Sync-One2® v2

API reference

Issue 23.03 FW 2.3.0

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,O⏎
```

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;

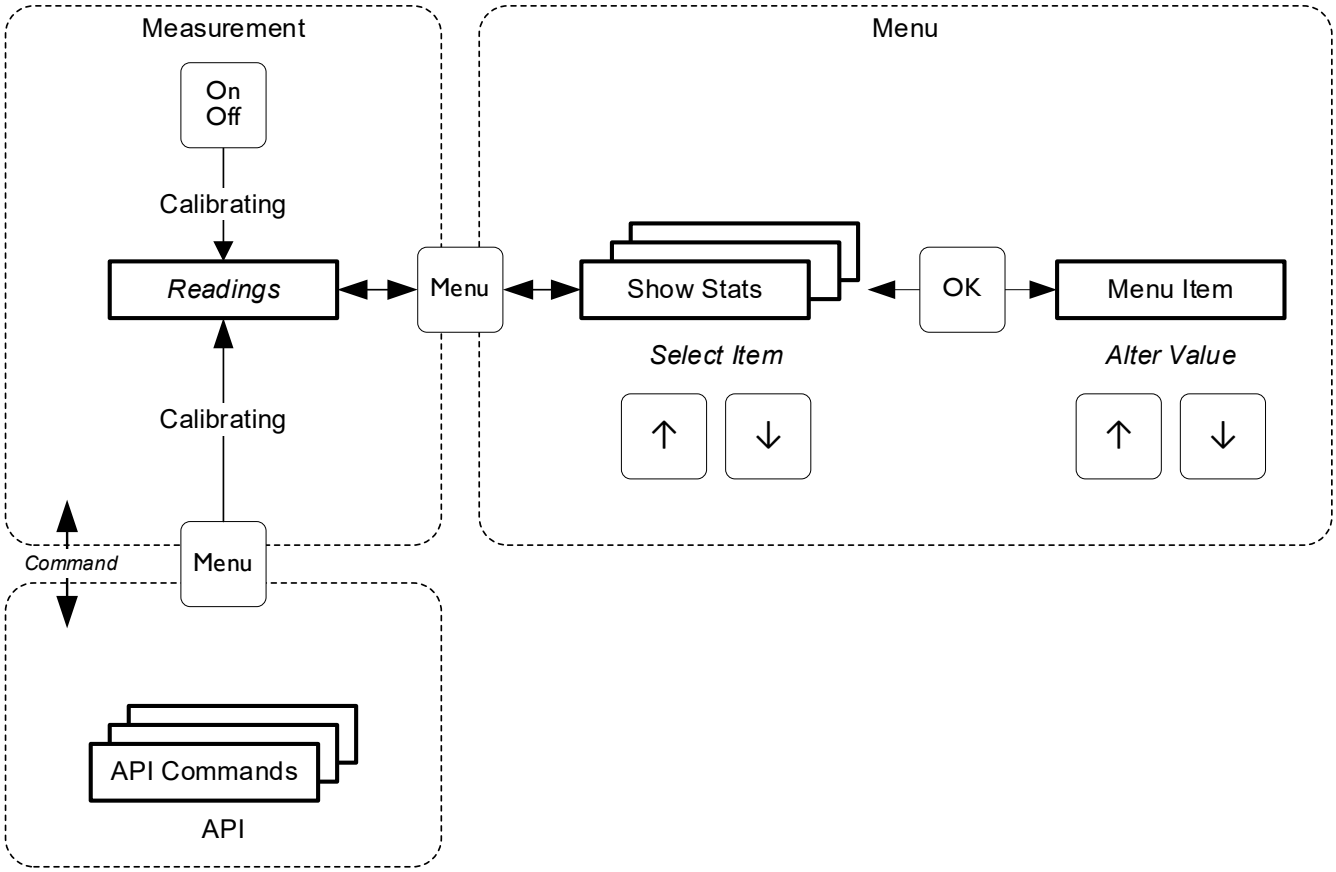
FRAME RATE	will read the frame rate
SET FRAME RATE	will set the frame rate

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



Moving between Measurement mode and Menu mode is via the Menu button.

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

To exit API mode, issue the exit command, press the Menu button, or disconnect the USB Mini-B cable.

The Auto Off feature is automatically disabled in API mode

Data logging

Sync-One2 v2 will always automatically log measurements taken, in real time, to the host whilst in Measurement mode.

When entering Measurement mode Sync-One2 v2 sends

```
START↵
```

When a reading is taken, this is sent in milliseconds as displayed on the main display

```
+010↵
-005↵
```

When exiting Measurement mode Sync-One2 sends

```
STOP↵
```

Activate API mode

When connected to the host computer Sync-One2 v2 will automatically switch on and enter Measurement mode. The initial character of the first command received will transfer from Measurement mode into API mode, this is to ensure measurements taken are not interrupted by processing incoming commands.

Once in API mode the display will then show API Control

When commands are issued the display will act as normal for that option but remains under API control.

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
RESET SETTINGS	Reset all settings to default
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

Details of each command

API	Enters API mode, commands will not be accepted if not in API mode.
	
	Command
	
	`API↵`
	
	Reply
	
	`OK↵`

AUDIO TRIGGER LEVEL	To obtain the current audio trigger level setting
	
	Command
	
	`AUDIO TRIGGER LEVEL↵`
	
	Reply
	
	`4↵`
	
	The returned value is the trigger level, in this case 4.
	
	The level will be a value between 0 and 4, where 0 is the lowest sensitivity and 4 is the highest.

AUDIO IN	To obtain the current audio input selection setting
	
	Command
	
	`AUDIO IN↵`
	
	Possible replies
	
	`AUTO↵`
	`EXTERNAL↵`
	`INTERNAL↵`

CALIBRATE	Performs a sensor calibration.
	
	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.
	
	Command
	
	`CALIBRATE↵`
	
	Reply
	
	`OK↵`

CLEAR STATS	Clears the measurement memory buffer.
	
	Command
	
	`CLEAR STATS↵`
	
	Reply
	
	`OK↵`

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
	
	 
	
	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↵`

EXIT	Returns from API control into Measurement mode Command EXIT↵ Reply OK↵ To exit manually from API control the Menu can also be used.
EXTENDED MODE	Returns the current state of Extended Mode Command EXTENDED MODE↵ Reply If extended mode is off OFF↵ If extended mode is on ON↵

FEATURE CODE	To enable additional features or perform specific actions
	
	Command
	
	`FEATURE CODE` *`AABBCCDD 11223344`*↵
	
	The *`AABBCCDD 11223344`* is a unique code used to unlock a specific feature or perform a specific custom action tied to a specific unit serial number.
	
	Reply
	
	If the command is accepted
	
	`OK`↵
	
	If the code is not for the correct serial number
	
	`ERR invalid feature code`
	
	If the code is valid for the serial number, but the action requested is unknown.
	
	`ERR unknown feature code`
	
	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.

FRAME RATE	To obtain the current frame rate set Command `FRAME RATE`↵ Reply `29`↵ The returned value is the frame rate, in this case 29.

MASK LEN	To obtain the current Mask Time Command MASK LEN↵ Reply 150↵ The returned value is the Mask Time set, the value is in milliseconds.
OFFSET	To obtain the current manual offset set. Command OFFSET↵ Reply +10↵ The returned value is the offset set, in this case +10.
RESET SETTINGS	To reset all settings to default Command RESET SETTINGS↵ Reply OK↵

SET AUDIO IN	To set the current audio input selection Command `SET AUDIO IN value`↵ `value` can be `AUTO`, `INTERNAL`, or `EXTERNAL` Reply If the command is accepted `OK`↵ If the value entered does not match the commands above `ERR parameter value`↵ To ensure correct operation, perform a calibration after switching to an alternative audio source.
SET AUDIO TRIGGER LEVEL	To set the current audio trigger level setting, this adjusts the sensitivity of the audio sensor. The level may be a value between 0 and 4, where 0 is the lowest sensitivity and 4 is the highest. Command `SET AUDIO TRIGGER LEVEL 4`↵ Will set the level to the highest sensitivity. Reply If the command is accepted `OK`↵ If the value entered it too large or small `ERR value out of bounds`↵ If the value entered is not numeric `ERR parameter value`↵

SET EXTENDED MODE	To enable Extended Mode, to increase the maximum error from +/- 750ms to +/- 3000ms
	
	The Sync-One2 display will show real time readings in Seconds rather than milliseconds.
	
	With the mode active stats reported via the API/console will remain in milliseconds, with the numbers of digits reported increased as required.
	
	The mode can be either ON or OFF.
	
	Command
	
	`SET EXTENDED MODE ON↵`
	
	Reply
	
	If the command is accepted
	
	`OK↵`

SET FRAME RATE	To set frame rate used in the display and statistics calculations to also show errors in frames.
	
	The frame rate may be between 0 and 120, setting it to 0 turns off frame rate calculations and displays.
	
	Command
	
	`SET FRAME RATE 29↵`
	
	Will set a frame rate of 29 fps.
	
	Reply
	
	If the command is accepted
	
	`OK↵`
	
	If the value entered it too large or small
	
	`ERR value out of bounds↵`
	
	If the value entered is not numeric
	
	`ERR parameter value↵`

SET MASK LEN	To set a Mask Time The Mask Time can be set to 150, 300, 450, 600, 750, or 900. Command SET MASK LEN 300↵ Will set a Mask Time of 300 milliseconds Reply If the command is accepted OK↵ If the value entered is not a permitted value ERR value out of bounds↵ If the value entered is not numeric ERR parameter value↵
SET OFFSET	To set a manual offset applied to subsequent readings taken The offset may be between -99 and +99 and is in milliseconds Command SET OFFSET +10↵ Will set an offset of +10 milliseconds Reply If the command is accepted OK↵ If the value entered it too large or small ERR value out of bounds↵ If the value entered is not numeric ERR parameter value↵

SET SPEAKER DIST	To set a speaker distance applied to subsequent readings taken
	
	The distance may be between 0 and 20 in 0.5 increments, the value is in always in meters.
	
	Command
	
	`SET SPEAKER DIST 5.0↵`
	
	Will set the distance to 5.0 meters
	
	Reply
	
	If the command is accepted
	
	`OK↵`
	
	If the value entered it too large or small
	
	`ERR value out of bounds↵`
	
	If the value entered is not numeric
	
	`ERR parameter value↵`

SET VIDEO TRIGGER LEVEL

To set the current video trigger level setting, this adjusts the sensitivity of the video sensor.

The level may be a value between 0 and 4, where 0 is the lowest sensitivity and 4 is the highest.

Command

```
SET VIDEO TRIGGER LEVEL 4↵
```

Will set the level to the highest sensitivity.

Reply

If the command is accepted

```
OK↵
```

If the value entered it too large or small

```
ERR value out of bounds↵
```

If the value entered is not numeric

```
ERR parameter value↵
```

SETTINGS

Displays the serial number and various system parameters

Command

```
SETTINGS↵
```

Replies with data in the following CSV format

```
A2123456,v2.2.0,00,+00, 0.00,150,auto,15,4,4↵
```

The fields returned are;

`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

SPEAKER DIST	To obtain the current speaker distance set
	
	Command
	
	`SPEAKER DIST↵`
	
	Reply
	
	`5.0,16,4↵`
	
	The returned value is the speaker distance, in meters, feet, inches
	In this case 5.0m, 16 feet, 4 inches.

START	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.
	
	Command (with calibration)
	
	`START↵`
	
	Command (without calibration)
	
	`START NOCAL↵`
	
	Reply
	
	If the command is accepted
	
	`OK↵`
	
	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.
	
	`ERR external audio disconnected↵`
	
	When in Measurement mode readings are reported in real time, the reply of
	
	`START↵`
	
	Indicates data logging is active

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↵`

STATS AVG	Displays the average of the whole memory buffer in milliseconds and frames.
	
	Command
	
	`STATS AVG↵`
	
	Replies with data in the following CSV format
	
	`+020,+0.00↵`
	
	The fields returned are;
	
	`+020` Average of whole buffer in milliseconds
	`+0.00` Average of whole buffer in frames
	
	If Extended Mode is enabled the Readings will have expanded numbers of digits to handle the larger readings.
	
	If the memory buffer is empty the command will return
	
	`ERR no stats recorded↵`

STATS COUNT	Returns the number of readings in the memory buffer.
	
	Command
	
	`STATS COUNT↵`
	
	Reply
	
	`5↵`
	
	The returned value is the number of readings in the memory buffer, in this case 5.

STATS SPAN	Displays the span on the whole memory buffer in milliseconds and frames.
	
	Command
	
	`STATS SPAN↵`
	
	Replies with data in the following CSV format
	
	`0090,00.0↵`
	
	The fields returned are;
	
	`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.
	
	If the memory buffer is empty the command will return
	
	`ERR no stats recorded↵`

STATS TRIM	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.
	
	Command
	
	`STATS TRIM↵`
	
	Reply
	
	If the command is accepted
	
	`OK↵`
	
	If there are fewer than 3 entries in the memory buffer the command will return
	
	`ERR too few stats recorded↵`

STOP	Return from Measurement mode to API mode
	
	Command
	
	`STOP↵`
	
	Reply
	
	`OK↵`

SUPPORT CODE	Returns a support code used to identify a specific Sync-One2 device, its firmware level, enabled options, and other data to assist in troubleshooting.
	
	Command
	
	`SUPPORT CODE↵`
	
	Reply
	
	`01020304 0A0B0C0D↵`
	
	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.

VIDEO TRIGGER LEVEL	To obtain the current video trigger level setting
	
	Command
	
	`VIDEO TRIGGER LEVEL↵`
	
	Reply
	
	`4↵`
	
	The returned value is the trigger level, in this case 4.
	
	The level will be a value between 0 and 4, where 0 is the lowest sensitivity and 4 is the highest.

Sync-One2® is a registered trademark of Harkwood Services Ltd

For additional support or information please visit the website, or e-mail sync-one2@harkwood.co.uk

Sync-One2 is designed and manufactured in Cambridge, UK, by Harkwood Services Ltd.