

# **NVISION Serial Protocol**

## **Router Control Messages**

**NP0010-02**  
**Rev D**

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## 1.0 Introduction

This document defines those messages intended for control of and communication with NVISION routing switchers. Most of these commands require the use of Device ID or Global addressing.

## 2.0 References

### 2.1 Specifications and Standards

### 2.2 Other Protocol Documents

- NP0015 – NVISION Protocol – Shared Definitions
- NP0009 – NVISION Serial Protocol – General Messages

## 3.0 Router Communications Interface

### 3.1 Message response Time

Devices conforming to this protocol shall respond to control messages received at their CONTROL ports in 30 milliseconds or less, measured from the end of the stop bits of the messages' last characters to the beginning of the start bits of the responses' first characters. The response time for diagnostic messages received at CONTROL ports is not specified. The response time for any messages received at DIAGNOSTIC ports is not specified.

### 3.2 Source, Destination, and Level Addressing

Most router control messages specify one or more source and destination data fields. These fields specify virtual addresses that are mapped to physical inputs and outputs as specified by configurable partition parameters. For this reason, these messages must use Device ID or Global addressing, so that a level, and therefore a partition, is specified. If such messages are received using other addressing modes, the Bad Mode error response is returned. Source and destination addresses are 16 bit values that are sent as two bytes, the most significant referred to as *High* and the least significant as *Low*.

### 3.3 Delayed Switching Using Timestamping

The Timestamp (0x02), Take (0x50), and Salvo (0x5E) commands support a method of specifying connections to be performed in the future. The Timestamp command may be used to assign an unsigned 16 bit value to the current frame that is incremented each vertical interval and rolls over from 65535 (0xFFFF) to 0. The Take and Salvo commands include an optional timestamp field that, if provided, specify the frame in which the take is to occur. If the timestamp field is omitted from the Take and Salvo commands, the connections are performed immediately.

#### **IMPORTANT NOTES:**

- 1) **This functionality is not supported by all current NVISION routers and may not be supported by all future NVISION routers.**
- 2) **NVISION Compact Routers do not support this functionality.**

## 4.0 Command and Addressing Mode Support

### 4.1 NVISION Controllers and Routers

Table 1 indicates which controllers work with which routers.

Controller	Routers Supported	Current status
EM0127	NV3064, NV3128 and NV3256	Discontinued. Superseded by EM0134
EM0134	NV3064, NV3128 and NV3256	Discontinued.
EM3502	NV3512	Discontinued. Superseded by EM3510
EM3510	NV3512	Discontinued.
EM0209	NV6064, NV6128 and NV6256	Discontinued. Superseded by EM0374
EM0353	NV3128 and NV3256	Discontinued.
EM0374-00 EM0374-01	NV6064, NV6128, NV6256, NV6904, NV5128, NV7256 and NV8256	EM0374-00 is discontinued. Superseded by EM0374-01
EM0374-02	NV6064, NV5128, NV5256, NV7256, NV7512 and NV8256	EM0374-02 is discontinued. Superseded by EM0374-03
EM0374-03	NV5128, NV5256, NV7256, NV7512 and NV8256	
EM0529	NV8288 and NV8288 Plus	

**Table 1. Mapping of NVISION control cards to NVISION routers**

## 4.2 General and Router Control Command Message Support

Not all General and Router Control command messages are supported by all NVISION router controllers. Table 2 indicates those commands that are supported by the various controllers.

Commands	E M 0 1 2 7	E M 3 5 0 2	E M 0 1 3 4	E M 0 2 0 9	E M 3 5 1 0	E M 0 3 5 3	E M 0 3 7 4 - 0 0	E M 0 3 7 4 - 0 1	E M 0 3 7 4 - 0 2	E M 0 3 7 4 - 0 3	E M 0 5 2 9	N V 9 0 0 0	C o m p a c t R t r
0x01: Device Present	•	•	•	•	•	•	•	•	•	•	•	•	•
0x02: Timestamp			•	•	•		•	•	•	•	•		
0x03: Real Time Clock			•	•	•	•	•	•	•	•	•		
0x10: Manufacturer and Product ID			•	•	•	•	•	•	•	•	•		
0x11: Software Version			•	•	•	•	•	•	•	•	•		
0x13: Report Controller Type			*	*	*	•	•	•	•	•	•		
0x15: Extended Software Version Command						•	*	*	•	•	•		•
0x50: Take (without timestamp)	•	•	•	•	•	•	•	•	•	•	•	•	•
0x50: Take (with timestamp)			•	•	•		•	•	•	•	•		
0x51: Destination Status	•	•	•	•	•	•	•	•	•	•	•	•	•
0x55: Lock Destination	•	•	•	•	•		•	•	•	•	•	•	•
0x56: Protect Destination	•	•	•	•	•		•	•	•	•	•	•	
0x57: Release Source	•	•	•	•	•							•	
0x58: Release Destination	•	•	•	•	•	•	•	•	•	•	•	•	•
0x59: Level Configuration	•	•	•	•	•	•	•	•	•	•	•		
0x5A: Status Changes	•	•	•	•	•		•	•	•	•	•		
0x5C: Clear Change Flags, Locks, and Protects			•	•	•		•	•	•	•	•		
0x5D: Tally			•	•	•	•	•	•	•	•	•	•	•
0x5E: Salvo (without timestamp)			•	•	•	•	•	•	•	•	•		•
0x5E: Salvo (with timestamp)			•	•	•	•	•	•	•	•	•		
0x65: Source LPR State			*	*	*								
0x66: Destination LPR State			*	*	*		•	•	•	•	•	•	•
0x67: Machine Control Salvo Command						•							?
0x68: Expanded Tally Command						•	*	*	•	•	•		•
0x6A: Enable Asynchronous Status Change Command									7.2	•	•		
0x6B: Query Asynchronous Status Change Command									7.2	•	•		
0x80: Error Response	•	•	•	•	•	•	•	•	•	•	•	•	•
0x81: Error Response to Sequenced Message			•	•	•	•	•	•	•	•	•		•

• = Supported in all releases

\* = Not supported in earlier releases

# = Not supported in later releases

m.n = Supported in software version m.n (e.g. 7.1) and later

**Table 2. General and Router Control Message Support**

### 4.3 Addressing Mode Support

Multiple [Addressing Modes](#) are defined in NP0009-02. Not all Addressing Modes are supported by all NVISION router controllers. Table 3 indicates the modes that are supported by the various controllers.

[illegible]

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• = Supported in all releases

\* = Supported only on Diagnostic ports

**Table 3: Addressing Mode Support**

#### 4.3.1 SSID in Responses to Global Addressing Mode Commands

In a command using Global Addressing mode the:

DDID = 0xFE

$$\text{DDAD} = \text{Level Number}$$

The SSID in the response message will follow one of two possible methods.

- 1) Device ID

With this method the response will contain

SSID = Device ID (see [NP0015-00](#))

SSAD = Level Number

- 2) 0xFF

With this method the response will contain

SSID = 0xFE

SSAD = Level Number

[illegible]

Table 4: SSID in Responses to Global Addressing Mode

## 5.0 Router Control Command Messages

### 5.1 Timestamp Command

**0x02**

**IMPORTANT NOTE:** This command is not supported by all NVISION routers and may not be supported by all future NVISION routers.

Queries and sets the device' current timestamp value.

Query Timestamp message format:

STX	0xFF
DDID	Any addressing mode
DDAD	??
SSID	??
SSAD	??
COUNT	0x02
COMMAND	0x02
DATA 0	0x00 = upload
CHECKSUM	??

Responses:      0x0B: Timestamp Response  
                    0x80: Error response

Set Timestamp message format:

STX	0xFF
DDID	Any addressing mode
DDAD	??
SSID	??
SSAD	??
COUNT	0x04
COMMAND	0x02
DATA 0	0x01 = download
DATA 1	Timestamp (high byte)
DATA 2	Timestamp (low byte)
CHECKSUM	??

Responses: none



## 5.2 Take Command

0x50

Connection of the specified source to the specified destination, with or without a timestamp, is requested. The timestamp, if specified, indicates the absolute value of the controller's timestamp, as set by the Timestamp Command (0x02) and advanced each vertical interval, at which the connection should occur. See **Machine Control Router Special Cases** in Appendix 1 for information concerning special source addresses used with machine control routers.

Non-timestamped message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x05
COMMAND	0x50
DATA 0	High source
DATA 1	Low source
DATA 2	High destination
DATA 3	Low destination
CHECKSUM	??

Timestamped message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x07
COMMAND	0x50
DATA 0	High source
DATA 1	Low source
DATA 2	High destination
DATA 3	Low destination
DATA 4	High timestamp
DATA 5	Low timestamp
CHECKSUM	??

**IMPORTANT NOTE: The Timestamped message is not supported by all NVISION routers and may not be supported by all future NVISION routers.**

Responses:

- 0xD0: Router Status Response, take will occur as scheduled
- 0xD3: Source Lock Response, take denied due to source lock
- 0xD4: Source Protect Response, take denied due to source protect
- 0xD5: Destination Lock Response, take denied due to destination lock
- 0xD6: Destination Protected Response, take denied due to destination protect
- 0x80: Error response

### 5.3 Destination Status Command

**0x51**

The status of the specified destination is requested.

Message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x03
COMMAND	0x51
DATA 0	High destination
DATA 1	Low destination
CHECKSUM	??

Responses:      0xD0:    Router Status Response  
                    0x80:    Error response

## 5.4 Lock Destination Command

0x55

Lock of the specified destination is requested. When a destination is locked, its connection status may not be changed by any device until that lock is released

Message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x03
COMMAND	0x55
DATA 0	High destination
DATA 1	Low destination
CHECKSUM	??

Responses: 0xD5: Destination Locked  
0xD6: Destination Protected  
0x80: Error Response

## 5.5 Protect Destination Command

0x56

Protect of the specified destination is requested. When a destination is protected, its connection status may not be changed by any device EXCEPT the protect's owner until that protect is released.

Message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x03
COMMAND	0x56
DATA 0	High destination
DATA 1	Low destination
CHECKSUM	??

Response: 0xD5: Destination Locked  
0xD6: Destination Protected  
0x80: Error Response

## 5.6 Release Source Command

0x57

**IMPORTANT NOTE:** This command is not supported by newer NVISION routers and is documented here for historical purposes only.

Release of the specified source's lock and protect is requested. This command is not supported in the machine control routers.

Message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x03
COMMAND	0x57
DATA 0	High source
DATA 1	Low source
CHECKSUM	??

A source address of 0 (SSAD = 0x00 and SSID = 0x00) is defined as the MASTER ADDRESS. A device using the master address is permitted to release locks and protects that normally requires the address of the device that invoked that locks and protects.

Responses: 0xD7: Source released response  
0xD3: Source Locked (by another controlling device)  
0xD4: Source Protected (by another controlling device)  
0x80: Error

## 5.7 Release Destination Command

0x58

Release of the specified destination's lock and protect is requested.

Message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x03
COMMAND	0x58
DATA 0	High destination
DATA 1	Low destination
CHECKSUM	??

A source address of 0 (SSAD = 0x00 and SSID = 0x00) is defined as the MASTER ADDRESS. A device using the master address is permitted to release locks and protects that normally requires the address of the device that invoked that locks and protects.

Responses: 0xD8: Destination released response  
0xD5: Destination Locked (by another controlling device)  
0xD6: Destination Protected (by another controlling device)  
0x80: Error

## 5.8 Level Configuration Command

**0x59**

The configuration of a specified level is requested.

Message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x01
COMMAND	0x59
CHECKSUM	??

Responses:      0xD9: Router Status  
                    0x80: Error

## 5.9 Status Changes Command

**0x5A**

Connection status changes that have occurred since the last such query is requested.

Accept any number of destinations message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x01
COMMAND	0x5A
CHECKSUM	??

Specify the maximum number of destinations message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x03
COMMAND	0x5A
DATA 0	Maximum number of destinations (high byte)
DATA 1	Maximum number of destinations (low byte)
CHECKSUM	??

Responses:      0xDA: Latest changes response  
                    0x80: Error

## 5.10 Clear Change Flags, Locks, and Protects Command

**0x5C**

Clearing of the "changes since last query" flags, locks, and/or protects are requested.

The change flags are cleared when a "Changes Since Last Query" is received. This message allows them all to be cleared without having to request unwanted data (current state).

Message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x02
COMMAND	0x5C
DATA 0	Clear Flags: 0x00 = Clear all change flags 0x01 = Clear all locks and protects set by specified SSID/SSAD 0x02 = Clear all change flags, lock, and protects regardless of SSID/SSAD
CHECKSUM	??

Responses:      0x04: ACK  
                    0x80: Error response

## 5.11 Tally Request

**0x5D**

Tally of the specified number of router connections starting with the specified destination is requested.

Message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x05
COMMAND	0x5D
DATA 0	High destination
DATA 1	Low destination
DATA 2	High count
DATA 3	Low count
CHECKSUM	??

Responses:      0xDD: Tally Response (more than one response may be required)  
                    0x80: Error response

The specified salvo is requested.

There are two types of salvo request messages, each of which may include a timestamp that applies to all connections specified in the message. The timestamp, if specified, indicates the absolute value of the controller's timestamp, as set by the Timestamp Command (0x02) and advanced each vertical interval, at which the connection should occur.

There are two types of salvos:

- A type 0 salvo specifies a series of as many as 59 source / destination connection pairs as specified by Xpt Count.
- A type 1 salvo specifies an initial destination address followed by as many as 118 source addresses as specified by Src Count. Connections are specified as each source address to linearly increasing destination addresses, beginning with the initial address.

**IMPORTANT NOTE: The Timestamp functionality is not supported by all NVISION routers and may not be supported by all future NVISION routers.**

Support for salvo message bursts is provided by a sequence number that is echoed in the messages' ACK and error responses, allowing an external device to determine to which message a response applies. Only sequence numbers zero (0) and one (1) shall be used, and at no time shall the controlling device have more than two salvo messages with outstanding responses.

A salvo that contains one or more attempts to violate locks and protects is denied in its entirety, and a source lock, source protect, destination lock or destination protect response is returned for the first such violation that is discovered.

Long salvos may need to be sent in more than one message.

Timestamped type 0 salvo message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	??
COMMAND	0x5E
DATA 0	0x00 = timestamped type 0 salvo
DATA 1	High timestamp
DATA 2	Low timestamp
DATA 3	Sequence number
DATA 4	Number of source/destination pairs to follow
DATA 5	High source
DATA 6	Low source
DATA 7	High destination
DATA 8	Low destination
CHECKSUM	??

} may repeat



Timestamped type 1 salvo message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	??
COMMAND	0x5E
DATA 0	0x01 = timestamped type 1 salvo
DATA 1	High timestamp
DATA 2	Low timestamp
DATA 3	Sequence number
DATA 4	High initial destination
DATA 5	Low initial destination
DATA 6	Number of sources to follow
DATA 7	High source
DATA 8	Low source
CHECKSUM	??

} may repeat

Non-timestamped type 0 salvo message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	??
COMMAND	0x5E
DATA 0	0x02 = Non-timestamped type 0 salvo
DATA 1	Sequence number
DATA 2	Number of source/destination pairs to follow
DATA 3	High source
DATA 4	Low source
DATA 5	High destination
DATA 6	Low destination
CHECKSUM	??

} may repeat

Non-timestamped type 1 salvo message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	??
COMMAND	0x5E
DATA 0	0x03 = Non-timestamped type 1 salvo
DATA 1	Sequence number
DATA 2	High initial destination
DATA 3	Low initial destination
DATA 4	Number of sources to follow
DATA 5	High source
DATA 6	Low source
CHECKSUM	??

} may repeat

Responses:

- 0x04: ACK (with sequence number), take will occur as scheduled.
- 0xD3: Source Locked Response, salvo denied due to source lock.
- 0xD4: Source Protected Response, salvo denied due to source protect.
- 0xD5: Destination Locked Response, salvo denied due to destination lock.
- 0xD6: Destination Protected Response, salvo denied due to destination protect.
- 0x80: Error Response
- 0x81: Sequence Error Response

### 5.13 Destination LPR State Command

0x66

The locked, protected, or released state of the specified destination is requested.

Message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x03
COMMAND	0x66
DATA 0	High destination
DATA 1	Low destination
CHECKSUM	??

Responses: 0xD8: Destination released response  
0xD5: Destination Locked  
0xD6: Destination Protected  
0x80: Error

### 5.14 Machine Control Salvo Command

0x67

This command will only be supported by Machine Control Routers.

All takes within the command will be attempted in the order sent. The status of each take will be reported in the response (see the response for details). If an individual take fails (e.g. due to an attempt to violate a lock), all takes following that take will still be attempted. Note that this behavior is different from the Salvo Command (0x5E).

Message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	??
COMMAND	0x67
DATA 0	Number of master/slave pairs to follow ( <b>max = 32</b> )
DATA 1	High master port #
DATA 2	Low master port #
DATA 3	High slave port #
DATA 4	Low slave port #
DATA 5	Take mode: 0x00: Point-to-point 0x01: Broadcast
CHECKSUM	??

} may repeat

Responses: 0xE7: Machine Control Salvo response  
0x80: Error

## 5.15 Expanded Tally Command

0x68

Tally of the specified number of router connections starting with the specified destination of the addressed controller is requested.

Message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x05
COMMAND	0x68
DATA 0	Tally mode: 0x00: Source Tally 0x01: Source Tally and Destination status 0x02: Source Tally, Dest status and LPR
DATA 1	High destination
DATA 2	Low destination
DATA 3	Count ( <b>max = 128</b> )
CHECKSUM	??

Notes:

- 1) The 0x02 Tally Mode (Source Tally, Dest status and LPR) is only supported by software version 7.1 and later of the EM0374 and EM0353

Responses: 0xE8: [Expanded Tally Response](#) (more than one response may be required)  
0x80: Error response

## 5.16 Enable Asynchronous Status Change Command

**0x6A**

This messages controls whether the router sends asynchronous status change for a level on the router. If asynchronous messaging is required on multiple levels one of these messages must be sent for each level.

When asynchronous messaging is turned on, changes that occur within the router will be sent from that that serial port of the router. The asynchronous messages that may be sent are [Asynchronous Destination LPR Changes Message \(0xE9\)](#) and/or [Asynchronous Destination Status Changes Message \(0xEA\)](#).

Message format when Command Type (Data 0) is 0:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x04
COMMAND	0x6A
DATA 0	Command Type: 0
DATA 1	Crosspoint Changes (Takes): 0x00 = Turn off asynchronous notification 0x01 = Turn on asynchronous notification. Clear existing change flags. 0x02 = Turn on asynchronous notification. Do not clear existing change flags.
DATA 2	Destination Lock/Protect/Release Changes: 0x00 = Turn off asynchronous notification 0x01 = Turn on asynchronous notification. Clear existing change flags. 0x02 = Turn on asynchronous notification. Do not clear existing change flags.
CHECKSUM	??

Responses:      0x04: ACK  
                    0x80: Error response

Notes:

- 1) Note that if the Crosspoint changes are turned on for a level, the [Status Changes Command \(0x5A\)](#) can not be used with that level on that serial port of the router.
- 2) When a system initially connects to a router, it is recommended to use the “Clear existing change flags” option. This will instruct the router to send all changes from this point in time.
- 3) If a system is dependant on asynchronous messages, it is recommended to periodically check these settings via the [Query Asynchronous Status Change Command](#). Some maintenance events (e.g. replacing a router controller) may cause these settings to be lost.

## 5.17 Query Asynchronous Status Change Command

**0x6B**

This message queries the state of whether the router sends asynchronous status change for a level on the router.

Message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x02
COMMAND	0x6B
DATA 0	Query Type: 0
CHECKSUM	??

Responses:      0xEB: [Query Asynchronous Status Change Response](#)  
                    0x80: Error response

## 6.0 Router Control Response Messages

The following responses are from routers directly to devices that issued controlling commands.

### 6.1 Timestamp Response

**0x0B**

The response to a timestamp command.

Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	??
COUNT	0x03
COMMAND	0x0B
DATA 0	Timestamp (high byte)
DATA 1	Timestamp (low byte)
CHECKSUM	??

## 6.2 Status Response

0xD0

This is a general response to many router commands. If the source or destination is locked or protected the response will contain a flag character indicating the status of the source and destination. See **Invalid Source Special Case** and **Machine Control Router Special Cases** in Appendix 1 for information concerning special case source addresses.

Source nor destination locked nor protected message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	0x05
COMMAND	0xD0
DATA 0	High source
DATA 1	Low source
DATA 2	High destination
DATA 3	Low destination
CHECKSUM	??

Source and/or destination locked and/or protected message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	0x06
COMMAND	0xD0
DATA 0	High source
DATA 1	Low source
DATA 2	High destination
DATA 3	Low destination
DATA 4	Lock/Protect flags: Bit 0: 0 = source unlocked      1 = source locked Bit 1: 0 = source unprotected    1 = source protected Bit 2: 0 = destination unlocked   1 = destination locked Bit 3: 0 = destination unprotected 1 = destination protected Bit 4: reserved Bit 5: reserved Bit 6: reserved Bit 7: reserved
CHECKSUM	??



### 6.3 Source Locked Response

**0xD3**

The originator of the lock of a specified source is reported. This message confirms a lock request or a denial of a lock request, returning the information as to which ID/AD has the lock.

Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	0x05
COMMAND	0xD3
DATA 0	High source
DATA 1	Low source
DATA 2	Lock ID
DATA 3	Lock AD
CHECKSUM	??

### 6.4 Source Protected Response

**0xD4**

The originator of the protect of a specified source is reported. This message confirms of a protect request or a denial of a protect request, returning the information as to which ID/AD has the protect in place.

Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	0x05
COMMAND	0xD4
DATA 0	High source
DATA 1	Low source
DATA 2	Protect ID
DATA 3	Protect AD
CHECKSUM	??

## 6.5 Destination Locked Response

**0xD5**

The originator of the lock of a specified destination is reported. This message confirms of a lock request or a denial of a lock request, returning the information as to which ID/AD has the lock.

Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	0x05
COMMAND	0xD5
DATA 0	High destination
DATA 1	Low destination
DATA 2	Lock ID
DATA 3	Lock AD
CHECKSUM	??

## 6.6 Destination Protected Response

**0xD6**

The originator of the protect of a specified source is reported. This message confirms a protect request or a denial of a protect request, returning the information as to which ID/AD has the protect in place.

Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	0x05
COMMAND	0xD6
DATA 0	High destination
DATA 1	Low destination
DATA 2	Protect ID
DATA 3	Protect AD
CHECKSUM	??

## 6.7 Destination Released Response

0xD8

Release of the specified destination's lock and protect is reported.

Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	0x03
COMMAND	0xD8
DATA 0	High destination
DATA 1	Low destination
CHECKSUM	??

## 6.8 Level Configuration Response

0xD9

The specified level's configuration is reported.

Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	0x10
COMMAND	0xD9
DATA 0	Signal Type See NP0015 for Signal type definitions.
DATA 1	High start source
DATA 2	Low start source
DATA 3	High end source
DATA 4	Low end source
DATA 5	High source controller offset
DATA 6	Low source controller offset
DATA 7	High null source
DATA 8	Low null source
DATA 9	High start destination
DATA 10	Low start destination
DATA 11	High end destination
DATA 12	Low end destination
DATA 13	High destination controller offset
DATA 14	Low destination controller offset
CHECKSUM	??

The Controller Offsets are functions of their respective Start Address, End Address, and Controller Start Address. That function is:

$$\text{Controller Offset} = \text{Controller Start Address} - \text{Start Address} + 1.$$

## 6.9 Status Changes Response

**0xDA**

The connection changes that have occurred since the last such request are reported.

The response is broken into multiple messages when the number of messages to follow character is greater than 0. Each subsequent response will have number of messages to follow character that is one less than the previous response until it reaches zero. For example if 5 responses are required the first will have a number of messages to follow value of 4 meaning four more responses follow. The last response will have a number of messages to follow value of 0. See **Invalid Source Special Case** and **Machine Control Router Special Cases** in Appendix 1 for information concerning special case source addresses.

Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	??
COMMAND	0xDA
DATA 0	Number of messages to follow
DATA 1	Number of crosspoints reported
DATA 2	High source
DATA 3	Low source
DATA 4	High destination
DATA 5	Low destination
CHECKSUM	??

} may repeat

## 6.10 Tally Response

0xDD

Sources currently connected to the specified and subsequent destination are reported. See **Invalid Source Special Case** and **Machine Control Router Special Cases** in Appendix 1 for information concerning special case source addresses.

The response is broken into multiple messages when the number of messages to follow character is greater than 0. Each subsequent response will have a number of messages to follow character that is one less than the previous response until it reaches zero. For example if 5 responses are required the first will have a number of messages to follow value of 4 meaning four more responses follow. The last response will have a number of messages to follow value of 0.

Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	??
COMMAND	0xDD
DATA 0	Number of messages to follow
DATA 1	High starting destination
DATA 2	Low starting destination
DATA 3	Number of sources reported
DATA 4	High source
DATA 5	Low source
CHECKSUM	??

} may repeat

## 6.11 Machine Control Salvo Response

**0xE7**

This response will only be sent by Machine Control Routers.

Message format:

STX	0xFF	
DDID	Device ID or Global addressing mode	
DDAD	??	
SSID	??	
SSAD	Level	
COUNT	??	
COMMAND	0xE7	
DATA 0	Number of messages to follow	
DATA 1	Number of takes requested	
DATA 2	High take status	} may repeat
DATA 3	Low take status	
DATA x	Number of ports that changed state	
DATA x+1	High port #	} may repeat
DATA x+2	Low port #	
DATA x+3	High port status	
DATA x+4	Low port status	
CHECKSUM	??	

Note: “Take status” and “Port status” values are the “Extended Status Values” defined NP0015.

## 6.12 Expanded Tally Response

0xE8

Sources currently connected to the specified and subsequent destination are reported. See **Invalid Source Special Case** in Appendix 1 for information concerning special case source addresses.

The response is broken into multiple messages when the number of messages to follow character is greater than 0. Each subsequent response will have a number of messages to follow character that is one less than the previous response until it reaches zero. For example if 5 responses are required the first will have a number of messages to follow value of 4 meaning four more responses follow. The last response will have a number of messages to follow value of 0.

Source Tally Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	??
COMMAND	0xE8
DATA 0	0x00 (Source Tally)
DATA 1	Number of messages to follow
DATA 2	High starting destination
DATA 3	Low starting destination
DATA 4	Number of destinations reported
DATA 5	High source
DATA 6	Low source
CHECKSUM	??

Notes:

- 1) Highlighted DATA may repeat.

Source Tally and Destination Status Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	??
COMMAND	0xE8
DATA 0	0x01 (Source Tally and Destination Status)
DATA 1	Number of messages to follow
DATA 2	High starting destination
DATA 3	Low starting destination
DATA 4	Number of destinations reported
DATA 5	High source
DATA 6	Low source
DATA 7	High destination status
DATA 8	Low destination status
CHECKSUM	??

Notes:

- 1) Destination status values are the “Extended Status Values” defined NP0015.
- 2) Highlighted DATA may repeat.

Source Tally, Destination Status and Destination LPR Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	??
COMMAND	0xE8
DATA 0	0x02: Source Tally, Dest status and Dest LPR
DATA 1	Number of messages to follow
DATA 2	High starting destination
DATA 3	Low starting destination
DATA 4	Number of destinations reported
DATA 5	High source
DATA 6	Low source
DATA 7	High destination status
DATA 8	Low destination status
DATA 9	Destination LPR 0 - Released 1 - Locked 2 - Protected
DATA 10	High Destination LPR ID (always 0 if LPR = 0)
DATA 11	Low Destination LPR ID (always 0 if LPR = 0)
CHECKSUM	??

Notes:

- 1) This version of the response is only supported by software version 7.1 and later of the EM0374 and EM0353
- 2) Destination status values are the ["Extended Status Values" defined NP0015](#).
- 3) **Highlighted** DATA may repeat.



### 6.13 Query Asynchronous Status Change Response

**0xEB**

This message queries the state of whether the router sends asynchronous status change for a level on the router.

Message format:

STX	0xFF
DDID	Device ID or Global addressing mode
DDAD	Level
SSID	??
SSAD	??
COUNT	0x04
COMMAND	0xEB
DATA 0	Query Type
DATA 1	Crosspoint Changes (Takes): Enable state 0x00 = Turn off asynchronous notification 0x01 = Turn on asynchronous notification. Clear existing change flags. 0x02 = Turn on asynchronous notification. Do not clear existing change flags.
DATA 2	Destination Lock/Protect/Release Changes: Enable state 0x00 = Turn off asynchronous notification 0x01 = Turn on asynchronous notification. Clear existing change flags. 0x02 = Turn on asynchronous notification. Do not clear existing change flags.
CHECKSUM	??

## 7.0 Router Asynchronous Messages

The following messages can be sent asynchronously by the routers. By default, the router will send no asynchronous messages. The [Enable Asynchronous Status Change Command](#) (0x6A) must be sent to the router to enable the asynchronous message.

When asynchronous messages are enabled the router will send an asynchronous message whenever a change occurs independent of which communication port was used to make the change. Note: only the communication port that sent the asynchronous enables will receive the asynchronous messages containing the changes.

### 7.1 Asynchronous Destination LPR Changes Message

**0xE9**

This messages can be sent asynchronously by the router when the LPR (Lock/Protect/Release) status of a destination changes. By default, the router will not send this message. Commands must be sent to the router to enable asynchronous messaging.

Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	??
COMMAND	0xE9
DATA 0	Number of destinations reported
DATA 1	LPR State
DATA 2	High LPR ID
DATA 3	Low LPR ID
DATA 4	High destination
DATA 5	Low destination
CHECKSUM	??

Notes:

- 1) **Highlighted** DATA may repeat.

## 7.2 Asynchronous Destination Status Changes Message

**0xEA**

This messages can be sent asynchronously by the router when the crosspoint status of a destination changes. By default, the router will not send this message.

Message format:

STX	0xFF
DDID	??
DDAD	??
SSID	??
SSAD	Level
COUNT	??
COMMAND	0xEA
DATA 0	Number of destinations reported
DATA 1	High source
DATA 2	Low source
DATA 3	High destination status
DATA 4	Low destination status
DATA 5	High destination
DATA 6	Low destination
CHECKSUM	??

Notes:

- 1) Destination status values are the ["Extended Status Values" defined NP0015](#).
- 2) **Highlighted** DATA may repeat.
- 3) The message will be sent when the source changes. In the case where the destination status changes but the source does not change, the message will not be sent.

## 8.0 Reserved Command and Response Messages

The following command and response values are reserved for future use:

0x06:	reserved
0x52:	reserved
0x53:	reserved
0x54:	reserved
0x5B:	reserved
0x5F:	Extension Command (Presently not used. Reserved for future use.)
0x60:	reserved
0x61:	reserved
0x62:	reserved
0x64:	reserved
0x65:	reserved
0x69:	reserved
0xD2:	reserved
0xD7:	reserved

## 9.0 Revision History

### 9.1 Revision A

- Released: May 2002

### 9.2 Revision B

- Released: June 2005
- Removed the following messages which were no longer supported:
  1. 0x06: Set Controller State Command
  2. 0x12: System Status Command
  3. 0x52: Source Status Command
  4. 0x53: Lock Source Command
  5. 0x54: Protect Source Command
  6. 0x5B: Refresh Command
  7. 0x65: Source LPR State Command
  8. 0x92: System Status Response
  9. 0xD2: Source Status Response
  10. 0xD7: Source Released Response

### 9.3 Revision C

- Released: April 2006
- Added the EM0374-03 control card
- Added the following messages:
  1. 0x6A: Enable Asynchronous Status Change Command
  2. 0x6B: Query Asynchronous Status Change Command
  3. 0xE9: Asynchronous Destination LPR Changes Message
  4. 0xEA: Asynchronous Destination Status Changes Message
  5. 0xEB: Query Asynchronous Status Change Response

### 9.4 Revision D

- Released: January 2007
- Added the EM0529 control card
- Added the Compact Router
- Added the section: [Addressing Mode Support](#)

## **Appendix 1: Special Source and Destination Values**

### **Invalid or Unknown Source Special Case**

There can be cases where the source routed to a destination is invalid for that partition. Responses that include connection information specify these sources as the “INVALID SOURCE” address (0xFFFF).

INVALID SOURCE ADDRESS: 0xFFFF

### **Machine Control Router Special Cases**

The nature of the NV3128 and NV3256 machine control routers require that they be able to tri-state, or disconnect, their ports. To do so, the port to be tri-stated shall be sent as the destination and the “TRI\_STATE SOURCE” address (0xF3F3) shall be sent as the source in TAKE commands.

TRI-STATE SOURCE ADDRESS: 0xF3F3

On the EM0134, a port may also be tri-stated by being taken to itself. On the EM0127, this results in no response.

When a data router’s port is in use as a source, responses that include destination connection information specify such ports as the “PORT IN USE AS A SOURCE” address (0xFF80).

PORT IN USE AS A SOURCE: 0xFF80

When a data router’s port is in use as a destination, responses that include source connection information specify such ports as the “PORT IN USE AS A DESTINATION” address (0xFF81).

PORT IN USE AS A DESTINATION: 0xFF81