

ADAM 6050 Series

Digital Output Follows Digital Input State Change

Manufacturer: Advantech

Technical Note Date: 01/05/2023

Hardware Platform: ADAM 6050 Series Digital I/O

Firmware Version(s): Tested with 6.11 B35

Prerequisite Downloads:

Firmware can be found here: <u>https://www.advantech.com/en/support/details/firmware?id=1-1XJRP1</u> Advantech ADAM/APAX Utility: <u>https://www.advantech.com/en-us/support/details/utility?id=1-2AKUDB</u>

Overview:

There are occasions when sites using the ADAM 6050 Digital I/O devices need to have an output that follows an input state change on the same unit. This guide will walk through the steps of how to accomplish that locally on the ADAM 6050 instead of having to do it via other methods (i.e. BVMS scripting). The way this is done is through the ADAM's Graphic Condition Logic (GCL). This allows the output state changes to work locally on the ADAM unit and will work regardless of network connection to the ADAM module. However, functions <u>WILL STOP</u> if the ADAM unit loses power and has no network connection. Once network connectivity is reestablished then rule will work again. It would be a good idea to keep the ADAM/APAX utility running on a workstation or server that will have communication to the unit(s) and can easily download the configuration in the event of a power loss.

You will need the ADAM/APAX Utility to configure the ADAM 6050 and this guide assumes the module has already been assigned an IP address. For reference, the default IP address for configuring any part of the ADAM 6050 is **00000000**.

The ADAM 6050 comes with twelve Digital Inputs (DI's) and six Digital Ouputs (DO's). The DI's are all out of the box defaulted to Normally Closed (N/C) operation. The DO's are all out of the box defaulted to Normally Open (N/O). This guide assumes that the DI states have not been inverted and are default. However, there will be a section at the end to show you how to invert the DI default state to N/O and what you must change with the GCL rule if you do invert it.

Here are the logic stages that will be configured during this guide:



Process:

When you launch the ADAM/APAX Utility, select the GCL option that will be a subcategory under the ADAM 6050 module. By default, GCL is not running and you will notice that it is disabled.



Step 1: Click on PROG and acknowledge the alert that you get when it pops up.

Advantech ADAM/APAX Utility (Win32) Version 2.6.00 (B15)			
File Tools Setup Help			
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Image: Serial	Image: Construction Image: Construction		
	Error X There is an invalid project in the module! Please download a new project again. OK		



Step 3: Enable the rule, and then click on the button to the right to edit the description of the rule. Once you have a description, click OK. The description is optional and does not affect the rule.

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File Tools Setup Help	
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Setal Setal 192-168-50.155/ADAM-6050_74F 6050 OCL Others ADAM4500_5510Setes Wireless Sensor Networks	Image: Property Control Disable Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Control Image: Property Contro Image:
	OK Cancel

Step 4: Highlight the top "NOP" option in the Input Condition Stage area.



Step 6: In the pop-up window, set the Mode to "DI", set the input channel you want the rule to apply to, and set the Condition to "False". Remember, DI's are numbered 0-11. In this example we are using DI 1. Click OK.

₩ GCL Input Properties ×					
Tag: Adam6050.Rule1.Input1					
Mode:	DI	~			
Channel:	1	1 ~			
Operation	Operation				
Туре:	ChannelValu	ie 🗸 🗸			
Scaling					
	Min (n1):	Max (m1):			
Input range:	*****	*****			
	Min (n2):	Max (m2):			
Scale to:					
Result = n2 + (input - n1) x [(m2 - n2) / (m1 - n1)]					
Condition:	False V				
Value:	0				
Refresh		OK Cancel			

Step 7: Verify that the default logic state is set for AND. If it is not, please change it to AND.



Step 8: Click on the Execution Period object in the Execution Stage.



Step 9: Verify the Type is set for "Execution_Period" and set the Execution Period to "Full Speed". Click OK.

GCL Condition Properties X				
Tag: Adam6050.Rule1.Condition				
Operation Type:	Operation Type: Execution_Period ~			
Execution Period:	Full Speed 🗸 🗸			
Value:	0 (ms)			
Note: The execution period value should not be 0 (Full Speed) when output is in remote mode. It makes network traffic busy.				
Speed) when ou makes network t	itput is in remote mode. It traffic busy.			

Step 10: Click on the top "NOP" object in the Output Stage.

Advantech ADAM/APAX Utility (Win32) Version 2.6.00 (B15)			
File Tools Setup Help			
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	Rule1 Rule2 Rule3 Rule4 Rule5 Rule6 Rule7 Rule8		
ADAM4500_5510Series	- -		
	Rule 1		
	Enable Rule Note: Output X follows Input X State		
	NOP OR Execution Period NOP 0(ms)		

Step 11: Set the Operation Type to DO (Digital Output), and assign the channel (output) that you want the rule associated to. Remember, the ADAM 6050 has six Digital Outputs that are numbered 0-5. In this example we are using DO 1.

GCL Output Properties ×			
Tag: Adam6050.Rule1.Output1			
Destination:	Local 🗸	IP table	
Operation Type:	DO	~	
Note: You can verify th	e destination device if it supp	ports GCL .	
		Verify	
Operation			
Target module:	<not assigned=""></not>	\sim	
True Action:	True	\sim	
False Action:	False		
Channel:	1	~	
Value:	0		
Message:			
	(Device Description)		
Refresh	ОК	Cancel	

Step 12: Click on the Download Project icon to save the configuration to the ADAM 6050. A progress window will be displayed.

Advantech ADAM/APAX Utility (Advantech ADAM/APAX Utility (Win32) Version 2.6.00 (B15)			
File Tools Setup Help				
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- ■ Serial - @ Ethemet - @ 192.168.50.50 				
- 6050 - 1 DI_00 - 2 DI_01 - 2 DI_02 - 2 DI_03				
	Rule9 Rule10 Rule11 Rule12 Rule13 Rule14 Rule15 Rule16 Rule 1 Rule 1 Rule12 Rule13 Rule14 Rule15 Rule16			
- A DL_08 - A DL_09 - A DL_10 - A DL_11	Enable Rule Note: Rule1 >			
→ DD_00 → DD_01 → DD_02 → DD_03 → DD_04				
DO_05 DO_05 OSO GCL Others Arrore Group				
Wireless Sensor Networks	0(ms)			



Step 13: Click on RUN to have the rule start and continuously run.

Step 14: Verify running state. By default, monitoring will be enabled which is represented by yellow circles. When you short the associated Digital Input, you will see the yellow circles progress to the right. You should check continuity with a multi-meter on the Digital Output you associated to make sure you are getting a closer before you connect to the endpoint device. This completes the configuration to have the output follow the input state. No further action required.



Default Input Status (out of box) Normally Closed:

As mentioned in the beginning of this guide, the Digital Inputs for the ADAM 6050 are in a Normally Closed (N/C) state. Steps 1-14 are assuming the DI's are staying in this N/C state.



Inverting Digital Input State to be Normally Open:

Should you want to change the Digital Input to be Normally Open, you can invert the state by selecting the DI on the left side of the ADAM/APAX Utility and selecting "Invert signal" then clicking "Apply Change". Remember, if you rule is already configured with Steps 1-14, then inverting the signal afterwards will cause the rule to be true and will fire the output.

Advantech ADAM/APAX Utility (Win32) Version 2.6.00 (B15)					
	۵ ۲ <i>۸</i> ۵ (۲)				
	ADAM-6050 DI[1]	setting:			
192.183.03.03 192.185.01.55-[ADAM-6050_74F 192.185.01.155-[ADAM-6050_74F 192.185.01.155-[ADAM-6050_74F 192.185.01.155-[ADAM-6050_74F 101.01 101.01 101.01 101.02 101.03 101.04 101.05 101.06 101.07 101.08 101.09 101.01 101.01 101.02 101.03 101.04 101.05 101.06 101.07 101.08 101.09 101.00 100.00 100.01 100.02 100.03 100.01 100.02 100.03 100.04 100.04 100.05 100.04 100.05 100.05 100.04 100.05 100.05 100.04 100.05 100.05 100.05	DI mode:	DI	Apply mode	Apply to all	
	Setting:	🗌 Invert signal	Apply change		
		Enable digital filter Minimum low signal width Minimum high signal width	0.1 ms		
	DI status:	0			

Updating Rule after Inverting Digital Input Signal to Normally Open:

Should you invert the Digital Input signal, and make it Normally Open, then you must update your GCI rule to reflect the change. You will need to go back to the GCL, click on PROG (see Step 2) to edit the rule, edit the input object (see Step 4) and change the condition from False to True. Then click OK, download the project (see Step 12), and click RUN (see Step 13) to start the rule engine again.

₩ GCL Input Properties ×			
Tag: Adam	050.Rule1.Input1		
Mode:	DI		
Channel:	1	~	
Operation			
Туре:	ChannelVal	ue 🗸 🗸	
Scaling			
	Min (n1):	Max (m1):	
Input range:	*****	*****	
	Min (n2):	Max (m2):	
Scale to:			
Result = n2 + (input - n1) x [(m2 - n2) / (m1 - n1)]			
Condition:	True	~	
Value:	0		
Refresh		OK Cancel	

NOTE: Solutions to any technical problem should be thoroughly discussed prior to implementation. User interface, storage, device functionality, integration of third-party systems, and other software or hardware may be impacted by making changes to a system. Chesapeake and Midlantic Marketing is not responsible for and assumes no liability for loss of functionality, technical complications, loss of data, or any other expected or unforeseen circumstance related to use of this document or its content.



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