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EZLINK™, EZLINK Plus™ and EZLINK™ Monitor Software

Catalog Numbers
1204-EZL1
1204-EZL2
1204-EZLP1
1204-EZLSW

User Manual

Rockwell Automation

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. "*Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls*" (Publication SGI-1.1 available from your local Allen-Bradley Sales Office or online at **http://www.ab.com/manuals/gi**) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will the Allen-Bradley Company be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, the Allen-Bradley Company cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Allen-Bradley Company with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual we use notes to make you aware of safety considerations.

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

Attentions help you:

- identify a hazard
- avoid the hazard
- recognize the consequences

Important: Identifies information that is especially important for successful application and understanding of the product.

Shock Hazard labels may be located on or inside the drive to alert people that dangerous voltage may be present.

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Notes:

Getting Started

This manual will guide you when using the EZLINK hardware and Software Monitor. The hardware enables you to monitor the temperature, speed, vibration, and pressure in your mounted bearings and gear reducers. The software enables you to see the current state of your monitored hardware. Both provide the ability to communicate to a DeviceNet™ capable PLC.

ATTENTION: Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, and/or service this equipment. Read and understand this manual in its entirety before proceeding. Failure to observe this precaution could result in personal injury or loss of life.

ATTENTION: High voltage and rotating parts can cause serious or fatal injury. The use of electric machinery, like all other utilization of concentrated power and rotating equipment, can be hazardous. Installation, operation, and maintenance of electric machinery should be performed by qualified personnel. Familiarization with NEMA safety standards, national electrical code and sound local practices is recommended.

ATTENTION: To guard against personal injury or death caused by contact with moving parts, guards (coupling, belt, chain, etc.) must be installed. Machines accessible to the public should be further guarded by screening, guard rails, etc.

General Description

All EZLINK and EZLINK Plus modules include the ability to monitor bearing vibration, bearing temperature and shaft speed.

- **1204-EZL1**
  Adaptable EZLINK kit suitable for mounting on mechanical equipment, but not intended for mounting on motors. Kit includes mounting plate and non-shielded bearing thermocouple.
- **1204-EZL2**
  This adaptable EZLINK kit is suitable for use on variable speed motors and includes a mounting plate and shielded thermocouple. The mounting plate has a 0.5 inch threaded opening to mount the module to the motor.

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- **1204-EZLP1**
  The adaptable EZLINK Plus motor kit has all the same features as the 1204-EZL2. In addition, it includes the capability to monitor three discrete inputs.
- **1204-EZLSW**
  EZLINK demonstration software designed to work with 16 bit DeviceNet platforms (i.e. 1770-KFD). This software is only intended to demonstrate the capabilities of the EZLINK and EZLINK Plus modules. It is not intended to replace the need for status monitoring by plant preventative maintenance systems. The software may also be used to help commission EZLINK modules.

Required Components

The software requires the following components.

- IBM compatible personal computer.
- A CAN interface module for communicating over DeviceNet from the PC (i.e. 1770-KFD).
- Allen-Bradley WinDNet Version 1.2 compliant interface software. Consult your vendor documentation.
- Microsoft® Windows, Version 3.1 or later, or Microsoft Windows for Workgroups 3.11 or later.

Installing the Software

Follow these steps to install the EZLINK Software Monitor software onto the hard drive of your computer.

1. Insert the Setup Diskette 1 into the A: drive of your computer.
2. From the Start Menu, select Run.
3. Type “A:\SETUP.EXE”.
4. Answer the prompts in the Setup program. When the program is done, the appropriate EZLINK Tools will be copied onto your hard drive and a new icon will be created.

Commissioning your EZLINK with EZLINK Tools

This chapter describes the steps needed to commission, configure and remove EZLINK devices.

Commissioning

Every EZLINK hardware monitor is shipped from the factory programmed with default parameter values. Commissioning is the process by which you customize the EZLINK parameters for your particular needs.

Tools Used in Commissioning

The EZLINK Monitoring Software tool is needed for commissioning. This software package supports a Network Status view, individual Node Status views, Temperature Trending views, and Vibration Spectrum views.

Preparing to Commission

Follow these steps to prepare for commissioning your EZLINK hardware.

1. Ensure that your DeviceNet adapter module is properly installed or connected to your personal computer.
2. Verify that the DeviceNet drop line is properly connected to your DeviceNet adapter module.
3. Start Windows and install the software on your computer.
4. Start the software (SMART.EXE) by double-clicking on its icon.
5. Select the appropriate WinDNet compliant driver for your adapter module.

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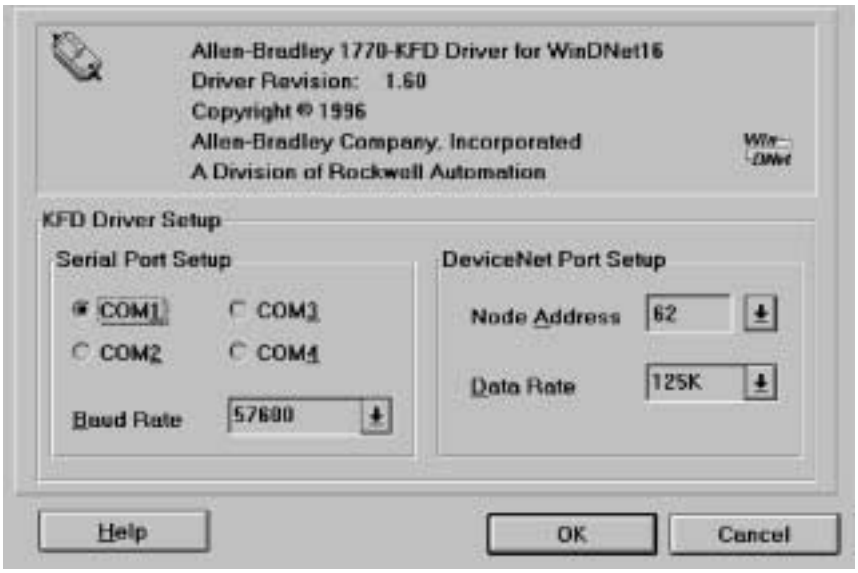
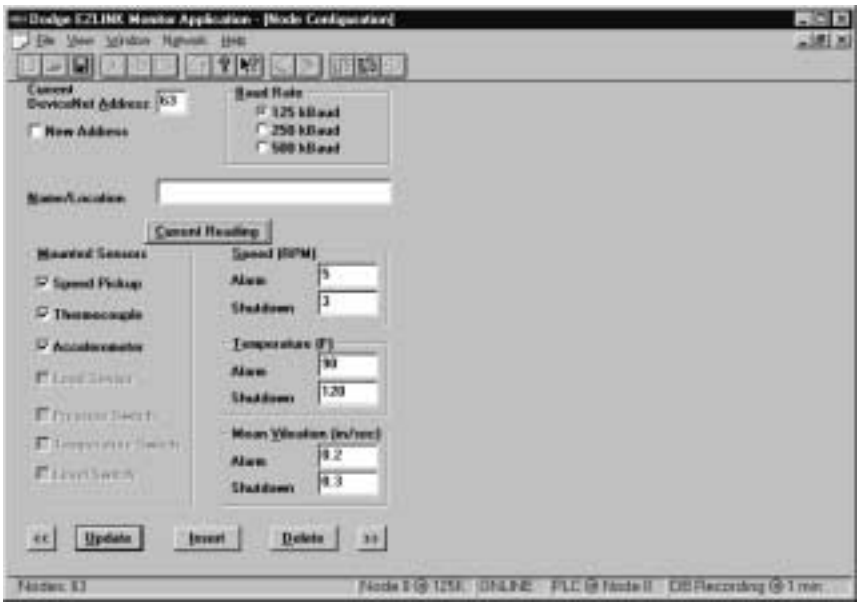
6. Select a DeviceNet *Data Rate* of **125KB** and a *Node Address* of **62** from the WinDNet compliant driver for your adapter module.



Setting DeviceNet Parameters

EZLINK hardware is shipped from the factory with a default DeviceNet Address (MAC Id) of **63** and a Baud Rate of **125KB**.

1. Connect only one EZLINK hardware monitor to the DeviceNet at a time.
2. Enter the desired Node Address for your EZLINK. It is recommended that you reserve lower addresses for higher priority devices and address 0 for the your PLC or other control device.



3. Check the *New Address* box so that the default address will be updated to the address entered in step 2.

4. Enter a *Name/ Location* for the EZLINK (this information is maintained only to help you identify the device later).

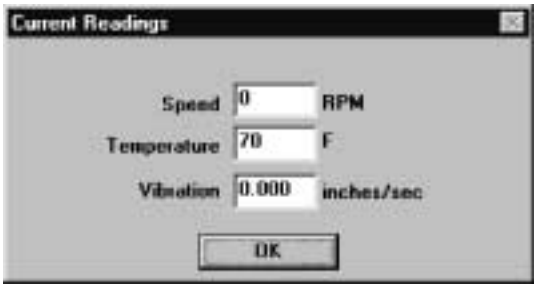
5. Click the button corresponding to the desired *Baud Rate* for your DeviceNet Network.

Selecting Installed Sensors

To configure the sensor list, simply check the sensors installed with your EZLINK in the *Mounted Sensors* box.

Choosing Appropriate Limits

Since bearing vibration and temperature levels vary depending on a range of installation specific characteristics, you may not know exactly what temperature, speed, and vibration limits are appropriate for your environment. To help you choose appropriate limits, the configuration screen provides a button that will display the current values of temperature, speed, and vibration. To use this part of the configuration tool simply click “Current Readings...” at the center of the screen. Your window will look like this:



Click “OK” to close the dialog.

Setting Limits

To set the Under Speed and Over Temperature limits for your environment, follow the steps below.

1. Click the Mouse in the *Alarm* box of the *Speed* group. Enter an Under Speed Alarm limit from 0 - 6000 RPM.

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2. Press the TAB key to move to the Under Speed *Shutdown* limit. Enter a value for the Under Speed Shutdown limit from 0 - 6000 RPM (Note: the Shutdown limit must be less than or equal to the Alarm limit).

3. Press the TAB key to move to the *Alarm* limit of the *Temperature* group and enter the Over Temperature Alarm limit from -55 to 255 degrees F.

4. Press the TAB key to move to the Over Temperature *Shutdown* limit and enter the Over Temperature Shutdown limit from -55 to 255 degrees F.

5. Press the TAB key to move to the *Alarm* limit of the *Vibration* Level group and enter the Vibration Level Alarm limit from 0.000 to 2.000 inches/second (Note: that Vibration is measured in increments of 0.004 inches/second).

6. Press the TAB key to move to the Vibration Level *Shutdown* limit and enter the Vibration Level Shutdown limit from 0.000 to 2.000 inches/second.

Saving the Configuration

To save the new configuration to both the EZLINK and the network configuration list, click the *Insert* button at the bottom of the screen.

Updating Your EZLINK

In the future, you may find that your initial configuration needs to be altered. For example, you may need to change the Node Address to give another node higher priority or your over temperature limits may need to be raised. Updating the EZLINK configuration is as simple as the initial commissioning of the device.

1. If the Baud Rate was changed, restart your commissioning software at the Baud Rate saved to your EZLINK.

2. Find the EZLINK to be updated in the network configuration list by using the *Next Node(>>)* and *Previous Node(<<)* buttons to navigate through the list.

3. If the Node Address is to be changed, click the mouse in the *Current DeviceNet Address* box and type in the new address (also check the New Address Box).

4. To update the *Name/Location*, click in the box and type in the new information.

5. To update the *Baud Rate* or *Dodge Product*, click the button corresponding to the correct value.

6. To update the sensor list, simply check or uncheck the sensors to be monitored or ignored.
7. To update the limits, click or TAB into the appropriate text box and type in the new limit value.
8. Save the changes by clicking the *Update* button at the bottom of the screen.

Removing an EZLINK

If, for any reason, you need to remove an EZLINK from your network configuration list, follow these steps.

1. Use the *Previous Node(<<)* and *Next Node(>>)* buttons to locate the node to be removed from the network configuration list.
2. Click the Delete button at the bottom of the screen.

Important: Deleting a node from the network configuration list does not affect any of the parameters previously saved to the EZLINK

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Commissioning your EZLINK with EDS Based Tools

This chapter describes the steps required to commission your EZLINK devices, to change their configuration in the future, and to remove EZLINK devices.

What is Commissioning?

Every EZLINK hardware monitor is shipped from the factory with default parameter values that guide its operation. Commissioning is the process by which you customize the EZLINK parameters for your particular needs.

Commissioning Your EZLINK

Follow these steps to prepare for commissioning your EZLINK hardware.

1. Make sure your DeviceNet adapter module is properly installed or connected to your personal computer.
2. Make sure the DeviceNet drop line is properly connected to your DeviceNet adapter module.
3. Start Windows.
4. Start the EDS Based tool such as the DeviceNet Manager or RSNetWorx software by double-clicking on the icon for the program in Program Manager.

5. Connect the EDS Based Tool to the network by selecting its online option (*Setup Online Connection...* in the DeviceNet Manager *Utilities* menu)
6. Select the appropriate WinDNet compliant driver for your adapter module.

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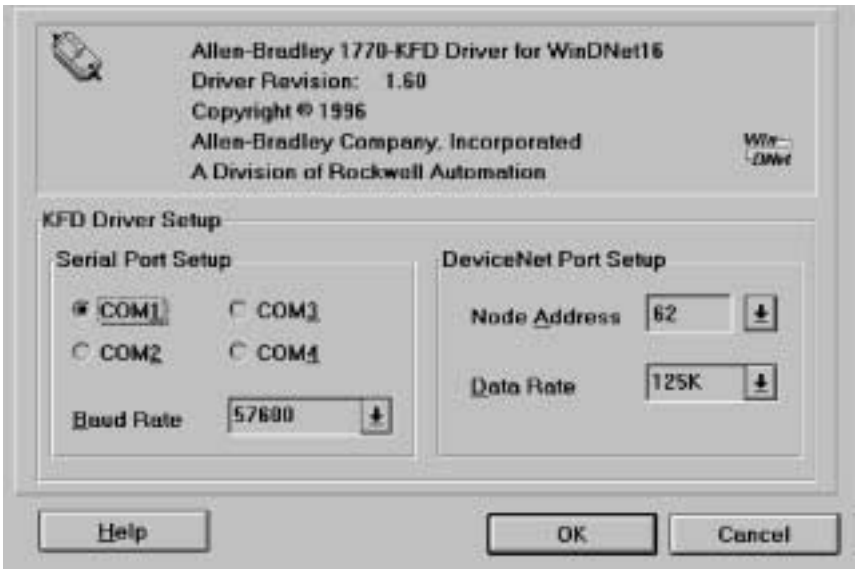
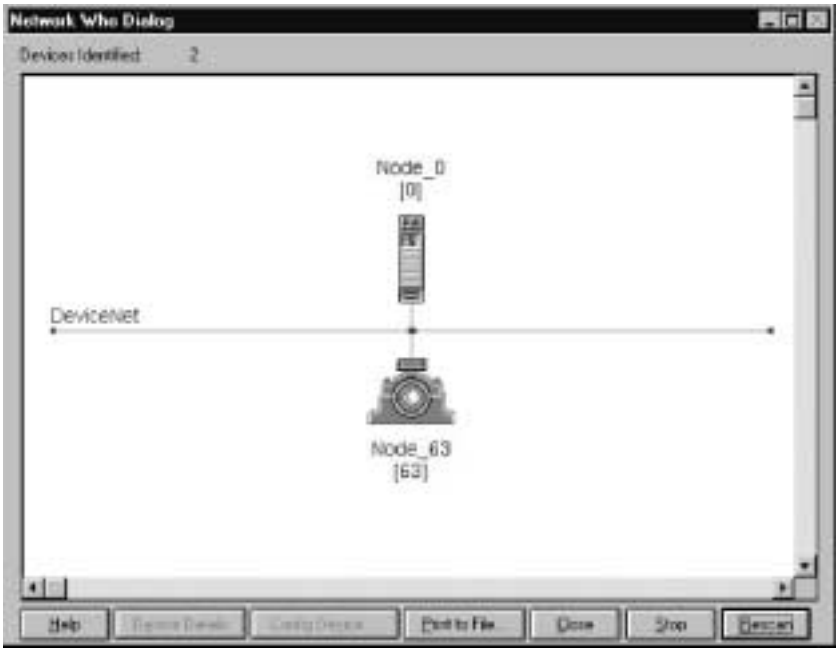
7. Select a DeviceNet *Data Rate* of 125KB and a *Node Address* of 62 from the WinDNet compliant driver for your adapter module.



8. Find the EZLINK nodes on the network by performing a Network Who function in the EDS Based Tool.

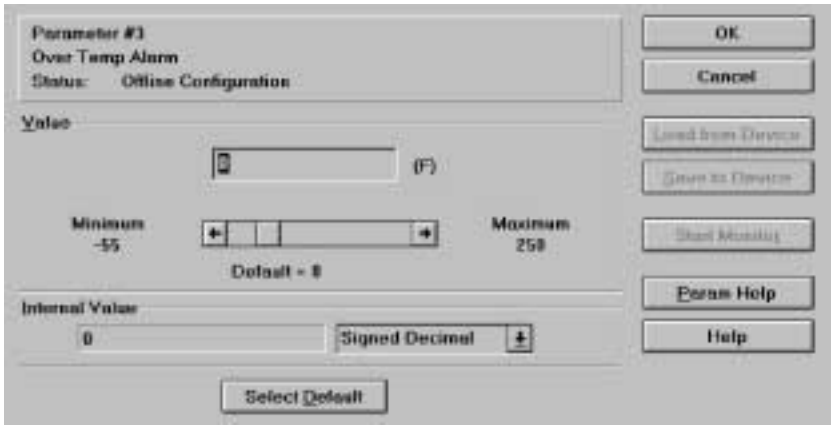
9. When the Network Who operation is complete, select an EZLINK to configure by clicking on the line containing information about that EZLINK.



10. If you would like to set temperature, speed, or vibration limits on the EZLINK, click on the "*Configure Device...*" button. Otherwise, skip to step 17.

11. From the list of operational parameters, select the limit you would like to change by clicking on the line describing that limit.

12. Click the "*Modify Parameter...*" button.



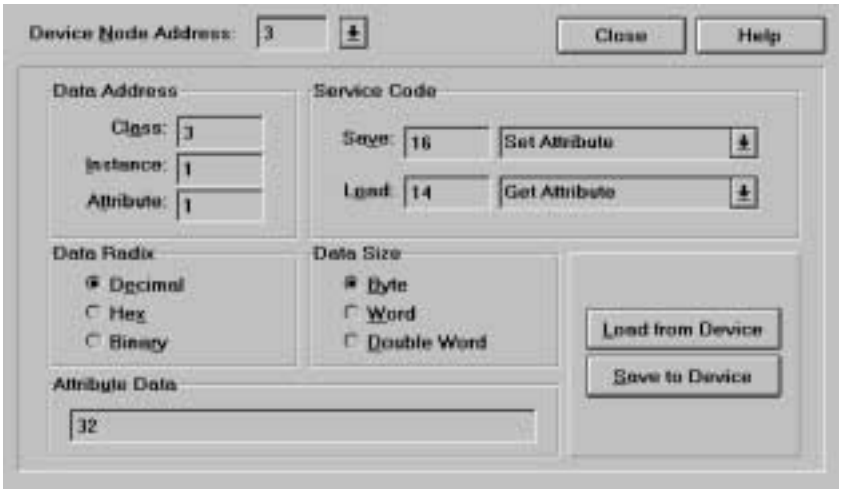
13. In the parameter dialog box, either type the new value of the parameter in the "*Value*" box or use the mouse to slide the scroll bar "thumb" until the correct value appears.

14. Click the "*OK*" button to close the dialog.

15. When you have adjusted all the parameters you are interested in, click the "*Save to Device*" button. If you do not need to change the DeviceNet Address (MAC Id) or Baud Rate of the EZLINK, your commissioning is now complete.

16. Select *Basic Device Configuration...* from the *Utilities* menu.

17. If you would like to change the DeviceNet Address of the EZLINK, fill in the fields as follows: Object = 3, Instance=1, Attribute=1, Value=*new MAC Id*. Click *SDN* in the *Save To* group.



18. If you would like to change the Baud Rate of the EZLINK, fill in the fields as follows: Object=3, Instance=1, Attribute=2. The value can be 0 for 125kbps, 1 for 250kbps, or 2 for 500kbps. Click *SDN* in the *Save To* group.

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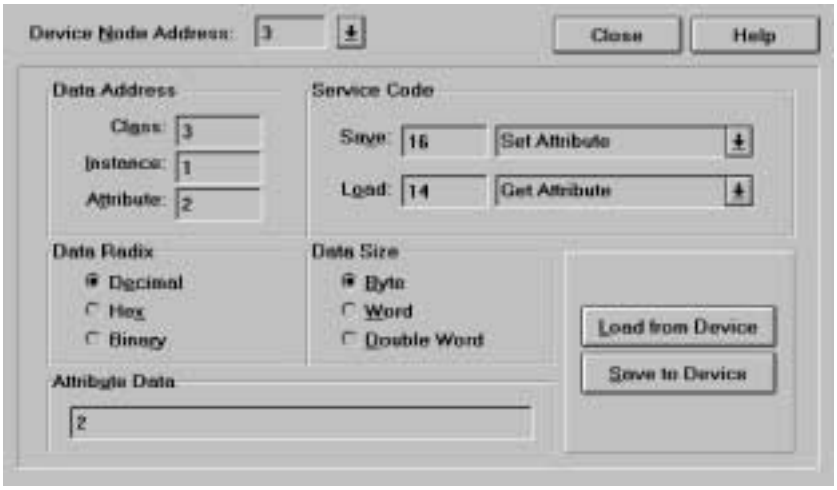


19. Click *Close* on the Basic Configuration dialog.

Setting DeviceNet Parameters

All units are shipped from the factory with a default DeviceNet Address (MAC Id) of 63 and a Baud Rate of 125KB.

Monitoring and Control with the EZLINK Software Monitor

This chapter describes the steps required to use the EZLINK Software Monitor with a PLC to monitor and control your system based on information obtained from your EZLINK devices. The control example used describes an Allen-Bradley SLC-500 PLC.

Meeting the Requirements

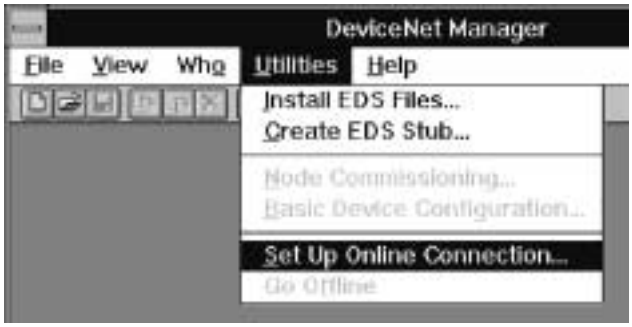
This chapter assumes the following components in your system.

- IBM compatible personal computer with DeviceNet adapter module (e.g., Allen-Bradley 1770-KFD or PCD card).
- EZLINK Software Monitor.
- Allen-Bradley DeviceNet Software Manager Version 2.0 or later or RsNetworx.
- A PLC with a Slave-mode capable DeviceNet Scanner (e.g., Allen-Bradley SLC-500). The DeviceNet Scanner must accept input data on polling commands.
- EZLINK modules mounted on bearings, gear reducers or other equipment.

Preparing the PLC

Follow these steps to prepare the PLC to receive data from the EZLINK Software Monitor.

1. Start DeviceNet Software Manager 2.0 (or later) or RsNetworx.
2. Connect the DeviceNet Software Manager to the DeviceNet by selecting *Set Up Online Connection...* from the *Utilities* menu.



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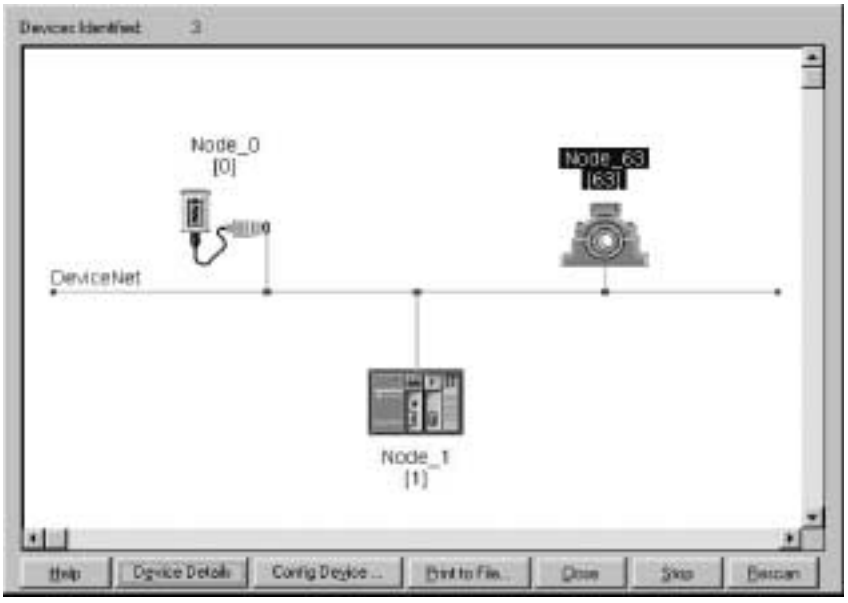
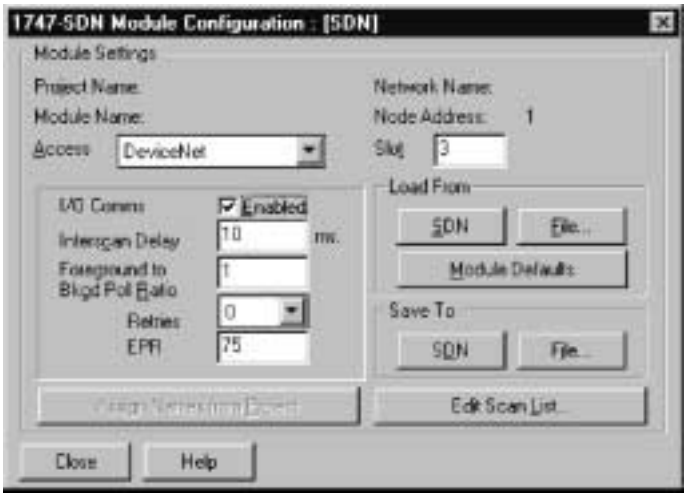
3. Find the PLC DeviceNet Scanner Card on the DeviceNet by selecting *Network Who* from the *Who* menu.



4. The scanner can be configured by clicking on its image. If you would like your EZLINK nodes read less frequently than the default poll rate, change the *Background Poll Ratio* by clicking in the box and typing in a new ratio (Note: this number indicates the number of scan loops executed prior to polling the device).



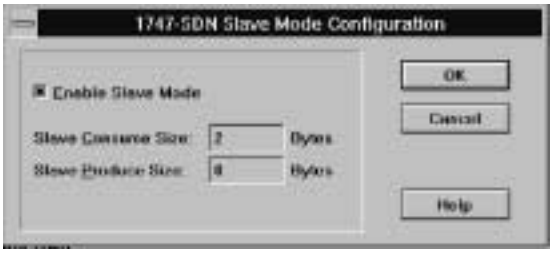
5. Make sure the *Enabled* box is checked next to *I/O Comms*.

6. Save the information to the Scanner by clicking the *SDN* button in the *Save To* group.

7. Click the *Edit Scan List...* button.

8. Click the *SDN Slave Mode...* button in the Scan List Editor dialog box.

9. Click the *Enable Slave Mode* box in the Slave Mode Configuration dialog.



10. Enter the number of EZLINK DeviceNet nodes in your system times 2 in the *Slave Consume Size* text box.

11. Enter “0” in the *Slave Produce Size* text box.

12. Click the *OK* button. When you have returned to the Scan List Editor dialog, click the *Datatable Map* button.

13. In the Datatable Map dialog, click the *Data Entry* button.

14. Make sure the *Device Select* drop down menu identifies the PLC DeviceNet Scanner Card.

15. Make sure the *Data Map Input* button is highlighted.

16. Select *Poll Message* from the *Map Data From* drop down menu.

17. Select *Discrete* from the *Map Data To* drop down menu.

18. Update the *No. Bits* text box with the number of bits to be received by the PLC DeviceNet Scanner Card (this should be the number of EZLINK nodes multiplied by 16).

19. Click the *Apply Segment* button. You should see the node address of the PLC DeviceNet Scanner Card appear in the input table.

20. Click the *Close* button. When you return to the Scan List Editor dialog, click on the line identifying the PLC DeviceNet Scanner Card.

21. Click on the *SDN...* button in the *Save To* group.

22. In the Scan List Editor - Download dialog, make sure the *Node X* button is highlighted (X = the Node Address of the Scanner).

23. Click on the *OK* button. A message box should appear telling you that the Scanner is being updated. Click *OK* again.

24. Click on the *Close* button in the Scan List Editor. Click on the *Close* button in the Module Configuration dialog

You may now program your PLC Ladder logic to read the EZLINK information from the Discrete Table. The EZLINK Software Monitor will deliver Status Bytes for the EZLINK hardware in ascending node address order.

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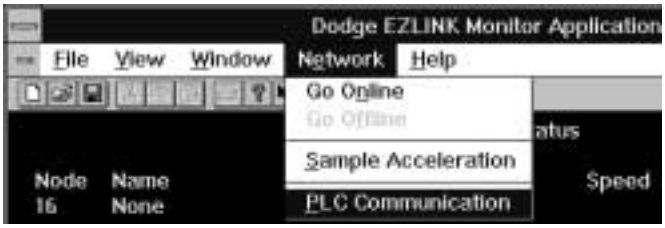
Preparing the Software Monitor

Follow these steps to prepare the EZLINK Software Monitor to work with the PLC to control other devices in your system.

1. Start the EZLINK Software Monitor.
2. Select *PLC Communication* from the *Network* menu.
3. Select the node address for the PLC DeviceNet Scanner Card from the *PLC Node Address* drop down menu.



4. Click the *Update* button.

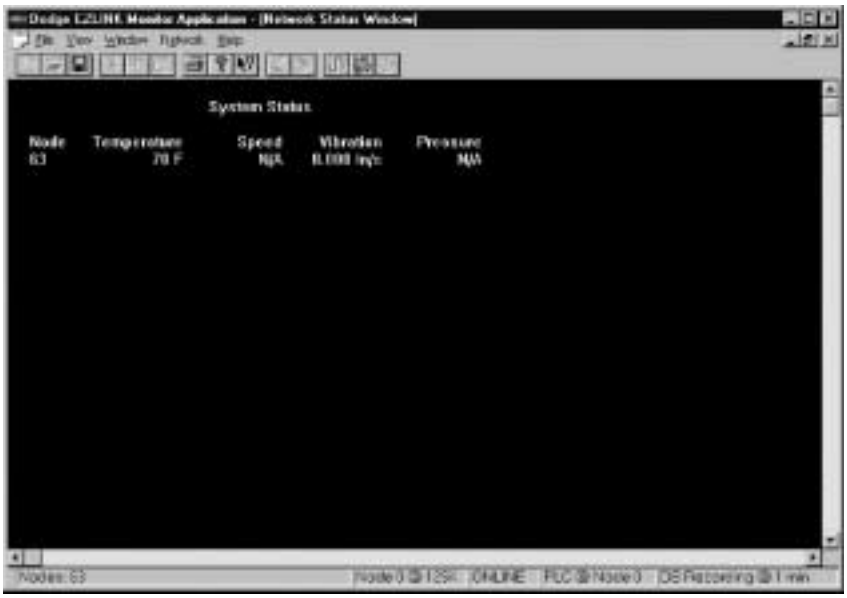
   The EZLINK Software Monitor will now send two Status Bytes to the PLC for every EZLINK in the network configuration list. The data is transmitted in the Polling message with Status Bytes in ascending node address order.

EZLINK Software Monitoring

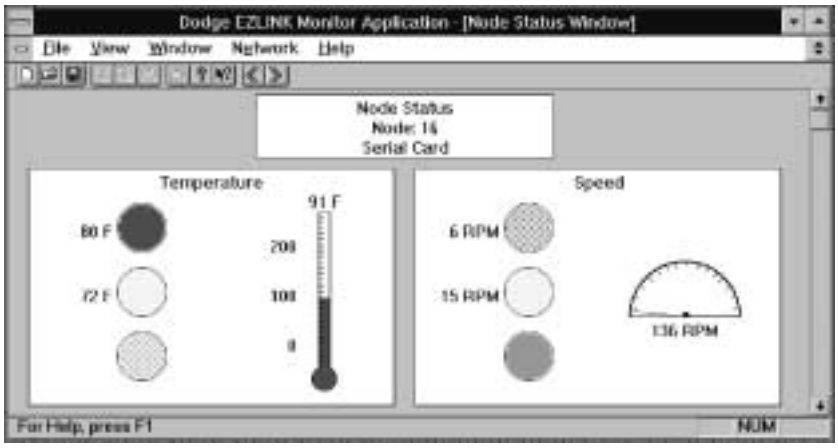
The EZLINK Software Monitor provides four different views for monitoring the status of EZLINK devices on your DeviceNet network. Each view can be accessed by clicking on its name in the *Window* menu.

These views are:

- *Network Status View*
  Provides current readings for all EZLINK nodes in a scrolled window. Each line is color coded to provide status information in a glance.



- *Node Status View*
  Provides graphical readings for a specific EZLINK node in your network. You may proceed through all nodes in your network by clicking on the *Next Node (>>)* and *Previous Node (<<)* buttons in the toolbar.



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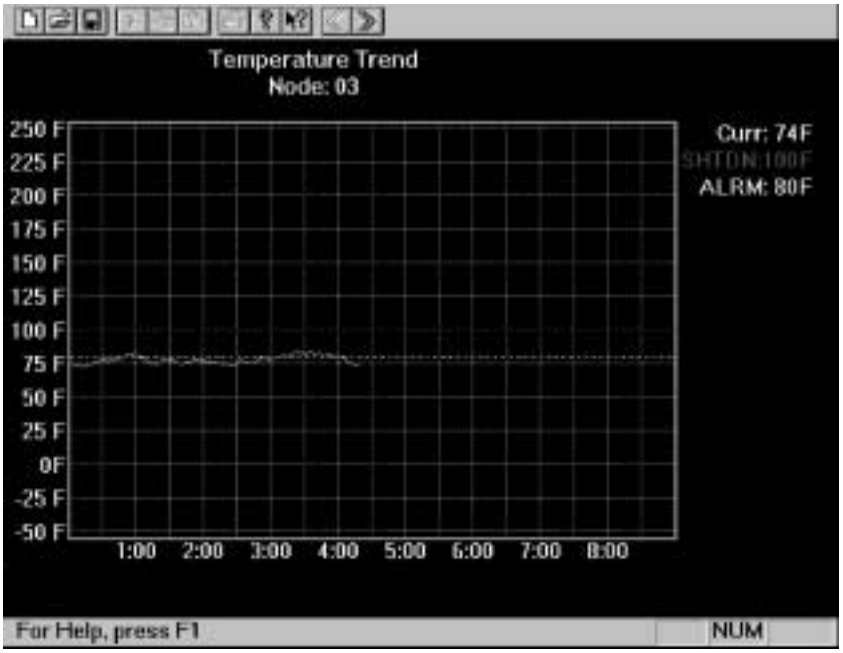
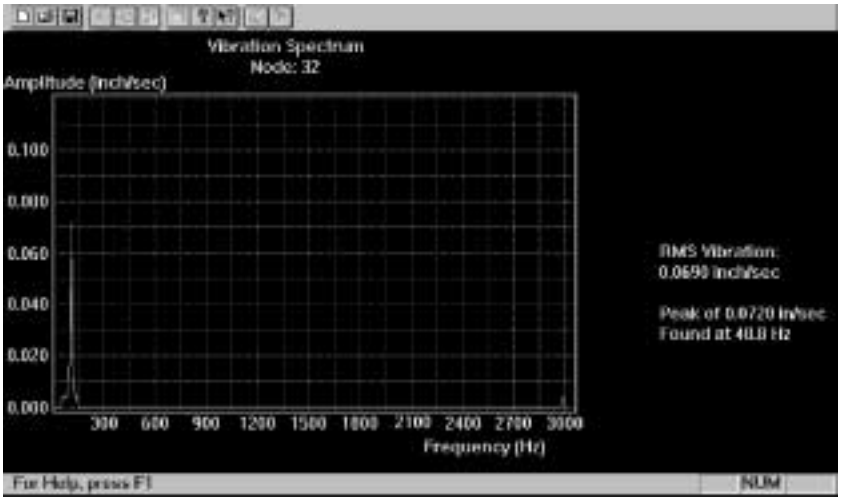
- *Temperature Trend*
  Provides a time-based trend for temperature on a specific EZLINK node in your network. You may proceed through all nodes in your network by clicking on the *Next Node (>>)* and *Previous Node (<<)* buttons in the toolbar.



- *Vibration Trend*
  Provides the current RMS Vibration and a display of the vibration spectrum for a specific EZLINK node in your network. You may proceed through all nodes in your network by clicking on the *Next Node (>>)* and *Previous Node (<<)* buttons in the toolbar.



PLC Based Control with EZLINK Monitored Hardware

This chapter describes the steps necessary to perform system control, based on Status Bytes returned directly from EZLINK nodes to a DeviceNet capable PLC/Scanner. The example presented in this chapter is based on an Allen-Bradley SLC-500 PLC.

Meeting the Requirements

This chapter assumes the following components in your system.

- IBM compatible personal computer with DeviceNet adapter module (e.g., Allen-Bradley 1770-KFD).
- Allen-Bradley DeviceNet Software Manager Version 2.0 or later or RsNetworx.
- A PLC with DeviceNet Scanner (e.g., Allen-Bradley SLC-500 or PLC 5). The DeviceNet Scanner must accept input data on polling commands.
- EZLINK Modules mounted on bearings, gear reducers or other equipment.

Preparing the PLC

Follow these steps to prepare the PLC to receive data from the EZLINK Software Monitor.

1. Start DeviceNet Software Manager 2.0 (or later) and go online.
2. Find the PLC DeviceNet Scanner Card on the DeviceNet by selecting *Network Who* from the *Who* menu. It is advisable at this time to change the node address from 63 to the number you would like to be by using the configure node from the pull down menu. This would enable adding new future nodes. In this example the address 63 is shown for illustration purposes.

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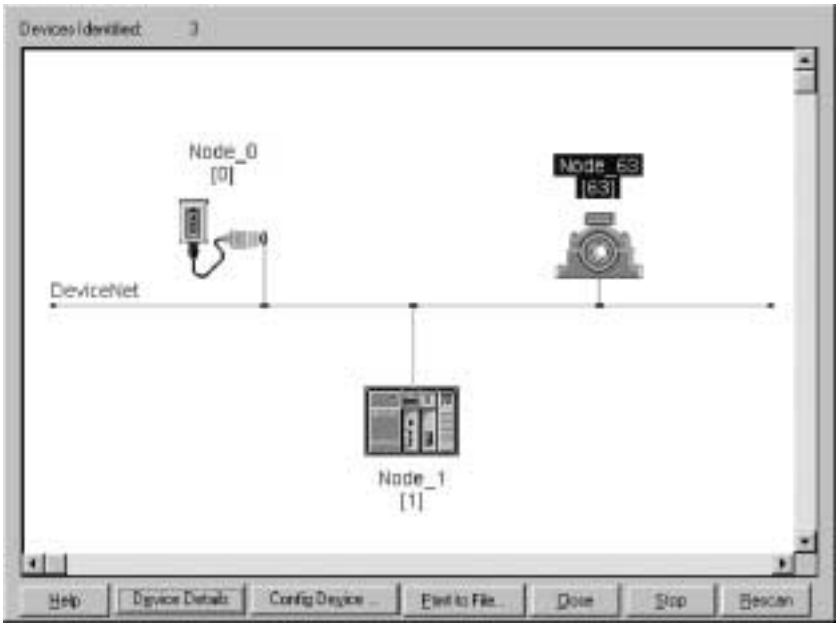
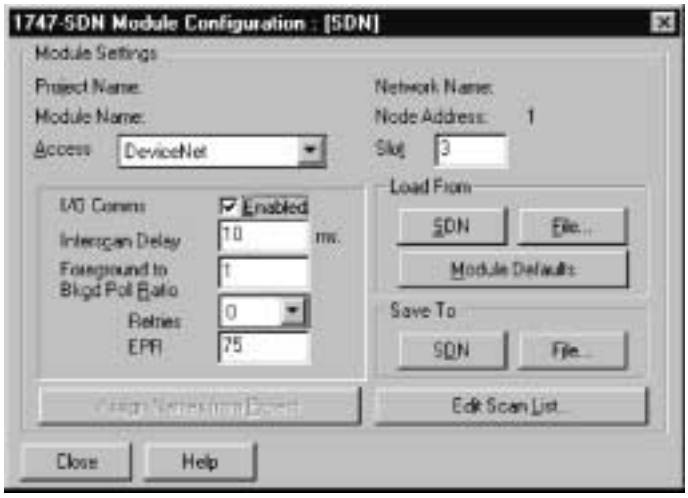


3. Select the PLC DeviceNet Scanner Card in the list of devices found on the DeviceNet by clicking the mouse on figure identifying the scanner.

4. Click the mouse on the *Configure Device* button at the bottom of the dialog box to start the Scanner Card Configuration process.

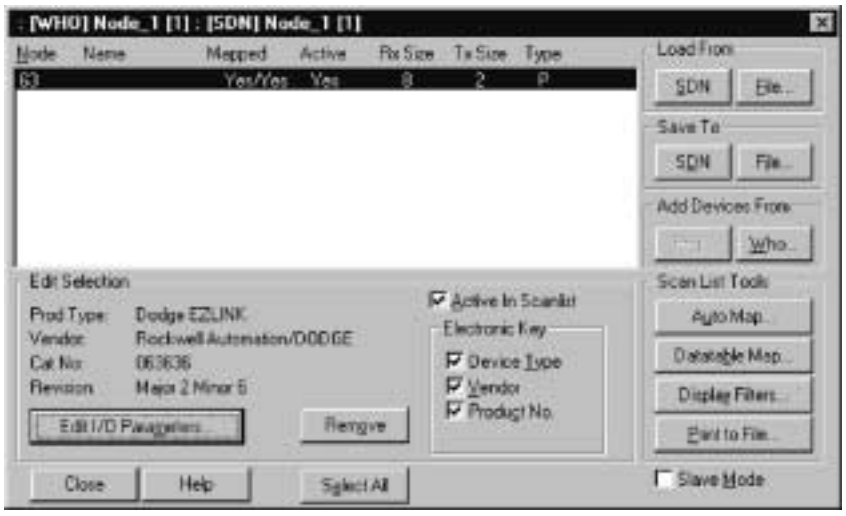


5. If you would like your EZLINK nodes read less frequently than the default poll rate, change the *Background Poll Ratio* by clicking in the box and typing in a new ratio (Note: this number indicates the number of scan loops executed prior to polling the device).

6. Make sure the *Enabled* box is checked next to *I/O Comms*.

7. Save the information to the Scanner by clicking the *SDN* button in the *Save To* group.

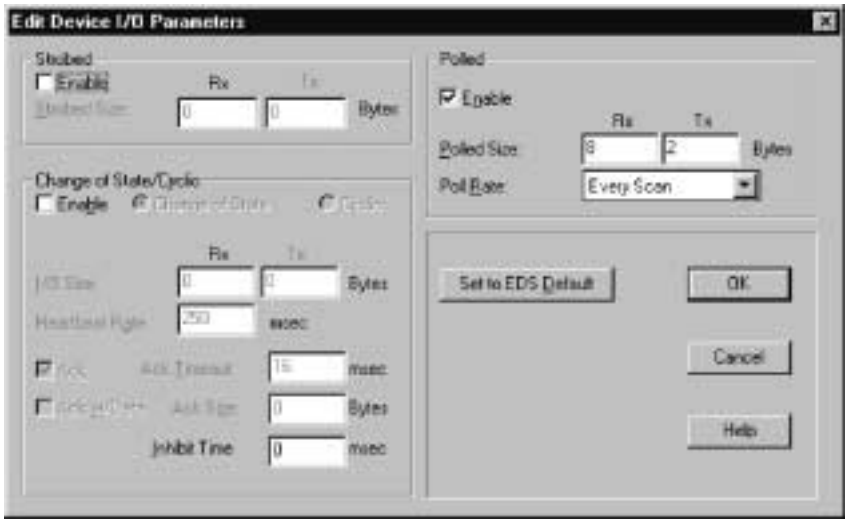
8. Click the *Edit Scan List...* button. You should see the Scan List Editor dialog.



Note: Steps 9 through 13 must be performed for each EZLINK node in the DeviceNet network.

9. Select one EZLINK node by clicking on a line that identifies the node address for an EZLINK node.

10. Click on the *Edit I/O Parameters...* button. You should see this dialog.



11. In the I/O Parameters dialog, verify that either the *Polled* box or the *Change of State* box (when available) is checked and that the *Strobed* box is not checked.

12. Verify that the *Rx* value is 8 and the *Tx* values is 2 in the group corresponding to the checked *Polled* or *Change of State* box.

13. Click the *OK* button.

14. When you have returned to the Scan List Editor dialog, click the *Datatable Map* button.

15. In the Datatable Map dialog, click the *Data Entry* button.

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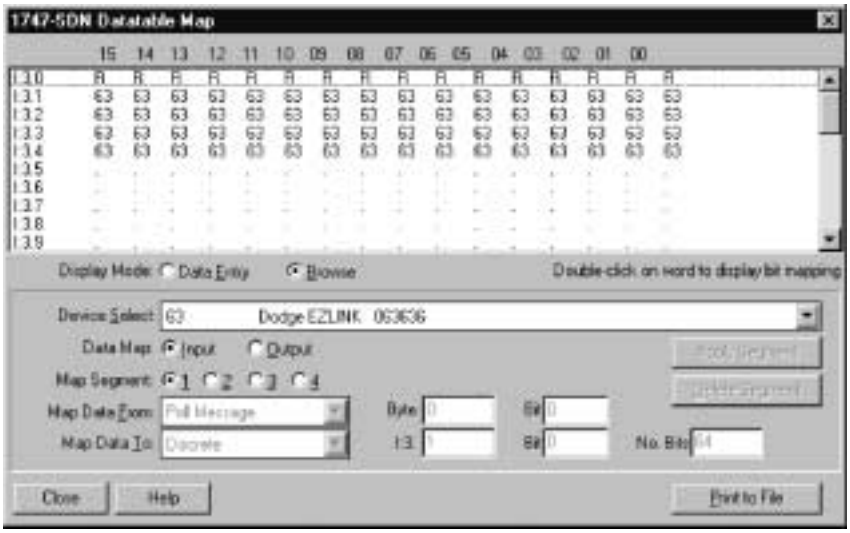
16. Make sure the *Data Map Input* button is highlighted.



Note: Steps 17 through 24 must be completed for each EZLINK node in the DeviceNet network.

17. Select an EZLINK node from the *Device Select* drop down menu.

18. Select *Poll Message* from the *Map Data From* drop down menu.

19. If you would like to save only part of the information returned by the EZLINK, identify the Byte index and Bit index in the Poll message which contains the data to be saved (See Assembly Object on page A-1 for details). You must save contiguous bytes from the Poll message.

20. Select *Discrete* from the *Map Data To* drop down menu.

21. Update the *No. Bits* text box with the number of bits to be received by the PLC DeviceNet Scanner Card from the selected EZLINK. You may choose to map 0 - 64 bits for each node that you map. If any bits are excluded, they are always excluded in order from the most significant bit toward the least significant.

22. Change the *I:1* and *Bit* text boxes to identify the position the EZLINK status information should be stored in the Discrete Table.

23. Click the *Apply Segment* button. You should see the node address of the EZLINK node appear in the input table. In the example shown above, 64 bits of information have been added for an EZLINK node at address 63. As mentioned before typically a different node address is selected so when new nodes are inserted the address 63 will be available.

24. Click the *Close* button.

25. When you return to the Scan List Editor dialog, click on the first line identifying an EZLINK node.

26. While holding down the *Ctrl* key, click on all other lines identifying EZLINK nodes.

27. Click on the *SDN...* button in the *Save To* group.

28. In the Scan List Editor - Download dialog, make sure the *Selected Scan List Records* button is highlighted.

29. Click on the *OK* button.

30.A message box should appear telling you that the Scanner is being updated. Click *OK* again.

31. Click on the *Close* button in the Scan List Editor.

32. Click on the *Close* button in the Module Configuration dialog.

33. You may now program your PLC Ladder logic to read the EZLINK information from the Discrete Table. The EZLINK nodes will deliver two Status Bytes, two bytes for vibration level, two bytes for temperature and two bytes for speed each to the PLC DeviceNet Scanner when Polled by the Scanner.

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Notes:

On Command Sampling of Vibration

This chapter describes the steps required to perform Command Sampling of Vibration using EZLINK modules and explicit messaging from a PLC.

What is On Command Sampling?

In some applications where the operation of the equipment is not continuous, such as put and place robots, it is desirable to sample vibration only when the equipment is running. This way the level of the vibration can be compared in a consistent manner.

Tools Used

PLC programming for explicit messaging, DeviceNet scanners, and EZLINK modules.

Explicit Messaging

The 1747- SDN scanner module uses the M0 and M1 files areas for data transfer. Words 224 through 256 must be used to execute the Explicit MessageRequest and rResponse functions. The minimum data size for an Explicit Message Request is 6 words and maximum is 32 words. Following is the data format to follow for the Start Service.

TXID	COMMAND
PORT	SIZE
SERVICE	MAC ID

CLASS
INSTANCE
ATTRIBUTE
.....

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Transmission ID (TXID)	The scanner uses this value to track the transaction to completion, and returns the value with the response that matches the request down loaded by the SLC-500 processor. The TXID data size is one byte.
Command	This code instructs the scanner how to administer the request. In this case it is 1. In binary it is 00000001. The command data size is one byte.
Port	The physical channel of the scanner where the transaction is to be routed. The port setting can be zero (channel A) or 1 (channel B).
Size	This identifies the size of the transaction body in bytes. The Transaction body begins at word 3. Note that the first word number is 0. A word is two bytes. In this case the value to be used is 6. In Binary it is 00000110.
Service	The code specifies the type request being delivered. The service data size is 1 byte. The Start Service Code is 0x06. In binary it is 00000110.
MAC ID	This the DeviceNet node address that you have assigned to EZLINK. The values can range from 0 to 63 expressed in binary.
Class	The class of the vibration object in this case is 0x0A. In binary it is 00001010.
Instance	The instance to be used here is 0x04. In binary the Instance value is 00000100.
Attribute	The attribute value to be used is 0x03. In binary the Attribute value is 00000011.

Important: To issue another Start Service to another node the last Start instructions must be erased. This can be accomplished by using the above table except command needs to be changed to 00000100 instead of 00000001. Then a new start request can be issued.

Sequence of Events

Use the following sequence of events as a guide for establishing the explicit message request in the ladder logic:

1. Put the Explicit Message Request data into an integer (N) file of the SLC-500 processor.
2. Use the file copy instruction (COP) to copy the Explicit Request data entered in step 1 to the M0 file, words 224 through 256.
3. Use the examine if closed instruction (XIC) to monitor bit 15 of the scanner's Module Status Register for an indication that it has received a response from EZLINK.
4. Clear the instruction in M0 file as indicated above so you can start addressing a new node. to close the dialog.

Technical Information

Appendix A contains technical information regarding the EZLINK Hardware. This information includes the byte ordering of EZLINK messages; the meaning of each bit within encoded status bytes, and the physical characteristics of the device.

Data Specifications

The accessible data objects of the EZLINK Hardware are described below.

I/O Data Structure

Data	Object	Instance	Size
Assembly Object	4	1	8 bytes
Current Temperature	10	1	2 bytes
Current Speed	10	2	2 bytes
Vibration Level	10	8	2 bytes
Vibration Sample	10	4	2 bytes*
Device Status	101	1	2 bytes

*Stores 4096 2-byte samples that can be individually addressed in a Get Single Request using explicit message.

Assembly Object

Produces 8 bytes of Polled input data

Byte 0	Status (Low Byte)
Byte 1	Status (High Byte -- Reserved)
Byte 2	Mean Vibration Level (Low Byte)
Byte 3	Mean Vibration Level (High Byte)
Byte 4	Temperature (Low Byte)
Byte 5	Temperature (High Byte)
Byte 6	Speed (Low Byte)
Byte 7	Speed (High Byte)

AIP Object, Current Speed
AIP Object, Current Temperature
AIP Object, Vibration Level

- Produces 2 bytes of Polled input data.
- Speed returned in units of RPM.
- Temperature returned in degrees Fahrenheit.
- Vibration Level returned in 0.001 inches/second.

Byte 0	Sample (Low Byte)
Byte 1	Sample (High Byte)

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AIP Object, Vibration Sample Instance

Produces 2 bytes of data from a 4096 sample array. Explicit message Get Single Request must include the sample “address” (e.g., 2*N below).

Byte 0	Sample N (Low Byte)
Byte 1	Sample N (High Byte)

Status Object

Produces 2 bytes of Polled or Change-Of-State data. The High Byte is unused.

Byte 0	Voltage Shutdown	Input Status	Vibration Shutdown	Vibration Alarm	Temperature Shutdown	Temperature Alarm	Under Speed Shutdown	Under Speed Alarm
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Bit 0 is set to...	When...
0	Speed is greater than Alarm setting.
1	Speed is less than Alarm setting.
Bit 1 is set to...	**When...**
0	Speed is greater than Shutdown setting.
1	Speed is less than Shutdown setting.
Bit 2 is set to...	**When...**
0	Temperature is less than Alarm setting.
1	Temperature is greater than Alarm setting.
Bit 3 is set to...	**When...**
0	Temperature is less than Shutdown setting.
1	Temperature is greater than Shutdown setting -- or -- Temperature Switch is Closed.
Bit 4 is set to...	**When...**
0	Vibration is less than Alarm setting.
1	Vibration is greater than Alarm setting.
Bit 5 is set to...	**When...**
0	Vibration is less than Shutdown setting.
1	Vibration is greater than Shutdown setting.
Bit 6 is Not Used	
Bit 7 is set to...	**When**
0	EZLINK Voltages are within operating ranges
1	EZLINK Voltages are out of tolerance.

I/O Exchange Data

Exchange Method:	
Strobe	Applicable: No
Poll	Applicable: Yes
Change-of-State	Applicable: Yes
Cyclic I/O	Applicable: No
Messaging Type:	
Slave Mode	Applicable: Yes
Peer-to-Peer	Applicable: No
Configuration:	
Data Rate	Set Attribute Request stored in Non-Volatile Memory
Node Address	Set Attribute Request stored in Non-Volatile Memory
Parameters	Non-Volatile Memory Object

Physical Connection

The EZLINK uses a mini-male connector to connect to a DeviceNet network.

EZLINK Physical Specifications

Status Indicator	Combined Network/Status (red/green)
Network Address	00 - 63
Current Draw	110mA @ 25V 225mA @ 11V
Inputs Number Type Voltage/Current	 6 Analog & Digital Varies
Outputs Number Type Voltage/Current	 1 Voltage 26V @ 40mA
Dimensions	4.375” x 1.875” x 3.250”
Weight	612 g
Enclosure Rating	water tight, dust tight
Environmental Conditions Operating Temperature Storage Temperature Relative Humidity	 –40 to 85 degrees C –55 to 100 degrees C 95% non-condensing
Certifications	FCC Part 15, Class A EN50082-1: 1992 EN55011: 1991

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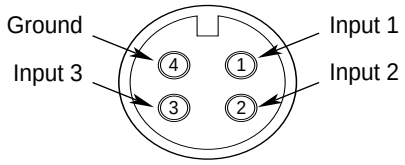
Notes:

EZLINK Plus Pin and Status Byte Assignments

EZLINK Plus has a four-pin connector on the lower half that can be used as a switch input. The connector is internally connected to the EZLINK card.

Pin Assignments

Connector nipple is 1/2-14. Pin assignments are shown below.



When the switch is open the status byte “8 bits bit 0 to bit 7”, will have a value 1 in bit 6. When the switch is closed bit 6 will change to the value 0.

The status byte can be obtained by using requesting class 101, Instance 1, attribute 3.

To obtain status:

Input	Class	Instance	Attribute	Notes
3	8	1	3	An Open switch returns a value of “0” A Closed switched returns a value of “1”
2	8	2	3	
1	8	3	3	

Bit Assignments

The bits assignment from right to left is as follows:

Bit 0	Under speed alarm. It has a value of 0 if the speed is above the alarm level stored in EZLINK. It has a value of 1 if the speed drops below this alarm level.
Bit 1	Under speed shut down alarm. It has a value of 0 if the speed is above this alarm level stored in EZLINK. It has a value of 0 if the speed is below this level.
Bit 2	Over temperature alarm. It has a value of 0 if the temperature is below the alarm level stored in EZLINK. It has a value of 1 if the temperature exceeds this alarm level.
Bit 3	Shut down temperature alarm. It has a value of 0 if the temperature is below the shut down alarm stored in EZLINK. It has a value of 1 if the temperature exceeds this alarm level.
Bit 4	Vibration alarm level. It has a value of 0 if the vibration level is below the alarm level stored in EZLINK. It has a value of 1 if the vibration level is above this limit.
Bit 5	Vibration shut down alarm. It has a value of 0 if the vibration level is below the shut down level stored in EZLINK. It has a value of 1 if the vibration level is above this limit.
Bit 6	Is the status of the switch connected to EZLINK. It has a value of 1 if the switch is closed and has a value of 0 if the switch is open.
Bit 7	Is voltages levels alarm. If all voltages are correct the bit has a value of 0. If the voltages are out of tolerance it has a value of 1.

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Notes:

Installing EZLINK Kits

All EZLINK Kits are equipped with a connection for the thermocouple, an internal accelerometer, and a connection for an optional external DC proximity (or photoelectric) switch based speed sensor. Speed sensing requires a DC Proximity Switch Kit and a Cable Kit which must be ordered separately. The 5-pin connector at one end of the EZLINK module is to be used with a standard DeviceNet drop cable that terminates with a mini-female connector.

Installing Adaptable EZLINK Modules

1. Machine a flat surface on top of the housing. The flat surface should at least 2" square to mount the supplied plate using the two counter sunk screws.

   Important: Machining a flat surface can weaken the housing. Make sure that the loads seen by the housing are within the allowable values.

2. Place the mounting plate on top of the flat surface where the EZLINK module is to be mounted.Using the plate as a template, mark the location of the thermocouple hole in the middle of the plate, and the two counter sunk screw holes.

3. Using the thermocouple mark that was made, drill 1/8 in. hole. The hole depth should be 1/16 in. from the inner housing surface.

   Important: Do not drill all the way through the housing. Using a #21 (0.159 inches) drill bit, drill the two screw holes to a depth of 0.630 inches.

4. Tap the two holes to a depth of 0.530" using a #10-32 tap.

5. Fill the 1/8” thermocouple hole 3/4 full with high temperature epoxy. McMaster item #7563A24 (or equivalent) is recommended.

6. Insert the sealed end of the supplied J-Type thermocouple into the hole until it bottoms. If needed, fill the rest of the hole with epoxy. Secure the thermocouple in position with tape.

7. Let the epoxy cure for 24 hours before proceeding with the rest of the installation.

8. Follow the Installing Adaptable EZLINK Modules procedure on page C-1.

9. Apply silicon sealer to the top of the mounting surface.

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10. Thread the thermocouple wire through the mounting plate provided.
11. Secure the mounting plate using the counter sunk screws. Torque screws to 65-75 in.-lb.
12. Thread the thermocouple wire from the bearing housing through the middle hole of the two cork gaskets provided. Place the cork gaskets on the mounting surface.
13. Thread the rubber boot onto the thermocouple wire – small end first.
14. Remove the top of the thermocouple male connector provided.
15. Connect the thermocouple red wire to the screw terminal marked "–" or "Co". Verify that the screw is tightened securely.
16. Connect the thermocouple white wire to the screw terminal marked "+" or "–." Verify that the screw is securely tightened.
17. Repeat steps 13 to 16 on the EZLINK thermocouple wires using the female thermocouple connector.
18. Plug the male thermocouple connector into the female thermocouple connector.
19. Fill the rubber boots halfway with 100% silicon sealer.
20. Slide the rubber boots over the thermocouple connector until the boots overlap.
21. Remove the nuts holding the 2.5 inch, #10-32 screws in the EZLINK.
22. Place the EZLINK module on top of the mounting surface. Align the module holes with the holes in the gaskets and the mounting surface. Make sure that the thermocouple wires and connectors are inside the EZLINK module and that all cables that are to be connected to the EZLINK module are able to be routed away from moving parts.
23. Secure the module using the four 2.5 inch, #10-32 socket head screws and #10 lock washers provided. Torque the screws to 65-75 in.-lb.
24. Connect the 5-pin DeviceNet connector on the EZLINK module to the DeviceNet network.
25. Connect the proximity (or photoelectric) sensor to the 3-pin connector (on the EZLINK module) if the speed input is being used.

Installing Adaptable EZLINK Motor Modules

All EZLINK kits are equipped with a connection for the thermocouple, an internal accelerometer, and a connection for an optional external DC proximity (or photoelectric) switch based speed sensor (cables & sensors are sold separately). In addition, EZLINK Plus has a 4-pin connector for three discrete inputs. The 5-pin connector at one end of the EZLINK module is to be used with a standard DeviceNet drop cable that terminates with a mini-female connector. The following are the installation procedures for these kits.

1. Remove the end bell of the motor “Shaft Side.”
2. Select the position on the rim where you want to mount the module.
3. Drill and tap a 1/2 inch - 14 radial hole.
4. Drill 1/8 inch radial hole in the bearing housing on the axis of the threaded hole machined in step 3.
5. Fill half of the 1/8 inch hole with high temperature epoxy. Insert the thermocouple tip into the hole making sure it does not protrude from the hole. Make sure the thermocouple shields touches the edge of the hole.
6. Let the epoxy cure with the thermocouple wire sticking out from the 1/2 inch hole.
7. Install the end shield back on the motor.
8. Thread a pipe nipple (not included in kit) that has a 1/2 inch pipe thread on both ends. The length of the nipple will depend on the size and type of motor used.
9. Thread the thermocouple wire through the mounting plate provided.
10. Secure the mounting plate on the 1/2 pipe using a 1/2 inch star nut.
11. Thread the thermocouple wire through the middle hole of the two cork gaskets provided.
12. Place the cork gaskets on the mounting surface.
13. Thread the rubber boot onto the thermocouple wire small end first as shown below

14. Remove the top of the thermocouple male connector provided.

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15. Connect the thermocouple red wire to the screw terminal marked “–” or “Co”, making sure the screw is tightened securely.

16. Connect the thermocouple white wire to the screw terminal marked “+” or “Ir”, making sure the screw is securely tightened.

17. Repeat Steps 13 through 16 on the EZLINK thermocouple wires using the female thermocouple connector.

18. Plug the male thermocouple connector into the EZLINK female thermocouple connector.

19. Fill the rubber boots halfway with 100% silicon sealer.

20. Slide the rubber boots over the thermocouple connector until the boots overlap as shown below.

21. Place the EZLINK module on top of the mounting surface, aligning the module holes with the gasket and mounting surface holes. Verify that the thermocouple wires and connectors are inside the EZLINK module and that all connectors point away from all moving parts.

22. Secure the module using the four 2 1/2 inch - 10-32 socket head screws and #10 lock washers provided. Torque the screws to 65-75 in-Ib.

23. Connect the 5-pin DeviceNet connector on the EZLINK module to the DeviceNet network.

24. For EZLINK Plus connect the four-pin connector to its cable for the switches.

25. Connect the proximity (or photoelectric) sensor to the 3-pin connector on the EZLINK module if the speed input is being used.

Installing the Speed Sensing Input

The EZLINK and EZLINK Plus modules include the capability to monitor shaft speed of mechanical equipment. A proximity or photoelectric sensor can be connected to the 3-pin connector on the EZLINK module. The sensor selected will be powered by the EZLINK module and must comply with the electrical specifications shown below.

Description	Specification
Voltage	10-30V DC
Current	40 mA Maximum
Output Configuration	PNP (Sourcing) N.O.
Switching Frequency	Must be able to provide 2 pulses per revolution

Figure D.1 Typical Sensor Wiring

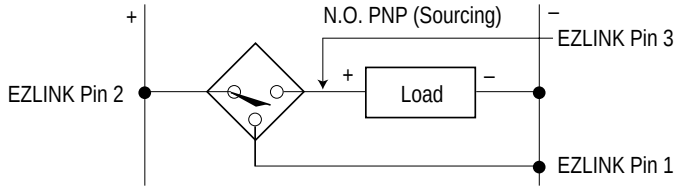
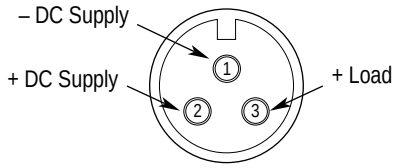


Figure D.2 EZLINK 3-Pin Connector



The EZLINK module will record one revolution for every two pulses from the sensor.

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