

AKD Ethernet IP: Using Compactlogix or Contrologix With No Cyclic Poll (Explicit Messaging Only)

In general most users want to use the benefit of using add-on-instructions, getting built in and extended diagnostics, and the possibility of dynamically mapping parameters on the command and response assemblies (poll). However, one nuance is with cyclic data, the drive must be enabled using either the command word or using the AKD_Enable add on instruction in order to enable the “fieldbus enable” in the AKD.

Device Topology

- Project
- no_name (Online)

Add New Device... Add New Group...

- Communication
- Power
- Regen
- Motor
- Feedback 1
- Feedback 2
- Foldback
- Brake
- Units
- Modulo
- Limits
- Current Loop
- Encoder Emulation (X9 Cfg)
- Analog Input
- Analog Output
- Digital I/O
- Programmable Limit Switches
- Compare Engines
- Enable/Disable

Enable/Disable

This page allows you to control how the drive enables and disables.

Enable Dis:

Hardware Enable Mode: 0 - Rising edge of hardware enable will clear drive faults Dis

Software Enable Default: 1 - Software enabled at startup Dis

Device Status

Dynamic Brake (False)

Software Enable (True)

No Fault (True)

In-Rush Relay Closed (True)

Initialization Successful (True)

No Controlled Stop (True)

Fieldbus Enable (False)

Hardware Enable (True)

STO (True)

Power Stage (Off)

Controlled Stop

Velocity Threshold: 500.000 (counts)/s Deceleration: 10.922.851.328 (counts)/s²

Velocity Threshold Timeout: 25 ms

Controlled Stop Input: No CS Input Configure Configure Inputs

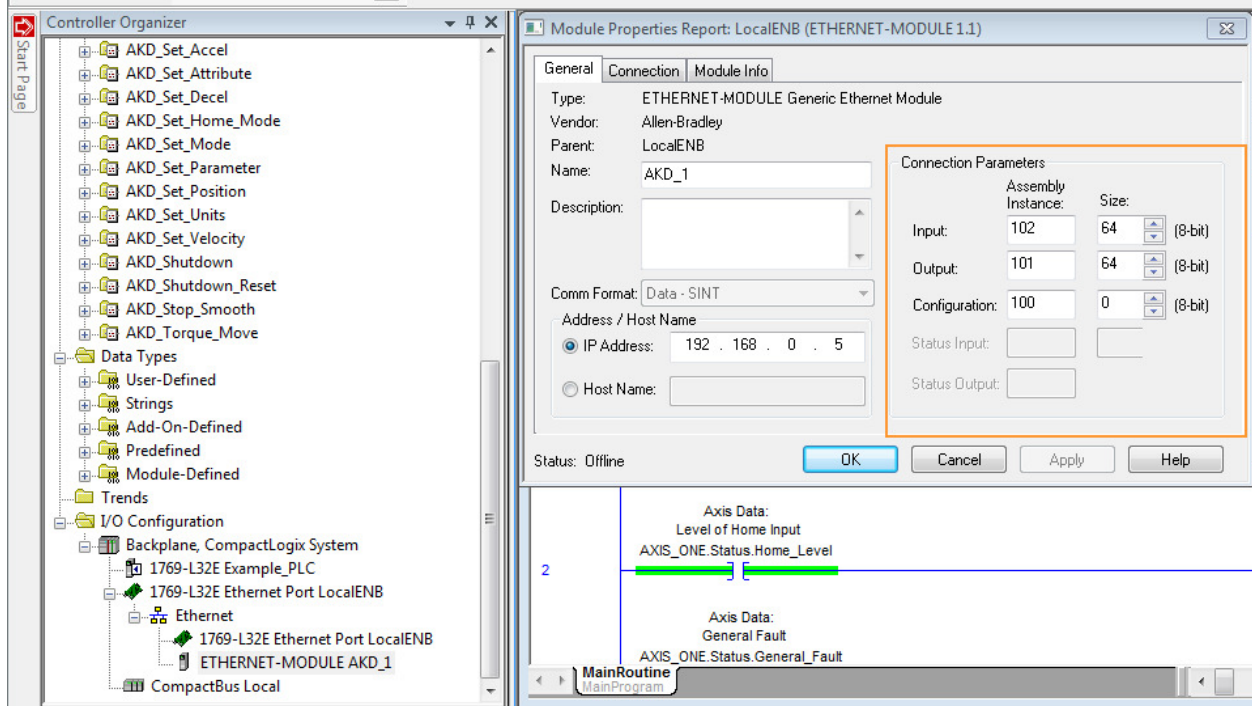
More >>

Watch

Enab...	Device	Parameter	Value	Units
<input checked="" type="checkbox"/>	no_name (Online)	PL.FB - [Axis 1] Position feedback	-111,113,560.278	counts
<input checked="" type="checkbox"/>	no_name (Online)	IL.FB - [Axis 1] Current feedback	-0.004	Arms
<input checked="" type="checkbox"/>	no_name (Online)	VL.FB - [Axis 1] Velocity feedback	-7,125.000	(counts...
<input type="checkbox"/>				

● Panic = Abort (F12)
 ● Axis inactive
 ● SW
 ● HW
 ● CS
 ● STO
 ● No Faults
 ● No Warnings
 AKD-P00306-NBEI-0000

In our sample project and other documentation, we show the connection for each AKD drive setup as a “Generic Ethernet Module”. The cyclic mapping is done via the “Connection Parameters”.

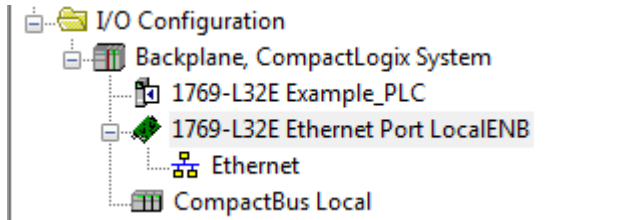


On power up (first scan) or after download and running the project in the PLC the drive will be disabled at the time the connection between the PLC and the AKD drive is made when cyclic polling is used. If the connection is made but then disrupted (i.e. the cable is disconnected, etc.) then the AKD drive will report a F702 “Fieldbus Loss”. This is usually desirable as well.

However, in rare cases and application dependent, a user may prefer that the communications not influence the drive enable. In this case, only explicit messaging will be used. This reduces the communications capability of the Compactlogix and Contrologix to the same level as the Micrologix 1400 which only supports explicit messaging via the MSG block. Without cyclic communications, the drive will not fault on F702 fieldbus loss in the event the connection is lost (it is up to the user to create their own heartbeat methodology or determine if there is a method in the AB PLC for doing so with only this type of connection).

Implementing a Connection Without Cyclic Communications

In my case I have the 1769-L32E with “Ethernet Port LocalENB” whose properties has the IP Address of the PLC.



The key is inputting a path that points to the target AKD drive’s IP Address.

To read or write using explicit messaging, add a MSG block to your ladder logic.

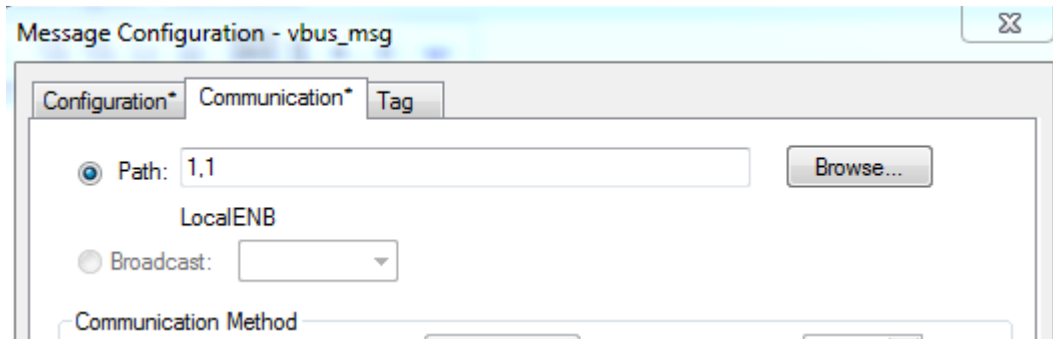
Under each MSG’s Communication Tab there is a field for “Path”.

To specify the Ethernet port on the 1769-L23E, 1769-L32E, and 1769-L35E Compactlogix controllers a 1,1,2 needs to be entered in the beginning portion of the MSG Path. This would be displayed as “LocalENB, 2”. An example would be an AKD with an IP Address of 192.168.0.5 where the path would be LocalENB, 2, 192.168.0.5”.

When using a new Compactlogix 5370 controller it is simplified where the path begins with just the “2”. An example would be an AKD with IP Address of 192.168.0.5 where the path would be 2, 192.168.0.5.

following example is based on using the 1769-L32E. Please review the support documentation for your specific PLC hardware and model, firmware, and software version for correct usage and syntax.

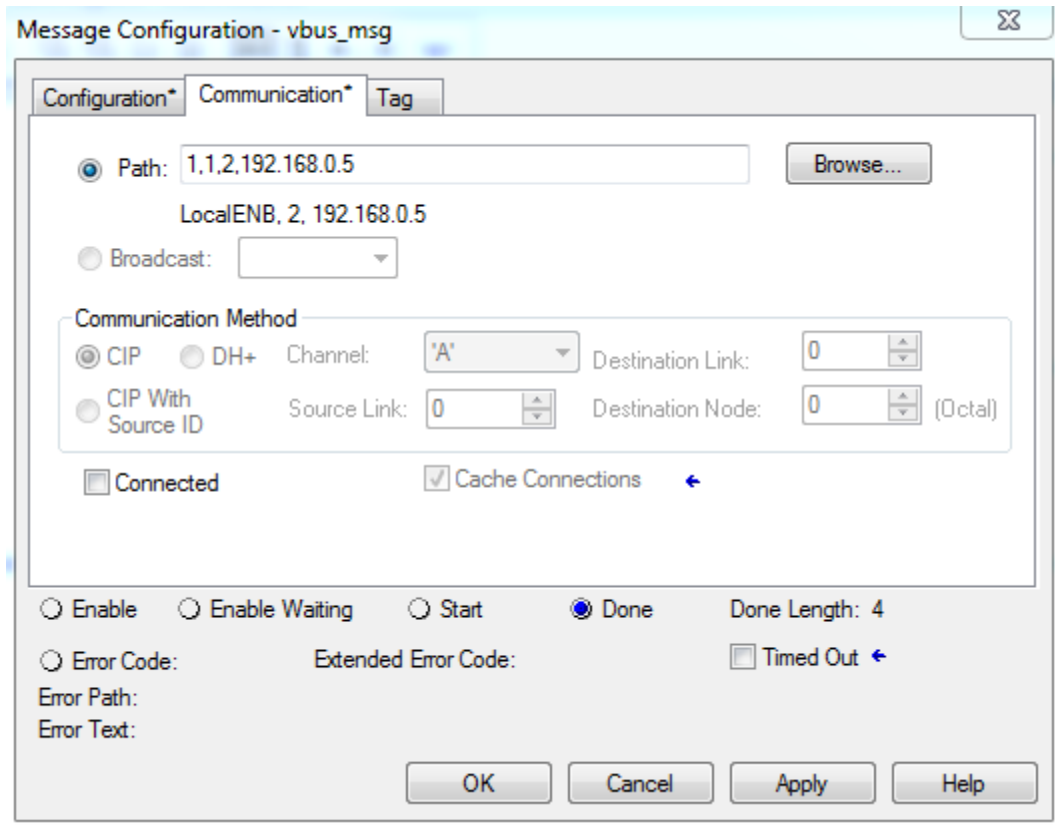
Using 1,1 syntax below the Path on a MSG block you can see it identifies it as "LocalENB". Note typing 1,1 or LocalENB directly has the same effect.



Adding a comma 2 comma device IP address (the AKD for example) yields one of two equivalent syntaxes.

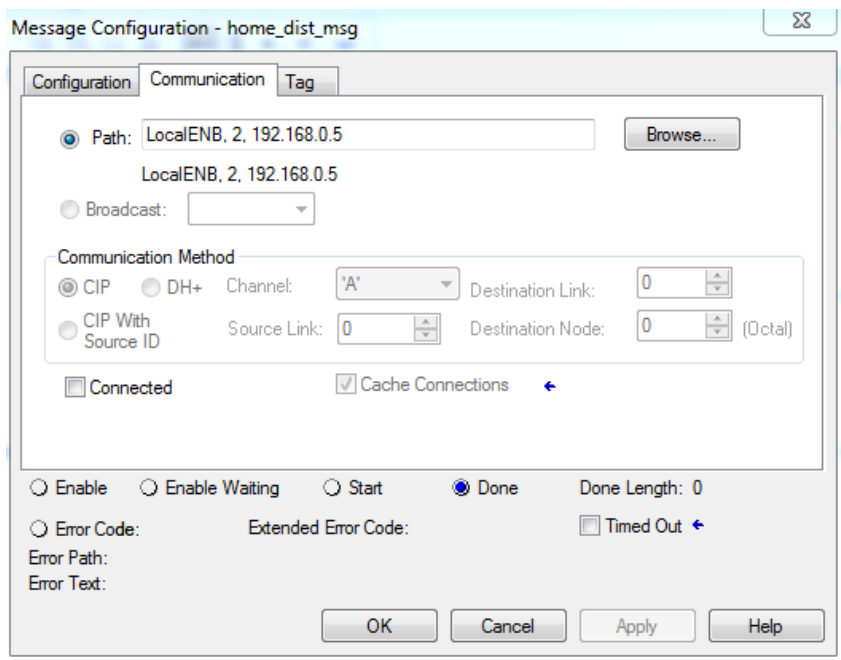
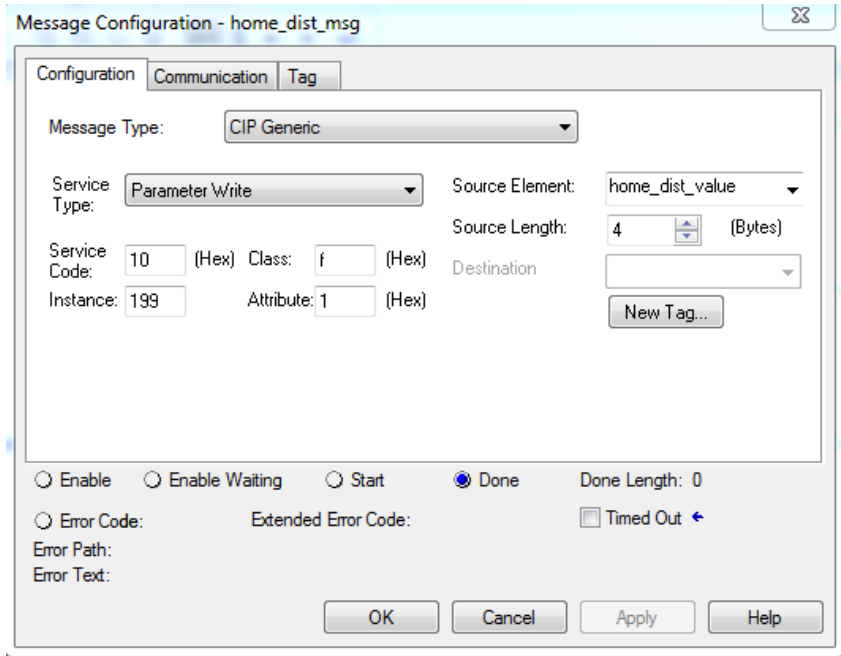
1,1,2,192.168.0.5 or LocalENB,2,192.168.0.5.

The comma 2 sends the message out via Ethernet and comma IP Address indicates the target IP address or device.



As stated before you will lose the intrinsic communications heartbeat once the I/O assembly is not used/created (i.e. F702 fieldbus loss in the AKD). I am not privy to what port or communication diagnostics are available using this method in the Allen Bradley PLC so it is possible you will have to create your own heartbeat if desired.

Here is an example of setting up the MSG block to write:



Here is an example of setting up a MSG block to read:

Message Configuration - vbush_msg

Configuration* Communication Tag

Message Type: CIP Generic

Service Type: Parameter Read Source Element: []

Service Code: e (Hex) Class: f (Hex) Source Length: 0 (Bytes)

Instance: 404 Attribute: 1 (Hex) Destination: vbush_value

New Tag...

Enable Enable Waiting Start Done Done Length: 4

Error Code: Extended Error Code: Timed Out

Error Path:
Error Text:

OK Cancel Apply Help

Message Configuration - vbush_msg

Configuration* Communication Tag

Path: LocalENB, 2, 192.168.0.5 Browse...

LocalENB, 2, 192.168.0.5

Broadcast: []

Communication Method

CIP DH+ Channel: 'A' Destination Link: 0

CIP With Source ID Source Link: 0 Destination Node: 0 (Octal)

Connected Cache Connections

Enable Enable Waiting Start Done Done Length: 4

Error Code: Extended Error Code: Timed Out

Error Path:
Error Text:

OK Cancel Apply Help

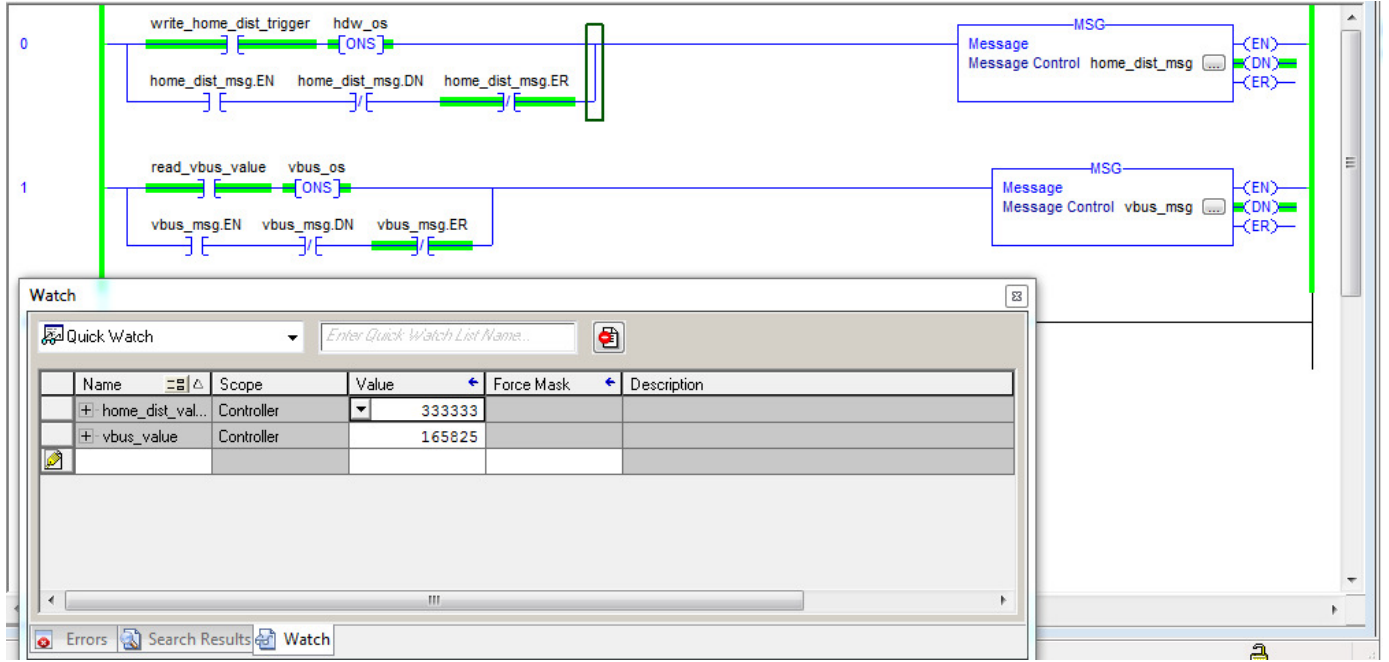
The home_dist_value and vbus_value tags were declared as DINT or 4 bytes.

The Instance numbers come from the manuals.

- 7 Troubleshooting
- 8 Appendix A: Supported EtherNet/IP Objects and Attributes
- 9 Appendix B: Parameter Listing
- 10 Appendix C: RSLogix 500
- Bookmarks
- Kollmorgen Support

Instance	Parameter	Data Size	Data Type
199	HOME.DIST	8 Byte Signed	Position
404	VBUS.VALUE	4 Byte	Float

toggling the trigger to read or write:



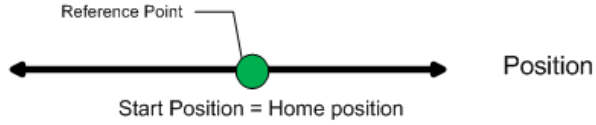


Home

This page is used to issue a homing command. The home command is used to zero the drives position.

Select the type of homing motion you wish to use:

0 - Use current position



Settings

Acceleration: (counts)/s²

Deceleration: (counts)/s²

Direction:

Distance: counts

Position: counts

Position Lag: counts

Velocity: (counts)/s

Max Distance: counts i Disabled when value is 0.

[Goto Drive Motion Status](#)

Controls

Found:

Done:

Active:

Error:

Position Feedback: counts

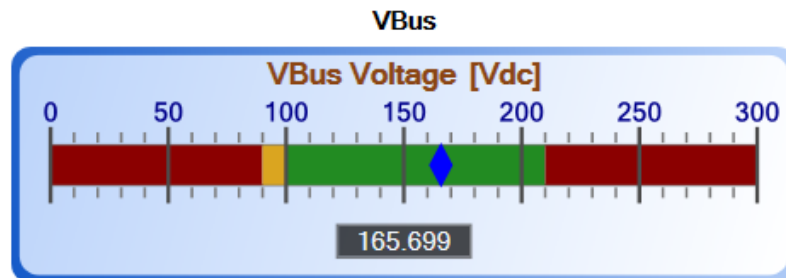
Auto Homing:

Drive is inactive.



Power

Monitor and configure the different power values.



Other documentation regarding explicit messaging and MSG blocks:

From the AKD Ethernet IP Communications manual:

7.3.2 Read a Parameter Value

To read a parameter value through Explicit messaging, use Service 0x0E (Read Value), Class 0x0F (Parameter class), Attribute 1 (Parameter Value).

The instance number corresponds to the index of the desired parameter. This number may be found in Appendix B. For controllers which cannot access 64 bit parameters, it is possible to read a range-reduced 32 bit value by reading the next instance number to the 64-bit instance number. For example, for DRV.ACC (instance number 109) the instance number 110 can be used for reading.

7.3.3 Write a Parameter Value

To set a parameter value through Explicit messaging, use Service 0x10 (Write Value), Class 0x0F (Parameter class), Attribute 1 (Parameter Value).

The instance number corresponds to the index of the desired parameter. This number may be found in Appendix B.

The length of the data written must match the length of the parameter. Read attribute 0x06 Data Length to determine the correct length to send. For controllers which cannot access 64 bit parameters, it is possible to read a range-reduced 32 bit value by reading the next instance number to the 64-bit instance number. For example, for DRV.ACC (instance number 109) the instance number 110 can be used for reading.

From the AKD Ethernet IP RSLogix5000 Manual:

Appendix C covers RSLogix500 and Micrologix1400 but you can see the setup is similar to the screenshots above with the Compactlogix PLC.

10 Appendix C: RSLogix 500

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10.3 Write Explicit Message Setup	94

If you have RSLogix500 you may find the sample project posted on the KDN (Kollmorgen Developer's Network) that demonstrates using the Micrologix 1400 to the AKD using the MSG block and Ethernet IP.

It demonstrates simple commands like enable/disable, jog, motion tasking, etc.

<https://kdn.kollmorgen.com/content/allen-bradley-micrologix-1400-eip-program-akd>

The screens and programming environment between RSLogix5000 and RSLogix500 may be different but conceptually the techniques would be the same.