Module/Node Fault and Alarm Attributes

These are the module/node fault and alarm related attributes associated with a Motion Control Axis.

Module Fault Bits

Usage	Access	T	Data Type	Default	Min	Max	Semantics of Values
Required - All	Get/GSV	T	DWORD	-	-	-	Bitmap 0 = Control Sync Fault 1 = Module Sync Fault 2 = Timer Event Fault 3 = Module Hard Fault 4 = Reserved 5 = Reserved 6 = Reserved 7 = Conn. Format Fault 8 = Local Mode Fault 9 = CPU Watchdog Fault 10 = Clock Jitter Fault 11 = Cyclic Read Fault 12 = Cyclic Write Fault 13 = Clock Skew Fault 14 = Control Conn. Fault 15 = Reserved 16 = Module Clock Sync Fault 17 = Logic Watchdog 18 = Duplicate Address 19...31 = Reserved

This bit field is a roll-up of module scoped fault conditions that can include synchronization faults detected on either side of the CIP Motion connection. All defined Node Fault Codes are mapped into bits in this attribute. The controller generally applies a shutdown fault action when a Module Fault occurs and recovery generally requires module reconnection or reconfiguration.

The following table defines a list of conditions associated with the Module Fault Bits attributes. While the Module Fault Bits attribute is marked as Required in the CIP Motion device implementation, support for each of the individual fault conditions therein is left Optional. In this table the terms motion module and motion device are used synonymously.

Bit	Module Fault Name	Device Node Fault Name	Description
0	Control Sync Fault	-	The Control Sync Fault bit attribute is set when the Logix controller detects that several consecutive connection updates from the motion module have been missed. This condition results in the automatic shutdown of the associated motion module. The Logix controller is designed to "ride-through" a maximum of four missed position updates without issuing a fault or adversely impacting motion in progress. Missing more than four position updates in a row constitutes a problematic condition that warrants shutdown of the motion module. This bit is cleared when the connection is reestablished.
1	Module Sync Fault	Control Connection Update Fault	The Module Sync Fault bit attribute is set when the motion module detects that several consecutive connection updates in a row from the Logix processor module have been missed or that an update has been excessively late as determined by the Controller Update Delay High Limit attribute value. This condition results in the automatic shutdown of the motion module. The motion module is designed to "ride-through" a maximum of missed or late updates without issuing a fault or adversely impacting motion in progress. Missed or late update that exceed the Controller Update Delay High Limit result in the Module Sync Fault condition. This bit is cleared when the connection is reestablished.
2	Timer Event Fault	-	The Timer Event Fault bit attribute is set when the associated motion module has detected a problem with the module's timer event functionality used to synchronize the motion module's control loops. The Timer Event Fault bit can only be cleared by reconfiguration or power cycle of the motion module.
3	Module Hard Fault	Hardware Fault	If the Module Hardware Fault bit attribute is set it indicates that the associated motion module has detected a hardware problem that, in general, is going to require replacement of the module to correct.
4 - 6	Reserved	-	
7	Conn Format Fault	Data Format Error	This fault bit indicates that an error has occurred in the data format between the controller and the device, for example, a Format Revision mismatch.
8	Local Mode Fault	-	The Local Mode Fault is set when the controller is locked in Local Mode operation.
9	CPU Watchdog Fault	Processor Watchdog Fault	The Processor Watchdog Fault bit indicates that the processor associated with the device node has experienced an excessive overload condition that has tripped the associated processor watchdog mechanism.

10	Clock Jitter Fault	-	The Clock Jitter Fault bit is set when there is excessive clock jitter between the controller and the motion device.
11	Cyclic Read Fault	-	The Cyclic Read Fault is set when the controller detects a runtime error associated with the Cyclic Read mechanism.
12	Cyclic Write Fault	-	The Cyclic Write Fault is set when the controller detects a runtime error associated with the Cyclic Write mechanism.
13	Clock Skew Fault	Clock Skew Fault	Clock Skew Fault bit indicates that the motion device has detected significant difference between the device's System Time and the controller's System Time that prevented the device from switching to synchronous operation after a time out period.
14	Control Conn Fault	Control Connection Loss Fault	The Control Connection Loss fault bit indicates that the CIP Motion C-to-D connection from the controller has timed out.
15	Reserved	-	
16	Clock Sync Fault	Clock Sync Fault	The Clock Sync Fault bit indicates that the motion device's local clock has lost synchronization with the master clock for an extended period of time (40 to 60 seconds) during synchronous operation. This fault condition is an indication that the local IEEE 1588 clock has lost synchronization with the master and was not able to resynchronize within the allotted timeout (such as 40 to 60 seconds).
17	Logic Watchdog Fault	Logic Watchdog Fault	The Logic Watchdog Fault bit indicates that an auxiliary logic component (for example, FPGA, or ASIC) associated with the device node has experienced an excessive overload condition that has tripped the associated logic watchdog mechanism.
18	Duplicate Address Fault	Duplicate Address Fault	The Duplicate Address Fault bit indicates that a motion device node has been detected on the network that uses the same Node Address as this device node. For Ethernet, this address would be the IP Address of the device.
19-31	Reserved	-	

Module Alarm Bits

Usage	Access	T	Data Type	Default	Min	Max	Semantics of Values

Required - All	Get/GSV	T	DWORD	-	-	-	Bitmap 0 = Control Sync Alarm 1 = Module Sync Alarm 2 = Timer Event Alarm 3 = CPU Overload Alarm 4 = Clock Jitter Alarm 5 = Out of Range Alarm 6 = Clock Skew Alarm 7 = Clock Sync Alarm 8 = Node Address Alarm 9...31 = Reserved

This bit field is a roll-up of module scoped alarm conditions that can include synchronization alarms detected on either side of the CIP Motion connection. All defined Node Alarm Codes are mapped into bits in this attribute.

The following table defines a list of conditions associated with the Module Alarm Bits attributes. While the Module Alarm Bits attribute is marked as Required in the CIP Motion device implementation, support for each of the individual fault conditions therein is left Optional. In this table the terms motion module and motion device are used synonymously.

Bit	Alarm Name	Device Node Alarm Name	Description
0	Control Sync Alarm	-	The Control Sync Alarm bit attribute is set when the Logix controller detects that several consecutive connection updates from the motion module have been missed.
1	Module Sync Alarm	Control Connection Update Alarm	The Module Sync Alarm bit attribute is set when the motion module detects that several consecutive connection updates in a row from the Logix processor module have been missed or that an update has been excessively late as determined by the Controller Update Delay Low Limit attribute value. This bit is cleared after 10 seconds without another alarm condition.
2	Timer Event Alarm	-	The Timer Event Alarm bit attribute is set when the associated motion module has detected a problem with the module's timer event functionality used to synchronize the motion module's control loops. The Timer Event Alarm bit can only be cleared by reconfiguration or power cycle of the motion module.

3	Processor Overload Alarm	Processor Overload Alarm	The Processor Overload Alarm bit indicates that the host processor associated with motion device is experiencing overload conditions that could eventually lead to a fault.
4	Clock Jitter Alarm	Clock Jitter Alarm	Clock Jitter Alarm bit indicates that the Sync Variance has exceeded the Sync Threshold while the motion device is running in Sync Mode.
5	Out of Range Alarm	-	The Out of Range Alarm indicates that the motion device has detected that a Cyclic Write attribute value has exceeded its allowed range.
6	Clock Skew Alarm	Clock Skew Alarm	Clock Skew Alarm bit indicates that the motion device has detected significant difference between the device's System Time and the controller's System Time that is preventing the device from switching to synchronous operation.
7	Clock Sync Alarm	Clock Sync Alarm	The Clock Sync Alarm bit indicates that the motion device's local clock has lost synchronization with the master clock for a short period of time (such as 10 to 20 seconds) during synchronous operation. This alarm condition can also occur when a change in the master clock source has been detected. The Clock Sync Alarm is an indication that the local IEEE-1588 clock has shifted back to its start-up mode to quickly synchronize into the master clock.
8	Node Address Alarm	Node Address Alarm	The Node Address Alarm bit indicates that the Node Address setting of the device has been changed during motion device operation and may no longer be valid.
19-31	Reserved	-	

See also

Exceptions

Standard Exceptions

Exception Factory Limit Info Attributes

Exception User Limit Configuration Attributes

How are we doing?