DataCAD Boston Users Group

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A Committee of the Boston Society of Architects

July DBUG Meeting

July 27, 2005

Host: Neil Blanchard, Reeves Design Assoc.

Sudbury, Massachusetts

Neil Blanchard welcomed a dozen DBUGers to Reeves Design Associates in Sudbury for a mid-summer meeting that offered something quite different for an agenda: a real hands-on session on the guts of a computer. A working computer was taken apart, the parts laid out on a table, and various components handed around the room for close inspection. It was a true act of confidence for DBUG's own Mr. "Tom's Hardware," and so we trust that Neil was able to get all the parts back together into a working computer again the next day.

In terms of announcements, Evan noted that there would be no DBUG meeting in August and that the September meeting had no host, so would be tentative at this point. DataCAD was working on a new update DataCAD 11.08.00, whose major new feature was Symbol Tools, which Neil previewed a bit, showing how you could easily open the folder where a symbol originated in the Symbol Browser by using this new context menu tool.

What follows in an reformatted version of Neil's handout. The full original handout can be found on the DBUG website at <http://world.std.com/~eshu/dbug.htm>.

LESSON 1: Finding your way around your computer case.

* *The front panel:* 5 1/4" drive bays (optical drives),3 1/2" drive bays (floppy, Zip, etc.), front connectors (USB2 or USB 1.1, audio, Firewire, etc.)
* *The rear panel:* nPS/2 (keyboard is purple, typically, & mouse is green) [color-coding standard], LPT (for printer, scanner, hardlock, etc.), Serial (for old printers, some PDA docking units),Video onboard or, expansion card: RGB (analog - blue) & DVI (digital - white), LAN (local area network), USB, Firewire [similar to USB2], Sound (analog inputs – red for mic, blue for line in & outputs – green, & digital), modems, game ports, etc.
* *The inside:* Power supply (ATX, Molex, SATA, 12volt, 5volt, 3.3 volt), Hard drives, 3 1/2" (ATA aka PATA, SATA aka Serial ATA), Optical drive, 5 1/4" (CD/DVD-ROM, CD-R, CD-RW, DVD-R),
* *Motherboard:CPU socket (or slot)*

AMD: Socket A (aka Socket 462), Athlon XP, Duron; Socket 754, early Athlon 64, Sempron; Socket 939, Athlon 64, Athlon 64 X2; Socket 940, Opteron.

Intel: Socket 370, Celeron; Socket 478, Pentium 4, Celeron; Socket 479, Pentium M; Socket 604, Xeon; Socket T (aka LGA 775), Pentium 4 "Prescott"

Video slot: AGP- typically brown or dark gray, PCI Express (aka PCIe) often black; RAM slots: 184-Pin DDR-SDRAM, 240-Pin DDR2 SDRAM (older types: 168-Pin SDRAM, 184-Pin RDRAM aka RAMBUS); PCI slots – the rest of the expansion slots – usually white; Northbridge, Southbridge, BIOS [the brain stem] – the other important chips; Header pin connectors: USB2 & USB1.1, Firewire, audio

* *Fans:* 80mm, 92mm, 120mm

LESSON 2: Upgrading or Replacing; how things work inside the case, things to look for, and how to go about building your own box.

Upgrading Issues: compatibility and value. i.e. What will work, and how much will it get me?

There are several things that can be upgraded: RAM, hard drives & OS, video, optical burner. In my opinion, for Win98 (or WinME) you need 256MB minimum, and for WinNT/2K/XP 512MB is a bare minimum. If the CPU is close to 1gHz or better, then it could be useful for several years more.

For hard drives, how old are they, and have you checked them for errors? Reinstalling Windows & your programs can take a day or two, and then how do you transfer your data files? It could be worthwhile upgrading Windows – and definitely upgrade the hard drive if you do anything with Windows.

The video card and optical burner options are more specific to your needs: they are more limited in their benefits, because you can move to two monitors or burn CD's – they don't affect the performance of the computer, per se.

Buying or Building? Costs, compromises, and service. Buying a computer from a large OEM has certain advantages to be sure, but there are compromises, too: proprietary hardware, software media, knowing & understanding what you are buying, and generic & impersonal tech support. Buying a complete machine from a smaller company (online or local) offers a different mix: standardized components, less extraneous "stuff", better documentation, less generic and more "direct" support. Building your own requires that you do your homework, and a day or so of work, but you will know exactly what you have, and will know much more about it.

The case & power supply: *air flow, heat & noise, how things fit together.*

Today's computers are much more demanding for good air flow. There are surprising few truly good cases. For excellent information and recommendations on cases and everything else, too, go to: <http://www.silentpcreview.com/>. Three examples of the best cases are the Evercase 4252 (my personal favorite), the Antec SLK3000B, and the Antec P-180. Each of these has things that you must take into account, that will affect some, if not all of the other components.

The areas where most cases are weak: front air intake restriction and fan grill restriction, and hard drive isolation. In order to have a cool and quiet computer (and therefore a more dependable and pleasant machine) you **must** have the best possible air flow. You'll want to use as slow and quiet fans as possible – and this means use low speed 120mm fans (600-1500RPM) where ever possible. Cool hard drives are "happy" hard drives.

Quiet 120mm fans are Nexus, Yate Loon (also sold at CompUSA as "Mad Dog"), GlacialTech, AeroCool "Turbine", Enermax/Globe – with the exception of the Nexus, all of these need to be slowed down to be truly quiet. So, a Zalman FanMate or otherwise undervolting them is required.

The motherboard, CPU, and it's heatsink/fan [HEAT is the ENEMY!]

These are interdependent – the balance between performance & heat, and how much they cost are the main decisions. In my opinion, the balance of all these leans towards AMD Athlon 64 CPU's. They run much cooler, have excellent performance, generally cost less, and will run "tomorrow's" 64bit Windows; *if* we then get 64bit programs.

The newest "thing" in CPU's is **dual cores**. These are pretty common at the upper end AMD CPU's – they are called Athlon 64 X2, coincidentally enough! :-) The top model at the moment is the Athlon 64 X2 4800+. I am less familiar with Intel's lines of CPU's, but I'm fairly sure that they also have dual core models.

The CPU heatsink is quite important, so the computer can be as quiet as possible, while keeping the CPU at a safe temperature. Some of the best are the Scythe SCNJ-1000, and the Thermalright XP-120. Depending on your CPU though, you might be fine with a Zalman CNPS7000B-ALCU, Thermalright XP-90, or Alpha heatsinks.

The choice of the motherboard is critical: it must have the features that you need, and it must **fit** your heatsink/fan. Many motherboards offer a wide array of built in features, that literally the only expansion card you'll need to buy is the video card – and sometimes, not even that! Built-in LAN (sometimes *two*) ports, up to **10** USB2 ports/headers, sound, are typical, and many have Firewire, SATA and PATA RAID controllers, etc.

The *lack* of a Northbridge fan is key, in my mind – those little fans make a ton of noise most of the time.

The hard drives: reliability and redundancy.

I favor Samsung hard drives for their quietness, they run cooler than most, and they have a 3 year warranty. Seagate are also relatively quiet, and they have a **5** year warranty, but they are warmer running. The newer Maxtor, Western Digital, and Hitachi drives are now using fluid bearings (and therefore are much quieter than their older models), but they are typically only covered by 1 year warranties, and they are a bit noisier and run hotter. I would only ever use SATA drives in a new machine – they are faster and more dependable.

I **highly recommend a RAID 1** (mirrored) hard drive array in a new machine, especially if you have data files on the local machine. If there are no data files (you are using a file server), then it is not as critical. You should still do an additional backup method – like to an external hard drive or to another networked machine.

RAM: how much is enough?

I would not build or buy a new machine with less than 1GB, and if it has "just" that, then I would allow for expansion. In other words, if you use two 512MB sticks, be sure to have one or two more RAM slots available. Having 1.5GB or 2GB in a new machine is not too much, especially if you have several drawings open at once, and/or work with large image files, or do rendering, or if you tend to "multi-task"; with several programs running at once.

The video card: performance & heat.

Unless you are working with a lot of 3D (DataCAD or SketchUp), then having the ultimate top-of-the-line video card is not a necessity. Most mid-line video cards that have 64MB-256MB of RAM on them will be fine, if not excellent! The two things that I do look for in a video card are: passive cooling, and dual outputs; if not dual DVI outputs. If you already have, or plan on owning dual LCD monitors, then the latter is critical. Almost **all** of the video card fans are way too noisy to be part of a quiet machine, though there are a **few** that are okay.

The other obvious choice is AGP or PCIe: this will depend wholly on your motherboard; though PCIe can offer slightly better performance, and will have better upgrade possibilities. SLI (scan line interlacing) is not required for all but the most intensive 3D tasks.

LESSON 3: Further Into XRef's: Circular, Nesting, Highlighting, X-Clips – Why draw anything twice?

The overview of the way I use DataCAD is to have several files, but not a separate file for each drawing sheet. I think it is most efficient to have all the floor plans to be in one file, but if you need to you can use Xref's to share info while being able to separate each plan; so that more than one person could work on them, for example.

- You can use **Clip Cubes** (hereafter CC) to "zoom in" on a portion of a drawing and then add layers of info to be plotted at a larger scale (Text Scale makes this much easier), and GTV's also save the CC. The one drawback with a 3D CC is that you cannot draft outside the CC (by definition!).
- If you use a **self referencing XRef** (which is kind of an oxymoronic name, isn't it?), then you can draft outside the boundaries of the **X-Clip Cube** (hereafter X-CC).
- **Xref's** allow you to use Highlighting, which means that you can change the lines to a different linetype (all dashed, for example), and/or a different color – one that plots as a 20% gray line, maybe.

On a townhouse project, we use Xref's extensively: especially in the sections files, to isolate areas that need to be shown as details. By adding layers with the additional lines, and for the text & dims, and hatching, this is a good way to show a detail, and it prevents coordination errors; while eliminating duplication.

-- Notes by Neil Blanchard

A unique and valuable experience was had by all at this month's hands-on DBUG meeting.

-- Meeting Notes by Evan H. Shu, FAIA