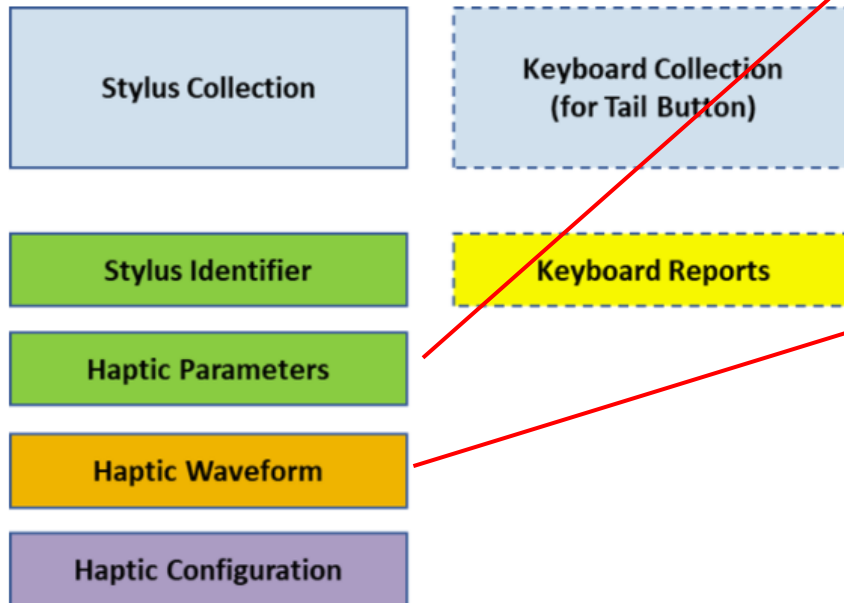# Haptic Pen log Analysis

2022/02/08

Haptic Pen Hid Format

- According to bluetooth log, Host(Surface Pro) will first read the Haptic Parameters on Pen(WaveFormList, DurationList)

- After start using Pen, Host will use Haptic Waveform to set which waveform to trigger

Required Top Level HID Collection

Stylus Collection		Keyboard Collection (for Tail Button)

Stylus Identifier		Keyboard Reports
Haptic Parameters		
Haptic Waveform		
Haptic Configuration		

	Data size
Auto Trigger Control	32(constant: 0x0d0042)
Duration List	16*n
Waveform List	16*n(0x1003~0x2FFF)

	Data size
Repeat Count	8
Intensity	8
Manual Trigger	8(1~18)
Waveform cutoff time	8(0~254, units : 100ms)
Retrigger Period	16

Haptic Parameters

- Host will read parameters from haptic parameters ble hid characteristic, duration list and waveform list data is ordered(ordinals start with 3)

- WAVEFORM_NONE, WAVEFORM_STOP are required for all haptic devices, ordinals 1, 2 are set to none and stop. They do not need to be declared in list

Haptic parameters example

Index	DurationList	WaveformList
0x03		0x1003(Click)
0x04		0x1006(Press)
…		…
0x0D(13)		0x100F(Brush_Continuous)

Waveform Button

- for button waveform, host will send a waveform first(ex. WAVEFORM_CLICK), after that immediately send a stop waveform(WAVEFORM_STOP)

- Example: Haptic Pen Validation Tool – 3 Check Optional Waveform – Optional Interaction Waveforms

Waveform Send by Host

Repeat Cnt	Intensity	Manual Trigger	Waveform Cutoff time	Retrigger Period
0x00	0xfe	0x03(Click)	0x00	0x00
0x00	0xfe	0x02(Stop)	0x00	0x00

Waveform Continuous

- for continuous waveform, host will send a waveform when the pen enter the texture(WAVEFORM_PENCILCONTINUOUS)

- during the pen in the texture's area, host will not send any waveform to pen, stop waveform (WAVEFORM_STOP) will send immediately after pen leave the texture's area

- Example: Haptic Pen Validation Tool – 3 Check Optional Waveform – Optional Continuous Waveforms

Waveform Send by Host

Repeat Cnt	Intensity	Manual Trigger	Waveform Cutoff time	Retrigger Period
0x00	0xfe	0x0A(Pencil_Conti)	0x00	0x00
0x00	0xfe	0x02	0x00	0x00

Microsoft Pen's Haptic Parameters

Index	DurationList	WaveformList
0x03	0x002d	0x1003(Click)
0x04	0x003c	0x1006(Press)
0x05	0x003c	0x1007(Release)
0x06	0x0023	0x1008(Hover)
0x07	0x0091	0x1009(Success)
0x08	0x00B9	0x100A(Error)
0x09	0x07CB	0x100B(Ink_Continuous)
0x0A	0x07CB	0x100C(Pencil_Continuous)
0x0B	0x07CB	0x100D(Marker_Continuous)
0x0C	0x07CB	0x100E(ChiselMarker_Continuous)
0x0D	0x07BC	0x100F(Brush_Continuous)
0x0E	0x07CB	0x1010(Eraser_Continuous)
0x0F	0x07BC	0x1011(Sparkle_Continuous)
…	…	…

Haptic Pen Validation Tool Log

- 2 Check Requirement Interactions – Inking and Interaction Feedback Test
- Test Scenario: During Ink Continuous Waveform will send a click waveform

ⓘ **Note**

The host at any time may request for a non-continuous waveform to be played. In that event, the pen should play it and then return to the state it was previously in.

Waveform Send by Host

Repeat Cnt	Intensity	Manual Trigger	Waveform Cutoff time	Retrigger Period
0x00	0xfe	0x09(Ink_Conti)	0x00	0x00
0x00	0xfe	0x03(Click)	0x00	0x00

so, after click waveform, pen will back to ink continuous waveform

Haptic Pen Validation Tool Log

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Gear Radio Electronics Corp.

- 4 Check Optional Interactions – Repeat Count Test

- Test Scenario: Click the Send Repeated Feedback button to verify the Click signal is played three times

- Host will send Click waveform with repeat count = 3, after click waveform host will send stop waveform

Waveform Send by Host

Repeat Cnt	Intensity	Manual Trigger	Waveform Cutoff time	Retrigger Period
0x03	0xfe	0x03(Click)	0x00	0x091
0x00	0xfe	0x02(Stop)	0x00	0x00

Haptic Pen Validation Tool Log

- 4 Check Optional Interactions – Retrigger Period Test

- Test Scenario: Click the test button to verify the Click signal is played three times with a one second between each

- similar with Repeat Count Test

Waveform Send by Host

Repeat Cnt	Intensity	Manual Trigger	Waveform Cutoff time	Retrigger Period
0x03	0xfe	0x03(Click)	0x00	0x0415
0x00	0xfe	0x02(Stop)	0x00	0x00