Industrial communication solutions for Windows

XN2 Driver Manual

Johnson Controls N2 Master Protocol Driver

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XN2 technical specifications

General information

The XN2 allows you to connect N2 devices in a Metasys network through a low speed serial connection using the N2 System protocol from Johnson Controls.

The N2 System protocol is a general interface for accessing data that resides in devices on a N2 network. Each device on the N2 can be thought of as a data base manager. The key to referencing a specific N2 device's data base is the device's N2 address. The data under the management of a particular N2 device can further be subdivided into groupings called regions. Each region is made up of one or more records, each record within a region having the same structure.

For details about the structure of each supported object, please refer to the 'N2 System Protocol Spec.pdf' document from Johnson Controls.

In order to get a first response from your device, it might be necessary that you send a 'Identify Device Type' command followed by a 'Poll Without/ With Ack Message' command prior to any other reading or writting commands.

Command list

Identify Device Type

Description of this command:
This command request the N2 device to respond with a unique code identifying which kind of device it is.

Methods used to run this command:
Analog Input

Number of points accepted by this command:
1

Meaning of the DriverP0 parameter:
Defines the address of the N2 device (1-255).

Meaning of the DriverP1 parameter:
15 (Command)

Meaning of the DriverP2 parameter:
-1

Meaning of the DriverP5 parameter:
2 (CHAR2)

Values that are returned:
Value in PointValue (0) = Device type

Poll Without/With Ack Message

Description of this command:
This message can be sent periodically to slave devices on the N2 by the N2 master to allow the slave devices to report any changes in condition. The poll message contains an acknowledge code which signals the device receiving the poll whether the master received any data sent in response to the previous poll message. If the master did not receive the data response, the slave device will transmit the previous response again.

Methods used to run this command:
Analog Input

Number of points accepted by this command:
2

Meaning of the DriverP0 parameter:
Defines the address of the N2 device (1-255).

Meaning of the DriverP1 parameter:
0 (Command)

Meaning of the DriverP2 parameter:
4 (without ACK code), 5 (with ACK code)
Meaning of the DriverP3 parameter:
-1
Meaning of the DriverP4 parameter:
-1
Values that are returned:
Value in PointValue (0) = Region of changed object (0=no changes, or 1-4)
Value in PointValue (1) = Index of changed object (0-255)

Read Analog Input Value

Description of this command:
This command is used to retrieve the current value of a group of analog input objects.
Methods used to run this command:
Analog Input
Number of points accepted by this command:
1-256
Meaning of the DriverP0 parameter:
Defines the address of the N2 device (1-255).
Meaning of the DriverP1 parameter:
1 (Command)
Meaning of the DriverP2 parameter:
1 (Region)
Meaning of the DriverP3 parameter:
First analog input object to be read (0-255).
Meaning of the DriverP4 parameter:
3 (Attribute)
Meaning of the DriverP5 parameter:
8 (CHAR8)
Values that are returned:
Value in PointValue (0) = First analog input value
Value in PointValue (1) = Second analog input value
...
Value in PointValue (n-1) = Last analog input value

Read Analog Output Value

Description of this command:
This command is used to retrieve the current value of a group of analog output objects.
Methods used to run this command:
Analog Input
Number of points accepted by this command:
1-256
Meaning of the DriverP0 parameter:
Defines the address of the N2 device (1-255).
Meaning of the DriverP1 parameter:
1 (Command)
Meaning of the DriverP2 parameter:
3 (Region)
Meaning of the DriverP3 parameter:
First analog output object to be read (0-255).
Meaning of the DriverP4 parameter:
3 (Attribute)
Meaning of the DriverP5 parameter:
8 (CHAR8)
Values that are returned:
Value in PointValue (0) = First analog output value
Value in PointValue (1) = Second analog output value
...
Value in PointValue (n-1) = Last analog output value

Read Binary Input State

Description of this command:
This command is used to retrieve the current state of a group of binary input objects.
Methods used to run this command:
Digital Input
Number of points accepted by this command:
1-256
Meaning of the DriverP0 parameter:
Defines the address of the N2 device (1-255).
Meaning of the DriverP1 parameter:
1 (Command)
Meaning of the DriverP2 parameter:
2 (Region)
Meaning of the DriverP3 parameter:
First binary input object to be read (0-255).
Meaning of the DriverP4 parameter:
2 (Attribute)
Meaning of the DriverP5 parameter:
2 (CHAR2)
Meaning of the DriverP6 parameter:
6 (Bit)
Values that are returned:
Value in PointValue (0) = First binary input value
Value in PointValue (1) = Second binary input value
...
Value in PointValue (n-1) = Last binary input value

Read Binary Output State

Description of this command:
This command is used to retrieve the current state of a group of binary output objects.
Methods used to run this command:
Digital Input
Number of points accepted by this command:
1-256
Meaning of the DriverP0 parameter:
Defines the address of the N2 device (1-255).
Meaning of the DriverP1 parameter:
1 (Command)
Meaning of the DriverP2 parameter:
4 (Region)
Meaning of the DriverP3 parameter:
First binary output object to be read (0-255).
Meaning of the DriverP4 parameter:
2 (Attribute)
Meaning of the DriverP5 parameter:
2 (CHAR2)
Meaning of the DriverP6 parameter:
6 (Bit)
Values that are returned:
Value in PointValue (0) = First binary output value
Value in PointValue (1) = Second binary output value
...
Value in PointValue (n-1) = Last binary output value

Read Internal Parameter Value

Description of this command:
This command is used to retrieve the current value of a group of internal parameter objects.
Methods used to run this command:
Analog Input

Number of points accepted by this command:
    1-256
Meaning of the DriverP0 parameter:
    Defines the address of the N2 device (1-255).
Meaning of the DriverP1 parameter:
    1 (Command)
Meaning of the DriverP2 parameter:
    Region number (5-8)
Meaning of the DriverP3 parameter:
    First internal parameter object to be read (0-255).
Meaning of the DriverP4 parameter:
    Attribute number (1-2)
Meaning of the DriverP5 parameter:
    Lenght of each value read (2=CHAR2/4=CHAR4/8=CHAR8)
Values that are returned:
    Value in PointValue (0) = First internal parameter value
    Value in PointValue (1) = Second internal parameter value
    ...
    Value in PointValue (n-1) = Last internal parameter value

Synch Time

Description of this command:
    This command is used to synchronize the software clocks of the N2 devices with the clock of the master.
Methods used to run this command:
    Analog Output
Number of points accepted by this command:
    7
Meaning of the DriverP0 parameter:
    Defines the address of the N2 device (1-255).
Meaning of the DriverP1 parameter:
    0 (Command)
Meaning of the DriverP2 parameter:
    0 (Subcommand)
Values that are sent:
    Value in PointValue (0) = Year (1-9999)
    Value in PointValue (1) = Month (1-12)
    Value in PointValue (2) = Day of month (1-31)
    Value in PointValue (3) = Day of week (1-8, 1=sunday, 8=holiday)
    Value in PointValue (4) = Hours (0-23)
    Value in PointValue (5) = Minutes (0-59)
    Value in PointValue (6) = Seconds (0-59)

Override Analog Output

Description of this command:
    The override analog output command is used to send an override value to the analog output object to be used in place of its current value attribute. The override value becomes the object's current value. Generally, the override value remains active as long as the master continues polling the N2 device. In standalone operation, or should the polling stop, the object reverts to the object's output value after a specified period (normally 10 minutes).
Methods used to run this command:
    Analog Output
Number of points accepted by this command:
    1
Meaning of the DriverP0 parameter:
    Defines the address of the N2 device (1-255).
Meaning of the DriverP1 parameter:
    7 (Command)
Meaning of the DriverP2 parameter:
    3 (Region)

Meaning of the DriverP3 parameter:
Analog output object to be changed (0-255).
Values that are sent:
Value in PointValue (0) = New analog output value

Override Binary Output

Description of this command:
The override binary output command is used to send an override value to the binary output object to be used in place of its current binary state. The override value becomes the object's current binary state.
Methods used to run this command:
Binary Output
Number of points accepted by this command:
1
Meaning of the DriverP0 parameter:
Defines the address of the N2 device (1-255).
Meaning of the DriverP1 parameter:
7 (Command)
Meaning of the DriverP2 parameter:
4 (Region)
Meaning of the DriverP3 parameter:
Binary output object to be changed (0-255).
Values that are sent:
Value in PointValue (0) = New binary state (0 or 1)

Override Internal Parameter Value

Description of this command:
The override internal parameter command is used to change any internal parameter value. The override value becomes the object's current value.
Methods used to run this command:
Analog Output
Number of points accepted by this command:
1
Meaning of the DriverP0 parameter:
Defines the address of the N2 device (1-255).
Meaning of the DriverP1 parameter:
7 (Command)
Meaning of the DriverP2 parameter:
Region (5-8)
Meaning of the DriverP3 parameter:
Internal parameter object to be changed (0-255).
Meaning of the DriverP5 parameter:
Forma de codificar el dato a ser enviado:
2 = Codificar como CHAR2 (byte 0-255)
4 = Codificar como CHAR4 (word 0-65535)
8 = Codificar como CHAR8 (float)
Values that are sent:
Value in PointValue (0) = New internal parameter value

Write Internal Parameter Value

Description of this command:
The write internal parameter command is used to change the value attribute of internal parameter objects.
Methods used to run this command:
Analog Output
Number of points accepted by this command:
1
Meaning of the DriverP0 parameter:
Defines the address of the N2 device (1-255).

Meaning of the DriverP1 parameter:
    2 (Command)
Meaning of the DriverP2 parameter:
    Region (5-8)
Meaning of the DriverP3 parameter:
    Internal parameter object to be changed (0-255).
Meaning of the DriverP5 parameter:
    Forma de codificar el dato a ser enviado:
    2 = Codificar como CHAR2 (byte 0-255)
    4 = Codificar como CHAR4 (word 0-65535)
    8 = Codificar como CHAR8 (float)
Values that are sent:
    Value in PointValue (0) = New internal parameter value

Override Release Request

Description of this command:
    This message commands the N2 device to release a previously overridden data value. Once a value has been released the local value is be used.
Methods used to run this command:
    Digital Output
Number of points accepted by this command:
    1
Meaning of the DriverP0 parameter:
    Defines the address of the N2 device (1-255).
Meaning of the DriverP1 parameter:
    8 (Command)
Meaning of the DriverP2 parameter:
    Region (1-8)
Meaning of the DriverP3 parameter:
    Object number (0-255).
Values that are sent:
    Value in PointValue (0) = Ignored

Error messages

The following list shows the possible error messages that can be returned by the driver during a failed communication in the 'Status' property.

    [1005] DRIVER (Internal): Invalid driver stage
    [1300] PROTOCOL (Timeout): No answer
    [1433] PROTOCOL (Format): Validation error in device response
    [2130] CONFIG (NumValues): Invalid number of values (must be 7)
    [2142] CONFIG (NumValues): Only one output allowed
    [2245] CONFIG (NumValues): Too many values requested
    [3022] CONFIG (P0): Invalid device address (1-255)
    [6038] CONFIG (P6): Invalid bit address
    [8347] CONFIG (Remote): Unknown error
    [8403] CONFIG (Remote): Device has reset and is waiting for the 'Identify Yourself' command
    [8404] CONFIG (Remote): Undefined Command: command not understood by addressed device
    [8405] CONFIG (Remote): Checksum error
    [8406] CONFIG (Remote): Input buffer overrun: message longer than maximum device expects to receive
    [8407] CONFIG (Remote): Data field error: size of message not correct for command type
    [8407] CONFIG (Remote): Invalid Data: one of the fields contains a value that is out of the expected range
    [8408] CONFIG (Remote): Invalid command for data type: command not appropriate for this field or record
    [8409] CONFIG (Remote): Command not accepted: due to problems with the device, the command is ignored

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Supported devices

This driver can communicate with these devices, but is not necessarily limited to this list:

JOHNSON CONTROLS N2 devices in a Metasys Network.
JOHNSON CONTROLS UNT
JOHNSON CONTROLS VMA1410
JOHNSON CONTROLS VMA1420
JOHNSON CONTROLS DX9100 with XT9100 extension
JOHNSON CONTROLS NCM
JOHNSON CONTROLS VAV
JOHNSON CONTROLS AHU
JOHNSON CONTROLS VND