Analog I/O Setup and Diagnostics

Introduction

AUTOMATION DIRECT offers a variety of analog I/O that is supported by KEPDirect OPC Server in the DirectLOGIC, Productivity3000 and Terminator I/O product lines. Most of these modules have relatively the same setup and diagnostics within each product family but there are some exceptions. This section documents the common setups and diagnostics for analog I/O modules through KEPDirect OPC Server.

DirectLOGIC and Productivity3000 Analog I/O

For information on specific analog module configuration and jumper settings, please consult the appropriate user manual.

Terminator Analog I/O

All setup for Terminator I/O is either automatically enabled (for analog input modules) or is accomplished through software enable bits (for analog output modules) available in the KEP**Direct** OPC Server software. Only the thermocouple (T1F-14THM) and RTD module (T1F-16RTD) include hardware jumpers on the module for channel selection and setup. For more information on specific module analog setup, see the in-the-box data sheet included with each Terminator I/O module, or see the Terminator I/O Installation Manual (T1K-INST-M).

The in-the-box data sheets and Terminator I/O Installation Manual (T1K-INST-M) describe the usage of the Module Control Byte for Output Enable and range selections. This Module Control Byte is presented as a separate byte and boolean output points that can be selected by the connected OPC Client to enable the output, and to select specific analog range options. The following table shows the correlation of the Module Control Byte and the KEP**Direct** byte for Output Enable and range selections.

Appendix B

Module Control Byte	Bit 24	Bit 25	Bit 26	Bit 27	Bit 28-31
KEPDirect Byte	D00_Point	D01_Point	D02_Point	D03_Point	DO4_Point - DO7_Point
Description	Outputs Enable	Unipolar / Bipolar	5V / 10V Range	0-20 mA / 4-20 mA Range	Reserved for future use
	0 = All outputs OFF	0 = Unipolar selected	0 = 5V range 1 = 10V range	0 = 0-20 mA range	
	1 = All outputs Enabled	1 = Bipolar selected	r – rov rungo	1 = 4-20 mA range	

The following example shows how the KEPDirect OPC Quick Client can be used to setup the Terminator I/O analog output voltage module located in slot 3.



NOTE: As seen in the following diagram, the EBC driver will generate both bit level and word level tags for each analog channel of a module. Many of these tags are duplicates and may not be needed for your particular application.

The highlighted selections are configured for Output Enabled (DO0_Point=1), BiPolar (DO1_Point=1), and 5V (DO2_Point=0). The analog output data value is 1024 decimal and results in a voltage output of -2.5V.

쯞 OPC Quick Client - Untitled *										
File Edit View Tools Help										
D 🛎 🖬 🌿 📽 📽 👗 ங 🖻 🗙										
-: dutomationDirect.KEPDirect.V5		Item ID 🖉	Data Type	Value	^					
Channel1System		Channell.T1HEBC21.SLOT_03.S3_DW00	DWord	1024						
Channel1.T1HEBC21		Channel1.T1HEBC21.SLOT_03.S3_D07_POINT	Boolean	0						
		Channell.TIHEBC21.SLOT_03.S3_D06_POINT	Boolean	0						
Channel1.T1HEBC21.SLOT_01		Channel1.T1HEBC21.SLOT_03.S3_DO5_POINT	Boolean	0						
Channel1.T1HEBC21.SLOT_02		Channell.T1HEBC21.SLOT_03.S3_DO4_POINT	Boolean	0						
Channell. I THEBC21.5LUT_03		Channel1.T1HEBC21.SLOT_03.S3_D03_P0INT	Boolean							
		Channel1.T1HEBC21.SLOT_03.S3_D02_P0INT	Boolean		-					
		Channel1.T1HEBC21.SLOT_03.S3_DO1_POINT	Boolean	1						
		Channel1.T1HEBC21.SLOT_03.S3_DO0_WORD	Word	3						
		Channel1.T1HEBC21.SLOT_03.S3_DO0_SHORT	Short	3	_					
	_	Channel1.T1HEBC21.SLOT_03.53_DO0_POINT	Boolean	1						
	~	Channel1.T1HEBC21.SLOT 03.53 DO0 LONG	Long	3	~					
	4				2					
Date Time	E	Ivent			^					
1 2/15/2011 8:47:50 AM	- 4	Added 2 items to gr								
1 2/15/2011 8:47:50 AM		Added group 'Chan								
1 2/15/2011 8:47:50 AM	- 4	Added 139 items to								
1 2/15/2011 8:47:50 AM	- 1	Added group 'Chan								
1 2/15/2011 8:47:50 AM	- 4	Added 22 items to g								
1 2/15/2011 8:47:50 AM	- 4	Added 11 items to g								
1 2/15/2011 8:47:50 AM		Added group 'Chan								
1 2/15/2011 8:47:50 AM		Added group 'Chan								
0 2/15/2011 8:47:50 AM		Added 4 items to gr								
1 2/15/2011 8:47:50 AM	- 4	Added 14 items to g			~					
Ready				Item Counts	353					

Diagnostic bits for the analog I/O are supported differently on each module but will present themselves as error bits/values or messages to the KEP*Direct* OPC Server software using a common convention. A complete definition of the error information, and it's format convention, is available in the Help file. This can be accessed through the **Help** menu from within the server.



The example below shows the list of error codes supported by the **AUTOMATION DIRECT EBC** server. The most common errors for analog I/O are 139, 142, 155, and 200-216 depending on the features supported in the specific analog module.

😵 AutomationDirect EBC Driver Help			
Hide Locate Back Forward Print			
Contents Index Search Favorites	Previous Next	? ?	le EBC
E 00 Getting Started	132	UIKIOWI WAK.	
? Help Contents	133	Range error.	
Overview	134	Length warning.	1
🗈 🎨 Device Setup	135	Invalid base number	
Dptimizing Your AutomationDirect E	126	Involid pedule time	-
🕀 💽 Data Types Description	130	invalid module type.	-
Address Descriptions	137	Invalid offset.	
Module Hot Swapping	138	Invalid boot version for OS.	
End Descriptions	139	Broken transmitter; nn contains channel number that failed.	
Driver Error Messages	140	Invalid address.	1
Driver Warning Messages	142	Channel fail multiple: nn contains channel BITS from module.	
🗉 🎃 Read Errors			-
🗄 🧄 Write Errors		Example: If bit 0 is set then channel 0 has failed	
😑 🗓 EBC Error Codes		In bit 1 and 5 are set then challeds 1 and 5 have failed.	-
EBC Error Codes	153	I/O module missing (I/O module removed in hot swap).	-
🗈 🎨 Application Notes	154	I/O Base has changed (I/O module replaced in hot swap).	
🕀 💎 OPC Server Help	155	Module in error. Possible errors:	
		- missing 24V on discrete modules - blown fuses on discrete modules - missing 24V on analog modules - missing 2CV block on the T1F-14THM	
	200-216	XX unused analog input channels exist where: XX = Value - 200.	
<	0x8004	Supplied buffer is too small.	
	Launnar .	where the second second is also and the	×