
# "D" PROTOCOL ADDENDUM FOR TRAFFIC EXTENSIONS

## EXTENDED COMMANDS

| Command | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Response Type |
|---|---|---|---|---|---|
| Set Zero Position | 00 | 0x49 | 00 | 00 | General |
| Set Pan Position | 00 | 0x4B | Pan position MSB | Pan position LSB | General |
| Set Tilt Position | 00 | 0x4D | Tilt position MSB | Tilt position LSB | General |
| Set Zoom Position | 00 | 0x4F | Zoom position MSB | Zoom position LSB | General |
| Query Pan Position | 00 | 0x51 | 00 | 00 | Extended (0x59) |
| Query Tilt Position | 00 | 0x53 | 00 | 00 | Extended (0x5B) |
| Query Zoom Position | 00 | 0x55 | 00 | 00 | Extended (0x5D) |
| Download | 00 | 0x57 | 00 | 00 | General |
| Query Pan Response | 00 | 0x59 | Pan position MSB | Pan position LSB | Not Applicable |
| Query Tilt Response | 00 | 0x5B | Tilt position MSB | Tilt position LSB | Not Applicable |
| Query Zoom Response | 00 | 0x5D | Zoom position MSB | Zoom position LSB | Not Applicable |
| Set Magnification | 00 | 0x5F | Mag position MSB | Mag position LSB | General |
| Query Magnification | 00 | 0x61 | 00 | 00 | Extended (0x63) |
| Query Magnification Response | 00 | 0x63 | Mag position MSB | Mag position LSB | Not Applicable |
| Activate Echo Mode | 00 | 0x65 | 00 | 00 | General |
| Set Remote Baud Rate | 00 | 0x67 | 00 | 00 to 05. | General |
| Start Download | 00 | 0x69 | 00 | 00 | General |
| Query Device Type | 00 | 0x6B | 00 | 00 | Extended (0x6D) |
| Query Device Type Response | 00 | 0x6D | Software Type | Hardware Type | Not Applicable |
| Query Diagnostic Info | 00 | 0x6F | 00 | 00 | Extended (0x71) |
| Query Diagnostic Info Response | 00 | 0x71 | Device Dependent | Device Dependent | Not Applicable |

# RESPONSES

## The General Response

The General Response has the following format. Note that each block represents 1 byte.

| Sync | Address | Alarm Information | Checksum |
|---|---|---|---|

The alarm information is formatted as follows:

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|
| Alarm 8 | Alarm 7 | Alarm 6 | Alarm 5 | Alarm 4 | Alarm 3 | Alarm 2 | Alarm 1 |

If the bit is on (1) then the alarm is active. If the bit is off (0) then the alarm is inactive.

The checksum is the sum of the received command's checksum and the alarm information.

## The Extended Response

The Extended Response has the following format. Note that each block represents 1 byte

| Sync | Address | Future Use | "opcode" | Data1 | Data2 | Checksum |
|---|---|---|---|---|---|---|

The address is the address of the device that is responding.

The Future Use byte should always be set to 0.

Opcode, Data1 and Data2 are dependent on the type of response. See the opcode description section of this document for the details of a particular response.

The checksum is the 8 bit (modulo 256) sum of all the bytes excluding the Sync byte.

## OPCODE DESCRIPTIONS

### Set Zero Position (0x49)

This command is used to set the pan position that the unit uses as a zero reference point for the azimuth on-screen display. The unit's current pan position when this command is received becomes the zero reference point. This command performs the same function as the "Set Azimuth Zero" menu item.

### Set Pan Position (0x4B)

This command is used to set the pan position of the device. The position is given in hundredths of a degree and has a range of from 0 to 35999 (decimal). Example: the value to use to set the pan position to 45 degrees is 4500. Note that the value used here is always the "absolute" pan position. It **does not** take into account any adjustment to the screen display that may have been made by using the "Set Zero Position (0x49)" command or the "Set Azimuth Zero" menu item.

### Set Tilt Position (0x4D)

This command is used to set the tilt position of the device. The position is given in hundredths of a degree and has a range of from 0 to 35999 (decimal). Example: the value to use to set the tilt position to 45 degrees is 4500. Spectra interprets theses values as follows: Zero degrees is when the camera is pointed horizontally. Ninety degrees is when the camera is pointed straight down.

### Set Zoom Position (0x4F)

This command is used to set the zoom position of the device. The position is given as a ratio based on the dome's Zoom Limit setting. The position is calculated as follows:

Position = desired_zoom_position / zoom_limit * 65535

Where desired_zoom_position and zoom_limit are given in units of magnification.

Example: Given that the zoom limit of the dome is X184, calculate the value to needed to set the zoom position to X5:

Position = 5 / 184 * 65535 = approximately 1781

### Query Pan Position (0x51)

This command is used to query the current pan position of the device. The response to this command uses opcode 0x59. See the description of opcode 0x59 for more information.

**Query Tilt Position (0x53)**

This command is used to query the current tilt position of the device. The response to this command uses opcode 0x5B. See the description of opcode 0x5B for more information.

**Query Zoom Position (0x55)**

This command is used to query the current zoom position of the device. The response to this command uses opcode 0x5D. See the description of opcode 0x5D for more information.

**Prepare For Download (0x57)**

Puts the device into a state where it is prepared to receive a firmware update.

**Query Pan Position Response (0x59)**

The position is given in hundredths of a degree and has a range of from 0 to 35999 (decimal). Example: a position value of 4500 means 45 degrees. Note that the value returned is always the "absolute" pan position. It **does not** take into account any adjustment to the screen display that may have been made by using the "Set Zero Position (0x49)" command or the "Set Azimuth Zero" menu item.

Note: This message is sent in response to the Query Pan Position (0x51) command.

**Query Tilt Position Response (0x5B)**

The position is given in hundredths of a degree and has a range of from 0 to 35999 (decimal). Example: a position value of 4500 means 45 degrees. The orientation Spectra uses is illustrated by the following: zero degrees is returned when the camera is pointed horizontally. Ninety degrees is returned when the camera is pointed straight down.

Note: This message is sent in response to the Query Tilt Position (0x53) command.

**Query Zoom Position Response (0x5D)**

The position is given as a ratio based on the dome's Zoom Limit setting. This value can be converted into units of magnification by using the following formula:

current_magnification = position / 65535 * zoom_limit

Where current_zoom_position and zoom_limit are given in units of magnification.

Example: Given that the zoom limit of the dome is X184, position value is 1781, calculate the current magnification:

Current magnification = 1781 / 65535 * 184 = approximately X5.

Note: This message is sent in response to the Query Zoom Position (0x55) command.

**Set Magnification (0x5F)**

This command is used to set the zoom position of the device. The position is given in hundredths of units of magnification. Example: a value of 500 means X5.

This opcode was first implemented in Spectra III version 1.14. It is not in version 1.16.

**Query Magnification (0x61)**

This command is used to query the current zoom position of the device. The response to this command uses opcode 0x63. See the description of opcode 0x63 for more information.

This opcode was first implemented in Spectra III version 1.14. It is not in version 1.16.

**Query Magnification Response (0x63)**

The value returned is given in hundredths of units of magnification. Example: a value of 500 means X5.

Note: This message is sent in response to the Query Magnification (0x61) command.

This opcode was first implemented in Spectra III version 1.14. It is not in version 1.16.

**Activate Echo Mode (0x65)**

Puts the unit into a mode in which characters that are received by the unit are immediately retransmitted. The unit comes out of this mode when of following happens: more than 100 milliseconds pass without receipt of a character or more than 180 characters have been received.

Currently only the Spectra III BIOS supports this command.

This opcode was first implemented in Spectra III version 1.20.

THIS COMMAND IS INTENDED FOR INTERNAL USE BY PELCO. ITS FUNCTIONALITY MAY CHANGE IN THE FUTURE WITHOUT NOTICE.

**Set Remote Baud Rate (0x67)**

Sets the unit's baud rate. Valid values for this command are:

| Value | Baud |
|---|---|
| 0 | 2400 |
| 1 | 4800 |
| 2 | 9600 |
| 3 | 19200 |
| 4 | 38400 |
| 5 | 115200 |

Note that the unit sends its response to this command before changing its baud. The baud automatically returns to 2400 after 100 milliseconds of no activity.

Currently only the Spectra III BIOS supports this command.

This opcode was first implemented in Spectra III version 1.20.

THIS COMMAND IS INTENDED FOR INTERNAL USE BY PELCO. ITS FUNCTIONALITY MAY CHANGE IN THE FUTURE WITHOUT NOTICE.

**Start Download (0x69)**

Puts the unit into a state where it looks for download commands (instead of "D" protocol commands).

This opcode was first implemented in Spectra III version 1.20.

THIS COMMAND IS INTENDED FOR INTERNAL USE BY PELCO. ITS FUNCTIONALITY MAY CHANGE IN THE FUTURE WITHOUT NOTICE.

**Query Device Type (0x6B)**

This command is used to query the device for information about the hardware platform the device is running on and the type of software that is running on the platform. The response to this command uses opcode 0x6D. See the description of opcode 0x6D for more information.

This opcode was first implemented in Spectra III version 1.20.

**Query Device Type Response (0x6D)**

The value returned "byte 5" is the hardware type. Valid values are:

17 (hex) – MMC2107 processor.

The value returned in "byte 6" is the software type. Valid values are:

01 – Spectra III Application
02 – Spectra III BIOS

Note: This message is sent in response to the Query Device Type (0x6B) command.

This opcode was first implemented in Spectra III version 1.20.

**Query Diagnostic Info (0x6F)**

This command is used to query the device for diagnostic information . The response to this command uses opcode 0x71. See the description of opcode 0x71 for more information.

This opcode was first implemented in Spectra III version 1.20.

THIS COMMAND IS INTENDED FOR INTERNAL USE BY PELCO. ITS FUNCTIONALITY MAY CHANGE IN THE FUTURE WITHOUT NOTICE.

## Query Diagnostic Info Response (0x71)

This message is sent in response to the Query Diagnostic Info command (0x6F). The contents of the message may vary based on the type of device that is being queried. For Spectra III the contents of the message are defined as follows:

byte 5 of the message is 0.

Bit 0 of byte 6 is the pan sensor indicator. If the bit is on then the unit is oriented such that the pan sensor is being detected.

Bit 1 of byte 6 is the tilt sensor indicator. If the bit is on then the unit is oriented such that the tilt sensor is being detected.

Note: This message is sent in response to the Query Diagnostic Info (0x6F) command.

This opcode was first implemented in Spectra III version 1.20.