

# Ophir User Commands

## Revision History

|    |             |  |
|----|-------------|--|
| 06 | 02-Jul-2024 | <ul style="list-style-type: none"><li>• Mention Ethernet, including rewrite of Introduction, adding <b>Communication Types</b> table and <b>Communication Protocol</b> section</li><li>• Added DS and RO commands</li></ul>  |
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| 04 | 02-May-2019 | <ul style="list-style-type: none"><li>• Updated for Centauri and Juno+</li><li>• Added information about multiple channels</li><li>• Updated for new features: Pulsed Power, Fast Power, Low Frequency Power, External Trigger, TTL output</li><li>• General formatting improvements</li></ul> |
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## Introduction

This document contains a description of the various commands that are used for remote control of Ophir meters. For each command, we list which devices support the command as well as providing examples when necessary and listing limitations, as applicable.

Note: All commands work in an ASCII-based command and response protocol. As such, data delivery rates will not be as high as when working with the standard data streaming methods provided by the COM object. Therefore, for top performance we recommend working with the COM object. However, for features not directly supported by the COM object, or when the COM object cannot be used, for example on non-Windows platforms, or for RS-232 or Ethernet communication, these commands may be used.

## **Communication Types Supported**

The following table indicates which types of communication can be used with each instrument.

|            | USB | RS-232 | Ethernet |
|------------|-----|--------|----------|
| Juno       | •   |        |          |
| Juno+      | •   |        |          |
| Juno-RS    |     | •      |          |
| Nova II    | •   | •      |          |
| Vega       | •   | •      |          |
| StarLite   | •   |        |          |
| StarBright | •   | •      |          |
| Ariel      | •   |        |          |
| Pulsar*    | •   |        |          |
| Centauri   | •   | •      | •        |

\*The Pulsar is limited in its ability to allow remote control when measuring with Pyroelectric sensors. To work with Pyroelectric sensor on a Pulsar, the user must use the standard COM object methods.

## **Communication Protocol**

Communication consists of a command sent to the instrument, followed by a response received from the instrument. Every read of a response must be preceded by sending a command, and every command sent must be followed by reading a response. Failure to follow these rules may lead to communication problems.

- All commands and responses are ASCII strings.
- All commands are two or more letters, followed by parameters (when applicable).
- All commands are prefixed by a "\$" (0x24).
- Response to successful command starts with a "\*" (0x2A).
- Response to an invalid command starts with a "?" (0x3F).

## **USB**

For communication via USB use the COM object Write and Read methods. Do not prefix commands with a "\$" – this is handled by the Write method. The "\*" and "?" prefixes for responses are returned by the Read method to allow the user to know if the command was successful.

## **RS-232**

All commands must be terminated by a <LF><CR> (0x0A 0x0D) sequence. Responses from the instrument will also be terminated by a <LF><CR> sequence.

## **Ethernet**

Communication with the Centauri via Ethernet uses TCP/IP on port 12321.

All commands must be terminated by a <LF> (0x0A). Responses from the instrument will also be terminated by a <LF>.

## **User Commands**

This section describes the commands available to control the Ophir devices. It is divided into 4 sections.

1. [Command Summary](#). Table listing all available commands.
2. [Basic Commands](#). These commands query and set the measurement configuration of the sensor and the device.
3. [Logging Commands](#). These commands are specific to the Nova-II and Vega. They provide a means for uploading to the PC log files that were stored on board the meters.
4. [Advanced Commands](#). Commands that change calibration factors of the sensors and instrument. Use of these commands will change the results of measurements and should be used only after careful consideration.

## **Multichannel devices**

The Pulsar and Centauri have more than one channel. The [CL](#) command is provided to indicate which channel to operate on, for those commands which are specific to a channel.

## **Command Summary**

The following table contains a listing of commands available with Ophir devices.

| Command              | Meaning                                  |
|----------------------|--|
| <a href="#">AAHR</a> | <a href="#">High Resolution</a>          |
| <a href="#">AAPC</a> | <a href="#">Pulse Cycle</a>              |
| <a href="#">AATL</a> | <a href="#">TTL pass/fail Limits</a>     |
| <a href="#">AF</a>   | <a href="#">Average Flag</a>             |
| <a href="#">AQ</a>   | <a href="#">Average Query</a>            |
| <a href="#">AR</a>   | <a href="#">All Ranges</a>               |
| <a href="#">AW</a>   | <a href="#">All Wavelengths</a>          |
| <a href="#">BD</a>   | <a href="#">BauD rate</a>                |
| <a href="#">BQ</a>   | <a href="#">BC20 Query</a>               |
| <a href="#">BT</a>   | <a href="#">BeamTrack</a>                |
| <a href="#">CL</a>   | <a href="#">select Channel</a>           |
| <a href="#">CQ</a>   | <a href="#">Calibration Query</a>        |
| <a href="#">DS</a>   | <a href="#">analog output Scale</a>      |
| <a href="#">DQ</a>   | <a href="#">Diffuser Query</a>           |
| <a href="#">EE</a>   | <a href="#">Exposure Energy</a>          |
| <a href="#">EF</a>   | <a href="#">Energy Flag</a>              |
| <a href="#">EP</a>   | <a href="#">Energy Pulse length</a>      |
| <a href="#">ER</a>   | <a href="#">Energy Ready</a>             |
| <a href="#">ET</a>   | <a href="#">Energy Threshold</a>         |
| <a href="#">FB</a>   | <a href="#">Force BeamTrack</a>          |
| <a href="#">FE</a>   | <a href="#">Force Energy</a>             |
| <a href="#">FP</a>   | <a href="#">Force Power</a>              |
| <a href="#">FQ</a>   | <a href="#">Filter Query</a>             |
| <a href="#">FS</a>   | <a href="#">Force Screen</a>             |
| <a href="#">FX</a>   | <a href="#">Force eXposure</a>           |
| <a href="#">GU</a>   | <a href="#">Get range in Use</a>         |
| <a href="#">HC</a>   | <a href="#">Head Configuration</a>       |
| <a href="#">HI</a>   | <a href="#">Head Information</a>         |
| <a href="#">HT</a>   | <a href="#">Head Type</a>                |
| <a href="#">IC</a>   | <a href="#">Instrument Configuration</a> |
| <a href="#">II</a>   | <a href="#">Instrument Information</a>   |
| <a href="#">KL</a>   | <a href="#">Key Legends</a>              |
| <a href="#">LC</a>   | <a href="#">Log Choose</a>               |
| <a href="#">LD</a>   | <a href="#">Log Delete</a>               |
| <a href="#">LF</a>   | <a href="#">Log File</a>                 |
| <a href="#">LI</a>   | <a href="#">Log Info</a>                 |

| Command            | Meaning                                 |
|--------------------|---|
| <a href="#">LL</a> | <a href="#">Log Last</a>                |
| <a href="#">LR</a> | <a href="#">Log Reset</a>               |
| <a href="#">LS</a> | <a href="#">Log Send</a>                |
| <a href="#">MA</a> | <a href="#">MAins</a>                   |
| <a href="#">MF</a> | <a href="#">Maximum Frequency</a>       |
| <a href="#">MM</a> | <a href="#">Measurement Mode</a>        |
| <a href="#">PL</a> | <a href="#">Pulse Length</a>            |
| <a href="#">RE</a> | <a href="#">REset</a>                   |
| <a href="#">RN</a> | <a href="#">Read raNge</a>              |
| <a href="#">RO</a> | <a href="#">analog output type</a>      |
| <a href="#">RQ</a> | <a href="#">Response Query</a>          |
| <a href="#">SE</a> | <a href="#">Send Energy</a>             |
| <a href="#">SF</a> | <a href="#">Send Frequency</a>          |
| <a href="#">SG</a> | <a href="#">Send averaGe</a>            |
| <a href="#">SI</a> | <a href="#">Send units</a>              |
| <a href="#">SK</a> | <a href="#">Simulate Key-press</a>      |
| <a href="#">SP</a> | <a href="#">Send Power</a>              |
| <a href="#">SX</a> | <a href="#">Send maX</a>                |
| <a href="#">TA</a> | <a href="#">TTL output</a>              |
| <a href="#">TW</a> | <a href="#">Trigger Window</a>          |
| <a href="#">UT</a> | <a href="#">User Threshold</a>          |
| <a href="#">VE</a> | <a href="#">VErsion</a>                 |
| <a href="#">WD</a> | <a href="#">Wavelength adD</a>          |
| <a href="#">WE</a> | <a href="#">Wavelength Erase</a>        |
| <a href="#">WI</a> | <a href="#">Wavelength Index</a>        |
| <a href="#">WL</a> | <a href="#">WaveLength</a>              |
| <a href="#">WN</a> | <a href="#">Write raNge</a>             |
| <a href="#">WW</a> | <a href="#">Wavelength Discrete</a>     |
| <a href="#">XO</a> | <a href="#">eXternal trigger On/off</a> |
| <a href="#">XT</a> | <a href="#">eXternal Trigger mode</a>   |
| <a href="#">ZA</a> | <a href="#">Zero Abort</a>              |
| <a href="#">ZE</a> | <a href="#">Zero</a>                    |
| <a href="#">ZQ</a> | <a href="#">Zero Query</a>              |
| <a href="#">ZS</a> | <a href="#">Zero Save</a>               |

## Basic Commands

### Command: **High Resolution**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      | •     | •       |         |      |          | •          |       |        | •        |

|             |   |
|-------------|---|
| Syntax      | AAHR <option>   |
| Description | <p>Queries or sets measurement resolution. Normally instruments send 4 significant digits of measurement, when set to high resolution some sensors and measurement modes support 7 significant digits.</p> <p>Values for &lt;option&gt; (if not set, default to 0)</p> <ul style="list-style-type: none"> <li>• 0: Query</li> <li>• 1: Normal resolution (4 digits)</li> <li>• 2: High resolution (7 digits)</li> </ul> |
| Example     | <ul style="list-style-type: none"> <li>• User sent “<b>AAHR 0</b>”. Device returns “<b>*1 NormalResolution HighResolution</b>”</li> <li>• User sent “<b>AAHR 2</b>”. Device returns “<b>*2 NormalResolution HighResolution</b>”</li> </ul>  |
| Limitations | None  |
| See Also    | <a href="#">Command Summary</a>   |

### Command: **Pulse Cycle**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       |         |      |          | •          |       |        | •        |

|             |  |
|-------------|--|
| Syntax      | AAPC <0 or 10000-200000>   |
| Description | Queries or sets the pulse cycle period in microseconds for Low Frequency Power mode on Photodiode sensors. |
| Example     | Returns: The current pulse cycle period.   |
| Limitations | Applicable to Low Frequency Power mode only  |
| See Also    | <a href="#">MM</a> ; <a href="#">Command Summary</a>   |

### Command: **TTL pass/fail limits**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      |       |         |         |      |          |            |       |        | •        |

|             |  |
|-------------|--|
| Syntax      | AATL <lower limit> <upper limit>   |
| Description | Queries or sets lower and upper limits for TTL when in Pass/Fail mode. <lower limit> and <upper limit> are measurement values in exponential notation. If <lower-limit> and <upper-limit> are both 0 or omitted, this queries the values; if both are non-zero this sets the values. |
| Example     | <ul style="list-style-type: none"> <li>• User sent “<b>AATL 0 0</b>”. Device returns “<b>*1.000000e+0 5.000000e+3</b>”</li> <li>• User sent “<b>AATL 1.0e+1 1.0e+2</b>”. Device returns “<b>*1.000000e+01 1.000000e+02</b>”</li> </ul>   |
| Limitations | None   |
| See Also    | <a href="#">TA</a> ; <a href="#">Command Summary</a>   |

## Command: Average Flag

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      |       |         | •       | •    |          |            |       |        |          |

|             |  |
|-------------|--|
| Syntax      | AF   |
| Description | Checks if a new averaged reading has been prepared since previous use of SG command.   |
| Example     | Returns: 0 (no new average) or 1 (new average prepared).   |
| Limitations | Thermopile sensors do not have an averaging option when measuring energy. If the command is sent when in energy mode, the instrument will return an error string |
| See Also    | <a href="#">AQ</a> and <a href="#">SG</a> ; <a href="#">Command Summary</a>  |

## Command: Average Query

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      |       |         | •       | •    | •        | •          |       |        | •        |

|             |   |
|-------------|---|
| Syntax      | AQ <average-setting>  |
| Description | <p>Query and set the average setting of the sensor. Returns index of presently active Average setting as well as literal description of set of all available Average settings. If an unsupported index is specified, will prefix a '?' to the response.</p> <p>Values for &lt;average-setting&gt; (if not set, default to 0)</p> <ul style="list-style-type: none"> <li>• 0: Query device for present average setting.</li> <li>• 1: Configure sensor for first setting ("NONE")</li> <li>• 2: Configure sensor for second setting.</li> <li>• Etc</li> </ul> |
| Example     | <p>PE50-BBDIF-C set to average over one second</p> <ul style="list-style-type: none"> <li>• User sent "AQ". Device returns "<b>* 3 NONE 0.5sec 1sec 3sec 10sec 30sec</b>"</li> <li>• User sent "AQ 4". Device returns "<b>* 4 NONE 0.5sec 1sec 3sec 10sec 30sec</b>". Sensor is now averaging over 3 seconds</li> <li>• User sent "AQ 9". Device returns "<b>? 4 NONE 0.5sec 1sec 3sec 10sec 30sec</b>". Sensor is still averaging over 3 seconds</li> </ul>  |
| Limitations | Thermopile sensors do not have an averaging option when measuring energy. If the command is sent when in energy mode, the instrument will return an error string  |
| See Also    | <a href="#">AF</a> and <a href="#">SG</a> ; <a href="#">Command Summary</a>   |

## Command: All Ranges

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |   |
|-------------|---|
| Syntax      | AR  |
| Description | Returns all ranges available in sensor. This is prefixed by the index of the presently active range.  |
| Example     | For a PD300 sensor in the 30 microwatt range, this command will return <b>“* 3 AUTO 30.0mW 3.00mW 300uW 30.0uW 3.00uW 300nW 30.0nW”</b> .<br><br>Note: The index of the highest numeric range is 0. The index of AUTO (when applicable) is -1 |
| Limitations | None  |
| See Also    | <a href="#">GU</a> , <a href="#">RN</a> , <a href="#">SX</a> , and <a href="#">WN</a> ; <a href="#">Command Summary</a>   |

## Command: All Wavelengths

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |   |
|-------------|---|
| Syntax      | AW  |
| Description | Returns string fully describing the wavelengths that the sensor is configured to work with.   |
| Example     | Example 1. PD300 with Filter Out. Device returns <b>“*CONTINUOUS 350 1100 1 633 488 978 NONE NONE NONE”</b><br><br>The user would know that it is a continuous curve sensor (from the prefix CONTINUOUS), that the range of wavelengths is 350nm through 1100nm, that the present wavelength that the sensor is configured to measure for is 633 (from the index 1), and the 6 favorite settings as they would be displayed in StarLab (above 10000nm would be displayed as 10.0). The second and third parameters delimit the range of values that the \$WL command would succeed with.<br><br>Example 2. 3AP sensor. Device returns <b>“*DISCRETE 1 VIS NIR”</b><br><br>The user would know that this sensor is configured for a discrete set of wavelengths (from the prefix DISCRETE), that the sensor is presently configured to work at the VIS wavelength (from the index 1) and that the set of wavelengths that the sensor could be configured to work with (via the \$WW command) is "VIS" and "NIR". |
| Limitations | None  |
| See Also    | <a href="#">WD</a> , <a href="#">WE</a> , <a href="#">WI</a> , <a href="#">WL</a> , and <a href="#">WW</a> ; <a href="#">Command Summary</a>  |

## Command: **BauD rate**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      |       | •       |         |      |          |            |       |        |          |

|             |  |
|-------------|--|
| Syntax      | BD <baud rate>   |
| Description | <p>Queries or sets the RS-232 baud rate.<br/>If &lt;baud-rate&gt; is omitted, this is a query, otherwise &lt;baud-rate&gt; must be one of the following values: 4800, 9600 , 14400, 19200, 38400, 57600, 115200.</p> <p>The change takes effect after the response is sent; the response is sent at the old baud rate.</p> |
| Example     | <ul style="list-style-type: none"> <li>• User sent “<b>BD</b>”. Device returns “*<b>115200</b>”</li> <li>• User sent “<b>BD 9600</b>”. Device returns “*<b>9600</b>”</li> </ul>  |
| Limitations | None   |
| See Also    | <a href="#">Command Summary</a>  |

## Command: **BC20 Query**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    |          | •          |       |        |          |

|             |   |
|-------------|---|
| Syntax      | BQ <BC20-setting>   |
| Description | <p>Query and set BC20 sensor mode (HOLD or CONTINUOUS). Returns string containing index of present BC20 Mode as well as a literal description of both modes<br/>If Remote User specified an unsupported index, will prefix a '?' to the response.</p> <p>Values for &lt;average-setting&gt; (if not set, default to 0)</p> <ul style="list-style-type: none"> <li>• 0: Query device for present setting.</li> <li>• 1: for HOLD (if applicable)</li> <li>• 2: for CONTINUOUS</li> </ul> |
| Example     | <ul style="list-style-type: none"> <li>• User sent “<b>BQ</b>”. Meter returned “* <b>1 HOLD CONTINUOUS</b>”. Sensor is in HOLD mode.</li> <li>• User sent “<b>BQ 2</b>”. Device returns “* <b>2 HOLD CONTINUOUS</b>”. Sensor is now in CONTINUOUS mode.</li> <li>• User sent “<b>BQ 3</b>”. Device returns “? <b>2 HOLD CONTINUOUS</b>”. Requested setting was an error. Sensor stayed in CONTINUOUS mode.</li> </ul>   |
| Limitations | For BC20 Sensors only. Error string will be returned for all other sensor types.  |
| See Also    | <a href="#">Command Summary</a>   |

## Command: **BeamTrack**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          |       |        | •        |

|             |   |
|-------------|---|
| Syntax      | BT  |
| Description | <p>Query device for latest BeamTrack position and size measurements</p> <p>Response Format: "F" &lt;Errors&gt; "X" &lt;X&gt; "Y" &lt;Y&gt; "S" Size.<br/>           Where F is followed by Hex map of error codes<br/>           X is followed by the location of the laser spot on the X-axis in mm<br/>           Y is followed by the location of the laser spot on the Y-axis in mm<br/>           S is followed by the size of the laser beam in mm</p> <p>The following is the listing of possible error codes. Other codes may be returned by the sensor but can be ignored; they are either meant as diagnostic information for Ophir personnel or are reserved for future use.</p> <p>0x00001000: Position not measured (sensor can't measure position)<br/>           0x00002000: Signal too low (signal is just noise, not a meaningful measurement)<br/>           0x00004000: Position Measurement out of range (laser beam hit detector too far off center)<br/>           0x00008000: General Position Measurement Error</p> |
| Example     | <p>“* <b>F 00000000 X -1.50 Y -0.9 S 6.50</b>”</p> <p>There were no errors, the spot size is 6.5mm and is found at the coordinates (-1.5, -0.9)</p>   |
| Limitations | For BeamTrack Sensors only.   |
| See Also    | <a href="#">Command Summary</a>   |

## Command: **select Channel**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      |       |         |         |      |          |            |       | •      | •        |

|             |   |
|-------------|---|
| Syntax      | CL <channel>  |
| Description | Queries or sets the channel which channel-specific commands will operate on. If <channel> is 0, returns the current channel, otherwise it sets the channel (by 1-based index) |
| Example     | “* <b>1</b> ” The current channel is channel 1 or A   |
| Limitations |   |
| See Also    | <a href="#">Command Summary</a>   |

## Command: **analog output Scale**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      | •     | •       | •       | •    |          | •          |       |        | •        |

|             |  |
|-------------|--|
| Syntax      | DS <voltage>   |
| Description | <p>Queries or sets the maximum analog output voltage.</p> <p>Values for &lt;voltage&gt; (if not present, default is 0)</p> <ul style="list-style-type: none"> <li>• 0: Query current maximum analog output voltage</li> <li>• 1, 2, 5, 10: Set the analog out voltage that indicates a reading at the maximum for the current range</li> </ul> |
| Example     | None   |
| Limitations | For Juno+, Juno_RS and StarBright this setting has no effect when analog output type is set to raw   |
| See Also    | <a href="#">RQ; Command Summary</a>  |

## Command: **Diffuser Query**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          |       |        | •        |

|             |   |
|-------------|---|
| Syntax      | DQ <diffuser-setting>   |
| Description | <p>Query and set the diffuser setting of the sensor.</p> <p>Values for &lt;diffuser-setting&gt; (if parameter isn't set, default to 0)</p> <ul style="list-style-type: none"> <li>• 0: Query meter for present Diffuser Mode</li> <li>• 1: Configure sensor for Diffuser Out mode</li> <li>• 2: Configure sensor for Diffuser In mode</li> </ul>  |
| Example     | <p>Example 1. A PE10-C sensor.</p> <ul style="list-style-type: none"> <li>• User sent “<b>DQ</b>”. Device returns “*<b>1 N/A</b>”. There is only 1 setting (that the command is not applicable).</li> </ul> <p>Example 2. PE50-BBDIF.</p> <ul style="list-style-type: none"> <li>• User sent “<b>DQ</b>”. Device returns “*<b>1 OUT IN</b>”. Sensor is in Diffuser Out mode.</li> <li>• User sent “<b>DQ 2</b>”. Device returns “*<b>2 OUT IN</b>”. Sensor is now in Diffuser In mode.</li> <li>• User sent “<b>DQ 3</b>”. Device returns “?<b>2 OUT IN</b>”. Request is invalid and sensor remains in Diffuser In mode.</li> </ul> |
| Limitations | For Pyroelectric sensor only  |
| See Also    | <a href="#">HC; Command Summary</a>   |

## Command: **Exposure Energy**

Supported on the following meters:

| Juno   | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright  | Ariel | Pulsar | Centauri    |
|--------|-------|---------|---------|------|----------|-------------|-------|--------|-------------|
| Pyro C | Pyro  | Pyro    | Pyro    | Pyro |          | Pyro, Photo |       |        | Pyro, Photo |

|             |   |
|-------------|---|
| Syntax      | EE  |
| Description | Instructs device to report up do date exposure measurement, number of pulses (for Pyroelectric sensors), and time elapsed (in tenths of a second).  |
| Example     | <p>Example 1. Pyroelectric sensor in exposure mode. Device returns<br/> <b>"* 1.064E-1 2773 124"</b></p> <p>Total exposure is 106.4mJ, 2773 pulses have been measured, and 12.4 seconds have elapsed since the start of exposure measurement.</p> <p>Example 2. Pyroelectric sensor in energy mode. Device returns<br/> <b>"?HEAD NOT MEASURING EXPOSURE"</b></p> <p>Example 3. Pyroelectric sensor in power mode. Device returns<br/> <b>"HEAD NOT MEASURING ENERGY"</b></p> |
| Limitations | On most instruments for Pyroelectric sensors only, on some instruments also for Photodiodes (see table above). On Juno, supported only for Pyro C, not for old Pyros  |
| See Also    | <a href="#">FX; Command Summary</a>   |

## Command: **Energy Flag**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |  |
|-------------|--|
| Syntax      | EF   |
| Description | Polls device if a new energy reading has been processed and not yet communicated to the user.  |
| Example     | Device returns <b>"*1"</b> if there is a new reading or <b>"*0"</b> if there isn't.  |
| Limitations | For Pyroelectric in power or energy measurement modes; Thermopile sensors in energy or pulsed power measurement modes                          |
| See Also    | <a href="#">ER</a> (Thermopile only), <a href="#">SE</a> , and <a href="#">SP</a> (for Pyroelectric only), <a href="#">MM; Command Summary</a> |

## Command: **Energy Pulse length**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       |         |      |          | •          | •     |        | •        |

|             |  |
|-------------|--|
| Syntax      | EP <0 or 1-10000>  |
| Description | <p>Queries or sets the pulse length in milliseconds for pulsed power mode on Thermopile sensors.</p> <p>The Ariel measures the pulse length with each measurement, and therefore will return <b>"*AUTO"</b> for a query and <b>"?AUTO"</b> when attempting to set the value.</p> |
| Example     | Returns: The current pulse length.   |
| Limitations | Applicable to pulsed power measurement mode only   |
| See Also    | <a href="#">MM; Command Summary</a>  |

## Command: **Energy Ready**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |   |
|-------------|---|
| Syntax      | ER  |
| Description | Polls device if sensor is ready to take a new energy reading. This is useful for users that can control when their laser fires. |
| Example     | Device returns “*1” if ready for a new energy pulse or “*0” if not.   |
| Limitations | For Thermopile sensors only, in energy or pulsed power measurement modes  |
| See Also    | <a href="#">EF</a> and <a href="#">SE</a> ; <a href="#">Command Summary</a>   |

## Command: **Energy Threshold**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |  |
|-------------|--|
| Syntax      | ET <threshold>   |
| Description | Query and set the threshold setting of the sensor.<br><br>Values for <threshold> (if not set, default to 0) <ul style="list-style-type: none"><li>• 0: Query sensor for present threshold setting.</li><li>• 1: Configure sensor to work with LOW threshold.</li><li>• 2: Configure sensor to work with MEDIUM threshold.</li><li>• 3: Configure sensor to work with HIGH threshold.</li></ul>                             |
| Example     | 30A sensor. <ul style="list-style-type: none"><li>• User sent “ET”. Device returns “*2 LOW MEDIUM HIGH”. The sensor is in MEDIUM threshold mode.</li><li>• User sent “ET 4”. Device returns “?1 LOW MEDIUM HIGH”. Trigger level is invalid and sensor remains in LOW threshold mode.</li><li>• User sent “ET 3”. Device returns “*3 LOW MEDIUM HIGH”. Sensor has been configured to work in HIGH threshold mode.</li></ul> |
| Limitations | For Thermopile sensors only  |
| See Also    | <a href="#">HC</a> , <a href="#">UT</a> ; <a href="#">Command Summary</a>  |

## Command: **Force BeamTrack**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          |       |        | •        |

|             |  |
|-------------|--|
| Syntax      | FB   |
| Description | Puts instrument into Position Measurement mode. Device returns “*” if successful and “?HEAD CANNOT MEASURE BEAMTRACK” if not.  |
| Example     | User sent “FB”. Device returns “*”. Sensor is now measuring Position.  |
| Limitations | For BeamTrack series of sensors only.  |
| See Also    | <a href="#">FE</a> , <a href="#">FP</a> , <a href="#">FX</a> , <a href="#">HC</a> , <a href="#">HI</a> , <a href="#">MM</a> , and <a href="#">SE</a> ; <a href="#">Command Summary</a> |

## Command: Force Energy

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |  |
|-------------|--|
| Syntax      | FE   |
| Description | Puts instrument into Energy Measurement mode. Device returns “*” if successful and “?HEAD CANNOT MEASURE ENERGY” if not.   |
| Example     | User sent “FE”. Device returns “*”. Sensor is now measuring Energy.  |
| Limitations | For Thermopile and Pyroelectric sensors.   |
| See Also    | <a href="#">FB</a> , <a href="#">FP</a> , <a href="#">FX</a> , <a href="#">HC</a> , <a href="#">HI</a> , <a href="#">MM</a> , and <a href="#">SE</a> ; <a href="#">Command Summary</a> |

## Command: Force Power

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |  |
|-------------|--|
| Syntax      | FP   |
| Description | Puts instrument into Power Measurement mode. Device returns “*” if successful and “?HEAD CANNOT MEASURE POWER” if not.   |
| Example     | User sent “FP”. Device returns “*”. Sensor is now measuring Power.   |
| Limitations | None   |
| See Also    | <a href="#">FB</a> , <a href="#">FE</a> , <a href="#">FX</a> , <a href="#">HC</a> , <a href="#">HI</a> , <a href="#">MM</a> , and <a href="#">SP</a> ; <a href="#">Command Summary</a> |

## Command: Force Power (Illuminance Sensors)

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    |          | •          |       |        | •        |

|             |   |
|-------------|---|
| Syntax      | FP <lux or footcandles>   |
| Description | Special case of FP command for PD300-CIE sensors. Causes the instrument to go to a specified illuminance measurement screen, irrespective of current status. If no parameter is sent, this command will force the instrument into the currently configured illuminance screen.<br><br>Values for <lux or footcandles> <ul style="list-style-type: none"><li>• L: Set measurement mode to lux</li><li>• F: Set measurement mode to footcandles</li></ul> |
| Example     | User sent “FP L”. Device returns “*”. Sensor is now measuring lux.  |
| Limitations | None  |
| See Also    | <a href="#">FB</a> , <a href="#">FE</a> , <a href="#">FX</a> , <a href="#">HC</a> , <a href="#">HI</a> , <a href="#">MM</a> , and <a href="#">SP</a> ; <a href="#">Command Summary</a>  |

## Command: **Filter Query**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          |       | •      | •        |

|             |  |
|-------------|--|
| Syntax      | FQ <filter-setting>  |
| Description | <p>Query and set the filter setting of the sensor.</p> <p>Values for &lt;filter-setting&gt; (if not set, default to 0)</p> <ul style="list-style-type: none"> <li>• 0: Query device for present filter setting.</li> <li>• 1: Configure sensor for Filter Out mode.</li> <li>• 2: Configure sensor for Filter In mode.</li> </ul>  |
| Example     | <p>Example 1. 3A-IS sensor.</p> <ul style="list-style-type: none"> <li>• User sent “<b>FQ</b>”. Device returns “*<b>1 N/A</b>”. There is only 1 setting (that the command is not applicable).</li> </ul> <p>Example 2. PD300 sensor.</p> <ul style="list-style-type: none"> <li>• User sent “<b>FQ</b>”. Device returns “*<b>1 OUT IN</b>”. Sensor is in Filter Out mode.</li> <li>• User sent “<b>FQ 2</b>”. Device returns “*<b>2 OUT IN</b>”. Sensor has been reconfigured to Filter In mode.</li> <li>• User sent “<b>FQ 3</b>”. Device returns “?<b>2 OUT IN</b>”. Invalid setting and sensor remains in Filter In mode.</li> </ul> |
| Limitations | For Photodiode sensors only  |
| See Also    | <a href="#">HC</a> ; <a href="#">Command Summary</a>   |

## Command: **Force Screen**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     |        | •        |

|             |   |
|-------------|---|
| Syntax      | Force Screen <screen-setting>   |
| Description | <p>Force the instrument into one of the screens</p> <p>Values for &lt;screen-setting&gt;</p> <ul style="list-style-type: none"> <li>• 0: Force to power measurement.</li> <li>• 1: Force to energy measurement.</li> <li>• 2: Force to non-measurement screen</li> <li>• 3: Force to no sensor connected screen</li> <li>• 5: Force to Position screen (BeamTrack sensors only)</li> </ul>  |
| Example     | <p>Example 1. 3A-IS sensor.</p> <ul style="list-style-type: none"> <li>• User sent “<b>FS 1</b>”. Now measuring power</li> <li>• User sent “<b>FS 2</b>”. Now measuring energy</li> </ul> <p>Example 2. PD300 sensor.</p> <ul style="list-style-type: none"> <li>• User sent “<b>FS 1</b>”. Now measuring power</li> <li>• User sent “<b>FS 2</b>”. Device responds with error code because sensor cannot be used for measuring energy</li> </ul> |
| Limitations | None  |
| See Also    | <a href="#">FB</a> , <a href="#">FE</a> , <a href="#">FP</a> , <a href="#">HC</a> , <a href="#">MM</a> : <a href="#">Command Summary</a>  |

## Command: **Force eXposure**

Supported on the following meters:

| Juno   | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright  | Ariel | Pulsar | Centauri    |
|--------|-------|---------|---------|------|----------|-------------|-------|--------|-------------|
| Pyro C | Pyro  | Pyro    | Pyro    | Pyro |          | Pyro, Photo |       |        | Pyro, Photo |

|             |  |
|-------------|--|
| Syntax      | FX   |
| Description | Puts instrument into exposure measurement mode. Device returns “*” upon success.   |
| Example     | User sent “ <b>FX</b> ”. Device returns “*”. Sensor is now measuring Exposure.   |
| Limitations | On most instruments for Pyroelectric sensors only, on some instruments also for Photodiodes (see table above). On Juno, supported only for Pyro C, not for old Pyros |
| See Also    | <a href="#">EE</a> , <a href="#">FE</a> , <a href="#">FP</a> , <a href="#">MM</a> , and <a href="#">SE</a> ; <a href="#">Command Summary</a>                         |

## Command: **Get range in Use**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          |       |        | •        |

|             |   |
|-------------|---|
| Syntax      | GU  |
| Description | When in autoranging, returns presently active numeric range.  |
| Example     | PD300 with Filter Out in autoranging. The latest readings have been about 2mW. Device returns “*1”.                     |
| Limitations | None  |
| See Also    | <a href="#">AR</a> , <a href="#">RN</a> , <a href="#">SX</a> , and <a href="#">WN</a> ; <a href="#">Command Summary</a> |

## Command: **Head Configuration**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |  |
|-------------|--|
| Syntax      | HC <configuration>   |
| Description | Save selected Sensor Configuration Settings.<br><br>Values for <configuration> <ul style="list-style-type: none"> <li>• ‘S’: startup settings (Filter Setting, Energy Range, Diffuser setting, etc.).</li> <li>• ‘C’: Calibration settings.</li> <li>• ‘R’: Response settings.</li> </ul> Device returns “* <b>SAVED</b> ” on success, “* <b>UNCHANGED</b> ” if nothing needed to be updated, or “* <b>FAILED</b> ” if not successful. |
| Example     | None   |
| Limitations | R is for Thermopile sensors only   |
| See Also    | <a href="#">CQ</a> , <a href="#">DQ</a> , <a href="#">ET</a> , <a href="#">FE</a> , <a href="#">FM</a> , <a href="#">FP</a> , <a href="#">FQ</a> , <a href="#">PL</a> , <a href="#">RQ</a> , <a href="#">WD</a> , <a href="#">WE</a> , <a href="#">WI</a> , <a href="#">WL</a> , <a href="#">WN</a> , <a href="#">WW</a> ; <a href="#">Command Summary</a>   |

## Command: **Head Information**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |  |
|-------------|--|
| Syntax      | HI   |
| Description | Returns type, serial number, name, and measurement abilities of sensor. Measurement abilities are reported as an 8 byte hexadecimal code where Bit 0 is lit if sensor can measure power. Bit 1 is lit if sensor can measure energy. Bit 31 is lit if sensor can measure frequency. All other bits are reserved and are not guaranteed to be 0 or 1.  |
| Example     | <p>Example 1. 03AP sensor. Device returns <b>“* TH 12345 03AP 00000183”</b>.</p> <p>The user knows that this is a Thermopile sensor (TH), its serial number (12345) and name (03AP), and that it can be used to measure power or energy (bits 0 and 1 are lit).</p> <p>Example 2. PE10-C sensor. Device returns <b>“* PY 22323 PE10-C 80000003”</b>.</p> <p>The user knows that this is a Pyroelectric sensor (PY), the serial number and name, and that it can measure power, energy, and frequency</p> |
| Limitations | None   |
| See Also    | <a href="#">FE</a> , <a href="#">FP</a> , <a href="#">HT</a> , and <a href="#">II</a> ; <a href="#">CommandSummary</a>   |

## Command: **Head Type**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     |        | •        |

|             |   |
|-------------|---|
| Syntax      | HT  |
| Description | Returns more specific sensor type than the HI command<br><br>Return Codes: <ul style="list-style-type: none"> <li>• BC : BC20</li> <li>• BT: BeamTrack</li> <li>• CR : RM9 family of sensors</li> <li>• CP: Pyroelectric</li> <li>• FX : Axial Sensor</li> <li>• LX : PD300-CIE sensor</li> <li>• NJ : nanoJoule meter (obsolete sensor type)</li> <li>• PY : Pyroelectric (obsolete sensor type)</li> <li>• RM : PD300RM</li> <li>• SI : Photodiode</li> <li>• TH : Thermopile</li> <li>• TP : Temperature Probe (obsolete sensor type)</li> <li>• XX : No sensor connected</li> </ul> |
| Example     | 3A-P sensor. Device returns <b>“*TH”</b><br>PE10-C sensor. Device returns <b>“*CP”</b>  |
| Limitations | None  |
| See Also    | <a href="#">FE</a> , <a href="#">FP</a> , <a href="#">HI</a> , and <a href="#">II</a> ; <a href="#">CommandSummary</a>  |

## Command: Instrument Configuration

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |   |
|-------------|---|
| Syntax      | IC  |
| Description | Save Instrument Configuration. The new settings will be saved in the device's memory. Device returns <b>**SAVED**</b> on success, <b>**UNCHANGED**</b> if nothing needed to be updated, or <b>**FAILED**</b> if not successful. |
| Example     | None  |
| Limitations | None  |
| See Also    | <a href="#">MA</a> ; <a href="#">CommandSummary</a>   |

## Command: Instrument Information

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |   |
|-------------|---|
| Syntax      | II  |
| Description | Returns id, serial number, and name of instrument being queried   |
| Example     | Device returns <b>** JNPL 443002 JUNO_PLUS**</b> . The user knows that this is a Juno+ and its serial number (443002) |
| Limitations | None  |
| See Also    | <a href="#">HI</a> ; <a href="#">CommandSummary</a>   |

## Command: Key Legends

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      |       |         | •       | •    |          |            |       |        |          |

|             |  |
|-------------|--|
| Syntax      | KL   |
| Description | Returns a string containing the legends for each soft key, delimited by the open quote character ". A tilde "~" character preceding a legend indicates an active, reverse highlighted key. |
| Example     | None   |
| Limitations | None   |
| See Also    | <a href="#">SK</a> ; <a href="#">CommandSummary</a>  |

## Command: **MAins**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |  |
|-------------|--|
| Syntax      | MA <line-frequency>  |
| Description | <p>Query and set the line-frequency setting of the instrument.</p> <p>Values for &lt;line-frequency&gt; (if not set, default is 0)</p> <ul style="list-style-type: none"> <li>• 0: Query meter for present setting.</li> <li>• 1: Configure meter to work with mains of 50Hz (European standard).</li> <li>• 2: Configure meter to work with mains of 60Hz (North American and Japanese standard).</li> </ul> <p>Response: String containing index of presently active mains setting as well as literal description of both mains settings. If Remote User specified an unsupported index, will prefix a '?' to the response.</p> <p>Note: Factory default for devices is 50Hz</p> |
| Example     | <p>Example 1. User sent “<b>MA</b>”. Device returns “<b>* 2 50Hz 60Hz</b>”. The User knows that the device is configured to work with a line frequency of 60Hz.</p> <p>Example 2. European customer wants to set the device to correct line frequency and sends “<b>MA 1</b>”. Device returns “<b>* 1 50Hz 60Hz</b>”</p>   |
| Limitations | Unsupported on Nova-II / Vega unless working with a BeamTrack sensor.  |
| See Also    | <a href="#">IC</a> ; <a href="#">CommandSummary</a>  |

## Command: **Maximum Frequency**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          |       |        | •        |

|             |   |
|-------------|---|
| Command     | <b>MF (Maximum Frequency)</b>   |
| Syntax      | MF  |
| Description | Queries the device for maximum pulse frequency at which the sensor can sample the laser for energy measurements.  |
| Example     | <p>Example 1. PE25-C set to 1µS pulse width. Device returns “<b>*10000</b>”. The sensor can sample pulses of a laser whose frequency is 10kHz.</p> <p>Example 2. PE25-C set to 5mS pulse width. Device returns “<b>*100</b>”. The sensor can sample pulses of a laser whose frequency is 100 Hertz.</p> |
| Limitations | For Pyroelectric and Photodiode energy sensors only   |
| See Also    | <a href="#">HI</a> , <a href="#">PL</a> , and <a href="#">SE</a> ; <a href="#">CommandSummary</a>   |

## Command: Measurement Mode

The following table indicates which modes are supported for which instruments. 4C means exposure is supported on Pyro C sensors only. 4E means exposure is supported on all Pyroelectric sensors. 4CD means exposure is supported on Pyro C and Photodiode sensors. Note that the MM command is not supported on Pulsar – use [FE](#), [FP](#) and [FX](#) instead. For BC-20 sensors on the Nova II and Vega use [BQ](#). For PD300-CIE on Nova II and Vega use [FP](#).

| Juno   | Juno+   | Juno-RS   | Nova-II           | Vega                 | StarLite      | StarBright   | Ariel          | Pulsar | Centauri  |
|--|---|---|-------------------|----------------------|---------------|--|----------------|--------|---|
| 1, 2, 3,<br>4C, 5,<br>7, 8,<br>11, 12,<br>14, 16 | 1, 2, 3,<br>4C, 5, 7,<br>8, 9, 10,<br>11, 12,<br>14, 16 | 1, 2, 3,<br>4C, 5, 7,<br>8, 9, 10,<br>11, 12,<br>14, 16 | 1, 2, 3,<br>4E, 5 | 1, 2,<br>3,<br>4E, 5 | 1, 2, 3,<br>5 | 1, 2, 3,<br>4CD, 5, 7,<br>8, 9, 10,<br>11, 12, 14,<br>16 | 1, 2,<br>3, 14 |        | 2, 3,<br>4CD, 5,<br>7, 8, 9,<br>10, 14,<br>15, 16 |

|             |  |
|-------------|--|
| Syntax      | MM <measurement-mode>  |
| Description | <p>Set instrument to selected Measurement Mode</p> <p>Values for &lt; measurement-mode &gt;</p> <ul style="list-style-type: none"> <li>• 0: Query present measurement mode</li> <li>• 1: Passive, non-measurement mode</li> <li>• 2: Power</li> <li>• 3: Energy</li> <li>• 4: Exposure (Pyroelectric, Photodiode)</li> <li>• 5: Power with Position (and Size) (BeamTrack sensors)</li> <li>• 6: Reserved for Future Use</li> <li>• 7: Lux (PD300-CIE sensors)</li> <li>• 8: Footcandles (PD300-CIE sensors)</li> <li>• 9: Irradiance (PD300-RM sensors)</li> <li>• 10: Dosage (PD300-RM sensors)</li> <li>• 11: Hold mode (BC20 sensors)</li> <li>• 12: Continuous (BC20 sensors)</li> <li>• 13: Reserved for Future Use</li> <li>• 14: Pulsed Power (Thermopile)</li> <li>• 15: Fast Power (Photodiode)</li> <li>• 16: Low Frequency Power (Photodiode)</li> </ul> <p>Device returns “*” on success, “?NOT SUPPORTED” if the sensor doesn’t support this measurement mode, or “?PARAM ERROR” if it doesn’t recognize the &lt;measurement-mode&gt; (such as all modes above 5 for Nova-II and Vega)</p> <p>Note: MM is intended to supersede the BQ, FB, FE, FP, and FX commands.</p> |
| Example     | None   |
| Limitations | As listed in the table above   |
| See Also    | <a href="#">BQ</a> , <a href="#">FB</a> , <a href="#">FE</a> , <a href="#">FP</a> , <a href="#">FX</a> , <a href="#">HC</a> ; <a href="#">Command Summary</a>  |

## Command: **Pulse Length**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          |       |        | •        |

|             |   |
|-------------|---|
| Syntax      | PL <pulse-length>   |
| Description | Query and set maximum pulse-length (in time) that sensor is configured to measure.<br><br>Values for <pulse-length> (if not set, default is 0) <ul style="list-style-type: none"> <li>• 0: Query device for present setting.</li> <li>• 1: Set sensor to first pulse width setting.</li> <li>• 2: Set sensor to second pulse width setting.</li> <li>• Etc.</li> </ul>  |
| Example     | PE25-C <ul style="list-style-type: none"> <li>• User sent “<b>PL</b>”. Device returns “<b>*3 2.0us 30us 500us 1.0ms 5.0ms</b>”. The full set of options is 2µS, 30µS, 500µS, 1mS and 5mS and the sensor is presently configured to option 3 500µS pulses.</li> <li>• User sent “<b>PL 6</b>”. Device returns “<b>?3 2.0us 30us 500us 1.0ms 5.0ms</b>”. 6 is a setting that is out of range and therefore the setting is still 500µS</li> <li>• User sent “<b>PL 1</b>”. Device returns “<b>**</b>”. Setting has been changed to 2.0µs.</li> </ul> |
| Limitations | For Pyroelectric and Photodiode Energy sensors only.  |
| See Also    | <a href="#">HC</a> and <a href="#">MF</a> ; <a href="#">Command Summary</a>   |

## Command: **REset**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |  |
|-------------|--|
| Syntax      | RE   |
| Description | Resets the instrument.   |
| Example     | None   |
| Limitations | Note: May cause loss of USB communication that will need to be re-enumerated |
| See Also    | <a href="#">Command Summary</a>  |

## Command: **Read raNge**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |  |
|-------------|--|
| Syntax      | RN   |
| Description | Returns presently active measurement range.  |
| Example     | Example 1. PD300 in autoranging. Device responds “ <b>*-1</b> ”.<br><br>Example 2. PE50-C in 2mJ range. Device responds “ <b>*4</b> ”. |
| Limitations |  |
| See Also    | <a href="#">AR</a> , <a href="#">GU</a> , <a href="#">SX</a> , and <a href="#">WN</a> ; <a href="#">Command Summary</a>                |

## Command: **analog output type**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |  |
|-------------|--|
| Syntax      | RO <analog-output-type>  |
| Description | Queries or sets the analog output type.<br><br><b>For the Centauri</b><br>Values for <analog-output-type> (if not present, default is 0) <ul style="list-style-type: none"><li>• 0: Query current analog output type</li><li>• 1: Set the analog output type to digital</li><li>• 2: Set the analog output type to raw</li></ul><br><b>For the StarBright, Juno+, Juno-RS</b><br>Values for <analog-output-type> <ul style="list-style-type: none"><li>• Not present: Query current analog output type</li><li>• 0: Set the analog output type to digital</li><li>• 1: Set the analog output type to raw</li></ul> |
| Example     |  |
| Limitations |  |
| See Also    | <a href="#">DS; Command Summary</a>  |

## Command: **Send Energy**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |  |
|-------------|--|
| Syntax      | SE   |
| Description | Queries device for Energy Measurement  |
| Example     | This command returns the most recent energy measurement. To verify that the device has not previously reported it to the user, this command should be used in together with the EF command.<br><br>Example. <ol style="list-style-type: none"><li>1. User sends EF command.</li><li>2. Read device response. If response is “*0” repeat step 1. If response is “*1” continue with step 3.</li><li>3. User send SE command</li><li>4. Device responds “*1.100E-4” (110uJ)</li></ol> |
| Limitations | Not for Photodiode sensors. Sensor must be measuring Energy  |
| See Also    | <a href="#">EF</a> , <a href="#">ER</a> , <a href="#">FE</a> , <a href="#">SF</a> , and <a href="#">SP</a> ; <a href="#">Command Summary</a>   |

## Command: **Send Frequency**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          |       |        | •        |

|             |   |
|-------------|---|
| Syntax      | SF  |
| Description | Queries device for frequency at which the laser is firing.<br>Note: Although sensors can measure frequency up to 1000's of Hertz, to actually measure each of those pulses, you must work with the COM object |
| Example     | Example. Device returns <b>"*1.000E3"</b> . The laser is firing at a frequency of 1000Hz.   |
| Limitations | For Pyroelectric and Photodiode energy sensors only   |
| See Also    | <a href="#">MF</a> , <a href="#">PL</a> , <a href="#">SE</a> , and <a href="#">SP</a> ; <a href="#">Command Summary</a>   |

## Command: **Send averaGe**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      |       |         | •       | •    |          |            |       |        |          |

|             |  |
|-------------|--|
| Syntax      | SG   |
| Description | Requests most recent average calculated by the instrument.   |
| Example     | Returns power or energy average as an ASCII string in scientific notation.<br><br>Returns most recent average reading calculated by the instrument. Will return the same average more than once if the request is repeated before a new average has been prepared. Use with \$AF to ensure reading each average only once.<br><br>Errors reported<br><b>"?HEAD NOT MEASURING POWER"</b> if thermopile sensor is measuring energy |
| Limitations | Nova-II and Vega only. Does not average energy for Thermopile sensors.   |
| See Also    | <a href="#">AF</a> and <a href="#">AQ</a> ; <a href="#">Command Summary</a>  |

## Command: **Send units**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |  |
|-------------|--|
| Syntax      | SI   |
| Description | <p>Queries meter for present measurement mode. Returns a single character that represents the present measurement mode.</p> <ul style="list-style-type: none"> <li>• c: Foot-Candles (PD300CIE sensor, not supported on all meters)</li> <li>• d: dBm</li> <li>• j: Energy Density (Joules/cm<sup>2</sup>) (Irradiance)</li> <li>• J: Joules</li> <li>• l: Lux (PD300CIE sensor, not supported on all meters)</li> <li>• u: Lumens (PD300CIE-IS sensor, not supported on all meters)</li> <li>• w: Power Density (Watts/cm<sup>2</sup>) (Dosage)</li> <li>• W: Watts</li> <li>• X: Passive mode. Nothing being measured</li> </ul> |
| Example     | 3AP measuring power. Device returns “ <b>W</b> ”.  |
| Limitations | None.  |
| See Also    | <a href="#">Command Summary</a>  |

## Command: **Simulate Key-press**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      |       |         | •       | •    | •        | •          | •     |        |          |

|             |   |
|-------------|---|
| Syntax      | SK<1..3 for Ariel, 0..3 for StarLite, 0..8 for others>  |
| Description | <p>Simulates pressing a key on the meter’s front panel</p> <p>For Nova-II, Vega, StarBright and StarLite</p> <ul style="list-style-type: none"> <li>• 0: Left-most softkey</li> <li>• 1: 2<sup>nd</sup> softkey.</li> <li>• 2: 3<sup>rd</sup> softkey</li> <li>• 3: Right-most softkey</li> </ul> <p>For Nova-II, Vega and StarBright</p> <ul style="list-style-type: none"> <li>• 4: Right Arrow of the Navigation Panel</li> <li>• 5: Left Arrow of the Navigation Panel</li> <li>• 6: Up Arrow of the Navigation Panel</li> <li>• 7: Down Arrow of the Navigation Panel</li> <li>• 8: Enter Button of the Navigation Panel</li> </ul> <p>For Ariel</p> <ul style="list-style-type: none"> <li>• 1: Left-most softkey</li> <li>• 2: 2<sup>nd</sup> softkey.</li> <li>• 3: 3<sup>rd</sup> softkey</li> </ul> |
| Example     | None.   |
| Limitations | None.   |
| See Also    | <a href="#">Command Summary</a>   |

## Command: **Send Power**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |   |
|-------------|---|
| Syntax      | SP  |
| Description | Queries device for Power Measurement  |
| Example     | <p>For all sensors except Pyroelectric sensors:<br/>Return next power measurement</p> <ul style="list-style-type: none"> <li>• Example. User sent “<b>SP</b>”. Device returns “<b>*1.300E-5</b>”. Power measured is 13 microwatts.</li> </ul> <p>For Pyroelectric sensors<br/>This command returns the most recent power measurement. To verify that the device has not previously reported it to the user, this command should be used in together with the EF command.</p> <p>Example.</p> <ol style="list-style-type: none"> <li>1. User sends EF command.</li> <li>2. Read device response. If response is “<b>*0</b>” repeat step 1. If response is “<b>*1</b>” continue with step 3.</li> <li>3. User sends SP command</li> <li>4. Device returns “<b>*1.100E-1</b>” (110mW)</li> </ol> |
| Limitations | Sensor must be measuring Power  |
| See Also    | <a href="#">EF</a> , <a href="#">FP</a> , <a href="#">SE</a> , and <a href="#">SF</a> ; <a href="#">Command Summary</a>   |

## Command: **Send maX**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     |        | •        |

|             |   |
|-------------|---|
| Syntax      | SX  |
| Description | Queries device for the maximum allowable reading on present scale.  |
| Example     | <p>Returns Max allowable reading for present range in scientific notation or AUTO if in autoranging.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• “<b>*AUTO</b>” for sensor in autoranging.</li> <li>• “<b>*3.000E-2</b>” for sensor in the 30mW range.</li> </ul> |
| Limitations | None  |
| See Also    | <a href="#">AR</a> , <a href="#">GU</a> , <a href="#">RN</a> , <a href="#">WN</a> ; <a href="#">Command Summary</a>   |

## Command: TTL output

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      |       |         |         |      |          |            |       |        | •        |

|             |   |
|-------------|---|
| Syntax      | TA <TTL-setting>  |
| Description | <p>Queries or sets the devices TTL output setting.</p> <p>When &lt;TTL-setting&gt; is 0, this is a query which returns the current setting and the available settings. When &lt;TTL-setting&gt; is greater than 0 it is the 1-based index of the desired setting. The following settings are available:</p> <ul style="list-style-type: none"> <li>• 1 Disable_(Low): The output will be set low</li> <li>• 2 On_(High): The output will be set high</li> <li>• 3 Signal_On_Error: The output will be high when there is a measurement error (out of range), and low when there is no measurement error</li> <li>• 4 Pass/Fail_Limits: The output will be high when there is a measurement error or when the measurement is out of the range set with the <a href="#">AATL</a> command; at other times it will be high</li> </ul> |
| Example     | <ul style="list-style-type: none"> <li>• User sent “<b>TA 0</b>”. Device returns “<b>*1 Disable_(Low) On_(High) Signal_On_Error Pass/Fail_Limits</b>”. TTL is set low</li> <li>• User sent “<b>TA 2</b>”. Device returns “<b>*2 Disable_(Low) On_(High) Signal_On_Error Pass/Fail_Limits</b>”. TTL is now set high</li> </ul>   |
| Limitations | None  |
| See Also    | <a href="#">AATL</a> ; <a href="#">Command Summary</a>  |

## Command: Trigger Window

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      |       |         |         |      |          |            |       |        | •        |

|             |  |
|-------------|--|
| Syntax      | TW <0 or 1-50000>  |
| Description | <p>Queries or sets the devices external trigger window size, in microseconds.</p> <p>When the value is 0, this is a query which returns the current window size. Otherwise it sets the window size</p> |
| Example     | <ul style="list-style-type: none"> <li>• User sent “<b>TW 0</b>”. Device returns “<b>*100</b>”</li> <li>• User sent “<b>TW 200</b>”. Device returns “<b>*200</b>”</li> </ul>                           |
| Limitations | None   |
| See Also    | <a href="#">XO</a> , <a href="#">XT</a> ; <a href="#">Command Summary</a>  |

## Command: **User Threshold**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          |       |        | •        |

|             |   |
|-------------|---|
| Syntax      | UT <0..2500>  |
| Description | Queries and sets threshold for Pyroelectric and Photodiode energy sensors. This aids in screening out false triggers due that may arise due to electronic noise.  |
| Example     | Examples: <ul style="list-style-type: none"> <li>• "\$UT". Device returns "<b>*300 169 2500</b>". Present threshold setting is 3%, minimum is 1.69%, maximum is 25%</li> <li>• "\$UT 2000". Device returns "<b>*2000 169 2500</b>". Threshold now set to 20%, minimum is 1.69%, maximum is 25%</li> </ul> |
| Limitations | For Pyroelectric and Photodiode energy sensors only.  |
| See Also    | <a href="#">ET</a> ; <a href="#">Command Summary</a>  |

## Command: **VVersion**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |  |
|-------------|--|
| Syntax      | VE   |
| Description | Query device for version of embedded software                            |
| Example     | Firmware version 2.13 is installed. The Juno+ returns " <b>*JP2.13</b> " |
| Limitations | None   |
| See Also    | <a href="#">Command Summary</a>  |

## Command: **Wavelength add**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          |       | •      | •        |

|             |   |
|-------------|---|
| Syntax      | WD <Index> <Wavelength>   |
| Description | Add a wavelength to list of favorite wavelengths that the sensor is configured to work with.<br>Index: Location in list of wavelengths in which to insert the wavelength selected (must be between an unused value between 1 and 6 as returned by the <a href="#">AW</a> command)<br>Wavelength: New favorite wavelength (must be between the lower and upper wavelength limits as returned by the <a href="#">AW</a> command)  |
| Example     | PE10-C with the following settings as returned by the <a href="#">AW</a> command<br>" <b>*CONTINUOUS 193 12000 4 NONE 366 532 1064 2100 10.6</b> " <ul style="list-style-type: none"> <li>• User sent "<b>WD 4 248</b>". Device returns "<b>?WAVELENGTH ALREADY DEFINED. USE WL COMMAND</b>"</li> <li>• User sent "<b>WD 1 100</b>". Device returns "<b>?WAVELENGTH OUT OF RANGE</b>"</li> <li>• User sent "<b>WD 7 248</b>". Device returns "<b>?INDEX NOT IN RANGE</b>".</li> <li>• User sent "<b>WD 1 248</b>". Device returns "<b>**</b>".</li> </ul> |
| Limitations | For all sensors with a continuous spectrum  |
| See Also    | <a href="#">AW</a> , <a href="#">HC</a> , <a href="#">WE</a> , <a href="#">WI</a> , and <a href="#">WL</a> ; <a href="#">Command Summary</a>  |

## Command: **Wavelength Erase**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          |       | •      | •        |

|             |   |
|-------------|---|
| Syntax      | WE <Index>  |
| Description | Instructs device to delete from its list of favorite wavelengths the wavelength at location <Index>. Index must be between 1 and 6 and not the presently active index.  |
| Example     | PE10-C with the following settings as returned by the AW command<br><b>“*CONTINUOUS 193 12000 4 248 366 532 1064 2100 10.6”</b> <ul style="list-style-type: none"> <li>• User sent <b>“WE 4”</b>. Device returns <b>“?CANNOT ERASE PRESENTLY ACTIVE INDEX”</b>.</li> <li>• User sent <b>“WE 5”</b>. Device returns <b>“*”</b>.</li> </ul> |
| Limitations | For all sensors with a continuous spectrum  |
| See Also    | <a href="#">AW</a> , <a href="#">HC</a> , <a href="#">WD</a> , <a href="#">WI</a> , and <a href="#">WL</a> ; <a href="#">Command Summary</a>  |

## Command: **Wavelength Index**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |   |
|-------------|---|
| Syntax      | WI <Index>  |
| Description | Set the device to work with wavelength at location <Index> in list of wavelengths.  |
| Example     | PE10-C with the following settings as returned by the AW command<br><b>“*CONTINUOUS 193 12000 4 248 366 532 1064 NONE 10.6”</b> <ul style="list-style-type: none"> <li>• User sent <b>“WI 5”</b>. Device returns <b>“?NO WAVELENGTH DEFINED AT SELECTED INDEX”</b>.</li> <li>• User sent <b>“WI 1”</b>. Device returns <b>“*”</b>.</li> </ul> |
| Limitations | None  |
| See Also    | <a href="#">AW</a> , <a href="#">HC</a> , <a href="#">WD</a> , <a href="#">WE</a> , <a href="#">WL</a> , and <a href="#">WW</a> ; <a href="#">Command Summary</a>   |

## Command: **WaveLength**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          |       | •      | •        |

|             |   |
|-------------|---|
| Syntax      | WL <Wavelength>   |
| Description | Set wavelength at presently active index to new value. <Wavelength> must be between the lower and upper limits of the spectrum as returned in the AW command  |
| Example     | PE10-C with the following settings as returned by the AW command<br><b>“*CONTINUOUS 193 12000 1 248 366 532 1064 NONE 10.6”</b> <ul style="list-style-type: none"> <li>• User sent <b>“WL 19000”</b>. Device returns <b>“?WAVELENGTH OUT OF RANGE”</b>.</li> <li>• User sent <b>“WL 11000”</b>. Device returns <b>“*”</b>.</li> </ul> |
| Limitations | For all sensors with a continuous spectrum  |
| See Also    | <a href="#">AW</a> , <a href="#">HC</a> , <a href="#">WD</a> , <a href="#">WE</a> , and <a href="#">WI</a> ; <a href="#">Command Summary</a>  |

## Command: **Write raNge**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |   |
|-------------|---|
| Syntax      | WN <range-setting>  |
| Description | Configure sensor to measure in a specific range<br><br>Note: The index of the highest numeric range is 0. The index of AUTO (when applicable) is -1 |
| Example     | To force a PD300 in Filter Out mode into the 3mW range enter <b>“WN 1”</b> . Device returns <b>“*”</b> .  |
| Limitations | None  |
| See Also    | <a href="#">AR</a> , <a href="#">GU</a> , <a href="#">RN</a> , and <a href="#">SX</a> ; <a href="#">Command Summary</a>                             |

## Command: **Write discrete Wavelength**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      |       |         | •       | •    |          |            |       |        |          |

|             |   |
|-------------|---|
| Syntax      | WW <wavelength-string>  |
| Description | Configure sensor to work with laser as defined in <wavelength-string> (must be a string as returned by the AW command).   |
| Example     | 3AP sensor with the following settings as returned by the AW command.<br><b>“*DISCRETE 1 VIS NIR”</b> <ul style="list-style-type: none"> <li>• User sent <b>“WW CO2”</b>. Device returns <b>“?LASER NOT FOUND”</b>.</li> <li>• User sent <b>“WW NIR”</b>. Device returns <b>“*”</b>.</li> </ul> |
| Limitations | For all sensors with a discrete spectrum. Note: WI works with Discrete Spectrum sensors and as such is preferred over WW  |
| See Also    | <a href="#">AW</a> , <a href="#">HC</a> , and <a href="#">WI</a> ; <a href="#">Command Summary</a>  |

## Command: **eXternal trigger On/off**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      |       |         |         |      |          |            |       |        | •        |

|             |  |
|-------------|--|
| Syntax      | XO <option>  |
| Description | Query and set the external trigger setting of the sensor.<br><br>Values for <option> (if not set, default to 0) <ul style="list-style-type: none"> <li>• 0: Query device for present external trigger setting.</li> <li>• 1: Set external trigger off for this sensor</li> <li>• 2: Set external trigger on for this sensor</li> </ul> |
| Example     | <ul style="list-style-type: none"> <li>• User sent <b>“XO 0”</b>. Device returns <b>“*1 Off On”</b>.</li> <li>• User sent <b>“XO 2”</b>. Device returns <b>“*2 Off On”</b>.</li> </ul>   |
| Limitations | See <a href="#">XT</a>   |
| See Also    | <a href="#">XT</a> , <a href="#">TW</a> ; <a href="#">Command Summary</a>  |

## Command: **eXternal Trigger mode**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
|      |       |         |         |      |          |            |       |        | •        |

|             |   |
|-------------|---|
| Syntax      | XT <option>   |
| Description | <p>Query and set the external trigger mode of the instrument.</p> <p>Values for &lt;option&gt; (if not set, default to 0)</p> <ul style="list-style-type: none"> <li>• 0: Query device for present external trigger mode.</li> <li>• 1 Disable: Trigger is off</li> <li>• 2 Rising: Triggers on a rising edge (Pyro sensors only)</li> <li>• 3 Falling: Triggers on a falling edge (Pyro sensors only)</li> <li>• 4 High: Measures when trigger is high</li> <li>• 5 Low: Measures when trigger is low</li> </ul> |
| Example     | <ul style="list-style-type: none"> <li>• User sent "<b>XT 0</b>". Device returns "<b>*1 Disable Rising Falling High Low</b>"</li> <li>• User sent "<b>XT 2</b>". Device returns "<b>*2 Disable Rising Falling High Low</b>"</li> </ul>  |
| Limitations |   |
| See Also    | <a href="#">XO</a> , <a href="#">TW</a> ; <a href="#">Command Summary</a>   |

## Logging Commands

These commands enable the user to upload log files that were stored on the Nova-II and Vega devices. The Juno, Juno+, Juno-RS, Pulsar, and StarLite do not provide on-board storage. The StarBright and Centauri log data to a USB Flash Drive that can afterwards be attached to the PC for direct transfer.

### Command: **Log Choose**

|             |   |
|-------------|---|
| Syntax      | LC <1-54000> for Nova-II <1-250000> for Vega  |
| Description | Set the Log pointer to the next datum to upload.<br><br>Returns <ul style="list-style-type: none"> <li>• *&lt;index&gt;: for success</li> <li>• ?POINT NOT IN RANGE: parameter greater than number of readings stored in this log file</li> </ul> |
| Example     | Log File with 100 readings <ul style="list-style-type: none"> <li>• LC 5: Instrument will return “*5”</li> <li>• LC 103: Instrument will return “?POINT NOT IN RANGE”</li> </ul>  |
| Limitations | None  |
| See Also    | <a href="#">Command Summary</a>   |

### Command: **Log Delete**

|             |  |
|-------------|--|
| Syntax      | LD <file-size>   |
| Description | Delete Log File that was previously selected with the LF command.<br><br><file-size> must equal actual file size. This is a security measure to prevent unintentionally deleting the wrong log file.<br><br>Returns <ul style="list-style-type: none"> <li>• *&lt;index&gt;: for success</li> <li>• ?PARAM ERROR: if &lt;file-size &gt; doesn't equal size of selected file</li> <li>• ?NO FILE CHOSEN: if no log file had been previously selected with the LF command</li> </ul> |
| Example     | Log File with 100 readings <ul style="list-style-type: none"> <li>• LD 5: Instrument will return “?PARAM ERROR”</li> <li>• LD 100: Instrument will return “*”</li> </ul>   |
| Limitations | None   |
| See Also    | <a href="#">Command Summary</a>  |

## Command: **Log File**

|             |   |
|-------------|---|
| Syntax      | LF <0-10>   |
| Description | Select a Log File for processing, where 0 represents the present logging session and 1-10 represent the log files that were stored<br><br>Returns<br>* <param>: <file size> for success   |
| Example     | Vega contains one Log File with 100 readings <ul style="list-style-type: none"> <li>• LF 1: Instrument will return <b>**1: 100</b></li> <li>• LF 3: Instrument will return <b>**3: 0</b></li> <li>• LF 11: Instrument will return <b>?NO SUCH FILE</b></li> </ul> |
| Limitations | None  |
| See Also    | <a href="#">Command Summary</a>   |

## Command: **Log Info**

|             |  |
|-------------|--|
| Syntax      | LI   |
| Description | Get information about logged data.<br><br>Returns<br>" " <exp> <min> <max> <points> <sample rate> <units> <corrupt> <checksum><br><name> <max_in_range> <serial_number> NONE 0 0 0 0<br><br><exp>: Exponent used for all stored data in this log file<br><min>: Lowest mantissa in this file<br><max>: Highest mantissa in this file<br><points>: Number of data points stored in this file<br><sample rate>: Elapsed time between samples in seconds multiplied by 30 for logs of power and 0 for logs of energy<br><units>: Units logged (J, W etc.)<br><corrupt>: 1 if data may have been corrupted, else 0.<br><checksum>: Hexadecimal checksum word of the logged samples<br><Name>: NULL terminated string containing the name of the sensor<br><max_in_range>: Maximum value that is still within range for this log file<br><serial_no>: Serial number of the sensor<br>"NONE 0 0 0 0": Have no meaning and are here for historical reasons<br><br>To convert the mantissa data <mant> returned by \$LI and this <exp> to a real power or energy in watts or joules, use the formula $RealPower = \text{mant} * \text{Antilog}(\text{Exp} - 3)$ where antilog (x) means 10 raised to the power of x. |
| Example     | Vega contains one Log File with 100 readings <ul style="list-style-type: none"> <li>• LF 1: Instrument returns <b>**1: 100</b></li> <li>• LI: Instrument returned <b>*-6 17 782 100 2 W 0 8812 PD300-UV 3000 711578 NONE 0 0 0 0</b></li> </ul> <p>This is a log file made with a PD300-UV serial number 711578. The readings were measured 15 times per second. The max possible reading was 3uW. The actual readings are between 0.017uW and 0.782 uW and the file wasn't corrupted.</p>   |
| Limitations | None   |
| See Also    | <a href="#">Command Summary</a>  |

## Command: **Log Last**

|             |   |
|-------------|---|
| Syntax      | LL  |
| Description | Resend the last 10 logged readings without incrementing the log pointer   |
| Example     | <ul style="list-style-type: none"><li>• LR “*”</li><li>• LS “*+0228 +0239 +0243 +0210 +0136 +0107 +0120 +0168 +0296 +0473”</li><li>• LL “*+0228 +0239 +0243 +0210 +0136 +0107 +0120 +0168 +0296 +0473”</li></ul> <p>Log pointer was set to start of log. First 10 measurement were sent twice to the PC</p> |
| Limitations | None  |
| See Also    | <a href="#">Command Summary</a>   |

## Command: **Log Reset**

|             |  |
|-------------|--|
| Syntax      | LR   |
| Description | Reset the Log File pointer to the first reading in the log. Next time LS is received, instrument will report readings 1 through 10 |
| Example     | None   |
| Limitations | None   |
| See Also    | <a href="#">Command Summary</a>  |

## Command: **Log Send**

|             |  |
|-------------|--|
| Syntax      | LS   |
| Description | <p>Send the next 10 logged measurements to the PC, incrementing the log pointer to the next batch of 10.</p> <p>Since all data stored in data logging mode are collected in the same measurement range, there is no need transmit the exponent associated with each data point for each point. This is read once using \$LI. When blocks of data are read from the memory using this \$LS command, only the mantissa is sent across the interface. The string returned contains ten mantissas in ASCII (text, not binary) form separated by spaces. If a block contains more points than were recorded, those points will have a mantissa of -9999.</p> <p>Each datum takes on the form "+8888 ". That is 1 character for sign, 4 characters exactly for mantissa, and 1 space. This will allow the PC software to do format checking to verify that no characters have been lost in transmission.</p> |
| Example     | <ul style="list-style-type: none"><li>• LR “*”</li><li>• LS “*+0228 +0239 +0243 +0210 +0136 +0107 +0120 +0168 +0296 +0473”</li><li>• LS “*+0616 +0682 +0736 +0767 +0782 +0779 +0763 +0742 +0710 +0648”</li></ul> <p>Log pointer was set to start of the log. First 20 measurements were sent to PC</p>   |
| Limitations | None   |
| See Also    | <a href="#">Command Summary</a>  |

The basic method of uploading log data to the PC is as follows:

LF <file-number>      Select the file to upload  
LI                              Get all applicable information  
LR                              Set log pointer to start of file  
Repeat  
    LS                        Upload next 10 readings  
Until receiving a string that contains -9999 in it.

## Advanced Commands

Commands described in this chapter will affect the measurement performance of the sensor. They should be used with caution.

### Command: **Calibration Query**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    |          | •          | •     | •      | •        |

#### General Overview

|             |   |
|-------------|---|
| Syntax      | CQ <factor-index> <new-factor>  |
| Description | <p>Query and set presently active calibration factors.</p> <p>Values for &lt;factor-index&gt; (if not set, default is 0)</p> <ul style="list-style-type: none"> <li>• 0: Query only.</li> <li>• 1: Request to change the active overall factor.</li> <li>• 2: Request to change the active laser's factor. For sensors that don't have per-wavelength factors, will return error code.</li> </ul> <p>New-factor is a floating-point number between 0.0002 and 2.0 scaled up by 10000 (2 to 20000)</p> |
| Example     | Examples for different sensor types are listed below  |
| Limitations | None  |
| See Also    | <a href="#">HC</a> ; <a href="#">Photodiode</a> , <a href="#">Pyroelectric – Continuous</a> , <a href="#">Pyroelectric – Discrete</a> , <a href="#">Thermopile</a> ; <a href="#">Command Summary</a> ;  |

#### Photodiode Sensors

|             |   |
|-------------|---|
| Syntax      | See <a href="#">CQ (Calibration Query – Overview)</a>   |
| Description | Will return overall factor presently in use (depends on the Filter setting). Photodiode sensors only have an overall factor. Therefore Factor-index should not be set to 2.   |
| Example     | <ul style="list-style-type: none"> <li>• User sent “<b>CQ</b>”. Device responded “<b>*1.025</b>” (correction factor of 2.5%)</li> <li>• User sent “<b>CQ 2 10000</b>”. Device responded “<b>?1.025</b>” (factor not changed).</li> <li>• User sends “<b>CQ 1 22000</b>”. Device responds “<b>?PARAM ERROR</b>” (new-factor is greater than 20000).</li> <li>• User sends “<b>CQ 1 10100</b>”. Device responds “<b>*1.0100</b>” (factor set to 1%).</li> </ul> <p>Note. In order to adjust the calibration factors for both Filter Out and Filter In modes the User should perform the following steps</p> <ol style="list-style-type: none"> <li>1. FQ 1 (Set the sensor to Filter Out mode)</li> <li>2. Adjust Filter Out factor with the CQ command</li> <li>3. FQ 2 (Set the sensor to Filter In mode)</li> <li>4. Adjust Filter In factor with the CQ command</li> <li>5. HC C (to save calibration factors permanently)</li> </ol> |
| Limitations | None  |
| See Also    | <a href="#">FQ</a> and <a href="#">HC</a> ; <a href="#">Calibration Query – Overview</a>  |

### Thermopile Sensors

|             |  |
|-------------|--|
| Syntax      | See <a href="#">CQ (Calibration Query – Overview)</a>  |
| Description | <p>CQ returns 4 values</p> <ul style="list-style-type: none"> <li>• User Power or Energy factor (depending on measurement mode). This factor can be updated by “CQ 1 &lt;value&gt;”. It affects measurements with any laser.</li> <li>• User Laser factor. This factor can be updated by “CQ 2 &lt;value&gt;”. It affects measurement with the presently active laser only</li> <li>• Overall Laser factor. This is the factor that the Device uses for the present Laser in use. It is affected by the User Laser Factor and by an Ophir calibration factor for this wavelength that cannot be adjusted by the User</li> <li>• Overall Sensitivity. This is a composite of the User Power factor, the Laser factors in use, and an Ophir overall sensitivity factor that cannot be adjusted by the User. Note that changes in the Power Factor affect this field for all Lasers. Changes in the User Laser Factor affect this field only for the present laser in use.</li> </ul>   |
| Example     | <ul style="list-style-type: none"> <li>• User sent “<b>AW</b>”. Device responded “<b>*DISCRETE 1 CO2 YAG VIS</b>”. Presently active laser is CO2</li> <li>• User sent “<b>SI</b>”. Device responded “<b>*W</b>”. Sensor is in power mode.</li> <li>• User sent “<b>CQ</b>”. Device responded “<b>*1.0000 1.0000 1.0000 2.5926E-8</b>”. These are the factors for CO2 laser in Power Mode.</li> <li>• User sent “<b>CQ 1 11000</b>”. Device responded “<b>*1.1000 1.0000 1.0000 2.3569E-8</b>”. Note the change in fields 1 and 4.</li> <li>• User sent “<b>CQ 2 11000</b>”. Device responded “<b>*1.1000 1.1000 1.1000 2.1426E-8</b>”. Note the change in fields 2, 3, and 4</li> <li>• User sent “<b>WI 2</b>”. Device responded “<b>*</b>”. Presently active laser is now YAG.</li> <li>• User sent “<b>CQ</b>”. Device responded “<b>*1.1000 1.0000 1.0950 2.1524E-8</b>”. Fields 2, 3, and 4 were replaced by values for YAG laser</li> <li>• User sent “<b>CQ 2 9000</b>”. Device responded “<b>*1.1000 0.8999 0.9853 2.3919E-8</b>”. Note change in fields 2, 3, and 4</li> <li>• User sent “<b>WI 1</b>”. Device responded “<b>*</b>”. Presently active laser is now CO2.</li> <li>• User sent “<b>CQ</b>”. Device responded “<b>*1.1000 1.1000 1.1000 2.1426E-8</b>”. Notice that the values are the same as in step 5. The laser specific changes of step 8 have no effect on a different laser.</li> <li>• User sent “<b>FE</b>”. Device responded “<b>*</b>”. Sensor is in energy mode</li> <li>• User sent “<b>CQ</b>”. Device responded “<b>*1.0000 1.1000 1.1000 2.1426E-8</b>”. Field 1 is the energy factor. It has no effect on field 4.</li> </ul> |
| Limitations | None   |
| See Also    | <a href="#">AW</a> , <a href="#">FE</a> , <a href="#">FP</a> , <a href="#">HC</a> , and <a href="#">WI</a> ; <a href="#">Calibration Query – Overview</a>  |

### Pyroelectric Sensors – Continuous

|             |   |
|-------------|---|
| Syntax      | See <a href="#">CQ (Calibration Query – Overview)</a>   |
| Description | Will return overall factor presently in use (depends on the Pulse Width setting). These Pyroelectric sensors only have an overall factor. Therefore Factor-index should not be set to 2.  |
| Example     | <ul style="list-style-type: none"> <li>• User sends “<b>CQ</b>”. Device responds “<b>*1.025</b>” (correction factor of 2.5%)</li> <li>• User sends “<b>CQ 2 10000</b>”. Device responds “<b>?1.025</b>” (factor not changed)</li> <li>• User sends “<b>CQ 1 22000</b>”. Device responds “<b>?PARAM ERROR</b>” (new-factor is greater than 20000)</li> <li>• User sends “<b>CQ 1 10100</b>”. Device responds “<b>*1.0100</b>” (factor set to 1%)</li> </ul> <p>Note. In order to adjust the calibration factors for all pulse widths, use CQ in conjunction with the PL command.</p> |
| Limitations | None  |
| See Also    | <a href="#">PL</a> and <a href="#">HC</a> ; <a href="#">Calibration Query – Overview</a>  |

### Pyroelectric Sensors – Discrete

|             |   |
|-------------|---|
| Syntax      | See <a href="#">CQ (Calibration Query – Overview)</a>   |
| Description | <p>CQ returns 3 values</p> <ul style="list-style-type: none"> <li>• Overall Energy Factor. This factor can be updated by “CQ 1 &lt;value&gt;”. It affects measurements with any laser.</li> <li>• User Laser factor. This factor can be updated by “CQ 2 &lt;value&gt;”. It affects measurement with the presently active laser only</li> <li>• Overall Laser factor. This is the factor that the Device uses for the present Laser in use. It is affected by the User Laser Factor and by an Ophir calibration factor for this wavelength that cannot be adjusted by the User</li> </ul>   |
| Example     | <ul style="list-style-type: none"> <li>• User sent “<b>AW</b>”. Device responds “* <b>DISCRETE 2 248 1064 193</b>”. Presently active wavelength is 1064</li> <li>• User sent “<b>CQ</b>”. Device responds “*<b>1.0000 1.0000 1.2500</b>”</li> <li>• User sent “<b>CQ 1 11000</b>”. Device responds “*<b>1.1000 1.0000 1.2500</b>”. Only first factor changed.</li> <li>• User sent “<b>CQ 2 12000</b>”. Device responds “*<b>1.1000 1.2000 1.5000</b>”. Note change in fields 2 and 3.</li> <li>• User sent “<b>WI 1</b>”. Device responds “*”. Presently active laser is now 248</li> <li>• User sent “<b>CQ</b>”. Device responds “*<b>1.1000 1.0000 1.0000</b>”. Overall Energy factor is unchanged. Factors 2 and 3 have been replaced by values for 248</li> <li>• User sent “<b>CQ 2 9000</b>”. Device responds “*<b>1.1000 0.8999 0.8999</b>”. Note change in fields 2 and 3.</li> <li>• User sent “<b>WI 2</b>”. Device responds “*”. Presently active laser is now 1064.</li> <li>• User sent “<b>CQ 2 12000</b>”. Device responds “*<b>1.1000 1.2000 1.5000</b>”. Note values of factors 2 and 3 are same as in step 4. The laser specific changes of step 8 have no effect on a different laser.</li> </ul> <p>Note. In order to adjust the calibration factors for all pulse widths, use CQ in conjunction with the PL command. For sensors with an adjustable diffuser, use CQ together with the DQ command.</p> |
| Limitations | None  |
| See Also    | <a href="#">AW</a> , <a href="#">DQ</a> , <a href="#">HC</a> , <a href="#">PL</a> , and <a href="#">WI</a> ; <a href="#">Calibration Query – Overview</a>   |

### Command: **Response Query**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    |          | •          | •     | •      | •        |

|             |   |
|-------------|---|
| Syntax      | RQ <response-factor>  |
| Description | <p>Query and set the User adjustable response time factor.</p> <p>Response-factor is a floating-point number between 0.0002 and 2.0 scaled up by 10000 (2 to 20000)</p>   |
| Example     | <p>User sent “<b>RQ</b>”. Device responds “*<b>1.000</b>”</p> <p>User sends “<b>RQ 22000</b>”. Device responds “<b>?PARAM ERROR</b>” (Response-factor is greater than 20000).</p> <p>User sends “<b>RQ 10100</b>”. Device responds “*<b>1.0100</b>”</p> |
| Limitations | For Thermopile sensors only   |
| See Also    | <a href="#">CQ</a> and <a href="#">HC</a> ; <a href="#">Calibration Query – Overview</a> ; <a href="#">Command Summary</a> ;  |

## Command: **Zero Abort**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |   |
|-------------|---|
| Syntax      | ZA  |
| Description | Aborts request to zero the device's measurement circuitry. Device returns status of the zeroing process.<br><b>"**ZEROING NOT STARTED"</b> . If ZA was sent before the ZE command.<br><b>"**ZEROING ABORTED"</b> . If ZA was sent before zeroing was completed.<br><b>"**ZEROING COMPLETED"</b> . If ZA was sent after zeroing was completed. |
| Example     | User sent <b>"ZE"</b> followed by the <b>"ZA"</b> command. Device returned <b>"**ZEROING ABORTED"</b> .   |
| Limitations | None  |
| See Also    | <a href="#">ZE</a> , <a href="#">ZQ</a> , and <a href="#">ZS</a> ; <a href="#">Command Summary</a>  |

## Command: **ZZero**

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |   |
|-------------|---|
| Syntax      | ZE  |
| Description | Analog components occasionally "drift" thereby introducing small errors in the meter's measurement circuitry. This command measures that drift and subtracts it from measurements. We suggest zeroing the device once in two months.  |
| Example     | Example 1. User sent <b>"ZE"</b> . Device responded <b>"**"</b> .<br><br>Example 2. User sent <b>"ZE"</b> before previous zeroing request terminated. Device responded <b>"?ZEROING IN PROGRESS"</b> .<br><br>Note. There are three different types of zeroings. <ul style="list-style-type: none"> <li>• High Impedance: With no sensor attached or with a Photodiode sensor attached.</li> <li>• Low Impedance: With a Thermopile sensor attached. For these sensors, the User should first perform a Low Impedance zero, save the result, and then perform a High Impedance zero.</li> <li>• Fast Zero: With a Pyroelectric sensor attached</li> </ul> |
| Limitations | None  |
| See Also    | <a href="#">ZA</a> , <a href="#">ZQ</a> , and <a href="#">ZS</a> ; <a href="#">Command Summary</a>  |

## Command: Zero Query

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |   |
|-------------|---|
| Syntax      | ZQ  |
| Description | User request to determine status of zeroing process. Device will return<br><b>**ZEROING NOT STARTED**</b> . If ZE command has not been sent.<br><b>**ZEROING IN PROGRESS**</b> . If ZE command was sent but the zeroing process has not yet terminated.<br><b>**ZEROING COMPLETED**</b> . If the zeroing process terminated successfully.<br><b>**ZEROING FAILED**</b> . If the zeroing process terminated unsuccessfully.<br><b>**ZEROING ABORTED**</b> . If the zeroing process was terminated by the ZA command. |
| Example     | <ul style="list-style-type: none"> <li>• User sent <b>"ZQ"</b>. Device responded <b>**ZEROING NOT STARTED**</b>.</li> <li>• User sent <b>"ZE"</b>. Device responded <b>**"</b>.</li> <li>• User sent <b>"ZQ"</b>. Device responded <b>**ZEROING IN PROGRESS**</b>.</li> <li>• Delay about 30 seconds.</li> <li>• User sent <b>"ZQ"</b>. Device responded <b>**ZEROING COMPLETED**</b>.</li> </ul>   |
| Limitations | None  |
| See Also    | <a href="#">ZA</a> , <a href="#">ZE</a> , and <a href="#">ZS</a> ; <a href="#">Command Summary</a>  |

## Command: Zero Save

Supported on the following meters:

| Juno | Juno+ | Juno-RS | Nova-II | Vega | StarLite | StarBright | Ariel | Pulsar | Centauri |
|------|-------|---------|---------|------|----------|------------|-------|--------|----------|
| •    | •     | •       | •       | •    | •        | •          | •     | •      | •        |

|             |   |
|-------------|---|
| Syntax      | ZS  |
| Description | Save results of the zeroing process to the device's memory.<br>Device returns<br><b>?ZEROING ABORTED</b> . If ZS is issued after zero was aborted.<br><b>?ZEROING IN PROGRESS</b> . If ZS is issued during zeroing process.<br><b>?ZEROING FAILED</b> . If ZS is issued after zeroing process failed.<br><b>**SAVED</b> . Upon success  |
| Example     | <ul style="list-style-type: none"> <li>• User sent <b>"ZS"</b>. Device responded <b>**ZEROING NOT STARTED**</b>.</li> <li>• User sent <b>"ZE"</b>. Device responded <b>**"</b>.</li> <li>• User sent <b>"ZS"</b>. Device responded <b>**ZEROING IN PROGRESS**</b>.</li> <li>• Delay about 30 seconds.</li> <li>• User sent <b>"ZS"</b>. Device responded <b>**SAVED</b>.</li> </ul> |
| Limitations | None  |
| See Also    | <a href="#">ZA</a> , <a href="#">ZE</a> , and <a href="#">ZQ</a> ; <a href="#">Command Summary</a>  |