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| Command | Code | Additional parameters | Returns | Description |
| Blink power LED | 0x00 | None | 0x00 | Blinks the power LED 10 times |
| Visor | 0x01 | None | 0x01 | Plays a visor pattern across the front panel LEDs |
| Blink power for counts | 0x02 | Number of blinks (0-255) | 0x02 | Blinks the power LED for the specified number of times |
| Set radius | 0x10 | Waveform amplitudes (0-65535) | 0x10 | Updates the waveform output amplitude DACs with the specified values. The new values is saved in memory as the circle scan amplitude. The command is sent as:  0x10 HB\_X LB\_X HB\_Y LB\_Y  Where HB and LB are the high byte and low bytes for the respective axis |
| Set center | 0x11 | Waveform offsets (0-65535) | 0x11 | Updates the DC offset to the waveform outputs. Applies only when scanning (waveform) mode is active. Sent as:  0x11 HB\_X LB\_X HB\_Y LB\_Y |
| Set TIRF | 0x12 | Waveform amplitudes (0-65535) | 0x12 | Updates the stored TIRF amplitude values. Switches output to TIRF scan. Same message structure as “Set radius”. |
| Circle scan | 0x13 | None | 0x13 | Switches to circle scan value for the waveform amplitude. |
| TIRF scan | 0x14 | None | 0x14 | Switched to TIRF scan value for the waveform amplitude. |
| Location park | 0x15 | DC amplitudes (0-65535) | 0x15 | Stops scanning (waveform) output and sets a constant output voltage. Same message structure as “Set center”. |
| Discrete scan | 0x16 | Amplitude and scan rate | 0x16 | Stops waveform output and approximates sine wave outputs with a discretized, 32-point sine wave. Sent as:  0x16 HB\_amp LB\_amp HB\_reset LB\_reset  The point dwell time is calculated as 0.25\*(0xFFFF-reset) μs where reset is an integer between 0 and 65535.  Must be canceled by sending 0x1E before resuming waveform operation. |
| Discrete scan off | 0x1E | None | 0x1E | Cancels the discrete scan output |
| Center Park | 0x1F | None | 0x1F | Stops waveform and sets output to the scan center value in memory. Sets the illumination blank and shutter outputs to 0. |
| Set Frequency | 0x20 | Waveform frequency (0-65535) | 0x20 | Updates the waveform output frequency of both axis.  0x20 HB\_freq LB\_freq |
| Default Frequency | 0x21 | None | 0x21 | Updates the waveform output frequency of both axis to 1 kHz |
| Set Phase | 0x22 | Waveform phase offset (0-4095) | 0x22 | Sets the phase offset of the two waveform outputs to a new value. The phase offset in degrees can be calculated as *f* \* 360 \* 2-12.  0x22 HB\_freq LB\_freq |
| Default Phase | 0x23 | None | 0x23 | Updates the waveform output phase offset to 90 deg |
| Toggle waveform clock | 0x24 | None | 0x24 | Toggles the waveform generation master clock on/off. When the clock is switched off the output remains constant at the last value. |
| Waveform disable | 0x25 | None | 0x25 | Puts the waveform generators into reset state. Output is set to midscale (0 V). Updates to frequency and phase are stored and will be reflected in the outputs once reenabled. |
| Waveform enable | 0x26 | None | 0x26 | Returns the waveform generators from reset. |
| Waveform sine | 0x27 | None | 0x27 | Sets the output waveform type to sine |
| Waveform triangle | 0x28 | None | 0x28 | Sets the output waveform type to triangle |
| Waveform square | 0x29 | None | 0x29 | Sets the output waveform type to square |
| Set axis frequency | 0x2A | Per-axis frequencies (0-4095) | 0x2A | Update the frequency of each waveform generator independently.  0x2A HB\_Xfreq LB\_Xfreq HB\_Yfreq LB\_Yfreq |
| Set DC value | 0x30 | Output (0, 1), value (0-1023) | 0x30 | Set the DC level of the specified output  0x2A Output HB\_value LB value |
| Set DC midscale | 0x31 | None | 0x31 | Sets the DC level of both outputs to midscale (0 V) |
| Set DC minimum | 0x32 | None | 0x32 | Sets the DC level of both outputs to the minimum value (-0.1 to -10 V depending on the hardware configuration) |
| Enable excitation | 0x40 | None | 0x40 | Sets the global blanking output high |
| Disable excitation | 0x41 | None | 0x41 | Sets the global blanking output low |
| Set excitation channel | 0x42 | Channel (0-7), value (0-1023) | 0x42 | Updates the output value of the specified channel  0x42 Channel HB\_value LB\_value |
| Load excitation profile | 0x43 | Profile number | 0x43 | Sets the current excitation output to the values stored in the profile |
| Open shutter | 0x44 | None | 0x44 | Sets the digital shutter output high |
| Close shutter | 0x45 | None | 0x45 | Sets the digital shutter output low |
| Toggle shutter | 0x46 | None | 0x46 | Toggles the output state of the digital shutter output |
| Add excitation profile | 0x4C | Profile number, values (0-1023) | 0x00 on success | Adds an excitation profile to memory. Any data in the existing profile will be overwritten. Values are listed in channel order from 0 to 7. Values are byte-pairs, high byte first.  0x47 Profile HB\_Ch0 LB\_Ch0 HB\_Ch1 LB\_Ch1 … LB\_Ch7 |
| Excitation reset | 0x4F | None | 0x4F | Resets the excitation outputs to 0 V and sets the global blank low. |
| Fire ON | 0x50 | None | 0x50 | Enables the camera fire interrupt for excitation shuttering |
| Fire OFF | 0x51 | None | 0x51 | Disables the camera fire interrupt |
| Software trigger | 0x5F | Trigger length (0-65535) | 0x5F | Simulates a single, trigger pulse. Duration of the pulse can be calculated as 0.25 \* (0xFFFF – value). |
| Get sequence | 0x80 | Sequence number, sequence length, number of packets, angle values | 0x00 on success | Loads a sequence of angles into controller memory. The first packet sent to the controller is:  0x80 number HB\_length LB\_length HB\_packets LB\_packets  Once the controller responds with 0x00 the controller will load the values for the following number of packets as defined in the first transmission into the angle sequence. |
| Delete sequence | 0x81 | Sequence number | 0x81 | Deletes the specified angle sequence and frees dynamic memory used to store it. |
| Make linear sequence | 0x82 | Sequence number, sequence length, step size, initial value, y scalar | 0x00 on success | Creates a new sequence of angles in memory. The first angle is equal to the initial value, and subsequent angles are calculated from step size. Y scalar is a multiplier for adjusting the relative amplitude of the two axis.  0x82 number HB\_length LB\_length HB\_step LB\_step HB\_start LB\_start HB\_y LB\_y |
| Make experiment | 0x83 | Experiment number, sequence number, profile number | 0x00 on success | Creates a new head node from which to build an experiment sequence. All parameters are sent as bytes. |
| Add first node | 0x84 | Experiment number, sequence number, profile number | 0x00on success | Pushes a node onto the front of the experiment list. If no experiment exists a new list will be created. Same syntax as **Make Experiment**. |
| Add last node | 0x85 | Experiment number, sequence number, profile number | 0x00 on success | Same as **Add first node** but pushes a node to the back of the list. |
| Loop | 0x86 | Experiment number, node number | 0x00 on success | Creates a loop in the experiment. Once the last node in the sequence is reached the experiment continues from the indicated node. Parameters are sent as bytes. |
| Start experiment | 0x87 | Repeat, experiment number, step number, loop on/off | 0x00 on success | Begins an experiment, sets the controller into the beginning state and enables the camera fire interrupt. Waits for the first exposure to begin. If the byte immediately following the command is 0 the previous experiment is repeated. Step number is counted in number of exposures, and the experiment will be incremented to the requested value before beginning. **The packet must include two trailing zero bytes after the loop switch if not a repeat of the previous experiment.**  Repeat previous: 0x87 0x00  Start new experiment (1) at step (0) with a loop:  0x87 0x01 0x01 0x00 0x00 0x01 0x00 0x00 |
| Pause experiment | 0x88 | None | 0x88 | Pauses the experiment at the current step. The camera fire ISR continues to function and the controller can be operated manually at this point without disrupting the experiment sequence. |
| Resume experiment | 0x89 | None | 0x89 | Resumes a paused experiment at the next step in the sequence |
| Restart experiment | 0x8A | None | 0x8A | Resets the currently running experiment’s step to the first step in the list |
| Delete experiment | 0x8B | None | 0x8A | Pops all nodes from the experiment list and frees memory. |
| Delete first node | 0x8C | Experiment number | 0x8B | Pops the first node from the list |
| Delete last node | 0x8D | Experiment number | 0x8C | Pops the last node from the list |
| Count steps | 0x8E | Experiment number | See note | Counts the number of nodes in the experiment list and the total number of steps for all nodes. Example output for experiment 0 with 2 nodes of 16 steps each:  0x8E 0x00 0x02 0x20 |
| Stop experiment | 0x8F | None | 0x8F | Halts execution of the current acquisition sequence. The controller returns to the pre-experiment state. The experiment progress is lost. |
| Load static half sequence | 0x90 | Number of steps, step size | 0x00 on success | Creates a sequence of dc values (static SAIM angles) along both axes starting from the circle scan zero value.  0x90 HB\_steps LB\_steps HB\_size LB\_size |
| Load static full sequence | 0x91 | Number of steps, step size, start X, start Y | 0x00 on success | Creates a sequence of dc values along both axes starting from the parameter values.  0x91 HB\_steps LB\_steps HB\_size LB\_size HB\_xstart LB\_ystart |
| Static scan direction | 0x92 | Scan direction (axis) | 0x92 | If the direction byte is 0 the experiment proceeds along the y-axis, otherwise scanning is along x-axis |
| Start static experiment | 0x93 | None | 0x93 | Starts the currently programmed static scanning experiment. |
| Start dithered experiment | 0x94 | Dither amplitude | 0x94 | Starts the currently programmed static scanning experiment with a dithered beam. The output along the non-scanned axis will be a sine wave with specified amplitude. |
| Stop static experiment | 0x95 | None | 0x95 | Stops a static scanning experiment and parks the outputs at the scan center. |
| TS\_PERIOD | 0xF0 | Settling time reset value | 0xF0 | Adjusts the scanning mirror settling timer reset value. |
| GET\_SETTINGS | 0xF1 | None | See note | Returns the current controller settings. First byte is the command byte (0xF1) and settings follow as byte pairs in this order:  Scan center X  Scan center Y  TIRF value  Waveform phase offset  Waveform frequency X |
| GET\_INFO | 0xF2 | None | See note | Returns the hardware version and firmware version of the controller |
| CHECK\_MEM | 0xFD | Experiment number | See note | Checks which experiment addresses are currently used and the storage pattern.  First return byte is the command, second is the number of experiment addresses in use. The third through sixth bytes are a bitmask of the possible experiment addresses, 1 = programmed, 0 = free. |
| SEND\_STAT | 0xFE | None | Status flags | The second and third bytes in the response is the current system flags:  int Ts:1;  int SAIM:1;  int SAIMLoop:1;  int LastFrame:1;  int Paused:1;  int Fire:1;  int Arm:1;  int DiscScan:1;  int EndOfExp:1;  int SimpleSAIM:1;  int AlwaysOpen:1;  int UseMirrorDetector:1;  int SWTrigger:1;  int SWTriggerState:1; |
| RESET | 0xFF | None | None | Resets the controller CPU, erasing all memory and returning to the default state. |