x2121 - HiRes Wheel

Version 1

High resolution wheel

[0] **getWheelCapability**() → multiplier, hasSwitch, hasInvert, hasAnalyticsData, ratchetsPerRotation, wheelDiameter
[1] **getWheelMode**() → target, resolution, invert, analytics

[2] **setWheelMode**(target,resolution, invert, analytics) → target, resolution, invert, analytics

[3] **getRatchetSwitchState**() → state

[4] **getAnalyticsData**() → analyticsData

[event0] **wheelMovement**() → resolution, periods, deltaV

[event1] **ratchetSwitch**() → state

Overview

Reporting of hi-res wheel events.

A hi-res wheel must have a freewheel or microratchet mode (more than one microratchet per normal scroll unit) to make the high resolution useful. It may have a user controlled mechanism to switch to normal ratchet mode. If this ratchet control is motorized or has a mechanical switch for the firmware to detect the state, then the wheel has the "ratchet switch" capability described in this feature.

The high-resolution setting is applied both when the wheel is reported natively via HID and when diverted to software.

The invert setting applies only to values reported natively via HID. Values report via HID++ are unaffected. When active it causes reporting of the additive inverse of normal wheel motion. Normal motion reporting gives positive values when the wheel is moved away from the user. Inverted motion reporting gives negative values when the wheel is moved away from the user.

The period count reported is the number of reporting periods that motion took to be reported. It will normally be 1, but may be greater when the HID report is delayed due to HID++ reports being sent. The initial periods of no motion preceding the first motion report do not count towards the number of periods.

Functions and Events

[0] getWheelCapability() → multiplier, hasSwitch, hasInvert, hasAnalyticsData, ratchetsPerRotation, wheelDiameter

Parameters

none

Returns

multiplier

    N = Hi-res multiplier. One normal ratchet distance produces N counts of wheel movement.

hasAnalyticsData

    1 = Can report some project-specific analytics data related to high-resolution wheel.

hasInvert

    1 = Can invert HID reported motion

hasSwitch

    1 = Has ratchet switch

ratchetsPerRotation

    Number of ratchets that can be generated by a whole rotation of the wheel.

wheelDiameter

    Nominal wheel diameter in millimeters. This may allow the SW to compute the tangential velocity the user applies on the wheel.

Errors

none

Table 1. getWheelCapability() request packet format

byte \ bit	7	6	5	4	3	2	1	0
0..15	reserved							

Table 2. getWheelCapability() response packet format

byte \ bit	7	6	5	4	3	2	1	0
0	multiplier							
1	capabilities							

byte \ bit	7	6	5	4	3	2	1	0
	rsv(0)	rsv(0)	rsv(0)	hasAnalyticsData	hasInvert	hasSwitch	rsv(0)	rsv(0)
2	ratchetsPerRotation							
3	wheelDiameter							
4..15	reserved							

[1] getWheelMode() → target, resolution, invert, analytics

Parameters

none

Returns

analytics

0 = Unsupported / Analytics data collection was stopped (default value after a reset), 1 = Analytics data is being collected

invert

0 = Not inverted, 1 = Inverted

resolution

0 = Low resolution, 1 = High resolution

target

0 = HID, 1=HID++ notification

Table 3. getWheelMode() request packet format

byte \ bit	7	6	5	4	3	2	1	0
0..15	reserved							

Table 4. getWheelMode() response packet format

byte \ bit	7	6	5	4	3	2	1	0
0	wheelmode							
	rsv(0)	rsv(0)	rsv(0)	rsv(0)	analytics	invert	resolution	target
1..15	reserved							

[2] setWheelMode(target,resolution, invert, analytics) → target, resolution, invert, analytics

Parameters

analytics

0 = Stop analytics data collection, 1 = Collect analytics data (if supported)

> An invalid argument error will be sent back if trying to enable this flag while analytics data is not supported.

invert

0 = Do not invert, 1 = Invert

resolution

0 = Low resolution, 1 = High resolution

target

0 = HID, 1=HID++ notification

Returns

analytics

0 = Stop analytics data collection, 1 = Collect analytics data (echo of the request)

invert

0 = Do not invert, 1 = Invert (echo of the request)

resolution

0 = Low resolution, 1 = High resolution (echo of the request)

target

0 = HID, 1=HID++ notification (echo of the request)

Table 5. setWheelMode() request packet format

byte \ bit	7	6	5	4	3	2	1	0
0	wheelmode							
	rsv(0)	rsv(0)	rsv(0)	rsv(0)	analytics	invert	resolution	target
1..15	reserved							

Table 6. setWheelMode() response packet format

byte \ bit	7	6	5	4	3	2	1	0
0	wheelmode							

byte \ bit	7	6	5	4	3	2	1	0
	rsv(0)	rsv(0)	rsv(0)	rsv(0)	analytics	invert	resolution	target
1..15	reserved							

Errors

Invalid argument error

[3] getRatchetSwitchState() → state

Parameters

none

Returns

state

    0 = Free wheel, 1 = Ratchet engaged

Table 7. getRatchetSwitchState() request packet format

byte \ bit	7	6	5	4	3	2	1	0
0..15	reserved							

Table 8. getRatchetSwitchState() response packet format

byte \ bit	7	6	5	4	3	2	1	0
0	ratchet mode							
	rsv(0)	rsv(0)	rsv(0)	rsv(0)	rsv(0)	rsv(0)	rsv(0)	state
1..15	reserved							

[4] getAnalyticsData() → analyticsData

Parameters

none

Returns

analyticsData

    Project specific analytics data related to high-resolution wheels. The analytics data can be retrieved if the capability "hasAnalyticsData" is supported. After retrieving the data, it will be cleaned.

> The analytics data collection process is enabled/disabled by the configurable flag "analytics". However, the value of this flag doesn't prevent the SW from retrieving the latest analytics data.

Table 9. getAnalyticsData() request packet format

byte \ bit	7	6	5	4	3	2	1	0
0..15	reserved							

Table 10. getAnalyticsData() response packet format

byte \ bit	7	6	5	4	3	2	1	0
0..15	analyticsData							

Errors

The function will return "Unsupported" error if analytics data is not supported.

[event0] wheelMovement() → resolution, periods, deltaV

Reported when "target" bit is set to 1 (HID++ notification).

Event report

resolution

0 = Low resolution, 1 = High resolution

periods

Number of sampling periods combined in this report. If this value is greater than 15, then the value 15 is sent.

deltaV

Vertical wheel motion delta. Moving away from the user produces positive values.

Table 11. wheelMovement() report packet format

byte \ bit	7	6	5	4	3	2	1	0
0	rsv(0)	rsv(0)	rsv(0)	resolution	periods			
1	deltaV (MSB)							
2	deltaV (LSB)							
3..15	reserved							

[event1] ratchetSwitch() → state

Reported when ratchet switch state changes.

Event report

state

　　0 = Free wheel, 1 = Ratchet engaged

Table 12. ratchetSwitch() report packet format

byte \ bit	7	6	5	4	3	2	1	0
0	rsv(0)	rsv(0)	rsv(0)	rsv(0)	rsv(0)	rsv(0)	rsv(0)	state
1..15	reserved							

ChangeLog

- Version 1: Add high-res wheel analytics data capability and provide further wheel information (diameter, number of ratchets per rotation).
- Version 0: Initial version