



ION

Operator Manual
Rev. 2.1

SHOT OVER

Document Revision History			
Rev Number	Description	Page/Section	Date
1.0	Original document release	--	JAN 2016
1.1	Weather radar added	Sec 4	JAN 2016
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About this Manual

This manual contains instructions for using the SHOTOVER Systems ION. Every effort has been made to make this document as complete and accurate as possible.

The following symbols for warnings, cautions, and notes are used to throughout this manual.



Warning

A warning symbol denotes an item where a potential hazard capable of producing injury to personnel or destruction of equipment exists if the approved procedure is not followed.



Caution

A caution symbol denotes an item where, if not followed, damage to equipment or degradation of mission capability can occur.



Note

The note symbol is used to identify information for installers and operators. While not directly related to safety or protection of equipment from damage, the note symbol identifies information to which attention should be paid during the installation and/or operation of the equipment.

Product Guarantee & Warranty Information

For details about the SHOTOVER Systems ION warranty, please see the Terms and Conditions page available at www.shotover.com/agreement



This document contains information that was current as of the printing of this manual. To obtain always up-to-date installation drawings, ICDs, and much more, visit: www.shotover.com/specifications

Introduction

Thank you for purchasing the SHOTOVER Systems ION video recorder. With a flexible configuration and assortment of pre-programmed modules (plus the ability to develop your own), coupled with an easy-to-use operator interface, the ION is ready to solve any video-related challenge you may have. This manual provides detailed information on the technical specifications and characteristics as well as the operation of your ION video recorder.

Section 1 Characteristics & Specifications

1.0 Description

This section contains information concerning the physical characteristics and technical specifications of the SHOTOVER ION video recorder.

1.1 Design Characteristics

ION is a compact, solid-state DZUS mounted video recorder. ION offers simultaneous recording of two channels of HD-SDI video, one channel of analog video, audio, and metadata. Video is saved to removable USB or SD media for easy transport and hand-off. A full-color, backlit LCD display allows operators to review recorded clips on the go and even perform playback while recording.



- 1) Backlit, full-color, 2.15 in [54.61 mm] diagonal LCD screen
- 2) Backlit REC button
- 3) Backlit Mute button
- 4) Control knob (inner knob, outer knob, and push-button operation)
- 5) SD media (2x)
- 6) USB 3.0 (2x)
- 7) Fault light
- 8) CMOS Battery access tray (located on the bottom of the enclosure) *

* CMOS battery access tray included on ION hardware revision 2.8 and higher.

1.2 Specifications

Specification	Characteristic
Product Designation/Description	ION Video Recorder
Physical Dimensions	Height at bezel: 1.875 in [47.63 mm] Width at bezel: 5.75 in [146.05 mm] Length (Enclosure depth): 7.0 in [177.8 mm] Overall depth, front knob to back of enclosure, excluding connectors: 8.32 in [211.33 mm]
Weight	2.6 lbs ± .05 lbs [1.18 kg ± .02 kg]
Display type / dimensions / resolution	Backlit LCD, 2.15 in [54.61 mm] diagonal Native 320 x 240 pixel resolution NVIS Class A compliant / NVIS class B compatible
Environmental Qualifications	DO-160 Qualified
Operating Temperature Range	-20°C to +70°C
Maximum Operating Altitude	+45,000 feet [+13,716m]
Power: Input Voltage	28VDC
Input Current	4A on 28VDC (normal operating range)
Power consumption	112W (maximum)
Circuit Breaker Requirement	Minimum 5 amp rated
Connection Types, Protocols, and Standards	LEMO (1x) J1 – Power/GPIO LEMO (1x) J2 – Ethernet LEMO (1x) J3 – Misc. (USB, ARINC 429*, Audio) LEMO (1x) J4 – Serial port (RS232, RS422) BNC J5, J6, J7 – HD-SDI 1 & HD-SDI 2 video in / HD-SDI video out BNC J8, J9, J10 – Analog in Wi-Fi compatibility – 802.11ac
Video-in Support	2x HD-SDI inputs - Single channel, 3G-SDI (1080p60) input supported 1x Analog video input (CVBS, Y/C, YPbPr, & RGB)
Video-out Support	1x HD-SDI output - 3G-SDI (1080p60) output supported
Video-out Supported Resolutions	720p (50 fps), 720p (60 fps), 1080p (25 fps), 1080p (30 fps) 1080p (60 fps), 1080i (50 fps), 1080i (60 fps)

* ARINC 429 requires additional software functionality and is offered for an additional fee.

Metadata Standard	KLK MISB/STANAG 4609 compliant
Video Recording Codec	H.265 (HEVC) – Skylake processor models only H.264 (MPEG-4) H.262 (MPEG-2)
Audio-in Support	L/R channel in
Audio-out Support	L/R channel out

Section 2 Operation

2.0 Description

This section contains instructions for the operation of the SHOTOVER Systems ION video recorder.

2.1 Powering the Unit On

In most aircraft installations, the ION will be wired to a 28-volt DC aircraft power source and/or via a dedicated mission bus. In these cases, the ION will automatically start-up once power has been provided to the unit. Running the ION solely using aircraft battery power is not advised.

For non-aircraft installations, use the provided power cable connected to a standard 120 VAC outlet. The ION will start-up immediately once power is applied.

If at any point in time the ION fails to properly boot or encounters a hardware error during the boot sequence, the fault light will illuminate. In this case, cycle power to the ION and attempt another restart. If, at that point in time, the ION still does not power-up and the fault light is still illuminated, please refer to the troubleshooting section of this manual.

2.2 Hardware

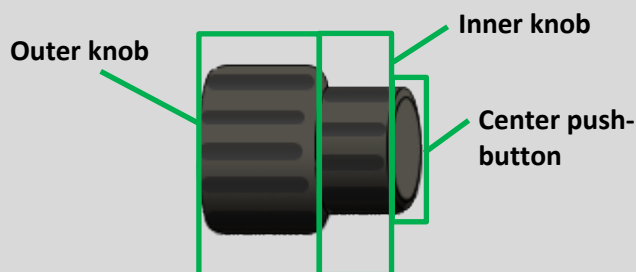
The ION's hardware interface is streamlined for easy and intuitive operation. This eliminates navigating complex menus to perform basic tasks during time-critical missions. The ION features two hardware-based buttons for quick access to recording and muting. Additionally, the dual concentric rotary encoder knob (referred to as "*control knob*" in this manual) provides access to all other internal menus, navigation within menus, and a center push-button for selection.



[FIG 2.1] ION's hardware-based buttons: REC and MUTE buttons (top) and control knob with center push-button (bottom).

Two hardware-based buttons provide the operator with quick access to enable and disable recording (**REC**) and mute and un-mute audio (**MUTE**) during the recording.

The *control knob* features an inner and outer section as well as a center push-button end. Typical operation uses the outer knob for "coarse" selection and navigation between major sections of the menu and the inner knob for "fine" selection within menus. To select an item, the operator can press the push-button end of the knob as the "enter" command.



2.3 Basic Operation

During basic operation, the outer control knob is used to select the desired recorder(s) from which video will be captured. By pressing the REC button, the operator starts and stops the recording as desired.

2.4 Recorders

In the ION, the term **recorder** is given to the recordable output made up of several different input parameters for any given video source. Recorders combine the video signal itself (analog or digital) with preferences for the type of encoder, video scaling, and metadata, plus global parameters like audio, into a single entity. These settings and sources combine to become the HD-SDI-1, HD-SDI-2, and Analog recorders as shown below.



[FIG 2.2] Recorder selection screen

In addition to the name, the recorder selection screen contains information about each recorder source. This includes the status (recording / not recording) and the recorder's assigned primary removable media location (SD 1, SD 2, USB 1, USB 2).

2.4.1 Recorder Selection Screen

The recorder selection screen displays an overview of the status of the recorders that have been setup in the ION. This screen is useful to get a general overview of the status of the recorder (either recording or not recording) and information about the removable media that has been assigned to each recorder. The options available in the recorder selection screen will vary by customer and application.



[FIG 2.3] Recorder selection screen detail

2.4.2 Recorder Display Page

The video available to each recorder can be monitored using the individual recorder display pages for HD-SDI 1, HD-SDI 2, and Analog. These pages allow the operator to monitor the video associated with the recorder as well as the basic status of the recorder: Recording, Not recording, No video, etc.



- 1 HD-SDI 1 is selected from the Recorder Selection Screen.
- 2 Pressing the control knob while HD-SDI 1 is selected shows the live video from the camera with an indication of "Not Recording".
- 3 Pressing the REC button, the recorder page for HD-SDI 1 indicates it is now being recorded.

2.5 Recording Video

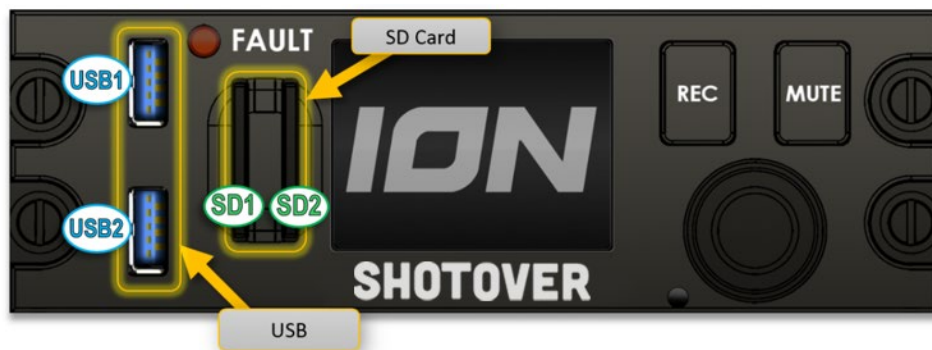
2.5.1 Removable Media

Prior to recording, ensure that the ION has at least one available removable media device installed. Two USB and two SD ports are available for recording. Operators can set the recording order preference for each recorder available in the ION. This option will also allow the ION to "rollover" to the next available drive when the current one becomes full.

Removable Media Recommendations:

- USB**
- Format as exFAT or NTFS
 - USB 2.0 (or better)
 - Expect to consume roughly 4GB per hour of recorded video

- SD**
- Format as exFAT or NTFS
 - Class 4 (or better)
 - Expect to consume roughly 4GB per hour of recorded video



[FIG 2.4] Removable media interfaces

2.5.2 Recording HD-SDI Video

When the ION is receiving one or both HD-SDI recorder channels, use the outer control knob to select the desired recorder and press the REC button to start recording.



[FIG 2.5] Recording operation

Press the REC button once again to end the recording. Video files will be automatically saved to the recorder's preferred removable media location.

The recorder selection screen will also provide an overview of any active recordings as well as the length of video that has been recorded.



[FIG 2.6] HD-SDI 1 recording in progress as viewed from the Recorder Selection Screen

2.5.3 Recording Analog Video

The ION's analog video recorder can be selected and recorded in an identical manner to the HD-SDI recorders' operation. Use the outer knob to select the analog channel and press the REC button to start and stop the recording.



[FIG 2.7] Hoist camera recording using analog video

Note: Because the ION can accept several types of analog video, **setup is required** for first-time installation of analog video on an ION. If you have connected analog video and still see a “no signal” screen or no analog channel is available, please refer to section 6.4.1(c) – *Analog video inputs* and 7.2 – *Troubleshooting Analog Video*.

2.6 Audio

2.6.1 Audio Setup

For best audio quality, SHOTOVER Systems recommends that the ION audio input be connected to a balanced (chassis ground independent) output, with -15 dBV signal levels. It is also recommended to connect the ION audio input to a COM port, rather than a headset output. Please see the ION installation manual for addition setup detail.



ION can be configured to record stereo audio as two separate channels; ICS as channel 1 and RX/TX (radio comms) as channel 2, for example. See the installation manual for details.

The recommended ION audio setup has been tested on common aircraft audio control systems including the Eagle Copters USA (Geneva Aviation) G13000 Digital Audio Router and Technisonic A711 and A711X. If you have questions regarding the best audio setup for your installation, please contact SHOTOVER Systems.

2.6.2 Muting and Unmuting Audio

The ION features a hardware-based mute button to allow operators to quickly mute and un-mute the audio being recorded. When recording audio is muted, an icon will display in the upper right of the ION’s screen, as shown below. **The mute button mutes the captured audio for all recorders.**



[FIG 2.8] Audio recording is muted



When the hardware-based mute button is activated, audio recording is muted for ALL recorders.

2.7 Software Updates

ION software is updated frequently to add new features and improve functionality. The current version of the ION software, as well as an archive of previously released versions, can be found by visiting the Software Release Notes webpage at: <http://shotover.com/releasenotes/>

2.7.1 Downloading & Installing Updates

To update the software for your ION, simply download the update from the Release Notes webpage (<http://shotover.com/releasenotes/>) and save the file to an SD card or USB drive. Next, insert the SD or USB drive with the saved update file into the ION and restart the device. The software will then be automatically loaded and the operator will be prompted by the ION to install the latest version.

Once the update process is successful, the fault light will blink once and the unit will reboot.

Section 3 Playback

3.0 Description

This section contains information for playing back the video captured by the SHOTOVER Systems ION video recorder.

3.1 File Format

The ION's video files will be saved in .TS (Transport Stream) file format. Transport Stream is a standard format specified in MPEG-2 for the transmission and storage of audio, video, and metadata. Recorded video files will be saved to the removable media (either USB or SD) based on operator preferences.

File names will generally be in the format of: [RecorderName]-yyyy-mm-dd-HHMMSS.TS

Because a .TS video file also captures metadata, video files can contain additional information including GPS lat/long position, aircraft heading/pitch/roll, etc.

3.2 On-Device Playback

Use the ION's on-screen menu to access the playback option and select the video file you wish to play.



[FIG 3.1] On-device playback operation

3.2.1 Playback controls:

Select the desired video clip using the outer knob and press the center push button to select and to start/pause playback. The on-screen progress indicator at the bottom of the screen will show where you are in the clip.

Turn the inner knob left or right to incrementally skip forward and backward. Alternatively, you can advance the clip one frame at a time by first pausing the playback turning the inner control knob.

By default, on-device playback will take place at normal speed (1x). While reviewing any clip, playback speed can be adjusted downward or upward. To adjust playback speed, turn the inner control knob left or right while pressing the knob in. The playback speed will be indicated in the lower, right corner of the screen.

To exit playback mode, rotate the outer knob to the left.

3.3 Windows PC Playback

For Microsoft Windows users, SHOTOVER Systems recommends using the free VLC Player available from videolan.org. Please note that the Movies and TV App and Windows Media Player are not supported at this time.

3.4 Macintosh Playback

While some versions of Apple QuickTime Player can handle playback of .TS files, it is recommended that Macintosh users install the free VLC Player to view the .TS video files recorded by the ION.

3.5 Editing Recorded Video Files

.TS files can be edited using the most current versions of Windows Movie Maker, Apple Final Cut, Adobe Premier, and others. Some software packages like Apple iMovie may require transcoding from .TS file format into .MP4 (or another compatible format). Free products such as HandBrake (www.handbrake.fr) or other video transcoding software will generally work well to perform this conversion.

Operators are encouraged to refer to outside or online documentation as a complete discussion on how to edit recorded video files is outside of the scope of this manual.

Section 4 Setup Menu

4.0 Description

ION is fully configurable to support most installation and setup scenarios. This section details the advanced setup options that are available to operators.

4.0.1 Accessing the Setup Menu

The setup menu is accessed via the recorder selection screen. Use the inner control knob to select “Setup” and then press the control knob’s center push button.



[FIG 4.1] Accessing the Setup menu.

4.0.2 Using the On-Screen Keyboard

The on-screen keyboard allows operators to change text entries using only the functions of the control knob and push button, eliminating the need for an external keyboard. The on-screen keyboard allows for entry of upper and lower-case letters, numbers, and a predefined set of special characters.



[FIG 4.2] On-screen keyboard functional areas.

On-screen Keyboard Usage:

- 1) Use the inner control knob to select the desired character. The selected character space is shown surrounded by a bolded box. Scrolling between characters and lines is accomplished by turning the inner control knob left and right.
- 2) Once the desired character is selected in the character selection area, press the center push-button to enter that character in the text display area.
- 3) Move to the next character using the inner control knob and repeat until finished. Use the inner control knob to highlight the “OK” button to commit the text entry.

- 4) The shift key () will toggle between lowercase characters and upper case with special characters and numbers. The space () character will insert a blank space.
- 5) The delete key () will remove the selected character.



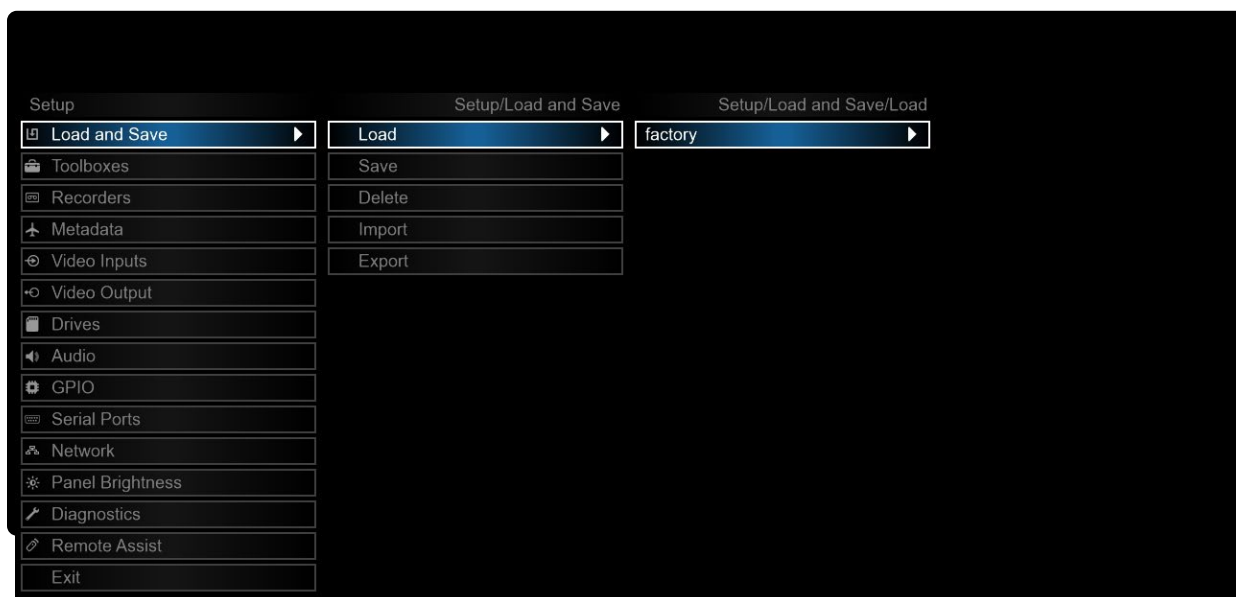
Plugging a USB keyboard into ION's front USB port will also allow the operator to perform text entries without using the on-screen keyboard.

4.1 Load and Save

ION allows operators to load, save, and export system configuration files known as *graphs*. Graph files are saved with an *.iog file format. This option allows operators to choose specific configurations based on different hardware setup. At any time, the configuration of an ION can be returned to the factory settings through this menu.

The menu options include:

- **Load** (shown below) – Loads a graph file that has been imported and saved on the ION's internal hard drive.
- **Save** – Allows the operator to save a current graph file. Here, it is possible to overwrite/update an existing graph file (if present) or to create a new graph file by using the “New Configuration” option.
- **Delete** – Deletes a graph file from the ION's internal hard drive.
- **Import** – Imports the graph file from external media to the ION's internal hard drive. When using this option, first select the removable media drive that contains the desired graph file.
- **Export** – Allows the operator to export the graph file to external media. When using this option, first select the removable media drive that contains the desired graph file.



Once you have configured recorders, inputs, outputs, ports, and preferences to meet your requirements, use the “Save” and/or “Export” menu options to save that configuration for future use or across multiple IONs.

4.2 Toolboxes

Toolboxes work in conjunction with the graph functionality discussed in the previous section. Toolboxes provide a set of functionalities that can be used by a custom graph. In almost all cases, SHOTOVER Systems will supply any toolbox functionality necessary for the ION operator's mission.

4.3 Recorders

Through the *recorders menu*, operators can configure all aspects of the available recorders; HD-SDI-1, HD-SDI-2, and Analog. Additional recorders may be present in this menu depending on hardware configuration and connected video sources.

4.3.1 Recorder Menu Options



a) Trigger

Available for all recorders: The trigger setting determines the behavior of the ION's record button. Available options for the trigger setting are as follows:

- | | |
|------------------------|---|
| <i>"REC On Video"</i> | Pressing the ION's REC button will start recording video if the desired recorder (HD-SDI 1, HD-SDI 2, Analog) is highlighted on the recorder selection screen. Or, if the recorder display page is selected when the REC button is pressed. |
| <i>"REC Anywhere"</i> | When "REC Anywhere" is selected, pressing the ION's REC button will trigger the recording regardless of what ION page the operator is on. |
| <i>"Video Present"</i> | When "Video Present" is selected, ION will start recording whenever a video signal is present for the selected recorder. |
| <i>"Always"</i> | When "Always" is selected, ION will record the selected recorder channel as soon as it has powered-on with available media present. |

b) Historical

The historical setting determines the amount of pre-record buffer for the specified recorder. This is the amount of video *in seconds* that will be captured by a recording before the operator physically pressed the REC button. This provides an extra margin so that an operator doesn't "miss any of the action." Settings range from 0 to 60 seconds in 15 second increments.

c) Max File Size (mb) / (min)

Recordings can be limited in length by specifying the maximum number of minutes (15, 30, or 60) or megabytes (1024mb) before the clip is "split" into a new file. This is helpful as it will prevent larger files from being overwritten when using the looping setting described below.

d) Looping

Enabling looping instructs ION to overwrite previously recorded video files, starting with the oldest, as more file space is needed on the selected media.

e) Video Fault

The Video Fault field allows the operator to enable or disable the on-screen prompt when a video source is not connected. In most cases, operators will want to leave this as "enabled".

f) Media Priority

The operator can select the 1st, 2nd, 3rd, and 4th priority storage device. For example, if USB-1 is selected as the priority for the given recorder and that drive is offline or the media is full, ION will roll-over to the next lower priority drive.

4.3.2 Scaler Menu Options



a) Scaler: Input Format

Using the input format setting, the operator can manually define what type of video input is being used by the selected recorder.

b) Scaler: Output

Available for all recorders: The operator can change the scaler output type for the selected recorder. The default setting, PASSTHROUGH, does not modify outgoing video. However, if desired, the following options are available:

<u>OPTION</u>	<u>DESCRIPTION</u>
PASSTHROUGH	Does not modify video (default)
1080I50	1080px 50 fps interlaced
1080I59.94	1080px 59.94 fps interlaced
1080I60	1080px 60 fps interlaced
1080P24	1080px 24 fps progressive scan
1080P25	1080px 25 fps progressive scan
1080P29.97	1080px 29.97 fps progressive scan
1080P30	1080px 30 fps progressive scan
1080P59.94	1080px 59.94 fps progressive scan
1080P60	1080px 60 fps progressive scan
480I59.94	480px 59.94 fps interlaced
480P29.97	480px 29.97 fps progressive
480P30	480px 30 fps progressive
720P29.97	720px 29.97 fps progressive scan
720P30	720px 30 fps progressive scan
720P50	720px 50 fps progressive scan
720P59.94	720px 59.94 fps progressive scan
720P60	720px 60 fps progressive scan
DOWNLINK180	180 px resolution for downlink
DOWNLINK360	360 px resolution for downlink
NTSC	NTSC standard (30 fps)
PAL	PAL standard (25 fps)
ADVANCED	(see below)

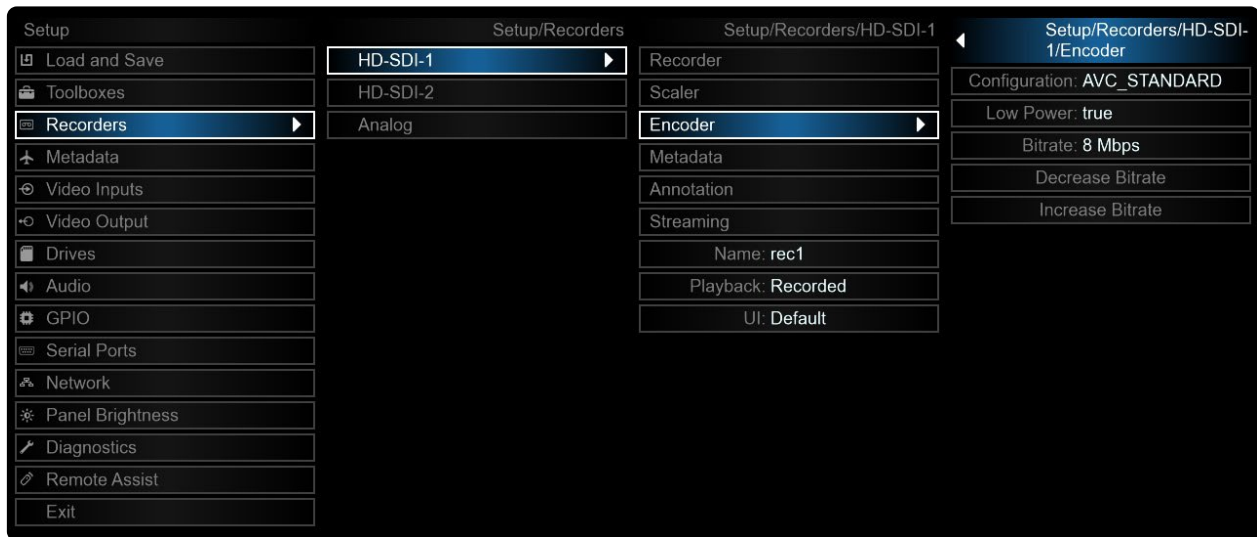
Advanced Option

Using the option for “Advanced”, operators can manually set the width, height, frame rate, and field format (progressive, interlaced, or alternating fields) of the output.



The output scaler settings are useful if you have video input that is in one resolution and you would like to down-scale it for applications such as a downlink.

4.3.3 Encoder Menu Options



a) Encoder: Configuration

Available for all recorders: The operator can change the recording codec presets used by ION. These include the following options:

ENCODER OPTIONS

MPEG2_STANDARD
MPEG2_LOW_LATENCY
AVC_STANDARD
AVC_LOW_LATENCY
HEVC_STANDARD*
MANUAL**

* HEVC_STANDARD is not available on all ION hardware versions.

** If *MANUAL* is selected, the operator will be able to manually control items such as the base Codec, AVC profile, AVC level, usage, GOP pic size, etc.

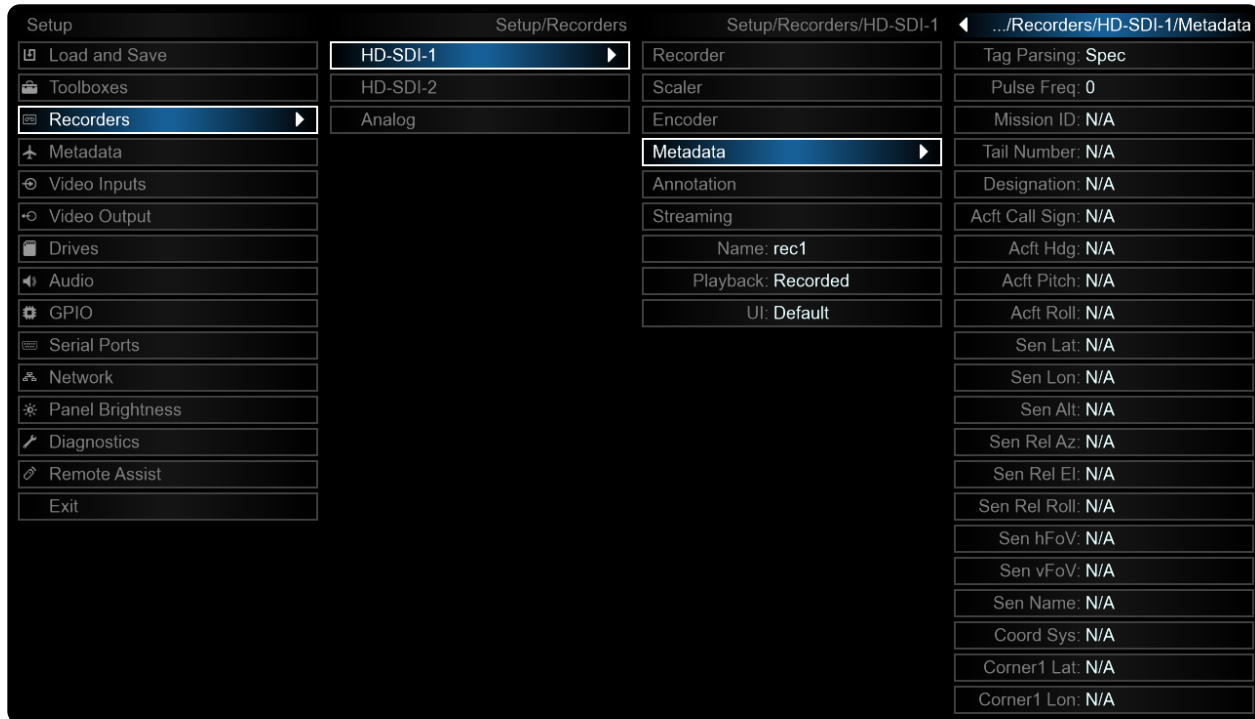
b) Encoder: Bitrate

Available for all recorders: The desired encoder bitrate can be selected from the following options:

BITRATE OPTIONS			
Minimum	1 Mbps	8 Mbps	40 Mbps
256 Kbps	2 Mbps	10 Mbps	48 Mbps
512 Kbps	4 Mbps	20 Mbps	

The *MINIMUM* option forces video encoding at the lowest possible bitrate for the selected codec. This will reduce recording quality.

4.3.4 Recorder Metadata Menu Options

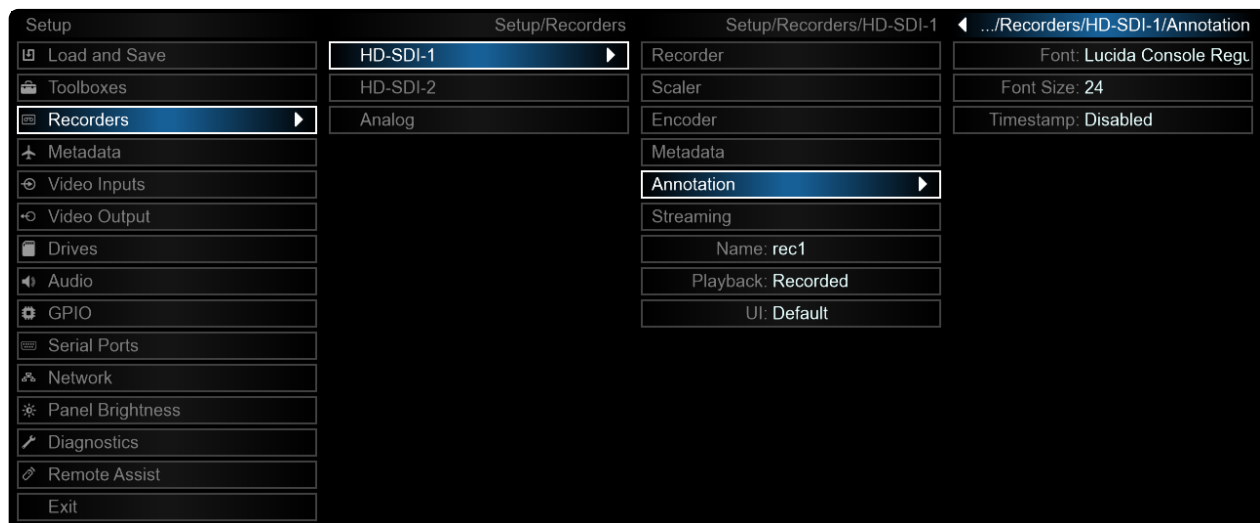


a) Metadata

Metadata is information encoded into video recordings. In most configurations, metadata will be supplied to ION by external components, GPS, AHRS, etc. However, in the recorder metadata menu options section, operators can override the metadata being supplied by external devices with user-defined values. Metadata defined at the recorder level will also overwrite any global metadata.

Because Metadata requirements vary by customer, please contact SHOTOVER Systems Support with questions or for help with changing these settings.

4.3.5 Annotation Menu Options



The options included in the *Annotation* section allow the operator to enable/disable the overlaid timestamp text in the recorder’s captured video. Font face, font size, and timestamp position can be modified via the menu options in this section. This setting is useful for installations where IRIG-B timestamp information is required to be burned into the recorded video.

4.3.6 Recorder Name

The entry used in the recorder name field will be prepended to the file name for all recordings from that source. To change the default entry, select the name field and press the control knob’s center push button. Once selected, the operator will be presented with the on-screen keyboard. **The name field should be unique for each recorder.**

4.3.7 Playback

By default (when set to “recorded”), the video player shows the actual recorded video. To show live video instead, set this option to “live”.

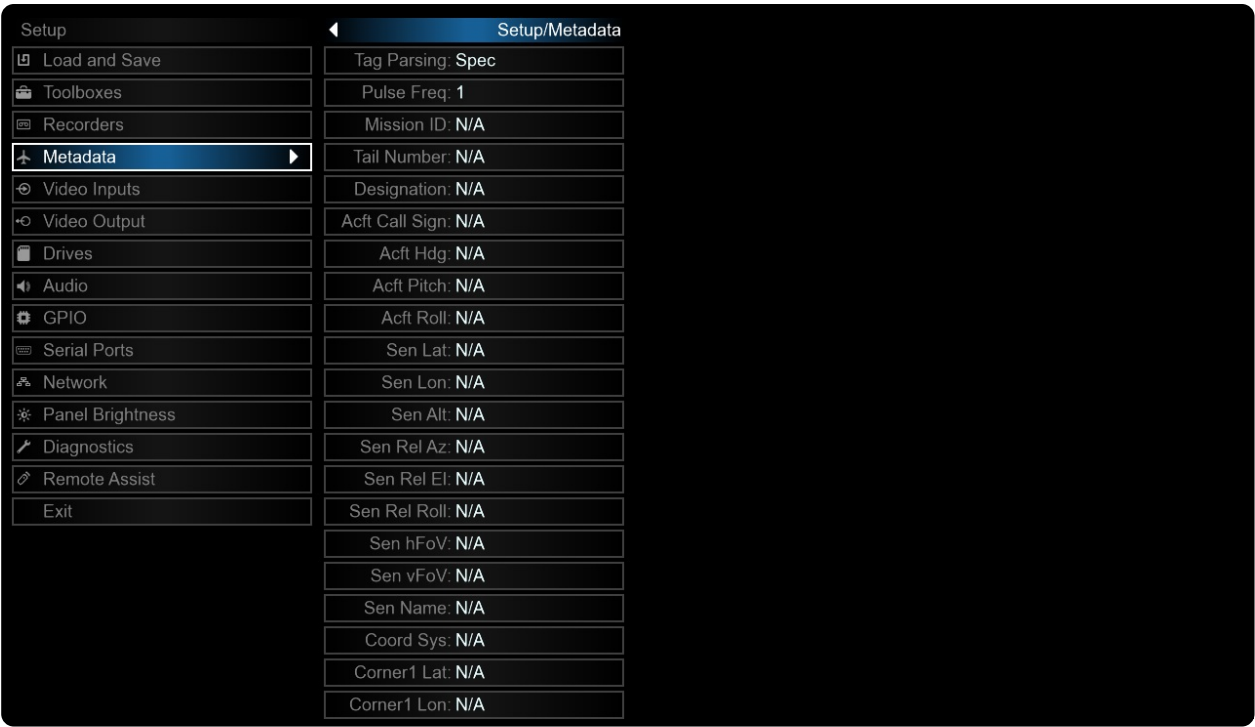
4.3.8 UI

This parameter can be used to change how the recorder video is output when connected to a secondary display. Options include Default, Full screen, and Full Overlay.

4.4 Metadata

4.4.1 Metadata Menu Options

ION allows the operator to change metadata associated with an individual recorder or “globally” within the ION unit itself. Section 7.4.4 describes how to modify the metadata for each recorder; this menu impacts the metadata associated “globally” within the ION, and subsequently what will be written into all recorded video, unless overwritten at the recorder level.



4.5 Video Inputs

4.5.1 Video Inputs Menu Options

The video inputs menu allows the operator to enable or disable the HD-SDI 1 and 2 inputs as well as define configuration for the analog recorder channel.



a) HD-SDI-1 (and HD-SDI-2)

Each HD-SDI recorder can be enabled or disabled via this setting. If no HD-SDI source is connected to HD-SDI 1 or to HD-SDI 2, disable the input here.

b) VANC – HD-SDI-1 (and HD-SDI-2)

Each recorders VANC channel can be enabled or disabled via this setting. If the input to the recorder you are using does not provide VANC, disable this setting.

c) Timeout (ms)

A timeout in milliseconds has been provided to allow operators to extend or reduce the amount of time before the Video Lost warning message is displayed.

d) Analog Input Signal Type

By default, the analog input type is set to CVBS. Because ION is compatible with many types of analog signals, exact configuration of this setting is not possible at time of manufacture. Because of this, the desired analog signal type should be verified and set by the installer / operator.



4.6 Video Output

4.6.1 Video Output Menu Options



a) Resolution

ION's HD-SDI output resolution, scanning method, and framerate can be configured to meet the requirements of nearly any external display. Operators can select from the following options:

OUTPUT RESOLUTION

720P50	1080p25	1080i50
720P59	1080p29	1080i59
720P60	1080p30	1080i60
	1080p60	

b) Source

The Source option allows the operator to specify video output when using an external display. By selecting HD-SDI-1, HD-SDI-2, Analog, etc., the external display will always display that video source regardless of what is being shown on the ION's built-in display. Selecting Active Page will mirror whatever is being shown on the ION's built-in display to the external display.

c) Mode

These settings are useful for ION video output testing. Please contact SHOTOVER Systems prior to changing this setting.

d) Raw Output

These settings are useful for ION video output testing. Please contact SHOTOVER Systems prior to changing this setting.

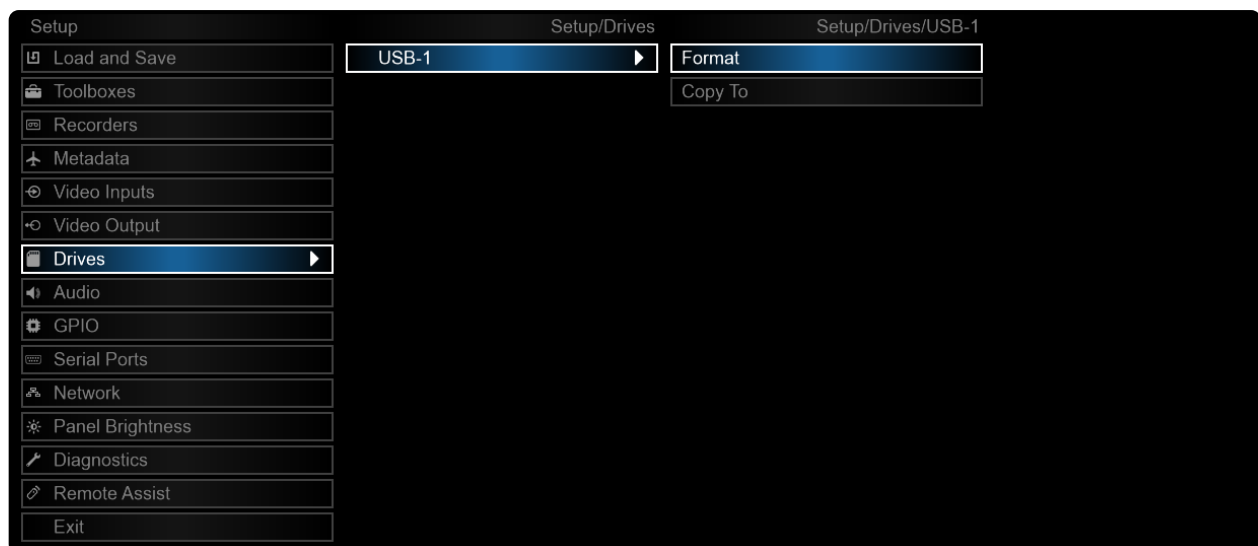
e) Min/Max VANC

These settings are useful for ION video output testing of VANC data. Please contact SHOTOVER Systems prior to changing this setting.

4.7 Drives

4.7.1 Drives Menu Options

The Drives section of the menu allows the operator to perform certain tasks with the physical USB and SD card drives. This includes formatting or copying the contents of one drive to another.



4.8 Audio

4.8.1 Audio Menu Options

a) Capture

The audio capture settings allow the operator to specify the channels to be recorded (Stereo, Left, Right, Right – Left, and Left – Right). Specifying Left – (minus) Right or Right – (minus) Left is used when differential audio inputs are present.

Input audio gain can also be specified for both the left and right channels. To change the input value, use the inner control knob to increase or decrease the level of input gain. Rotate the outer knob to save the setting and exit the menu.



In some installations, only one channel (left or right) is wired to ION's audio capture input. In these cases, operators should change the audio channel setting to use the wired channel only to eliminate noise from the unused channel. ION will continue to record in stereo by duplicating the left or right channel to the unused side.

b) Playback

The playback setting allows recorded audio to be played back while reviewing recorded video on the ION. In cases where no audio has been wired to the ION, it is recommended that operators leave this setting set to "Disabled."

Playback volume: To change the output volume, use the inner control knob to increase or decrease the level. Rotate the outer knob to save the setting and exit the menu.

Test Output: Plays left channel and right channel aural tests and allows the operator to adjust the volume as desired while the test is playing.

c) Encoder

The encoder settings menu allows the operator to set the parameters for recorded audio. This includes the Codec, Bitrate, Framing and Channels for recorded audio. In most installations, these settings should remain in the factory default selections.

4.9 GPIO

ION supports up to two General Purpose Input / Output (GPIO) connections via connector J1. The type of GPIO input that ION can expect is set via the GPIO menu options. The GPIO menu is dynamic based on connected hardware and the version of ION. Since configuration varies by customer and connected hardware, please contact SHOTOVER Systems Support if you are unsure of the GPIO settings you should use.



4.9.1 IMU

The IMU settings menu allows the operator to specify IMU mode. Settings for Off, Low Level, and High Level can be selected. This feature is reserved for future development and should be left as disabled.

4.9.2 GPIO Config

GPIO settings allow the operator to define the type of GPIO the ION should expect. Sources for GPIO 1 can be IRIG-B, analog or digital inputs, GPS pulse input, or digital output. GPIO 2 is configured for analog or digital input only. Based on the selection here, either the trigger (input) or extractor (output) should be configured.

4.9.3 GPIO Trigger (Input)

The GPIO trigger settings define the condition and action to take when either GPIO 1 or 2 is triggered. Selecting to show Advanced Settings provides additional menu options for specifying items such as the active event (Record HD-SDI-1, Record Analog, stop recording, etc.), inactive event, as well as voltage ranges for the GPIO trigger.

The Configure option provides a setup wizard used to configure the GPIO input. Follow the on-screen prompts to complete the setup of your GPIO device.



4.9.4 GPIO Extractor (Output)

When a GPIO output event is triggered, ION can interpret the output in one of several ways. These settings should be used only in conjunction to the output mode under the *GPIO Config* menu. For more information on configuring and using GPIO inputs and outputs, contact SHOTOVER Systems.

4.10 Serial Ports

4.10.1 Serial Port Menu Options

ION features several RS422 and RS232 standard compatible serial ports, each of which is fully configurable via the serial ports menu. Operators can access the following configuration options:

First, select the serial port to modify. Then, the following menu items will be available.

a) Port

The port that should be used. Select from COM1-COM7

b) Baud rate

Set the baud rate of the selected serial port. Available options are:

1,200	9,600	28,800	115,200
2,400	14,400	38,400	460,800
4,800	19,200	57,600	921,600

c) Parity

Set the parity setting for the selected serial port. Available options are: None, Odd, Even, Mark, or Space.

d) Data Bits

The data bit setting is selectable between 5, 6, 7, or 8.

e) Stop Bits

The stop bit setting can be configured to use 1, 1.5, or 2.

f) Flow control

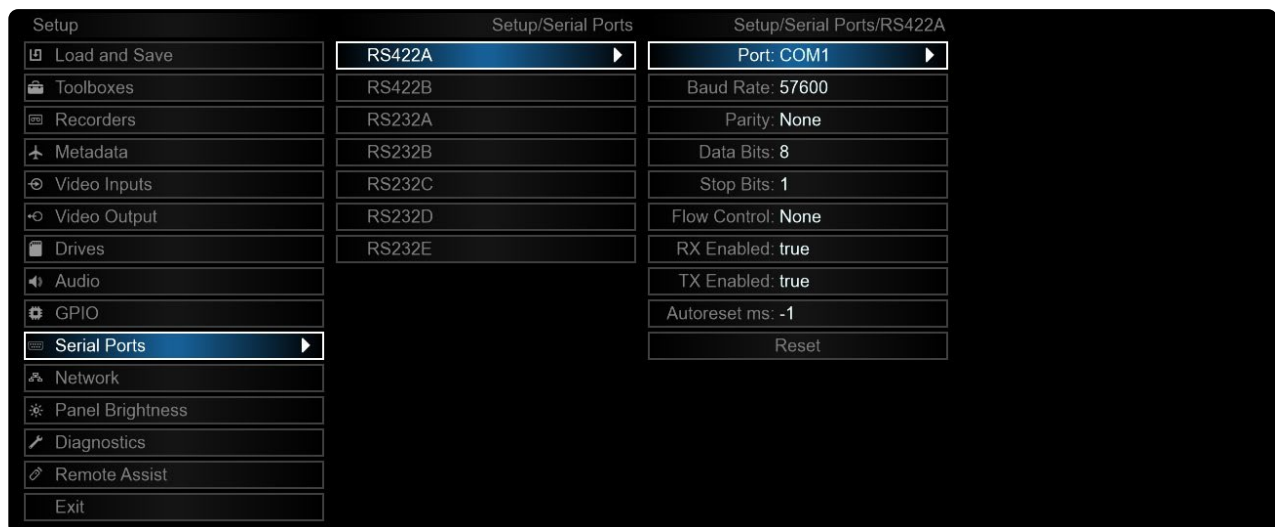
Operators can select between Request to Send/Clear to Send (RTS/CTS) or Data Terminal Ready/Data Set Ready (DTR/DSR).

g) RX Enabled

True/False setting to determine if the serial port will receive data.

h) TX Enabled

True/False setting to determine if the serial port will transmit data.



4.11 Network

The network setting allows the operator to select between a static IP address and an automatically-assigned IP address. In cases where a static IP address is desired, use the on-screen keyboard to set it and the subnet mask (if necessary).

4.11.1 Adapters

In most cases, all changes to network configuration should use the “Ethernet” option.

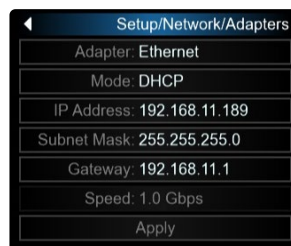
4.11.2 Mode

To change from DHCP to a static IP mode, select the Mode option and choose the desired setting.

4.11.3 IP Address, Subnet Mask, Gateway

If using a static IP address, subnet mask, or gateway, enter the desired addresses and then select the “OK” button.

Once changes are made to any of the network settings, click the Apply button to save the changes. In some cases, the ION may also need to be power-cycled to commit the changes.



Setup/Network/Adapters	
Adapter:	Ethernet
Mode:	DHCP
IP Address:	192.168.11.189
Subnet Mask:	255.255.255.0
Gateway:	192.168.11.1
Speed:	1.0 Gbps
Apply	

4.11.4 Web Server

This display-only page provides the details for the ION’s internal web server as well as the link for the ION browser-based remote-control page.

4.11.5 Earthscape

During the Earthscape setup process, use the on-screen number pad to enter the unique pairing code provided by Earthscape. This is typically done only once.

4.11.6 Video Server

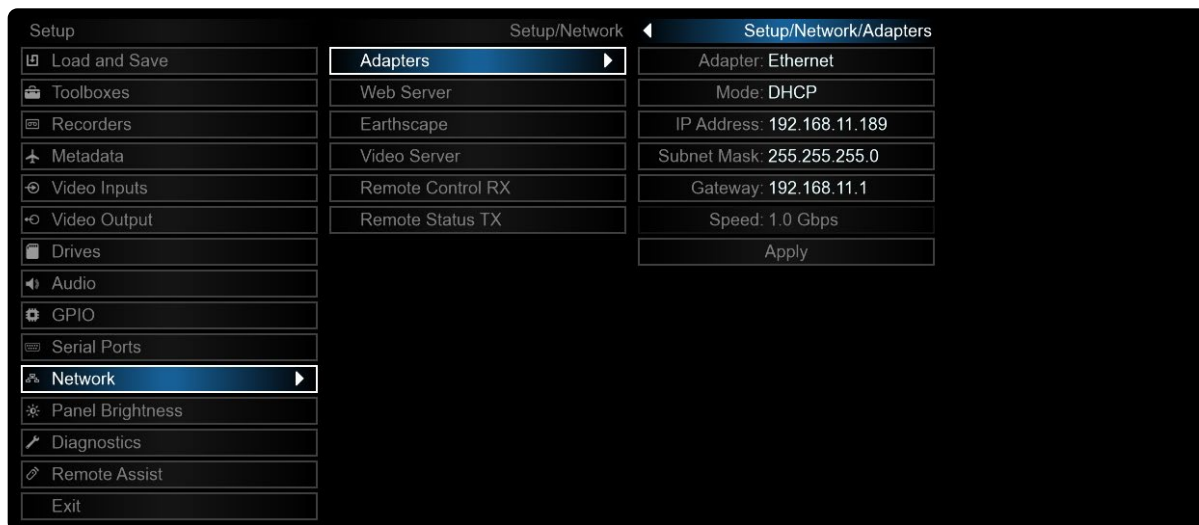
Use this menu to set the Port, Name, and Description for using ION as a video server.

4.11.7 Remote Control RX

If using a packet-sending program to remotely control the ION, operators can set details for receiving commands via this menu item.

4.11.8 Remote Status TX

Operators can set details for receiving status updates via this menu item.



Setup	Setup/Network	Setup/Network/Adapters
Load and Save	Adapters	Adapter: Ethernet
Toolboxes	Web Server	Mode: DHCP
Recorders	Earthscape	IP Address: 192.168.11.189
Metadata	Video Server	Subnet Mask: 255.255.255.0
Video Inputs	Remote Control RX	Gateway: 192.168.11.1
Video Output	Remote Status TX	Speed: 1.0 Gbps
Drives		Apply
Audio		
GPIO		
Serial Ports		
Network		
Panel Brightness		
Diagnostics		
Remote Assist		
Exit		

4.12 Panel Brightness

The Panel Brightness menu section is used to control the brightness of the ION LCD display, fault light, and button backlighting.

4.12.1 Startup

The brightness of the ION screen during the start-up sequence can be set by selecting this option and using the inner control knob to adjust the desired brightness.

4.12.2 Source

a) Source: Manual

When the panel brightness source is set to *Manual*, the operator has direct control of the ION unit's screen brightness setting. After selecting manual as the source, select the Brightness menu option. Using the inner control knob, adjust the brightness to the desired level. Turn the outer control knob to the left to save the brightness setting and return to the previous menu.



b) Source: Cockpit Dimmer

When the display brightness setting is set to the cockpit dimmer option, ION will take brightness settings from cockpit lighting controls. By enabling the advanced features in this menu, the operator has access to set the dim level, bright level, dim adjust, bright adjust, and full threshold – the voltage threshold that, when reached, the screen will be at maximum brightness.

A calibration option provides a step-by-step walkthrough of the calibration process.

c) Source: Light Sensor

This option uses the built-in light sensor on the front panel of the ION. The light sensor is the small hole immediately below and to the left of the control knob. The sensitivity setting allows the operator to adjust the rate at which screen brightness changes in response to changes in ambient light. In most cases, the “*balanced*” or “*prefer bright*” options will yield the most desirable results.



When advanced settings are enabled, operators have access to fine-tune the adjustments for screen brightness. Here, the *current level* indicator shows the current reading from the light sensor. The *dim level* and *bright level* settings allow the operator to adjust where maximum dim and brightness occur, referencing the current level indication directly from the light sensor. The dim adjust and bright adjust then are used to set the brightness for when the dim and bright level values from the sensor are achieved.

A calibration option provides a step-by-step walkthrough of the light sensor brightness calibration process.



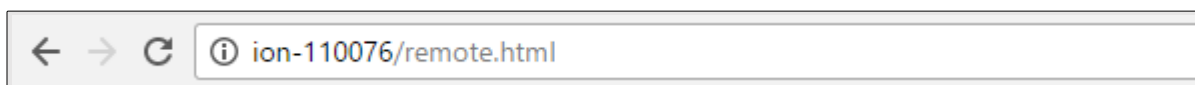
4.13 Remote-Control

The remote-control feature gives the operator the ability to manipulate the ION via a web browser without needing to be physically present at the device. Both the ION and the computer with the web browser software must be on the same network, though a connection to the internet is not required.

To access the ION remotely, ensure that both the ION and the computer with which you’re connecting are on the same network. Open a web browser (Chrome, Firefox, Edge) and enter the **ION’s serial number** appended with “/remote.html” in the web browser URL bar. The serial number can be found on the bottom of the ION.



Example: For an ION with the serial number of ION-110076, the entry should look like this:



Once remotely connected, the ION's functions can be accessed by using the mouse and the on-screen "virtual" controls as shown on the next screenshot.



4.14 Diagnostics

4.14.1 About Menu Options

The about menu provides detailed information about the firmware and software installed on your ION as well as any saved settings. The information presented in the about menu is as follows:

SW	Currently installed ION software version, release, and build information
ION-	The ION's serial number
VIB	Current installed ION firmware version
FX3	Current USB firmware version.
STM	Serial controller firmware version
BOOT DRIVE	Shows ION's boot drive version.

4.14.2 Export

The Export option allows the operator to save diagnostic files from the ION to a USB or SD card. Diagnostic information is saved in a compressed file with an .IOD file extension. Once saved, this information can be sent to SHOTOVER Systems Support if requested.

4.14.3 Hardware

The hardware menu allows the operator access to several logging and test features used to confirm certain aspects of ION's hardware operation. These options are:

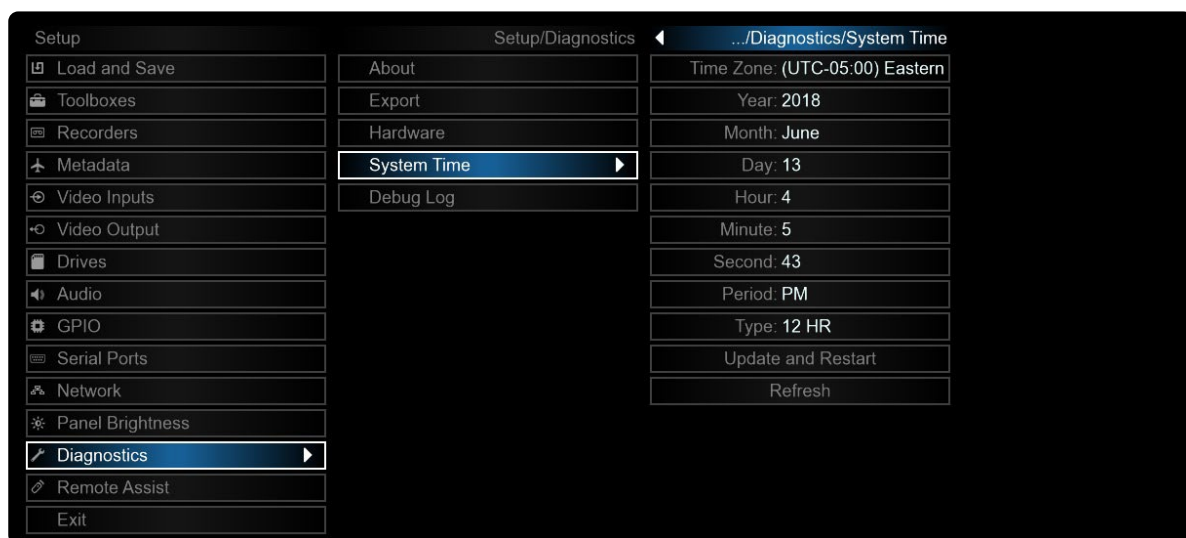
Journal / Journal Period	When enabled, journal-level logging allows inclusion of log entries in the metadata stream. Additionally, journal logging is available to other, connected hardware. Operators can set the journal period to custom or predefined intervals.
Log	Enabling the log option outputs loggable items to a CSV file. Operators can also rename the log file using the on-screen or a connected keyboard.
Ethernet	Displays the maximum speed of the connected Ethernet.
STM Present	When disabled, serial statistics are no longer recorded. This should remain enabled for nearly all installations.
UI	When enabled, the hardware diagnostics page will be displayed in the top-level ION menu structure for easy access and quick reference.
Reboot	Reboots ION.
Test ARINC Loopback	Used to test the optional ARINC connection.
Test Fault	Push the center push button to temporarily illuminate the fault light. To extinguish the fault light, press the center push button again. *See note below.
Test I/O Speed	Tests the read/write speed of connected USB or SD media.
Test Serial Loopback	Used to test the serial connection for COM1 – COM7.



* Under certain lighting conditions and especially with the use of NVIS/NVGs, the fault light can be extremely bright. Use caution when exercising this option under those conditions.

4.14.4 System Time

Operators can view and adjust the system date/time from this menu. Time format (12-hour/24-hour) can also be selected. After updating, it may be necessary to select the “Update and Restart” option for changes to take effect.



4.14.5 Debug Log

The debug log option allows the operator to view error messages that have been encountered by ION. Selecting a log entry displays additional information about the error that ION encountered.



Section 5 Add-on Features: Weather Radar

Weather Radar connectivity requires additional software functionality and is offered for an additional fee. Please contact SHOTOVER Systems for more information.

5.0 Description

This section contains information for displaying weather radar on the SHOTOVER Systems ION video recorder.

5.1 Requirements

The weather radar function of the ION takes ARINC 708-formatted data via USB and displays it on the ION screen as well as overlaid on a map via HD-SDI video out.

Depending on installation, an ARINC 708 databus output to USB converter may be required. SHOTOVER Systems recommends the *USB 708 Avionics Interface for Weather Radar* from Ballard Technologies. (www.ballardtech.com)



[FIG 5.1] Ballard ARINC 708 to USB Converter

5.2 Accessing the Weather Radar Display Feature

The weather radar function is available from the ION's Recorders Menu. Simply select the option for "Weather Radar" or select the Weather Radar recorder by rotating the outer control knob until the option for "Weather Radar" is on-screen.



[FIG 5.2] Weather radar option in the recorder selection screen

5.3 Weather Radar Operation

The ION's weather radar display receives data from the aircraft's on-board weather radar system and displays it via the on-screen display as well as the HD-SDI out channel. When position data is supplied via RS232A serial connection (using NMEA 0183 standards), the aircraft's position will also be displayed on a moving map via HD-SDI out. If no position data is received, the moving map is disabled and the HD-SDI out channel will mirror the ION's on-screen weather radar display.



The ION does not send control commands to the onboard weather radar. Radar operation, i.e. range, gain, tilt, etc. are still controlled by the aircraft's on-board radar control unit.

The following control knob functions are available:

Outer control knob	Cycle recorder (HD-SDI 1/HD-SDI 2/Analog/WX Radar)
Inner control knob	Toggle background map type on HD-SDI out display only
Push and hold inner control knob	Zoom in/out moving map on HD-SDI out display only
Center push button	Toggle radar echo transparency (Off/50% transparent/opaque) on HD-SDI out display only
Push center button while turning inner control knob	Change zoom level on the <u>moving map display</u> . Note: This feature is only available when position data is being provided to the ION.

5.4 On-screen Display

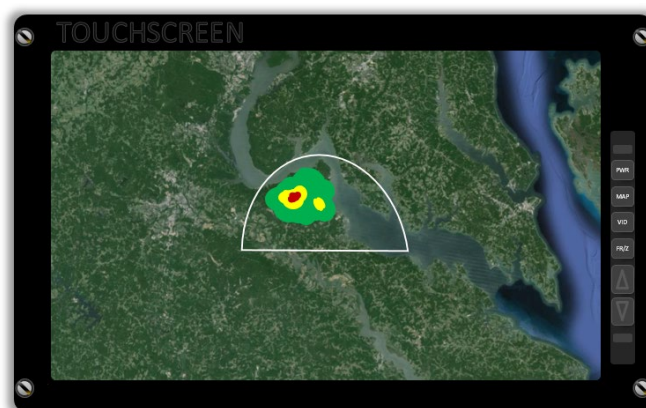
Radar echoes will display on the ION's on-screen display as shown below. Note that the ION's on-screen display does not feature a moving map.



[FIG 5.3] WX Radar displayed on-screen on the ION.

5.5 HD-SDI Out Display

Radar echoes will be shown on the HD-SDI channel overlaid on a zoom-able moving map*. Echo transparency can be toggled using the center push button. Background imagery for the map can be toggled by rotating the inner control knob. Available imagery types are 1) Street map 2) Topographical Map 3) FAA Sectional**. Note: FAA sectional charts are not available in all areas.



[FIG 5.4] WX Radar displayed on a secondary monitor via HD-SDI out.

* Moving map functionality requires NMEA position data supplied via RS232A serial connection.

** FAA sectional chart should not be used for navigation.

Section 6 Add-on Features: Camera Link

Camera Link requires additional hardware and software functionality and is offered for an additional fee. Please contact SHOTOVER Systems for more information.

6.0 Description

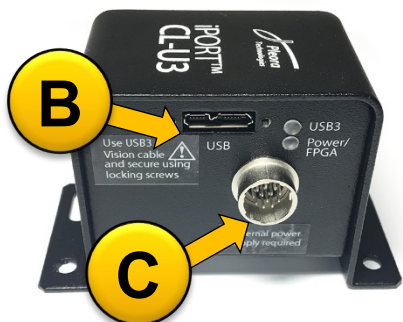
ION features support for a wide range of Camera Link interface cameras. This allows operators to record SWIR, MWIR, LWIR, high-resolution, or high-frame rate video through the ION.

6.1 Requirements

The ION's Camera Link interface uses an iPort CL-U3 External Frame Grabber to connect the Camera Link camera with the USB connector on the ION.



[FIG 6.1] CL-U3 Front Detail



[FIG 6.2] CL-U3 Rear Detail

Camera Link: The front of the CL-U3 contains connectors for the Camera Link interface cable labeled CL1 and CL2, as well as DIP switches for differential type and I/O level. For most installations, connect the camera to the connector labeled CL1 (Fig 6.1 “A”).

Medium/Full configuration Camera Link cameras provide additional video data paths over a second connector/cable, doubling video bandwidth. In these cases, use both CL1 and CL2.

USB: The rear of the CL-U3 contains connectors for USB and External Power. Connect the supplied USB 3.0 Micro Type B plug to the CL-U3 (Fig 6.2 “B”) and the USB Type A plug to any available USB port on the ION.

Power: Connect the External Power supply to the power connector (Fig 6.2 “C”).

Connect the external power supply to a source of AC power and hand-tighten the D Sub jack screws as required to ensure the connectors do not unseat.



[FIG 6.3] All required connectors attached.

6.2 Camera Link Operation

When a Camera Link camera has been connected to the system, the operator should load the Camera Link graph file supplied by SHOTOVER Systems. After doing this, menu options for configuring the Camera Link input will be enabled in the Recorders and Video Inputs menus, as well as elsewhere in the ION menu structure.



Section 7 Add-on Features: Moving Map Display

Please note: The moving map display feature requires additional software functionality and is offered for an additional fee. Contact SHOTOVER Systems for more information.

7.0 Description

This section contains information for displaying the moving map on the SHOTOVER Systems ION video recorder.

7.1 Requirements

The moving map feature of the ION takes positional data from an external source and presents it as a top-down moving map. The moving map can be shown on the ION screen as well as via HD-SDI video out (preferred method).

The map imagery installed on the ION can be customized to meet individual customer requirements. Map types can include high-resolution satellite or aerial imagery, navigational and nautical charts, or other types of custom maps or charts. For installation options, please contact SHOTOVER Systems.



[FIG 7.1] Moving Map on-device display

A typical installation will see the ION connected to an external display via the HD-SDI out connector. This allows the operator more flexibility to view the map output and use the larger screen of the secondary display. The built-in ION display will still retain moving map functionality, but the feature will be more interactive with a larger, secondary display.



Use of a touchscreen display and/or a keyboard and mouse is recommended for interacting with the ION's mapping capabilities.

7.2 ION Only Display Functions

To access the moving map display, rotate the outer control knob on the ION to the right to “scroll” to the moving map display. If position data is being received by the ION, the map position will correspond to the vehicle's current location. If no position data is present, the map will start-up in the default location until GPS data is provided.

To zoom in or out of the map: Rotate the inner control knob left or right to change the zoom level.



[FIG 7.2] Moving Map zoomed-in to custom high-resolution aerial imagery.

7.3 Moving Map Feature: SDI-Out

When connected to a secondary display via the ION's HD-SDI out connector, the operator can benefit from full-screen ION Moving Map functionality. The functions and features described in the following sections are based on operation using a secondary display connected to the ION.

When selected from the ION recorders screen, the moving map will be maximized to full-screen and can operate in the modes described in the following sections.



[FIG 7.3] ION Moving Map in split-screen mode

7.4 Modes:

The ION can operate in three moving map modes: Video only, Map only, and Split-screen. Shortcut keys for these modes are as follows:

F1	To enter Video mode, press the on-screen VIDEO button or the F1 key. Real-time video is displayed on the output display.
F2	Map mode features three methods of centering the map mode view. To enter any of these modes, press the on-screen MAP button or the hotkey.
F3	Hotkeys will center the map on the <i>camera target</i> "TGT" (F2), the <i>active marker</i> "MKR" (F3), or the <i>aircraft</i> "ACFT" (F4). <i>Map User</i> "USER" simply indicates that the map has been moved and is no longer following one of the previously mentioned modes.
F4	
F5	Split-screen mode allows the operator to simultaneously view both the live video feed as well as the map layer. It is enabled by pressing the split button on the screen or by pressing the F5 key.



[FIG 7.4] ION Moving Map in split-screen mode

7.5 Using Mapping Features

When connected to a secondary display output via the ION's HD-SDI out connector, the secondary display will show the moving map *interface* in one of three modes: Video only, Map only, or Split-screen mode, a combination of video and map modes.

The moving map interface allows the operator to change the view and other aspects of the moving map.

7.6 Video Mode

To display video from the camera, enter video mode by pressing F1 on the keyboard or the on-screen VIDEO button.

7.7 Map & Split-screen Mode Controls

When operating in Map or Split-screen Mode, the moving map can be controlled using the following shortcut keys.

+/-	Zooming in or out of the map is accomplished using the plus and minus keys. Press and hold the + key to reset the zoom level to default.
Move	The map can be moved using a "click and drag" motion with the mouse, or by dragging the touchscreen.
I	Cycle available imagery (see section 5.4)
O	Cycle overlay (see section 5.5)

7.8 Imagery

Use the imagery button to select between the different imagery (base map) types loaded in the system. The button name will change based on your selection as shown below.

- **SAT** displays satellite imagery.
- **TOPO** displays a topographic map.
- **AIR** displays aeronautical charts (where available)
- **NAV** displays a vector-based street map.
- **NIGHT** show a night-optimized street map.



Note: The map data installed on each ION can vary based on area and availability. Other types of imagery such as nautical charts, trail maps, etc. can be configured based on operator needs. Contact SHOTOVER Systems for additional information.

7.9 Overlay Modes

Use the overlay button to select to display or hide overlay information on the map. The amount of data displayed with each setting is configurable at setup.

OFF will turn off all overlays including streets, house numbers, and parcel overlays.

MINIMUM will display street overlays only.

Select **DEFAULT** to display the street lines and street labels on-screen.

Select **ALL** to display the all overlay information including roof top address numbers and parcel information (if available), parcel plot outlines will also be displayed, if available.

7.10 Markers

Markers are used to designate, save, and label locations. Markers can be used to enter coordinates for a destination, as a reminder of a specific area of interest, or to mark a site that you may need to revisit.

A marker represents a location (usually on the ground) and may be created as a result of a coordinate search or by marking the location using the touchscreen or keyboard shortcut in Map or Split-screen mode. When a marker is placed, the marker's coordinates will be displayed as the marker name.

While there can be an unlimited number of markers, only one marker at a time can be the **active marker**. On-screen, the active marker is shown in red, all other markers are shown in green.



Markers are temporary and, unless saved, will be cleared when the system is powered off.

Placing a Marker:

There are three methods for placing a marker:

- Using the touchscreen, touch anywhere on the screen to place the marker.
- Using the keyboard, press the **X key** to place a marker at the center of the screen.
- Using the search feature to enter the marker coordinates.

Saving Markers:

If you wish to save the markers created during a session, use the **SAVE MARKERS** button. Markers can be saved to the removable media as a Keyhole Markup Language (*.KML) file.

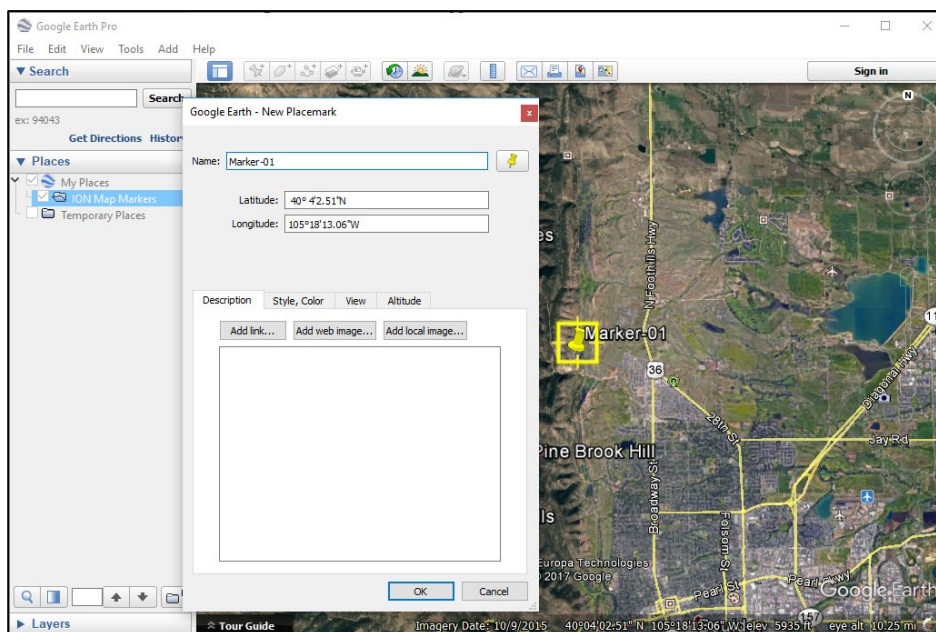
Loading Markers

To load previously saved markers, use the **LOAD MARKERS** button and then, using the subsequent file menu, select the desired saved marker(s) file from the list.

Importing Markers

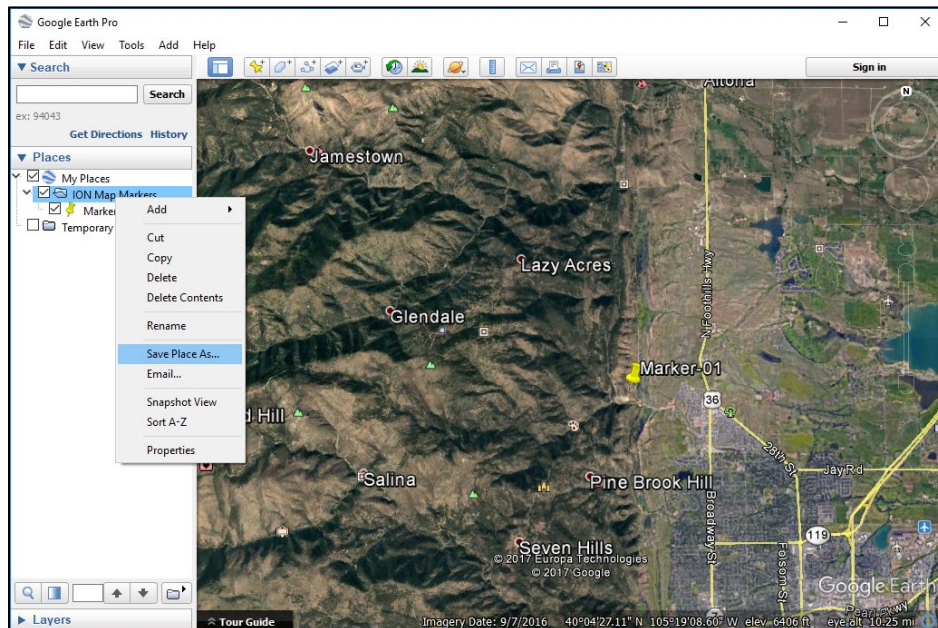
Markers can be imported from any application capable of saving points in KML format. Google Earth is a commonly used and freely-available solution for creating and saving points for import into the ION. The process of creating a marker location, or “placemark” in Google Earth terminology, is described below.

To do this, first create a folder under “my places” or “temporary places” in Google Earth (Add -> New Folder). Then, select the folder and create a placemark(s) using the placemark tool (📍). Enter a name for the placemark(s) and press OK:



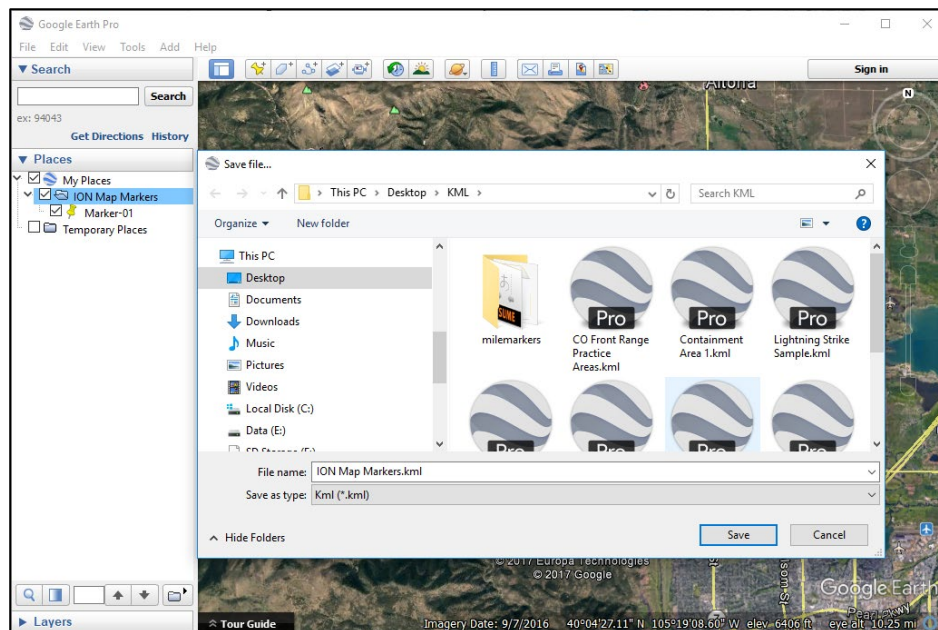
[FIG 6.5] Creating a placemark in Google Earth

Next, right-click on the placemark folder in Google Earth's left-side menu and choose "Save Place As", selecting .KML as the file type. Each folder can contain several placemarks to be imported as markers.



[FIG 6.6] Saving the placemark folder in Google Earth

Save the .KML file to a location of your choosing. Saving directly to a USB or SD card will ensure ease of transfer to the ION. Now the KML placemark location can be opened by the ION Map as a marker location.



[FIG 6.7] Google Earth .KML placemarks can be imported as ION map marker locations

Marker Controls

On-screen buttons and shortcut keys that can be used with markers include the following:

 <i>Single Press or Press & Hold</i>	D ALT+D	Delete the current, active marker. Delete <u>a</u> ll markers.
 	P / N	P (P <u>re</u> vious) and N (N <u>e</u> xt), used to cycle between markers.
	G	Slew camera to marker location

Slewing Camera to Marker Location

The ION can send a command to the camera to slew the camera to a marker location. To do this, first create a marker using search or any other method of placing markers. Then, press the slew button () or the **G key** and a slew command will be sent to the camera instructing it to slew to the marker location.

Renaming Markers

To rename a marker for later identification or reference, the operator may wish to give it a more “user friendly” name. To do this, use the ALT+X shortcut key combination and enter the desired name.

7.11 Coordinate Search

The ION’s mapping function can perform a coordinate search using any one of several coordinate systems.

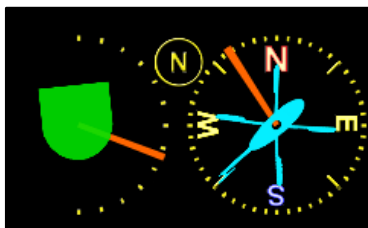
To Search by Coordinates

1. Open the search function by pressing the magnifying glass on-screen button.
2. Select the desired coordinate system search tab.
3. Enter the coordinates for which you wish to search in the corresponding format.
4. As the operator begins typing, the system will display a conversion of the coordinates being entered in all supported coordinate systems. This allows the operator to accept coordinates in one system and, as they type, convert the coordinates to another format that may be more familiar.
5. Select the desired coordinates from the list, then press **GO** to confirm and place a marker at the search location.

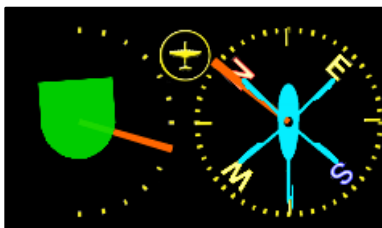
7.12 Map Symbology & Orientation

Symbology in the lower right of the map mode view graphically depicts displays camera elevation, azimuth, and field of view. Map orientation can be changed by clicking or touching on the **compass indicator** in the lower right of the screen or by pressing the **F6 key**. The small yellow circle to the upper-left of the on-screen compass will display an icon indicating the selected orientation: north-up, track-up, or camera target-up.

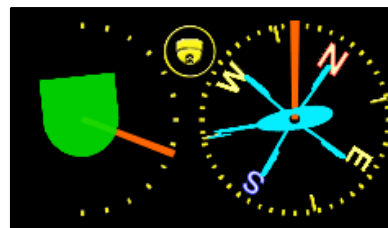
The compass indicator icon symbology for map orientation is as follows:



North-up orientation



Track-up orientation



Camera Target-up orientation



Map orientation (and map center) cannot be changed in Video Mode as this is determined by the field of view of the camera and where it is pointed, i.e. camera “target”.

5.1 Map Menu Options

The map options menu contains operator-configurable settings for the moving map.



Section 8 Troubleshooting

8.0 Description

The front panel of the ION features a fault light that will illuminate at any time a fault condition is encountered. Often, fault light activation can be resolved by following the on-screen instructions.

9.1 Troubleshooting Fault Causes

The ION will detect and alert the operator to any fault conditions by way of the fault light. Fault conditions can occur because of the following:



- **No recordable media**
- **All recordable media full**
- **Boot failure or malfunction (contact SHOTOVER Systems)**

Recommended resolution:

If a fault condition is encountered and it can't be cleared through operator action, contact SHOTOVER Systems Support by phone at (720) 744-3300.

9.2 Troubleshooting Analog Video

Since the ION supports multiple types of analog video, the analog video recorder type is not defined by default and typically must be specified in the menu before analog recordings can be made.

Until the operator has specified the type of analog video, the ION will show a default green screen and be unable to record from that channel.

To setup the analog signal type:

- 1) Enter the "Setup" menu
- 2) Select "Video Inputs"
- 3) Select "Analog"
- 4) Choose the type of analog signal
- 5) Exit the Setup menu



[FIG 9.1] No analog recorder signal present.

The different types of analog signaling standards supported by the ION:

- S-Video In
- Composite Video In (CVBS)
- Component Video In (YUV)
- Component Video In (RGB)

Once the operator has specified the type of analog video that the ION should expect, the analog recorder channel can be viewed and recorded to the removable media.

9.3 Restoring Your ION to Factory Settings

All IONs have the default factory graph file stored and it can be reverted at any time. To do so, select “Load and Save” and then select “factory” to load the default graph. The ION will do a soft restart with the factory graph loaded. See section 6.2 for details on loading graph files.

9.4 System Battery (CMOS)

The CMOS battery maintains the time, date, and other configuration settings in the CMOS memory of the ION. All CMOS batteries gradually deplete over time and have an in-service shelf life of roughly 5 years. Symptoms of a CMOS battery that is reaching the end of its service life may appear as a system clock that is not displaying the correct time, error messages during use, or error messages on boot-up.

9.4.1 Replacing your CMOS battery

Contact SHOTOVER Systems for a replacement CMOS battery. Once obtained, remove the ION from its mounting location and access the compartment on the bottom of the enclosure. Remove the two Phillips head screws and battery compartment covering. Remove and properly discard of the old CMOS battery and replace with the new battery supplied by SHOTOVER. Replace the compartment cover and re-install the ION into its mounting location.

9.5 Contacting Support

In some cases, it may be necessary to contact SHOTOVER Support. Please have your ION software version information available for the support representative.

ION Support Phone: +1 (720) 744-3300

ION Support Email: support@shotover.com