How-To: Make your Mini-ITX Bargain Bundle into a Working Myth TV Server

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This document is an install guide to help turn the box of goodies known as the "DIY Mini-ITX PVR Project Bundle" into a working TV set-top box. You'll need a few bits of computer hardware in addition to the Bundle hardware, and a few hours of effort.

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What is this?

This document is an install guide to help turn the box of goodies known as the "DIY Mini-ITX PVR Project Bundle" into a working TV set-top box. You'll need a few bits of computer hardware in addition to the Bundle hardware, and a few hours of effort.

Why would I want to do that?

Well, that's a good question. If you follow this guide you'll end up with a tiny, all-but-silent computer which you can sit near a TV and use as a tapeless video recorder for analogue TV channels. It will store hours of recorded TV on the hard disk, and store your music library. With an internet connection it will do all sorts of other things, too.

This guide uses the Mini-ITX bundle for the main hardware components, because it's a good value all-inclusive deal. It's based on the MythDora software pack – a self-contained collection of programs which provides the free Linux operating system (specifically 'Fedora 8' if you want to know) and MythTV (version 5), the best free Personal Video Recorder software pack.

What do I need?

Firstly, if you haven't done so already, go to the Mini-ITX store (http://www.mini-itx.com/store/?c=38#bundle) and place your order for a bundle – it's a bargain! Also read a bit further to check you have the other bits necessary to complete this guide – if you have another computer you should be fine, but if there's anything in the list missing you might want to include it in your Mini-ITX order.

The Bundle includes the major components for a (small!) PC: the main computer board with a processor, plus memory, a hard disc drive, and a power supply. It also includes a TV capture card. We'll use all these items in the Myth server (the only item in the Bundle which isn't specifically needed for this project is the PCI riser card).

You will also need these items, which aren't included;

- Akeyboard (USB or PS/2 connector)

- a mouse (USB or PS/2 connector)

- a DVD writing drive (this can be working in another PC)

- a DVD reading drive (available to connect physically to the Myth server, at least temporarily – IDE, SATA or USB all work, though you will also need a Molex-to-SATA power adapter cable for that type of drive)

- a recordable DVD disk that the writing drive can write to, and the reading drive can read!

- DVD-burning software

- broadband internet access (for downloading necessary software)

- an analogue DVI video cable (the one with dark blue connector plugs)

- a monitor or TV with a DVI cable input

- an audio cable (possibly with adapters) with a 3.5mm (personal stereo size) jack for the computer end and whatever the monitor or TV accepts at the other

- a TV-aerial cable (connected to a working aerial!)

Optional but useful

- a couple of normal flat-bladed screwdrivers are handy

- a working computer nearby, so you can refer to this guide (or print it out)

- a spare Ethernet cable, if you can provide permanent network access to the internet for the finished computer, necessary for electronic programme guides and extra Myth functionality.

What are you assuming?

Not a lot.

You don't need to be a computer expert to use this guide. It will help if you're careful and methodical when you follow the instructions. You won't be exposed to any dangerous voltages and the cables are clearly marked and shaped so you can't easily plug them in the wrong way around.

The guide is based around a UK installation of Myth, though many of the steps will be the same regardless of the location. The Mini-ITX bundle includes a UK-type power supply.

Step-by-Step Instructions

Get the (free) MythDora software

You can do this whilst the courier is busy delivering your box of Mini-ITX goodies to your door. You'll need a writeable DVD disc and a DVD writer drive (note: you can do this with writeable CD's, and whilst you'll need two physical compact discs the process is otherwise much the same).

1. *Software download*

   a. Connect your PC to the internet and start your internet browser (Firefox, Internet Explorer etc.) Due to the size of the download, broadband is the only practical selection.

   b. Connect to the MythDora website http://www.mythdora.com

   c. On that front page you'll see the announcement of MythDora 5.0, the version on which this guide is based. Click on the 'Read More…' link

   d. On the MythDora 5 page there is a description of the package. At the bottom of the page are links to the single DVD image ("MythDora-5.0_DVD.iso"), or the two CD images if you're using a CD drive.

   e. Click on MythDora-5.0_DVD.iso and choose 'Save to disc'. Select a suitable place to save the image and remember or write down this location. The image is about 1.5GB in size.

   f. Wait whilst it downloads.

2. *Create a DVD boot disc for MythDora*

   a. Once the .iso image has finished downloading, you need to create a DVD disc from it.

   b. Most DVD writers come with 'burner' software - if you don't have any, I used the free Windows ImgBurn package which you can download from http://www.imgburn.com/ and install to your PC.

   c. Find a blank DVD-writeable disc and put it in your DVD-writer drive.

   d. Run your DVD burning software, if it hasn't started automatically.

   e. Point the burning software at the .ISO image you downloaded in Step 1(a)(v) and tell it to burn a disc from it.

   f. Once it's done, retrieve the disc from the drive and use a CD-writer pen to label the top of the disc 'MythDora 5.0 DVD' (or 'MythDora 5.0 CD1' and 'MythDora 5.0 CD2').

   g. You may also want to download the original Operating Manual and User's Guide for the motherboard direct from VIA. These documents are available as Adobe Acrobat .pdf files at: http://www.via.com.tw/en/products/mainboards/downloads.jsp?motherboard_id=261#Manual

Initial hardware setup

3. *Working with PC hardware*

Whenever you work with computer hardware it's good for you and the components if you observe a few simple guidelines.

    a. Clear a large space around you. Work on a non-metallic flat clean surface which doesn't scratch and isn't slippery (or put a thick cotton cloth on it).

    b. Have a saucer or two available to put small components in temporarily.

    c. Try and earth yourself, at least before you start – touching the exposed metal case of a lamp or PC is enough.

    d. Keep drinks, food and pets away.

4. *Unpack the Hardware box*

    a. Soon after ordering you'll get a compact cardboard box from Mini-ITX containing your bundle of components.

    b. Remove each component from the box carefully.

    c. Some items are sent in silvery plastic bags, which protect them against static electricity as well as e.g. scratches.

    d. Do a simple count of items and then check each one against the list to ensure you have everything. Contact Mini-ITX if there's anything missing.

5. *Reset the Motherboard*

    a. This step might not be necessary – your motherboard may work OK straight out of the box and have the right settings. If you do follow this step, however, you'll be working from a known starting point and this guide will make more sense. All this step does is reset the basic motherboard options to their defaults. It should take a couple of minutes.

    b. Earth yourself (see Step 3).

    c. Remove the Motherboard from its anti-static bag. Lay it in front of you on your work surface.

    d. Next to the battery holder is a small red tab called a 'Jumper' (there are several more jumpers around the board). It completes a simple circuit on the board. Pull only that jumper directly up off the board.

    e. You can now see three metal pins where the jumper was; push the jumper carefully back onto the two pins nearest the battery holder. Count slowly to ten.

    f. Pull the jumper back off the pins, and re-insert it – this time on the two pins further from the battery holder, where it probably started.

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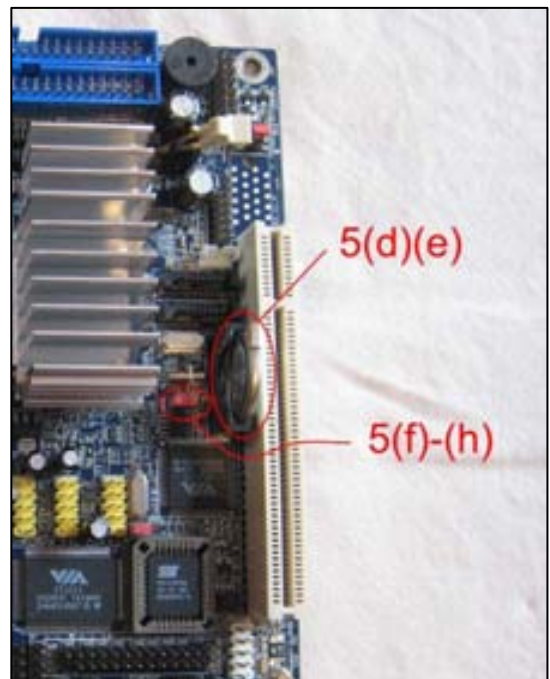
g. You have now cleared the CMOS. When this is done, you will need to reset the BIOS values. You will do this in stage 7, once the board is powered up.

6. *Connect the core components to the motherboard*

a. Earth yourself (see Step 3).

b. ATX Power

   i. The white plug on the 12V DC Input Cable plugs into the matching socket on the DC Power Board (right).

   ii. Plug one of the large 24-pin ATX Power plugs on the ATX Wiring Loom into the matching socket at the other end of the DC Power Board (right). You'll notice a small latch on the side of the plug, which has a matching nub on the socket. It doesn't matter which of the plugs from the Wiring Loom you choose.

   iii. Plug the other 24-pin ATX Power plug into the motherboard's matching power socket.

c. Memory

   i. Alongside the large finned metal heatsink which dominates the motherboard is a single, long slot with a white plastic tab at each end. This is the memory slot.

   ii. Push each of the tabs gently away from the slot itself so that they spring out and down.

   iii. Remove the memory from its antistatic bag. Try to handle it by the thin sides, avoid touching the chips themselves or the long edge with the gold-coloured connectors.

   iv. Not quite in the middle of the memory card is a notch. You'll see a similar notch in the memory slot. This stops the memory from being inserted the wrong way round.

   v. Matching the notches, lower the memory card into the slot. As you push it into the slot you'll find that the white tabs you pushed aside in (ii) start moving back upright.

   vi. Push the memory into the slot firmly and the white tabs will click back into place, fitting into small notches on the sides of the memory card (right). The card will feel firmly attached to the motherboard.

d. Keyboard

    i. Connect your keyboard to the motherboard, using either the purple PS/2 connector or one of the two USB sockets on the back edge of the motherboard.

    ii. You don't need a mouse at this stage.

e. Video and Audio output

    i. Connect the blue DVI cable to the lower of the two similarly-shaped sockets on the back edge of the motherboard (the one next to the purple keyboard socket), and the other end into your monitor. If necessary, select DVI Input on the monitor.

    ii. If you don't use a DVI cable, you may not get a video output from the other sockets on the motherboard until the BIOS configuration has been completed (see Step 7).

    iii. The sound output is by default through the green 3.5mm audio jack towards the right-hand end of the motherboard (if the sockets are facing toward you). Ideally, use a stereo cable to connect this to the monitor/ TV.

f. DC Power

    i. Plug the 120W power brick mains cable into a wall socket, and make sure the cable is firmly inserted into the power brick itself. A green light will glow at the DC Output Cable end.

    ii. Plug the DC Output Cable from the Power Brick into the socket of the DC Input Cable.
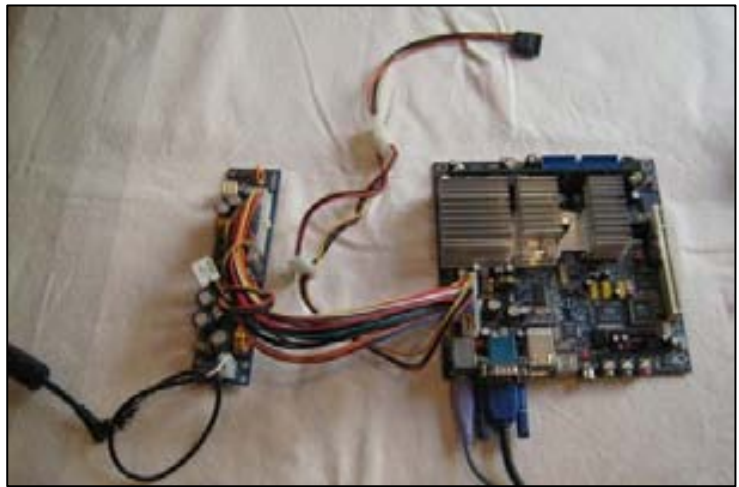
7. *Configure the Motherboard BIOS*

The BIOS is one of the core components of a computer. It coordinates the essential elements of hardware so that they can work together and start running software.

a. Powering up

    i. There is no power button with this kit, but we can substitute a small-bladed screwdriver for this and, once this step is complete, the PC will start up as soon as it receives power.

    ii. Arrange the motherboard in front of you so that the back panel of connectors is closest to you. The heatsink and memory will then be furthest away.

    iii. In the far right corner of the motherboard is a row of metal pins, fifteen in all (seven pairs and, on the far edge of the board, a single one)

iv. Printed on the motherboard (in tiny letters!) are the characters 'PWR', with small printed lines showing the two pins to be used for a power button connector – they are the third and fourth in the lefthand column counting away from you.

v. Use a small flat-bladed screwdriver (or other metal implement) to touch those two pins briefly. A touch is all that's necessary so once it starts you can set the screwdriver down. When successful, there is a quiet 'click' sound and the motherboard will start up. When the boot screen (right) is displayed on your monitor, press 'Del' or 'Delete' immediately.

b. Enter the BIOS configuration

i. Press the 'Del' or 'Delete' key on your keyboard as soon as the logo appears on the screen from power-up. After a delay, the blue background of the BIOS menu will soon appear (right), titled "Phoenix – AwardBIOS CMOS Setup Utility"

ii. If you don't press Del in time, the motherboard will soon complain that there is 'no bootable device' attached. Turn off the power supply at the mains socket and return to 7(a).

iii. The BIOS configuration is all done using the keyboard – mainly the arrow keys to select between menus, and the Enter key to select options. There is often helpful text on the items you're looking at in boxes at the bottom or right of the screen. The next sections cover what needs to be changed from the default values.

c. Set Standard CMOS Features

i. From the main BIOS Screen, highlight 'Standard CMOS Features' with the arrow up/ down keys and press 'Enter'.

ii. Set the current date using the arrow keys to highlight the day/ month/ year and adjusting these up or down with the Page Up or Page Down keys as appropriate. Note that the computer calculates the weekday using this information automatically.

iii. Use a similar method to set the time of day.

iv. There is no need to amend the other settings on the screen. Press 'Esc' to return to the main menu.

d. Set Advanced BIOS Features

i. From the main BIOS Screen, highlight 'Advanced BIOS Features' with the arrow up/ down keys and press 'Enter' (right).

ii. Set 'Second Boot Device' to 'Hard Disk'.

iii. Set 'First Boot Device' according to the type of DVD/ CD reader drive you're

going to use. If it's an IDE or SATA device, set 'First Boot Device' to 'CDROM'. If it's a USB device then set it instead to 'USB-CDROM' (this is what I used).

iv. Set 'Display Full Screen Logo' to 'Disabled'.

v. Set 'Display Small Logo' to 'Enabled'.

vi. The default values for the other settings on this screen are fine. Press Esc to return to the main menu.

e. Set Advanced Chipset Features

i. From the main BIOS Screen, highlight 'Advanced Chipset Features' with the arrow up/ down keys and press Enter

ii. (UK-specific) Set the 'TV Type' to 'PAL'. Press 'Esc' to return to the main menu.

f. Power Management Setup

i. From the main BIOS Screen, highlight 'Power Management Setup' with the arrow up/ down keys and press 'Enter'.

ii. Set 'AC Loss Auto restart' to 'On'. This means that the motherboard will restart automatically when it detects a power connection, ignoring the fact that it hasn't detected a power button press. Press 'Esc' to return to the main menu.

g. Save configuration

i. From the main BIOS Screen, highlight 'Save & Exit Setup' with the arrow up/ down keys and press 'Enter'.

ii. A Red box will appear: 'SAVE to CMOS and EXIT (Y/N)? Y'. Press 'Enter'.

iii. The system will restart. Turn off the power supply at the mains socket to stop it, as we need to connect more parts before we continue.

8. *Attach the hard disk, video capture card, mouse and DVD drive*

This step covers the attachment of the final set of hardware, ready to start the software installation which is covered below in Step 9.

a. Ensure that the PC is not powered up – switching off at the mains is good. If you leave the power supply plugged in but switched off at the mains the machine is earthed, which is a good thing.

b. Remove the hard disk drive carefully from its anti-static bag. At one end you'll find two connector sockets next to one another: the larger one for power, and the smaller one next to it for data.

c. Amongst the cables is the power adapter for the disk drive: white four-pin ('Molex') at one end and slimmer and black at the other. Connect the white end to either one of the two 'Molex' plugs on the large wiring link that connects the motherboard to the power convertor. Check the black plug and note that it has a small tab at one end – like a very tall L. This matches the socket in the hard disk: plug it in.

d. The long cable with matching black connectors is the SATA data cable. Both ends are the same, with the long-L format to ensure there's only one correct orientation. Connect one end into the disk drive next to the power cable. The other end plugs into the motherboard in either of the two sockets next to the battery we temporarily removed in Step 5(e).

e. Remove the TV capture card from its anti-static bag. It's simplest to plug it directly into the motherboard rather than use the riser card.

f. The card simply slots down into the long white slot next to the battery we removed and replaced in Step 5(e), which is of the PCI type. Note that the connectors at the end of the card should be at the same end as the other connectors on the motherboard – don't try and plug the card in the wrong way. When fitted, the metal end-plate on the card projects below the bottom of the motherboard, so you should put the board on e.g. a paperback to lift it up. (Alternatively, the end plate can be safely unscrewed from the TV card.)

g. Plug your mouse into the motherboard, using either the green PS/2 socket or a USB connector as appropriate.

h. Lastly, connect your DVD (or CD) reading device to the board. I used a USB one, but you might have SATA or IDE. There is a spare Molex power connector on the ATX loom to provide power to the drive, though you may need an adapter cable for SATA. There's a second SATA plug next to the one you've used for the hard disk, or use one of the blue IDE connectors on the edge of the board near the memory slot.

i. You should now have everything connected up and ready to go.
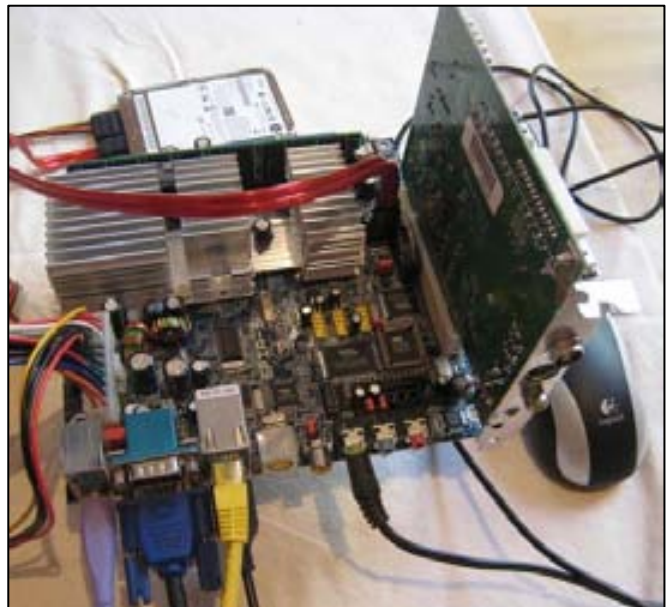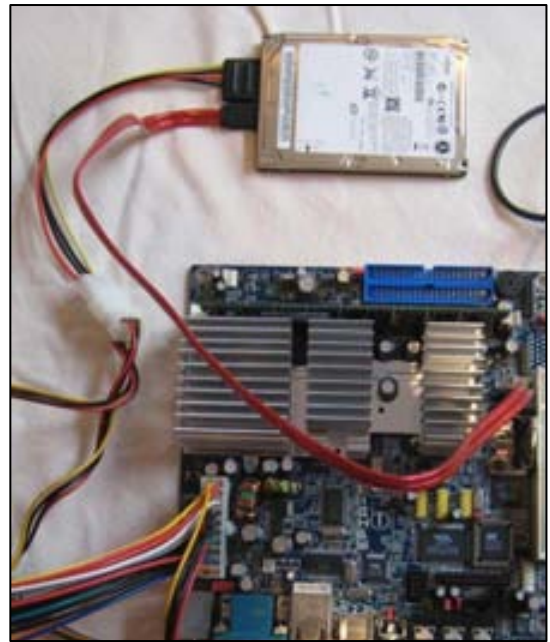
Operating System Installation

9. Check the MythDora disc

a. Locate the MythDora DVD (or CDs) you prepared in Step 1.

b. Switch on the mains supply to the power supply; with the change to the BIOS setting from Step 6(f)(ii) the computer should start booting. The system boot screen appears and a few basic checks are completed. Insert the DVD into its drive once it has power.

c. All being well, after a few seconds the DVD will spin up and you'll get a 'Welcome to MythDora 5.0!' screen (right).

d. There are six options; the default one 'Install or upgrade an existing system' is correct. Press 'Enter' to continue.

e. The MythDora install disc will be detected, and you will get the option to check it. I suggest you choose 'OK' – it doesn't take very long, and you'll be certain that the disc has been recorded correctly.

f. Assuming you agree to test the disc (or discs if you have CDs), the next screen simply asks for confirmation to check the one in the drive now; press 'Enter'.

g. After a few minutes you should see 'The media check passed for the image…' and you can just press 'Enter'. If the check fails, you need to repeat Step 2 to burn a replacement disc before returning to Step 9(a).

h. The system automatically ejects the checked disc and offers to check another. Unless you have CDs, you're done and can 'Continue'. Re-insert the disc into the drive.

10. Start installing MythDora

a. After some informational stuff appears, the MythDora 5 boot screen (right) will appear. The mouse should now be active. Click 'Next'.

b. The first question asks what language to perform the installation in. I selected 'English (English)'; click 'Next' when you've made your selection.

c. Next you need to confirm the type of keyboard you're using. Use the mouse or arrow keys to highlight the correct one (for me, 'United Kingdom') and click 'Next'.

d. 'Installation requires partitioning'. Just click 'Next'.

e. The network devices screen can be ignored – click 'Next'.

f. A world map appears. Either click on the map to indicate your time zone, or select it from the list (mine was 'Europe – London'). Click 'Next'.

g. Root password. Set the high-level password on the next screen. This password is crucial, so choose something you will remember! You must enter it once in each box and then click 'Next'.

h. Nearly done. The next screen (right) enables you to select extra, non-standard software to support specific hardware you might have. For the standard build, just leave the default 'MythTV Digital Video Recording System' and 'Video Capture Device Drivers' ticked and click 'Next'.

i. A final pre-installation screen confirms that the machine is ready to start. Click 'Next'.

j. The software installation starts. I'd estimate that it takes 30-40 minutes to complete, partially dependent upon the speed of your DVD drive. You can safely go away and let it work.

k. Once software installation is complete, a confirmatory screen appears.

l. Eject the DVD disc from the drive. Click on the 'Reboot' button.

Software Configuration

11. MythDora Setup

a. Once the computer reboots, you'll see the MythDora 5 welcome screen. There are a few more steps to setup the operating system. Click 'Forward'.

b. The next screen explains the software License. When you're happy with that, click 'Forward'.

c. Firewall configuration is next. I left the defaults, 'MythTV', 'SSH', 'Secure WWW' and 'WWW'. Make your selections from the tick boxes and click 'Forward'.

d. The next screen allows you to configure extra security in the form of SELinux. I just clicked 'Forward' for simplicity.

e. Setting Date and Time. Provided your ITX computer will have broadband internet access, you can just leave the defaults here – Enable Network Time Protocol and leave the three suggested NTP servers. The computer will then adjust the clocks according to the time zone you set earlier and always be accurate. You can click on the 'Date & Time' tab to see the current details. Click 'Forward'.

f.   Creating the MythTV user. The MythTV software needs to have a user called 'mythtv' configured, and some of the installation is done in that user's account. The only significant choice you need to make is to define the mythtv user's account password.

    i.   There is a default password already filled in, but I strongly suggest you replace it with one of your own. Like the root password you set in 10(g), you need to remember this password.

    ii. Select a password, type it into the 'Password' and 'Confirm Password' boxes over the default, and click 'Forward'.

g.   Depending upon the complexity of the password you might get a warning that it's 'Too weak'. You may either click 'No' and then enter a more complex one, or 'Yes' to ignore the warning.

12. *MythTV Initial Setup*

a.   In the 'MythTV Initial Setup' screen, first click the 'Set up MythTV' button. Click OK on the little 'Welcome' box that appears.

b.   You next need to confirm what type of MythTV services you want to run on your computer:

- Frontend and backend (all MythTV services)

- Frontend only (selecting and displaying TV recordings from elsewhere, plus music player and other Myth services)

- Backend only (recording TV, but not playing shows)

- Neither front nor backend.

c.   In this guide I assume you're starting from scratch. Check option 1, 'Complete Frontend and Backend', and then click 'OK'.

d.   Remote Control. As there's no remote control in the kit, just click '0 None of the above' and click 'OK'.

e.   IR Blaster. Again, as there's no IR Blaster available there's nothing to configure here. Click 'No'.

f.   Frontend Startup. I selected to 'Start MythTV frontend on login', which just means that, each time the computer is started, it opens the main MythTV software automatically. Make your selection and click 'OK'.

g.   'Configuration complete' is the final screen. Click 'OK'.

h.   You'll return to the MythTV Initial Setup screen. Provided you're happy that the selections you made are correct, click 'Finish' – otherwise, just click on 'Set up MythTV' and return to Step 12(b).

i. After a short installation pause, you'll see the main MythDora 5 desktop with the blue background (right).

j. Let the PC work a little; it's automatically bringing up MythTV's database installation screens.

k. Soon the Setup routine starts. This doesn't use a mouse, just the keyboard. The main keys are the arrows to move up and down between selections, 'Enter' to make a selection, and 'Esc' to go back.

l. The first question asks for you to select your preferred language. I arrowed down to 'English (British)' and pressed 'Enter'.

m. You next get a Warning that MythTV wants to upgrade the database. Just leave the highlight on 'Upgrade' and press 'Enter' – as you have no database yet this is fine.

n. There is next a warning that a database backup is made. Just highlight 'Upgrade' again and press 'Enter'.

o. After the database upgrade work is complete you'll return to the MythDora desktop. You may get a warning about 'No Schedules Direct / XMLTV', to which you can just click 'OK'.

p. After a short while, you are returned to the MythDora desktop – the computer is still working, though. It's starting the MythTV software, as requested in Step 12(f). This takes a while, with some screens saying 'Pre-scaling theme images' which can take a while to complete.

q. Eventually you'll see the main MythTV menu. At this stage, we still need to do some TV configuration so we just need to come out of this.

r. Press 'Esc'. You'll be warned that it 'Cannot connect to the master backend…' – just press 'Enter' on the 'OK' button that's highlighted.

s. A further warning is issued, this time checking that you do want to exit MythTV. Arrow down to highlight 'Yes, Exit now' and press 'Enter'. You'll return to the MythDora desktop.
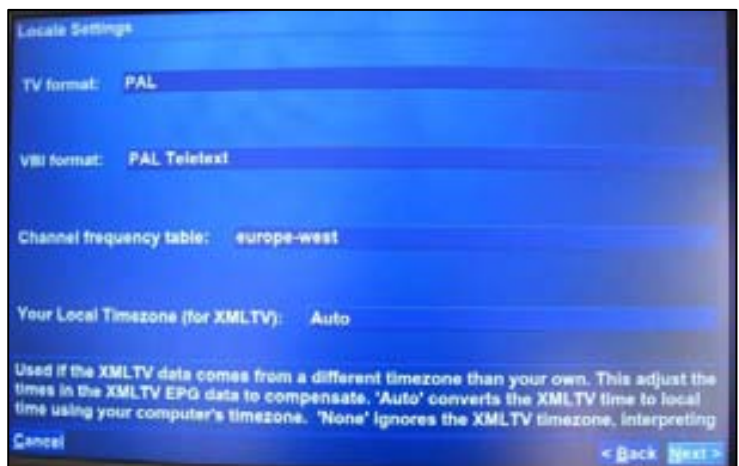
13. Main MythTV Setup

MythTV Setup is a reasonably compact set of questions which enable you to configure your computer and TV capture card.

a. From the MythDora desktop, you'll see on the left hand side a few icons. Just above the trashcan at the bottom of these is one labelled MythTV Setup. Double-click this.

b. There are a couple of screens with 'Pre-scaling theme images' and a progress bar. These are initially quite slow, but just let them work and they will complete in a couple of minutes.

c. The main menu for MythTV Setup will be displayed (right), with six numbered options down the right hand side. We address each of these in turn in the steps that follow.


14. MythTV Setup Option 1 – General

a. On the MythTV Setup main menu screen, highlight option 1, 'General', and press 'Enter'.

b. 'Host Address Backend Setup'. You can leave the default values on this screen. Note that the 'hostname' of the computer is quoted here as 'Local Backend (name of computer)'. Highlight 'Next' and press 'Enter'.

c. Provided you're in the UK, some changes are required to the settings on the next screen, 'Locale Settings' (right).

　　i. Arrow up to highlight 'TV format', which defaults to NTSC, the US standard. Arrow right or left until this reads 'PAL'.

　　ii. Arrow down to highlight 'VBI format'. Select 'PAL teletext'.

　　iii. Arrow down to highlight 'Channel frequency table'. Select 'europe-west'.

　　iv. Arrow down to highlight 'Your Local Timezone (for XMLTV)'. Select 'Auto'.

　　v. Arrow down to 'Next' and press 'Enter'.

d. There are several more screens in this section, but the default values are fine in each case. Press 'Next' on each one and then 'Finish' on the last, to return to the MythTV Setup main menu.

15. MythTV Setup Option 2 – Capture cards

a. On the MythTV Setup main menu screen, highlight option 2, 'Capture cards', and press 'Enter'.

b. Highlight 'New capture card' and press 'Enter'.

c. 'Capture Card Setup' (right).

   i. Arrow up to Card Type. Select 'MPEG-2 encode card (PVR-x50, PVR-500)'

   ii. The other settings should be OK – Video device as '/dev/video0'; Probed info as 'Hauppauge WinTV PVR-150 [ivtv]'; Default input 'Tuner 1'.

   iii. Highlight 'Finish' and press 'Enter' to save settings.
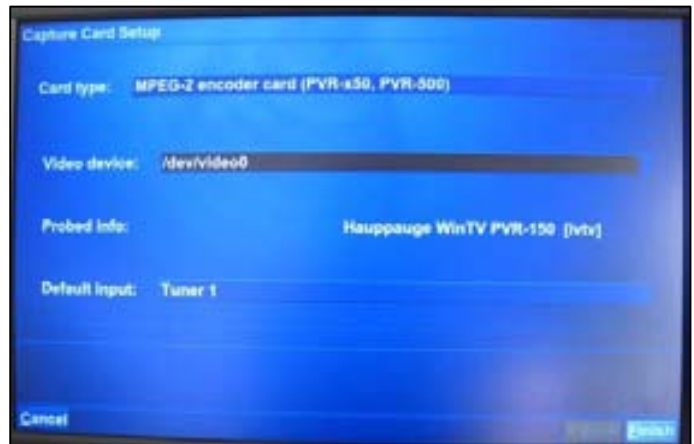
d. Note that the settings you've entered appear now on this option's menu. Press 'Esc' to return to the main menu.

16. MythTV Setup Option 3 – Video sources

a. On the MythTV Setup main menu screen, highlight option 3, 'Video sources', and press 'Enter'.

b. Highlight 'New video source' and press 'Enter'.

c. A work screen will appear with 'Searching for installed XMLTV grabbers': let this work for a few seconds.

d. 'Video source setup' (right).

   i. Arrow up to the 'Video source name' box. Type a name – I'm in Brighton, and the signal is analogue not digital, so I called mine 'BrightonAnalogue'.

   ii. The analogue transmitters don't carry any listings information. We'll set up our own TV listings source later, so highlight 'Listings grabber' and set to 'No grabber'.

   iii. Leave 'Channel frequency table' at 'Default'.

   iv. Highlight 'Finish' and press 'Enter.

e. Note that the settings you've entered appear now on this option's menu. Press 'Esc' to return to the main menu.

17. MythTV Setup Option 4 – Input connections

   a.   On the MythTV Setup main menu screen, highlight option 4, 'Input connections', and press 'Enter'.

   b.   Ensure you have the TV aerial cable securely inserted into the TV capture card in the motherboard before carrying out this step.

   c.   'Input connections'. Highlight the top choice 'Tuner 1' and press 'Enter'.

   d.   'Connect source to input' (right).

   e.   Arrow up to 'Display Name (optional)'. I gave it the unoriginal but accurate name 'Analogue'.

   f.   From the 'Video Source' pull-down list, there should be just one relevant option – the one you created in Step 16. In my case, that's 'BrightonAnalogue'.

   g.   Arrow down to the 'Scan for Channels' button and press 'Enter'.

   h.   Press 'Enter' to confirm the setup for the scan and begin the operation. The computer will scan each of the TV transmission channels available. When it completes, highlight 'Finish' and press 'Enter'.

   i.   Press 'Esc' until you're returned to the setup Main Menu.

18. MythTV Setup Option 5 – Channel Editor

   a.   I suggest you set up the TV channels at a later stage, and without using this menu option. Go directly to Step 19.

   b.   If you do require access, then from the MythTV Setup main menu screen, highlight option 5, 'Channel Editor', and press 'Enter'.

19. MythTV Setup Option 6 – Storage Directories

a. On the MythTV Setup main menu screen, highlight option 6, 'Storage Directories', and press 'Enter'.

b. Storage Groups (directories for new recordings). Highlight 'Default' and press 'Enter'.

c. 'Default' Storage Group Directories. Highlight '(Add New Directory)' and press 'Enter'.

d. 'Enter directory name or press SELECT to ent' (right). Highlight the empty space in the box and type'/storage/recordings'. Press 'Enter'.

e. Down arrow to highlight 'OK' and press 'Enter'.

f. You'll get a warning that there is no Starter Channel set. Select 'I know what I'm doing' and press 'Enter'.

g. Press 'Esc'. You'll get a warning that you have to 'run mythfilldatabase' – we'll do that later, for now just press 'Enter' with 'OK' highlighted. You'll return to the MythDora desktop.

20. TV listings

Steps 20-25 are UK-specific. You must provide internet access direct to the MythTV computer to run these steps.

a. In Step 17, you will have had Myth scan for TV channels being received by the TV Capture Card. Being an analogue signal, all it could do at that stage is recognise whether there is a reasonable signal on each channel – not recognise whether it represents e.g. Channel 4, BBC1 London, or some half-hearted echo of a distant transmitter bouncing off a nearby building. In this step, we'll try to resolve these issues.

b. The BBC publish a comprehensive electronic programming guide covering all the major TV (and radio) channels in the UK, including Sky and many cable channels. It's free to access, and part of the Radio Times service (that is, you can access the same thing at http://www.radiotimes.com/). MythTV comes with a software module which enables the computer to 'grab' this data and keep a 14-day look-ahead TV schedule. You can use this to set recordings of programmes to watch later, just like a tape or DVD recorder, but more flexible than most.

c. This guide is based on the PVR-150 capture card which is supplied with the bundle, and therefore we're only expecting to be able to get local analogue TV – usually BBC1, BBC2, ITV, Channel4 and, from some transmitters, five. If you have an analogue TV tuner now, you'll know what channels you get – but there's a bit more information required to set up the Myth system. The basic process is this;

- Look up information about how TV channels are sent from your local analogue transmitter.

- Confirm which channels you want to include in the MythTV listings.

- Run the 'listings grabber' to download the Radio Times data.

- Match the transmitted channels to the ones we want to watch.

We'll take these steps one by one below.

21. Local TV channel transmissions

So, firstly we need to find out some information about our local analogue transmitter. You can do this either using another computer with internet access or with the Myth computer provided it has internet access.

a. If you're using the Myth computer, get to the MythDora desktop. Along the top of the MythDora desktop runs a grey panel very much like the Windows task bar. On it are pull-down menu titles – Applications, Places, System. Next to that is the blue-and-orange Firefox (internet browser) logo. Click on this.

b. In the address bar of the browser that appears, type;

    www.wolfbane.com/cgi-bin/tva.exe

c. The page titled 'UK analogue TV reception predictor' appears (right). Note that Wolfbane refers to 'ITC' for what would normally be called ITV – they're the same thing.

d. Provided you're fairly close to your TV transmitter, you probably don't need to do anything special here – go straight to (e) below.

    i. If you're in the countryside, you may need to click on the 'Distant' selector rather than the 'Local' default.

    ii. If your TV antenna is unusually high (tall building) or low, you can amend the Antenna height from the default setting of 10 metres (which approximates a house roof mounting).

e. Type your postcode in the box provided, and click on the 'GO' button.

f. The bottom part of the page (right) should automatically show information about your local analogue TV transmitter or transmitters – there may be several in range.

g. There is lots of technical information listed, but you will need only a small amount of it to set up Myth.

h. The crucial columns are:

    • The 'UHF channel numbers' listed for BBC-1, BBC-2, ITC-1 (i.e. ITV) and C-4 in columns 3, 4, 5 and 6.

    • The 'BBC region' listed in column 12.

    • The 'ITC region' listed in column 13.

i. If there is a five (Channel 5) transmitter in range, it will be listed in a similar table below. All you need from this is the UHF (channel number) quoted in column three.

j. If you have a number of transmitters listed, you'll ideally need to work out which one your aerial is pointed at now so you record the right information. A few things can make this easier: if a five (Channel 5) transmitter is listed, but you're sure you don't receive a five analogue signal, then that transmitter can be ignored from the BBC/ ITC list too. Also, if you know which BBC and ITV region's programmes you receive that will help select the correct option.

k. Once you've decided, make careful notes of the UHF channel numbers and the BBC/ ITV regions – you can use the table below. You'll need them later.

Channel	UHF number	Region
BBC1		
BBC2		
ITV		
Channel 4		
five		

22. Run the TV listings grabber

Next we'll set up the listings grabber for the channels you'll receive. It's a bit laborious but not difficult.

a. From the MythDora desktop, click on the 'Applications' drop-down menu, click on 'System Tools', and click on 'Terminal' from the sub-menu.

b. The terminal window appears. By default the commands will be executed as the MythTV user - the one you gave a password to in Step 11(f) - but we need to do this work as the 'root' user. You set that password all the way back in Step 10(g).

c. Type

      su –

…and press 'Enter'.

d. Type in your root password and press 'Enter'. If you typed it correctly, the prompt changes from 'myth@<computername>' to 'root@<computername>' (right). If you mistyped it, just go back to (iii).
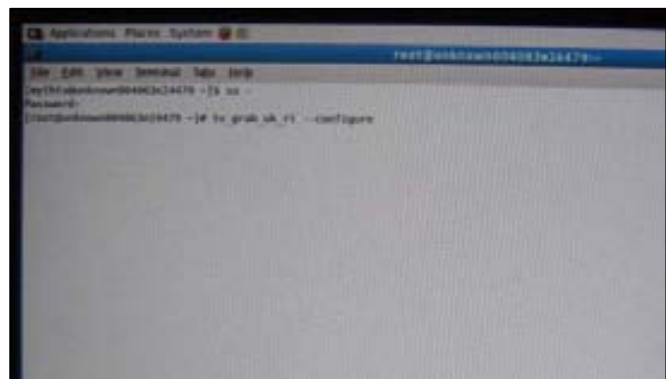
e. Now we're identified as the root user, we can run the command to configure the UK TV listings grabber channel selector. Type

         tv_grab_uk_rt --configure

…and press 'Enter' (note the double-hyphen which is immediately before 'configure' – no space).

f. You'll be shown a copyright warning, and a paragraph detailing the number of channels currently being supported by Radio Times. It will automatically retrieve a list of supported channels from the Radio Times database, confirm the name of the configuration file it will save your decisions to, and then ask 'Add channel <channel name>? [yes,no,all,none (default=yes)]?'

i. I suggest you add only the channels the PVR-150 will actually receive from your transmitter – so that's usually four or five. So, you're going to say 'No' to all except BBC1 and 2 for your region, ITV for your region, and maybe Channel 4 and five. Remember the regions you noted in Step 21(k).

ii. So, you need to type

    no

…for each question except for the specific ones you want – for these you can just press 'Enter', since 'yes' is the default answer. Fortunately the channels are listed in alphabetical order; unfortunately there are a lot of them so it is rather tedious.

iii. Once you've answered all the questions, you'll return to the terminal prompt.

g. You can check what you've set up by typing this;

    cat /root/.xmltv/tv_grab_uk_rt.conf

…which will show you something like my file;

    channel south.bbc1.bbc.co.uk

    channel south.bbc2.bbc.co.uk

    channel meridian.co.uk

    channel channel4.com

    channel five.tv

h. If there's a mistake, you need to return to step (e) above and repeat the process, overwriting the configuration file with a new copy.

23. *Running the listings grabber*

a. Now we have selected the channels we expect to receive, we can ask for the two-week listings from the Radio Times internet service.

b. Still in the terminal window from (b), now type;

    tv_grab_uk_rt –output tvlisting.xml

c. This process takes a few minutes, and a progress bar shows how far it's got. It creates a small file (called 'tvlisting.xml') with the listings data for your channels.

d. Finally for this section, we need MythTV to import the listings information into its database with;

    mythfilldatabase --file 1 tvlisting.xml

e. Again, this will take a few minutes and progress will be shown on the screen. Note the double-hyphen immediately before the 'file' command.

f. We now need to reboot the computer. From the task bar at the top of the screen, pull down 'System', click on 'Shut Down' and click 'Restart'.

g. When the computer restarts, it will again load the MythTV program. Once it's in, press 'Esc', highlight 'Yes, exit now', and press 'Enter'. Return to the MythDora desktop.

24. *Match the transmitted channels to the ones we want to watch*

a. For this step we'll use MythWeb, MythTV's browser-based controller.

b. Open up the Firefox browser from MythDora's desktop (as we did in Step 21(a)).

c. In the address bar, enter

   127.0.0.1

d. The main MythWeb screen will appear. You may want to add this address as a bookmark (favourite) for ease of reference in future – to do this just use the pull down menu 'Bookmarks' > 'Bookmark this page'.

e. Towards the top of the page is an icon showing a spanner and a key. Click on this.

f. On the left hand side, click on the 'TV' button. There are three tabs available now – 'My Session', 'Channel Info', 'Playback Groups'. Click on 'Channel Info'.

g. If you scroll down you should find a number of channels listed at the top with many columns filled in – these are the ones you chose from the Radio Times grabber setup in Step 22(f). Note that the 'channum' column is empty here. Below that are the channels actually found by the TV Tuner card when you did a scan in Step 17(g). These do have a channel number, but not much else.

h. You need to put the correct channel numbers (from the bottom rows of the list) into the empty channum boxes (at the top of the list). Refer back to the list of Channels, Region names and Channel Names you made in Step 21(k).

i. You should end up with a channel number in each of the named channels at the top of the screen. Now, for the entries below that, click in the 'delete' box at the left-hand end.

j. Scroll down and below all the lists in the middle of the screen you'll find a 'Save' button. Click this.

k. You should have a compact list of channels with all the columns filled in, see right for an example.

l. If you now click on the
    'Listings' shortcut towards
    the top of the browser
    window, you will see all
    the channels you've
    chosen and their
    programming schedules
    (right).

Using MythTV

25. *Watching Live TV*

a. To watch TV on your computer, you need to run the MythTV front end software. If you followed Step
    12(f) it starts automatically when you boot the computer. In any case there is a large 'MythTV' icon on
    the MythDora desktop which you can click to run it. Once it starts you'll get the main menu. The front
    end doesn't use a mouse at all, it's all keyboard controlled (since this makes it easy to use a remote control
    instead).

b. The first item on the main menu is Watch
    TV (right). With this highlighted, press
    'Enter'.

c. The default TV channel is displayed. To
    change channels, press the up arrow to get
    the channel browser overlay, and then up
    or down arrow to change channels until
    you get the one you want.

d. Press 'Esc' to return to the menu, or all the
    way out to the desktop.

26. Setting a recording schedule

a. Provided you leave the computer on, you can set it to record a scheduled programme like a video recorder. Remember that the tuner card has just a single tuner, so you can't watch one channel whilst recording another with the bundle package.

b. Whilst you can set the schedule using MythWeb (as in Step 20 (d)) it's probably easier to do this from MythTV.

c. Press 'Esc' until you're at the MythTV Main Menu.

d. Down arrow to 'Manage Recordings' and press 'Enter' (right).

e. Note the other menu items here, whose functions are fairly self-explanatory. As we want to set a new recording, leave 'Schedule Recordings' highlighted and press 'Enter'.

f. The simplest way to set your recordings is probably to browse the listings. So, leave the highlight on 'Program Guide' and press 'Enter'.

g. The page (right) shows the TV listings for your installed channels in a grid pattern. The grid shows from about now to a couple of hours ahead, but you can move to the right to go ahead in time. You move about the grid using the cursor key arrows, and as the highlight rests on each programme a description appears at the top of the screen to provide more information on that particular show.

h. Once you've highlighted the show you want to record, press 'Enter'. More details of the show appear on the new screen (right).

   i. If you want to go ahead and set a recording schedule, you change the settings by pressing left or right arrow and the text advice changes too. You can set the scheduler to record just one show, or record this show every week, or even look for shows with the same name on other channels to record, too.
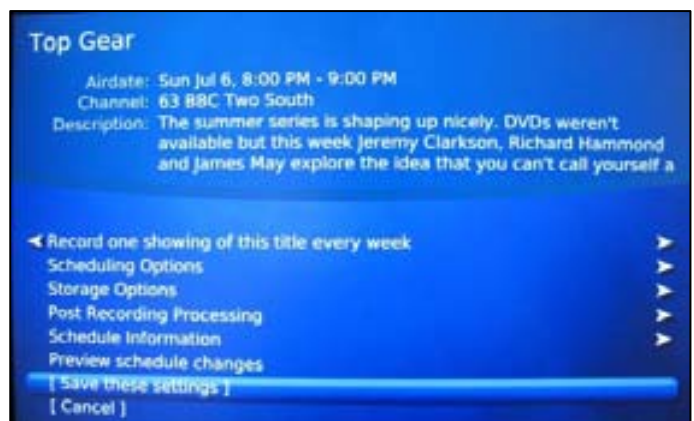
   ii. Once you have the recording setting you want, arrow down to '[Save these settings]' and press 'Enter'. You return to the TV listings.

---

27. *Watching recorded shows*

    a.   From the main MythTV menu select 'Media Library' (right) and press 'Enter'.

    b.   Highlight 'Watch Recordings' and press 'Enter'.

    c.   All previous recordings are listed; use the up and down arrows to select between them and press 'Enter' to watch the show.

Optional Extras

28. *Automating the Radio Times listings grabber and myth database population*

a.   You'll recall that in Step 23 you ran a couple of commands to grab the Radio Times TV listings from their server, and then put those listings details into the MythTV database.

b.   The listings cover a two week period, and occasionally are updated at shorter notice because of programming changes due to weather, news or sport overruns etc. So, from time to time you'll probably want to refresh the listings so that your schedule is up-to-date.

c.   You can either type in the two commands given in 23(b) and (d) every now and again, or set up an automated job to do it for you. Read on if you'd like to forget the chore and let the computer handle it!

d.   Go to the MythDora desktop, open a terminal window and log in as root. Just follow 22(a)-(d).

e.   Creating a script

    i.   You need to create a script with the two commands in, so that this can be automatically called by the operating system scheduler. Type

        vi refresh_mythlistings.sh

    ii.   The screen clears as you enter the rather unfriendly vi editor. Type a single letter 'i' so that the word INSERT appears at the bottom of the screen.

    iii.   Next type the following lines.

        /usr/bin/tv_grab_uk_rt   -output /root/UKRT.xml

        /usr/bin/mythfilldatabase --file 1 /root/UKRT.xml

    iv.   Press 'Esc', then ':wq', then 'Enter'. If you see typing errors or get stuck with the editor appearing not to respond, I suggest it's easiest to type 'Esc' ':q!' 'Enter' and start again at step (e)(i) above.

f.   All being well, type

    ls -l

A list of files in the current directory will appear and should include one called 'refresh_mythlistings.sh'.

g.   We need to tell MythDora that we want to run this as a program by changing its 'file permissions'. Just type;

    chmod +x refresh_mythlistings.sh

h.   Check the script

    i.   To check that the script works, we just need to run it. Type;

        ./refresh_mythlistings.sh

    ii.   If the script is working, you'll see a whole lot of output to the screen as the new listings data is retrieved, and loaded into Myth's database. If there are errors, you can start again by deleting your script and returning to step (e)(i) above, so delete the file with;

        rm refresh_mythlistings.sh

29. Schedule the grabber script to run regularly

If your script from Step 28 runs OK, you can now complete this section by including it in the job scheduler within the operating system.

a. Type

crontab –e

b. You're in the vi editor again. As before type a single letter 'i' so that the word INSERT appears at the bottom of the screen.

c. Next type the following line – don't press 'Enter' at the end of this text;

52 01 * * * /root/refresh_database.sh > /root/refresh_database.log 2>&1

d. Press 'Esc', then ':wq', then 'Enter'. If you see typing errors or get stuck with the editor appearing not to respond, I suggest it's easiest to type 'Esc' ':q!' 'Enter' and start again at step (e) above.

e. This tells the computer to run the refresh script at 01:52 every day, and write a log file of what it did. You can change the time if you prefer; the computer must be on to perform the scheduled task.

f. You can check that this works OK by coming back to the /root directory and checking the time on the UKRT.xml file – it should be stamped at around 2am each morning.