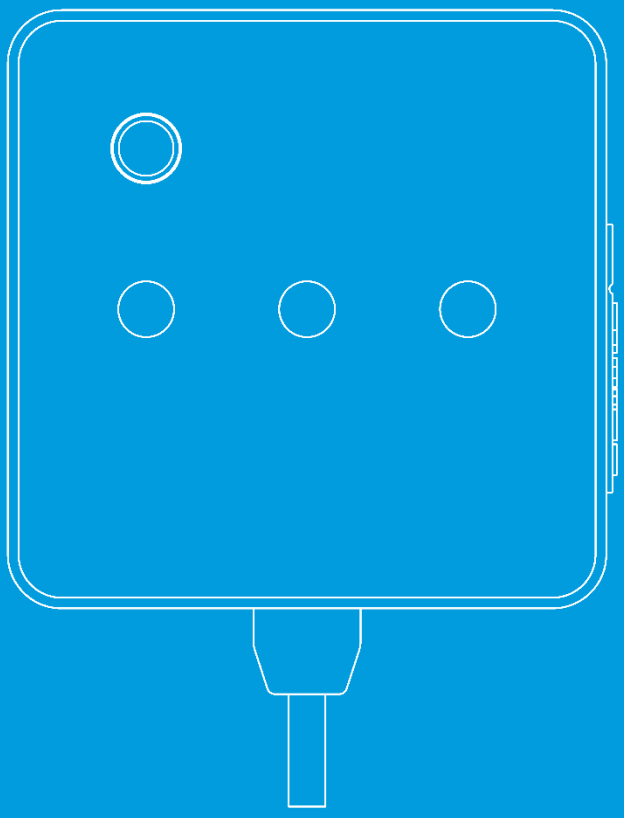
apture
RACE ELECTRONICS



RemoteGP
User Manual

Professional Camera Controller for GoPro Cameras

Contents

Description

RemoteGP is a professional camera controller designed specifically for motorsport. Built for reliability and ease of use, it gives drivers and teams an effortless way to control their camera system.

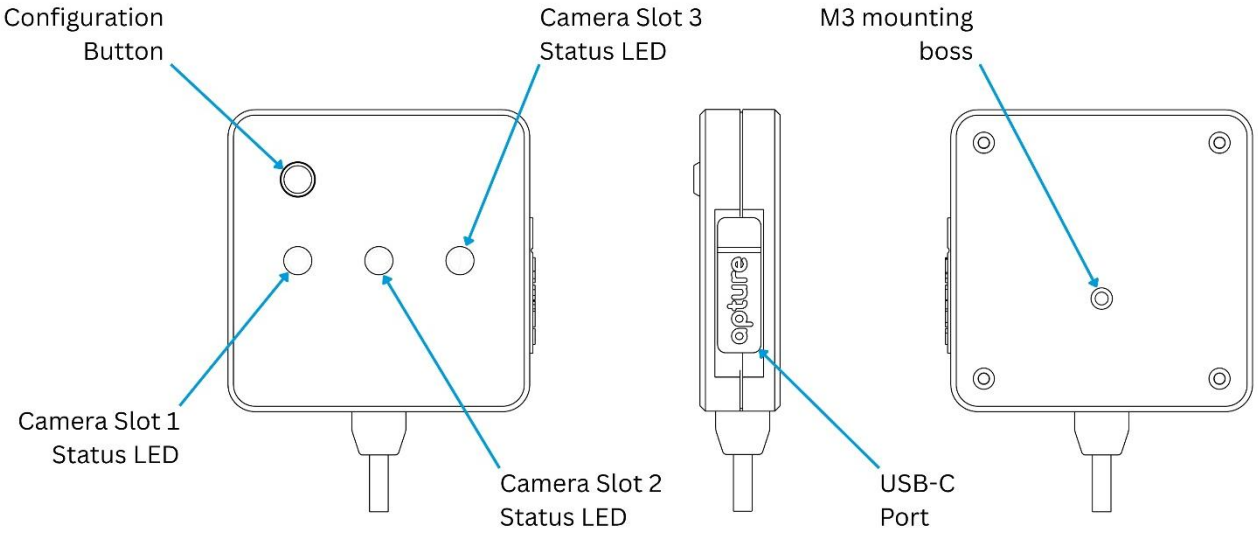
Designed to work seamlessly with GoPro cameras, RemoteGP provides wireless control of up to three cameras simultaneously. This eliminates the need to run wiring throughout the vehicle, simplifying installation and ensuring you have full flexibility for capturing the perfect angle.

RemoteGP ensures that every race, stage, or session is captured automatically. Once installed and configured, recordings can be started and stopped without driver intervention, allowing drivers to focus fully on the road or track.

RemoteGP can be configured to work with almost any vehicle – from classics to the latest in modern rally and circuit cars. With configurable inputs and CAN bus compatibility, RemoteGP can connect to vehicle systems such as ECUs or external switches, enabling flexible control options for any setup.

Customisable warnings also allow users to receive clear feedback on the status of their camera system, ensuring they always know when cameras are recording or require attention.

RemoteGP provides a simple, reliable solution for ensuring that every run is recorded, using a proven camera platform trusted across motorsport.



Installation

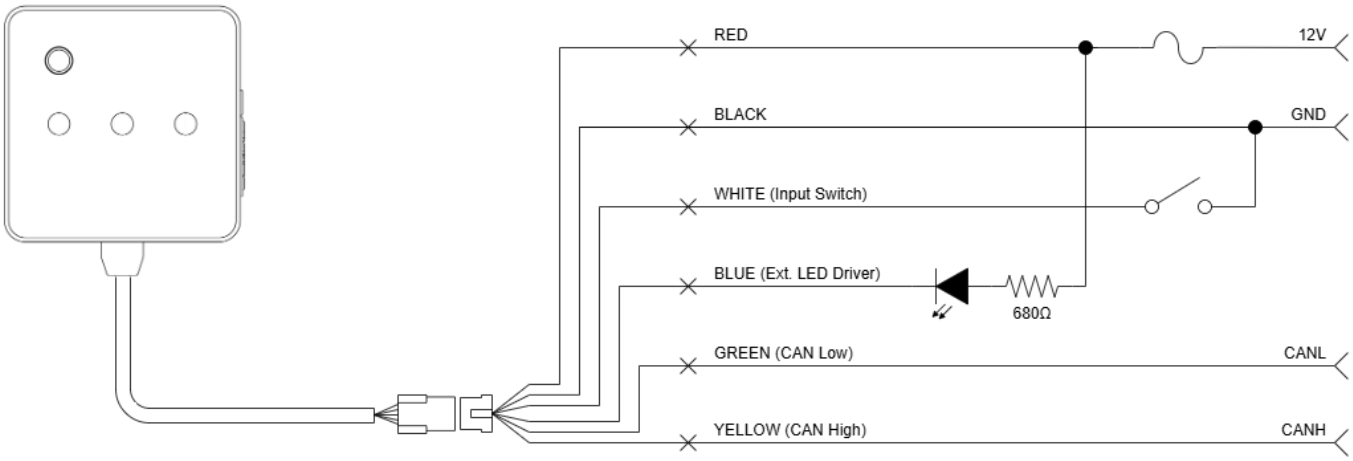
Mounting

The RemoteGP has an M3 mounting boss on the rear for mounting to a flat surface. Alternatively, use the provided Dual Lock tape. Consideration should be given to minimise heat and vibration when selecting a mounting location. If the RemoteGP is to be mounted in a high-vibration environment, anti-vibration mounting is recommended.

Whilst the RemoteGP is splash-proof, it is recommended to choose a location that minimises contact with water.

Electrical Connection

The RemoteGP connects to the vehicle's electrical system via the colour-coded flying lead and Molex connector (P/N 43020-0601). Connect as shown below. To simplify installation, consider using our RemoteGP Wiring Kit.



Power Connection

Connect the ground wire (black) to a common ground point for the vehicle's electrical system. The power wire (red) should be connected to a 12 Volt power source that is disconnected from the vehicle's battery when the vehicle is switched off (for example, after the ignition relay). A fuse between the RemoteGP and the power source is recommended.

Unsuppressed alternator load dump events may damage the RemoteGP. It is recommended to connect the RemoteGP near a device with transient voltage protection of 60V or less.

Input Switch Connection

The *Input Switch* can be used to command the connected cameras to start/stop recording and to drop a HiLight tag (refer to HiLight Tags for more information). The *Input Switch* has an internal pull-up resistor and must be switched to ground.

Both momentary and latching switches can be used. Multiple switches can be connected in parallel for additional trigger locations.

Do not connect the *Input Switch* to a device with its own pull-up circuitry as this could damage the RemoteGP.

External LED Connection

The RemoteGP has a low-side switch for controlling an external LED. This increases installation flexibility, allowing the RemoteGP to be mounted away from the driver's eye-line but still provide status information. Refer to the *External LED Output* section for choosing the LED output states.

The above wiring diagram shows the recommended installation of the external LED. The maximum current limit of the low-side switch is 40 mA. An external current-limiting resistor (recommended 680Ω 0.5W or greater) is required.

Do not connect inductive or capacitive loads to the External LED connection. Ensure that the maximum current limit of the RemoteGP and LED are not exceeded. Use of a current limiting resistor is required.

CAN Bus Connection

Connecting the RemoteGP to the vehicle's CAN bus allows camera recording to be controlled by another device on the same network (for example the vehicle's ECU). The RemoteGP also uses the CAN bus to transmit status and camera information. These can be used by data loggers or displays to provide information on the camera system. For further information on the format and transmission refer to the *CAN Communication* section.

The RemoteGP does not have an internal termination resistor and therefore requires 120Ω termination resistors at each end of the CAN bus.

Operation

Camera Slots

The RemoteGP can be paired with up to three GoPro cameras. The slot a camera is assigned to is chosen during the pairing process. It is recommended that you keep a record of which camera is assigned to which slot for resolving warnings quickly.

For example, a system with three cameras may be configured as follows:

Slot	Camera Location
1	Forward-facing camera
2	Driver-facing camera
3	Passenger-facing camera

The RemoteGP's *Status LEDs* provide feedback on the status of the camera assigned to that slot. Refer to the *Status LEDs* section for more details.

Pairing Cameras

To pair a camera to the RemoteGP:

1. Enter pairing mode on your camera. The process to do this varies between camera models so refer to your camera's User Manual for instructions. If prompted, select the option to pair with the *GoPro Quik App*.
2. Supply the RemoteGP with 12 Volt power.
3. Press and hold the *Configuration Button* for 5 seconds. The RemoteGP will enter *Pairing Mode* (indicated by yellow *Status LEDs*).
4. Press the *Configuration Button* to cycle through the camera slots. The currently selected slot is indicated by the *Status LED* flashing yellow.
5. Press and hold the *Configuration Button* for 3 seconds to confirm the camera slot and begin the pairing process. The *Status LED* on the confirmed slot will turn blue (either solid or flashing), and the camera should acknowledge the pairing request once completed.
6. Repeat Steps 1-5 for additional cameras.

The RemoteGP will exit *Pairing Mode* after a camera has successfully paired or after 90 seconds.

Notes:

- Ensure the *Wireless Connections* option is enabled on the camera (refer to your camera instructions for more details). This allows the RemoteGP to reconnect to a paired camera for up to 8 hours after the camera has entered sleep mode.
- It is recommended to confirm a successful pairing by power cycling both the camera and RemoteGP and confirming the RemoteGP connects to all paired cameras without issue. If an issue arises, reset the camera connections (refer to camera's user manual) and re-pair.
- If an already paired camera is being swapped to a different slot (for example, from Slot 1 to Slot 2), you must remove the camera first before repairing (see *Removing Paired Cameras*).
- The pairing procedure will need to be repeated if a camera's connection settings are reset.

Removing Paired Cameras

To remove a paired camera from the RemoteGP:

1. Enter *Pairing Mode* by pressing and holding the *Configuration Button* for 5 seconds.
2. Press the *Configuration Button* to select the camera slot to be cleared. The currently selected slot is indicated by the *Status LED* flashing yellow.
3. Press and hold the *Configuration Button* for 3 seconds to confirm the camera slot.

Once the camera is removed, the RemoteGP will exit *Pairing Mode* (indicated when the *Status LEDs* are no longer yellow) and enter the normal operation mode.

Recording Start & Stop

There are three input triggers for starting and stopping a recording on connected cameras:

- *Input Switch*
- *CAN Switch*
- *Configuration Button*

These triggers are enabled or disabled in the PC Configuration Tool.

To start recording, at least one trigger must be active. To stop recording, all inputs must be inactive. The RemoteGP will automatically switch the cameras into video mode before starting a recording.

If the *Input Switch* is enabled and configured as a momentary switch, the *Configuration Button* is mapped as a second momentary switch in parallel. This means either trigger can be used to start or stop a recording (for example, start with the *Input Switch* and stop with the *Configuration Button*).

If the *Input Switch* is configured as a latching switch or the *CAN Switch* is enabled, the *Configuration Button* can start and stop a recording provided the state of the other triggers does not change. If the Input Switch or *CAN Switch* is switched on, the *Configuration Button* is ignored until the recording has stopped.

Record Stop Delay

The *Record Stop Delay* adds a delay between a stop request and when the camera stops recording. This feature is useful for continuing a recording after the finish line when the input trigger is mapped to the race mode of the vehicle. To disable, set the *Record Stop Delay* to 0 seconds.

Connection Modes

The RemoteGP has two connection modes: *Always* and *On Record Request*. These modes control how the RemoteGP connects to paired cameras.

Always

When the connection mode is *Always*, the RemoteGP will always stay connected to the paired cameras. If a connection is lost, the RemoteGP will continuously attempt to regain the connection. Connected cameras are prevented from going to sleep and are kept in a ready state to start recording.

On Record Request

When the connection mode is *On Record Request*, the RemoteGP will only connect to paired cameras when a start recording trigger is received, or when the RemoteGP is powered on. The RemoteGP will remain connected to the cameras (preventing them from entering sleep mode) until all cameras have stopped recording and the *Disconnect Delay Time* has expired.

This mode can be used to save battery power by allowing the cameras to sleep when not in use. There is a small delay time (approximately 30 seconds) for the cameras to connect and start recording that must be considered if you use this mode.

When the RemoteGP is not connected to a camera and not scanning, paired camera slots are indicated by a slow flashing green *Status LED* (see *Status LEDs* for more information).

There are some additional features available when the connection mode is *On Record Request*. These features are configured in the PC Configuration Tool.

Disconnect Delay Time
After a recording has stopped (or after power-up), the RemoteGP will stay connected to the cameras until this time has expired.

Sleep On Disconnect
If enabled, the RemoteGP will send a sleep request to all connected cameras after the *Disconnect Delay Time* has expired.

Wake Up
If enabled, a quick on-off recording trigger will command the RemoteGP to connect to all paired cameras but not start a recording. The cameras will stay connected until the *Disconnect Delay Time* expires.

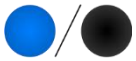
This feature can be used to prepare the camera system just before starting an event, therefore avoiding the connection delay and ensuring the cameras are ready to record when needed.

Status LEDs

The table below shows the states that are indicated by the *Status LEDs*. The brightness of the Status LEDs can be set using the PC Configuration Tool.

Table 1. Status LED states

Status	LED Colour
Camera Connected & Ready	Green Flashing (2s period)
Camera Connected with Warning	Orange Flashing (2s period)
Camera Recording	Green
Camera Recording with Warning	Orange
Camera Recording and Record Stop Delay Active	Green Flashing (Double)
Camera Recording and Record Stop Delay Active with Warning	Orange Flashing (Double)
Camera Error	Red Flashing (2s period)

Scanning for Camera		Blue Flashing (2s period)
Connecting to Camera		Blue
Scanning Timeout		Blue / Red Flashing
Idle with Paired Camera (On Record Request connection mode only)		Green Flashing (4s period)
Pairing Mode Active		Yellow / Yellow Flashing (for selected slot)
No Paired Cameras		Yellow Flashing (LED 1 only) (4s period)
USB Connected		White (LED 1 only)
CAN Error		Purple Flashing (LED 3 only) (2s period)
Low battery voltage		Red slow flashing (LED 3 only) (4s period)

Camera Connected & Ready
The camera is connected and ready to start recording. No warnings or errors are active.

Camera Connected with Warning
The camera is connected and ready to start recording but has one or more warnings active. Refer to *Warnings and Errors* for more information.

Camera Recording
The camera is currently recording.

Camera Recording with Warning
The camera is currently recording with one or more warnings active. Refer to *Warnings and Errors* for more information.

Camera Recording and Record Stop Delay Active
The camera is currently recording, and the *Record Stop Delay* is active.

Camera Recording and Record Stop Delay Active with Warning
The camera is currently recording, the *Record Stop Delay* is active, and one or more warnings are active. Refer to *Warnings and Errors* for more information.

Camera Error
The camera has either reported an error or is in a state that prevents it from starting a recording and requires your intervention to resolve it. Refer to *Warnings and Errors* for more information.

Scanning for Camera
The RemoteGP is currently scanning for the camera that was paired to the corresponding slot.

Connecting to Camera
The paired camera has been found, and a connection is being established. Once complete, the state will either change to *Camera Connected & Ready*, *Camera Connected with Warning* or *Camera Error* depending on the situation.

Scanning Timeout
The paired camera has not been found within 30 seconds. The RemoteGP will continue scanning, but you should check the camera for issues.

Idle with Paired Camera
This state is only applicable when the connection mode is *On Record Request*. It indicates that the RemoteGP is powered but is not connected or scanning for the paired camera. Once a recording or wake-up request is received, the state will change to *Scanning for Camera*.

Pairing Mode Active
The RemoteGP has entered *Pairing Mode* for pairing/unpairing cameras. The *Status LED* of the currently selected camera slot will flash yellow, whilst the remaining two *Status LEDs* will stay solid yellow.

No Paired Cameras
No cameras have been paired to the RemoteGP. This is shown only on *Status LED 1*.

USB Connected
The RemoteGP has been connected to a PC via the USB-C connector for settings configuration.

CAN Error
An error has been detected on the CAN Bus and may not respond correctly to CAN inputs. CAN communication must be enabled for this status to be evaluated.

Low Battery Voltage
The input battery voltage is too low to guarantee correct operation.

Input Switch

The *Input Switch* can be used to both start/stop recordings, and to drop a *HiLight Tag* when recording. The *Input Switch* is enabled using the PC Configuration Tool and has the following options:

Switch Type
The switch type must be selected for correct operation. Momentary and latching switches are supported.

Dual Function Mode
Enabling *Dual Function Mode* configures the *Input Switch* to control the recording state and to drop *HiLight Tags*.

Momentary Switch: Use a short press to start recording and then additional short presses to drop a HiLight tag. Long press to stop recording.

Latching Switch: Switch on to start recording, switch off to stop recording. To drop a HiLight tag, quickly turn the switch off and back on again (on-off-on).

HiLight Tag Only
If enabled, the *Input Switch* is used to drop *HiLight Tags* only and will not control the recording state of connected cameras. This option is only available if the switch type is *Momentary*.

External LED Output

The *External LED Output* can be used as an additional option for indicating operation states. This is helpful if the RemoteGP is mounted away from the driver's eye-line, but feedback is still required.

Use the PC Configuration Tool to configure the switching pattern of the *External LED Output* depending on the current state of the RemoteGP. The same switching pattern can be assigned to multiple controller states. The current state is a summary of all paired cameras.

Recording (Stop Delay Active)
At least one connected camera is recording, and the *Record Stop Delay* is active.

Recording (Error Active)
At least one connected camera is recording, and an error is active (see *Warnings and Errors* for more information). This state will be set if a *Scanning Timeout* or *CAN Error* status is active.

Recording (Warning Active)
At least one connected camera is recording, and at least one camera has a warning active (see *Warnings and Errors* for more information).

Recording (No Errors or Warnings)
At least one connected camera is recording, and no errors or warnings are active.

Idle / Ready (Error Active)
None of the connected cameras are recording, and an error is active (see *Warnings and Errors* for more information). This state will be set if a *Scanning Timeout* or *CAN Error* status is active.

Ready (Warning Active)
All paired cameras are connected and ready to start recording. At least one camera has a warning active (see *Warnings and Errors* for more information).

Ready (No Errors or Warnings)
All paired cameras are connected and ready to start recording. There are no active errors or warnings.

HiLight Tags

HiLight tags allow you to mark specific moments in your video as you are recording. This lets you quickly find those moments when watching the video (via the camera screen, GoPro Quik app, or a video viewing application such as VLC Player).

The RemoteGP gives you unlimited flexibility for adding HiLight tags to your videos. Up to 80 tags can be added per recording. Tags can be dropped using the *Input Switch*, the *CAN HiLight Tag Message* and the *CAN Vehicle Speed Message*.

Some examples of how HiLight tags can upgrade your experience are:

- Rally stage reconnaissance – use HiLight tags to mark moments in the stage that need to be reviewed for note changes. Go one step further and use a driver “mark” button to tag moments in the stage during competition that need review.
- Lap markers – use the output of a lap beacon to drop a HiLight tag at the start of each lap. The result is a video with pre-configured lap markers ready for post-race analysis.
- Fault finding – use HiLight tags to mark the point in the video that an alarm is generated. This lets you quickly align data to video when time is critical.
- Distance markers – using the *CAN Vehicle Speed Message*, HiLight tags can be added at a distance interval chosen by you. This is a great alternative to lap markers for disciplines with a separate start and finish line. Refer to *CAN Vehicle Speed Message* for more information.

Warnings and Errors

Warnings

Warnings are evaluated for each camera independently. The corresponding *Status LED* will indicate if one or more warnings are active. Warnings are enabled using the PC Configuration Tool.

Low Battery
Activates a warning if the camera's internal battery level is less than the chosen percentage.

Temperature
Activates a warning if the camera is overheating or too cold to start/continue recording. The camera may stop recording if not resolved.

Spot Meter Not Set
Activates a warning if the camera's spot meter has not been set. The spot meter adjusts the exposure based on a single point in the centre of the frame rather than the entire scene. This is helpful for cameras facing through windshields to prevent the video from overexposing.

Mic Adapter / Media Mod Not Connected
Activates a warning if a GoPro Pro 3.5mm Mic Adapter or GoPro Media Mod is not connected. This can be used as a setup alert for cameras connected to an intercom system.

No External Microphone Connected
Activates a warning if an external microphone has not been connected to the GoPro Pro 3.5mm Mic Adapter or GoPro Media Mod. This can be used as a setup alert for cameras connected to an intercom system.

All warnings (except for the Low Battery warning) are indicated in the Camera Status CAN message (if CAN communication has been enabled). These are evaluated regardless of whether the warning has been enabled by the user.

Errors

An error is considered anything that prevents a connected camera from recording. Errors are evaluated for each camera independently and most likely require your intervention to resolve. If an error is active, the corresponding *Status LED* will flash red.

Camera System Error
The camera is reporting an internal system error. The recommended solution is to power cycle the camera.

Playback Mode Active
Playback Mode allows previously recorded videos to be viewed on the camera. The RemoteGP cannot command a camera to exit Playback Mode. This must be done by the user.

SD Card Error Active
An SD Card Error is active if the camera reports the SD Card is in one of the following states which prevents a recording from starting.

- SD Card not installed.
- SD Card Full – there is no remaining space available.

- SD Card Busy – normally when the SD card is being formatted by the camera.
- SD Card Format Error – a reformat is recommended to resolve this issue.

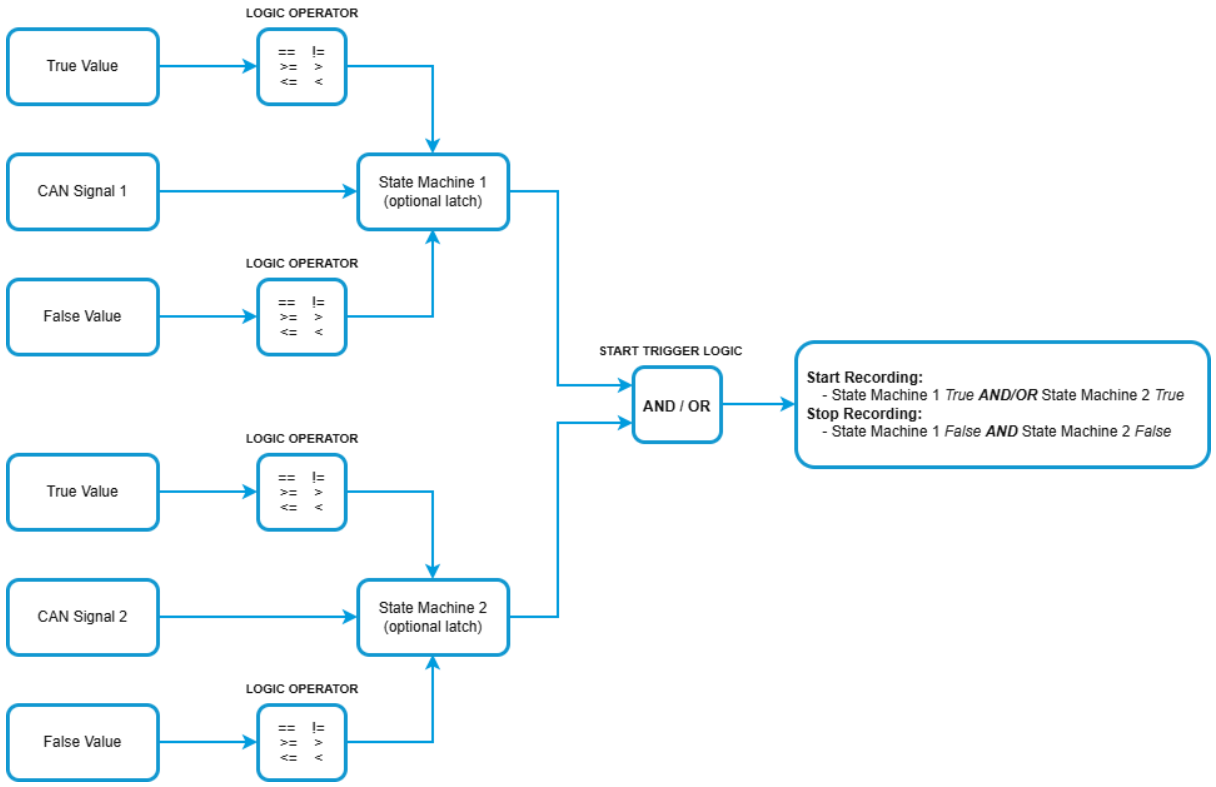
CAN Communication

CAN communication is enabled and configured using the PC Configuration Tool. The user can configure the baud rate to 1 Mbps, 500 kbps, 250 kbps or 125 kbps.

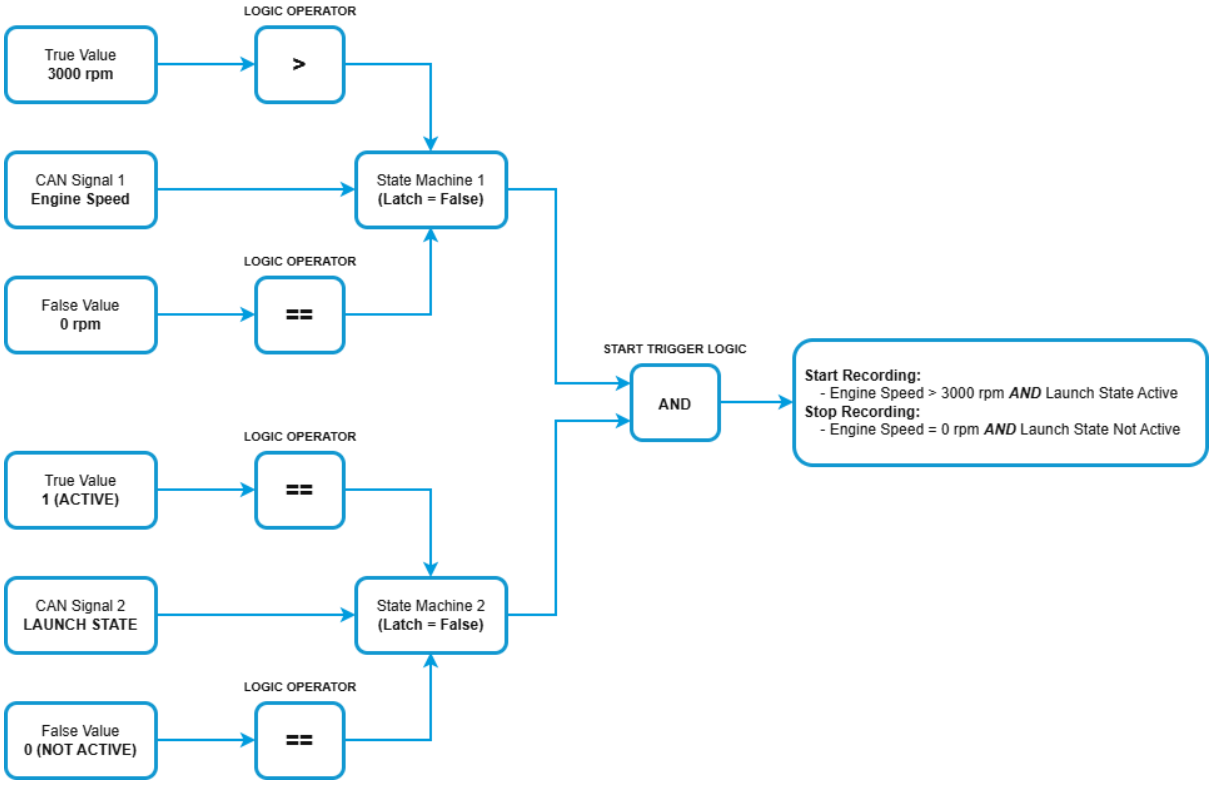
> Improper installation or configuration may cause vehicle malfunction, reduced performance, or safety system failure. Installation must be performed by a competent, qualified individual familiar with vehicle CAN systems.

CAN Recording Start & Stop Message

Up to two CAN messages can be assigned as a recording start/stop trigger. Each CAN message has its own state machine with selectable logic operators to determine if the input value is *True* or *False*. The outputs of each state machine are combined at an *AND/OR* logic gate to generate the recording start trigger. The cameras will stop recording when both state machine outputs are *False*.

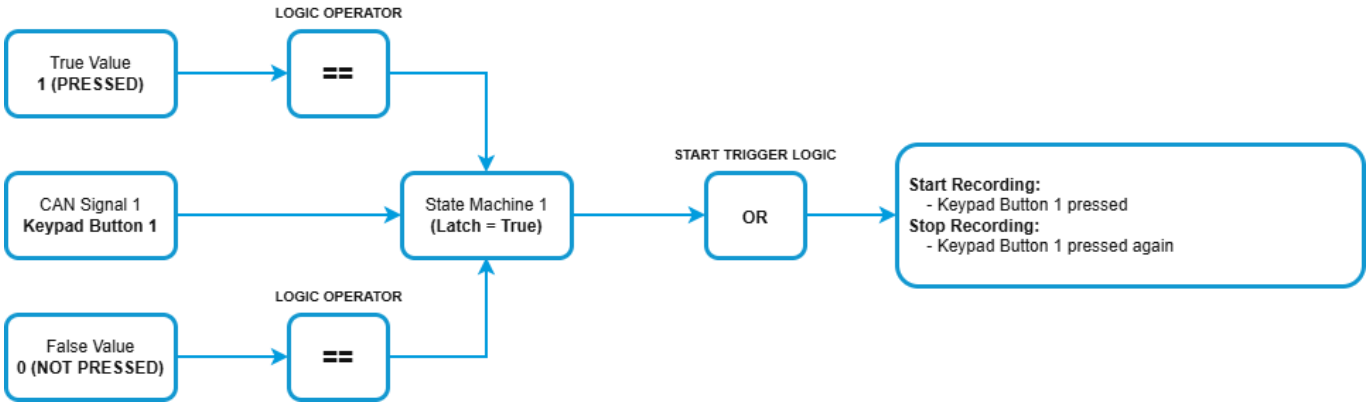


This gives you greater flexibility for controlling the cameras. At a basic level, use one CAN message outputting a *Race Mode* state from the ECU to start and stop the cameras. A more complex arrangement is shown in the diagram below, which uses *Engine Speed* and *Launch State* to prevent the cameras from starting when the vehicle is being warmed up in the pits. The cameras will start recording when the vehicle enters launch mode at the starting line and then stop recording once the engine is turned off.



Latching Function for Momentary Switches

If a recording start/stop trigger is assigned to a CAN message from a momentary switch source (for example, a CAN keypad), the latching function must be enabled for that message. This converts the momentary switch input into a latched switch within the corresponding state machine. The latched state changes each time the state machine transitions from *False* to *True*. In the case of a CAN keypad, this would result in a start trigger on the first button press, and a stop trigger the second time the button is pressed.



CAN HiLight Tag Message

One CAN message can be assigned as a trigger for dropping a *HiLight Tag*. As with the *CAN Recording Start & Stop* messages, a state machine is used to determine if the input value is *True* or *False*.

A *HiLight Tag* is dropped when the state machine transitions from *False* to *True*. The state machine must return to *False* before a subsequent *HiLight Tag* can be dropped.

CAN Vehicle Speed Message

One CAN message can be assigned to receive vehicle speed. Vehicle speed is used to calculate the total distance travelled since starting a recording and drops a *HiLight Tag* at your chosen distance interval.

This feature lets you add distance markers to your videos (for example, every 1 km) for easy reference after an event.

Notes:

- The accuracy of the calculated distance depends on the quality of the received vehicle speed. Using a speed signal with large variance (for example, a wheel speed sensor with a lot of wheel spin) or a signal with a slow update rate (recommended at least 10 Hz) may result in inaccurate distance markers.

CAN Tx Message Format

If enabled, the RemoteGP will transmit a status message for each camera slot. The base address can be selected (standard CAN IDs only). The address format is:

CAN Base Address + 0x00 = Camera Slot 1 message

CAN Base Address + 0x01 = Camera Slot 2 message

CAN Base Address + 0x02 = Camera Slot 3 message

Table 2 shows the format of the transmitted channels. Each message is transmitted at a rate of 2Hz (500ms) and are in Big-Endian (MSB) format. All transmitted channels are unsigned.

Table 2: CAN Tx Message format

Byte	Channel	Units	Length	Scale
0 1	Camera Status (see Table 3)	-	2	-
2	Internal Battery Level	%	1	1
3	Number of Videos on SD Card	-	1	1
4 5	Current Video Duration	Seconds	2	1
6 7	Remaining Video Time (on SD Card)	Seconds	2	1

Table 3: Camera Status bit table

Bit	Channel	Description
0	Slot Paired	Set if the slot has a paired camera assigned
1	Connected	Set if the camera is connected
2	Scanning	Set if the RemoteGP is currently scanning for the camera
3	Scan Timeout	Set if the RemoteGP could not find the paired camera within 30 seconds of scanning
4	System Ready	Set if the camera is connected and ready to start recording
5	Recording	Set if the camera is recording
6	Playback Error	Set if the camera is in Playback Mode (see *Warnings and Errors for more information*)
7	SD Card Error	Set if the camera has an SD Card Error (see *Warnings and Errors for more information*)
8	Temperature Warning	Set if a temperature warning is active (see *Warnings and Errors for more information*)
9	Spot Meter Not Set Warning	Set if the camera's spot meter is not set (see *Warnings and Errors for more information*)
10	Media Mod Connected	Set if a GoPro Pro 3.5mm Mic Adapter or GoPro Media Mod is connected
11	External Microphone Connected	Set if an external microphone is connected
12	GPS Lock	Set if the camera has a valid GPS lock
13	Internal Battery Present	Set if the internal battery is installed
14	Charging Status	Set if the camera is currently charging
15	Status Error	Set if there is an error present (see *Warnings and Errors for more information*)

Notes:

- The *Current Video Duration* and *Remaining Video Time* are received from the cameras and not calculated by the RemoteGP. This means they can sometimes not align with expectations when recording. For example, the *Remaining Video Time* may increase once the recording has stopped, and the camera has processed the video file. It is recommended that these channels are used as a reference only.

CAN Tx Debug Messages

Additional CAN debugging messages can be enabled with the intention of being logged for technical support purposes. Unless requested by Apture, these messages should be disabled. The messages are transmitted within the CAN address range of *CAN Base Address + 0x03* to *CAN Base Address + 0x06*.

PC Configuration Tool

The PC Configuration Tool lets you change the settings on your RemoteGP to match your vehicle install.

Download the tool from *www.apturerace.com/downloads*.

To help with setup, the PC Configuration Tool comes with sample configurations covering a range of vehicles, ECUs and scenarios. Visit our Downloads page to get the latest samples package.

Toolbar


Open a saved configuration file


Save the current settings to a configuration file


Upload the current settings to your RemoteGP

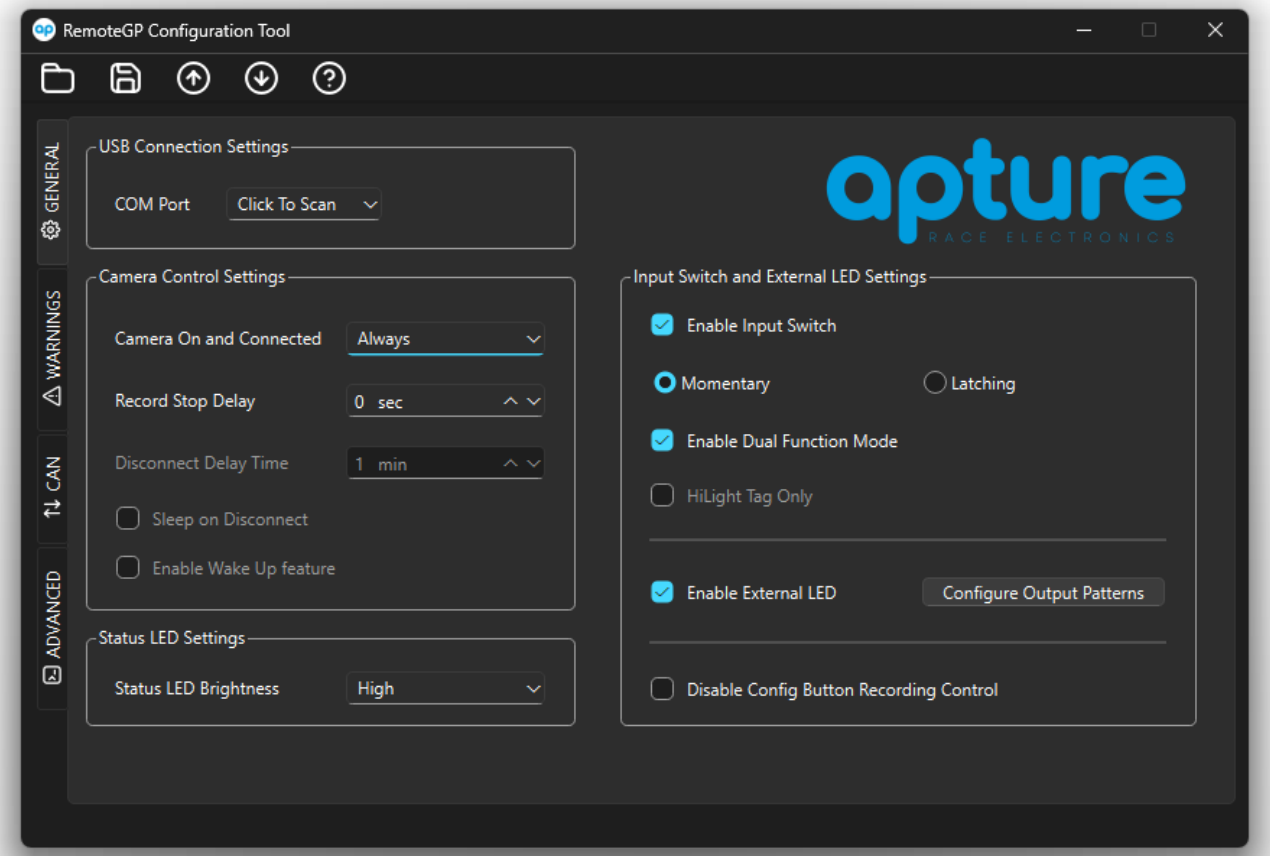

Download the settings from your RemoteGP


Opens the User Manual (requires internet connection)

Notes:

- After a new settings file has been successfully uploaded, the RemoteGP power must be reset to load the new settings.

General Tab



USB Connection Settings

Click the drop-down menu to select the COM port that the RemoteGP is connected to. The PC Configuration Tool will filter any ports that are not connected to a RemoteGP.

Camera Control Settings

Setting	Description
Camera On and Connected	Sets the *Connection Mode*
Record Stop Delay	Sets the *Record Stop Delay* (set to 0 to disable)
Disconnect Delay Time	Sets the *Disconnect Delay Time* (Camera *Connection Mode* must be *On Record Request*)
Sleep On Disconnect	Check to enable the *Sleep on Disconnect* option (Camera *Connection Mode* must be *On Record Request*)
Enable Wake Up feature	Check to enable the *Wake Up* feature (Camera *Connection Mode* must be *On Record Request*)

Status LED Settings

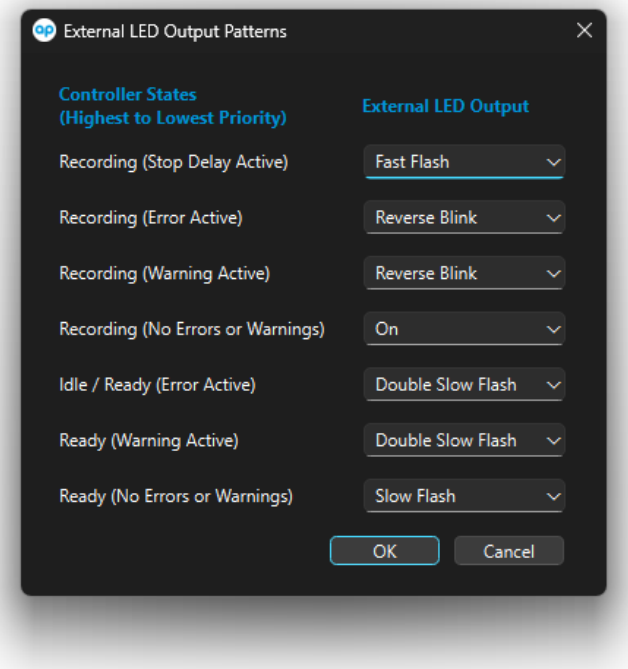
The brightness of the *Status LEDs* can be either Low, Medium or High.

Input Switch and LED Settings

Setting	Description
Enable Input Switch	Check to enable the *Input Switch*
Momentary / Latching	Selects the type of switch used
Enable Dual Function Mode	Check to enable *Dual Function Mode*
HiLight Tag Only	Check to configure the *Input Switch* to *HiLight Tag Only* mode
Enable External LED	Check to enable the *External LED Output*
Disable Config Button Recording Control	Check to prevent the *Configuration Button* from starting/stopping a recording. This is useful if the RemoteGP is mounted in a location that is prone to being bumped accidentally.

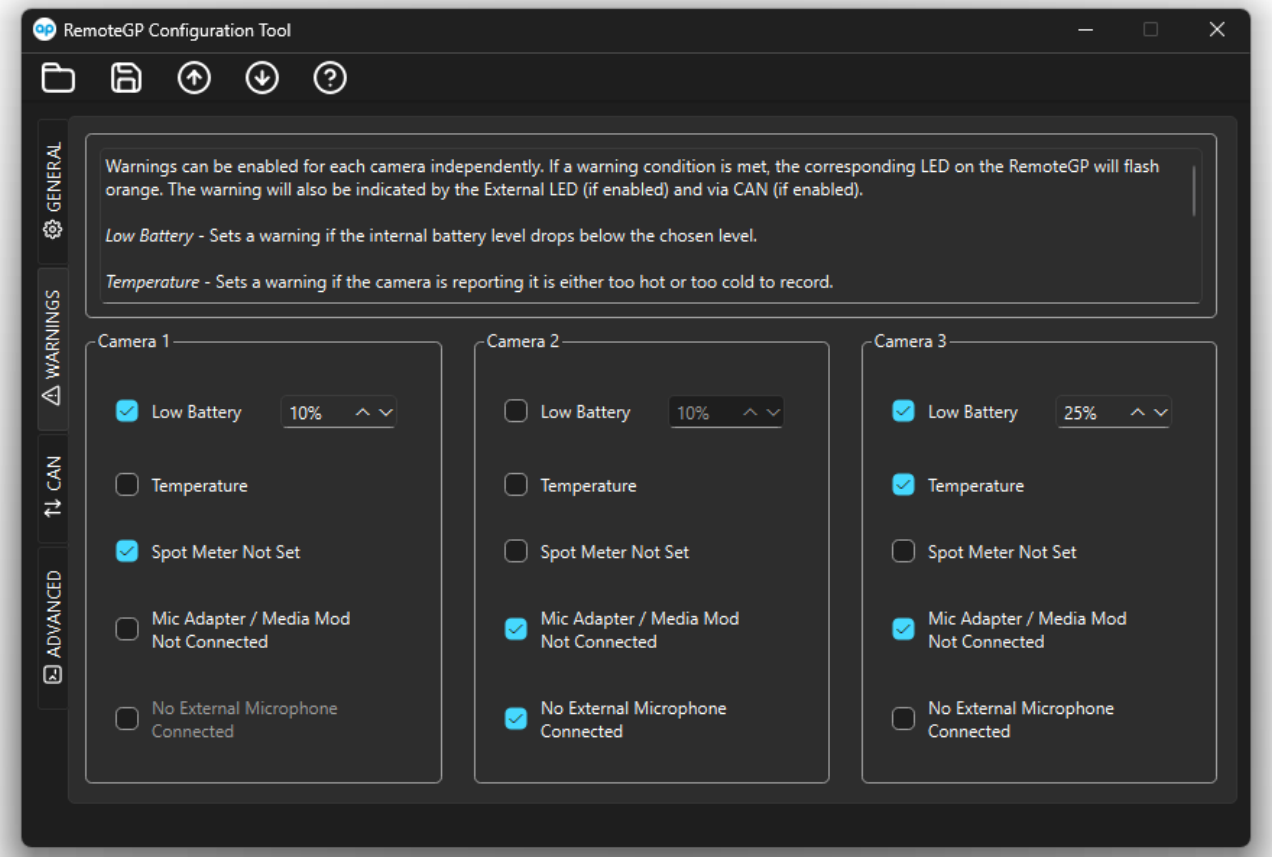
Configure Output Patterns

Press the *Configure Output Patterns* button to open the pattern configuration window. The *Controller States* are as described in the *External LED Output* section. Use the drop-down menus to assign output patterns to each *Controller State*.

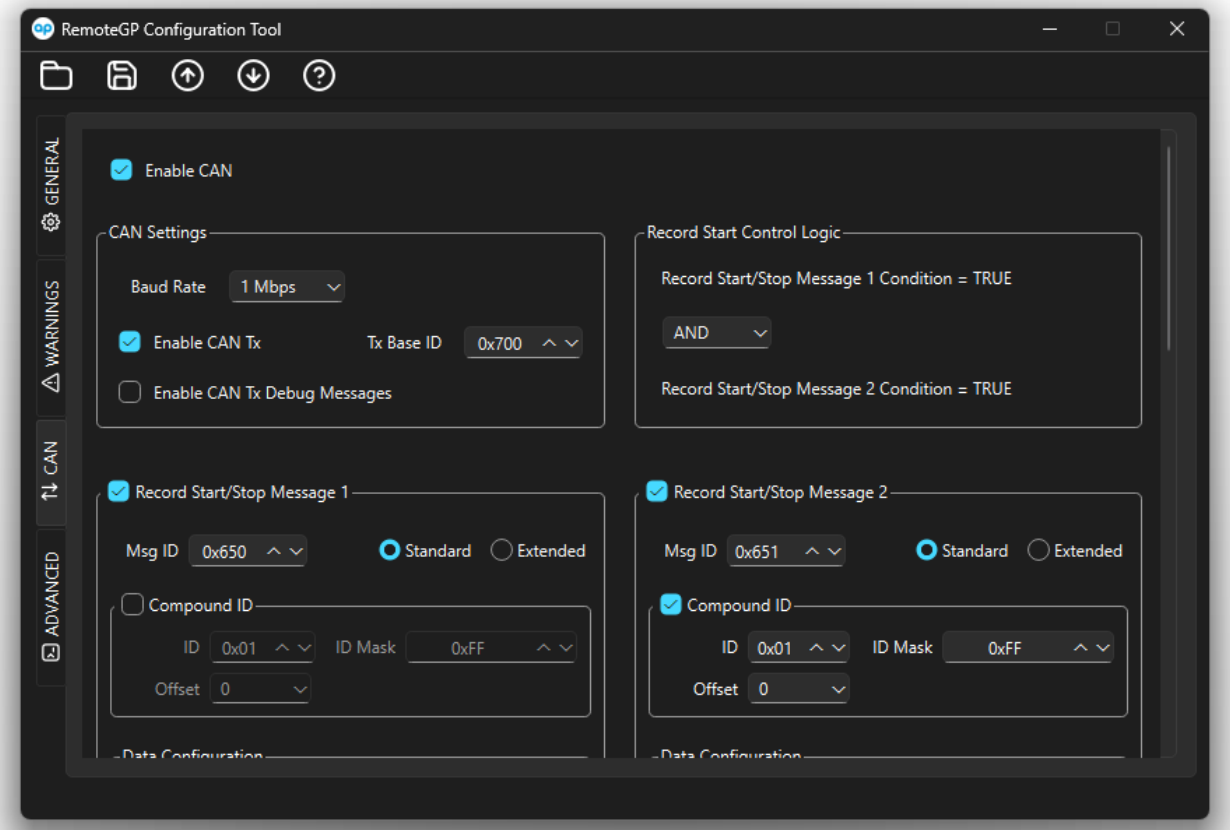


Warnings Tab

The *Warnings Tab* is used to configure which warnings are displayed by the *Status LEDs*. Warnings are configured individually for each camera (refer to the *Warnings and Errors* section for more information).



CAN Tab



CAN Settings

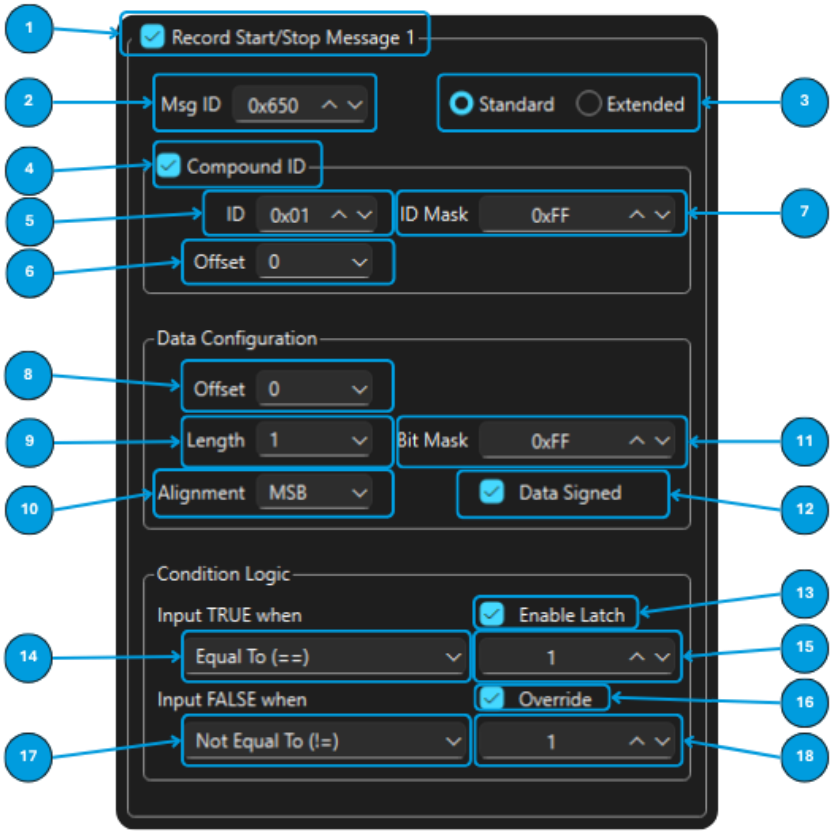
Setting	Description
Baud Rate	Select the baud rate of the CAN bus. This must match the current rate if connecting to an existing network. Options are 1Mbps, 500 kpbs, 250 kpbs, 125 kpbs.
Enable CAN Tx	Check to transmit camera status messages (see *CAN Tx Message Format*).
Tx Base ID	The base CAN address for transmitted status messages (see *CAN Tx Message Format*). Only standard CAN IDs are accepted.
Enable CAN Tx Debug Messages	Check to transmit debugging messages (see *CAN Tx Debug Messages*).

Record Start Control Logic

Use the drop-down menu to select the *Record Start Control Logic* described in the *CAN Recording Start Stop Message* section. Both CAN Start/Stop messages must be enabled (see below) to allow *AND* logic to be selected.

CAN Rx Message Configuration

The following section describes the available options for configuring a received CAN message. This applies to the Record Start/Stop messages and HiLight Tag message.

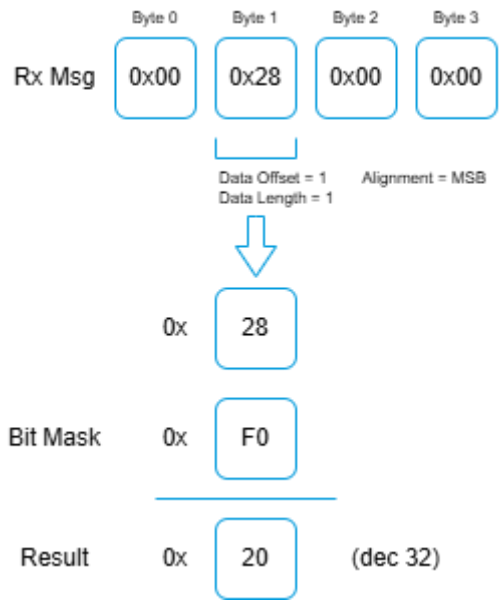


No.	Description
1	Check the checkbox to enable the CAN Rx message.
2	***Msg ID*** – CAN ID of the message being received
3	Select if the CAN ID is *Standard* (11-bit) or *Extended* (29-bit)
4	Check the checkbox if the received CAN message is a *Compound Message*. The *ID, ID Mask* and *Offset* will then be available to change.
5	***Compound ID*** – Compound ID to match a received message against
6	***Compound Offset*** – Byte offset of the CAN message containing the *Compound ID*
7	***Compound ID Mask*** – Bit mask applied to the byte specified by *Compound Offset* before comparison with the *Compound ID* for a message match
8	***Data Offset*** – Byte offset of the CAN message containing the data for comparison
9	***Data Length*** – Length of the data in bytes
10	***Data Alignment*** – Specifies if the data is MSB (most-significant bit first, Big-Endian) or LSB (least-significant bit first, Little-Endian)
11	***Data Bit Mask*** – Bit mask applied to data byte(s)

12	***Data Signed*** – Check if the data is signed
13	***Enable Latch*** – Select this option if the received CAN message is from a momentary switch source (for example, a CAN keypad button) to enable the latching feature within the state machine (refer to *CAN Recording Start & Stop Message* for more information). Note, this option is not available for the HiLight Tag message.
14	***Condition True Logic*** – The logic operator applied by the state machine to determine a *True* result (refer to *CAN Recording Start & Stop Message* for more information)
15	***Condition True Value*** – The value (decimal format) applied by the state machine to determine a *True* result (refer to *CAN Recording Start & Stop Message* for more information)
16	***Condition False Override*** – By default, the *Condition False Logic* and *Condition False Value* will automatically be updated to the opposite logical output of the *True* configuration. Select this checkbox to allow the *False Logic* and *False Value* to be changed manually.
17	***Condition False Logic*** - The logic operator applied by the state machine to determine a *False* result (refer to *CAN Recording Start & Stop Message* for more information)
18	***Condition False Value*** – The value (decimal format) applied by the state machine to determine a *False* result (refer to *CAN Recording Start & Stop Message* for more information)

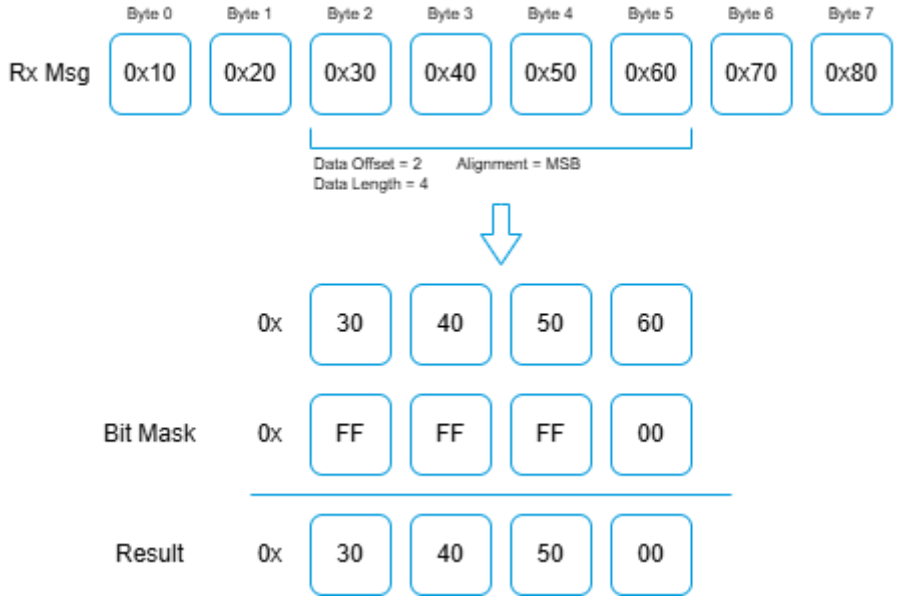
Notes:

- Bit masks are applied after the data has been extracted, so are not affected by the data alignment of the message. Bit masks are applied as a bitwise AND operation only, and do not shift the result to remove trailing zeros.
  For example, a data byte 0x28 with bit mask 0xF0 will result in a value of 0x20 (not 0x2). The *Condition True Value* must be set to 32 (decimal of 0x20) to start recording.

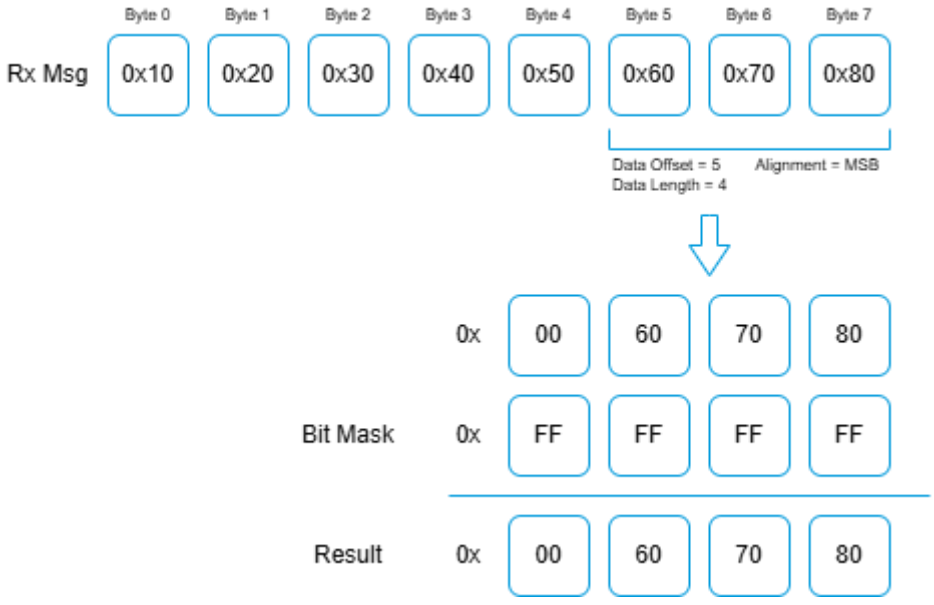


- Data scaling and offsets can be handled by adjusting the *Condition True/False Values* accordingly.
  For example, a pressure sensor is transmitted with a conversion equation of y = 0.1x – 101.3 kPa (i.e. a scale of 0.1 and an offset of -101.3 kPa). To trigger an action when the pressure exceeds 200 kPa, set the relevant *Condition True/False Value* to 3013 (x = 10*(y + 101.3)).

- The *Data Length* options are 1, 2 and 4 bytes. If 3 bytes of data are required, use a partial bit mask to extract the correct data.



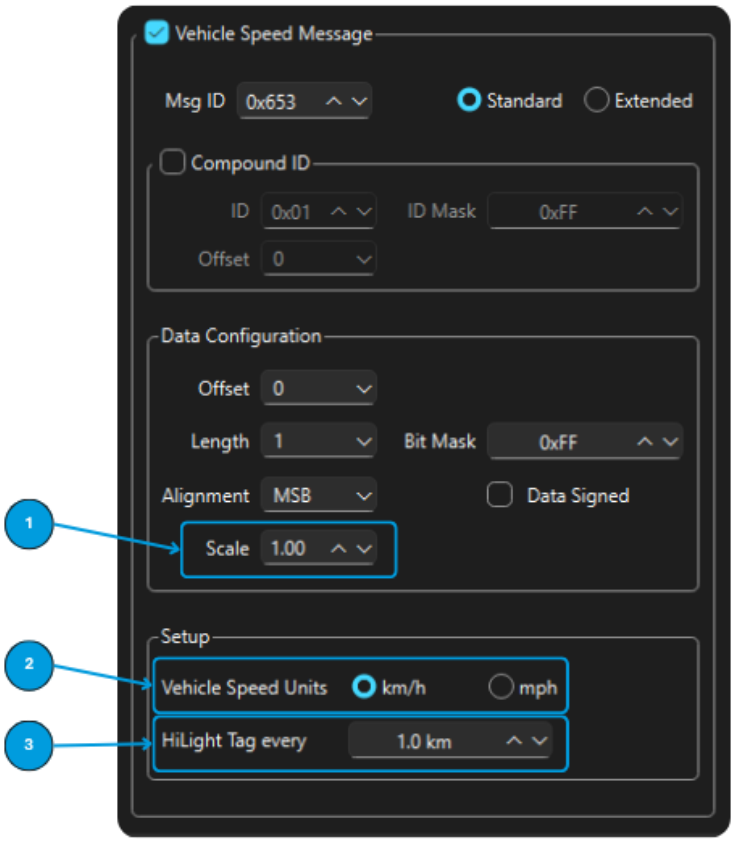
- If the combination of *Data Offset* and *Data Length* is greater than the number of bytes in the received message, the extracted data will be clipped.



Vehicle Speed Message

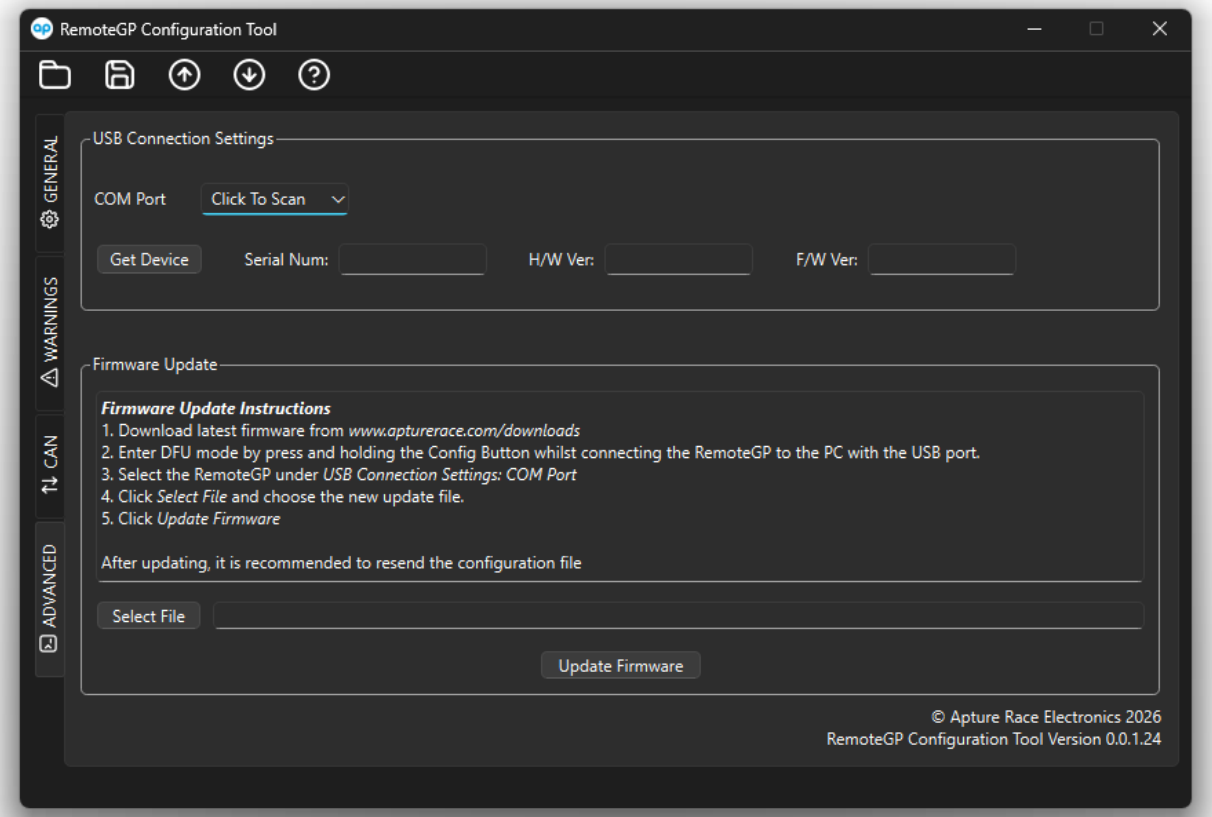
The Vehicle Speed message is configured similarly to the Record Start/Stop and HiLight Tag messages (refer to *CAN Rx Message Configuration*). The *Data Configuration* section has an additional option for setting the scale of the received data.

The *Condition Logic* section has been replaced with the *Setup* section. This lets you select the units and distance interval.



No.	Description
1	***Data Scale*** – Scaling variable for received vehicle speed data
2	***Vehicle Speed Units*** – Select the units of the received data. If the received speed is not in km/h or mph, use the *Data Scale* to convert accordingly.
3	Select the distance interval for HiLight tags

Advanced Tab



USB Connection Settings

Use the *Get Device* button to retrieve the serial number, hardware version and firmware version of you RemoteGP.

Firmware Update

It is recommended to keep your RemoteGP updated to the latest firmware version. To update the device firmware, follow the instructions below:

1. Download the latest firmware from *apturerace.com/downloads/*.
2. Enter Update Mode by press and holding the *Configuration Button* at the same time as connecting the RemoteGP to your PC via the USB port. You can release the *Configuration Button* a few seconds after you have connected the USB cable.
   There is no *Status LED* to indicate the RemoteGP is in firmware update mode. In some cases, the *Status LEDs* may illuminate and/or flash. This is not an issue.
3. Select your RemoteGP using the *COM Port* drop-down menu under *USB Connection Settings*.
4. Click the *Select File* button and select the downloaded firmware update file.
5. Click the *Update Firmware* button and wait for the update to complete.
6. After the update has completed, it is recommended to re-upload your settings to the RemoteGP (using the ⓘ icon).

GoPro Tips and Compatibility

Wireless Connections

Ensure *Wireless Connections* is enabled in your GoPro camera's settings (refer to the user manual of your camera model for instructions on how to do this). This allows the RemoteGP to connect to the camera when it is in sleep mode[1]. For the GoPro HERO7 Black, you will need to pair with the official GoPro Quik App first to enable *Wireless Connections* (this will need to be repeated whenever you reset the camera connections).

The wireless connections remain active unless one of the following conditions are met:

- The camera has been in sleep mode for longer than 8 hours.
- The camera's internal battery is replaced.
- USB power is removed when the camera is in sleep mode.

The RemoteGP cannot connect to a camera if its wireless connections have been switched off. To switch back on, do one of the following actions:

- Manually turn the camera on using the power button
- Connect USB power (this wakes the internal transceiver without the camera exiting sleep mode)

Start of an Event

It is good practice to double check the RemoteGP can connect to all paired cameras at the start of an event, after pairing, after replacing a battery, or after the cameras have been in sleep mode for an extended period. This ensures when your system is ready to go when you need it.

The recommended procedure is:

1. With the RemoteGP off, turn on all cameras and wait for them to initialise. If prompted, set the data and time. This is also a good chance to double check all settings are correct.
2. Turn off the cameras using their power buttons (sleep mode).
3. Turn on the RemoteGP and confirm that all cameras wake up and are ready to start recording.
4. Start and then stop a recording using your chosen *Recording Start/Stop* input.

GoPro Camera Compatibility

Some features offered by the RemoteGP are not compatible to all GoPro camera models. The below table shows compatibility with GoPro's product lineup.

[1] This does not apply to the GoPro HERO. Once in sleep mode, the camera cannot be connected to unless the camera is switched on manually using the power button.

Table 4. GoPro camera model compatibility

	 MISSION 1 (v1.10)	 HERO13 Black (v2.10)	 MAX2 (v1.22)	 HERO (v2.30)	 HERO12 Black (v2.40)	 HERO11 Black Mini (v2.50)	 HERO11 Black (v2.32)	 HERO10 Black (v1.62)	 HERO9 Black (v1.72)	 HERO8 Black (v2.51)	 HERO7 Black (v1.90)
Always Connect	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗[2]
Wake from Sleep Mode	✓	✓	✓	✗[3]	✓	✓	✓	✓	✓	✓	✓
Auto Switch to Video	✓	✓	✓	✓[4]	✓	✓[5]	✓	✓	✓	✓	✓
HiLight Tag	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Low Battery Warning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Temperature Warning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Spot Meter Not Set Warning	✓	✓	✓	N/A[6]	✓	N/A[6]	✓	✓	✓	✓	✓
Mic Adapter Not Connected Warning	N/A[7]	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Media Mod Not Connected Warning	N/A[7]	✓	N/A[7]	N/A[7]	✓	N/A[7]	✓	✓	✓	N/A[7]	N/A[7]
No External Mic Connected Warning	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Playback Mode Error	✓	✓	✓	✓	✓	N/A	✓	✓	✓	✓	✓
SD Card Error	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

[2] RemoteGP cannot prevent the GoPro HERO7 Black from entering sleep mode (even if the connection mode is *Always Connected*). It is recommended to change the *Auto Power Off* settings to *Never* to prevent the camera from sleeping.
[3] RemoteGP cannot wake the GoPro HERO once it has entered sleep mode. It is recommended to set the *Auto Power Off* setting to *Never* if using with *On Record Request* connection mode.
[4] RemoteGP will only switch Photo mode to Video mode.
[5] RemoteGP will not switch *Max Lens Video* mode to *Video* mode. If current mode is *Max Lens Timewarp*, mode will be switched to *Max Lens Video*.
[6] Camera model does not have a spot meter feature.
[7] Accessory is not compatible with camera model.

Specifications

Physical	
Dimensions (excluding flying lead)	57 x 55 x 16 mm (H x W x D)
Mass	50 g
Flying Lead	300 mm with Molex connector (P/N 43020-0601)
Mounting	1x M3 brass insert mount
Electrical	
Supply Voltage (Vs)	11 – 15 V nominal
Operating Current	20 – 60 mA
Input Switch	
Switch Type	Momentary or latching
Pull-up Resistor	Internal 10 kΩ pull-up resistor to Vs
External LED Driver	
Drive Type	Low-side switch to GND (resistive load only)
Max Voltage	Supply Voltage (Vs)
Max Current	40 mA
CAN	
Standard	CAN 2.0B
Baud Rate	Configurable (1 Mbps, 500 kbps, 250 kbps, 125 kbps)
Transmit & Receive Addresses	Configurable
Termination Resistor	External Required
Configuration	
Software	RemoteGP Configuration Tool
Connection	USB-C

Troubleshooting

Problem	Possible Cause	Solution or Diagnosis Tips
RemoteGP doesn't pair to a camera.	Camera is not in pairing mode. Camera wireless connection settings need to be reset. Camera is a GoPro HERO7.	Double-check the camera is in pairing mode and restart the pairing procedure on the RemoteGP. Reset the camera's wireless connection settings and repair to the RemoteGP. If the camera is a GoPro HERO7, it must first be paired with the GoPro Quik App to enable wireless communications before being paired with the RemoteGP.
RemoteGP doesn't connect to a paired camera.	Camera has been in sleep-mode for longer than 8 hours. Camera was removed from USB power when in sleep mode. Wireless communications are not enabled on the camera. Camera needs to update pairing information with RemoteGP.	Manually switch the camera on to re-enable wireless transmissions. These are switched off in the camera once it has been in sleep mode for longer than 8 hours. Wireless transmissions are switched off in the camera if USB power is removed when in sleep mode. Depending on your installation, enabling the Always Active connection mode may assist with this. Check that wireless communications are enabled in the camera's settings. Reset the camera's wireless connection settings and repair to the RemoteGP.
Camera doesn't start recording when requested.	RemoteGP is not connected to the camera. RemoteGP start trigger has not been configured correctly. Camera SD Card error. Camera is in playback mode.	Use the Status LEDs to confirm if the camera is connected to the RemoteGP. The Status LEDs will also indicate if the camera is in an error state preventing a recording from starting. Double-check the settings are correct for your start/stop trigger inputs. Use the Configuration Button (ensure it is not disabled in the settings) to validate if the cameras start recording when pushed. This indicates a fault with either the Input Switch or CAN (depending on which is enabled).

Camera doesn't stop recording when requested.	One or more start/stop triggers are still active. RemoteGP has lost the connection to the camera.	Check that all start/stop input triggers are inactive. It is recommended to only enable the required start/stop triggers in the PC Configuration Tool. If you stop the recording manually on the camera and it restarts, it indicates at least one start/stop trigger is active. Confirm the RemoteGP has a connection to the camera using the corresponding Status LED.
RemoteGP alternates between connected and disconnected to a paired camera before displaying a camera fault (solid red Status LED)	Camera needs to update pairing information with RemoteGP.	Power cycle both RemoteGP and camera. If problem persists, reset the camera's wireless connection settings and repair to the RemoteGP.
RemoteGP doesn't communicate on the CAN bus (CAN inputs not received, or no data is received by logger or ECU). RemoteGP is displaying a CAN error (flashing purple Status LED3).	CAN wiring is not correct (CAN High and CAN Low swapped or not connected). Missing or incorrect termination resistors on the CAN bus. Incorrect baud rate or base address configured on the RemoteGP or receiving device. Incorrect settings for message reception in the RemoteGP.	Double-check that CAN High (yellow wire) and CAN Low (green wire) are correctly aligned to the vehicle's CAN bus. Ensure a 120Ω termination resistor is installed at either end of the CAN bus. Verify that the baud rate is correct for the CAN bus. Ensure the transmitted address range does not coincide with the addresses of existing CAN messages. Double-check the correct settings have been entered for CAN message receiving. Inspect for any loose or damaged CAN wiring.
RemoteGP doesn't operate as expected after a firmware update	Settings configuration does not align with new firmware. Firmware updated incorrectly.	Re-upload the settings. It is recommended to always upload the settings after a firmware update. Repeat the firmware update process.

For further troubleshooting or assistance, don't hesitate to contact Apture directly:

Website: www.apturerace.com

Email: info@apturerace.com

Contains FCC ID: X8WBT840
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 any interference received, including interference that may cause undesired operation.

RemoteGP User Manual Version 1.0