PC Hardware for the Living Room

Quiet Please!

Multimedia is becoming more and more part of everyday computing. But the noise produced by today's systems is the biggest obstacle to living room PC use. This article describes the hardware required to build a silent Linux video recorder. **BY DANIEL COOPER AND THOMAS KOCH**

J ust hot air, that is one way of looking at current computer systems: one or two power supply fans, and additional fans for the CPU, the motherboard chipset and the graphics adapter, even the hard disk needs cooling and just for good measure let's add an extra case fan to really cool things down. A state-of-the-art computer with a 2.5 GHz processor converts about 100 to 200 Watts of energy to heat, and the noise level grows alarmingly with each fan you add.

Low Clock Speed

Low clock speed, energy saving processors that require only passive cooling are an alternative. The chip manufacturer Via launched the highly compact EPIA motherboard at this year's CeBIT. The board is one of the first to use the Intel compatible C3 processor. Both the motherboard and the processor can make do with passive cooling at clock speeds of up to 600 MHz. We opted for the ME6000P at around 130 Euro from [2].

The ITX form factor motherboard has an extremely small 17 x 17 cm footprint, and more or less constitutes a single board computer as it includes a full set of interfaces besides the CPU, the chipset and the graphics adapter, sporting a PCI slot, two IDE channels, a floppy connector, network, sound, TV output, 4 x USB 2.0, 2 x Firewire, 2 x serial, 1 x parallel, and 2 x PS/2 connectors. Linux support is good, although you will need the Via [1] X server or resort to the Framebuffer X server.

The Yeong-Yang A106 case for 60 Euro was supplied by Northern Micro [7]. It is quite compact and does not even look like a computer at first glance. The CD drive is hidden behind an acrylic cover in the middle of the case, and the buttons and ports are concealed.

Fanless Power Supply

We replaced the integrated 70W power with a fanless Lex 14-19V DC 110W ATX power supply for 125 Euro, from [3]. The power supply comprises two components, and external transformer and an internal transducer, which unfortunately turned out to be too small for the opening in the case. This meant we could only use one screw to fasten down the transducer, but there were no other hitches.

The Casper case is quite roomy with enough room for four PCI adapters, a hard disk, a floppy disk and a CD ROM drive (see Figure 1). Heat can escape via the case lid, and this allows fanless operations – however, the internal temperature may rise to 40 degrees and the motherboard chipset can reach peak temperatures of 60 degrees.

DVB Cards

A wide selection of Digital Video Broadcasting (DVB) cards is available, but unfortunately not all of them support VDR [11]. Cards manufactured by Hauppauge [4] and Technotrend [5] should perform well for satellite, cable, and terrestrial reception. The drivers were mainly written by Convergence [6] developers.

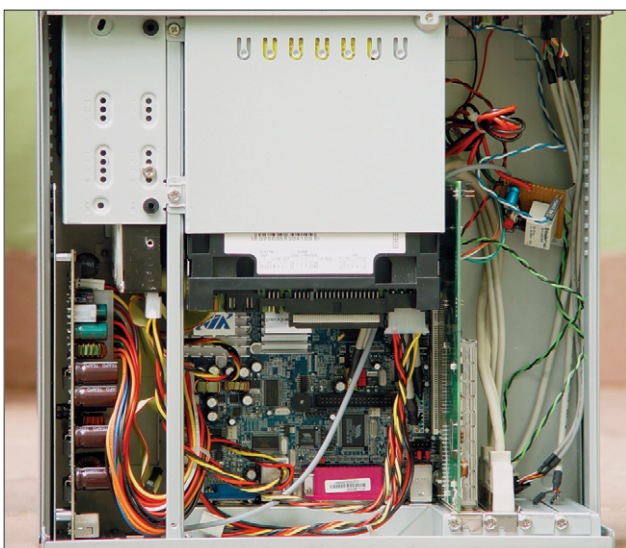You have to distinguish between so-called full-featured and low-budget

Figure 1: The case is compact, but provides ample space for a video recorder with a CD drive and one or two hard disks. As fanless operation is possible, the hard disk is the only source of noise, however, the operating temperature is about 40 degrees

cards. Full-featured cards include an MPEG 2 decoder, and allow you to view the satellite signal on TV without impacting CPU performance. Prices range from 160 to 250 Euro depending on the model and dealer. In contrast, low-budget models cost somewhere in the region of 70 to 90 Euro, and provide only reception facilities without the MPEG 2 decoder and TV output. They make perfect backup cards, if you want to record multiple channels simultaneously.

Full-Featured Cards

Full-featured cards are all based on a reference design by Technotrend, and use various tuner modules depending on the revision. The revision number is printed at the top of the card and provides for easy identification.

If you have the money

Technotrend Revision 1.3 DVBs are the only ones with two satellite connectors – an input and an output port. As there are very few practical applications for the output port, subsequent models (revision 1.6 and 2.1) have retained only the input port. The WinTV Nexus card by Hauppauge [10] is only available in the current revision 2.1 version. The adapter is the most expensive of our test candidates (225 Euro), but comes complete with a remote control and an infrared receiver. The older 1.3 and 1.6 revisions are an alternative, although they produce more heat than the new 2.1 revision, they sell at around 170 to 180 Euros (from [5]).

Low-Budget Cards

Be careful when purchasing a low-budget card. Again, only Technotrend models proved reliable. Low-budget cards are sold by a variety of manufacturers under a variety of names. The Hauppauge WinTV Nova (85 Euro) and Technotrend WinDVB Budget2 (70 Euro from [5]) passed our tests.

In contrast, the Typhoon TV Sat DVB [8] does not support VDR: drivers are available from [9], but Video4Linux support is unavailable. The extremely low-priced Technisat Skystar 2 was still unstable at time of writing – it supports the current DVB driver, but the project is still looking for a maintainer to continue.

As a general statement, reliable support is available for cards with the Philips SAA7146A chip only at present. CA modules that allow users to add a crypto card for pay TV are another problem – in fact only one full-featured card supports this at present, and driver support is lacking for the low-budget cards. ■
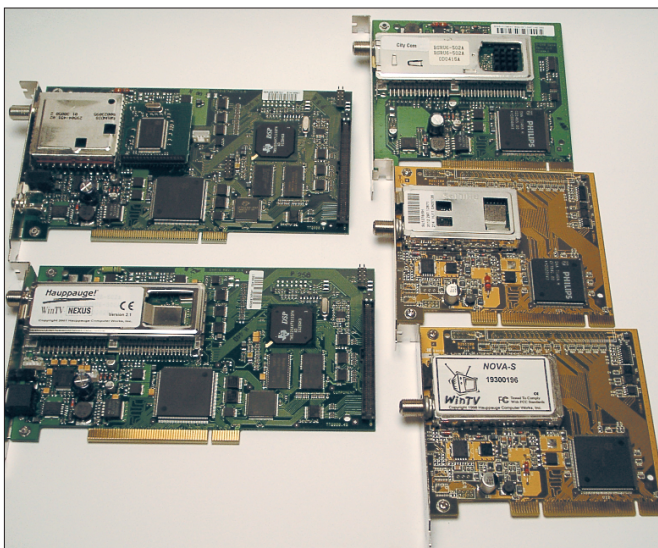

Figure 2: Full-featured cards, Revision 1.6 top left, and Revision 2.1 bottom left, are identical apart from the tuner. The low-budget cards, Hauppauge WinTV-Nova-s (bottom right) and Technotrend WinDVB-s Budget2 (center right) are absolutely identical; the Satelco card (top right) has a different tuner

INFO
[1] Via driver page: *http://www.viaarena.com*
[2] ITX Motherboard: *www.mini-itx.com*
[3] Power Supplies: *http://www.linitx.com*
[4] Hauppauge, DVB cards: *http://www.hauppauge.com*
[5] DVB-Shop, DVB cards: *http://www.dvbshop.tv*
[6] Convergence: *http://www.convergence.de*
[7] Northern Micro: *http://www.northernmicro.com*
[8] Typhoon: *http://www.anubisline.com/english/eindex.htm*
[9] DVB drivers for Typhoon DVBs: *http://www.metzlerbros.de/ mbros/dvb*
[10] Scan: *http://www.scan.co.uk*
[11] Recorder software: *http://www.cadsoft.de/people/kls/vdr/*