Request #: HUTRR90d
Title: Dockable Devices
Spec Release: 1.12
Received Date:
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Pages Affected: 0x01 Generic Desktop
Values checked: By Chair

Current Status: Approved
Priority: Normal

Required Voter: Wacom
Required Voter: Intel
Required Voter: Apple

Voting Begins: 25 September, 2019
Voting Ends: 1 October, 2019
Voting Result: 7-0-0 Yes-No-Abstain

Summary:

This Review Request adds usages for a Dockable Device collection, which describes a Dockable Device that can be physically attached ("docked") to the system. This also adds usages for a Device Dock collection, which is a device that can detect the presence of a Dockable Device that has been physically attached ("docked") to the system. This also adds support for related usages for the system to understand which device has been docked to the system and at what location.

Background:

In many computing systems, there are cases where a potentially non-HID Dockable Devices can be physically attached to a system or another device - whether for storage, to charge, or for ergonomic usage of the device relative to the needs of the computing system. While modern operating systems may be able to detect some elements of this attachment though device enumeration or ACPI information, there are use cases where rich information specific to the state of the Dockable Device's attachment to the system can be valuable.

For example, a digital pen which only communicates with a digitizer within a short range may not be able to communicate that it has been attached to a pen holder on the device for the system to update UI showing the pen has been connected. Other representations may disable a Dockable Device's connection to the host when placed in a dock to allow for reduced power consumption.

In other cases, the Device Dock itself may have access to information that the Dockable Device may not. In a system with a horizontal display, for example, it may be possible for a sensor to detect exactly where a Dockable Device or other object has been placed relative to the display, so that the system may adjust placement of UI around it, while the object itself is incapable of detecting or reporting this information.

Proposal:

All changes are localized to Chapter 4 Generic Desktop Page (0x01).

New usages to be added to Table 6: Generic Desktop Page

ID	Name	
0x11	Device Dock	CA
0x12	Dockable Device	CA
0xD0	Dockable Device Unique ID	DV
0xD1	Dockable Device Vendor ID	DV
0xD2	Dockable Device Primary Usage Page	DV
0xD3	Dockable Device Primary Usage ID	DV
0xD4	Dockable Device Docking State	DF
0xD5	Dockable Device Display Occlusion	CL

Additions referenced by the above usages, Section numbering per technical editor.

Device Dock	CA	A device that reports the presence of a Dockable Device physically attached to the system.
Dockable Device	CA	A device describing a Dockable Device that can be physically attached to the system.
Dockable Device Unique ID	DV	Specifies the unique ID identifying the device which has been docked. This is an optional usage - if the Dockable Device does not have a unique ID or the Device Dock is not capable of reading the Unique ID from the device, this would not be provided. If provided, the Unique ID must be unique for the vendor ID, specified by Dockable Device Vendor ID below. For example, this could contain the unique serial number of the Dockable Device or a product identifier if a serial number cannot be provided.
Dockable Device Vendor ID	DV	Specifies the USB-IF Vendor ID of the Dockable Device, used in combination with Dockable Device

		Unique ID to uniquely identify the device. This is an optional usage. If provided, this must be a 16-bit value.
Dockable Device Primary Usage Page	DV	Specifies the usage page of the primary top-level collection of the Dockable Device (in the case of a complex HID device), to allow the system to understand which Dockable Device has been docked. This is an optional usage - this can be useful in cases where the Dockable Device is not connected to the system, or is not capable of reporting a unique serial number, in conjunction with Dockable Device Primary Usage ID. For a Dockable Device with multiple HID top-level collections, the value of this usage is defined by the vendor.
Dockable Device Primary Usage ID	DV	Specifies the usage ID of the primary top-level collection of the Dockable Device (in the case of a complex HID device). This is an optional usage, used in conjunction with Dockable Device Primary Usage Page. For a Dockable Device with multiple HID top-level collections, the value of this usage is defined by the vendor.
Dockable Device Docking State	DF	A bit that indicates if the Dockable Device is currently attached to the system. This is a required usage. A report with this bit set would indicate the Dockable Device is physically attached to the system. A report with this bit cleared would indicate the Dockable Device has been physically detached from the system.
Dockable Device Display Occlusion	CL	A physical collection describing what portion of a display is occluded by the Device Dock. This collection is optional – it would not be reported if the supported Dockable Device cannot occlude the display. This collection could include values like X, Y, Width (in mm), Height (in mm), Azimuth, etc. for rectangular-shaped occlusions. Future usages could support other Dockable Device shapes.

Sample descriptors:

Device Dock :

The below descriptor describes a Device Dock collection which contains a single Input report which supports reporting the docking state of a Dockable Device with a rectangular-shaped display occlusion region.

```
0x05, HID_USAGE_PAGE_GENERIC,                          // USAGE_PAGE (Generic Desktop)
0x09, HID_USAGE_GENERIC_DEVICE_DOCK,                   // USAGE (Device Dock)
0xa1, 0x01,                                            // COLLECTION (Application)
0x85, 0x01,                                            // REPORT_ID (1)
0x05, HID_USAGE_PAGE_GENERIC,                          //   USAGE_PAGE (Generic Desktop)
0x09, HID_USAGE_GENERIC_DOCKABLE_DEVICE_UNIQUE_ID,     //   USAGE (Dockable Device Unique ID)
0x15, 0x00,                                            //   LOGICAL_MINIMUM (0)
0x26, 0xff, 0x00,                                      //   LOGICAL_MAXIMUM (255)
0x75, 0x08,                                            //   REPORT_SIZE (8)
0x95, 0x08,                                            //   REPORT_COUNT (8)
0x81, 0x03,                                            //   INPUT (Data,Ary,Abs)
0x09, HID_USAGE_GENERIC_DOCKABLE_DEVICE_VENDOR_ID,     //   USAGE (Dockable Device Vendor ID)
0x15, 0x00,                                            //   LOGICAL_MINIMUM (0)
0x27, 0xff, 0xff, 0x00, 0x00,                          //   LOGICAL_MAXIMUM (65535)
0x75, 0x10,                                            //   REPORT_SIZE (16)
0x95, 0x01,                                            //   REPORT_COUNT (1)
0x81, 0x02,                                            //   INPUT (Data,Var,Abs)
0x09, HID_USAGE_GENERIC_DOCKABLE_DEVICE_USAGEPAGE,     //   USAGE (Dockable Device Primary Usage Page)
0x81, 0x02,                                            //   INPUT (Data,Var,Abs)
0x09, HID_USAGE_GENERIC_DOCKABLE_DEVICE_USAGE,         //   USAGE (Dockable Device Primary Usage ID)
0x81, 0x02,                                            //   INPUT (Data,Var,Abs)
0x09, HID_USAGE_GENERIC_DOCKABLE_DEVICE_DOCKING_STATE,//   USAGE (Dockable Device Docking State)
0x15, 0x00,                                            //   LOGICAL_MINIMUM (0)
0x25, 0x01,                                            //   LOGICAL_MAXIMUM (1)
0x75, 0x01,                                            //   REPORT_SIZE (1)
0x95, 0x01,                                            //   REPORT_COUNT (1)
0x81, 0x02,                                            //   INPUT (Data,Var,Abs)
0x95, 0x07,                                            //   REPORT_COUNT (7)
0x81, 0x03,                                            //   INPUT (Cnst,Var,Abs)
0x09, HID_USAGE_GENERIC_DOCKABLE_DEVICE_DISPLAY_OCCLUSION, //   USAGE (Dockable Device Display Occlusion)
0xa1, 0x00,                                            //   COLLECTION (Physical)
0x05, HID_USAGE_PAGE_GENERIC,                          //     USAGE_PAGE (Generic Desktop)
0x09, HID_USAGE_GENERIC_X,                             //     USAGE (X)
0x15, 0x00,                                            //     LOGICAL_MINIMUM (0)
0x26, 0xff, 0x7f,                                      //     LOGICAL_MAXIMUM (32767)
0x35, 0x00,                                            //     PHYSICAL_MINIMUM (0)
0x46, DISPLAY_WIDTH_HM,                                //     PHYSICAL_MAXIMUM (Display Width)
0x55, 0x0d,                                            //     UNIT_EXPONENT (-3)
0x65, 0x11,                                            //     UNIT (Cm,EngLinear)
0x75, 0x10,                                            //     REPORT_SIZE (16)
0x95, 0x01,                                            //     REPORT_COUNT (1)
0x81, 0x02,                                            //     INPUT (Data,Var,Abs)
0x09, HID_USAGE_GENERIC_Y,                             //     USAGE (Y)
0x46, DISPLAY_HEIGHT_HM,                               //     PHYSICAL_MAXIMUM (Display Height)
0x81, 0x02,                                            //     INPUT (Data,Var,Abs)
0x05, HID_USAGE_PAGE_DIGITIZER,                        //     USAGE_PAGE (Digitizer)
0x09, HID_USAGE_DIGITIZER_WIDTH,                       //     USAGE (Width)
0x26, 0x00, 0x80,                                      //     LOGICAL_MAXIMUM (32768)
0x46, DISPLAY_WIDTH_HM,                                //     PHYSICAL_MAXIMUM (Display Width)
0x81, 0x02,                                            //     INPUT (Data,Var,Abs)
0x09, HID_USAGE_DIGITIZER_HEIGHT,                      //     USAGE (Height)
0x46, DISPLAY_HEIGHT_HM,                               //     PHYSICAL_MAXIMUM (Display Height)
0x81, 0x02,                                            //     INPUT (Data,Var,Abs)
0xc0,                                                  //   END_COLLECTION
0xc0                                                   // END_COLLECTION
```

Dockable Device :

The following descriptor describes a Dockable Device collection which contains a single Feature report containing its Unique ID, Vendor ID, Primary Usage Page, and Primary Usage ID. This can be used by the host to identify the specific Dockable Device that docked.

```
0x05, HID_USAGE_PAGE_GENERIC,                          // USAGE_PAGE (Generic Desktop)
0x09, HID_USAGE_GENERIC_DOCKABLE_DEVICE,               // USAGE (Dockable Device)
0xa1, 0x01,                                            // COLLECTION (Application)
0x85, 0x01,                                            // REPORT_ID (1)
0x05, HID_USAGE_PAGE_GENERIC,                          //   USAGE_PAGE (Generic Desktop)
0x09, HID_USAGE_GENERIC_DOCKABLE_DEVICE_UNIQUE_ID,     //   USAGE (Dockable Device Unique ID)
0x15, 0x00,                                            //   LOGICAL_MINIMUM (0)
0x26, 0xff, 0x00,                                      //   LOGICAL_MAXIMUM (255)
0x75, 0x08,                                            //   REPORT_SIZE (8)
0x95, 0x08,                                            //   REPORT_COUNT (8)
0xb1, 0x03,                                            //   FEATURE (Data,Ary,Abs)
0x09, HID_USAGE_GENERIC_DOCKABLE_DEVICE_VENDOR_ID,     //   USAGE (Dockable Device Vendor ID)
0x15, 0x00,                                            //   LOGICAL_MINIMUM (0)
0x27, 0xff, 0xff, 0x00, 0x00,                          //   LOGICAL_MAXIMUM (65535)
0x75, 0x10,                                            //   REPORT_SIZE (16)
0x95, 0x01,                                            //   REPORT_COUNT (1)
0xb1, 0x02,                                            //   FEATURE (Data,Var,Abs)
0x09, HID_USAGE_GENERIC_DOCKABLE_DEVICE_USAGEPAGE,     //   USAGE (Dockable Device Primary Usage Page)
0xb1, 0x02,                                            //   FEATURE (Data,Var,Abs)
0x09, HID_USAGE_GENERIC_DOCKABLE_DEVICE_USAGE,         //   USAGE (Dockable Device Primary Usage ID)
0xb1, 0x02,                                            //   FEATURE (Data,Var,Abs)
0xc0                                                   // END_COLLECTION
```

Response:
