is off)
TASKSTATUS3_MFOChange               10 // The MFO has changed
TASKSTATUS3_MotionFeedHoldActive    11 // The contour feedhold is on
TASKSTATUS3_CutterEnabling          12 // Cutter compensation is
                                     // being
                                     // enabled on the current
                                     // move
TASKSTATUS3_CutterActiveLeft        13 // Cutter compensation is
                                     // active on the left
TASKSTATUS3_CutterActiveRight       14 // Cutter compensation is
                                     // active on the right
TASKSTATUS3_CutterDisabling         15 // Cutter compensation is
                                     // being
                                     // disabled on the current
                                     // move
TASKSTATUS3_NormalcyActiveLeft      16 // Normalcy is active on the
                                     // left (G21)
TASKSTATUS3_NormalcyActiveRight     17 // Normalcy is active on the
                                     // right (G22)
TASKSTATUS3_NormalcyAlignment       18 // The normalcy axis is being
                                     // aligned
TASKSTATUS3_ProgramFeedRateMPU      19 // Feedrates are in minutes
                                     // per unit G94(If
                                     // ProgramFeedrateMPU and
                                     // ProgramFeedrateUPR are
                                     // off,then G93 is active)
TASKSTATUS3_ProgramFeedRateUPR      20 // Feedrates are in units per
                                     // minute G95 (If
                                     // ProgramFeedrateMPU and
                                     // ProgramFeedrateUPR are
                                     // off, then G93 is active)
TASKSTATUS3_LimitFeedRateActive     21 // The current feedrate is
```

```
                                        // being limited
                                        // by the axis maximums
TASKSTATUS3_LimitMFOActive          22 // The MFO is being limited
                                        // to account for feedrate
                                        // limits
TASKSTATUS3_Coord1Plane1Active      23 // (G17) Plane specified by
                                        // Coord1X & Coord1Y is
                                        // active
TASKSTATUS3_Coord1Plane2Active      24 // (G18) Plane specified by
                                        // Coord1Y & Coord1Z is
                                        // active
TASKSTATUS3_Coord1Plane3Active      25 // (G19) Plane specified by
                                        // Coord1Z & Coord1X is
                                        // active
TASKSTATUS3_Coord2Plane1Active      26 // (G27) Plane specified by
                                        // Coord2X & Coord2Y is
                                        // active
TASKSTATUS3_Coord2Plane2Active      27 // (G28) Plane specified by
                                        // Coord2Y & Coord2Z is
                                        // active
TASKSTATUS3_Coord2Plane3Active      28 // (G29) Plane specified by
                                        // Coord2Z & Coord1X is
                                        // active
TASKSTATUS3_MotionNoAccel           29
TASKSTATUS3_MirrorActive            30
```

Used by

AerTaskGetStatusName
AER_TASK_STATUS

∇ ∇ ∇

APPENDIX B: VISUAL BASIC CONSTANTS

In This Section:

B.1. Description

The following section provides a quick reference of all the visual basic constants used within the libraries (AerSys.DLL, AerErr.DLL, and AerCmplr.DLL).

All of these constants are available with the MS VB programming environment by pressing the F2 key ("Object Browser"), and selecting the Aerotech System Library. If they are not present, see Section 1.4., Visual Basic Programming Quick Start.

B.2. aerAnalogIndex

Specifies an analog channel.

Constants

aerAnalogIndex1	0
aerAnalogIndex2	1
aerAnalogIndex3	2
aerAnalogIndex4	3
aerAnalogIndex5	4
aerAnalogIndex6	5
aerAnalogIndex7	6
aerAnalogIndex8	7
aerAnalogIndex9	8
aerAnalogIndex10	9
aerAnalogIndex11	10
aerAnalogIndex12	11
aerAnalogIndex13	12
aerAnalogIndex14	13
aerAnalogIndex15	14
aerAnalogIndex16	15
aerMaxAnalogs	16

Used by

ANALOGINDEX variable

B.3. aerAnalogMask

These constants specify an analog input channel. To specify multiple channels, add them together (i.e., aerAnalogMask1 + aerAnalogMask2).

Constants

aerAnalogMask1	&H0001	
aerAnalogMask2	&H0002	U600
aerAnalogMask3	&H0004	
aerAnalogMask4	&H0008	
aerAnalogMask5	&H0010	
aerAnalogMask6	&H0020	4EN configured as board #1
aerAnalogMask7	&H0040	
aerAnalogMask8	&H0080	
aerAnalogMask9	&H0100	
aerAnalogMask10	&H0200	4EN configured as board #2
aerAnalogMask11	&H0400	
aerAnalogMask12	&H0800	
aerAnalogMask13	&H1000	
aerAnalogMask14	&H2000	4EN configured as board #3
aerAnalogMask15	&H4000	
aerAnalogMask16	&H4000	
aerAnalogMask	&HFFFF	

B.4. aerAutoProgSystem

Specifies either a system file or a user's file within a program automation.

Constants

aerAutoProgSystemSysFile	1
aerAutoProgSystemUserFile	2

Used by

AerAutoProgXXXX

B.5. aerAutoProgType

Specifies the type of program to allocate.

Constants

aerAutoProgTypeInclude	0
aerAutoProgTypeDownloadOnly	1
aerAutoProgTypeRunSilent	2
aerAutoProgTypeRun	3
aerAutoProgTypeRunImmediate	4
aerAutoProgTypeLoad	5

Used by

AerProgramAllocate

B.6. aerAxisIndex

Physical axis index numbers.

Constants

aerAxisIndex1	0
aerAxisIndex2	1
aerAxisIndex3	2
aerAxisIndex4	3
aerAxisIndex5	4
aerAxisIndex6	5
aerAxisIndex7	6
aerAxisIndex8	7
aerAxisIndex9	8
aerAxisIndex10	9
aerAxisIndex11	10
aerAxisIndex12	11
aerAxisIndex13	12
aerAxisIndex14	13
aerAxisIndex15	14
aerAxisIndex16	15
aerMaxAxes	16

Used By

AerParmAxisGetValue, …

B.7. aerAxisMask

Specifies multiple axes within one parameter passed to a function (i.e., aerAxisMask1 + aerAxisMask2).

Constants

aerAxisMask1	&H0001
aerAxisMask2	&H0002
aerAxisMask3	&H0004
aerAxisMask4	&H0008
aerAxisMask5	&H0010
aerAxisMask6	&H0020
aerAxisMask7	&H0040
aerAxisMask8	&H0080
aerAxisMask9	&H0100
aerAxisMask10	&H0200
aerAxisMask11	&H0400
aerAxisMask12	&H0800
aerAxisMask13	&H1000
aerAxisMask14	&H2000
aerAxisMask15	&H4000
aerAxisMask16	&H8000
aerAxisMask	&HFFFF

Used by

AerMoveMulti

B.8. aerAxisParm

Axis Parameter numbers

Constants

aerAxisParmStatus	1
aerAxisParmPos	2
aerAxisParmEcho	3
aerAxisParmClock	4
aerAxisParmResolver	5
aerAxisParmRawPos	6
aerAxisParmPosCmd	7
aerAxisParmPosErr	8
aerAxisParmPosToGo	9
aerAxisParmPosTarget	10
aerAxisParmIVel	11
aerAxisParmAvgVel	12
aerAxisParmAvgVelTime	13
aerAxisParmKI	16
aerAxisParmKP	17
aerAxisParmPGain	18
aerAxisParmVff	19
aerAxisParmDrive	20
aerAxisParmAux	21
aerAxisParmAffGain	24
aerAxisParmReversalMode	29
aerAxisParmReversalValue	30
aerAxisParmIAvg	31
aerAxisParmIMax	32
aerAxisParmIAvgLimit	33
aerAxisParmIAvgTime	34
aerAxisParmICmd	35
aerAxisParmPosErrLimit	36
aerAxisParmInPosLimit	37
aerAxisParmCWEot	38
aerAxisParmCCWEot	39
aerAxisParmVelCmdTrap	41
aerAxisParmVelPosition	42
aerAxisParmFBWindow	43
aerAxisParmSafeZoneCW	44
aerAxisParmSafeZoneCCW	45
aerAxisParmSafezoneMode	46
aerAxisParmSimulation	47
aerAxisParmAccel	48
aerAxisParmDecel	49
aerAxisParmAccelMode	50
aerAxisParmDecelMode	51
aerAxisParmFeedrateMode	52
aerAxisParmAccelRate	53
aerAxisParmDecelRate	54
aerAxisParmHomeSwitchPos	56
aerAxisParmHomeSwitchToL	57
aerAxisParmSystemClock	58
aerAxisParmFault	64
aerAxisParmFaultMask	65
aerAxisParmDisableMask	66
aerAxisParmIntMask	67

aerAxisParmAuxMask	68
aerAxisParmHaltMask	69
aerAxisParmIOLevel	70
aerAxisParmAuxOffset	71
aerAxisParmAbortMask	72
aerAxisParmCamPosition	78
aerAxisParmCamPoint	79
aerAxisParmMasterPos	80
aerAxisParmMasterRes	81
aerAxisParmMasterLen	82
aerAxisParmCamOffset	84
aerAxisParmSyncSpeed	85
aerAxisParmProfQDepth	87
aerAxisParmProfQSize	88
aerAxisParmMoveQDepth	89
aerAxisParmMoveQSize	90
aerAxisParmOffset	95
aerAxisParmMotionStatus	97
aerAxisParmServoStatus	98
aerAxisParmExtr2dscl	109
aerAxisParmBase_Speed	110
aerAxisParmMax_Phase	111
aerAxisParmPhase_Speed	112
aerAxisParmAlt_Status	113
aerAxisParmSoftLimitMode	115
aerAxisParmHomeVelMult	116
aerAxisParmCamAdvance	117
aerAxisParmVGain	118
aerAxisParmAlpha	119
aerAxisParmVelTimeConst	120
aerAxisParmMaxCamAccel	121
aerAxisParmHomeOffset	122
aerAxisParmICmdPolarity	123
aerAxisParmBrakeMask	124
aerAxisParmDacOffset	125
aerAxisParmB0	126
aerAxisParmB1	127
aerAxisParmB2	128
aerAxisParmA1	129
aerAxisParmA2	130
aerAxisParmPosToGoIRQ	131
aerAxisParmAuxDelay	132
aerAxisParmScalePGain	133
aerAxisParmPosModulo	134
aerAxisParmNegModulo	135
aerAxisParmModuloMode	136
aerAxisParmIMaxPlus	137
aerAxisParmIMaxMinus	138
aerAxisAuxLevel	139
aerAxisParmGearSlave	140
aerAxisParmGearMaster	141
aerAxisParmGearMode	142
aerAxisParmAuxVelCmd	143
aerAxisParmPositionTol	144
aerAxisParmPositionTolTime	145
aerAxisParmGantryMode	146
aerAxisParmGantryOffset	147

aerAxisParmGantryMaster	148
aerAxisParmPhaseAOffset	149
aerAxisParmPhaseBOffset	150
aerAxisParmDataPlotMode	151
aerAxisParmBB0	152
aerAxisParmBB1	153
aerAxisParmBB2	154
aerAxisParmAA1	155
aerAxisParmAA2	156
aerAxisParmMax	157

Used by

AerParmAxisxxxx

B.9. aerAxisState

Specifies an axis state.

Constants

aerAxisStateFree	0
aerAxisStateCaptured	1
aerAxisStateBound	2

B.10. aerAxisType

These constants specify the type of axis.

Constants

aerAxisTypeLinear	0
aerAxisTypeRotaryModulo	1
aerAxisTypeRotaryNoModulo	2
aerAxisTypeMax	3

Used by

Machine parameter – Type

B.11. aerBit

VB

These constants specify a bit in a bit-masked parameter, such as the FAULTMASK axis parameter, aerAxisParmFaultMask.

Constants

aerBit1	&H00000001
aerBit2	&H00000002
aerBit3	&H00000004
aerBit4	&H00000008
aerBit5	&H00000010
aerBit6	&H00000020
aerBit7	&H00000040
aerBit8	&H00000080
aerBit9	&H00000100
aerBit10	&H00000200
aerBit11	&H00000400
aerBit12	&H00000800
aerBit13	&H00001000
aerBit14	&H00002000
aerBit15	&H00004000
aerBit16	&H00008000
aerBit17	&H00010000
aerBit18	&H00020000
aerBit19	&H00040000
aerBit20	&H00080000
aerBit21	&H00100000
aerBit22	&H00200000
aerBit23	&H00400000
aerBit24	&H00800000
aerBit25	&H01000000
aerBit26	&H02000000
aerBit27	&H04000000
aerBit28	&H08000000
aerBit29	&H10000000
aerBit30	&H20000000
aerBit31	&H40000000
aerBit32	&H80000000

B.12. aerBrkPnt

These constants are used for defining breakpoints, on, off and toggling the break point.

Constants

aerBrkPntToggle	-1	// long data type
aerBrkPntOff	0	
aerBrkPntOn	1	

B.13. aerCard

These constants are used to register a card with the system and to establish communications with the card during device initialization. The Aerotech device driver can communicate with up to four cards simultaneously.

Constants

aerCardDefault	0
aerCard1	1
aerCard2	2
aerCard3	3
aerCard4	4

Used by

AerRegxxxx
AerSysOpen

VB

B.14. aerCompileError

This constant specifies a compiler error.

Constants

aerCompileError	&HE0085150

Used by

AerCompilerCompileFile

B.15. aerCPUStatus

These constants are used for testing the status of the firmware on the controller, Boot Image executing, normal image executing or a fatal error has occurred.

Constants

AerCPUStatusBootExec	1
AerCPUStatusImgExec	2
AerCPUStatusFatal	3

B.16. aerDeviceID

These constants are used to specify to the device driver, the type of Aerotech controller hardware that it will be communicating with. They are used when registering the system in the Win32 registry.

Constants

aerDeviceIDDefault	0
aerDeviceID600	600
aerDeviceID631	631

Used by

AerRegxxxx
AerSysOpen

B.17. aerDrv600Default

VB

These constants are used for defining the default values of the device driver to communicate with the controller. They are AT Window, &hdc00 0000, I/O base address &h220, IRQ 5 and DRAM Size Code, 2 Megabytes.

Constants

AerDrv600DefaultATWin	&hDC00 0000	// AT Window &hDC00 0000
aerDrv600DefaultIO	&h2200	// I/O address &h2200
aerDrv600DefaultIRQ	5	// interrupt 5
aerDrv600DefaultDSC	2	// 2 megabytes

VB

B.18. aerErrType

These constants specify the type of warning message (Message Only, Warning Message, Error Message or No Message).

Constants

aerErrTypeMsg	0
aerErrTypeWarn	1
aerErrTypeError	2
aerErrTypeNone	3

B.19. aerEvent

These constants specify an event type.

Constants

aerEventUnknownEvent	&H8000
aerEventIRQ2Timer	&H8001
aerEventTaskFault	&H8002
aerEventAxisFault	&H8003
aerEventSerial	&H8004
aerEventVirtIOUpdate	&H8005
aerEventTaskCallback	&H8006
aerEventJoystick	&H8007
aerEventNone	&HFFFFFFFF

Used by

AerEventCreateEvent

B.20. aerFBType

An axis feedback type definition.

Constants

aerFBTypeNull	0
aerFBTypeResolver	1
aerFBTypeEncoder	2
aerFBTypeEncoderHall	3
aerFBTypeResolverHall	6

Used by

AerConfigXXXX

B.21. aerFLT

To determine which fault is active.

Constants

aerFltPositionError	&H00000001	// excess position error
aerFltIAverage	&H00000002	// excess RMS current error
aerFltCWHardLimit	&H00000004	// CW hardware limit error
aerFltCCWHardLimit	&H00000008	// CCW hardware limit error
aerFltCWSoftLimit	&H00000010	// CW software limit error
aerFltCCWSoftLimi	&H00000020	// CCW software limit error
aerFltDrive	&H00000040	// drive fault error
aerFltFeedback	&H00000080	// feedback failure error
aerFltProgramming	&H00000100	// programming error
aerFltMasterFeedback	&H00000200	// master feedback failure
aerFltHoming	&H00000400	// homing fault
aerFltUser	&H00000800	// user trigger
aerFltVelTrap	&H00001000	// velocity trap
aerFltVel_CommandTrap	&H00002000	// velocity command trap
aerFltHomeTolerence	&H00004000	// home fault tolerance
aerFltProbe	&H00008000	// probe input fault
aerFltTask	&H00010000	// Task fault
aerFltExternalFeedback	&H00020000	// external feedback failure
aerFltSafezone	&H00040000	// safe zone fault
aerFltConstant	&H00080000	// irq at end accel
aerFltDecel	&H00100000	// irq at beginning of decel
aerFltDone	&H00200000	// irq at move completion
aerFltPosToGo	&H00400000	// irq at position to go
aerFltEStop	&H00800000	// ESTOP

Used by

Axis parameter FAULT

VB

B.22. aerGStripMode

These constants are used for defining the mode of the strip chart.

Constants

aerGStripModeTime	0
aerGStripModeTimeSpdOverRide	1
aerGStripModePos	2
aerGStripModeQueue	3
aerGStripModeQueueHold	4
aerGStripModeEventCount	5
aerGStripModeEventQueue	6
aerGStripModeIO	7
aerGStripModeIOQueue	8

B.23. aerGStripStatus

These constants are used to determine the status of the strip chart.

Constants

aerGStripStatusAllocated	&H0001
aerGStripStatusArmed	&H0002
aerGStripStatusTriggered	&H0004
aerGStripStatusDone	&H0008
aerGStripStatusOverflow	&H0010
aerGStripStatusFRMode	&H0020
aerGStripStatusHold	&H0040
aerGStripStatusTableMode	&H0080
aerGStripStatusTrigAllocated	&H0100
aerGStripStatusQueueMode	&H0200
aerGStripStatusAborted	&H0400
aerGStripStatusEventMode	&H0800
aerGStripStatusUploading	&H1000
aerGStripStatusLogicTime	&H2000
aerGStripStatusLogicLevel	&H4000
aerGStripStatus4khz	&H8000

Used by

AerStripGetStatus

B.24. aerGStripLogicMode

These constants define the mode of the strip chart.

Constants

aerGStripLogicModeStop	0
aerGStripLogicModeTime	1
aerGStripLogicModeLevel	2

B.25. aerGStripLogic

These constants specify the type of virtual I/O data to be collected by the strip chart.

Constants

aerGStripLogicBI	0
aerGStripLogicBO	1
aerGStripLogicRI	2
aerGStripLogicRO	3

B.26. aerGlobalParm

Global parameter names.

Constants

aerGlobalParmAvgPollTimeSec	0
aerGlobalParmVersion	1
aerGlobalParmNumGlobalDoubles	2
aerGlobalParmNumGlobalStrings	3
aerGlobalParmNumGlobalAxisPts	4
aerGlobalParmEStopEnabled	5
aerGlobalParmCallBackTimeoutSec	6
aerGlobalParmInterrupt2TimeSec	7
aerGlobalParmEnable1KhzServo	8
aerGlobalParmBuildNumber	9
aerGlobalParmUserMode	10
aerGlobalParmThrowTaskWarningsAsFaults	11
aerGlobalParmSystemStatus	12
aerGlobalParmEnable2Dcalibration	13
aerGlobalParmNumCannedFunctions	14
aerGlobalParmCompatabilityMode	15
aerGlobalParmNumDecimalsCompare	16
aerGlobalParmMeasurementMode	17
aerGlobalParmMax	18

Used by

AerParmGlobalxxxx

B.27. aerImgExecuting

VB

This constant specifies an error code indicating that the controller is currently running its firmware, most typically when you try to preload its firmware.

Constants

aerImgExecuting	&HE0083009

Used by

AerSysDownLoad

B.28. aerIOType

An axis IO type definition.

Constants

aerIOTypeNull	0
aerIOTypeD2A	1

Used by

AerConfigXXXX

B.29. aerMachParm

Machine Parameter names.

Constants

aerMachParmType	0	
aerMachParmCntsPerInch	1	
aerMachParmCntsPerDeg	2	
aerMachParmMaxFeedRateIPM	3	
aerMachParmMaxFeedRateRPM	4	
aerMachParmRapidFeedRateIPM	5	
aerMachParmRapidFeedRateRPM	6	
aerMachParmHomeType	7	
aerMachParmHomeDirection	8	
aerMachParmHomeFeedRateIPM	9	
aerMachParmHomeFeedRateRPM	10	
aerMachParmHomeOffsetInch	11	
aerMachParmHomeOffsetDeg	12	
aerMachParmNumDecimalsEnglish	13	
aerMachParmNumDecimalsMetric	14	
aerMachParmAxisState	15	
aerMachParmControllingTask	16	
aerMachParmPositionUnits	17	
aerMachParmPositionCmdUnits	18	
aerMachParmPresetCmdUnits	19	
aerMachParmAvgVelUnits	20	
aerMachParmFixtureOffset	21	
aerMachParmFixtureOffset1	21	// same as aerMachParmFixtureOffset
aerMachParmScaleFactor	22	
aerMachParmPresetUnits	23	
aerMachParmFixtureOffset2	24	
aerMachParmFixtureOffset3	25	
aerMachParmFixtureOffset4	26	
aerMachParmFixtureOffset5	27	
aerMachParmFixtureOffset6	28	
aerMachParmJogDistanceInch	29	
aerMachParmJogDistanceDeg	30	
aerMachParmJogVelocityIPM	31	
aerMachParmJogVelocityRPM	32	
aerMachParmUnusedAxis	33	
aerMachParmReverseSlewDir	34	

Used by

AerParmMachinexxxx

B.30. aerMax

These constants specify various maximum lengths of data used by the functions.

Constants

aerMaxParmNameLength	32
aerMaxPath	261
aerMaxTextLength	255

B.31. aerMaxVirtIO

VB

These constants specify the maximum number of virtual I/O registers and virtual I/O binary bits (as bits, bytes, words and dwords (32 bits)).

Constants

aerMaxVirtIOBits	512
aerMaxVirtIOBytes	(aerMaxVirtIOBits/8)
aerMaxVirtIOWords	(aerMaxVirtIOBits/16)
aerMaxVirtIODWords	(aerMaxVirtIOBits/32)
aerMaxVirtIORegisters	128

VB

B.32. aerMFBType

An axis master feedback type definition.

Constants

aerMFBTypeNull	0
aerMFBTypeResolver	1
aerMFBTypeEncoder	2
aerMFBTypeVirtual	3

Used by

AerConfigXXXX

B.33. aerMove

These constants specify the type of motion to be generated by the AerMoveAxis function.

Constants

aerMoveAbsolute	&H80000000
aerMoveHome	&H80000001
aerMoveIncremental	&H80000002
aerMoveFreerun	&H80000003
aerMoveInfeedSlave	&H80000004
aerMoveQIncremental	&H80000005
aerMoveQAbsolute	&H80000006
aerMoveHomeQuick	&H80000007
aerMoveHomeAltRev	&H80000008
aerMoveHomeNoLimit	&H80000009
aerMoveOscillate	&H8000000A
aerMoveAlignSlave	&H8000000B
aerMoveHalt	&H40000010
aerMoveAbort	&H40000011
aerMoveFeedhold	&H40000012
aerMoveRelease	&H40000013
aerMoveQFlush	&H40000014
aerMoveQHold	&H40000015
aerMoveQRelease	&H40000016
aerMoveLinear	&H20000000

Used by

AerMoveAxis

B.34. aerNoErr

A constant specifying no error has occurred.

Constants

aerNoErr	0

Used by

AerCompilerCompileFile

B.35. aerOS

These constants specify the Operating System the application is running under.

Constants

aerOSWin95 (Win98, also)	1
aerOSWinNT	2

Used by

AerVerGetOS

VB

B.36. aerParm

These constants specify the parameter type (Axis, Machine, Global, or Task) and the sub-group type.

Constants

aerParmSubGroupNone	&H0000
aerParmAxisSubGroupCamming	&H0001
aerParmAxisSubGroupFaultLevel	&H0002
aerParmAxisSubGroupFaultMask	&H0003
aerParmAxisSubGroupMotion	&H0004
aerParmAxisSubGroupServo	&H0005
aerParmAxisSubGroupFilter	&H0006
aerParmAxisSubGroupAdvanced	&H0007
aerParmAxisSubGroupConfig	&H0008
aerParmAxisSubGroupMisc	&H0009
aerParmMachineSubGroupConfig	&H0011
aerParmMachineSubGroupBasic	&H0012
aerParmMachineSubGroupDisplay	&H0013
aerParmMachineSubGroupHoming	&H0014
aerParmMachineSubGroupOffset	&H0015
aerParmTaskSubGroupFeedrate	&H0021
aerParmTaskSubGroupJogging	&H0022
aerParmTaskSubGroupBasic	&H0023
aerParmTaskSubGroupCircular	&H0024
aerParmTaskSubGroupTransform	&H0025
aerParmTaskSubGroupProgram	&H0026
aerParmTaskSubGroupSpindle	&H0027
aerParmTaskSubGroupMisc	&H0028

B.37. aerParmAttr

These values can be binary anded with the attribute mask returned by the *AerParmxxxxGetInfo* functions, to determine if the conditions listed in the comments below are true or not.

Constants

aerParmAttrValid	&H0001
aerParmAttrRead	&H0002
aerParmAttrWrite	&H0004
aerParmAttrUpdate	&H0008
aerParmAttrUnsigned	&H0010
aerParmAttrTest	&H0020
aerParmAttrInteger	&H0040
aerParmAttrEnglish	&H0100
aerParmAttrNoLimit	&H0200

Used by

AerParmAxisGetInfo
AerParmMachineGetInfo
AerParmGlobalGetInfo
AerParmTaskGetInfo

B.38. aerParmDisplay

These constants specify the display attributes of the parameters (Axis, Global, Machine, and Task).

Constants

aerParmDisplayAttrValue	&H0000
aerParmDisplayAttrBitmask	&H0001
aerParmDisplayAttrChoice	&H0002
aerParmDisplayAttrHex	&H0004
aerParmDisplayAttrDSPLong	&H0010
aerParmDisplayAttrDSPFixInt	&H0020
aerParmDisplayAttrDSPFixLong	&H0040

B.39. aerParmType

These constants specify the type of parameter.

Constants

aerParmTypeAxis	0
aerParmTypeMachine	1
aerParmTypeTask	2
aerParmTypeGlobal	3

B.40. aerPhysAxisIndex

These constants specify physical axis indexes.

Constants

aerPhysAxisIndex1	0
aerPhysAxisIndex2	1
aerPhysAxisIndex3	2
aerPhysAxisIndex4	3
aerPhysAxisIndex5	4
aerPhysAxisIndex6	5
aerPhysAxisIndex7	6
aerPhysAxisIndex8	7
aerPhysAxisIndex9	8
aerPhysAxisIndex10	9
aerPhysAxisIndex11	10
aerPhysAxisIndex12	11
aerPhysAxisIndex13	12
aerPhysAxisIndex14	13
aerPhysAxisIndex15	14
aerPhysAxisIndex16	15

B.41. aerProbeStatus

These constants are used for testing the status of the probe.

Constants

aerProbeStatusArmed	1	// probe is armed
aerProbeStatusValidPos	2	// position is valid
aerProbeStatusInput	4	// has been configured
aerProbeStatusHighSpeed	8	// using high speed position latch

B.42. aerProgramMsg

These constants specify the status of the CNC program compilation and download process.

Constants

aerProgramMsgNone	-1
aerProgramMsgCompileStart	0
aerProgramMsgCompileEnd	1
aerProgramMsgCompileWarn	2
aerProgramMsgCompileError	3
aerProgramMsgCompileInfo	4
aerProgramMsgDownloadStart	5
aerProgramMsgDownloadEnd	6
aerProgramMsgDownloadError	7

B.43. aerPSOChannelMask

These constants are used for defining the channels that the PSO-PC card will track for generating the firing pulse, etc.

Constants

aerPsoChannelMask1	0x01	// PSO channel 1
aerPsoChannelMask2	0x02	// PSO channel 2
aerPsoChannelMask3	0x04	// PSO channel 3
aerPsoChannelMask4	0x08	// PSO channel 4

B.44. aerPSOMode

These constants are used for defining the mode of the PSO-PC card.

Constants

aerPsoModeImmediate	0x00	// write output value NOW
aerPsoModeVelTracking	0x01	// track velocity
aerPsoModePosTracking	0x02	// track position

B.45. aerPSOTable

These constants are used for defining the mode of the PSO-PC table based commands.

Constants

aerPsoTableIncDist	0	// incremental distances
aerPsoTableAbsDist	1	// absolute distances
aerPsoTableInvalid	&HFFFF	// invalid firing table type

VB

B.46. aerPtrType

Constants

aerPtrTypeNull	&H00	
aerPtrTypeCSPParmVar	&H01	
aerPtrTypeAptGlobalVar	&H02	Axis Point Variables
aerPtrTypeAptTaskVar	&H03	
aerPtrTypeAptCSParmVar	&H04	
aerPtrTypeStrGlobalVar	&H05	String Variables
aerPtrTypeStrTaskVar	&H06	
aerPtrTypeStrProgramVar	&H07	
aerPtrTypeDblGlobalVar	&H08	Double Precision Variables
aerPtrTypeDblTaskVar	&H09	
aerPtrTypeDblProgramVar	&H0A	
aerPtrTypeDblCSParmVa	&H0B	
aerPtrTypeMaskCSParmVar	&H0C	
aerPtrTypeDblAptGlobalVar	&H0D	Global Variable (i.e., $Glob0)
aerPtrTypeMaskAptGlobalVar	&H0E	
aerPtrTypeDblAptTaskVar	&H0F	Task Variable (i.e., $Task0)
aerPtrTypeMaskAptTaskVar	&H10	
aerPtrTypeDblGlobalParm	&H11	Axis, Global, Task, and Machine parameters.
aerPtrTypeDblTaskParm	&H12	
aerPtrTypeDblMachParm	&H13	
aerPtrTypeDWordAxisParm	&H14	
// Virtual I/O		
aerPtrTypeByteBIVIO	&H15	; Binary Input
aerPtrTypeByteBOVIO	&H16	; Binary Input
aerPtrTypeWordRIVIO	&H17	; Register Input
aerPtrTypeWordROVIO	&H18	; Register Input
aerPtrTypeDblInputAnalog	&H19	; Analog Input

Used by

AerVarXXXX

B.47. aerPulseWidth

These constants are used for defining the type of pulse for PSOP CNC command.

Constants

aerPulseWidthMsec	0x00	// define pulse width in mSec (PSOP 0)
aerPulseWidthUsec	0x01	// define pulse width in uSec (PSOP 4)
aerPulseDefine	0x02	// define 3 phase pulse (PSOP 1)
aerPulseDefineRamp	0x03	// define 3 phase pulse with ramp (PSOP 1)
aerPulseToggle	0x04	// (PSOP 5)

B.48. aerRegID

Constants

aerRegIDConverted	-1
aerRegIDAxisCfgFile	0
aerRegIDAxisWizFile	1
aerRegIDAxisParmFile	2
aerRegIDMachParmFile	3
aerRegIDTaskParmFile	4
aerRegIDGlobParmFile	5
aerRegIDManualPageFile	6
aerRegIDInstallDir	7
aerRegIDProgramDir	8
aerRegIDDefaultTeachFile	9
aerRegIDPSOImageFile	10
aerRegIDImageFile	11
aerRegIDBootImageFile	12
aerRegIDSymbolicName	13
aerRegIDCal2DFile	14
aerRegIDAutomationFile	15
aerRegIDToolFile	16
aerRegIDVirtIOFile	17
aerRegIDU600MMIIniFile	18
aerRegIDU600MMIPosFile	19
aerRegIDU600IniFile	20
aerRegIDUserErrFile	21
aerRegIDManualIO1File	22
aerRegIDManualIO2File	23
aerRegIDManualIO3File	24
aerRegIDManualIO4File	25
aerRegIDTaskIni1File	26
aerRegIDTaskIni2File	27
aerRegIDTaskIni3File	28
aerRegIDTaskIni4File	29
aerRegIDMax	30

Used By

AerRegGetFilename()
AerRegSetFilename()

B.49. aerReturnType

These constants specify the return type from the ONGOSUB CNC command.

Constants

aerReturnTypeNull	0
aerReturnTypeStart	1
aerReturnTypeInterrupt	2
aerReturnTypeEnd	3
aerReturnTypeOffset	4

B.50. aerRIO

These constants specify the Register I/O action.

Constants

aerRIOCycleStart	&H0001
aerRIOCycleStep	&H0002
aerRIOCycleRetraceOn	&H0004
aerRIOCycleRetraceOff	&H0008
aerRIOCycleStop	&H0010
aerRIOCycleReset	&H0020
aerRIOCycleAbort	&H0040
aerRIOAsyncMove	&H0080
aerRIOSlewStart	&H0100
aerRIOSlewStop	&H0200
aerRIOReserved2	&H0400
aerRIOReserved3	&H0800
aerRIOAutoModeOn	&H1000
aerRIOAutoModeOff	&H2000

B.51. aerServoStat

To determine the state of an axis.

Constants

aerServoStatDrive	&H00000001	// drive on,off
aerServoStatAux	&H00000002	// auxiliary output on,off
aerServoStatCWLimit	&H00000004	// cw limit switch on,off
aerServoStatCCWLimit	&H00000008	// ccw limit switch on,off
aerServoStatHome	&H00000010	// home switch on,off
aerServoStatDriveFlt	&H00000020	// drive fault status
aerServoStatAtHome	&H00000040	// axis at home position
aerServoStatDone	&H00000080	// motion done
aerServoStatInPos	&H00000100	// axis in position
aerServoStatFaulted	&H00000200	// axis is faulted
aerServoStatProbeInput	&H00000400	// probe input active
aerServoStatMarker	&H00000800	// marker
aerServoStatHall1	&H00001000	// hallinput 1
aerServoStatHall2	&H00002000	// hallinput 2
aerServoStatHall3	&H00004000	// hallinput 3
aerServoStatHall4	&H00008000	// hallinput 4
aerServoStatINegLimit	&H00010000	// integral negative clamped
aerServoStatIPosLimit	&H00020000	// integral positive clamped
aerServoStatVFF	&H00040000	// VFF Enabled
aerServoStatBrake	&H00080000	// Brake output active
aerServoStatAlive	&H00100000	// axis has been configured
aerServoStatVVF_0ATC	&H00200000	// VFF or position loop zero
aerServoStatFeedbackIn	&H00400000	// Feedback fault input
aerServoStatMFeedbackIn	&H00800000	// Mst Feedback fault input
aerServoStatHPVMELaser	&H01000000	// HPVME Laser
aerServoStatScalePGain	&H02000000	// SCALEPGAIN axis parameter
aerServoStatAC	&H04000000	// AC motor selected
aerServoStatMSET	&H08000000	// Axis in MSET mode
aerServoStatHomed	&H10000000	// Axis has been homed
aerServoStatEncoder	&H20000000	// Axis has encoder feedback
aerServoStatErrorMap	&H40000000	// Error mapping enabled
aerServoStatPLoopOnly	&H80000000	// position loop only

Used by

Axis parameter SERVOSTATUS

VB

B.52. aerStat

To determine the state of the axis processor.

Constants

```
// Axis status bits defined

aerStatDrive         &H00000001   // drive on,off
aerStatAux           &H00000002   // auxiliary output on,off
aerStatCWlimit       &H00000004   // cw limit switch on,off
aerStatCCWLimit      &H00000008   // ccw limit switch on,off
aerStatHome          &H00000010   // home switch on,off
aerStatDriveFlt      &H00000020   // drive fault status
aerStatAtHome        &H00000040   // axis at home position
aerStatDone          &H00000080   // motion done
aerStatInPos         &H00000100   // axis in position
aerStatFaulted       &H00000200   // axis is faulted
aerStatProbeInput    &H00000400   // probe input active
aerStatMarker        &H00000800   // marker
aerStatHall1         &H00001000   // hall input1
aerStatHall2         &H00002000   // hall input2
aerStatHall3         &H00004000   // hall input3
aerStatHall4         &H00008000   // hall input4
aerStatMoveDir       &H00010000   // move direction
aerStatMoving        &H00020000   // moving
aerStatAccel         &H00040000   // axis in accel phase
aerStatDecel         &H00080000   // axis in decel phase
aerStatHoming        &H00100000   // axis homing
aerStatFeedOver      &H00200000   // feed rate override
aerStatProfile       &H00400000   // axis in profile mode
aerStatSync          &H00800000   // axis in sync mode
aerStatCamTable      &H01000000   // cam table enabled
aerStatHomeDir       &H02000000   // home direction
aerStatContMove      &H04000000   // continuous move
aerStatQueue         &H08000000   // motion queue active
aerStatHold          &H10000000   // hold active
aerStatAuxMode       &H20000000   // aux mode
aerStatBlockMotion   &H40000000   // block motion
aerStatHoldQueue     &H80000000   // hold queue
```

Used by

Axis parameter STATUS

B.53. aerStripIOPosLatch

These constants are used to test the state of the I/O position latch.

Constants

aerStripIOPosLatchDisable	0
aerStripIOPosLatchOneShot	1
aerStripIOPosLatchCont	2
aerStripIOPosLatchAxisIO	0
aerStripIOPosLatchVirtIO	1
aerStripIOPosLatchBitCCW	0
aerStripIOPosLatchBitCW	1
aerStripIOPosLatchHome	2
aerStripIOPosLatchEncFlt	3
aerStripIOPosLatchFault	4
aerStripIOPosLatchHallA	5
aerStripIOPosLatchHallB	6
aerStripIOPosLatchHallC	7

VB

B.54. aerStatus

These constants specify status words.

Constants

aerStatusFault	&H0001
aerStatusAxisWord1	&H0002
aerStatusAxisWord2	&H0003

B.55. aerSP1Type

A spare axis feedback type definition.

Constants

aerSp1TypeNull	0
aerSp1TypeEncoder	3
aerSp1TypeEncoderSlave	4
aerSp1TypeResolver	5

Used by

AerConfigXXXX

VB

B.56. aerSP2Type

A spare feedback type definition, defined as 0.

Constants

aerSp2TypeNull	0

Used by

AerConfigXXXX

B.57. aerTaskAxisIndex

These constants are used to specify a task axis index.

Constants

aerTaskAxisIndex1	0
aerTaskAxisIndex2	1
aerTaskAxisIndex3	2
aerTaskAxisIndex4	3
aerTaskAxisIndex5	4
aerTaskAxisIndex6	5
aerTaskAxisIndex7	6
aerTaskAxisIndex8	7
aerTaskAxisIndex9	8
aerTaskAxisIndex10	9
aerTaskAxisIndex11	10
aerTaskAxisIndex12	11
aerTaskAxisIndex13	12
aerTaskAxisIndex14	13
aerTaskAxisIndex15	14
aerTaskAxisIndex16	15

VB

B.58. aerTaskExec

Specifies the type of program execution to begin.

Constants

aerTaskExecDefault	-1	
aerTaskExecRun	0	
aerTaskExecRunInto	0	// same as aerTaskExecRun
aerTaskExecStepInto	1	
aerTaskExecStepOver	2	
aerTaskExecRunOver	3	

Used by

AerTaskProgramExecute

B.59. aerTaskIndex

Task index numbers.

Constants

aerTaskIndex1	0
aerTaskIndex2	1
aerTaskIndex3	2
aerTaskIndex4	3
aerMaxTasks	4

Used by

TASKINDEX *variables*

B.60. aerTaskMask

These constants allow multiple tasks to be specified as one parameter to a function (i.e., aerTaskMask1 + aerTaskMask2).

Constants

aerTaskMask1	&H0001
aerTaskMask2	&H0002
aerTaskMask3	&H0004
aerTaskMask4	&H0008
aerTaskMask	&H000F

Used by

AerSysInitSystem
AerAutoProgXXXX
AerCompilerAutoIncludeEx
AerDCGetTaskDirect
AerParmTaskDownloadFile
AerSysFaultAck

B.61. aerTaskMode

To determine which task mode is active. Parentheses indicate the interpretation of the mode when it is not active.

VB

Constants

aerTaskModeWord1	0	
aerTaskMode1BitEnglish	&H00000001	// G70/G71 !Metric
aerTaskMode1BitAbsolute	&H00000002	// !Incremental
aerTaskMode1BitAccelModeLinear	&H00000004	// !1-cosine
aerTaskMode1BitAccelModeRate	&H00000008	// !Time based
aerTaskMode1BitRotaryDominant	&H00000010	// !Linear
aerTaskMode1BitMotionContinuous	&H00000020	// !Decel To Zero
aerTaskMode1BitInverseCircular	&H00000040	
aerTaskMode1BitSpindleShutDown	&H00000080	
aerTaskMode1BitBlockDelete	&H00000100	
aerTaskMode1BitOptionalStop	&H00000200	
aerTaskMode1BitBreakPoint	&H00000400	
aerTaskMode1BitMFOLock	&H00000800	
aerTaskMode1BitMSOLock	&H00001000	
aerTaskMode1BitDryRunFeedRate	&H00002000	
aerTaskMode1BitRetrace	&H00004000	
aerTaskMode1BitAutoMode	&H00008000	
aerTaskMode1BitProgramFeedRateMPU	&H00010000	
aerTaskMode1BitProgramFeedRateUPR	&H00020000	
aerTaskMode1BitProgramSFeedRateSurf1	&H00040000	
aerTaskMode1BitProgramSFeedRateSurf2	&H00080000	
aerTaskMode1BitProgramSFeedRateSurf3	&H00100000	
aerTaskMode1BitProgramSFeedRateSurf4	&H00200000	
aerTaskMode1BitBlockDelete2	&H00400000	
aerTaskMode1BitRunOverMode	&H00800000	
aerTaskMode1BitMultiBlockLookAhead	&H01000000	
aerTaskMode1BitMachineLock	&H02000000	
aerTaskMode1BitHighSpeedBuffering	&H04000000	

Used by

AerTaskGetModeName
AER_TASK_MODE

B.62. aerTaskParm

Task Parameter names.

Constants

aerTaskParmNumber	0
aerTaskParmTaskFault	1
aerTaskParmTaskWarning	2
aerTaskParmMaxCallStack	3
aerTaskParmMaxModeStack	4
aerTaskParmNumTaskDoubles	5
aerTaskParmNumTaskStrings	6
aerTaskParmNumTaskAxisPts	7
aerTaskParmEStopInput	8
aerTaskParmFeedHoldInput	9
aerTaskParmFeedHoldEdgeInput	10
aerTaskParmS1_Index	11
aerTaskParmS1_RPM	12
aerTaskParmS2_Index	13
aerTaskParmS2_RPM	14
aerTaskParmS3_Index	15
aerTaskParmS3_RPM	16
aerTaskParmS4_Index	17
aerTaskParmS4_RPM	18
aerTaskParmRotateX	19
aerTaskParmRotateY	20
aerTaskParmRotateAngleDeg	21
aerTaskParmRThetaX	22
aerTaskParmRThetaY	23
aerTaskParmRThetaR	24
aerTaskParmRThetaT	25
aerTaskParmRThetaRadiusInch	26
aerTaskParmRThetaEnabled	27
aerTaskParmUpdateTimeSec	28
aerTaskParmAccelTimeSec	29
aerTaskParmDecelTimeSec	30
aerTaskParmAccelRateIPS2	31
aerTaskParmDecelRateIPS2	32
aerTaskParmAccelRateDPS2	33
aerTaskParmDecelRateDPS2	34
aerTaskParmLinearFeedRate	35
aerTaskParmRotaryFeedRate	36
aerTaskParmMFO	37
aerTaskParmMSO	38
aerTaskParmCoord1I	39
aerTaskParmCoord1J	40
aerTaskParmCoord1K	41
aerTaskParmCoord1Plane	42
aerTaskParmCoord2I	43
aerTaskParmCoord2J	44
aerTaskParmCoord2K	45
aerTaskParmCoord2Plane	46
aerTaskParmCutterX	47
aerTaskParmCutterY	48
aerTaskParmCutterRadiusInch	49
aerTaskParmNormalcyX	50

aerTaskParmNormalcyY	51
aerTaskParmNormalcyAxis	52
aerTaskParmUserFeedRateMode	53
aerTaskParmMaxMonitorData	54
aerTaskParmMaxOnGosubData	55
aerTaskParmAnalogMFOInput	56
aerTaskParmFeedHold	57
aerTaskParmMaxRadiusError	58
aerTaskParmStatus1	59
aerTaskParmStatus2	60
aerTaskParmStatus3	61
aerTaskParmMode1	62
aerTaskParmAnalogMSOInput	63
aerTaskParmErrCode	64
aerTaskParmGlobalEStopDisable	65
aerTaskParmLinearFeedRateActual	66
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aerTaskParmInterruptReturnType	70
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aerTaskParmS4_AnalogMSOInput	73
aerTaskParmS2_MSO	74
aerTaskParmS3_MSO	75
aerTaskParmS4_MSO	76
aerTaskParmROReq1	77
aerTaskParmRIAction1	78
aerTaskParmROAction1	79
aerTaskParmJoyStickPort	80
aerTaskParmSlewPair1	81
aerTaskParmSlewPair2	82
aerTaskParmSlewPair3	83
aerTaskParmSlewPair4	84
aerTaskParmSlewPair5	85
aerTaskParmSlewPair6	86
aerTaskParmSlewPair7	87
aerTaskParmSlewPair8	88
aerTaskParmRIActionOpCode	89
aerTaskParmRIActionAxis	90
aerTaskParmRIActionParm1	91
aerTaskParmRIActionParm2	92
aerTaskParmS1_SpindleRadius	93
aerTaskParmS2_SpindleRadius	94
aerTaskParmS3_SpindleRadius	95
aerTaskParmS4_SpindleRadius	96
aerTaskParmBlendMaxAccelLinearIPS2	97
aerTaskParmBlendMaxAccelRotaryDPS2	98
aerTaskParmBlendMaxAccelCircleIPS2	99
aerTaskParmReserved	100
aerTaskParmActiveFixtureOffset	101
aerTaskParmExecuteNumLines	102
aerTaskParmJogPair1EnableIn	103
aerTaskParmJogPair1Mode	104
aerTaskParmJogPair1Axis1	105
aerTaskParmJogPair1Axis1PlusIn	106
aerTaskParmJogPair1Axis1MinusIn	107

aerTaskParmJogPair1Axis2	108
aerTaskParmJogPair1Axis2PlusIn	109
aerTaskParmJogPair1Axis2MinusIn	110
aerTaskParmJogPair2EnableIn	111
aerTaskParmJogPair2Mode	112
aerTaskParmJogPair2Axis1	113
aerTaskParmJogPair2Axis1PlusIn	114
aerTaskParmJogPair2Axis1MinusIn	115
aerTaskParmJogPair2Axis2	116
aerTaskParmJogPair2Axis2PlusIn	117
aerTaskParmJogPair2Axis2MinusIn	118
aerTaskParmDryRunLinearFeedRateIPM	119
aerTaskParmDryRunRotaryFeedRateRPM	120
aerTaskParmMaxLookAheadMoves	121
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aerTaskParmCannedFunctionID	124
aerTaskParmDecelOnProgramAbortMask	125
aerTaskParmIgnoreAxesMask	126
aerTaskParmChordicalToleranceInch	127
aerTaskParmROReq1Mask	128
aerTaskParmNormalcyToleranceDeg	129
aerTaskParmChordicalSlowdownMsec	130
aerTaskParmCommandVelocityVariance	131
aerTaskParmCutterToleranceDeg	132
aerTaskParmCutterZ	133
aerTaskParmCutterLength	134
aerTaskParmCutterWear	135
aerTaskParmCutterOffsetX	136
aerTaskParmCutterOffsetY	137
aerTaskParmCutterRadius	138
aerTaskParmCutterActive	139
aerTaskParmRThetaRadius	140
aerTaskParmAccelRate	141
aerTaskParmDecelRate	142
aerTaskParmMaxRadiusAdjust	143
aerTaskParmUpdateNumEntries	144
aerTaskParmMaxCornerRoundErr	145
aerTaskParmGroup1GCodeMode	146
aerTaskParmExecuteNumMonitors	147
aerTaskParmExecuteNumSpindles	148
aerTaskParmProfileAxesZeroVel	149
aerTaskParmProfileAxesInpos	150
aerTaskParmMax	151

Used by

AerParmTaskxxxx

B.63. aerTaskStatus

To determine which task status is active. TaskStatus, which is a result of a G-code, is identified with the appropriate status bit.

Constants

aerTaskStatusWord1	0
aerTaskStatusWord2	1
aerTaskStatusWord3	2

aerTaskStatus1BitProgramAssociated	&H00000001
aerTaskStatus1BitProgramActive	&H00000002
aerTaskStatus1BitProgramExecuting	&H00000004
aerTaskStatus1BitImmediateCodeExecuting	&H00000008
aerTaskStatus1BitReturnMotionExecuting	&H00000010
aerTaskStatus1BitAborted	&H00000020
aerTaskStatus1BitSingleStepInto	&H00000040
aerTaskStatus1BitSingleStepOver	&H00000080
aerTaskStatus1BitInterruptFaultPending	&H00000100
aerTaskStatus1BitInterruptCallBackPending	&H00000200
aerTaskStatus1BitEStopInputActive	&H00000400
aerTaskStatus1BitFeedHoldInputActive	&H00000800
aerTaskStatus1BitCallBackHoldActive	&H00001000
aerTaskStatus1BitCallBackResponding	&H00002000
aerTaskStatus1BitProgramCleanup	&H00004000
aerTaskStatus1BitProgramCodeCleanup	&H00008000
aerTaskStatus1BitOnGosubPending	&H00010000
aerTaskStatus1BitFeedHoldInputLatch	&H00020000
aerTaskStatus1BitProbeCycle	&H00040000
aerTaskStatus1BitRetrace	&H00080000
aerTaskStatus1BitInsertLinkMove	&H00100000
aerTaskStatus1BitInterruptActive	&H00200000
aerTaskStatus1BitSlewActive	&H00400000
aerTaskStatus1BitCornerRounding	&H00800000
aerTaskStatus1BitROReq1Active	&H01000000
aerTaskStatus1BitCannedFunctionPending	&H02000000
aerTaskStatus1BitCannedFunctionActive	&H04000000
aerTaskStatus1BitCannedFunctionExecuting	&H08000000

aerTaskStatus2BitSpindleActive1	&H0001
aerTaskStatus2BitSpindleActive2	&H0002
aerTaskStatus2BitSpindleActive3	&H0004
aerTaskStatus2BitSpindleActive4	&H0008
aerTaskStatus2BitMSOChange	&H0010
aerTaskStatus2BitSpindleFeedHoldActive	&H0020
aerTaskStatus2BitASyncFeedHoldActive	&H0040

aerTaskStatus3BitRotationActive	&H0001
aerTaskStatus3BitRThetaPolarActive	&H0002
aerTaskStatus3BitRThetaCylindricalActive	&H0004
aerTaskStatus3BitScalingActive	&H0008
aerTaskStatus3BitOffsetFixtureActive	&H0010
aerTaskStatus3BitUnused2	&H0020
aerTaskStatus3BitMotionType1	&H0040
aerTaskStatus3BitMotionType2	&H0080
aerTaskStatus3BitMotionActive	&H0100
aerTaskStatus3BitMotionContinuous	&H0200
aerTaskStatus3BitMFOChange	&H0400
aerTaskStatus3BitMotionFeedHoldActive	&H0800
aerTaskStatus3BitCutterEnabling	&H1000
aerTaskStatus3BitCutterActiveLeft	&H2000
aerTaskStatus3BitCutterActiveRight	&H4000
aerTaskStatus3BitCutterDisabling	&H8000
aerTaskStatus3BitNormalcyActiveLeft	&H00010000
aerTaskStatus3BitNormalcyActiveRight	&H00020000
aerTaskStatus3BitNormalcyAlignment	&H00040000
aerTaskStatus3BitMotionTypeCW	&H00080000
aerTaskStatus3BitMotionTypeCCW	&H00100000
aerTaskStatus3BitLimitFeedRateActive	&H00200000
aerTaskStatus3BitLimitMFOActive	&H00400000
aerTaskStatus3BitCoord1Plane1Active	&H00800000
aerTaskStatus3BitCoord1Plane2Active	&H01000000
aerTaskStatus3BitCoord1Plane3Active	&H02000000
aerTaskStatus3BitCoord2Plane1Active	&H04000000
aerTaskStatus3BitCoord2Plane2Active	&H08000000
aerTaskStatus3BitCoord2Plane3Active	&H10000000
aerTaskStatus3BitMotionNoAccel	&H20000000
aerTaskStatus3BitMirrorActive	&H40000000

Used by

AerTaskGetStatusName
AER_TASK_STATUS

B.64. aerTool

These constants are used for Tool Tables.

Constants

aerToolEnglish	&H00000001
aerToolInUse	&H00000002
aerToolForceUnits	&H00000004
aerToolUserDiameter	&H00008000
aerToolValid	&H80000000

Used by

AerToolXXXX

B.65. aerVersion

These constants specify the controllers software version.

Constants

aerVersionMajor aerVersionMinor aerVersionBuild	Indicates current version number i.e., 6.0.132

B.66. Q

These are miscellaneous constants.

Constants

QConstant	1
QBinaryIn	2
QBinaryOut	3
QRegisterIn	4
QRegisterOut	5
QLongIn	5
QLongOut	6
QServoStatus	98
QMotionStatus	97
QEQ	0
QLT	1
QLE	2
QGT	3
QGE	4
QNE	5
QOR	6
QAND	7
QANDNOT	8
QADD	9
QSUB	10
QMULT	11
QDIV	12
QASSIGN	13
QXOR	14
QXNOR	15
QMoveAbs	0
QMoveIndex	1
QMoveStart	2
QMoveHalt	3
QStart	1
QHold	0
QReset	2
QStep	3
QAuto	4

∇ ∇ ∇

APPENDIX C: STRUCTURES AND DATA TYPES (C LANGUAGE)

In This Section:

C.1. Description

The following section provides a definition of all the structures used within the library (AerSys.DLL).

> Any of the following structures can be proceeded by a "P" to refer to a pointer to the structure (i.e., SPINDLEMASK becomes a pointer to the structure as "PSPINDLEMASK")

C.2. AER_AUX_POINT

Structure

```
typedef struct tagAER_AUX_POINT
{
   LONG  lMaster;   // Master coordinate (in counts)
   WORD  wLevel;    // Aux level to set (from lMaster to next
                   // point’s lMaster)
} AER_AUX_POINT;
typedef AER_AUX_POINT *PAER_AUX_POINT;
```

Members

See inline comments in the structure listed above.

See

AerAuxTablexxx

C.3. AER_AXISCAL_PACKET

Structure

```
typedef struct tagAER_AXISCAL_PACKET
{
   WORD    wTable;     // table number.
   DWORD   dwInput;    // axis number whose positions produce the
                       // correction.
   DWORD   dwScale;    // scale for the correction value.
} AER_AXISCAL_PACKET;
typedef AER_AXISCAL_PACKET *PAER_AXISCAL_PACKET;
```

Members

See inline comments in the structure listed above.

See

AerAxisCalGetPacket

C.4. AER_AXISCAL_STATUS_PACKET

Structure

```
typedef struct tagAER_AXISCAL_STATUS_PACKET
{
   WORD  wSize;        // size of axis calibration table
   WORD  wStatus;      // 1/0 = allocated/not allocated
} AER_AXISCAL_STATUS_PACKET;
typedef AER_AXISCAL_STATUS_PACKET *PAER_AXISCAL_STATUS_PACKET;
```

Members

See inline comments in the structure listed above.

See

AerAxisCalGetStatusPacket

C.5. AER_AXIS_DATA_EX

Structure

```
typedef struct tagAER_AXIS_DATA_EX
{
LONG    lPos;           // counts - Reflects Axis Parm - POS
LONG    lPosCmd;        // counts - Reflects Axis Parm - POSCMD
LONG    lAvgVel;        // cnts/sec - Reflects Axis Parm - AVGVEL
LONG    lRawPos;        // counts - Reflects Axis Parm - RAWPOS
LONG    lTarget;        // counts - Reflects Axis Parm - TARGET

DOUBLE  dPreset;        // units,deg
DOUBLE  dFixtureOffset; // units,deg

DOUBLE  dPosFactor;     // Position conversion factor -> counts To
User Units
DOUBLE  dAvgVel;        // AvgVel User Units

DWORD   dwFaultStatus;  // Reflects Axis parameter - FAULT
DWORD   dwServoStatus;  // Reflects Axis parameter - SERVOSTATUS
DWORD   dwMotionStatus; // Reflects Axis parameter - MOTIONSTATUS

DWORD   dwType;         // AXISTYPE_
WORD    wNumDecimals;   // Number of Decimals
WORD    wEnglish;       // Whether your in English or Metric
} AER_AXIS_DATA_EX;
typedef AER_AXIS_DATA_EX   *PAER_AXIS_DATA_EX;
```

The position information is in counts. To convert to user units - mm or inch:

dPosUserUnits = lPos * dPosFactor;

The "PositionFactor" takes into account the current mode (English/Metric) and the CntsPerInch machine parameter.

Members

See inline comments in the structure listed above.

See

Data Center Functions

C.6. AER_CAM_GETPOINT

Structure

```
typedef struct tagAER_CAM_GETPOINT
{
    LONG lMaster;       // Master position (in counts)
    LONG lSlave;        // Slave  position (in counts)
    LONG lCoeffA;       // A coefficient
    LONG lCoeffB;       // B coefficient
    LONG lCoeffC;       // C coefficient
    WORD wType;         // Type of interpolation (AERCAM_POINT_XXX
                        // constant)
} AER_CAM_GETPOINT;
typedef AER_CAM_GETPOINT   *PAER_CAM_GETPOINT;
```

Members

See inline comments in the structure listed above.

See

AerCamTableGetPoint

C.7. AER_CAM_SETPOINT

Structure

```
typedef struct tagAER_CAM_SETPOINT
{
    LONG lMaster;      // Master position (in counts)
    LONG lSlave;       // Slave  position (in counts)
    WORD wType;        // Type of interpolation (AERCAM_POINT_XXX
                       // constant)
} AER_CAM_SETPOINT;
typedef AER_CAM_SETPOINT   *PAER_CAM_SETPOINT;
```

Members

See inline comments in the structure listed above.

See

AerCamTableSetPoint

C.8. AER_CFG_FBPACKET_ENCODER

Structure

```
// Use if wFBType == AER_FBTYPE_ENCODER        2
typedef struct tagAER_CFG_FBPACKET_ENCODER
{
   WORD  wChannel;     // Position feedback channel 1 to 16
   DWORD dwLines;      // Lines per motor revolution/after x4
                       // multiplication
   WORD  wBounded;     // 1 to activate software limits, 0 to
                       // disable them
} AER_CFG_FBPACKET_ENCODER;
typedef AER_CFG_FBPACKET_ENCODER *PAER_CFG_FBPACKET_ENCODER;
```

Members

See inline comments in the structure listed above.

See

AerConfig

C.9. AER_CFG_FBPACKET_ENCODER_HALL

Structure

```
// Use if wFBType == AER_FBTYPE_ENCODER_HALL    3
typedef struct tagAER_CFG_FBPACKET_ENCODER_HALL
{
   WORD  wChannel;     // Position feedback channel 1 to 16
   DWORD dwLines;      // Lines per motor revolution/after x4
                       // multiplication
   DWORD dwHallLines;  // Lines per elec. cycle after x4
                       // multiplication
   WORD  wCommOffset;  // Commutation offset (Hall effect)
   WORD  wCommChannel; // Feedback channel, 1 to 16 for commutation
   WORD  wBounded;     // 1 to activate software limits, 0 to
                       // disable them
} AER_CFG_FBPACKET_ENCODER_HALL;
typedef AER_CFG_FBPACKET_ENCODER_HALL
*PAER_CFG_FBPACKET_ENCODER_HALL;
```

Members

See inline comments in the structure listed above.

See

AerConfigHallEffect

C.10. AER_CFG_FBPACKET_HPVME

Structure

```
// Use if wFBType == AER_FBTYPE_HPVME           4
typedef struct tagAER_CFG_FBPACKET_HPVME
{
   WORD  wAddress;            // Upper 16 bits of address
   WORD  wLSCR;               // Laser source control register
   DWORD dwActualLines;       // Number of actual lines
   DWORD dwEffectiveLines;    // Number of effective lines
} AER_CFG_FBPACKET_HPVME;
typedef AER_CFG_FBPACKET_HPVME *PAER_CFG_FBPACKET_HPVME;
```

Members

See inline comments in the structure listed above.

See

AerConfig

C.11. AER_CFG_FBPACKET_NULL

Structure

```
// Use if wFBType == AER_FBTYPE_NULL    0
typedef struct tagAER_CFG_FBPACKET_NULL
{
   DWORD dwDummyLines;
} AER_CFG_FBPACKET_NULL;
typedef AER_CFG_FBPACKET_NULL *PAER_CFG_FBPACKET_NULL;
```

Members

See inline comments in the structure listed above.

See

AerConfig

C.12. AER_CFG_FBPACKET_RESOLVER

Structure

```
// Use if wFBType == AER_FBTYPE_RESOLVER        1
typedef struct tagAER_CFG_FBPACKET_RESOLVER
{
   WORD  wChannel;     // Position feedback channel 1 to 16
   WORD  wResolution   // Resolution of resolver (number of bits
                       // in R/D
                       // converter, must be 10, 12, 14, 16,
                       // based on R/D
                       // converter hardware used)
   WORD  wPoles;       // Number of poles (must be even, use 0
                       // for a DC motor)
   WORD  wCommOffset   // Commutation offset (Hall effect)
   WORD  wBounded;     // 1 to activate software limits, 0 to
                       // disable them
} AER_CFG_FBPACKET_RESOLVER;
typedef AER_CFG_FBPACKET_RESOLVER *PAER_CFG_FBPACKET_RESOLVER;
```

Members

See inline comments in the structure listed above.

See

AerConfig

C.13. AER_CFG_FBPACKET_RESOLVER_HALL

Structure

```
// Use if wFBType == AER_FBTYPE_RESOLVER_HALL      6
typedef struct tagAER_CFG_FBPACKET_RESOLVER_ HALL
{
    WORD  wChannel;      // Position feedback channel 1 to 16
    WORD  wResolution;   // Resolution of resolver (number of bits
                         // in R/D
                         // converter, must be 10, 12, 14, 16,
                         // based on
                         // R/D converter hardware used)
    DWORD dwHallLines;   // Lines per electrical cycle after x4
                         // multiplication
    WORD  wCommOffset;   // Commutation offset (Hall effect)
    WORD  wCommChannel;  // Feedback channel for commutation
    WORD  wBounded;      // 1 to activate software limits, 0 to
                         // disable them
} AER_CFG_FBPACKET_RESOLVER_HALL;
typedef AER_CFG_FBPACKET_RESOLVER_HALL
*PAER_CFG_FBPACKET_RESOLVER_HALL;
```

Members

See inline comments in the structure listed above.

See

AerConfigHallEffect

C.14. AER_CFG_FBPACKET_STEPPER

Structure

```
// Use if wFBType == AER_FBTYPE_STEPPER         7
typedef struct tagAER_CFG_FBPACKET_STEPPER
{
   WORD  wChannel;     // Position feedback channel 1 to 16
   DWORD dwLines;      // Lines per motor revolution
   DWORD dwCommLines;  // Number of lines per electrical cycle
   WORD  wBounded;     // 1 to activate software limits, 0 to
                       // disable them
} AER_CFG_FBPACKET_STEPPER;
typedef AER_CFG_FBPACKET_STEPPER *PAER_CFG_FBPACKET_STEPPER;
```

Members

See inline comments in the structure listed above.

See

AerConfig

C.15. AER_CFG_IOPACKET_D2A

Structure

```
// Use if wIOType == AER_IOTYPE_D2A             1
typedef struct tagAER_CFG_IOPACKET_D2A
{
   WORD  wChannel;            // current/velocity output channel
                              // 1 to 16
} AER_CFG_IOPACKET_D2A;
typedef AER_CFG_IOPACKET_D2A *PAER_CFG_IOPACKET_D2A;
```

Members

See inline comments in the structure listed above.

See

AerConfig

C.16. AER_CFG_MASTER_PACKET

Structure

```
typedef struct tagAER_CFG_MASTER_PACKET
{
   WORD  wFBType;           // Type of master feedback. Use
                            // AER_MFBTYPE_xxx constant.
   union
   {
      char  szFBData[16];   // Padding - do not use
      struct
      {
        WORD  wChannel;     // position feedback channel 1 to 16
        WORD  wResolution;  // resolution of resolver
     } Resolver;

     struct {
      WORD  wChannel;       // position feedback channel 1 to 16

      DWORD dwLines;        // lines per rev
    } Encoder;

     struct {
      WORD  wChannel;       // position feedback channel 1 to 16

    } Virtual;
   } FB;
} AER_CFG_MASTER_PACKET;

typedef AER_CFG_MASTER_PACKET *PAER_CFG_MASTER_PACKET;
```

Members

See inline comments in the structure listed above.

See

AerrRegGetDeviceInfo

C.17. AER_CFG_PACKET

The **AER_CFG_PACKET** structure defines configuration information used by the *AerConfig* functions. This large packet establishes how an axis is configured. It consists of four unions: FB, IO, SP1, and SP2; and four types associated with each union. The structures associated with the members of this structure, are detailed in the structure definitions following this one.

Structure

```
typedef struct tagAER_CFG_PACKET
{
   WORD wFBType;              // Set = AER_FBTYPE_xxxx
   WORD wIOType;              // Set = AER_IOTYPE_xxxx
   WORD wSpare1Type;          // Set = AER_SPARETYPE1_xxxx
   WORD wSpare2Type;          // Set = AER_SPARETYPE2_xxxx

   union
   {
      BYTE                           szFBData[16]; // Padding -
                                                   // not used
      AER_CFG_FBPACKET_NULL          Null;         // No Feedback
      AER_CFG_FBPACKET_RESOLVER      Resolver;     // Resolver
      AER_CFG_FBPACKET_ENCODER       Encoder;      // Encoder
      AER_CFG_FBPACKET_ENCODER_HALL  EncoderHall;  // Encoder
                                                   // with Hall
      AER_CFG_FBPACKET_HPVME         Hp;           // HP VME
      AER_CFG_FBPACKET_RESOLVER_HALL ResolverHall; // Hall Resolver
      AER_CFG_FBPACKET_STEPPER       Stepper;      // Stepper
                                                   // motor
   } FB;

   union
   {
      BYTE                           szIOData[16]; // Null
      AER_CFG_IOPACKET_D2A           D2ACard;      // D2A card
   } IO;

   union
   {  // Used for velocity feedback in systems with dual feedback
      BYTE                       szSpare1Data[16]; // Null
      AER_CFG_SP1PACKET_RESOLVER Resolver;         // Resolver
                                                   // New Resolver
      AER_CFG_SP1PACKET_ENCODER  Encoder;          // Encoder
                                                   // New Encoder
                                                   // Slave
Encoder
   } SP1;

   union
   {
      BYTE        szSpare2Data[16];                // Not used
   } SP2;
} AER_CFG_PACKET;
typedef AER_CFG_PACKET  *PAER_CFG_PACKET;
```

Members

See inline comments in the structure listed above.

See

AerConfig

C.18. AER_CFG_SP1PACKET_ENCODER

Structure

```
// Use if wSpare1Type == AER_SPARETYPE1_ENCODER           2
// Use if wSpare1Type == AER_SPARETYPE1_NEW_ENCODER       3
// Use if wSpare1Type == AER_SPARETYPE1_SLAVE_ENCODER     4
typedef struct tagAER_CFG_SP1PACKET_ENCODER
{
   WORD  wChannel;         // Position feedback channel 1 to 16
   DWORD dwLines;          // Lines per motor revolution
   WORD  wVelHomeFlag;     // Set to 1 to use HOME marker on
                           // velocity transducer. For
                           // AER_SPARETYPE1_NEW_ENCODER and
                           // AER_SPARETYPE1_SLAVE_ENCODER only
} AER_CFG_SP1PACKET_ENCODER;
typedef AER_CFG_SP1PACKET_ENCODER *PAER_CFG_SP1PACKET_ENCODER;
```

Members

See inline comments in the structure listed above.

See

AerConfigHallResolver

C.19. AER_CFG_SP1PACKET_RESOLVER

Structure

```
// Use if wSpare1Type == AER_SPARETYPE1_RESOLVER          1
// Use if wSpare1Type == AER_SPARETYPE1_NEW_RESOLVER      5
typedef struct tagAER_CFG_SP1PACKET_RESOLVER
{
   WORD  wChannel;             // Position feedback channel 1 to
                               // 16
   WORD  wResolution;          // Resolution of resolver (number
                               // of bits in R/D converter, must
                               // be 10, 12, 14, 16, based on R/D
                               // converter hardware used)
   WORD  wPoles;               // For AER_SPARETYPE1_NEW_RESOLVER
                               // only
   WORD  wCommOffset;          // For AER_SPARETYPE1_NEW_RESOLVER
                               // only
   WORD  wCommutationOnlyFlag; // For AER_SPARETYPE1_NEW_RESOLVER
                               // only
} AER_CFG_SP1PACKET_RESOLVER;
typedef AER_CFG_SP1PACKET_RESOLVER *PAER_CFG_SP1PACKET_RESOLVER;
```

Members

See inline comments in the structure listed above.

See

AerConfigHall

C.20. AER_COMPILE_ERROR_DATA

Structure

```
typedef struct         // Type returned by
                       // AerCompilerGetErrData()
{
   AERERR_CODE dwCode; // Code of error (see aercode.h +
                       // AerErr.rc for code meanings)
                       // (AERERR_NOERR if no error)
   LONG dwProgLine;    // PROGRAM Line that error occurred. (0-
                       // based) (-1 if not relevant)
   LONG dwFileLine;    // FILE Line that error occurred. (0-
                       // based) (-1 if not relevant)
   LONG dwCharStart;   // First Character of offending token (0-
                       // based) (-1 if not applicable)
   LONG dwCharEnd;     // Last Character of offending token (0-
                       // based) (-1 if not applicable)
   TCHAR pszFile[MAX_PATH];   // File error occurred in (or "" if
                              // not applicable)

} AER_COMPILE_ERROR_DATA;
```

Members

See inline comments in the structure listed above.

See

AerCompilerGetErrData

C.21. AER_COMPILE_STATUS_DATA

Structure

```
typedef struct                        // Type returned by
AerCompilerGetStatus()
{
   DWORD dwState;                     // (see states below)
   TCHAR pszState[MAX_STATE_CHARS];   // Verbal equivalent of
                                      // dwState
   DWORD dwProgLine;                  // Current program line being
                                      // compiled (is total num at
                                      // end)
   DWORD dwFileLine;                  // Current file line being
                                      // compiled
   DWORD dwNErrs;                     // Number of errors+warnings
                                      // so far.
   DWORD dwNWarns;                    // Number of warnings so far.
   TCHAR pszFile[MAX_PATH];           // Current file being scanned
                                      // (only pass 0 relevant,
                                      // else blank.)
   LONG ctime;                        // time (milliseconds) spent
                                      // in compile
   LONG dtime;                        // time (milliseconds) spent
                                      // in download

} AER_COMPILE_STATUS_DATA;
```

Members

Compile states are as follows:

```
COMPILER_STATE_NULL                // Created, but nothing else
                                   // done.
COMPILER_STATE_PREPROC             // Now preprocessing
COMPILER_STATE_PASS1               // Now in pass1
COMPILER_STATE_PASS2               // Now in pass2
COMPILER_STATE_DOWNLOADING         // Now downloading
COMPILER_STATE_DONE_OK 5           // Compiled successfully, no
                                   // warnings
COMPILER_STATE_DONE_WITH_WARNINGS// Compiled successfully, with
                                   // warnings
COMPILER_STATE_DONE_WITH_ERRORS    // Failed compile due to errors
COMPILER_STATE_DOWNLOADED          // Compiled and downloaded
                                   // successfully (may or may not
                                   // have warnings)
COMPILER_STATE_DOWNLOADERROR       // Compiled successfully, but
                                   // failure in download (may or
                                   // may not have compile
                                   // warnings)
COMPILER_STATE_DOWNLOADING         // currently downloading
```

C.22. AER_GSTRIP_AXIS_DATA

Structure

```
typedef struct tagAER_GSTRIP_AXIS_DATA
{
   LONG  lPos;              // Position (in counts)
   LONG  lPosCommand;       // Position command (in counts)
   LONG  lRawPos;           // Raw position (in counts)
   LONG  lMasterPos;        // Master position (in counts)
   SHORT sVelocity;         // Filtered velocity command, in
                            // counts/millisec
   SHORT sVelocityCommand;  // in counts/millisec
   SHORT sAcceleration;     // in counts/millisec2
   SHORT sTorque;           // in units of -32K to +32K, times
                            // the maximum torque for that motor.
} AER_GSTRIP_AXIS_DATA;
typedef AER_GSTRIP_AXIS_DATA  *PAER_GSTRIP_AXIS_DATA;
```

Members

Raw position is normally equal to position, only when axis calibration is active do they differ: raw position is before axis calibration, position is after axis calibration. The sVelocity member is not velocity directly from the feedback device, but it is the derivative of position from the feedback device computed once every millisecond (see axis parameter *VELTIMECONST*).

See

AerStripGlobalGetSample, *AerAxisCalxxxx*

C.23. AER_GSTRIP_SAMPLE

Structure

```
typedef struct tagAER_GSTRIP_SAMPLE
{
   PAER_GSTRIP_SYSTEM_DATA  pSystem;
   PAER_GSTRIP_AXIS_DATA    pAxis[MAX_AXES];
} AER_GSTRIP_SAMPLE;
typedef AER_GSTRIP_SAMPLE *PAER_GSTRIP_SAMPLE;
```

Members

This structure contains pointers to other structures. One pointer is for the global strip data (not related to a specific axis) the other pointers are for the axis data, one pointer per axis.

See the *GSTRIP_SYSTEM_DATA* and *GSTRIP_AXIS_DATA* structure definitions for more details.

See

AerStripGlobalGetSample

C.24. AER_GSTRIP_SYSTEM_DATA

Structure

```
typedef struct tagAER_GSTRIP_SYSTEM_DATA
{
   WORD  wAnalogInput[8];     // Analog inputs
   DWORD dwIO;                // Debug, for internal use only
   LONG  lClock;              // Clock value (milliseconds)
} AER_GSTRIP_SYSTEM_DATA;
typedef AER_GSTRIP_SYSTEM_DATA   *PAER_GSTRIP_SYSTEM_DATA;
```

Members

The specified analog inputs are either onboard the UNIDEX 600/620 controller or are the analog inputs on the Matrix analog input card in the UNIDEX 631 VME chassis, unless the analog probe is enabled (see *AerProbxxx* routines), in which case these are the probe inputs. The clock value is the number of milliseconds after the last axis processor card reset.

See

AerStripGlobalGetSample

C.25. AER_MOTN_LINEAR_PACKET

Structure

```
typedef struct tagAER_MOTN_LINEAR_PACKET
{
    AXISMASK   mAxis;                // Bitmask of axis to move.
    DWORD      dwSpeed;              // Vectorial speed in machine
                                     // steps/second.
    DWORD      dwTarget[MAX_AXES];  // Array of distances for each
                                     // axis to move.
} AER_MOTN_LINEAR_PACKET;
typedef AER_MOTN_LINEAR_PACKET   *PAER_MOTN_LINEAR_PACKET;
```

Members

See inline comments in the structure listed above.

See

AerMotionLinear

C.26. AER_MOTN_PACKET

Structure

```
typedef struct tagAER_MOTN_PACKET
{
   DWORD dwMove;              // Distance in machine steps
   DWORD dwSpeed;             // Speed in machine steps/second
} AER_MOTN_PACKET;
typedef AER_MOTN_PACKET  *PAER_MOTN_PACKET;
```

Members

See inline comments in the structure listed above.

See

AerMotionPacket

C.27. AER_PARM_INFO

Structure

```
typedef struct tagAER_PARM_INFO
{
   CHAR      szName[MAX_PARM_NAME_LEN]; // Parameter name(see
AerParmxxxx)
   DOUBLE    fdMin;                     // Minimum value
   DOUBLE    fdMax;                     // Maximum value
   DWORD     dwAttr;                    // Attribute mask (see
                                        // Constants chapter under
                                        // PARM_ATTR)
   DOUBLE    fdDefault;                 // Default value
   DWORP     dwDisplaySubGroup;         // Which subgroup to
                                        // display the parameter in
} AER_PARM_INFO;
```

Members

See inline comments in the structure listed above.

See

AerParmxxxx
AerProbePosPacket
AerProbeStatusPacket

C.28. AER_PROBE_POS_PACKET

Structure

```
typedef struct tagAER_PROBE_POS_PACKET
{
   WORD    wStatus;    // AER_PROBESTATUS_xxx constant
   DWORD   dwPos;      // Position probe was triggered
} AER_PROBE_POS_PACKET;
typedef AER_PROBE_POS_PACKET  *PAER_PROBE_POS_PACKET;
```

Members

See inline comments in the structure listed above.

See

Probe Functions

C.29. AER_PROBE_STATUS_PACKET

Structure

```
typedef struct tagAER_PROBE_STATUS_PACKET
{
   WORD  wStatus;      // AER_PROBESTATUS_xxx constant
   WORD  wInput;       // Probe Input
   WORD  wLevel;       // Active level
} AER_PROBE_STATUS_PACKET;
typedef AER_PROBE_STATUS_PACKET  *PAER_PROBE_STATUS_PACKET;
```

Members

See inline comments in the structure listed above.

See

Probe Functions

C.30. AER_PROFILE

Structure

```
typedef struct tagAER_PROFILE
{
   LONG   lPoint;       // Target Position in counts
   DWORD  dwTime;       // Motion time in msec
   LONG   lVelStart;    // Starting Velocity in msec/sec
   LONG   lVelEnd;      // Ending Velocity in msec/sec
} AER_PROFILE;
typedef AER_PROFILE  *PAER_PROFILE;
```

Members

See inline comments in the structure listed above.

See

AerProfileLoadQueue
AerProfileLoadQueueMult

C.31. AER_PROG_FAULT

Structure

```
typedef struct tagAER_PROG_FAULT
{
   WORD  wErrCode;            // error code number
   char  szErrMsg[80];        // ASCII error message
   WORD  wErrLen;             // message length in bytes
   char  szErrData[80];       // error data in hexadecimal format
} AER_PROG_FAULT;
typedef AER_PROG_FAULT *PAER_PROG_FAULT;
```

Members

See inline comments in the structure listed above.

See

AerProgGetFault

C.32. AER_PROG_HANDLE

Structure

```
typedef struct tagAER_PROG_HANDLE
{
   CHAR  szName[MAX_PROG_NAME_LEN];  // Unique name for
                                     // referencing programs on
                                     // the controller.
} AER_PROG_HANDLE;
typedef AER_PROG_HANDLE  *PAER_PROG_HANDLE;
```

Members

See inline comments in the structure listed above.

See

AerProgramAllocate
AerTaskProgramxxxx

C.33. AER_PROG_HEADER

Structure

```
typedef struct tagAER_PROG_HEADER
{
   DWORD    dwNumLines960;  // Number of program code lines
   DWORD    dwSizeBytes;    // Size in bytes for entire program
                            // code section
   DWORD    dwNumLabels;    // Number of program labels
   DWORD    dwNumDoubles;   // Number of double variables
   DWORD    dwNumStrings;   // Number of string variables
} AER_PROG_HEADER;
typedef AER_PROG_HEADER  *PAER_PROG_HEADER;
```

Members

See inline comments in the structure listed above.

See

AerProgramxxxx

C.34. AER_PROG_INFO

Structure

```
typedef struct tagAER_PROG_INFO
{
   AER_PROG_STATUS   Status; // Prgram status information
   DWORD    dwNumLines960;   // Number of program code lines
   DWORD    dwNumDoubles;    // Number of double variables in
                             // program
   DWORD    dwNumStrings;    // Number of string variables in
                             // program
   DWORD    dwNumLabels;     // Number of program labels in
                             // program
} AER_PROG_INFO;
typedef AER_PROG_INFO  *PAER_PROG_INFO;
```

Members

See inline comments in the structure listed above.

See

AerProgramGetInfo

C.35. AER_PROG_LABEL

Structure

```
typedef struct tagAER_PROG_LABEL
{
   CHAR     szName[MAX_PROG_LABEL_LEN];   // Label name
} AER_PROG_LABEL;
typedef AER_PROG_LABEL  *PAER_PROG_LABEL;
```

Members

See inline comments in the structure listed above.

See

AER_PROG_LABEL_INFO

C.36. AER_PROG_LABEL_INFO

Structure

```
typedef struct tagAER_PROG_LABEL_INFO
{
   AER_PROG_LABEL Label;         // Label
   DWORD          dwLine960;     // Label line number
} AER_PROG_LABEL_INFO;
typedef AER_PROG_LABEL_INFO   *PAER_PROG_LABEL_INFO;
```

Members

See inline comments in the structure listed above.

See

AerProgramLoadLabel
AerProgramGetLabel

C.37. AER_PROG_STATUS

Structure

```
typedef union tagAER_PROG_STATUS
{
   DWORD    dwStatus[1];                 // Program Status, see
                                         // the bit breakdown below
   struct
   {
      unsigned TaskAssociated:MAX_TASKS; // Mask of tasks that
                                         // are associated with
                                         // this program
      unsigned MemoryAllocated:1;        // AerProgramAllocate has
                                         // been called for this
                                         // program
      unsigned LabelFilled:1;            // All labels that have
                                         // been allocated, have
                                         // been downloaded
      unsigned Queue:1;                  // 1 if a queued program
      unsigned nCodeFilled:1;            // All code lines that
                                         // has been allocated,
                                         // has been downloaded
      unsigned nLoadComplete:1;          // Everything that has
                                         // been allocated, is now
                                         // downloaded
      unsigned qBufferFull:1;            // Queue is currently full
      unsigned qBufferEmpty:1;           // Queue is currently empty
   } Bit;
} AER_PROG_STATUS;
 typedef AER_PROG_STATUS *PAER_PROG_STATUS;
```

Members

See inline comments in the structure listed above. The *dwStatus* member is broken into a series of bits, each of which can be true or false. The *nCodeFilled* and *nLoadComplete* members are not relevant for queued programs (if Queue is true), and the *qBufferFull* and *qBufferEmpty* bits are not relevant for unqueued programs (if Queue is false). See *AerCompilerDownloadQueue* for details on queues. *nLoadComplete* is true if and only if *nCodeFilled* and *LabelFilled* are true. *LabelFilled* is true only if *MemoryAllocated* is true, and *AerProgramLoadLable* has been called for each label specified in the program header passed in through *AerProgramAllocate*. *nCodeFilled* is true only if *MemoryAllocated* is true, and *AerProgramLoadLine* has been called for each line specified in the program header passed in through *AerProgramAllocate*.

See

AerProgramGetInfo

C.38. AER_PROG_STATUS

Structure

```
typedef union tagAER_PROG_STATUS
{
   DWORD    dwStatus[1];               // Program Status, see
                                       // the bit breakdown below
   struct
   {
      unsigned TaskAssociated:MAX_TASKS;  // Mask of tasks that
                                          // are associated with
                                          // this program
      unsigned MemoryAllocated:1;         // AerProgramAllocate
                                          // has been called for
                                          // this program
      unsigned LabelFilled:1;             // All labels that have
                                          // been allocated, have
                                          // been downloaded
      unsigned Queue:1;                   // True if a queued
                                          // program
      unsigned nCodeFilled:1;             // All code lines that
                                          // have been allocated,
                                          // have been downloaded
      unsigned nLoadComplete:1;           // Everything that has
                                          // been allocated, is
                                          // now downloaded
      unsigned qBufferFull:1;             // Queue is currently
                                          // full
      unsigned qBufferEmpty:1;            // Queue is currently
                                          // empty
   } Bit;
} AER_PROG_STATUS;
typedef AER_PROG_STATUS *PAER_PROG_STATUS;
```

Members

See inline comments in the structure listed above. The *dwStatus* member is broken into a series of bits, each of which can be true or false. The *nCodeFilled* and *nLoadComplete* members are not relevent for queued programs (if Queue is true), and the *qBufferFull* and *qBufferEmpty* bits are not relevent for unqueued programs (if Queue is false). See *AerCompilerDownloadQueue* for details on queues. *nLoadComplete* is true if and only if *nCodeFilled* and *LabelFilled* are true. *LabelFilled* is true only if *MemoryAllocated* is true, and *AerProgramLoadLable* has been called for each label specified in the program header passed in through *AerProgramAllocate*. *nCodeFilled* is true only if *MemoryAllocated* is true, and *AerProgramLoadLine* has been called for each line specified in the program header passed in through *AerProgramAllocate*.

See

AerProgramGetInfo

C.39. AER_PSO_D2A

Structure

```
typedef struct tagAER_PSO_D2A
{
   WORD  wChannel;             // Channel Number (0-1)
   union
   {
      double   dVoltage;       // Immediate Write Voltage
      struct
      {
         double   dZeroVolts;  // Voltage at Zero Velocity
         double   dTargVolts;  // Voltage at Target Velocity
         DWORD    dTarget;     // Target Velocity
      } tVel;
      struct
      {
         double   dCurrVolts;  // Voltage at Zero Velocity
         double   dTargVolts;  // Voltage at Target Velocity
         ULONG    dTarget;     // Target Velocity
      } tPos;
   };
} AER_PSO_D2A;
typedef AER_PSO_D2A   *PAER_PSO_D2A;
```

Members

See inline comments in the structure listed above.

See

AerPSOSetMultAnalogOutput

C.40. AER_PSO_D2A_PACKET

Structure

```
typedef union
{
   DWORD dwOutputValue;      // DWORD containing fields below
   struct
   {
      BYTE byValue[3];       // Voltage to output II.FF FFv
      BYTE byNumber;         // D/A Channel Number
   } tOutput;
} AER_PSO_D2A_PACKET;
typedef AER_PSO_D2A_PACKET  *PAER_PSO_D2A_PACKET;
```

Members

See inline comments in the structure listed above.

C.41. AER_PULSE_DEFINE

Structure

```
typedef struct tagAER_PULSE_DEFINE
{
   DWORD dwLead;        // De-assertion Time Preceding Ramp-up
   DWORD dwWidth;       // Assertion Time at Ramp Completion
   DWORD dwTail;        // De-assertion Time Following Ramp-down
} AER_PULSE_DEFINE;
```

Members

See inline comments in the structure listed above.

See

AerPSOSetPulse

C.42. AER_PULSE_DEFINE_RAMP

Structure

```
typedef struct tagAER_PULSE_DEFINE_RAMP
{
   DWORD dwLead;         // De-assertion Time Preceding Ramp-up
   DWORD dwWidth;        // Assertion Time at Ramp Completion
   DWORD dwTail;         // De-assertion Time Following Ramp-down
   WORD  wRampTime;      // Pulse Ramp Increment
   WORD  wRampInterval;  // Interval between Ramp Increments
} AER_PULSE_DEFINE_RAMP;
```

Members

See inline comments in the structure listed above.

See

AerPSOSetPulse

C.43. AER_PULSE_WIDTH

Structure

```
typedef struct tagAER_PULSE_WIDTH
{
   DWORD dwWidth;             // Duration of Laser Firing Pulse
} AER_PULSE_WIDTH;
```

Members

See inline comments in the structure listed above.

See

AerPSOSetPulse

C.44. AER_REG_DEVICE_INFO

The *AER_REG_DEVICE_INFO* structure defines device information used by some of the Aerotech Registry functions. .

Structure

```
typedef struct tagAER_REG_DEVICE_INFO
{
  TCHAR            szBootImageName[MAX_TEXT_LEN+1]; // Boot image
                                                    // name
  TCHAR            szImageName[MAX_TEXT_LEN+1];     // Image name
  THCAR            szSymbolicName[MAX_TEXT_LEN+1];  // Symbolic
                                                    // Link name
  AER_UNIDEX_INFO  tUNIDEX;                         // Device info
} AER_REG_DEVICE_INFO;
typedef AER_REG_DEVICE_INFO   *PAER_REG_DEVICE_INFO;
```

Members

szBootImageName

Name of boot image file used by axis processor. This is not used by UNIDEX 631

szImageName

Name of image file (firmware) used by axis processor.

szSymbolicName

This is the name used by the system to establish communications with the device driver and axis processor.

For Windows 95 this is the name of device driver (.vxd) including path and extension (i.e. “C:\U600\VU600D.VXD”).

For Windows NT this is the name of the device driver (.sys) without path and extension (i.e.used by the system “U600”).

See

AerRegSetDeviceInfo, *AerRegGetDeviceInfo*

C.45. AER_STRIP_SAMPLE

Structure

```
typedef struct tagAER_STRIP_SAMPLE
{
   LONG  lPos;                // Position
   LONG  lPosCommand;         // Position command
   LONG  lSpare;              // “Accel-term”
   WORD  wTorque;             // Torque
} AER_STRIP_SAMPLE;
typedef AER_STRIP_SAMPLE  *PAER_STRIP_SAMPLE;
```

Members

Position and position command are in units of counts.

Torque is in units of -32K to +32K, times the maximum torque for that motor.

The “Accel-term” is the commanded acceleration times the accel gain. The commanded acceleration is that determined by the users axis parameters concerning acceleration and deceleration (see ACCELRATE, ACCELMODE axis parameters) The commanded acceleration is in units of counts per millisecond squared. The accel gain is an axis parameter available to the user, (the AFF_GAIN axis parameter) for the purposes of affecting the servo loop operation.

See

AerStripGetSample

C.46. AER_TASK_DATA

Structure

```
typedef struct tagAER_TASK_DATA
{
   AER_TASK_STATUS Status;                 // Task status
                                           // information
   AER_TASK_MODE   Mode;                   // Task mode
                                           // information
   DWORD           dwCallStackDepth;       // Call stack depth
                                           // level
   DWORD           dwCurrentProgNumber;    // Currently
                                           // executing program
                                           // number
   DWORD           dwCurrentLine960;       // Currently
                                           // executing 960 line
                                           // number
   DWORD           dwCurrentLineUser;      // Currently
                                           // executing user
                                           // line number
   DWORD           dwCurrentPriorityLevel; // Currently priority
                                           // level
   AERERR_CODE     Fault;                  // Task fault
} AER_TASK_DATA;
typedef AER_TASK_DATA *PAER_TASK_DATA;
```

Members

See inline comments in the structure listed above.

See

TASKPARM_TaskFault
TASKPARM_MaxCallStack
AER_TASK_MODE
AER_TASK_STATUS
AerDCGetTaskDirect

C.47. AER_TASK_MODE

Structure

```
//  Please see documentation on the associated G/M codes listed
on the
      // right, for more details.

typedef struct tagAER_TASK_MODE
{
   union
   {
      DWORD    dwMask;
     struct
   {
     unsigned English:1;                    // 0 - (G70 mode)
     unsigned Absolute:1;                   // 1 - (G90 mode)
     unsigned AccelModeLinear:1;            // 2 - (G64 mode)
     unsigned AccelModeRate:1;              // 3 - (G68 mode)
     unsigned RotaryDominant:1;             // 4 - (G98 mode)
     unsigned MotionContinuous:1;           // 5 - (G108 mode)
     unsigned InverseCircular:1;            // 6 - (G111 mode)
     unsigned SpindleShutDownOnProgHalt:1; // 7 (G101 mode)
     unsigned BlockDelete:1;                // 8 - (G112 mode)
     unsigned OptionalStop:1;               // 9 - (G114 mode)
     unsigned BreakPoint:1;                 // 10 - Currently on a
                                            // breakpoint
     unsigned MFOLock:1;                    // 11 - (M48 mode)
     unsigned MSOLock:1;                    // 12 - (M50 mode)
     unsigned Reserved1:1;                  // not used
     unsigned Retrace:1;                    // 14 - Currently in
                                            // ReTrace mode
     unsigned AutoMode:1;                   // 15 - Currently not in
                                            // single step mode
     unsigned ProgramFeedRateMPU:1;         // 16 - (G93 mode)
     unsigned ProgramFeedRateUPR:1;         // 17 - (G94 mode)
     unsigned ProgramSFeedRateSurf1:1;      // 18 - (G95 mode)
     unsigned ProgramSFeedRateSurf2:1;      // 19 - (G195 mode)
     unsigned ProgramSFeedRateSurf3:1;      // 20 - (G295 mode)
     unsigned ProgramSFeedRateSurf4:1;      // 21 - (G395 mode)
     unsigned BlockDelete2:1;               // 22 - (G212 mode)
     unsigned RunOverMode:1;                // 23 - Currently in
                                            // Step over mode
      } Bit;
   } DW1;
} AER_TASK_MODE;
typedef AER_TASK_MODE *PAER_TASK_MODE;
```

Members

See TASKMODE definitions for bit descriptions.

See

TASKMODE1_xxxx
AerTaskGetModeName
AerDCGetTaskDirect
AER_TASK_DATA

C.48. AER_TASK_STATUS

Structure

```
typedef struct tagAER_TASK_STATUS
{
   union
   {
      DWORD    dwMask;
      struct
      {
       unsigned ProgramAssociated:1;
       unsigned ProgramActive:1;
       unsigned ProgramExecuting:1;
       unsigned ImmediateCodeExecuting:1;
       unsigned ReturnMotionExecuting:1;
       unsigned NotUsed:1;

       unsigned SingleStepInto:1;
       unsigned SingleStepOver:1;

       unsigned InterruptFaultPending:1;
       unsigned InterruptCallBackPending:1;

       unsigned EStopInputActive:1;
       unsigned FeedHoldInputActive:1;
       unsigned FeedHoldInputLatch:1;

       unsigned CallBackHoldActive:1;
       unsigned CallBackResponding:1;

       unsigned ProgramCleanup:1;
       unsigned ProgramCodeCleanup:1;
       unsigned OnGosubPending:1;
      } Bit;
   } DW1;

   union
   {
      DWORD    dwMask;
      struct
      {
       unsigned SpindleActive:MAX_SPINDLES;
       unsigned MSOChange:1;
       unsigned SpindleFeedHoldActive:1;
       unsigned ASyncFeedHoldActive:1;
      } Bit;
   } DW2;

   union
   {
      DWORD    dwMask;
      struct
      {
       unsigned RotationActive:1;
       unsigned RThetaPolarActive:1;
       unsigned RThetaCylindricalActive:1;
        unsigned OffsetPresetActive:1;
       unsigned OffsetFixtureActive:1;
       unsigned OffsetManualActive:1;

       unsigned MotionType:2;        // MOTIONTYPE_
       unsigned MotionActive:1;
```

```
        unsigned MotionContinuous:1;

        unsigned MFOChange:1;
        unsigned MotionFeedHoldActive:1;

        unsigned CutterEnabling:1;
        unsigned CutterActiveLeft:1;
        unsigned CutterActiveRight:1;
        unsigned CutterDisabling:1;

        unsigned NormalcyActiveLeft:1;
        unsigned NormalcyActiveRight:1;
        unsigned NormalcyAlignment:1;

        unsigned ProgramFeedRateMPU:1;
        unsigned ProgramFeedRateUPR:1;

        unsigned LimitFeedRateActive:1;
        unsigned LimitMFOActive:1;
       } Bit;
    } DW3;
} AER_TASK_STATUS;
typedef AER_TASK_STATUS *PAER_TASK_STATUS;
```

Members

See *TASKSTATUS* definitions for bit descriptions.

See

TASKSTATUS1_xxxx
TASKSTATUS2_xxxx
TASKSTATUS3_xxxx
AerTaskGetStatusName
AerDCGetTaskDirect
AER_TASK_DATA

C.49. AER_TORQ_PACKET

Structure

```
typedef struct tagAER_TORQ_PACKET
{
   WORD  wMode;      // 0/1 to disable/enable torque mode
   WORD  wChannel;   // A/D channel number for temperature sensor.
   FLOAT dAmpsVel;   // Velocity compensation term expressed in
                     // D/A bits per count/sec
   FLOAT dAmpsTemp;  // Temperature compensation
   WORD  wNomTemp;   // Nominal (room) operating temperature
                     // expressed in A/D bits
} AER_TORQ_PACKET;
typedef AER_TORQ_PACKET *PAER_TORQ_PACKET;
```

Members

See inline comments in the structure listed above.

See

AerTorqueSetModePacket
AerTorqueGetModePacket

C.50. AER_U600_INFO

The *AER_U600_INFO* structure defines device information specific to the UNIDEX 600 card.

Structure

```
typedef struct tagAER_U600_INFO
{
   DWORD  dwDSC;       // DRAM size code
} AER_U600_INFO;
typedef AER_U600_INFO  *PAER_U600_INFO;
```

Members

dwDSC

DRAM size code.

See

AER_UNIDEX_INFO

C.51. AER_U631_INFO

The *AER_U631_INFO* structure defines device information specific to the UNIDEX 631 controller.

Structure

```
typedef struct tagAER_U631_INFO
{
   DWORD  dwVMEAddr;    // VME Address
} AER_U631_INFO;
typedef AER_U631_INFO  *PAER_U631_INFO;
```

Members

dwVMEAddr

VME address.

See

AER_UNIDEX_INFO

C.52. AER_UNIDEX_INFO

The *AER_UNIDEX_INFO* structure defines device information used to describe how a device is setup.

Structure

```
typedef struct tagAER_UNIDEX_INFO
{
   DWORD    dwDeviceID;        // Device Identifier
(AER_UNIDEX_xxx constant)
   DWORD    dwATWindow;       // AT Window
   DWORD    dwIOBase;         // I/O Base address
   DWORD    dwIRQ;            // IRQ number
   union {
      AER_U600_INFO   tU600;
      AER_U631_INFO   tU631;
   } tDevice;
} AER_REG_CARD_INFO;
typedef AER_REG_CARD_INFO  *PAER_REG_CARD_INFO;
```

Members

dwDeviceID

Device identifier. Determines which member of *tDevice* to use.

dwATWindow

AT window that the axis processor uses to address data.

dwIOBase

Base I/O address setting of axis processor.

dwIRQ

Interrupt the axis processor will use.

dwDSC

DRAM size code.

tDevice

Device specific data that is setup based on the *DeviceID*.

See

AerRegSetDeviceInfo
AerRegGetDeviceInfo

C.53. AER_VERSION

Structure

```
typedef struct tagAER_VERSION
{
   WORD  wUNIDEX;    // AER_UNIDEX_xxxx constant
   WORD  wInternal;  // Internal Version Number
   WORD  wMajor;     // Major Version Number
   WORD  wMinor;     // Minor Version Number
} AER_VERSION;
typedef AER_VERSION   *PAER_VERSION;
```

Members

See inline comments in the structure listed above.

See

AerVerGetImgVersion

C.54. AERERR_CODE

Typedef

A 32 bit unsigned number, defined as a ulong.

See

PAERERR_CODE

C.55. AERVIRT_BINARY_DATA

This union is used to help create a map of the virtual binary input and output data. By using this structure, binary I/O can be accessed on BYTE, WORD, or DWORD boundaries.

Structure

```
typedef union tagAERVIRT_BINARY_DATA
{
  BYTE tByte[MAX_BINARY_BYTES];      // Map of binary bytes
                                     // (8 bit)
  WORD tWord[MAX_BINARY_WORDS];      // Map of binary words
                                     // (16 bit)
  DWORD tDWord[MAX_BINARY_DWORDS];   // Map of binary dwords
                                     // (32 bit)
} AERVIRT_BINARY_DATA;
typedef AERVIRT_BINARY_DATA   *PAERVIRT_BINARY_DATA;
```

Members

See inline comments in the structure listed above.

See

AerVirtGetBinaryIO
AerVirtSetBinaryIO

C.56. AERVIRT_REGISTER_DATA

This union is used to help create a map of the virtual register input and output data. By using this structure, register I/O can be accessed on WORD boundaries.

Structure

```
typedef union tagAERVIRT_REGISTER_DATA
{
   WORD  tWord[MAX_REGISTERS];       // Map of registers (16 bit)
} AERVIRT_REGISTER_DATA;
typedef AERVIRT_REGISTER_DATA *PAERVIRT_REGISTER_DATA;
```

Members

See inline comments in the structure listed above.

See

AerVirtGetRegisterIO
AerVirtSetRegisterIO

C.57. ANALOGINDEX

Typedef

An ANALOGINDEX is a 0 based number specifying the analog channel.

See

PANALOGINDEX

C.58. AXISINDEX

Typedef

An AXISINDEX is a 0 based number referring to a specific physical axis. It is defined to be a DWORD.

See

AXISMASK
AXISINDEXxxxx
PAXISINDEX

C.59. AXISMASK

Typedef

An AXISMASK is a bitwise mask representing a set of physical axis. Bit 0 corresponds to axis 1, etc. It is defined to be a DWORD.

See

AXISINDEX
PAXISMASK

C.60. BOOL

Typedef

A logical value being 1 or 0, defined as an int.

See

PBOOL

C.61. BYTE

Typedef

An 8 bit signed number, defined as a byte.

See

PBYTE

C.62. CHAR

Typedef

An 8 bit unsigned character, defined as a char.

See

PCHAR

C.63. CSPARMINDEX

Typedef

A 0 based number specifying a call stack parameter, defined as a DWORD. The maximum range is determined by the *MaxCallStack* task parameter (-1).

See

PCSPARMINDEX
CSPARMINDEX_xxxx

C.64. CSPARMMASK

Typedef

A bitmask representing multiple call stack parameters, defined as a DWORD.

See

PCSPARMMASK

C.65. DOUBLE

Typedef

A double precision number defined as a double.

See

PDOUBLE

C.66. DWORD

Typedef

A 32 bit unsigned number, defined as a ulong.

C.67. FLOAT

Typedef

A floating point number, defined as a float.

See

PFLOAT

C.68. HAERCTRL

Typedef

A HAERCTRL is a handle to the axis processor card created by the *AerSysOpen* function, which is defined as DECLARE_HANDLE (C language definition).

See

AerSysOpen and/or PHAERCTRL

C.69. HANDLE

Typedef

A handle is a 32 bit value.

See

PHANDLE

C.70. HCOMPILER

Typedef

A HCOMPILER is a handle to an Aerotech compiler session created by the *AerCompilerCreate* function. HCOMPILER is defined as DECLARE_HANDLE (C language definition).

See

AerCompilerCreate

C.71. LONG

Typedef

A 32 bit signed number, defined as a long.

See

PLONG

C.72. LPARAM

Typedef

A 32 bit value, defined as a long.

C.73. LPCTSTR

Typedef

A constant pointer to a null terminated string of characters, defined as a char *.

C.74. LPTSTR

Typedef

A pointer to a null terminated string of characters, defined as a char *.

C.75. PAERERR_CODE

Typedef

A pointer to a 32 bit signed number, defined as a ulong *.

See

AERERR_CODE

C.76. PANALOGINDEX

Typedef

A pointer to an analog channel specifier.

See

ANALOGINDEX

C.77. PAXISINDEX

Typedef

A pointer to an axis specifier, defined as a DWORD *. The range is 0 through 15.

See

AXISINDEX

C.78. PAXISMASK

Typedef

A pointer to a bitmask specifying multiple axes. It is defined to be a DWORD *.

See

AXISMASK

C.79. PBOOL

Typedef

A pointer to a logical value being 1 or 0, defined as an int.

See

BOOL

C.80. PBYTE

Typedef

A pointer to an 8 bit signed number, defined as a byte *.

See

BYTE

C.81. PCHAR

Typedef

A pointer to an 8 bit unsigned character, defined as a char *.

See

CHAR

C.82. PCSPARMINDEX

Typedef

A pointer to a 0 based number specifying a call stack parameter, defined as a DWORD *.

See

CSPARMINDEX

C.83. PCSPARMMASK

Typedef

A pointer to a bitmask representing multiple call stack parameters, defined as a DWORD *.

See

CSPARMMASK

C.84. PDOUBLE

Typedef

A pointer to a double precision number defined as a double *.

See

DOUBLE

C.85. PDWORD

Typedef

A pointer to a 32 bit signed number, defined as a ulong *.

See

DWORD

C.86. PFLOAT

Typedef

A pointer to a floating point number, defined as a float *.

See

FLOAT

C.87. PHAERCTRL

Typedef

A pointer to a handle to the axis processor card created by the *AerSysOpen* function, which is defined as DECLARE_HANDLE *(C language definition).

See

AerSysOpen and/or HAERCTRL

C.88. PHANDLE

Typedef

A pointer to a handle, which is a 32 bit value.

See

HANDLE

C.89. PHYSAXISINDEX

Typedef

An axis specifier, defined as a *DWORD*. The range is 0 thru 15 to specify all 16 axes.

See

PHYSAXISMASK
PHYSAXISINDEX_xxxx
PPHYSAXISINDEX

C.90. PHYSAXISMASK

Typedef

A pointer to a bitmask specifying multiple axes. It is defined to be a *DWORD*. The first axis is represented by bit 0 and the last axis by bit 15.

See

PHYSAXISINDEX
PPHYSAXISMASK

C.91. PLONG

Typedef

A pointer to an 8 byte signed number, defined as a long double *.

See

LONG

C.92. PPHYSAXISINDEX

Typedef

A pointer to an axis specifier, defined as a *DWORD **.

See

PHYSAXISINDEX

C.93. PPHYSAXISMASK

Typedef

A pointer to a bitmask representing multiple axes, defined as a *DWORD **.

See

PHYSAXISINDEX

C.94. PSPINDLEINDEX

Typedef

A pointer to a 0 based number specifying a spindle, defined as a *DWORD* *.

See

SPINDLEINDEX

C.95. PSPINDLEMASK

Typedef

A pointer to a bitmask specifying multiple spindles, defined as a *DWORD* *.

See

SPINDLEMASK

C.96. PSZ

Typedef

A pointer to a NULL terminated character string, defined as a *char **.

C.97. PTASKAXISINDEX

Typedef

A pointer to a 0 based number specifying a task number, defined as a *DWORD **.

See

TASKAXISINDEX

C.98. PTASKAXISMASK

Typedef

A pointer to a bitmask specifying multiple tasks, defined as a *DWORD **.

See

TASKAXISMASK

C.99. PTASKINDEX

Typedef

A pointer to a task number specifier, which is defined as *DWORD **.

C.100. PTASKMASK

Typedef

A pointer to a bitmask specifying multiple task number's, defined as *DWORD **.

See

TASKMASK

C.101. PUINT

Typedef

A pointer to an unsigned integer, defined as an *unsigned* *.

See

UINT

C.102. PVOID

Typedef

A pointer to an unknown data type, defined as *VOID **.

C.103. PWORD

Typedef

A pointer to a 16 bit signed number, defined as a *ushort **.

See

WORD

C.104. SHORT

Typedef

A signed 16 bit number, defined as a short.

C.105. SPINDLEINDEX

Typedef

A 0 based number specifying a spindle, defined as a *DWORD*. There are four spindles represented as 0 thru 3.

See

PSPINDLEINDEX

C.106. SPINDLEMASK

Typedef

A bitmask specifying multiple spindles, defined as a *DWORD*. Bit 0 represents spindle 1.

See

PSPINDLEMASK

C.107. TASKAXISINDEX

Typedef

A 0 based number specifying a task number, defined as a *DWORD*. There are four possible tasks represented by 0 thru 3.

See

PTASKAXISINDEX

C.108. TASKAXISMASK

Typedef

A bitmask specifying multiple tasks, defined as a *DWORD*. Task 0 is represented by bit 0.

See

PTASKAXISMASK

C.109. TASKINDEX

Typedef

A TASKINDEX is a 0 based number referring to a specific task. It is defined to be a DWORD.

See

TASKMASK
TASKINDEX_xxxx
PTASKINDEX

C.110. TASKMASK

Typedef

A TASKMASK is a bitwise mask representing a set of tasks. Bit 0 corresponds to task 1, etc. It is defined to be a DWORD.

See

TASKINDEX
PTASKINDEX

C.111. UINT

Typedef

An unsigned 16 bit integer, defined as an unsigned.

See

PUINT

C.112. WORD

Typedef

A 16 bit signed number, defined as a ushort.

See

PWORD

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APPENDIX D: WARRANTY AND FIELD SERVICE

In This Section:

Aerotech, Inc. warrants its products to be free from defects caused by faulty materials or poor workmanship for a minimum period of one year from date of shipment from Aerotech. Aerotech's liability is limited to replacing, repairing or issuing credit, at its option, for any products that are returned by the original purchaser during the warranty period. Aerotech makes no warranty that its products are fit for the use or purpose to which they may be put by the buyer, where or not such use or purpose has been disclosed to Aerotech in specifications or drawings previously or subsequently provided, or whether or not Aerotech's products are specifically designed and/or manufactured for buyer's use or purpose. Aerotech's liability or any claim for loss or damage arising out of the sale, resale or use of any of its products shall in no event exceed the selling price of the unit.

Laser Products

Aerotech, Inc. warrants its laser products to the original purchaser for a minimum period of one year from date of shipment. This warranty covers defects in workmanship and material and is voided for all laser power supplies, plasma tubes and laser systems subject to electrical or physical abuse, tampering (such as opening the housing or removal of the serial tag) or improper operation as determined by Aerotech. This warranty is also voided for failure to comply with Aerotech's return procedures.

Return Procedure

Claims for shipment damage (evident or concealed) must be filed with the carrier by the buyer. Aerotech must be notified within (30) days of shipment of incorrect materials. No product may be returned, whether in warranty or out of warranty, without first obtaining approval from Aerotech. No credit will be given nor repairs made for products returned without such approval. Any returned product(s) must be accompanied by a return authorization number. The return authorization number may be obtained by calling an Aerotech service center. Products must be returned, prepaid, to an Aerotech service center (no C.O.D. or Collect Freight accepted). The status of any product returned later than (30) days after the issuance of a return authorization number will be subject to review.

Returned Product Warranty Determination

After Aerotech's examination, warranty or out-of-warranty status will be determined. If upon Aerotech's examination a warranted defect exists, then the product(s) will be repaired at no charge and shipped, prepaid, back to the buyer. If the buyer desires an air freight return, the product(s) will be shipped collect. Warranty repairs do not extend the original warranty period.

Returned Product Non-warranty Determination

After Aerotech's examination, the buyer shall be notified of the repair cost. At such time the buyer must issue a valid purchase order to cover the cost of the repair and freight, or authorize the product(s) to be shipped back as is, at the buyer's expense. Failure to obtain a purchase order number or approval within (30) days of notification will result in the product(s) being returned as is, at the buyer's expense. Repair work is warranted for (90) days from date of shipment. Replacement components are warranted for one year from date of shipment.

Rush Service

At times, the buyer may desire to expedite a repair. Regardless of warranty or out-of-warranty status, the buyer must issue a valid purchase order to cover the added rush service cost. Rush service is subject to Aerotech's approval.

On-site Warranty Repair

If an Aerotech product cannot be made functional by telephone assistance or by sending and having the customer install replacement parts, and cannot be returned to the Aerotech service center for repair, and if Aerotech determines the problem could be warranty-related, then the following policy applies:

Aerotech will provide an on-site field service representative in a reasonable amount of time, provided that the customer issues a valid purchase order to Aerotech covering all transportation and subsistence costs. For warranty field repairs, the customer will not be charged for the cost of labor and material. If service is rendered at times other than normal work periods, then special service rates apply.

If during the on-site repair it is determined the problem is not warranty related, then the terms and conditions stated in the following "On-Site Non-Warranty Repair" section apply.

On-site Non-warranty Repair

If any Aerotech product cannot be made functional by telephone assistance or purchased replacement parts, and cannot be returned to the Aerotech service center for repair, then the following field service policy applies:

Aerotech will provide an on-site field service representative in a reasonable amount of time, provided that the customer issues a valid purchase order to Aerotech covering all transportation and subsistence costs and the prevailing labor cost, including travel time, necessary to complete the repair.

Company Address

Aerotech, Inc.
101 Zeta Drive
Pittsburgh, PA 15238-2897
USA

Phone: (412) 963-7470
Fax: (412) 963-7459

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REVISION HISTORY

In This Section:

Revisions

The following section provides the user with general information regarding the latest changes to this manual. Extensive changes, if made, may not be itemized – instead, the section or chapter will be listed with “extensive changes / additions” in the corresponding General Information cell.

Table R-1. Revisions

Revision	Section(s) Affected	General Information
1.4	All pages	Full revision – extensive changes / additions / deletions throughout manual.

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READER'S COMMENTS

UNIDEX 600 Series Library Manual
P/N EDU 156, December, 2001

Please answer the questions below and add any suggestions for improving this document. Is the information:

	Yes	No
Adequate to the subject?	____	____
Well organized?	____	____
Clearly presented?	____	____
Well illustrated?	____	____
Would you like to see more illustrations?	____	____
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