Knowledgebase Rockwell Automation

General Information

G19906 - ControlNet Device Status in a ControlLogix Processor

Last Modified: 05/08/2001
Previously Released as #13889

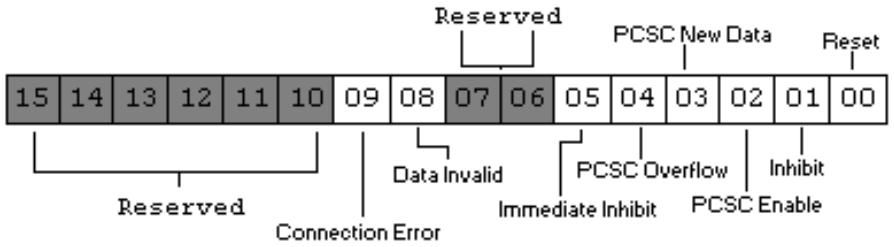
General Category:	Programmable Controllers Communications and Network Products
Product(s):	ControlLogix (1756); ControlNet (1786)
Catalog #:	1756L1; 1756L55
Series / Revision:	
Subject (Keyphrases):	
Summary of Technote Information:	

ControlNet Device Status in a ControlLogix Processor

When using devices on ControlNet with a PLC-5, each explicitly mapped device gets 3 words of status associated with the entry. These 3 words are used to determine the device / modules status. When using these devices with a ControlLogix processor, you still get the 3 words of status, but they are not as obvious as they are in a PLC-5. The first word of status is used to determine the devices connection status, the second and third words report back the error code, depending on the device.

First Word

shown below is the first word of status as seen in a PLC-5C15 processor:



For the specific definition of these bits, refer to publication 1785-6.5.22

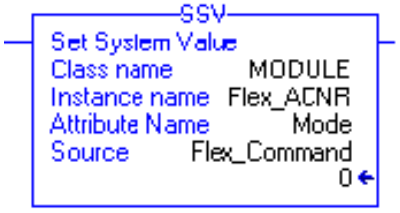
For a ControlLogix you will need to:

Reset: Use a GSV/SSV instruction
Inhibit: Use a GSV/SSV instruction
PCSC Enable: Not Available
PCSC New Data: Not Available
PCSC Overflow: Not Available
Immediate Inhibit: Use an GSV/SSV instruction
Data Invalid: Use an GSV/SSV instruction
Connection Error: Use an GSV/SSV instruction

Each of these GSV's / SSV's are specific to the MODULE you are issuing the command to.
Example:
If you have a 1794-ACNR15 adapter configured for Rack Optimized and you have discrete modules configured for rack optimized and one of those discrete modules fault, you cannot do a GSV to the Adapter and detect the connection problem. As far as the 1794-ACNR15 is concerned, it has a connection to the ControlLogix processor. In this case you would have to do a GSV to the discrete modules to determine the fault code.

RESET:
There is not any way to directly reset the connection other than doing an SSV to inhibit the connection, then doing an SSV to unihibit the connection. Refer to the INHIBIT section on how to perform this.

INHIBIT:
To inhibit the connection, you will need to setup an SSV (Set System Value) instruction as shown below:

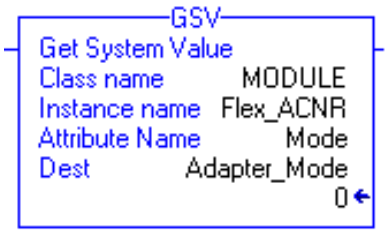


Class Name: MODULE
Instance Name: The name of the device you wish to inhibit.
Attribute name: MODE, used to change the mode of the device from normal (0), Major Fault on loss of connection (1), or Inhibit (4).
Source: Source tag used for the command.

In this example, you will inhibit a 1794-ACNR15 adapter by setting the tag Flex_Command to a 4.

Make sure that the conditions for the rung are not continuously true
or you will not be able to unihibit the device or vice versa.

In order to check and see if the connection to the 1794-ACNR15 is inhibited, you will need to use a GSV (Get System Value)



Class Name: MODULE
Instance Name: The name of the device you wish to check.
Attribute name: MODE, current running condition.
Dest: Destination tag where the data will be placed.

In this example, you will check the status of the 1794-ACNR15 adapter, here it shows the Mode as 0, or Not inhibited nor set for Major Fault Controller on connection loss.

PCSC ENABLE:
This feature is not currently supported in the ControlLogix Platform.

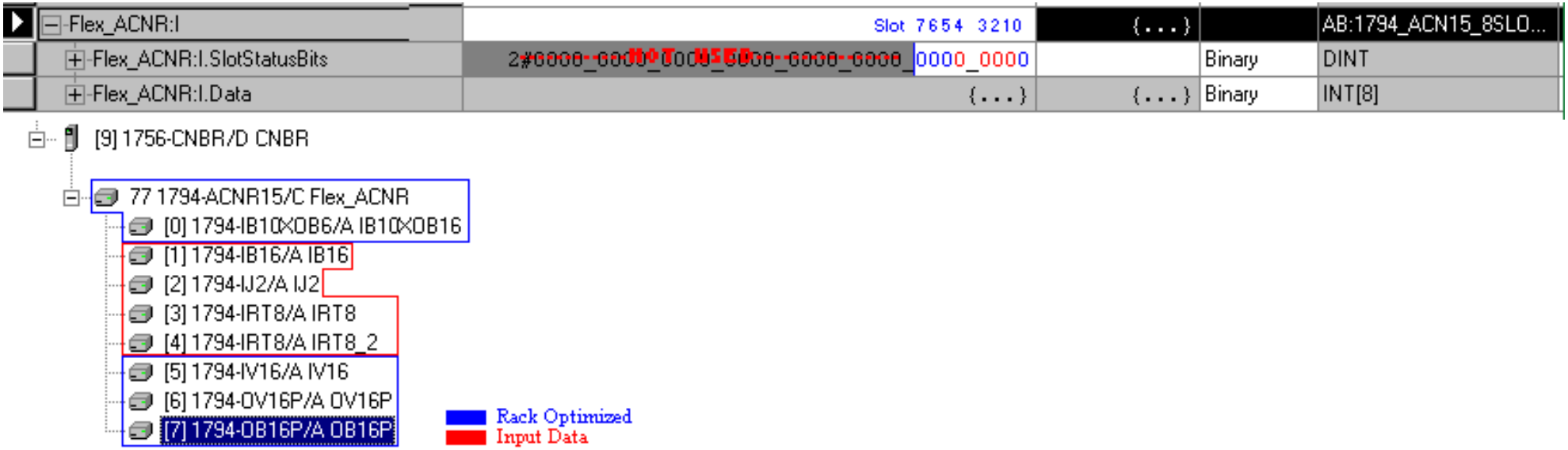
PCSC NEW DATA:
This feature is not currently supported in the ControlLogix Platform.

PCSC OVERFLOW:
This feature is not currently supported in the ControlLogix Platform.

IMMEDIATE INHIBIT:
Refer to the INHIBIT section.

Immediate Inhibit stops talking to the device as if it were taken off the network (i.e. device powered off or ControlNet cables disconnected from it), Inhibit will do an orderly shutdown of the connections. There is not any distinction between Inhibit and Immediate Inhibit in a ControlLogix processor.

DATA INVALID:
Refer to the INHIBIT section.
For Rack Optimized connections, the 1794-ACNR15 will contain all the valid slot bits in its status register, this acts similar to the Data Invalid bit that you would see with a PLC-5. If the bit is set, then the Data from that slot is not valid.



In this example, the tag Flex_ACNR:I.SlotStatusBits is refering to the modules that are configured as rack optimized only. If any of these rack optimized modules has a communication problem to the 1794-ACNR15, then its associated status bit will be set indicating some communication problem.
If the 1794-ACNR15 is not mapped as rack optimzed, then there will not be any status tags created for the adapter, yet each individual module would have its own fault registers.

Analog modules and modules that are NOT configured for RACK OPTIMIZED will not be reflected in the adapters SlotStatusBits. In this case, these modules will contain their own status registers.

Shown below is the status or fault registers for the 1794-IB16, which is mapped as Input Data. Since it is not a Rack Optimized connection, it will contain its own Fault bits in the tag Flex_ACNR:1:I.Fault. The first 8 bit of this word are used to indicate a communication problem, the rest of the bits in this word are not used. When a communication problem between the processor and this module exhists, then the first 8 bits will be set to 1, otherwise these bits will be 0. Since this module is NOT mapped as Rack Optimized, any faults for this module will not be indicated by the 1794-ACNR15's SlotStatusBits word.

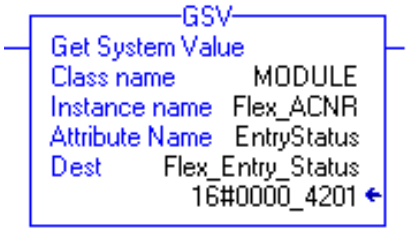
-Flex_ACNR:1:I	{...}	{...}		AB:1794_IB16:I:0
-Flex_ACNR:1:I.Fault	2#0000_0000_0000_0000_0000_0000_1111_1111		Binary	DINT
-Flex_ACNR:1:I.Data	2#0000_0000_0000_0000		Binary	INT
-Flex_ACNR:1:I.Counter	0		Decimal	INT

NOT USED

All modules, except for the 1794-ACNR15, that are not mapped as Rack Optimized will contain an Input tag called Fault.

CONNECTION ERROR:
Connection errors in a ControlLogix processor would normally be caused by a module fault or communication loss to the module. 90% of the time, the resulting error code returned would be 515 or 516 (Connection Timed Out).

To obtain the status of the connection, you will need to configure a GSV instruction as shown below:



Class Name: MODULE
Instance Name: The name of the device you wish to check.
Attribute name: Entry Status, status of this entries connection.
Dest: Destination tag where the data will be placed.

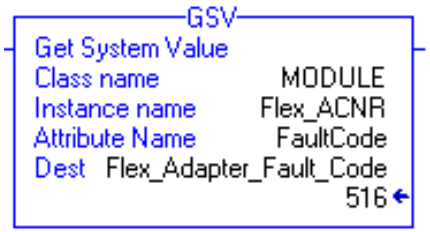
In this example, the device is reporting back 4201 in hex. The 4xxx means that the connection is running. Normally you would run the returned value through a mask and report back only the 3rd byte of information (i.e. return 4000 vice 4201)

EntryStatus will report back one of the following codes in HEX:
0000 Module is currently powering up
1xxx Faulted
2xxx Validating Connection
3xxx Connecting
4xxx Connection Running
5xxx Shutting Down Connection
6xxx Connection Inhibited
7xxx Waiting on Connection to be establish

If the EntryStatus reports back 1xxx, you would then need to do a GSV to that module to obtain the fault / reason code.

Word 2 and 3 (FAULT CODE)

If an EntryStatus reports back a fault, you can obtain the fault code using a GSV instruction:



A fault code of 516 (Unconnected Request Timed Out) means that a connection was trying to be opened, in this case to a 1794-ACNR15, but did not complete before the timeout value (4 x RPI).

Below are some of the more common error codes that may be seen with a ControlLogix Processor. For a listing of the error codes, refer to publication 1785-6.5.22, appendix D.

0 Connection Success
12 Object in the Wrong State
38 Invalid Destination Address Size
256 Connection in use
265 Invalid Connection Size
273 Invalid RPI
275 Out of Connections
276 Product Code Mismatch
277 Product Type Mismatch
278 Revision Mismatch
280 Invalid Configuration Format
515 Connection Timed Out
516 Unconnected Request Timed Out
769 Out of Buffer Memory
770 Scheduled Bandwidth Not Available

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