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Application Note #2443

Error Code Descriptions for Optima Controllers

Introduction

The command TC1 is a useful tool to determine why the controller has a problem. This application note gives examples and explanations on how each of the error codes can be generated. These error codes appear whenever the command TC or TC1 is issued. Most error codes listed here are applicable for all series of Galil controllers (Optima, Econo, etc…) however this list has been specifically developed for Optima level controllers.

Table of Contents

1   Unrecognized command

This occurs when an invalid command is issued.

```
:TY
?
:TC1
1 Unrecognized command
:
```

This is illegal because `TY` is not a Galil command

2   Command only valid from program

```
:EN
?
:TC1
2 Command only valid from program
:
```

This is illegal because the `EN` command is used to control program sequence. This command cannot be run from the command line. The Command Reference indicates whether a command is valid from the command line in the Usage section. Other commands that aren't valid from the command line include `IN`, `IF`, etc.

3   Command not valid in program

```
#Label
RS
EN
```

This program will cause error 3 because the `RS` command (Reset) is illegal from within a program. The Command Reference indicates whether a command is valid in a program in the Usage section. Other commands that aren't valid in a program include `^R^S` and `^R^V`.

4   Operand error

```
#Label
AP
EN
```

This program will cause error 4 because the `AP` command requires that a position be specified. Any command that requires that the operand be specified can generate this error when the operand is omitted.

5   Input buffer full

```
:
```

This error will occur if a trippoint is issued via the RS-232 line, and a large amount of data is sent before the clearing of this trippoint.

6   Number out of range

```
:SP12200000
?
:TC1
6 Number out of range
:
```

The SP (speed) command has a valid input range of 0 to 12000000. Commands that require an argument have a valid input range as indicated in the Command Reference.

7   Command not valid while running

If DP is commanded while the axis is already in commanded motion (the profiler is active) this error will be generated:

```
:JG1000
:BGX
:DP0
?
:TC1
7 Command not valid while running
:
```

MO and PR will also generate this error if executed while the axis is in commanded motion.

8   Command not valid when not running

```
#Label
ST
AM
AP1000
EN
```

This will generate error 8 if there is no commanded motion (the profiler is inactive). Certain commands require that the profiler be active for them to work. The AD command also requires the profiler to be active.

9   Variable error

```
:SP var
?
:TC1
9 Variable error
:
```

If the variable, in this case var, isn't initialized before it is used as a command argument this error can be generated. In this case if var had been initialized to some value, for example:

```
:var=5000
```

this error would not have occurred.

10 Empty program line or undefined label

If there is no program in the controller's memory and the `XQ` command is issued, the controller will respond with this error.

```
:XQ
?
:TC1
10 Undefined label or empty sequence line
:
```

11 Invalid label or line number

```
#Label
TP
EN
```

If this program is loaded into memory, and the command:

```
:XQ#Start
```

Is executed the controller will respond with this error since the label `#Start` does not exist.

12 Subroutine more than 16 deep

```
#Loop
JS#Loop
EN

:XQ
:?6 JS#Loop
```

The limit to the number of nested subroutine calls which can be made is 16. To alter the subroutine stack, use the `ZS` command.

13 JG only valid when running in jog mode

```
:PA1000000
:BGX
:JG1000
```

If the axis is already executing a move in another mode, such as a `PA` move, it is invalid to issue a jog command.

14 EEPROM check sum error

If this error is returned it indicates that there is a check sum error in the EEPROM. This can occur if the controller power is interrupted while burning data to the controller (using the `BN`, `BP` or `BV` commands). The `_RS` operand indicates if the check sum error is due to the variables, parameters, or the program.

On legacy controllers the EEPROM had a limited number of burn cycles. On these controllers it is possible to wear out the EEPROM by storing variables frequently within a program.

15   EEPROM write error

This error will occur if there is a physical flaw on one or more sectors of the flash EEPROM. This will occur if BN, BV, or BP is issued with this flaw present.

16   IP incorrect sign during position move or IP given during forced deceleration

```
:PA1000000
:BGX
:IP-1000
```

The code will generate this error. If the axis is moving towards a position specified by PR, PA or IP the incremental position specified by IP must be in the current direction of motion.

17   ED and DL not valid while program running

```
#Loop
JP#Loop
EN
```

If a program is currently executing the ED and DL commands are invalid.   When using the terminal in WSDK or DMC Smart Terminal the ED and DL commands are intercepted before they are sent to the controller, and the terminal either opens up the terminal editor (if it isn't already open) or asks if the user wishes to interrupt the program.

18   Command not valid when contouring

When executing contour mode other non-contour moves are not valid. In this example a simple contour program is used:

```
#Start
CMX       ;'Set contour mode on X-axis
DT8       ;'Set contour interval to 256ms
#Loop
CD100;WC ;'Send contour data and wait
JP#Loop  ;'Jump to #Loop
DT0;CD0  ;'End contour mode
EN
```

If one attempts to start a PR move while contouring this error occurs:

```
:XQ
:PR1000
:BGX
?
:TC1
18 Command not valid when contouring
:
```

19   Application strand already executing
This error will occur if the thread is already executing. Take for instance the following program:
```
#Loop
JP#Loop
EN

:XQ
:XQ
:?19
```
The error occurred because the thread was already running when the 2nd XQ was commanded.

20   Begin not valid with motor off
```
:MO
:PR1000
:BGX
```
The above code returns this error. The motor needs to be enabled using the SH command to be able to start a move.

21   Begin not valid while running
```
:PR1000000
:BGX
:BGX
```
This code generates an error when the 2nd BGX is issued since the axis is already moving.

22   Begin not possible due to Limit Switch
```
:PR100
:BGX
```
If the above code is executed while the forward limit switch is active this error will be generated. It is only possible to move in the direction opposite that of the active limit switch.

24   Begin not valid because no sequence defined
```
:VMXY
:BGS
```
When in vector mode or linear interpolation mode vector data must be specified using CR, VP or LI commands before the motion is started with BG.

25   Variable not given in IN command
```
#Start
IN "Please enter number."
EN
```
This code generates the error. When using the IN (input) command the input variable must be specified. The following input command has the correct format:
```
IN "Please enter number.",var
```

28   S operand not valid

```
#Start
MCS
EN
```

The S operand is not a valid argument to certain commands. For instance, in this code example the MC command is a trippoint that waits for an encoder to reach a certain position, but has no meaning for the S-plane.

29   Not valid during coordinated move

```
#Start
VMXY
VP10000,20000
BGS
ES3,4
EN
?
:TC1
29 Command not valid during coordinated move
:
```

A coordinated move was started from a program. However, during the move, the next line in the code attempted to set up the Ellipse Scale (ES).

30   Sequence segment too short

In vector (VM) and linear interpolation (LM) modes all vector segments must have a non-zero position delta. In the following example the first vector segment from the starting coordinates of 0,0 to 100,50 is valid because it has a non-zero delta distance. The next vector segment is to the same position as the current one, resulting in a vector segment of zero distance, which is invalid:

```
:VMXY
:VP100,50
:VP100,50
?
:TC1
30 Sequence segment too short
:
```

31   Total move distance in a sequence > 2 billion

This error occurs if the total buffered length of a coordinate move exceeds 2 billion counts.

```
counter=0
LMXYZ
#Loop
LI8000000,8000000,0
counter=counter+1
JP#Loop,counter<511
LE;BGS
```

```
EN
:XQ
?
:TC1
31 Total move distance in a sequence > 2 billion
```

32   More than 511 segments in a sequence

In both vector (VM) and linear interpolation (LM) modes no more than 511 segments may be in the vector buffer at a one time. This error is generated when the following program attempts to add the 512th element:

```
LMXY                    ;'Start Linear Interpolation Mode
counter=0               ;'Initialize counter
#Loop
LI100,100               ;'Add vector segment to buffer
counter=counter+1       ;'Increment counter
JP#Loop, counter<512 ;'Jump to label #Loop
LE                      ;'End of linear interpolation sequence
BGS                     ;'Begin sequence motion
EN

:XQ
:?3 LI100,100                   ;'Add vector segment to buffer
:TC1
32 More than 511 segments pending in a sequence
:counter=
 511.0000
:
```

If more than 511 segments are in a vector sequence it is possible do so after the motion begins. As each segment is executed, space becomes available in the buffer.   The available space in the buffer can be monitored using the _LM operand.   Please see Application Note 2413: "Controlling Linear Interpolation from a Host Program" for more details at:
http://www.galilmc.com/support/appnotes/optima/note2413.pdf

33   VP or CR commands cannot be mixed with LI commands

When in vector (VM) mode CR and VP must be used. The LI command will not work in VM mode. Conversely in linear interpolation (LM) mode LI must be used, but CR and VP will not work.

```
:LMXY
:VP300,100
?
:TC1
33 VP-CR and LI moves cannot be mixed in a sequence
:
```

41   Contouring record range error
This error code no longer exists.

42   Contour data being sent too slowly
```
:CMX
:DT2
:CD100
:TC1
42 Contour data sent too slow
:
```
When executing a contour motion the data must be fed at a rate sufficient to maintain constant motion. If the data is fed too slowly, such as would be the case if the CD data were typed in manually from the command line, this error will be generated. The Accelera series uses a buffered contour mode.

46   Gear axis both master and follower
```
:GAX=X
```
The gearing master and slave must be two different axes. Specifying the master to be the same as the slave axis as above will return this error.

50   Not enough fields in CR command
This code occurs if one or more fields in the CR command are empty.
```
:VMXY
:CR3000,100
?
:TC1
50 Not enough Fields
```

51   Question mark not valid
The question mark syntax used to query certain values isn't valid with all commands. Commands that will generate this error when used with the question mark syntax include the trippoints AD, AP, AR, MF, MR, AI, AV, for example:
```
:AP?
?
:TC1
51 Question mark not valid
:
```

52   Missing " or string too long
```
:MG"Hello
```
This example returns the error since the second quotation mark is missing.

53   Error in {}

Curly brackets are used primarily to format the output of commands such as MG. This error may be generated when an invalid format is used inside the Curly brackets. For instance, to format a decimal number the {Fm.n} format is used where m are the number of digits to the left of the decimal point, and n is the number of digits to the right of the decimal point. One way to generate this error is to omit the F:

```
:x=3.1416
:MGx{4.2}
?
:TC1
53 Curly bracket error
:
```

54   Question mark part of string

This error occurs if a '?' is used within a string. For example,

```
:FRED=1000
:PRFRED?
?
:TC1
54 Question mark part of string
```

55   Missing [or []

This error will occur if a right bracket ']' is noted but there is no left-bracket '[] to begin the argument. Example:

```
:v1=@AN4]
?
:TC1
55 Missing [ or []
```

56   Array index invalid or out of range

```
:DM array[3]
:array[5]=123
?
:TC1
56 Array index invalid or out of range
:
```

As in this example, the array index must be within the size of the dimensioned array. If the array is dimensioned to be 3 elements in size, as in:

```
DM array[3]
```

the valid range of array indices is 0 to 2. All arrays on Galil controllers have a base of zero.

57   Bad function or array

This error is generated when an array that hasn't been defined is queried. It can also be generated by improper use of square brackets. Use the LA (List Arrays) command to list any arrays in memory. If no arrays exist in memory, the LA command will return nothing. Here, the non-existent array, VAR[] is queried:

```
:LA
:VAR[3]=
?
:TC1
57 Bad function or array
:
```

58   Bad command response

This error will be returned if the operand being queried is not valid, for example:

```
:MG_QQQ
?
:TC1
58 Bad command response
:
```

59   Mismatched parentheses

```
:x=3*(5/2))
?
:TC1
59 Mismatched parenthises
:
```

In a mathematical expression each opening bracket must have a corresponding closing bracket.

60   Download error - line too long or too many lines

Each model of controller has a program size limit in both the number of lines of code and the total number of characters per line. Take for instance the following line of code:

```
MG"0123456789012345678901234567890123456789012345678901234567
890123456789"
EN
```

This code sample has over 80 characters in the first line. If one attempts to download this code using DMC Smart Terminal the following error message is displayed:

DMCTerminal Control

⚠ 60 Download error-line too long or too many lines. Line Number in error = 0.

[OK]
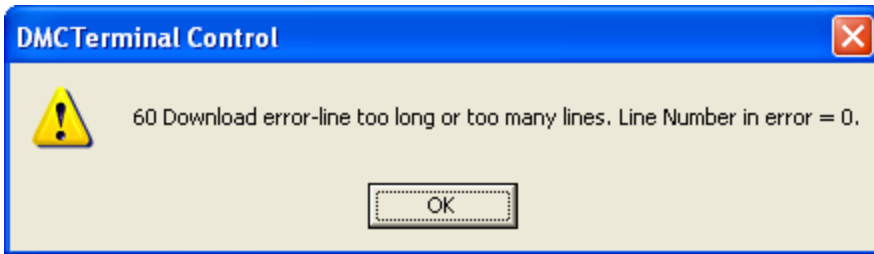
On all Optima bus series, DMC-18x2, DMC-2xxx and CDS-3310 controllers the maximum program size is 1000 lines by 80 characters. On DMC-1410, DMC-1411, DMC-1412, and DMC-1417 controllers the maximum program size is 250 lines by 40 characters. On DMC-14x5, DMC-34x5, and IOC-7007 controllers the maximum program size is 500 lines by 80 characters.

If more program memory is required it's possible to download a larger program to the controller by concatenating multiple commands onto one line using a semicolon, as in the following line:

```
PR1000;BGX;AMX
```

Using DMC Smart Terminal it's possible to do this automatically. Under the File menu in the program editor there are options to download with compression:
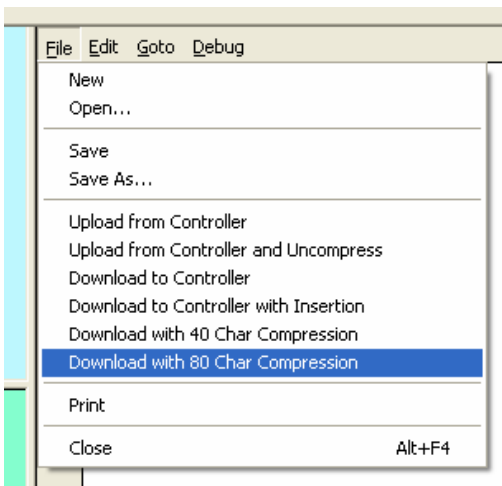
The options to 'Download with 40 Char Compression' and 'Download with 80 Char Compression' automatically concatenate commands where possible to a maximum of 40 or 80 characters per line.

61   Duplicate or bad label

```
#Start
x=1
#Start
y=1
EN
```

When attempting to download the code above DMC Smart Terminal captures the error code and displays the following message box:

To avoid this error make sure that each label in a Galil program is unique.

62   Too many labels

There is a limit to the number of labels that may be in a program. For instance if the following code is downloaded to a DMC-1842 controller an error is generated:

```
#LBL001;MG 1;EN
#LBL002;MG 2;EN
...
#LBL255;MG 255;EN
```

When using DMC Smart Terminal the error is intercepted and the following message box is displayed:
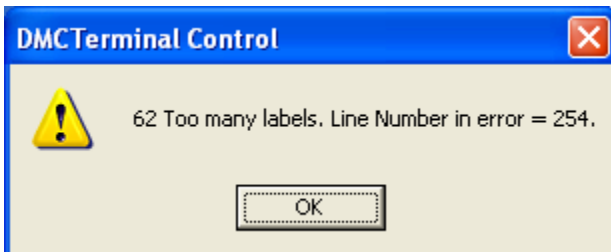
The maximum number of labels depends on the controller. On all Optima bus series and DMC-18x2 controllers this limit is 254, on DMC-2xxx controllers the limit is 510 and on DMC-14xx controllers the limit is 126.

It's possible to query the controller for the number of labels currently available using the _DL operand. For instance commanding MG _DL would return the number of labels.

63   IF statement without ENDIF

```
#Start
x=1
IF x=2
y=3
EN
```

Every IF statement must be followed by a corresponding ENDIF statement.

65   IN command must have a comma

This error code no longer exists

66   Array space full

Each model of controller has a limit on the available array space. For example, the controller in the following program has a limit of 8000 array elements.

```
#Start
DA*[]          ;'De-allocate all arrays in memory
DMarray1[8000] ;'Dimension array1 to be 8000 elements
DMarray2[1]    ;'Dimension array2 to be 1 element
EN
```

When the first array is dimensioned all available array space is used up. When the program attempts to allocate just one more array element the controller responds with an error:

```
:XQ
:?3 DMarray2[1]    ;'Dimension array2 to be 1 element
:TC1
66 Array space full
:
```

The number of available array elements can be querried using the _DM operand:

```
:MG_DM
```


67   Too many arrays or variables

Each controller model has a particular limit on the number of variables or arrays it can hold. For instance, on a DMC-1842 controller this limit is 254 variables. The following sample program attempts to set 260 variables.:

```
#Start
var001=1
var002=2
...
var260=260
EN
```

When this program is executed it generates an error because more than 254 variables were set:

```
:XQ
:?255 var255=255
:TC1
```

```
67 Too many arrays or variables
:
```

One can query the number of variables currently available using the _UL operand:
```
:MG_UL
```
The number of arrays currently available can be queried using the _DA operand:
```
:MG_DA
```

68   Not valid from USB Port
This error only occurs if the user is trying to access the internal Editor (ED command) via the USB using non-Galil software

71   IN only valid in task #0
The input command, IN can only be used in the main thread, thread #0. This code sample demonstrates the result of attempting to use the IN command in thread #1:
```
#Start
XQ#Other,1
EN
#Other
IN"Enter No.",var
EN

:XQ
:?4 IN"Enter No.",var
:TC1
71 IN only valid in main task
:
```

80   Record mode already running
Once the record array mode is started it must be stopped before it is restarted. The following program demonstrates the result of issuing the RC command when record array mode has already started:
```
#START
DA*[]               ;'Clear all array memory
DM position[1000]   ;'Dimension array
RA position[]       ;'Select array for data capture
RD _TPX             ;'Specify type of data for recording
RC2                 ;'Begin recording at 2^2 samples between records
PRX=1000            ;'Move relative 1000 counts
BGX                 ;'Begin motion
RC2
EN

:XQ
:?8 RC2
:TC1
80 Record mode already running
```

81   No array or source specified

If an array isn't specified using the `RA` command before record array mode is started this error will occur:

```
:RD_TPX
:RC2
?
:TC1
81 No array or source specified
:
```

82   Undefined Array

In record array mode if an array is specified with the RA command for an undefined array this error will occur:

```
:RA position[]
?
:TC1
82 Undefined array
:
```

83   Not a valid number

This error will occur during the QD (Quick Download) if one or more of the elements is not a number.

84   Too many elements

This error will occur during the QD (Quick Download)if there are too many numeric elements in the data file.

90   Only A B C D valid operand

No longer a valid error code.

96   SM jumper needs to be installed for stepper motor operation

All pre-Accelera Galil controllers must be configured for step motor operation by both setting the SM jumper for each axis on the controller and using the `MT` command to indicate step motor operation. If the `MT` command is used to set step motor operation without the SM jumper in place this error will be generated:

```
:MT2
?
:TC1
96 SM jumpers must be installed for stepper motors
:
```

97   Bad Binary Command Format

This error will occur if byte #2 in the binary command is not a 00, 01, 02, 04, or 06.

98 Binary Commands not valid in application program

This error will only occur if a binary command is written to the controller using the local editor (ED command).

99 Bad binary command number

When using the binary command mode, not all values for the command byte are valid commands. The following valid binary command represented in hexadecimal:

`a7 02 00 01 03 e8`

This is a valid binary command equivalent to PR1000.

If the first byte, the command byte is changed to an invalid value such as `ff` as follows:

`ff 02 00 01 03 e8`

the following error will be displayed in DMC Smart Terminal:
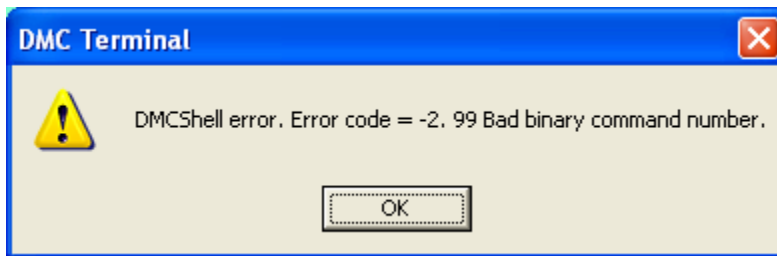
100 Not valid when running ECAM

If ECAM is already active on the controller one must disable ECAM using EB 0 before redefining the ECAM master using the EA command. If ECAM is already active and the EA command is used, this error will be generated:

```
:EAX
?
:TC1
100 Not valid when ECAM running
:
```

101 Improper index into ET (must be 0-256)

A limited number of ECAM points can be entered into the ECAM table. The argument to ET must be in the range of 0 to 256. Any value greater than this range will cause this error to be generated:

```
:EAX
:EM700,700
:EP100,0
:ET[257]=,0
?
:TC1
101 Inproper index in ET (must be 0 to 256)
:
```

102   No master axis defined for ECAM
This error code is no longer valid.

103   Master axis modulus greater than 256*EP value
The master axis modulus set by the `EM` command must be within 256 times the value set by the `EP` command. This is so because there is a limit of 256 ECAM table entries. The `EP` command sets the number of encoder counts the master axis traverses for each ECAM table entry. Therefore the maximum modulus for the master axis is 256*`EP`. In the following example the modulus is set to 40000, and the maximum allowable modulus is 256*100=25600:

```
#INIT
EAX           ;'Enable gearing with the X-axis as master
EM 40000, 400 ;'Set the E-Cam modulus
EP 100,0      ;'Set Cam table interval and starting point
ET[0]=,0      ;'E-Cam table entries
ET[1]=,150
ET[2]=,325
ET[3]=,375
ET[4]=,400
EB1           ;'Enable E-Cam
EG,0          ;'Specify position at which to engage E-Cam
EN


:XQ
:?9 EB1            ;'Enable E-Cam
:TC1
103 Master axis modulus greater than 256 * EP value
```

104   Not valid when axis performing ECAM
While an axis is operating as an ECAM slave it is invalid to command other motion on this slave axis. In this example the Y-axis is an ECAM slave to the X-axis:
```
:PRY=1000
:BGY
?
:TC1
104 Not valid when axis performing ECAM
```

105   EB1 command must be given first
Before the `EG` command is given to specify the position at which to enable ECAM the `EB1` command must first be given to enable ECAM. Issuing `EG` before setting up ECAM using the other ECAM commands, including `EA`, `EM`, `EP`, `ET` and `EB` to cause this error:
```
:EG,0
?
:TC1
105 EB1 command must be given first
```

110   No hall effect sensors detected

This error occurs after an axis is set to brushless (BA command), the Hall sensors are tied to inputs (using BI command) and commutated motion has been initiated. If the Hall data is illegal (value of 0 or 7) then the error will occur inside the control law.(no '?')

111   Must be made brushless by BA command

Commands used with brushless motors will return this error if the axis has not been made brushless with the BA command.

```
:BA    Note: the BA command with no arguments removes all axes configured for sinusoidal commutation.
:BS1,1000
?
:TC1
111 Must be made brushless by BA command
```

112   BZ command timeout

This error will be returned if the BZ command takes too long to settle on the motor's zero magnetic phase. This could happen if the motor is not wired correctly.

```
:BZ2
?
:TC1
112 BZ command timed out
```

113   No movement in BZ command

The BZ command drives the brushless motor to a position where the commutation phase is zero, and sets the phase to zero. If no movement is detected on the motor, this error will be generated:

```
:BZ-2
?
:TC1
113 No movement in BZ command
```

114   BZ command runaway

118   Axis must be configured as stepper

This error occurs only if a command is issued that is only valid for step motor operation.

119   Not valid for axis configured as stepper

Some commands require an axis be a servo only. An example is the OC (Output Compare) command:

```
:MT2
:OCX=200,100
?
:TC1
119 Not valid for axis configured as stepper
```

120   Bad Ethernet transmit

This error code is no longer valid.

121   Bad Ethernet packet received

This error occurs if a corrupt Ethernet packet is received by the microprocessor from the Ethernet chip. If this error occurs, it indicates a hardware problem with the Ethernet chip.

122   Ethernet input buffer overrun

This error occurs if large amounts of data (such as programs or arrays) is transmitted without adequate time for the controller to decode the packets. Current software drivers allow for small delays in the transmission of large amounts of data to allow the controller to decode packets and avoid this error.

123   TCP lost sync

This error indicates that there was a problem with Ethernet communication. Most commonly this error indicates that the Ethernet connection was lost, possibly by the Ethernet cable being unplugged. This error can also occur when there is too much traffic on the network. For best results it is recommended that Galil controllers be used on an isolated network. It is also recommended that a pre-manufactured Ethernet cable with molded ends be used.

In this example the error is duplicated by interrupting Ethernet communications by disconnecting the Ethernet cable briefly. First the unsolicited response is set to the current Ethernet handle, and then the program listed is executed to cause data transfer over Ethernet:

```
:CFI
:XQ
:Hello World.
Hello World.
Hello World.

#Loop
MG"Hello World."
WT400
JP#Loop
EN
```

Next another connection is made to the controller over an RS-232 connection to monitor the error. The Ethernet cable is disconnected briefly, and the error code is checked:

```
:TC1
123 TCP lost sync or timeout
```

124   Ethernet handle already in use

If an Ethernet handle is currently in use it cannot be assigned using the IH command. Use the `TH` command first to determine which Ethernet handles are available:

```
:TH
CONTROLLER IP ADDRESS 10,0,150,101 ETHERNET ADDRESS 00-50-
4C-10-00-33
IHA UDP PORT 1227 TO IP ADDRESS 10,0,0,83 PORT 1727
IHB TCP PORT 5000 TO IP ADDRESS 10,0,0,83 PORT 1728
IHC TCP PORT 1000 TO IP ADDRESS 10,0,150,100 PORT 1017
IHD AVAILABLE
IHE AVAILABLE
IHF AVAILABLE
:
```

If we were to attempt connecting to handle A which is already assigned to IP address 10.0.0.83, as can be seen in the `TH` command response above, this error will be generated:

```
:IHA=10,0,150,100
?
:TC1
124 Ethernet handle already in use
:
```
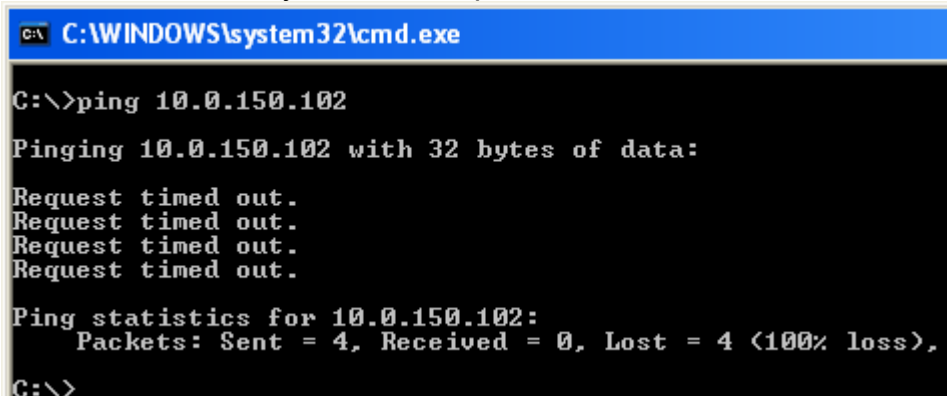
The solution is to use an available Ethernet handle, or if none are available to close some of the open handles and use those.

125   No ARP response from IP address

This error will occur when the destination IP address is unreachable while attempting to open a handle to it using the `IH` command:

```
:IHG=10,0,150,102
:TC1
125 No ARP response from IP address
:
```

One can check to see if the destination IP address can be reached over the network using the PING command from a DOS prompt. If the target address can't be reached any PING attempts will time out:

If the target IP address can be reached the PING command will display the response time:

```
C:\WINDOWS\system32\cmd.exe

C:\>ping 10.0.150.100

Pinging 10.0.150.100 with 32 bytes of data:

Reply from 10.0.150.100: bytes=32 time<1ms TTL=128
Reply from 10.0.150.100: bytes=32 time<1ms TTL=128
Reply from 10.0.150.100: bytes=32 time<1ms TTL=128
Reply from 10.0.150.100: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.150.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

126 Closed Ethernet Handle

Before communication can be started over a particular Ethernet handle the handle must be opened first using the IH command. To open communications to IP address 10.0.150.101 the following command would be issued:

```
:IHH=10,0,150,101
:
```

If the handle is not opened first, and a command is sent over the handle with the SA command this error will result:

```
:SAH="TE"
?
:TC1
126 Closed Ethernet handle (use IH)
:
```

127 Illegal Modbus Function Code

This error code occurs if an illegal Modbus function code is issued. Legal codes are 1,2,3,4,5,6,7,15,16,17. Due to the Modbus connection, no '?' is generated because there is no intelligent device in the Modbus network to receive it.

128 IP address not valid

When using the HC automatic handle configuration command to automatically assign IP addresses to slave controllers, the IP address of the master controller from which the HC command is issued must already be configured. Use the IA command over a serial connection or DMC Net to assign the IP address. If the IP address is not set, such as after a master reset, the HC command will generate this error:

```
:^R^S (Warning: this will perform a master reset on the
controller clearing all programs, settings and variables
stored to EEPROM)
:HC
?
:TC1
128 IP address not valid
:
```

129   HC already executed

If the HC command has already been executed this error will be generated. Once the slave controllers have been configured the HC command is invalid:

```
:HC3,20,2,0
:
:HC4,30,2,0
?
:TC1
129 HC already executed
:
```

130   Illegal IOC command

When sending a Modbus command to an IOC-7007 controller using the extended addressing capability of Galil IO commands on Ethernet controllers, such as SB, the particular module being addressed must be appropriate to the command. If an attempt is made to set an digital output bit using the SB command to a analog output module an error is generated:

```
:IHB=10,0,150,101
:SB2000
?
:TC1
130 IOC command error
:
```

131   Timeout On Serial Port

This error can happen when the controller continues to send data over the serial port after the serial cable has been disconnected. In this example the following program is run to output data to the serial port at a high rate:

```
#LOOP
MG"This will output data on the serial port."
JP#LOOP
EN
```

The serial cable was disconnected and then reconnected. Another connection to the controller over Ethernet was used to test for the error:

```
:TC1
131 Serial port hardware handshake timeout
:
```

This error can be avoided by using CW,1 to allow the program to continue executing while the output FIFO on the serial port is full. Characters output after

the FIFO is full will be lost. For more information on the `CW` command please refer to Application Note 2437: Unsolicited Messages and the CW command at: http://www.galilmc.com/support/appnotes/optima/note2437.pdf

132   Analog inputs not present
This error indicates that there is no analog to digital converter present on the controller. In this example a DMC-2143 was used, with no sandwich amplifiers or daughterboard present:
```
:MG@AN[1]
?
:TC1
132 Analog inputs not present
:
```

Analog inputs can be added to DMC-21x3 controllers with a DB-28040, an AMP-205x0, or SDM-206x0.

132   PLCSCAN Program not defined (IOC-7007 only)
Before attempting to compile or run a PLC program on an IOC-7007 using the `CP` and `XP` commands respectively the PLC program must be defined using the #PLCSCAN label. Attempting to compile a PLC program without #PLCSCAN defined will result in this error:
```
:CP
?
:TC1
132 PLCSCAN program not defined
:
```

133   Handle must be UDP
Some connections require a UDP connection be used. An example is the Data record handle. If the handle is not UDP, then this error occurs.

134   All motors must be in MO for this command
All motors must be disabled using the `MO` command before the `BS` (Brushless Setup) command is used:
```
:SH
:BS2,900
?
:TC1
134 All Motors must be in MO for this command
```

134 PLCSCAN program executing (IOC-7007 only)

If the PLC program is already running on an IOC-7007 the `XP` command cannot be executed to run the #PLCSCAN thread again until it is stopped:

```
:XP
:XP
?
:TC1
134 PLCSCAN program executing
```

135 Motor must be in MO

On the DMC-21x3 or CDS-3310 controllers the motors must be off before changing the amplifier gain using the `AG` command.

```
:SH
:AG2
?
:TC1
135 Motor must be in MO
:
```

141 Incorrect Xilinx configuration (ONLY IN CDS-3310 MANUAL)

Some controllers like the CDS-3310 can be ordered from the factory in a variety of configurations. However, sometimes a specific function may become unavailable. This error occurs if such a command is issued.

150 Not defined as digital input

On the IOC-7007 the IO modules are automatically detected as digital or analog input or output modules as reported by the `TZ` command. If an attempt is made to read a digital input from a module that is not mapped as a digital input module this error will be generated:

```
:MG@IN[1]
?
:TC1
150 Not Defined as Digital Input
```

151 Not defined as digital output

On the IOC-7007 the IO modules are automatically detected as digital or analog input or output modules as reported by the `TZ` command. If an attempt is made to set a digital output on a module that is not mapped as a digital output module this error will be generated:

```
:SB1
?
:TC1
151 Not Defined as Digital Output
```

152 Not defined as analog input

On the IOC-7007 the IO modules are automatically detected as digital or analog input or output modules as reported by the TZ command. If an attempt is made to read an analog input from a module that is not mapped as an analog input module this error will be generated:

```
:MG@AN[1]
?
:TC1
152 Not Defined as Analog Input
:
```

153 Not defined as analog output

On the IOC-7007 the IO modules are automatically detected as digital or analog input or output modules as reported by the TZ command. If an attempt is made to set an analog output on a module that is not mapped as an analog output module this error will be generated:

```
:AO1,3
?
:TC1
153 Not Defined as Analog Output
:
```