Logitech UVC Driver Public Property Sets: Specification

Beta version

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Logitech

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1 Introduction

1.1 Purpose

This document covers those property sets exposed by the Logitech UVC driver that are openly accessible and designed for use by third party developers.

Please do *not* contact Logitech customer support with questions about the content of this document. Instead you are invited to post any questions or feedback in the *Webcam development* section of the QuickCam Team Forums:

http://forums.quickcamteam.net/

1.2 Revision history

Revision 3	2009-06-24	Initial version for the public

1.3 Disclaimer

The information in this document is provided “as is” and is subject to the QuickCam Team Terms of Use which can be found at the following URL:

http://www.quickcamteam.net/

Logitech does not provide any support for the use of the information or code samples contained in this document.

All information is subject to change without prior announcement. Please also keep in mind that the implementation status may vary from one driver version to another.

2 Property sets

This section contains a list of all property sets that are exposed by the Logitech UVC driver and are designed for use by third party developers.

2.1 Camera Control

The Logitech UVC driver supports the Camera Control property set that is defined in the Windows SDK and Windows Driver Kit documentation:

IAMCameraControl
http://msdn.microsoft.com/en-us/library/dd389145.aspx

PROPSETID_VIDCAP_CAMERACONTROL
http://msdn.microsoft.com/en-us/library/aa510754.aspx

The following table lists each property contained in the property set together with its support status. Please note that a status of 'supported' means that the driver implements the property, but whether or not it is supported for a given camera also depends on other factors, such as the camera's capabilities. Certain of these factors are mentioned in the table but the list is not complete.

Property	***Status***
KSPROPERTY_CAMERACONTROL_EXPOSURE	supported
KSPROPERTY_CAMERACONTROL_FOCUS	supported (if device has a focus motor)
KSPROPERTY_CAMERACONTROL_IRIS	supported
KSPROPERTY_CAMERACONTROL_ZOOM	not supported
KSPROPERTY_CAMERACONTROL_PAN	supported (if device supports hardware pan)
KSPROPERTY_CAMERACONTROL_ROLL	not supported
KSPROPERTY_CAMERACONTROL_TILT	supported (if device supports hardware tilt)
KSPROPERTY_CAMERACONTROL_SCANMODE	not supported
KSPROPERTY_CAMERACONTROL_PRIVACY	not supported
KSPROPERTY_CAMERACONTROL_PANTILT	supported (if device supports hardware pan/tilt)
KSPROPERTY_CAMERACONTROL_PAN_RELATIVE	not supported
KSPROPERTY_CAMERACONTROL_TILT_RELATIVE	not supported
KSPROPERTY_CAMERACONTROL_ROLL_RELATIVE	not supported
KSPROPERTY_CAMERACONTROL_ZOOM_RELATIVE	not supported
KSPROPERTY_CAMERACONTROL_EXPOSURE_RELATIVE	not supported
KSPROPERTY_CAMERACONTROL_IRIS_RELATIVE	not supported
KSPROPERTY_CAMERACONTROL_FOCUS_RELATIVE	not supported
KSPROPERTY_CAMERACONTROL_PANTILT_RELATIVE	not supported
KSPROPERTY_CAMERACONTROL_FOCAL_LENGTH	not supported
KSPROPERTY_CAMERACONTROL_AUTO_EXPOSURE_PRIORITY	supported

2.2 Video Proc Amp

The Logitech UVC driver supports the Video Proc Amp property set that is defined in the Windows SDK and Windows Driver Kit documentation:

IAMVideoProcAmp
http://msdn.microsoft.com/en-us/library/dd376033.aspx

PROPSETID_VIDCAP_VIDEOPROCAMP
http://msdn.microsoft.com/en-us/library/ms811490.aspx

The following table lists each property contained in the property set together with its support status. Please note that a status of 'supported' means that the driver implements the property, but whether or not it is supported for a given camera also depends on other factors, such as the camera's capabilities.

Property	***Status***
KSPROPERTY_VIDEOPROCAMP_BACKLIGHT_COMPENSATION	supported
KSPROPERTY_VIDEOPROCAMP_BRIGHTNESS	supported
KSPROPERTY_VIDEOPROCAMP_COLORENABLE	not supported
KSPROPERTY_VIDEOPROCAMP_CONTRAST	supported
KSPROPERTY_VIDEOPROCAMP_GAMMA	supported
KSPROPERTY_VIDEOPROCAMP_HUE	supported
KSPROPERTY_VIDEOPROCAMP_SATURATION	supported
KSPROPERTY_VIDEOPROCAMP_SHARPNESS	supported
KSPROPERTY_VIDEOPROCAMP_WHITEBALANCE	supported
KSPROPERTY_VIDEOPROCAMP_GAIN	supported
KSPROPERTY_VIDEOPROCAMP_DIGITAL_MULTIPLIER	supported
KSPROPERTY_VIDEOPROCAMP_DIGITAL_MULTIPLIER_LIMIT	supported
KSPROPERTY_VIDEOPROCAMP_WHITEBALANCE_COMPONENT	not supported
KSPROPERTY_VIDEOPROCAMP_POWERLINE_FREQUENCY	supported

2.3 Logitech Public Property Set (LP1)

The Logitech Public Property Set (LP1) contains the following properties:

ID	*Name*	*Description*
0	KSPROPERTY_LP1_VERSION	Query the interface version of the property set
1	KSPROPERTY_LP1_DIGITAL_PAN	Control the digital pan position
2	KSPROPERTY_LP1_DIGITAL_TILT	Control the digital tilt position
3	KSPROPERTY_LP1_DIGITAL_ZOOM	Control the digital zoom factor
4	KSPROPERTY_LP1_DIGITAL_PANTILTZOOM	Control the digital pan and tilt positions and digital zoom factor
5	KSPROPERTY_LP1_EXPOSURE_TIME	Control the exposure time and automatic exposure mode
6	KSPROPERTY_LP1_FACE_TRACKING	Enable or disable single and multiple face tracking
7	KSPROPERTY_LP1_LED	Control the LED behavior
8	KSPROPERTY_LP1_FINDFACE	Control centering of the face for widescreen videos

The following sections describe each of these properties in detail.

The GUID of the property set is: {CAAE4966-272C-44a9-B792-71953F89DB2B}

The above GUID is defined as a constant as follows:

```
#define STATIC_PROPSETID_LOGITECH_PUBLIC1 \
    0xCAAE4966, 0x272C, 0x44A9, 0xB7, 0x92, 0x71, 0x95, 0x3F, 0x89, 0xDB, 0x2B
DEFINE_GUIDSTRUCT("CAAE4966-272C-44a9-B792-71953F89DB2B", \
    PROPSETID_LOGITECH_PUBLIC1);
#define PROPSETID_LOGITECH_PUBLIC1 \
    DEFINE_GUIDNAMED(PROPSETID_LOGITECH_PUBLIC1)
```

All constants and structures are defined in the *LVUVCPublic.h* header file.

2.3.1 KSPROPERTY_LP1_VERSION

Usage summary table

Name	KSPROPERTY_LP1_VERSION
Description	Returns the interface version of the property set.
ID	0
Unit	n/a
Range	Currently always: { *usMajor*: 1, *usMinor*: 0 }
Step size	n/a
Default	n/a

Property value type	`typedef struct {`
	`  KSPROPERTY_LP1_HEADER  Header;`
	`  USHORT  usMajor;`
	`  USHORT  usMinor;`
	`} KSPROPERTY_LP1_VERSION_S;`

Supported requests	☑ Get (absolute) ☐ Get (relative) ☐ Manual ☐ Set (absolute) ☐ Set (relative) ☐ Auto
Availability	all cameras

Comments

This property returns a version number that indicates the version of the property set. Backwards compatibility is guaranteed for versions with the same major version number. For example: 1.1 supports all the properties that 1.0 supports, 1.2 supports all properties that 1.1 supports, etc.

Property sets with different major version numbers may not be binary compatible. Therefore, applications using this property set should always perform a runtime check whether the major version number is equal to the one they were designed for.

Sample code

```
// Obtain the version number of the property set
IKsPropertySet *pKsPropertySet;     // Pointer obtained earlier
DWORD dwReturned = 0;
KSPROPERTY_LP1_VERSION_S version = { 0, 0 };
HRESULT hr = pKsPropertySet->Get(
    PROPSETID_LOGITECH_PUBLIC1,
    KSPROPERTY_LP1_VERSION,
    NULL,
    0,
    &version,
    sizeof(version),
    &dwReturned
);
```

2.3.2 KSPROPERTY_LP1_DIGITAL_PAN

Usage summary table

Name	KSPROPERTY_LP1_DIGITAL_PAN
Description	Gets or sets the current digital pan position.
ID	1
Unit	arbitrary (the unit does not directly map to pixels or view angle)
Range	[–100, 100]
Step size	1
Default	0 (center)

Property value type	`typedef struct {`
	`  KSPROPERTY_LP1_HEADER  Header;`
	`  LONG  lPan;`
	`} KSPROPERTY_LP1_DIGITAL_PAN_S;`

Supported requests	▣ Get (absolute) ▣ Get (relative) ☐ Manual ▣ Set (absolute) ▣ Set (relative) ☐ Auto
Availability	Only cameras that support digital pan/tilt/zoom

Comments

Positive values can be thought of as the camera rotating clockwise (as seen from the top). Negative values indicate that the camera is rotated counterclockwise. This is illustrated in the following figure:

Digital pan can be reset to the default center position by setting this property to its default value.

This property supports setting of values that are taken relative to the current value by setting the *Header.ulFlags* member to *KSPROPERTY_CAMERACONTROL_FLAGS_RELATIVE*. Note that the property call does *not* fail if an out of range value is specified. Instead, the value is truncated to match the property's valid range.

To set both digital pan and tilt at the same time use the KSPROPERTY_LP1_DIGITAL_PANTILTZOOM property.

2.3.3 KSPROPERTY_LP1_DIGITAL_TILT

Usage summary table

Name	KSPROPERTY_LP1_DIGITAL_TILT
Description	Gets or sets the current digital tilt position.
ID	2
Unit	arbitrary (the unit does not directly map to pixels or view angle)
Range	[–100, 100]
Step size	1
Default	0 (center)

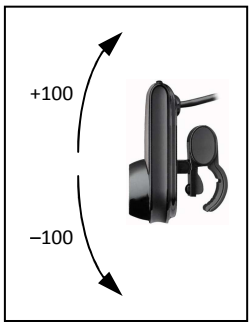
Property value type	`typedef struct {`
	`  KSPROPERTY_LP1_HEADER  Header;`
	`  LONG  lTilt;`
	`} KSPROPERTY_LP1_DIGITAL_TILT_S;`

Supported requests	▣ Get (absolute) ▣ Get (relative) ☐ Manual ▣ Set (absolute) ▣ Set (relative) ☐ Auto
Availability	Only cameras that support digital pan/tilt/zoom

Comments

Positive values tilt the image upwards, negative values tilt it downwards.

Positive values can be thought of as the camera lens tilting upwards. Negative values indicate that the camera is tilting downwards. This is illustrated in the following figure:



Digital tilt can be reset to the default center position by setting this property to its default value.

This property supports setting of values that are taken relative to the current value by setting the *Header.ulFlags* member to *KSPROPERTY_CAMERACONTROL_FLAGS_RELATIVE*. Note that the property call does *not* fail if an out of range value is specified. Instead, the value is truncated to match the property's valid range.

To set both digital pan and tilt at the same time use the KSPROPERTY_LP1_DIGITAL_PANTILTZOOM property.

2.3.4 KSPROPERTY_LP1_DIGITAL_ZOOM

Usage summary table

Name	KSPROPERTY_LP1_DIGITAL_ZOOM
Description	Gets or sets the current digital zoom factor.
ID	3
Unit	percent (e.g. 100% = no zoom, 200% = 2x zoom)
Range	[100, 400]
Step size	2
Default	100 (no zoom)

Property value type	`typedef struct {`
	`  KSPROPERTY_LP1_HEADER  Header;`
	`  ULONG  ulZoom;`
	`} KSPROPERTY_LP1_DIGITAL_ZOOM_S;`

Supported requests	▣ Get (absolute) ▣ Get (relative) ☐ Manual ▣ Set (absolute) ▣ Set (relative) ☐ Auto
Availability	Only cameras that support digital pan/tilt/zoom

Comments

Digital zoom can be reset to 100% (i.e. no zoom) by setting this property to its default value.

This property supports setting of values that are taken relative to the current value by setting the *Header.ulFlags* member to *KSPROPERTY_CAMERACONTROL_FLAGS_RELATIVE*. Note that the property call does *not* fail if an out of range value is specified or if the value violates the step size. Instead, the value is truncated to match the property's valid range or rounded down to the nearest valid value.

To set the zoom factor together with digital pan and tilt use the KSPROPERTY_LP1_DIGITAL_-PANTILTZOOM property.

2.3.5 KSPROPERTY_LP1_DIGITAL_PANTILTZOOM

Usage summary table

Name	KSPROPERTY_LP1_DIGITAL_PANTILTZOOM
Description	Gets or sets the current digital pan and tilt position and the digital zoom factor.
ID	4
Unit, Step size, Default	ulPan: same as KSPROPERTY_LP1_DIGITAL_PAN ulTilt: same as KSPROPERTY_LP1_DIGITAL_TILT ulZoom: same as KSPROPERTY_LP1_DIGITAL_ZOOM
Range	ulPan: same as KSPROPERTY_LP1_DIGITAL_PAN ulTilt: same as KSPROPERTY_LP1_DIGITAL_TILT ulZoom: same as KSPROPERTY_LP1_DIGITAL_ZOOM but including zero

Property value type	`typedef struct {`
	`  KSPROPERTY_LP1_HEADER  Header;`
	`  LONG  lPan;`
	`  LONG  lTilt;`
	`  ULONG  ulZoom;`
	`} KSPROPERTY_LP1_DIGITAL_PANTILTZOOM_S`

Supported requests	▣ Get (absolute) ▣ Get (relative) ☐ Manual ▣ Set (absolute) ▣ Set (relative) ☐ Auto
Availability	Only cameras that support digital pan/tilt/zoom

Comments

This property provides the same functionality as the previous three properties but can be used to set either pan/tilt/zoom or only pan/tilt with a single function call.

A zoom value of zero is ignored. Therefore a value of zero can be specified for ulZoom if changing only the pan and tilt values is desired.

This property supports setting of values that are taken relative to the current values by setting the *Header.ulFlags* member to *KSPROPERTY_CAMERACONTROL_FLAGS_RELATIVE*. Note that the property call does *not* fail if out of range values are specified or if any of the values violates the corresponding step size. Instead, all values are truncated to match their valid range or rounded down to the nearest valid value.

To set digital pan, tilt, or zoom values separately use the KSPROPERTY_LP1_DIGITAL_PAN, KSPROPERTY_LP1_DIGITAL_TILT, and KSPROPERTY_LP1_DIGITAL_ZOOM properties.

2.3.6 KSPROPERTY_LP1_EXPOSURE_TIME

Usage summary table

Name	KSPROPERTY_LP1_EXPOSURE_TIME
Description	Control the exposure time and automatic exposure mode.
ID	5
Unit	100µs (e.g. 1 = 0.0001 s, 10 = 0.001 s, 500 = 0.05 s, 10000 = 1 s, etc.)
Range	device dependent (usually [10, 10000], i.e. [0.001 s, 1 s])
Step size	device dependent (usually 1)
Default	device dependent

Property value type	`typedef struct {`
	`  KSPROPERTY_LP1_HEADER  Header;`
	`  ULONG  ulExposureTime;`
	`} KSPROPERTY_LP1_EXPOSURE_TIME_S;`

Supported requests	▣ Get (absolute) ☐ Get (relative) ▣ Manual ▣ Set (absolute) ☐ Set (relative) ▣ Auto
Availability	All cameras

Comments

This property is recommended to be used as a replacement for CameraControl_Exposure because it exposes a finer granularity while the latter one accepts only powers of two.

Certain KSPROPERTY_CAMERACONTROL_FLAGS_* flags may be specified for the *Header.ulFlags* field.

Specifying the *Auto* flag enables auto exposure control while specifying the *Manual* flag disables automatic exposure control ("auto-exposure"). If the camera does not support automatic exposure control any specified flags are ignored. The property call fails if an invalid flag is specified.

If auto-exposure is enabled set requests fail unless the *Manual* flag is also set, in which case auto-exposure is disabled and the exposure time is set to the specified value. In order to disable auto-exposure without explicitly specifying the exposure time a value of zero can be specified with the *Manual* flag set. In that case the camera's current exposure time, as last set by the auto-exposure algorithm, is retained.

Please note that exposure time is subject to different hardware and other constraints. For example, there is an interdependence between exposure time and the current frame rate, which, in turn, is a function of many other parameters. Therefore, you should not expect the precision suggested by the property's unit or invariable results when using the same parameters.

Limitations

If multiple cameras are connected that have different hardware exposure time ranges, step sizes, or default values, the range, step size, and default value of this property may be incorrectly reported. However, the property still accepts the values that are correct according to the device's hardware capabilities.

Reading this property immediately after it has been set may return a different value than the one just set. This can happen even while automatic exposure control is disabled and is usually caused by the device adjusting the exposure time due to internal constraints.

2.3.7 KSPROPERTY_LP1_FACE_TRACKING

Usage summary table

Name	KSPROPERTY_LP1_FACE_TRACKING
Description	Enable or disable single and multiple face tracking.
ID	6
Unit	n/a
Range	values from the *LVUVC_LP1_FACE_TRACKING_MODE* enumeration
Step size	n/a
Default	*LVUVC_LP1_FACE_TRACKING_MODE_OFF*

Property value type	`typedef struct {`
	`  KSPROPERTY_LP1_HEADER  Header;`
	`  ULONG  ulMode;`
	`} KSPROPERTY_LP1_FACE_TRACKING_S;`

Supported requests	▣ Get (absolute) ☐ Get (relative) ☐ Manual ▣ Set (absolute) ☐ Set (relative) ☐ Auto
Availability	Only cameras that support face tracking

Comments

The following constants can be used for the *ulMode* field:

LVUVC_LP1_FACE_TRACKING_MODE_OFF: Disable face tracking

LVUVC_LP1_FACE_TRACKING_MODE_SINGLE: Enable tracking of a single face. This corresponds to the *Follow me* option in the Logitech Webcam Software settings panel.

LVUVC_LP1_FACE_TRACKING_MODE_MULTIPLE: Enable tracking of multiple faces. This corresponds to the *Follow two or more of us* option in the Logitech Webcam Software settings panel.

2.3.8 KSPROPERTY_LP1_LED

Usage summary table

Name	KSPROPERTY_LP1_LED
Description	Control the LED behavior.
ID	7
Unit	ulMode: n/a ulFrequency: 0.1 [Hz] (e.g. 1 = 0.1 Hz, 15 = 1.5 Hz, 100 = 10 Hz)
Range	ulMode: values from the *LVUVC_LP1_LED_MODE* enumeration ulFrequency: [0, 255]
Step size	ulMode: n/a ulFrequency: 1
Default	ulMode: *LVUVC_LP1_LED_MODE_AUTO* ulFrequency: device dependent

Property value type	`typedef struct {`
	`  KSPROPERTY_LP1_HEADER  Header;`
	`  ULONG  ulMode;`
	`  ULONG  ulFrequency;`
	`} KSPROPERTY_LP1_LED_S;`

Supported requests	▣ Get (absolute) ☐ Get (relative) ☐ Manual ▣ Set (absolute) ☐ Set (relative) ☐ Auto
Availability	Only cameras that have an LED

Comments

This property permits to change the behavior of the camera's LED and change the frequency with which it blinks. The following constants can be used in the *ulMode* field:

LVUVC_LP1_LED_MODE_OFF: The LED is off, even when the camera is streaming video.

LVUVC_LP1_LED_MODE_ON: The LED is on when the camera is streaming video. (Note that this cannot be used to turn on the LED while the camera is not streaming video.)

LVUVC_LP1_LED_MODE_BLINKING: The LED is blinking when the camera is streaming video. The frequency of the blinking is determined by the value of the *ulFrequency* field. (Note that this cannot be used to turn the LED into blinking mode while the camera is not streaming video.)

LVUVC_LP1_LED_MODE_AUTO: The LED behavior is controlled by the camera. This typically means that the LED is on when the camera is streaming video and off when it is not streaming video.

The LED frequency is given in units of 0.1 Hertz. This frequency specifies how often the LED state changes per second. So, for example, a value of 5 (i.e. 0.5 Hertz) corresponds to one state change every two seconds: At t = 0 the LED turns on, at t = 2 [s] it turns off, and at t = 4 [s] it turns on again. Please note that the precision of the blinking frequency may vary.

If the *ulFrequency* field is 0, the frequency remains unchanged.

2.3.9 KSPROPERTY_LP1_FINDFACE

Usage summary table

Name	KSPROPERTY_LP1_FINDFACE
Description	Control centering of the face for widescreen videos.
ID	8
Unit	n/a
Range	ulMode: values from the *LVUVC_LP1_FINDFACE_MODE* enumeration ulReset: values from the *LVUVC_LP1_FINDFACE_RESET* enumeration
Step size	n/a
Default	ulMode: *LVUVC_LP1_FINDFACE_MODE_OFF* ulReset: *LVUVC_LP1_FINDFACE_RESET_NONE*

Property value type	`typedef struct {`
	`  KSPROPERTY_LP1_HEADER  Header;`
	`  ULONG  ulMode;`
	`  ULONG  ulReset;`
	`} KSPROPERTY_LP1_FINDFACE_S;`

Supported requests	▣ Get (absolute) ☐ Get (relative) ☐ Manual ▣ Set (absolute) ☐ Set (relative) ☐ Auto
Availability	Cameras that support the 'Find my face for wide screen videos' feature

Comments

This property controls the 'Find my face for wide screen video' feature that can be found in the Logitech Webcam Software settings panel. If this feature is enabled and a widescreen video stream is started the camera can automatically center on the user's face by adjusting the vertical field of view.

The feature has two modes: enabled and disabled. There are also two actions that can be initiated: (re)centering on the face of the user and resetting the picture to the default position. The different constants are explained below.

LVUVC_LP1_FINDFACE_MODE_OFF: Turn off automatic centering of the user's face when a widescreen video stream is initiated. Turning the feature off automatically performs a reset to the default position. Note that even when the feature is off you can still initiate a manual centering process by specifying the *LVUVC_LP1_FINDFACE_RESET_FACE* value for the *ulReset* field.

LVUVC_LP1_FINDFACE_MODE_ON: Turn on automatic centering of the user's face when a widescreen video stream is initiated.

LVUVC_LP1_FINDFACE_MODE_NO_CHANGE: Do not turn the feature on or off. This value should be used when an action is specified using *ulReset*. Note, however, that specifying a reset action does not prevent you from enabling or disabling the feature at the same time.

LVUVC_LP1_FINDFACE_RESET_NONE: Do not perform any action. This is typically used when the feature should simply be turned on or off.

LVUVC_LP1_FINDFACE_RESET_DEFAULT: Reset the field of view to its default position, which is typically the center.

LVUVC_LP1_FINDFACE_RESET_FACE: Re-center the field of view to the current position of the user's face. Note that for this to work the face tracker must be able to locate the face. If this is not currently possible, the centering process is delayed until the face is locatable again.

In widescreen mode the field of view can also be manually adjusted by using the Pan and Tilt properties of the Camera Control property set. When doing so it is advisable to disable the Find Face feature in order to avoid undesired interactions.