



# cuDLA API

## API Reference Manual

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# Chapter 1. Modules

Here is a list of all modules:

- ▶ [Data types used by cuDLA driver](#)
- ▶ [cuDLA API](#)

## 1.1. Data types used by cuDLA driver

union cudlaDevAttribute

struct cudlaExternalMemoryHandleDesc\_t

struct cudlaExternalSemaphoreHandleDesc\_t

struct CudlaFence

union cudlaModuleAttribute

struct cudlaModuleTensorDescriptor

struct cudlaSignalEvents

struct cudlaTask

struct cudlaWaitEvents

enum cudlaAccessPermissionFlags

Access permission flags for importing NvSciBuffers

#### Values

**CUDLA\_READ\_WRITE\_PERM = 0**

Flag to import memory with read-write permission

**CUDLA\_READ\_ONLY\_PERM = 1**

Flag to import memory with read-only permission

**CUDLA\_TASK\_STATISTICS = 1<<1**

Flag to indicate buffer as layerwise statistics buffer.

enum cudlaDevAttributeType

Device attribute type.

#### Values

**CUDLA\_UNIFIED\_ADDRESSING = 0**

Flag to check for support for UVA.

**CUDLA\_DEVICE\_VERSION = 1**

Flag to check for DLA HW version.

## enum cudlaFenceType

Supported fence types.

### Values

**CUDLA\_NVSCISYNC\_FENCE = 1**

NvSciSync fence type for EOF.

**CUDLA\_NVSCISYNC\_FENCE\_SOF = 2**

## enum cudlaMode

Device creation modes.

### Values

**CUDLA\_CUDA\_DLA = 0**

Hybrid mode.

**CUDLA\_STANDALONE = 1**

Standalone mode.

## enum cudlaModuleAttributeType

Module attribute types.

### Values

**CUDLA\_NUM\_INPUT\_TENSORS = 0**

Flag to retrieve number of input tensors.

**CUDLA\_NUM\_OUTPUT\_TENSORS = 1**

Flag to retrieve number of output tensors.

**CUDLA\_INPUT\_TENSOR\_DESCRIPTOR = 2**

Flag to retrieve all the input tensor descriptors.

**CUDLA\_OUTPUT\_TENSOR\_DESCRIPTOR = 3**

Flag to retrieve all the output tensor descriptors.

**CUDLA\_NUM\_OUTPUT\_TASK\_STATISTICS = 4**

Flag to retrieve total number of output task statistics buffer.

**CUDLA\_OUTPUT\_TASK\_STATISTICS\_DESCRIPTOR = 5**

Flag to retrieve all the output task statistics descriptors.

## enum cudlaModuleLoadFlags

Module load flags for [cudlaModuleLoadFromMemory](#).

## Values

### **CUDLA\_MODULE\_DEFAULT = 0**

Default flag.

### **CUDLA\_MODULE\_ENABLE\_FAULT\_DIAGNOSTICS = 1**

Flag to load a module that is used to perform permanent fault diagnostics for DLA HW.

## enum cudlaNvSciSyncAttributes

cuDLA NvSciSync attributes.

## Values

### **CUDLA\_NVSCISYNC\_ATTR\_WAIT = 1**

Wait attribute.

### **CUDLA\_NVSCISYNC\_ATTR\_SIGNAL = 2**

Signal attribute.

## enum cudlaStatus

Error codes.

## Values

### **cudlaSuccess = 0**

The API call returned with no errors.

### **cudlaErrorInvalidParam = 1**

This indicates that one or more parameters passed to the API is/are incorrect.

### **cudlaErrorOutOfResources = 2**

This indicates that the API call failed due to lack of underlying resources.

### **cudlaErrorCreationFailed = 3**

This indicates that an internal error occurred during creation of device handle.

### **cudlaErrorInvalidAddress = 4**

This indicates that the memory object being passed in the API call has not been registered before.

### **cudlaErrorOs = 5**

This indicates that an OS error occurred.

### **cudlaErrorCuda = 6**

This indicates that there was an error in a CUDA operation as part of the API call.

### **cudlaErrorUmd = 7**

This indicates that there was an error in the DLA runtime for the API call.

### **cudlaErrorInvalidDevice = 8**

This indicates that the device handle passed to the API call is invalid.

### **cudlaErrorInvalidAttribute = 9**

This indicates that an invalid attribute is being requested.



**cudaErrorIncompatibleDlaSWVersion = 10**

This indicates that the underlying DLA runtime is incompatible with the current cuDLA version.

**cudaErrorMemoryRegistered = 11**

This indicates that the memory object is already registered.

**cudaErrorInvalidModule = 12**

This indicates that the module being passed is invalid.

**cudaErrorUnsupportedOperation = 13**

This indicates that the operation being requested by the API call is unsupported.

**cudaErrorNvSci = 14**

This indicates that the NvSci operation requested by the API call failed.

**cudaErrorDlaErrInvalidInput = 0x40000001**

DLA HW Error.

**cudaErrorDlaErrInvalidPreAction = 0x40000002**

DLA HW Error.

**cudaErrorDlaErrNoMem = 0x40000003**

DLA HW Error.

**cudaErrorDlaErrProcessorBusy = 0x40000004**

DLA HW Error.

**cudaErrorDlaErrTaskStatusMismatch = 0x40000005**

DLA HW Error.

**cudaErrorDlaErrEngineTimeout = 0x40000006**

DLA HW Error.

**cudaErrorDlaErrDataMismatch = 0x40000007**

DLA HW Error.

**cudaErrorUnknown = 0x7fffffff**

This indicates that an unknown error has occurred.

## enum cudaSubmissionFlags

Task submission flags for [cudaSubmitTask](#).

### Values

**CUDLA\_SUBMIT\_NOOP = 1**

Flag to specify that the submitted task must be bypassed for execution.

**CUDLA\_SUBMIT\_SKIP\_LOCK\_ACQUIRE = 1<<1**

Flag to specify that the global lock acquire must be skipped.

**CUDLA\_SUBMIT\_DIAGNOSTICS\_TASK = 1<<2**

Flag to specify that the submitted task is to run permanent fault diagnostics for DLA HW.

## typedef cudaDevHandle\_t \*cudaDevHandle

cuDLA Device Handle

```
typedef cudlaModule_t *cudlaModule
```

cuDLA Module Handle

## 1.2. Modules

Here is a list of all modules:

- ▶ [Data types used by cuDLA driver](#)
- ▶ [cuDLA API](#)

### 1.1. Data types used by cuDLA driver

```
union cudlaDevAttribute
```

```
struct cudlaExternalMemoryHandleDesc_t
```

```
struct cudlaExternalSemaphoreHandleDesc_t
```

```
struct CudlaFence
```

```
union cudlaModuleAttribute
```

```
struct cudlaModuleTensorDescriptor
```

```
struct cudlaSignalEvents
```

```
struct cudlaTask
```

```
struct cudlaWaitEvents
```

```
enum cudlaAccessPermissionFlags
```

Access permission flags for importing NvSciBuffers

#### Values

**CUDLA\_READ\_WRITE\_PERM = 0**

Flag to import memory with read-write permission

**CUDLA\_READ\_ONLY\_PERM = 1**

Flag to import memory with read-only permission

**CUDLA\_TASK\_STATISTICS = 1<<1**

Flag to indicate buffer as layerwise statistics buffer.

## enum cudlaDevAttributeType

Device attribute type.

### Values

**CUDLA\_UNIFIED\_ADDRESSING = 0**

Flag to check for support for UVA.

**CUDLA\_DEVICE\_VERSION = 1**

Flag to check for DLA HW version.

## enum cudlaFenceType

Supported fence types.

### Values

**CUDLA\_NVSCISYNC\_FENCE = 1**

NvSciSync fence type for EOF.

**CUDLA\_NVSCISYNC\_FENCE\_SOF = 2**

## enum cudlaMode

Device creation modes.

### Values

**CUDLA\_CUDA\_DLA = 0**

Hybrid mode.

**CUDLA\_STANDALONE = 1**

Standalone mode.

## enum cudlaModuleAttributeType

Module attribute types.

### Values

**CUDLA\_NUM\_INPUT\_TENSORS = 0**

Flag to retrieve number of input tensors.

**CUDLA\_NUM\_OUTPUT\_TENSORS = 1**

Flag to retrieve number of output tensors.

**CUDLA\_INPUT\_TENSOR\_DESCRIPTOR = 2**

Flag to retrieve all the input tensor descriptors.

**CUDLA\_OUTPUT\_TENSOR\_DESCRIPTOR = 3**

Flag to retrieve all the output tensor descriptors.

**CUDLA\_NUM\_OUTPUT\_TASK\_STATISTICS = 4**

Flag to retrieve total number of output task statistics buffer.

**CUDLA\_OUTPUT\_TASK\_STATISTICS\_DESCRIPTOR = 5**

Flag to retrieve all the output task statistics descriptors.

## enum cudlaModuleLoadFlags

Module load flags for [cudlaModuleLoadFromMemory](#).

### Values

**CUDLA\_MODULE\_DEFAULT = 0**

Default flag.

**CUDLA\_MODULE\_ENABLE\_FAULT\_DIAGNOSTICS = 1**

Flag to load a module that is used to perform permanent fault diagnostics for DLA HW.

## enum cudlaNvSciSyncAttributes

cuDLA NvSciSync attributes.

### Values

**CUDLA\_NVSCISYNC\_ATTR\_WAIT = 1**

Wait attribute.

**CUDLA\_NVSCISYNC\_ATTR\_SIGNAL = 2**

Signal attribute.

## enum cudlaStatus

Error codes.

### Values

**cudlaSuccess = 0**

The API call returned with no errors.

**cudlaErrorInvalidParam = 1**

This indicates that one or more parameters passed to the API is/are incorrect.

**cudlaErrorOutOfResources = 2**

This indicates that the API call failed due to lack of underlying resources.

**cudlaErrorCreationFailed = 3**

This indicates that an internal error occurred during creation of device handle.

**cudlaErrorInvalidAddress = 4**

This indicates that the memory object being passed in the API call has not been registered before.

**cudlaErrorOs = 5**

This indicates that an OS error occurred.

**cudaErrorCuda = 6**

This indicates that there was an error in a CUDA operation as part of the API call.

**cudaErrorUmd = 7**

This indicates that there was an error in the DLA runtime for the API call.

**cudaErrorInvalidDevice = 8**

This indicates that the device handle passed to the API call is invalid.

**cudaErrorInvalidAttribute = 9**

This indicates that an invalid attribute is being requested.

**cudaErrorIncompatibleDlaSWVersion = 10**

This indicates that the underlying DLA runtime is incompatible with the current cuDLA version.

**cudaErrorMemoryRegistered = 11**

This indicates that the memory object is already registered.

**cudaErrorInvalidModule = 12**

This indicates that the module being passed is invalid.

**cudaErrorUnsupportedOperation = 13**

This indicates that the operation being requested by the API call is unsupported.

**cudaErrorNvSci = 14**

This indicates that the NvSci operation requested by the API call failed.

**cudaErrorDlaErrInvalidInput = 0x40000001**

DLA HW Error.

**cudaErrorDlaErrInvalidPreAction = 0x40000002**

DLA HW Error.

**cudaErrorDlaErrNoMem = 0x40000003**

DLA HW Error.

**cudaErrorDlaErrProcessorBusy = 0x40000004**

DLA HW Error.

**cudaErrorDlaErrTaskStatusMismatch = 0x40000005**

DLA HW Error.

**cudaErrorDlaErrEngineTimeout = 0x40000006**

DLA HW Error.

**cudaErrorDlaErrDataMismatch = 0x40000007**

DLA HW Error.

**cudaErrorUnknown = 0x7fffffff**

This indicates that an unknown error has occurred.

## enum cudaSubmissionFlags

Task submission flags for [cudaSubmitTask](#).

### Values

**CUDA\_SUBMIT\_NOOP = 1**

Flag to specify that the submitted task must be bypassed for execution.

**CUDLA\_SUBMIT\_SKIP\_LOCK\_ACQUIRE = 1<<1**

Flag to specify that the global lock acquire must be skipped.

**CUDLA\_SUBMIT\_DIAGNOSTICS\_TASK = 1<<2**

Flag to specify that the submitted task is to run permanent fault diagnostics for DLA HW.

**typedef cudlaDevHandle\_t \*cudlaDevHandle**

cuDLA Device Handle

**typedef cudlaModule\_t \*cudlaModule**

cuDLA Module Handle

---

# Chapter 2. Data Structures

Here are the data structures with brief descriptions:

[cudaDevAttribute](#)

[cudaExternalMemoryHandleDesc](#)

[cudaExternalSemaphoreHandleDesc](#)

[CudaFence](#)

[cudaModuleAttribute](#)

[cudaModuleTensorDescriptor](#)

[cudaSignalEvents](#)

[cudaTask](#)

[cudaWaitEvents](#)

## 2.1. cudaDevAttribute Union Reference

Device attribute.

`uint32_t cudaDevAttribute::deviceVersion`

DLA device version. Xavier has 1.0 and Orin has 2.0.

`uint8_t`

`cudaDevAttribute::unifiedAddressingSupported`

Returns 0 if unified addressing is not supported.

## 2.2. cudaExternalMemoryHandleDesc\_t Struct Reference

External memory handle descriptor.

```
const void
*cudlaExternalMemoryHandleDesc_t::extBufObject
```

A handle representing an external memory object.

```
unsigned long long
cudlaExternalMemoryHandleDesc_t::size
```

Size of the memory allocation

## 2.3. cudlaExternalSemaphoreHandleDesc\_t Struct Reference

External semaphore handle descriptor.

```
const void
*cudlaExternalSemaphoreHandleDesc_t::extSyncObject
```

A handle representing an external synchronization object.

## 2.4. CudlaFence Struct Reference

Fence description.

```
void *CudlaFence::fence
```

Fence.

```
cudlaFenceType CudlaFence::type
```

Fence type.

## 2.5. cudlaModuleAttribute Union Reference

Module attribute.



`cudaModuleTensorDescriptor`  
`*cudaModuleAttribute::inputTensorDesc`

Returns an array of input tensor descriptors.

`uint32_t cudaModuleAttribute::numInputTensors`

Returns the number of input tensors.

`uint32_t cudaModuleAttribute::numOutputTensors`

Returns the number of output tensors.

`cudaModuleTensorDescriptor`  
`*cudaModuleAttribute::outputTensorDesc`

Returns an array of output tensor descriptors.

## 2.6. `cudaModuleTensorDescriptor` Struct Reference

Tensor descriptor.

## 2.7. `cudaSignalEvents` Struct Reference

Signal events for [cudaSubmitTask](#)

`const **cudaSignalEvents::devPtrs`

Array of registered synchronization objects (via [cudaImportExternalSemaphore](#)).

`CudaFence *cudaSignalEvents::eofFences`

Array of fences pointers for all the signal events corresponding to the synchronization objects.

`uint32_t cudaSignalEvents::numEvents`

Total number of signal events.

## 2.8. cudlaTask Struct Reference

Structure of Task.

**const \*\*cudlaTask::inputTensor**

Array of input tensors.

**cudlaModule cudlaTask::moduleHandle**

cuDLA module handle.

**uint32\_t cudlaTask::numInputTensors**

Number of input tensors.

**uint32\_t cudlaTask::numOutputTensors**

Number of output tensors.

**const \*\*cudlaTask::outputTensor**

Array of output tensors.

**cudlaSignalEvents \*cudlaTask::signalEvents**

Signal events.

**const cudlaWaitEvents \*cudlaTask::waitEvents**

Wait events.

## 2.9. cudlaWaitEvents Struct Reference

Wait events for [cudlaSubmitTask](#).

**uint32\_t cudlaWaitEvents::numEvents**

Total number of wait events.

```
const CudlaFence *cudlaWaitEvents::preFences
```

Array of fence pointers for all the wait events.

---

# Chapter 3. Data Fields

Here is a list of all documented struct and union fields with links to the struct/union documentation for each field:

**deviceVersion**

[cudlaDevAttribute](#)

**devPtrs**

[cudlaSignalEvents](#)

**eofFences**

[cudlaSignalEvents](#)

**extBufObject**

[cudlaExternalMemoryHandleDesc](#)

**extSyncObject**

[cudlaExternalSemaphoreHandleDesc](#)

**fence**

[CudlaFence](#)

**inputTensor**

[cudlaTask](#)

**inputTensorDesc**

[cudlaModuleAttribute](#)

**moduleHandle**

[cudlaTask](#)

**numEvents**

[cudlaWaitEvents](#)

[cudlaSignalEvents](#)

**numInputTensors**

[cudlaTask](#)

[cudlaModuleAttribute](#)

**numOutputTensors**

[cudlaTask](#)

[cudlaModuleAttribute](#)

**outputTensor**

[cudlaTask](#)

**outputTensorDesc**

[cudlaModuleAttribute](#)

**preFences**[cudaWaitEvents](#)**signalEvents**[cudaTask](#)**size**[cudaExternalMemoryHandleDesc](#)**type**[CudlaFence](#)**unifiedAddressingSupported**[cudaDevAttribute](#)**waitEvents**[cudaTask](#)

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