



PROFESSIONAL HD ACTION CAMERAS

DRIFT GHOST-S USER MANUAL

WWW.DRIFTINNOVATION.COM

VERSION: 1.0.0



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Precautions

General Precautions

Please take note of the following guidelines when using your Ghost-S camera:

- The camera is 2m shock resistant, but not shock proof—please take care of your camera and accessories, mounting and storing them securely.
- For your safety, do not press the buttons on the camera during sports activities.
- Do not store the camera anywhere prone to dust or damp for extended periods of time.
- Do not leave the camera exposed to extremely high temperatures—such as under direct sunlight—for extended periods of time as this may affect the camera housing and internal components.
- Clean the lens and screen with a micro fibre, antistatic cloth to remove fingerprints or dust—no cleaning chemicals are required.
- The camera has a working temperature range of -10°C to 40°C (14°F to 104°F).
- Power off the camera before removing the battery or memory card—the memory card and stored data may be damaged if it is removed or inserted while the camera is powered on.
- Remove the battery and memory card before storing the camera for long periods of time.

Weather Resistance

The Ghost-S is engineered to withstand dust, snow, rain, splashes and submersion up to 3m for 30 minutes at a time.

- Operating the camera at temperatures below 0°C reduces battery life and lowers battery performance.
- Do not charge the battery at temperatures below 0°C.
- Do not leave the camera submerged for longer than 30 minutes.
- Clean off any salt water or dirt from the camera immediately and prior to storing.
- Do not subject the camera to a sudden impact of water—the camera should always be used in the waterproof case when in intensive water-based applications.
- Always use the universal clip as a rear hatch key to ensure the camera is sealed tightly to ensure full water proofing. (See figure 1)
- The camera is only 3m waterproof when the STANDARD rear hatch is used and fitted properly as shown below.

Attention

- ! Rechargeable batteries are only to be charged under adult supervision
- ! **DO NOT** short-circuit the battery terminals
- ! **DO NOT** open, puncture or otherwise damage the rechargeable battery, or dispose of it in fire

Optimal Camera Storage

We recommend users store cameras for a minimum of 6-12 hours with the Back Hatch open, Battery Hatch open and the Battery removed in less than 30% humidity to help dry out anti-fog inserts regularly.

Avoid opening the Back Hatch in damp or humid conditions.

Disclaimer

Drift Innovation will not, under any circumstances, be responsible for injuries or property damaged incurred during participation of any high-risk sport or activity not endorsed or recommended by Drift Innovation. Remember that the warranty will only cover manufacturing defects.

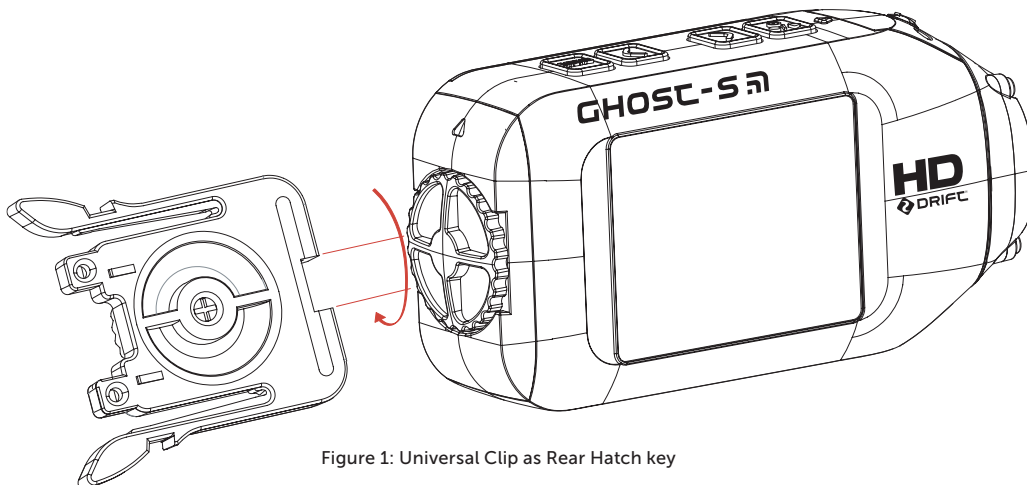


Figure 1: Universal Clip as Rear Hatch key

Overview

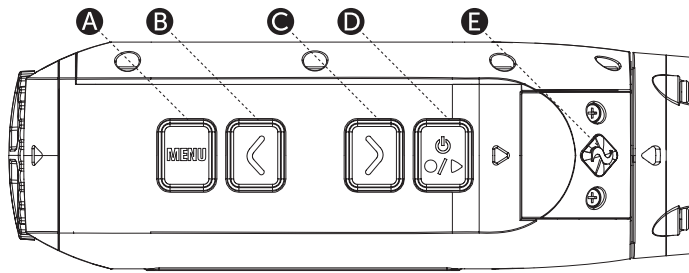


Figure 2: Top View

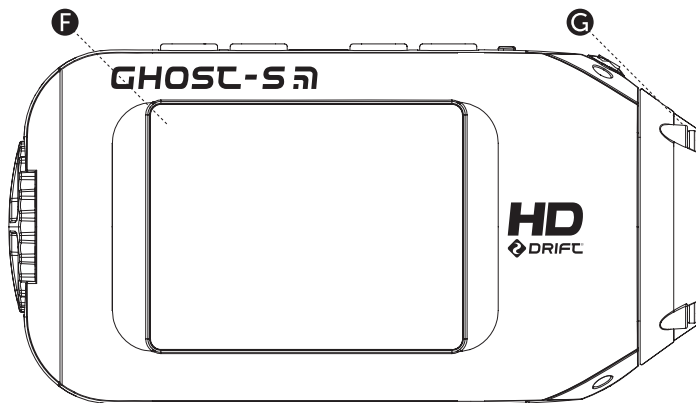


Figure 3: Screen View

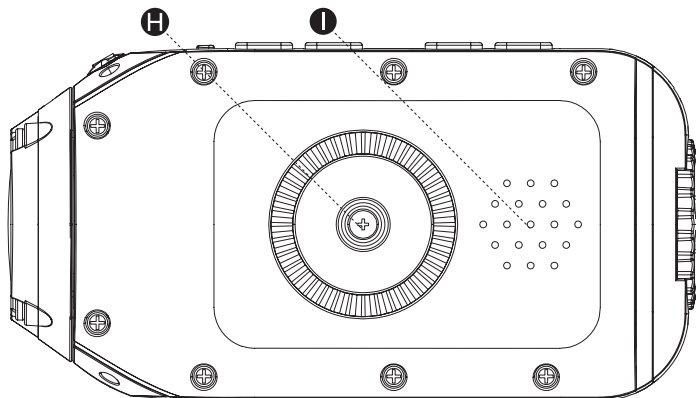


Figure 4: Connector View

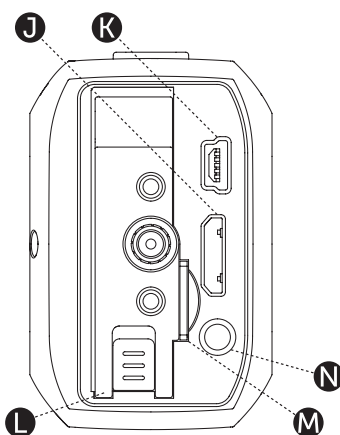


Figure 5: Rear View - No Hatch

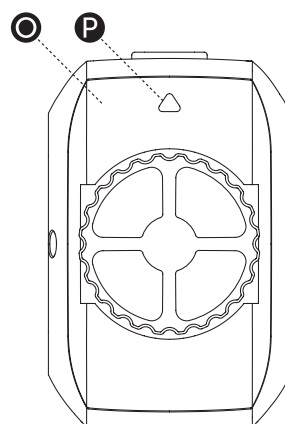


Figure 6: Rear View - Standard Hatch

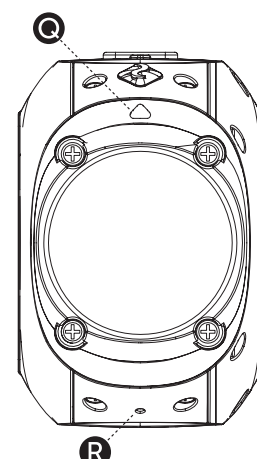


Figure 7: Front View

- A** MENU Button (Video Tag/Simultaneous Photo)
- B** LEFT Button (Zoom Out)
- C** RIGHT Button (Zoom In)
- D** ACTION Button (On/Off/Rec/Stop)
- E** Camera LED Indicator
- F** 2.0" LCD Screen
- G** 300° Rotating/Replaceable Lens
- H** 1/4"-20 Thread
- I** Speaker
- J** HDMI Port (Mini Type C)
- K** USB Port (Mini Type B)
- L** Battery Slot Cover
- M** Micro SD Card Slot
- N** 3.5mm Microphone Input
- O** Standard Rear Hatch
- P** Rear Hatch 'Up' Indicator
- Q** Lens 'Up' Indicator
- R** Built-in Noise Reducing Microphone

Using The Camera

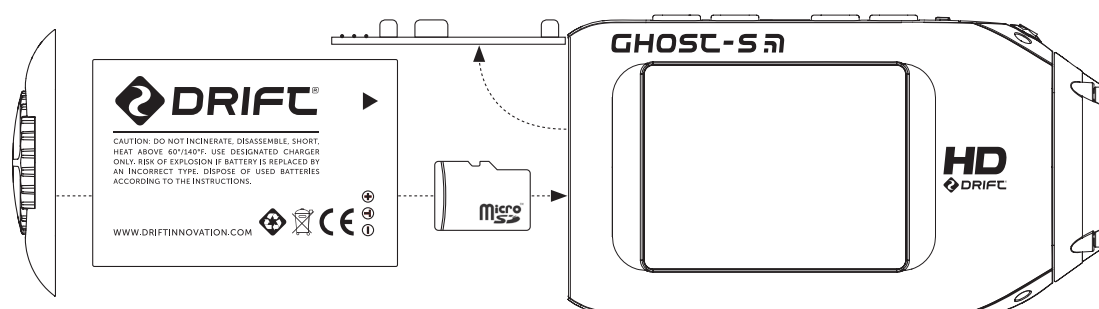


Figure 8: Inserting the Battery and Micro SD Card

Initial Setup

1. Unscrew the rear hatch of the camera by hand, or by using the notch in the Universal Clip (anti-clockwise movement).
2. Slide the catch and open the battery slot cover, insert the battery as above and close the cover.
3. Insert a micro SD card into the card slot, as above, until you hear a click.
4. Connect the camera by the mini USB cable (provided) to a powered USB port and charge for 4 hours before first use.
5. Replace the rear hatch, ensuring the arrow indicator points to the camera face with the control buttons.
6. Connect the Two-Way Remote Control by the mini USB cable (provided) to a powered USB port and charge for 2 hours, or until remote LED indicator lights turn green before first use.

Powering On and Off

Press and hold the ACTION button on the camera—the camera LED indicator and screen will power on and display a welcome message.

To power off, hold the ACTION button for 3 seconds, or until the camera LED indicator and screen power off.

Charging

1. Ensure the battery is inside the camera and the camera is powered off.
 2. Connect the mini USB cable to the port at the rear of the camera and then to a powered USB port in your computer, other USB device or USB power adaptor (not included).
- ! If connected to a computer, the camera screen will show a USB symbol.
- ! If connected to a USB power adaptor, the screen will show 'Charging...'.
3. A full charge takes around 4 hours (min 1A)—once the camera is fully charged, remove the mini USB cable and replace the rear hatch and screw closed.

Battery Life

At a temperature of 25°C (77°F), with all power saving features off and the camera recording continuously, the battery will last for about 3.5 hours (1080p 30FPS, Wi-Fi off, normal bit rate) on a full charge (see *Conserving Battery Life*, p20).

Using an External Power Supply

The camera can be powered by an external power supply such as a USB power adaptor, Drift Power Pack or Drift 12V Charger. We recommend you to power off your camera before plugging your camera to any external power supply.

Press the ACTION button to begin normal usage when using an external power supply. If the external power is cut off for any reason during recording, the camera will immediately start drawing power from the rechargeable battery instead and continue recording, protecting your footage from file corruption.

Selecting a Micro SD Card

The Drift Ghost-S is compatible with Micro SD, SDHC or SDXC cards up to 64GB. We recommend Class 10 cards for recording HD video and system stability.

Below is a table of approximate video recording times against card size in normal bit rate mode.

	Approximate Recording Time (30 FPS)		
	1080P	720P	WVGA
1 GB	9min	12min	27min
2 GB	18min	24min	54min
4 GB	36min	48min	1h 48min
8 GB	1h 12min	1h 36min	3h 36min
16 GB	2h 24min	3h 12min	7h 12min
32 GB	4h 48min	6h 24min	14h 24min
64 GB	9h 36min	12h 48min	28h 48min

Formatting a Micro SD Card

Formatting will remove all files from a memory card. When using a new card for the first time, always format the memory card using the camera. With the card inserted in the camera:

1. Open the Main Menu (see p6) and select 'Camera Settings'.
2. Select 'Format Memory Card', press ACTION and then confirm.

Formatting may take a few moments to complete—please be patient.

Removing a Micro SD Card

To remove the card, push it until you hear a click. The card slot is spring loaded and the card will slide from the slot.

Camera Menu System

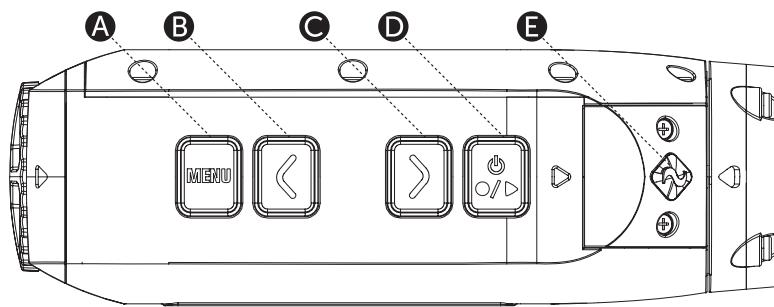


Figure 9: Ghost-S Top View

The Drift Ghost-S has an easy-to-use menu system which can be navigated using the camera's four control buttons.

Main Menu (Figure 10)

To open the Main Menu, press MENU while the camera is powered on. The Main Menu screen will display the four menu options.

Use LEFT and RIGHT to navigate between the menu options. A highlighted option will show a green icon instead of red. To select a highlighted menu option, press ACTION and a sub-menu will open.

! To go back a step, at any time, press MENU.

Mode Selection Menu (Figure 11)

The Mode Selection menu is used to select the camera recording mode.

On opening the Mode Selection menu, the screen will display the four camera mode icons. Move between the different camera modes using LEFT and RIGHT. To select a highlighted camera mode, press ACTION. The screen will return to Live Preview for the selected mode and the camera is ready to capture media.

For more information about the four camera modes, see p7-12.

Mode Settings Menu (Figure 12)

The Mode Settings menu is used to view and edit settings for each of the four camera modes.

On opening the Mode Settings menu, the screen will display the four camera mode icons. To select a highlighted camera mode, press ACTION. A further sub-menu will open, listing adjustable settings for the selected camera mode. Use LEFT and RIGHT to navigate between settings. Use ACTION to edit and confirm settings; LEFT and RIGHT to adjust setting values.

For more information about the four camera modes and their settings, see p7-12.

Playback Menu (Figure 13)

The Playback menu is used to view video and images for each of the four camera modes.

For full details, see p13.

Camera Settings Menu

The Camera Settings menu is used to view and adjust camera settings.

For full details, see p14.

- A MENU Button (Tag/Back)
- B LEFT Button (Zoom Out)
- C RIGHT Button (Zoom In)
- D ACTION Button (On/Off/Rec/Stop)
- E Camera LED Indicator

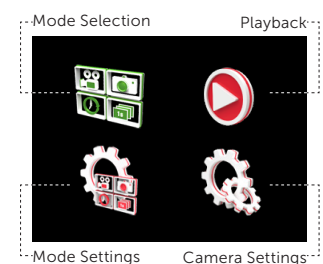


Figure 10: Main Menu

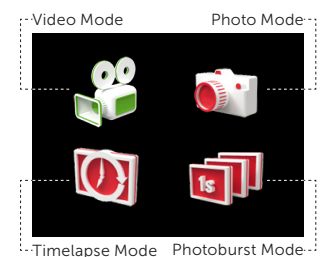


Figure 11: Mode Selection Menu

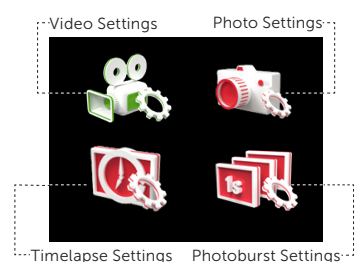


Figure 12: Mode Settings Menu

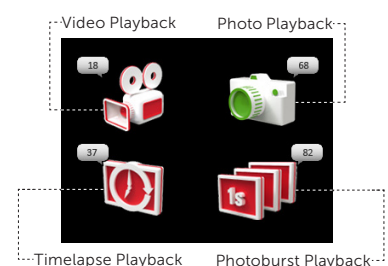


Figure 13: Playback Menu




Video Mode

Video Mode (GREEN LED)

While the camera is powered on and in Video Mode—with a micro SD card inserted with enough free memory—it will record video when ACTION is pressed on the camera or the remote control.

1. To enter Video Mode, ensure the camera is powered on.
2. Press MENU to enter the Main Menu.
3. Open the Mode Selection menu, highlight Video Mode and press ACTION.

The screen will return to Live Preview and display the Video Mode icon  in the top-left hand corner of the screen, the camera LED will turn green—the camera is ready to record video.

Recording Video

1. Press ACTION on the camera or remote control to begin recording video.
2. The camera LED indicator will blink red while the camera is recording.
3. To stop recording, press ACTION on the camera, or STOP on the remote control—the camera LED indicator will turn green.

- ! The duration of the current recording is indicated by the on-screen timer.
- ! For best performance always use, at minimum, a class 10 Micro SD card.

Taking Simultaneous Photos While Recording Video

Pressing MENU on the camera (or ACTION on the remote control) while recording video will simultaneously take a still photo. Taking a simultaneous photo will result in an 8MP photo if the Ghost-S is recording at 30 or 25fps in any resolution. If you are recording in 48, 50 or 60fps, the Ghost-S will create a 2MP simultaneous photo.

- ! This feature is not active for frame rates higher than 60fps.
- ! This feature is only available when Video Tagging (see p8) is turned off.

Video Mode Settings

Resolution	1080P
	960P
	720P
	WVGA
Frame Rate	25 (1080/960/720/WVGA)
	30 (1080/960/720/WVGA)
	48 (960)
	50 (1080/960/720/WVGA)
	60 (1080/960/720/WVGA)
	100 (720/WVGA)
	120 (720/WVGA)
	200 (WVGA)
Field Of View	160° (1080/960/720/WVGA)
	127° (1080)
	90° (1080)
Exposure	-2
	-1
	0
	+1
	+2
Self Timer	Off
	3s
	5s
	10s
Video Tagging	On
	Off
Video Tagging Interval	10s
	30s
	1m
	2m
	5m
Car DVR Mode	On
	Manual
	Off
Car DVR Interval	1m
	3m
	5m
	10m
Bit Rate	Normal
	High
Scene Mode	Normal
	Vivid
	Low Light
Default Settings	Yes
	Cancel

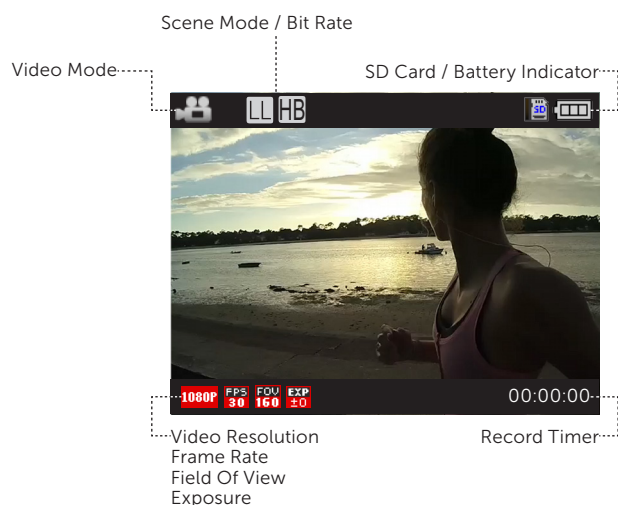


Figure 14: Video Mode Live Preview Screen



Video Mode (cont'd)

Video Tagging

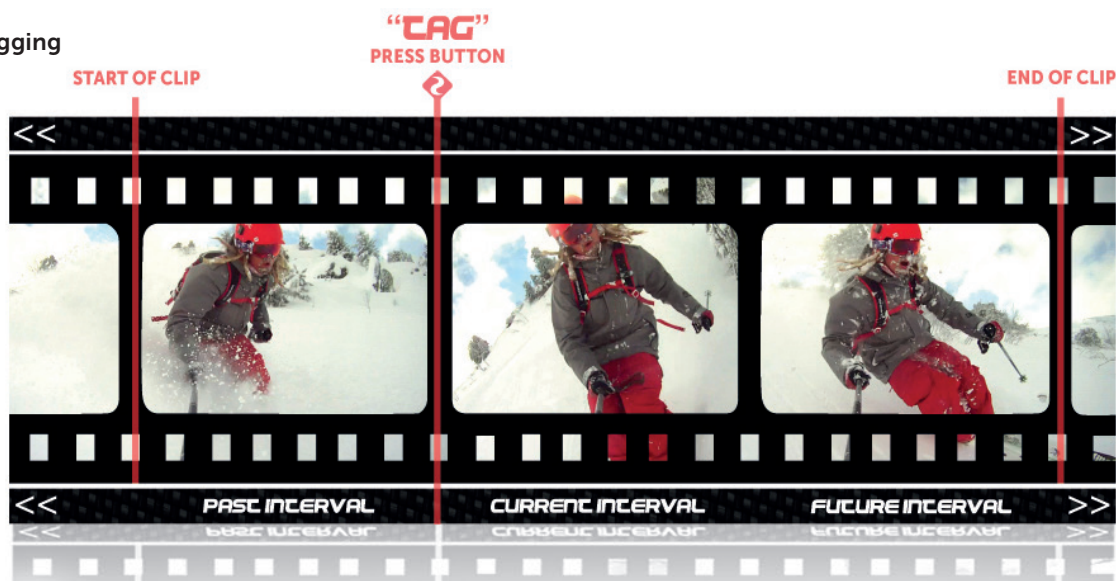


Figure 15: Video Tagging Graphic Representation

When activated, this feature allows the camera to continuously record video, but save only 'tagged' footage. For example, with Video Tagging turned on and a Video Tagging Interval of 30s selected, pressing MENU while recording video will save the previous 30s, current 30s and an additional 30s—a total of 1m30s of tagged footage.

Video Tagging can be turned on or off in the Video Settings menu.

1. To turn Video Tagging on, switch to Video Settings Menu.
2. Cycle to 'Video Tagging', press ACTION to toggle between On/Off.
3. Under 'Video Tagging Interval', press ACTION to choose the desired interval time.
4. Now when you press ACTION from the live preview screen, the camera LED will BLINK GREEN, and you are now recording in video tagging mode, without saving the footage. This is also shown by the TAG icon rectangle being RED.
5. While recording video, press MODE on the camera (or ACTION from the remote) to tag a video—the camera LED will begin to BLINK RED while a tagged interval is being saved. This is also shown by the TAG icon rectangle turning GREEN.
6. Tagging can be stopped by pressing ACTION on the camera, or STOP on the remote control. This will change the camera LED from blinking RED, to solid RED.
7. Once the three video tagging intervals are saved, the camera will automatically return to recording without saving, until commanded to stop by pressing the ACTION button.

In the event that you require extending your video to be sure you do not miss any critical shots, pressing ACTION again while in a tagging session (LED blinking GREEN) will add an additional tagging interval to the end of the saved footage.

- ! Please ensure you have at least 4GB of free space on your micro SD card for video tagging to function properly.
- ! Activating Video Tagging will disable accessibility to Car DVR mode.



Video Mode (cont'd)

Car DVR mode

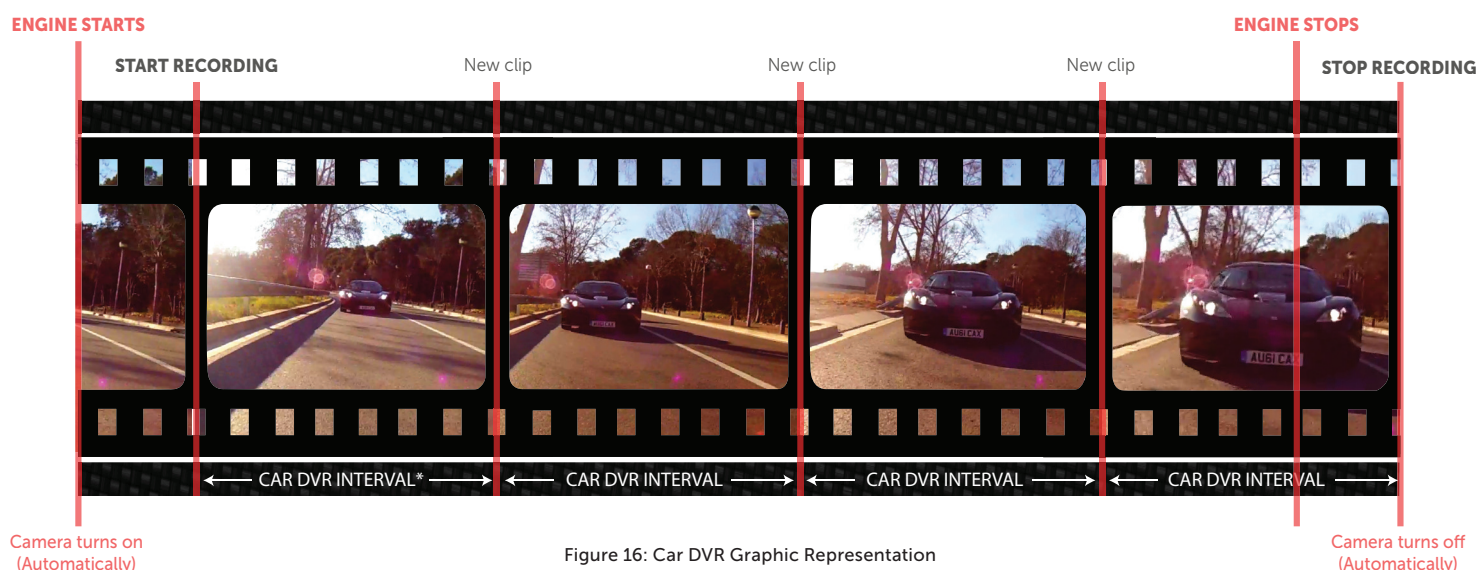


Figure 16: Car DVR Graphic Representation

Car DVR mode can be turned on or off in the Video Settings menu

This hands off mode setting is ideal for insurance and security purposes. In this mode the camera records footage in a continuous loop style (Car DVR Intervals) recording loop after loop until it fills the Micro SD Card. Once full, the oldest loops will be deleted as the newest ones are saved. DVR loop intervals can be 1min, 3min, 5min and 10min.

Car DVR mode can be turned on or off in the Camera Settings menu, it will automatically power the camera on and begin recording when power is delivered to the USB port. Setting the Car DVR to 'M' (manual) allows the user to use this feature while manually starting the first loop by pressing ACTION. This is ideal for users such as cyclists, where external power is not frequently used.

1. To turn Car DVR mode on, open Video Mode Settings from the Main Menu and select Car DVR, press ACTION, then select 'ON', or 'M' for manual mode. On the live preview screen a CAR icon will indicate that Car DVR mode is enabled.

Bit Rate

Users can select to keep the normal compression used by the H.264 codec, or if they prefer, allow a higher flow of data for preserving more of the original recording. This will increase the bit rate used in all recording modes. The maximum bit rate is set to 35.0 Mbps, this is reserved for the most processor intensive recording modes of 720p 120/100, WVGA 240/200. In High Bit Rate, 1080p 60/50 will be approximately 26.0 Mbps versus 18.0 Mbps in Normal Bit Rate.

Scene Mode

Normal: Use this as your 'go to' setting. This is the default setting and will give you the most neutral, true colour palette possible for the broadest range of environments, and is the best mode to choose for bright outdoor environments.

Vivid: Use this mode when you are intentionally looking to make your colours a touch more saturated.

Low Light: This setting should only be used in low light settings such as filming at night or indoors with less ambient lighting. If the camera is set to 60/50fps in any resolution, auto slow shutter mode will regulate the frame rate from 60/50fps to 30/25fps based on the luminance in order to achieve the highest exposure rate possible for each frame. In this instance, each frame will be printed twice in order to keep the overall frame rate at 60/50fps.




Photo Mode

PHOTO MODE (YELLOW LED)

While the camera is powered on and in Photo Mode—with a Micro SD card inserted with available memory—it will capture a 5, 8 or 12MP still image when ACTION is pressed on the camera or the remote control.

1. To enter Photo Mode, ensure the camera is powered on.
2. Press MENU to enter the Main Menu.
3. Open the Mode Selection menu, highlight Photo Mode and press ACTION.

The screen will return to Live Preview and will display the Photo Mode icon  in the top-left corner of the screen, and the camera LED will turn YELLOW. The camera is ready to take photos.

Capturing photos

1. Press ACTION on the camera or remote control to take a photo.
2. The LED indicator will BLINK RED once before returning to YELLOW.

Scene Mode

Normal: Use this as your 'go to' setting. This is the default setting and will give you the most neutral, true to reality colour palette possible for the broadest range of environments, and is the best mode to choose for bright sunny days.

Vivid: Use this mode when you are intentionally looking to make your colours a touch more saturated.

Low Light: This setting should only be used in low light settings such as filming at night or indoors with less ambient lighting. This will optimise the camera to reduce image noise in low light settings.

Photo Mode Settings

Resolution	12MP
	8MP
	5MP
Field Of View	160°
	127°
	90°
Exposure	-2
	-1
	0
	+1
	+2
Self Timer	Off
	3s
	5s
	10s
Scene Mode	Normal
	Vivid
	Low Light
Default Settings	Yes
	Cancel

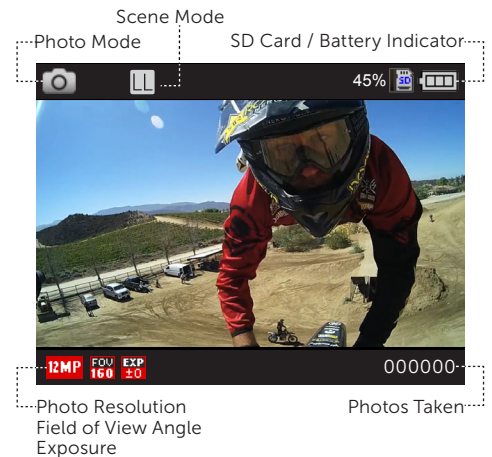


Figure 17: Photo Mode Live Preview




Timelapse Mode

Timelapse Mode (PURPLE LED)

While the camera is powered on and in Timelapse Mode—with a Micro SD card inserted with enough free memory—it will capture a series of still images at a specified rate when ACTION is pressed on the camera or the remote control.

1. To enter Timelapse Mode, ensure the camera is powered on.
2. Press MENU to enter the Main Menu.
3. Open the Mode Selection menu, highlight Timelapse Mode and press ACTION.

The screen will return to Live Preview and will display the Timelapse Mode icon  in the top-left corner of the screen. The camera LED will turn purple—the camera is ready to take timelapse photos.

Capturing Timelapse Sequences

The Timelapse Sequence Interval can be set from the Mode Settings menu.

1. Open Mode Settings from the Main Menu and select Timelapse Mode.
2. Under 'Sequence Interval', choose the desired interval time and press ACTION to confirm.
3. Return to Live Preview and press ACTION on the camera or remote control to start timelapse.
4. The camera LED will BLINK RED once when each photo is taken.
5. To stop timelapse, press ACTION on the camera or STOP on the remote control.

! The Ghost-S will not render the timelapse still images into a video, you must insert the still sequences produced by the Ghost-S into third party post-production software in order to render a timelapse video.

Scene Mode

Normal: Use this as your 'go to' setting. This is the default setting and will give you the most neutral, true to reality colour palette possible for the broadest range of environments, and is the best mode to choose for bright sunny days.

Vivid: Use this mode when you are intentionally looking to make your colours a touch more saturated.

Low Light: This setting should only be used in low light settings such as filming at night or indoors with less ambient lighting. This will optimise the camera to reduce image noise in low light settings.

Timelapse Mode Settings

Resolution	12MP
	8MP
	5MP
Field Of View	160°
	127°
	90°
Exposure	-2
	-1
	0
	+1
	+2
Sequence Interval	0.5s
	1s
	2s
	3s
	5s
	10s
	30s
	1m
Self Timer	Off
	3s
	5s
	10s
Scene Mode	Normal
	Vivid
	Low Light
Default Settings	Yes
	Cancel

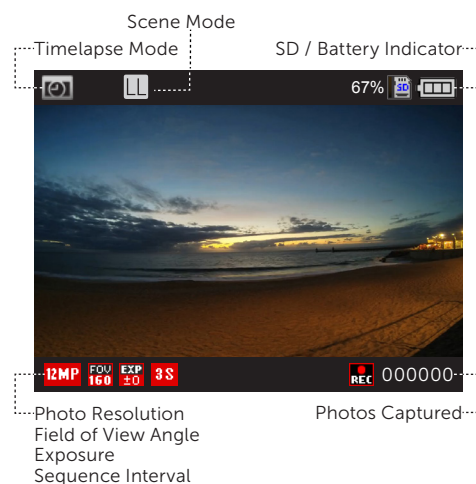


Figure 18: Timelapse Mode Live Preview



Photoburst Mode

Photoburst Mode (CYAN BLUE LED)

While the camera is powered on and in Photoburst Mode—with a Micro SD card inserted with enough free memory—it will capture a burst of still images for an allotted duration, at a specified rate when ACTION is pressed on the camera or the remote control.

1. To enter Photoburst Mode, ensure the camera is powered on.
2. Press MENU to enter the Main Menu.
3. Open the Mode Selection menu, select Photoburst Mode and press ACTION.

The screen will return to Live Preview and will display the Photoburst Mode icon in the top-left corner of the screen. The camera LED indicator will turn CYAN (light blue)—the camera is ready to take a photoburst series.

Capturing Photoburst Sequences

The Photoburst Mode settings can be set from the Mode Settings menu.

1. Open Mode Settings from the Main Menu and select Photoburst Mode.
2. Under 'Capture Rate', highlight the desired photo capture rate and press ACTION to confirm.
3. Under 'Burst Duration', highlight the desired duration and press ACTION to confirm.
4. Return to Live Preview and press ACTION on the camera or remote control to start photoburst.
5. The camera LED indicator will BLINK RED once when each photo is taken, and return to CYAN (light blue) once the file is saved and ready to shoot another photoburst.

! The Ghost-S does not automatically make composite images from the photoburst sequence shot. This can be done on third party post-production software.

Scene Mode

Normal: Use this as your 'go to' setting. This is the default setting and will give you the most neutral, true to reality colour palette possible for the broadest range of environments, and is the best mode to choose for bright sunny days.

Vivid: Use this mode when you are intentionally looking to make your colours a touch more saturated.

Low Light: This setting should only be used in low light settings such as filming at night or indoors with less ambient lighting. This will optimise the camera to reduce image noise in low light settings.

Photoburst Mode Settings

Resolution	12MP		
	8MP		
	5MP		
FOV	160°		
	127°		
	90°		
Capture Rate	5/s		
	10/s		
	20/s		
	30/s		
FOV	160°		
	127°		
	90°		
Exposure	-2		
	-1		
	0		
	+1		
	+2		
Self Timer	Off		
	3s		
	5s		
	10s		
Scene Mode	Normal		
	Vivid		
	Low Light		
Default Settings	Yes		
	Cancel		
Resolution	Capture Rate	Burst Duration	
12MP	10/s	1s	
	5/s	1s	2s
8MP	10/s	1s	2s 5s
	5/s	1s	2s 5s
5MP	30/s	1s	
	20/s	1s	
	10/s	1s	2s 5s
	5/s	1s	2s 5s

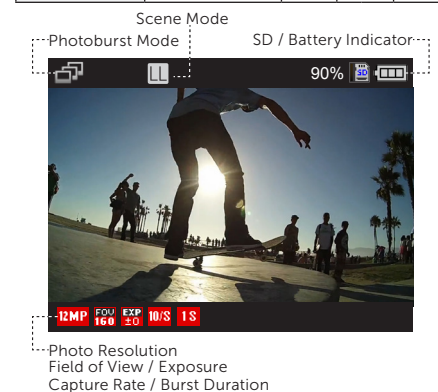


Figure 19: Photoburst Mode Live Preview

Playback

On opening Playback from the Main Menu, the screen will display the four camera mode icons. A number will be displayed beside each camera mode icon to indicate how many files are stored on the memory card for each mode.

To select a highlighted camera mode, press ACTION.

The screen will display the most recent video, photo, timelapse or photoburst folder. To move between files, use LEFT and RIGHT. To return to Live Preview, press the menu button to backout.

Video Playback (Figure 21)

1. Select the video file you wish to playback using LEFT / RIGHT, then press ACTION.
2. The screen will display a sub-menu. Highlight 'View' to watch the selected video and press ACTION.
- ! Highlight 'View All' to watch all the videos stored on the memory card and press ACTION.
3. Pressing ACTION will pause playback and pressing MENU will stop playback.
4. Use LEFT and RIGHT during playback to rewind and fast-forward.

Viewing Photos (Figure 22)

On opening Photo Mode from the Playback menu, the screen will display the most recent photo. To move between photos, use LEFT and RIGHT. Photos are displayed in their native 4:3 format for 12, 8 and 5MP images.

Viewing Timelapse Photos (Figure 23)

On opening Timelapse Mode from the Playback menu, the screen will display the first image in the most recent timelapse sequence. To move between sequences, use LEFT and RIGHT. Press ACTION and select 'View Series' to open the desired sequence.

Viewing Photoburst Photos (Figure 24)

On opening Photoburst Mode from the Playback menu, the screen will display the first image in the most recent photoburst sequence. To move between sequences, use LEFT and RIGHT. Press ACTION and select 'View Series' to open the desired sequence.

Deleting Files

1. Pressing ACTION while viewing any file in Playback will open a sub-menu.
2. Highlight 'Delete' to delete the selected video or photo, or 'Delete All' to delete every file for the selected camera mode. Press ACTION and confirm.
3. You can also choose to delete timelapse or photoburst sequences in the same manner as above.
- ! Please be aware when using 'Delete All' that all files for the selected camera mode will be removed from the memory card and cannot be retrieved.
- ! Using this function will not delete any other files from the Micro SD card.

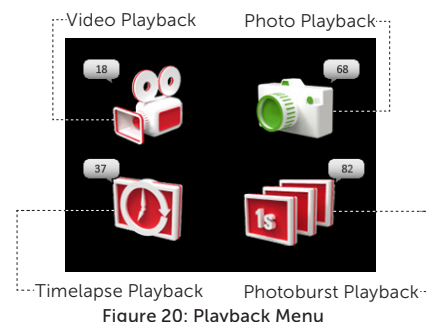


Figure 20: Playback Menu

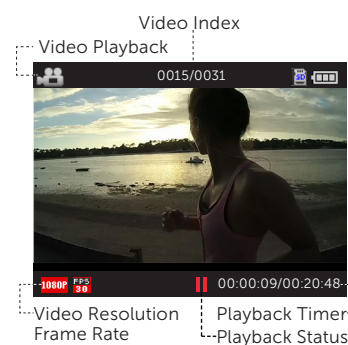


Figure 21: Video Mode Playback

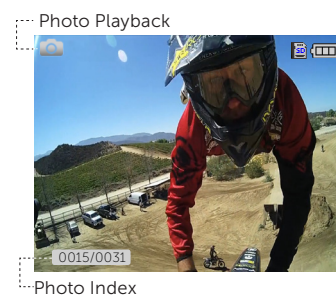


Figure 22: Photo Mode Playback

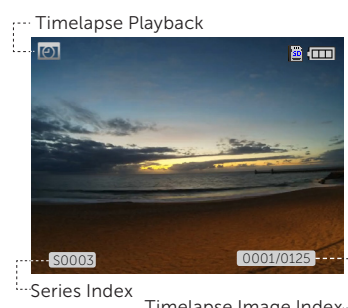


Figure 23: Timelapse Mode Playback

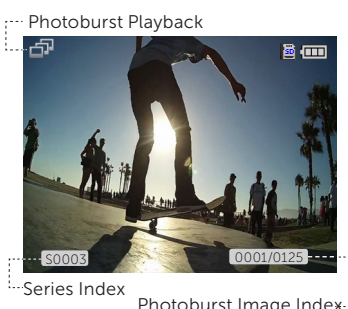


Figure 24: Photoburst Mode Playback




Camera Settings

Upon opening Camera Settings from the Main Menu, the screen will display the list of adjustable camera settings.

Use LEFT and RIGHT to move between settings. Use ACTION to edit and confirm settings; LEFT and RIGHT to move between setting values.

Wi-Fi

To turn Wi-Fi on or off, highlight 'Wi-Fi' from the Camera Settings menu and press ACTION. While Wi-Fi is on, the Wi-Fi icon  will show in Live Preview.

For more about connecting the camera to other Wi-Fi devices, see [p19](#).

Wi-Fi Network Name

Your camera will create a local area network, with the network name 'Ghost S XXX', where 'XXX' is any three digit number you wish to assign in this setting. Pressing LEFT/RIGHT will cycle the selected digit value, while pressing ACTION will move the cursor to the next digit.

Clone Mode

See [p15](#).

Setting the Date and Time

1. Highlight 'Date' from the Camera Settings menu and press ACTION.
2. Adjust the year using LEFT/RIGHT and press ACTION to confirm.
3. Set the month, day and time, pressing ACTION to confirm each.

Camera Settings Profiles

All camera settings can be saved by selecting 'Save Settings' from the Camera Settings menu and choosing a save profile: 'A', 'B' or 'C'.

Settings profiles can be loaded by selecting 'Load Settings' from the menu, then 'A', 'B' or 'C'.

The camera will power on in the same settings configuration it was powered off in, except for digital zoom, which gets reset.

Wi-Fi	On
	Off
Wi-Fi Network Name	'000'
Clone Mode	Off
	AP
	ST
Mic Sensitivity	Off
	Low
	Med
	High
Speaker Volume	Off
	Low
	Medium
	High
LCD Brightness	Low
	Medium
	High
LCD Off	Never
	5s
	10s
	20s
	1m
	5m
	Off
Remote Control	On
Remote Pairing	One To One
	One To All
Remote LED	On
	Off
Camera LED	On
	Off
Digital Zoom	On
	Off
Camera Off	Never
	1m
	2m
	5m

Reset Default Settings

To restore the factory camera settings, highlight 'Reset Settings' from the Camera Settings menu and press ACTION, then confirm.

HDMI Out Resolution	AUTO		
	1080P		
	1080i		
	720P		
HDMI Out Frame Rate	60 FPS		
	50 FPS		
	30 FPS		
	25 FPS		
Date/Time	Year/Month/Day		
Date/Time Stamp	Off		
	On		
Save Settings	Profile A		
	Profile B		
	Profile C		
Load Settings	Profile A		
	Profile B		
	Profile C		
Language	English		
	Français		
	Deutsch		
	Español		
	Italiano		
	Português		
	Russian		
	Nederlands		
	Norwegian		
	Dansk		
	Polski		
	Român		
	Svenskt		
	Český		
	ελληνικά		
Save Settings	A	B	C
Load Settings	A	B	C
Reset Settings	Yes		
	Cancel		
Format Memory Card	Yes		
	Cancel		
Firmware Version	X.X.X.X		

Firmware Version

This will display the camera's current firmware version. For more details about updating firmware, see [p21](#).



Camera Settings (cont'd)

Clone Mode

The ultimate tool for any video production, Drift Innovation's Clone Mode allows simultaneous recording and synchronized setting adjustments for linked cameras. Users can sync up to five cameras connected to the same Clone Network via Wi-Fi. Start just one camera and all networked cameras start. Change the mode on one, and all cameras update to the new mode.

Setting Up Clone Mode

Clone mode works on a 'Master-Slave' type of system. There is one main Access Point (AP) camera; all Station (ST) cameras connect by all having the same SSID (see figure 25).

Setting up the Access Point (AP) Camera

1. Select the first camera for the Clone Network (this can be any camera you wish to be on the network), navigate to 'Clone Mode' in the SETTINGS menu. Press ACTION, and then highlight 'AP' to designate this first camera as the Access Point for your System. Once highlighted, press ACTION to select.
2. On your Access Point camera, set the 'Wi-Fi Network Name' to be the number you wish to assign to this Clone Network. This is of your choosing at this point, and can be anything.
3. Next (still on the AP camera) turn on your Wi-Fi, see p14.

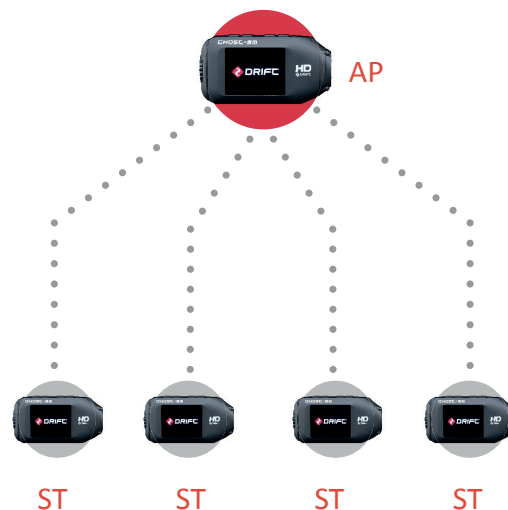


Figure 25: Clone Mode System Overview

Setting up the Station Mode (ST) Camera(s)

At this point your AP camera is already setup (see above) and you are connecting up to four additional cameras in Station Mode to your Clone Mode Network.

1. Select the next camera you wish to add to your network. Navigate to 'Clone Mode' in the SETTINGS menu. Press ACTION, and then highlight 'ST' to designate this next camera into Station Mode. Once highlighted, press ACTION to select.
2. On your Station Mode camera, set the 'Wi-Fi Network Name' to be the SAME NUMBER you assigned to the AP camera. Whatever network name you gave in step two, you must re-enter here for the cameras to be on the same network.
3. Next (still on this ST camera) turn on your Wi-Fi, see p14.

Repeat steps 4-6 to add up to four Station Mode cameras, making a total network of five cameras including the Access Point camera.

Two-Way Remote Control

Powering On and Off



1. Ensure the camera is powered on, see p5.
 2. Press and hold the ACTION button on the remote—the LED will power on and indicate the current camera mode.
- !** The remote will automatically power off if it does not find a camera after 15s.

Charging

Connect the remote control using the Mini USB cable (provided) to a powered USB port. The LED will blink red. A full charge takes around two hours using a 1-2A charger. Once the remote is fully charged, the LED will show solid green—remove the mini USB cable and replace the rubber dust-proof USB seal.

Pairing Camera to a Remote Control - One to One

[The camera and remote control included in the package are already paired to one another]

1. On the camera, press MENU, select Camera Settings from the Main Menu and press ACTION.
 2. Highlight 'Remote Pairing' in the Camera Settings menu and press ACTION.
 3. Highlight ' — ' in the Remote Pairing options and press ACTION.
 4. Ensure the remote control is powered on.
 5. On the remote control, press ACTION — The camera will beep and return to the Camera Settings menu if it has recognised the remote.
- !** If the camera does not display 'successful' and return to the Camera Settings menu it will not be paired—try pressing ACTION on the remote again.
6. On the camera, the icon beside Remote Pairing will change to indicate it is paired to a remote control.

Using the Remote Control - One to One

While the camera and remote are both powered on and paired, pressing ACTION on the remote control will begin recording video, capture a photo, start timelapse or photoburst, depending on the camera mode.

Pressing ACTION while recording video will capture a photo, or start Video Tagging (if activated, see p8). Pressing STOP will end video recording or timelapse.

Pressing STOP while the camera is in Live Preview will toggle between camera modes, as indicated by the LED indicator on the camera and remote.

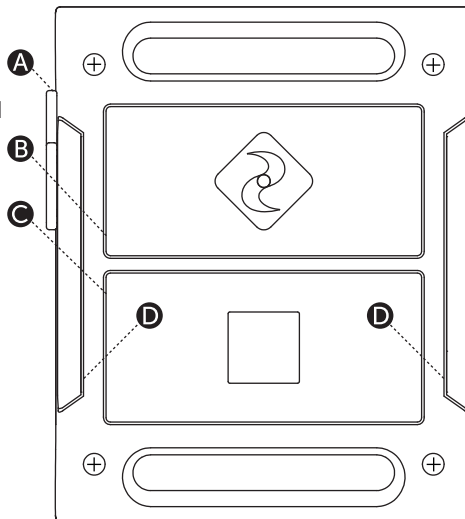


Figure 26: Two Way Remote Control Top View

- A** USB Power In
- B** ACTION Button
- C** STOP/MODE Button
- D** Remote LED Indicators

! The Remote is **NOT** waterproof, and should not be submerged. It is however weather-resistant, and can withstand rain and snow.

LED Status	Description
Rapid Blinking Red	Low Battery (<15%)
Blink Red	Taking a photo
Blinking Red	Recording video
Blink Blue	Signal confirmation
Solid Green	Video Mode
Solid Yellow	Photo Mode
Blinking Purple	Timelapse Mode
Blinking Cyan	Photoburst Mode
Blinking White	One to All Mode

Two-Way Remote Control (cont'd)

Pairing Camera to a Remote Control - One to All



A single remote control can be paired to an infinite number of cameras in a 10m range from the remote control, to enable footage to be captured from every angle.

1. On the cameras, press MENU, select Camera Settings from the Main Menu and press ACTION.
2. Highlight 'Remote Pairing' from the Camera Settings menu and press ACTION.

3. Highlight '  ' in the Remote Pairing options and press ACTION.

4. On the remote control, press ACTION—the camera will display 'successful' and return to the Camera Settings menu if it has recognised the remote.

! Any camera that does not display 'successful' and returns to the Camera Settings menu will not be paired—try pressing ACTION on the remote again.

5. On the camera, the icon beside Remote Pairing will change to indicate it is in "One to All" mode.

! When pairing multiple cameras, always test the remote control to see if it operates all the cameras before mounting them.

Using the Remote Control - One to All



While the camera and remote are both powered on and paired, pressing ACTION on the remote control will begin recording video, capture a photo, start timelapse or photoburst, depending on the camera mode.

Pressing ACTION while recording video will capture a photo, or start Video Tagging (if activated, see p8). Pressing STOP will end video recording or timelapse.

! The remote control indicator lights will show white to indicate the remote control is paired to multiple cameras.

! Mode changing from the remote control is disabled when in one to all mode.

Shot Setup

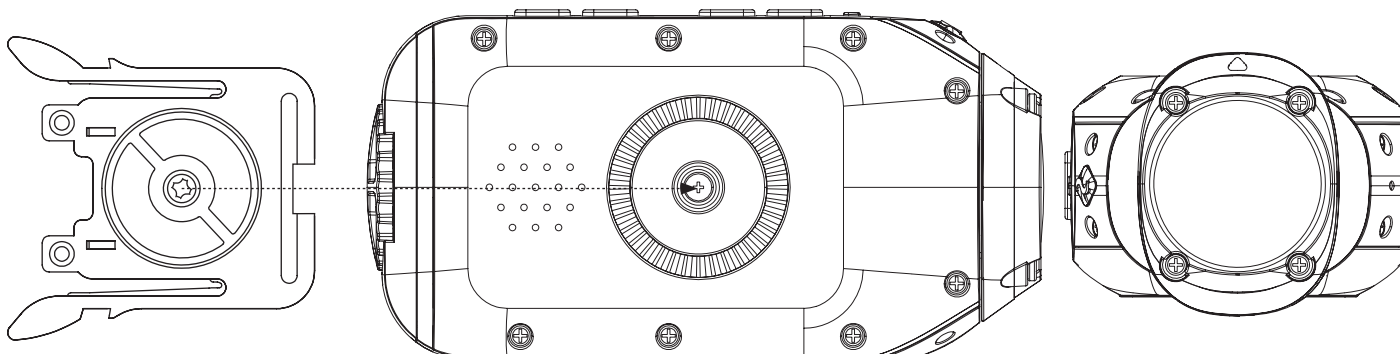


Figure 27: Universal Clip Screw Location & Lens Rotation

Fixing the Camera to the Universal Clip

1. Align the screw of the Universal Clip with the thread on the underside of the camera body.
2. Twist the screw thread in a clockwise direction by hand.
3. As the Universal Clip tightens against the body of the camera, rotate the camera to provide the desired angle of attachment, holding the clip in place.
4. Tighten the screw on the Universal Clip until it fits firmly against the camera body.

Closing the Rear Hatch

1. Ensure the directional arrow “up” indicator is pointing up towards the buttons.
 2. Use the notch in the Universal Clip to tighten the screw on the Rear Hatch.
- ! Failure to completely seal the Rear Hatch where water is present may result in permanent damage to the camera (see p3).

Mounting the Camera to a Drift Mount

Included with the camera are several Drift mounts which will help you find the shot you want.

Mounting the Camera on Goggles

1. Attach the Goggle Mount to the strap of your goggles.
2. Slide the camera (with Universal Clip attached) into the mount until the two arms on the clip click into place, check that the clip is fully secured.

Mounting the Camera on a Helmet

1. Position the Curved Surface Mount against your helmet to find the optimum mounting position.
2. Ensure the mounting surface is clean, dry and free of oil and dust.
3. Remove the cover of the mount’s 3M adhesive and fix the mount to the helmet—allow 24 hours to cure.
4. Slide the camera (with Universal Clip attached) into the mount until the two arms on the clip click into place, check that the clip is fully secured.

Fixing the Camera to the Standard 1/4"-20 Thread

Thread the camera onto a tripod, or any other mount with a standard camera thread, turning the camera body on the thread clockwise to secure.

- ! However you choose to mount your camera, ensure that the camera is fitted firmly to reduce the risk of losing it. Give it a tug before you set out.

Lens Rotation

In order to maximise your mounting options, the camera lens is rotatable through 300°, allowing for the perfect shot from even the most extreme of positions.

Whilst holding the camera body in one hand, use the index finger and thumb of the other hand to hold the camera lens firmly, then twist the lens to the desired angle. The arrow indicator above the lens indicates ‘up’ and corresponds with the top of the display in Live Preview.

- ! Be sure to rotate the lens back to the 0° position (so the ‘up’ indicator on the lens is aligned with the LED indicator on the camera) before mounting, or un-mounting, the camera to reduce the risk of damage to the lens.

Zoom

The Drift Ghost-S includes a 10x digital zoom function that allows you to take close-up photo and video.

While in Live Preview, or while recording video, press and hold the RIGHT button to zoom in, and the LEFT button to zoom out.

Digital zoom can be disabled in the general Camera Settings Menu.

Connectivity

Recorded video footage and photos can be copied to a computer using the USB cable provided or—if your computer has an appropriate card reader—directly from the Micro SD card.

Connecting to a Windows PC by USB Cable

1. Connect the camera to your PC using the USB cable. The camera screen will display a USB logo and the LED status indicator will blink red.
2. Your PC's operating system may be setup to open new devices automatically, if not, open My Computer.
3. Your PC should recognise the camera as a removable device—look for DRIFT CARD in the list of all devices and open.
4. Open the DCIM folder, inside you will find the 100DRIFT folder, which contains all the files saved on the memory card by the camera.
! If there are a very large numbers of files, there will be multiple folders (100DRIFT, 101DRIFT, etc).
5. Copy the desired files to your PC.

Connecting to a Mac by USB Cable

1. Connect the camera to your Mac using the USB cable. The camera screen will display a USB logo and the LED status indicator will blink red.
2. Your Mac's operating system may be setup to open new devices automatically, if not, open a new Finder window.
3. Your Mac should recognise the camera as a removable device—look for DRIFT CARD in the list of devices and open.
4. Open the DCIM folder—inside, you will find the 100DRIFT folder which contains all the files saved on the memory card by the camera.
! If there are a very large numbers of files, there will be multiple folders (100DRIFT, 101DRIFT, etc).
5. Copy the desired files to your Mac.

Connecting the Camera to a TV

1. While the camera is turned off, connect it to your TV using a Mini HDMI type C cable (not included).
2. Power on the camera.
3. Once booted up, the image usually displayed on the camera's LCD screen will instead be displayed directly on your TV, and the sound will come out of the TV speakers.
4. Press MENU to cycle through camera modes while connected to a TV.

Connecting to a Wi-Fi Device

1. Set the Wi-Fi network name and turn on the Wi-Fi as per p14.
2. On your mobile device navigate to your Wi-Fi network settings. For most devices, this will be found in SETTINGS>Wi-Fi. Search for the network name 'Ghost S XXX' where XXX is the three number digit you assigned when setting up the network name on your camera.
3. Select the network found in step 2 to connect your device and your camera.

Manual HDMI Out

The Ghost-S will automatically connect via HDMI to an HD ready TV. However, it is also capable of manually setting the HDMI out to either 1080p, 1080i or 720p. These can be set to 60, 50, 30 or 25 frames per second for the progressive modes, and 60 or 50 HZ for the interlaced modes.

Playing Video on a Computer

Some computers may not have the correct codecs required for video playback and editing.

If you experience difficulties playing video recorded with your camera, you can download VLC media player for free from www.videolan.org.

If you are experiencing difficulties editing video or do not wish to use VLC player for playback, you will need to download and install a codec pack. The FFDshow codec pack can be downloaded from www.free-codecs.com/FFDshow_download.htm.

Recommended System Requirements

To smoothly view and edit HD video, powerful hardware is required:

Windows

- 2nd Generation Intel® Core™ or AMD equivalent, Intel® Core™ i7 recommended.
- Minimum 2GB of RAM (recommend 4GB and up).
- Graphics card comparable to NVIDIA GeForce 600 or AMD Radeon HD6000 and up.
- Microsoft Windows Vista or Windows 7 or later.

Mac

- 2nd Generation Intel® Core™ or AMD equivalent, Intel® Core™ i7 recommended.
- Minimum 2GB of RAM (recommend 4GB and up).
- Graphics card comparable to NVIDIA GeForce 600 or AMD Radeon HD6000 and up.
- Mac OS X v10.5 or later.

Conserving Battery

The Ghost-S comes with a rechargeable 1700mAh Lithium-Ion battery, allowing you to record continuously for hours between charges. However, sometimes you may find yourself in a location without a power outlet to charge your camera. If you're outside, cold conditions can drain battery power at a faster rate than usual. Fortunately, the Ghost-S comes with a number of features to conserve the battery life. These can all be found in the Camera Settings menu.

LCD Off

The camera's LCD screen consumes power, so one of the best ways to extend battery life is to use the 'LCD Off' feature. By default, LCD screen will automatically power off after 20 seconds (the time interval can be chosen when selecting 'LCD Off' from the Camera Settings menu).

The camera will still function as normal when the screen is off: in Live Preview, the camera is ready to record at any time. If recording is in progress, the camera will continue to record. The remote can also be used while the screen is off. The screen can be turned back on again at any time by pressing any button.

LCD Brightness

The LCD screen is backlit, this too consumes power. It is possible to reduce the intensity of this light by adjusting the 'LCD Brightness' setting in the Camera Settings menu—you will notice a slight increase in battery life if you use a lower brightness setting.

Camera Auto Off

It is possible to set the camera to power off entirely when no buttons are pressed for a number of minutes (the duration can be chosen selecting 'Camera Auto Off' from the Camera Settings menu). This can be useful to reduce battery consumption if the camera is accidentally left powered on.

- ! The camera will not power off while recording is in progress. However, once the camera has powered off, you will need to power it on again before capturing any footage.
- ! The remote control will not operate the camera while the unit is powered off.

Using Different Video Resolutions

Bigger resolutions as well as higher frame rates all contribute to more 'work' for the processor; this means more battery power is required to process the work. If you are shooting video and do not require full 1080p (for instance for easy internet sharing) try using a lower resolution and your battery life will increase accordingly. For example, in 1080p at 30fps you can expect 3h 30min versus 4h 20min in WVGA at 30fps.

Spare batteries

You can also charge a second battery before you set out and then swap it when the first is empty. Spare 1700mAh Ghost batteries and Power Packs are available from official Drift retailers.

Please visit driftinnovation.com for more information and where to purchase.

- ! Always change the battery in a clean, dry and safe environment. Getting camera batteries wet will damage them and may result in injury. For your own safety, never use damaged batteries.

Updating Firmware

The Drift Ghost-S should always be operated on the latest firmware available, downloadable from www.driftinnovation.com. Be sure to check back often for updates as we will continue to add features and options to your camera after you purchase it

1. Go to www.driftinnovation.com and download the latest firmware file ("Ghost_S.bin") found easily in the Drift Ghost-S section, or by navigating to 'Firmware' listed in the bottom footer of any page.
 2. Plug your Drift Ghost-S unit into your computer (MAC or PC) using the supplied USB cable.
 3. Your camera should come up as an External Device with the "Drift Card" Micro SD card being visible as a storage device (see *connectivity p19*). Please copy the "Ghost_S.bin" firmware file into the root folder of the "Drift Card" Micro SD card.
 4. Safely eject your Drift Ghost-S and Micro SD as a storage device from your computer.
 5. Power on the camera and wait for it to automatically update itself. You will get a "Firmware Update in Progress" message and the LED status indicator will blink red. This should take a few seconds and the camera will automatically power off after.
 6. Power the unit on again.
 7. Navigate to the settings menu and check the "Firmware Version" to ensure the firmware has been successfully updated.
- ! Your camera might shut off automatically once more after step 6, this is normal. Simply turn the unit back on. This step is necessary in order to refresh a set of Wi-Fi initialisation code that only needs to be refreshed once per firmware update.

Camera Care

The Ghost-S is specifically designed for extreme sports. It is a very durable piece of equipment. However, to ensure a long and healthy life for your camera, please follow the guidelines below.

Cleaning the Camera

During your sporting activities, the camera will inevitably get dirty or wet. Although this is not an issue, it is recommended that you clean the camera after each use. Clean the camera thoroughly with a damp cloth and let it air dry before you open the back hatch or rotate the lens. Take extra care when cleaning the built-in microphone and speaker.

Cleaning the Lens and LCD Screen

In order to provide a clear image for high definition video, it is important to keep the camera lens clean. Be careful not to scratch the camera lens whilst cleaning it. Wipe off any surface mud or water from the lens with a damp cloth and use a dry, micro fibre, scratch proof cloth to polish the lens once it is dry.

! Scratch proof cloths are available from any camera shop or optician.

Cleaning the Seals

To ensure that the camera remains waterproof, it may be necessary to occasionally clean the contact surfaces around the rear hatch seal. This can be done by wiping a damp cloth around the seal. Be careful not to leave excessive water on the seal, then let it air dry.

Anti Fog Care

The camera is equipped with anti fog inserts, as well as anti fog treatments for the LCD screen. For the best results always ensure the environment is dry before you open the rear-hatch of the camera to prevent moisture from excessively humid air from being trapped inside the camera. Trapped moisture inside the camera might cause slight condensation to occur. To remove this moisture, store the camera overnight in a cool, dry environment with the battery and rear hatch removed, and the battery latch open.

Technical Specifications

Video Resolution	1080p, 960p (4:3), 720p and WVGA (16:9)
File Format	.MP4 (H.264 codec)
Sensor Type	12 MP Sony CMOS sensor with back illuminated technology
Frame Rate	1080P: 25 / 30 / 50 / 60 fps
	960p: 25 / 30 / 48 / 50/ 60 fps
	720p: 25 / 30 / 50 / 60 / 100/ 120 fps
	WVGA: 25 / 30 / 50 / 60 / 100 / 120 / 200 / 240 fps
Field of View	1080p: 90° / 127° / 160°
	960p: 160°
	720p: 160°
	WVGA: 160°
Lens Focal Range	0.5m to infinity
Lens Rotation	300°
Zoom	x10 (digital)
Photo Mode	5 / 8 / 12 megapixels
Exposure	Auto / Manual (advanced users)
LCD Screen	2.0" colour TFT covered in Corning® Gorilla® Glass
Waterproof	3m (9.84ft)
Microphone	Built-in, noise reducing microphone
Built-In Memory	256MB (not user accessible)
Memory Capacity	Micro SD memory cards up to 128GB
Inputs	3.5mm external microphone (extension included)
Outputs	HDMI connector type C (cable not included)
	USB Plug and Play, mini-B USB connector
Compatibility	Windows Vista or Windows 7 and up / Mac OS X 10.5 and up
Remote Range	10m (32ft)
Radio Frequency	2.4G
Camera	Dimensions: 105 (L) x 52 (W) x 33 (D) mm
	Weight: 171g
	Power: 1700mAh rechargeable lithium-ion battery (included) (DC 3.7V)
Remote Control	Dimensions: 59 (L) x 48 (W) x 12 (D) mm
	Weight: 22g
	Power: 350mAh rechargeable lithium-ion battery (DC 3.7V)

Warranty

Drift Innovation ("Manufacturer") warrants to the original End User ("Purchaser") that this product purchased from us or any authorized dealer is free from manufacturing defects in material and workmanship for the applicable warranty period, as set forth in the product specification, or 12 months—whichever is the less. Drift Innovation products purchased from non-authorized dealers might not be covered by the offered warranty. The warranty period is considered valid from the issue date confirmed on the sale invoice.

This limited warranty covers defects encountered in the normal use of the product during the warranty period and does not apply under the following conditions:

- Product is damaged due to physical abuse, mishandling, accident, negligence or failure to follow the supplied operating instructions;
- Product is physically modified by Purchaser in any manner other than that for which it was intended or otherwise previously approved by the Manufacturer;
- Product is damaged or has developed defects caused by the use of unauthorized parts or by an unauthorized repair service;
- The product has been subject to unsuitable operating or physical conditions outside those recommended in product specifications as provided by the Manufacturer;
- Product has its serial numbers altered or removed;
- Product is damaged due to improper packaging of the warranty return to the dealer or Manufacturer.

In the event of a product failure under normal use and within the warranty period, a repair or replacement will be provided at the discretion of the Manufacturer or the authorized dealer. The Manufacturer warranty does not cover loss, accidental damage or costs incurred during the handling and shipping of repairs or replacement products.

The Manufacturer shall have no liability or responsibility whatsoever to Purchaser or any other person for any loss, injury, death, or any damages derived from the use of the product or accessories.

Service

To obtain our warranty service, register your product at driftinnovation.com.

Customer Support

- Check driftinnovation.com for firmware updates, product updates and user videos.
- We are here to help you make the most of your Ghost-S camera; if you have any suggestions, comments or complaints, please visit the support section of our website—support.driftinnovation.com—or contact our customer support team on support@driftinnovation.com.

Disclosures

FCC Information

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and;
2. This device must accept interference received, including interference that may cause undesired operation.

Warning

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by powering the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna;
- Increase the separation between the equipment and the receiver;
- Connect the equipment into an outlet on a circuit different from that which the receiver is connected;
- Consult the dealer or an experienced radio / TV technician for help.

Industry Canada Information

This device complies with Industry Canada license-exempt RSS standard(s).

Operation is subject to the following two conditions:

1. This device may not cause interference, and;
2. This device must accept any interference, including interference that may cause undesired operation of the device.

This Class [B] digital apparatus complies with Canadian ICES-003.

Cet appareil s'accorde avec Industrie Canada licence-exempte RSS standard.

Son fonctionnement est soumis aux deux conditions suivantes:

1. Cet appareil ne peut pas causer l'intervention, et;
2. Cet appareil doit accepter de l'intervention, y compris l'intervention qui peut causer l'opération non désirée de.

Cet appareil numérique de la classe [B] est conforme à la norme NMB-003 du Canada.

Cet appareil s'accorde avec Industrie Canada licence-exempte RSS standard.

FCC RADIATION EXPOSURE

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Motorcycle Disclaimer

Interacting with the camera while riding could cause a crash and you or others may be seriously injured or killed.

- Keep your eyes and mind on the road;
- Avoid looking at the camera while riding;
- Stop the vehicle in a safe location before adjusting the camera.