# WDF Filter Driver or Virtual Audio Driver

<http://www.techtalkz.com/microsoft-device-drivers/243534-audio-steram-capturing-usinf-filter-driver.html>

之后可以发现Virtual Audio Driver在操作系统中表现为一个独立的设备，在使用DDK编译形成sys以及cat还有inf之后可以使用添加老旧硬件，之后选择地址来安装此硬件，这个硬件在系统中体现为一个独立的播放设备，在设立默认播放设备之后，会取代原先的扬声器播放设备，此时系统不会从扬声器等设备播放声音，反而会回放到虚拟声卡设备上，之后会吧系统回放的声音记录成PCM的WAV格式，之后记录到C盘上面。

由于设备的特殊性，所以最后还是考虑Filter Driver的思路。但是WDF的Filter Driver牵扯到Coinstaller的Dll问题，很难解决，所以还是使用比较成熟的WDM形式的键盘过滤记录驱动来改写最后的声卡过滤驱动。

附WDF程序安装过程的提问以及解答：

# [ntdev] Use Filter Driver to Capture URB to the USB Audio Device

|  |  |
| --- | --- |
| Inbox | x |

https://mail.google.com/mail/c/photos/public/AIbEiAIAAABDCKSszdDfuZ6kbCILdmNhcmRfcGhvdG8qKGIwMjM4ZjVjMTIyMThhZDk1MmQ4M2RmMjZiN2VmY2JjNjI1Mjk0N2QwAR7uFRyUbjaJG2ykq0glyMEBAy4F?sz=32

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| |  | | --- | | **zx0319@gmail.com** [via](http://support.google.com/mail/bin/answer.py?hl=en&ctx=mail&answer=1311182) lists.osr.com | | Jul 30 (3 days ago)  https://mail.google.com/mail/ca/images/cleardot.gif |  | **https://mail.google.com/mail/ca/images/cleardot.gif**  **https://mail.google.com/mail/ca/images/cleardot.gif** |
| |  | | --- | | to Windows  https://mail.google.com/mail/ca/images/cleardot.gif | | | |

I want to develop  a WDM filter driver.  
Now I just attach a filter to the first device of USBAudio driver.  
But the dispatch function may be not so perfect, the system always stuck after load in the driver.  
Here is my problem:  
1, Is there any thing wrong with the device that my driver attached to?  
2,According to my source code, how can I or which function should I implement to capture the URB?  
3,What is the format of the signal that contained in the URB?  
  
Source Code(NOT ALL):  
NTSTATUS DriverEntry(IN PDRIVER\_OBJECT DriverObject,IN PUNICODE\_STRING RegistryPath)  
{       for (ucCnt = 0; ucCnt < IRP\_MJ\_MAXIMUM\_FUNCTION; ucCnt++)  
        {  
                DriverObject->MajorFunction[ucCnt] = KSnifferDispatchGeneral;  
        }  
  
    DbgPrintEx(DPFLTR\_DEFAULT\_ID,DPFLTR\_ERROR\_LEVEL,"Enter DriverEntry \n");  
    DriverObject->MajorFunction[IRP\_MJ\_READ] = KSnifferDispatchRead;  
        DriverObject->DriverUnload = KSnifferDriverUnload;  
        DriverObject->DriverExtension->AddDevice = KSnifferAddDevice;  
  
    RtlInitAnsiString(&ntNameString,"\\Device\\KeyboardClass0");  
    RtlAnsiStringToUnicodeString(&ntUnicodeString,&ntNameString,TRUE);  
        RtlInitUnicodeString(&DevName,L"\\Device\\KBfilter0");  
        RtlInitUnicodeString(&DriverName,L"\\Driver\\usbaudio");  
  
        ObReferenceObjectByName( &DriverName,  
                           OBJ\_CASE\_INSENSITIVE,  
                           NULL,  
                           0,  
                           \*IoDriverObjectType,  
                           KernelMode,  
                           NULL,  
                           &AudioDriver );  
        if ( AudioDriver == NULL )  
        {  
                DbgPrintEx(DPFLTR\_DEFAULT\_ID,DPFLTR\_ERROR\_LEVEL,"Not found USB Keyboard Device hidusb!\n" );  
                return STATUS\_UNSUCCESSFUL;  
        }  
        else  
        {  
                DbgPrintEx(DPFLTR\_DEFAULT\_ID,DPFLTR\_ERROR\_LEVEL,"Get it found USB Keyboard Device hidusb!\n" );  
                DeviceObject = AudioDriver -> DeviceObject;  
                DbgPrintEx(DPFLTR\_DEFAULT\_ID,DPFLTR\_ERROR\_LEVEL,"hidusb!%x\n",DeviceObject);  
        }  
  
    status = IoCreateDevice(DriverObject,  
                 2\*sizeof(PDEVICE\_OBJECT),  
                 &DevName,  
                 FILE\_DEVICE\_UNKNOWN,  
                 0,  
                 FALSE,  
                 &HookDeviceObject);  
        if(!NT\_SUCCESS(status))  
        {  
                DbgPrintEx(DPFLTR\_DEFAULT\_ID,DPFLTR\_ERROR\_LEVEL,"Init Error\n");  
                RtlFreeUnicodeString(&ntUnicodeString);  
                return STATUS\_SUCCESS;  
        }  
        DbgPrintEx(DPFLTR\_DEFAULT\_ID,DPFLTR\_ERROR\_LEVEL,"Successfully Create\n");  
    HookDeviceObject->Flags |= DO\_BUFFERED\_IO;  
    IoAttachDeviceToDeviceStack(HookDeviceObject,DeviceObject);  
    if(!NT\_SUCCESS(status))  
        {  
                DbgPrintEx(DPFLTR\_DEFAULT\_ID,DPFLTR\_ERROR\_LEVEL,"Connect with keyboard failed!\n");  
                IoDeleteDevice(HookDeviceObject);  
                RtlFreeUnicodeString(&ntUnicodeString);  
                return STATUS\_SUCCESS;  
        }  
        RtlFreeUnicodeString( &ntUnicodeString );  
        DbgPrintEx(DPFLTR\_DEFAULT\_ID,DPFLTR\_ERROR\_LEVEL,"Successfully connected to keyboard device\n");  
        return STATUS\_SUCCESS;  
}  
......  
  
  
THANKS.  
  
---  
NTDEV is sponsored by OSR  
  
For our schedule of WDF, WDM, debugging and other seminars visit:  
<http://www.osr.com/seminars>  
  
To unsubscribe, visit the List Server section of OSR Online at <http://www.osronline.com/page.cfm?name=ListServer>

https://ssl.gstatic.com/ui/v1/icons/mail/profile_mask2.png

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| |  | | --- | | **Tim Green** Tim.Green@displaylink.com [via](http://support.google.com/mail/bin/answer.py?hl=en&ctx=mail&answer=1311182) lists.osr.com | | Jul 31 (2 days ago)  https://mail.google.com/mail/ca/images/cleardot.gif |  | **https://mail.google.com/mail/ca/images/cleardot.gif**  **https://mail.google.com/mail/ca/images/cleardot.gif** |
| |  | | --- | | to Windows  https://mail.google.com/mail/ca/images/cleardot.gif | | | |

> Source Code(NOT ALL):

> RtlInitAnsiString(&ntNameString,"\\Device\\KeyboardClass0");  
> RtlAnsiStringToUnicodeString(&ntUnicodeString,&ntNameString,TRUE);  
> RtlInitUnicodeString(&DevName,L"\\Device\\KBfilter0");  
> RtlInitUnicodeString(&DriverName,L"\\Driver\\usbaudio");

You might be showing us too much code! Is this a USB Audio filter or a keyboard filter?

https://mail.google.com/mail/ca/images/cleardot.gif

https://ssl.gstatic.com/ui/v1/icons/mail/profile_mask2.png

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| |  | | --- | | **Doron Holan** Doron.Holan@microsoft.com [via](http://support.google.com/mail/bin/answer.py?hl=en&ctx=mail&answer=1311182) lists.osr.com | | Jul 31 (2 days ago)  https://mail.google.com/mail/ca/images/cleardot.gif |  | **https://mail.google.com/mail/ca/images/cleardot.gif**  **https://mail.google.com/mail/ca/images/cleardot.gif** |
| |  | | --- | | to Windows  https://mail.google.com/mail/ca/images/cleardot.gif | | | |

That code is pretty horrific, even for filtering a keyboard.  Where did you get it?  Regardless, if you want to filter URBs on a usb audio device, you can't do any of this nastiness because to see URBs you need to be below usbaudio and above its pdo. The only way to do that is to do a correct pnp install of your driver to add yourself as a lower filter.  If you are going to do that, might as well be a KMDF driver instead of WDM and save yourself a ton of time.

https://mail.google.com/mail/ca/images/cleardot.gif

https://mail.google.com/mail/c/photos/public/AIbEiAIAAABECLWbvM3T5ceb2wEiC3ZjYXJkX3Bob3RvKihkZTgzNmYyYWNmYTgxOWQ1ZDM1ZDljMjA5ODE0NmRkZDJhNDIwZDdhMAHKCx4jGcCSvDiCX8qrw4ABFBrk7A?sz=32

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| |  | | --- | | **Tim Roberts** timr@probo.com [via](http://support.google.com/mail/bin/answer.py?hl=en&ctx=mail&answer=1311182) lists.osr.com | | Jul 31 (2 days ago)  https://mail.google.com/mail/ca/images/cleardot.gif |  | **https://mail.google.com/mail/ca/images/cleardot.gif**  **https://mail.google.com/mail/ca/images/cleardot.gif** |
| |  | | --- | | to Windows  https://mail.google.com/mail/ca/images/cleardot.gif | | | |

[zx0319@gmail.com](mailto:zx0319@gmail.com) wrote:  
> I want to develop  a WDM filter driver.  
> Now I just attach a filter to the first device of USBAudio driver.  
> But the dispatch function may be not so perfect, the system always stuck after load in the driver.  
> Here is my problem:  
> 1, Is there any thing wrong with the device that my driver attached to?  
> 2,According to my source code, how can I or which function should I implement to capture the URB?

I want to reinforce Doron here.  If you want URBs, you will need to be a  
LOWER filter to usbaudio.sys, and you will need to be a PnP driver.  
KMDF makes that almost trivial -- a hundred lines of code, as opposed to  
a thousand otherwise.  
  
What you have here is simply the wrong way to do it.

> 3,What is the format of the signal that contained in the URB?

You have to monitor the configuration packets to know what format the  
driver and the hardware agreed to.

https://mail.google.com/mail/ca/images/cleardot.gif

https://mail.google.com/mail/c/photos/public/AIbEiAIAAABDCKSszdDfuZ6kbCILdmNhcmRfcGhvdG8qKGIwMjM4ZjVjMTIyMThhZDk1MmQ4M2RmMjZiN2VmY2JjNjI1Mjk0N2QwAR7uFRyUbjaJG2ykq0glyMEBAy4F?sz=32

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| |  | | --- | | **Shane Wayne** | | Jul 31 (2 days ago)  https://mail.google.com/mail/ca/images/cleardot.gif |  | **https://mail.google.com/mail/ca/images/cleardot.gif**  **https://mail.google.com/mail/ca/images/cleardot.gif** |
| |  | | --- | | to Windows  https://mail.google.com/mail/ca/images/cleardot.gif | | | |

This Driver was adopted from a keyboard filter driver.

https://mail.google.com/mail/ca/images/cleardot.gif

https://mail.google.com/mail/c/photos/public/AIbEiAIAAABDCKSszdDfuZ6kbCILdmNhcmRfcGhvdG8qKGIwMjM4ZjVjMTIyMThhZDk1MmQ4M2RmMjZiN2VmY2JjNjI1Mjk0N2QwAR7uFRyUbjaJG2ykq0glyMEBAy4F?sz=32

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| |  | | --- | | **Shane Wayne** | | Jul 31 (2 days ago)  https://mail.google.com/mail/ca/images/cleardot.gif |  | **https://mail.google.com/mail/ca/images/cleardot.gif**  **https://mail.google.com/mail/ca/images/cleardot.gif** |
| |  | | --- | | to Windows  https://mail.google.com/mail/ca/images/cleardot.gif | | | |

Thanks for your reply,

>1, you will need to be aLOWER filter to usbaudio.sys, and you will need to be a PnP driver.

I am really not so family with driver, do you mean I am now attach a higher filter of usbaudio?

And I can ensure when the driver running, the hardware was connected, is that still necessary to be a PnP driver?

And can I achieve that using WDM? I want to improve the framework after I achieved that.

Thanks again!

https://mail.google.com/mail/ca/images/cleardot.gif

https://mail.google.com/mail/c/photos/public/AIbEiAIAAABECLWbvM3T5ceb2wEiC3ZjYXJkX3Bob3RvKihkZTgzNmYyYWNmYTgxOWQ1ZDM1ZDljMjA5ODE0NmRkZDJhNDIwZDdhMAHKCx4jGcCSvDiCX8qrw4ABFBrk7A?sz=32

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| |  | | --- | | **Tim Roberts** timr@probo.com [via](http://support.google.com/mail/bin/answer.py?hl=en&ctx=mail&answer=1311182) lists.osr.com | | Jul 31 (2 days ago)  https://mail.google.com/mail/ca/images/cleardot.gif |  | **https://mail.google.com/mail/ca/images/cleardot.gif**  **https://mail.google.com/mail/ca/images/cleardot.gif** |
| |  | | --- | | to Windows  https://mail.google.com/mail/ca/images/cleardot.gif | | | |

Shane Wayne wrote:  
> Thanks for your reply,  
> >1, you will need to be aLOWER filter to usbaudio.sys, and you will  
> need to be a PnP driver.  
> I am really not so family with driver, do you mean I am now attach a  
> higher filter of usbaudio?

I don't have a clue how you are configuring it.  Your position in the  
stack depends on how you set up the registry (UpperFilters vs LowerFilters).

> And I can ensure when the driver running, the hardware was connected,  
> is that still necessary to be a PnP driver?

Absolutely, yes.  In order to be a filter in a PnP device stack, you  
must be a PnP driver.

> And can I achieve that using WDM? I want to improve the framework  
> after I achieved that.

You are looking at it the wrong way.  It is 10 times harder to write a  
filter driver in WDM than it is to write it in KMDF.  You can -- quite  
literally -- write a fully functional and fully PnP- and power-compliant  
KMDF filter driver in 40 lines of source code.