



Considerations over CockpitCUBE®'s hardware, by our CTO David Tesi.

<< **CockpitCUBE®**, together with its upgrade modules, is designed to run on modern, off-the-shelf laptops (both PC and IntelMac running Windows). This doesn't absolutely mean that it cannot run on desktops, on minis, on ruggedized laptops, on rack mounted or on any other possible computer configuration. It simply means that everything the software does doesn't necessarily require anything "bigger" than a laptop.

It is nevertheless undeniable that laptops have some limitation that may prevent the user from taking full advantage of all the features we developed so far, especially the 4 Camera setup. This is due to the fact that, at present moment, it's impossible to connect more than one Canopus ADVC-110 or ADVC-300 bidirectional DV converter box to the same IEEE-1394a FireWire400 controller (incompatibilities of a different kind make the FireWire800 totally unusable). This effectively limits the number of recordable cameras - on a laptop - to 2. Let me expand on this: usually modern off-the-shelf laptops have an internal FireWire400 controller with one - or in rare cases 2 - FireWire400 ports, plus either a PCMCIA(Cardbus) or ExpressCard expansion slot where an additional FireWire400 controller with usually 2 ports can be plugged-in. This makes up for a total of 3 or 4 FireWire400 ports, but only 2 separate controllers. If you were using most existing DV cameras or other more standard DV devices for the I/O, you could connect all of them at the same time for a total of 3 or 4 A/V sources, bypassing the limitation described above; but on a production set you are probably going to use a DV converter box and not a DV camera to input and output the video. And because also the combination of a box and a camera on the same controller doesn't work, you end up with only 2 usable I/O video channels.

So why use Canopus boxes? Because they are the only ones on the market, as far as we know, that can be software controlled to switch between input and output without requiring the user to switch them manually. They also guarantee audio/video synch and the ADVC-300 has internal TBC that may become handy when using wireless cameras. You don't need to commit to a single model, you can mix and match ADVC-110 and ADVC-300.

How can the usable-video-channels limitation be overcome? By building a desktop, a tower or a rack mounted computer using an ATX motherboard with enough PCI or PCI-express expansion slots (like the ASUS P5B-E) to accommodate 3 FireWire controllers in addition to the one on the motherboard itself. BTW, this way you can power up the boxes without the need of an external power supply. This of course goes beyond the concept of being laptop compatible.

Another limitation in using laptops is the speed of the video hard-drive. For reasons I'm not explaining here, it's impractical to connect external FireWire hard-drives to the same controllers used for the video I/O, so the only other option is the USB2 connection, which is fast enough to accommodate 2 stream of data, but may become a little too tight for 4 (don't forget the additional layers for video compositing). Luckily, soon enough laptops should become equipped with the Mobile-SATA connection that will give enough bandwidth for all use scenarios. At present time some expensive laptops do come equipped with 2 internal SATA hard drives; alternatively you can build a desktop, a tower or a rack-mounted computer for added hard-drive bandwidth. Again, this goes beyond the concept of being laptop compatible... but why be so focused on laptops? Mainly because of portability and modularity. As said, nothing prevent you from using the computer setup of your choice. It's our own dedication, not your boundary.

Let's consider the worst-case scenario of a motherboard failure: how long does it take you to replace the rack-mounted PC in your cart with a new one? And how long does it take to just unplug the external devices (ExpressCard, hard drives, DV converters, USB dongle, USB pendrive) and swap the laptop?

Regarding which laptop to buy, we suggest you avoid buying the most super-charged machine out there just yet, simply because **CockpitCUBE®** and the upgrade modules coming soon have limited requirements. Maybe later this year, when we will release HDV support and more powerful live compositing tools, you may want to consider buying a top class machine.

It's hard for us to tell exactly which are the minimum system requirements or the approved hardware because it's a gigantic task to test all possible hardware combinations or laptop models. What we can do is tell you what we are using to develop and test the **CockpitCUBE®** + Dual camera module + Mix module + Edit module so you can make up your mind more clearly. This is what we are currently using:

a Dell Inspiron 9200 laptop with 1.60GHz Intel Centrino CPU (the old one) and 1.25GB of RAM running Windows XP Professional SP2, DOES NOT SUPPORT MIX MODULE

a Toshiba P10 laptop with 3.00GHz Pentium4 and 1GB of RAM running Windows XP Professional SP2,

an Alienware Area51 laptop with 3.60GHz Pentium4 and 2 GB of RAM running Windows XP Professional SP2,

an HP laptop with 1.8GHz Intel Centrino Core 2 Duo and 2GB of RAM running Windows XP Professional SP2,

an Asus W6 laptop with 1,60GHz Intel Centrino and 512 MB of RAM running Windows XP Professional SP2. DOES NOT SUPPORT MIX MODULE

a 15' MacBookPro with 2.16GHz Intel Centrino Core 2 Duo and 1GB of RAM running Windows XP Professional SP2 and Windows Vista Unlimited,

a custom built desktop with a ASUS P5B-E motherboard with 1.8GHz Intel Centrino Core 2 Duo Desktop and 2 GB of RAM DDR2 running Windows XP Professional SP2, Windows XP Professional 64bit, Windows Vista Unlimited and Windows Vista 64bit.

We use LaCie 500GB BigDisk Extreme (RAID 0) on all machines as external video storage and Unibrain Firewire controller cards. >>