



Technical Document

# PyD3XX Programmer's Guide

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PyD3XX is a Python wrapper created by Hector Soto for FTDI's D3XX library. This technical document gives an overview of PyD3XX's Application Programming Interface (API).

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PyPi Repo: [PyD3XX](#) · [PyPI](#)

GitHub Repo: <https://github.com/S-Hector/PyD3XX>



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# 1 - Introduction

The PyD3XX Python package is a Python wrapper for Future Technology Devices International's (FTDI's) C language D3XX library. PyD3XX was created so you could easily import a Python API that is cross-compatible with Windows, Linux, & macOS, to interact with FTDI's FT600 and FT601 devices. PyD3XX's API was designed to closely follow the naming conventions of the original D3XX C library's API while requiring zero ctypes knowledge to effectively use PyD3XX.

This programmer's guide provides an overview of PyD3XX's functions and classes.

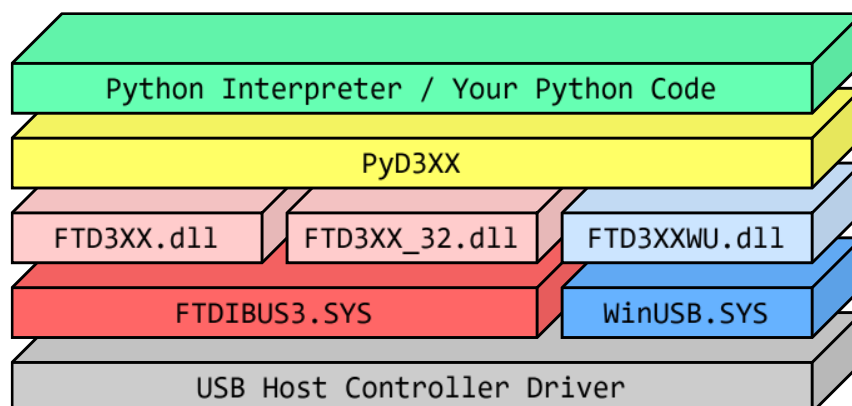
## 1.1 - Driver Library Files

PyD3XX comes with multiple D3XX dynamic library files for different operating systems and architectures. PyD3XX will automatically load whichever D3XX dynamic library file is necessary to run on the operating system and architecture it detects. Table 1.1.0 shows what D3XX dynamic library files are loaded for specific operating systems and architectures. For Windows, the older non-WinUSB drivers are designated as "Legacy" in Table 1.1.0.

Operating System		Library Version	Library File
Windows	WinUSB	64-Bit (x64)	FTD3XXWU.dll
		32-bit (x86)	FTD3XXWU_32.dll
		ARM	FTD3XXWU_ARM.dll
	Legacy	64-Bit (x64)	FTD3XX.dll
		32-bit (x86)	FTD3XX_32.dll
Linux	64-Bit (x64)		libftd3xx.so
	32-bit (x86)		libftd3xx_32.so
	ARM 64-bit		libftd3xx_ARM.so
	ARM 32-bit		libftd3xx_ARM_32.so
macOS	64-Bit (x64)		libftd3xx.dylib
	32-bit (x86)		libftd3xx_32.dylib
	ARM		libftd3xx_ARM.dylib

**Table 1.1.0 - D3XX Dynamic Library OS Associations**

Figure 1.1.0 shows how PyD3XX sits in your Windows application's hierarchy. If PyD3XX detects the WinUSB driver for FTDI's FT60X devices, it will load the WinUSB version of the D3XX library.



**Figure 1.1.0 - PyD3XX Windows Hierarchy**

## 1.2 - Interfaces, Channels, & Endpoints

FTDI's FT60X devices come with two interfaces, a communication interface and a data interface. The data interface can have up to 4 channels when the device is configured in FT600 mode. Each channel comes with a read and write endpoint, adding up to 8 total data endpoints for the data interface. The communication interface comes with two endpoints, a OUT BULK endpoint for receiving Session List commands from the host, and a IN INTERRUPT endpoint for Notification List commands.

Interface	FIFO Index	Pipe Index	Channel	Endpoint/s	Description
0	N/A	0	N/A	0x01	OUT BULK endpoint for Session List commands.
		1		0x81	IN INTERRUPT endpoint for Notification List commands.
1	0-3	0,2,4,6	1-4	0x02-0x05	OUT BULK endpoint for application write access. Writes data out to channels.
		1,3,5,7		0x82-0x85	IN BULK endpoint for application read access. Reads data in from channels.

Table 1.2.0 - FT60X Interfaces, Channels, & Endpoints

## 1.3 - SetPrintLevel()

D3XX C API Equivalent = NONE. PyD3XX exclusive.

### Summary

Sets the PrintLevel behavior of PyD3XX. By default, PrintLevel is set to PRINT\_NONE, where PyD3XX will not print out any messages.

### Parameters

Type	Name	Description
int	PrintLevel	A bitmask controlling what messages PyD3XX will print.
		PRINT_NONE 0b00000 Print no messages.
		PRINT_ERROR_CRITICAL 0b00001 Print critical error messages.
		PRINT_ERROR_MAJOR 0b00010 Print major error messages.
		PRINT_ERROR_MINOR 0b00100 Print minor error messages.
		PRINT_ERROR_ALL 0b00111 Print all error messages.
		PRINT_INFO_START 0b01000 Print informational startup messages.
		PRINT_INFO_DEVICE 0b10000 Print device information.
		PRINT_INFO_ALL 0b11000 Print all informational messages.
		PRINT_ALL 0b11111 Print all messages.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.

### Example Code

Example Code	PyD3XX.SetPrintLevel(PyD3XX.PRINT_ALL) # Make PyD3XX print everything.		
State	Successfully loaded dynamic library file.	Output	PyD3XX - Startup INFO: DID NOT DETECT WinUSB: Will use D3XX dynamic library. PyD3XX - Startup INFO: DETECTED 64-BIT PYTHON ENVIRONMENT: LOADING 64-bit dynamic library file & setting 64-bit argtypes. PyD3XX - Startup INFO: Successfully loaded FTDI D3XX dynamic library.

## 2 - PyD3XX Functions

This section goes over the available PyD3XX functions which can vary based on the operating system your Python code is running on. The "Platform" variable in PyD3XX is populated with one of the strings in Table 2.0.0 based off the operating system PyD3XX detected.

Operating System	Platform
Windows	windows
Linux	linux
Unknown OS	
macOS	darwin

Table 2.0.0 - Platform String Values

### 2.1 - FT\_CreateDeviceInfoList()

D3XX C API Equivalent = FT\_CreateDeviceInfoList()

#### Summary

Builds an internal device information list of all D3XX devices connected to the system and returns the total number of devices. The internal device information list does not change even if devices are added/removed from the system until FT\_CreateDeviceInfoList() is called again.

#### Parameters

None

#### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
int	DeviceCount	Number of D3XX devices connected to the system.

#### Example Code

Example Code	<pre>Status, DeviceCount = PyD3XX.FT_CreateDeviceInfoList() # Create a device info list. if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO CREATE DEVICE INFO LIST: ABORTING")     exit() print(str(DeviceCount) + " Devices detected.") if (DeviceCount == 0):     print("NO DEVICES DETECTED: ABORTING")     exit()</pre>					
	State	<table><tr><td>One device.</td><td rowspan="2">Output</td><td>1 Devices detected.</td></tr><tr><td>No devices.</td><td>0 Devices detected. NO DEVICES DETECTED: ABORTING</td></tr></table>	One device.	Output	1 Devices detected.	No devices.
One device.	Output	1 Devices detected.				
No devices.		0 Devices detected. NO DEVICES DETECTED: ABORTING				

## 2.2 – FT\_GetDeviceInfoList()

D3XX C API Equivalent = FT\_GetDeviceInfoList()

### Summary

Returns a list of FT\_Device objects and the number of D3XX devices in the list.

This function should only be called after calling FT\_CreateDeviceInfoList() which creates the list this function retrieves its device information from.

### Parameters

Type	Name	Description
int	DeviceCount	The number of devices you want to retrieve from the internal device information list.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
list[FT_Device]	Devices	A list of FT_Device objects.

### Example Code

Example Code	<pre>Status, Devices = PyD3XX.FT_GetDeviceInfoList(DeviceCount) # This will create a list. if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO CREATE DEVICE INFO LIST: ABORTING")     exit() for i in range(0, DeviceCount): # Get device info at each index from 0-&gt;(DeviceCount - 1).     if(Devices[i].Flags &amp; PyD3XX.FT_FLAGS_OPENED):         print("Device " + str(i) + " is opened by another process!")         continue # Device info not valid. Move onto next device.     print("---  Device " + str(i) + "  ---")</pre>					
	State	<table><tr><td>2 unopened devices.</td><td rowspan="2">Output</td><td>---  Device 0  --- ---  Device 1  ---</td></tr><tr><td>1 open, 1 unopened.</td><td>---  Device 0  --- Device 1 is opened by another process!</td></tr></table>	2 unopened devices.	Output	---  Device 0  --- ---  Device 1  ---	1 open, 1 unopened.
2 unopened devices.	Output	---  Device 0  --- ---  Device 1  ---				
1 open, 1 unopened.		---  Device 0  --- Device 1 is opened by another process!				

2 opened devices.	Device 0 is opened by another process! Device 1 is opened by another process!
-------------------	--

## 2.2B – FT\_GetDeviceInfoDict()

D3XX C API Equivalent = NONE. PyD3XX exclusive.

### Summary

Returns a dictionary of FT\_Device objects and the number of D3XX devices in the dictionary. This is meant as an alternative to FT\_GetDeviceInfoList() in the scenario where you want a Python dictionary instead of a Python list of FT\_Device objects.

This function should only be called after calling FT\_CreateDeviceInfoList() which creates the list this function retrieves its device information from.

### Parameters

Type	Name	Description
int	DeviceCount	The number of devices you want to retrieve from the internal device information list.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
dict[int, FT_Device]	Devices	A dictionary of FT_Device objects.

### Example Code

Example Code	<pre>Status, Devices = PyD3XX.FT_GetDeviceInfoDict(DeviceCount) # This will create a Python dictionary. if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO CREATE DEVICE INFO LIST: ABORTING")     exit() for i in range(0, DeviceCount): # Get device info at each index from 0-&gt;(DeviceCount - 1).     if(Devices[i].Flags &amp; PyD3XX.FT_FLAGS_OPENED):         print("Device " + str(i) + " is opened by another process!")         continue # Device info not valid. Move onto next device.     print("---  Device " + str(i) + "  ---")</pre>		
	2 unopened devices.	Output	---  Device 0  --- ---  Device 1  ---
	1 open, 1 unopened.		---  Device 0  --- Device 1 is opened by another process!
	2 opened devices.		Device 0 is opened by another process! Device 1 is opened by another process!

## 2.3 – FT\_GetDeviceInfoDetail()

D3XX C API Equivalent = FT\_GetDeviceInfoDetail()



## Summary

Returns an FT\_Device object that contains all of the information of the device recorded at the given index of the internal device information list. This does not create/open a device.

This function should only be called after calling FT\_CreateDeviceInfoList() which creates the list this function retrieves its device information from.

## Parameters

Type	Name	Description
int	Index	Index of the device entry to retrieve from the internal device information list.

## Return Values

Type	Name	Description
int	Status	FT_OK if successful.
FT_Device	ReturnDevice	The FT_Device object with the retrieved device information.

## Example Code

Example Code	<pre>Status, Device = PyD3XX.FT_GetDeviceInfoDetail(0) # Get info of a device at index 0. if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   WARNING: FAILED TO GET INFO FOR DEVICE 0") else:     if(Device.Flags &amp; PyD3XX.FT_FLAGS_OPENED):         print("Device 0 is opened by another process!")     else:         if(Device.Type == PyD3XX.FT_DEVICE_601):             print("Device 0 is a FT601 device!")         elif(Device.Type == PyD3XX.FT_DEVICE_600):             print("Device 0 is a FT600 device!")</pre>			
	State	FT600 connected.	Output	Device 0 is a FT600 device!
		FT601 connected.		Device 0 is a FT601 device!
		FT60X open in another program.		Device 0 is opened by another process!

## 2.4 - FT\_ListDevices()

D3XX C API Equivalent = FT\_ListDevices()

## Summary

Can return the total number of devices, the serial number or description of a single device, or return the serial number or description of multiple devices. This function will always return the Status integer. This function will also return either an integer, string, or list of strings.

## Parameters

Type	Name	Description
int	IndexCount	If (Flags & FT_LIST_BY_INDEX) != 0, then IndexCount is the index of the device whose serial number or description you want returned. If (Flags & FT_LIST_ALL) != 0, then IndexCount is the number of devices you

		want to get the info of. This should never be more than the number of devices connected to the system.
int	Flags	A bit field that controls what data you're requesting from FT_ListDevices. FT_LIST_NUMBER_ONLY = Return the number of devices connected to the system. FT_LIST_BY_INDEX = Return the serial number or description of the device at index IndexCount. FT_LIST_ALL = Return a list of the serial number or description of IndexCount devices. FT_OPEN_BY_SERIAL_NUMBER = Return serial number/s. FT_OPEN_BY_DESCRIPTION = Return description/s.

## Return Values

Type	Name	Description
int	Status	FT_OK if successful. Status will always be returned. Condition: (Flags & FT_LIST_NUMBER_ONLY) != 0
int	DeviceCount	The number of devices currently connected to the system. Condition: (Flags & FT_LIST_BY_INDEX) != 0
str	SerialDesc	If (Flags & FT_OPEN_BY_SERIAL_NUMBER) != 0, then it is the serial number of the device at the given index. If (Flags & FT_OPEN_BY_DESCRIPTION) != 0, then it is the description of the device at the given index. If there was an error, then it is FT_STATUS_STR[Status]. Condition: (Flags & FT_LIST_ALL) != 0
list[str]	SeriDescList	If (Flags & FT_OPEN_BY_SERIAL_NUMBER) != 0, then it is list of IndexCount device's serial numbers. If (Flags & FT_OPEN_BY_DESCRIPTION) != 0, then it is list of IndexCount device's descriptions. If there was an error, then it is a list of IndexCount FT_STATUS_STR[Status].

## Example Code

Example Code	<pre> Status, Count = PyD3XX.FT_ListDevices(PyD3XX.NULL, PyD3XX.FT_LIST_NUMBER_ONLY) print("Device Count: " + str(Count)) Status, SerialNumber = PyD3XX.FT_ListDevices(0, PyD3XX.FT_LIST_BY_INDEX   PyD3XX.FT_OPEN_BY_SERIAL_NUMBER) print("Device 0 Serial Number: " + str(SerialNumber)) Status, Description = PyD3XX.FT_ListDevices(0, PyD3XX.FT_LIST_BY_INDEX   PyD3XX.FT_OPEN_BY_DESCRIPTION) print("Device 0 Description: " + str(Description)) Status, SerialNumbers = PyD3XX.FT_ListDevices(Count, PyD3XX.FT_LIST_ALL   PyD3XX.FT_OPEN_BY_SERIAL_NUMBER) for i in range(Count):     print("Device " + str(i) + " Serial Number: " + str(SerialNumbers[i])) Status, Descriptions = PyD3XX.FT_ListDevices(Count, PyD3XX.FT_LIST_ALL   PyD3XX.FT_OPEN_BY_DESCRIPTION) for i in range(Count):     print("Device " + str(i) + " Description: " + str(Descriptions[i])) </pre>
--------------	--

State	Two devices connected.	Output	Device Count: 2 Device 0 Serial Number: 000000000001 Device 0 Description: FTDI SuperSpeed-FIFO Bridge Device 0 Serial Number: 000000000001 Device 1 Serial Number: 44TXERgJa3h2IHD Device 0 Description: FTDI SuperSpeed-FIFO Bridge Device 1 Description: TestDevice
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## 2.5 – FT\_Create()

D3XX C API Equivalent = FT\_Create()

### Summary

Opens the given device by index, serial number, or description for sole use by your program. You must give this function an FT\_Device object created by FT\_GetDeviceInfoList(), FT\_GetDeviceInfoDict(), or FT\_GetDeviceInfoDetail().

### Parameters

Type	Name	Description
int, str	Identifier	The index, serial number, or description of the device you want to open.
int	OpenFlag	A flag that controls whether the function opens the device by index, serial number, or description.
FT_Device	Device	The device you want to open.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.

### Example Code

Example Code	<pre> Status, Device = PyD3XX.FT_GetDeviceInfoDetail(0) # Get info of a device at index 0. if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   WARNING: FAILED TO GET INFO FOR DEVICE 0") print("Device (index, serial, desc): 0, " + Device.SerialNumber + ", " + Device.Description); Status = PyD3XX.FT_Create(0, PyD3XX.FT_OPEN_BY_INDEX, Device) if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO OPEN DEVICE: ABORTING")     exit() PyD3XX.FT_Close(Device) print("Successfully opened and closed device by index!"); Status = PyD3XX.FT_Create("44TXERgJa3h2IHD", PyD3XX.FT_OPEN_BY_SERIAL_NUMBER, Device) if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO OPEN DEVICE: ABORTING")     exit() PyD3XX.FT_Close(Device) print("Successfully opened and closed device by serial number!"); Status = PyD3XX.FT_Create("TestDevice", PyD3XX.FT_OPEN_BY_DESCRIPTION, Device) if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO OPEN DEVICE: ABORTING")     exit() PyD3XX.FT_Close(Device) print("Successfully opened and closed device by description!"); </pre>		
State	<table border="1"> <tr> <td data-bbox="147 1129 480 1281">Device not in use by another program.</td><td data-bbox="480 1129 1549 1281"> <div data-bbox="505 1161 532 1255" data-label="Text">Output</div> <div data-bbox="557 1140 1442 1281" data-label="Text"> <pre> Device (index, serial, desc): 0, 44TXERgJa3h2IHD, TestDevice Successfully opened and closed device by index! Successfully opened and closed device by serial number! Successfully opened and closed device by description! </pre> </div> </td></tr> </table>	Device not in use by another program.	<div data-bbox="505 1161 532 1255" data-label="Text">Output</div> <div data-bbox="557 1140 1442 1281" data-label="Text"> <pre> Device (index, serial, desc): 0, 44TXERgJa3h2IHD, TestDevice Successfully opened and closed device by index! Successfully opened and closed device by serial number! Successfully opened and closed device by description! </pre> </div>
Device not in use by another program.	<div data-bbox="505 1161 532 1255" data-label="Text">Output</div> <div data-bbox="557 1140 1442 1281" data-label="Text"> <pre> Device (index, serial, desc): 0, 44TXERgJa3h2IHD, TestDevice Successfully opened and closed device by index! Successfully opened and closed device by serial number! Successfully opened and closed device by description! </pre> </div>		

## 2.6 – FT\_Close()

D3XX C API Equivalent = FT\_Close()

### Summary

Closes a device opened by FT\_Create().

### Parameters

Type	Name	Description
FT_Device	Device	The device you want to close.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.

### Example Code

Example Code	<pre>Status = PyD3XX.FT_Create(0, PyD3XX.FT_OPEN_BY_INDEX, Device) # Open the device. if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO OPEN DEVICE: ABORTING")     exit() PyD3XX.FT_Close(Device) if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO CLOSE DEVICE: ABORTING")     exit() print("Successfully opened and closed device by index!");</pre>		
State	Device connected.	Output	Successfully opened and closed device by index!
	No devices.		FT_DEVICE_NOT_FOUND   FAILED TO OPEN DEVICE: ABORTING

## 2.7 - FT\_WritePipe()

D3XX C API Equivalent = FT\_WritePipe()

### Summary

Write data from an FT\_Buffer object to a given pipe.

### Parameters

Type	Name	Description	
FT_Device	Device	The device whose pipe you want to write to.	
FT_Pipe   int	Pipe_Endpoint	Windows	An FT_Pipe object of the pipe you want to write to.
		Linux MacOS	An integer of the endpoint you want to write to. Values 0x82-0x85 = Channels 1-4
FT_Buffer	Buffer	The buffer whose data you'll write to the pipe.	
int	BufferLength	The amount of data from the buffer that you want to write.	
FT_Overlapped   int	Overlapped_TimeoutMs	Windows	An FT_Overlapped structure if doing an asynchronous write or NULL for a synchronous write.
		Linux MacOS	An int for the number of milliseconds FT_WritePipe can hang on before timing out.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
int	BytesTransferred	The number of bytes successfully written to the pipe.

### Example Code

Example Code

```
Pipes = {}
for i in range(2): # Get in and out pipes for channel 1.
    Status, Pipes[i] = PyD3XX.FT_GetPipeInformation(Device, 1, i)
    if Status != PyD3XX.FT_OK:
        print("FAILED TO GET PIPE INFO OF [1," + str(i) + "]: ABORTING")
        exit()
if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):
    Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipe(Device, int("0x82", 16), 1, 0)
else:
    Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipe(Device, Pipes[1], 1, PyD3XX.NULL)
if(Status == PyD3XX.FT_OK):
    ReadValue = format(int.from_bytes(ReadBuffer.Value(), "little"), "x").zfill(1*2)
    print("Channel 1 = 0x" + ReadValue)
else:
    print(PyD3XX.FT_STATUS_STR[Status] + " | Failed to read data!: ABORTING")
    exit()
WriteBuffer = PyD3XX.FT_Buffer.from_int(int.from_bytes(ReadBuffer.Value(), "little") + 1)
if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):
    Status, BytesWrote = PyD3XX.FT_WritePipe(Device, int("0x02", 16), WriteBuffer, 1, 0)
else:
    Status, BytesWrote = PyD3XX.FT_WritePipe(Device, Pipes[0], WriteBuffer, 1, PyD3XX.NULL)
if(Status == PyD3XX.FT_OK):
    WriteValue = format(int.from_bytes(WriteBuffer.Value(), "little"), "x").zfill(1*2)
    print("Wrote 0x" + WriteValue + " to Channel 1!")
else:
    print(PyD3XX.FT_STATUS_STR[Status] + " | Failed to write data!: ABORTING")
    exit()
```

State

First success.

Second success.

Output

Channel 1 = 0x01  
Wrote 0x02 to Channel 1!

Channel 1 = 0x02  
Wrote 0x03 to Channel 1!

## 2.8 – FT\_ReadPipe()

D3XX C API Equivalent = FT\_ReadPipe()

### Summary

Returns an FT\_Buffer object with data read from a given pipe.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose pipe you want to read from.

FT_Pipe   int	Pipe_Endpoint	Windows	An FT_Pipe object of the pipe you want to read from.
		Linux MacOS	An integer of the endpoint you want to read from. Values 0x02-0x05 = Channels 1-4
int	BufferLength	The amount of data you want to read from the pipe.	
FT_Overlapped   int	Overlapped_TimeoutMs	Windows	An FT_Overlapped structure if doing an asynchronous read or NULL for a synchronous read.
		Linux MacOS	An int for the number of milliseconds FT_ReadPipe can hang on before timing out.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
FT_Buffer	Buffer	The buffer with data read from the pipe.
int	BytesTransferred	The number of bytes successfully read from the pipe into the buffer.

### Example Code

Example Code

```
Pipes = {}
for i in range(2): # Get in and out pipes for channel 1.
    Status, Pipes[i] = PyD3XX.FT_GetPipeInformation(Device, 1, i)
    if Status != PyD3XX.FT_OK:
        print("FAILED TO GET PIPE INFO OF [1," + str(i) + "]: ABORTING")
        exit()
if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):
    Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipe(Device, int("0x82", 16), 1, 0)
else:
    Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipe(Device, Pipes[1], 1, PyD3XX.NULL)
if(Status == PyD3XX.FT_OK):
    ReadValue = format(int.from_bytes(ReadBuffer.Value(), "little"), "x").zfill(1*2)
    print("Channel 1 = 0x" + ReadValue)
else:
    print(PyD3XX.FT_STATUS_STR[Status] + " | Failed to read data!: ABORTING")
    exit()
WriteBuffer = PyD3XX.FT_Buffer.from_int(int.from_bytes(ReadBuffer.Value(), "little") + 1)
if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):
    Status, BytesWrote = PyD3XX.FT_WritePipe(Device, int("0x02", 16), WriteBuffer, 1, 0)
else:
    Status, BytesWrote = PyD3XX.FT_WritePipe(Device, Pipes[0], WriteBuffer, 1, PyD3XX.NULL)
if(Status == PyD3XX.FT_OK):
    WriteValue = format(int.from_bytes(WriteBuffer.Value(), "little"), "x").zfill(1*2)
    print("Wrote 0x" + WriteValue + " to Channel 1!")
else:
    print(PyD3XX.FT_STATUS_STR[Status] + " | Failed to write data!: ABORTING")
    exit()
```

State

First success.

Second success.

Output

Channel 1 = 0x01  
Wrote 0x02 to Channel 1!

Channel 1 = 0x02  
Wrote 0x03 to Channel 1!

## 2.9 - FT\_WritePipeEx()

D3XX C API Equivalent = FT\_WritePipeEx()

### Summary

Write data from an FT\_Buffer object to a given pipe. FT\_WritePipeEx() has lower latency than FT\_WritePipe() for asynchronous transfers when used along with FT\_SetStreamPipe.

Note: FT\_WritePipeEx() supports a maximum buffer size of 1 MiB. This is to guarantee lower latencies.

### Parameters

Type	Name	Description
------	------	-------------



FT_Device	Device	The device whose pipe you want to write to.	
FT_Pipe   int	Pipe_FIFOindex	Windows	An FT_Pipe object of the pipe you want to write to.
		Linux MacOS	An integer FIFO index of the channel you want to write to. Values 0-3 = Channels 1-4
FT_Buffer	Buffer	The buffer whose data you'll write to the pipe.	
int	BufferLength	The amount of data from the buffer that you want to write.	
FT_Overlapped   int	Overlapped_TimeoutMs	Windows	An FT_Overlapped structure if doing an asynchronous write or NULL for a synchronous write.
		Linux MacOS	An int for the number of milliseconds FT_WritePipeEx can hang on before timing out.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
int	BytesTransferred	The number of bytes successfully written to the pipe.

### Example Code

Example Code

```
Pipes = {}
for i in range(2): # Get in and out pipes for channel 1.
    Status, Pipes[i] = PyD3XX.FT_GetPipeInformation(Device, 1, i)
    if Status != PyD3XX.FT_OK:
        print("FAILED TO GET PIPE INFO OF [1," + str(i) + "]: ABORTING")
        exit()
if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):
    Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipeEx(Device, 0, 1, 0)
else:
    Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipeEx(Device, Pipes[1], 1, PyD3XX.NULL)
if(Status == PyD3XX.FT_OK):
    ReadValue = format(int.from_bytes(ReadBuffer.Value(), "little"), "x").zfill(1*2)
    print("Channel 1 = 0x" + ReadValue)
else:
    print("Failed to read data!: ABORTING")
    exit()
WriteBuffer = PyD3XX.FT_Buffer.from_int(int.from_bytes(ReadBuffer.Value(), "little") + 1)
if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):
    Status, BytesWrote = PyD3XX.FT_WritePipeEx(Device, 0, WriteBuffer, 1, 0)
else:
    Status, BytesWrote = PyD3XX.FT_WritePipeEx(Device, Pipes[0], WriteBuffer, 1, PyD3XX.NULL)
if(Status == PyD3XX.FT_OK):
    WriteValue = format(int.from_bytes(WriteBuffer.Value(), "little"), "x").zfill(1*2)
    print("Wrote 0x" + WriteValue + " to Channel 1!")
else:
    print("Failed to write data!: ABORTING")
    exit()
```

State

First success.

Second success.

Output

Channel 1 = 0x01  
Wrote 0x02 to Channel 1!

Channel 1 = 0x02  
Wrote 0x03 to Channel 1!

## 2.9B - FT\_WritePipeAsync()

D3XX C API Equivalent = FT\_WritePipeAsync()

WARNING - This function is exclusive to Linux/macOS systems.

### Summary

Asynchronously write data from an FT\_Buffer object to a given pipe.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose pipe you want to write to.
int	FIFOindex	An integer FIFO index of the channel you want to write to. Values 0-3 = Channels 1-4



---

---

FT_Buffer	Buffer	The buffer whose data you'll write to the pipe.
int	BufferLength	The amount of data from the buffer that you want to write.
FT_Overlapped	Overlapped	An FT_Overlapped structure for doing an asynchronous write.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
int	BytesTransferred	The number of bytes successfully written to the pipe.

### Example Code

```

if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):
    Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipeAsync(Device, 0, 1, Overlaps[1])
else:
    Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipe(Device, Pipes[1], 1, Overlaps[1])
Attempts = 0
Status = PyD3XX.FT_IO_INCOMPLETE
while(Status == PyD3XX.FT_IO_INCOMPLETE):
    Status, BytesTransferred = PyD3XX.FT_GetOverlappedResult(Device, Overlaps[1], False)
    print("Waiting on input...")
    Attempts += 1
    time.sleep(1)
    if(Status == PyD3XX.FT_OK): break
    if(Attempts == 5):
        print(PyD3XX.FT_STATUS_STR[Status] + " | ERROR: Async read failed!")
        exit()
print(PyD3XX.FT_STATUS_STR[Status] + " | FT_ReadPipe was successful.")
ReadValue = format(int.from_bytes(ReadBuffer.Value(), "little"), "x").zfill(1*2)
print("Channel 1 = 0x" + ReadValue)

WriteBuffer = PyD3XX.FT_Buffer.from_int(int.from_bytes(ReadBuffer.Value(), "little") + 1)
if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):
    Status, BytesWrote = PyD3XX.FT_WritePipeAsync(Device, 0, WriteBuffer, 1, Overlaps[0])
else:
    Status, BytesWrote = PyD3XX.FT_WritePipe(Device, Pipes[0], WriteBuffer, 1, Overlaps[0])
Attempts = 0
Status = PyD3XX.FT_IO_INCOMPLETE
while(Status == PyD3XX.FT_IO_INCOMPLETE):
    Status, BytesTransferred = PyD3XX.FT_GetOverlappedResult(Device, Overlaps[0], False)
    print("Waiting on output...")
    Attempts += 1
    time.sleep(1)
    if(Status == PyD3XX.FT_OK): break
    if(Attempts == 5):
        print(PyD3XX.FT_STATUS_STR[Status] + " | ERROR: Async write failed!")
        exit()
print(PyD3XX.FT_STATUS_STR[Status] + " | FT_WritePipe was successful.")
for i in range(2): # Release overlaps since we're done using them.
    Status = PyD3XX.FT_ReleaseOverlapped(Device, Overlaps[i])
    if Status != PyD3XX.FT_OK:
        print(PyD3XX.FT_STATUS_STR[Status] + " | WARNING: FAILED TO RELEASE OVERLAP " +
str(i))

```

State	First success.	Output	Waiting on input... FT_OK   FT_ReadPipe was successful. Channel 1 = 0x01 Waiting on output... Waiting on output... FT_OK   FT_WritePipe was successful.
	Second success.		Waiting on input... Waiting on input... FT_OK   FT_ReadPipe was successful. Channel 1 = 0x02 Waiting on output... Waiting on output... FT_OK   FT_WritePipe was successful.

## 2.10 - FT\_ReadPipeEx()

D3XX C API Equivalent = FT\_ReadPipeEx()

### Summary

Returns an FT\_Buffer object with data read from a given pipe. FT\_ReadPipeEx() has lower latency than FT\_ReadPipe() for asynchronous transfers when used along with FT\_SetStreamPipe.

### Parameters

Type	Name	Description	
FT_Device	Device	The device whose pipe you want to read from.	
FT_Pipe   int	Pipe_FIFOindex	Windows	An FT_Pipe object of the pipe you want to read from.
		Linux MacOS	An integer FIFO index of the channel you want to read from. Values 0-3 = Channels 1-4
int	BufferLength	The amount of data you want to read from the pipe.	
FT_Overlapped   int	Overlapped_TimeoutMs	Windows	An FT_Overlapped structure if doing an asynchronous read or NULL for a synchronous read.
		Linux MacOS	An int for the number of milliseconds FT_ReadPipeEx can hang on before timing out.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
FT_Buffer	Buffer	The buffer with data read from the pipe.
int	BytesTransferred	The number of bytes successfully read from the pipe into the buffer.

## Example Code

Example Code	<pre>Pipes = {} for i in range(2): # Get in and out pipes for channel 1.     Status, Pipes[i] = PyD3XX.FT_GetPipeInformation(Device, 1, i)     if Status != PyD3XX.FT_OK:         print("FAILED TO GET PIPE INFO OF [1," + str(i) + "]: ABORTING")         exit() if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):     Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipeEx(Device, 0, 1, 0) else:     Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipeEx(Device, Pipes[1], 1, PyD3XX.NULL) if(Status == PyD3XX.FT_OK):     ReadValue = format(int.from_bytes(ReadBuffer.Value(), "little"), "x").zfill(1*2)     print("Channel 1 = 0x" + ReadValue) else:     print("Failed to read data!: ABORTING")     exit() WriteBuffer = PyD3XX.FT_Buffer.from_int(int.from_bytes(ReadBuffer.Value(), "little") + 1) if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):     Status, BytesWrote = PyD3XX.FT_WritePipeEx(Device, 0, WriteBuffer, 1, 0) else:     Status, BytesWrote = PyD3XX.FT_WritePipeEx(Device, Pipes[0], WriteBuffer, 1, PyD3XX.NULL) if(Status == PyD3XX.FT_OK):     WriteValue = format(int.from_bytes(WriteBuffer.Value(), "little"), "x").zfill(1*2)     print("Wrote 0x" + WriteValue + " to Channel 1!") else:     print("Failed to write data!: ABORTING")     exit()</pre>		
	State	First success.	Output
	Second success.		Channel 1 = 0x02 Wrote 0x03 to Channel 1!

## 2.10B - FT\_ReadPipeAsync()

D3XX C API Equivalent = FT\_ReadPipeAsync()

### Summary

Returns an FT\_Buffer object with data asynchronously read from a given pipe.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose pipe you want to read from.
int	FIFOindex	An integer FIFO index of the channel you want to read from. Values 0-3 = Channels 1-4



---

---

int	BufferLength	The amount of data you want to read from the pipe.
FT_Overlapped	Overlapped	An FT_Overlapped structure for doing an asynchronous read.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
FT_Buffer	Buffer	The buffer with data read from the pipe.
int	BytesTransferred	The number of bytes successfully read from the pipe into the buffer.

### Example Code

```

if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):
    Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipeAsync(Device, 0, 1, Overlaps[1])
else:
    Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipe(Device, Pipes[1], 1, Overlaps[1])
Attempts = 0
Status = PyD3XX.FT_IO_INCOMPLETE
while(Status == PyD3XX.FT_IO_INCOMPLETE):
    Status, BytesTransferred = PyD3XX.FT_GetOverlappedResult(Device, Overlaps[1], False)
    print("Waiting on input...")
    Attempts += 1
    time.sleep(1)
    if(Status == PyD3XX.FT_OK): break
    if(Attempts == 5):
        print(PyD3XX.FT_STATUS_STR[Status] + " | ERROR: Async read failed!")
        exit()
print(PyD3XX.FT_STATUS_STR[Status] + " | FT_ReadPipe was successful.")
ReadValue = format(int.from_bytes(ReadBuffer.Value(), "little"), "x").zfill(1*2)
print("Channel 1 = 0x" + ReadValue)

WriteBuffer = PyD3XX.FT_Buffer.from_int(int.from_bytes(ReadBuffer.Value(), "little") + 1)
if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):
    Status, BytesWrote = PyD3XX.FT_WritePipeAsync(Device, 0, WriteBuffer, 1, Overlaps[0])
else:
    Status, BytesWrote = PyD3XX.FT_WritePipe(Device, Pipes[0], WriteBuffer, 1, Overlaps[0])
Attempts = 0
Status = PyD3XX.FT_IO_INCOMPLETE
while(Status == PyD3XX.FT_IO_INCOMPLETE):
    Status, BytesTransferred = PyD3XX.FT_GetOverlappedResult(Device, Overlaps[0], False)
    print("Waiting on output...")
    Attempts += 1
    time.sleep(1)
    if(Status == PyD3XX.FT_OK): break
    if(Attempts == 5):
        print(PyD3XX.FT_STATUS_STR[Status] + " | ERROR: Async write failed!")
        exit()
print(PyD3XX.FT_STATUS_STR[Status] + " | FT_WritePipe was successful.")
for i in range(2): # Release overlaps since we're done using them.
    Status = PyD3XX.FT_ReleaseOverlapped(Device, Overlaps[i])
    if Status != PyD3XX.FT_OK:
        print(PyD3XX.FT_STATUS_STR[Status] + " | WARNING: FAILED TO RELEASE OVERLAP " +
str(i))

```



State	First success.	Output	Waiting on input... FT_OK   FT_ReadPipe was successful. Channel 1 = 0x01 Waiting on output... Waiting on output... FT_OK   FT_WritePipe was successful.
	Second success.		Waiting on input... Waiting on input... FT_OK   FT_ReadPipe was successful. Channel 1 = 0x02 Waiting on output... Waiting on output... FT_OK   FT_WritePipe was successful.

## 2.11 - FT\_GetOverlappedResult()

D3XX C API Equivalent = FT\_GetOverlappedResult()

### Summary

Returns the result of an overlapped operation to a pipe.

### Parameters

Type	Name	Description
FT_Device	Device	The device that had an overlapped operation done.
FT_Overlapped	Overlap	The overlapped structure that was used in a read/write operation.
bool	Wait	True: FT_GetOverlappedResult() will hang until the read/write operation has completed. False: FT_GetOverlappedResult() will immediately return whether the read/write operation has completed or not.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
int	LengthTransferred	The number of bytes successfully transferred in the read/write operation.

### Example Code

```
Pipes = {}
Overlaps = {}
for i in range(2): # Get in and out pipes for channel 1 and create overlaps.
    Status, Pipes[i] = PyD3XX.FT_GetPipeInformation(Device, 1, i)
    if Status != PyD3XX.FT_OK:
        print("FAILED TO GET PIPE INFO OF [1," + str(i) + "]: ABORTING")
        exit()
    Status, Overlaps[i] = PyD3XX.FT_InitializeOverlapped(Device)
    if(Status != PyD3XX.FT_OK):
        print("FAILED TO CREATE OVERLAP FOR PIPE " + str(i) + ": ABORTING")
        exit()
    Status = PyD3XX.FT_SetPipeTimeout(Device, Pipes[i], 100)
    if(Status != PyD3XX.FT_OK):
        print("WARNING: FAILED TO SET PIPE TIMEOUT TO 100")
        print("Status = " + PyD3XX.FT_STATUS_STR[Status])
if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):
    Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipeAsync(Device, 0, 1, Overlaps[1])
else:
    Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipe(Device, Pipes[1], 1, Overlaps[1])
Attempts = 0
Status = PyD3XX.FT_IO_INCOMPLETE
while(Status == PyD3XX.FT_IO_INCOMPLETE):
    Status, BytesTransferred = PyD3XX.FT_GetOverlappedResult(Device, Overlaps[1], False)
    print("Waiting on input...")
    Attempts += 1
    time.sleep(1)
    if((Status != PyD3XX.FT_OK) and (Status != PyD3XX.FT_IO_PENDING)) or (Attempts == 3):
        StatusAP = PyD3XX.FT_AbortPipe(Device, Pipes[1])
        if(StatusAP != PyD3XX.FT_OK):
            print("FT_AbortPipe failed!")
        else:
            print("Aborted read pipe!")
            break
print(PyD3XX.FT_STATUS_STR[Status] + " | Encountered error or FT_ReadPipe was successful.")
ReadValue = format(int.from_bytes(ReadBuffer.Value(), "little"), "x").zfill(1*2)
print("Channel 1 = 0x" + ReadValue)
for i in range(2): # Release overlaps since we're done using them.
    Status = PyD3XX.FT_ReleaseOverlapped(Device, Overlaps[i])
    if Status != PyD3XX.FT_OK:
        print(PyD3XX.FT_STATUS_STR[Status] + " | WARNING: FAILED TO RELEASE OVERLAP " +
str(i))
```

State	Successfully read one byte.	Output	Waiting on input... FT_OK   Encountered error or FT_ReadPipe was successful. Channel 1 = 0x01
	Overlapped read operation did not complete.		Waiting on input... Aborted read pipe! FT_IO_INCOMPLETE   Encountered error or FT_ReadPipe was successful. Channel 1 = 0x00

## 2.12 - FT\_InitializeOverlapped()

D3XX C API Equivalent = FT\_InitializeOverlapped()

### Summary

Create an FT\_Overlapped object to be used asynchronously with the FT\_WritePipe and FT\_ReadPipe functions. The FT\_Overlapped object should be released with FT\_ReleaseOverlapped after it is no longer needed.

### Parameters

Type	Name	Description
FT_Device	Device	The device you want to create an FT_Overlapped object from.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
FT_Overlapped	Overlap	The overlapped structure necessary for asynchronous read and write operations. Release with FT_ReleaseOverlapped when no longer needed.

### Example Code

Example Code	<pre>Status, Overlap = PyD3XX.FT_InitializeOverlapped(Device) if(Status != PyD3XX.FT_OK):     print("FAILED TO CREATE OVERLAP: ABORTING")     exit() print("Successfully created overlap!")</pre>		
State	Success	Output	Successfully created overlap!

## 2.13 - FT\_ReleaseOverlapped()

D3XX C API Equivalent = FT\_ReleaseOverlapped()

### Summary

Releases the resources used by an FT\_Overlapped object. Call this when an FT\_Overlapped object is no longer needed.

### Parameters

Type	Name	Description
------	------	-------------

FT_Device	Device	The device you want to release an overlap from.
FT_Overlapped	Overlap	The overlap to be released.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.

### Example Code

Example Code	<pre>Status, Overlap = PyD3XX.FT_InitializeOverlapped(Device) if(Status != PyD3XX.FT_OK):     print("FAILED TO CREATE OVERLAP: ABORTING")     exit() print("Successfully created overlap!") Status = PyD3XX.FT_ReleaseOverlapped(Device, Overlap) if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   WARNING: FAILED TO RELEASE OVERLAP.") else:     print("Successfully released overlap!")</pre>		
	State	Success	Output Successfully created overlap! Successfully released overlap!

## 2.14 – FT\_SetStreamPipe()

D3XX C API Equivalent = FT\_SetStreamPipe()

### Summary

Set the streaming protocol for pipes with a fixed transfer size in bytes.

Note: For the WinUSB drivers, the StreamSize parameter must be a multiple of the max packet size. Otherwise, future read calls will fail.

SuperSpeed: MaxPacketSize = 1024 bytes.

Hi-Speed: MaxPacketSize = 512 bytes.

Full Speed: MaxPacketSize = 64 bytes.

### Parameters

Type	Name	Description
FT_Device	Device	The device you want to set a streaming protocol for.
bool	AllWritePipes	True: Set the streaming protocol for all write pipes. False: Ignore
bool	AllReadPipes	True: Set the streaming protocol for all read pipes. False: Ignore
FT_Pipe	Pipe	If AllWritePipes & AllReadPipes are both False, then this specific pipe's streaming protocol is set. Otherwise this parameter is ignored and you should pass NULL instead.
int	StreamSize	Transfer size in bytes used for read/write operations.

### Return Values

Type	Name	Description
------	------	-------------

int	Status	FT_OK if successful.
-----	--------	----------------------

### Example Code

Example Code	<pre>Status = PyD3XX.FT_SetStreamPipe(Device, True, True, PyD3XX.NULL, 1024) if Status != PyD3XX.FT_OK:     print("FAILED TO SET STREAM SIZE FOR ALL PIPES.")     exit() else:     print("Stream size for all pipes set to 1024 bytes!")</pre>		
	State	Success	Output Stream size for all pipes set to 1024 bytes!

## 2.15 - FT\_ClearStreamPipe()

D3XX C API Equivalent = FT\_ClearStreamPipe()

### Summary

Clear the previously set streaming protocol transfer for pipes.

### Parameters

Type	Name	Description
FT_Device	Device	The device you want to clear a streaming protocol for.
bool	AllWritePipes	True: Clear the streaming protocol for all write pipes. False: Ignore
bool	AllReadPipes	True: Clear the streaming protocol for all read pipes. False: Ignore
FT_Pipe	Pipe	If AllWritePipes & AllReadPipes are both False, then this specific pipe's streaming protocol is cleared. Otherwise this parameter is ignored and you should pass NULL instead.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.

### Example Code

Example Code	<pre> Pipes = {} for i in range(2): # Get in and out pipes for channel 1.     Status, Pipes[i] = PyD3XX.FT_GetPipeInformation(Device, 1, i)     if Status != PyD3XX.FT_OK:         print("FAILED TO GET PIPE INFO OF [1," + str(i) + "]: ABORTING")         exit() Status = PyD3XX.FT_SetStreamPipe(Device, True, True, PyD3XX.NULL, 1) if Status != PyD3XX.FT_OK:     print("FAILED TO SET STREAM SIZE FOR ALL PIPES.")     exit() else:     print("Stream size for all pipes set to 1 byte!") Status = PyD3XX.FT_ClearStreamPipe(Device, False, False, Pipes[1]) if Status != PyD3XX.FT_OK:     print("FAILED TO CLEAR STREAM SIZE FOR CH1 READ PIPE.")     exit() else:     print("Cleared stream size for CH1 read pipe!") </pre>		
	State	Success	<div>Output</div> Stream size for all pipes set to 1 byte! Cleared stream size for CH1 read pipe!

## 2.16 – FT\_SetPipeTimeout()

D3XX C API Equivalent = FT\_SetPipeTimeout()

### Summary

Sets the timeout value for a given FT\_Pipe object (endpoint). FT\_ReadPipe and FT\_WritePipe will timeout if they hang for however many seconds the timeout value is set to. If the FT\_Device is closed and re-opened, then the pipe timeout value will reset to the driver default.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose FT_Pipe you want to change the timeout value of.
FT_Pipe	Pipe	The pipe (endpoint) you want to change the timeout value of.
int	Timeout	The new timeout value you want to set for the pipe (endpoint).

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.

### Example Code

Example Code	<pre> Pipes = {} for i in range(CHANNEL_COUNT * 2): # Set timeout of all pipes to 100.     Status, Pipes[i] = PyD3XX.FT_GetPipeInformation(Device, 1, i) # Get pipe information.     if Status != PyD3XX.FT_OK:         print("FAILED TO GET PIPE INFO OF [1," + str(i) + "]: ABORTING")         exit()     Status_SPT = PyD3XX.FT_SetPipeTimeout(Device, Pipes[i], 100)     if(PyD3XX.Platform == "windows"): # FT_GetPipeTimeout not in D3XX Linux library.         Status, TimeOut = PyD3XX.FT_GetPipeTimeout(Device, Pipes[i])         if (Status != PyD3XX.FT_OK) or (TimeOut != 100):             print("FAILED TO SET AND/OR CONFIRM PIPE TIMEOUT TO 100: ABORTING")             print("Status = " + PyD3XX.FT_STATUS_STR[Status] + "   Timeout = " + str(TimeOut))             exit()         if(Status_SPT != PyD3XX.FT_OK):             print("FAILED TO SET AND/OR CONFIRM PIPE TIMEOUT TO 100: ABORTING")             print("Status = " + PyD3XX.FT_STATUS_STR[Status] + "   Timeout = " + str(TimeOut))         else:             print("Successfully set timeout of pipe " + str(i) + " to 100!") </pre>		
State	<table border="1"> <tr> <td data-bbox="147 1016 477 1131">CHANNEL_COUNT = 1 and success.</td><td data-bbox="477 1016 1549 1131"> Output <div>Successfully set timeout of pipe 0 to 100!</div> <div>Successfully set timeout of pipe 1 to 100!</div> </td></tr></table>	CHANNEL_COUNT = 1 and success.	Output <div>Successfully set timeout of pipe 0 to 100!</div> <div>Successfully set timeout of pipe 1 to 100!</div>
CHANNEL_COUNT = 1 and success.	Output <div>Successfully set timeout of pipe 0 to 100!</div> <div>Successfully set timeout of pipe 1 to 100!</div>		

## 2.17 – FT\_GetPipeTimeout()

D3XX C API Equivalent = FT\_GetPipeTimeout()

WARNING – This function is exclusive to Windows systems.

### Summary

Gets the timeout value for a given FT\_Pipe object (IN endpoint). This function is exclusive to Windows systems.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose FT_Pipe you want to get the timeout value of.
FT_Pipe	Pipe	The pipe (endpoint) you want to get the timeout value of.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
int	Timeout	The timeout value of the pipe (IN endpoint).

### Example Code

Example Code	<pre> Pipes = {} for i in range(CHANNEL_COUNT * 2): # Set timeout of all pipes to 100.     Status, Pipes[i] = PyD3XX.FT_GetPipeInformation(Device, 1, i) # Get pipe information.     if Status != PyD3XX.FT_OK:         print("FAILED TO GET PIPE INFO OF [1," + str(i) + "]: ABORTING")         exit()     Status_SPT = PyD3XX.FT_SetPipeTimeout(Device, Pipes[i], 100)     if(PyD3XX.Platform == "windows"): # FT_GetPipeTimeout not in D3XX Linux library.         Status, TimeOut = PyD3XX.FT_GetPipeTimeout(Device, Pipes[i])         if (Status != PyD3XX.FT_OK) or (TimeOut != 100):             print("FAILED TO SET AND/OR CONFIRM PIPE TIMEOUT TO 100: ABORTING")             print("Status = " + PyD3XX.FT_STATUS_STR[Status] + "   Timeout = " + str(TimeOut))             exit()         if(Status_SPT != PyD3XX.FT_OK):             print("FAILED TO SET AND/OR CONFIRM PIPE TIMEOUT TO 100: ABORTING")             print("Status = " + PyD3XX.FT_STATUS_STR[Status] + "   Timeout = " + str(TimeOut))         else:             print("Successfully set timeout of pipe " + str(i) + " to 100!") </pre>		
State	<table border="1"> <tr> <td data-bbox="151 1018 479 1129">CHANNEL_COUNT = 1 and success.</td><td data-bbox="479 1018 1546 1129"> Output  Successfully set timeout of pipe 0 to 100!  Successfully set timeout of pipe 1 to 100! </td></tr> </table>	CHANNEL_COUNT = 1 and success.	Output Successfully set timeout of pipe 0 to 100! Successfully set timeout of pipe 1 to 100!
CHANNEL_COUNT = 1 and success.	Output Successfully set timeout of pipe 0 to 100! Successfully set timeout of pipe 1 to 100!		

## 2.18 – FT\_AbortPipe()

D3XX C API Equivalent = FT\_AbortPipe()

### Summary

Aborts the pending transfers for a pipe.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose FT_Pipe you want to abort the transfers of.
FT_Pipe	Pipe	The pipe you want to abort the transfer of.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
int	LengthTransferred	The timeout value of the pipe (IN endpoint).

### Example Code



Example Code	<pre> if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):     Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipeAsync(Device, 0, 1, Overlaps[1]) else:     Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipe(Device, Pipes[1], 1, Overlaps[1]) Status, BytesTransferred = PyD3XX.FT_GetOverlappedResult(Device, Overlaps[1], False) if(Status == PyD3XX.FT_IO_INCOMPLETE):     print("Waiting on input! Attempting FT_AbortPipe()...")     Status = PyD3XX.FT_AbortPipe(Device, Pipes[1])     if(Status != PyD3XX.FT_OK):         print("FT_AbortPipe failed!")     else:         print("FT_AbortPipe succeeded!") else:     print(PyD3XX.FT_STATUS_STR[Status] + "   Encountered error or FT_ReadPipe was successful.")     ReadValue = format(int.from_bytes(ReadBuffer.Value(), "little"), "x").zfill(1*2)     print("Channel 1 = 0x" + ReadValue) </pre>		
	State	Output	<p>Waiting on input.</p> <p>Received 1 byte with value 0x01.</p>
			<p>Waiting on input! Attempting FT_AbortPipe()...</p> <p>FT_AbortPipe succeeded!</p> <p>FT_OK   Encountered error or FT_ReadPipe was successful.</p> <p>Channel 1 = 0x01</p>

## 2.19 – FT\_GetDeviceDescriptor()

D3XX C API Equivalent = FT\_GetDeviceDescriptor()

### Summary

Get the USB device descriptor of a FT\_Device object.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose USB device descriptor you want to retrieve.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
FT_DeviceDescriptor	DeviceDescriptor	The USB device descriptor.

### Example Code

Example Code	<pre>Status, DeviceDescriptor = PyD3XX.FT_GetDeviceDescriptor(Device) #Status, DeviceDescriptor, BytesTransferred = PyD3XX.FT_GetDescriptor(Device, PyD3XX.FT_DEVICE_DESCRIPTOR_TYPE, 0) if Status != PyD3XX.FT_OK:     print("FAILED TO GET DEVICE DESCRIPTOR FOR DEVICE 0: ABORTING.")     exit() print("---  Device 0 Device Descriptor  ---") print("\tLength = " + str(DeviceDescriptor.bLength)) print("\tDescriptor Type = " + hex(DeviceDescriptor.bDescriptorType))</pre>		
State	Success.	Output	<pre>---  Device 0 Device Descriptor  ---     Length = 18     Descriptor Type = 0x1</pre>

## 2.20 – FT\_GetConfigurationDescriptor()

D3XX C API Equivalent = FT\_GetConfigurationDescriptor()

### Summary

Get the USB configuration descriptor of a FT\_Device object.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose USB configuration descriptor you want to retrieve.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
FT_ConfigurationDescriptor	ConfigurationDescriptor	The USB configuration descriptor.

### Example Code

Example Code	<pre>Status, ConfigurationDescriptor = PyD3XX.FT_GetConfigurationDescriptor(Device) #Status, ConfigurationDescriptor, BytesTransferred = PyD3XX.FT_GetDescriptor(Device, PyD3XX.FT_CONFIGURATION_DESCRIPTOR_TYPE, 0) if Status != PyD3XX.FT_OK:     print("FAILED TO GET THE CONFIGURATION DESCRIPTOR FOR DEVICE 0: ABORTING.")     exit() print("---  Device 0 Configuration Descriptor  ---") print("\tLength = " + str(ConfigurationDescriptor.bLength)) print("\tDescriptor Type = " + hex(ConfigurationDescriptor.bDescriptorType))</pre>		
State	Success.	Output	<pre>---  Device 0 Configuration Descriptor  ---     Length = 9     Descriptor Type = 0x2</pre>

## 2.21 - FT\_GetInterfaceDescriptor()

D3XX C API Equivalent = FT\_GetInterfaceDescriptor()

### Summary

Get the USB interface descriptor of a FT\_Device object.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose USB interface descriptor you want to retrieve.
int	InterfaceIndex	The index of the interface descriptor you want to retrieve.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
FT_InterfaceDescriptor	InterfaceDescriptor	The USB interface descriptor.

### Example Code

Example Code	<pre>Status, Interface = PyD3XX.FT_GetInterfaceDescriptor(Device, 1) # Index 0 is for proprietary protocols. Using 1 instead. #Status, Interface, BytesTransferred = PyD3XX.FT_GetDescriptor(Device, PyD3XX.FT_INTERFACE_DESCRIPTOR_TYPE, 1) if Status != PyD3XX.FT_OK:     print("FAILED TO GET INTERFACE INFO OF [1]: ABORTING")     exit() print("---  Interface 1  ---") print("\tLength = " + hex(Interface.bLength)) print("\tDescriptor Type = " + hex(Interface.bDescriptorType))</pre>		
	State	Success.	Output
			<pre>---  Interface 1  ---       Length = 0x9       Descriptor Type = 0x4</pre>

## 2.21B - FT\_GetStringDescriptor()

D3XX C API Equivalent = FT\_GetStringDescriptor()

### Summary

Get the USB string descriptor of a FT\_Device object.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose USB string descriptor you want to retrieve.
int	StringIndex	The index of the string descriptor you want to retrieve.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.

FT_StringDescriptor	StringDescriptor	The USB string descriptor.
---------------------	------------------	----------------------------

### Example Code

Example Code	<pre>Status, StringDescriptor = PyD3XX.FT_GetStringDescriptor(Device, 2) #Status, StringDescriptor, BytesTransferred = PyD3XX.FT_GetDescriptor(Device, PyD3XX.FT_STRING_DESCRIPTOR_TYPE, 2) if Status != PyD3XX.FT_OK:     print("FAILED TO GET THE STRING DESCRIPTOR FOR DEVICE 0: ABORTING.")     exit() print("----  Device 0 String[2] Descriptor  ----") print("\tLength = " + str(StringDescriptor.bLength)) print("\tDescriptor Type = " + hex(StringDescriptor.bDescriptorType)) print("\tString = '" + StringDescriptor.szString + "'")</pre>		
	State	Success.	Output
			<pre>---  Device 0 String[2] Descriptor  ---     Length = 56     Descriptor Type = 0x3     String = 'FTDI SuperSpeed-FIFO Bridge'</pre>

## 2.22 - FT\_GetPipeInformation()

D3XX C API Equivalent = FT\_GetPipeInformation()

### Summary

Get an FT\_Pipe object from the given open FT\_Device object. The returned FT\_Pipe object will only contain valid pipe information if the FT\_Device object was previously opened by FT\_Create() and is still open.

Interface 1 (data interface) is for the data read and write pipes. Pipes with an even index are write pipes and pipes with an odd index are read pipes.

### Parameters

Type	Name	Description
FT_Device	Device	The device you want to get an FT_Pipe from.
int	InterfaceIndex	The index of the interface you want to get a USB endpoint descriptor (FT_Pipe) from.
int	PipeIndex	The index of the pipe (FT_Pipe) you want to get from the given interface.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
FT_Pipe	Pipe	An FT_Pipe object that can be used for read or write calls.

### Example Code

Example Code	<pre> Pipes = {} for i in range(CHANNEL_COUNT * 2): # Print info for all pipes for interface 1.     Status, Pipes[i] = PyD3XX.FT_GetPipeInformation(Device, 1, i) # Get pipe information.     if Status != PyD3XX.FT_OK:         print("FAILED TO GET PIPE INFO OF [1," + str(i) + "]: ABORTING")         exit()     print("---  Pipe " + str(i) + "  ---")     print("\tPipe Type = " + hex(Pipes[i].PipeType))     print("\tPipe ID = " + hex(Pipes[i].PipeID))     print("\tPipe MaxPacketSize = " + str(Pipes[i].MaximumPacketSize))     print("\tPipe Interval = " + str(Pipes[i].Interval)) </pre>		
State	CHANNEL_COUNT = 1	Output	<pre> ---  Pipe 0  ---     Pipe Type = 0x2     Pipe ID = 0x2     Pipe MaxPacketSize = 0     Pipe Interval = 4 ---  Pipe 1  ---     Pipe Type = 0x2     Pipe ID = 0x82     Pipe MaxPacketSize = 0     Pipe Interval = 4 </pre>

## 2.23 – FT\_GetDescriptor()

D3XX C API Equivalent = FT\_GetDescriptor()

### Summary

Get a USB descriptor from a FT\_Device object. Returns any one of the following descriptor objects: FT\_DeviceDescriptor, FT\_ConfigurationDescriptor, FT\_StringDescriptor, FT\_InterfaceDescriptor.

**WARNING:** this is not a full equivalent of FT\_GetDescriptor() as it only returns four common descriptors. This function's implementation will likely change in the future to closer match the C library equivalent's ability to get uncommon USB descriptors. Use the dedicated functions FT\_GetDeviceDescriptor, FT\_GetConfigurationDescriptor, FT\_GetInterfaceDescriptor, FT\_GetStringDescriptor, and FT\_GetPipeInformation instead.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose USB descriptor you want to retrieve.
int	DescriptorType	The type of descriptor you want to retrieve.
int	Index	The index of the descriptor you want to retrieve.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful. Status is always returned.

Condition: DescriptorType = FT_DEVICE_DESCRIPTOR_TYPE		
FT_DeviceDescriptor	DeviceDescriptor	The USB device descriptor.
Condition: DescriptorType = FT_CONFIGURATION_DESCRIPTOR_TYPE		
FT_ConfigurationDescriptor	ConfigurationDescriptor	The USB configuration descriptor.
Condition: DescriptorType = FT_STRING_DESCRIPTOR_TYPE		
FT_StringDescriptor	StringDescriptor	The USB string descriptor.
Condition: DescriptorType = FT_INTERFACE_DESCRIPTOR_TYPE		
FT_InterfaceDescriptor	InterfaceDescriptor	The USB interface descriptor.
Condition: Always		
int	LengthTransferred	Number of bytes transferred to the descriptor buffer.

### Example Code

Example Code	<pre>#Status, StringDescriptor = PyD3XX.FT_GetStringDescriptor(Device, 2) Status, StringDescriptor, BytesTransferred = PyD3XX.FT_GetDescriptor(Device, PyD3XX.FT_STRING_DESCRIPTOR_TYPE, 2) if Status != PyD3XX.FT_OK:     print("FAILED TO GET THE STRING DESCRIPTOR FOR DEVICE 0: ABORTING.")     exit() print("---  Device 0 String[2] Descriptor  ---") print("\tLength = " + str(StringDescriptor.bLength)) print("\tDescriptor Type = " + hex(StringDescriptor.bDescriptorType)) print("\tString = '" + StringDescriptor.szString + "'")</pre>		
	State	Success.	Output
			<pre>---  Device 0 String[2] Descriptor  ---     Length = 56     Descriptor Type = 0x3     String = 'FTDI SuperSpeed-FIFO Bridge'</pre>

## 2.24 - FT\_ControlTransfer()

D3XX C API Equivalent = FT\_ControlTransfer()

### Summary

Transmits control data over the default control endpoint.

### Parameters

Type	Name	Description
FT_Device	Device	The device you want to do a control transfer with.
FT_SetupPacket	SetupPacket	The 8-byte setup packet.
FT_Buffer	Buffer	The buffer used for data transfer.
int	BufferLength	The length of the buffer used for data transfer.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
int	LengthTransferred	The number of bytes transferred.

### Example Code

Example Code	<pre> Buffer = PyD3XX.FT_Buffer(1) SetupPacket = PyD3XX.FT_SetupPacket SetupPacket.RequestType = int("10000001", 2) SetupPacket.Request = 10 SetupPacket.Value = 0 SetupPacket.Index = 1 SetupPacket.Length = 1 Status, DataWritten = PyD3XX.FT_ControlTransfer(Device, SetupPacket, Buffer, 1) if Status != PyD3XX.FT_OK:     print("WARNING: FAILED TO GET ALTERNATE SETTINGS OF INTERFACE 1 FROM DEVICE 0.") print("Alternate Settings of Interface 1: " + hex(int.from_bytes(Buffer.Value(), "little"))) </pre>		
State	Success.	Output	Alternate Settings of Interface 1: 0x0

## 2.25 - FT\_GetVIDPID()

D3XX C API Equivalent = FT\_GetVIDPID()

### Summary

Get the vendor ID (VID) and product ID (PID) of an FT\_Device object. The device must be opened beforehand.

### Parameters

Type	Name	Description
FT_Device	Device	The device you want get the VID & PID of.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
int	VID	The vendor ID of the given device.
int	PID	The product ID of the given device.

### Example Code

Example Code	<pre> Status, Device = PyD3XX.FT_GetDeviceInfoDetail(0) # Get info of a device at index 0. Status = PyD3XX.FT_Create(0, PyD3XX.FT_OPEN_BY_INDEX, Device) # Open the device we're using. if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO OPEN DEVICE: ABORTING")     exit() Status, VID, PID = PyD3XX.FT_GetVIDPID(Device) print("Device 0 (VID:PID) = " + format(VID, "x").zfill(4) + ":" + format(PID, "x").zfill(4)) </pre>		
State	Success.	Output	Device 0 (VID:PID) = 0403:601e

## 2.26 - FT\_EnableGPIO()

D3XX C API Equivalent = FT\_EnableGPIO()

### Summary

Enable GPIO mode and set the input/output direction of the two GPIO pins.

### Parameters

Type	Name	Description
FT_Device	Device	The device you want enable the GPIO of.
int	EnableMask	Select which GPIO pins to enable. Bits 31-2 are ignored. 0 = ignore. 1 = enable.
int	DirectionMask	Select which input/output direction the GPIO pins should have. Bits 31-2 are ignored. 0 = input. 1 = output.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.

### Example Code

Example Code	<pre>Status = PyD3XX.FT_EnableGPIO(Device, int("11", 2), int("11", 2)) if Status != PyD3XX.FT_OK:     print("WARNING: FAILED TO ENABLE GPIO OF DEVICE 0") else:     print("Successfully enabled GPIO[1:0] as outputs.");</pre>		
	State	Success.	Output Successfully enabled GPIO[1:0] as outputs.

## 2.27 - FT\_WriteGPIO()

D3XX C API Equivalent = FT\_WriteGPIO()

### Summary

Set the output state of the GPIO0 and GPIO1 pins. Make sure FT\_EnableGPIO() is used beforehand to make the GPIO pins outputs.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose GPIO pins you want to write to.
int	SelectMask	Select which GPIO pins to change the output state of. Bit 0 = GPIO0. Bit 1 = GPIO1. 1 = change output state. 0 = ignore.
int	Data	Data to write to the GPIO pins. Bit 0 = GPIO0. Bit 1 = GPIO1.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.

### Example Code



Example Code	<pre>Status = PyD3XX.FT_WriteGPIO(Device, int("11", 2), int("11", 2)) if Status != PyD3XX.FT_OK:     print("WARNING: FAILED TO WRITE GPIO OF DEVICE 0") else:     print("Successfully wrote 0b11 to GPIO pins!");</pre>		
State	Success.	Output	Successfully wrote 0b11 to GPIO pins!

## 2.28 – FT\_ReadGPIO()

D3XX C API Equivalent = FT\_ReadGPIO()

### Summary

Read the state of the GPIO0 and GPIO1 pins. Make sure FT\_EnableGPIO() is used beforehand to make the GPIO pins inputs.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose GPIO pins you want to read from.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
int	Data	Data read from the GPIO pins. Bit 0 = GPIO0. Bit 1 = GPIO1.

### Example Code

Example Code	<pre>Status, GPIO_Data = PyD3XX.FT_ReadGPIO(Device) if Status != PyD3XX.FT_OK:     print("WARNING: FAILED TO READ GPIO OF DEVICE 0") else:     print("GPIO DATA = 0b" + format(GPIO_Data, "02b"))</pre>		
State	GPIO[1:0] = 0b10	Output	GPIO DATA = 0b10

## 2.29 – FT\_SetGPIOPull()

D3XX C API Equivalent = FT\_SetGPIOPull()

### Summary

Set the internal resistor pull state of the GPIO0 and GPIO1 pins high, low, or hi-Z. This only works for revision B FT60X devices or newer.

### Parameters

Type	Name	Description
FT_Device	Device	The device whose GPIO pins you want to change the pull state of.
Int	SelectMask	Select which GPIO pins to change the pull state of. Bit 0 = GPIO0.

		Bit 1 = GPIO1. 1 = change pull state. 0 = ignore.
int	PullMask	Control what pull state the GPIO pins are set to. PullMask[1:0] = GPIO0 pull state, PullMask[3:2] = GPIO1 pull state. 0b00 = 50k ohm pull-down (default) 0b01 = Hi-Z 0b10 = 50k ohm pull-up 0b11 = Hi-Z

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.

### Example Code

Example Code	<pre>Status = PyD3XX.FT_SetGPIOPull(Device, int("11", 2), int("1111", 2)) if Status != PyD3XX.FT_OK:     print("WARNING: FAILED TO SET GPIO PULL OF DEVICE 0") else:     print("Successfully set GPIO pull to hi-Z!");</pre>		
State	Success.	Output	Successfully set GPIO pull to hi-Z!

## 2.30 - FT\_SetNotificationCallback()

D3XX C API Equivalent = FT\_SetNotificationCallback()

### Summary

Set a callback function that will be called when any IN endpoint with no current ongoing read requests receive data. If notification messages are enabled for a specific channel, never make a FT\_ReadPipe call unless it is within the callback function for the exact number of bytes available in the IN endpoint.

### Parameters

Type	Name	Description
FT_Device	Device	The device you want to set the callback notification function for.
typing.Callable[[int, int, int], None]	CallbackFunction	Your callback function.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.

### Example Code

```
Status, ReadPipeCH1 = PyD3XX.FT_GetPipeInformation(Device, 1, 1)
if Status != PyD3XX.FT_OK:
    print("FAILED TO GET READ PIPE INFO OF CH1: ABORTING")
    exit()
def CallBackFunction(CallbackType: int, PipeID_GPIO0: int | bool, Length_GPIO1: int | bool):
    global NotificationCount
    NotificationCount += 1
    print("Received " + str(NotificationCount) + " notifications!")
    if(CallbackType == PyD3XX.E_FT_NOTIFICATION_CALLBACK_TYPE_DATA):
        print("CBF: You have " + str(Length_GPIO1) + " bytes to read at pipe " +
hex(PipeID_GPIO0) + "!")
        if(NotificationCount != 5): # Disable callback function.
            if(PyD3XX.Platform == "linux") or (PyD3XX.Platform == "darwin"):
                Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipe(Device, int("0x82", 16),
Length_GPIO1, 0)
            else:
                Status, ReadBuffer, BytesRead = PyD3XX.FT_ReadPipe(Device, ReadPipeCH1,
Length_GPIO1, PyD3XX.NULL)
            else:
                Status = PyD3XX.FT_ClearNotificationCallback(Device) # Clear callback function so
we don't get called again.
                if Status != PyD3XX.FT_OK:
                    print(PyD3XX.FT_STATUS_STR[Status] + " | WARNING: FAILED TO CLEAR CALLBACK
FUNCTION OF DEVICE 0")
                elif(CallbackType == PyD3XX.E_FT_NOTIFICATION_CALLBACK_TYPE_GPIO):
                    print("CBF: GPIO 0 Status = " + str(PipeID_GPIO0) + " | GPIO 1 Status = " +
str(Length_GPIO1))
                return None

PyD3XX.FT_SetNotificationCallback(Device, CallBackFunction)
if Status != PyD3XX.FT_OK:
    print("FAILED TO SET CALLBACK FUNCTION OF DEVICE 0: ABORTING")
    exit()
print("This program will exit after at least 5 notifications or 5 seconds.")
Loops = 0
while((NotificationCount != 5) and not(Loops == 5)):
    time.sleep(1)
    Loops += 1;
print("Total Notifications Received: " + str(NotificationCount))
print("Seconds Passed: " + str(Loops))
```

State	Channel 1 received five master writes while no read requests were ongoing.	Output	<p>This program will exit after at least 5 notifications or 5 seconds.</p> <p>Received 1 notifications!</p> <p>CBF: You have 4 bytes to read at pipe 0x82!</p> <p>Received 2 notifications!</p> <p>CBF: You have 2 bytes to read at pipe 0x82!</p> <p>Received 3 notifications!</p> <p>CBF: You have 4 bytes to read at pipe 0x82!</p> <p>Received 4 notifications!</p> <p>CBF: You have 4 bytes to read at pipe 0x82!</p> <p>Received 5 notifications!</p> <p>CBF: You have 4 bytes to read at pipe 0x82!</p> <p>Total Notifications Received: 5</p> <p>Seconds Passed: 1</p>
-------	--	--------	--

## 2.31 - FT\_ClearNotificationCallback()

D3XX C API Equivalent = FT\_ClearNotificationCallback()

### Summary

Clears the notification callback function set by FT\_SetNotificationCallback.

### Parameters

Type	Name	Description
FT_Device	Device	The device you want clear the callback notification function for.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.

### Example Code

Example Code	<pre>Status = PyD3XX.FT_ClearNotificationCallback(Device) # Clear callback function. print(PyD3XX.FT_STATUS_STR[Status] + "   WARNING: FAILED TO CLEAR CALLBACK FUNCTION OF DEVICE 0")</pre>		
State	Success.	Output	
	Failure.		FT_INVALID_HANDLE   WARNING: FAILED TO CLEAR CALLBACK FUNCTION OF DEVICE 0

## 2.32 - FT\_GetChipConfiguration()

D3XX C API Equivalent = FT\_GetChipConfiguration()

### Summary

Get the chip configuration of the given FT\_Device object.

## Parameters

Type	Name	Description
FT_Device	Device	The device you want to get the chip configuration of.

## Return Values

Type	Name	Description
int	Status	FT_OK if successful.
FT_60XCONFIGURATION	Configuration	The chip configuration of the given device.

## Example Code

Example Code	<pre>Status, ChipConfiguration = PyD3XX.FT_GetChipConfiguration(Device) # Get configuration. if Status != PyD3XX.FT_OK:     print("FAILED TO GET CHIP CONFIGURATION OF Device 0: ABORTING.")     exit() print("Device 0 Description: '" + ChipConfiguration.StringDescriptors[1] + "'")</pre>		
	State	Success.	Output Device 0 Description: 'TEST 1'

## 2.33 - FT\_SetChipConfiguration()

D3XX C API Equivalent = FT\_SetChipConfiguration()

### Summary

Set the chip configuration of the given FT\_Device object.

## Parameters

Type	Name	Description
FT_Device	Device	The device you want to set the chip configuration of.
FT_60XCONFIGURATION	Configuration	The chip configuration you want to set.

## Return Values

Type	Name	Description
int	Status	FT_OK if successful.

## Example Code

Example Code	<pre>Status, ChipConfiguration = PyD3XX.FT_GetChipConfiguration(Device) # Get chip configuration. if Status != PyD3XX.FT_OK:     print("FAILED TO GET CHIP CONFIGURATION OF Device 0: ABORTING.")     exit() print("Device 0 Description: '" + ChipConfiguration.StringDescriptors[1] + "'") if(ChipConfiguration.StringDescriptors[1] == "TEST 0"):     ChipConfiguration.StringDescriptors[1] = "TEST 1" else:     ChipConfiguration.StringDescriptors[1] = "TEST 0" Status = PyD3XX.FT_SetChipConfiguration(Device, ChipConfiguration) if Status != PyD3XX.FT_OK:     print("WARNING: FAILED TO SET CHIP CONFIGURATION OF DEVICE 0")</pre>					
	State	<table><tr><td>Success.</td><td rowspan="2">Output</td><td>Device 0 Description: 'TEST 1'</td></tr><tr><td>Success again.</td><td>Device 0 Description: 'TEST 0'</td></tr></table>	Success.	Output	Device 0 Description: 'TEST 1'	Success again.
Success.	Output	Device 0 Description: 'TEST 1'				
Success again.		Device 0 Description: 'TEST 0'				

## 2.34 - FT\_IsDevicePath()

D3XX C API Equivalent = FT\_IsDevicePath()

WARNING - This function is exclusive to Windows systems.

### Summary

Returns FT\_OK if the given device path matches the device path of the device handle.

### Parameters

Type	Name	Description
FT_Device	Device	The device you want to check the path of.
str	DevicePath	The device path you want to compare.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.

### Example Code

Example Code	<pre>Status = PyD3XX.FT_IsDevicePath(Device, DevicePath) if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO CONFIRM DEVICE PATH.") else:     print("SUCCESSFULLY CONFIRMED DEVICE PATH.")</pre>		
	State		
	Success.	Output	SUCCESSFULLY CONFIRMED DEVICE PATH.
	Incorrect path.		FT_INCORRECT_DEVICE_PATH   FAILED TO CONFIRM DEVICE PATH.

## 2.35 - FT\_GetDriverVersion()

D3XX C API Equivalent = FT\_GetDriverVersion()

## Summary

Returns the D3XX kernel driver version number in 4 bytes formatted in 4-bit Binary-Coded Decimal (BCD). Example: 0x01457000 = 1.45.70.0.

## Parameters

Type	Name	Description
FT_Device	Device	The device you want get the kernel driver version of.

## Return Values

Type	Name	Description
int	Status	FT_OK if successful.
int	DriverVersion	The driver version encoded in 4-bit BCD format.

## Example Code

Example Code	<pre>Status, DriverVersion = PyD3XX.FT_GetDriverVersion(Device) print("Device 0 Driver Version: " + format((DriverVersion &amp; int("0xFF000000", 16)) &gt;&gt; 24, 'x') + '.' \       + format((DriverVersion &amp; int("0x00FF0000", 16)) &gt;&gt; 16, 'x') + '.' \       + format((DriverVersion &amp; int("0x0000FF00", 16)) &gt;&gt; 8, 'x') + '.' \       + format(DriverVersion &amp; int("0x000000FF", 16), 'x')       )</pre>		
	State	Version = 0x01030010	Output

## 2.35B – GetDriverVersion()

D3XX C API Equivalent = NONE. PyD3XX exclusive.

## Summary

Returns the D3XX kernel driver version number as a string. Example: 0x01457000 = "1.45.70.0".

This is meant as an easier to use form of FT\_GetDriverVersion().

## Parameters

Type	Name	Description
FT_Device	Device	The device you want get the kernel driver version of.

## Return Values

Type	Name	Description
int	Status	FT_OK if successful.
str	DriverVersion	The driver version as a string.

## Example Code

Example Code	<pre>Status, DriverVersion = PyD3XX.GetDriverVersion(Device) print("Device 0 Driver Version: " + DriverVersion)</pre>		
State	Version = 0x01030010	Output	Device 0 Driver Version: 1.3.0.10

## 2.36 – FT\_GetLibraryVersion()

D3XX C API Equivalent = FT\_GetLibraryVersion()

### Summary

Returns the D3XX user driver library version number in 4 bytes formatted in 4-bit Binary-Coded Decimal (BCD) for Windows. Example: 0x01457000 = 1.45.70.0.

For Linux/macOS the library version is the version of libusb installed on the system.

### Parameters

None

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
int	DriverVersion	The driver library version encoded in 4-bit BCD format.

### Example Code

Example Code	<pre>Status, LibraryVersion = PyD3XX.FT_GetLibraryVersion() print("Device 0 Library Version: " + format((LibraryVersion &amp; int("0xFF000000", 16)) &gt;&gt; 24, 'x') + '.' \ + format((LibraryVersion &amp; int("0x00FF0000", 16)) &gt;&gt; 16, 'x') + '.' \ + format((LibraryVersion &amp; int("0x0000FF00", 16)) &gt;&gt; 8, 'x') + '.' \ + format(LibraryVersion &amp; int("0x000000FF", 16), 'x') )</pre>		
State	Version = 0x01030008	Output	Device 0 Library Version: 1.3.0.8

## 2.36B – GetLibraryVersion()

D3XX C API Equivalent = NONE. PyD3XX exclusive.

### Summary

Returns the D3XX user driver library version number as a string. Example: 0x01457000 = "1.45.70.0".

This is meant as an easier to use form of FT\_GetLibraryVersion().



## Parameters

None

## Return Values

Type	Name	Description
int	Status	FT_OK if successful.
str	DriverVersion	The driver library version as a string.

## Example Code

Example Code	<pre>Status, LibraryVersion = PyD3XX.GetLibraryVersion() print("Device 0 Library Version: " + LibraryVersion)</pre>		
State	Version = 0x01030008	Output	Device 0 Library Version: 1.3.0.8

## 2.37 – FT\_CycleDevicePort()

D3XX C API Equivalent = FT\_CycleDevicePort()

### Summary

Makes the host system power cycle the device port so that the device re-enumerates.

## Parameters

Type	Name	Description
FT_Device	Device	The device whose port you want to power cycle.

## Return Values

Type	Name	Description
int	Status	FT_OK if successful.

## Example Code

Example Code	<pre>Status = PyD3XX.FT_CycleDevicePort(Device) if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   WARNING: FAILED TO CYCLE PORT OF DEVICE 0") else:     print("Successfully cycled port of Device 0!")</pre>		
State	Success.	Output	Successfully cycled port of Device 0!

## 2.37B – FT\_ResetDevicePort()

D3XX C API Equivalent = FT\_ResetDevicePort()

## Summary

Makes the host system reset the device port so that the device re-enumerates.

## Parameters

Type	Name	Description
FT_Device	Device	The device whose port you want to reset.

## Return Values

Type	Name	Description
int	Status	FT_OK if successful.

## Example Code

Example Code	<pre>Status = PyD3XX.FT_ResetDevicePort(Device) if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   WARNING: FAILED TO RESET PORT OF DEVICE 0") else:     print("Successfully reset port of Device 0!")</pre>		
	State	Success.	Output Successfully reset port of Device 0!

## 2.38 - FT\_SetSuspendTimeout()

D3XX C API Equivalent = FT\_SetSuspendTimeout()

WARNING - This function is exclusive to Windows systems.

## Summary

Sets the USB Selective suspend timeout for the given FT\_Device. By default with unmodified drivers, devices have the suspend feature enabled with an idle timeout of 10 seconds. If the FT\_Device is closed and re-opened, then the idle timeout will reset to the driver default.

If you want your device to always output a CLK signal, you should disable USB selective suspend. FT\_SetSuspendTimeout is only available on Windows systems. This function will fail if the notification feature is enabled.

## Parameters

Type	Name	Description
FT_Device	Device	The device you want to set the suspend timeout value of.
int	Timeout	The new USB selective suspend idle timeout value in seconds. If set to 0, then USB selective suspend will be disabled.

## Return Values

Type	Name	Description
int	Status	FT_OK if successful.

## Example Code

Example Code	<pre>Status, ChipConfiguration = PyD3XX.FT_GetChipConfiguration(Device) # Get chip configuration. CallbackNotificationsEnabled = (ChipConfiguration.OptionalFeatureSupport &amp; PyD3XX.CONFIGURATION_OPTIONAL_FEATURE_ENABLENOTIFICATIONMESSAGE_INCHALL) != 0 if(PyD3XX.Platform != "windows"):     print("FT_SetSuspendTimeout is only available on Windows!")     exit() if(CallbackNotificationsEnabled != False): # Can only disable suspend timeout if callback notifications are disabled.     print("WARNING: Callback notifications are enabled!") Status = PyD3XX.FT_SetSuspendTimeout(Device, 0) # Disable suspend timeout. if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO DISABLE SUSPEND MODE: ABORTING")     exit() Status, SuspendTimeout = PyD3XX.FT_GetSuspendTimeout(Device) if (Status != PyD3XX.FT_OK) or (SuspendTimeout != 0):     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO CONFIRM SUSPEND MODE: ABORTING")     exit() print("Successfully disabled suspend mode!");</pre>		
	State	Success.	Successfully disabled suspend mode!
		Not on Windows.	FT_SetSuspendTimeout is only available on Windows!
		Notifications are enabled.	WARNING: Callback notifications are enabled! FT_OTHER_ERROR   FAILED TO DISABLE SUSPEND MODE: ABORTING

## 2.39 – FT\_GetSuspendTimeout()

D3XX C API Equivalent = FT\_GetSuspendTimeout()

WARNING – This function is exclusive to Windows systems.

### Summary

Returns the idle timeout value for USB Selective suspend for the given FT\_Device object.

FT\_GetSuspendTimeout is only available on Windows systems. This function will fail if the notification feature is enabled.

### Parameters

Type	Name	Description
FT_Device	Device	The device you want to get the suspend timeout value of.

### Return Values

Type	Name	Description
int	Status	FT_OK if successful.
int	Timeout	The USB selective suspend idle timeout value in seconds. If 0, then USB selective suspend is disabled.

### Example Code

Example Code	<pre> Status = PyD3XX.FT_SetSuspendTimeout(Device, 0) # Disable suspend timeout. if Status != PyD3XX.FT_OK:     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO DISABLE SUSPEND MODE: ABORTING")     exit() Status, SuspendTimeout = PyD3XX.FT_GetSuspendTimeout(Device) if (Status != PyD3XX.FT_OK) or (SuspendTimeout != 0):     print(PyD3XX.FT_STATUS_STR[Status] + "   FAILED TO CONFIRM SUSPEND MODE: ABORTING")     exit() print("Successfully disabled suspend mode!"); </pre>		
State	<table border="1"> <tr> <td data-bbox="151 640 479 745">Success.</td><td data-bbox="479 640 1546 745">Output Successfully disabled suspend mode!</td></tr> </table>	Success.	Output Successfully disabled suspend mode!
Success.	Output Successfully disabled suspend mode!		

## 3 – PyD3XX Classes

All the classes defined in PyD3XX.

### 3.1 – FT\_Buffer

D3XX C API Equivalent = NONE. PyD3XX exclusive.

#### Summary

A buffer that holds data to be written or data that was received for write/read functions like FT\_WritePipe() and FT\_ReadPipe().

#### Attributes

None

#### Methods

Name	Parameters	Description
<code>__init__</code>	Size: int	Construct an FT_Buffer that can hold Size bytes.
<code>from_int</code>	Integer: int	Construct an FT_Buffer from an integer.
<code>from_str</code>	String: str	Construct an FT_Buffer from an ASCII string.
<code>from_bytearray</code>	ByteArray: bytearray	Construct an FT_Buffer from a bytearray.
<code>from_bytes</code>	Bytes: bytes	Construct an FT_Buffer from bytes.
<code>Value</code>	None	Return the data of the buffer in a bytearray.

### 3.2 – FT\_Device

D3XX C API Equivalent = FT\_DEVICE\_LIST\_INFO\_NODE / FT\_HANDLE

#### Summary

A class that holds the same information about a device as FT\_DEVICE\_LIST\_INFO\_NODE but is also used as a replacement for FT\_HANDLE for function calls. You must initialize/obtain an FT\_Device from functions like FT\_GetDeviceInfoDetail or FT\_GetDeviceInfoList for an FT\_Device object to be valid and openable.

#### Attributes

Type	Name	Description
int   str	Handle	The value of a valid FT_HANDLE as an integer or a string of an FT_ERROR like "FT_OTHER_ERROR".
int	Flags	A bitmask showing the status of the device.
		0b001 FT_FLAGS_OPENED Device is opened by another program.
		0b010 FT_FLAGS_HISPEED Device is operating at USB Hi-Speed. <i>Note: Device could also be operating at USB Full Speed. If MaximumPacketSize from FT_Pipe is 512, it's USB Hi-Speed. If it's 64, it's USB Full Speed.</i>
		0b100 FT_FLAGS_SUPERSPEED Device is operating at USB SuperSpeed.
int	Type	Represents what type of FT60X device the FT_Device is.
		0d3 FT_DEVICE_UNKNOWN Device type is unknown.
		0d600 FT_DEVICE_600 Device is an FT600.
		0d601 FT_DEVICE_601 Device is an FT601.
int	LocID	The device's location ID.
str	SerialNumber	The device's serial number as a string.
str	Description	The device's description as a string.

## Methods

None

## 3.3 - FT\_DeviceDescriptor

D3XX C API Equivalent = FT\_DEVICE\_DESCRIPTOR

## Summary

The USB device descriptor retrieved from an FT\_Device.

## Attributes

Type	Name	Description
int	BLength	The length of the device descriptor itself.
int	bDescriptorType	The type of the descriptor itself.
int	bcdUSB	The version of the USB specification the device conforms to. 0x0200 = USB 2.0, 0x0310 = USB 3.1, etc.
int	bDeviceClass	The device's USB base class code. More Info: <a href="https://www.usb.org/defined-class-codes">https://www.usb.org/defined-class-codes</a>
int	bDeviceSubClass	The device's USB sub class code. More Info: <a href="https://www.usb.org/defined-class-codes">https://www.usb.org/defined-class-codes</a>
int	bDeviceProtocol	The device's USB device protocol. More Info: <a href="https://www.usb.org/defined-class-codes">https://www.usb.org/defined-class-codes</a>
int	bMaxPacketSize0	The max packet size of endpoint zero.
int	idVendor	The device's vendor ID (VID).
int	idProduct	The device's product ID (PID).
int	bcdDevice	The device's device-defined revision number.
int	iManufacturer	The device's device-defined index of the string descriptor containing the name of the device's manufacturer.
int	iProduct	The device's device-defined index of the string descriptor containing the device's description.
int	iSerialNumber	The device's device-defined index of the string descriptor containing the device's serial number.

int	bNumConfigurations	The device's total number of possible configurations.
-----	--------------------	---

## Methods

None

## 3.4 – FT\_ConfigurationDescriptor

D3XX C API Equivalent = FT\_CONFIGURATION\_DESCRIPTOR

## Summary

The USB configuration descriptor retrieved from an FT\_Device. FTDI D3XX devices support only one USB configuration.

## Attributes

Type	Name	Description
int	BLength	The length of the configuration descriptor itself.
int	bDescriptorType	The type of the descriptor itself.
int	wTotalLength	The number of bytes needed to contain the full configuration descriptor. This length accounts for all interface, endpoint, class, and/or vendor-specific descriptors that are returned with the configuration descriptor.
int	bNumInterfaces	The total number of interfaces supported by the configuration.
int	bConfigurationValue	The value used to select a configuration.
int	iConfiguration	The device's device-defined index of the string descriptor for this configuration.
int	bmAttributes	A bitmap describing the behavior of the configuration.
	bmAttributes[4:0]	Bits 4-0. Reserved.
	bmAttributes[5]	0b1 = The configuration supports remote wakeup.
	bmAttributes[6]	0b1 = The configuration is self-powered.
	bmAttributes[7]	0b1 = The configuration is bus-powered.
int	MaxPower	Power requirements of the device represented in 2mA units typically. Example: MaxPower = 0d50 means device has a power requirement of 100mA (50 * 2). Warning: For D3XX, MaxPower appears to represent power in units of 8mA and not 2mA. MaxPower = 0d62 means device has a power requirement of 496mA (62 * 8).

## Methods

None

## 3.5 – FT\_InterfaceDescriptor

D3XX C API Equivalent = FT\_INTERFACE\_DESCRIPTOR

## Summary

The USB interface descriptor retrieved from an FT\_Device.

## Attributes

Type	Name	Description
int	BLength	The length of the interface descriptor itself.
int	bDescriptorType	The type of the descriptor itself.

int	bInterfaceNumber	The index number of the interface.
int	bAlternateSetting	The index number of the alternate setting of the interface.
int	bNumEndpoints	The number of endpoints used by the interface, excluding the status endpoint.
int	bInterfaceClass	The class code of the device.
int	bInterfaceSubClass	The sub class code of the device.
int	bInterfaceProtocol	The protocol code of the device.
int	iInterface	The device's device-defined index of the string descriptor containing the device's description.

## Methods

None

## 3.6 - FT\_StringDescriptor

D3XX C API Equivalent = FT\_STRING\_DESCRIPTOR

### Summary

The USB string descriptor retrieved from an FT\_Device. Can hold a device, configuration, interface, class, vendor, or endpoint string descriptor.

### Attributes

Type	Name	Description
int	BLength	The length of the string descriptor itself.
int	bDescriptorType	The type of the descriptor itself.
str	szString	The string for the requested descriptor.

## Methods

None

## 3.7 - FT\_EndpointDescriptor

D3XX C API Equivalent = FT\_ENDPOINT\_DESCRIPTOR

### Summary

The USB endpoint descriptor retrieved from an FT\_Device.

### Attributes

Type	Name	Description
int	bLength	The length of the endpoint descriptor itself.
int	bDescriptorType	The type of the descriptor itself.
int	bEndpointAddress	The USB-defined endpoint address.
		bEndpointAddress[3:0] The endpoint number.
		bEndpointAddress[6:4] Reserved
		bEndpointAddress[7] 0 = OUT endpoint 1 = IN endpoint
int	bmAttributes	The attributes of the endpoint.
		bmAttributes[1:0] 0b00 = This is a Control endpoint. 0b01 = This is an Isochronous endpoint. 0b10 = This is a Bulk endpoint. 0b11 = This is an Interrupt endpoint.

		bmAttributes[3:2]	0b00 = No synchronization. Bits 5-4 are zero. 0b01 = Asynchronous. 0b10 = Adaptive. 0b11 = Synchronous.
		bmAttributes[5:4]	0b00 = Used for data. 0b01 = Used for feedback. 0b10 = Used for implicit feedback. 0b11 = Reserved.
		bmAttributes[7:6]	Reserved.
int	wMaxPacketSize	The maximum packet size for this endpoint.	
int	bInterval	The polling interrupt for isochronous and interrupt endpoints.	

## Methods

None

## 3.8 – FT\_Pipe

D3XX C API Equivalent = FT\_PIPE\_INFORMATION / ucPipeID

## Summary

An FT\_Device's IN or OUT endpoint. Used as an equivalent for ucPipeID in read/write functions like FT\_ReadPipe() and FT\_WritePipe(). FT\_Pipe is the read or write endpoint for one of the FT60X's channels.

## Attributes

Type	Name	Description	
int	PipeType	The type of the pipe.	
		0d0	FTPipeTypeControl This is a Control pipe.
		0d1	FTPipeTypeIsochronous This is an Isochronous pipe.
		0d2	FTPipeTypeBulk This is a Bulk pipe.
		0d3	FTPipeTypeInterrupt This is an Interrupt pipe.
int	PipeId	The pipe's ID.	
		PipeId[3:0]	The pipe's number.
		PipeId[6:4]	Reserved
		PipeId [7]	0 = This is a write (OUT) pipe. 1 = This is a read (IN) pipe.
int	MaximumPacketSize	The maximum packet size for this pipe.	
int	Interval	The pipe's interrupt interval if used for callbacks.	

## Methods

None

## 3.9 – FT\_Overlapped

D3XX C API Equivalent = OVERLAPPED

## Summary

The equivalent of the OVERLAPPED structure used for asynchronous I/O operations.

## Attributes

Type	Name	Description
------	------	-------------



int	Internal	The status code for the I/O request.
int	InternalHigh	The number of bytes transferred for a successful I/O request.
int	DummyUnion	The address of the dummy union.
int	DummyUnion_Offset	The low-order part of the file position specified by the user to start the I/O request.
int	DummyUnion_OffsetHigh	The high-order part of the file position specified by the user to start the I/O request.
int	DummyUnion_Pointer	Reserved. Do not use.
int	Handle	A handle to an event signaled by the system when the I/O operation has completed.

## Methods

None

## 3.10 – FT\_SetupPacket

D3XX C API Equivalent = FT\_SETUP\_PACKET

### Summary

The equivalent of a USB setup packet to perform standard device requests. You can find more information about setup packets and standard device requests in official USB specifications.

### Attributes

Type	Name	Description
int	RequestType	The type of request to be performed.
int	Request	The request code.
int	Value	A request-specific value.
int	Index	A request-specific value.
int	Length	The number of bytes to transfer.

## Methods

None

## 3.11 – FT\_60XCONFIGURATION

D3XX C API Equivalent = FT\_60XCONFIGURATION

### Summary

Holds the chip configuration read from or to be written to a FT60X device.

### Attributes

Type	Name	Description
int	VendorID	The vendor ID. VID
int	ProductID	The product ID. PID
list[str]	StringDescriptors	A list of string descriptors which are encoded in ASCII.
		StringDescriptors[0] The manufacturer string, can hold a max of 15 characters.
		StringDescriptors[1] The description string, can hold a max of 31 characters.
		StringDescriptors[2] The serial number string, can hold a max of 15 characters.

int	bInterval	<p>The minimum latency in <math>2^{(bInterval-1)}</math> USB frames. This is the minimum latency for notification callbacks and GPIO reads.</p> <p>The minimum value is 1, and the maximum value is 16.</p> <p>Example: bInterval=15 means a latency of <math>2^{14}</math> USB frames. Since each frame is 125us, that is a minimum latency of 2.048 seconds (<math>2^{14} * 125us</math>).</p>	
int	PowerAttributes	PowerAttributes[4:0]	Bits 4-0. Reserved.
		PowerAttributes[5]	0b1 = The device supports remote wakeup.
		PowerAttributes[6]	0b1 = The device is self-powered.
		PowerAttributes[7]	0b1 = The device is bus-powered.
int	PowerConsumption	<p>Power requirements of the device represented in 8mA units. PowerConsumption = 0d62 means device has a max power requirement of 496mA (<math>62 * 8</math>).</p>	
int	Reserved2	Reserved.	
int	FIFOClock	<p>The clock speed of the FIFO.</p> <p>0d0 = 100 MHz.</p> <p>0d1 = 66 MHz.</p>	
int	FIFOMode	<p>The mode of the FIFO.</p> <p>0d0 = 245 Mode.</p> <p>0d1 = 600 Mode.</p>	
int	ChannelConfig	<p>The channel configuration.</p> <p>0x0 = 4 Channels.</p> <p>0x1 = 2 Channels.</p> <p>0x2 = 1 Channel.</p> <p>0x3 = 1 OUT Pipe.</p> <p>0x4 = 1 IN Pipe.</p>	
int	OptionalFeatureSupport	A bitmask representing support for optional features.	
int	BatteryChargingGPIOConfig	<p>A bitmask to disable or set GPIO states that indicate what power source type was detected. 0d0 = Disabled.</p> <p>SDP = Standard Downstream Port.</p> <p>CDP = Charging Downstream Port.</p> <p>DCP = Dedicated Charging Port.</p>	
		BatteryChargingGPIOConfig[1:0]	GPIO default state.
		BatteryChargingGPIOConfig[3:2]	SDP detected state.
		BatteryChargingGPIOConfig[5:4]	CDP detected state.
		BatteryChargingGPIOConfig[7:6]	DCP detected state.
int	FlashEEPROMDetection	Read only bit mask.	
int	MSIO_Control	<p>Controls the drive strength of the FIFO pins.</p> <p>Default value is 0x010800. Make sure to only alter the first byte of data.</p>	
		Byte0[3:0]	<p>Data pins' drive strength.</p> <p>0d0 = 50 Ohm</p> <p>0d1 = 35 Ohm</p> <p>0d2 = 25 Ohm</p> <p>0d3 = 18 Ohm</p>
		Byte0[7:4]	<p>CLK pin's drive strength.</p> <p>0d0 = 50 Ohm</p> <p>0d1 = 35 Ohm</p> <p>0d2 = 25 Ohm</p>

int	GPIO_Control	0d3 = 18 Ohm		
		Controls the drive strength of the GPIO pins.		
		GPIO_Control	GPIO0 Drive Strength	GPIO1 Drive Strength
		0x0000	50 Ohm	50 Ohm
		0x0100	35 Ohm	50 Ohm
		0x0200	25 Ohm	50 Ohm
		0x0300	18 Ohm	50 Ohm
		0x0400	50 Ohm	35 Ohm
		0x0500	35 Ohm	35 Ohm
		0x0600	25 Ohm	35 Ohm
		0x0700	18 Ohm	35 Ohm
		0x0800	50 Ohm	25 Ohm
		0x0900	35 Ohm	25 Ohm
		0x0A00	25 Ohm	25 Ohm
		0x0B00	18 Ohm	25 Ohm
		0x0C00	50 Ohm	18 Ohm
		0x0D00	35 Ohm	18 Ohm
		0x0E00	25 Ohm	18 Ohm
		0x0F00	18 Ohm	18 Ohm

## Methods

None

## Appendix A - Miscellaneous

This section goes over miscellaneous information.

### PyD3XX Constants

```
NULL = ctypes.c_void_p(0)
```

```
# FT_Status values.
```

```
FT_OK = 0
```

```
FT_INVALID_HANDLE = 1
```

```
FT_DEVICE_NOT_FOUND = 2
```

```
FT_DEVICE_NOT_OPENED = 3
```

```
FT_IO_ERROR = 4
```

```
FT_INSUFFICIENT_RESOURCES = 5
```

```
FT_INVALID_PARAMETER = 6
```

```
FT_INVALID_BAUD_RATE = 7
```

```
FT_DEVICE_NOT_OPENED_FOR_ERASE = 8
```

```
FT_DEVICE_NOT_OPENED_FOR_WRITE = 9
```

```
FT_FAILED_TO_WRITE_DEVICE = 10
```

```
FT_EEPROM_READ_FAILED = 11
```

```
FT_EEPROM_WRITE_FAILED = 12
```

```
FT_EEPROM_ERASE_FAILED = 13
```

```
FT_EEPROM_NOT_PRESENT = 14
```

```
FT_EEPROM_NOT_PROGRAMMED = 15
FT_INVALID_ARGS = 16
FT_NOT_SUPPORTED = 17
FT_NO_MORE_ITEMS = 18
FT_TIMEOUT = 19
FT_OPERATION_ABORTED = 20
FT_RESERVED_PIPE = 21
FT_INVALID_CONTROL_REQUEST_DIRECTION = 22
FT_INVALID_CONTROL_REQUEST_TYPE = 23
FT_IO_PENDING = 24
FT_IO_INCOMPLETE = 25
FT_HANDLE_EOF = 26
FT_BUSY = 27
FT_NO_SYSTEM_RESOURCES = 28
FT_DEVICE_LIST_NOT_READY = 29
FT_DEVICE_NOT_CONNECTED = 30
FT_INCORRECT_DEVICE_PATH = 31
FT_OTHER_ERROR = 32

# Describe dictionaries for easier error code conversion.
FT_STATUS_STR = {
    FT_OK: "FT_OK",
    FT_INVALID_HANDLE: "FT_INVALID_HANDLE",
    FT_DEVICE_NOT_FOUND: "FT_DEVICE_NOT_FOUND",
    FT_DEVICE_NOT_OPENED: "FT_DEVICE_NOT_OPENED",
    FT_IO_ERROR: "FT_IO_ERROR",
    FT_INSUFFICIENT_RESOURCES: "FT_INSUFFICIENT_RESOURCES",
    FT_INVALID_PARAMETER: "FT_INVALID_PARAMETER",
    FT_INVALID_BAUD_RATE: "FT_INVALID_BAUD_RATE",
    FT_DEVICE_NOT_OPENED_FOR_ERASE: "FT_DEVICE_NOT_OPENED_FOR_ERASE",
    FT_DEVICE_NOT_OPENED_FOR_WRITE: "FT_DEVICE_NOT_OPENED_FOR_WRITE",
    FT_FAILED_TO_WRITE_DEVICE: "FT_FAILED_TO_WRITE_DEVICE",
    FT_EEPROM_READ_FAILED: "FT_EEPROM_READ_FAILED",
    FT_EEPROM_WRITE_FAILED: "FT_EEPROM_WRITE_FAILED",
    FT_EEPROM_ERASE_FAILED: "FT_EEPROM_ERASE_FAILED",
    FT_EEPROM_NOT_PRESENT: "FT_EEPROM_NOT_PRESENT",
    FT_EEPROM_NOT_PROGRAMMED: "FT_EEPROM_NOT_PROGRAMMED",
    FT_INVALID_ARGS: "FT_INVALID_ARGS",
    FT_NOT_SUPPORTED: "FT_NOT_SUPPORTED",
    FT_NO_MORE_ITEMS: "FT_NO_MORE_ITEMS",
    FT_TIMEOUT: "FT_TIMEOUT",
    FT_OPERATION_ABORTED: "FT_OPERATION_ABORTED",
    FT_RESERVED_PIPE: "FT_RESERVED_PIPE",
```

```
FT_INVALID_CONTROL_REQUEST_DIRECTION: "FT_INVALID_CONTROL_REQUEST_DIRECTION",
FT_INVALID_CONTROL_REQUEST_TYPE: "FT_INVALID_CONTROL_REQUEST_TYPE",
FT_IO_PENDING: "FT_IO_PENDING",
FT_IO_INCOMPLETE: "FT_IO_INCOMPLETE",
FT_HANDLE_EOF: "FT_HANDLE_EOF",
FT_BUSY: "FT_BUSY",
FT_NO_SYSTEM_RESOURCES: "FT_NO_SYSTEM_RESOURCES",
FT_DEVICE_LIST_NOT_READY: "FT_DEVICE_LIST_NOT_READY",
FT_DEVICE_NOT_CONNECTED: "FT_DEVICE_NOT_CONNECTED",
FT_INCORRECT_DEVICE_PATH: "FT_INCORRECT_DEVICE_PATH",
FT_OTHER_ERROR: "FT_OTHER_ERROR"
}
#^ FT_STATUS_STR[FT_OTHER_ERROR] == FT_STATUS_STR[32] == "FT_OTHER_ERROR"
FT_STATUS = {v: k for k, v in FT_STATUS_STR.items()}
#^ FT_STATUS["FT_OTHER_ERROR"] == FT_OTHER_ERROR == 32

FT_DEVICE_UNKNOWN = 3
FT_DEVICE_600 = 600
FT_DEVICE_601 = 601
FT_FLAGS_OPENED = 1
FT_FLAGS_HISPEED = 2
FT_FLAGS_SUPERSPEED = 4
FTPipeTypeControl = 0
FTPipeTypeIsochronous = 1
FTPipeTypeBulk = 2
FTPipeTypeInterrupt = 3
FT_LIST_NUMBER_ONLY = int("0x80000000", 16)
FT_LIST_BY_INDEX = int("0x40000000", 16)
FT_LIST_ALL = int("0x20000000", 16)
FT_OPEN_BY_SERIAL_NUMBER = int("0x00000001", 16)
FT_OPEN_BY_DESCRIPTION = int("0x00000002", 16)
FT_OPEN_BY_LOCATION = int("0x00000004", 16)
FT_OPEN_BY_GUID = int("0x00000008", 16)
FT_OPEN_BY_INDEX = int("0x00000010", 16)
FT_GPIO_DIRECTION_IN = 0
FT_GPIO_DIRECTION_OUT = 1
FT_GPIO_VALUE_LOW = 0
FT_GPIO_VALUE_HIGH = 1
FT_GPIO_0 = 0
FT_GPIO_1 = 1
E_FT_NOTIFICATION_CALLBACK_TYPE_DATA = 0
E_FT_NOTIFICATION_CALLBACK_TYPE_GPIO = 1
E_FT_NOTIFICATION_CALLBACK_TYPE_INTERRUPT = 2
```

```
CONFIGURATION_OPTIONAL_FEATURE_DISABLEALL = 0
CONFIGURATION_OPTIONAL_FEATURE_ENABLEBATTERYCHARGING = int("0x001", 16)
CONFIGURATION_OPTIONAL_FEATURE_DISABLECANCELSESSIONUNDERRUN = int("0x002", 16)
CONFIGURATION_OPTIONAL_FEATURE_ENABLENOTIFICATIONMESSAGE_INCH1 = int("0x004", 16)
CONFIGURATION_OPTIONAL_FEATURE_ENABLENOTIFICATIONMESSAGE_INCH2 = int("0x008", 16)
CONFIGURATION_OPTIONAL_FEATURE_ENABLENOTIFICATIONMESSAGE_INCH3 = int("0x010", 16)
CONFIGURATION_OPTIONAL_FEATURE_ENABLENOTIFICATIONMESSAGE_INCH4 = int("0x020", 16)
CONFIGURATION_OPTIONAL_FEATURE_ENABLENOTIFICATIONMESSAGE_INCHALL = int("0x03C", 16)
CONFIGURATION_OPTIONAL_FEATURE_DISABLEUNDERRUN_INCH1 = int("0x040", 16)
CONFIGURATION_OPTIONAL_FEATURE_DISABLEUNDERRUN_INCH2 = int("0x080", 16)
CONFIGURATION_OPTIONAL_FEATURE_DISABLEUNDERRUN_INCH3 = int("0x100", 16)
CONFIGURATION_OPTIONAL_FEATURE_DISABLEUNDERRUN_INCH4 = int("0x200", 16)
CONFIGURATION_OPTIONAL_FEATURE_SUPPORT_ENABLE_FIFO_IN_SUSPEND = int("0x400", 16)
# available in RevB parts only
CONFIGURATION_OPTIONAL_FEATURE_SUPPORT_DISABLE_CHIP_POWERDOWN = int("0x800", 16)
# available in RevB parts only
CONFIGURATION_OPTIONAL_FEATURE_DISABLEUNDERRUN_INCHALL = int("0x3C0", 16)
CONFIGURATION_OPTIONAL_FEATURE_ENABLEALL = int("0xFFFF", 16)

FT_DEVICE_DESCRIPTOR_TYPE = int("0x01", 16)
FT_CONFIGURATION_DESCRIPTOR_TYPE = int("0x02", 16)
FT_STRING_DESCRIPTOR_TYPE = int("0x03", 16)
FT_INTERFACE_DESCRIPTOR_TYPE = int("0x04", 16)
FT_ENDPOINT_DESCRIPTOR_TYPE = int("0x05", 16) # THIS IS PYTHON API SPECIFIC.
```

## Document References

D3XX Programmer's Guide (AN\_379): [Application Notes - FTDI](#)

FT600Q-FT601Q SuperSpeed USB3.0 IC Datasheet: [USB IC Data Sheets - FTDI](#)

## Appendix B – Version History

This section goes over version history of this document and PyD3XX.

Version	Date	Changes
1.0.0	February 5 <sup>th</sup> , 2025	Initial release.
1.0.1	February 10 <sup>th</sup> , 2025	Updated sections 2.7 & 2.8; parameters table and example code were modified to reflect Linux operation. Added paragraph at start of section 2 that goes over possible Platform string values.
1.0.2	February 12 <sup>th</sup> , 2025	Updated Table 1.1.0 to reflect there's no WinUSB dynamic library for 32-bit systems. Added Table B.0.1 to track PyD3XX version history. Fixed some table formatting and alignment.
1.0.4	April 8 <sup>th</sup> , 2025	PyD3XX Programmer's Guide document will now be released synchronously with PyD3XX updates and share the same version number. Section 1 was updated to reflect new driver library files packaged

		with PyD3XX. Sections 2.8, 2.10, 2.10B: Fixed descriptions where write was used when read was meant. Section 2.9B, 2.10B: Updated examples and descriptions to indicate overlapped object is required.
1.0.5	April 8 <sup>th</sup> , 2025	No major change to document. PyD3XX was updated.
1.0.6	May 7 <sup>th</sup> , 2025	Sections 2.38 & 2.39: Updated description for Device parameter to match function behavior. Section 2.14: Added note about StreamSize limitation for the WinUSB drivers. Updated example code + output.
1.0.7	July 30 <sup>th</sup> , 2025	Table 1.2.0: Added pipe index column and renamed index column to FIFO index column. Section 2.14: Clarified StreamSize note and mentioned Full Speed. Section 3.2: Added note about Full Speed for the Flags attribute.

**Table B.0.0 – Document History**

Version	Date	Changes
1.0.0	July 16 <sup>th</sup> , 2024	Initial release.
1.0.1	July 16 <sup>th</sup> , 2024	Initial release.
1.0.2	February 10 <sup>th</sup> , 2025	Fixed bugs on macOS & Linux. Added GetDriverVersion() & GetLibraryVersion() functions. Added FT_ResetDevicePort() function.
1.0.3	February 12 <sup>th</sup> , 2025	PyD3XX no longer loads the WinUSB dynamic library file for 32-bit systems as it is only for 64-bit systems. PyD3XX will now prioritize using the D3XX dynamic library over the WinUSB dynamic library if both drivers are installed.
1.0.4	April 8 <sup>th</sup> , 2025	PyD3XX now prioritizes loading the WinUSB dynamic libraries from FTDI for Windows for all architectures. D3XX library files packaged with PyD3XX have been updated. PyD3XX now uses windll “stdcall” calling convention for Windows systems instead of cdecl “cdecl” calling convention.
1.0.5	April 8 <sup>th</sup> , 2025	Fixed bug on Linux & macOS with functions like FT_GetDeviceInfoList() not working correctly due to byte-misalignment by changing size of unsigned long and DWORD to match Windows.
1.0.6	May 7 <sup>th</sup> , 2025	Fixed byte misalignment issue when getting MaximumPacketSize in FT_GetPipeInformation(). Added major error message to FT_SetStreamPipe() that's triggered when an invalid stream size is set.
1.0.7	July 30 <sup>th</sup> , 2025	Fixed allocated buffer size of pipe information struct in FT_GetPipeInformation().

**Table B.0.1 – PyD3XX History**