

NVISION Ethernet Protocol

Router Control Messages

NP0016-00

Rev B

TABLE OF CONTENTS

1.	Introduction	3
2.	References	3
2.1	Specifications and Standards	3
2.2	Other Protocol Documents	3
3.	Document Conventions	3
4.	Overview	3
4.1	Physical and Datalink layers.....	3
4.2	Network layer	3
4.3	Transport layer	3
4.4	Maximum message size.....	3
5.	Protocol Message Structure	4
5.1	NVEP Header format	4
5.2	Response time.....	4
5.3	Error Responses.....	4
6.	Commonly Used Types	4
6.1	Status Flags.....	4
6.2	LPR ID	4
6.3	LPR State.....	4
6.4	Router Partition Data.....	5
7.	Parameters	5
7.1	Generic Parameter Data Format	5
8.	Protocol Command Messages	6
8.1	0x0000 0050 Take Command.....	6
8.2	0x0000 0051 Set Output LPR Command	6
8.3	0x0000 0052 Get Status of Outputs Command	7
8.4	0x0000 0059 Router Partition Information Command	7
8.5	0x0000 005E Crosspoint Tally Command.....	8
8.6	0x0000 0060 Chop Command	8
8.7	0x0000 0070 Machine Control Take Command.....	9
8.8	0x0000 5000 Get System Status Command.....	9
9.	Protocol Response Messages.....	10
9.1	0x8000 0000 Error Response.....	10
9.2	0x8000 0001 Command Succeeded Response.....	10
9.3	0x8000 0002 Multiple Status Response.....	10
9.4	0x8000 0050 Take Response	10
9.5	0x8000 0052 Get Status of Outputs Response.....	11
9.6	0x8000 0059 Router Partition Information Response.....	11
9.7	0x8000 005E Crosspoint Tally Response	12
9.8	0x8000 0060 Chop Response	12
9.9	0x8000 0070 Machine Control Take Response	13
9.10	0x8000 5000 Get System Status Response	14
10.	Reserved Command and Response Messages	16
11.	Revision History	16
11.1	Revision A	16
11.2	Revision B	16

1. Introduction

This document specifies the format, delivery mechanisms, and timing for the Router Control Messages within the NVISION Ethernet Protocol [NVEP].

2. References

2.1 Specifications and Standards

IEEE 802.3

2.2 Other Protocol Documents

NP0015 – NVISION Protocol – Shared Definitions

NP0018 – NVISION Ethernet Protocol [NVEP]

3. Document Conventions

Decimal numbers are expressed with no radix. Hexadecimal numbers are prefixed with a radix of “0x” as in the “C” programming language.

The absolute size of a protocol data field is specified with brackets as follows: [32] will indicate 32 bits, etc.

Message formats are described in a simplified BNF as follows:

$\{X\}^+ = X$ repeats 1 to n times.

$\{X\}^* = X$ repeats 0 to n times.

$\{X\}^0 = X$ occurs 0 or 1 time.

$\{X\}^n = X$ occurs n times

$\{X | Y\} =$ either X or Y occurs.

4. Overview.

4.1 Physical and Datalink layers

This protocol assumes an Ethernet network in compliance with IEEE 802.3.

4.2 Network layer

Router control cards will have static IP addresses for each network interface. Both IP addresses and subnet masks must be settable from a separate diagnostic protocol. Other devices may or may not use DHCP, to be determined later.

4.3 Transport layer

This protocol currently uses TCP/IP connection oriented sockets for all communications. The option of UDP connectionless communications for extensions to this protocol is not precluded at this point.

Router control cards will maintain a multi-client listening/server **TCP/IP socket on port 5194** on each IP interface. Controlling applications will connect to this listening port to request services.

4.4 Maximum message size

Maximum supported message size including header is 8192 Bytes. Max data size is 8176 Bytes.

5. Protocol Message Structure

5.1 NVEP Header format

The header format is defined in NP0018, NVISION Ethernet Protocol. The Router control messages will use a **Protocol ID of 0x0000000C**.

5.2 Response time

Router control cards must send a proper response within 16 milliseconds of reception of an incoming message. Network latency will affect the external timing of message exchanges, however.

5.3 Error Responses

Each message has the potential to generate an error.

6. Commonly Used Types

6.1 Status Flags

Status Flags are the Extended Status values defined in the document NP0015.

6.2 LPR ID

Lock, protect, release, and take commands all require an LPR ID. This number is the application specific identifier that the controller uses to track ownership of locks and protects. Although the LPR ID is 32 bits in length in the protocol, router control cards will only use values in the range of 1 to 65535 (0xFFFF).

6.2.1 Third party systems

To avoid conflicts with NVISION software, 3rd party systems should use always an LPR ID of 0xF000.

There are some specific values reserved for specific 3rd party systems. These are identified in the table below.

LPR ID	3 rd Party Control System
0xF000	General use
0xF001	Miranda
0xF005	Harris Automation
0xF010	SONY

6.3 LPR State

Values and meanings:

0x0000 Released

0x0001 Locked

0x0002 Protected

6.4 Router Partition Data

{Router Partition Data} =
 {[32] Level Number}
 {[32] Signal type}
 {[32] Starting Source}
 {[32] Ending Source}
 {[32] Controller Starting Source}
 {[32] Starting Destination}
 {[32] Ending Destination}
 {[32] Controller Starting Destination}

Signal types are defined in the document NP0015.

7. Parameters

7.1 Generic Parameter Data Format

Generic Parameter Data Format is defined in the document NP0018.

8. Protocol Command Messages

8.1 0x0000 0050 Take Command

This message requests connection of the specified source to the specified destination of the addressed active router control card. A control card which is not active will respond with an Error Response of 'Not Active'. Every take requested in a single message will be attempted, regardless of the success or failure of any previous take.

8.1.1 Message Format

```
{NVEP Header}
{[32] Number Of Takes = n}
{Take Data}n

{Take Data} =
  {[32] Level Number (range of 0 to 250)}
  {[32] LPR ID}
  {[32] Source}
  {[32] Destination}
```

8.1.2 Responses

```
0x8000 0000 Error Response.
0x8000 0050 Take Response.
```

8.2 0x0000 0051 Set Output LPR Command

This message is sent to the active control card to set the LPR status of the router control card's outputs. A control card which is not active will respond with an Error Response of 'Not Active'. Controlling applications may ask for a maximum of ??? destinations at one time.

8.2.1 Message Format

```
{NVEP Header}
{[32] Number Of LPRs to Set = n}
{Output LPR Data}n

{Output LPR Data} =
  {[32] Level Number (range of 0 to 250)}
  {[32] Output}
  {[32] LPR Action}
  {[32] LPR ID}
```

Output Action Format values and meanings:

```
0x0000 Release
0x0001 Lock
0x0002 Protect
0x0010 Force Release (Note: LPR ID is ignored).
```

8.2.2 Responses

0x8000 0000 Error Response.

0x8000 0002 Multiple Status Response

8.3 0x0000 0052 Get Status of Outputs Command

This message is sent to the active control card to request the status of a (potentially proper) subset of the router control card's outputs. A control card which is not active will respond with an Error Response of 'Not Active'.

WARNING: Sending this message too frequently can have a negative effect on the performance of the router control card. A recommended maximum rate is to request 64 destinations every 500 msec.

8.3.1 Message Format

{NVEP Header}

{[32] Output Status Format}

{[32] Level Number}

{[32] Starting Output}

{[32] Number of Outputs}

Output Status Format values and meanings:

1 - Crosspoint Information

2 - Crosspoint and Output LPR Information

8.3.2 Responses

0x8000 0000 Error Response

0x8000 0052 Get Status Of Outputs Response

8.4 0x0000 0059 Router Partition Information Command

This message is used to request the partition information from a control card.

8.4.1 Message Format

{NVEP Header}

8.4.2 Responses

0x8000 0000 Error Response.

0x8000 0059 Router Partition Information Response.

8.5 0x0000 005E Crosspoint Tally Command

This message is sent to the active control card to request the crosspoint status of a (potentially proper) subset of the router control card's destinations. A control card which is not active will respond with an Error Response of 'Not Active'. Controlling applications may ask for a maximum of 1016 destinations at one time.

WARNING: Sending this message too frequently can have a negative effect on the performance of the router control card. A recommended maximum rate is to request 64 destinations every 500 msec.

8.5.1 Message Format

- {NVEP Header}
- {[32] Level Number}
- {[32] Starting Destination}
- {[32] Number of Destinations}

8.5.2 Responses

- 0x8000 0000 Error Response.
- 0x8000 005E Crosspoint Tally Response.

8.6 0x0000 0060 Chop Command

This message requests the active router control card to alternately switch the two specified sources to the specified destination, with switching occurring at the specified field interval. A control card which is not active will respond with an Error Response of 'Not Active'. Chop will continue on the specified destination until a new 'Take' message is sent to this destination.

8.6.1 Message Format

- {NVEP Header}
- {[32] Level Number (range of 0 to 250)}
- {[32] LPR ID}
- {[32] Source 1}
- {[32] Source 2}
- {[32] Destination}
- {[32] Chop Interval (Interval=#fields)}

8.6.2 Responses

- 0x8000 0000 Error Response
- 0x8000 0060 Chop Response

8.7 0x0000 0070 Machine Control Take Command

This command will only be supported by machine control routers. When using this command, Takes will occur in a 'Forward only' mode- i.e. signal type partition settings will be ignored

This message requests connection, in the designated mode, of the specified master port to the specified slave port of the addressed active router control card. Every individual take requested in a single message will be attempted, regardless of the success or failure of any previous take.

A control card which is not active will respond with an Error Response of 'Not Active'.

8.7.1 Message Format

{NVEP Header}

{[32] MCTake Format Flag = 0x00000000 = Format 1}

Format 1:

{[32] Level Number (range of 0 to 250)}

{[32] Number Of Takes = n}

{MC Router Take Data}ⁿ

{MC Router Take Data} =

{[32] LPR ID}

{[32] Master Port}

{[32] Slave Port}

{[32] Take Mode Flag }

Take Mode Flag = 0x00 Point to point

0x01 Broadcast

8.7.2 Responses

0x8000 0000 Error Response

0x8000 0070 Machine Control Take Response.

8.8 0x0000 5000 Get System Status Command

The format of this message is defined in the document NP0018.

Routers only support a System Format Flag = 0x02 (Format 2).

9. Protocol Response Messages

9.1 0x8000 0000 Error Response

This message can be sent in response to any command.

9.1.1 Message Format

{NVEP Header}
{Originating Sequence Number}
{[32] Status Flag}

9.1.2 Applies To:

All Commands.

9.2 0x8000 0001 Command Succeeded Response

The format of this message is defined in the document NP0018.

9.3 0x8000 0002 Multiple Status Response

The format of this message is defined in the document NP0018.

9.4 0x8000 0050 Take Response.

The active router control card sends this message in response to a take request. Every individual take in the original request will have a status flag returned for it, in the same order as they were received.

9.4.1 Message Format

{NVEP Header}
{Originating Sequence Number}
{[32] Number Of Takes = n}
{[32] Status Flag }ⁿ

9.4.2 Applies To:

0x0000 0050 Take Command

9.5 0x8000 0052 Get Status of Outputs Response

The active router control card sends this message in response to a Crosspoint Tally Command. The status flag in the connection data shall return 'success' if the source is valid for the partition and no additional status is required, otherwise an applicable status flag should be returned.

9.5.1 Message Format

{NVEP Header}
{Originating Sequence Number}
{[32] Output Status Format}
{[32] Level Number}
{[32] Starting Output}
{[32] Number of Outputs = n}
{Status Data}ⁿ

If Output Status Format is equal to 1, {Status Data} is defined as:

{[32] Status Flag}
{[32] Input}

If Output Status Format is equal to 2, {Status Data} is defined as:

{[32] Status Flag}
{[32] Input}
{[32] Output LPR State}
{[32] Output LPR ID}

9.5.2 Applies To:

0x0000 0052 Get Status Of Outputs Command

9.6 0x8000 0059 Router Partition Information Response

The router control card sends this message in response to a Router Partition Information Command. Every partition defined for the router control card will be reported. If the router is not configured for any levels, the 'Number of Levels' field will be set to zero and no 'Router Partition Data' will be returned.

9.6.1 Message Format

{NVEP Header}
{Originating Sequence Number}
{[32] Number of Levels = n}
{Router Partition Data}ⁿ

Applies To:

0x0000 0059 Router Partition Information Command

9.7 0x8000 005E Crosspoint Tally Response

The active router control card sends this message in response to a Crosspoint Tally Command. The status flag in the connection data shall return 'success' if the source is valid for the partition and no additional status is required, otherwise an applicable status flag should be returned.

9.7.1 Message Format

- {NVEP Header}
- {Originating Sequence Number}
- {[32] Level Number}
- {[32] Starting Destination}
- {[32] Number of Destinations = n}
- {Connection Data}ⁿ
- {Connection Data} is defined as:
 - {[32] Status Flag}
 - {[32] Source}

9.7.2 Applies To:

0x0000 005E Crosspoint Tally Command

9.8 0x8000 0060 Chop Response

The active router control card sends this message in response to a chop request.

9.8.1 Message Format

- {NVEP Header}
- {Originating Sequence Number}
- {[32] Status Flag}

9.9 0x8000 0070 Machine Control Take Response

The active router control card sends this message in response to a machine control take request. Every individual take in the original request will have a status flag returned for it, in the same order in which they were received. The total number of distinct ports that were switched or tri-stated during completion of the successive takes will be returned along with their final status.

9.9.1 Message Format

{NVEP Header}
{Originating Sequence Number}
{[32] MCTake Format Flag = 0x00000000 = Format 1

Format 1 Response:

{[32] Level Number (range of 0 to 250)}
{[32] Number Of Takes = m}
{[32] Take Status Flag}^m
{[32]Number of ports that changed state = n}
{[32]Port Data}ⁿ

{Port Data} is defined as:
{[32] Port Number }
{[32] Port Status}

The Take status flag is used to indicate the individual status of the take, the Port status flag is used to indicate the final state of each 'touched' port after all takes are completed.

9.9.2 Applies To:

0x0000 0070 Machine Control Router Take Command

9.10 0x8000 5000 Get System Status Response

The format of this message is defined in the document NP0018. Routers support a System Format Flag = 0x02 (Format 2).

Format 2 Response:

Note: this format is supported by software version 7.1 and later of the Unicon99 software.

{[32] Device Type ID}
{[32] Frame ID}
{[32] Card ID}
{[32] Card Revision Number}
{[32] Controller State}
{[32] Controller Healthy: 0- not healthy, 1 - healthy}
{[32] Other Controller Healthy: 0- not healthy, 1 - healthy }
{[32] Timestamp}
{[32] Number of alarms = j}
{[32] Number of power supplies = k}
{[32] Number of fans = l}
{[32] Number of Vertical References = m}
{[32] Number of AES References= o}
{[32] Alarm Data}^j
{[32] Power Supply Data}^k
{[32] System Status Flag - Fans}^l
{[32] System Status Flag – VRef}^m
{[32] System Status Flag - AES}^o

Controller State values and meanings:

0x00 Active
0x01 Standby
0x02 Offline
0x03 Ineligible

Alarm Data is defined as:

{[32] Alarm Type}
{[32] Alarm State (0 = Off, 1 = On)}

Alarm Type has the following values and meanings:

0x0000 0000 Unknown
0x0000 0001 Major
0x0000 0002 Minor
0x0000 0003 Power Supply
0x0000 0004 Video Ref
0x0000 0005 AES Ref/Clock
0x0000 0006 Fans/Temperature
0x0000 0007 Card Health
0x0000 FFFF Does not apply

Power Supply Data is defined in [NP0018](#).

System Status Flags are defined in [NP0018](#).

Reference Selected Flag has the following values and meanings:

0x0000 0000 Both selected

0x0000 0001 Ref 1 selected

0x0000 0002 Ref 2 Selected

10. Reserved Command and Response Messages

The following messages are reserved:

1. 0x0000 005D

11. Revision History

11.1 Revision A

- Released: May 2003

11.2 Revision B

- Released: June 2005
- Added Parameters Section
- Added the following types to the Commonly Used Types Section:
 1. LPR State
 2. Router Partition Data
- Added the following messages:
 1. 0x0000 0051 Set Output LPR Command
 2. 0x0000 0052 Get Status Of Outputs Command
 3. 0x0000 5000 Get System Status Command
 4. 0x8000 0001 Command Succeeded Response
 5. 0x8000 0002 Multiple Status Response
 6. 0x8000 0052 Get Status of Outputs Response
 7. 0x8000 5000 Get System Status Response