Chapter 1

Controller Status LEDs

Introduction

Three controller status LEDs are located on the front panel of the controller. These LEDs indicate the results of power-up diagnostic tests. They are marked either:

- Control Status 0 1 2 (on 1394, 1394L or 1394 Turbo controllers), or
- Status 0 1 2 (on the Compact, Integrated and Basic controllers).

LED Value

Each controller status LED, when turned ON, represents a numeric value, as follows:

LED Status	Value
0	1
1	2
2	4

The General System Variable Status_LEDs represents the sum of all controller status LED values.

The value of any controller status LED, when OFF (i.e., unlit), is zero.

LED Signal

An LED signal can appear in any of four states:

- no signal,
- solid signal,
- flashing fast signal (10 times per second) or
- flashing slow signal (2 times per second).

In the following sections, Controller Status LEDs are grouped according to their LED Signal type, and Status_LEDs value.

As noted below, only faults occurring during download or initialization can be addressed on-site. All other controller status LED conditions indicate a hardware problem that is internal to the controller. These problems can be corrected only by returning the controller to the manufacturer for repair.

Any time you return a controller for repair, be sure to include a cover letter containing all of the following information:

- the controller status LED sequence,
- whether the signal is solid or flashing fast or flashing slow, and
- the value of the Status_LEDs General System Variable.

1394 Turbo, 1394L, 1394 or Compact Controllers

No LED Signal

Status_LEDs = 0

0	1	2	Signal
Off	Off	Off	none

Status Description:

The controller is OK. There are no faults.

Remedial Steps Include:

None

Solid LED Signal

Status_LEDs = 1

0	1	2	Signal
On	Off	Off	Solid

Status Description:

Memory Fault – Setup or Program Checksum Error!

Remedial Steps Include:

Re-initialize the controller as follows:

1. Press both the Control Reset and Control Init buttons.
2. Release the Control Reset button. The three Controller Status LEDs should flicker.
3. When the System Module Status LED alternately flashes red and green, release the Control Init button. The controller is re-initialized. (This assumes 3-phase power is not yet applied via inputs U, V and W.)
4. Go online and download the diagram with setups.
5. Press Control Reset to clear the Controller Status LEDs.

If these steps do not clear the problem, it is a hardware failure. Return the controller to the manufacturer for repair.

Status_LEDs = 2

0	1	2	Signal
Off	On	Off	Solid

Status Description:

1394 Initialization Failure!

Note: This Controller LED status does not apply to the IMC S Class Compact controller.

Remedial Steps Include:

In the 1394, 1394L or 1394 Turbo, this can be caused either by applying 3-phase power to the system module immediately upon startup, or by a failure of a system, axis or DIM module.

1. Reset and power-down the controller.
2. Re-apply 24V logic power via inputs W1 and W2 (without 3-phase power).
3. Wait for a click. This means the Drive OK has closed.
4. Apply 3-phase power via inputs U, V and W.
5. If the fault persists:
6. Remove the axis modules.
7. Plug the terminator into the system module.
8. Power up and check the system module.
9. If the system module is OK, plug in one axis module at a time. See which one fails. If none fails, try to line them up in different combinations to see which one is causing the system to fail.
10. Return the problem module to the manufacturer for repair.

Status_LEDs = 3

0	1	2	Signal
On	On	Off	Solid

Status Description:

AxisLink Initialization failure!

Remedial Steps Include:

Reset the controller. If the fault persists, return the controller to the manufacturer for repair.

Status_LEDs = 4

0	1	2	Signal
Off	Off	On	Solid

Status Description:

RIO Initialization failure!

Remedial Steps Include:

Reset the controller. If the fault persists, return the controller to the manufacturer for repair.

Status_LEDs = 5

0	1	2	Signal
On	Off	On	Solid

Status Description:

Flex I/O Initialization failure!

Remedial Steps Include:

Reset the controller. If the fault persists, return the controller to the manufacturer for repair.

Status_LEDs = 6

0	1	2	Signal
Off	On	On	Solid

Status Description:

Interrupt Initialization failure!

Remedial Steps Include:

Reset the controller. If the fault persists, return the controller to the manufacturer for repair.

Status_LEDs = 7

0	1	2	Signal
On	On	On	Solid

Status Description:

Initialization failure!

Remedial Steps Include:

Reset the controller. If the fault persists, return the controller to the manufacturer for repair.

LED Signal Flashing Fast (10x per second)

Status_LEDs = 1

0	1	2	Signal
On	Off	Off	Flashing Fast

Status Description:

DRAM test #1 failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 2

0	1	2	Signal
Off	On	Off	Flashing Fast

Status Description:

DRAM test #2 failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 3

0	1	2	Signal
On	On	Off	Flashing Fast

Status Description:

DRAM test #3 failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 4

0	1	2	Signal
Off	Off	On	Flashing Fast

Status Description:

Application Memory Functionality test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair

Status_LEDs = 5

0	1	2	Signal
On	Off	On	Flashing Fast

Status Description:

Setup Memory Functionality test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair

Status_LEDs = 6

0	1	2	Signal
Off	On	On	Flashing Fast

Status Description:

Dual Port test #1 failed!

Note: This Controller LED status does not apply to the IMC S Class Compact controller.

Remedial Steps Include:

Return the controller to the manufacturer for repair

Status_LEDs = 7

0	1	2	Signal
On	On	On	Flashing Fast

Status Description:

Dual Port test #2 failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair

LED Signal Flashing Slow (2x per second)

Status_LEDs = 1

0	1	2	Signal
On	Off	Off	Flashing Slow

Status Description:

Serial Port test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 2

0	1	2	Signal
Off	On	Off	Flashing Slow

Status Description:

Timer Diagnostic test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 3

0	1	2	Signal
On	On	Off	Flashing Slow

Status Description:

Initialization test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 4

0	1	2	Signal
Off	Off	On	Flashing Slow

Status Description:

Auxiliary I/O test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 5

0	1	2	Signal
On	Off	On	Flashing Slow

Status Description:

CXIC failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 6

0	1	2	Signal
Off	On	On	Flashing Slow

Status Description:

Fill and Flush DRAM test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 7

0	1	2	Signal
On	On	On	Flashing Slow

Status Description:

ROM to DRAM Transfer test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Basic and Integrated Controllers

No LED Signal

Status_LEDs = 0

0	1	2	Signal
Off	Off	Off	none

Status Description:

The controller is OK. There are no faults.

Remedial Steps Include:

None

Solid LED Signal

Status_LEDs = 1

0	1	2	Signal
On	Off	Off	Solid

Status Description:

Application Module Data Re-Initialized.

Remedial Steps Include:

No action required.

Status_LEDs = 2

0	1	2	Signal
Off	On	Off	Solid

Status Description:

Memory Fault - Setup Data Checksum Error!

Remedial Steps Include:

Reset the controller. If the fault persists, return the controller to the manufacturer for repair.

Status_LEDs = 3

0	1	2	Signal
On	On	Off	Solid

Status Description:

This Controller LED status does not apply to the IMC S Class Compact controller.

Remedial Steps Include:

Not Applicable.

Status_LEDs = 4

0	1	2	Signal
Off	Off	On	Solid

Status Description:

Memory Fault - Program Checksum Error!

Remedial Steps Include:

Reset the controller. If the fault persists, return the controller to the manufacturer for repair.

Status_LEDs = 5

0	1	2	Signal
On	Off	On	Solid

Status Description:

This Controller LED status does not apply to the IMC S Class Compact controller.

Remedial Steps Include:

Not Applicable.

Status_LEDs = 6

0	1	2	Signal
Off	On	On	Solid

Status Description:

This Controller LED status does not apply to the IMC S Class Basic or Integrated controller.

Remedial Steps Include:

Not Applicable.

Status_LEDs = 7

0	1	2	Signal
On	On	On	Solid

Status Description:

This Controller LED status does not apply to the IMC S Class Compact controller.

Remedial Steps Include:

Not Applicable.

LED Signal Flashing Fast (10x per second)

Status_LEDs = 1

0	1	2	Signal
On	Off	Off	Flashing Fast

Status Description:

DRAM test #1 failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 2

0	1	2	Signal
Off	On	Off	Flashing Fast

Status Description:

DRAM test #2 failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 3

0	1	2	Signal
On	On	Off	Flashing Fast

Status Description:

DRAM test #3 failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 4

0	1	2	Signal
Off	Off	On	Flashing Fast

Status Description:

Application Module Data Bit test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair

Status_LEDs = 5

0	1	2	Signal
On	Off	On	Flashing Fast

Status Description:

Application Module Address Bit test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair

Status_LEDs = 6

0	1	2	Signal
Off	On	On	Flashing Fast

Status Description:

Set Module Data Bit test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair

Status_LEDs = 7

0	1	2	Signal
On	On	On	Flashing Fast

Status Description:

Set Module Address Bit test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair

LED Signal Flashing Slow (2x per second)

Status_LEDs = 1

0	1	2	Signal
On	Off	Off	Flashing Slow

Status Description:

Serial Port test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 2

0	1	2	Signal
Off	On	Off	Flashing Slow

Status Description:

Timer Diagnostic test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 3

0	1	2	Signal
On	On	Off	Flashing Slow

Status Description:

Interrupt test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 4

0	1	2	Signal
Off	Off	On	Flashing Slow

Status Description:

Auxiliarry I/O test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 5

0	1	2	Signal
On	Off	On	Flashing Slow

Status Description:

CXIC failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 6

0	1	2	Signal
Off	On	On	Flashing Slow

Status Description:

Fill and Flush DRAM test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

Status_LEDs = 7

0	1	2	Signal
On	On	On	Flashing Slow

Status Description:

ROM to DRAM Transfer test failed!

Remedial Steps Include:

Return the controller to the manufacturer for repair.

1394 System Module Status LED

The System Module Status LED, sometimes called the System Module Front Cover LED, is a single LED located on the front of the 1394, 1394L or 1394 Turbo System module. The following sections describes each LED status, the conditions that can cause each status, and the steps to take in response.

LED Status: OFF

Status Description:

No power, or insufficient power, is being supplied to the system module via the 24V W1 and W2 logic inputs.

Remedial Steps Include:

Check the following to insure that the power supplied to the system module is adequate for the number of axes you are using:

- Check the wiring between the power supply and the system module.
- Be sure that both fuses are of the recommended type (Bussman MDA-15 or equivalent) and still good.
- Be sure that the power rating is either:
  - 19-28V AC RMS, single-phase, 60/60 Hz., or
  - 18.75-31.25V DC
- Verify that the Current is at least:
  - 3.5A for one axis
  - 4.4A for 2 axes
  - 5.2A for 3 axes

- 6A for 4 axes.

LED Status: Flashing Green

Status Description:

The system module is receiving 24V logic power via the W1 and W2 inputs. The DC bus is up and recognized by the control. However, the System Enable terminal (on the input wiring board) is not receiving 24V power. Therefore, feedback cannot be turned ON.

Remedial Steps Include:

Check both the wiring and the power supply.

There are several ways to energize the System Enable. For example, the System Enable can be:

- Always tied to the 24V DC supply so that it comes on with the 24V main logic power,
- Inserted in the E-stop string to pull in/out with the M1 contactor, or
- Included in a secondary stop string (for example, a photoeye workarea).

LED Status: Flashing Red

Status Description:

A Drive_hard_fault_1394 has occurred. This fault is caused by either of the two following middle-level faults:

- System_module_hard_fault_1394 = 1, or
- Axis_module_hard_fault_1394 = 1.

Remedial Steps Include:

Check the lower-level fault variables that can cause either a System module hard fault or an Axis module hard fault. Refer to Online Help or to the Reference Manual (in the System Variable section of the Expression Builder chapter) for information on how to clear this fault.

For a System module hard fault, check these lower-level fault variables:

System_bus_over_voltage_flt_1394
System_bus_undr_voltage_flt_1394
System_control_power_fault_1394
System_ground_fault_1394
System_over_temp_fault_1394
System_phase_loss_fault_1394
System_serial_ring_fault_1394
System_smrt_pwr_i_limit_fault_1394
System_smrt_pwr_pre_charge_fault_1394
System_smrt_pwr_shunt_timeout_fault_1394

For an Axis module hard fault, check these lower-level fault variables:

Axis_bus_loss_fault_1394
Axis_Drive_over_temp_fault_1394
Axis_it_fault_1394
Axis_Motor_over_temp_fault_1394
Axis_power_fault_1394

LED Status: Flashing Red & Green

Status Description:

The system module is receiving 24V logic power over the W1 and W2 inputs, but 3-phase power is not being supplied via the U, V and W inputs.

Remedial Steps Include:

Check the following:

- DC bus power.
- Start/Stop circuit wiring.
- The fuses for the U, V and W inputs.

LED Status: Solid Green

Status Description:

The system module is functioning properly. DC bus power has been applied. The system enable has been applied.

Remedial Steps Include:

None

LED Status: Solid Red

Status Description:

This occurs in any of the following cases:

- A Kill Control command was issued from either:
  - a Stop Motion block set to **Kill Control**.
  - the GML Commander Online Toolbar.
- An emergency stop was generated by:
  - an RIO E-stop dedicated bit issued from a PLC, or
  - an SLC E-stop dedicated bit issued from the SLC.
- A CPU Utilization Overrun fault (Global_fault = 15) has occurred.
- Malfunctioning system module hardware.

Remedial Steps Include:

To determine the cause of this condition, press the Control Restart button, then try one or more of the following diagnostic approaches:

- Check to see if a Kill Control command was issued.
- In the PLC or SLC, force the RIO or SLC E-Stop dedicated bit to zero. Press the RESET button on the controller. If the problem does not recur, the cause was an E-stop generated by the PLC or SLC.
- Replace the diagram's fault handler with an Equation block. Use the Equation block to set a new User Variable equal to either Global_fault or CPU_utilization_peak. Re-initialize the controller and re-download the program. The problem should recur. Press the Control RESET button and check the value of the new User Variable to see if a CPU Utilization Overrun fault occurred.

Note: To prevent a recurrence of a CPU Utilization Overrun fault, either:

- Lower the Servo Update Rate (in the Configure Control Options dialog box), or
- Simplify the diagram, thereby lessening the demand it places on the CPU during runtime.

In the case of malfunctioning hardware, return the system module to the manufacturer for repair.

AxisLink Status LED

The AxisLink Status LED is either:

- a single AxisLink LED located on the lower-left front of the 1394, 1394L or 1394 Turbo system module, or
- the channel A AxisLink LED located on the upper right front of the Basic, Integrated or Compact system module.

Note: Although the Basic, Integrated and Compact system modules have both channel A and channel B LEDs (as well as channel A and B plugs), only the channel A LED (and plug) is used.

Axis-Specific vs. General AxisLink Faults

When troubleshooting an AxisLink LED fault condition, be mindful that there are two different sources of AxisLink faults:

- **Axis-specific faults** relate to a specific Virtual Axis. Check to see if the General System Variable Global_fault = 9. If so, check the Axis System Variables for each virtual axis to see if AxisLink_timeout = 1 or if AxisLink_failed = 1.
- **General AxisLink faults** describe a general (non-axis-specific) AxisLink fault. Check to see if the General System Variables Global_fault = 8 and AxisLink_general_fault = 1. If so, check the General System Variable AxisLink_fault_code to determine the nature of the problem and the remote controller that is the source of the problem.

For information on the cause of, and the cure for, these faults, refer to the specific topic in the GML Commander Online Help file or in the Expression Builder chapter of the GML Commander Reference Manual.

The remainder of this chapter describes each LED status, the conditions that can cause each status, and the steps to take in response.

LED Status: OFF

Status Description:

Either:

- AxisLink is not enabled in the General page of the Configure Control Options dialog box, or
- AxisLink has been disabled by a Control Settings block.

Remedial Steps Include:

- Enable AxisLink either by making configuration settings in the Configure Control Options dialog box or by means of a Control Settings block.

LED Status: Solid Green

Status Description:

Either:

- AxisLink communications is established. This means:
  1. AxisLink has been enabled (in the General page of the Configure Control Options dialog box), and
  2. A remote controller has been selected (in the Axis-Link page of the Configure Control Options dialog box), and
  3. The local controller is reading outputs from the remote controller (if configured to do so).

Or:

- AxisLink has been enabled, but communications to a remote controller have not been established because:

1. No remote controller has been selected (in the General page of the Configure Control Options dialog box), therefore the local controller is not attempting to read outputs from a remote controller.

   Note: This condition will lead to a flashing green LED if a remote controller is later selected (in the AxisLink page) and the diagram is downloaded.

Remedial Steps Include:

None necessary.

LED Status: Flashing Green

Status Description:

Axis-specific causes include:

- A connection between the local controller and the remote axis could not be established. Global_fault = 9 and AxisLink_failed = 1. Possible causes include:
  - The local controller attempted to read the Command position of the remote Virtual Axis. However, Feedback was not turned ON for that axis.
  - The axis in the remote controller, designated in the local controller as the virtual axis, does not physically exist.
  - The axis in the remote controller, designated in the local controller as the virtual axis, is not configured (in the remote controller).

Non-axis-specific causes include:

- A connection between the local controller and a remote controller (selected in the AxisLink page of the Configure Control Options dialog box) could not be established. Global_fault = 8, AxisLink_general_fault = 1 and AxisLink_fault_code = 16 - 31. Possible causes include:
  - An intermittent cabling problem.
  - Excessive noise on the cable connection.
  - Improper cable termination.
  - A failed remote AxisLink module.
  - The selected remote controller does not exist. This is often a result of improper addressing (i.e., the wrong remote controller address was selected in the Axis-Link page of GML Commander configuring the local controller).

Remedial Steps Include:

For Axis-Specific faults:

1. Identify and correct the underlying cause of the problem.
2. Clear the AxisLink_failed fault variable by using either:
   - a Reset Fault block or
   - an Equation block (assigning a value of 0 to AxisLink_failed for the specific axis).

   Note: See the Handling Faults section of the Using AxisLink chapter in the GML Commander Reference Manual for more information about constructing an AxisLink fault handler.

For Non-Axis-Specific faults:

1. Check on the condition of the controller indicated by the value of AxisLink_fault_code.

Note: Code values 16 to 31 refer to controller addresses 0 to 16, respectively.

2. Verify that a remote controller, working properly and with the specified address, is connected to AxisLink.
3. Use two Equation blocks to clear AxisLink_general_fault and reset AxisLink_fault_code (by setting their values to 0).

   Note: If the program is not running, AxisLink will attempt to clear this fault. However, if the underlying problem is not resolved, the fault will immediately re-appear, and the associated faults and fault codes will turn on and off in the Tag Window of GML Commander.

LED Status: Flashing Red

Status Description:

Axis-specific causes include:

A Virtual Axis, which had been communicating properly to the local controller via AxisLink, has not sent any axis information in the last 4 servo updates. Global_fault = 9 and AxisLink_timeout = 1. Possible causes include:

- The AxisLink cable has failed or been disconnected.
- The controller (or ALEC), with the physical axis to which the Virtual Axis is linked, has failed or disabled AxisLink.

Non-axis-specific causes include:

A connection between a local and remote controller has been established, and the local controller is properly configured to read outputs from the remote controller. However,

- One second has passed since the remote controller last updated its AxisLink outputs. (The remote controller has either stopped, or never started, updating its AxisLink outputs.) Global_fault = 8, AxisLink_general_fault = 1 and AxisLink_fault_code = 32-47.

Possible causes include:

- The AxisLink cable has failed or been disconnected.
- The remote controller has failed.
- The remote controller has been reset.
- A Read Remote Value block in the local controller diagram could not read the specified output from the selected remote motion controller. (More than 20 milliseconds have elapses without a response from the remote motion controller.)

Remedial Steps Include:

Re: Axis-Specific faults:

1. Identify and correct the underlying cause of the problem.
2. Clear the AxisLink_timeout fault variable by using either:
   - a Reset Fault block or
   - an Equation block (assigning a value of 0 to AxisLink_timeout for the specific axis).

Note: See the Handling Faults section of the Using AxisLink chapter in the GML Commander Reference Manual for more information about constructing an AxisLink fault handler.

Re: Non-Axis-Specific faults

1. Check on the condition of the controller indicated by the value of AxisLink_fault_code.

Note: Code values 32 to 47 (and 64 to 79) refer to controller addresses 0 to 16, respectively.

2. Verify that a remote controller, working properly and with the specified address, is connected to AxisLink.
3. Use two Equation blocks to clear AxisLink_general_fault and reset AxisLink_fault_code (by setting their values to 0).

Note: If the program is not running, AxisLink will attempt to clear this fault. However, if the underlying problem is not resolved, the fault will immediately re-appear, and the associated faults and fault codes will turn on and off in the Tag Window of GML Commander.

LED Status: Flashing Red & Green

Status Description:

There have been at least 96 link errors, and AxisLink is in danger of going Offline. Global_fault = 8, AxisLink_general_fault = 1 and AxisLink_fault_code = 128. Possible causes include:

- A diagram has been downloaded to the controller, but the controller has not yet been RESET.
- Intermittent cabling problems.
- Excessive noise.
- Improper cable termination.
- A failing AxisLink module.

Remedial Steps Include:

- If the program is not running, AxisLink will attempt to clear this fault. However, if the underlying problem is not resolved, the fault will immediately re-appear, and the associated faults and fault codes will turn off and on in the Tag Window of GML Commander.
- If the program is running, your fault handling routine must clear this fault. The fault handling routine should contain two Equation blocks that clear AxisLink_general_fault and reset AxisLink_fault_code (by setting their values to 0).

Note: See the Handling Faults section of the Using AxisLink chapter in the GML Commander Reference Manual for more information on constructing an AxisLink fault handler.

LED Status: Solid Red

Status Description:

There have been at least 256 link errors. AxisLink shuts down and is Offline. Global_fault = 8, AxisLink_general_fault = 1 and AxisLink_fault_code = 128.

This condition is often caused by a hardware problem on the AxisLink card in the local controller, which causes a power-up sequence problem.

Remedial Steps Include:

- Press the RESET button on the controller.
- Use two Control Settings blocks to disable then re-enable AxisLink.

If neither of these options works, return the AxisLink card (or the system module) to the manufacturer for replacement or repair.

Chapter 4

RIO Status LED

Introduction

The RIO Status LED indicates the current status of RIO communications. It is a visual presentation of the RIO_status General System Variable.

The particular meaning of any LED status depends upon whether the controller is being used as a scanner (master) or as an adapter (slave). All IMC S Class controllers can be employed as adapters. Only IMC S Class Basic or Integrated controllers can be used as scanners. Often, the scanning function will be performed by either a Programmable Logic Controller (PLC) or by a Small Logic Controller (SLC).

Note: See the chapter “Using the RIO Adapter Option” in the GML Commander Reference manual for information on how to program discrete and block transfers in your controller, SLC or PLC.

In the event of an RIO fault, the RIO Status LED does not indicate the cause or nature of the fault. To determine the cause of an RIO failure, you must investigate the RIO_fault_code General System Variable. See Online help or the GML Commander Reference Manual for information about this fault variable and its several conditions.

LEDs

LED Status: Green

Status Description:

Online.

For an adapter, the slave controller is operating properly and is being scanned by the master (PLC, SLC, basic or integrated controller).

For a scanner, the master (basic or integrated controller) is scanning and all devices in the RIO scan are operational.

RIO_status = 0 (if the master is a basic or integrated controller, or if the master is a PLC operating in Run mode, Remote Run mode or Remote Test mode), or

RIO_status = 5 (if the master is a PLC operating in Program mode or Remote Program mode).

RIO_fault_code = 0.

Remedial Steps Include:

None necessary.

LED Status: Off

Status Description:

Offline.

For either the adapter or scanner, the causes include:

- RIO may not be enabled and configured,
- a failure of the RIO, connection, or
- a controller's RIO card is not functioning properly.

RIO_status = 1 (all modes).

RIO_fault_code: possible values include 4, 5, 6, 7, 8 or 9.

Remedial Steps Include:

1. Confirm that RIO is properly enabled and configured in the General and RIO pages of the Configure Control Options dialog box.
2. Check the RIO cables. After you have fixed any problem (or determined there is no cabling problem),
3. Issue a Reset RIO direct command. In the case of an adapter, its RIO status will remain Offline while awaiting the first scan from the RIO scanner. After the adapter detects a proper scan from the scanner, its status changes to Online (solid green LED).

LED Status: Flashing Green

Status Description:

Standby.

For an adapter, this can mean either:

- errors occurred during a scan, or
- no scan is ongoing.

For a scanner, this means that at least one device in the RIO scan has faulted.

RIO_status = 2 (if the master is a basic or integrated controller, or if the master is a PLC operating in Run mode, Remote Run mode or Remote Test mode), or

RIO_status = 5 (if the master is a PLC operating in Program mode or Remote Program mode).

RIO_fault_code: possible values include 1, 2 or 3.

Remedial Steps Include:

It is possible that no corrective steps are required. For example, if the scan was intentionally discontinued in a controlled manner, the LED will again turn solid green (Online) when the RIO scan is resumed.

If errors have occurred during a scan, this condition may progress to flashing red (Recoverable Error) or solid red (Non-Recoverable Fault) before you can take any corrective steps. However, if time allows:

1. Check the RIO cables. After you have fixed any problem (or determined there is no cabling problem),
2. If in scanner mode, ensure that all I/O racks are functioning properly,
3. Issue a Reset RIO direct command.

LED Status: Flashing Red

Status Description:

Recoverable Error.

For an adapter, this means that a recoverable error has occurred.

For a scanner, this means that all devices in the RIO scan have faulted.

RIO_status = 3 (all modes).

RIO_fault_code: possible values include 1, 2 or 3.

Remedial Steps Include:

It is possible that this condition will progress to solid red (Non-Recoverable Fault) before you can take any corrective steps. However, if time allows:

1. Check the RIO cables. After you have fixed any problem (or determined there is no cabling problem),
2. Issue a Reset RIO direct command.

LED Status: Solid Red

Status Description:

Non-Recoverable Fault.

For an adapter, this means that a catastrophic fault has occurred.

For a scanner, this means either:

- a catastrophic fault has occurred, or
- an RIO hardware failure has occurred.

RIO_status = 4 (all modes).

RIO_fault_code: possible values include 1, 2 or 3.

Remedial Steps Include:

- In the case of a catastrophic fault, press the RESET button on the controller.
- If the condition immediately recurs, the problem is most likely a malfunctioning RIO card. In this case, return the controller to the manufacturer for replacement or repair.

CNET Status LEDs

The 1394 Turbo controller supports ControlNet (CNET) communications. There are two CNET Status LEDs - one for each communications channel (A and B) on the CNET Plug Card.

Important: If the network access port (NAP) on the CNET Plug Card is in use (e.g., to provide the controller with general information relating to the status of the ControlNet network), the CNET status LEDs are meaningless.

The CNET LEDs are not easily visible on the fiber optic CNET Plug Card. On the fiber optic cable CNET Plug Card, the LEDs are internal to the card and can be viewed only by looking into the unit through the ventilation slots above the CNET Plug Card. Channel A is the upper LED and channel B is the lower LED.

Although each CNET Plug Card is equipped with two channels, communications between a CNET Plug Card and the ControlNet network occurs over only one channel at a time. Channel A is the primary communications channel and channel B can be configured as the backup channel (referred to as the “redundant media”).

Note: Refer to documentation for RSNetWorx for instructions on configuring your CNET communications using the Plug Card and designating channel B as redundant media.

The remainder of this chapter describes each LED status, the conditions that can cause each status, and the steps to take in response.

LED Status: OFF

Status Description:

Causes include:

- If the LEDs for both channels A and B are off, power has not been applied to the CNET Plug Card.

CNET_fault = 0, CNET_fault_code = 0 and CNET_status = 1.

Remedial Steps Include:

- Cycle power to the CNET Plug Card, or
- Configure Channel B for use as redundant media using RSNetWorx, Allen-Bradley's network configuring software application.

LED Status: Solid Green

Status Description:

Normal CNET operation. CNET_fault = 0, CNET_fault_code = 0 and CNET_status = 0.

Remedial Steps Include:

None necessary.

LED Status: Flashing Green

Status Description:

Causes include:

- The CNET node (i.e. controller) is not configured for CNET operation. In this case, CNET_fault = 0, CNET_fault_code = 0 and CNET_status = 1, or
- The CNET Plug Card is experiencing temporary errors. In this case, CNET_fault = 0, CNET_fault_code = 0 and CNET_status = 2.

Remedial Steps Include:

- Be sure the controller is configured for CNET operations (in the General and CNET pages of the Configure Control Options dialog box in GML Commander).
- In the case of temporary CNET Plug Card errors, there are no corrective steps to take. The CNET Plug Card will attempt to automatically correct these errors. Either the Plug Card will succeed in self-correction, or a fault condition will occur.

LED Status: Flashing Red

Status Description:

Causes include:

- During CNET initialization, multiple nodes on the ControlNet network are set to the same Media Access Control (MAC) ID (in the CNET page of the Configure Control Options dialog box in GML Commander). In this case, Global_fault = 16, CNET_fault = 1, CNET_fault_code = 1 and CNET_status = 3, or
- A wiring problem. Examples include: an unplugged cable, a broken cable, a cable without a terminator. In this case, Global_fault = 16, CNET_fault = 1, CNET_fault_code = 3 and CNET_status = 3, or
- No other nodes on the network have been configured for CNET communications. In this case, Global_fault = 16, CNET_fault = 1, CNET_fault_code = 3 and CNET_status = 3.

Remedial Steps Include:

- Recycle power to the CNET Plug Card, or
- Find and fix the underlying cause of the problem:
  1. Confirm that no two nodes are configured using the same MAC ID;

2. Confirm that the cable is not broken, and that it is properly connected to both the CNET Plug Card and to the terminator;
3. Confirm that other nodes on the network have been configured for CNET communications.
4. Execute a Reset CNET Fault block, set to Type **All Faults**, as a direct Command from the Select Direct Command Window on the Online Toolbar.

LED Status: Flashing Red & Green

Status Description:

Causes include:

- The CNET Plug Card is conducting a self-test during initialization. In this case, CNET_fault = 0, CNET_fault_code = 0 and CNET_status = 1, or
- An Incorrect Network Configuration fault has occurred. For example, if the CNET network is configured for redundant media, connecting a channel A cable to a channel B port (or a channel B cable to a channel A port) would cause this fault. In this case, Global_fault = 16, CNET_fault = 1, CNET_fault_code = 2 and CNET_status = 3.

Remedial Steps Include:

- In the case of a self-test, do nothing. Wait for the test to conclude.
- If an Incorrect Network Configuration fault has occurred:
  - Find and fix the network configuration problem. Check that all channel A cable connections are connected only to channel A ports, and that all channel B cable connections are connected only to channel B ports. Then,
    - recycle power to the CNET Plug Card, or
    - execute a Reset CNET Fault block, set to Type **All Faults**, as a Direct Command from the Select Direct Command Window on the Online Toolbar.

If neither of these options works, return the CNET Plug Card to the manufacturer for replacement or repair.

LED Status: Solid Red

Status Description:

A fault, internal to the CNET Plug Card, has occurred during initialization. In this case, Global_fault = 16, CNET_fault = 1, CNET_fault_code = 4, and CNET_status = 3.

Remedial Steps Include:

- Recycle power to the CNET Plug Card, or
- Execute a Reset CNET Fault block, set to Type **Card**, as a Direct Command from the Select Direct Command Window on the Online Toolbar.

If neither of these options works, return the CNET card (or the system module) to the manufacturer for replacement or repair.

Axis Module LED

The Axis Module LED is a single LED located on the front of the Axis module. The following section describes each LED status, the conditions that can cause each status, and the steps to take in response.

LED Status: OFF

Status Description:

No power is being supplied to the axis module. Possible causes include:

- No power, or insufficient power, is being supplied to the system module.
- A problem with the DC bus.
- An axis module hardware problem.

Remedial Steps Include:

- Check the System Module LED. If it is OFF, the system module is not receiving power.

  Note: Refer to the chapter of this manual that deals with 1394 System Module Status LEDs for instructions on how to respond to System Module Status LEDs.

- Verify that a terminator is attached to the end of the last axis module.
- Verify that all DC bus slider connections are fully engaged, by pressing them together.
- In the case of an axis module hardware problem, return the module to the manufacturer for replacement or repair.

LED Status: Flashing Green

Status Description:

The axis is not enabled and feedback is OFF. Possible causes include:

- The controller is initialized, but the axis is not configured.
- A Feedback block, set to Turn **OFF**, has executed.
- An Axis_fault has occurred, with Fault Action for this axis set to **Disable Drive**.
- The System Enable terminal (on the input wiring board) is not receiving 24V power.

Remedial Steps Include:

- Download the program from GML Commander, including the axis configuration settings.
- Use the Feedback block to turn feedback **ON**.
- Use the Tag Explorer and Tag Window to view the status of one or more of the following system variables indicates a Drive fault:
  - Global_fault = 5
  - Axis_fault = 5, or
  - Axis_status = 11.
- Check the wiring to the System Enable terminal.

LED Status: Flashing Red

Status Description:

An Axis module hard fault (Axis_module_hard_fault_1394 = 1) has occurred.

Remedial Steps Include:

Use the Tag Explorer and Tag Window to see if Axis_module_hard_fault_1394 = 1. If so, verify which one (or more) of the following lower-level faults has occurred:

- Axis_bus_loss_fault_1394
- Axis_Drive_over_temp_fault_1394
- Axis_it_fault_1394
- Axis_Motor_over_temp_fault_1394
- Axis_power_fault_1394

Note: Refer to Online Help or to the System Variable section of the Expression Builder chapter of the Reference Manual for instructions on clearing these faults.

LED Status: Flashing Red & Green

Status Description:

Because 3-phase power is not being applied to the axis module, the DC bus is not up. Possible causes include:

- A terminator is not present on the last axis module.
- One or more sliding connections on the DC bus have come loose.
- A system module hard fault (System_module_hard_fault_1394 = 1).
- An axis module has failed (its LED is a solid red) causing bus power to fail. The LEDs of all other axis modules flash red and green.

Remedial Steps Include:

- Verify that a terminator is attached to the end of the last axis module.

- Verify that the pins of all DC bus slider connections are fully engaged, by pressing together the system module, all axis modules and the terminator.
- Look at the System module status LED. If it is:
  - Solid Red, 3-phase power to the axis modules has been turned off by:
    - A Kill Control command
    - An E-stop
    - A CPU utilization overrun fault (Global_fault = 15), or
    - A faulty system module.
  - Flashing Red, a system module hard fault has occurred.
  - Flashing Red and Green, the system module is not receiving 3-phase power via the U, V and W inputs.

Note: Refer to the section of this manual that deals with 1394 System Module LEDs for instructions on how to respond to System Module LEDs.

- Is one of the axis module LEDs a solid red? If so, replacing that module should let you restore DC bus power and return all Axis module LEDs to solid green.

LED Status: Solid Green

Status Description:

The axis module is enabled. Power is applied and feedback is ON.

Remedial Steps Include:

None

LED Status: Solid Red

Status Description:

The axis module has failed.

Remedial Steps Include:

Return the failed module to the manufacturer for replacement or repair.

Chapter 7

Global Faults

Introduction

Global_fault is the highest-level fault variable. With the exception of Runtime faults, the occurrence of every other lower-level fault triggers a specific Global_fault value.

The Global_fault values are:

Value	Description	Runtime Display
16	CNET Fault	
15	CPU Utilization Overrun Fault	CPU FLT
14	Feedback Device Fault	FDB FLT
13	Flex Fault	FLX FLT
12	SLC Fault	SLC FLT
11	DH485 General Fault	DH FLT
10	RIO Fault	RIO FLT
9	AxisLink Timeout or AxisLink Failed	AXL FLT
8	AxisLink General Fault	AXL FLT
7	Setup Data Memory Fault	MEM FLT
6	Application Program Memory Fault	PRG FLT
5	Drive Fault	DRV FLT
4	Position Error Fault	ERR FLT
3	Hardware Overtravel Fault	HRD LIM
2	Software Overtravel Fault	SFT LIM
1	Encoder Loss Fault or Encoder Noise Fault	ENC FLT
0	No Faults	AXES OK

Global_fault values are prioritized, from highest (16) to lowest (1). If multiple global faults co-exist, the Global_fault variable displays the highest priority fault.

When the highest priority Global_fault value is cleared, Global_fault then displays the next highest priority fault value (and so on until all global faults have been cleared).

Clearing Global_fault

You cannot directly clear a Global_fault. Instead, you must investigate and resolve the underlying cause of the Global_fault value.

Most Global_fault values (1, 2, 3, 4, 5, 8, 9, 11, 12 and 13 inclusive) are caused by the occurrence of a lower-level fault variable (with a value = 1). To clear these Global_fault values, you must investigate and fix the underlying cause of the fault, then (in most cases) use the appropriate block to clear the lower-level fault.

However, other Global_fault values (6, 7, 10, 14, 15 and 16) occur independently and are not caused by the occurrence of a lower-level fault variable. To clear these independent Global_fault values, you must investigate and resolve the underlying cause of the fault. In some cases, you will have to re-download your program. In others, you must press the controller RESET button.

The remainder of this chapter describes each Global_fault value and the hierarchy of lower-level faults leading to that Global_fault.

Note: For more information on each lower-level fault, including a description of both its cause and cure, refer to:

- GML Commander Online Help, or
- the System Variable section of the Expression Builder chapter in the GML Commander Reference Manual.

Global Fault Tree

Global_fault = 16 (CNET Fault)

Global_fault = 16

CNET_fault = 1

CNET_fault_code = 0 – 5.

(The CNET_fault value represents the most recent CNET_fault condition:

- 5 - Communication fault
- 4 - Plug fault
- 3 - Media fault
- 2 - Incorrect Network Configuration
- 1 - Incorrect Node Configuration
- 0 - No fault)

Global_fault = 15 (CPU Utilization Overrun Fault)

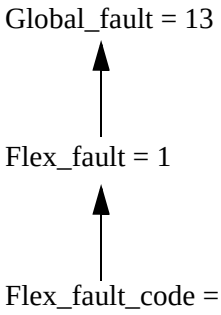
No lower-level faults trigger this Global_fault value.

Global_fault = 14 (Feedback Device Fault)

No lower-level faults trigger this Global_fault value.

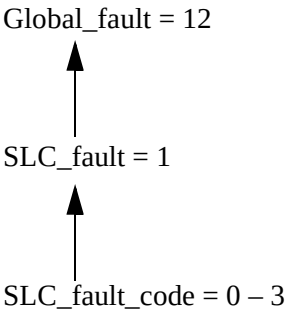
However, the occurrence of this fault also triggers Encoder_loss_fault = 1 and Resolver_loss_fault_1394 = 1, which in turn trigger Axis_fault = 1.

Global_fault = 13 (Flex Fault)



(The Flex_fault value indicates the number of the first detected failed Flex I/O module. When that Flex I/O module is replaced or repaired, this variable displays the number of the next detected failed Flex I/O module, if any.)

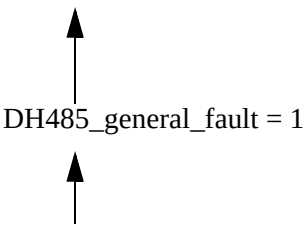
Global_fault = 12 (SLC Fault)



(The SLC_fault_code value indicates the most recent SLC fault condition:

- 3: SLC interface hardware fault
- 2: Power failure in an SLC rack
- 1: SLC process fault
- 0: No fault)

Global_fault = 11 (DH485 General Fault)



(The DH485_fault_code value indicates the fault condition of the most recent DH-485 transaction:

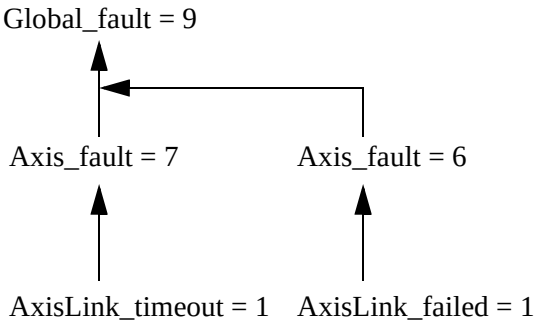
- 5: Remote Device Response STS Byte
- 4: Command Failed
- 3: Response Timeout
- 2: Transition ID Mismatch
- 1: Bad Command
- 0: No DH-485 Fault)

Global_fault = 10 (RIO Fault)

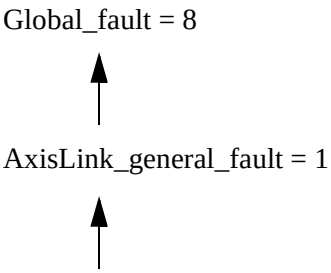
No lower-level faults trigger this Global_fault value. However, check the value of RIO_fault_code, which indicates the most recent RIO fault condition:

- 9: Initialization Failure
- 8: Setup Failure-Adapter
- 7: Setup Failure-Scanner
- 6: Failed Getting Inputs
- 5: Failed Sending Outputs
- 4: Scanner Failure
- 3: Failed Getting Data
- 2: Failed BTW Request
- 1: Failed Sending BTR
- 0: No RIO Fault

Global_fault = 9 (AxisLink Fault)



Global_fault = 8 (AxisLink General Fault)



(The AxisLink_fault_code value indicates he highest priority condition causing an AxisLink general fault:

- 128: Offline
- 96: Failing
- 64 - 79: Timeout Accessing Controller (#0 - 15) Data
- 32 - 47: Timeout Accessing Controller (#0 - 15) Outputs
- 16 - 31: Link Error Accessing Controller (#0 - 15)
- 0: No AxisLink General Fault.)

Global_fault = 7 (Setup Data Memory Fault)

No lower-level faults trigger this Global_fault value.

Global_fault = 6 (Application Program Memory Fault)

No lower-level faults trigger this Global_fault value.

Global_fault = 5 (Drive Fault)

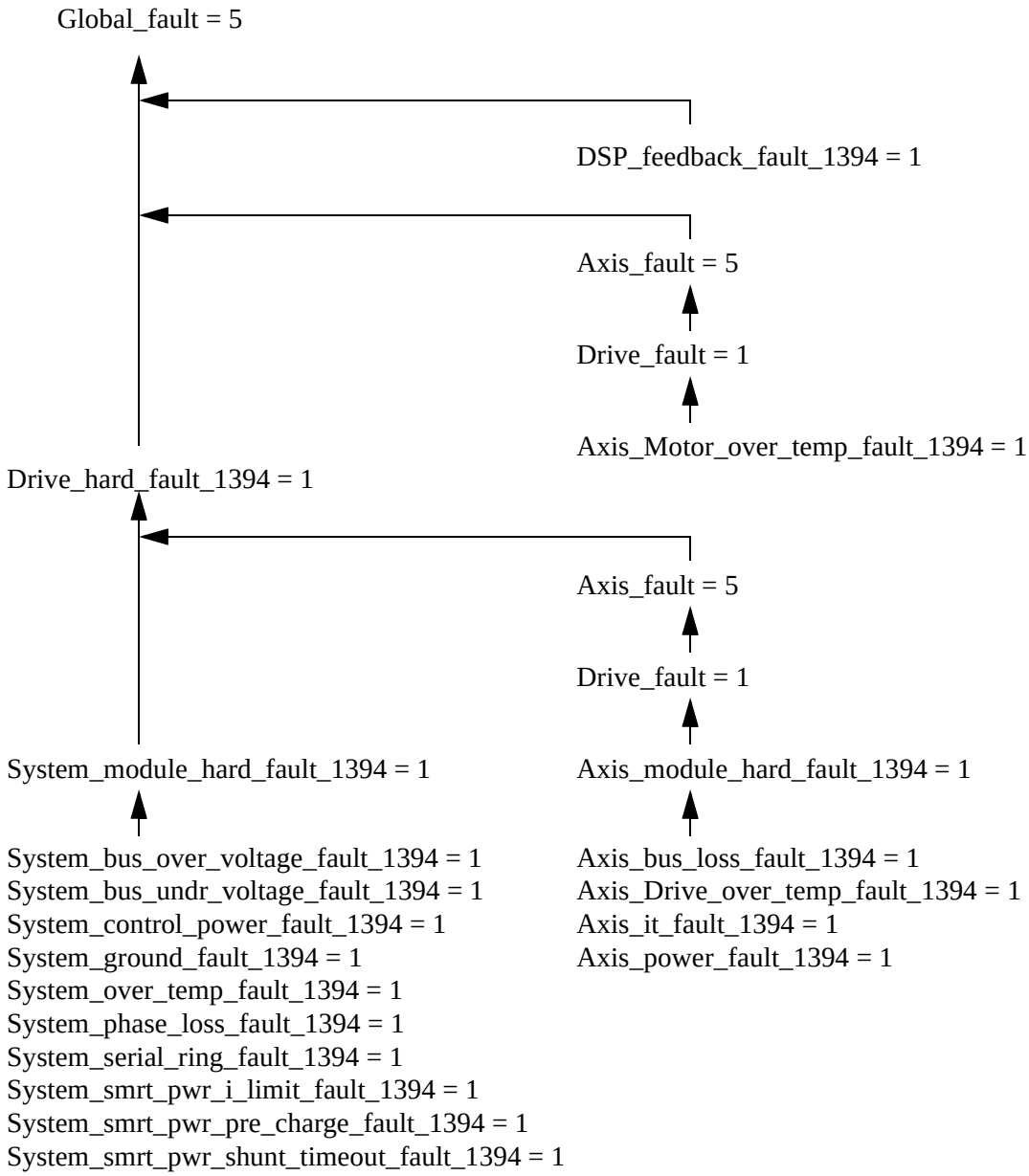
In the IMC S Class Basic, Integrated or Compact, the fault tree looks like this:

Global_fault = 5

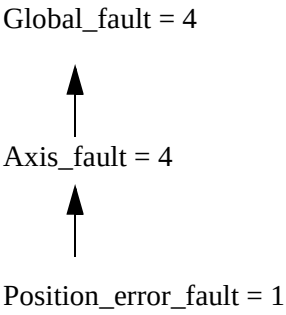
Axis_fault = 5

Drive_fault = 1

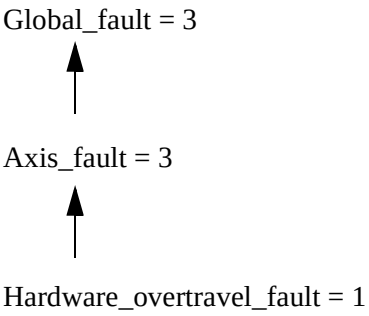
However, in the 1394, 1394L or 1394 Turbo controller, the fault tree looks like this:


Global_fault = 5
DSP_feedback_fault_1394 = 1
Axis_fault = 5
Drive_fault = 1
Axis_Motor_over_temp_fault_1394 = 1
Drive_hard_fault_1394 = 1
Axis_fault = 5
Drive_fault = 1
System_module_hard_fault_1394 = 1
Axis_module_hard_fault_1394 = 1
System_bus_over_voltage_fault_1394 = 1
System_bus_undr_voltage_fault_1394 = 1
System_control_power_fault_1394 = 1
System_ground_fault_1394 = 1
System_over_temp_fault_1394 = 1
System_phase_loss_fault_1394 = 1
System_serial_ring_fault_1394 = 1
System_smrt_pwr_i_limit_fault_1394 = 1
System_smrt_pwr_pre_charge_fault_1394 = 1
System_smrt_pwr_shunt_timeout_fault_1394 = 1
Axis_bus_loss_fault_1394 = 1
Axis_Drive_over_temp_fault_1394 = 1
Axis_it_fault_1394 = 1
Axis_power_fault_1394 = 1

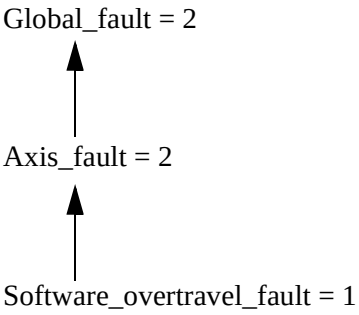
Global_fault = 4 (Position Error Fault)



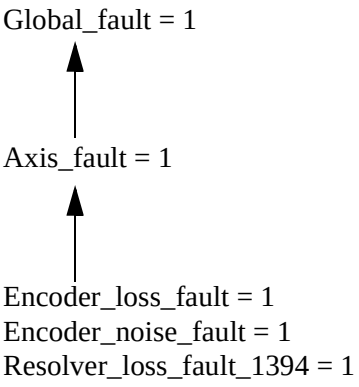
Global_fault = 3 (Hardware Overtravel Fault)



Global_fault = 2 (Software Overtravel Fault)



Global_fault = 1 (Encoder Fault)



Chapter **8**

GML Commander Software Error Messages

This chapter contains:

- a list of all the GML Commander software error messages,
- a description of the message, and
- the steps to take to address and resolve the error.

Messages are listed in alpha-numeric order.

1, 2, 3 ...

1394 Commission Error! Motion Controller was unable to detect Drive Modules for the Axis Specified in Axis Use Definitions. Ensure that Drive Modules are correctly installed.

Message Description:

On diagram download, GML Commander could not detect an axis drive module that was referenced in the application program.

Remedial Steps Include:

Check the slider on which the axis drive modules are located, and confirm that they are properly connected.

A - B

Access Denied!
Please Verify that the Password in the Control Options matches the Password configured in the control.

Message Description:

The password in the controller does not match the **Setups Password** setting in the General page of the Configure Control Options dialog box.

Remedial Steps Include:

- Change the **Setups Password** setting to the same password in the controller.
- If the controller's password is unknown, re-initialize the controller before performing automated testing in the Hookups and Tune Servo pages of the Configure Axis Use dialog box.
- Refer to the controller's Installation and Setup manual for instructions on re-initializing the controller.

Address already used!

Message Description:

The address of the tag (i.e., I/O, variable, or constant) you are defining is used by a previously defined tag of the same type.

Remedial Steps Include:

Options include:

- Assign a different address to the tag you are defining.
- Edit the address of the previously defined tag.

All SLC bits in the defined group must fall within the specified word boundary!
Word0 = Bits 0-7
Word1 = Bits 8-23
Word2 = Bits 24-39

Message Description:

In an SLC Input (or Output) Group Bit dialog box, the **Address** and/or the **Total Signals in Group** settings do not support the desired group.

Remedial Steps Include:

1. In the SLC page of the Configure Control Options dialog box, be sure the Input Bits and Output Bits settings support the desired SLC word boundary.
2. Then, in the SLC Input (or Output) Group Bit dialog box, define the group so that:
   - the **Address** field is set to the first bit in the group, and
   - the **Total Signals in Group** field is set to a number of bits that fit in the selected SLC word.

See the Online Help topic: How to Define SLC Inputs, Outputs and M Files

An axis cannot be slaved to itself!

Message Description:

The **Slave Axis** and **Master Axis** fields in the Gear Axes dialog box are set to the same axis.

Remedial Steps Include:

Select different axes for the **Slave Axis** and **Master Axis** settings.

An Axis Fault has occurred. Please examine and clear the Axis Fault before re-executing the test.

Message Description:

This message can arise while tuning (in the Hookups or Tune Servo pages of the Configure Axis Use dialog box) or while executing an application program.

If it arises during tuning, the error message also displays the particular axis fault.

Remedial Steps Include:

1. Diagnose and fix the underlying condition causing the axis fault.

Note: If Motor Thermal fault (1394 controllers) or Drive fault (compact, basic and integrated controllers) is displayed, the problem may arise from the default Motor Thermal Fault Input or Drive Fault Input setting of **Normally Closed**. If so, change this setting in the Configure Axis Use dialog box's Motor/Drive or Servo page to **Not Used** or **Normally Open** depending upon the hardware configuration.

2. In the Online Toolbar's Select Direct Command Window, use a Reset Fault block to clear the axis fault condition.
3. Repeat steps 1 and 2 for all axis faults, before resuming tuning or execution of the application program.

Application Checksum Error!

Message Description:

Each diagram has a checksum – an algorithmically generated number used to insure the diagram's integrity. After downloading a diagram or a script, GML Commander compares the checksum in the controller with the diagram's checksum in the PC. This error message indicates that an undetected error occurred during the download.

Remedial Steps Include:

Repeat the download.

Application Program Memory Limit Exceeded.

Message Description:

The size of the application program being downloaded exceeds the controller's memory capacity. The controller's memory capacity is:

- 64 KB for the 1394 Turbo controller.
- 32 KB for all other S Class controllers (1394, 1394L, Compact, Integrated and Basic).

Remedial Steps Include:

- Reduce the size of the application program. (E.g. use the Duplicate Module method instead of Copy and Paste where possible. See Online Help topic: Duplicate Module versus Copy & Paste.)
- Upgrade to the 1394 Turbo controller.

Appropriate rows or columns have not been selected!

Message Description:

No Columns selection was made in the Build Table block.

Remedial Steps Include:

Select at least one of the Build Table block Column types:

- Master Time
- Master Position, or
- Slave Profile

ATTENTION: Block has no Input Connection.

Message Description:

While translating a diagram to script, GML Commander detected a function block with an unconnected input node.

The error message identifies, and GML Commander highlights the offending block.

Remedial Steps Include:

1. Select **OK** to close the message box. GML Commander will continue with script translation.
2. After script translation ends, return to and fix the diagram as necessary.
3. Repeat **Translate to Script** command.

ATTENTION: The Motor's Speed Limit in the diagram cannot be handled by the selected torque and drive! The Velocity Limit will be changed to the maximum value that can be handled.

Message Description:

The Velocity Limit was either set offline or increased manually. In either case, when axis configurations are downloaded to the controller, the controller must scale down this value to adjust for the power of the 1394 axis module.

Remedial Steps Include:

- Accept the GML Commander-generated reduced Velocity Limit.
- Replace the existing 1394 axis module with a more powerful 1394 axis module, which can accept a higher Velocity Limit value.

ATTENTION: The Motor's Torque Limit in the diagram cannot be handled by the selected speed and drive! The Torque Limit will be changed to the maximum value that can be handled.

Message Description:

The Torque Limit was either set offline or increased manually. In either case, when axis configurations are downloaded to the controller, the controller must scale down this value to adjust for the power of the 1394 axis module.

Remedial Steps Include:

- Accept the GML Commander-generated reduced Torque Limit.

- Replace the existing 1394 axis module with a more powerful 1394 axis module, which can accept a higher Torque Limit value.

ATTENTION: The Motor's Torque Limit in the diagram does not match the Control's Torque Limit! See the Motor/Drive section of this dialog.

Message Description:

When auto-tuning the axis, the 1394, 1394L or 1394 Turbo controller detected that the Motor /Drive page's **Torque Limit** setting has changed, and no longer matches this setting in the controller.

Remedial Steps Include:

1. Discontinue tuning. (Continuing tuning, without correcting the **Torque Limit** setting, can cause unreliable tuning results.)
2. Re-compute the **Torque Limit** setting. (See the Online Help topic: How to optimize Velocity and Torque Limit settings.)
3. Resume tuning.

ATTENTION: With a zero Proportional Gain and a non-zero Integral Gain, a run-away condition can occur. Please verify these values in the Gains page of the Configure Axis Use dialog.

Message Description:

Failure to include a positive Proportional Gain value in the Gains page of the Axis Use dialog box can cause a run-away condition.

Remedial Steps Include:

Edit your diagram to include a positive Proportional Gain value in the Gains page of the Axis Use dialog box.

Auto-Updates for DH-485 Local Variables are limited to 8 variables per axis and 8 user variables.

Message Description:

The maximum number of DH-485 Local Variables that GML Commander can automatically update has been exceeded. GML Commander can automatically update a maximum of 8 user variables, and 8 axis system variables per axis.

Remedial Steps Include:

None. No additional DH-485 Local Variable updates, relating to the selected Auto update Type (User Variables or System Variables of a specific axis), can be configured.

Axis Disabled!

Message Description:

An axis, referenced in an expression, has subsequently been disabled.

Remedial Steps Include:

- Re-enable the axis, or
- Select a different axis that is already enabled.

Axis/Drive Data Download/ Upload Aborted

Message Description:

Refer to this appendix for information regarding the next line of the error message.

Remedial Steps Include:

None.

Axis in Control must be a Servo Axis!
Check Axis Configuration and Download First!

Message Description:

Although Axis Type in the General page of the Configure Axis Use dialog box is set to **Servo**, this setting has not yet been downloaded to the controller (where Axis Type is set to **Master Only**).

This message arises during tuning.

Remedial Steps Include:

Download the current axis settings – thereby changing the Axis Type in the controller to **Servo** – by selecting **Download** in the Apply page of the Configure Axis Use dialog box.

Axis Not Enabled in Control!
Check Axis Configuration and Download First!

Message Description:

During tuning (in the Hookups or Gains page of the Configure Axis Use dialog box) or during diagram upload, GML Commander detected that an axis required by the diagram in GML Commander has not been enabled in the controller.

GML Commander aborts the tuning or the upload.

Remedial Steps Include:

1. In GML Commander, open the application program in the controller.
2. In the Axes page of the Configure Axis Use dialog box, check to be sure that all required axes are enabled.
3. Complete the Configure Axis Use dialog box for all axes.
4. Download the application program to the controller.

Axis Reference is Not Allowed!

Message Description:

An Axis reference has been added to a variable (or other tag) that is not axis specific. This can occur while exiting the expression builder, exiting a block dialog with an expression field, or during translation of a diagram.

Remedial Steps Include:

Delete the axis reference, and re-save or re-translate.

AxisLink Controller for reading inputs must be enabled via Configure Control Options Menu! Hint: Press OK, then click Right Mouse to access!

Message Description:

AxisLink must be enabled, before an AxisLink-related block can be added to the diagram.

Remedial Steps Include:

1. In the General page of the Configure Control Options dialog box, select AxisLink.
2. In the AxisLink page, select a controller to Read Outputs from.

AxisLink Extended Node has been disabled in the Control Options Menu. Check and make sure the Remote Controller Address is valid!

Message Description:

The **From Controller** setting in the Read Remote Value block is no longer valid. It had been set to a controller address from 8 to 15, which address was enabled by selecting:

- **Extended AxisLink** in the General page of the Control Options dialog box, and
- **Read Outputs from** controller address (8 to 15) in the AxisLink page.

Subsequently, after the Read Remote Value block was configured, Extended AxisLink was de-selected, and controller addresses 8 to 15 were disabled.

The error message references the problem block. GML Commander opens the dialog box for that block and focuses on the problem setting.

Remedial Steps Include:

- Re-select Extended AxisLink in the General page of the Control Options dialog box, and re-enable the original **Read Outputs from** setting in the AxisLink page, or
- Select an available **From Controller** address (0 – 7) in the Read Remote Value block.

AxisLink Hardware Missing! Check AxisLink Connections!

Message Description:

The AxisLink card in the motion controller is missing, or not properly connected.

Remedial Steps Include:

Insert (or tighten if loose) the AxisLink card in the motion controller.

C

Cannot Initialize DH-485 Link! Ensure DIP Switch 5 (Compact) or DIP Switch 4 (1394) is set ON to switch from RS-232 to DH-485 mode on Port B!

Message Description:

During diagram download, GML Commander detected that the controller's serial port B communications switch is set for RS-232 communications, instead of DH-485 communications.

Remedial Steps Include:

1. Set the controller's serial port B communications DIP switch – switch #5 (for Compact controllers) or switch #4 (for 1394, 1394L or 1394 Turbo controllers) – to **ON**.

2. Re-download the diagram.

Caution: Control Mismatch! Please correct this problem by configuring the correct control in the Control Options dialog.

Message Description:

The current diagram is configured for a different type of controller than the one to which the PC is connected.

Remedial Steps Include:

- In the Configure Control Options dialog box, select the Control Type that the PC is connected to, or
- Without changing the diagram's configuration, switch controllers to the type for which the diagram is configured.

Caution: GML Commander will update this GML 3.x File Format, unless the name is changed using the Save As option.

Message Description:

The current diagram was created by an earlier version of GML (versions 3.6 to 3.9).

Saving it in GML Commander will convert it to a GML Commander diagram, and the earlier version diagram will be lost.

Remedial Steps Include:

To preserve the GML version 3.6 to 3.9 diagram and create an additional GML Commander version diagram:

1. Select **Cancel** to close the message box without saving.
2. Select **Save As** from the File menu, and save the diagram under a different name and/or path.

Alternatively, select **OK** to close the message box and convert the diagram to a GML Commander version diagram.

CNET must be enabled in the Control Options! Hint: Press OK, then click Right Mouse to access.

Message Description:

CNET communications must be enabled before configuration settings for the On CNET Status, Reset CNET and Show CNET Status blocks can be saved.

Remedial Steps Include:

1. Select **CNET** in the General page of the Control Options dialog box.
2. Complete settings in the CNET page.

Communications Timeout!

Message Description:

Communications between your PC (and GML Commander) and the controller has been lost. This occurs during a download or upload operation and has numerous causes, including:

- Wiring problems with the 232 communications cable that is plugged into Serial Port A.
- Loss of controller power.

Remedial Steps Include:

- Check the wiring between the PC and the controller for loose connections or other wiring problems.
- Check the controller to see that it has not lost power.

Control Data has not been updated!

Message Description:

GML Commander aborts the download of a diagram or script if it detects one of the following conditions:

- Write Protected,
- Remote mode disabled, or

- Feedback on.

Remedial Steps Include:

1. Address the underlying problem by:
   - Turning off the controller's write protection key, or
   - Executing a Feedback block set to Turn **OFF** in the Online Toolbar's Select Direct Command window.
2. Re-download.

Note: See the error message "MCC Remote Mode Disabled" for more information.

D

Data at the bottom of the table will be lost. OK to continue? CANCEL will stop the insert process.

Message Description:

Using the Build Table block's pop-up menu **Insert** command to insert cells into a column can "push" existing cells beyond the column's maximum range (1,999 rows for variable arrays, 3,999 rows for cam tables). If you elect to do this, some cell data will be lost.

Remedial Steps Include:

- Select **Cancel** to abort the insert.
- Continue with the insertion and lose some cell data.

Demo Version of GML Commander Does Not Allow this Diagram Function!

Message Description:

You are using a demo version of GML Commander. The demo version does not support downloading or saving diagrams.

Remedial Steps Include:

Purchase the full-featured version of GML Commander.

DH-485 Communications must be enabled in the Control Options! Hint: Press OK, then click Right Mouse to access.

Message Description:

A DH-485-related block (On DH-485 Status, Show DH-485 Status, or DH-485 Value block) cannot be included in a diagram until DH-485 communications are enabled.

Remedial Steps Include:

1. Select **DH-485** in the General page of the Control Options dialog box.
2. Complete settings in the DH-485 page.

DH-485 Local and Remote File Types must match!

Message Description:

The DH-485 Local variable's File Type (binary, integer, floating, ASCII, BCD or IntFloat) is not the same as the DH-485 Remote variable's File Type. The File Type of both variables must be the same for DH-485 communications.

Remedial Steps Include:

1. Close the DH-485 Value block.
2. In the Tag Explorer, select the DH-485 variable type (**Local** or **Remote**).
3. In the Tag Window, select the variable to edit.
4. Edit the selected Local or Remote DH-485 variable.
5. Repeat steps 2 – 4 as necessary until both the remote and local variables share the same File Type.
6. Complete the configuration of the DH-485 Value block.

See the Online Help topic: How to Edit DH-485 Variables

DH-485 requires the use of Serial Port B.

Message Description:

The DH-485 interface is enabled for this diagram. DH-485 requires the use of Serial Port B, and thereby pre-empts the use of the following blocks:

- Key Input Control block
- On Key Press block
- Remote Control block (if set to **Force to Port B**)
- Print to Display block (if set to **Force to Port B**).

Remedial Steps Include:

- Disable DH-485 communications by de-selecting DH-485 in the General page of the Configure Control Options dialog box.
- Do not use the Key Input Control or the On Key Press blocks.
- When using the Remote Control and Print to Display blocks, do not select Force to Port B.

Do Runset Menu is not supported in GML Commander. Please remove the block from your GML3 Diagram, and then reopen the Diagram in GML Commander.

Message Description:

GML Commander does not support the Do Runset Menu block, featured in earlier versions of GML.

Remedial Steps Include:

Remove the Do Runset Menu block from the diagram.

Note: An Edit Value block can be substituted in the GML Commander diagram for each runset menu item.

Do Setups is not supported in GML Commander. Please remove the block from your GML3 Diagram, and then reopen the Diagram in GML Commander.

Message Description:

GML Commander does not support the Do Setups block, featured in earlier versions of GML.

Remedial Steps Include:

Remove the Do Setups block from the diagram. There is no GML Commander substitute.

E

Error opening Serial Communication Port!

Message Description:

Another application is open, and is using the PC's serial port.

Remedial Steps Include:

1. Exit the other application, or otherwise end its use of the PC's serial port.
2. Re-issue the **Online Connection** command.

Error Transferring Data from the Control's Powerup Values to the Working Values! Please verify data.

Message Description:

A communications error occurred between the PC and the controller while uploading data. The error occurred while working in the Configure Axis Use dialog box, when attempting to **Upload** in the Apply page.

Remedial Steps Include:

Re-issue the **Upload** command.

Error Transferring Data from the Control's Working Values to the Powerup Values! Please Verify Data.

Message Description:

A communications error occurred between the PC and the controller while downloading data. The error occurred while working in the Configure Axis Use dialog box, when attempting to:

- **Save to Powerup** in the Adjust Gains page, or
- **Save to Powerup** in the Adjust Dynamics page, or
- **Download** in the Apply page.

Remedial Steps Include:

Re-issue the **Save to Powerup** or **Download** command.

Expression syntax error!

Message Description:

The iCODE of a command created by the Expression Builder has become corrupted.

Remedial Steps Include:

1. Delete the block that has become corrupted, then
2. Replace the removed block by re-inserting a new instance of the same block.

F

Failed to create object. Make sure the object is entered in the system registry.

Message Description:

This occurs when attempting to open a particular .GML file from Windows Explorer. The Windows operating system cannot locate GML Commander and, thus, cannot open the file. Typically, the problem is a corruption of the Windows Registry.

Remedial Steps Include:

1. Uninstall GML Commander (Follow the path: Start \ Settings \ Control Panel \ Add/Remove Programs), then
2. Re-Install GML Commander.

Failed to reach tuning speed! Try again with a lower tuning speed or higher maximum travel/torque limit. Gains Not Tuned!

Message Description:

During tuning, the axis accelerates through a distance (the Tuning Travel Limit) in an attempt to reach the Tuning Speed. Gains are tuned only if the Tuning Speed is reached.

Either the Tuning Speed is too high, or the Tuning Travel Limit distance is too small to let the controller reach the Tuning Speed.

Remedial Steps Include:

In the Tune Servo page of the Configure Axis Use dialog box:

- increase the Tuning Travel Limit value, or
- decrease the Tuning Speed value, or
- both.

See the Online Help for the Tune Servo Page of the Configure Axis Use dialog box.

Feature requires Control Type IMC S CLASS 1394 in Control Options.

Message Description:

A feature (e.g. a function block), supported only by 1394, 1394L or 1394 Turbo controllers, was included in the diagram when the Control Type was set to either **IMC S Class 1394/1394 Turbo** or **IMC S Class 1394L**. Later, the Control Type setting was changed.

Remedial Steps Include:

1. Click **OK** to close the message box. GML Commander will open the dialog box for the non-conforming setting.
2. Change either:
   - the setting in the open dialog box to conform to the currently selected Control Type, or
   - the Control Type setting to either **IMC S Class 1394/ 1394 Turbo** or **IMC S Class 1394L**, in the Configure Control Options dialog box.

Feature requires ICODE Version 3.0 or later in Control Options.

Message Description:

The diagram was developed for – and includes features that require – iCODE version 3.0 or higher. Subsequently, the iCODE Version setting was changed to a version earlier than 3.0.

This validation error occurs during execution of a **Translate to Script**, **Diagram Download**, or **Download Script** command. GML Commander highlights the non-supported feature in the Diagram Window

Remedial Steps Include:

- Use a later firmware version that supports iCODE version 3.0 or higher, and change the **Control Type** and **iCODE Version** settings in the Configure control Options dialog box.
- Remove the highlighted feature from the diagram.

Feature requires ICODE Version 3.2 or later in Control Options.

Message Description:

The diagram was developed for – and includes features that require – iCODE version 3.2 or higher. Subsequently, the iCODE Version setting was changed to a version earlier than 3.2.

This validation error occurs during execution of a **Translate to Script**, **Diagram Download**, or **Download Script** command. GML Commander highlights the non-supported feature in the Diagram Window.

Remedial Steps Include:

- Use a later firmware version that supports iCODE version 3.2 or higher, and change the **Control Type** and **iCODE Version** settings in the Configure Control Options dialog box.
- Remove the highlighted feature from the diagram.

Feature requires ICODE Version 3.5 or later in Control Options.

Message Description:

The diagram was developed for – and includes features that require – iCODE version 3.5 or higher. Subsequently, the iCODE Version setting was changed to a version earlier than 3.5.

This validation error occurs during execution of a **Translate to Script**, **Diagram Download**, or **Download Script** command. GML Commander highlights the non-supported feature in the Diagram Window.

Remedial Steps Include:

- Use a later firmware version that supports iCODE version 3.5 or higher, and change the **Control Type** and **iCODE Version** settings in the Configure Control Options dialog box.

- Remove the highlighted feature from the diagram.

Feature requires ICODE Version 3.9 or later in Control Options.

Message Description:

The diagram was developed for – and includes features that require – iCODE version 3.9 or higher. Subsequently, the iCODE Version setting was changed to a version earlier than 3.9.

This validation error occurs during execution of a **Translate to Script**, **Diagram Download**, or **Download Script** command. GML Commander highlights the non-supported feature in the Diagram Window.

Remedial Steps Include:

- Use a later firmware version that supports iCODE version 3.9 or higher, and change the **Control Type** and **iCODE Version** settings in the Configure Control Options dialog box.

Remove the highlighted feature from the diagram.

Feature requires Operator Interface set for Port B in Control Options.

Message Description:

The Key Input Control block and the On Key Press block require the use of the controller's serial port B.

Remedial Steps Include:

Set the **Operator interface port** to port B, in the Interface page of the Control Options dialog box.

Feedback Not Disabled!

Message Description:

The current operation (e.g., tuning an axis, downloading or uploading a diagram) requires Feedback be turned off.

Remedial Steps Include:

1. Use a Feedback direct command to turn Feedback **OFF**, then
2. Re-issue the command.

Firmware in Control is Non-AxisLink Firmware. Please disable AxisLink in the Control Options before downloading.

Message Description:

The controller's firmware does not support AxisLink communications.

Remedial Steps Include:

- Replace the current firmware with firmware that supports AxisLink. Then, in the Configure Control Options dialog box, set the **Control Type** and **iCODE Version** settings to match the new firmware.
- De-select **AxisLink** in the General page of the Configure Control Options dialog box.

Firmware Version in Control Is Older than the Selected Control Options Firmware Version for this Diagram!

Message Description:

The firmware in the controller requires an earlier (lower-numbered) iCODE version than the version selected in the General page of the Configure Control Options dialog box. GML Commander aborts any upload or download.

Remedial Steps Include:

- Replace the current firmware with firmware that supports the higher version iCODE. Then, in the Configure Control Options dialog box, set the **Control Type** and **iCODE Version** settings to match the new firmware.

- Select an **iCODE Version** that the existing firmware will support, in the General page of the Configure Control Options dialog box.

Note: You may need to make changes to your diagram, to permit it to run under the earlier version firmware.

Flex I/O Modules Not Found! Check Flex I/O connections. Ensure that installed Modules/ Module Order matches GML Flex Definitions. Cycle +24 VDC Flex I/O Power, then reset IMCS Control.
Diagram Download Aborted.

Message Description:

On diagram download, the controller cannot detect all Flex I/O modules enabled in the diagram, and aborts the download.

Remedial Steps Include:

1. Check that all modules are receiving 24 volts of direct current as required.
2. Check that all Flex I/O modules are installed on their rack in the same order that they are:
   - enabled in the Flex I/O page of the Configure Control Options dialog box, and
   - configured in the Configure menu and the Flex I/O sub-menu.
3. Reset the controller.

See the Online help topic: How to Define Flex I/O.

G - H

GML 3 File Version must be between 3.6 and 3.9, and Diagram must be written for IMCS Class, Compact, or 1394 in order to be opened in GML Commander!

Message Description:

The selected diagram was created by a version of GML older than version 3.6. It cannot be opened in GML Commander.

Remedial Steps Include:

1. Open the diagram in any version of GML 3.6 to 3.9.
2. Save the diagram in that GML version.
3. Open the diagram in GML Commander.

GML Commander has not been properly installed, or your operating system's Registry File has been corrupted! Please uninstall and install again.

Message Description:

This message appears when GML Commander cannot be opened because of an installation or registry error.

Remedial Steps Include:

1. Remove GML Commander from your computer's hard drive. (Click on the Windows 95 **Start** button; select **Settings** and **Control Panel**; double click on **Add/ Remove Programs**.)
2. Reinstall GML Commander.

GML Commander only supports firmware versions 2.3 or greater!

Message Description:

The selected diagram cannot be opened in GML Commander, because it is configured to use firmware that is older than version 2.3.

Remedial Steps Include:

1. Open the diagram in an earlier version of GML

2. Change the firmware configuration setting to version 2.3 or greater.
3. Save the change and close the older version of GML.
4. Be sure the controller is using the firmware version (2.3 or higher) that was selected.
5. Open the diagram in GML Commander.

I - J - K

Illegal Module Name: New Module. Please rename this module in the previous version of GML prior to opening it in GML Commander.

Message Description:

A module named “New Module” was included in a GML v3.x diagram. That module must be renamed before being imported into GML Commander.

Remedial Steps Include:

Open the diagram in GML v3.x and rename “New Module”.

Illegal Name!

Message Description:

No name, or a string of illegal characters, has been entered for the object being defined or enabled (e.g., when defining a tag, or when enabling an Axis in the Axes page of the Configure Control Options dialog box).

Remedial Steps Include:

Enter a unique name for the object.

Insufficient Travel for Tuning! Try again with a lower maximum output or higher maximum travel limit.
Gains Not Tuned!

Message Description:

When tuning a Compact controller, the axis accelerates through a distance (the Tuning Travel Limit) in an attempt to reach the Tuning Speed. Gains are tuned only if the Tuning Output Limit is reached.

Either the Tuning Output Limit is too high, or the Tuning Travel Limit distance is too small.

Remedial Steps Include:

In the Tune Servo page of the Configure Axis Use dialog box:

- increase the Tuning Travel Limit value, or
- decrease the Tuning Output Limit value, or
- both.

See the Online Help for the Tune Servo Page of the Configure Axis Use dialog box.

Interpolated axis specified more than once!

Message Description:

In the Interpolate Axes block, the same axis was selected for interpolation two or more times.

Only different axes can be selected for interpolation.

Remedial Steps Include:

Change the Axes selections so that no axis is selected more than once.

Invalid Address! Formatted Adapter Addresses must start at: 4, 20, 36, 52, or 68! Note that Formatted Data is 32 bits wide.

Message Description:

The starting Address for the formatted data input group is incorrect, or the Rack Size is too small, or both.

Remedial Steps Include:

- Set the starting **Address** to 4, 20, 36, 52, or 68 (as required), or
- select a larger **Rack Size** in the RIO page of the Configure Control Options dialog box.

See the Online Help topic RIO Adapter Formatted Data Input Group.

Invalid Axis Reference!

Message Description:

For Basic, Integrated and Compact controllers. The **Expansion Card for AXIS2 and AXIS3** selection was de-selected after configuring an Input block or a Show Input Status block dedicated to AXIS2 or AXIS3.

On download or translation to script, GML Commander opens the affected dialog box and focuses on the changed axis selection

Remedial Steps Include:

- Select an available axis from the menu.
- Re-select **Expansion Card for AXIS2 and AXIS3**, in the Configure Control Options dialog box. Then return to the dialog box that GML Commander highlighted and repeat the original selection.
- Delete the Input block or Show Input Status block.

Invalid Expression!

Message Description:

The string expression does not represent any system or user defined tag.

Usually, a tag has been included in an expression before being defined, or a defined tag has been misspelled.

Remedial Steps Include:

- Correct any misspelled tags.
- Define all tags used in the diagram.

Invalid Format! Valid characters include '#' and '.'.

Message Description:

Use this input box only to define a display format.

Remedial Steps Include:

- Input a display format using only the pound (#) and period (.) characters.
- Do not select other field settings that require the use of a display format. (If the input box is enabled, it cannot remain blank).

Invalid ratio! The result of dividing the slave counts by the master counts must be between .00001 and 99,999,99999 (inclusive).

Message Description:

When setting a fractional ratio in a Gear Axis block, dividing the **Slave Counts** value by the **Master Counts** value must yield a result between the numbers in the message.

Remedial Steps Include:

Input new values for either or both the **Slave Counts** and the **Master Counts** settings.

Note: Select **Fraction** as the ratio type to input an irrational number as a ratio (e.g., a number that ends as a repeating decimal).

Invalid Use of Decimal Point!

Message Description:

One or more decimal points have been improperly used in an expression.

Typically, more than one decimal point has been included in a number (e.g. 3.3.4 instead of 3.4).

Remedial Steps Include:

Delete the extra decimal point.

I/O Address in tag definitions extends beyond address boundary.

Message Description:

The RIO configuration, set in the RIO page of the Configure Control Options dialog box, has been changed since the highlighted RIO input or output was defined. Consequently, the Address setting is higher than permitted by the current configuration.

The error message references the problem block. GML Commander opens the dialog box for that block and focuses on the problem setting.

Remedial Steps Include:

- Increase the **Rack Size** setting in the RIO page of the Configure Control Options dialog box.
- Lower the **Address** setting in the dialog box that defines the RIO tag.

I/O Group extends beyond the Address boundary.

Message Description:

The settings for the group's beginning **Address** and the **Total Signals in Group** combine to extend the range of group addresses beyond the available range.

The maximum range of addresses in a group varies with the I/O type, as follows:

- AxisLink I/O 16
- General Purpose I/O 12
- RIO 4, 36, 68 or 100 depending upon the rack size.

Remedial Steps Include:

- (RIO only) Increase the available address range in the RIO page of the Configure Control Options dialog box.
- Lower the starting address of the group by inputting a lower **Address** setting in the dialog box that defines the group.
- Reduce the number of **Total Signals in Group** in the dialog box that defines the group

M

Maximum Safe Speed Exceeded!

Message Description:

When tuning Gains (1394 and Compact controllers) or Dynamics (Basic and Integrated controllers), the Tuning Speed and Tuning Output Limit values combine to exceed the maximum safe speed.

Remedial Steps Include:

1. Either:

- Raise the Tuning Speed value, or
- Reduce the Tuning Output Limit value, or
- Both.

2. Repeat tuning.

Maximum Safe Travel Exceeded!

Message Description:

A software overtravel occurred when tuning dynamics (in the Tune Servo page of the Configure Axis Use dialog box).

Remedial Steps Include:

1. Insert a larger value into the Tuning Travel Limit field (in the Tune Servo page of the Configure Axis Use dialog box), to permit completion of tuning without hitting the software overtravel.
2. Re-tune.

Maximum Speed Set to Maximum Safe Speed!

Message Description:

During auto tuning, GML Commander has set the Maximum Speed setting (in the Dynamics page of the Configure Axis Use dialog box) to the Tuning Speed (which you set in the Tune Servo page) for the axis being tuned.

Remedial Steps Include:

- Accept the Maximum Speed setting, or
- Increase the Tuning Speed in the Tune Servo page and re-tune dynamics.

MCC Detected Error!

Message Description:

When downloading an iCODE script from the Script Window, the motion control card in the controller detected an error in the iCODE.

Typically, the error is the result of creating a diagram with settings the controller does not support. For example, creating a diagram with Control Type **IMC S Class 1394/1394 Turbo** when the controller is a Compact.

Note: Because the download command issued from the Script Window, the validation features built in to GML Commander are circumvented. Thus, this error message is hardware generated and not a software error message.

Remedial Steps Include:

- Return to the GML Commander Diagram Window and use the Diagram Download command in the Main Menu. This will identify any programming errors, making it easier for you to find and fix those errors.
- Remain in the Script Window. Find the problem command listed in the error message. Diagnose and fix the problem. Then re-download from the Script Window.

Note: We strongly recommend that you work in, and issue commands from, the Diagram Window rather than the Script Window.

MCC Remote Mode Disabled!

Message Description:

The GML Commander software (in your PC) is no longer receiving (from the controller) responses to the GML Commander software's requests for updated information about the current diagram. Possible causes of this message include:

- attempts by the GML Commander software to edit a diagram configuration setting, while the application memory switch is set to “locked”, or
- GML Commander “thinks” the controller is in multidrop mode, when the controller is not in multidrop mode, or
- GML Commander “thinks” the controller is not in multidrop mode, when the controller actually is in multidrop mode, or
- a communications error, between the GML Commander software in your PC and the controller, has occurred.

Remedial Steps Include:

- Press the RESET button on the controller.
- Insure that the diagram’s configuration settings are appropriate for the controller and the hardware configuration.
- Check the cabling between the PC and the controller.
- Re-initialize the controller (by simultaneously pressing both the RESET and the INIT buttons on the controller); then re-download the diagram to the controller.
- Contact Rockwell Automation Tech Support for additional help.

MCC Write Protected!

Message Description:

The controller’s memory is locked. Download or tuning is aborted.

Remedial Steps Include:

- For 1394, 1394L, 1394 Turbo and Compact controllers, use the controller’s keyswitch.

- For Integrated or Basic controllers, install the memory unlock jumper.

See the controller's Installation & Setup manual.

Missing Expression Operator!

Message Description:

The expression requires an operator.

Remedial Steps Include:

- In the Expression Builder, select the appropriate operator from the Operator Scrolling List.
- Use the keyboard to type in the appropriate operator.
- In an appropriate case, render an operator unnecessary by deleting part of the expression.

Motor Test Failed! No Motion Detected!
Check that the Transducer Type and/or encoder wiring is correct.

Message Description:

For 1394, 1394L or 1394 Turbo controllers: the Motor Test failed. Causes include:

- The Test Increment is too small.
- There is a hardware problem with either the 1394, 1394L or 1394 Turbo system module or an external transducer.

Remedial Steps Include:

1. Check to see if the problem is with the Test Increment:
   - **A.** Select **No**.
   - **B.** Enter a sufficiently large Test Increment (in the Hookups page of the Configure Axis Use dialog box) and re-run the Motor/Encoder Test.

2. If the Motor Test still fails, there is a hardware or wiring problem.

   A. Check all wiring.

3. If the problem is not wiring, try turning the axis manually. Does Actual_position value change, when the axis is turned?

   - If so, the Transducer is working and the problem probably lies with the 1394, 1394L or 1394 Turbo system module.
   - If not, the problem lies with the Transducer.

Motor Test Failed! No Motion Detected! Run Encoder Test?

Message Description:

For Compact, Integrated and Basic controllers: the Motor Test failed. Causes:

- The Test Increment is too small.
- There is a hardware problem with either the motor or the encoder. (Did the motor turn? Or did the encoder fail to read it?)

Remedial Steps Include:

1. Check to see if the problem is with the Test Increment:

   A. Select **No**.

   B. Enter a sufficiently large Test Increment (in the Hookups page of the Configure Axis Use dialog box) and re-run the Motor/Encoder Test.

2. If the Motor Test still fails, there is a hardware problem. Proceed with the Encoder Test:

   A. Select **Yes** to run the encoder test.

   - If the encoder test is successful, the problem is

with the motor.

- If the encoder test fails, the problem could be with the motor or the encoder (or both).

B. Correct hardware problem:

- Verify proper connections to the motor, and the power supply.
- Is the motor bad?
- Is the encoder bad?

Motor Type has not been updated in Control!
Check Motor Type and Download before Tuning!
CAUTION: Failure to select the correct Motor ID could damage the Motor!

Message Description:

When tuning in the Tune Servo page or testing in the Hookups page, the controller detects a difference between:

- the Motor ID setting in GML Commander, and
- the same setting in the controller.

GML commander resets Velocity Limit and Torque Limit to zero.

Remedial Steps Include:

1. In the Motor/Drive page of the Configure Axis Use dialog box, select a new **Motor ID**:

- If you select a listed Motor ID, GML Commander automatically completes the Velocity Limit and Torque Limit settings.
- If you select **Custom**, type in the Velocity Limit and Torque Limit settings for the custom motor.

2. Re-test or re-tune.

See the Online Help topic: How to optimize Velocity and Torque Limit settings

Multidrop Address and AxisLink Address must match.

Message Description:

The local controller address for both Multidrop and (non-extended node) AxisLink is determined by the rotary address switch on the front of the controller. The GML Commander controller settings, for both Multidrop and (non-extended node) AxisLink, must reflect the address on the controller's rotary address switch.

Note: If Extended AxisLink is selected in the General page of the Configure Control Options dialog box:

- the Multidrop address is determined by the controller's rotary address switch, but
- the Extended AxisLink address is determined by the GML Commander software (in the AxisLink page of the Configure Control Options dialog box).

Remedial Steps Include:

1. In the General page of the Configure Control Options dialog box (with **Multidrop** and **AxisLink** – but not **Extended AxisLink** – selected), set the Multidrop **Control Address** to the address on the controller's rotary switch.
2. In the AxisLink page, set the **Address of This Control** to the same address.

Multidrop must be enabled via Configure Control Options Menu! Hint: Press OK, then click Right Mouse to access.

Message Description:

Before the Remote Control block's configurations can be saved, Multidrop communications must first be enabled.

Remedial Steps Include:

In the General Page of the Control Options dialog box, select both:

- Multidrop, and
- the Control Address of the local controller.

Must download Diagram before attempting to perform Trace, Trap, or Step Functions in NORMAL Debug Mode!

Message Description:

To use the Trace, Trap, or Step functions in NORMAL Debug Mode, the diagram in GML Commander must be the same as the diagram in the controller.

Remedial Steps Include:

- Use the **Diagram Download** command to download the diagram from GML Commander to the controller, or
- Set Debug Mode to TERMINAL, then Trace, Trap or Step the diagram in the controller, and view its execution in the Terminal Window.

N

Name already used!

Message Description:

The name of the tag (i.e., I/O, variable, or constant) you are defining is used by a previously defined tag.

Remedial Steps Include:

- Assign a different name to the tag you are defining.
- Edit the name of the previously defined tag.

No Call Modules defined!

Message Description:

To complete the configuration of the Call Module block, input the **Value** (or number) of a module that has previously been assigned to the Call Module list.

Remedial Steps Include:

1. Close the Call Module block's dialog box.
2. In the Tag Explorer, select **Call Modules**. A list of modules available to be called appears.

   Note: If **Call Modules** does not appear in the Tag Explorer, no modules have been added to the Call Module List.

   See the Online Help topic: How to add a module to the Call Module list.

3. In the Tag Window, view the available modules and their values.
4. Return to the Call Module block's dialog box, and input as the **User Defined Module Number** the value of the module to be called.

No Expression Defined!

Message Description:

In the named function block, an input box has been left blank.

Remedial Steps Include:

Enter a value, or use the expression builder to enter an expression.

No Marker Detected! Check Encoder Hookup and Retest!

Message Description:

When performing the Marker Test in the Hookups page of the Configure Axis Use dialog box, the encoder marker was not detected.

Remedial Steps Include:

1. Check that the encoder marker is properly wired.
2. Run the Marker Test again, and make sure to manually turn the axis a sufficient amount so that the encoder marker will be detected.

No more addresses of this data type are available!

Message Description:

When defining Remote I/O, all presently available addresses have already been defined.

Remedial Steps Include:

No new addresses are available. The only recourse is to edit and overwrite a previously defined Remote I/O.

No Motion Detected! Check Encoder Hookup and Retest!

Message Description:

This message appears after the Motor/Encoder test for a Master Only axis has failed. It indicates that the controller detected no encoder pulse when the axis was turned.

Remedial Steps Include:

- Check the connections and power supply to the encoder.
- Use an oscilloscope (or other appropriate device) to test the encoder.

No print options are selected. There is nothing to print.

Message Description:

In the Print section of the Print dialog box, no option is selected.

Remedial Steps Include:

1. Select one or more of the checkbox selections:
   - Diagram Title Page
   - Table of Contents
   - Configure/Tags
   - Diagrams
   - Block details
2. After all other Print dialog selections are made, select **OK.**

Non-extended AxisLink Control Address (if enabled) or Multidrop Address (if enabled) does not match Control Address on Front Panel! Check Control and/or AxisLink Definitions!

Message Description:

On diagram download, the local controller address for either Multidrop or (non-extended) AxisLink does not match the controller address set by the rotary switch on the front of the controller.

Remedial Steps Include:

- Set the Multidrop **Control Address** to the address on the controller's rotary switch (in the General page of the Configure Control Options dialog box), or
- Set the non-Extended AxisLink **Address of This Control** to the address on the controller's rotary switch (in the AxisLink page of the Configure Control Options dialog box).

Note: If the Position Display Format is increased in the Units page, a larger value may be entered.

Message Description:

The Motor/Encoder Test's **Test Increment** value – in the Configure Axis Use dialog box's Hookups page – is larger than the permitted **Position Display Format** in the Units page.

Remedial Steps Include:

- Increase the size of the permitted **Position Display Format**, or
- Use a smaller **Test Increment**.

No valid data entered!

Message Description:

A data entry field has not been, or cannot be, completed. For example:

1. Be sure that no axis is defined as **Master Only** (in the General page of the Configure Axis Use dialog box).
2. Set a servo axis' (e.g. AXIS0's) Drive Interface Type to **Dual** in the Servo page.
3. Note that the Velocity Axis input box (which would display the available Master Only axes) is grayed-out. This is because no Master Only axes have been defined.
4. Selecting **OK** generates this message, because a Master Only axis must be selected in the Velocity Axis input box to complete the Dual Type configuration.

Remedial Steps Include:

Enter appropriate data in the required input box. In the example, above:

1. Configure a physical axis (e.g. AXIS1) as a **Master Only** axis (in the General page of the Configure Axis Use dialog box).

2. Configure a second physical axis (e.g. AXIS0) as a **Servo** axis (in the General page of the Configure Axis Use dialog box).
3. Set the second a servo axis' (AXIS0's) Drive Interface Type to **Dual** in the Servo page.
4. Select **AXIS1** the Velocity Axis.
5. Select **OK**.

O

Offset Comp Failed! No Motion Detected! Check Motor Hookup and Retest!

Message Description:

The Compact, Integrated or Basic controller was unable to detect any axis motion while performing the first part of the Drive Offset test.

Remedial Steps Include:

1. Check the proper electrical connections to the motor, and the power supply.
2. Re-execute the Drive Offset test (in the Hookups page of the Configure Axis Use dialog box).

See the Online Help topic: How to perform the Drive Offset test

Only the Actual or Command Positions may be saved to a User Variable when the Equation block is connected to an event/ action block.

Message Description:

When an Equation block is connected to the action node of a Watch Control block (set to **Enable Event/Action**, with **Dedicated** or **Configured** selected), the Equation block must be configured to set a selected User Variable equal to an axis' Actual_Position or Command_Position. Otherwise, no connection between the Watch Control and Equation blocks can be made.

Remedial Steps Include:

- Configure the diagram as described.
- Re-design the diagram, by deleting the Watch Control – Equation block sequence.

P - Q

Position Error Tolerance Exceeded!
The Motor/Transducer polarities may be wrong!
This error must be corrected before attempting to tune again.

Message Description:

For Basic and Integrated controllers, after selecting **Tune Dynamics** or **Follow Error Test**, a position error fault occurred. Tuning aborts.

Remedial Steps Include:

1. Check motor/Transducer polarities.
2. Re-tune or re-test

Positive Feedback Detected!
Run Motor/Encoder Test then Retune! Gains not Tuned!

Message Description:

In the Tune Servo page, the **Tune Gains** command failed. Because a runaway condition will follow, tuning aborts.

Remedial Steps Include:

1. Check Motor/Transducer polarities.
2. Re-test.

Positive Limit must be larger than Negative Limit!

Message Description:

The Maximum Positive Software Travel Limit must be a larger number than the Maximum Negative Software Travel Limit (set in the Overtravel page of the Configure Axis Use dialog box).

Remedial Steps Include:

- Increase the Maximum Positive setting, or
- Decrease the Maximum Negative setting.

R

RIO must be enabled via Configure Control Options Menu! Hint: Press OK, then click Right Mouse to access.

Message Description:

RIO communications must be enabled before configuration settings for the Auto RIO Update or the On RIO block can be saved.

Remedial Steps Include:

1. Select **RIO** in the General page of the Control Options dialog box.
2. Complete settings in the RIO page.

S

Selection list is empty or no selection is made!

Message Description:

No selection has been made from the list of available variables, inputs or outputs in the Tag Window.

Remedial Steps Include:

1. Select a variable, input or output from the list.
2. If none appears, click the right mouse button to define a new tag, then select it.

SLC must be enabled in the Control Options! Hint: Press OK, then click Right Mouse to access.

Message Description:

SLC communications must be enabled before configuration settings for the On SLC Status block can be saved.

Remedial Steps Include:

1. Select **SLC** in the General page of the Control Options dialog box.
2. Complete settings in the SLC page.

Soft Overtravel Limits: The Maximum Negative Value must be less than the Maximum Positive Value!

Message Description:

In the Overtravel page of the Configure Axis Use dialog box – under Soft Travel Limits – the Maximum Negative value must be less than the Maximum Positive value.

Remedial Steps Include:

Under Soft Travel Limits, edit the Maximum Negative value, or the Maximum Positive value, or both, so that the Maximum Positive value is greater than the Maximum Negative value.

System Not Enabled! Gains Not Tuned!

Message Description:

Tuning a 1394, 1394L or 1394 Turbo controller failed because the 24-volt system is not enabled.

Remedial Steps Include:

1. Apply 24 volts to the system enable input.
2. Re-tune.

T

The 1394 System Bus Power is not applied. Please apply System Bus Power and re-execute the test.

Message Description:

During testing in the Hookups page, or tuning in the Tune Servo page, the controller detected that 1394 System bus power is off. Tuning or testing aborts.

Remedial Steps Include:

1. Apply 24 volts to the system enable input.
2. Re-tune or re-test.

The AxisLink Read Outputs from Controller for this selected AxisLink Input tag has been disabled in the Configure AxisLink Menu. The tag definition is no longer valid. You must edit or delete the tag definition.

Message Description:

The **Read Outputs from** setting (in the AxisLink page of the Configure Control Options dialog box) for the selected input was disabled after the highlighted input had been defined. Consequently, the **From Controller** setting (in the AxisLink I/O Input dialog box) is no longer valid.

Remedial Steps Include:

- Re-enable the initially selected **Read Outputs from** setting (in the AxisLink page of the Configure Control Options dialog box).
- Change the **From Controller** setting to a currently enabled remote controller (in the AxisLink I/O Input dialog box).

The CNET Configuration in the Control Options has been changed since this CNET tag was defined.
This CNET tag is no longer valid.

Message Description:

The address of either a CNET Output Bit or CNET Output Group Bit - selected in an Equation block - is no longer valid because, subsequent to the definition of the referenced bit, the number of available Output bits has been reduced (in the CNET page of the Configure Control Options dialog box).

Remedial Steps Include:

- Increase the number of available Output bits in the CNET page of the Configure Control Options dialog box, or
- Edit the specific CNET Output Bit or CNET Output Group Bit by selecting an Address within the range of available addresses.

The Default Values for Transducer Type and Conversion Constant for the 1394 Control do not match what is selected.
Do you want GML to set these defaults?

Message Description:

Which do you want to use as the settings for Transducer Type and Conversion Constant:

- The default settings? or
- The current settings?

Remedial Steps Include:

- Select **Yes** to let GML Commander insert the following default values:

- **Motor Resolver** as the Transducer Type, and
- **8192** as the Conversion Constant.

- Select **No** to retain the current settings.

The DH-485 Configuration in the Control Options has been changed since this DH-485 tag was defined. You must select a node other than the DH-485 Node defined for this Controller in the Control Options!

Message Description:

The local controller's **Node address** setting (in the DH-485 page of the Configure Control Options dialog box) was changed after a remote DH-485 variable had been defined. The Node Address setting is now the same as the setting for the remote DH-485 variable's **Remote Node** setting.

Remedial Steps Include:

- Change the local controller's **Node address** setting to different node (in the DH-485 page of the Configure Control Options dialog box).
- Change the DH-485 remote variable's **Remote Node** setting to a different node (in the DH-485 Remote Variable dialog box).

See the Online Help topic How to Define DH-485 Variables.

The Diagram's Axis Configuration does not match the Control's Configuration. Caution: Failure to download could cause unexpected motion while performing controller diagnostics or tuning. Do you want to download this axis configuration now? Note: Gains and Dynamics pages will not be downloaded!

Message Description:

There is a difference between the controller's and GML Commander's axis/drive data.

The "axis/drive data" consists of the settings in the Configure Axis Use dialog box's General through Tune Servo pages.

Remedial Steps Include:

- Select **Yes** to download new axis/drive data. Then tune.

- Select **No**. Then select **Upload** in the Apply page to upload the controller's axis/drive data to GML Commander. Then tune.

The Diagram's Axis Configuration does not match the Control's Configuration. You must download this axis configuration from the Apply Page, before adjusting the gains or dynamics.

Message Description:

The axis/drive data must be the same in both GML Commander and the controller, before adjusting working gains or dynamics settings. Otherwise, the Adjust Gains and Adjust Dynamics dialog boxes are not accessible.

Remedial Steps Include:

- Download GML Commander's axis/drive data to the controller by:
  - selecting **Download** in the Apply page, or
  - using the **Diagram Download** command with **Download Axis/Drive Data with the Diagram** selected (in the Configure Control Options dialog box).
- Upload the controller's axis/drive data by selecting **Upload** in the Apply page.

The File Number selected has been Pre-Configured for a different file type than you have selected! Choose a different file number.

Message Description:

When defining DH-485 variables, four File Types have pre-defined File # settings, which are available only for that File Type:

- Binary (#3)
- Integer (#7)
- Floating (#8), and
- ASCII (#10).

Remedial Steps Include:

- Accept the default File #.
- Input a non-pre-defined File #.

See the Online Help topic: DH-485 File Numbers and File Types.

The Flex Module for the selected Flex I/O tag is no longer enabled in the Configure Control Options Menu! Hint: Press OK, then click Right Mouse to access it!

Message Description:

The Flex I/O Module, which supported the Flex I/O tag selected in the highlighted block, was disabled after the highlighted Flex I/O tag had been defined.

The error message references the problem block. GML Commander opens the dialog box for that block and focuses on the problem setting.

Remedial Steps Include:

- Re-enable the disabled Flex I/O module (in the Flex I/O page of the Configure Control Options dialog box).
- Select an available **Module** setting for the Flex I/O input or output (in the Flex I/O input or output dialog box).

The following inputs are no longer supported in GML Commander. Miscellaneous: Initialization, DualPort Interrupt 1394, DSP Bus Grant 1394, DH485 Switch. Dedicated: CXIC Interrupt

Message Description:

The diagram contains inputs that were supported in earlier versions of GML, but not by GML Commander.

Remedial Steps Include:

1. Eliminate from the diagram all references to these unsupported inputs.
2. Substitute inputs supported by GML Commander.

The following tags share the same name, but have a different address, as tags already defined in this diagram:

Message Description:

Blocks that have been copied in another diagram and pasted into the current diagram share the same name, but not the same address.

Remedial Steps Include:

Be sure that the current diagram has a pre-defined tag with the same name and address as any tag referenced by a block copied from another diagram. Edit the tag in either the source or receiving diagram to assure consistency.

The Module Type for this selected Flex I/O tag has been changed in the Configure Flex Menu. The tag definition is no longer valid. You must edit or delete the tag definition.

Message Description:

The Flex I/O module Type, supporting the Flex I/O tag, selected in the highlighted block, was changed after the highlighted Flex I/O tag had been defined.

The error message references the problem block. GML Commander opens the dialog box for that block and focuses on the problem setting.

Remedial Steps Include:

- Re-select the original module **Type** in the Configure Module Use dialog box.
- Select an available **Module** setting for the Flex I/O input or output (in the Flex I/O input or output dialog box).

The Motor's ID, Speed, and Torque data values for all REAL axes will be reset to their default selections if the line voltage is changed!
Are you sure?

Message Description:

Selecting or de-selecting **Low Line Voltage** (in the General page of the Configure Control Options dialog box) instantly changes the **Motor ID**, **Velocity Limit** and **Torque Limit** settings (in the Motor/Drive page of the Configure Axis Use dialog box) to the default values.

Remedial Steps Include:

- Select **Yes** to confirm the **Low Line Voltage** selection, and change the **Motor ID**, **Velocity Limit** and **Torque Limit** settings to the default values, or
- Select **No** to undo the selection, and retain the current values for these settings.

The Motor ID, Velocity Limit and Torque Limit cannot be changed while the program is running or feedback is enabled. Please abort the program and disable feedback to change these parameters.

Message Description:

This message is self-evident.

Remedial Steps Include:

So are the remedies.

The size of the master and slave tables must be the same.

Message Description:

When using the Build Table block for multiple columns, each column must have values input for the same number of rows.

Remedial Steps Include:

- Enter values for the same number of rows in each column.
- Use a separate Build Table block for each column. In this case, the columns need not contain the same number of rows.

The SLC Configuration in the Control Options has been changed since this SLC tag was defined.
This SLC tag is no longer valid.

Message Description:

The SLC input bit, output bit, input float, output float, M1 Float or M1 Integer was assigned an **Address** that no longer exists because the range of available addresses has since been reduced.

GML Commander opens the problem block, and highlights the relevant bit, float or integer selection.

Remedial Steps Include:

- Define a new bit, float or integer within the available address range and select it for the highlighted block.
- In the SLC page of the Configure Control Options dialog box, increase the available number of bit, float or integer addresses.

See the Online Help topic: How to Define SLC Inputs, Outputs and M Files

The Starting Offset, plus the number of points in the table, exceeds the maximum number of points allowed for the selected Type.
It is possible to have data hidden in the table, if the configuration of the control has changed, or the Type of table has changed since the table was built. If this is so, change the configuration back the way it was, delete the hidden data, then re-select the desired configuration.

Message Description:

The maximum number of CAM table points (or rows) is:

- 13,000 for Compact and 1394, 1394L or 1394 Turbo controllers, and
- 2,000 for Integrated and Basic controllers.

The sum of the **Starting Offset** number and the number of table rows for which a value is input cannot exceed the maximum number of CAM table points.

Remedial Steps Include:

- Reduce the **Starting Offset** number, or
- Reduce the number of rows for which a value is input, or
- Both.

The total number of SLC M0 Integers and M0 Float words exceeds the 512 word limit specified for the M File Configurations.
Please lower the number of M0 Integers and/or M0 Floats.

Message Description:

The number of **M0 Floats** and **M0 Integers** (set in the SLC page of the Configure Control Options dialog box) require more space than the M0 file contains.

An M0 file is 1024 bytes in size, and can contain up to:

- 256 (four byte) M0 Floats,
- 512 (two byte) M0 Integers, or
- a combination of both.

Remedial Steps Include:

- Decrease the number of M0 Floats, or
- Decrease the number of M0 Integers, or
- Both.

See the Online Help topic: M File Floats and Integers.

The total number of SLC M1 Integers and M1 Float words exceeds the 512 word limit specified for the M File Configurations.
Please lower the number of M1 Integers and/or M1 Floats.

Message Description:

The number of **M1 Floats** and **M1 Integers** (set in the SLC page of the Configure Control Options dialog box) require more space than the M1 file contains.

An M1 file is 1024 bytes in size, and can contain up to:

- 256 (four byte) M1 Floats,
- 512 (two byte) M0 Integers, or
- a combination of both.

Remedial Steps Include:

- decrease the number of M1 Floats, or

- decrease the number of M1 Integers, or
- both.

See the Online Help topic: M File Floats and Integers.

There are no Flex Modules of this type enabled!!

Message Description:

A non-enabled Flex I/O module somehow was listed as being available.

Note: An error of this type is much more likely to occur in GML versions 3.9 or lower. This should not occur in GML Commander versions 4.0 or higher.

Remedial Steps Include:

- Configure an enabled Flex I/O module as the desired type.
- Select a different, enabled Flex I/O module type.

There are no SLC M File Integers or Floats configured. Please either disable the M File Transfer or enter some values.

Message Description:

If **Enable Transfers** is selected (in the SLC page of the Configure Control Options dialog box), at least one **M0 Float**, **M0 Integer**, **M1 Float** or **M1 Integer** must be enabled.

Remedial Steps Include:

- De-select Enable Transfers, or
- Enable at least one M0 Float, M0 Integer, M1 Float or M1 Integer.

See the Online Help topic: Configure Control Options - SLC Page.

There is a conflict between this tag in the clip board and another tag within this document. Contents within the clip board will be lost.

Message Description:

An attempt has been made to copy a block from one GML Commander diagram and paste it into another diagram. The copied block refers to a tag with settings that conflict with settings for another tag already defined for the second diagram.

Typically, the two tags will have the same name but different addresses, or the same address but different names.

Remedial Steps Include:

Change the configuration for the tag in the first diagram so that its settings either:

- Exactly match the settings for the tag in the second diagram, or
- Entirely differ from the settings for the tag in the second diagram.

This 1394 axis module is a Drive Interface Module (DIM). Please select the Drive Interface Module Axis check box for axis.

Message Description:

On diagram download, the controller has detected that the axis module for the current axis is a DIM axis. Consequently, this axis must be defined as a DIM axis in the General page of the Configure Axis Use dialog box.

Remedial Steps Include:

Select **Drive Interface Module Axis** in the General page of the Configure Axis Use dialog box for the current axis.

This 1394 axis module is not a Drive Interface Module (DIM). Please deselect the Drive Interface Module Axis check box for axis.

Message Description:

On diagram download, the controller has detected that the axis module for this axis is a 1394 axis module, and not a DIM axis. Consequently, this axis cannot be defined as a DIM axis.

Remedial Steps Include:

De-select **Drive Interface Module Axis** in the General page of the Configure Axis Use dialog box for the current axis.

This is not a valid print range.

Message Description:

An invalid print entry has been made in the Print dialog box's **Pages:** input box.

Remedial Steps Include:

- Delete the invalid entry, and enter a new, valid print range, or
- Select **All**.

Tips file does not exist in the prescribed directory.

Message Description:

The file containing the "Tip of the Day" (TIPS.DB) cannot be found in the directory that contains the GML.EXE file.

Remedial Steps Include:

To use the Tip of the Day:

- Find and move or copy the TIPS.DB file into the directory containing the GML.EXE file, or
- Re-install GML Commander.

Too many SLC Variables from your GML3 diagram. You need to fix the error in GML3.

Message Description:

In GML versions 3.X, the number of defined SLC tags (i.e., Input or Output discrete or group Bits or Floats, or M0 or M1 Floats or Integers) could exceed the number of enabled SLC addresses.

In GML Commander, the number of defined SLC tags cannot exceed the number of addresses enabled in the SLC page of the Configure Control Options dialog box.

Remedial Steps Include:

In GML version 3.X either:

- Decrease the number of defined SLC tags, or
- Increase (if possible) the number of enabled SLC addresses.

Too many User Variables from your GML3 diagram. You need to fix the error in GML3.

Message Description:

In GML versions 3.X, the number of defined User Variables could exceed the number of User Variables that the controller's firmware could support.

GML Commander does not permit the definition of more User Variables than the controller's firmware will support.

Note: The maximum number of User Variables are:

- 1,000 for iCODE versions 2.3 or lower,
- 2,000 for iCODE versions 3.0 or higher.

Remedial Steps Include:

In GML version 3.X either:

- Decrease the number of defined User Variables, or

- Upgrade to iCODE version 3.0 or higher to increase the number of available User Variables to 2,000 (for iCODE versions 2.3 or lower).

Transducer Loss Detected! Check Transducer Hookup and Retest!

Message Description:

While performing a test in the Hookups page of the Configure Axis Use dialog box, the signal from the transducer – or encoder – has been lost. A Transducer (or Encoder) Loss fault occurs.

This condition is usually caused by:

- a broken wire between the transducer and controller, or
- a loss of power.

Remedial Steps Include:

1. Determine, then clear, the underlying cause of the transducer (encoder) loss fault.
2. Repeat the test in the Hookups page.

Transmission Error!

Message Description:

A communications problem has occurred, preventing the transmission.

Remedial Steps Include:

Repeat the transmission.

Trouble reading the tips file.

Message Description:

The file containing the “Tip of the Day” (TIPS.DB) is corrupted.

Remedial Steps Include:

- Overwrite the existing TIPS.DB file by copying it from the installation diskettes (or CD) to the directory containing the TIPS.DB file, or
- Re-install GML Commander.

U

Unmatched Left Parenthesis!

Message Description:

An expression, which already includes an opening left parenthesis, is missing a closing right parenthesis.

Remedial Steps Include:

- Add the right parenthesis, or
- Delete the left parenthesis (if feasible).

Unmatched Right Parenthesis!

Message Description:

An expression, which already includes a closing right parenthesis, is missing an opening left parenthesis.

Remedial Steps Include:

- Add the left parenthesis, or
- Delete the right parenthesis (if feasible).

V

Value must be a number!

Message Description:

This field requires a number, and will not accept an expression.

For example, many of the settings in the Configure Control Options and the Configure Axis Use dialog boxes require numbers and will not accept expressions.

Remedial Steps Include:

Use a numerical value.

Value must be an integer!

Message Description:

The field requires a whole integer.

An empty field (e.g., as an address in a tag definition dialog box), a fraction or a decimal value (e.g., as a Slave or Master Counts value in a Gear Axes block set to **Fraction**) are not permitted.

Remedial Steps Include:

Use an integer value.

Value out of range!

Message Description:

The input value is either too small or too large. The message usually indicates the acceptable range of values.

Remedial Steps Include:

Use a value that lies within the range.

Virtual Axis must be enabled in the Axes screen within the Control Options! Hint: Press OK, then click Right Mouse to access!

Message Description:

A Virtual Axis must be enabled before configuration settings for the Reset AxisLink Fault or Virtual Axis Control block can be saved.

Remedial Steps Include:

1. Open the Configure Control Options dialog box.
2. With AxisLink already selected in the General page, select a virtual axis in the Axes page.
3. Complete the settings for the Reset AxisLink Fault or Virtual Axis Control block.

W

Wrong Number of Parameters!

Message Description:

The number of argument values included in a function differs from the required number of arguments for that function.

Remedial Steps Include:

One solution is to use the Expression Builder, as follows:

1. In the data input field, click the right mouse button to open the Expression Builder.
2. Select **System Functions** in the Tag Explorer.
3. Select the desired function in the Tag Window. The required syntax for the selected function appears beneath the Tag Window.
4. Following the displayed syntax, input the function's required arguments in the **Expression =** window.

5. the function is complete, select **OK**.

See the Online Help topic: Expression Builder.

Y

You must select a node less than or equal to the DH-485 Maximum Node defined in the Control Options!

Message Description:

When using a DH-485 Value block to specify remote addressing, you must select a Node address that is within the Max node address range (set in DH-485 page of the Configure Control Options dialog box).

Remedial Steps Include:

Select an address within the node address range – other than the local node address.

You must select a node other than the DH-485 Node defined for this Controller in the Control Options!

Message Description:

When defining a DH-485 remote variable, the **Remote Node** setting (in the DH-485 Remote Variable dialog box) cannot be set to the **Node address** setting for the local controller (in the DH-485 page of the Configure Control Options dialog box).

Remedial Steps Include:

- Change the DH-485 remote variable's **Remote Node** setting to a different node (in the DH-485 Remote Variable dialog box), or
- Change the local controller's **Node address** setting to different node (in the DH-485 page of the Configure Control Options dialog box).

See the Online Help topic How to Define DH-485 Variables.

You must select "Drive Interface Module Axis" for the first - and each subsequent - axis enabled by the Drive Interface Module (DIM).

Message Description:

Because an axis – appearing sequentially ahead of the current axis – has been defined as a DIM axis, the current axis must also be defined as a DIM axis.

Remedial Steps Include:

Select **Drive Interface Module Axis** in the General page of the Configure Axis Use dialog box for the current axis.

Frequently Asked Questions

Installation Questions:

Q: I have just installed GML Commander on my PC. When I opened GML Commander for the first time I got the message "Internal Error – Error Code xxxxx-1792039". When I closed the error message, GML Commander automatically shuts down. What is happening, and what should I do?

A: The Windows operating system generated the error message, indicating that a general protection fault (GPF) has occurred. The GPF was caused by a conflict between GML Commander and a Windows printer driver. To be able to run GML Commander, you must identify and delete the conflicting printer driver. In some cases, both GML Commander and the conflicting printer driver can co-exist on the same PC, provided GML Commander is installed first and the printer driver installed later. In other cases, GML Commander will run only if the conflicting printer driver has been deleted and not re-installed.

To delete the conflicting printer driver:

1. Click on the path Start → Settings → Printers. The Printers dialog box opens.
2. Delete all the printer drivers.
3. Re-install the printer drivers one at a time. After installing a printer driver, open GML Commander and see if it crashes.
4. If GML Commander doesn't crash, the printer driver can remain installed. If GML Commander crashes, delete the printer driver.
5. Repeat steps 3 and 4 until all non-conflicting printer drivers are re-installed.

Q: When GML Commander is installed on my computer, what files are copied onto my hard drive? Where do they reside?

A: The files listed below are copied to your hard drive when you install GML Commander v4.01. Except where noted to the contrary, installation will overwrite existing files of the same name.

Note: To remove any file installed with GML Commander, use the Windows uninstall feature (Start → Settings → Control Panel → Add/Remove Programs) and uninstall GML Commander in its entirety.

Other than files with .gml extensions installed in the Samples sub-directory, do **not** remove a file by deleting it. Merely deleting a file will not clear all references to the deleted file in the Windows Registry.

The following files are installed:

To the application directory: (C:\Program Files\Rockwell Automation\GML Commander):

- GML.exe
- GML.hlp
- GML.cnt
- readme.txt
- tips.db
- DelsL1.isu

To the following sub-directories, created beneath the application directory:

(\Samples\1394):

- Fault.gml

(\Samples\imcs200):

- AxisLink.gml
- Coilwind.gml
- Conveyor.gml
- Drillfd.gml
- Dualreg.gml
- Flthndlr.gml
- Flyshear.gml
- Packlabl.gml
- Pickplac.gml
- Simpfeed.gml
- Slipcomp.gml

(\Samples\imcs230):

- Benchmark.gml
- Datarec.gml
- Imtsdemo.gml
- Library.gml
- Multadd.gml
- Multitsk.gml
- Sheeter.gml
- Timer.gml

To the C:\Windows\System (for Windows 95) or System32 (for Windows NT) directory:

Note: The following files will overwrite existing files upon installation **only** if the date of the existing file is earlier than the date of the file being installed.

- SS32x25.ocx
- Mfc40.dll (for GML Commander v4.0 only)
- Mfc42.dll (for GML Commander v4.01 and higher; Win 95 only, not NT)
- Msvcrt.dll
- msvcrt4.dll
- olepro32.dll
- gsw32.exe
- gswag32.dll
- gswdll32.dll

Wiring Questions:

Q: Why do the line input fuses to my 1394 controller keep failing?

A: You probably are using fuses not designed to withstand the current for the time it takes to power-up the DC bus. We recommend Bussman type FRS fuses. However, you can use fuses from other manufacturers provided they meet the specifications of Bussman type FRS fuses.

When the 1394, 1394L or 1394 Turbo system module powers up and 3-phase power is applied, the system module experiences an inrush of current. This current inrush continues until the DC bus – which powers the axis modules – is fully powered. Fuses that cannot withstand this level of current for the time it takes to power-up the DC bus will fail.

Firmware and Controller Upgrade Questions:

Q: I upgraded my controller from an old IMC S Class to a Compact. After making this upgrade, I changed the Control Type to IMC S Class Compact in the Configure Control Options dialog box. When I did this, the category General Purpose I/O disappeared from view in the Tag Explorer. Now I want to define new Flex I/O using the names of the original General Purpose I/O. When I try to do this, GML Commander indicates that these names are already used. However, these names are not visible in any of the I/O groups. Why can't I reuse the original I/O names?

A: Even though you cannot see the original General Purpose I/O, they still exist. When you selected **IMC S Class Compact** as the Control Type, GML Commander hid the General Purpose I/O category from view in the Tag Explorer. GML Commander did this because your new controller cannot use General Purpose I/O.

Because the General Purpose I/O tags still exist, their names are initially unavailable for use as Flex I/O. To reuse these names, do the following:

1. In the Main Menu, select Configure → Control Options. The Configure Control Options dialog box opens.
2. In the Configure Control Options dialog box, select the original Control Type (in this case, **IMC S Class Basic/ Integrated**).
3. In the Tag Explorer, under General Purpose I/O, select the old I/O type. The old I/O names reappear.
4. In the Tag Window, highlight then delete the General Purpose I/O names you wish to re-use.
5. Repeat steps 3 and 4 for each General Purpose I/O type.
6. In the Configure Control Options dialog box, re-select the current Control Type (in this case, **IMC S Class Compact**).
7. In the Tag Explorer, highlight the type of I/O you wish to define.
8. In the Tag Window, click the right mouse button and select **New.** You can now define new I/O using the old I/O names.

Q: I have new controller firmware, but still use an older version of GML Commander. Can I download an application program (created with my old version of GML Commander) to my controller with the new firmware, even though the application program's original iCODE setting is not available in the in the Configure Control Options dialog box?

A: Yes. You can still develop a program, using your old version of GML Commander, and download it to the controller. The controller, with new firmware, will run the program without any problem.

However, your new firmware possesses additional firmware features that you cannot see and cannot utilize when you develop your program. Only if you upgrade your software to the newest version of GML Commander, will you be able to employ the full power of your new firmware in your programs.

For a list of these new features, read the Release Notes that came with your firmware.

Configuration Questions:

Q: I am configuring an axis, and would like to see all the tabbed pages of the Configure Axis Use dialog box at once. Instead, I'm stuck in a wizard that steps me through each page of the Configure Axis Use dialog box in sequence. How do I get out of the wizard and display the tabbed pages?

A: You are running GML Commander in Novice Mode. Novice Mode is designed to help new users complete the basic settings that are minimally required to run GML Commander.

To get out of Novice Mode, and display all the tabs on the Configure Axis Use (and other) dialog boxes, select File → Properties in the Main Menu then, in the Properties dialog box, de-select **Novice Mode**.

Q: I need to run in 'dual loop' mode, but I can't select this in GML Commander. What do I do?

A: The 1394, 1394L or 1394 Turbo is designed so that the motor resolver automatically closes the motor's velocity loop. Consequently, if you select anything other than Motor Resolver – for example, **Incremental Encoder** – as the Transducer Type (in the Feedback page of the Configure Axis Use dialog box), you automatically get dual loop control. Better still, dual loop control in the 1394, 1394L or 1394 Turbo does not require the use of a second axis (as do other members of the S-Class family of controllers).

Axis Testing and Tuning Questions:

Q: I would like to be able to run tests on the drive and motor in a 1394 system. However, because the motor and drive are both internal to the system, how do I test them?

A: The 1394, 1394L or 1394 Turbo system's input wiring board provides two software programmable analog output terminals (A TEST 0 located at TB1 signal 24, and A TEST 1 located at TB1 signal 25). You can connect these outputs to an oscilloscope, data recorder, or strip chart recorder to monitor any axis, actual velocity and/or torque, or other user-assigned value.

Default values for the two analog output terminals are:

- actual velocity for AXIS0 for A TEST 0 (TB1-24), and
- actual current for AXIS0 for A TEST 1 (TB1-25).

In GML Commander, use two consecutive Control Settings blocks to program output from either of the analog output terminals, as follows:

1. Use the first Control Settings block to select what will be monitored, as follows:
   - **A.** Select the function type (**Read, Show** or **Adjust**)
   - **B.** Set the Value to **Working**.

C. Select **Data Parameters**.

D. Select **Analog Test 0** (or 1) **Mode 1394**.

E. Set the State to the desired **Mode**:

- 0 – to specify any axis value, measurable in volts, available for monitoring via an Equation block that follows the two Control Settings blocks.

Note: Because the output is limited to values between -10 and +10 volts, it may be necessary to scale the selected variable value,

- 1 – to check on axis velocity (represented in volts, with 1 volt = 1000 rpm),
- 2 – to check on axis current (represented in volts, with 1 volt = 40% of rated motor current).

2. Use the second Control Settings block to select the Axis – 0 to 3 – that you want to monitor, as follows:

A. Select the function type (**Read, Show** or **Adjust**).

B. Select the Axis to monitor.

C. Set the Value to **Working**.

D. Set the State to the selected axis (**0**, **1**, **2** or **3**)

E. Select **Data Parameters**.

F. Select **Analog Test 0** (or 1) **Axis 1394**.

3. If you are adjusting, and not just monitoring a value, add an Equation block set to **Configured** Type, select the desired Axes or General System Variable to be adjusted, then set the new value or expression for the selected variable.

Q: If I hit an overtravel limit switch, or reach a software travel limit while tuning Gains and Dynamics (in the Tune Servo page of the Configure Axis Use dialog box), or performing the Motor/Encoder and Marker tests (in the Hookups page), will I get an overtravel fault?

A: Yes, you will get either a Hardware_overtravel_fault or a Software_overtravel_fault.

Q: When I run the Motor/Encoder test on a Basic, Integrated or Compact controller (in the Hookups page of the Configure Control Options dialog box), I get the message "Motor Test Failed! No Motion Detected! Run Encoder Test?" Why does this test fail, and what do I do?

A: In most cases, the Motor Test failed because you input a Test Increment (in the Hookups page of the Configure Axis Use dialog box) that is too small for the controller to successfully complete the test. Generally, the test works best with a Test Increment that produces a 1/4 revolution of the feedback device. An easy way to calculate this is to divide the encoder resolution (in lines) by the conversion constant (in counts) of the axis, as follows:

$$\text{Test Increment} = \frac{\text{Feedback Resolution (in lines)}}{\text{Axis Conversion Constant - K (in counts)}}$$

It is not necessary to further divide by 4, because the factor of 4 from the 4X encoder multiplication of the S Class cancels the factor of 1/4 from the test increment. Thus the resolution of the encoder in lines is the same as 1/4 revolution of the encoder in counts.

Note: The value for the Axis Conversion Constant can be found in the Feedback page of the Configure Control Options dialog box. Look in the documentation of your feedback device for its Feedback Resolution value.

However, sometimes the Motor/Encoder test fails because of a hardware problem with either the motor or the encoder. If the Motor Test portion of the test still fails even after you entered a larger Test Increment, proceed with the Encoder Test. If the encoder test is successful, the problem is with the motor. If not, the problem could be with either the motor or the encoder (or both). Check the motor and encoder connections and their power supply.

Programming Questions:

Q: How can I determine the size of my application program (diagram) and the amount of Application Memory it will require?

A: You can estimate the size, and the consequent memory demand, of your application as follows:

1. Select File → Properties in the Main Menu. The Properties dialog box opens.
2. In the Properties dialog box, be sure that **Generate Comments** is de-selected.
3. Select Configure → Control Options… in the Main Menu. The Configure Control Options dialog box opens.
4. In the Configure Control Options dialog box, be sure that **Download Axis/Drive Data with the Diagram** is selected.
5. Select Diagram → Translate to Script in the Main Menu, to create a script file.
6. Save the new script file as a text (.txt) file.
7. In the left pane of Windows Explorer, highlight the directory that contains the new text file.

8. Select View → Details in the Explorer Menu. The size of the text file and its size are displayed in the right pane of Windows Explorer. This file size is the approximate amount of memory required to run your application program.

Q: The program I created using GML Commander has reached the maximum Application Memory size (64 KB for 1394 Turbo, 32 KB for all other controllers). How can I reduce the size of my program without sacrificing functionality?

A: To reduce amount of Application Memory, you must reduce the number of lines of code in your program (i.e., the number of lines that appear in the script, or text, file after the diagram is translated to script). Ways to do this include the following:

Option 1: Move Build Table blocks to a separate program

If your program includes Build Table blocks that are not dynamically changed by running the program, you can:

1. Remove all Build Table blocks from your original program.
2. Construct a new program that includes **all** of the Build Table blocks that were part of the original program.
3. Download and run the program containing only the Build Table blocks.
4. Download and run the program containing the remainder of the original diagram.

Running the program containing the Build Table blocks places the Cam Table or Variable Array data into Data Memory. This data remains available to the second program (i.e. the original program less the Build Table blocks) when the second program runs. Because the Cam Table or Variable Array data resides in Data Memory, more Application Memory space is freed for the second program.

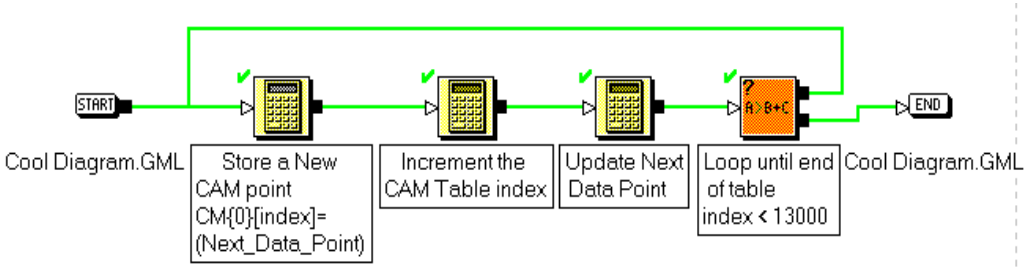
Be sure to remove **all** Build Table blocks from the original program. If any Build Table blocks remain in the original program when it runs (Step 4.), the Cam Table or Variable Array data contained in that block will over-write some or all of the data previously placed into Data Memory (Step 3.).

Note: See Chapter 12 “Memory Organization” in the GML Commander Reference Manual for a discussion of how the motion controller segments memory and stores data.

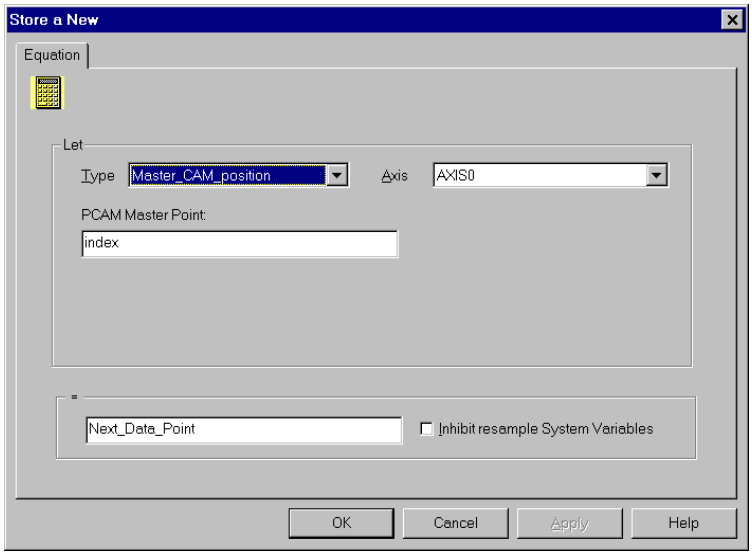
Option 2: Let two equation blocks loop program execution

If your program includes Build Table blocks that are not dynamically changed by running the program, you may be able to create a loop using three Equation blocks and an On Expression block, in place of each Build Table block.

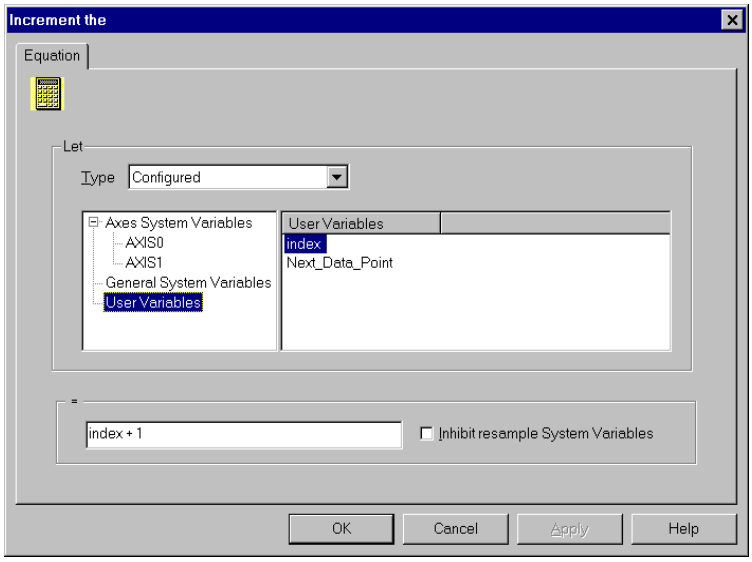
For example, the following diagram uses just four lines of iCODE to create the equivalent of a 13,000 point Cam table:



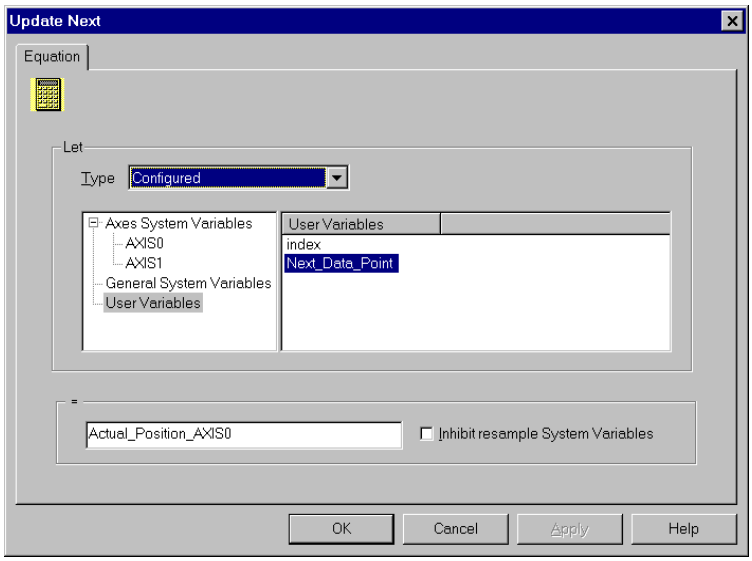
The first block sets the variable “index” (which serves as the Cam point index) equal to the value of the variable “Next_Data_Point” (which serves as that Cam point value) each time the loop executes:



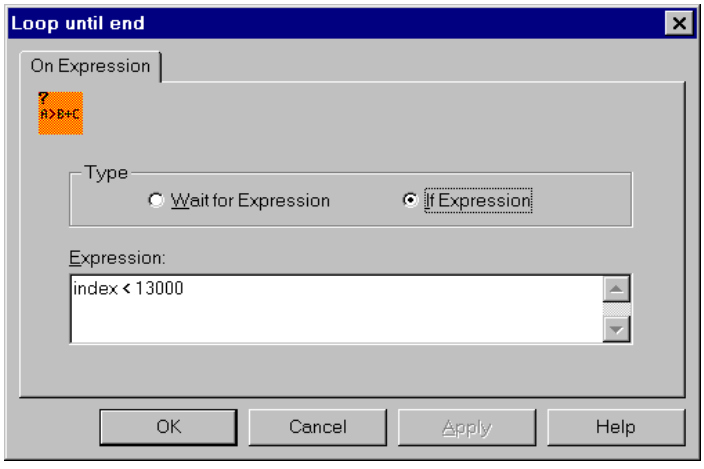
The second block increments the value of the variable "index" by 1:



The third block fills the variable “Next_Data_Point” (which serves as that Cam point value). The manner in which you elect to assign values to this variable will depend upon your program’s particular needs. The following example sets a new value based on the Actual_Position of AXIS0:



The fourth block causes program execution to loop and repeat if the value of the variable “index” is less than 13000:



Option 3: Use Duplicate Module instead of Copy & Paste

If the same sequence of identically configured blocks appears in several parts of your diagram, you can reduce the lines of iCODE in your program if you:

1. Create a module that encapsulates the first occurrence of the identically configured, repeating blocks.
2. Delete each subsequent occurrence of these blocks.
3. Replace each deleted occurrence of these blocks with a duplicate of the module you created in step 1.
4. When program execution reaches a duplicate module, GML Commander refers back to (or "calls") the iCODE of the original module. Although two module blocks appear in your diagram, both blocks share the same lines of iCODE. This reduces lines of iCODE and saves Application Memory.

Note: Any change to a parameter in a duplicated module also changes the same parameter in the duplicate module (and vice versa).

See the Online Help topic "Duplicate Module versus Copy & Paste" for more information.

Q: Is there a way I can find out how long it takes to execute a module, or other series of blocks, in my diagram?

A: Yes. You can use the Free Running Clock to time the execution of any module, or series of function blocks. The steps are:

1. Declare a new User Variable to receive the time it takes to execute your function blocks. Do not initialize this variable.
2. Add a Set Timer block to your program at the point where you want to start timing. The Set Time value should be set to 0.

3. Add an Equation block to your program at the point where you want to end timing. Select **Configured** Type, **User Variables** and the name of the new User Variable set in step 1.

4. After the function blocks run, check the value of the User Variable. This represents the time, in seconds, it took your code to execute.

Or, you can use the sample diagram Timer.GML (found in the Samples\imcs230 subdirectory) to measure how long it takes to execute a module. Just insert the module (or modules) you wish to time into this diagram in the places indicated, then run Timer.GML. For instructions on using Timer.GML, open the diagram and select Diagram → Diagram Documentation from the Main Menu.

Q: Can you view User Variables listed according to their address?

A: Yes. In the Tag Window, just click the "Address" column header, and the User Variables will be sorted by Address in ascending order.

Q: I know that I can add five lines of comments (up to 64 characters per line) beneath each block, but can I make lengthier and more detailed comments for modules?

A: Yes. One helpful, if not obvious, feature of GML Commander is the ability to make lengthy comments for each module in your diagram. If you copy a module in one diagram and paste it into another diagram, the comments will travel with the module.

To do this:

1. In the Diagram Explorer, click on the module you wish to document.

2. In the Main Menu, select **Module** → **Module Doc…** . The Module Documentation dialog box opens.

3. Enter your comments in the input box (replacing the default words "Module Documentation").

Note: You can enter over 100 lines of comments in this input box.

4. Click **OK** to save your comments.

Q: I used a Task Control block to create multiple tasks within my diagram. What happens if I connect Task1 back to Task0? Will this end Task1?

A: No, this does not end Task1. Instead, this causes the blocks in Task0, to which Task 1 is connected, to execute as both part of Task0 and Task1.

Note: This programming practice is **not** recommended.

Q: Why aren't all General and Axes System Variables made available in the Equation block?

A: The purpose of the Equation block is to set a value for a tag. Thus, only "Read/Write" tags are displayed in this block. It would be misleading to display "Read Only" System Variables in the Equation block, because their values are set exclusively by the controller and cannot otherwise be changed.

Q: I properly configured a Position Lock Cam block but, when I run my program, the Cam never executes. Why?

A: Most likely, the master axis never reached the Master Reference Position, so the Position Lock Cam was not triggered. The Cam is triggered - and motion along the slave axis begins - only when the absolute position of the master axis passes the specified Master Reference Position.

Once the master axis passes this position, it enters the range defined by the master cam table. At the same time, slave axis motion is initiated according to the Cam profile and PCAM_profile_status for the slave axis is set to 1.

Q: After the Position Lock Cam block executes, GML Commander indicates that I suddenly have a large position error on the slave axis. Why?

A: This most frequently occurs for Rotary axis operations (i.e., with **Rotary** selected as the Position Mode in the General page of the Configure Axis Use dialog box). For a full 360-degree operation, the Master axis Cam Start Point and Cam End Point must refer to the same point on the Master axis.

For example, if your Position Lock Cam table consists of one point per degree (points 0 through 359), the table must also include a 361st point (point number 360). Both point number 0 and point number 360 must refer to the same Master axis position. If this 361st point (in this case Cam point number 360) is not included, the controller will attempt to return the master axis to Cam point 0. This causes brief and uncontrolled motion on the slave axis, and creates a Position_Error value on the slave axis.

Q: How many points can I place into a Build Table block?

A: The maximum number of points depends upon the iCODE (or firmware) version you are using, and whether the table holds Cam Table points or a Variable Array, as follows:

iCODE Version	Table Type	Number of Points
3.0 or later:	Master Cam Table	13,000
	Slave Cam Table	13,000
	Variable Array	2,000
2.3 or earlier:	Master Cam Table	2,000
	Slave Cam Table	2,000
	Variable Array	1,000

Q: When my PCam executes, machine motion is very rough. What can I do to smooth-out machine motion?

A: Add more points to your Cam Table, with a smaller incremental difference between each point. This will fill-in the Cam profile, and cause the Cam to run more smoothly.

Note: Remember that the values in each master or slave axis profile represent incremental differences between each point, and not absolute axis positions.

Fault Handling Questions:

Q: My fault handler executes even when my program doesn't have a fault. Why? Also, when I abort my program, the controller shows a "Stop Command Failed." message. What do I do?

A: Typically, a fault handling routine will be triggered by an End Program block set to **When End or Fault**. Thus, the fault handler will run if any of the following three events exits:

- a Runtime Fault has occurred,
- a Global Fault has occurred, or
- a Stop Program command has been issued.

Often, the fault handler is designed to handle a Runtime or a Global fault, but overlooks the case of a Stop Program command. To confirm this case, take the following steps:

1. Select **General System Variables** in the Tag Explorer, then look in the Tag Window to verify that there is no Global or Runtime fault.
2. If there is no Runtime or Global fault, look at your fault handler. After this routine checks for Runtime and Global faults, does it lead to an End Program block set to **End**? If not, add this block to the end of the fault handler.

Note: It is good programming practice to include a controlled stop routine before the End Program block. This routine should include any Stop Motion blocks and Output blocks necessary to bring your system's machinery to a safe stop, and set outputs to the desired state.

3. Check your RIO or SLC interface dedicated I/O bits to insure that these are not issuing a stop program command, thereby triggering the fault handler.

Q: After I clear a fault, program execution remains in the fault handler. Why?

A: Remember that the fault handler will always execute when a fault is present. Most likely, your fault handler is designed to restart ("Restart Program") or continue ("Restart Dispatcher") program execution immediately after clearing the fault. Although the fault-clearing command you issue will immediately set the fault bit in GML Commander, the controller does not read this value until the next servo interrupt (or update). In the meantime, the controller continues to read the value in the servo loop, which is the faulted value.

If GML Commander (which typically is faster than the servo update rate) tries to restart the program before the servo update occurs, the controller will detect the previous fault and direct program execution to the fault handler. Because the fault bit in GML Commander has already been cleared, GML Commander will not display this fault.

Note: Depending upon the Servo Update Rate (set in the General page of the Configure Control Options dialog box), there can be a delay of 1 to 10 milliseconds before the cleared fault is communicated to the controller.

To get out of this loop and take program execution out of the fault handler, delay program restart. To do this, insert one or more of the following blocks into the fault handling routine, ahead of the block (either a Restart Program block, or a Task Control block set to **Restart Dispatcher**) used to restart the program:

- an On Expression block, set to **If Expression**, to check that the global and runtime faults are equal to 0, and

- a Set Timer block, with a **Count Down Timer** selected, to delay program restart until enough time has passed (1 to 2 seconds) so that the servo loop has been updated and the fault has been reset.

Note: If an emergency stop command has dropped the three-phase power to a 1394, 1394L or 1394 Turbo controller, use one of the following blocks to insure that three-phase power is restored before restarting the program:

- an On Expression block (set to **If Expression**) to wait for (**System_bus_up_1394** = 1 && **Miscellaneous_input[4]** = 1)
- a Reset Fault block (set to **Reset 1394**).

Q: Is there an easy way to move an axis after it has hit an overtravel limit?

A: There usually is no simple way to move off an overtravel. In most cases, Fault Action (set in the Fault Action page of the Configure Axis Use dialog box) is set to **Disable Drive** or **Stop Motion**. In either case, it will take several programming steps to clear the overtravel and move the axis.

Follow these steps to clear the overtravel and move the axis:

1. Use the Control Settings direct command to adjust and disable Hardware Overtravel Checking (data bit #4) or Software Overtravel Checking (data bit #6), depending upon the type of overtravel.
2. Use the Reset Fault direct command, set to **Axis Fault**, to clear the Hardware Overtravel or Software Overtravel fault.
3. If Fault Action was set to **Disable Drive**, use a Feedback direct command to turn feedback **ON**.

4. Use the Move Axis (or Jog Axis) direct command to move (or jog) the axis to a point that does not trigger either a hardware or software overtravel.

ATTENTION: Be careful to move (or jog) the axis in the direction that is opposite from the previous motion (i.e., away from the overtravel condition). Movement in the wrong direction may cause physical harm to materials, machinery or even to the operator.

5. Use the Control Settings direct command to re-enable the Hardware Overtravel Checking (data bit #4) or Software Overtravel Checking (data bit #6), depending upon the type of overtravel.

Q: When running my diagram, I get a CPU Utilization Overrun Fault (Global_fault = 15). How do I continue running my diagram without this fault recurring?

A: The occurrence of this type of fault indicates that the servo update rate is set to a value that is too high to support the complexity of your diagram. To prevent this fault from recurring, lower the Servo Update Rate in the Configure Control Options dialog box.

The following table shows the relationship between servo update rate settings, and a rough estimate of the corresponding time between updates:

Servo Update Rates	Est. Time between Updates (milliseconds)
250	4.0
1000	1.0
2000	0.5

In the time between updates, the CPU must perform two tasks:

- perform the update of values (this takes roughly the same time, regardless of the time between updates), and
- run the application program (i.e. your diagram).

The shorter the time between updates, the less time is available for the CPU to run the program and the higher the CPU utilization rate.

Q: When executing my application program on a 1394 controller, GML Commander indicates a Global_fault = 5 (Drive Fault). What caused this and how do I clear the fault?

A: Global_fault is the highest level fault variable. You cannot directly clear a Global_fault variable. Instead, you must identify and resolve the underlying cause of the problem, then clear the lower-level fault that triggered Global_fault = 5.

Any one of the following three lower-level faults will cause Global_fault = 5 (Drive Fault):

- Drive_hard_fault_1394
- Axis_Motor_over_temp_fault_1394
- DSP_feedback_fault_1394.

If the cause of Global_fault = 5 is either Axis_Motor_over_temp_fault_1394, or DSP_feedback_fault_1394, you can clear Global_fault = 5 by clearing either of these lower-level faults.

Note: You can clear these faults with a Reset Fault block. For a DSP_feedback_fault_1394, set the Type to **Reset 1394**.
For an Axis_Motor_over_temp_fault_1394, set the Type to **Axis Fault**, select the Axis, then select **Motor\Thermal Fault**.

However, if the cause of Global_fault = 5 is Drive_hard_fault_1394, you must delve through two additional levels of faults to find the cause of the Drive Fault.

Because the axis drive is internal to the 1394 module, the cause of the Drive_hard_fault_1394 could originate in either the system or the axis drive portion of the 1394, 1394L or 1394 Turbo system module. If the underlying fault is a system fault, System_module_hard_fault_1394 = 1. If the underlying fault is a drive fault, Axis_module_hard_fault_1394 = 1.

Because these hard faults are also upper level faults, you must identify the lower-level fault that triggered the axis or system hard fault.

Lower-level faults triggering System_module_hard_fault_1394:

System_bus_over_voltage_fault_1394 = 1
System_bus_undr_voltage_fault_1394 = 1
System_control_power_fault_1394 = 1
System_ground_fault_1394 = 1
System_over_temp_fault_1394 = 1
System_phase_loss_fault_1394 = 1
System_serial_ring_fault_1394 = 1
System_smrt_pwr_i_limit_fault_1394 = 1
System_smrt_pwr_pre_charge_fault_1394 = 1
System_smrt_pwr_shunt_timeout_fault_1394 = 1

Lower-level faults triggering Axis_module_hard_fault_1394:

Axis_bus_loss_fault_1394 = 1
Axis_Drive_over_temp_fault_1394 = 1
Axis_it_fault_1394 = 1
Axis_power_fault_1394 = 1

(For additional information about the relationship between Global_fault conditions and underlying faults, see the Global Fault chapter of this manual.)

After you have fixed the underlying cause of the hard fault, you must reset the lower-level fault using a Reset Fault block with the Type set to **Reset 1394**.

Clearing the lower level fault automatically clears all upper-level faults – including the Global_fault – unless another lower-level fault simultaneously exists. After all lower-level faults are cleared, the controller automatically clears all upper-level faults.

Going Online Questions:

Q: I can't get GML Commander to come online and communicate with the controller. What is wrong?

A: There are many possible causes for this failure. Some of the more likely causes are:

- GML Commander might be configured to use the wrong serial port or baud rate. To change these settings, select **File → Properties** in the Main Menu. In the Properties dialog box, select **Configure Interface…**, then edit Serial Port and Baud Rate values as necessary.
- Either the cable that connects your PC to the controller or the cable connectors are defective.
- GML Commander and another application on your PC are competing to use the same serial port. This often occurs when a driver, such as a DF1 serial protocol driver, or another application are being loaded by the operating system. Check to see if other drivers or applications, which use serial communications ports, are loaded or open. If so, temporarily disable the other drivers or close the other applications – one at a time – to see which one of them may be causing the conflict. If the problem persists call Rockwell Automation technical support.

Q: After I downloaded my diagram to the controller, it was obvious that not all of the settings – particularly the axis configuration settings – were downloaded. Why did this happen?

A: You must select **Download Axis/Drive Data with the Diagram** (in the Configure Axis Use dialog box) to download all axis configuration settings. If this selection is not made, only the configuration settings in the General and Units pages of the Configure Axis Use dialog box will be downloaded.

Q: I used the Upload Options dialog box to upload my Cam point settings. However, the uploaded Cam points are not the same as the Cam points as set in the Build Table block. Why?

A: When GML Commander downloads Cam Point settings, it converts the Cam table points (set in axis units) into the number of encoder edges that must be counted to move the axis the set number of axis units. The equation for this conversion is:

(Cam Point Value) x (Axis Conversion Constant) = Encoder Edges to Count.

Note: The Axis Conversion Constant is set in the Feedback page of the Configure Axis Use dialog box for the selected axis.

When you upload these values from the controller, using the Upload Options dialog box, these values can be displayed either in:

- their converted format (by de-selecting **Data Only**), or
- their original Cam table format (by selecting **Data Only**).

Example:

Assume the following:
The Master Axis (Axis0) Conversion Constant is 4000.
The Slave Axis (Axis1) Conversion Constant is 8192.
A Build Table block in the GML diagram contains the following Cam table:

Master	Slave
0	0
1	1
2	2
3	3
4	4

When these incremental axis points are downloaded to the controller and executed in the program, they are stored in memory as encoder edges to count using the equation set forth above, as follows:

Master	Slave
0	0
4000	8192
8000	16384
12000	24576
16000	32768

De-Selecting Data Only

If you upload these points from the controller by de-selecting **Data Only**, these points will not appear as they did in the original Build Table block. Because the controller does not know which column in the table is associated with which axis (Axis0 or Axis1), the controller will divide both columns by the Axis0 Conversion Constant. Therefore, the following data is uploaded with **Data Only** selected:

Master	Slave
0	0
1	2.048
2	4.096
3	6.144
4	8.192

Note: De-select **Data Only** if you want to create a back-up file of Cam table data, which can be stored and later downloaded to the controller. When you re-download the uploaded data, the controller will again multiply both columns by the Axis0 Conversion Constant, returning these values to the encoder edges to count format.

Selecting Data Only

Conversely, if you upload these points from the controller by selecting **Data Only**, these points will appear as they did in the original Build Table block.

Note: The uploaded Cam table data file, created with **Data Only** selected, cannot be re-downloaded to the controller.

Diagram Execution Questions:

Q: Will the CPU Utilization Rate increase as the number of tasks in the diagram increases?

A: No. The controller executes one block from each task in round-robin fashion. Increasing the number of tasks in the diagram will slow program execution, but will not increase the CPU Utilization rate.

Communications Questions:

Q: I want to change the baud rate of the diagram that I have already downloaded to the controller. How can I do this?

A: In order to change the baud rate and run your diagram, you must change the baud rate setting in both GML Commander and the controller.

To re-set the baud rate in the controller:

1. Use the Online Toolbar's Select Direct Command window to issue a Control Settings block command with the following settings:

- Type = **Adjust**
- Value = **Power-up**
- Select **Data Parameters**
- Select the data parameter **Channel A Baudrate**

- The State is Set To the setting that represents the desired baud rate:
  0 = 300
  1 = 1200
  2 = 2400
  3 = 4800
  4 = 9600
  5 = 19,200
  6 = 38,400
  7 = 56,000
  8 = 115,300
  9 = 128,000

To re-set the baud rate in GML Commander:

1. From the Main Menu, select File → Properties. The Properties dialog box opens.
2. In the Properties dialog box, select **Configure Interface…** . The Serial Interface Configuration dialog box opens.
3. Set the Baud Rate.

Note: Be sure to set both the controller and GML Commander to the same baud rate setting.

4. Select **OK** to close each of the open dialog boxes. When you do this, GML Commander communications go OFFLINE.
5. Press the RESET button on the controller.
6. In GML Commander, click the Online Connection button on the Online Toolbar to re-establish communications with the controller.
7. To confirm the baud rate change, use the Direct Command window to issue another Control Settings block with the following settings:
   - Type = **Show**

- Value = **Power-up**
- Select **Data Parameters**
- Select the data parameter **Channel A Baudrate**.

The Terminal Window should display the number (0 – 9) that represents the new baud rate.

Q: My RIO block transfer fails (times out), and the error message reads "-9". What caused the transfer to fail?

A: This error message usually means your transfer was incorrectly configured. Check your configuration for one or more of the following:

- Verify that the number of sequential elements being transferred is in hexadecimal (hex) format, and not in decimal format. Be sure that word two of the configuration, which sets both the format of the data and the number of elements to be transferred, is in hex and not decimal format. For example, if word two is "3010", the numeric format of the transfer is "32-bit floating point" (3), no decimal digits are specified (0), and sixteen sequential items are included in the transmission (10). Remember that word two is represented as a hexadecimal number, and that the number 10 in hexadecimal equals the number 16 decimal.
- If you are transferring user variable values, be sure that you have defined (in the receiving controller) at least the number of user variables that are being transferred. Also, be sure that the addresses of the user variables (in the receiving controller) match the addresses of the user variable values being sent.

Q: When I use AxisLink, I sometimes get AxisLink_fault_code error messages 17 and 96. What causes this?

A: Possible causes for error message 96 are:

- The connectors at each end of the AxisLink cable might be improperly wired. Unplug the AxisLink cable and hold both connectors side by side (facing the same way). Verify that the blue wire in one connector matches the blue wire in the other, the clear wire matches the clear wire in the other, and that the shield (with no plastic cover) matches the shield in the other.

  Note: Remember that the AxisLink connector is inserted "upside down" into the 1394, 1394L or 1394 Turbo controller (when looking at it from the front).

- The AxisLink cable might be of the wrong length for the controller connection you are making. The minimum cable length between any two controllers on the AxisLink chain is three feet; the maximum end-to-end cable length for an entire AxisLink chain is 82 feet (25 meters).

A possible cause of error message 17 is:

- If you are using an ALEC module, the GML Commander software might be improperly configured. In the AxisLink page of the Configure Control Options dialog box, verify that the "Read Outputs from: Controller" checkbox is **not** selected for any ALEC module. (An ALEC does not have any outputs.)

Q: Can I connect my computer to the controller using a modem and telephone line?

A: No. The controller does not have the necessary handshaking data to permit the use of telephone line/modem communications.

Q: The controller sometimes experiences a communication failure during DH-485 variable transfers. Why?

A: DH-485 communications failures often occur in the following cases:

Case 1: The application program is designed to send two (or more) DH-485 variables, and transmission of the second variable begins before transmission of the first value has concluded. Solutions include:

- Delay the sending of the second (or later) DH-485 transmission. Place a Set Timer block (set to **Count Down Timer**) between the Equation blocks that set the values of the DH-485 variables to be sent.

  Note: The length of the delay – longer or shorter – depends upon the File Type of DH-485 variable being sent. For example, a **Floating** File Type (set when the DH-485 local variable is defined) will take more time to send, so follow this with a longer delay (e.g. 0.5 seconds or more). A **Binary** or **Integer** File Type will require less time to send, so follow this with a shorter delay (0.1 seconds, or so).

- Place an On DH-485 Status block (set to **If DH-485** status is **Busy**) ahead of the DH-485 Value block that sends the second (or subsequent) DH-485 variable. Loop this block's upper node back upon itself, so that program execution will loop until the DH-485 communication connection is no longer busy.

Case 2: The controller is communicating with an intelligent device (e.g. an SLC), and both the controller and the other device are attempting to communicate simultaneously. Solution:

- Use the SLC as the 'master' to coordinate communications –thereby eliminating any handshaking collisions on the network – by using MSG (message) ladder logic instructions within the SLC.

Q: My SLC experiences a "power loss fault" (SLC_fault_code = 2) whenever I reset the 1394 Turbo controller, change and download changes to the SLC configuration (set in the SLC page of the Configure Control Options dialog box), or power down the 1394 controller. Why does this "power loss fault" occur, and what should I do in response to it?

A: All three events terminate, at least temporarily, backplane communications between the 1394 Turbo controller and the SLC. Whenever backplane communications terminate, this fault occurs. When the 1394 Turbo is reset, communication from the 1394 Turbo to the SLC is restored and this fault disappears on its own.

Note: You may need to handle this type of fault in the ladder diagram in your SLC.

Q: What sequence should I use to power up the SLC and the 1394 Turbo controller?

A: Apply 24V W1, W2 control power to the 1394 Turbo controller, and 115V power to the SLC at the same time. However, if power up of either device is delayed, they both should recognize the other when they start up.

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