Setting up UDP output for DiRT 4

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Contents

1 Overview

Most of Codemasters racing titles export telemetry data from the player's vehicle in order to support 3rd party motion platforms, telemetry applications and steering devices. Over the years, the number of export formats has grown. This document aims to describe the legacy data formats exported from games such as DiRT Rally and Grid 2.

There have also been additions for DiRT 4 which should open up the telemetry export for a wider range of 3rd party applications, which will be outlined later.

The motion platform setup can be found in the `%userprofile%\Documents\My Games\DiRT 4\hardwaresettings\hardware_settings_config.xml`, which will contain the XML extract below.

```
<hardware_settings_config version="..." deviceId="...">
    .
    .
    <motion_platform>
        <dbox
            enabled="false" />
        <udp
            enabled="false"
            extradata="0"
            ip="127.0.0.1"
            port="20777"
            delay="1" />
        <custom_udp
            enabled="false"
            filename="example_udp_channel_data.xml"
            ip="127.0.0.1"
            port="20777"
            delay="1" />
        <fanatec
            enabled="false"
            pedalVibrationScale="1.0"
            wheelVibrationScale="1.0"
            ledTrueForGearsFalseForSpeed="true" />
    </motion_platform>
    .
    .
</hardware_settings_config>
```

2 D-BOX

2.1 Config Setup

To enable exporting to D-BOX, simply set enabled to true in the `dbox` XML tag.

```
<dbox enabled="true" />
```

Ensure you have the latest motion codes from D-BOX. Motion codes and drivers can be downloaded at their website at

`http://www.d-box.com/corporate-page/downloads/`

3 UDP

3.1 Config Setup

UDP data is probably the primary way of getting telemetry data from the game, and almost certainly the least understood.

It is possible to export to multiple devices by simply adding more instances of the `udp` tag, for example

```
<motion_platform>
    <udp enabled="true" extradata="0" ip="...." port="20777" delay="1" />
    <udp enabled="true" extradata="0" ip="...." port="20888" delay="1" />
    <udp enabled="true" extradata="2" ip="...." port="20999" delay="1" />
</motion_platform>
```

The tag attributes are:

enabled

Set to "true" to enable the UDP export to this IP/port, "false" otherwise.

extradata

The network packet type to export. 0 for LiveForSpeed compatible packets, 1-3 for other packets. (Detailed descriptions of all existing packet formats are included at the end of this document.)

ip

The 32-bit numeric IP address to export the data to.

port

The port number to export the data to.

delay

The delay between network packets, measured in 1/100th of a second.

4 Custom UDP

To improve the flexibility of the system, custom UDP data packets can now be defined, enabling 3rd parties to be more selective about the telemetry channels they are interested in. The behaviour is exactly the same as the legacy UDP options, and examples of how to replicate the legacy UDP data packets with the new system can be found at the end of this document.

4.1 Config Setup

As with UDP, multiple ports can be exported to by adding more `custom_udp` tags to the settings.

The tag attributes are:

enabled

Set to "true" to enable the UDP export to this IP/port, "false" otherwise.

filename

The XML filename within the motionplatforms folder which contains the network packet format.

ip

The 32-bit numeric IP address to export the data to.

port

The port number to export the data to.

delay

The delay between network packets, measured in $1/100^{th}$ of a second.

4.2 XML Layout

UDP packet definition files must be located in the `%userprofile%\Documents\My Games\DiRT 4\motionplatforms\` folder, and contain the following structure

```
<custom_udp>
    <uint32 channel="...." scale="...." />
    <int32  channel="...." scale="...." />
    <float  channel="...." scale="...." />
    <fourcc text="...." />
</custom_udp>
```

where the type tags `uint32`, `int32`, `float`, and `fourcc` are the only supported types, which represent 32 bit unsigned integers, 32 bit signed integers, 32 bit floating point numbers, and 4 byte strings respectively. All exported data types are currently 4 bytes in size, and up to 100 telemetry channels are supported per packet.

Numeric types must specify a `channel` which must match one of the supported channels below.

An optional `scale` modifier can be specified, and will typically be used for changing units or types.

The `fourcc` data must define a 4-character string in the `text` attribute.

Examples of use can be found at the end of this document.

4.3 Available Channels

In alphabetical order, here is a list of all the available telemetry channels that can be exported from the game. Channels that are not supported by a game will return zero.

abs

Not supported in DiRT4

acceleration_x
acceleration_y
acceleration_z

Returns the x, y or z component of the world space acceleration of the vehicle (in m/s^2)

angular_velocity_x
angular_velocity_y
angular_velocity_z

Returns the x, y or z component of the world space angular velocity of the vehicle (in radians/s)

brake_input

Returns the level of brake input applied through the controller. A value between 0 and 1.

brake_temp_bl
brake_temp_br
brake_temp_fl
brake_temp_fr

Returns the brake temperature in Centigrade of the specified wheel. (bl = Back Left Wheel, br = Back Right, fl = Front Left, fr = Front Right

clutch_input

Returns the level of clutch input applied through the controller. A value between 0 and 1.

drs

Not supported in DiRT4

engine_rate

Returns the engine rotation rate in radians/second.

forward_dir_x
forward_dir_y
forward_dir_z

Returns the x, y or z component of the forward direction of the car in world space (in metres).

fuel_capacity

Not supported in DiRT4

fuel_in_tank

Not supported in DiRT4

gear

Returns the current gear number. 0 for neutral, -1 for reverse.

gforce_lateral
gforce_longitudinal
gforce_vertical

Returns the G-Force in the lateral, longitudinal or vertical direction.

idle_rpm

Returns the idle rate of the engine in radians/second.

in_pits

Not supported in DiRT4

kers_level_max

Not supported in DiRT4

kers_level

Not supported in DiRT4

lap_distance

Returns the distance of the track, in metres.

lap_time

Returns the current lap time, in seconds.

lap

Returns the current lap number.

last_lap_time

Returns the time of the last lap, in seconds.

left_dir_x
left_dir_y
left_dir_z

Returns the x, y or z component of the left direction of the car in world space (in metres).

local_velocity_x
local_velocity_y
local_velocity_z

Returns the x, y or z component of the linear velocity of the car in car local space (in metres).

max_gears

Returns the number of forward gears available in the vehicle.

max_rpm

Returns the maximum engine rate, in radians/second.

paused

Returns 1 if the game is paused, 0 otherwise.

pitch

Returns the pitch of the vehicle, in radians.

pitch_velocity

Returns the pitch velocity of the vehicle (in radians/second).

pitch_acceleration

Returns the pitch acceleration of the vehicle (in radians/second^2).

position_x
position_y
position_z

Returns the x, y or z component of the world space position of the car (in metres).

race_position

Returns the current position within the race.

race_sector

Returns the number of splits in the lap.

roll

Returns the roll of the vehicle, in radians.

roll_velocity

Returns the roll velocity of the vehicle (in radians/second).

roll_acceleration

Returns the roll acceleration of the vehicle (in radians/second^2).

sector_time_1
sector_time_2

Returns the first or second split time, in seconds.

speed

Returns the magnitude of the vehicles linear velocity, in m/s

steering_input

Returns the level of steering input applied through the controller. A value between -1 and 1.

suspension_position_bl
suspension_position_br
suspension_position_fl
suspension_position_fr

Returns the vertical position of the wheel from rest (in car space), measured in metres.

suspension_velocity_bl
suspension_velocity_br
suspension_velocity_fl
suspension_velocity_fr

Returns the vertical velocity of the wheel from rest (in car space), measured in m/s.

suspension_acceleration_bl
suspension_acceleration_br
suspension_acceleration_fl
suspension_acceleration_fr

Returns the vertical acceleration of the wheel from rest (in car space), measured in m/s^2.

throttle_input

Returns the level of throttle input applied through the controller. A value between 0 and 1.

total_distance

Returns the race distance, in metres.

total_laps

Returns the number of laps in the race.

total_time

Returns the amount of time since the race session begun, in seconds.

track_length

Returns the length of the track, in metres.

traction_control

Not supported in DiRT4

tyre_pressure_bl
tyre_pressure_br
tyre_pressure_fl
tyre_pressure_fr

Not supported in DiRT4

velocity_x
velocity_y
velocity_z

Returns the x, y or z component of the linear velocity of the car in world space (in metres).

wheel_patch_speed_bl
wheel_patch_speed_br
wheel_patch_speed_fl
wheel_patch_speed_fr

Returns the speed of the contact patch of the specified wheel, in metres/second.

yaw

Returns the yaw of the vehicle (in radians).

yaw_velocity

Returns the yaw velocity of the vehicle (in radians/second).

yaw_acceleration

Returns the yaw acceleration of the vehicle (in radians/second^2).

5 Fanatec

5.1 Config Setup

Included in the motion platform system is the Fanatec wheel and pedal extensions, which allow you to control vibration to pedals and LED displays.

The tag attributes are:

enabled

Set to "true" to enable the Fanatec specific extensions, "false" otherwise.

pedalVibrationScale

An optional scalar for the rumble motors in the pedals, currently set to rumble when anti-lock brakes kick in. A value between 0 and 1.

wheelVibrationScale

An optional scalar for the rumble motors in the wheel (separate to regular force feedback motors). Currently set to rumble at high RPM. A value between 0 and 1.

ledTrueForGearsFalseForSpeed

Set to "true" if you wish the LED display on the wheel to show you the current gear, "false" if you would prefer to see the transmission speed of the vehicle. The units of speed will be either km/h or mph, depending on the in-game setting for the OSD.

6 Appendix 1: Custom UDP for UDP mode 0

```
<custom_udp>
    <uint32 channel="total_time"          scale="1000.0"   />
    <float  channel="angular_velocity_x" scale="-1.0"     />
    <float  channel="angular_velocity_z" scale="1.0"      />
    <float  channel="angular_velocity_y" scale="1.0"      />
    <float  channel="yaw"                 scale="1.0"      />
    <float  channel="pitch"               scale="1.0"      />
    <float  channel="roll"                scale="1.0"      />
    <float  channel="acceleration_x"      scale="-1.0"     />
    <float  channel="acceleration_z"      scale="1.0"      />
    <float  channel="acceleration_y"      scale="1.0"      />
    <float  channel="velocity_x"          scale="-1.0"     />
    <float  channel="velocity_z"          scale="1.0"      />
    <float  channel="velocity_y"          scale="1.0"      />
    <int32  channel="position_x"          scale="-65535.0" />
    <int32  channel="position_z"          scale="65535.0"  />
    <int32  channel="position_y"          scale="65535.0"  />
    <fourcc text="ToCA"                                    />
</custom_udp>
```

7 Appendix 1: Custom UDP for UDP mode 1

```
<custom_udp>
    <float channel="total_time"              scale="1.0"    />
    <float channel="lap_time"                scale="1.0"    />
    <float channel="lap_distance"            scale="1.0"    />
    <float channel="total_distance"          scale="1.0"    />
    <float channel="position_x"              scale="1.0"    />
    <float channel="position_y"              scale="1.0"    />
    <float channel="position_z"              scale="1.0"    />
    <float channel="speed"                   scale="1.0"    />
    <float channel="velocity_x"              scale="1.0"    />
    <float channel="velocity_y"              scale="1.0"    />
    <float channel="velocity_z"              scale="1.0"    />
    <float channel="left_dir_x"              scale="-1.0"   />
    <float channel="left_dir_y"              scale="-1.0"   />
    <float channel="left_dir_z"              scale="-1.0"   />
    <float channel="forward_dir_x"           scale="1.0"    />
    <float channel="forward_dir_y"           scale="1.0"    />
    <float channel="forward_dir_z"           scale="1.0"    />
    <float channel="suspension_position_bl" scale="1000.0" />
    <float channel="suspension_position_br" scale="1000.0" />
    <float channel="suspension_position_fl" scale="1000.0" />
    <float channel="suspension_position_fr" scale="1000.0" />
    <float channel="suspension_velocity_bl" scale="1000.0" />
    <float channel="suspension_velocity_br" scale="1000.0" />
    <float channel="suspension_velocity_fl" scale="1000.0" />
    <float channel="suspension_velocity_fr" scale="1000.0" />
    <float channel="wheel_patch_speed_bl"    scale="1.0"    />
    <float channel="wheel_patch_speed_br"    scale="1.0"    />
    <float channel="wheel_patch_speed_fl"    scale="1.0"    />
    <float channel="wheel_patch_speed_fr"    scale="1.0"    />
    <float channel="throttle_input"          scale="1.0"    />
    <float channel="steering_input"          scale="1.0"    />
    <float channel="brake_input"             scale="1.0"    />
    <float channel="clutch_input"            scale="1.0"    />
    <float channel="gear"                    scale="1.0"    />
    <float channel="gforce_lateral"          scale="1.0"    />
    <float channel="gforce_longitudinal"     scale="1.0"    />
    <float channel="lap"                     scale="1.0"    />
    <float channel="engine_rate"             scale="1.0"    />
</custom_udp>
```

8 Appendix 1: Custom UDP for UDP mode 2

```
<custom_udp>
    <float channel="total_time"              scale="1.0"    />
    <float channel="lap_time"                scale="1.0"    />
    <float channel="lap_distance"            scale="1.0"    />
    <float channel="total_distance"          scale="1.0"    />
    <float channel="position_x"              scale="1.0"    />
    <float channel="position_y"              scale="1.0"    />
    <float channel="position_z"              scale="1.0"    />
    <float channel="speed"                   scale="1.0"    />
    <float channel="velocity_x"              scale="1.0"    />
    <float channel="velocity_y"              scale="1.0"    />
    <float channel="velocity_z"              scale="1.0"    />
    <float channel="left_dir_x"              scale="-1.0"   />
    <float channel="left_dir_y"              scale="-1.0"   />
    <float channel="left_dir_z"              scale="-1.0"   />
    <float channel="forward_dir_x"           scale="1.0"    />
    <float channel="forward_dir_y"           scale="1.0"    />
    <float channel="forward_dir_z"           scale="1.0"    />
    <float channel="suspension_position_bl" scale="1000.0" />
    <float channel="suspension_position_br" scale="1000.0" />
    <float channel="suspension_position_fl" scale="1000.0" />
    <float channel="suspension_position_fr" scale="1000.0" />
    <float channel="suspension_velocity_bl" scale="1000.0" />
    <float channel="suspension_velocity_br" scale="1000.0" />
    <float channel="suspension_velocity_fl" scale="1000.0" />
    <float channel="suspension_velocity_fr" scale="1000.0" />
    <float channel="wheel_patch_speed_bl"    scale="1.0"    />
    <float channel="wheel_patch_speed_br"    scale="1.0"    />
    <float channel="wheel_patch_speed_fl"    scale="1.0"    />
    <float channel="wheel_patch_speed_fr"    scale="1.0"    />
    <float channel="throttle_input"          scale="1.0"    />
    <float channel="steering_input"          scale="1.0"    />
    <float channel="brake_input"             scale="1.0"    />
    <float channel="clutch_input"            scale="1.0"    />
    <float channel="gear"                    scale="1.0"    />
    <float channel="gforce_lateral"          scale="1.0"    />
    <float channel="gforce_longitudinal"     scale="1.0"    />
    <float channel="lap"                     scale="1.0"    />
    <float channel="engine_rate"             scale="1.0"    />
    <float channel="native_sli_support"      scale="1.0"    />
    <float channel="race_position"           scale="1.0"    />
    <float channel="kers_level"              scale="1.0"    />
    <float channel="kers_level_max"          scale="1.0"    />
    <float channel="drs"                     scale="1.0"    />
    <float channel="traction_control"        scale="1.0"    />
    <float channel="abs"                     scale="1.0"    />
    <float channel="fuel_in_tank"            scale="1.0"    />
    <float channel="fuel_capacity"           scale="1.0"    />
    <float channel="in_pits"                 scale="1.0"    />
    <float channel="race_sector"             scale="1.0"    />
    <float channel="sector_time_1"           scale="1.0"    />
```

```
    <float channel="sector_time_2"          scale="1.0"    />
    <float channel="brake_temp_bl"          scale="1.0"    />
    <float channel="brake_temp_br"          scale="1.0"    />
    <float channel="brake_temp_fl"          scale="1.0"    />
    <float channel="brake_temp_fr"          scale="1.0"    />
    <float channel="tyre_pressure_bl"       scale="1.0"    />
    <float channel="tyre_pressure_br"       scale="1.0"    />
    <float channel="tyre_pressure_fl"       scale="1.0"    />
    <float channel="tyre_pressure_fr"       scale="1.0"    />
    <float channel="laps_completed"         scale="1.0"    />
    <float channel="total_laps"             scale="1.0"    />
    <float channel="track_length"           scale="1.0"    />
    <float channel="last_lap_time"          scale="1.0"    />
</custom_udp>
```

9 Appendix 1: Custom UDP for UDP mode 3

```
<custom_udp>
    <float channel="total_time"              scale="1.0"    />
    <float channel="lap_time"                scale="1.0"    />
    <float channel="lap_distance"            scale="1.0"    />
    <float channel="total_distance"          scale="1.0"    />
    <float channel="position_x"              scale="1.0"    />
    <float channel="position_y"              scale="1.0"    />
    <float channel="position_z"              scale="1.0"    />
    <float channel="speed"                   scale="1.0"    />
    <float channel="velocity_x"              scale="1.0"    />
    <float channel="velocity_y"              scale="1.0"    />
    <float channel="velocity_z"              scale="1.0"    />
    <float channel="left_dir_x"              scale="-1.0"   />
    <float channel="left_dir_y"              scale="-1.0"   />
    <float channel="left_dir_z"              scale="-1.0"   />
    <float channel="forward_dir_x"           scale="1.0"    />
    <float channel="forward_dir_y"           scale="1.0"    />
    <float channel="forward_dir_z"           scale="1.0"    />
    <float channel="suspension_position_bl" scale="1000.0" />
    <float channel="suspension_position_br" scale="1000.0" />
    <float channel="suspension_position_fl" scale="1000.0" />
    <float channel="suspension_position_fr" scale="1000.0" />
    <float channel="suspension_velocity_bl" scale="1000.0" />
    <float channel="suspension_velocity_br" scale="1000.0" />
    <float channel="suspension_velocity_fl" scale="1000.0" />
    <float channel="suspension_velocity_fr" scale="1000.0" />
    <float channel="wheel_patch_speed_bl"    scale="1.0"    />
    <float channel="wheel_patch_speed_br"    scale="1.0"    />
    <float channel="wheel_patch_speed_fl"    scale="1.0"    />
    <float channel="wheel_patch_speed_fr"    scale="1.0"    />
    <float channel="throttle_input"          scale="1.0"    />
    <float channel="steering_input"          scale="1.0"    />
    <float channel="brake_input"             scale="1.0"    />
    <float channel="clutch_input"            scale="1.0"    />
    <float channel="gear"                    scale="1.0"    />
    <float channel="gforce_lateral"          scale="1.0"    />
    <float channel="gforce_longitudinal"     scale="1.0"    />
    <float channel="lap"                     scale="1.0"    />
    <float channel="engine_rate"             scale="1.0"    />
    <float channel="native_sli_support"      scale="1.0"    />
    <float channel="race_position"           scale="1.0"    />
    <float channel="kers_level"              scale="1.0"    />
    <float channel="kers_level_max"          scale="1.0"    />
    <float channel="drs"                     scale="1.0"    />
    <float channel="traction_control"        scale="1.0"    />
    <float channel="abs"                     scale="1.0"    />
    <float channel="fuel_in_tank"            scale="1.0"    />
    <float channel="fuel_capacity"           scale="1.0"    />
    <float channel="in_pits"                 scale="1.0"    />
    <float channel="race_sector"             scale="1.0"    />
    <float channel="sector_time_1"           scale="1.0"    />
```

```
    <float channel="sector_time_2"          scale="1.0"    />
    <float channel="brake_temp_bl"          scale="1.0"    />
    <float channel="brake_temp_br"          scale="1.0"    />
    <float channel="brake_temp_fl"          scale="1.0"    />
    <float channel="brake_temp_fr"          scale="1.0"    />
    <float channel="tyre_pressure_bl"       scale="1.0"    />
    <float channel="tyre_pressure_br"       scale="1.0"    />
    <float channel="tyre_pressure_fl"       scale="1.0"    />
    <float channel="tyre_pressure_fr"       scale="1.0"    />
    <float channel="laps_completed"         scale="1.0"    />
    <float channel="total_laps"             scale="1.0"    />
    <float channel="track_length"           scale="1.0"    />
    <float channel="last_lap_time"          scale="1.0"    />
    <float channel="max_rpm"                scale="1.0"    />
    <float channel="idle_rpm"               scale="1.0"    />
    <float channel="max_gears"              scale="1.0"    />
</custom_udp>
```