

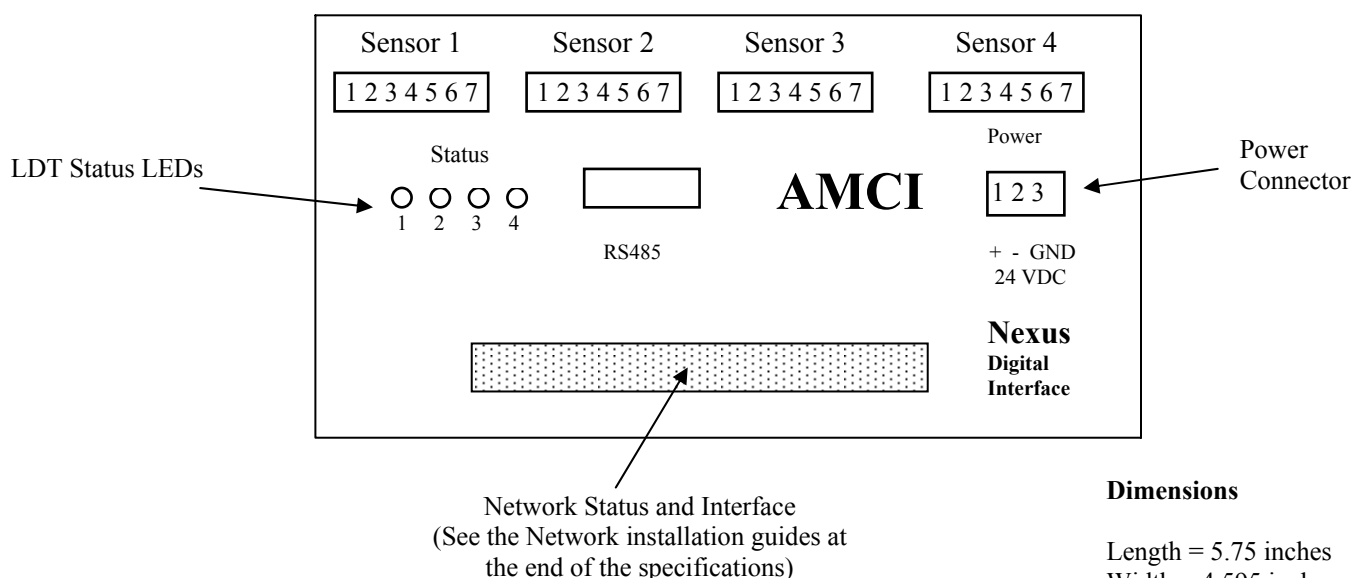
Section 1: Product Overview

The AMCI Nexus LDT Interface module connects a LDT sensor to a network. The available networks, along with the corresponding AMCI part number are shown in the following table.

Network	LDT Interface Part Number	Multiple Magnet LDT Interface Part Number
ControlNet	NX2C4C	NX2C4C-08
DeviceNet	NX2C4D	Not Available
Ethernet	NX2C4E	NX2C4E-08
Profibus	NX2C4P	Not Available

Note: Because DeviceNet and Profibus do not support the transfer of 136 output words; these versions of the Multiple Magnet LDT Interface Nexus are not available.

Section 2: Hardware Information



Power Connector

Pin	Function
1	+24Vdc
2	DC Common
3	Shields

The Nexus Module requires 500 mA of current @24Vdc to operate. If the sensors are being powered from the Nexus unit, add the power requirements of the sensor to those of the Nexus.

LDT Connectors

Pin Number	LDT Functional Description
1	+Interrogation
2	-Interrogation
3	+Gate or +Start/Stop
4	-Gate or -Start/Stop
5	DC Common
6	+24Vdc
7	Frame

The Nexus LDT Interface unit is designed to operate with sensors whose output signal levels are at 5Vdc. If the sensor receives its input power from a 24Vdc supply, then the +24Vdc and DC Common terminals can be used to power the sensor. However, if the sensor operates at a different voltage level, connect the Common of both the Nexus and the sensor's power supply together, and leave the +24Vdc terminal open.

LDT Status LEDs

Function	LED Pattern
LDT OK	solid green
Clearable Transducer Fault	Flashing green
Non Clearable Transducer Fault	flashing red
Module Fault	solid red

It is possible to enable or disable the LEDs when programming the Nexus module. The default LED function has only LED 1 enabled.

Throughput Time

The throughput time of the Nexus LDT Interface is dependent on the type of unit and how its parameters are configured and represents how long the module will need to decode the position data. It does not include the time that it will take to transfer data to and from the Nexus module over the network.

NX2C4X: 2ms minimum. Maximum time dependent on the value of the length parameter and the location of the magnet on the sensor

NX2C4X-08: The update time is either 2ms or the result of $(\text{Length} * 40 * 1.3)$ whichever is greater. The result of this calculation is in μs .



NX2C4X Specifications Rev 1.7

Networked Four Channel LDT Interface

Section 3: Single Magnet LDT Interface NX2C4X (20 Input Words and 33 Output Words)

The single magnet Digital Interface can interface with sensors that have either Start/Stop or Pulse Width Modulated outputs.

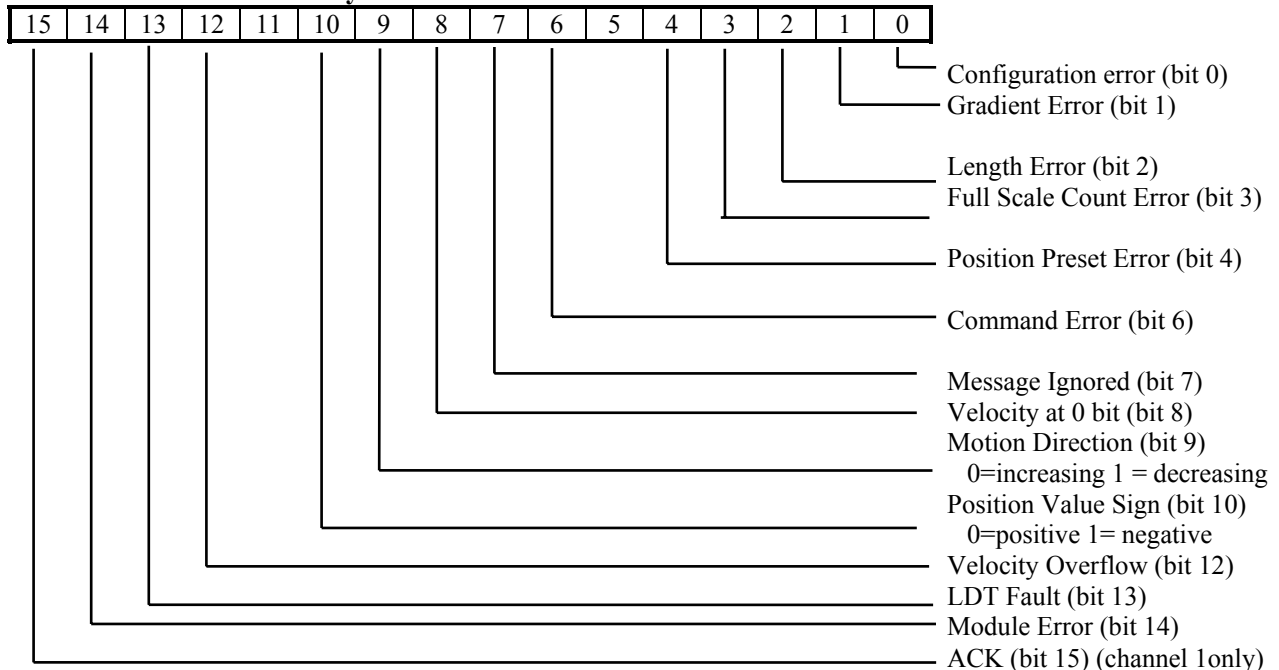
CAUTION: Because the data from the Nexus LDT interface module may be updated asynchronously to the program scan, AMCI recommends that the input data be buffered before it is used by the ladder logic program.

Input Words for LDT with Recirculations or Pulse Width Modulation

Note: A ControlLogix system using ControlNet will require 22 input words. The first two words will always be zero, and the Channel 1 Status Word will be located in word 2.

Word #	LDT Parameter
0	Channel 1 Status
1	Channel 1 upper 4 digits position
2	Channel 1 lower 4 digits position
3	Channel 1 upper 4 digits velocity
4	Channel 1 lower 4 digits velocity
5	Channel 2 Status
6	Channel 2 upper 4 digits position
7	Channel 2 lower 4 digits position
8	Channel 2 upper 4 digits velocity
9	Channel 2 lower 4 digits velocity
10	Channel 3 Status
11	Channel 3 upper 4 digits position
12	Channel 3 lower 4 digits position
13	Channel 3 upper 4 digits velocity
14	Channel 3 lower 4 digits velocity
15	Channel 4 Status
16	Channel 4 upper 4 digits position
17	Channel 4 lower 4 digits position
18	Channel 4 upper 4 digits velocity
19	Channel 4 lower 4 digits velocity

NX2C4X Status Word Layout



Configuration Error: Set if any of the unused bits in the configuration word are set

Gradient Error: This bit is set if the Gradient Value is outside the expected range 80000...99999, or if the lower gradient word exceeds 9999.

Length Error: Full Scale Length is outside the expected range (2 to 800)

Full Scale Count Error: Set if the Full Scale Count is outside the range of (2 to (Length * 1000))

Position Preset Error: Set if the preset value is outside of the range of $\pm 268,435,455$

Command Error: Set if any of unused bits in the command word are set, or if both the Program Channel and Apply Preset bits are set during the same programming sequence.

Message Ignored: Set if an attempt is made to program a parameter if an error already exists on a different parameter, or if an attempt is made to apply the preset value to a channel that is faulted. This bit is not set if the same channel is programmed a second time with incorrect data.

Motion Direction: This bit will be "0" if the position is increasing, or "1" if the position is decreasing. The bit will remain in its last state when there is no motion.

Position Value Sign: This bit will be "0" if the position is positive, or "1" if the position is negative.

Velocity at Zero: This bit will be set if there has been no motion for the last portion of the Velocity Update Time.

Velocity Overflow: This bit will be set if the rate of change value exceeds 2^{32} counts per second. When this occurs, the last valid value is sent to the processor.

LDT Fault: This bit will be set if a transducer fault has been detected caused by improper programming, improper installation or faulty transducer.

Module Fault: Set on EEPROM or PLD fault.

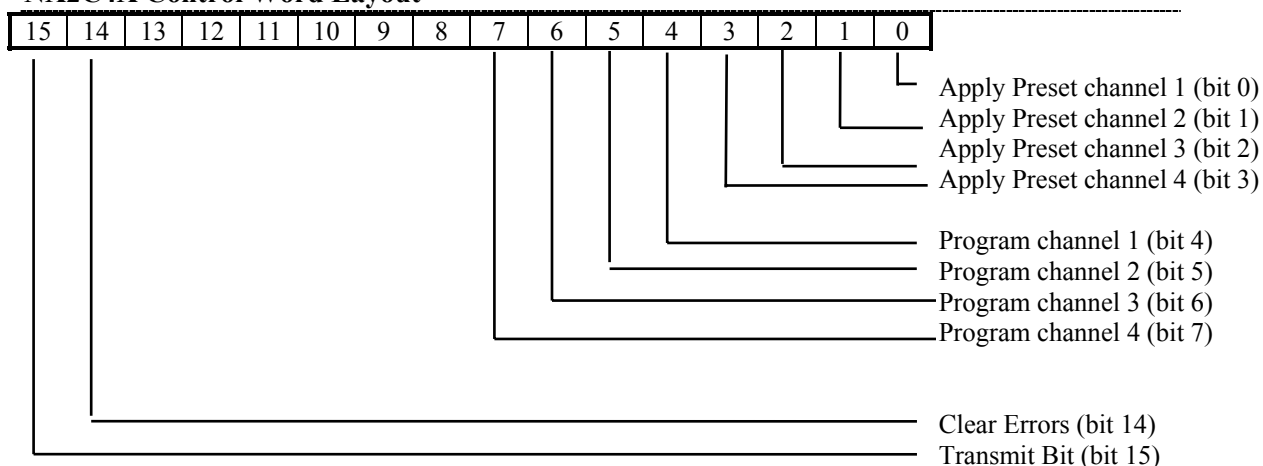
Acknowledge Bit: Set when the transmit bit is set. This bit is present only in the channel 1 status data.

NX2C4X Output Words

Word Number	LDT Set Up Word
0	Control
1	Channel 1: Configuration
2	Channel 1: Upper 1 Digit Gradient
3	Channel 1: Lower 4 Digits Gradient
4	Channel 1: Upper 2 Digits Full Scale Count
5	Channel 1: Lower 4 Digits Full Scale Count
6	Channel 1: Full Scale Length
7	Channel 1: Upper 4 Digits Preset Value +sign
8	Channel 1: Lower 4 Digits Preset Value
9	Channel 2: Configuration
10	Channel 2: Upper 1 Digit Gradient
11	Channel 2: Lower 4 Digits Gradient
12	Channel 2: Upper 2 Digits Full Scale Count
13	Channel 2: Lower 4 Digits Full Scale Count
14	Channel 2: Full Scale Length
15	Channel 2: Upper 4 Digits Preset Value + sign
16	Channel 2: Lower 4 Digits Preset Value
17	Channel 3: Configuration
18	Channel 3: Upper 1 Digit Gradient
19	Channel 3: Lower 4 Digits Gradient
20	Channel 3: Upper 2 Digits Full Scale Count
21	Channel 3: Lower 4 Digits Full Scale Count
22	Channel 3: Full Scale Length
23	Channel 3: Upper 4 Digits Preset Value + sign
24	Channel 3: Lower 4 Digits Preset Value
25	Channel 4: Configuration
26	Channel 4: Upper 1 Digit Gradient
27	Channel 4: Lower 4 Digits Gradient
28	Channel 4: Upper 2 Digits Full Scale Count
29	Channel 4: Lower 4 Digits Full Scale Count
30	Channel 4: Full Scale Length
31	Channel 4: Upper 4 Digits Preset Value + sign
32	Channel 4: Lower 4 Digits Preset Value

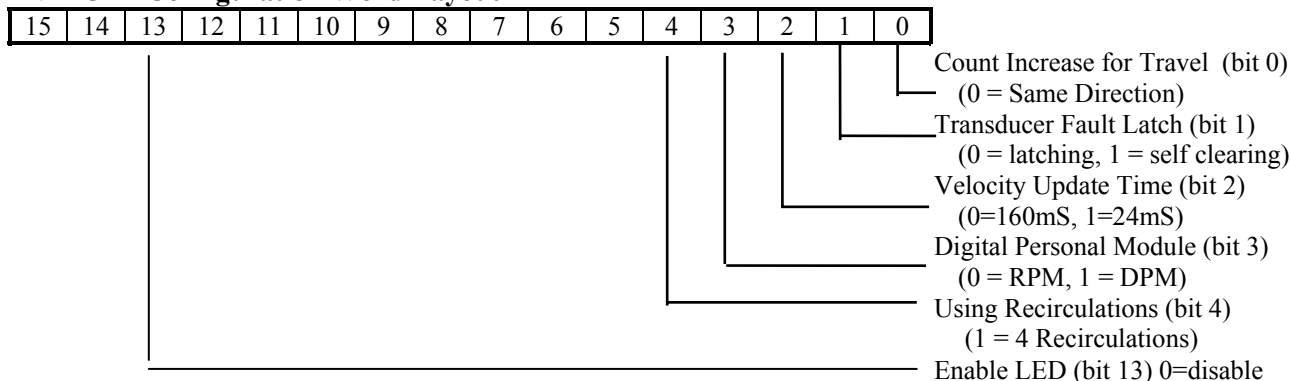
1. The Gradient Value (default=90300) must be between 80 000 and 99 999.
2. The Full Scale Length (default=40) can be between 2 and 800.
3. The Full Scale Count (default=40 000) can be between 2 and (Full Scale Length * 1000).
4. The preset value has a range of $\pm 268,435,455$ and a default value of zero. Negative Preset are transmitted with bit 15 set in the upper word of the corresponding Preset Value.
5. The Nexus LDT measures only in inches. However, the Full Scale Length and Full Scale Count parameters can be used to scale the position data so that it is reported in millimeters. To accomplish this, set the Length to its inch value and the Full Scale Count to (254 * Length in inches). The resolution will be 0.1mm.

NX2C4X Control Word Layout



Note: A Command Error is generated if you try to both preset and program a channel in a single programming sequence. However, it is possible to program a channel while presetting a different channel.

NX2C4X Configuration Word Layout



1. The Configuration Word has a default value of 0.
2. All bits that are not used, 5 to 12, 14, and 15, must be reset to zero or a configuration error will be generated.
3. Changing the direction of increasing counts sets the position sign bit in the input register's status data. The absolute value of the position data is not affected.
4. Changing the sensor type from RPM to DPM or vice versa will cause the Nexus unit to indicate a clearable transducer fault, unless the unit has also been configured to self clear the transducer fault.
5. The position update time is dependent on the programmed length parameter and an internal calculation. If the result of multiplying the $(Length * 40 * 1.3\mu s)$ is less than 2ms, then the position is updated every 2ms. However, if the result of this calculation is greater than 2ms, then the result of this calculation is used for the position update time.

Section 4: Four Channel, Multiple Magnet LDT interface NX2C4X-08. A maximum of 16 magnets can be used on each sensor. 136 Input Words and 33 Output Words.

CAUTION: Because the data from the Nexus LDT interface module may be updated asynchronously to the program scan, AMCI recommends that the input data be buffered before it is used by the ladder logic program.

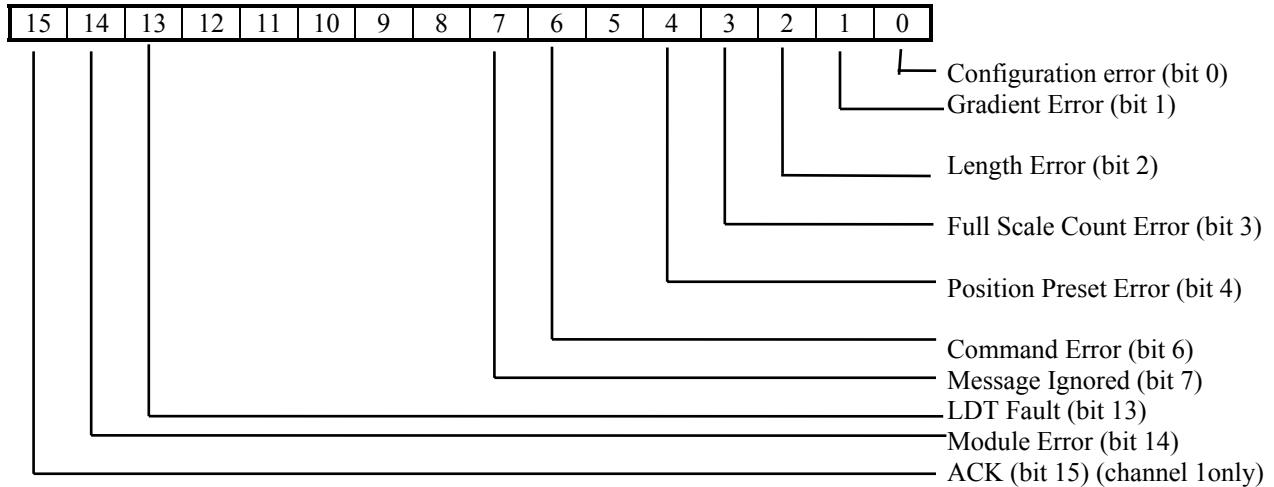
Input Words for LDT with Multiple Magnets

Note: A ControlLogix system using ControlNet will require 138 input words. The first two words will always be zero, and the Channel 1 Status Word will be located in word 2.

Word #	LDT Parameter
0	Channel 1, Status
1	Channel 1, Position Signs Word
2	Channel 1, Magnet 1 upper 4 digits position
3	Channel 1, Magnet 1 lower 4 digits position
4	Channel 1, Magnet 2 upper 4 digits position
5	Channel 1, Magnet 2 lower 4 digits position
6 to 33	Channel 1, Magnet 3 ... 16 position
34	Channel 2, Status
35	Channel 2, Position Signs Word
36	Channel 2, Magnet 1 upper 4 digits position
37	Channel 2, Magnet 1 lower 4 digits position
38 to 67	Channel 2, Magnet 2 ... 16 position
68	Channel 3, Status
69	Channel 3, Position Signs Word
70	Channel 3, Magnet 1 upper 4 digits position
71	Channel 3, Magnet 1 lower 4 digits position
72 to 101	Channel 3, Magnet 2 ... 16 position
102	Channel 4, Status
103	Channel 4, Position Signs Word
104	Channel 4, Magnet 1 upper 4 digits position
105	Channel 4, Magnet 1 lower 4 digits position
106 to 135	Channel 4, Magnet 2 ... 16 position

Note 1: The position sign words are used to indicate the sign of each of the 16 magnets in the channel. If the bit is reset, “0”, the position is positive, if the bit is set, “1”, the position is negative. Bit 0 = magnet 1 position sign, bit 1 = magnet 2 position sign, ... bit 15 = magnet 16 position sign.

NX2C4X-08 Status Word



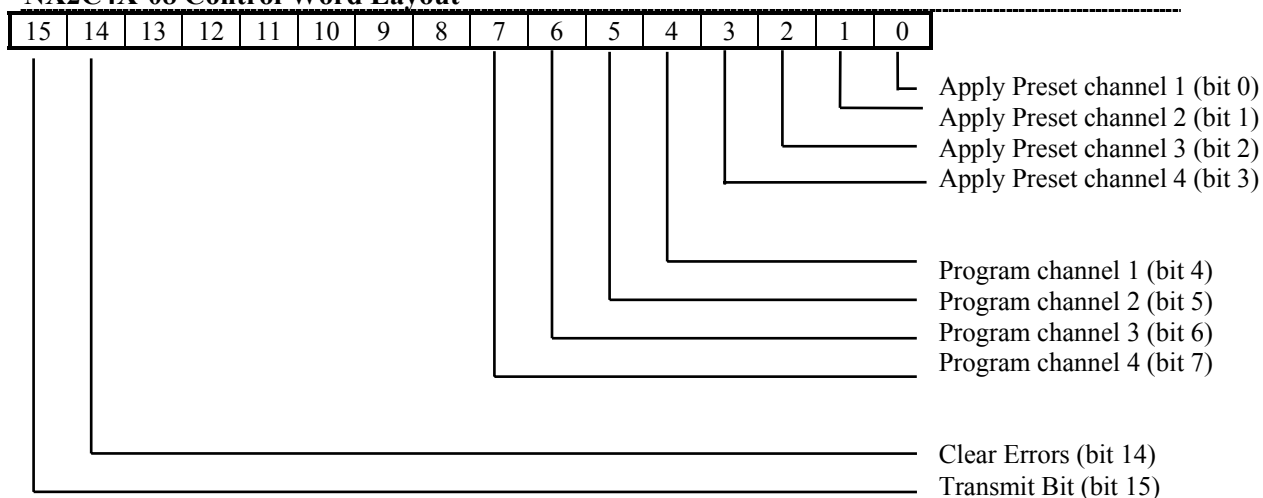
- Configuration Error: Set if any of the unused bits in the configuration word are set, if the length parameter is not twice the number of magnets, or if the channel is configured to operate with a DPM sensor and more than one magnet.
- Gradient Error: This bit is set if the Gradient Value is outside the expected range 80000...99999, or if the lower gradient word exceeds 9999.
- Length Error: Full Scale Length is outside the expected range (2 to 800)
- Full Scale Count Error: Set if the Full Scale Count is outside the range of (2 to (Length * 1000))
- Position Preset Error: Set if the preset value is outside of the range of $\pm 268,435,455$
- Command Error: Set if any of unused bits in the command word are set, or if both the Program Channel and Apply Preset bits are set during the same programming sequence.
- Message Ignored: Set if an attempt is made to program a parameter if an error already exists on a different parameter, or if an attempt is made to apply the preset value to a channel that is faulted. This bit is not set if the same channel is programmed a second time with incorrect data.
- LDT Fault: This bit will be set if a transducer fault has been detected caused by improper programming, improper installation or faulty transducer. This bit will also be set if the unit has been programmed for more magnets than are present on the sensor.
- Module Fault: Set on EEPROM or PLD fault.
- Acknowledge Bit: Set when the transmit bit is set. This bit is present only in the channel 1 status data.

NX2C4X-08 Output Words

Word Number	LDT Set Up Word
0	Control
1	Channel 1: Configuration
2	Channel 1: Upper 1 Digit Gradient
3	Channel 1: Lower 4 Digits Gradient
4	Channel 1: Upper 2 Digits Full Scale Count
5	Channel 1: Lower 4 Digits Full Scale Count
6	Channel 1: Full Scale Length
7	Channel 1: Upper 4 Digits Preset Value +sign
8	Channel 1: Lower 4 Digits Preset Value
9	Channel 2: Configuration
10	Channel 2: Upper 1 Digit Gradient
11	Channel 2: Lower 4 Digits Gradient
12	Channel 2: Upper 2 Digits Full Scale Count
13	Channel 2: Lower 4 Digits Full Scale Count
14	Channel 2: Full Scale Length
15	Channel 2: Upper 4 Digits Preset Value + sign
16	Channel 2: Lower 4 Digits Preset Value
17	Channel 3: Configuration
18	Channel 3: Upper 1 Digit Gradient
19	Channel 3: Lower 4 Digits Gradient
20	Channel 3: Upper 2 Digits Full Scale Count
21	Channel 3: Lower 4 Digits Full Scale Count
22	Channel 3: Full Scale Length
23	Channel 3: Upper 4 Digits Preset Value + sign
24	Channel 3: Lower 4 Digits Preset Value
25	Channel 4: Configuration
26	Channel 4: Upper 1 Digit Gradient
27	Channel 4: Lower 4 Digits Gradient
28	Channel 4: Upper 2 Digits Full Scale Count
29	Channel 4: Lower 4 Digits Full Scale Count
30	Channel 4: Full Scale Length
31	Channel 4: Upper 4 Digits Preset Value + sign
32	Channel 4: Lower 4 Digits Preset Value

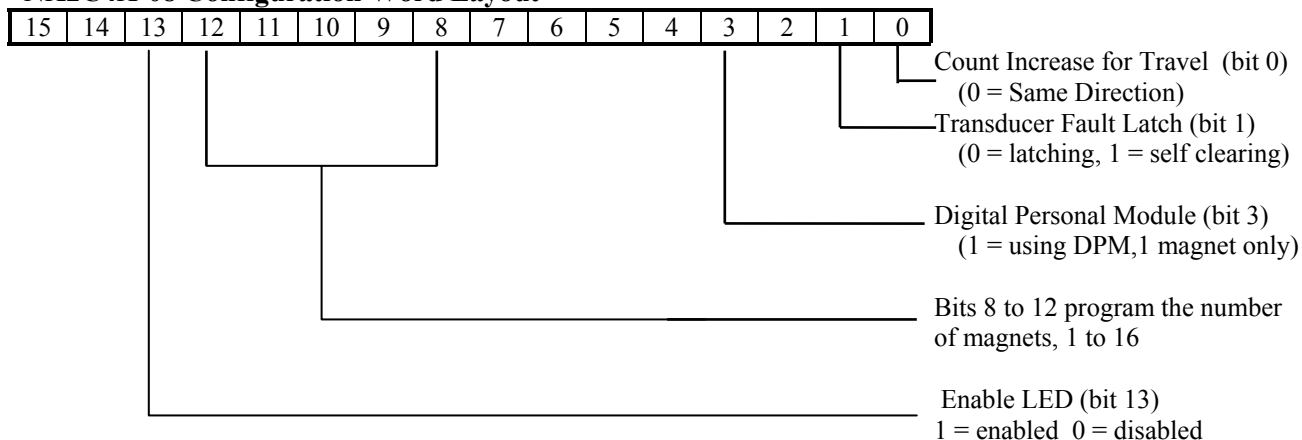
1. The Gradient Value (default=90300) must be between 80 000 and 99 999.
2. The Full Scale Length (default=40) can be between 2 and 800.
3. The Full Scale Count (default=40 000) can be between 2 and (Full Scale Length * 1000).
4. The preset value has a range of +268,435,455 and a default of zero. Negative Preset are transmitted with bit 15 set in the upper word of the corresponding Preset Value.
5. The Nexus LDT measures only in inches. However, the Full Scale Length and Full Scale Count parameters can be used to scale the position data so that it is reported in millimeters. To accomplish this, set the Length to its inch value and the Full Scale Count to (254 * Length in inches). The resolution will be 0.1mm.

NX2C4X-08 Control Word Layout



1. A Command Error is generated if you try to both preset and program a channel in a single programming sequence. However, it is possible to program a channel while presetting a different channel.
2. Applying the Preset to an LDT with Multiple Magnets sets the position for the first magnet to the programmed preset value. The offset that was necessary to set the first magnet to the preset value is also applied to the remaining magnets, maintaining the distance between each of the magnets.

NX2C4X-08 Configuration Word Layout



1. The Configuration Word has a default value of 0.
2. Bits 2, 4 to 7, 14, and 15 must be reset or a configuration error will be generated.
3. Bits 8 through 12 set the number of magnets in use. The range is 1 to 16. Entering a value of zero will generate a configuration error.
4. The length parameter must be at least twice the number of magnets, or a configuration error will be generated.
5. An LDT error will be reported if the unit has been programmed for more magnets than are present on the sensor. However, the module will operate correctly if the number of magnets on the sensor exceeds the value programmed.
6. The module can only be configured to accept signals from a sensor with a Digital Personality module if the number of magnets is set to 1. If the number of magnets is

-
- greater than 1, programming the module for a DPM sensor will cause a configuration error to be generated.
7. It is not possible to program the multiple magnet module for more than one recirculation.
 8. Multiple magnets should be kept at least three inches from each other. If the magnets are moved together closer than this, the position data of the magnet farther from the head of the sensor will increase. If the magnets are moved closer together still, the return signal from the farther magnet will disappear, and the unit will go into transducer fault.
 9. The update time is either 2ms or the result of $(\text{Length} * 40 * 1.3)$ whichever is greater. The result of this calculation is in μs .

Section 5: General Programming Notes for all versions of the Nexus LDT Interface Units

1. It is possible to enable or disable the four status LEDs. The channels are always enabled, and will function normally, even if the LED is disabled. By default, only the channel 1 LED is enabled.
2. It is possible to program multiple channels at one time.
3. When programming a channel, all of the data must be correct before it will be acted upon. However, if the data on one channel is incorrect, and the data on another channel is correct, then the data from the correct data will be accepted even if the channel with the incorrect data comes first.
4. If a programming error exists on any of the channels, the error must be cleared before a different channel can be programmed.
5. It is not possible to program and apply the preset value with one programming sequence. However, it is possible to program one channel and apply the preset to another channel.
6. Balluff recommends that only their magnets be used on their transducers.
7. Default parameters are loaded with jumper strap installed on JP3 at power up.

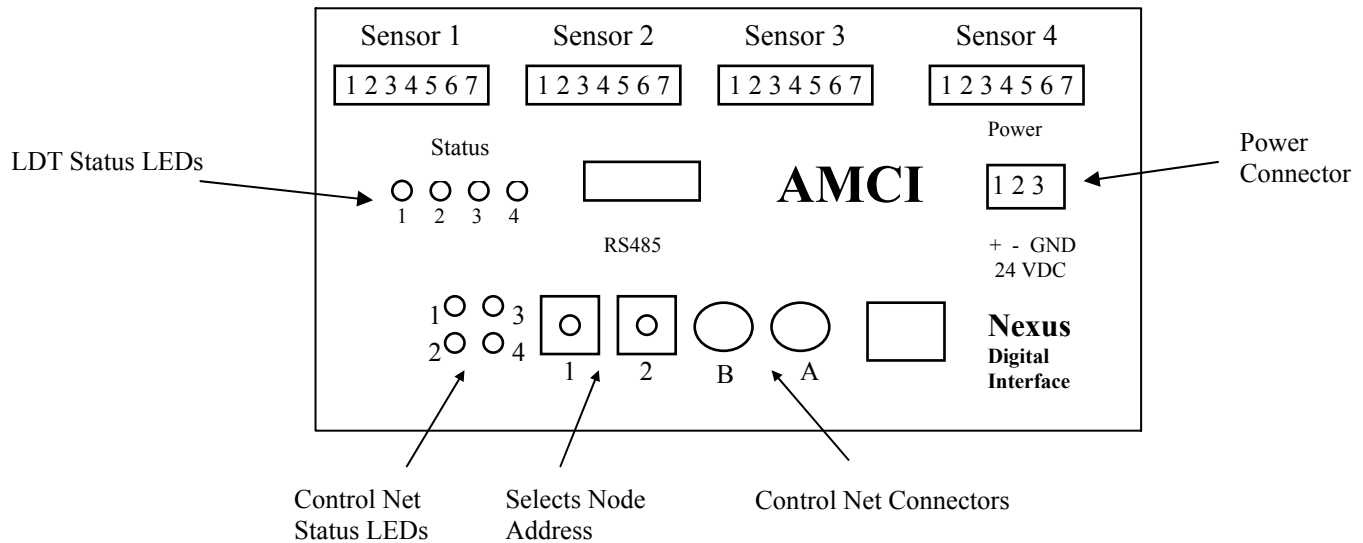
Section 6: Programming Sequence for all versions of the Nexus LDT Interface Units

1. The ladder logic program writes the data into the output registers.
2. The ladder logic program then sets the transmit bit.
3. When the module detects the 0 to 1 transition of the transmit bit, it will respond by setting any error bits and the Acknowledge bit in the input registers.
4. When the ladder logic program sees that the Acknowledge bit is set, it will examine any error bits, and then reset the transmit bit.
5. The module will reset the Acknowledge bit.
6. The programming sequence is now complete.

Section 7: Network Connections

ControlNet Hardware Overview

Note: A ControlLogix system using ControlNet will require 22 input words for the NX2C4C and 138 input words for the NX2C4C-08. The first two words will always be zero, and the Channel 1 Status Word will be located in word 2.



ControlNet Connectors

The Nexus module has two BNC network connections labeled A and B. Either can be used, depending on how the network configuration.

Node Address Selection

The Nexus module has two rotary switches used to set the module's address on the network. Any node from 0 to 99 can be selected. Switch 1 sets the one digit and switch 2 sets the 10s digit of the address. For example, if the Nexus is to be installed at node 46, switch 1 would be set to 6, and switch 2 would be set to 4. Note, changing the node address only takes affect at power up. Changing the address while power is applied to the Nexus module will generate a minor fault.

Network Update Time

The Nexus LDT Interface has a minimum network update time of 5ms.

ControlNet Status LEDs

The following table describes the function of the four network status LEDs.

LED Number	Name	LED Pattern	Function
1	Channel B status	Solid Green Flashing Red/Off Solid Off	Channel Operating Correctly Channel Disconnected from Network Channel Disabled
2	Channel A status	Solid Green Flashing Red/Off Solid Off	Channel Operating Correctly Channel Disconnected from Network Channel Disabled
3	Module Owned	Solid Green Off Solid Red	Network Card is communicating with Nexus Network Card is not communicating with Nexus Incorrectly Configured Network. Possible causes are incorrect Node #, Number of I/O words, or Comm format.
4	Module Status	Flashing Green Solid Green Flashing Red Solid Red	Network Card is waiting for initialization Module is initialized and operating correctly Minor Fault (For example Node address changed) Major Fault, module must be restarted

Note: If the Nexus module is removed from the Network, than both LEDs 1 and 2 will flash RED.

Quick Start Guide

AMCI Nexus to ControlLogix

1. With the power off, use the rotary switches on the Nexus to select the desired node address.
2. Connect the Nexus to the ControlNet using a ControlNet Tap to coax media. Either the A or B port can be used, depending on how your network is configured.
3. Apply power to the Nexus unit.
4. Start RSLogix 5000.
5. Start RSLinx and establish communications to the ControlLogix system.
6. Configure the ControlLogix hardware system, processor and discrete I/O. If it is not already present, also add the ControlNet adapter 1756-CNB(R) module to the system.
7. Right-click on the 1756-CNB(R) module and Click on **New Module...**
8. Define the Nexus LDT Interface as a generic CONTROLNET-MODULE. Click on **OK** and define the properties as follows.

Name: *Your Choice*

Description: *Your Choice*

Comm Format: Data-INT (**must be Data-INT**)

Node: Set it to the same value as the Node address on the Nexus Digital Interface

Assembly Instance – 100, Input – 22 for the NX2C4C
138 for the NX2C4C-08

Assembly Instance – 150, Output – 33 for the NX2C4C
33 for the NX2C4C-08

Assembly Instance – 110, Config – 0 for all versions of the Nexus LDT Interface



9. Click on **Next>**
10. Define the RPI. The minimum value is 5.0ms, however the value may be set higher.
11. Click **Finish**.
12. Save and Download the file to the Processor
13. Start RSNetworkx for ControlNet and either open an existing project or create a new one.
14. If this is the first time using the Nexus LDT Interface, register the **NX2C4C_R01.eds** or the **NX2C4C-08_R01.eds** EDS and icon files. These files are available from the driver file section of AMCI's website www.AMCI.com.
15. Go Online. RSNetWorx will scan the ControlNet network and should discover the Digital Interface module that you are using.
16. Click on the Enable Edits checkbox and then save the project.

At this point, the 1756-CNB(R) should be communicating; steady green LED and the top right LED (ControlNet Status LED #3) for the NEXUS communication should be on.

Go online to the ControlLogix processor. Select the **Logic** menu, followed by **Monitor Tags**. The data associated with the Nexus LDT Interface is available under the name you chose when configuring it.

Quick Start Guide

AMCI Nexus to PLC-5

1. With the power off, use the rotary switches on the Nexus to select the desired node address.
2. Connect the Nexus to the ControlNet using a ControlNet Tap to coax media. Either the A or B port can be used, depending on how your network is configured.
3. Apply power to the Nexus unit.
17. Start RSNetworkx. If this is the first time using the Nexus LDT Interface, register the **NX2C4C_R01.eds** or the **NX2C4C-08_R01.eds** EDS and icon files. These files are available from the driver file section of AMCI's website www.AMCI.com.
4. From RSNetworkx for ControlNet, go Online. After browsing the network, the Digital Interface will appear as an "Extra Device" at the node selected by the Nexus' rotary switches.
5. Click the **Enable Edits** checkbox and choose "Use online data (upload)". Click **OK**. At this point you can right click on the Nexus LDT Interface icon and select **Properties** from the pop-up menu. In the properties window, you can change the name associated with the unit and add a description.
6. Go Offline.
7. Click the **Enable Edits** checkbox.
8. Right Click on the PLC-5 icon and click on **Scanlist Configuration** in the pop-up menu.
9. In the Device Name column, right click on the name of the Nexus unit, and click on **Insert Connection** in the pop-up menu. The Connection Properties window will appear on the screen.
10. If needed, set the Input Size and Input Address of the Data Input File. This file resides in the PLC-5 and is used by all of the ControlNet nodes. Therefore, it must be large enough to hold all of the input data on the network. The maximum number of words that the two versions of the Nexus LDT Interface transfer to the PLC is shown below.

20 Input words for the NX2C4C

136 Input words for the NX2C4C-08

11. If needed, set the Output Size and Output Address of the Data Output File. This file resides in the PLC-5 and is used by all of the ControlNet Nodes. Therefore, it must be large enough to hold all of the output data on the network. The maximum number of words that the two versions of the Nexus LDT Interface receive from the PLC-5 is shown below.

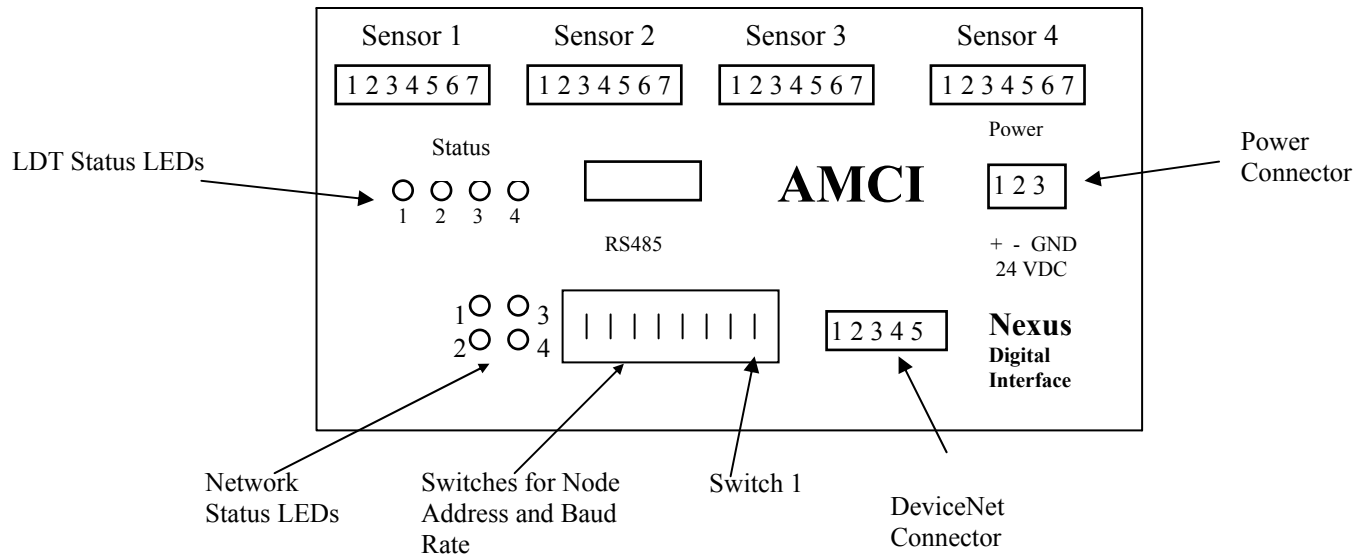
33 Output words for the NX2C4C

33 Output words for the NX2C4C-08

12. Set the Request Packet Interval time. This has a minimum acceptable value of five milliseconds, but can be set higher.
13. Click OK to close the Connection Properties window. In the Scanlist Configuration window, save the changes and close the window.
14. Go Online.
15. Verify that the PLC is in Program Mode.
16. Click on **Network** in the toolbar select **Download to Network** from the pull down menu that appears. After the download is complete, the Nexus unit should be communicating with the PLC.

DeviceNet Hardware Overview

Because DeviceNet does not support the transfer of 136 output words, a DeviceNet version of the Multiple Magnet Nexus unit, the NX2C4D-08, does not exist.



DeviceNet Connector

The 5 pin DeviceNet Connector has the following wiring.

Pin Number	Function	Standard Wire Color
1	+24Vdc	Red
2	Can High	White
3	Shields	Bare
4	Can Low	Blue
5	Common	Black

Node Address and Baud Rate Selection

The NX2C4D uses eight DIP switches to select the Node Address and the Baud Rate. Switches 1 and 2 set the Baud rate and switches 3 to 8 set the node, with switch 8 being the least significant bit. The following table shows the possible switch setting combinations.

The DIP switch package is mounted so that the numbers are upside down. However, “1” or “ON” is still in the up position and “0” or “OFF” is in the down position.

Baud Rate	Switches 1 & 2
125k	0 0
250k	0 1
500k	1 0
Reserved	1 1

Node Address	Switches 3 to 8
0	0 0 0 0 0 0
1	0 0 0 0 0 1
2	0 0 0 0 1 0
61	1 1 1 1 0 1
62	1 1 1 1 1 0
63	1 1 1 1 1 1

Example: For a Baud Rate = 250K and the Node Address = 5, switches 2, 6, and 8 would be ON, up towards the top of the module and switches 2, 3, 4, 5, and 7 would be OFF, down towards the bottom of the module.

Note: The state of the switch settings is only taken into account at power up.

DeviceNet Status LEDs

The following table describes the function of the four network status LEDs.

LED Number	Name	LED Pattern	Description
1	Module Network Status	Steady Off Steady Red Steady Green Flashing Red	No Power Unrecoverable Fault Device Operational Minor Fault
2	Network Status	Steady Off Steady Red Steady Green Flashing Red Flashing Green	Not Powered / Not On Line Critical link failure Link OK, On Line, Connected Connection Time Out On Line not connected
3	Reserved		
4	Reserved		

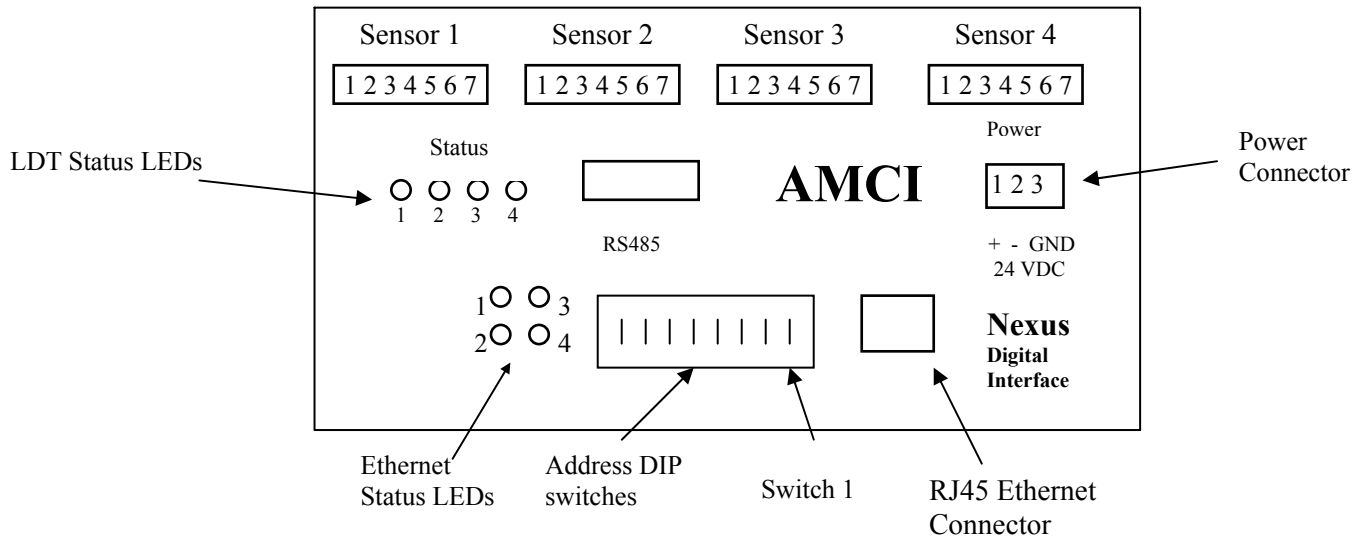
Adding the NX2C4D to your network

Before the NX2C4D can be attached to a network, it must be added to the RSNetWorx for DeviceNet software. The EDS and icon files are available in the *Driver File Download* section of our website, www.amci.com. The following procedure to add the EDS file to RSNetWorx assumes that you have already downloaded these files and un-zipped them.

1. With the power off, use the dip switches on the front of the NX2C4D to set the node address and the baud rate.
2. Start RSNetWorx for DeviceNet.
3. In the RSNetWorx program, click on **Tools** in the menu bar.
4. Click on **EDS Wizard...** from the pull down menu that appears.
5. Click on **Next>** in the window that appears.
6. Select **Register an EDS file(s)** and click on **Next>**.
7. Select **Register and EDS file**.
8. Click on **Choose File...** and navigate to the folder where you placed the un-zipped EDS and icon files.
9. Double click on **NX2C4D_r01.eds** file.
10. Click on **Next>**.
11. Click on **NX2C4D_r01.eds** file so that it is highlighted.
12. Click on **Next>** to assign an icon to the device.
13. Click on the NX2C4D and then click on **Change icon...** to select the icon for the Nexus unit. You can choose one of the built in icons from Rockwell Automation or click on the **Browse...** button and select the **NX2C4D_r01.ico** icon file.
14. Click on **Next>** and then click on **Finish** to complete the installation of the AMCI NX2C4D EDS file to the RSNetWorx system.

Once the EDS file is added to your system, add the NX2C4D to your network as you would any other device, including adding it to the scanlist configuration of the scanner module.

Ethernet Hardware Overview



Network Update Time

Both the NX2C4C and the NX2C4C-08 both have a minimum network update time of 3ms.

Ethernet IP Address

The NX2C4E uses has a default IP address of 192.168.000.XXX where “XXX” can be any number between 1 and 254.

Every Ethernet IP unit, including those made by AMCI, has a unique MAC ID number. This number is located directly below the label on the side of the unit and identifies the unit to the Ethernet Network.

You can download the BOOTP software from Allen-Bradley's website. This BOOTP software uses the MAC ID address and allows you to change the unit's IP address. After changing the IP address, you must cycle power to the NX2C4E to make the changes to the IP address take affect.

The DIP switches will no longer have any function after you have changed the IP address.

Ethernet Address Selection using the DIP switches

The NX2C4E uses an IP address of 192.168.000.XXX where “XXX” can be any number between 1 and 254. Eight dip switches on the NX2C4C are used to set the “XXX” portion of the address. Switch 8, the left most switch, is the least significant bit and switch 1, the right most switch, is the most significant bit. The address is programmed using the following procedure.

1. Determine the address of the NX2C4E. It can be any unused address between 1 and 254.
2. Convert the address to a binary number. A value of 50 will be 0011 0010.
3. Enter the address on the dip switches. Continuing the above example, switches 8, 6, 5, 2 and 1 will be off (down) and switches 7, 4, and 3 will be on (up).

Ethernet Status LEDs



NX2C4X Specifications Rev 1.7

Networked Four Channel LDT Interface

LED Number	Name	LED Pattern	Function
1	Network Status	Steady Off Steady Green Flashing Green Flashing Red Steady Red Flashing Green/Red	The module has no power or an IP address has been assigned. The module has at least one established Ethernet/IP connection. There are no Ethernet/IP connections established to the module One or more of the connections in which this module is the target has timed out The module has detected that its IP address is already in use The module is performing a power on self test
2	Module Status	Steady Off Steady Green Flashing Green Flashing Red Steady Red Flashing Green/Red	No Power. The module is operating correctly. The module has not been initialized. A minor recoverable fault has been detected. A major internal error has been detected. The module is performing a power on self test.
3	Activity LED		This LED flashes green each time a packet is received or transmitted
4	Link		This LED indicates that the module is connected to an Ethernet network

Setup Example

AMCI NX2C4E to Rockwell Automation 1756-ENET/B module

1. With power removed, use the dip switches to set the address of the NX2C4C.
2. Open an existing or create a new ControlLogix program.
3. From the project tree, right click on I/O configuration and select New Module.
4. From the Module Type list that appears, select 1756-ENET/B, the 1756 Ethernet Bridge module.
5. Type a name for the Bridge module, which must begin with a letter, in the Name field.
6. Enter the slot number where the 1756-ENET/B module is located in the ControlLogix rack.
7. In the Address/Host Name field, select the IP Address enter the desired address, for example, 192.168.000.XXX where XXX can be a unique number between 1 and 254.
8. Click the Finish button.
9. From the project tree, right click on the 1756-ENET/B module and select New Module.
10. Select ETHERNET-MODULE Generic Ethernet Module from the list that appears and click on OK.
11. In the module properties that appear, enter the following parameters.

Name: **Your Choice** (must begin with a letter)

Comm Format: **Data-INT (must be Data-INT)**

IP Address: **192.168.000.XXX** where XXX is the number entered on the DIP switches

Assembly Instance – 100, Input – 20 for the NX2C4E
136 for the NX2C4E-08

Assembly Instance – 150, Output – 33 for the NX2C4E
33 for the NX2C4E-08

Assembly Instance – 110, Config – 0 for all versions of the Nexus LDT Interface

12. Click on Next.

13. Select the RPI time, minimum = 3ms
14. Click on Finish.
15. Save and download the program to the ControlLogix rack.
16. While online with the PLC, right click on the Ethernet Bridge module and select Properties.

Click on the Port Configuration tab and modify the following fields.

Enable Bootp: **Unselected** (This will allow the data to be manually entered in the IP address and Domain Name fields.)

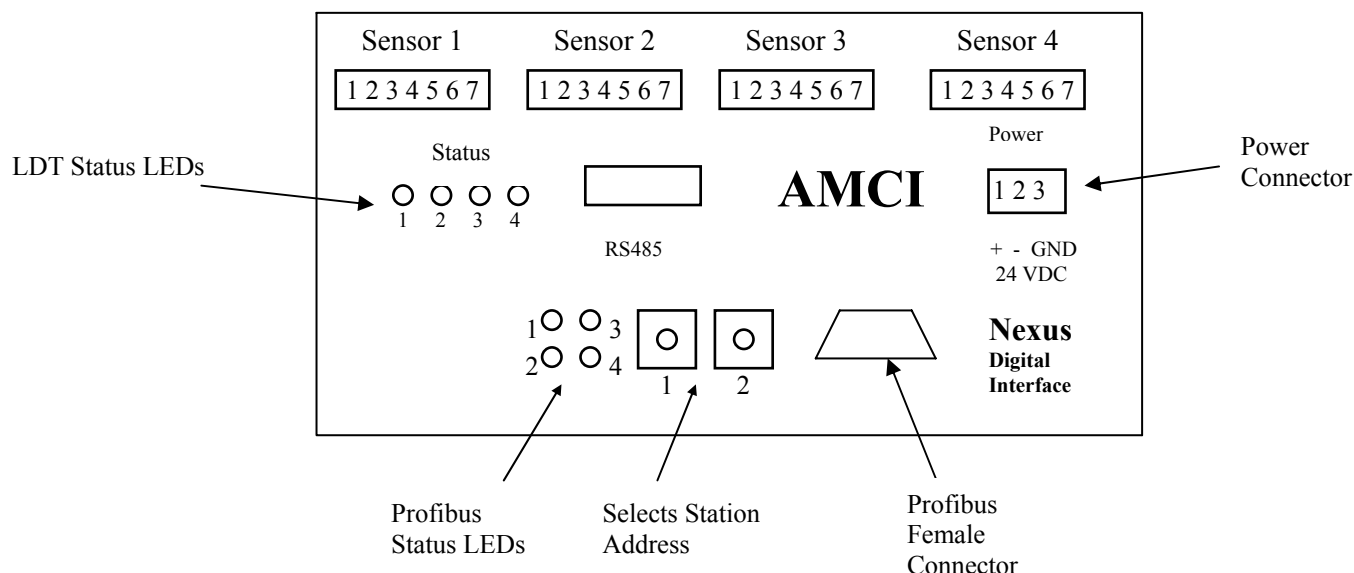
IP Address: **192.168.000.XXX** (must be the same as step 7 above)

Subnet Mask: **255.255.255.0**

The Gateway Address, Domain Name, Primary DNS Server Address, and Secondary DNS Server Addresses all remain unchanged.

Profibus Hardware Overview

Because Profibus does not support the transfer of 136 output words, a Profibus version of the Multiple Magnet Nexus unit, the NX2C4P-08, does not exist.



Profibus Connector

The Nexus module uses a 9 pin female D-sub connector to communicate with the Profibus network.

Station Address Selection

The Nexus module has two rotary switches used to set the module's address on the network. Any station from 0 to 99 can be selected. Switch 1 sets the one digit and switch 2 sets the 10s digit of the address. For example, if the Nexus is to be installed at station 46, switch 1 would be set to 6, and switch 2 would be set to 4. Note, changing the station address only takes affect at power up. Changing the address while power is applied to the Nexus module will generate a minor fault.

Profibus Status LEDs

LED Number	LED Pattern	Function
1	Red Off	Module is Offline and no data exchange is possible The module is Online
2	Green Off	Module is Online and data exchange is possible The module is Off line
3	Flashing Red 1Hz Flashing Red 2Hz Flashing Red 4Hz Off	Error in configuration: IN and/or OUT length set during initialization of the module is not equal to the length set during the configuration of the network Error in User Parameter data: The length/contents of the user parameter data set during initialization of the module is not equal to the length/contents set during configuration of the network. Error in initialization of the Profibus communication ASIC. No diagnostic present
4	Off	Not Used

Network Baud Rate

The NX1F2P supports the following network baud rates

9.6 kbits/sec, 19.2 kbits/sec, 93.75 kbits/sec, 187.5 kbits/sec, 500 kbits/sec, 1.5 Mbits/sec, 3 Mbits/sec, 6 Mbits/sec, and 12 Mbits/sec

Quick Start Guide**AMCI Nexus to SST-PFB-SLC Profibus interface module**

1. If it is not already present, install the SST-PFB-SLC module in the SLC rack and configure the rack (the ID code is 13635) for the module.
2. Place the PLC in program mode.
3. Connect a serial cable from the computer's COM port to the RS232 port of the SST-PFB-SLC module.
4. With the power off, use the rotary switches on the Nexus unit to select the desired station address. The left switch sets the 1s digit and the right switch sets the 10s digit of the station address.
5. Attach the Nexus unit to the Profibus network.
6. Apply power to the Nexus unit.
7. Start the SST Profibus Configuration software. (Current Version 1.9)

-
8. Either create a new or open an existing network.
 9. If it has not already present, register the Nexus units GSD file.

Click on Library in the toolbar and then select Add GSD file. Choose the directory where the GSD file is located, and then select the AnyBPRfB file.

When registered this module will appear under Slaves as:

HMS Fieldbus Systems AB
ANYBUS-S PDP

10. If SST-PBF-SLC module is not already present, click on Masters. Click and drag the Master (Rev 1.4) into the network. Right click on it and configure it according to your system's requirements.
11. Under slaves, click and drag the ANYBUS-S PDP module into the network. The setup window will appear.
 - Under the **General** tab, set the station number to match the station number set by the rotary switches on the Nexus unit.
 - Click on the **Modules** tab and then click on Add. The NX2C4P must be set for 20 input words and 33 output words. If a different number of words is programmed, Network LED 3 will flash indicating an Error in Configuration. The input words can be located in either the Input Image table or in the M1 file, however, all 20 input words must be located in one file. The 33 output words must be located in the M0 file.
 - Click on Input 32 Byte (16 word) and then on OK.
 - Click on the **SLC Address** tab and then select the Input Type, either I or M1, and the offset value, that is where in the I or M1 table the data begins. It is important not to leave gaps between an existing Profibus module and the data used by the Nexus unit.
 - Again click on the **Modules** tab and click on Add.
 - Click on Input 8 Byte (4 word) and then on OK.
 - Click on the **SLC Address** tab and then select the Input Type to be the same as was selected above. Set the offset value to the value assigned to the value assigned above plus 16.
 - Again click on the **Modules** tab and click on Add.
 - Click on Output 64 Byte (32 word) and then on OK.
 - Click on the **SLC Address** tab and then select the Output Type to be M0 and then select an offset value. As before, it is important not to leave gaps between an existing Profibus module and the data used by the Nexus unit.
 - Again click on the **Modules** tab and click on Add.
 - Click on Output 2 Byte (1 word) and then on OK.
 - Click on the **SLC Address** tab and then select the Output Type to be M0. Set the offset value to the value assigned to the 64 Byte plus 32.
 - Click on OK to accept.
12. Save the network file.
13. Right click on the Master Module and select Connect from the menu that appears.
14. Click on Yes if asked to retain the configuration.
15. Again right click on the Master Module and then select Load Configuration from the menu that appears.
16. Place the PLC in Run mode.



NX2C4X Specifications Rev 1.7

Networked Four Channel LDT Interface

Revision History

Version 1.0 added details to the specifications and a more complete hardware description.

Version 1.1 added the update time of the NX2C4X-08 and updated the ControlNet setup procedures.

Version 1.2 changed the SSI update time to 500 μ s (this change was made for the V1 firmware) and added a note on how programming the channel and applying the preset value on a NX2C4X and a NX2C4X-08 at the same time will cause a command error.

Version 1.3 was released on 12/6/01 and added a column to the input data tables. One column shows that the PLC-5 input data starts at word 0 and a second shows that the ControlLogix input data starts at word 2.

Version 1.4 was released on 3/18/02. Dimensions were added. The references to the RSLogix revisions were removed from the quickstart guide.

Version 1.5 was released on 10/15/02. A note was added that the Nexus unit interfaces with sensors whose output signals are at 5Vdc, regardless of the sensor's power supply.

Version 1.6 was released on 4/28/05. This version added a note to the functionality of ControlNet LED 3.

Version 1.7 was released on 5/11/05. This version removed the SSI functionality, and added the DeviceNet, Ethernet, and Profibus networks to the specifications. The Hardware overview and wiring as also moved to the beginning of the specifications. Notes were added that because of the number of words used, the NX2C4D-08 and the NX2C4P-08 are not available.

File: Nexus_LDT_rev_1.7.doc
date: 5/11/05