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Interface Protocol
GenICam
M3DS 3D-Sensoren



EN

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1 Use for Intended Purpose

According to the GenICam standard, all device features are defined in GenTL as APIs and organized into five layered modules: System, Interface, Local Device, Remote Device, and DataStream. Each module provides a GenAPI-compliant XML file detailing its features.

This document describes the GenTL features for M3DS under different modules and categories. These features are either standard or custom which are specific to sensor3d_gentl. For more information on standard feature naming conventions, feature meanings, and related topics, please refer to the GenICam SFNC (Standard Features Naming Convention) documentation.

2 System Module

2.1 SystemInformation

Feature Name	TLID
Access Mode	Read only
Interface Type	IString
Enum Entry	GenTL
Description	Unique identifier of the GenTL Producer like a GUID.

Feature Name	TLVendorName
Access Mode	Read only
Interface Type	IString
Description	Name of the GenTL Producer vendor. It returns wenglor MEL GmbH.

Feature Name	TLModelName
Access Mode	Read only
Interface Type	IString
Description	Name of the GenTL Producer to distinguish different kinds of GenTL Producer implementations from one vendor. It returns “Sensor3D”.

Feature Name	TLVersion
Access Mode	Read only
Interface Type	IString
Description	Vendor specific version string of the GenTL Producer.

Feature Name	TLFileName
Access Mode	Read only
Interface Type	IString
Description	File name including extension of the GenTL Producer. It returns “sensor3d_gentl.cti”.

Feature Name	TLPath
Access Mode	Read only
Interface Type	IString
Description	Full path to the GenTL Producer including filename and extension. Windows: *C:\Program Files\wenglor\Sensor3D SDK\cti\sensor3d_gentl.cti* Linux: */opt/wenglor/sensor3d-genicam/cti/sensor3d_gentl.cti*

Feature Name	TLType
Access Mode	Read only
Interface Type	IEnumeration
Description	Transport layer type of the GenTL Producer implementation. It returns “Custom”.

Feature Name	GenTLVersionMajor
Access Mode	Read only
Interface Type	IInteger
Value	>0
Description	Major version number of the GenTL specification the GenTL Producer implementation complies with.

Feature Name	GenTLVersionMinor
Access Mode	Read only
Interface Type	IInteger
Value	≥0
Description	Minor version number of the GenTL specification the GenTL Producer implementation complies with.

Feature Name	GenTLSFNCVersionMajor
Access Mode	Read only
Interface Type	IInteger
Value	>0
Description	Major version number of the GenTL Standard Features Naming Convention that was used to create the GenTL Producer's XML.

Feature Name	GenTLSFNCVersionMinor
Access Mode	Read only
Interface Type	IInteger
Value	>0
Description	Minor version number of the GenTL Standard Features Naming Convention that was used to create the GenTL Producer's XML.

2.2 InterfaceEnumeration

Feature Name	InterfaceUpdateList
Access Mode	(Read) Write
Interface Type	ICommand
Description	Updates the internal list of the interfaces. This feature should be readable if the execution cannot performed immediately. The command then returns and the status can be polled. This function interacts with the TLUpdateInterfaceList function of the GenTL Producer. It is up to the GenTL Consumer to handle access in case both methods are used.

Feature Name	InterfaceUpdateTimeout
Access Mode	Read/Write
Interface Type	IInteger
Value	>0
Description	Specifies timeout for the InterfaceUpdateList command.

Feature Name	InterfaceSelector
Access Mode	Read/Write
Interface Type	IInteger
Value	≥0
Description	Selector for the different GenTL Producer interfaces. This interface list only changes on execution of “InterfaceUpdateList”. The selector is 0-based in order to match the index of the C interface.

Feature Name	InterfaceID[InterfaceSelector]
Access Mode	Read only
Interface Type	IString
Description	GenTL Producer wide unique identifier of the selected interface.

3 Interface Module

3.1 InterfaceInformation

Feature Name	InterfaceID
Access Mode	Read only
Interface Type	IString
Description	GenTL Producer wide unique identifier of the selected interface. Returns same value as the InterfaceID (Beginner level) in System module.

Feature Name	InterfaceType
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	Custom
Description	Transport layer type of the interface.

3.2 DeviceEnumeration

Feature Name	DeviceSelector
Access Mode	Read/Write
Interface Type	IInteger
Value	≥0
Description	Selector for the available 3D Sensor (M3DS) devices on this interface. This value only changes on execution of "DeviceUpdateList". The selector is 0-based to match the index of the C interface.

Feature Name	DeviceID[DeviceSelector]
Access Mode	Read only
Interface Type	IString
Description	Interface wide unique identifier of the selected device, which is also a unique identifier to each wenglor device. It consists of DeviceModelName and DeviceSerialNumber. This value only changes on execution of the DeviceUpdateList command.

Feature Name	DeviceAccessStatus[DeviceSelector]
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	Unknown | ReadWrite | ReadOnly | NoAccess | Busy | OpenReadWrite | OpenReadOnly
Description	Gives the device's access status at the moment of the last execution of the DeviceUpdateList command. This value only changes on execution of the DeviceUpdateList command.

	• ReadWrite: Full access • NoAccess: Not available to connect. • Busy: The device is already opened by another entity. • OpenReadWrite : Open in Read/Write mode by this GenTL host **NOTE:** This Feature DeviceAccessStatus changes value only via DeviceUpdateList command. That is, when device is selected and being connected, this feature value will not be updated to OpenReadWrite, unless the DeviceUpdateList command is executed.

Feature Name	DeviceUserID[DeviceSelector]
Access Mode	Read only
Interface Type	IString
Description	Device User ID of the selected remote device. It returns Device Name, by default is “3D Sensor”.

Feature Name	DeviceSerialNumber[DeviceSelector]
Access Mode	Read only
Interface Type	IString
Visibility	Expert
Namespace	Standard
Description	Serial number of the selected remote device. This value only changes on execution of the DeviceUpdateList command.

Feature Name	DeviceIPAddress[DeviceSelector]
Access Mode	Read only
Interface Type	IInteger
Description	IPV4 Address of the selected remote device. This value reflects the device's actual address as reported by the last DeviceUpdateList (discovery), and is not changed by the DeviceForceIP command. DeviceIPAddress can be used to compose an alternative device ID for establishing a connection. The syntax of such an ID is “*#ip#<DeviceIPAddress>*”, for example: “*#ip#10.10.38.2*”.

Feature Name	DeviceSubnetMask[DeviceSelector]
Access Mode	Read only
Interface Type	IInteger
Description	SubnetMask of the selected remote device, as reported by the last DeviceUpdateList; not changed by DeviceForceIP.

Feature Name	DeviceGateway[DeviceSelector]
Access Mode	Read only
Interface Type	IInteger

Description	Gateway of the selected remote device, as reported by the last DeviceUpdateList; not changed by DeviceForceIP

Feature Name	DeviceMACAddress[DeviceSelector]
Access Mode	Read only
Interface Type	IInteger
Description	MAC address of the selected remote device.

Feature Name	DeviceForceIP[DeviceSelector]
Access Mode	Write
Interface Type	ICommand
Description	Apply the force IP settings (DeviceForceIPAddress, DeviceForceSubnetMask and DeviceForceGateway) in the selected device using ForceIP command. This command might reboot the device automatically to apply the changes. **Note:** This command is only accepted by a device showing ReadWrite for DeviceAccessStatus. If the device rejects the requested configuration, the command returns an error and DeviceForceIPAddress / DeviceForceSubnetMask / DeviceForceGateway are restored to the device's current values.

Feature Name	DeviceForceIPAddress[DeviceSelector]
Access Mode	Read/Write
Interface Type	IInteger
Description	Static IPV4 address (for the ICommand DeviceForceIP) to set. The value is a 32-bit unsigned integer in network byte order. Each byte represents one octet of the IP address. This field is (re)initialized to the device's current value on DeviceUpdateList, and restored to it if a DeviceForceIP is rejected.

Feature Name	DeviceForceSubnetMask[DeviceSelector]
Access Mode	Read/Write
Interface Type	IInteger
Description	Static subnet mask (for the ICommand DeviceForceIP) to set. The value is a 32-bit unsigned integer in network byte order. Each byte represents one octet of the device subnet mask. This field is (re)initialized to the device's current value on DeviceUpdateList, and restored to it if a DeviceForceIP is rejected.

Feature Name	DeviceForceGateway[DeviceSelector]
Access Mode	Read/Write

Interface Type	IInteger
Description	Static gateway (for the ICommand DeviceForceIP) to set. The value is a 32-bit unsigned integer in network byte order. Each byte represents one octet of the gateway. This field is (re)initialized to the device's current value on DeviceUpdateList, and restored to it if a DeviceForceIP is rejected.

4 Device Module

This module, as well as the features inside it, is only available when a physical device is selected and being connected.

4.1 DeviceInformation

Feature Name	DeviceAccessStatus
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	OpenReadWrite | OpenReadOnly
Description	Gives the device's access status at the moment of the last execution of the DeviceUpdateList command. This value only changes on execution of the DeviceUpdateList command. • OpenReadWrite : Open in Read/Write mode by this GenTL host • OpenReadOnly : Open in Read only mode by this GenTL host (not supported) **Attention!** Since this Feature DeviceAccessStatus is in Device module, it is only available when the device is being connected. Therefore the value is either OpenReadWrite or OpenReadOnly. Any real time status like connection lost can be read in feature DeviceConnectionStatus.

Feature Name	DeviceConnectionStatus
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	Inactive / Active
Description	Connection status of local host to the selected physical (remote) device. This value can be updated either by ICommand UpdateConnectionStatus or EventDeviceLost. **NOTE:** Feature DeviceAccessStatus changes value only via DeviceUpdateList command, it will not be aware of the real time connection status. This feature DeviceConnectionStatus is designed to fulfill this purpose.

Feature Name	UpdateConnectionStatus
Access Mode	Write
Interface Type	ICommand
Description	Actively updates the connection status of the selected remote device, (rather than passively via event notification).

4.2 EventControl

Feature Name	EventSelector
Access Mode	Read/Write

Interface Type	IEnumeration
Enum Entry	DeviceLost
Description	Selects which particular event to signal to the consumer. DeviceLost: Raised when the Ical host looses connection to the physical (remote) device.

Feature Name	EventNotification[EventSelector]
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	Off / On
Description	Activate or deactivate the notification to consumer of the occurrence of the selected event..

Feature Name	EventDeviceLostData
Access Mode	Read only
Interface Type	ICategory
Description	Category that contains all the data features related to the DeviceLost event.

Feature Name	EventDeviceLost
Category	EventDeviceLostData
Access Mode	Read only
Interface Type	IInteger
Description	Raised when the local host looses connection to the physical (remote)device. Its value uniquely identifies the type event received.

5 Remote Device Module

This module, as well as all features inside it, are only available when a physical device is selected and being connected. Most of the features in this module display information about the connected sensor and are therefore hardware dependent.

5.1 TransportLayerControl

Feature Name	PayloadSize
Access Mode	Read only
Interface Type	IInteger
Unit	B
Description	Provides the number of bytes transferred for frame or chunk on the stream channel. This includes any end-of-line, end-of-frame statistics or other stamp data. This is the total size of data payload for a data block.

Feature Name	GenDCStreamingMode
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	On
Description	Controls the device's streaming by GenDC format.

Feature Name	GenDCStreamingStatus
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	On
Description	Returns the device's streaming mode.

Feature Name	GenDCFlowMappingTable
Access Mode	Read only
Interface Type	IRegister
Description	Returns the GenDC Container data flow mapping table that will be used to transport the GenDC Container.

Feature Name	GenDCDescriptor
Access Mode	Read only
Interface Type	IRegister
Description	Returns a prefetched GenDC Descriptor that can be used as reference for the data to be streamed out by the device in its current configuration. This information can be used to set up the receiver in advance to be ready for incoming data containers.

5.2 DeviceControl

Feature Name	DeviceScanType
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	Areascan3D
Description	Returns the device scan type. The M3DS device always reports Areascan3D, since it exclusively generates 3D area images..

Feature Name	DeviceModelName
Access Mode	Read only
Interface Type	IString
Description	Model of the sensor 3D device.

Feature Name	DeviceVendorName
Access Mode	Read only
Interface Type	IString
Description	Name of the device vendor.

Feature Name	DeviceVersion
Access Mode	Read only
Interface Type	IString
Description	General version info about the device.

Feature Name	DeviceFirmwareVersion
Access Mode	Read only
Interface Type	IString
Description	Firmware info of the device.

Feature Name	DeviceSerialNumber
Access Mode	Read only
Interface Type	IString
Description	Serial number of the device.

Feature Name	DeviceTLType
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	Custom
Description	General info about the transport layer type of the device.

Feature Name	DeviceTemperatureSelector
Access Mode	Read/Write
Interface Type	IEnumeration

Enum Entry	CPU | LightEngine | ImageSensor | LED | Internal-Housing
Description	Selects the location of the device where the temperature is measured. CPU: The CPU of the sensor. LightEngine : The light engine of the sensor. ImageSensor : The image sensor of the sensor. LED: The LED of the sensor. InternalHousing: The internal housing of the sensor.

Feature Name	DeviceTemperature[DeviceTemperatureSelector]
Access Mode	Read only
Interface Type	IFloat
Description	Shows the current temperature of the selected DeviceTemperatureSelector

Feature Name	DeviceReset
Access Mode	Write only*
Interface Type	ICommand
Description	Calling DeviceReset overwrites the UserSets saved on the device to their defaults defined by the installed FW. Then it loads the Userset0 (Default) to the device. * This feature is locked when acquisition starts.



NOTICE

DeviceReset invalidates the whole GenICam tree.

5.3 ImageFormatControl

This section contains the features related to the format of the transmitted image.

Feature Name	DecimationVertical
Access Mode	Read/Write*
Interface Type	IInteger
Visibility	Expert
Value	1 / 2
Description	Vertical sub-sampling of the image. A value of 1 indicates that the camera performs no vertical decimation. A value of 2 reduces the vertical resolution (height) of the image by the specified vertical decimation factor. Please see the feature height for more information. * This feature is locked when acquisition starts.

Feature Name	DecimationHorizontal
Access Mode	Read/Write*
Interface Type	IInteger

Value	1 | 2
Description	Horizontal sub-sampling of the image. A value of 1 indicates that the camera performs no horizontal decimation. A value of 2 reduces the horizontal resolution (width) of the image by the specified horizontal decimation factor. Please see the feature Width for more information. * This feature is locked when acquisition starts.



NOTICE

DecimationVertical and DecimationHorizontal always share the same value. Changing either value automatically updates the other to match.

Feature Name	RegionSelector
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	Region0
Description	Selects the Region of interest to control. Currently only Region0 is available. Region0 includes Intensity, Confidence and Range components.

Feature Name	RegionMode[RegionSelector]
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	On
Description	Controls if the selected Region of interest is active and streaming.

Feature Name	ComponentSelector
Access Mode	Read/Write
Interface Type	IEnumeration
Value	Intensity | Confidence | Range)
Description	Selects which component to configure

Feature Name	ComponentEnable[ComponentSelector]
Access Mode	Read/Write*
Interface Type	IBoolean
Value	1
Description	Controls if the selected component streaming is active. ComponentEnable[Intensity] and ComponentEnable[Range] are RO ComponentEnable[Confidence] is R/W * The feature is locked during acquisition

Feature Name	PixelFormat[ComponentSelector]
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	Mono12 | Confidence8 | Coord3D_ABC32f
Description	This feature specifies the image format sent to the client, including the structure and size of transmitted frame data. • Mono12 is the pixel format for Component Intensity. It's used for the intensity values of the scanned profile, where each pixel is represented by 12 bit integer. • Confidence8 is the pixel format for Component Confidence. It represents a per-pixel confidence value using 16 bits integer. It is used to indicate the reliability of the corresponding depth (Range) measurement. • Coord3D_ABC32f is the pixel format for Component Range. When Coord3D_ABC32f is selected, the range image is represented using 32 bit float values for A (X), B (Y), and C (Z) respectively. It's the device native pixel format.

Feature Name	ComponentIDValue[ComponentSelector]
Access Mode	Read only
Interface Type	IInteger
Value	1 | 6 | 4
Description	Returns a unique identifier value that corresponds to type of the component selected by ComponentSelector according to GenICam standards. • ComponentIDValue[Intensity] = 1 • ComponentIDValue[Range] = 4 • ComponentIDValue[Confidence] = 6

Feature Name	Width[RegionSelector]
Access Mode	Read only
Interface Type	IInteger
Value	min.:0 ... max: 4096*
Description	This feature represents the width of the image provided by the device (in pixels). Width[Region0] is updated automatically, once DecimationHorizontal/DecimationVertical changes (both share the same value). For example, setting DecimationHorizontal to 2 will reduce Width by half. Please see the explanation inside feature DecimationHorizontal/DecimationVertical for details. * The max value depends on the device type

Feature Name	Height[RegionSelector]
Access Mode	Read only
Interface Type	IInteger
Value	min: 0 ... max: 3000*

Description	This feature represents the Height of the image provided by the device (in pixels). DecimationVertical/DecimationHorizontal affects the height[Region0] value. For example, setting DecimationVertical to 2 will reduce Height[Region0] by half. For further details, please refer to the description of DecimationVertical/DecimationHorizontal. * The max value depends on the device type

Feature Name	OffsetX[RegionSelector]
Access Mode	Read only
Interface Type	IInteger
Value	0
Description	This feature represents the horizontal offset from the origin to the region of interest (in pixels).

Feature Name	OffsetY[RegionSelector]
Access Mode	Read only
Interface Type	IInteger
Value	0
Description	This feature represents the vertical offset from the origin to the region of interest (in pixels).

5.4 AcquisitionControl

This section contains the features related to image acquisition, including trigger and exposure control.

Feature Name	AcquisitionMode
Access Mode	Read/Write*
Interface Type	IEnumeration
Enum Entry	Continous | SingleFrame
Description	Defines the acquisition mode of the interface. In Continuous mode, once the interface receives the command StartAcquisition from the client, it keeps sending images until the client sends a StopAcquisition command. In SingleFrame mode, one frame is captured, once the interface receives the command AcquisitionStart from client. The client does not need to send a StopAcquisition command. * This feature is locked during acquisition.

Feature Name	AcquisitionEngine
Access Mode	Read/Write*
Interface Type	IEnumeration
Enum Entry	AcquisitionEngine2d | AcquisitionEngine3d
Description	Sets the acquisition engine (2d or 3d) of the device. In AcquisitionEngine2d, the device captures 2d data only. In AcquisitionEngine3d, device captures 3d data including Range|Intensity|Confidence components. *This feature is locked during acquisition.

Feature Name	Projection2D
Access Mode	Read/Write*
Interface Type	IEnumeration
Enum Entry	Solid | Crosshair
Description	Sets the 2D pattern of the device, either Solid or Crosshair pattern. This feature is only available when AcquisitionEngine=AcquisitionEngine2d * This feature is locked during acquisition.

Feature Name	Engine3D
Access Mode	Read/Write*
Interface Type	IEnumeration
Enum Entry	Stripe | Phase
Description	Selects the 3D engine used by the device: Stripe pattern or Phase pattern. This feature is only available when AcquisitionEngine=AcquisitionEngine3d The selected Engine3D influences the value of StackSize. In Stripe mode: StackSize is fixed to 23 In Phase mode: StackSize can be set to 14 or 26 * This feature is locked during acquisition.

Feature Name	StackSize
Access Mode	Read/Write*
Interface Type	IEnumeration
Enum Entry	StackSize14 | StackSize23 | StackSize26
Description	Sets the stack size of the device. If Engine3D = Stripe, StackSize is fixed as 23; If Engine3D = Phase, StackSize can be either 14 or 26. * This feature is locked during acquisition.

Feature Name	AcquisitionPriority
Access Mode	Read/Write*
Interface Type	IEnumeration
Enum Entry	Individual | Accurate | Fast
Description	Sets the device acquisition configuration (Decimation & StackSize) to be either fast, accurate or individual. • Accurate means the device is setup to capture slower but high resolution point cloud. In this mode, the StackSize is set to the highest size available and the DecimationVertical & DecimationHorizontal are set to 1. If Engine3D=Phase, then Decimation = 1 & StackSize = 26 If Engine3D=Stripe, then Decimation = 1 & StackSize = 23

	• Fast (supported only when Engine3D = Phase) means the device is setup to capture fast but low resolution point cloud. In this mode, the StackSize is set to the lowest size available and the DecimationVertical & DecimationHorizontal are set to 2. If Engine3D=Phase, then Decimation = 2 & StackSize = 14 • Individual is a user defined mode where the user can setup his device according to his needs. If Engine3D=Phase or Stripe, the current values of Decimation and StackSize remain unchanged. * This feature is locked during acquisition.

Feature Name	AcquisitionFrameRate
Access Mode	Read/Write*
Interface Type	IFloat
Value	min: AcquisitionFrameRateMin ... max: AcquisitionFrameRateMax**
Unit	Hz
Description	Defines the measurement rate of the sensor in Hz (i.e. number of measured profiles per second). The value and the max value of AcquisitionFrameRate is invalidated by Decimation, Engine3D, StackSize, AcquisitionEngine & ExposureTime. If the value is within the min/max range, the 3D Sensor might adapt the value to fit the current hardware configuration (Decimation, Network speed, StackSize, Engine3D). The client should read back the value to know the current active value **ATTENTION!:** AcquisitionFrameRate is only available when TriggerMode is Off, please refer to TriggerMode feature. It is available in both 2D and 3D mode (AcquisitionEngine2d and AcquisitionEngine3d) * This feature is locked during acquisition. ** The minimum and maximum values are defined by invisible feature AcquisitionFrameRateMin and AcquisitionFrameRateMax, which are hardware dependent. Typically the values are 0.01 and 4.1 respectively.

Feature Name	TriggerSelector
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	FrameStart
Description	Selects the trigger to configure. FrameStart: Defines the trigger settings to generate a frame. For more information, please refer to feature TriggerSource and TriggerMode.

Feature Name	TriggerMode[TriggerSelector]
Access Mode	Read/Write*

Interface Type	IEnumeration
Enum Entry	On / Off
Description	Enabling and disabling external triggering. If TriggerMode=On, the sensor can be triggered by the source selected by the feature TriggerSource. If TriggerMode=Off, the sensor is triggered internally by the frequency set by the feature AcquisitionFrameRate. * This feature is locked when acquisition starts.

Feature Name	TriggerSource[TriggerSelector]
Access Mode	Read/Write*
Interface Type	IEnumeration
Enum Entry	Line1 / Line2 / Line3 / Line4 / Software
Description	Selects the external trigger signal which triggers capturing a new frame. The entries Line1 | Line2 | Line3 | Line4 are only available when the corresponding line is configured as input (LineMode = Input). * This feature is locked when acquisition starts.

Feature Name	TriggerSoftware[TriggerSelector]
Access Mode	Write only*
Interface Type	ICommand
Description	Sends a software trigger command to the 3D Sensor. * It is only available when TriggerSource=Software.

Feature Name	AcquisitionStart
Access Mode	Write only
Interface Type	ICommand
Description	The command starts the acquisition of profiles (image) from the 3D Sensor.

Feature Name	AcquisitionStop
Access Mode	Write only
Interface Type	ICommand
Description	The command stops the acquisition of profiles (image) from the 3D Sensor.

Feature Name	ExposureTime
Access Mode	Read/Write
Interface Type	IFloat
Value	min:ExposureTimeMin max:ExposureTimeMax*
Unit	µs
Description	Sets the exposure time of the sensor in µs.

	The minimum and maximum values are determined by invisible and read only feature ExposureTimeMin and ExposureTimeMax, can be for example 0 and 11249.00 respectively. For further information please refer to the M3DS 3D Sensors Operating Instruction.

Feature Name	AutoAdjust
Access Mode	Write only*
Interface Type	ICommand
Description	Executes the AutoAdjust command for the given Area Of Interest AOI, please refer to AutoAdjustAOIWidth, AutoAdjustAOIHeight, AutoAdjustAOIOffsetX and AutoAdjustAOIOffsetY. The algorithm computes the best values for ExposureTime, LightBrightness and Gain, and updates these parameters upon successful execution. In case of failure in computing the values, the user will get an error: GC_ERR_ERROR. * This feature is locked when acquisition starts.

Feature Name	AutoAdjustAOIWidth[AutoAdjustAOI]
Access Mode	Read/Write*
Interface Type	IInteger
Value	min:0... max:AutoAdjustAOIWidthMax**
Description	Controls the width of the AOI for the AutoAdjust command. * This feature is locked when acquisition starts. ** The maximum value is determined by invisible and read only feature AutoAdjustAOIWidthMax.

Feature Name	AutoAdjustAOIOffsetX[AutoAdjustAOI]
Access Mode	Read/Write*
Interface Type	IInteger
Value	min:0... max: AutoAdjustAOIOffsetXMax**
Description	Controls the offset in X of the AOI for the AutoAdjust command. * This feature is locked when acquisition starts. ** The maximum value is determined by invisible and read only feature AutoAdjustAOIOffsetXMax.

Feature Name	AutoAdjustAOIHeight[AutoAdjustAOI]
Access Mode	Read/Write*
Interface Type	IInteger
Value	min:0... max: AutoAdjustAOIHeightMax**
Description	Controls the height of the AOI for the AutoAdjust command. * This feature is locked when acquisition starts. ** The maximum value is determined by invisible and read only feature AutoAdjustAOIHeightMax.

Feature Name	AutoAdjustAOIOffsetY[AutoAdjustAOI]
Access Mode	Read/Write*
Interface Type	IInteger
Value	min:0... max: AutoAdjustAOIOffsetYMax**
Description	Controls the offset in Y of the AOI for the AutoAdjust command. * This feature is locked when acquisition starts. ** The maximum value is determined by invisible and read only feature AutoAdjustAOIOffsetYMax.

5.5 LightControl

Feature Name	LightBrightness
Access Mode	Read/Write
Interface Type	IFloat
Value	min:0... max: 100
Unit	%
Description	Controls the led power of the sensor.

5.6 AnalogControl

Feature Name	Gain
Access Mode	Read/Write*
Interface Type	IFloat
Value	min: 0... max: 100
Description	Controls the gain of the sensor.

5.7 ChunkDataControl

The Chunk Data Control defines a number of Chunks which are transmitted inside GenDC Chunk section.

Feature Name	ChunkModeActive
Access Mode	Read only
Interface Type	IBoolean
Value	1
Description	Activates the inclusion of Chunk data in the payload of the image.

Feature Name	ChunkSelector
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	TimeStamp | OvertriggerCounter
Description	Selects the chunk item to configure or control. Chunk TimeStamp carries the timestamp of the frame. Chunk OvertriggerCounter is used to count how often the device was over triggered.

	Since ChunkEnable is permanently enabled, ChunkTimeStamp and ChunkOvertriggerCount are always transmitted inside GenDC container, as long as Feature ChunkModeActive is set to Active.

Feature Name	ChunkEnable[ChunkSelector]
Access Mode	Read only
Interface Type	IBoolean
Value	1
Description	Enables the inclusion of the selected chunk data in the payload of the image.

Feature Name	ChunkTimestamp
Access Mode	Read only
Interface Type	IInteger
Value	≥0
Description	As a chunk data (8 bytes length) inside GenDC Chunk section, this feature carries the timestamp of the frame.

Feature Name	ChunkOvertriggerCounter
Access Mode	Read only
Interface Type	IInteger
Value	≥0
Description	As a chunk data (8 bytes length) inside GenDC Chunk section, this feature counts how often the device was over triggered.

Feature Name	ChunkCRC
Access Mode	Read only
Interface Type	IInteger
Value	≥0
Description	As a chunk data (8 bytes length) inside GenDC Chunk section, this feature shows the values of CheckSum32 of the GenDC container.

Feature Name	ChunkComponentSelector
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	Intensity | Confidence | Range
Description	Selects the Component from which to retrieve data from. Using this selector it is possible to read and map chunk data to the individual Components.

Feature Name	ChunkCRC
Access Mode	Read only
Interface Type	IInteger
Value	≥0

Description	As a chunk data (8 bytes length) inside GenDC Chunk section, this feature shows the values of CheckSum32 of the GenDC container.

Feature Name	ChunkComponentSelector
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	Intensity | Confidence | Range
Description	Selects the Component from which to retrieve data from. Using this selector it is possible to read and map chunk data to the individual Components.

Feature Name	ChunkComponentIDValue[ChunkComponentSelector]
Access Mode	Read only
Interface Type	IInteger
Description	Returns a unique identifier value that corresponds to type of the component selected by ChunkComponentSelector according to GenICam standards.

Feature Name	ChunkScan3dOutputMode
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	CalibratedABC_Grid
Description	Returns the Calibrated Mode of the payload image.

Feature Name	ChunkScan3dCoordinateSelector
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	CoordinateA / CoordinateB / CoordinateC
Description	Selects individual chunk coordinate in the 3D information/transformation.

Feature Name	ChunkScan3dCoordinateScale[ChunkScan3dCoordinateSelector]
Access Mode	Read only
Interface Type	IFloat
Description	Returns the value of the Scan3dCoordinateScale.

Feature Name	ChunkScan3dCoordinateOffset[ChunkScan3dCoordinateSelector]
Access Mode	Read only
Interface Type	IFloat
Description	Returns the value of the Scan3dCoordinateOffset.

5.8 Scan3DControl

This section contains the features related to the control of the 3D scan features.

Feature Name	Scan3dDistanceUnit
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	Millimeter
Description	Specifies the unit used when delivering calibrated distance data. The value is fixed to Millimeter.

Feature Name	Scan3dCoordinateSystem
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	Cartesian
Description	Specifies the coordinate system used by the device. The value is fixed to Cartesian.

Feature Name	Scan3dOutputMode
Access Mode	Read only
Interface Type	IEnumeration
Enum Entry	CalibratedABC_Grid
Description	Controls the calibration and data organisation of the device and the coordinates transmitted. The value is fixed to CalibratedABC_Grid, meaning the device always transmits calibrated X, Y, Z point cloud data on a regular grid.

Feature Name	Scan3dCoordinateSelector
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	CoordinateA / CoordinateB / CoordinateC
Description	Selects the individual coordinates in the vectors for 3D information/transformation. • CoordinateA is for X coordinate. • CoordinateB is for Y coordinate • CoordinateC is for Z coordinate

Feature Name	Scan3dCoordinateScale[Scan3dCoordinateSelector]
Access Mode	Read only
Interface Type	IFloat
Value	1.00
Description	Scale factor used to transform pixel values from relative coordinates to world mm coordinates. The feature has a value 1.00 for all PixelFormat and Scan3dCoordinateSelector selections.

Feature Name	Scan3dCoordinateOffset[Scan3dCoordinateSelector]
Access Mode	Read only

Interface Type	IFloat
Value	0.00
Description	Offset factor, used to transform pixel values from relative coordinates to world mm coordinates. Currently the value is 0.00

Feature Name	Scan3dInvalidDataFlag[Scan3dCoordinateSelector]
Access Mode	Read only
Interface Type	IBoolean
Value	1
Description	The flag enables/disables the identification of invalid points in the received data. • When value is 0/False: No specific value is used to indicate the missing or invalid points. • When value is 1/True: Scan3dInvalidDataValue defines a special value in CoordinateC to mark the invalid points. Currently the value is fixed to 1.

Feature Name	Scan3dInvalidDataValue[Scan3dCoordinateSelector]
Access Mode	Read only
Interface Type	IFloat
Value	0.00
Description	The feature can be used to identify invalid pixels/points if Scan3dInvalidDataFlag is enabled. Some pixel values in pointcloud are invalid, if the CoordinateC=0. For example, pixels outside working range are treated as invalid, and they are enforced automatically to [0, 0].

Feature Name	Scan3dAxisMin[Scan3dCoordinateSelector]
Access Mode	Read only
Interface Type	IFloat
Description	This feature defines the minimum working range value for the selected axis.

Feature Name	Scan3dAxisMax[Scan3dCoordinateSelector]
Access Mode	Read only
Interface Type	IFloat
Description	This feature defines the maximum working value for the selected axis.

Feature Name	Scan3dAxisMinStart[Scan3dCoordinateSelector]
Access Mode	Read only*
Interface Type	IFloat
Description	This feature defines the minimum working range value for the selected X or Y axis at start of working range.

	* This feature is unavailable, when Scan3dCoordianteSelector=CoordinateC.

Feature Name	Scan3dAxisMaxStart[Scan3dCoordinateSelector]
Access Mode	Read only*
Interface Type	IFloat
Description	This feature defines the maximum working range value for the selected X or Y axis at start of working range. * This feature is unavailable, when Scan3dCoordianteSelector=CoordinateC.

5.9 FilterControl

This section contains the features related to the filter control features.

Median Filter

Feature Name	MedianFilterEnable[MedianFilter]
Access Mode	Read/Write*
Interface Type	IBoolean
Value	1 | 0
Description	Enables/disables the median filter. * This feature is locked when acquisition starts.

Smooting Filter

Feature Name	SmoothingFilterEnable[SmoothingFilter]
Access Mode	Read/Write
Interface Type	IBoolean
Value	1 | 0
Description	Enables/disables the smoothing filter.

Feature Name	SmoothingFilterKernel[SmoothingFilter]
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	Three | Five | Seven | Nine
Description	Controls the kernel size of the smoothing filter. Kernel Size can be 3, 5, 7 or 9.

Outlier Filter

Feature Name	OutlierFilterEnable[OutlierFilter]
Access Mode	Read/Write
Interface Type	IBoolean
Value	1 | 0
Description	Enables/disables the outlier filter.

Feature Name	OutlierFilterSigma[OutlierFilter]
Access Mode	Read/Write

Interface Type	IFloat
Value	min: OutlierFilterSigmaMin* max: OutlierFilterSigmaMax*
Description	Controls the sigma of the outlier filter. * OutlierFilterSigmaMin and OutlierFilterSigmaMax are read only and invisible features.

Feature Name	OutlierFilterMinClusterSize[OutlierFilter]
Access Mode	Read/Write
Interface Type	IInteger
Enum Entry	min: 0 ... max: 1000
Description	Specifies the unit used when delivering (calibrated) distance data.

Working Area Filter

Feature Name	WorkingAreaCFilter[WorkingAreaFilter]
Access Mode	Read/Write
Interface Type	IBoolean
Value	1 | 0
Description	Enables/disables the working area filter.

Feature Name	WorkingAreaCMin[WorkingAreaFilter]
Access Mode	Read/Write
Interface Type	IInteger
Value	min: WorkingAreaCMinMin* ... max: WorkingAreaCMinMax*
Description	Controls the minimum value of the working area filter. * WorkingAreaCMinMin and WorkingAreaCMinMax are read only and invisible features. The values depends on the device working range in coordinate C (Coordinate Z)

Feature Name	WorkingAreaCMax[WorkingAreaFilter]
Access Mode	Read/Write
Interface Type	IInteger
Value	min:WorkingAreaCMaxMin* ... max: WorkingAreaCMaxMax*
Description	Controls the maximum of the working area filter. * WorkingAreaCMaxMin and WorkingAreaCMaxMax are read only and invisible features. The values depends on the device working range in coordinate C (Coordinate Z)

Feature Name	ExtendedWorkingArea[WorkingAreaFilter]
Access Mode	Read/Write*
Interface Type	IBoolean
Value	1 | 0

Description	This feature enables showing point cloud that might be located outside the working range. The number of points outside the working range and the position of them might be different from one device to another. * This feature is locked when acquisition starts.

Confidence Filter

Feature Name	ConfidenceFilterEnable[ConfidenceFilter]
Access Mode	Read/Write
Interface Type	IBoolean
Value	1 | 0
Description	Enables/disables filter of ConfidenceThreshold.

Feature Name	ConfidenceThreshold[ConfidenceFilter]
Access Mode	Read/Write*
Interface Type	IInteger
Value	min: 0.0 ... max: 0.99
Description	Controls the filter of ConfidenceThreshold. The point cloud that have a confidence value less than the threshold value will be invalidated * This feature is locked when acquisition starts.

5.10 UserSetControl

This section includes all features associated with user set management.

Feature Name	UserSetCurrent
Access Mode	Read only
Interface Type	IInteger
Description	Returns the index of the current active user set.

Feature Name	UserSetSelector
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	Default | Dark | Reflective | Translucent | Accurate
Description	Selects the User Set to load, save or configure.

Feature Name	UserSetLoad[UserSetSelector]
Access Mode	Write only*
Interface Type	ICommand
Description	Loads the User Set specified by UserSetSelector to the device and makes it active. * This feature is locked when acquisition starts.

Feature Name	UserSetSave[UserSetSelector]
Access Mode	Write only*
Interface Type	ICommand

Description	Saves the current device settings into the User Set specified by UserSetSelector to the non-volatile memory of the device. * This feature is locked when acquisition starts.

Feature Name	UserSetDefault
Access Mode	Read/Write*
Interface Type	IEnumeration
Enum Entry	Default | Dark | Reflective | Translucent | Accurate
Description	Selects the User Set to load and make active by default when the device is reset or powered up. * This feature is locked when acquisition starts.

5.11 DigitalIOControl

This section contains the features for configuring and controlling the digital input and output lines of the device.

Feature Name	LineSelector
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	Line1 / Line2 / Line3 / Line4
Description	Selects the physical I/O line to configure. The selected line determines the context for LineMode and LineSource.

Feature Name	LineMode[LineSelector]
Access Mode	Read/Write*
Interface Type	IEnumeration
Enum Entry	Input / Output
Description	Defines the direction of the selected line. This feature is only available in 3D mode (AcquisitionEngine = AcquisitionEngine3d); it is not available in 2D mode. • Input: The line is used as a digital input (e.g. as an external trigger source). Available for all lines. • Output: The line is used as a digital output driven by an internal signal selected via LineSource. Availability depends on the hardware configuration of the selected line. * This feature is locked when acquisition starts. The value is invalidated when LineSelector or TriggerSource changes..

Feature Name	LineSource[LineSelector]
Access Mode	Read/Write*
Interface Type	IEnumeration
Enum Entry	FrameActive | SensorBusy | Timer0

Description	This feature is available only in 3D mode (AcquisitionEngine = AcquisitionEngine3d) and only if the LineMode[LineSelector] = Output. It is not available in 2D mode. Selects the internal signal to output on the selected line. This feature is only available when LineMode = Output. • FrameActive: The output signal is active while a frame is being acquired. • SensorBusy: The output signal reflects the busy state of the image sensor. • Timer0: The output signal is driven by Timer0. See CounterAndTimerControl (section 4.12) for timer configuration. * This feature is locked when acquisition starts. The value is invalidated when LineSelector changes.

5.12 CounterAndTimerControl

This section contains the features for configuring the hardware timer. The timer output can be used as a line source via LineSource = Timer0 (see section DigitalIOControl [▶ 31]). TimerTriggerSource, TimerDuration and TimerDelay are hidden (Not Available) in the GenICam nodemap until a line is configured with LineMode = Output and LineSource = Timer0 (see section DigitalIOControl [▶ 31]), and 3D mode is active (AcquisitionEngine = AcquisitionEngine3d). They appear as soon as such a line is configured.

Feature Name	TimerSelector
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	Timer0
Description	Selects the timer to configure. Currently only Timer0 is available. The selected timer determines the context for TimerTriggerSource, TimerDuration, and TimerDelay.

Feature Name	TimerTriggerSource[TimerSelector]
Access Mode	Read/Write*
Interface Type	IEnumeration
Enum Entry	FrameStart | FrameEnd
Description	Selects the internal event that starts the selected timer. • FrameStart: The timer starts at the reception of the frame trigger. • FrameEnd: The timer starts at the end of frame acquisition. * This feature is hidden until at least one line has LineMode = Output, LineSource = Timer0 and AcquisitionEngine = AcquisitionEngine3d; see section DigitalIOControl [▶ 31].

Feature Name	TimerDuration[TimerSelector]
Access Mode	Read/Write*
Interface Type	IFloat
Value	min: 0.0 ... max: 80527
Unit	µs

Description	Sets the duration of the timer pulse in microseconds. * This feature is hidden until at least one line has LineMode = Output, LineSource = Timer0 and AcquisitionEngine = AcquisitionEngine3d; see section DigitalIOControl [▶ 31].

Feature Name	TimerDelay[TimerSelector]
Access Mode	Read/Write*
Interface Type	IFloat
Value	min: 0.0 ... max: 80527
Unit	µs
Description	Sets the delay in microseconds between the reception of the timer trigger event and the start of the timer pulse. * This feature is hidden until at least one line has LineMode = Output, LineSource = Timer0 and AcquisitionEngine = AcquisitionEngine3d; see section DigitalIOControl [▶ 31].

6 Data Stream Module

This module, as well as the features inside it, is only available when a physical device is selected, connected, and a data stream has been opened on it.

6.1 BufferHandlingControl

Feature Name	StreamLostFrameCount
Access Mode	Read only
Interface Type	IInteger
Description	Number of lost frames since the stream was opened. The value combines two sources of frame loss: • Device-level losses: frames dropped by the device or SDK, detected as gaps in the frame ID sequence. • Producer-level discards: frames dropped by the GenTL producer because no free input buffer was available in the buffer pool, or because the internal frame queue overflowed. The counter is reset to 0 each time the stream is opened.

6.2 EventControl

Feature Name	EventSelector
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	BuffersDiscarded
Description	Selects which stream event to signal to the consumer. BuffersDiscarded: Raised when input buffers are discarded due to a full GenTL input buffer pool, an internal frame queue overflow, or a gap detected in the SDK frame ID sequence.

Feature Name	EventNotification[EventSelector]
Access Mode	Read/Write
Interface Type	IEnumeration
Enum Entry	Off | On
Description	Activate or deactivate the notification to the consumer of the occurrence of the selected event.

Feature Name	EventBuffersDiscardedData
Access Mode	Read only
Interface Type	ICategory
Description	Category that contains all the data features related to the BuffersDiscarded event.

Feature Name	EventBuffersDiscarded
Category	EventBuffersDiscardedData

Access Mode	Read only
Interface Type	IInteger
Description	Raised when input buffers are discarded. Its value uniquely identifies the type of event received.

Feature Name	EventBuffersDiscardedDeviceCount
Category	EventBuffersDiscardedData
Access Mode	Read only
Interface Type	IInteger
Description	Cumulative number of frames discarded by the device or SDK, reported at the time of this event. Frame losses at this level are detected as gaps in the frame ID sequence provided by the SDK. The counter is reset to 0 each time the stream is opened.

Feature Name	EventBuffersDiscardedProducerCount
Category	EventBuffersDiscardedData
Access Mode	Read only
Interface Type	IInteger
Description	Cumulative number of frames discarded by the GenTL producer, reported at the time of this event. Producer-level discards occur when no free input buffer is available in the GenTL buffer pool, or when the internal SDK frame queue overflows and an existing frame is overwritten or dropped. The counter is reset to 0 each time the stream is opened.