

# Sync-One2<sup>®</sup> v2

## API reference

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FW 2.2.3

## General information

Notes / Tips provide helpful information on a particular item

Warnings are to ensure correct operation of equipment and prevent damage

## Formats used within this document

Commands and responses all terminate with a Carriage Return shown as ↵  
This is ASCII code 13 or 0x0D

Commands and responses are shown in the fonts as below;

Command 0123↵

+00,0,0,S,0↵

Commands and data are not case sensitive unless otherwise stated.

## Command compatibility

The details within this document are with reference to the firmware version shown on the front page and footer of this document.

Should a command be unavailable, please check the firmware version installed in your product and upgrade as required.

## Connection

Connection to a host is via a USB Mini-B port located on the left-hand side of the unit. This supplies power and disables the auto shutoff timer when in use.

A USB cable of 2m or less is recommended

When connected this presents as a USB Serial port and should be detected and installed without the need for additional drivers on Windows, Apple, or Linux computers.

Communication parameters for the port are;

Baud rate	115,200
Data bits	8
Parity	None
Stop bits	1
Flow Control	None

## Command Format

Commands issued are not echoed back to the sender, but confirmed with either an OK↵ a returned value or an error message.

For example;

Command

API↵

Reply

OK↵

If there is an error the reply will always start ERR then contain text to help identify the problem.

ERR *error description*↵

Generic non-command specific errors returned are

ERR unknown command↵	The command entered is unknown
ERR parameter count↵	The command entered is expecting a specific number of parameters. Check for closing “ in text messages etc.
ERR parameter value↵	The parameter entered does not match the type expected, for example a number was expected but a letter was received
ERR not in API mode↵	A valid command name was received but API mode has not been entered.

Commands relating to settings are read with just the command and altered with the SET prefix. For example;

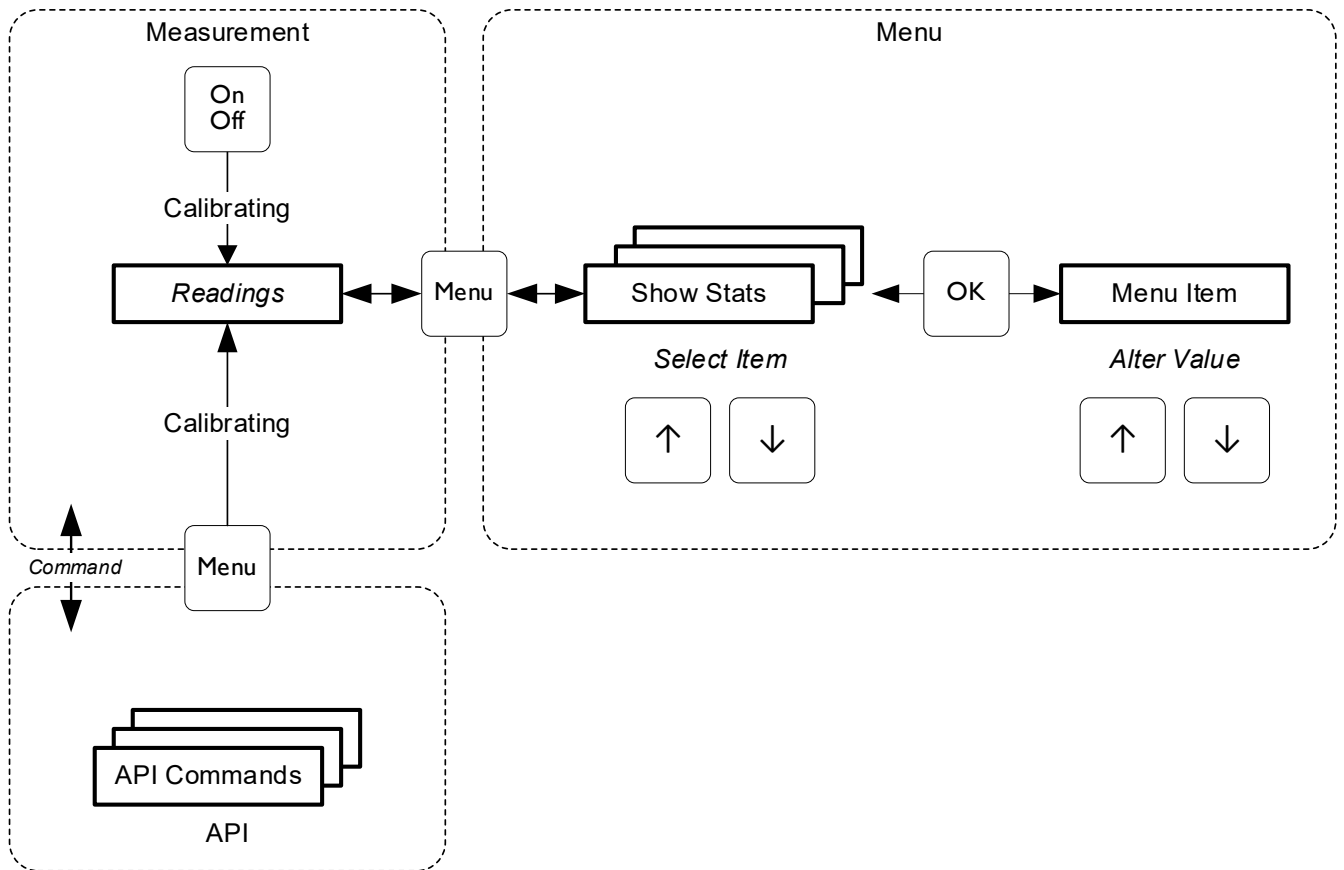
FRAME RATE	will read the frame rate
SET FRAME RATE	will set the frame rate

The use of a simple ASCII human readable API enables the end user to easily automate tasks using a language such Python. Where multiple items of data are returned, they are done so as CSV data for easier onward processing.

# Operating Modes

Sync-One2 runs in three distinct modes.

- Measurement mode, where the actual readings are taken and displayed in real time
- Menu mode, to display statistics and set various system options
- API mode, where Sync-One2 comes under remote control



Menu

API mode is activated once a command is received, and the display will show `API Control`

Menu

The Auto Off feature is automatically disabled in API mode

## Commands

The following commands are available, each is covered in more detail later in this document.

ADUIO IN	Returns the current audio input selection setting
API	Enter API mode
AUDIO TRIGGER LEVEL	Returns the current audio trigger level
CALIBRATE	Runs a sensor calibration
CLEAR STATS	Clears the measurement memory buffer
CUSTOM SPLASH 1	Set or clear a custom splash screen, line 1
CUSTOM SPLASH 2	Set or clear a custom splash screen, line 1
EXIT	Exits API mode
EXTENDED MODE	Return the current Extended Mode setting
FEATURE CODE	To enable additional features or perform specific actions
FRAME RATE	Returns the current frame rate set
MASK LEN	Returns the current Mask Time setting
OFFSET	Returns the current manual offset value
SET AUDIO IN	Sets the audio input selection
SET AUDIO TRIGGER LEVEL	Sets the audio trigger level
SET EXTENDED MODE	Sets the Extended Mode on or off
SET FRAME RATE	Sets the frame rate
SET MASK LEN	Sets the Mack Time value
SET OFFSET	Sets the manual offset value
SET SPEAKER DIST	Sets the speaker distance
SET VIDEO TRIGGER LEVEL	Sets the video trigger level
SETTINGS	Displays the system serial number and settings
SPEAKER DIST	Returns the current speaker distance set
START	Starts to take measurements, with or without calibration
STATS	Returns all the data in the measurement memory buffer
STATS AVG	Returns the average of the data in the measurement memory buffer
STATS COUNT	Returns the number of readings in the measurement memory buffer
STATS TRIM	Trims the most positive and negative readings in the measurement memory buffer
STOP	Return from Measurement mode to the API
SUPPORT CODE	Returns the support code to assist troubleshooting

VIDEO TRIGGER LEVEL	Returns the current video trigger level
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## Details of each command

<b>API</b>	<p>Enters API mode, commands will not be accepted if not in API mode.</p> <p>Command</p> <p style="text-align: center;">API↵</p> <p>Reply</p> <p style="text-align: center;">OK↵</p>
<b>AUDIO TRIGGER LEVEL</b>	<p>To obtain the current audio trigger level setting</p> <p>Command</p> <p style="text-align: center;">AUDIO TRIGGER LEVEL↵</p> <p>Reply</p> <p style="text-align: center;">4↵</p> <p>The returned value is the trigger level, in this case 4.</p> <p>The level will be a value between 0 and 4, where 0 is the lowest sensitivity and 4 is the highest.</p>
<b>AUDIO IN</b>	<p>To obtain the current audio input selection setting</p> <p>Command</p> <p style="text-align: center;">AUDIO IN↵</p> <p>Possible replies</p> <p style="text-align: center;">AUTO↵ EXTERNAL↵ INTERNAL↵</p>

<b>CALIBRATE</b>	<p>Performs a sensor calibration.</p> <div style="border: 1px solid blue; padding: 10px; margin: 10px auto; width: fit-content;"> <p>If the local environment (light or audio levels) has changed and measurements are being taken with the NOCAL option, it is recommended to run a calibration.</p> </div> <p>Command</p> <p style="text-align: center;">CALIBRATE ↵</p> <p>Reply</p> <p style="text-align: center;">OK ↵</p>
<b>CLEAR STATS</b>	<p>Clears the measurement memory buffer.</p> <p>Command</p> <p style="text-align: center;">CLEAR STATS ↵</p> <p>Reply</p> <p style="text-align: center;">OK ↵</p>

## CUSTOM SPLASH *n*

To create a custom splash message shown during system start-up, for example a company name or ownership information. The message is shown after the serial number and on the `System Info` menu option.

The text used for the splash screen is taken, verbatim, from the text in quotes. Up to 16 characters are permitted. Where *n* determines the line of the display the text is shown.

- 1 Top line of display
- 2 Bottom line of display

Command

```
CUSTOM SPLASH 1 " Property of"  
CUSTOM SPLASH 2 "Harkwood Svs Ltd"
```

Would result in a start-up splash screen of



```
Property of  
Harkwood Svs Ltd
```

Text may be cleared with the following command, where *n* determines the line of text to be cleared.

```
CUSTOM SPLASH n ""
```

Use spaces within the quoted text to position the text within the 16 character long line, as in the example above.

Reply

If successful


```
OK
```

If the message is too long

```
ERR text too long
```

If a permanent splash screen has been set at the time of order, this may not be overridden, and an error is returned.

```
ERR permanent splash set
```

<b>EXIT</b>	<p>Returns from API control into Measurement mode</p> <p>Command</p> <p style="text-align: center;">EXIT ↵</p> <p>Reply</p> <p style="text-align: center;">OK ↵</p> <p>To exit manually from API control the  can also be used.</p>
<b>EXTENDED MODE</b>	<p>Returns the current state of Extended Mode</p> <p>Command</p> <p style="text-align: center;">EXTENDED MODE ↵</p> <p>Reply</p> <p style="text-align: center;">If extended mode is off</p> <p style="text-align: center;">OFF ↵</p> <p style="text-align: center;">If extended mode is on</p> <p style="text-align: center;">ON ↵</p>

<p><b>FEATURE CODE</b></p>	<p>To enable additional features or perform specific actions</p> <p>Command</p> <p style="text-align: center;">FEATURE CODE <i>AABBCCDD 11223344</i>↵</p> <p>The <i>AABBCCDD 11223344</i> is a unique code used to unlock a specific feature or perform a specific custom action tied to a specific unit serial number.</p> <p>Reply</p> <p>If the command is accepted</p> <p style="text-align: center;">OK↵</p> <p>If the code is not for the correct serial number</p> <p style="text-align: center;">ERR invalid feature code</p> <p>If the code is valid for the serial number, but the action requested is unknown.</p> <p style="text-align: center;">ERR unknown feature code</p> <div style="border: 1px solid blue; padding: 5px; margin: 10px auto; width: fit-content;"> <p>If a supplied code for any given serial number generates this error, then it is likely that a firmware update will be required to action the feature code.</p> </div>
<p><b>FRAME RATE</b></p>	<p>To obtain the current frame rate set</p> <p>Command</p> <p style="text-align: center;">FRAME RATE↵</p> <p>Reply</p> <p style="text-align: center;">29↵</p> <p>The returned value is the frame rate, in this case 29.</p>

<b>MASK LEN</b>	<p>To obtain the current Mask Time</p> <p>Command</p> <p style="text-align: center;">MASK LEN↵</p> <p>Reply</p> <p style="text-align: center;">150↵</p> <p>The returned value is the Mask Time set, the value is in milliseconds.</p>
<b>OFFSET</b>	<p>To obtain the current manual offset set.</p> <p>Command</p> <p style="text-align: center;">OFFSET↵</p> <p>Reply</p> <p style="text-align: center;">+10↵</p> <p>The returned value is the offset set, in this case +10.</p>
<b>SET AUDIO IN</b>	<p>To set the current audio input selection</p> <p>Command</p> <p style="text-align: center;">AUDIO IN <i>value</i>↵</p> <p style="text-align: center;"><i>value</i> can be AUTO, INTERNAL, or EXTERNAL</p> <p>Reply</p> <p style="text-align: center;">If the command is accepted</p> <p style="text-align: center;">OK↵</p> <p style="text-align: center;">If the value entered does not match the commands above</p> <p style="text-align: center;">ERR parameter <i>value</i>↵</p> <div style="border: 2px solid red; padding: 5px; text-align: center; margin-top: 10px;"> <p>To ensure correct operation, perform a calibration after switching to an alternative audio source.</p> </div>

<p><b>SET AUDIO TRIGGER LEVEL</b></p>	<p>To set the current audio trigger level setting, this adjusts the sensitivity of the audio sensor.</p> <p>The level may be a value between 0 and 4, where 0 is the lowest sensitivity and 4 is the highest.</p> <p>Command</p> <p style="text-align: center;">SET AUDIO TRIGGER LEVEL 4↵</p> <p>Will set the level to the highest sensitivity.</p> <p>Reply</p> <p>If the command is accepted</p> <p style="text-align: center;">OK↵</p> <p>If the value entered it too large or small</p> <p style="text-align: center;">ERR value out of bounds↵</p> <p>If the value entered is not numeric</p> <p style="text-align: center;">ERR parameter value↵</p>
<p><b>SET EXTENDED MODE</b></p>	<p>To enable Extended Mode, to increase the maximum error from +/- 750ms to +/- 3000ms</p> <p>The Sync-One2 display will show real time readings in Seconds rather than milliseconds.</p> <p>With the mode active stats reported via the API/console will remain in milliseconds, with the numbers of digits reported increased as required.</p> <p>The mode can be either ON or OFF.</p> <p>Command</p> <p style="text-align: center;">SET EXTENDED MODE ON↵</p> <p>Reply</p> <p>If the command is accepted</p> <p style="text-align: center;">OK↵</p>

<b>SET FRAME RATE</b>	<p>To set frame rate used in the display and statistics calculations to also show errors in frames.</p> <p>The frame rate may be between 0 and 120, setting it to 0 turns off frame rate calculations and displays.</p> <p>Command</p> <p style="padding-left: 40px;">SET FRAME RATE 29↵</p> <p style="padding-left: 40px;">Will set a frame rate of 29 fps.</p> <p>Reply</p> <p style="padding-left: 40px;">If the command is accepted</p> <p style="padding-left: 80px;">OK↵</p> <p style="padding-left: 40px;">If the value entered it too large or small</p> <p style="padding-left: 80px;">ERR value out of bounds↵</p> <p style="padding-left: 40px;">If the value entered is not numeric</p> <p style="padding-left: 80px;">ERR parameter value↵</p>
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<p><b>SET MASK LEN</b></p>	<p>To set a Mask Time</p> <p>The Mask Time can be set to 150, 300, 450, 600, 750, or 900.</p> <p>Command</p> <p style="text-align: center;">SET MASK TIME 300↵</p> <p>Will set a Mask Time of 300 milliseconds</p> <p>Reply</p> <p>If the command is accepted</p> <p style="text-align: center;">OK↵</p> <p>If the value entered is not a permitted value</p> <p style="text-align: center;">ERR value out of bounds↵</p> <p>If the value entered is not numeric</p> <p style="text-align: center;">ERR parameter value↵</p>
<p><b>SET OFFSET</b></p>	<p>To set a manual offset applied to subsequent readings taken</p> <p>The offset may be between -99 and +99 and is in milliseconds</p> <p>Command</p> <p style="text-align: center;">SET OFFSET +10↵</p> <p>Will set an offset of +10 milliseconds</p> <p>Reply</p> <p>If the command is accepted</p> <p style="text-align: center;">OK↵</p> <p>If the value entered it too large or small</p> <p style="text-align: center;">ERR value out of bounds↵</p> <p>If the value entered is not numeric</p> <p style="text-align: center;">ERR parameter value↵</p>

<b>SET SPEAKER DIST</b>	<p>To set a speaker distance applied to subsequent readings taken</p> <p>The distance may be between 0 and 20 in 0.5 increments, the value is in always in meters.</p> <p>Command</p> <p style="text-align: center;">SET SPEAKER DIST 5.0↵</p> <p>Will set the distance to 5.0 meters</p> <p>Reply</p> <p>If the command is accepted</p> <p style="text-align: center;">OK↵</p> <p>If the value entered it too large or small</p> <p style="text-align: center;">ERR value out of bounds↵</p> <p>If the value entered is not numeric</p> <p style="text-align: center;">ERR parameter value↵</p>
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<p><b>SET VIDEO TRIGGER LEVEL</b></p>	<p>To set the current video trigger level setting, this adjusts the sensitivity of the video sensor.</p> <p>The level may be a value between 0 and 4, where 0 is the lowest sensitivity and 4 is the highest.</p> <p>Command</p> <p style="text-align: center;">SET VIDEO TRIGGER LEVEL 4↵</p> <p>Will set the level to the highest sensitivity.</p> <p>Reply</p> <p>If the command is accepted</p> <p style="text-align: center;">OK↵</p> <p>If the value entered it too large or small</p> <p style="text-align: center;">ERR value out of bounds↵</p> <p>If the value entered is not numeric</p> <p style="text-align: center;">ERR parameter value↵</p>
<p><b>SETTINGS</b></p>	<p>Displays the serial number and various system parameters</p> <p>Command</p> <p style="text-align: center;">SETTINGS↵</p> <p>Replies with data in the following CSV format</p> <p style="text-align: center;">A2123456,v2.2.0,00,+00,0.00,150,auto,15,4,4↵</p> <p>The fields returned are;</p> <p>A2123456    Serial Number  v2.2.0        Firmware Version Number  00             Frame rate set (0 – 120)  +00            Manual offset setting (-99 to +99)  0.00          speaker distance setting (in Meters)  150            mask time (in milliseconds)  auto           audio input (auto, internal, or external)  15             auto off time (in minutes)  4              audio trigger level  4              video trigger level</p>

<p><b>SPEAKER DIST</b></p>	<p>To obtain the current speaker distance set</p> <p>Command</p> <p style="text-align: center;">SPEAKER DIST ↵</p> <p>Reply</p> <p style="text-align: center;">5.0, 16, 4 ↵</p> <p>The returned value is the speaker distance, in meters, feet, inches In this case 5.0m, 16 feet, 4 inches.</p>
<p><b>START</b></p>	<p>Enters Measurement mode under API control, to begin taking readings. If the local environment has not changed, the sensor calibration may be omitted with an additional parameter.</p> <p>Command (with calibration)</p> <p style="text-align: center;">START ↵</p> <p>Command (without calibration)</p> <p style="text-align: center;">START NOCAL ↵</p> <p>Reply</p> <p>If the command is accepted</p> <p style="text-align: center;">OK ↵</p> <p>If external audio was in-use set during the previous calibration or the audio input is set to external, and a START NOCAL issued but no external audio is connected.</p> <p style="text-align: center;">ERR external audio disconnected ↵</p> <div style="border: 1px solid blue; padding: 10px; margin-top: 10px;"> <p>When in Measurement mode readings are reported in real time, the reply of</p> <p style="text-align: center;">START ↵</p> <p>Indicates data logging is active</p> </div>

## STATS

Displays the contents on the memory buffer, these are displayed as the most recent reading first going back to the oldest.

Command

```
STATS ↵
```

Replies with data in the following CSV format

```
+000,+0.00,+020,+0.00,0090,00.0,E,S,O ↵  
+000,+0.00,+020,+0.00,0090,00.0,,S,O ↵  
+000,+0.00,+020,+0.00,0090,00.0,,,O ↵  
+090,+0.00,+020,+0.00,0090,00.0,,, ↵  
+000,+0.00,+020,+0.00,0090,00.0,,, ↵  
+073,+0.00,+020,+0.00,0090,00.0,,, ↵  
+000,+0.00,+020,+0.00,0090,00.0,,, ↵  
+000,+0.00,+020,+0.00,0090,00.0,,, ↵
```

The fields returned are;

+000	Reading in milliseconds
+0.00	Reading in frames
+020	Average of whole buffer in milliseconds
+0.00	Average of whole buffer in frames
0090	Span on the whole buffer
00.0	Span on the whole buffer in frames

If Extended Mode is enabled the Readings will have expanded numbers of digits to handle the larger readings.

The remaining items are flags, if the letter is shown the flag is set for that reading in the memory buffer to indicate the setting incorporates the adjustment

E	External audio port was used
S	Speaker distance set
O	Manual Offset set

If the memory buffer is empty the command will return

```
ERR no stats recorded ↵
```

<p><b>STATS AVG</b></p>	<p>Displays the average of the whole memory buffer in milliseconds and frames.</p> <p>Command</p> <p style="text-align: center;"><b>STATS AVG</b>↵</p> <p>Replies with data in the following CSV format</p> <p style="text-align: center;"><b>+020 , +0 . 00</b>↵</p> <p>The fields returned are;</p> <p><b>+020</b>           Average of whole buffer in milliseconds  <b>+0 . 00</b>        Average of whole buffer in frames</p> <p>If Extended Mode is enabled the Readings will have expanded numbers of digits to handle the larger readings.</p> <p>If the memory buffer is empty the command will return</p> <p style="text-align: center;"><b>ERR no stats recorded</b>↵</p>
<p><b>STATS COUNT</b></p>	<p>Returns the number of readings in the memory buffer.</p> <p>Command</p> <p style="text-align: center;"><b>STATS COUNT</b>↵</p> <p>Reply</p> <p style="text-align: center;"><b>5</b>↵</p> <p>The returned value is the number of readings in the memory buffer, in this case 5.</p>

<p><b>STATS SPAN</b></p>	<p>Displays the span on the whole memory buffer in milliseconds and frames.</p> <p>Command</p> <p style="text-align: center;"><code>STATS SPAN↵</code></p> <p>Replies with data in the following CSV format</p> <p style="text-align: center;"><code>0090,00.0↵</code></p> <p>The fields returned are;</p> <p style="text-align: center;"><code>0090</code>            Span on the whole buffer  <code>00.0</code>            Span on the whole buffer in frames</p> <p>If Extended Mode is enabled the Readings will have expanded numbers of digits to handle the larger readings.</p> <p>If the memory buffer is empty the command will return</p> <p style="text-align: center;"><code>ERR no stats recorded↵</code></p>
<p><b>STATS TRIM</b></p>	<p>Trims the highest and lowest readings from the memory buffer, which may be useful to remove erroneous readings from the buffer. There needs to be at least 3 readings in the memory buffer.</p> <p>Command</p> <p style="text-align: center;"><code>STATS COUNT↵</code></p> <p>Reply</p> <p>If the command is accepted</p> <p style="text-align: center;"><code>OK↵</code></p> <p>If there are fewer than 3 entries in the memory buffer the command will return</p> <p style="text-align: center;"><code>ERR too few stats recorded↵</code></p>

<b>STOP</b>	<p>Return from Measurement mode to API mode</p> <p>Command</p> <p style="text-align: center;">STOP↵</p> <p>Reply</p> <p style="text-align: center;">OK↵</p>
<b>SUPPORT CODE</b>	<p>Returns a support code used to identify a specific Sync-One2 device, its firmware level, enabled options, and other data to assist in troubleshooting.</p> <p>Command</p> <p style="text-align: center;">SUPPORT CODE↵</p> <p>Reply</p> <p style="text-align: center;">01020304 0A0B0C0D↵</p> <p>The returned code should be supplied to Harkwood Services, when requested, to assist in troubleshooting issues. It may also be required when requesting specific test files to be created.</p>
<b>VIDEO TRIGGER LEVEL</b>	<p>To obtain the current video trigger level setting</p> <p>Command</p> <p style="text-align: center;">VIDEO TRIGGER LEVEL↵</p> <p>Reply</p> <p style="text-align: center;">4↵</p> <p>The returned value is the trigger level, in this case 4.</p> <p>The level will be a value between 0 and 4, where 0 is the lowest sensitivity and 4 is the highest.</p>



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For additional support or information please visit the website, or e-mail [sync-one2@harkwood.co.uk](mailto:sync-one2@harkwood.co.uk)

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