Quantum Automation Series
Network Option Module for LonWorks

840 USE 109 00 Version 3.0

31002028 01

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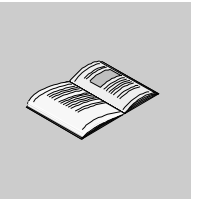
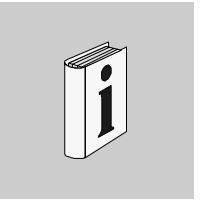


About the Book



At a Glance

Document Scope

This manual covers the installation, operation, and maintenance of the Quantum Automation Series Network Option Module for LonWorks® (NOL). The NOL module provides connectivity between a Modicon Quantum controller and a control network based on Echelon's LonWorks® technology.This manual does not include a comprehensive discussion of LonWorks® or of the Quantum Automation Series Programmable Logic Control family. Refer to documentation from Echelon® Corporation to learn more about LonWorks® technology. For information on the Quantum products, see the section below on related documentation.

Validity Note

This is the second version of this manual. It is a guide to the application of the Quantum NOL module as an interface between Quantum controllers and a LonWorks network.

Related Documents

Title of Documentation	Reference Number
Modicon TSX Quantum Automation Series Hardware Reference Guide	840 USE 100 00
Modicon Ladder Logic Block Library User Guide	840 USE 101 00
Modicon ModLink User Guide	890 USE 129 00
Modicon ModLink User Guide	890 USE 129 00
Modicon Programmer User Guide	890 USE 129 00
Modbus Protocol Reference Guide	PI-MBUS-300
Concept User Manual	372 SPU 440 01

Product Related Warnings

User Comments

We welcome your comments about this document. You can reach us by e-mail at TECHCOMM@modicon.com

Description of NOL Module

1

At a Glance

Purpose

This chapter gives a functional description of the NOL module. In addition, there are discussions on performance and interaction with applications, and connectors and indicators. Finally, tips and cautions for the startup phase.

What's in this Chapter?

This chapter contains the following topics:

Description and Performance Factors

Functional Description

The NOL module provides connectivity between a Modicon Quantum controller and a control network based on Echelon's LonWorks® technology. Some of the features are:

- module operates as a fully-functional node on a LonWorks network
- can operate as a passive or active participant on a LonWorks network
- conforms to requirements of LonMark Interoperability Guidelines, Version 3.0, including conformance to guidelines for layers 1 - 7 of the ISO/OSI reference model.
- supports up to 240 SNVTs with up to 31 bytes per SNVT
- supports user-defined network variables (CNVTs)
- compatible with Quantum Automation Series controllers, communicates to controller across backplane
- multiple modules can operate on local or remote Quantum backplanes using standard I/O mapping techniques
- uses 3150 Neuron Chip

NOL Performance and Effect on Your Application

The data throughput of the NOL module depends on a number of factors. Performance depends on the number of network variables that have been configured. The LonWorks network traffic will also affect the NOL module throughput. When you are designing applications you must consider this factor as it relates to scan times and required update rates for the contacts and registers used in the ladder logic program.

Connectors and Push-buttons

RS-232 Configuration Port

This is a 9 pin, D-shell, female, RS-232 compatible serial port wired in a 3 wire DTE configuration; see the following table. Data transmit, data receive, and signal ground are supported; no hardware handshake signals are presented. The port is configured at a fixed rate of 9600 baud, 8 data bits, 1 stop bit, and no parity. This port is used to download configuration and new firmware to the module. It can be direct connected to the communications port of a PC with a cable which swaps transmit and receive signals. The port supports the XMODEM protocol along with an ASCII terminal based command processor for configuration of downloads to the module. Modbus cables make a suitable connection between a PC serial port and the Configuration port on a NOL module. The following ModBus cables are available: 990 NAA 263 20, 990 NAA 263 50.

Pin Number	Signal	Pin Number	Signal
1	N/C (not connected)	6	N/C
2	RXD receive data	7	N/C
3	TXD transmit data	8	N/C
4	N/C	9	N/C
5	signal ground		

LonWorks Communications Ports

The Primary and Auxiliary ports are wired in parallel for flexibility. They are both standard interfaces to LonWorks networks. Wiring polarity concerns are minimized due to the polarity insensitivity of the twisted pair LonWorks transceivers.

Primary LonWorks Communications Port This is the primary interface for wiring into a LonWorks network. The connector is a two position 5.08 mm screw terminal.

Auxiliary LonWorks Communications Port This is the auxiliary interface for wiring into a LonWorks network. The connector is an eight position RJ-45 socket.

(Reference Echelon Engineering Bulletin 174, "Junction Box and Wiring Guidelines for Twisted Pair LonWorks Networks")

Service Pin push-button

Provides stimulus for LonWorks network installation. Depressing this switch causes the Service LED to illuminate, and forces the Neuron Chip in the module to output its unique 48-bit ID and program ID. See the network management tool documentation for more information.

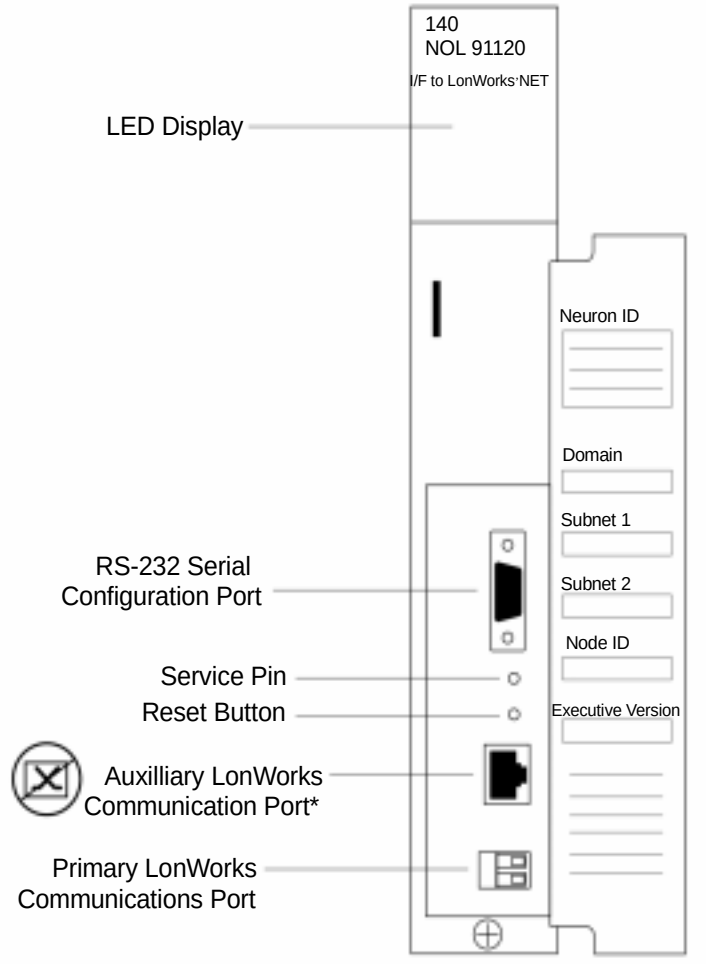
Reset push-button

Performs a hardware reset of the module. The module needs to be reset after new firmware has been downloaded. This push-button allows you to reset the unit without removing it from the backplane. The button is recessed and requires a paper clip or similar tool for activation.

Front Panel Illustration

Illustration

This illustration provides a front panel view of the NOL module connectors and indicators.



*Not intended to be connected to any public telecommunications network. See declaration on *Telecommunications Declaration , p. 20*.

LED Indicators

LED Descriptions

There are 6 LEDs on the front panel. The service LED is orange; the rest are green. The meanings of the LED Indicators are described below:

Active	Indicates the state of module configuration. When lit, the Active LED signifies that the module has received a valid network variable configuration and I/O mapping. In addition, this LED indicates the module is communicating with the DX Loadable at the CPU. You expect to see the Active LED illuminated when the NOL module is operating with a valid configuration. If not lit, either the module requires configuration and mapping or it is not communicating with the CPU by way of the DX Loadable.
Ready	Indicates the module has passed internal diagnostics and initialization. Upon powerup, after a short delay, the module should make this LED active, indicating the module is either ready to be configured or transfer into an active state. The Ready LED will blink once per second if the module has no internal errors, but needs a configuration loaded. If a module is inserted into a backplane and Ready LED does not illuminate, the Wink LED should be observed for an error code.
MsgIn	Flashes briefly (10 ms) when an update message for a bound network variable is received by the NOL module from the LonWorks network.
MsgOut	Flashes briefly (10 ms) when an update message for a bound network variable is transmitted by the NOL module to the LonWorks network.
Wink	Flashes briefly when the NOL module receives a wink message from the LonWorks network. This LED is also used to display internal error codes defined in *Maintenance, p. 37*.
Srvc	Indicates status of LonWorks network service. It is normally Off in a running system. Flashing means module is in an unconfigured state on the LonWorks network.

LED Indicator Status

The LEDs indicate the status of the NOL module, as shown in the following table:

The following table shows what the status of each NOL Module LED Indicator means.

LED	Color	Powered Up Not Configured Not Programmed	Powered Up Not Configured Not Programmed	Normal Operation Configured Programmed	Error Condition
Ready	Green	Blink	On	On	Off
Active	Green	Off	Off	On	See the description in [*LED Descriptions, p. 12*
Msg In	Green	Off	Off	Blink	
Msg Out	Green	Off	Off	Blink	
Wink	Green	Off	Off	Blink on command.	Blink/See description in*LED Descriptions, p. 12*
Srvc	Yellow	Off	Blink	Off	See the description in *LED Descriptions, p. 12*

Before You Begin

Items Included with Product

The NOL module and this user's guide are sold separately. The following list describes what items are included with the product shipment.

- NOL module with the Read Me First sheet, part number 043512579.

The Quantum Network Option Module for LonWorks User Guide must be ordered separately. Included with the manual is a set of 3.5 inch diskettes containing:

- NSUP.exe DX Loadable Function Block software
- NOL DX Loadable Function Block software
- NOL Configuration Tool software
- Modsoft Help file for NOL loadable

Other Components Required for Operation

You will need the following items to install and use the NOL module in a Quantum control system. Refer to the **Quantum Automation Series Hardware Reference Guide** for complete information on Quantum modules and related items.

- Quantum backplane
- Quantum CPU module
- Quantum power supply module
- cabling to connect modules to related hardware and peripherals
- LonWorks compliant network management software
- PC running Windows 95 or Windows 98
- Modsoft version 2.4 or Concept 2.2 or greater

Modsoft Programming Software

Modsoft Programming Software Version 2.4 for DOS is an integrated tool for programming, testing and documentation of Modicon Programmable Logic Controller programs. This software is used to I/O map and zoom into the DX Loadable of the NOL module. See the following figures.

The figure below shows the Modsoft I/O Map Screen

Utility ClrDrop Holdtme Drop QUANTUM Quit
F1 NOL_REL 1 F3 F4 F5 F6 F7 Lev 8 F8 OFF F9

QUANTUM I/O MAP

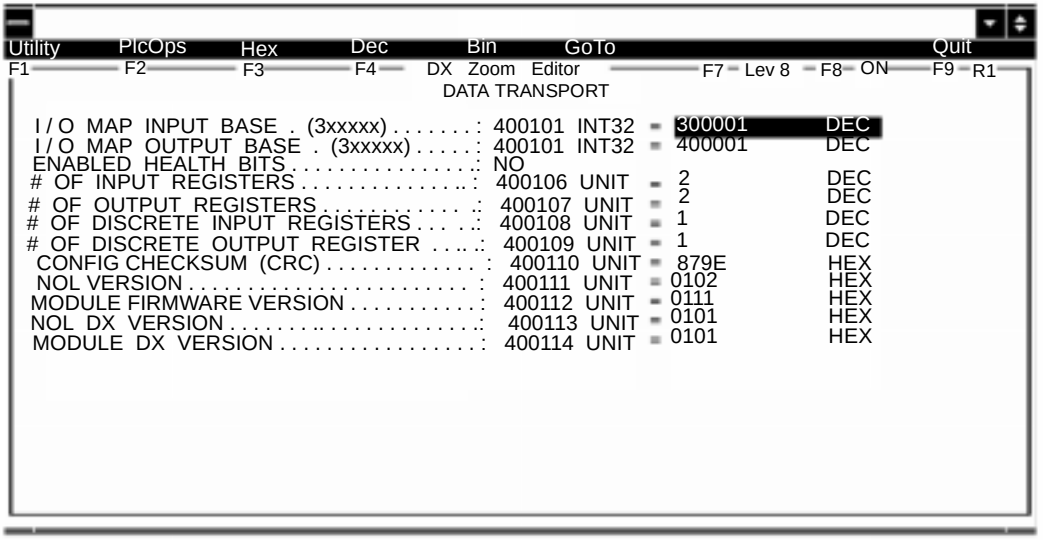
Type : Local I/O
Drop Hold Up Time : 3
Number of Inputs : 864

Head-Slot : 0 Drop 1
x100 ms Module Status Reg :
Number of Outputs :

Available : 383
0
592

Slot	Module	Input Ref	Output Ref	Description
101	CPS 114 xx			AC PS 115/230V 10A
102	CPU 424 0x			CPU 2MB 2xMB+
103	CRP 93x 00			RIO HEAD S908
104	NOM 2xx 00			Modbus/Modbus-Plus
105	DAI 540 00	100001-100016		AC IN 115V 16x1
106	DAO 842 10		000129-000144	AC OUT 100-230V 4x4
107				
108	AVI 030 00	300056-300064		AN IN 8CH BIPOLAR
109				
110	NOL 911 xx	300001-300016	400001-400016	I/F to LonWorks
111	NOL 911 xx	300017-300032	400017-400032	I/F to LonWorks
112				
113	AVO 020 00		400056-400059	AN OUT 4CH VOLT
114	DDI 853 00	100017-100048		DC IN 10-60V 4x8
115	ATI 030 00	300065-300074		TC IN 8CH
116				

The following figure shows the Modsoft I/O Zoom Screen



Concept Programming Software

See *Software Configuration, p. 23* for more information on Concept programming software. Please contact Schneider Automation for availability.

Hardware Installation

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At a Glance

Purpose

This chapter describes the configuration and mounting of an NOL module; proper cable connections; power up and power down procedures; and module status indicators.

What's in this Chapter?

This chapter contains the following topics:

Proper Configuration and Mounting of an NOL Module in a LonWorks Network

Transceiver Types

The NOL module supports three twisted pair media types with different network topologies or data transfer speeds. The module is offered in three models for different transceiver types.

NOL Model Number	Transceiver Type	Configuration	Rate
140 NOL 911 00	TP/FTT-10	free topology, twisted pair	78,000 bits per second
140 NOL 911 10	TP/XF-78	linear topology, twisted pair, transformer isolated	78,000 bits per second
140 NOL 911 20	TP/XF-1250	linear topology, twisted pair, transformer isolated	1.25 million bits per second

Media Types and Network Termination

The type of cable you choose affects the length of the network as well as performance characteristics of the network, including bit error rate and maximum baud rate. You must decide which type of cabling will best fit your application. Cost and performance are the two deciding factors.

The NOL module must be terminated properly in a LonWorks network. The type of termination depends on the topology and specific architecture of your network. See http://www.lonmark.org for more information. Go to the User Guide section. Select "LonMark Technical Information" and review Version 3.0 of LonMark Layer 1-6 Interoperability Guide.

Note: your network will not operate properly without the correct terminations.

Mounting NOL Module in Backplane

Mounting the Module

The NOL module can be installed into any unused slot on a Quantum backplane. Refer to the **Quantum Automation Series Hardware Reference Guide** for complete information about various Quantum modules and backplanes and requirements for a Quantum system.

Cable Connections

Making Connections

For logic application programming, connect a programming cable from the Quantum CPU module to the PC where you will be running the Modsoft or Concept software.

For NOL configuration, connect a Modbus cable (990 NAA 263 20 or 990 NAA 263 50) from the RS-232 port on the NOL module to the PC where you will be running the Configuration Tool.

Connect the appropriate cable from the LonWorks communications port on the module (either Primary or Auxiliary) to the LonWorks network. You must choose the twisted pair cable to match the transceiver type in your module. Refer to LonWorks topology documentation.

Telecommunications Declaration

Following is the Telecommunications Declaration

Schneider Automation One High Street North Andover, MA 01845	Network Option Module 

DECLARES THAT:

The Quantum Automation Series Network Option Module for LonWorks

NOL Model Numbers:

140 NOL 911 00 TP/FT-10

140 NOL 911 10 TP/XF-78

140 NOL 911 20 TP/XF-1250

are not intended to be connected to a public telecommunications network.

The connection of such equipment to a public telecommunications network in a European Community Member State will be in violation of the national law implementing Directive 91/263/EEC on the approximation of the laws of the Member States concerning telecommunication terminal equipment, including the mutual recognition of their conformity.

Power Up and Power Down

Power Up Initialization

When Power is turned on to a local backplane it takes approximately 10 seconds for the Quantum CPU to come on-line and begin processing the NOL module's data. On a Remote I/O backplane the RIO interface takes approximately 5 seconds to power up. If an NOL module is hotswapped or installed in a rack that has power on, the module itself takes approximately 1 second to initialize. Refer to *LED Indicators, p. 12* for proper power up LED indications.

Upon power up all input and output SNVT data from the LonWorks network is initialized to a zero state. Data transfer to and from the NOL module is not performed until after the NOL block is solved in the logic program, and a data transfer handshake is established between the NOL module and the logic function block. At that time if no new messages have been received by the NOL module, the initial zero states of the SNVTs will be transferred to the controller's 4x data table, and the data from the 4x data table will be written to the NOL module. Any non-zero SNVT data will be flagged as having changed state and will trigger a message to be sent out on the LonWorks network.

CAUTION

Loss of Data Hazard

When the NOL module is power cycled, all SNVT data within the NOL module is zeroed. No output SNVTs with a zero value on power up will be written to the Lonworks Network. The SNVTs in the NOL module are set up to utilize the standard change of state message processing.

Failure to observe this precaution can result in injury or equipment damage.

Power Down Sequence

When power to the backplane is lost, any outstanding (untransmitted) LonWorks messages will be lost.

The NOL block in the Quantum CPU will set to 0 all input registers that are I/O mapped to the NOL module. Output registers will be set to reflect the initialization sequence which re-establishes the handshake with the module.

The first 16 registers in the NOL logic block will retain the initial information that was previously received from the NOL module. All input SNVT data is retained in the controller's 4x data table.

The only indication of a problem with the module would be seen by monitoring the Quantum controller's I/O module status bit, or by using a timer programmed off the NOL block's middle output to act as a time-out in communication to the NOL module.

Module Status

Health Bits

Each network variable within the NOL module can be configured to support a "health bit" in the 4x register space. The NOL module supports health bits to determine that LonWorks nodes are operational. Health bits are supported for incoming messages and the LonWorks Acknowledge Message Service for outgoing messages. It is the responsibility of the PLC programmer to properly configure and monitor the health bit information.

See *NOL.exe DX Loadable, p. 29* for information on using health bits.

Module Identification

A configuration checksum is provided in the NOL module and transferred to the NOL function block that is derived from the configuration file loaded into the NOL module. It is the responsibility of the PLC programer to properly monitor this value, along with the standard Quantum I/O module health bits, to detect any unauthorized or unexpected change or replacement of the NOL module.

	**CAUTION**
	Data Transfer Hazard There is a potential for improper network data transfer if an NOL module is swapped with a differently configured module. **Failure to observe this precaution can result in injury or equipment damage.**

Software Configuration

3

At a Glance

Purpose

This chapter gives an overview of the configuration process, as well as discussions on: the DX Loadable Function Blocks; the use of Modsoft or Concept for I/O Mapping; and the installation and use of the NOL Configuration Tool.

What's in this Chapter?

This chapter contains the following topics:

Overview of Configuration Process

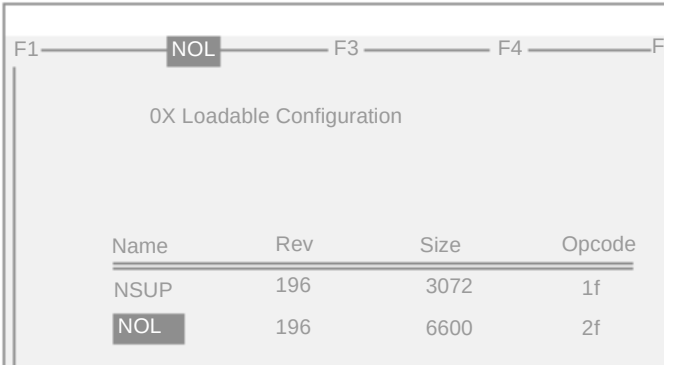
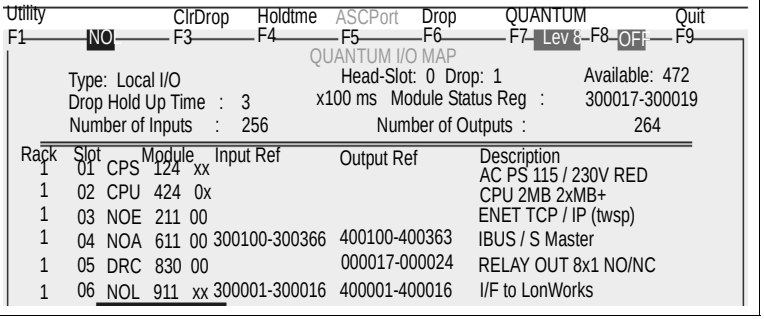
Procedures

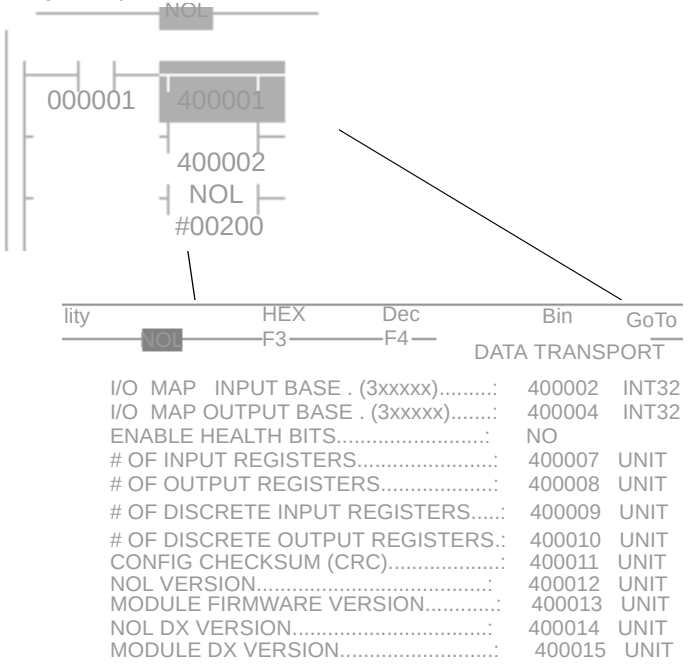
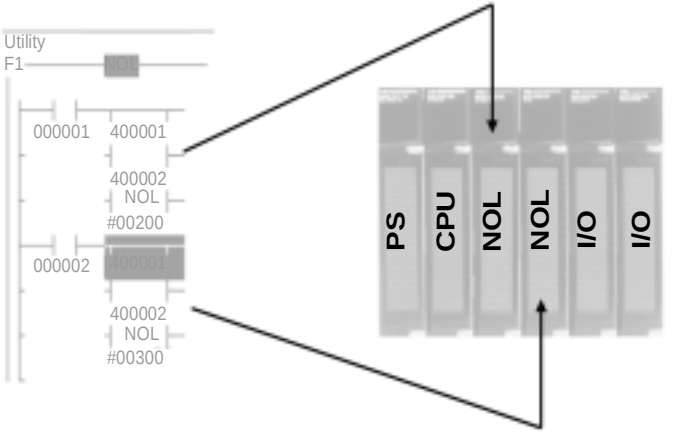
The software configuration process to prepare the NOL module for operation consists of the following four major steps.

Step	Action
1	Use the Windows 95 compatible NOL Configuration Tool to make the NOL module "LonWorks ready." This includes identifying network variables, both standard and custom, and linking them to controller register addresses.
2	Use a LonWorks compliant network management tool, such as MetraVision, to install the NOL module on the LonWorks network and perform binding of network variable types.
3	Use the Modsoft or Concept Programming software to load the NSUP.exe DX Loadable Function Block.
4	Use the Modsoft or Concept Programming software to load the NOL.exe DX Loadable Function Block and establish the I/O map between the NOL module and the Quantum controller.

Configuration Overview Using Modsoft

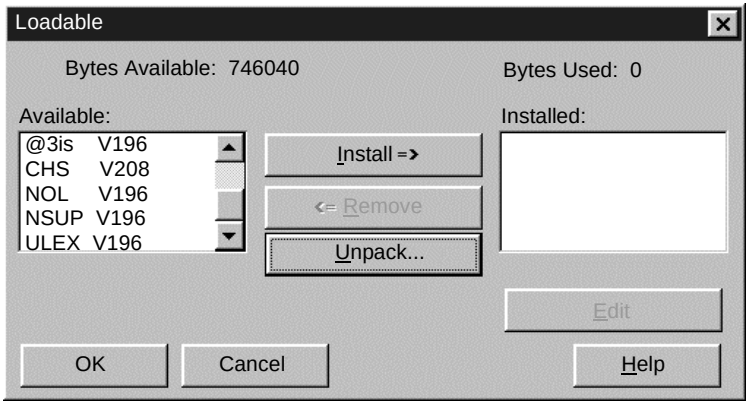
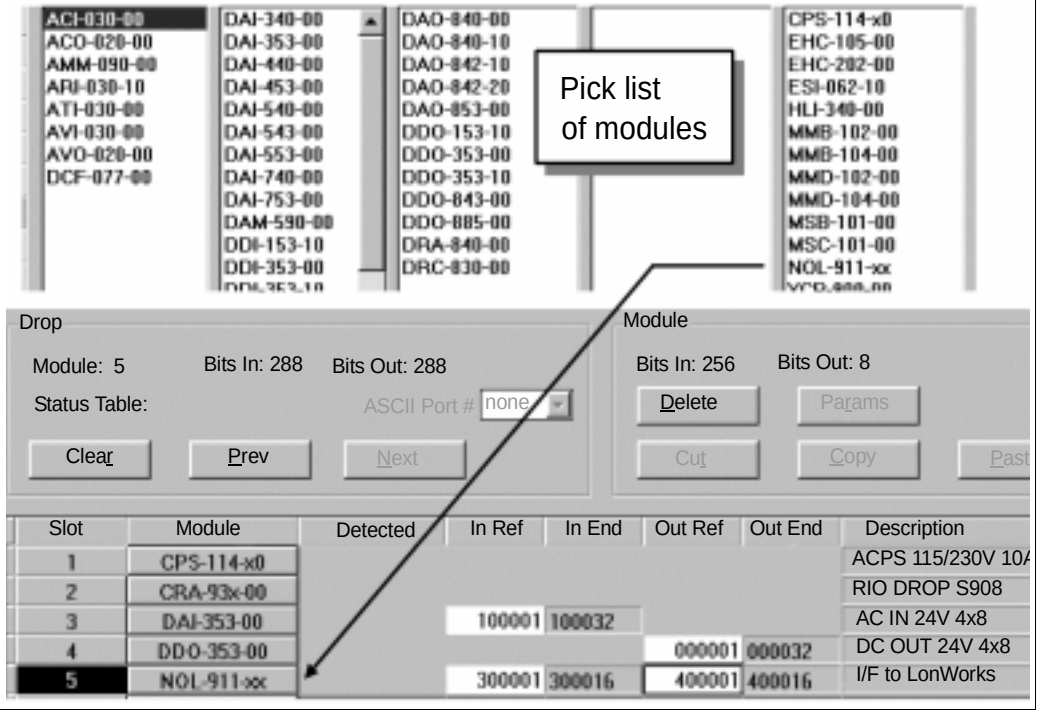
The following outlines the configuration of the NOL Module, using Modsoft.

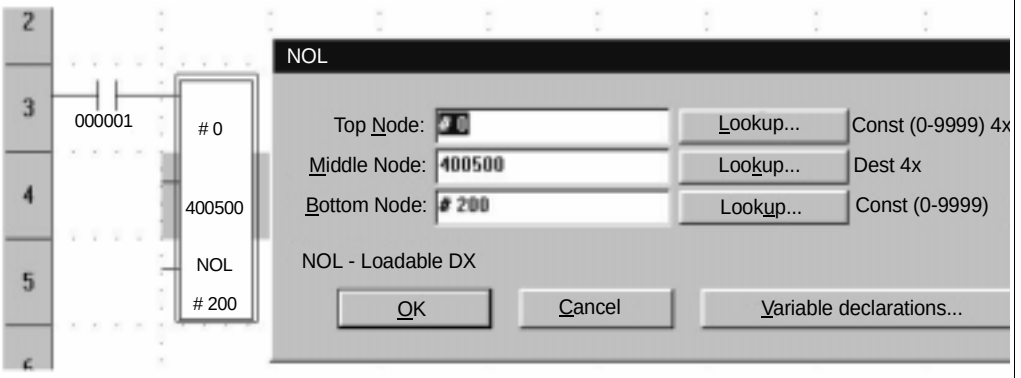
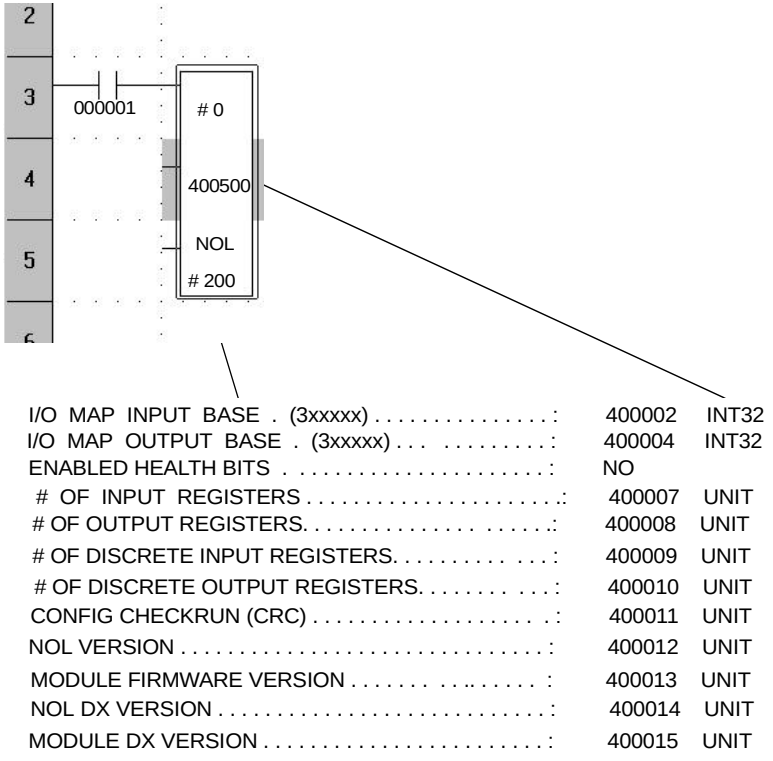
Step	Action
1	Add loadables to controller configuration in the order shown (NSUP then NOL) in the following figure. 
2	Add NOL modules into I/O map. 

Step	Action
3	Add function block to logic section of controller (Note the Loadable DX Zoom Configuration). 
4	Multiple NOL modules will require multiple instances of the loadable, although the NOL.exe loadable is only loaded into the controller one time. 

Configuration Overview Using Concept

The following is an overview of the configuration process, using Concept.

Step	Action
1	The first step in Concept Configuration is to add of loadables to controller configuration. 
2	Next, add NOL module into the I/O map. 

Step	Action
3	Add function block to logic section of controller, adding register assignments as required in all three node locations. 
4	This figure shows the Loadable DX Zoom Configuration of function block 

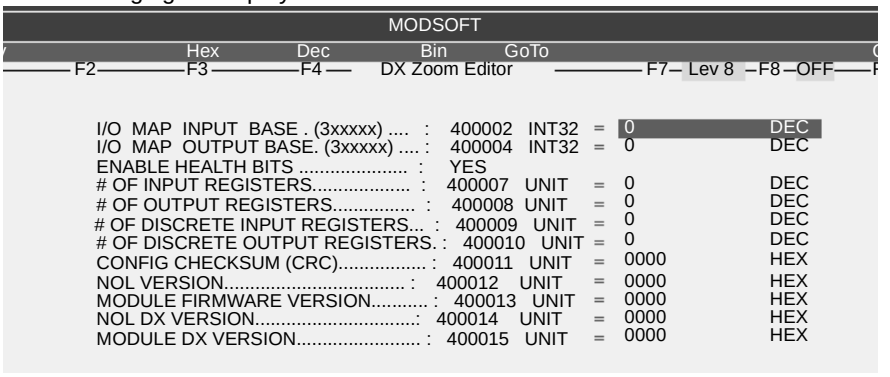
DX Loadable Function Blocks

Introduction

The NSUP.exe and NOL.exe DX Loadable Function blocks are provided to facilitate the movement of the large amount of data between the NOL module and the controller register space. The NOL Module is mapped for 16 input registers (3X) and 16 output registers (4X). Of these registers, two input and two output registers are for handshaking between the NOL Module and the DX Loadable. The remaining fourteen input and fourteen output registers are used to transport the data. See the DX Zoom screen in the figure below.

Refer to the **Modsoft Programmer User Manual** or the **Concept User Manual** for details of loading a DX Loadable file.

The following figure displays the DX Zoom Screen

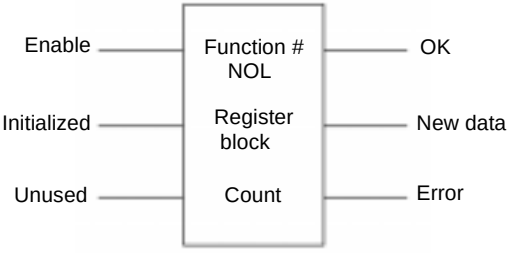


Characteristics

- Size - Three Nodes high
- PLC Compatibility - available as a downloadable for all Quantum CPUs.
- Opcode - 1F Hex (default)

Representation

The following is a representation of the Block structure NOL.exe DX Loadable



Inputs

- Enable - enables the NOL function
- Initialize - causes the NOL to re-sync with the module
- Unused - not used

Outputs

- OK - set when enabled and no error
- New data - set for one sweep when the entire data block from the module has been written to the register area
- Error - Set when an error condition exists

Top Node Content

Function number selects the function of the NOL block. Function 0 transfers data to/ from the module. Any other function number yields an error.

Middle Node Content

Defines the starting register for a block of 16+ registers used by the loadable function.

CAUTION

Operational Hazard

When the NSUP loadable is not installed, or is installed after the NOL loadable, or is installed in a Quantum PLC with an older executive than specified in *Middle Node Content, p. 30*, all three outputs turn on, regardless of the input states.

Failure to observe this precaution can result in injury or equipment damage.

Bottom Node Content

Defines the total number of registers required by the function block. This value must be set to a value equal to or greater than the number of data registers required to transfer and store the network data being used by the NOL module. If the count value is not large enough for the required data, the error output will be set. See the example in *Bottom Node Content, p. 30*

Using Modsoft or Concept for I/O Mapping

Overview and Requirements

The Modsoft or Concept Programming Software is used to I/O map the NOL Module to the Quantum CPUs 3x (input) and 4x (output) register space. Refer to the Modsoft Programmer User Manual or the Concept User Manual in the section on I/O Mapping for information on how to perform I/O mapping.

NOL Register Definitions

The NOL module can be configured for up to 240 network variables inclusive of all array elements, and has a maximum of 7440 registers available for storing network variable data.

All standard network variable types (SNVTs) are supported. SNVT_switch and SNVT_lev_disc are the only types of network variables that can be declared for storing data in the discrete input and discrete output data areas. User defined custom network variables (CNVTs) are also supported, with a maximum data length of 31 bytes each.

The only other setting is to 'Enable Health Bits'. If this is set to yes, then the next 16 registers following the first 16 configuration/status registers will be reserved for the SNVTs health bit status. Refer to *Health Bits, p. 22* and *Steps to Configuring Health Bits, p. 33* for further information on using health bits. The MSB of the first register of the health bit data table holds the health bit for the first SNVT defined in the XIF file and continues consecutively for each SNVT defined.

The actual SNVT data is stored in a table of consecutive registers starting with the 17th register defined by the middle register of the NOL block, if the health bit parameter is set to no. Or in the 33rd register if the health bit parameter is set to yes.

Data is stored in 4 groups, discrete inputs stored first, followed by register inputs, discrete outputs, and then register outputs. These groups of data are set up consecutively and start on word boundaries. Discrete data starts with the MSB as the first bit of data, which follows Modicon controllers standard format of numbering discrete data in registers as bits 1-16 (MSB-LSB).

Example of SNVT data storage:

If a .xif file were loaded into the NOL module that defined 18 discrete input SNVTs, with 2 input register SNVTs, 8 discrete output SNVTs, and 3 register output SNVTs, the data table would be configured as follows:

The following table shows an example of SNVT Data Storage configuration

Register	SNVT	MSB															LSB
4x + 16*	disc. input	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
4x + 17	disc. input	17	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4x + 18	reg. input							Word Data...									
4x + 19	reg. input							Word Data...									
4x + 20	disc. output	1	2	3	4	5	6	7	8	X	X	X	X	X	X	X	X
4x + 21	reg. output							Word Data...									
4x + 22	reg. output							Word Data...									
4x + 23	reg. output							Word Data...									

*4x refers to the middle register in the NOL block. An offset of 16 exists if the health bits parameter is set to No.

Note: If the defined SNVT is a structure of byte data then the "packed" parameter in the.xif configuration file determines if each byte is stored in one word (low order byte), or is packed as two bytes per word (high order then low order).

Steps to Configuring Health Bits

The following two steps may be performed in any order.

Step	Action
1	Enable the health bits on the NOL DX Zoom screen. The middle value of the NOL function block sets the starting register for the NOL function block's data table. The first 16 registers hold configuration data and status information for the function block (this data can be programmed and monitored via the NOL DX Zoom screen). When the health bits are enabled, the next 16 registers following the configuration and status registers hold the health bits. The LonWorks network variable data immediately follows the health bits (if the health bits are not enabled the LonWorks network variable data immediately follows the configuration and status data). Example 1: middle value of NOL block = 400001 Health bits Disabled 400001 - 400016..... Configuration data 400017 - 400xxx..... Network variable data Example 2: middle value of NOL block = 400001 Health bits Enabled 400001 - 400016..... Configuration data 400017 - 400032..... Health bits 400033 - 400xxx..... Network variable data
2	Program the PLC ladder logic necessary to act upon the health bits. Each programmable network variable (network variable index 4 and above) has an associated health bit. Note index 0-3 are reserved for network variables. The health bits are stored in the order of the network variable indexes with the first bit being the most significant bit of the first health bit register. The bit will be set if the associated network variable is "healthy" and reset otherwise. The input variable is "healthy" if an update has been received since the last module reset, and is not cleared unless the NOL module is reset or stops communicating to the NOL DX block. An output network variable is "healthy" if the most recent attempt to propagate the value across the LonWorks network was successful. When a change of state fails to propagate on the network, the Health status is reset.

Installing NOL Configuration Tool

System Requirements

The following table shows System Requirements for the NOL Configuration Tool

Minimum	Recommended
IBM PC or compatible with a 486, 33 MHz microprocessor	IBM PC or compatible with a Pentium, 75 MHz or higher microprocessor
4 MB RAM	16 MB RAM
VGA monitor (640x480 resolution)	SVGA monitor (1024x768 resolution)
Microsoft Windows 3.1 or Windows 95	Microsoft Windows 3.1 or Windows 95

Note: The NOL Configuration Tool should not be used with Windows NT.

Installing the Software

Perform the following steps to install the NOL Configuration Tool.

Step	Action
1	Start Windows, if it is not running.
2	Insert Program Disk 1 into your 3.5" disk drive.
3	From the Program Manager File menu, select Run.
4	In the Command Line box, enter the following: a:\setup and click OK. Substitute a:\ with the appropriate drive designation for your 3.5" disk drive. The system loads the Configuration Tool installation program.
5	Follow instructions on the screen.

Using the NOL Configuration Tool

Use the Configuration Tool to establish the logical database of network variables for the NOL module. Select the variable types from the NV Attributes dialog box and specify the starting index into the type of variable that will be used. The following procedure outlines the steps involved in using the Configuration Tool. Refer to the chapter on Configuration Tool Menu Descriptions for information on all of the Menus and Commands in the Configuration Tool.

Steps to Using Configuration Tool

Perform the following steps to use the configuration tool.

Step	Action
1	Start the Configuration Tool by double-clicking the icon. See Starting the Configuration Tool.
2	Enter a name in the File Info dialog box. The name can be entered in the Text box or the Hexadecimal box. Click OK. This name will become the Program ID for the .xif file. See File Info Dialog Box
3	On the Main menu screen, click the Add NV button. The NV Attributes dialog box is displayed.
4	You must now define your network variables by entering information in the NV Attributes dialog box. Enter a name for the first variable and select a variable type from the Type drop-down list. Enter the start register location and the direction information. See Adding, Modifying, or Deleting a Network Variable. For User Defined variable types, see Specify User Defined Type Dialog Box.
5	Repeat Step 4 for each network variable in your application.
6	Once you have completed identifying all of your network variables, you must save the file. The Configuration Tool defaults to saving as an .xif file. See Saving a Configuration File, in 840USE109 00, ***Quantum Automation Series - Network Option Module for LonWorks***.
7	Set the communications parameters by selecting Settings from the Comm menu. This configures the port for downloading the .xif file. See Setting the Communication Parameters in 840USE109 00, *Quantum Automation Series - Network Option Module for LonWorks* .
8	Use the Communications menu selection "Load Disk File" to load the .xif file.
9	Use a network management tool to install the NOL module on the LonWorks network and perform network variable binding. Refer to your network management tool documentation for complete instructions on this process.

Maintenance

4

At a Glance

Purpose

This chapter explains the aspects of maintenance, including Wink Error Code Identification; removal and replacement of, and upgrade of Firmware for the NOL module. The chapter concludes with a discussion on when to use reset and service buttons.

What's in this Chapter?

This chapter contains the following topics:

Wink Error Code Identification

Interpreting Error LEDs

The Wink LED on the front of the module is used to display error conditions. The LED will blink from one to four times, depending on the error condition.

- one blink means the module is in the bootloader
- two blinks means there is an error in writing to flash
- three blinks means there is an error in initializing the LonWorks interface
- four blinks means there is an error in the module configuration

Removing and Replacing the Module

Cautions and Procedures

An unconfigured module must go through I/O mapping, configuring with an .xif file, and binding before it can function on the network.

CAUTION

Operational Hazard

The module can support the electrical requirements of being removed while power is on ("hot swap"), but a replacement module will not function properly until it is loaded with the same configuration (.xif file) as the module it is replacing. Proper network installation and bindings are also required for correct operation.

Failure to observe this precaution can result in injury or equipment damage.

MetraVision Network Management software provides a replace function that will automatically bind the SNVTs of the new module to the same network SNVTs for which the previous module was configured. It is required that you set the node replacement options in the Option/Project Setup/Network menu to "Don't Download Application" for this function to work with the NOL module.

CAUTION

Data Loss Hazard

When the NOL module is power cycled, all SNVT data within the NOL module is zeroed. No output SNVTs with a zero value on power up will be written to the LonWorks Network if the SNVTs in the NOL module are set up to utilize the standard change of state message processing. Only modules set up to utilize the SCPTs (Standard Configuration Property Types) Min_Send_Time parameter will receive an initial zero value written to the network.

Failure to observe this precaution can result in injury or equipment damage.

Upgrading Firmware in the Module

Where to Get the Firmware Upgrade File

Contact Schneider Automation at 1-800-468-5342 or via the WWW at http://www.modicon.com.

The following table outlines the Firmware Download procedure:

1	Connect the PC to the NOL module with a Modbus (Null Modem) cable.
2	Using Windows Terminal software, configure the PC's port for 9600 baud, 8 data bits, no parity, one stop bit, with no flow control.
3	After hitting <CR> twice, the NOL module should respond with: >OK.
4	Enter the passcode command: P @P3817 <CR>.
5	Enter: R BOOTLOADER<cr>. The NOL should respond with: BOOT>
6	Enter: X NEWCODE<cr> The NOL will respond by sending C's to the terminal.
7	Initiate XMODEM download of the new Intel HEX file for the NOL. From the terminal emulator's Transfers Menu selection, select Send Binary File. From File Select, select the NOL's HEX firmware file and click OK. The Wink LED will flash during the download.
8	When the transfer has completed, reset the NOL module, or cycle power on the rack to initialize the module with the new firmware.

How to Check Module Firmware Revision Number

The following is the procedure for checking the module firmware revision number

1	Connect the PC to the NOL module with a Modbus cable (990 NAA 26320 or 990 NAA 263 50).
2	Configure the Windows terminal software to 9600 baud, no parity, and one stop bit.
3	Type: V <CR>
4	The module will respond with the firmware revision number

When to Use Reset and Service Buttons

Reset Button

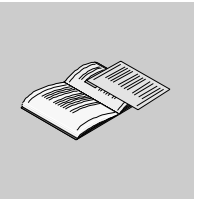
The Reset button can be used if the module requires a reset. The button is recessed, so you must use a pencil or other similar tool to access the button. The Reset button will perform a power-up reset of the module.

Service Pin

The Service Pin is used to send a message from the module to the LonWorks network. You may press this push-button during the installation process using your network management tool. The message that is sent out identifies the NOL module to the LonWorks network manager.

If you are using MetraVision as a network manager, you can enter the Neuron ID number instead of pressing the Service pin.

Appendices



At a Glance

Purpose

Appendix A gives specifications and agency approvals for the Quantum NOL Module.

What's in this Appendix?

The appendix contains the following chapters:

A

Specifications

At a Glance

Overview

Appendix A gives specifications and approvals for the NOL Module.

What's in this Chapter?

This chapter contains the following topics:

General Specifications

Specifications Table

For your reference, the general specifications for the NOL Module are provided here.

The following table outlines General NOL Module Product Specifications

Operating Temperature Range	**0°C to +60°C**
Storage Temperature Range	-40°C to +85°C
Operating Humidity Range	20 - 95% (validated at 20 - 95%) Non- Condensing at 0 - 60°C.
Ventilation	Convection only
Shock	15g Half Sine, 11 millisecond duration
Vibration	IEC68-2-6, Sinusoidal 10Hz to 150Hz (Operating).075mm Amplitude, 1.0g 10 Sweeps.
Flammability	PCB Material UL-94V0. UL Recognized Components
Radiated Emissions	Compliance to EN55011, Class A.
Conducted Emissions	All systems AC mains tested per EN55011, Class A, Group 1.
ESD Immunity	Compliance to IEC1000-4-2, 8kV air discharge, 4kV contact discharge, both polarities.
Radiated RF Susceptibility	Compliance to IEC1000-4-3, 80MHz to 1,000MHz: 10V/m test level, 80% AM @ 1 kHz. Also 1.89 GHz PM @ 100 Hz, 50% Duty Cycle.
Conducted RF Susceptibility	Compliance to IEC 1000-4-6, Table 1, Test Level 3. Use of ferrite clamp preferred.
Fast Transient Susceptibility	Compliance to IEC1000-4-4, Table 1, Test Level 3. Capacitive clamp preferred for use on communications ports.
Electrical Surge Susceptibility	Compliance to IEC 1000-4-5, Table 1, Installation Class 3.5 surges each line, line-line and line-Earth. Use of capacitive test clamp preferred.
Voltage Dips, Interruptions, and Voltage Variations	Compliance to IEC 1000-4-11. Voltage deviations to be applied to system AC mains input line.

The following table provides electrical specifications:

Input voltage	Module requires +5.1VDC +4%, -3% from the Quantum backplane for operation. No external power required.
Power Consumption	Module will consume 250 milliamps typical, with 400 milliamps maximum (surge at power up) from the Quantum backplane.

Agency Approvals

Requirements

The NOL module is designed to comply with the following regulatory agency requirements:

- UL 508 - Industrial Control Equipment (Safety)
- CSA C22.2 No. 142-M1987 - Process Control Equipment
- Factory Mutual, Class 1, Division 2 FM3611
- European EMC Directive, CE Mark
- CISPR 22, EN55022, Class A - Limits and Methods of measurement of EMI of industrial, scientific, and medical radio frequency equipment
- LonMark Compliance

CE Compliance

When installed in any specified, fully compliant system, the complete system will meet the requirements of the EMC Directive (89/336/EEC, EN55011, EN50082-1, EN50082-2, and all applicable annexes to date), and the Low Voltage Directive (73/23/EEC and all applicable annexes to date). EMC Directive compliance is determined by satisfactory completion of Quantum EMC Test Plan, and by incorporation into the Quantum Technical Construction File. Primary standards for LVD compliance are: IEC 1131-1, IEC 1131-2, IEC 1010-1, and IEC 950 (applicable portions only).

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