vJoy Feeder SDK

Version 2.0.5 Release – January 2015

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This SDK includes all that is needed to write a feeder for vJoy version 2.0.5
Check for the latest SDK.

Files listing:

inc	Include folder
inc\public.h	vJoy general public definitions
inc\vjoyinterface.h	Interface function declaration for vJoyInterface.dll
lib	Library folder (x86) folder
lib\vJoyInterface.dll	vJoy Interface module – must be included with the feeder (x86)
lib\vJoyInterface.lib	Import library – you must link your feeder to it (x86)
lib\vJoyInterface.pdb	Program Database – Use it for debugging (x86)
lib\amd64	Library folder (x64) folder
lib\amd64\vJoyInterface.dll	vJoy Interface module – must be included with the feeder (x64)
lib\amd64\vJoyInterface.lib	Import library – you must link your feeder to it (x64)
lib\amd64\vJoyInterface.pdb	Program Database – Use it for debugging (x64)

src	Sources of an example feeder folder
src\vJoyClient.cpp	Sources
src\vJoyClient.sln	VS2008 Express solution
src\vJoyClient.vcproj	VS2008 Express project
src\stdafx.h	Additional header files
c#	C# SDK folder
x86	Library folder (x86) folder
x64	Library folder (x64) folder
WrapperTest	Demo Wrapper Project (Visual Studio 2008 Express) folder
ReadMe.pdf	C# SDK Read Me file

Fundamentals:

This interface and example will enable you to write a C/C++ vJoy feeder.
Features introduced in version 2.0.5 are marked with [2.0.5]
To write a C# refer to ReadMe file in C# folder.

It is advisable to start your feeder from the supplied example and make the needed changes. Here are the five basic steps you might want to follow:

Test Driver:	Check that the driver is installed and enabled. Obtain information about the driver. An installed driver implies at least one vJoy device. [2.0.5] Test if driver matches interface DLL file
Test Virtual Device(s):	Get information regarding one or more devices. Read information about a specific device capabilities: Axes, buttons and POV hat switches.
Device acquisition:	Obtain status of a vJoy device. Acquire the device if the device status is *owned* or is *free*.
Updating:	Inject position data to a device (as long as the device is owned by the feeder). Position data includes the position of the axes, state of the buttons and state of the POV hat switches.
Relinquishing the device:	The device is *owned* by the feeder and cannot be fed by another application until relinquished.

Recommended Practices:

Test vJoy Driver:

Before you start, check if the vJoy driver is installed and check that it is what you expected:

```
	// Get the driver attributes (Vendor ID, Product ID, Version Number)
	if (!vJoyEnabled())
	{
		_tprintf("Failed Getting vJoy attributes.\n");
		return -2;
	}
	else
	{
		_tprintf("Vendor: %S\nProduct :%S\nVersion Number:%S\n",\
		TEXT(GetvJoyManufacturerString()),\
		TEXT(GetvJoyProductString()),\
		TEXT(GetvJoySerialNumberString()));
	};
```

Test Interface DLL matches vJoy Driver:

[2.0.5]

Before you start, check if file vJoyInterface.dll that you link to matches the vJoy driver that is installed. It is recommended that their version numbers will be identical.

```
WORD VerDll, VerDrv;
if (!DriverMatch(&VerDll, &VerDrv))
	_tprintf("Failed\r\nvJoy Driver (version %04x) does not match vJoyInterface DLL
(version %04x)\n", VerDrv ,VerDll);
else
	_tprintf( "OK - vJoy Driver and vJoyInterface DLL match vJoyInterface DLL (version
%04x)\n", VerDrv);
```

If you are not interested in the actual values of the respective version numbers, you can simplify your code by passing NULL to both function parameters.

Test vJoy Virtual Devices:

Check which devices are installed and what their state is it:

```
	// Get the state of the requested device
	VjdStat status = GetVJDStatus(iInterface);
	switch (status)
	{
	case VJD_STAT_OWN:
		_tprintf("vJoy Device %d is already owned by this feeder\n", iInterface);
		break;
	case VJD_STAT_FREE:
		_tprintf("vJoy Device %d is free\n", iInterface);
		break;
	case VJD_STAT_BUSY:
		_tprintf("vJoy Device %d is already owned by another feeder\nCannot continue\n",
iInterface);
		return -3;
	case VJD_STAT_MISS:
		_tprintf("vJoy Device %d is not installed or disabled\nCannot continue\n",
iInterface);
		return -4;
	default:
		_tprintf("vJoy Device %d general error\nCannot continue\n", iInterface);
		return -1;
	};
```

Now make sure that the axes, buttons (and POV hat switches) are as expected:

```
	// Check which axes are supported
	BOOL AxisX  = GetVJDAxisExist(iInterface, HID_USAGE_X);
	BOOL AxisY  = GetVJDAxisExist(iInterface, HID_USAGE_Y);
	BOOL AxisZ  = GetVJDAxisExist(iInterface, HID_USAGE_Z);
	BOOL AxisRX = GetVJDAxisExist(iInterface, HID_USAGE_RX);
	// Get the number of buttons supported by this vJoy device
	int nButtons  = GetVJDButtonNumber(iInterface);
	// Print results
	_tprintf("\nvJoy Device %d capabilities\n", iInterface);
	_tprintf("Numner of buttons\t\t%d\n", nButtons);
	_tprintf("Axis X\t\t%s\n", AxisX?"Yes":"No");
	_tprintf("Axis Y\t\t%s\n", AxisX?"Yes":"No");
	_tprintf("Axis Z\t\t%s\n", AxisX?"Yes":"No");
	_tprintf("Axis Rx\t\t%s\n", AxisRX?"Yes":"No");
```

Acquire the vJoy Device:

Until now you just made inquiries about the system and about the vJoy device status. In order to change the position of the vJoy device you need to Acquire it (if it is not already owned):

```
	// Acquire the target
	if ((status == VJD_STAT_OWN) || ((status == VJD_STAT_FREE) && (!
AcquireVJD(iInterface))))
	{
		_tprintf("Failed to acquire vJoy device number %d.\n", iInterface);
		return -1;
	}
	else
	{
		_tprintf("Acquired: vJoy device number %d.\n", iInterface);
	}
```

Feed vJoy Device:

The time has come to do some real work: feed the vJoy device with position data.

There are two approaches:

1. **Efficient**: Collect position data, place the data in a position structure then finally send the data to the device.
2. **Robust**: Reset the device once then send the position data for every control (axis, button,POV) at a time.

The first approach is more efficient but requires more code to deal with the position structure. The second approach hides the details of the data fed to the device at the expense of excessive calls to the device driver.

Efficient:

```
/*** Create the data packet that holds the entire position info ***/

// Set the device ID
id = (BYTE)iInterface;
iReport.bDevice = id;

// Set values in four axes (Leave the rest in default state)
iReport.wAxisX=X;
iReport.wAxisY=Y;
iReport.wAxisZ=Z;
iReport.wAxisZRot=ZR;

// Set buttons one by one
iReport.lButtons = 1<<count/20;

if (ContinuousPOV)
{
	// Make Continuous POV Hat spin
	iReport.bHats		= (DWORD)(count*70);
	iReport.bHatsEx1	= (DWORD)(count*70)+3000;
	iReport.bHatsEx2	= (DWORD)(count*70)+5000;
	iReport.bHatsEx3	= 15000 - (DWORD)(count*70);
	if ((count*70) > 36000)
	{
		iReport.bHats = -1; // Neutral state
		iReport.bHatsEx1 = -1; // Neutral state
		iReport.bHatsEx2 = -1; // Neutral state
		iReport.bHatsEx3 = -1; // Neutral state
	};
}
else
{
	// Make 5-position POV Hat spin
	unsigned char pov[4];
	pov[0] = ((count/20) + 0)%4;
	pov[1] = ((count/20) + 1)%4;
	pov[2] = ((count/20) + 2)%4;
	pov[3] = ((count/20) + 3)%4;

	iReport.bHats		= (pov[3]<<12) | (pov[2]<<8) | (pov[1]<<4) | pov[0];
	if ((count) > 550)
		iReport.bHats = -1; // Neutral state
};
```

If the structure changes in the future then the code will have to change too.

Robust:

```
	// Reset this device to default values
	ResetVJD(iInterface);

	// Feed the device in endless loop
	while(1)
	{
		for(int i=0;i<10;i++)
		{
			// Set position of 4 axes
			res = SetAxis(value+00, iInterface, HID_USAGE_X);
			res = SetAxis(value+10, iInterface, HID_USAGE_Y);
			res = SetAxis(value+20, iInterface, HID_USAGE_Z);
			res = SetAxis(value+30, iInterface, HID_USAGE_RX);
			res = SetAxis(value+40, iInterface, HID_USAGE_RZ);

			// Press Button 1, Keep button 3 not pressed
			res = SetBtn(TRUE, iInterface, 1);
			res = SetBtn(FALSE, iInterface, 3);
		}

	Sleep(20);
	value+=10;
	}
```

This code is readable and does not relay on any specific structure. However, the driver is updated with every *SetAxis()* and every *SetBtn()*.

Relinquish the vJoy Device:

You must relinquish the device when the driver exits:

```
RelinquishVJD(iInterface);
```

Detecting Changes

[2.0.5]

It is sometimes necessary to detect changes in the number of available vJoy devices.

You may define a callback function that will be called whenever such a change occurs. In order for it to be called, the user-defined callback function should first be registered by calling function *RegisterRemovalCB* as in the following example:

```
RegisterRemovalCB(ChangedCB, (PVOID)hDlg);
```

Where ChangedCB is the user-defined callback function and hDlg is the handle to the application's top dialog box.

An example to an implementation of the user-defined callback function ChangedCB:

```
void CALLBACK ChangedCB(BOOL Removed, BOOL First, PVOID data)
{
	HWND hDlg = (HWND)data;
	PostMessage(hDlg, WM_VJOYCHANGED, (WPARAM)Removed, (LPARAM)First);
}
```

This function is called when a process of vJoy device removal starts or ends and when a process of vJoy device

arrival starts or ends. The function must return as soon as possible. This is why in this example it **posts** a message to the application's top dialog box (passed as parameter *data*) and returns.

- When a process of vJoy device removal starts, Parameter *Removed*=TRUE and parameter *First*=TRUE.
- When a process of vJoy device removal ends, Parameter *Removed*=TRUE and parameter *First*=FALSE.
- When a process of vJoy device arrival starts, Parameter *Removed*=FALSE and parameter *First*=TRUE.
- When a process of vJoy device arrival ends, Parameter *Removed*= FALSE and parameter *First*=FALSE .

Parameter *data* always points to the data registered as second parameter of function *RegisterRemovalCB*.

Interface Function Reference:

General driver data

The following functions return general data regarding the installed vJoy device driver. It is recommended to call them when starting your feeder.

```
VJOYINTERFACE_API BOOL    __cdecl    vJoyEnabled(void);
```
Returns TRUE if vJoy version 2.x is installed and enabled.

```
VJOYINTERFACE_API SHORT __cdecl    GetvJoyVersion(void);
```
Return the version number of the installed vJoy. To be used only after `vJoyEnabled()`

```
VJOYINTERFACE_API PVOID   __cdecl    GetvJoyProductString(void);
VJOYINTERFACE_API PVOID   __cdecl    GetvJoyManufacturerString(void);
VJOYINTERFACE_API PVOID   __cdecl    GetvJoySerialNumberString(void);
```
These functions return an LPTSTR that points to the correct data (Product, Manufacturer or Serial number). To be used only after `vJoyEnabled()`

[2.0.5]
```
VJOYINTERFACE_API BOOL    __cdecl    DriverMatch(WORD * DllVer, WORD * DrvVer);
```
Returns TRUE if vJoyInterface.dll file version and vJoy Driver version are identical. Otherwise returns FALSE.
Optional (You may pass NULL):
Output parameter *DllVer*: If a pointer to WORD is passed then the value of the **DLL file** version will be written to this parameter (e.g. 0x205).
Output parameter *DrvVer*: If a pointer to WORD is passed then the value of the **Driver** version will be written to this parameter (e.g. 0x205).

[2.0.5]
```
VJOYINTERFACE_API VOID    __cdecl    RegisterRemovalCB((CALLBACK *)(BOOL, BOOL,
PVOID)ConfChangedCB, PVOID * UserData);
```
This function registers a user-defined **ConfChangedCB** callback fuction that is called everytime a vJoy device is added or removed.
Paremeter *ConfChangedCB* is a pointer to the user-defined callback function.
Parameter *UserData* is a pointer to a user-defined data item. The callback function recieves this pointer as its third parameter.
More in section Detecting Changes.

Write access to vJoy Device

The following functions access the virtual device by its ID (rID). The value of rID may vary between 1 and 16.
There may be more than one virtual device installed on a given system.
VJD stands for Virtual Joystick Device.

```
VJOYINTERFACE_API enum VjdStat      __cdecl    GetVJDStatus(UINT rID);
```
Returns the status of the specified device
The status can be one of the following values:

- VJD_STAT_OWN // The vJoy Device is owned by this application.
- VJD_STAT_FREE // The vJoy Device is NOT owned by any application (including this one).
- VJD_STAT_BUSY // The vJoy Device is owned by another application.
  // It cannot be acquired by this application.
- VJD_STAT_MISS // The vJoy Device is missing. It either does not exist or the driver is disabled.

- VJD_STAT_UNKN // Unknown

```
VJOYINTERFACE_API BOOL __cdecl AcquireVJD(UINT rID);
```
Acquire the specified device.
Only a device in state VJD_STAT_FREE can be acquired.
If acquisition is successful the function returns TRUE and the device status becomes VJD_STAT_OWN.

```
VJOYINTERFACE_API VOID __cdecl RelinquishVJD(UINT rID);
```
Relinquish the previously acquired specified device.
Use only when device is state VJD_STAT_OWN.
State becomes VJD_STAT_FREE immediately after this function returns.

```
VJOYINTERFACE_API BOOL __cdecl UpdateVJD(UINT rID, PVOID pData);
```
Update the position data of the specified device.
Use only after device has been successfully acquired.
Input parameter is a pointer to structure of type JOYSTICK_POSITION that holds the position data.
Returns TRUE if device updated.

vJoy Device properties

The following functions receive the virtual device ID (rID) and return the relevant data.
The value of rID may vary between 1 and 16. There may be more than one virtual device installed on a given system.
The return values are meaningful only if the specified device exists
VJD stands for Virtual Joystick Device.

```
VJOYINTERFACE_API int __cdecl GetVJDButtonNumber(UINT rID);
```
If function succeeds, returns the number of buttons in the specified device. Valid values are 0 to 128
[2.0.5]If function fails, returns a negative error code:
- NO_HANDLE_BY_INDEX
- BAD_PREPARSED_DATA
- NO_CAPS
- BAD_N_BTN_CAPS
- BAD_BTN_CAPS
- BAD_BTN_RANGE

```
VJOYINTERFACE_API int __cdecl GetVJDDiscPovNumber(UINT rID);
```
Returns the number of discrete-type POV hats in the specified device
Discrete-type POV Hat values may be North, East, South, West or neutral
Valid values are 0 to 4 (from version 2.0.1)

```
VJOYINTERFACE_API int __cdecl GetVJDContPovNumber(UINT rID);
```
Returns the number of continuous-type POV hats in the specified device
continuous-type POV Hat values may be 0 to 35900
Valid values are 0 to 4 (from version 2.0.1)

```
VJOYINTERFACE_API BOOL __cdecl GetVJDAxisExist(UINT rID, UINT Axis);
```
Returns TRUE is the specified axis exists in the specified device
Axis values can be:
HID_USAGE_X // X Axis
HID_USAGE_Y // Y Axis
HID_USAGE_Z // Z Axis
HID_USAGE_RX // Rx Axis

```
HID_USAGE_RY     // Ry Axis
HID_USAGE_RZ     // Rz Axis
HID_USAGE_SL0    // Slider 0
HID_USAGE_SL1    // Slider 1
HID_USAGE_WHL // Wheel
```

Robust write access to vJoy Devices

The following functions receive the virtual device ID (rID) and return the relevant data.
These functions hide the details of the position data structure by allowing you to alter the value of a specific control.
The downside of these functions is that you inject the data to the device serially as opposed to function *UpdateVJD()*.
The value of rID may vary between 1 and 16. There may be more than one virtual device installed on a given system.

```
VJOYINTERFACE_API BOOL    __cdecl  ResetVJD(UINT rID);
```
Resets all the controls of the specified device to a set of values.
These values are hard coded in the interface DLL and are currently set as follows:

- Axes X, Y & Z: Middle point.
- All other axes: 0.
- POV Switches: Neutral (-1).
- Buttons: Not Pressed (0).

```
VJOYINTERFACE_API BOOL    __cdecl  ResetAll(void);
```
Resets all the controls of the all devices to a set of values.
See function Reset VJD for details.

```
VJOYINTERFACE_API BOOL    __cdecl  ResetButtons(UINT rID);
```
Resets all buttons (To 0) in the specified device.

```
VJOYINTERFACE_API BOOL    __cdecl  ResetPovs(UINT rID);
```
Resets all POV Switches (To -1) in the specified device.

```
VJOYINTERFACE_API BOOL    __cdecl  SetAxis(LONG Value, UINT rID, UINT Axis);
```
Write Value to a given axis defined in the specified VDJ.
Value in the range 0x1-0x8000
Axis can be one of the following:

```
HID_USAGE_X     // X Axis
HID_USAGE_Y     // Y Axis
HID_USAGE_Z     // Z Axis
HID_USAGE_RX    // Rx Axis
HID_USAGE_RY    // Ry Axis
HID_USAGE_RZ    // Rz Axis
HID_USAGE_SL0   // Slider 0
HID_USAGE_SL1   // Slider 1
HID_USAGE_WHL   // Wheel
```

```
VJOYINTERFACE_API BOOL    __cdecl  SetBtn(BOOL Value, UINT rID, UCHAR nBtn);
```
Write **Value** (TRUE or FALSE) to a given button defined in the specified VDJ.
nBtn can in the range 1-128

```
VJOYINTERFACE_API BOOL    __cdecl  SetDiscPov(int Value, UINT rID, UCHAR nPov);
```
Write Value to a given discrete POV defined in the specified VDJ
Value can be one of the following:

0: North (or Forwards)
1: East (or Right)
2: South (or backwards)
3: West (or left)
-1: Neutral (Nothing pressed)

nPov selects the destination POV Switch. It can be 1 to 4

```
VJOYINTERFACE_API BOOL    __cdecl  SetContPov(DWORD Value,UINT rID,UCHAR nPov);
```

Write Value to a given continuous POV defined in the specified VDJ
Value can be in the range: -1 to 35999. It is measured in units of one-hundredth a degree. -1 means Neutral (Nothing pressed).
nPov selects the destination POV Switch. It can be 1 to 4

Build & Deploy:

The quickest way to build your project is to start from the supplied demo project written in C under Visual Studio 2008 Express. It will compile as-is for x64 target machines.

When you deploy your feeder, don't forget to supply the user with file vJoyInterface.dll of the correct bitness.

Location of Feeder

You may locate your feeder anywhere you like provided that file **vJoyInterface.dll** is on the feeder's search path. Here are a few points that may help you decide where to deploy your feeder:

1. If you choose to link to file **vJoyInterface.dll** provided by this SDK you risk to use a non-optimal library. If the user upgrades vJoy, you risk linking to an outdated library.
2. If you choose to link to file **vJoyInterface.dll** provided by vJoy Driver installation you need to locate the library file while installing your feeder.

Location of vJoyInterface.dll

[2.0.5]
vJoy folders are pointed at by registry Entries located under key:
`HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall\{8E31F76F-74C3-47F1-9550-E041EEDC5FBB}_is1`

Entry	Default Value	Notes
InstallLocation	C:\Program Files\vJoy\	vJoy root folder: Location of vJoy driver installer and uninstaller
DllX64Location	C:\Program Files\vJoy\x64	• Location of 64-bit utilities and libraries • Only on 64-bit Machines
DllX86Location	C:\Program Files\vJoy\x86	• Location of 32-bit utilities and libraries • On 32-bit and 64-bit Machines

Note that on 64-bit machine you are capable of developing both 32-bit and 64-bit feeders.

You can assume that DLL files are located in sub-folders x64 and x32 under vJoy root folder.

Logging [2.0.5]

Logging of vJoyInterface.dll activity into a log file is an option.
Use this feature for debugging purposes only. It accumulates data into the log file and generally slows down the system.

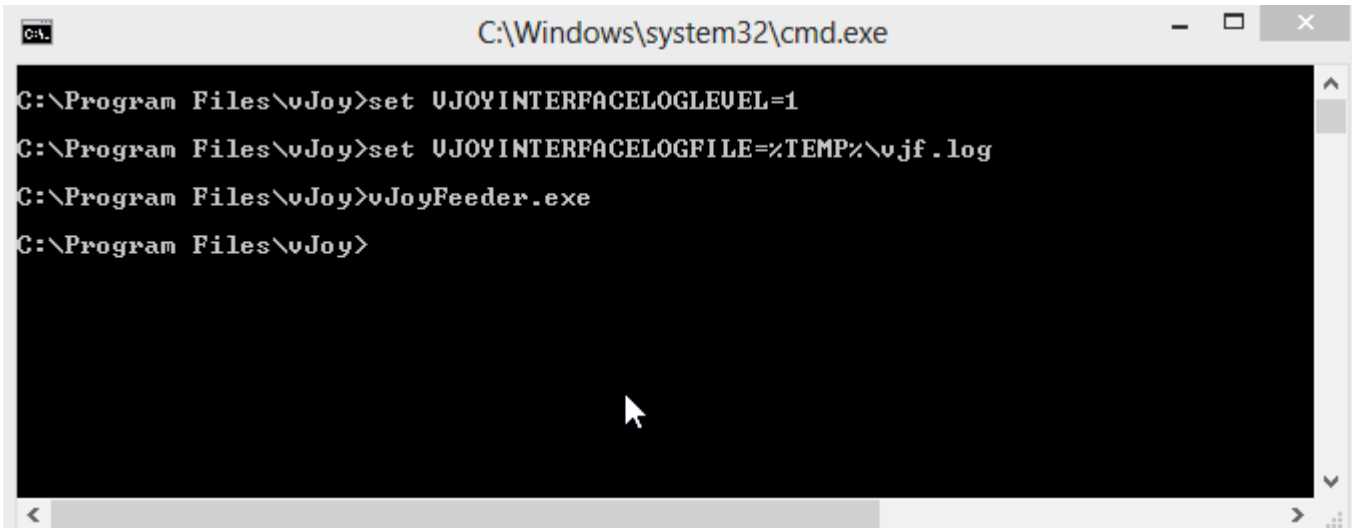
This feature is intended both for helping you develop your feeder and to collect data at the user's location – provided the user is willing to trigger logging for you. By default, logging state is OFF.

Start/Stop Logging.

To start logging, there are one or two system environment variables that have to be changed before the feeder (Or any other application calling vJoyInterface.dll) is started.

- VJOYINTERFACELOGLEVEL:
  Any positive value will trigger logging.
  Set to 0 to stop logging.
- VJOYINTERFACELOGFILE (Optional):
  If set, this is the full path to the log file.
  Default Path: %TEMP%\vJoyInterface.log

Example:



Notes:

- This session of vJoyFeeder will log into the given file.
- If the file exists, it will append the new data to the existing file.
- To stop logging, kill vJoyFeeder and then close this window.

Limitations:

- Logging begins on the application's first call to function AcquireVJD()
- If VJOYINTERFACELOGFILE is not defined, all applications that call AcquireVJD() will write to the same default output file.

Log File

The log file contains information about vJoyInterface.dll values, states and functions. It is mainly useful in conjunction with the code.

Here is a snippet of a log file:

```
[04988]Info: GetHandleByIndex(index=3) - Starting

[04988]Info: GetHandleByIndex(index=3) - Exit OK (Handle to \\?\hid#hidclass&col01#1&2d595ca7&db&0000#{4d1e55b2-
f16f-11cf-88cb-001111000030})




[03088]Process:"D:\WinDDK\vJoy-2.0.5\apps\vJoyFeeder\x64\Release\vJoyFeeder.exe"


[03088]Info: OpenDeviceInterface(9) - DevicePath[0]=\\?\{d6e55ca0-1a2e-4234-aaf3-
3852170b492f}#vjoyrawpdo#1&2d595ca7&db&vjoyinstance00#{781ef630-72b2-11d2-b852-00c04fad5101}\device_001

[03088]Info: isRawDevice(9) - Compare \\?\{d6e55ca0-1a2e-4234-aaf3-
3852170b492f}#vjoyrawpdo#1&2d595ca7&db&vjoyinstance00#{781ef630-72b2-11d2-b852-00c04fad5101}\device_001 with
001(d=1)

[03088]Info: OpenDeviceInterface(9) - DevicePath[1]=\\?\{d6e55ca0-1a2e-4234-aaf3-
3852170b492f}#vjoyrawpdo#1&2d595ca7&db&vjoyinstance00#{781ef630-72b2-11d2-b852-00c04fad5101}\device_002

[03088]Info: isRawDevice(9) - Compare \\?\{d6e55ca0-1a2e-4234-aaf3-
3852170b492f}#vjoyrawpdo#1&2d595ca7&db&vjoyinstance00#{781ef630-72b2-11d2-b852-00c04fad5101}\device_002 with
002(d=2)

[03088]Info: OpenDeviceInterface(9) - DevicePath[2]=\\?\{d6e55ca0-1a2e-4234-aaf3-
3852170b492f}#vjoyrawpdo#1&2d595ca7&db&vjoyinstance00#{781ef630-72b2-11d2-b852-00c04fad5101}\device_003

[03088]Info: isRawDevice(9) - Compare \\?\{d6e55ca0-1a2e-4234-aaf3-
3852170b492f}#vjoyrawpdo#1&2d595ca7&db&vjoyinstance00#{781ef630-72b2-11d2-b852-00c04fad5101}\device_003 with
003(d=3)
```

You can see the end of one process (Process ids are in brackets) and the beginning of a second process. The first line referring the second project is highlighted, and it indicates the command this process is carrying out.

Every line in the log file starts with the process id and followed by an error level string such as Info and a column.

The next string is usually the name of the function (e.g. `isRawDevice`) and its significant parameters.

For full understanding of the printout you should refer to the source file.