Creating An XBMC HTPC

(Microsoft Windows 7)

Draft

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1. INTRODUCTION

"XBMC (XBOX Media Center) is a cross platform free and open source media player and home entertainment system with a user interface design developed for use in a living room on the Television. It was originally engineered for the first generation Microsoft XBOX game console but now is available for Linux, MAC OS X, and Microsoft Windows.

XBMC supports most common audio, video, and image formats, playlists, audio visualizations, slideshows, weather reporting, and third-party plug ins. It is network-capable (internet and LAN shares). Unlike proprietary media center applications like Windows Media Center from Microsoft, or other free-software media center applications such as MediaPortal and MythTV, XBMC Media Center does not yet include native DVR/PVR TV-recording functionality or an EPG TV-Guide interface of its own, it does however offer the possibility to integrate such functionality through third-party plug ins.

Through its plug in system, which is based on the Python programming language, XBMC is expandable via add-ons that include features such as television program guides, YouTube, Hulu, Veoh, online movie trailer support, and SHOUTcast/Podcast streaming. XBMC also functions as a gaming platform by allowing users to play mini-games developed with Python, on any operating system. In addition, the Xbox version of XBMC contains the ability to launch console games, and homebrew applications such as emulators.

XBMC source code as a whole is distributed under GPL (GNU General Public License). XBMC is not produced, endorsed, or supported by Microsoft, which means that XBMC for Xbox requires a modchip or softmod exploit, or reflashing the Xbox onboard BIOS EEPROM chip with a modified BIOS." –*Reference: Wikipedia Article*

1.1 Purpose

This document is a complete walkthrough for installing and configuring XBMC on a Microsoft Windows 7 home theatre pc. A home theatre pc (HTPC) is designed to fit into your existing living room entertainment center and is controlled entirely by remote as would any other electronic entertainment device.

1.2 Audience

Anyone who desires a media center appliance to stream movies, music, photos, emulators, and television shows from computers to televisions in the home.

1.3 Screenshots



Figure 1: XBMC MediaStream Skin - Navigation

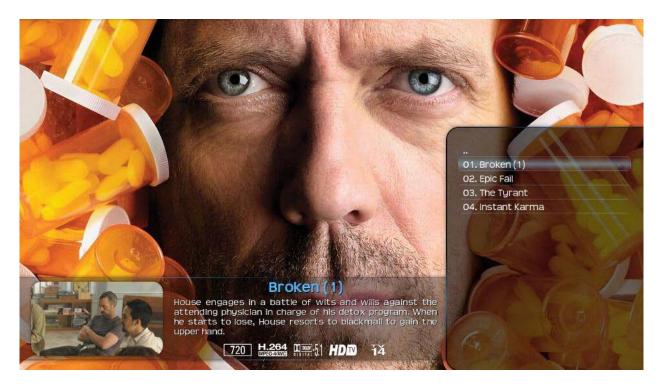


Figure 2: XBMC Transparency Skin – Browsing TV Show



Figure 3: XBMC Aeon Skin - Navigation

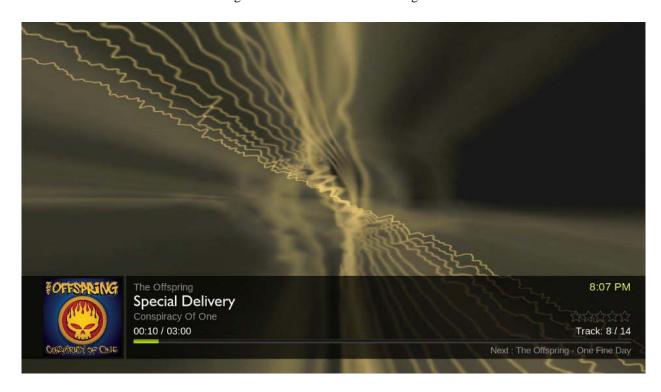


Figure 4: XBMC PM3.HD Skin – Music Playback



Figure 5: HTPC Up and Running in the living room

2. GETTING STARTED

The following section outlines the hardware requirements for your home theatre PC (HTPC).

2.1 Basic Architecture

The architecture for the media center is pretty simple. There are many options available but the recommended configuration is demonstrated below.

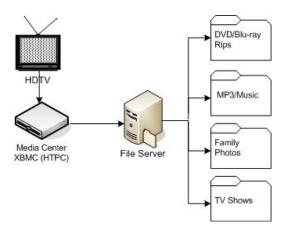


Figure 6: HTPC Architecture

The setup consists of a high definition television (HDTV), a Home Theatre PC running media center software, and a file server (for hosting your DVD/Blu-ray collection, music collection, family photos, television shows, emulators, etc, etc).

The file server is not required but it's highly recommended for scalability. If you establish a file server then you can add HTPCs to any room in the house at any time without having to copy media to each HTPC. Obviously, media centrally located on a file server is easily managed and, more importantly, easily backed up.

2.2 HTPC Computer (Front-end)

The home theatre PC (HTPC) is the machine in the living room connected directly to the television (via HDMI). Technically speaking any computer can perform this role but for optimal results your HTPC should meet some of the following requirements:

- Small form factor: Prefer PCs the same size or smaller than your cable box
- **Professional case:** Prefer cases that look like a stereo or DVR
- **Low Power:** Prefer PCs that use low wattage (< 80w) and have an external power supply (PSU).
- **DXVA/CUDA Capable GPU:** Prefer graphics chips/cards that support DirectX Video Acceleration (DXVA) and Compute Unified Device Architecture (GPU parallel processing).
- **HDCP Enabled:** Prefer PCs that offer HDMI output and are HD Content Protection compliant if you intend to watch Blu-ray, DirecTV2PC, etc, etc
- **Digital Audio:** Prefer PCs that offer HD audio output (S/PDIF, Coaxial)
- **Solid State Hard Drive:** Prefer PCs that offer SSD for non-volatile storage. This will allow the HTPC to boot in seconds and perform extremely well.

Of the options above, at the very least ensure the HTPC has HDMI output and a DXVA GPU (if you intend on watching HD content).

Optimally, you want an appliance that is indistinguishable from any other consumer electronic device (stereo, DVD-player, satellite box, etc). It should not be evident that you have a computer in the living room.

There are many options for your HTPC. Next we will introduce several options.

2.2.1 Nettop PCs

Nettop PCs are ideal as HTPCs because of their tiny form factor, low cost, low noise, and low power consumption. Most nettop PCs come with HDMI, HD audio, and HDCP compliance out of the box.



Acer Revo Nettop (\$199)



System 76 Meerkat Nettop (\$359)

Figure 7: Low Cost Nettop HTPCs

I am currently using the Meerkat Nettop series from System 76 for my HTPCs. This document will focus on the Meerkat system but the instructions should work on any nettop running Windows 7.

2.2.2 Traditional Media Center/Desktop PCs

It's highly recommended that you go with a Nettop for your HTPC however it is not required. If you must use a desktop PC, ensure that you have a graphics card (GPU) that provides HDMI output and ensure that you have appropriate horsepower. Prior to DXVA-enabled Nettops, extremely expensive, loud, and bulky PCs were required to provide Media Center functionality.

Below you can see a traditional Media Center PC from Cannon. This system starts at \$1699. It does offer extras like the ability to watch and record live-TV, which our nettop does not, but this option is extremely cost prohibitive.



Figure 8: Cannon PC LX Series

If you already have a Media Center PC running XP Media Center, Myth TV, or Sage TV with appropriate tuner cards, you can configure XBMC to run along side these media center solutions.

2.3 HTPC Remote Control

In order for your HTPC to reach its potential as a living room appliance, it's essential to have a nice remote control. I recommend the certified Widows Media Center Edition (MCE) remote control.



Figure 9: MCE Vista Certified Remote Control (\$21.99)

2.4 File Server Computer (Back-end/NAS)

It's highly recommended that you setup a file server for your media. This is not a requirement; of course, you can just copy your media directly to the HTPC. However, storing the media directly on the HTPC will require large hard disks, lots of electricity to power those hard disks, and will prohibit scaling later on.

XBMC uses the samba client to connect to remote shares (not *uPnP*) so this means that *any* old PC will do as your file server. All that's needed is hard drive space large enough to store your media. This *server* PC can run any operating system and can be anywhere in the house.

If you do not have an old PC around that you can use as a file server or you want more space than an old PC is capable of providing, then consider purchasing a commercial Network Attached Storage (NAS) server or similar server appliance.



Buffalo TeraStation 2TB NAS (\$699)



HP MediaSmart 1TB Server (\$429)

Figure 10: Network Media Storage Options



Tip

My current File Server setup includes a Windows 2003 Server with 2 TB of storage dedicated for music, photos, and TV recordings. I also have a Buffalo TeraStation with 2 TB of storage dedicated exclusively for my DVD and Blu-ray collection. For most people, this is excessive. An old Windows XP machine with a 500 GB hard drive would probably be enough for most people.

3. MEDIA CENTER SETUP

3.1 Home Theatre PC (HTPC)

The following sections will guide you through installation and configuration of the XBMC media center on your home theatre pc (HTPC).

3.1.1 XBOX Media Center

Perform the steps in the following table to install XBOX Media Center on your HTPC.

Table 1: Getting proper display on your HDTV

Step No.	Action	
	NOTE: The following steps are performed on the HTPC computer.	
1.	Connect your HTPC to your HDTV via an HDMI cable	
2.	When the PC is booted into Windows the display will likely be cropped and most of the task bar and left hand side of the screen will be cut off.	
3.	Download and install the latest versions of your display drivers (NVidia can be found here.)	
4.	Right click on your desktop and select NVidia Control Panel.	
5.	Use the Adjust Desktop Size and Position widget to scale the display to fit properly on screen.	

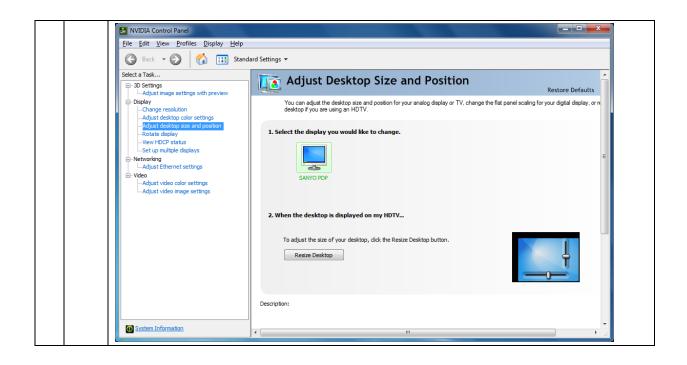


Table 2: Install XBMC Media Center

Step No.	Action
	NOTE: The following steps are performed on the HTPC computer.
1.	Go to XBMC's downloads website: http://xbmc.org/download/
2.	Download the latest Windows XBMC build
3.	Launch the installer and accept all the default settings. Be sure you are connected to the Internet as the XBMC installer must download the DirectX extensions and Visual C++ 2008 extensions if they are missing on your machine. If you are not online during the install then you will need to manually install the DirectX runtime extensions.
4.	When the installation is complete, do not start XBMC. We need to configure the remote control before launching XBMC.

3.1.2 Remote Control

Perform the steps in the following table to configure your MCE Remote Control to work with XBMC.

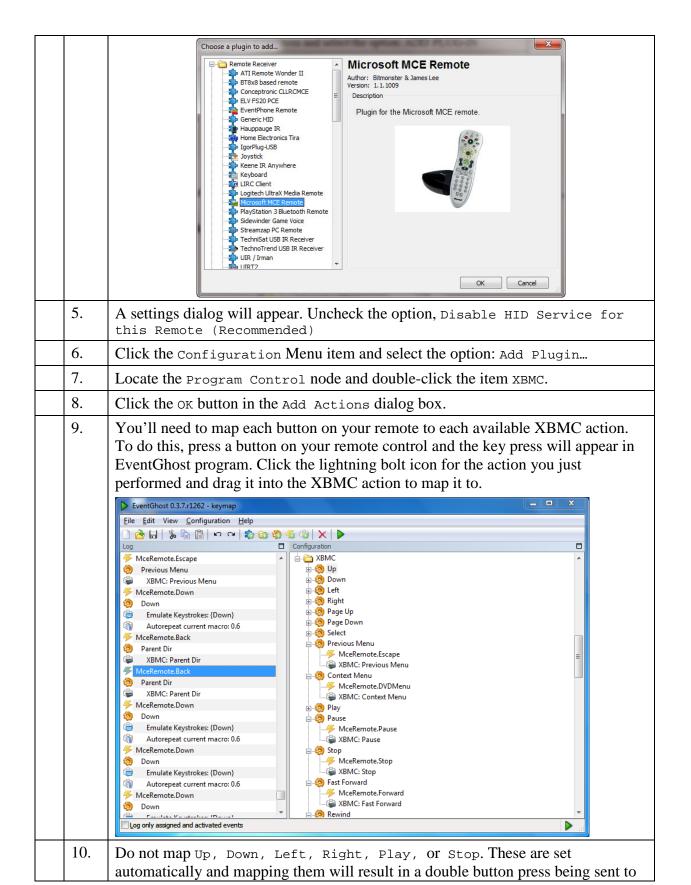


Tip

This guide works for the MCE Vista Certified Remote Control. If you have a universal remote control, refer to this website for guides which can assist you in setting up alternative remote controls.

Table 3: Configuring the Remote Control

Step No.	Action		
	NOTE: Ensure the MCE Remote Control is plugged into the HTPC before performing these steps.		
1.	Download and install the EventGhost program.		
2.	Start EventGhost as administrator by right clicking the EventGhost shortcut and clicking the context menu item: Run as administrator. Open Run as administrator Troubleshoot compatibility 7-Zip Erase Eraser Secure Move Scan with Microsoft Security Essentials		
3.	In EventGhost, click the Configuration menu item and select the option: Add Plugin		
4.	Locate the Remote Receiver node and double-click Microsoft MCE Remote		



	XBMC.
11.	When all the buttons are mapped as you like, save your progress. Saving will create a file called keymap.xml.
12.	Copy the keymap.xml file into your global XBMC user data installation directory (usually, %programfiles%\XBMC\userdata\keymap.xml). Backup the original before over writing the existing one (if one exists) in case of mistakes.



Tip

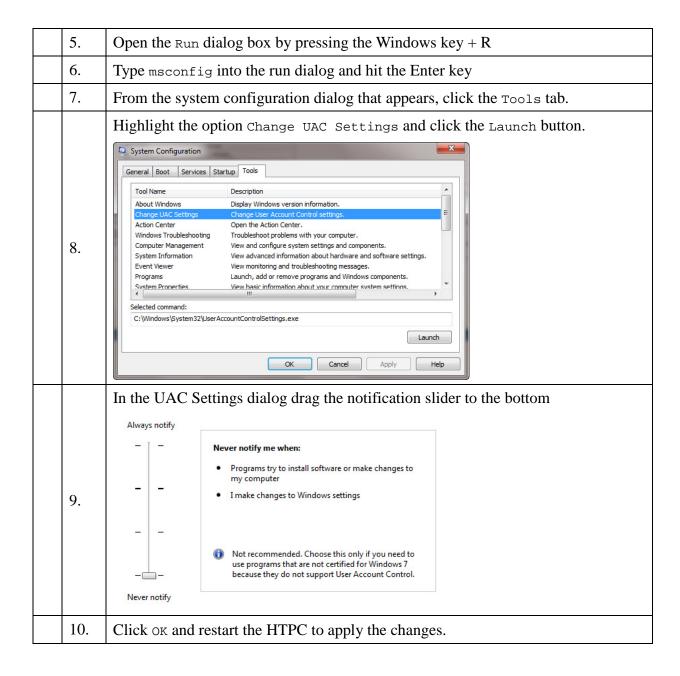
If you're using the MCE remote control, you can save yourself some time by downloading my keymap.xml file.

3.1.3 Automating Media Center Startup

We need the media center PC to automatically login and startup EventGhost and XBMC when the device is powered on. The following steps will walk through the process of configuring the HTPC to perform these tasks.

Table 4: HTPC Administrator Auto Login

Step No.	Action
	Configure Automatic login
1.	Open the Run dialog box by pressing the Windows key + R
2.	Type control userpasswords2 into the run dialog and hit the Enter key
3.	Uncheck the option: Users must enter a username and password to use this computer. User Accounts User Advanced Use the list below to grant or deny users access to your computer, and to change passwords and other settings. Users for this computer: User Name Group Nagilla.Gorilla Administrators
4.	Click ok. You will be prompted to enter the user's password for auto login.
	Disable User Account Control (for administrator auto-login)



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Note:

The above steps make your HTPC extremely vulnerable from a security perspective. Since the HTPC is ONLY used provide a media center frontend to your TV this blatant violation of best practices is acceptable. The HTPC must NEVER be used as a regular daily use computer in this configuration. It should ONLY be used as a media center.

3.1.3.1 Startup Script

Your HTPC should now be configured to automatically login with administrator permissions and your remote control should be functionally mapped to XBMC. At this stage you can start EventGhost and then start XBMC if you'd like to play around with the media center before deploying the production configuration.

In order for the Media Center to function properly, EventGhost must be running (as an administrator) before XBMC is started or the remote control will not work in XBMC. To assure that this happens in the correct order we need to create a startup script that will automate the required processes for loading up the media center properly.

Table 5: Install the Startup Script

Step No.	Action
1.	Copy the EventGhost link file from C:\Users\ <your name="" user="">\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\EventGhost\EventGhost.lnk to your Documents folder.</your>
2.	Copy the XBMC link file from C:\Users\ <your name="" user="">\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\XBMC\XBMC.lnk to your Documents folder.</your>
3.	Create a new file in your Documents folder called MediaCenter.vbs
4.	Create a shortcut from MediaCenter.vbs to C:\Users\ <your name="" user="">\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup</your>

Ø

Note:

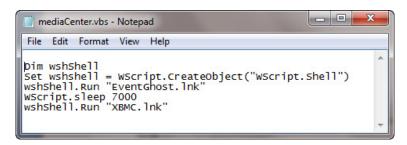
The above steps configure the startup script to run automatically when the machine boots.

Below you will find the startup script. You can copy this script into your MediaCenter.vbs file.

```
mediaCenter.vbs * X
            On Error Resume Next
Tools Browser
           Dim wshShell
           'Dim objNet
          Set wshshell = WScript.CreateObject("WScript.Shell")
           'Set objNet = WScript.CreateObject("WScript.Network")
Resource Browser
        7
           'objNet.MapNetworkDrive "Y:","\\baileyfs01\Files"
        8
            'objNet.MapNetworkDrive "Z:","\\baileyfs01\Music"
        9
            'objNet.MapNetworkDrive "X:","\\baileyfs02\Movies"
        10
        11
          wshShell.Run "EventGhost.lnk"
        12 WScript.sleep 7000
        13
            wshShell.Run "XBMC.lnk"
```

I have commented out the lines used to map network shares. If you are using a file server (recommended) then delete the ticks from each of the commented lines and change the <code>objNet.MapNetworkDrive</code> method to match your environment. You can see that I am mapping my Y:\ drive to the network share \\baileyfs01\Files and my Z:\ drive to \\baileyfs01\Music and so on.

If you are not using a file server, then all you need in this script are these lines:



Essentially, all we're doing here is starting up EventGhost, waiting for 7 seconds to allow it to load up properly, and then starting up XBMC.

3.2 High Definition Playback/Blu-Ray

Contrary to common wisdom, a tiny, low-powered nettop PC *can* playback blu-ray discs, MKV files, and H.264 encoded 720p/1080p files. Thanks to DirectX Video Acceleration (DXVA) enabled graphics cards this is indeed the case. I have found High Definition playback using DXVA to be flawless.

Unfortunately, at this time XBMC for Windows does not support DXVA/CUDA natively within XBMC. Only the Linux version supports it.

Because of this fact, we must install and configure an external player which supports DXVA and then configure XBMC to use that player for HD video files. The process is a little tedious and complicated but it's well worth the effort to get the end result (flawless HD playback on a ridiculously cheap and under-powered PC).

3.2.1 DirectX Video Acceleration (DXVA)

Here you can read up on the technical specification of DXVA.



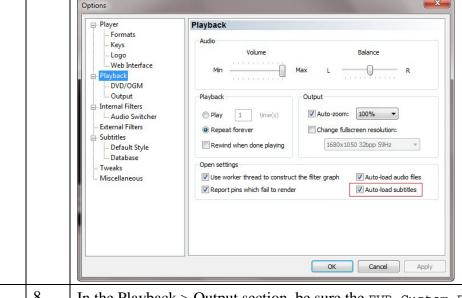
Tip

There is a DXVA enabled player for XBMC in development called DSPlayer. At this time it's still unstable but in the future it will be included with XBMC so the following steps will not be necessary.

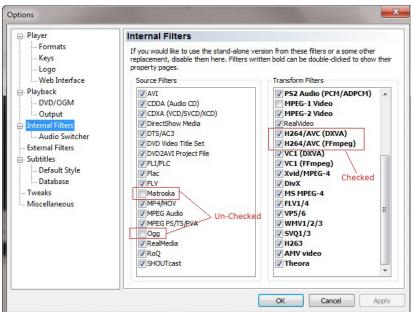
The following steps will walkthrough installing and configuring DXVA on your HTPC. The DXVA-enabled player will off-load all the processing cycles required to render high definition (HD) video to your graphics chip which will leave your machine's CPU free to do its usual processing. Without DXVA, playback of HD content will stutter, freeze, or not playback at all on a nettop pc.

Table 6: DXVA Installation/Configuration

Step No.	Action	
	Install DXVA Pre-requisites on the HTPC	
1.	Download and install the DirectX drivers (not necessary if XBMC setup already installed them for you)	
2.	Download and install the Microsoft .NET Framework v3.5 (if not installed already).	
3.	Download and install Haali Media Splitter.	
4.	During the installation of Haali Media Splitter, uncheck the option: Associate .mkv and .mka files with Windows Media Player	
5.	Download and install Media Player Classic – Home Cinema (MPC-HC). Be sure to download and install the x86 version, even if you're on an x64 PC.	
	Configure MPC-HC for DXVA	
6.	Start MPC-HC and open the options dialog (View > Options).	
7.	In the Playback section, check the option: Auto-load subtitles	

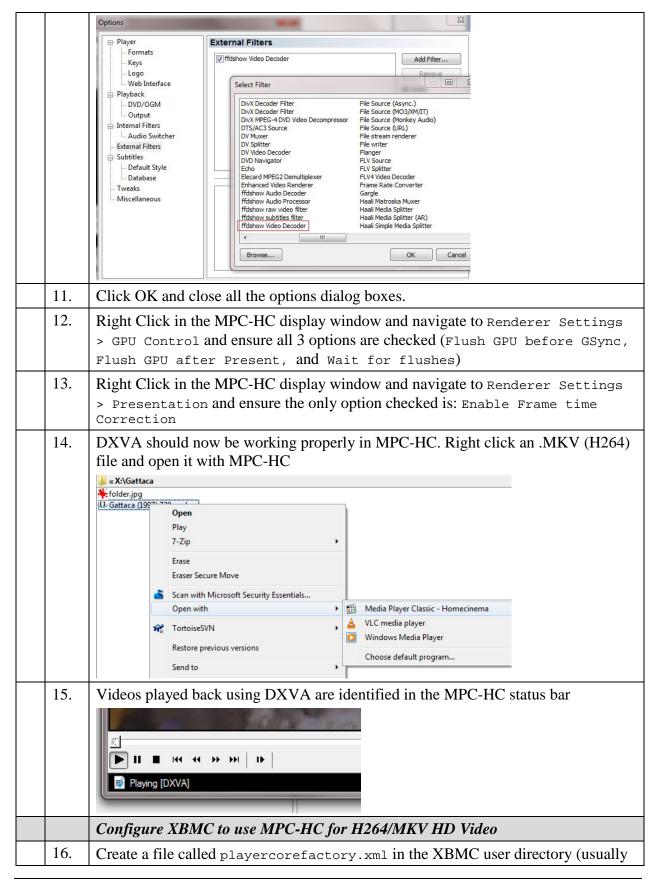


- 8. In the Playback > Output section, be sure the EVR Custom Pres. ** option is checked (in the DirectShow Video section)
- 9. In the Internal Filters section, Uncheck Matroska and Ogg and check H264/AVC (DXVA) and H264/AVC (FFmpeg)



If you have K-Lite Codec Pack or another codec pack installed which uses ffdshow, then follow step 10 to disable that decoder. Else, skip to step 11.

10. In the External Filters section, click the Add Filter button and locate ffdshow Video Decoder. Click the Block option for ffdshow, to prevent it from hijacking MPC-HC.





3.3 File Server

It's highly recommended that you utilize a file server to store all your media. The media center PC should be nothing more than a frontend dummy like a cable box, which does little other than providing the user interface for your media. The media itself should be stored on another computer. With this configuration you can add as many XBMC front-ends as you'd like in your house and they will seamlessly integrate with your back-end file server.

You can use any existing computer as a file server or you can purchase a retail NAS device to perform this task.

If you are using retail NAS devices or a Linux based solution such as FreeNAS please consult the manufacturer's device manual for instructions on configuring Shared Folders (a file server is nothing more than a set of shared folders).

The following section will walk you through configuring a Windows based computer as a File Server.

3.3.1 Shared Folders

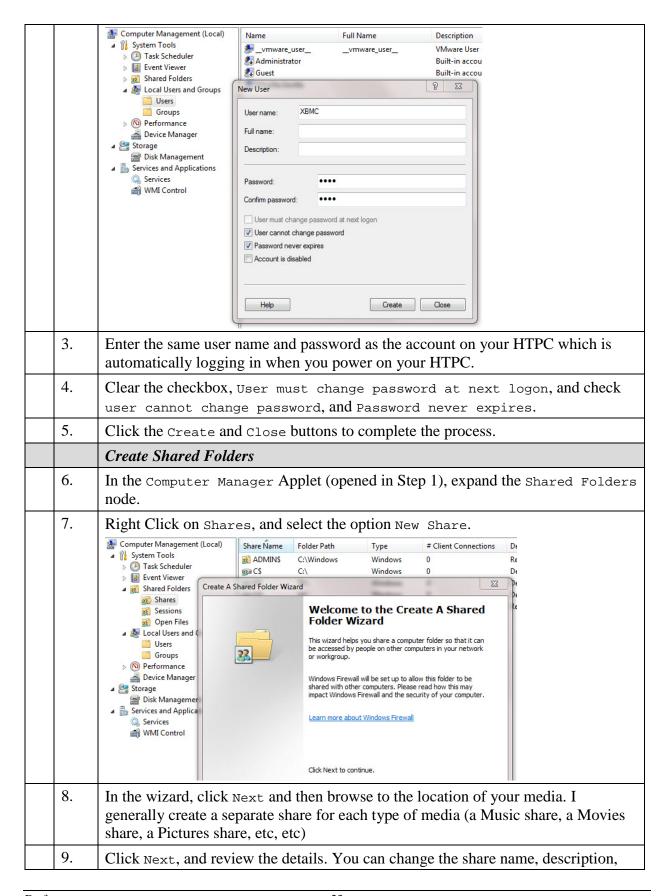


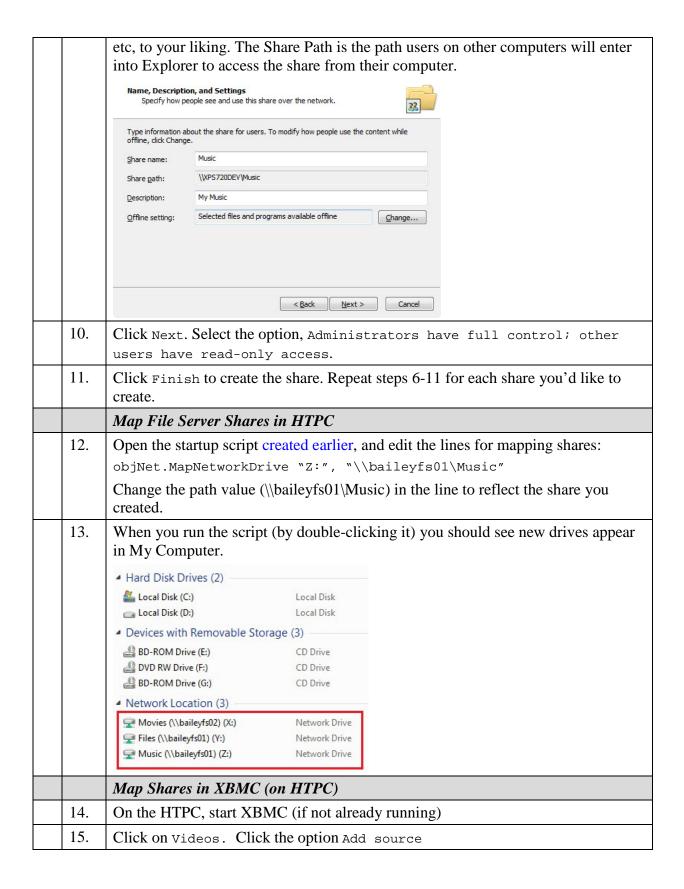
Note:

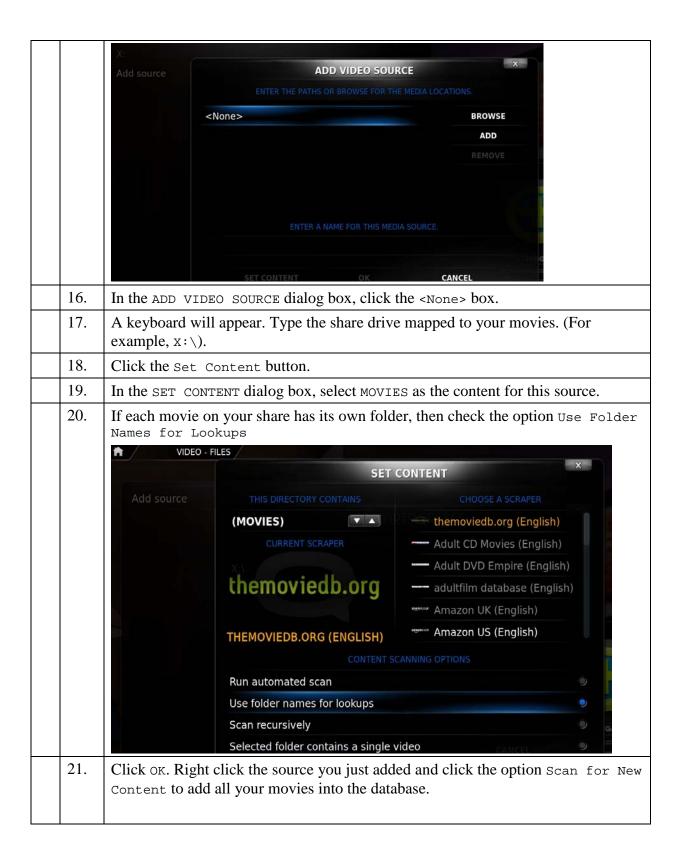
The following steps are to be completed on the File Server computer, NOT the HTPC unless directly specified.

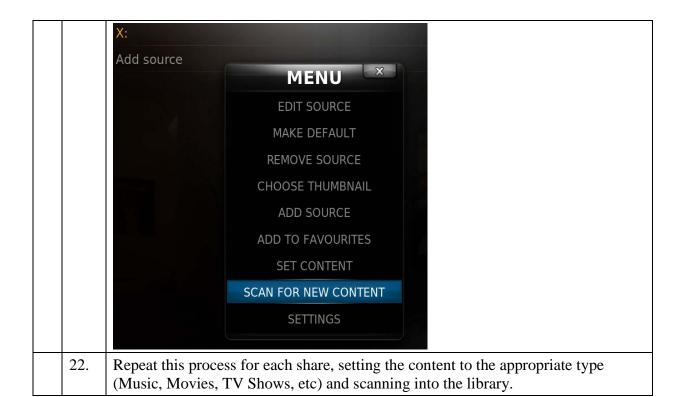
Table 7: Create Shared Folders

Ste No	Δ CHON	
Create XBMC User Account on File Server		
	NOTE: In a previous section, you configured an account on your HTPC to automatically log in and start EventGhost and XBMC. You need to create an account with the same user name and password on your file server computer. For example, I have an account named xbmc with the password xbmc on both my HTPC and File Servers. This allows for seamless connectivity between the 2 computers.	
1.	Start the Computer Management Applet (on your file server PC) by right-clicking on the My Computer icon on your desktop and clicking the Manage option. Documents Pictures Music Games Computer Open Control Panel Map network drive Disconnect network drive Show on Desktop Rename Properties	
2.	Expand Local Users and Groups, right-click Users, and select New User.	









APPENDIX A:

3.4 MPC-HC User Specific Configuration

Table 8: Disable Subtitles in MPC-HC

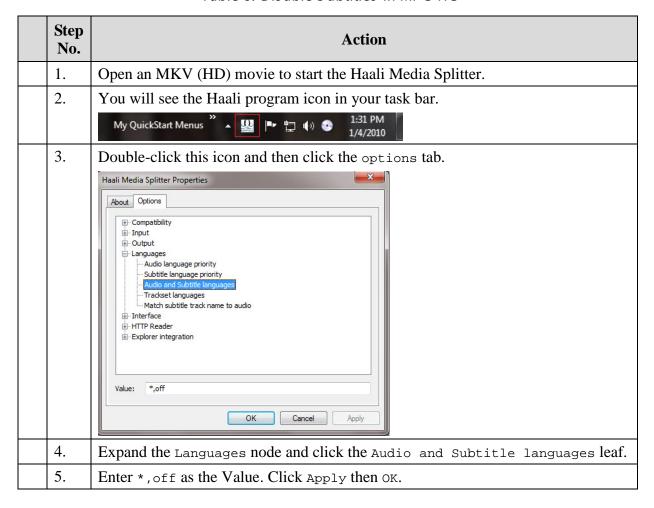


Table 9: Default MPC-HC to use a Specific Audio Stream

Step No.	Action	
1.	Open an MKV (HD) movie to start the Haali Media Splitter.	
2.	You will see the Haali program icon in your task bar. My QuickStart Menus * A	
3.	Double-click this icon and then click the options tab.	
4.	Expand the Languages node and click the Audio language priority leaf.	

5.	Enter eng as the Value (if defaulting all audio to English). Click Apply then OK.
6.	If English is not your desired Audio stream, then use this guide, and enter the 3 letter code corresponding to the audio stream you desire to be default.