

Request #: HUTRR82  
Title: Additional Sensor Usages  
Spec Release: 1.12  
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Priority: Normal  
Submitted: 25 Feb 2018  
Voting Starts: 14 Mar 2018  
Voting Ends: 21 Mar 2018  
Required Voter: Intel  
Required Voter: Microsoft  
Required Voter: Wacom  
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**Summary:**

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We propose the addition of new usages to the Sensor Page, to support various sensors which have recently become available on computing devices.

**Background:**

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Provide background information around the problem and how changes to the HID Usage Tables will solve the problem.

**Proposal:**

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**1. Object Presence and Object Proximity**

Add the following two new usages to the Sensors Usage Page, in section 1.0, page 8

Usage ID	Usage Name	Usage Type
3A	Environmental: Object Presence	CA,CP
3B	Environmental: Object Proximity	CA,CP

Omit 3A and 3B from Environmental: Reserved

Add the following to section 1.1, page 21

Environmental: Object Presence	CA,CP – An application-level of physical collection that identifies a device that detects object presence (Boolean yes or no)
Environmental: Object Proximity	CA,CP – An application-level or physical collection that identifies a device that detects object proximity (range of values)

Add the following to section 4.1, page 71

```
#define HID_USAGE_SENSOR_TYPE_ENVIRONMENTAL_OBJECT_PRESENCE           0x09,0x3A
#define HID_USAGE_SENSOR_TYPE_ENVIRONMENTAL_OBJECT_PROXIMITY         0x09,0x3B
```

Add the following to section 1.0, page 14

Usage ID	Usage Name	Usage Type
043A	Data Field: Object Presence	SF
043B	Data Field: Object Proximity Range (default Unit: meters)	SV
043C	Data Field: Object Proximity Out of Range	SF

Omit 043A, 043B, 043C from Data Field: Environmental Reserved

Add the following to table in section 1.8, page 31:

Object Presence	SF – TRUE when an object presence is detected by the computing device, otherwise FALSE
Object Proximity Range	SV – Measures the distance between an object and the computing device. Default unit of measure is meters; can be overridden using explicit Unit and/or Unit Exponent.
Object Proximity Out of Range	SF - TRUE when the sensor measuring object proximity range indicates “out of range” meaning the value provided as Object Proximity Range may not be accurate

Add the following to section 4.1, page 75:

```
#define HID_USAGE_SENSOR_DATA_ENVIRONMENTAL_OBJECT_PRESENCE           0x0A,0x3A,0x04
#define HID_USAGE_SENSOR_DATA_ENVIRONMENTAL_OBJECT_PROXIMITY_RANGE     0x0A,0x3B,0x04
#define HID_USAGE_SENSOR_DATA_ENVIRONMENTAL_OBJECT_PROXIMITY_OUT_OF_RANGE 0x0A,0x3C,0x04
```

Add the following to section 4.3, page 151:

### Illustration of sensor Environmental: Object Presence

```
// For reference: Complete HID report descriptor
const unsigned char pres_report_descriptor[] = {
    HID_USAGE_PAGE_SENSOR,
    HID_USAGE_SENSOR_TYPE_ENVIRONMENTAL_OBJECT_PRESENCE,
    HID_COLLECTION(Physical),

    // feature reports (xmit/receive)
    HID_USAGE_PAGE_SENSOR,
    HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE,
    HID_LOGICAL_MIN_8(0),
    HID_LOGICAL_MAX_8(5),
    HID_REPORT_SIZE(8),
    HID_REPORT_COUNT(1),
    HID_COLLECTION(Logical),
        HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_NO_EVENTS,
        HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_ALL_EVENTS,
        HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_THRESHOLD_EVENTS,
        HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_NO_EVENTS_WAKE,
        HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_ALL_EVENTS_WAKE,
        HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_THRESHOLD_EVENTS_WAKE,
        HID_FEATURE(Data_Arr_Abs),
    HID_END_COLLECTION,
    HID_USAGE_SENSOR_PROPERTY_SENSOR_STATUS,
    HID_LOGICAL_MIN_8(0),
    HID_LOGICAL_MAX_32(0xFF,0xFF,0xFF,0xFF),
    HID_REPORT_SIZE(32),
    HID_REPORT_COUNT(1),
    HID_FEATURE(Data_Var_Abs), // up to VT_UI4 worth of status info
    HID_USAGE_SENSOR_PROPERTY_REPORT_INTERVAL,
    HID_LOGICAL_MIN_8(0),
    HID_LOGICAL_MAX_32(0xFF,0xFF,0xFF,0xFF),
    HID_REPORT_SIZE(32),
}
```

```

HID_REPORT_COUNT(1),
// HID_USAGE_SENSOR_UNITS_MILLISECOND,
HID_UNIT_EXPONENT(0),
HID_FEATURE(Data_Var_Abs),
HID_USAGE_SENSOR_PROPERTY_SENSOR_CONNECTION_TYPE, // NArY
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_8(2),
HID_REPORT_SIZE(8),
HID_REPORT_COUNT(1),
HID_COLLECTION(Logical),
    HID_USAGE_SENSOR_PROPERTY_CONNECTION_TYPE_PC_INTEGRATED,
    HID_USAGE_SENSOR_PROPERTY_CONNECTION_TYPE_PC_ATTACHED,
    HID_USAGE_SENSOR_PROPERTY_CONNECTION_TYPE_PC_EXTERNAL,
    HID_FEATURE(Const_Arr_Abs),
HID_END_COLLECTION,

//input reports (transmit)
HID_USAGE_PAGE_SENSOR,
HID_USAGE_SENSOR_STATE,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_8(6),
HID_REPORT_SIZE(8),
HID_REPORT_COUNT(1),
HID_COLLECTION(Logical),
    HID_USAGE_SENSOR_STATE_UNKNOWN,
    HID_USAGE_SENSOR_STATE_READY,
    HID_USAGE_SENSOR_STATE_NOT_AVAILABLE,
    HID_USAGE_SENSOR_STATE_NO_DATA,
    HID_USAGE_SENSOR_STATE_INITIALIZING,
    HID_USAGE_SENSOR_STATE_ACCESS_DENIED,
    HID_USAGE_SENSOR_STATE_ERROR,
    HID_INPUT(Const_Arr_Abs),
HID_END_COLLECTION,
HID_USAGE_SENSOR_EVENT,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_8(16),
HID_REPORT_SIZE(8),
HID_REPORT_COUNT(1),
HID_COLLECTION(Logical),
    HID_USAGE_SENSOR_EVENT_UNKNOWN,
    HID_USAGE_SENSOR_EVENT_STATE_CHANGED,
    HID_USAGE_SENSOR_EVENT_PROPERTY_CHANGED,
    HID_USAGE_SENSOR_EVENT_DATA_UPDATED,
    HID_USAGE_SENSOR_EVENT_POLL_RESPONSE,
    HID_USAGE_SENSOR_EVENT_CHANGE_SENSITIVITY,
    HID_USAGE_SENSOR_EVENT_MAX_REACHED,
    HID_USAGE_SENSOR_EVENT_MIN_REACHED,
    HID_USAGE_SENSOR_EVENT_HIGH_THRESHOLD_CROSS_UPWARD,
    HID_USAGE_SENSOR_EVENT_HIGH_THRESHOLD_CROSS_DOWNWARD,
    HID_USAGE_SENSOR_EVENT_LOW_THRESHOLD_CROSS_UPWARD,
    HID_USAGE_SENSOR_EVENT_LOW_THRESHOLD_CROSS_DOWNWARD,
    HID_USAGE_SENSOR_EVENT_ZERO_THRESHOLD_CROSS_UPWARD,
    HID_USAGE_SENSOR_EVENT_ZERO_THRESHOLD_CROSS_DOWNWARD,
    HID_USAGE_SENSOR_EVENT_PERIOD_EXCEEDED,
    HID_USAGE_SENSOR_EVENT_FREQUENCY_EXCEEDED,
    HID_USAGE_SENSOR_EVENT_COMPLEX_TRIGGER,
    HID_INPUT(Const_Arr_Abs),
HID_END_COLLECTION,
HID_USAGE_SENSOR_DATA_ENVIRONMENTAL_OBJECT_PRESENCE,
HID_LOGICAL_MIN_8(0), // False
HID_LOGICAL_MAX_8(1), // True
HID_REPORT_SIZE(8),
HID_REPORT_COUNT(1),
HID_INPUT(Const_Var_Abs),

HID_END_COLLECTION
};

```

## Illustration of sensor Environmental: Object Proximity

```

// For reference: Complete HID report descriptor
const unsigned char pres_report_descriptor[] = {
    HID_USAGE_PAGE_SENSOR,
    HID_USAGE_SENSOR_TYPE_ENVIRONMENTAL_OBJECT_PROXIMITY,
    HID_COLLECTION(Physical),

```

```

// feature reports (xmit/receive)
HID_USAGE_PAGE_SENSOR,
HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_8(5),
HID_REPORT_SIZE(8),
HID_REPORT_COUNT(1),
HID_COLLECTION(Logical),
    HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_NO_EVENTS,
    HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_ALL_EVENTS,
    HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_THRESHOLD_EVENTS,
    HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_NO_EVENTS_WAKE,
    HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_ALL_EVENTS_WAKE,
    HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_THRESHOLD_EVENTS_WAKE,
    HID_FEATURE(Data_Arr_Abs),
HID_END_COLLECTION,
HID_USAGE_SENSOR_PROPERTY_SENSOR_STATUS,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_32(0xFF,0xFF,0xFF,0xFF),
HID_REPORT_SIZE(32),
HID_REPORT_COUNT(1),
HID_FEATURE(Data_Var_Abs), // up to VT_UI4 worth of status info
HID_USAGE_SENSOR_PROPERTY_REPORT_INTERVAL,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_32(0xFF,0xFF,0xFF,0xFF),
HID_REPORT_SIZE(32),
HID_REPORT_COUNT(1),
// HID_USAGE_SENSOR_UNITS_MILLISECOND,
HID_UNIT_EXPONENT(0),
HID_FEATURE(Data_Var_Abs),
HID_USAGE_SENSOR_PROPERTY_SENSOR_CONNECTION_TYPE, // NArY
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_8(2),
HID_REPORT_SIZE(8),
HID_REPORT_COUNT(1),
HID_COLLECTION(Logical),
    HID_USAGE_SENSOR_PROPERTY_CONNECTION_TYPE_PC_INTEGRATED,
    HID_USAGE_SENSOR_PROPERTY_CONNECTION_TYPE_PC_ATTACHED,
    HID_USAGE_SENSOR_PROPERTY_CONNECTION_TYPE_PC_EXTERNAL,
    HID_FEATURE(Const_Arr_Abs),
HID_END_COLLECTION,
HID_USAGE_SENSOR_PROPERTY_CHANGE_SENSITIVITY_ABS,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_16(0xFF,0xFF),
HID_REPORT_SIZE(16),
HID_REPORT_COUNT(1),
// HID_USAGE_SENSOR_UNITS_METER,
HID_UNIT_EXPONENT(0x0D), // scale default unit "meter" to "centimeter" to provide 2 digits past decimal point
HID_FEATURE(Data_Var_Abs),
HID_USAGE_SENSOR_DATA(HID_USAGE_SENSOR_DATA_ENVIRONMENTAL_OBJECT_PROXIMITY_RANGE,HID_USAGE_SENSOR_DATA_MOD_MAX),
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_16(0xFF,0xFF),
HID_REPORT_SIZE(16),
HID_REPORT_COUNT(1),
// HID_USAGE_SENSOR_UNITS_METER,
HID_UNIT_EXPONENT(0x0D), // scale default unit "meter" to "centimeter" to provide 2 digits past decimal point
HID_FEATURE(Data_Var_Abs),
HID_USAGE_SENSOR_DATA(HID_USAGE_SENSOR_DATA_ENVIRONMENTAL_OBJECT_PROXIMITY_RANGE,HID_USAGE_SENSOR_DATA_MOD_MIN),
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_16(0xFF,0xFF),
HID_REPORT_SIZE(16),
HID_REPORT_COUNT(1),
// HID_USAGE_SENSOR_UNITS_METER,
HID_UNIT_EXPONENT(0x0D), // scale default unit "meter" to "centimeter" to provide 2 digits past decimal point
HID_FEATURE(Data_Var_Abs),

//input reports (transmit)
HID_USAGE_PAGE_SENSOR,
HID_USAGE_SENSOR_STATE,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_8(6),
HID_REPORT_SIZE(8),
HID_REPORT_COUNT(1),
HID_COLLECTION(Logical),
    HID_USAGE_SENSOR_STATE_UNKNOWN,

```

```

        HID_USAGE_SENSOR_STATE_READY,
        HID_USAGE_SENSOR_STATE_NOT_AVAILABLE,
        HID_USAGE_SENSOR_STATE_NO_DATA,
        HID_USAGE_SENSOR_STATE_INITIALIZING,
        HID_USAGE_SENSOR_STATE_ACCESS_DENIED,
        HID_USAGE_SENSOR_STATE_ERROR,
        HID_INPUT(Const_Arr_Abs),
    HID_END_COLLECTION,
    HID_USAGE_SENSOR_EVENT,
    HID_LOGICAL_MIN_8(0),
    HID_LOGICAL_MAX_8(16),
    HID_REPORT_SIZE(8),
    HID_REPORT_COUNT(1),
    HID_COLLECTION(Logical),
        HID_USAGE_SENSOR_EVENT_UNKNOWN,
        HID_USAGE_SENSOR_EVENT_STATE_CHANGED,
        HID_USAGE_SENSOR_EVENT_PROPERTY_CHANGED,
        HID_USAGE_SENSOR_EVENT_DATA_UPDATED,
        HID_USAGE_SENSOR_EVENT_POLL_RESPONSE,
        HID_USAGE_SENSOR_EVENT_CHANGE_SENSITIVITY,
        HID_USAGE_SENSOR_EVENT_MAX_REACHED,
        HID_USAGE_SENSOR_EVENT_MIN_REACHED,
        HID_USAGE_SENSOR_EVENT_HIGH_THRESHOLD_CROSS_UPWARD,
        HID_USAGE_SENSOR_EVENT_HIGH_THRESHOLD_CROSS_DOWNWARD,
        HID_USAGE_SENSOR_EVENT_LOW_THRESHOLD_CROSS_UPWARD,
        HID_USAGE_SENSOR_EVENT_LOW_THRESHOLD_CROSS_DOWNWARD,
        HID_USAGE_SENSOR_EVENT_ZERO_THRESHOLD_CROSS_UPWARD,
        HID_USAGE_SENSOR_EVENT_ZERO_THRESHOLD_CROSS_DOWNWARD,
        HID_USAGE_SENSOR_EVENT_PERIOD_EXCEEDED,
        HID_USAGE_SENSOR_EVENT_FREQUENCY_EXCEEDED,
        HID_USAGE_SENSOR_EVENT_COMPLEX_TRIGGER,
        HID_INPUT(Const_Arr_Abs),
    HID_END_COLLECTION,
    HID_USAGE_SENSOR_DATA_ENVIRONMENTAL_OBJECT_PROXIMITY_OUT_OF_RANGE,
    HID_LOGICAL_MIN_8(0), // False
    HID_LOGICAL_MAX_8(1), // True
    HID_REPORT_SIZE(8),
    HID_REPORT_COUNT(1),
    HID_INPUT(Const_Var_Abs),
    HID_USAGE_SENSOR_DATA_ENVIRONMENTAL_OBJECT_PROXIMITY_RANGE,
    HID_LOGICAL_MIN_8(0),
    HID_LOGICAL_MAX_16(0xFF,0xFF),
    HID_REPORT_SIZE(16),
    HID_REPORT_COUNT(1),
    // HID_USAGE_SENSOR_UNITS_METER,
    HID_UNIT_EXPONENT(0x0D), // scale default unit "meter" to "centimeter" to provide 2 digits past decimal point
    HID_INPUT(Const_Var_Abs),

    HID_END_COLLECTION
};

```

## 2. Auto Brightness Preferred and Auto Color Preferred

Add the following new property to the Sensors Usage Page, in section 1.0, page 16

Usage ID	Usage Name	Usage Type
04E2	Property: Auto Brightness Preferred	DF
04E3	Property: Auto Color Preferred	DF

Omit 04E4 from Property: Light Reserved

Add the following to section 1.9, page 32

Property: Auto Brightness Preferred	DF – TRUE when this light sensor is preferred to be used for system auto brightness usage, otherwise FALSE
Property: Auto Color Preferred	DF – TRUE when this light sensor is preferred to be used for system auto color usage, otherwise FALSE

Add the following to section 4.1, page 75:

```
#define HID_USAGE_SENSOR_PROPERTY_AUTO_BRIGHTNESS_PREFERRED
#define HID_USAGE_SENSOR_PROPERTY_AUTO_COLOR_PREFERRED
```

```
0x0A,0xE2,0x04
0x0A,0xE3,0x04
```

### 3. NIR (Near Infra-Red)

Add the following new data field to the Sensors Usage Page, in section 1.0, page 15

Usage ID	Usage Name	Usage Type
04DE	Data Field: Near Infrared Light (default Units: W/mm <sup>2</sup> )	SV

Omit 04DE from Data Field: Light Reserved

Add the following to section 1.9, page 32

Near Infrared Light	SV – Measures the amount of infrared light (wavelength of approximately 700nm to 1mm). Default unit of measure is W/mm <sup>2</sup> , can be overridden using explicit Unit and/or Unit Exponent.
---------------------	---

Add the following to section 4.1, page 75:

```
#define HID_USAGE_SENSOR_DATA_NEAR_INFRARED_LIGHT
```

```
0x0A,0xDE,0x04
```

Add the following to section 4.3.12, page 119:

```
// For reference: Complete HID report descriptor
const unsigned char als_report_descriptor[] = {
    HID_USAGE_PAGE_SENSOR, // USAGE_PAGE (Sensor)
    HID_USAGE_SENSOR_TYPE_LIGHT_AMBIENTLIGHT, // USAGE (AmbientLight)
    HID_COLLECTION(Physical),

    //feature reports (xmit/receive)
    HID_USAGE_PAGE_SENSOR,
    HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE,
    HID_LOGICAL_MIN_8(0),
    HID_LOGICAL_MAX_8(5),
    HID_REPORT_SIZE(8),
    HID_REPORT_COUNT(1),
    HID_COLLECTION(Logical),
        HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_NO_EVENTS,
        HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_ALL_EVENTS,
        HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_THRESHOLD_EVENTS,
        HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_NO_EVENTS_WAKE,
        HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_ALL_EVENTS_WAKE,
        HID_USAGE_SENSOR_PROPERTY_REPORTING_STATE_THRESHOLD_EVENTS_WAKE,
        HID_FEATURE(Data_Arr_Abs),
    HID_END_COLLECTION,
    HID_USAGE_SENSOR_PROPERTY_SENSOR_STATUS,
    HID_LOGICAL_MIN_8(0),
    HID_LOGICAL_MAX_32(0xFF,0xFF,0xFF,0xFF),
    HID_REPORT_SIZE(32),
    HID_REPORT_COUNT(1),
    HID_FEATURE(Data_Var_Abs), // up to VT_UI4 worth of status info
    HID_USAGE_SENSOR_PROPERTY_REPORT_INTERVAL,
    HID_LOGICAL_MIN_8(0),
    HID_LOGICAL_MAX_32(0xFF,0xFF,0xFF,0xFF),
    HID_REPORT_SIZE(32),
    HID_REPORT_COUNT(1),
    // HID_USAGE_SENSOR_UNITS_MILLISECOND,
    HID_UNIT_EXPONENT(0),
    HID_FEATURE(Data_Var_Abs),
    HID_USAGE_SENSOR_PROPERTY_SENSOR_CONNECTION_TYPE, // NArY
    HID_LOGICAL_MIN_8(0),
    HID_LOGICAL_MAX_8(2),
    HID_REPORT_SIZE(8),
    HID_REPORT_COUNT(1),
    HID_COLLECTION(Logical),
        HID_USAGE_SENSOR_PROPERTY_CONNECTION_TYPE_PC_INTEGRATED,
        HID_USAGE_SENSOR_PROPERTY_CONNECTION_TYPE_PC_ATTACHED,
```

```

        HID_USAGE_SENSOR_PROPERTY_CONNECTION_TYPE_PC_EXTERNAL,
HID_FEATURE(Const_Arr_Abs),
HID_END_COLLECTION,
HID_USAGE_SENSOR_PROPERTY_CHANGE_SENSITIVITY_REL_PCT,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_16(0x10,0x27), // 10000 = 0.00 to 100.00 percent with 2 digits past decimal point
HID_REPORT_SIZE(16),
HID_REPORT_COUNT(1),
// HID_USAGE_SENSOR_UNITS_PERCENT,
HID_UNIT_EXPONENT(0x0E), // scale default unit to provide 2 digits past decimal point
HID_FEATURE(Data_Var_Abs),
HID_USAGE_SENSOR_DATA(HID_USAGE_SENSOR_DATA_LIGHT_ILLUMINANCE,HID_USAGE_SENSOR_DATA_MOD_MAX),
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_16(0xFF,0xFF),
HID_REPORT_SIZE(16),
HID_REPORT_COUNT(1),
HID_USAGE_SENSOR_UNITS_LUX,
HID_UNIT_EXPONENT(0x0F), // scale default unit to provide 1 digit past decimal point
HID_FEATURE(Data_Var_Abs),
HID_USAGE_SENSOR_DATA(HID_USAGE_SENSOR_DATA_LIGHT_ILLUMINANCE,HID_USAGE_SENSOR_DATA_MOD_MIN),
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_16(0xFF,0xFF),
HID_REPORT_SIZE(16),
HID_REPORT_COUNT(1),
HID_USAGE_SENSOR_UNITS_LUX,
HID_UNIT_EXPONENT(0x0F), // scale default unit to provide 1 digit past decimal point
HID_FEATURE(Data_Var_Abs),
HID_USAGE_SENSOR_PROPERTY_AUTO_BRIGHTNESS_PREFERRED,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_8(1),
HID_REPORT_SIZE(8),
HID_REPORT_COUNT(1),
HID_UNIT_EXPONENT(0),
HID_FEATURE(Data_Var_Abs),
HID_USAGE_SENSOR_PROPERTY_AUTO_COLOR_PREFERRED,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_8(1),
HID_REPORT_SIZE(8),
HID_REPORT_COUNT(1),
HID_UNIT_EXPONENT(0),
HID_FEATURE(Data_Var_Abs),

//input reports (transmit)
HID_USAGE_PAGE_SENSOR,
HID_USAGE_SENSOR_STATE,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_8(6),
HID_REPORT_SIZE(8),
HID_REPORT_COUNT(1),
HID_COLLECTION(Logical),
    HID_USAGE_SENSOR_STATE_UNKNOWN,
    HID_USAGE_SENSOR_STATE_READY,
    HID_USAGE_SENSOR_STATE_NOT_AVAILABLE,
    HID_USAGE_SENSOR_STATE_NO_DATA,
    HID_USAGE_SENSOR_STATE_INITIALIZING,
    HID_USAGE_SENSOR_STATE_ACCESS_DENIED,
    HID_USAGE_SENSOR_STATE_ERROR,
    HID_INPUT(Const_Arr_Abs),
HID_END_COLLECTION,
HID_USAGE_SENSOR_EVENT,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_8(16),
HID_REPORT_SIZE(8),
HID_REPORT_COUNT(1),
HID_COLLECTION(Logical),
    HID_USAGE_SENSOR_EVENT_UNKNOWN,
    HID_USAGE_SENSOR_EVENT_STATE_CHANGED,
    HID_USAGE_SENSOR_EVENT_PROPERTY_CHANGED,
    HID_USAGE_SENSOR_EVENT_DATA_UPDATED,
    HID_USAGE_SENSOR_EVENT_POLL_RESPONSE,
    HID_USAGE_SENSOR_EVENT_CHANGE_SENSITIVITY,
    HID_USAGE_SENSOR_EVENT_MAX_REACHED,
    HID_USAGE_SENSOR_EVENT_MIN_REACHED,
    HID_USAGE_SENSOR_EVENT_HIGH_THRESHOLD_CROSS_UPWARD,
    HID_USAGE_SENSOR_EVENT_HIGH_THRESHOLD_CROSS_DOWNWARD,

```

```

HID_USAGE_SENSOR_EVENT_LOW_THRESHOLD_CROSS_UPWARD,
HID_USAGE_SENSOR_EVENT_LOW_THRESHOLD_CROSS_DOWNWARD,
HID_USAGE_SENSOR_EVENT_ZERO_THRESHOLD_CROSS_UPWARD,
HID_USAGE_SENSOR_EVENT_ZERO_THRESHOLD_CROSS_DOWNWARD,
HID_USAGE_SENSOR_EVENT_PERIOD_EXCEEDED,
HID_USAGE_SENSOR_EVENT_FREQUENCY_EXCEEDED,
HID_USAGE_SENSOR_EVENT_COMPLEX_TRIGGER,
HID_INPUT(Const_Arr_Abs),
HID_END_COLLECTION,
HID_USAGE_SENSOR_DATA_LIGHT_ILLUMINANCE,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_16(0xFF,0xFF),
HID_UNIT_EXPONENT(0x0F), // scale default unit to provide 1 digit past decimal point
HID_REPORT_SIZE(16),
HID_REPORT_COUNT(1),
HID_INPUT(Const_Var_Abs),
HID_USAGE_SENSOR_DATA_LIGHT_COLOR_TEMPERATURE,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_16(0xFF,0xFF),
HID_USAGE_SENSOR_UNITS_KELVIN,
HID_UNIT_EXPONENT(0),
HID_REPORT_SIZE(16),
HID_REPORT_COUNT(1),
HID_INPUT(Const_Var_Abs),
HID_USAGE_SENSOR_DATA_LIGHT_CHROMATICITY_X,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_16(0xFF,0xFF),
HID_USAGE_SENSOR_UNITS_NOT_SPECIFIED,
HID_UNIT_EXPONENT(0x0C), // scale default unit to provide 4 digits past decimal point
HID_REPORT_SIZE(16),
HID_REPORT_COUNT(1),
HID_INPUT(Const_Var_Abs),
HID_USAGE_SENSOR_DATA_LIGHT_CHROMATICITY_Y,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_16(0xFF,0xFF),
HID_USAGE_SENSOR_UNITS_NOT_SPECIFIED,
HID_UNIT_EXPONENT(0x0C), // scale default unit to provide 4 digits past decimal point
HID_REPORT_SIZE(16),
HID_REPORT_COUNT(1),
HID_INPUT(Const_Var_Abs),
HID_USAGE_SENSOR_DATA_NEAR_INFRARED_LIGHT,
HID_LOGICAL_MIN_8(0),
HID_LOGICAL_MAX_16(0xFF,0xFF),
HID_UNIT_EXPONENT(0),
HID_REPORT_SIZE(16),
HID_REPORT_COUNT(1),
HID_INPUT(Const_Var_Abs),
HID_END_COLLECTION
};

```

#### 4. IsPrimary

Add the following new property to the Sensors Usage Page, in section 1.0, page 12

Usage ID	Usage Name	Usage Type
031E	Property: Is Primary	DF

Omit 031E from Property: Reserved

Add the following to section 1.5, page 30

Property: Is Primary	DF – used in multiple sensor in same type, operating system can use this property to tell whether this sensor is primary: TRUE if it is primary, otherwise FALSE
----------------------	--

Add the following to section 4.1, page 74:

```
#define HID_USAGE_SENSOR_PROPERTY_IS_PRIMARY
```

```
0x0A,0x1E,0x03
```



## 5. Custom Properties

Add the following new property to the Sensors Usage Page, in section 1.0, page 20

Usage ID	Usage Name	Usage Type
(These Properties are commonly used by all Sensors)		
05C0	Property: Custom	
05C1	Property: Custom Value 1	DV
05C2	Property: Custom Value 2	DV
05C3	Property: Custom Value 3	DV
05C4	Property: Custom Value 4	DV
05C5	Property: Custom Value 5	DV
05C6	Property: Custom Value 6	DV
05C7	Property: Custom Value 7	DV
05C8	Property: Custom Value 8	DV
05C9	Property: Custom Value 9	DV
05CA	Property: Custom Value 10	DV
05CB	Property: Custom Value 11	DV
05CC	Property: Custom Value 12	DV
05CD	Property: Custom Value 13	DV
05CE	Property: Custom Value 14	DV
05CF	Property: Custom Value 15	DV
05D0	Property: Custom Value 16	DV
05D1-05DF	Property: Custom Reserved	

Omit 05C0-05DF in Reserved for future use as Sensor Types, Data Fields and Properties

Create new section 1.19, in page 44, as “Custom Properties”

Property: Custom Value 1	DV – A first custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 2	DV – A second custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 3	DV – A third custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 4	DV – A fourth custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 5	DV – A fifth custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 6	DV – A sixth custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 7	DV – A seventh custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 8	DV – An eighth custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 9	DV – A ninth custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 10	DV – A tenth custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.

Property: Custom Value 11	DV – An eleventh custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 12	DV – A twelfth custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 13	DV – A thirteenth custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 14	DV – A fourteenth property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 15	DV – A fifteenth custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.
Property: Custom Value 16	DV – A sixteenth custom property value. Units are specified by the Units usage and scaling by the Unit Exponent usage.

**Response:**

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<Added by HID Chair upon closing the Request>

**Notes on Approval Procedure:**

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HID WG On Line Voting Procedures

1. Votes are on a per company basis.
  
2. Each Review Request shall have attached a Required Voter List that is the result of recruiting by the HID Chair and submitter of members of the USB IF. Required Voter List must include the HID Chair plus 2 companies (other than the submitter) plus any others designated by the HID Chair at the Chair's discretion. The Required Voter List ensures that a quorum is available to approve the Request.
  
3. Impose a 7-calendar-day posting time limit for new Review Requests. HID Chair or designate must post the RR within 7 calendar days. HID Chair or designate must work with the submitter to make sure the request is valid prior to posting. Valid review request must include all fields marked as required in the template. A new template will be adopted that requires at least the following fields: Change Text, Required Voter List, Review Period End Date and Voting End Date, Submittal Date, Submitter, Review Request Title and RR Number.
  
4. If a RR approval process stalls, the HID Chair may call a face-to-face meeting or conference call to decide the issue. Submitter may request that this take place.
  
5. Impose a minimum 15-calendar-day review period on a posted RR prior to the

voting period. At HID Chair discretion, changes to the RR may require this review period to restart.

6. The Chair will accept votes via documentable means such as mail or e-mail during the 7 calendar days after the close of the review period. If a Required Voter does not vote during the period, then there is no quorum and the Chair may pursue the absent required voter and extend the voting period. The Chair may designate a substitute for the absent voter and extend the voting period if necessary.