

Multi-Input Device System for DiRT Rally 2.0 - PC

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1 Overview

Previous Codemasters racing titles have had input device support for a single input device with the recent addition of a primary device and a peripheral (e.g. wheel and a USB pedal set).

For DiRT Rally 2.0 input, multiple input devices are supported with the ability to connect or store information on up to 15 separate USB devices at once. Multiple instances of the same device type are also supported allowing different actions to be bound on the different instances (e.g. two identical sequential shifters with one being used as a handbrake).

The following document will outline the functionality available to configure these devices from within the in-game menus or device configuration XML's for hardware manufactures and enthusiasts.

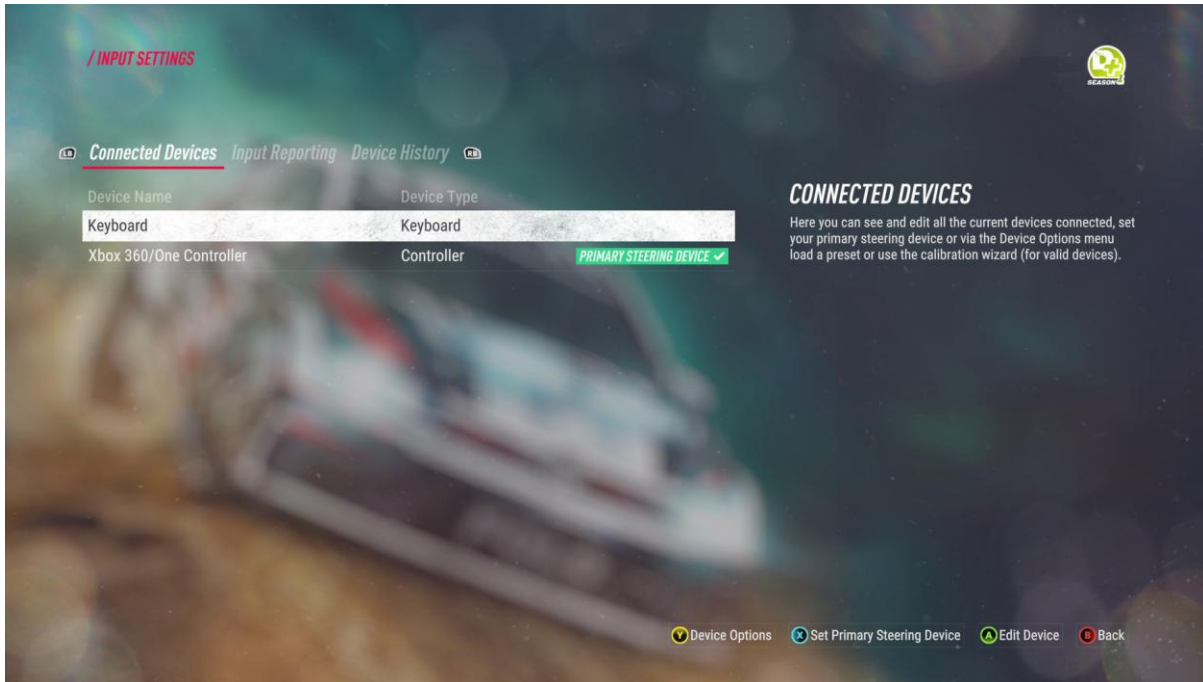
1.1 Support

- Up to 15 connected devices.
- Connect multiple instances of the same device.
- Each connected device configuration is saved with a rolling history of 15 devices.
- Each device is heavily configurable via provides xml files and in game menus.
- Common devices are known in a pre-defined device_defines.xml fixing common issues with drivers and pre-configuring device settings.
- Multiple action maps per device supported to allow for rim-swapping.
- Unknown devices can be configured via in-game menus.

Connected devices is an area that is constantly being improved and expanded through both internal testing and community feedback.

2 In-game Support

2.1 Connected Devices



Connected Devices is the first screen you'll see when selecting Input Settings (accessed via the Options and Extras menu). Here you will see all of the currently connected devices you have to the game.

By default the game will automatically choose the best steering device based on what is currently connected. On Sony PlayStation 4 and Microsoft Xbox One consoles the initial primary device will be the device the game is started with. If you have multiple devices of the same type or name they will be listed in order of connection (or USB initialisation order).

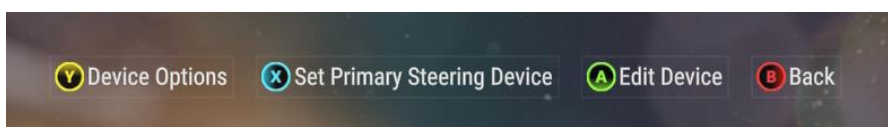
Priority is currently determined by the following (highest to lowest):

1. Wheel
2. Gamepad
3. Keyboard

This is setup to give the player the best plug and play experience. Automatic mode can be overridden however by selecting Steering Device and choosing Set Primary Steering Device.

2.2 Device Actions

When highlighting a device in the Connected Device menu there are a number of actions that can be performed, these are shown via the tool tips at the bottom of the screen



2.2.1 Device Options

For the device currently highlighted selecting Device Options launches a context menu that contains the ability to load a device preset (for devices where there are multiple presets available) or Calibrate Device which allows the calibration of wheels, pedals, etc. Calibrate Device is only visible when selecting a wheel or pedal set.

2.2.2 Primary Steering Device

To set your Primary Steering Device simply highlight the device you want as your primary input and select Set Primary Steering Device. A device which has been set as the primary device will be marked with a Primary Steering Device tag and will be the controller used when in game.



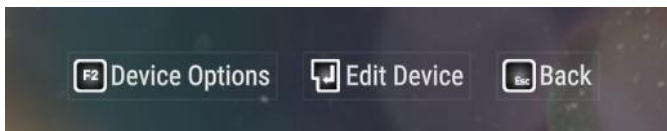
This allows a dual control approach for example when a racing rig is set up with a wheel but the player wishes to use a pad for menu navigation or if the player wants to use additional driving controls such as handbrake or individual pedal peripherals. In this case the Xbox 360/One Controller can be used without having to disconnect the wheel from the PC.

2.2.3 Edit Device

You can edit the input for any device by highlighting it and selecting Edit Device. Editing a device allows you to configure a specific connected device to suit your set up giving you the option to change the bindings, deadzones and vibration and feedback settings.

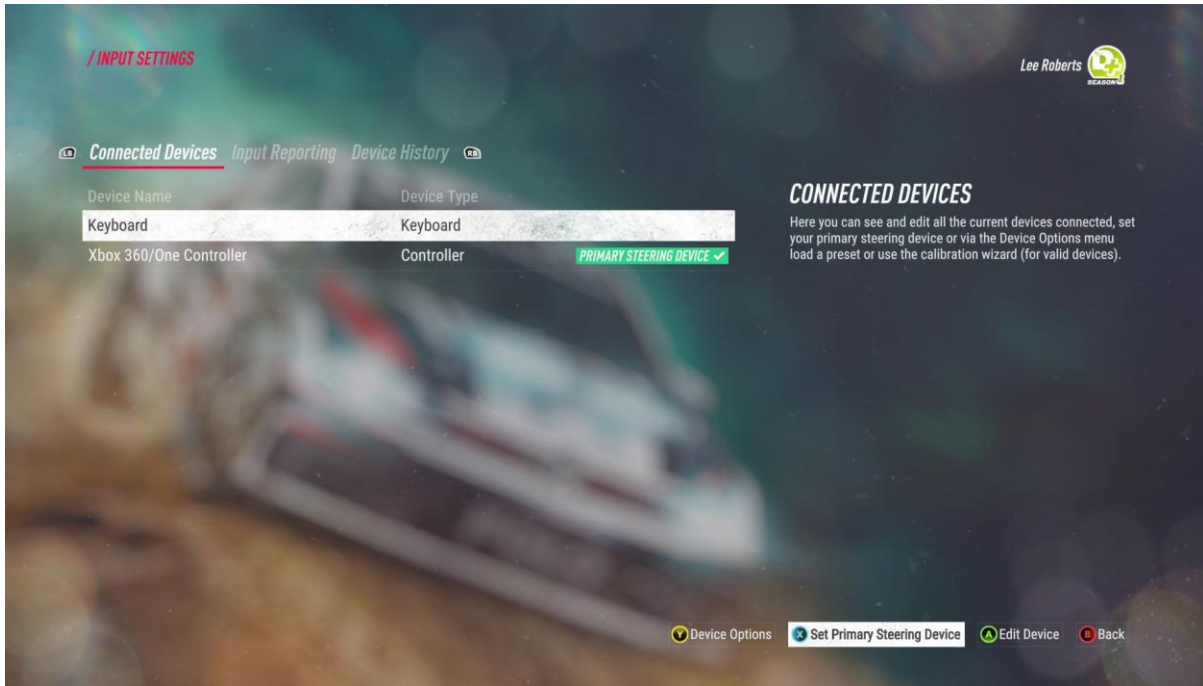
2.2.4 Tool tips behaviour

The steering device is seen as the primary controller so the game tool tips will update to reflect the change in real time. Any buttons not bound to the primary controller will fall back to the next highest priority device (a wheel with no buttons will display keyboard icons if only a keyboard and wheel is plugged in).



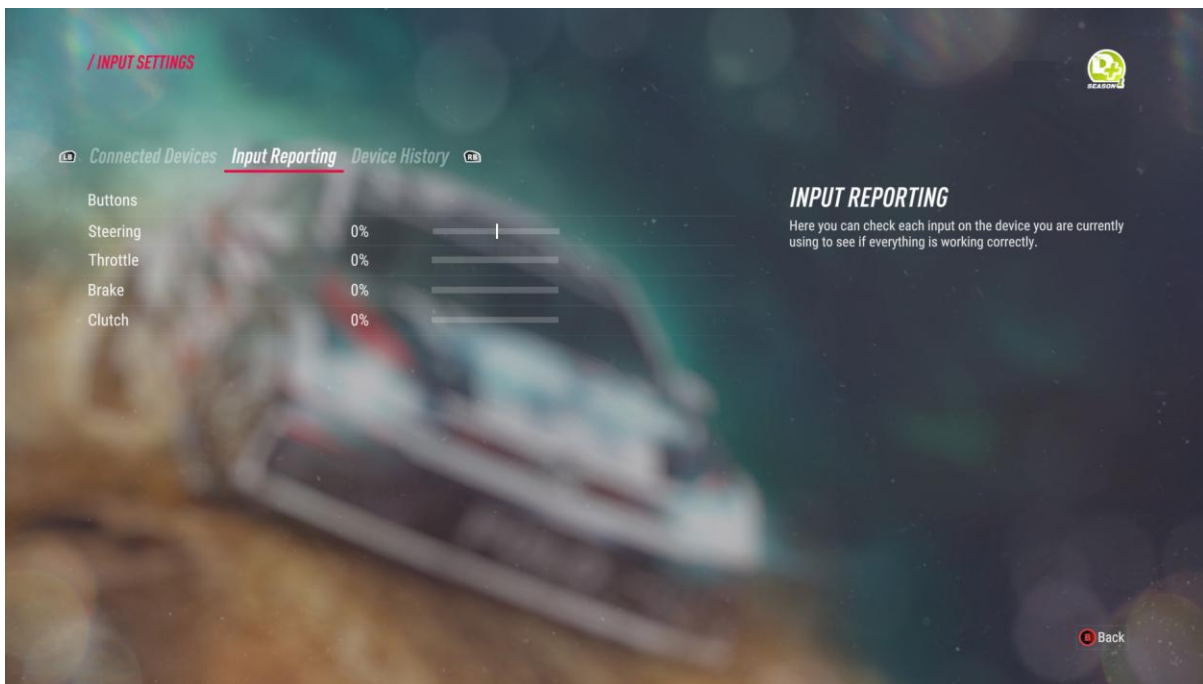
2.1.4 Mouse Support Improvements

Mouse controls can also be used in conjunction with pad. Using the mouse will show a cursor on screen and the tool tips will become buttons which can be highlighted and interacted with.



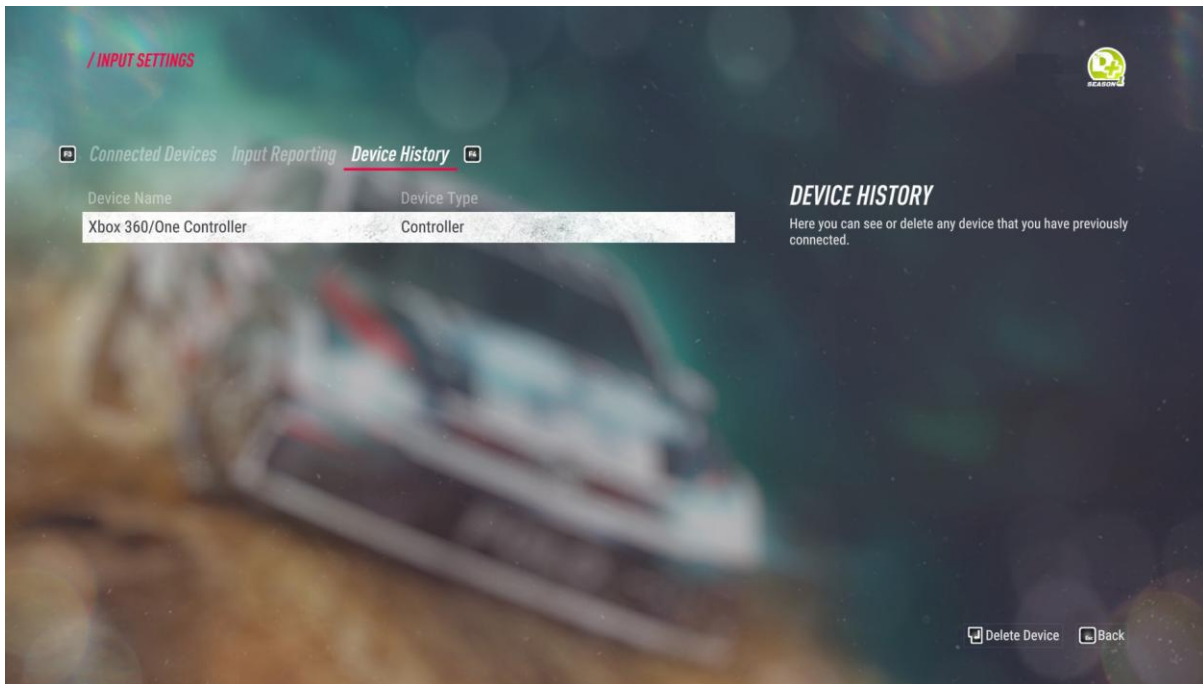
Mouse Button 4 will navigate back and some page elements are scrollable with the mouse wheel. The cursor will hide after 3 seconds once another device has been used.

2.3 Input Reporting



Tabbing across from Connected Devices takes you to the Input Reporting screen. On this screen you can preview any input axis currently pressed alongside the main driving axis. Using this you can test to see if your input device drivers are installed correctly (axis being reported look correct) and if the driving controls are bound.

2.4 Device History

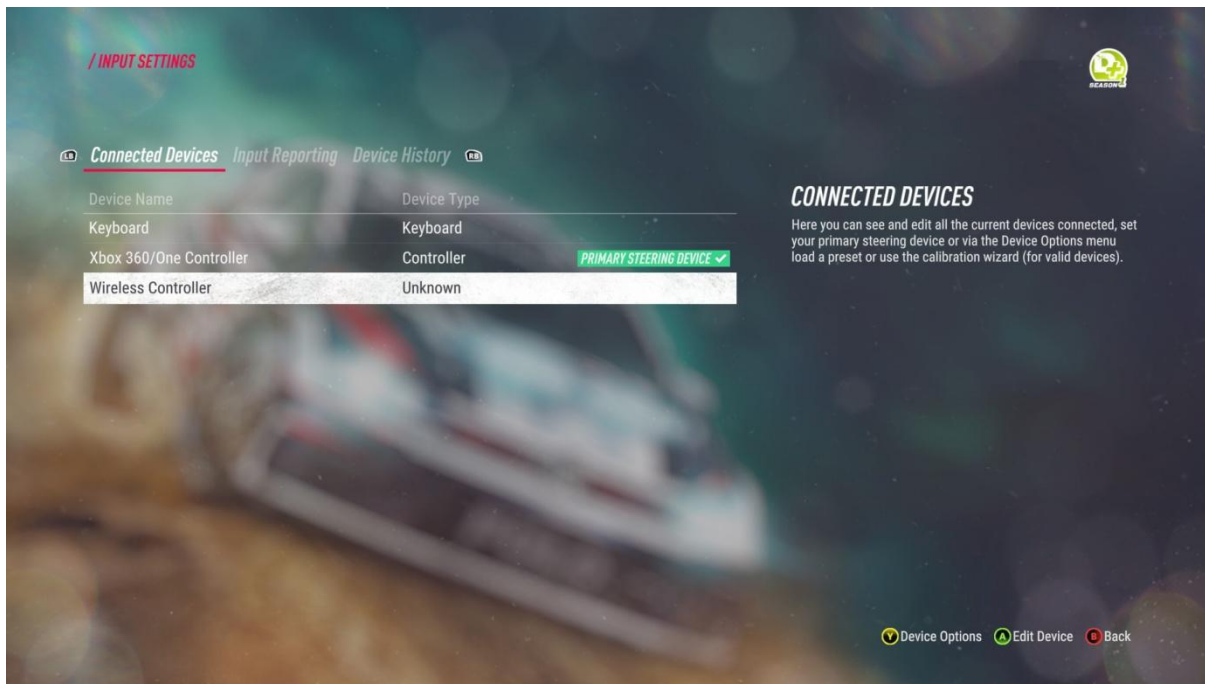


The final tab in Device Settings is Device History. Here you can see all devices that have previously been connected to the game. This allows you to disconnect and delete any device that may have [developed any issues](#) and then reconnect it to set them up again.

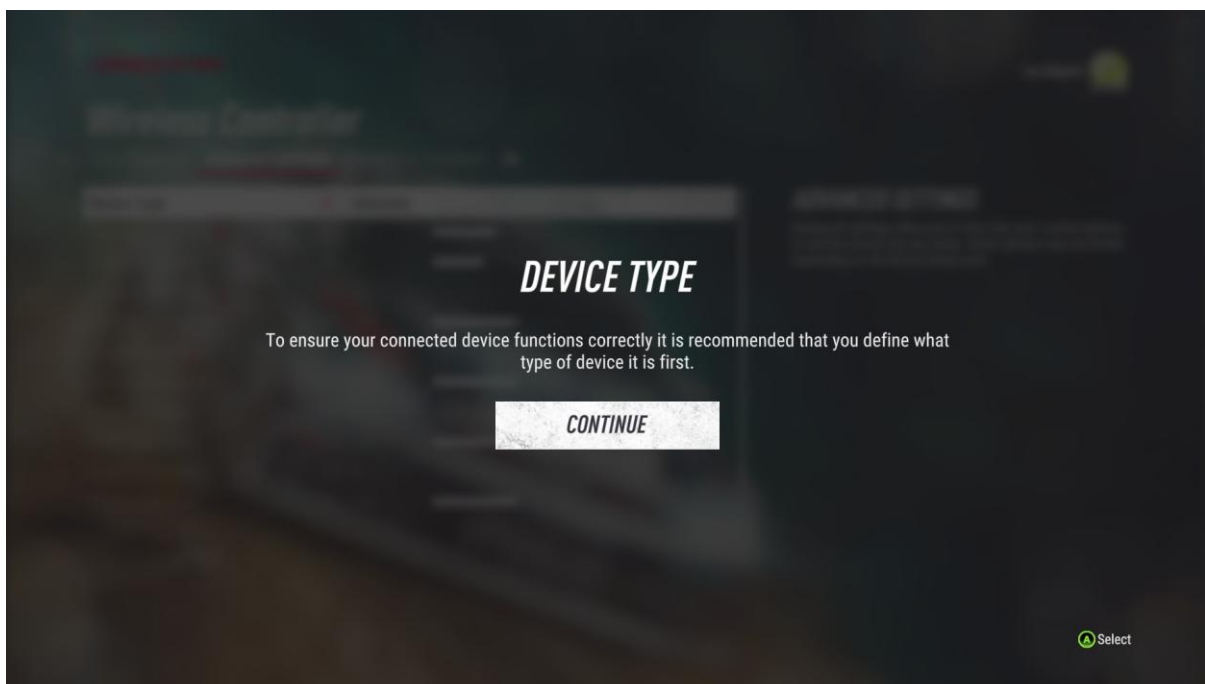
Devices will only appear in this menu when they are no longer connected and can be deleted via the Delete Device tool tip.

2.5 Unknown Devices

If you connect a device that is not officially supported it will be shown as an Unknown device in the Connected Devices screen.



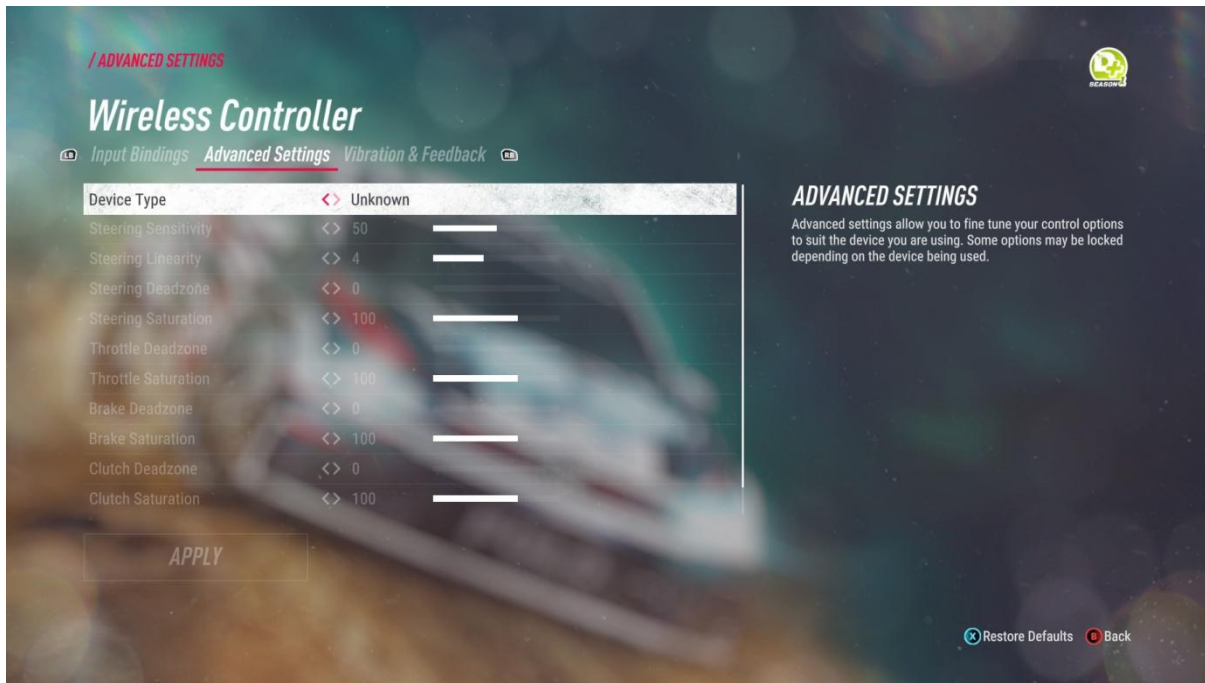
If you opt to select Edit Device then you will receive a dialog warning you that the device is currently unknown.



Continuing from the dialog moves you to the Edit Device options where you can then set the device type via the 2nd tab [Advanced Settings](#) (section 3.2). At this point it will unlock configuration of advanced features for the selected device type. Device types available are:

- Steering Wheel
- Controller
- Joystick

- Keyboard
- Mouse UI Control
- Pedals
- Gear Stick
- Handbrake



Setting a device type will also allow you to launch the Calibration Wizard to correctly set it up.

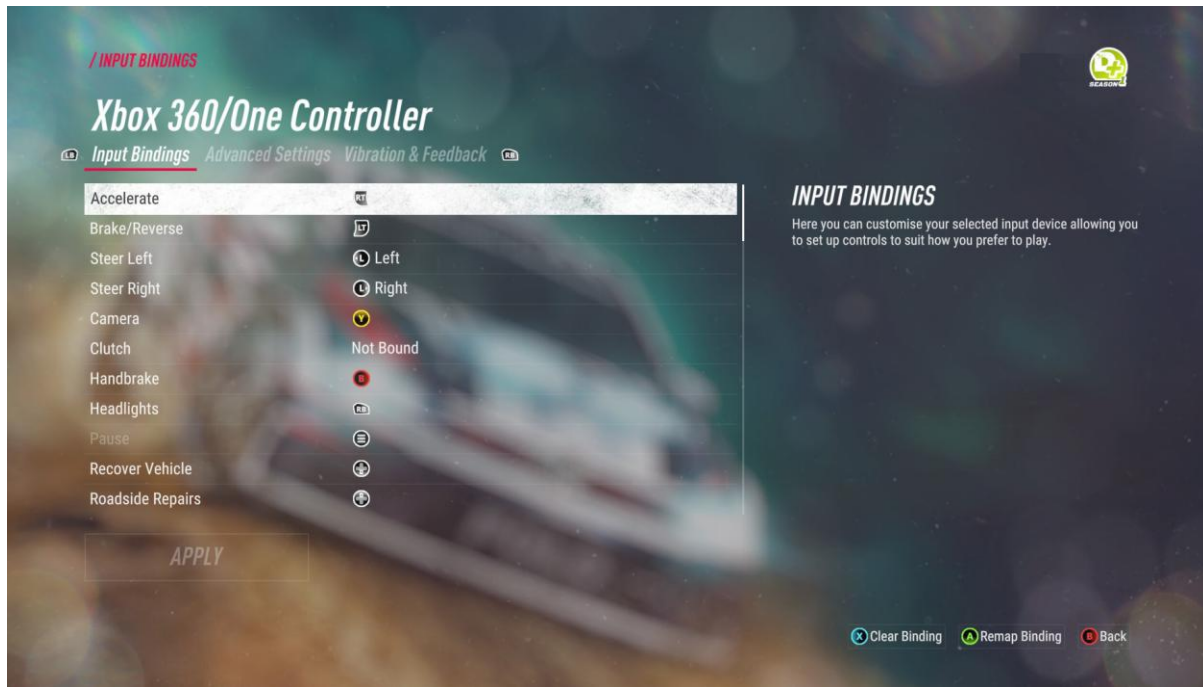
FFB can then be enabled or disabled manually in Vibration and Feedback menu if not reported by the device drivers correctly.

If your device is not fully bindable and has two device ID's see "Multi Device ID device_defines.xml configuration."

3 Editing a Device

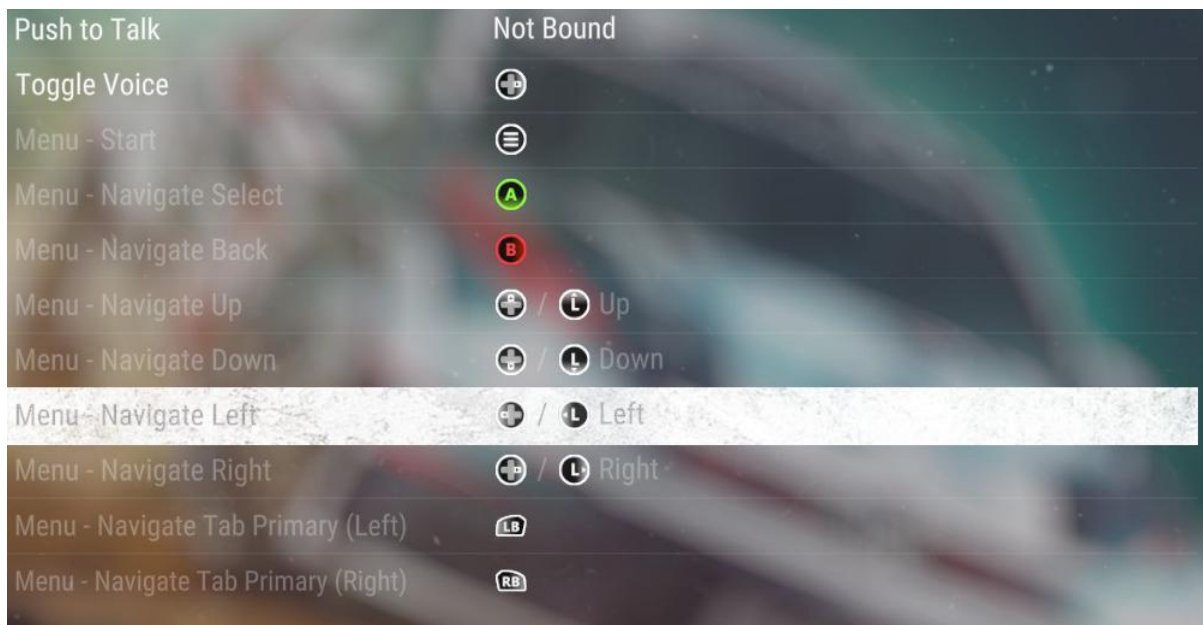
3.1 Input Bindings

Once you've selected Edit Device the first tab you will land on is Input Bindings

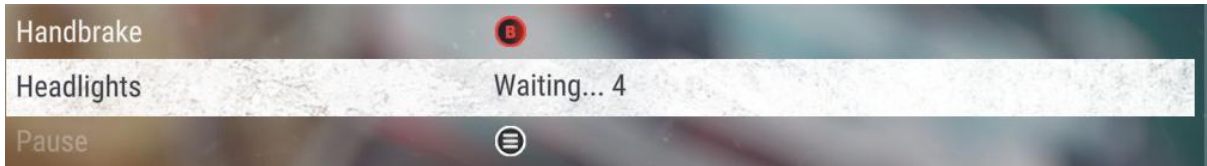


The input bindings screen allows binding of all in game actions to specific button presses. Based on the connected device type connected bindings will be auto assigned.

On officially supported devices some actions are protected against changes to prevent re-binding to invalid axis. If you need to re-bind these axis it is possible to allow re-binding via edits to the action definitions file however this is not officially supported and should be attempted at the users own risk see. [Actions that cannot be changed are greyed out in the menu.](#)



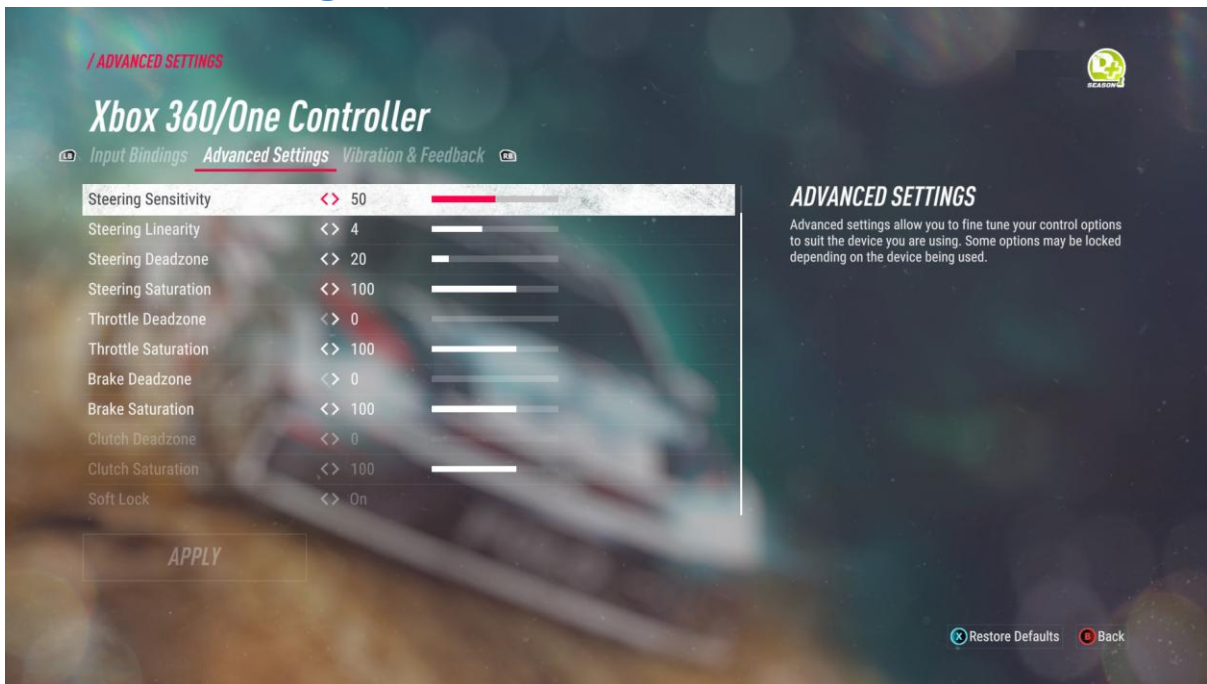
If you want to bind a new input to an action first highlight and then select Remap Binding, a 5 second timer will be displayed until an action button is pressed or the action is cancelled.



To unbind an action select the action and press Clear Binding.

If at any point two actions become dual bound you will be warned of the issue via the right hand help text and the inputs affected will be listed so they can be corrected.

3.2 Advanced Settings



Advance input settings allow you to set advanced wheel specific or pad specific settings.

- **DEVICE TYPE**

When viewing advanced settings with an officially supported device this will automatically be set and be greyed out. If the device is currently unsupported by the game **Unknown** is displayed and Device Type is selectable. The toggle can then be used to choose a different device type which will unlock configuration of advanced features for the selected device type. The available device types that can be chosen are:

- Steering Wheel
- Controller
- Joystick
- Keyboard
- Mouse UI Control
- Pedals
- Gear Stick
- Handbrake

- **STEERING SENSITIVITY**
High sensitivity will turn your wheels at a faster rate, which increases responsiveness but can reduce stability. Low sensitivity will turn your wheels at a slower rate, which can increase stability but reduce responsiveness.
- **STEERING LINEARITY**
Zero linearity makes steering directly proportional to your input, which can feel more consistent. High linearity can make your steering feel less sensitive for small inputs, but can feel inconsistent. Conversely, negative linearity (wheel input only) can make your steering feel more sensitive for small inputs. All settings give maximum steering angle at full input.
- **STEERING DEADZONE**
Sets a percentage of input that is ignored. A high percentage lowers the amount of usable input for your steering wheel.
- **STEERING SATURATION**
Sets the percentage of input that is required to achieve full input. A low percentage reduces the amount of input to reach 100% lock for your steering wheel.
- **THROTTLE DEADZONE**
Sets the percentage of input that is ignored. A high percentage lowers the amount of usable input for your throttle pedal.
- **THROTTLE SATURATION**
Sets the percentage of input that is required to achieve full input. A low percentage reduces the amount of input to reach 100% throttle.
- **BRAKE DEADZONE**
Sets the percentage of input that is ignored. A high percentage lowers the amount of usable input for your brake pedal.
- **BRAKE SATURATION**
Sets the percentage of input that is required to achieve full input. A low percentage reduces the amount of input to reach 100% brake.
- **CLUTCH DEADZONE**
Sets the percentage of input that is ignored. A high percentage lowers the amount of usable input for your clutch pedal.
- **CLUTCH SATURATION**
Sets the percentage of input that is required to achieve full input. A low percentage reduces

the amount of input to reach 100% clutch.

- **SOFT LOCK (STEERING WHEEL)**

Enabling soft lock will match the steering lock of the wheel to the lock of the vehicle.

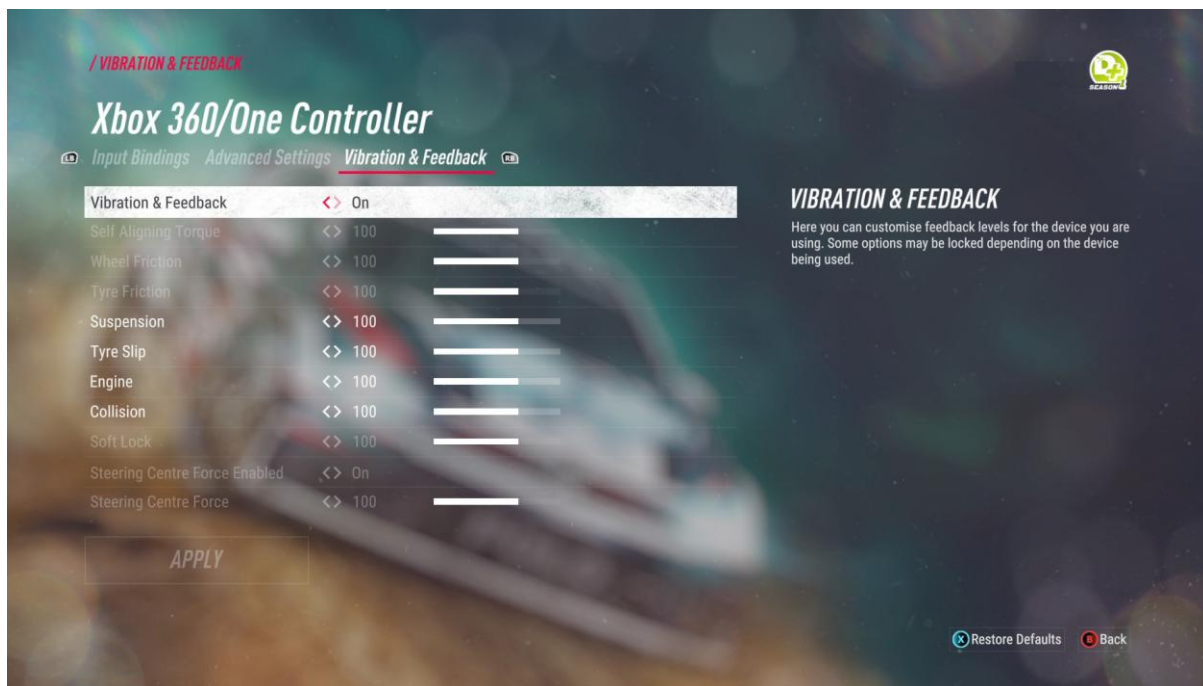
Disabling this will match the steering lock of the wheel to the full steering range. Enabling Soft Lock will override your steering saturation and calibrate the saturation to match that of the vehicle.

Warning: The wheel must be [calibrated](#) before soft lock will work.

3.3 Vibration & Feedback

Vibration and force feedback options will change based on what type of device is connected.

Available options can be edited but greyed out options are unavailable for that device. Different wheels and pads have different settings so if the option is greyed it means that it is not officially supported for that device and changing it would have no effect.



Each setting is either a toggle or a slider from 0%-150% strength.

- **VIBRATION & FEEDBACK**

Toggle FFB On or Off manually. If the device is unsupported its initial state is supplied by your device drivers (do they report that FFB is supported) denoted by "Device Driver".

If your device driver is miss-reporting (happens with highly custom or old devices) you can manually toggle FFB On

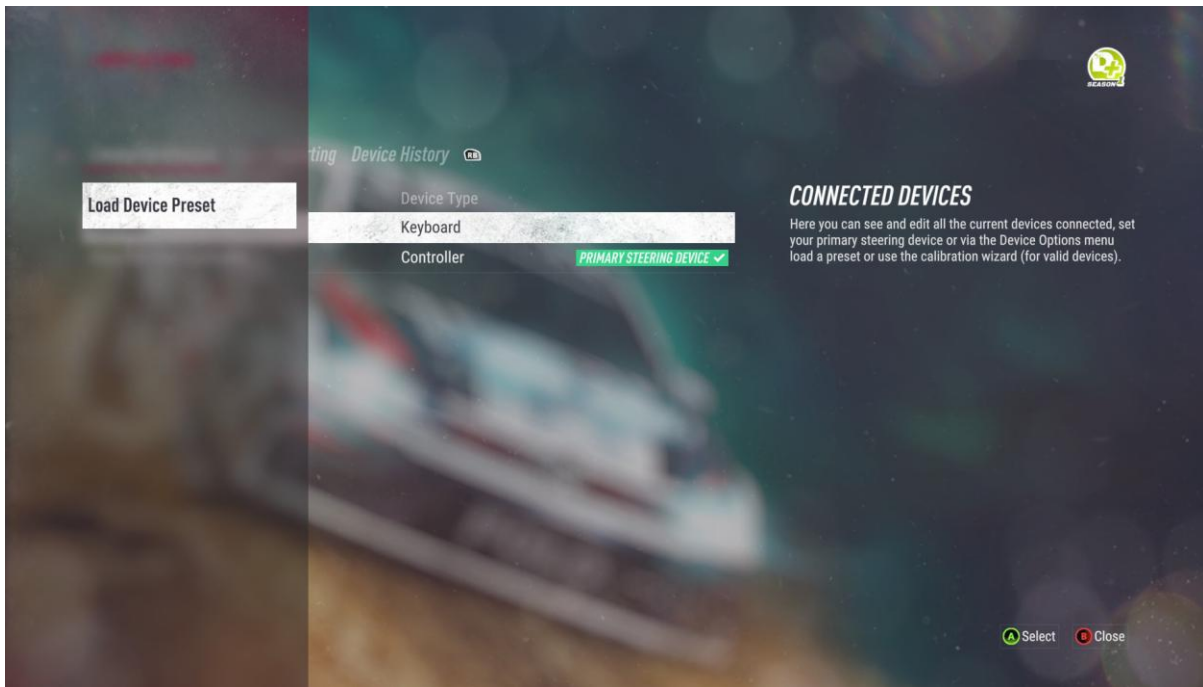
- **SELF-ALIGNING TORQUE**

This scales the torque created by the tyre and suspension geometry.

- **WHEEL FRICTION**
This scales the constant friction/weight of the steering device.
- **TYRE FRICTION**
This scales the dynamic friction of the tyre. This is the resistance of the tyre to turn.
- **SUSPENSION**
This scales an effect that is generated by taking information directly from the vehicle's suspension. Use this to emphasise the road noise.
- **TYRE SLIP**
This scales an effect that is generated by taking information directly from the tyres. If you are using a controller, it scales the slip of the front and rear tyres.
- **ENGINE**
This scales an effect that is generated by taking information directly from the vehicle's engine. Use this to scale the resonance that comes from your engine as it is revved.
- **COLLISION**
This scales an effect that is generated by taking information directly from an impact. Use this to scale the severity of the collision effect.
- **SOFT LOCK**
This scales the force that informs the player when they exceed the soft lock range of the wheel.
- **STEERING CENTER FORCE**
This scales the return to centre force when the vehicle is reset to the track. This will assist you in straightening the wheels before moving forward.
- **STEERING CENTER FORCE ENABLED**
Toggle steering center force.

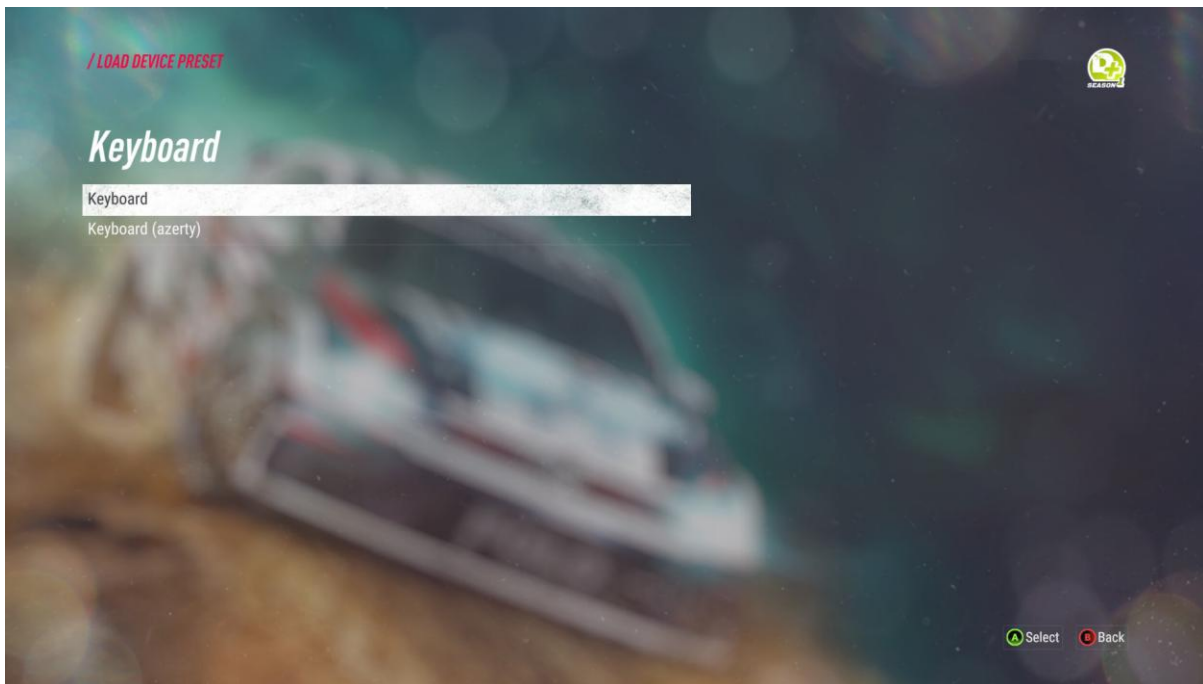
4 Input Presets

Some supported devices have multiple face layouts due to wheel rims or share the same Device Product ID and Vendor ID with another device. Because of this some official devices come bundled with multiple input binding setups for the optimal layout.



If a device has multiple presets you can select to load one via the context menu by selecting Device Options on the Connected Device screen then selecting Load Device Preset.

Once Load Device Preset has been selected the list of available presets will be shown. Selecting a preset from the list will apply the preset to the selected device only.

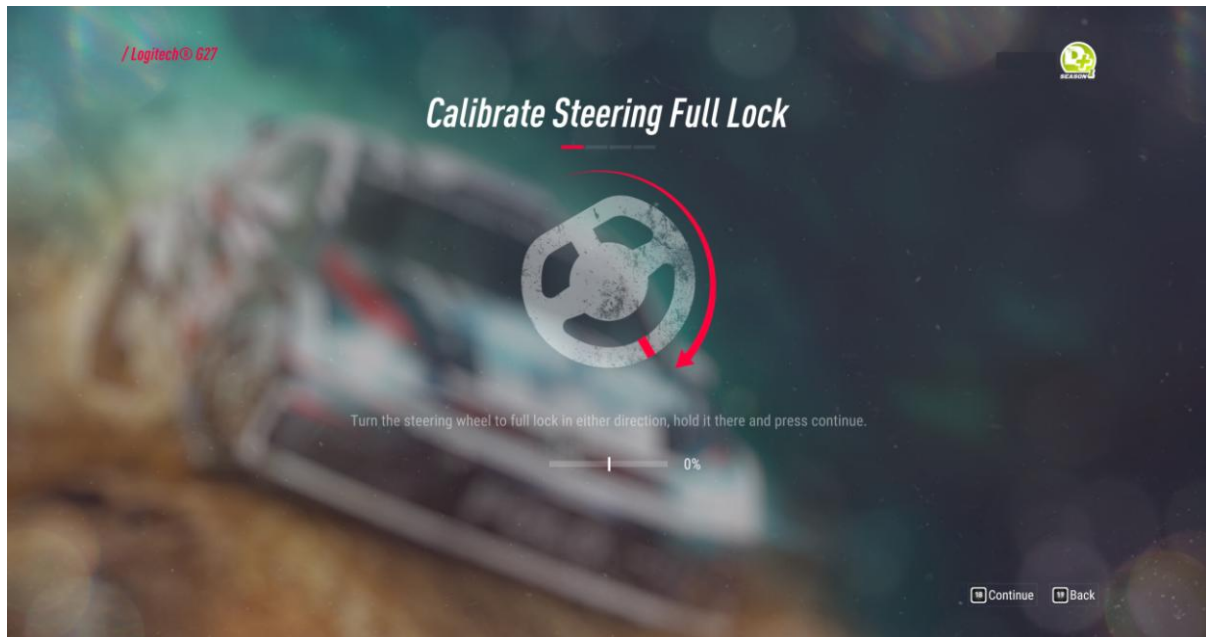


5 Calibration Wizard

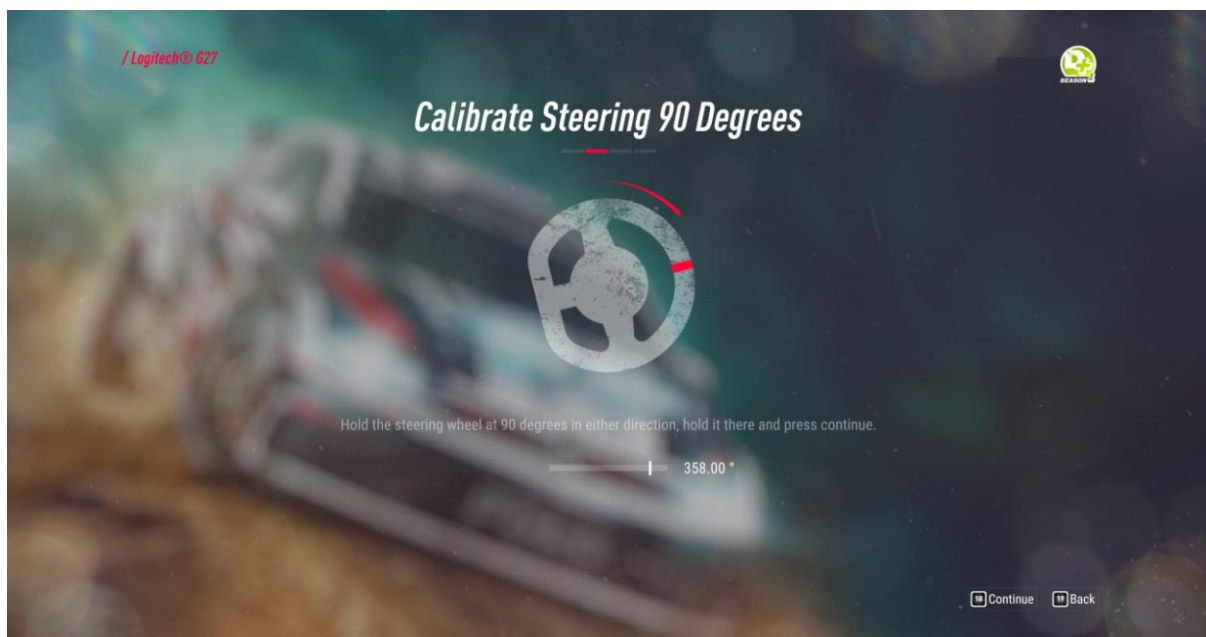
For any device that needs calibrating the Calibration Wizard should be used. This can be accessed via the Device Options context menu on the Connected Devices screen. Simply highlight the device you want to calibrate select device options and select calibration wizard to start the calibration. Note calibration is only available for wheels and pedal set ups.

5.1 Wheel Calibration

On the first screen rotate the steering wheel to full lock in either direction, hold it in place and press Continue.

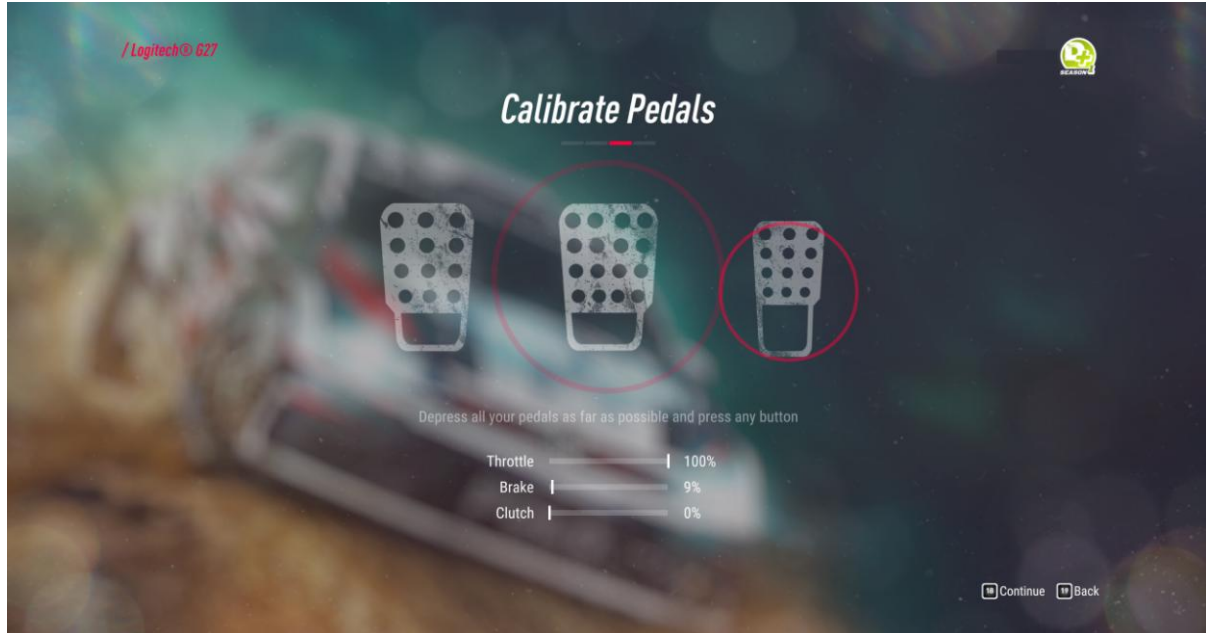


Next rotate the steering wheel at 90 degrees in either direction, hold it in place and press continue.



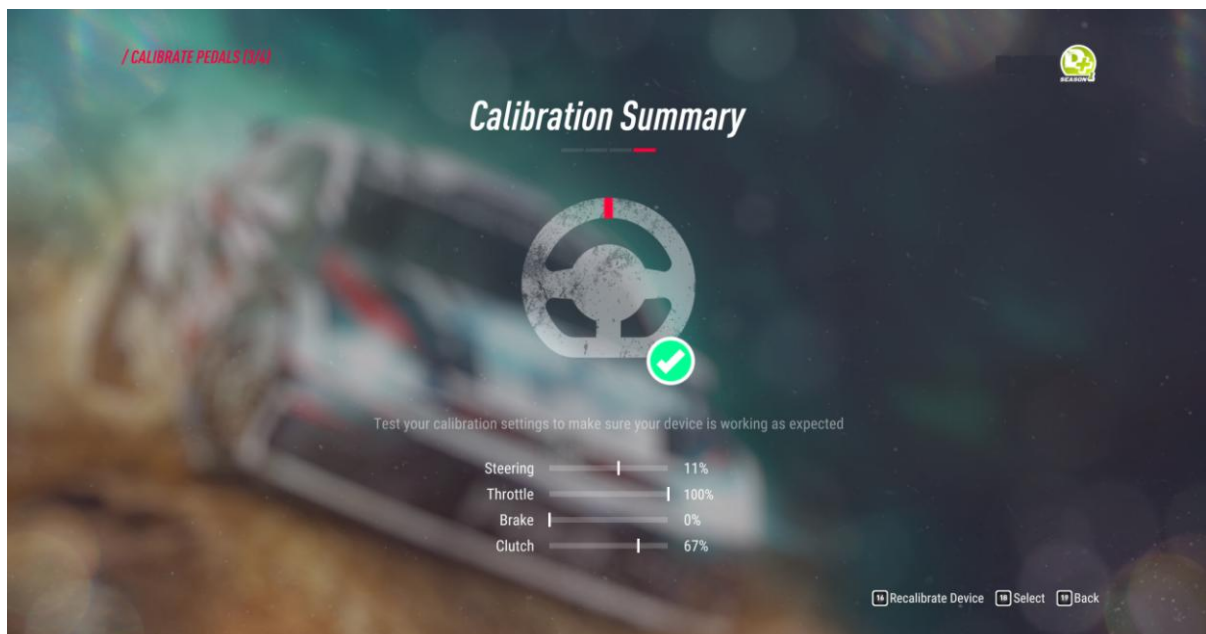
5.2 Pedal Calibration

If pedals are bound or selected in the menu you will land on the pedal calibration screen. To calibrate depress each connected pedal as far as possible and press continue.



5.3 Calibration Summary

Finally check over the summary then confirm the set up



The device is now configured and can be previewed. The outputs on screen should now match the device inputs.

If this is not the case try to re-calibrate or check the input bindings on any devices connected (a device may be bound to an action when it is not used).

6 Manual Data Entry

Warning: All changes to xml files are saved in the player's save game. If any issues occur with these changes the device will need to be deleted from the player's Device History in order for the default set up to be applied upon the next connection.

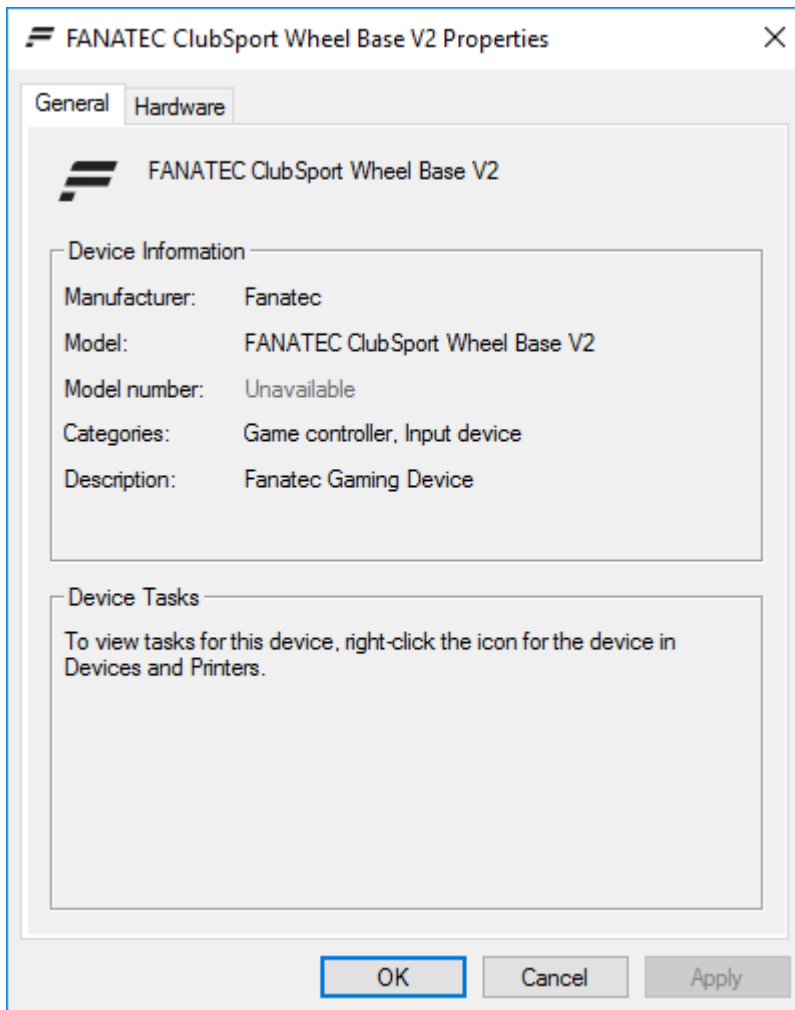
6.1 Adding New Devices

New devices are added to the input device_defines.xml to allow the game to know additional information not available through the device drivers. Adding a definition also allows the creation of presets allowing plug and play functionality.

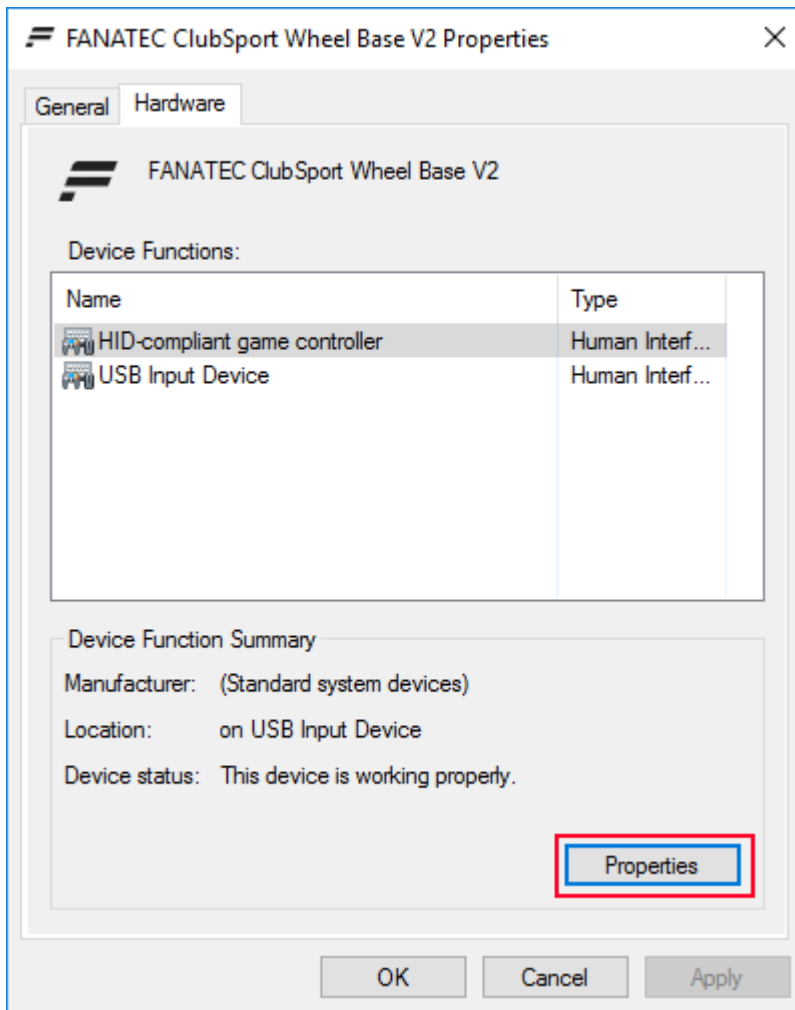
To add a new device the first thing needed is the USB Product ID (PID) and Vendor ID (VID). Officially supported devices are can be found here

<http://blog.codemasters.com/community/02/dirt-rally-2-0-supported-peripherals-list/>

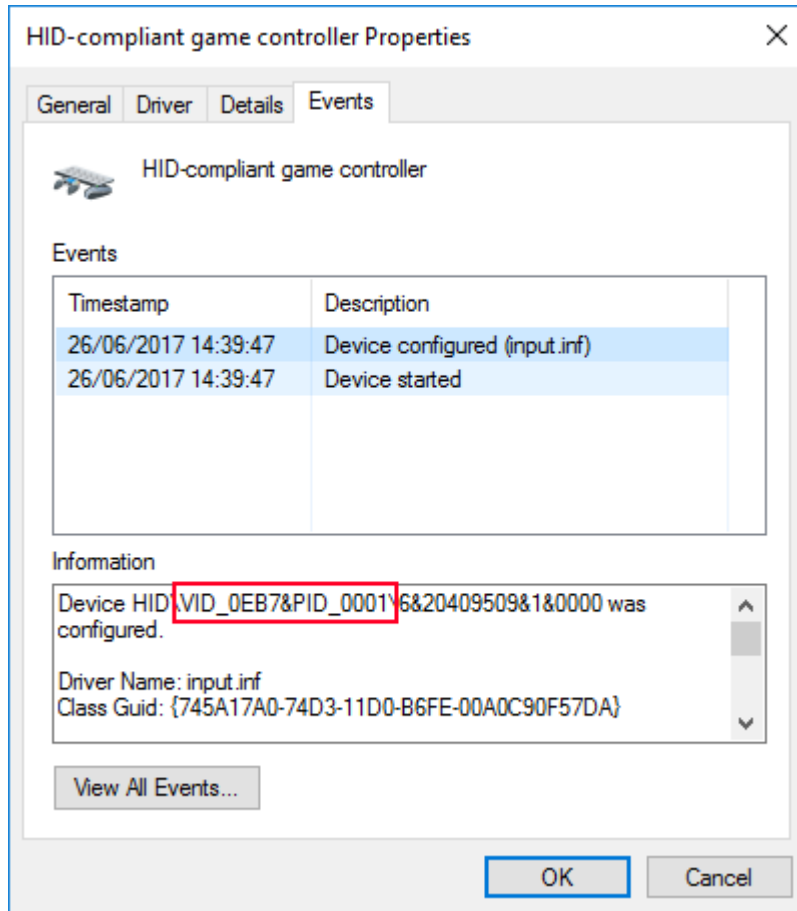
To get the PID/VID on Windows 10 navigate to Devices and Printers, right click on the device and select properties.



From here select Hardware and Properties.



On the new window select Events.



In the information box there should be some events prefixed "HID\" with the PID and VID listed after underscores.

The PID and VID can be combined along with "{PID#VID#-0000-0000-0000-504944564944}" to create a device id.

"{00010EB7-0000-0000-0000-504944564944}"

With the device id a basic device_defines.xml entry can be created.

```
<device id="{00010EB7-0000-0000-0000-504944564944}" name="ftec_clubsport" version="2"
priority="100" type="wheel" official="false" />
```

Your device must be marked as official="false" to be fully configurable in the in game menus and prevent save game conflicts when editing your device.

Additional parameters for the device definition are described below.

- **Name**

The name of the device matching the name used in the action maps. Must be lower case with no spaces and special characters except underscore.

- **Priority**

The higher the priority the more likely the device is used in automatic selection mode as the steering device over other devices.

Current priorities include:

- 0 : reserved for not_supported devices
- 1-5, 99 : reserved for library defaults
- 6-98 : pads
- 100+ : wheels

- **Type (Optional)**

The type of device, if set to 'unknown' the input system will use the device type returned from the driver, otherwise it will overwrite with the selection.

- wheel
- pad
- joystick
- keyboard
- mouse
- pedal
- shifter
- handbrake
- unknown **(Default)**
- not_supported (if a device is set to not_supported then it will not appear in game. This is covered in [6.2 Blocking Unsupported Devices](#))

- **FFB (Optional)**

Force enables or disables support for ffb ignoring if the device driver returns if ffb is supported.

- default – **(Default)** - Uses the value returned from the drivers
- enabled - Force enables the ffb even if the drivers return disabled.
- disabled - Force disables the ffb even if the drivers return enabled.

- **FFB_Force (Optional)**

- 1.0 - **(Default)**

- **FFB_Friction (Optional)**

- 1.0 - **(Default)**

- **FFB_High_Pass (Optional)**

- 0.0 - **(Default)**

- **Default (Optional)**

Only used by input library defaults, not to be used by externals.

- **Collections_Max (Optional)**

Single-function device with multiple TLC

<https://docs.microsoft.com/en-us/windows-hardware/drivers/hid/hidclass-hardware-ids-for-top-level-collections>

If a hardware device supports multiple collections a collection limit of 0 or above 1 will allow new devices to be created by the input system with the postfix '_col###' to the hardware id.

These devices can be used to extend functionality with additional device id's.

e.g.

```
<device id="{00050EB7-0000-0000-0000-504944564944}" name="ftec_csl_p1"
priority="100" type="wheel" collections_max="2" />
```

Secondary devices can now be setup with a collection id to change the device settings and assign its own action map for plug and play functionality.

```
<device id="{00050EB7-0000-0000-0000-504944564944}_col02" name="ftec_csl_p1_col02"
priority="100" type="wheel" ffb="disabled" />
```

Collection options:

- 0 – No collection limit (will create the maximum number of collections the device supports).
- 1 – **(Default)**
- >1

- **Official**

Official devices provided by Codemasters are semi-protected in game and cannot be fully edited.

WARNING: Custom devices without an action map must disable this option to prevent save game conflicts.

Custom user/manufacture devices external to official Codemasters patch releases MUST set this flag to false.

6.2 Blocking Unsupported Devices

Non supported devices are devices that are detected by the game but are not compatible.

To prevent these devices from interfering with the game a new id can be added to device_defines.xml.

```
<device id="{C626046D-0000-0000-0000-504944564944}" name="space_navigator" priority="0" type="not_supported" />
```

Setting Type to “not_supported” prevents the above device from causing undesired behaviour in game. By default unknown device input is ignored until a device type has been set. If you set a device to “not_supported” it will not be visible in game.

6.3 Custom Preset

Custom presets allow devices to auto bind enabling plug and play functionality or add additional presets to be selected from in game.

To add a preset first open action_defines.xml ("9 Appendix 2: action_defines.xml").

This file defines the input actions available in the game. These actions need to be added to any new preset (action map).

Only the actions that are needed have to be copied to reduce the file size.

For example creating an action map for a pedal set copy the driving actions, create a new xml file in input\actionmaps\ with a lower case name (my_pedal_set.xml) with the following:

```
<?xml version="1.0" encoding="utf-8"?>
<action_map name="my_pedal_set" device_name="my_device_name" library="lib_direct_input"
version="1">
</action_map>
```

Replace "my_pedal_set" with the name of the xml and "my_device_name" with the name of the device (see 6.1 Adding New Devices for reference).

Library should be replaced with lib_direct_input or lib_xinput depending on the type of device.

Next copy the actions required from action_defines.xml.

```
<?xml version="1.0" encoding="utf-8"?>
<action_map name="my_pedal_set" device_name="my_device_name" library="lib_direct_input"
version="1">
  <group name="driving">
    <action name="accelerate" />
    <action name="brake" />
    <action name="clutch" />
  </group>
</action_map>
```

Make sure to delete any "protection" attributes.

Next expand the actions to contain axis.

```
<?xml version="1.0" encoding="utf-8"?>
<action_map name="my_pedal_set" device_name="my_device_name" library="lib_direct_input"
version="1">
  <group name="driving">
    <action name="accelerate">
      <axis name="di_x_axis_rotation" type="negative" deadzone="0.0" saturation="1.0" />
    </action>
    <action name="brake">
      <axis name="di_y_axis_rotation" type="negative" deadzone="0.0" saturation="1.0" />
    </action>
    <action name="clutch">
```

```

    <axis name="di_z_axis_rotation" type="negative" deadzone="0.2" saturation="0.6" />
  </action>
</group>
</action_map>

```

Axis contain the following attributes:

Name

The name of the axis associated with the device library, see the following for the axis names:

```

<?xml version="1.0" encoding="utf-8"?>
<action_defines>
  <collision groups>
    <non_collision group1="driving" group2="menu" />
    <non_collision group1="driving" group1_recursive="false" group2="replay" />
    <non_collision group1="driving.gear" group2="replay" />
    <non_collision group1="driving.seat" group2="replay" />
    <non_collision group1="driving.steer" group2="replay" />
    <non_collision group1="driving.gear.h_pattern" group2="driving.gear.sequential" />
    <non_collision group1="menu" group2="replay" />
    <non_collision group1="menu.navigate.tab.secondary" group2="menu.view" />
    <non_collision group1="network.toggle" group2="menu" />
    <non_collision group1="network.toggle" group2="replay" />
    <non_collision group1="driving.look" group1_recursive="false" group2="replay" />
  </collision groups>
  <group name="driving">
    <action name="accelerate" />
    <action name="brake" />
    <action name="change_view" />
    <action name="clutch" />
    <action name="handbrake" />
    <action name="headlights" />
    <action name="horn" protection="hidden" />
    <action name="pause" protection="protected" />
    <action name="reset_vehicle" />
    <action name="roadside_repair" />
    <action name="wipers" />
  </group>
  <group name="gear">
    <group name="h_pattern">
      <action name="1" />
      <action name="2" />
      <action name="3" />
      <action name="4" />
      <action name="5" />
      <action name="6" />
      <action name="7" />
      <action name="reverse" />
    </group>
    <group name="sequential">
      <action name="up" />
      <action name="down" />
    </group>
  </group>
  <group name="look">
    <action name="back" />
    <group name="shared">
      <action name="up" />
      <action name="down" />
      <action name="right" />
      <action name="left" />
    </group>
  </group>
  <group name="seat">
    <action name="reset" />
    <group name="move">
      <action name="forward" />
      <action name="backward" />
      <action name="up" />
      <action name="down" />
    </group>
  </group>

```

```

    <group name="tilt">
      <action name="up" />
      <action name="down" />
    </group>
  </group>
  <group name="steer">
    <action name="left" />
    <action name="right" />
  </group>
</group>
<group name="network">
  <action name="push_to_speak" />
  <group name="toggle">
    <action name="voice" />
  </group>
</group>
<group name="menu" protection="protected">
  <action name="start" />
  <action name="option" protection="hidden" />
  <group name="navigate">
    <action name="back" jpn_alt="select" />
    <action name="down" />
    <action name="left" />
    <action name="right" />
    <action name="select" jpn_alt="back" />
    <action name="up" />
    <action name="cancel_keybinding" protection="hidden" />
    <group name="tab">
      <group name="primary">
        <action name="left" />
        <action name="right" />
      </group>
      <group name="secondary">
        <action name="left" />
        <action name="right" />
      </group>
    </group>
  </group>
</group>
<group name="view">
  <action name="down" />
  <action name="in" />
  <action name="left" />
  <action name="out" />
  <action name="right" />
  <action name="up" />
</group>
<group name="cursor" protection="hidden">
  <group name="button">
    <action name="left" />
    <action name="right" />
    <action name="middle" />
    <action name="4" />
    <action name="5" />
  </group>
  <group name="wheel">
    <action name="up" />
    <action name="down" />
  </group>
</group>
<group name="context">
  <action name="1" />
  <action name="2" />
</group>
</group>
<group name="replay" protection="protected">
  <action name="exit" jpn_alt="pause" />
  <action name="forward" />
  <action name="rewind" />
  <action name="playback_step_up" />
  <action name="playback_step_down" />
  <action name="pause" jpn_alt="exit" />
  <group name="toggle">
    <action name="ui" />
  </group>
</group>
<group name="camera">

```

```
<action name="previous" />  
<action name="next" />  
</group>  
</group>  
</action_defines>
```

- 10 Appendix 3: Direct Input Axis
11 Appendix 4: X Input Axis

- **Type**
 - positive – **(Default)**
 - negative
 - upper
 - lower
- **Deadzone (Optional)**
 - 0.0
- **Saturation (Optional)**
 - 1.0
- **Threshold (Optional)**

Point where the action determines that the axis is “pressed/held” and will be “released”.

 - 0.5

If any changes are made to the action map, you must increase the action map version before launching the game.

This will replace the action map stored in a save game automatically, otherwise the device will need to be deleted manually from the device history while disconnected.

```
<action_map name="my_pedal_set" device_name="my_device_name" library="lib_direct_input" version="1">
```

```
<action_map name="my_pedal_set" device_name="my_device_name" library="lib_direct_input" version="2">
```


7 Troubleshooting

7.1 How do I remap any locked action or the pause action, the line is greyed out?

On officially supported devices certain actions have been locked in order to prevent user error breaking the user's experience. There is a workaround available for experienced users so any action can be unlocked for re-binding.

Open "input\action_defines.xml" and remove `protection="protected"` from the action to allow re-binding.

To be able to re-bind Pause "cancel_keybinding" must be removed on the actionmap for the device being re-bound.

Open the action map for the device being used in "input\actionmaps\" and delete the following three lines:

```
<action name="cancel_keybinding">
  <axis name="*" />
</action>
```

This binding is used to cancel the current binding in the bindings screen (for instance hitting escape if accidentally selecting bind on an action that should not be changed). Without this being removed the original pause button cannot be re-assigned to another action.

8 Appendix 1: PC only device_defines.xml

```
<?xml version="1.0" encoding="utf-8"?>
<device list>
  <device id="{038E0EB7-0000-0000-0000-504944564944}" name="ftec_clubsport_v1" priority="100"
type="wheel" />
  <device id="{00010EB7-0000-0000-0000-504944564944}" name="ftec_clubsport" version="2"
priority="100" type="wheel" />
  <device id="{00040EB7-0000-0000-0000-504944564944}" name="ftec_clubsport" version="3"
priority="100" type="wheel" />
  <device id="{0E030EB7-0000-0000-0000-504944564944}" name="ftec_csl" priority="100"
type="wheel" />
  <device id="{00050EB7-0000-0000-0000-504944564944}" name="ftec_csl_ps4" priority="100"
type="wheel" />
  <device id="{18390EB7-0000-0000-0000-504944564944}" name="ftec_clubsport_pedal"
priority="100" type="pedal" />
  <device id="{183B0EB7-0000-0000-0000-504944564944}" name="ftec_clubsport_pedal_v3"
version="3" priority="100" type="pedal" />
  <device id="{1A920EB7-0000-0000-0000-504944564944}" name="ftec_clubsport_shifter"
priority="100" type="shifter" />
  <device id="{1A930EB7-0000-0000-0000-504944564944}" name="ftec_clubsport_handbrake"
priority="100" type="handbrake" />
  <device id="{B65A044F-0000-0000-0000-504944564944}" name="tm_f430" priority="100"
type="wheel" official="false" />
  <device id="{B677044F-0000-0000-0000-504944564944}" name="tm_t150" priority="100"
type="wheel" />
  <device id="{B66E044F-0000-0000-0000-504944564944}" name="tm_t300_rs" priority="100"
type="wheel" />
  <device id="{B689044F-0000-0000-0000-504944564944}" name="tm_ts_pc" priority="100"
type="wheel" />
  <device id="{B667044F-0000-0000-0000-504944564944}" name="tm_t80" priority="100"
type="wheel" />
  <device id="{B67F044F-0000-0000-0000-504944564944}" name="tm_tmx" priority="100"
type="wheel" />
  <device id="{B671044F-0000-0000-0000-504944564944}" name="tm_f458" priority="100"
type="wheel" official="false" />
  <device id="{45030738-0000-0000-0000-504944564944}" name="mc_pro_r" priority="100"
type="wheel" official="false" />
  <device id="{B65E044F-0000-0000-0000-504944564944}" name="tm_t500_rs" priority="100"
type="wheel" />
  <device id="{B662044F-0000-0000-0000-504944564944}" name="tm_t500_rs_f1" priority="100"
type="wheel" />
  <device id="{B660044F-0000-0000-0000-504944564944}" name="tm_shifter" priority="100"
type="shifter" />
  <device id="{C262046D-0000-0000-0000-504944564944}" name="lg_g920" priority="100"
type="wheel" />
  <device id="{C24F046D-0000-0000-0000-504944564944}" name="lg_g29" priority="100"
type="wheel" />
  <device id="{10201DD2-0000-0000-0000-504944564944}" name="sim_steering" version="1"
priority="100" type="wheel" ffb_force="0.5" />
  <device id="{22301DD2-0000-0000-0000-504944564944}" name="sim_steering" version="2"
priority="100" type="wheel" ffb_force="0.5" />
  <device id="{22331DD2-0000-0000-0000-504944564944}" name="sim_steering" version="3"
priority="100" type="wheel" ffb_force="0.5" />
  <device id="{804C1FC9-0000-0000-0000-504944564944}" name="simxperience_accuforce_pro"
priority="100" type="wheel" />
  <device id="{00110EB7-0000-0000-0000-504944564944}" name="ftec_csr_elite" priority="100"
type="wheel" official="false" />
  <device id="{01970EB7-0000-0000-0000-504944564944}" name="ftec_porsche_wheel" priority="100"
type="wheel" official="false" />
  <device id="{C294046D-0000-0000-0000-504944564944}" name="lg_driving_force_ex" priority="97"
type="wheel" official="false" />
  <device id="{C29A046D-0000-0000-0000-504944564944}" name="lg_driving_force_gt" priority="96"
type="wheel" official="false" />
  <device id="{C298046D-0000-0000-0000-504944564944}" name="lg_driving_force_pro"
priority="98" type="wheel" ffb_friction="0.15" official="false" />
  <device id="{C216046D-0000-0000-0000-504944564944}" name="lg_dual_action" priority="94"
type="pad" official="false" />
  <device id="{C218046D-0000-0000-0000-504944564944}" name="lg_f510" priority="94" type="pad"
official="false" />
  <device id="{C219046D-0000-0000-0000-504944564944}" name="lg_f710_and_cordless_rumblepad_2"
priority="94" type="pad" official="false" />
  <device id="{C299046D-0000-0000-0000-504944564944}" name="lg_g25" priority="100"
type="wheel" />

```

```

<device id="{C29B046D-0000-0000-0000-504944564944}" name="lg_g27" priority="100"
type="wheel" />
<device id="{CA03046D-0000-0000-0000-504944564944}" name="lg_momo_racing" priority="100"
type="wheel" ffb_friction="0.15" official="false" />
<device id="{0034045E-0000-0000-0000-504944564944}" name="ms_sidewinder_ffb" priority="100"
type="wheel" ffb="enabled" official="false" />
<device id="{00030E8F-0000-0000-0000-504944564944}" name="sl_strikefx" priority="94"
type="pad" />
<device id="{910511C0-0000-0000-0000-504944564944}" name="sl_torid" priority="94" type="pad"
/>
<device id="{B323044F-0000-0000-0000-504944564944}" name="tm_dual_trigger_3_in_1"
priority="94" type="pad" official="false" />
<device id="{B655044F-0000-0000-0000-504944564944}" name="tm_fgt_3_in_1" priority="100"
type="wheel" official="false" />
<device id="{B653044F-0000-0000-0000-504944564944}" name="tm_rgt_ffb_pro" priority="100"
type="wheel" official="false" />
<device id="{B669044F-0000-0000-0000-504944564944}" name="tm_tx" priority="100" type="wheel"
/>
<device id="{00080E8F-0000-0000-0000-504944564944}" name="grid2_pad" priority="100"
type="wheel" official="false" />
<device id="{05C4054C-0000-0000-0000-504944564944}" name="ps4_pad" priority="100" type="pad"
/>
<device id="{0BA0054C-0000-0000-0000-504944564944}" name="ps4_pad" priority="100" type="pad"
/>
<device id="{B678044F-0000-0000-0000-504944564944}" name="tm_usb_adapter" priority="100"
type="pedal" />
<device id="keyboard" name="keyboard" priority="2" type="keyboard" default="true" />
<device id="mouse" name="mouse" priority="1" type="mouse" default="true" />
<device id="xinput_pad" name="xinput_pad" priority="5" type="pad" default="true" />
<device id="xinput_wheel" name="xinput_wheel" priority="99" type="wheel" ffb_force="10"
default="true" />
<device id="pad_virtual" name="pad_virtual" priority="0" type="pad" default="true" />
<device id="lib_direct_input" name="lib_direct_input" priority="5" type="unknown"
default="true" />
<device id="lib_direct_input_pad" name="lib_direct_input_pad" priority="5" type="pad"
default="true" />
<device id="lib_direct_input_wheel" name="lib_direct_input_wheel" priority="99" type="wheel"
default="true" />
<device id="{C626046D-0000-0000-0000-504944564944}" name="space_navigator" priority="0"
type="not_supported" />
<device id="{046DBEEF-0000-0000-0000-504944564944}" name="space_navigator_driver"
priority="0" type="not_supported" />
<device id="{B695044F-0000-0000-0000-504944564944}" name="tm_tss_hb" priority="100"
type="handbrake" />
<device id="{B692044F-0000-0000-0000-504944564944}" name="tm_ts_xw" priority="100"
type="wheel" />
<device id="{B684044F-0000-0000-0000-504944564944}" name="tm_t_gt" priority="100"
type="wheel" />
<device id="{B681044F-0000-0000-0000-504944564944}" name="tm_t_gt" priority="100"
type="not_supported" />
<device id="{62040EB7-0000-0000-0000-504944564944}" name="ftec_csl_pedals" priority="100"
type="pedal" />
<device id="{07051532-0000-0000-0000-504944564944}" name="rz_raiju_mobile_pad" priority="94"
type="pad" default="true" />
<device id="{00060EB7-0000-0000-0000-504944564944}" name="ftec_dd_f1_pc" priority="100"
type="wheel" />
<device id="{00070EB7-0000-0000-0000-504944564944}" name="ftec_dd_2_pc" priority="100"
type="wheel" />
</device_list>

```

9 Appendix 2: action_defines.xml

```
<?xml version="1.0" encoding="utf-8"?>
<action defines>
  <collision_groups>
    <non_collision group1="driving" group2="menu" />
    <non_collision group1="driving" group1_recursive="false" group2="replay" />
    <non_collision group1="driving.gear" group2="replay" />
    <non_collision group1="driving.seat" group2="replay" />
    <non_collision group1="driving.steer" group2="replay" />
    <non_collision group1="driving.gear.h_pattern" group2="driving.gear.sequential" />
    <non_collision group1="menu" group2="replay" />
    <non_collision group1="menu.navigate.tab.secondary" group2="menu.view" />
    <non_collision group1="network.toggle" group2="menu" />
    <non_collision group1="network.toggle" group2="replay" />
    <non_collision group1="driving.look" group1_recursive="false" group2="replay" />
  </collision_groups>
  <group name="driving">
    <action name="accelerate" />
    <action name="brake" />
    <action name="change_view" />
    <action name="clutch" />
    <action name="handbrake" />
    <action name="headlights" />
    <action name="horn" protection="hidden" />
    <action name="pause" protection="protected" />
    <action name="reset_vehicle" />
    <action name="roadside_repair" />
    <action name="wipers" />
  </group>
  <group name="gear">
    <group name="h_pattern">
      <action name="1" />
      <action name="2" />
      <action name="3" />
      <action name="4" />
      <action name="5" />
      <action name="6" />
      <action name="7" />
      <action name="reverse" />
    </group>
    <group name="sequential">
      <action name="up" />
      <action name="down" />
    </group>
  </group>
  <group name="look">
    <action name="back" />
    <group name="shared">
      <action name="up" />
      <action name="down" />
      <action name="right" />
      <action name="left" />
    </group>
  </group>
  <group name="seat">
    <action name="reset" />
    <group name="move">
      <action name="forward" />
      <action name="backward" />
      <action name="up" />
      <action name="down" />
    </group>
    <group name="tilt">
      <action name="up" />
      <action name="down" />
    </group>
  </group>
  <group name="steer">
    <action name="left" />
    <action name="right" />
  </group>
  <group name="network">
    <action name="push_to_speak" />
    <group name="toggle">
```

```

    <action name="voice" />
  </group>
</group>
<group name="menu" protection="protected">
  <action name="start" />
  <action name="option" protection="hidden" />
  <group name="navigate">
    <action name="back" jpn_alt="select" />
    <action name="down" />
    <action name="left" />
    <action name="right" />
    <action name="select" jpn_alt="back" />
    <action name="up" />
    <action name="cancel_keybinding" protection="hidden" />
    <group name="tab">
      <group name="primary">
        <action name="left" />
        <action name="right" />
      </group>
      <group name="secondary">
        <action name="left" />
        <action name="right" />
      </group>
    </group>
  </group>
</group>
<group name="view">
  <action name="down" />
  <action name="in" />
  <action name="left" />
  <action name="out" />
  <action name="right" />
  <action name="up" />
</group>
<group name="cursor" protection="hidden">
  <group name="button">
    <action name="left" />
    <action name="right" />
    <action name="middle" />
    <action name="4" />
    <action name="5" />
  </group>
  <group name="wheel">
    <action name="up" />
    <action name="down" />
  </group>
</group>
<group name="context">
  <action name="1" />
  <action name="2" />
</group>
</group>
<group name="replay" protection="protected">
  <action name="exit" jpn_alt="pause" />
  <action name="forward" />
  <action name="rewind" />
  <action name="playback_step_up" />
  <action name="playback_step_down" />
  <action name="pause" jpn_alt="exit" />
  <group name="toggle">
    <action name="ui" />
  </group>
  <group name="camera">
    <action name="previous" />
    <action name="next" />
  </group>
</group>
</action_defines>

```

10 Appendix 3: Direct Input Axis

di_x_axis	di_y_axis	di_z_axis	
di_x_axis_rotation	di_y_axis_rotation	di_z_axis_rotation	
di_slider_0	di_slider_1		
di_pov_0	di_pov_1	di_pov_2	di_pov_3
di_dpad_0_up	di_dpad_0_down	di_dpad_0_left	di_dpad_0_right
di_dpad_1_up	di_dpad_1_down	di_dpad_1_left	di_dpad_1_right
di_dpad_2_up	di_dpad_2_down	di_dpad_2_left	di_dpad_2_right
di_dpad_3_up	di_dpad_3_down	di_dpad_3_left	di_dpad_3_right
di_button_0	di_button_1	di_button_2	di_button_3
di_button_4	di_button_5	di_button_6	di_button_7
di_button_8	di_button_9	di_button_10	di_button_11
di_button_12	di_button_13	di_button_14	di_button_15
di_button_16	di_button_17	di_button_18	di_button_19
di_button_20	di_button_21	di_button_22	di_button_23
di_button_24	di_button_25	di_button_26	di_button_27
di_button_28	di_button_29	di_button_30	di_button_31
di_button_32	di_button_33	di_button_34	di_button_35
di_button_36	di_button_37	di_button_38	di_button_39
di_button_40	di_button_41	di_button_42	di_button_43
di_button_44	di_button_45	di_button_46	di_button_47
di_button_48	di_button_49	di_button_50	di_button_51
di_button_52	di_button_53	di_button_54	di_button_55
di_button_56	di_button_57	di_button_58	di_button_59
di_button_60	di_button_61	di_button_62	di_button_63
di_button_64	di_button_65	di_button_66	di_button_67
di_button_68	di_button_69	di_button_70	di_button_71
di_button_72	di_button_73	di_button_74	di_button_75
di_button_76	di_button_77	di_button_78	di_button_79
di_button_80	di_button_81	di_button_82	di_button_83
di_button_84	di_button_85	di_button_86	di_button_87
di_button_88	di_button_89	di_button_90	di_button_91
di_button_92	di_button_93	di_button_94	di_button_95
di_button_96	di_button_97	di_button_98	di_button_99
di_button_100	di_button_101	di_button_102	di_button_103
di_button_104	di_button_105	di_button_106	di_button_107
di_button_108	di_button_109	di_button_110	di_button_111
di_button_112	di_button_113	di_button_114	di_button_115
di_button_116	di_button_117	di_button_118	di_button_119
di_button_120	di_button_121	di_button_122	di_button_123
di_button_124	di_button_125	di_button_126	di_button_127
di_x_axis_vel	di_y_axis_vel	di_z_axis_vel	
di_x_axis_ang_vel	di_y_axis_ang_vel	di_z_axis_ang_vel	
di_slider_0_vel	di_slider_1_vel		
di_x_axis_acc	di_y_axis_acc	di_z_axis_acc	

di_x_axis_ang_acc	di_y_axis_ang_acc	di_z_axis_ang_acc
di_slider_0_acc	di_slider_1_acc	
di_x_axis_force	di_y_axis_force	di_z_axis_force
di_x_axis_torque	di_y_axis_torque	di_z_axis_torque
di_slider_0_force	di_slider_1_force	
di_slider_0	di_slider_1	

11 Appendix 4: X Input Axis

xinput_dpad_up
xinput_dpad_down
xinput_dpad_left
xinput_dpad_right
xinput_button_start
xinput_button_back
xinput_button_left_stick
xinput_button_right_stick
xinput_button_left_shoulder
xinput_button_right_shoulder
xinput_button_a
xinput_button_b
xinput_button_x
xinput_button_y
xinput_left_trigger
xinput_right_trigger
xinput_left_stick_x
xinput_left_stick_y
xinput_right_stick_x
xinput_right_stick_y