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HARDWARE

My Life with a Handheld—Part 2 (2004-2005)—the 3E Era

by Bob Thomas

Welcome back folks! You'll recall that in my Part 1 article in the [January 2005](#) newsletter (Volume 22, #1), I related to you how much I loved the Instant On feature of my pocket PC. Part 1 covered the 2001-2004 time frame, noting that having applications like Word, Excel, and IE in my shirt pocket sized computer was terrific! In this installment I'll cover the 2004-2005 OP-CUG season. This period might best be described as: *Expansion, Evolution, Experience*.

Expansion

Just as the desktop PC rapidly evolved over the 1980's to become the Windows and Internet world of the 1990's and 2000's, so too did the handheld world rapidly change. The 16MB RAM models of 2000 are now 128MB and 256MB models in 2005. Software and critical files can now be stored in 'persistent memory' to prevent their loss when batteries are changed. Memory cards, available in a large variety of form factors (CF, SD, xD, etc.) have largely replaced Smart Media with capacities of 512MB – 4 GB now being the current standard. My CF hard drive holds 2GB and I have several 512 and 1GB cards. The wonderful news for us is that the cost of this expansion in capacities seems determined to keep Moore's Law alive. The \$100-\$150 for a 64MB card from 3 years ago now gets you 1-2GB cards! Just think back to how long you computed before getting your first 1GB sized hard drive and remember how much it cost you.

I upgraded my wireless Sierra AirCard modem to their 555 model to move up from 56 Kbps transmission speeds to 19,200 and 1xRTT. The resulting faster

transmission of messages and web pages was a joy to behold! Definitely worthwhile!

Although they're available, I have resisted getting a plug-in keyboard. I prefer to tap-type my notes or to just handwrite them in my handheld. I can convert the handwriting to text, if I choose. Similarly, since the Windows Media Player can handle MP3's, I don't need to get an additional MP3 device like an iPod – expansion not needed!

Evolution

Operating System evolution continues. My first pocket PC OS was raised to the 2002 level, the last available for my handheld. It entered what I call 'the dinosaur class' in late 2004 when HP indicated there would be no more OS upgrades for handheld models in its series' vintage. A dinosaur in 3 years! Yes, Moore's Law is holding true!

However, the pocket PC Operating System has evolved to become the OS of choice for a variety of devices, including Smart-Phones and watches. Consequently it has been retitled as Windows Mobile, to better reflect the wide variety of devices which employ the OS. The hardware companies, in addition to using faster processors and providing more built-in memory, have incorporated the ability for users to change batteries.

The software factories make steady improvements to their applications, most often providing free upgrades to releases within the same version of the software, but charging small upgrade fees for upgrading to a new version.

Probably the most phenomenal growth has been in the huge number and wide variety of good software applications for mobile devices. Handhelds are being used in such places as airport runways to report hazards

and in oil fields (to trace the travels of elk, polar bears and the like) using apps like Sybase's I-Anywhere to update headquarter databases. Doctors and nurses use them for a variety of medical apps, including tele-conferencing and for access to medical manuals, etc., even in operating rooms.

Experience

One of my older 256MB guaranteed for life CF (Compact Flash) memory cards failed, emphasizing to me the importance of having backups. I lost a few small notes and email attachments that had come in since my previous backup. I recovered the email attachments when I synchronized with my desktop, but had to recreate the few notes. I mailed the failed card to the manufacturer, Verbatim, and received the replacement within 3 weeks, not bad considering it was international.

When you get your handheld, be sure to get lots of storage for it. It's amazing how much of it you will grow to use as you add new applications to your mobile device as well as the information, photos, music, etc. in your own user-created files. They're also

(Continued on page 5)

Inside this issue:

<i>Calendar / Coming Up / Raffle</i>	2
<i>Hardware: My Life with a Handheld Part 2 (2004-2005) - the 3E Era</i>	1, 5
<i>Article: To (US)B or not to (US)B</i>	3,6,7
<i>Book Review: Google Hacks</i>	4, 8
<i>Change in Newsletter Contest Rules</i>	5
<i>Contact Information</i>	8

Next Meeting: **WEDNESDAY, January 11th, 2006**

December Prize Winners

Christmas came early for some of the members attending the OPCUG meeting on Dec. 14th. Due to the generosity of our evening's presenter, Harley Bloom of **Bloom MicroTech**, lots of folks went home with early Christmas presents:

A large group of OPCUG members will be attending a 67's game. The group includes **Michael Benson, John Bill, Mark Cayer, Micheline Johnson, Irene Kwik, Ted McDorman, George Monson and Bob Walker**. Each won a pair of tickets.

Fred Beisswanger, Mike Charette, Alice Charron, Vern Foster and Mike Hogan each won a surge protector for their PC's. **Gary Brooks** took home a 6-in-1 card reader device while **Norm Dafoe** got a package of high quality laser labels. **Richard Giroux** won a new pair of PC speakers and both **Tim Hillock** and **Mark Merriman** won notebook computer travel locks.

The evening's big winner was **Morris Turpin** with a copy of WordPerfect Office 12, courtesy of **Corel Corp.**

Congratulations to all the winners and thank you to Corel Corp. A special thank you goes out to Harley Bloom for giving away a big bag of goodies every year at this time (Harley, you'll have to grow a white beard).

January Raffle

At the January meeting, thanks again to the generosity of Corel, we have a copy of CorelDRAW Graphics Suite 12 for the raffle. This full-featured suite of applications includes CorelDRAW 12 for illustration and page layout, Corel PHOTO-PAINT® 12 for digital imaging and Corel R.A.V.E.™ 3 for motion graphics creation.

CorelDRAW Graphics Suite 12 has a street price of \$410.

Raffle tickets are \$1 for one, \$2 for three, or \$5 for ten.

Visit <http://www.corel.com/>



Upcoming meetings

January 11, 2006

Mike Neumann, Senior Technical Architect, Adobe Systems Canada

Adobe's acquisition of Macromedia is now complete, and an exciting new era in the company's history is underway. Please join a senior Adobe representative to discuss the technical integration of these two technical leaders.

February 22, 2006 (FOURTH Wednesday)—Eliott Finkleman, Practical Computing, "Protect Your Computer from Virtual Crime"

March 8, 2006—TBA

April 12, 2006—DBx GEOMATICS, "Web Mapping with Scalable Vector Graphics"
<http://www.dbxgeomatics.com>

CALENDAR

Meetings	Date	Time and Venue
OPCUG General Meeting	Wednesday, January 11 th	7:30 p.m. Auditorium of the Canada Museum of Science and Technology , 1867 St. Laurent Blvd. http://www.science-tech.nmstc.ca/english/index.cfm
Beginners' SIG	Wednesday, January 11 th	Immediately following the OPCUG General Meeting.
IT-Pro SIG	Wednesday, January 11 th	Immediately following the OPCUG General Meeting.
PIG SIG (Wing SIG West)	Wednesday, January 11 th	10:00 p.m. (after all other SIGs) at Chances "R" restaurant, Baseline Rd. at Woodroffe Ave. (College Square Shopping Centre)
Beer BOF (Wing SIG East)	Wednesday, January 11 th	10:00 p.m. (after all other SIGs) at Liam Maguire's, St. Laurent Blvd. at Innes Rd. (formerly Hooters')

Please note that unless otherwise noted, SIGs meet at 9:00 p.m. (immediately following the OPCUG General Meeting).

ENTRY FOR BEST NEWSLETTER ARTICLE

For contest details, visit <http://opcug.ca/public/Articles/contest2005.htm>. Some rules have been changed. See article, p.5, this issue.

To (US)B or not to (US)B, That Is the Question

(with apologies to the bard) *by Dunc Petrie*

A query in a Windows' SIG about the vagaries of USB thumb drives - removing them without data loss - piqued my curiosity to learn more. Was it the peripheral, the USB port, the operating system, some of them, or all of them together?

Historically, serial connections appeared early in the game; by today's standards those early protocols were slow, cranky and demanded end-user knowledge of myriad settings. Parallel connections soon came to the fore and the serial interface was relegated to the bleachers, although modems remained a stubborn exception for some time.

Serial connections use a simple premise: send the data one bit at a time - head to tail - in a continuous stream. As originally implemented, this was slow and suited only for small data streams. In contrast, parallel connections sent at least one byte (8 bits) simultaneously along individual cables. For reliable parallel bus communications the trick is to make each bit march in step and arrive at the destination at the same instant in time. As bus speeds increase this electronic feat becomes increasingly difficult to maintain. Crosstalk was another problem; as rates (frequencies) increase, signals have a tendency to radiate from one wire to another with predictable havoc. This "law of the inevitable" was instrumental in introducing the 80 wire/40pin connector for ATA 66 and beyond. Hard drives have finally yielded with SATA replacing the long-enduring parallel EIDE/ATA/ATAPI 100/133.

Currently, high speed serial buses are increasingly the norm: nearly every computer and peripheral has a USB port. It was originally introduced, as Version 1.1, with a maximum transfer rate of 12.5 Mbps (Megabits per second). Version 2.0 (aka Hi-Speed) in-

creased the raw transfer rate almost forty-fold to 480 Mbps. For comparison, a recent parallel port (EPP/ECP) would transfer data around 22 Mbps. In all cases, some of this bandwidth is devoted to management and control. For end-users with current hardware (USB 2.0 ports integrated on the motherboard) and operating systems (Windows 2000 or XP) in most cases Microsoft's Plug'n Play technology has finally achieved success. One thin, hot swappable, polarized connector does it all; many device drivers are already present in the operating system. Backward compatibility exists - up to a point - since pitfalls do remain.

FireWire 400 (originally introduced by Apple) or IEEE 1394a is USB's competitor. While both technologies display many parallels - including powered connectors and hot swapping - important differences exist. Due to early licensing and royalty issues, FireWire has not achieved the market penetration on Windows hardware that it enjoys on Macintosh machines. FireWire was originally intended for high bandwidth devices; initially, USB was intended as a bus for low bandwidth devices (evidenced by its 12.5 Mbps maximum throughput versus FireWire's original 400 Mbps). The burgeoning market for external peripherals must have caused the USB camp to rethink their strategy. Recently, FireWire 800/IEEE 1394b has appeared; it doubles the rate to 800 Mbps (more information at <http://www.quepublishing.com/articles/article.asp?p=339061>) but backward compatibility will be restricted since some circumstances require different cables and connectors. Future plans include quadrupling the speed to 3.2 Gbps although this has not been finalized. Further discussions in this article, unless stated otherwise, refer solely to the FireWire 400/IEEE

1394a (400 Mbps) variant. [Author's aside: Sony markets a very similar proprietary product called i.LINK for interconnecting its video hardware. While the technical specifications comply with FireWire 400, Sony has developed its own cables: an adapter may be necessary to use i.LINK with a standard FireWire connector.]

Many computer cases sport USB and FireWire ports on the front panel - a superb convenience; however, only a few higher-end motherboards implement FireWire to make these ports useful and not mere warts. Other possibilities to incorporate FireWire include video capture cards, sound cards (some SoundBlaster Audigy and Audigy 2 cards) and, of course, dedicated, PCI-bus, expansion cards (some are available with both USB 2.0 and FireWire on a single card). Until recently, FireWire's forte was video activities but it has started to appear as an alternate for some external hard drives. Most FireWire-equipped cases offer duality - both USB and FireWire uplinks. Important aside: never attempt to mount an external device using both ports simultaneously!

Recently, a third external serial protocol has appeared. Manufacturers have started to offer SATA as an option on external cases: not only the inside-the-box connector but also the external box-to-computer interface. Adapters are available to provide SATA-to-EIDE and EIDE-to-SATA translations to permit mating any combination of hardware and interface. SATA optical drives are starting to appear. Ultimately, it's reasonable to assume that the available parallel ATA connectors on motherboards will decrease and ultimately disappear as these hard and optical drive connectors lose significance.

(Continued on page 6)

BOOK REVIEW

Google Hacks

Reviewed by Alan German

Sub-titled “Tips and Tools for Smarter Searching”, this book just had to be for me. I have never figured out how to do a Google search without producing at least 100,000 hits, few of which pertained to the issue in question. So, did authors Tara Calishain and Rael Dornfest come to my rescue? Let’s find out...

The review copy, kindly provided to OPCUG by the publisher, O’Reilly Media, Inc., is the 2nd Edition of the work. The book is more-or-less sanctioned by Google since members of that company provide the forewords for both editions. As the first foreword indicates, one has to wonder just how much hacking can be done on Google to warrant an entire book. The answer is clear – plenty. The book contains 100 hacks (i.e. tips, tools, and techniques) that require well over 400 pages of explanation.

As you might imagine, just about everything you wanted to know about using Google is between the covers – from case (in)sensitivity, to the 850 million messages in Google Groups, to the technique of screen scraping. One caution though – to use most of the hacks in the book requires the knowledge to do scripting - using packages like Perl, Java and PHP. In fact, the book’s contents are broken down in several distinct sections. The first chapter is probably the most useful for many users since the tips describe Google’s basic features, and how to make best use of the search engine’s built-in, advanced capabilities. The remaining chapters make heavy use of scripts, together with information on specialized items such as add-ons, Google’s AdWords, page ranking, and the Web API. Since I don’t really do any scripting, and don’t think I have a use for AdWords, this article will mainly focus on the first section of the book, with just brief mentions of some of the more esoteric hacks that appear in later chapters.

Probably everyone knows how to search for a specific phrase by enclosing the text in quotation marks. But, do you need to enter capital letters for proper names? Try entering “ottawa pc users’ group” in Google’s search box and the answer is clear. Just like the book says - text searches are case insensitive – and can be very direct!

Probably everyone also knows that the use of “and” as a search word is redundant for most search engines, Google included. But, did you also know that if you want to use a Boolean “or”, this has to be entered in upper case? Or that you can combine Boolean search terms using brackets? For example, **“President’s Report” AND (Taylor OR Schopf) site:opcug.ca** returns information on precisely what you might expect. (As noted initially, AND in this search phrase is redundant; it is included here for clarity.)

A remarkable finding, to me at any rate, was this item of special syntax: “site:”, that allows you to restrict your search to a specific web site. You may have heard that OPCUG ran a workshop on digital imaging this past fall. You could have looked on the club’s home page, where you would have found the Workshop button prominently displayed but, just to illustrate the power of this tip, try typing the following into Google’s search box - **“digital imaging workshop” site:opcug.ca**. Now, that’s a focused search result!

Google has lots of other similar tricks up its electronic sleeve. For example, there’s the use of * as a wild card that, among other uses, will allow you to circumvent the search engine’s ten word search limit (did you know Google had such a limit?) You can also specify that a search is to include a range of numbers, such as looking for a digital camera having between 3 and 5 megapixels, by using the syntax: “digital camera” 3..5 megapixels. Regrettably, a search for “Windows XP” ..\$10, i.e. hopefully finding someone selling XP for less than \$10, is not so successful.

Try typing “digital imaging workshop” site:opcug.ca into Google’s search box. Now, that’s a focused search result!

Of course, if you don’t want to hack too much, you don’t have to learn all this strange syntax stuff. Google has a perfectly fine advanced search engine readily available through the link “Advanced Search”, just to the right of the main search box. Here, you can set a variety of complex search terms by simply completing various pre-defined fields, and selecting from a set of drop-down menus.

Some of Google’s other features noted in the book are similarly available from links

on the search engine’s main screen. Have you tried searching for image files on a given topic through the “Image” link? **“Chris Taylor” +OPCUG** produces lots of hits but not the particular image I was thinking of (Chris will know the one!)¹. On a more serious note, the “more” link on Google’s main page leads to a whole raft of things discussed in the book, including Directory, a subject index making use of the open directory project, Scholar, where academics can search for technical papers, and Google’s Labs where mere mortals can play with some stuff that is still under development. One of the latter items that has been mentioned on PUB II recently is Google Maps, <http://maps.google.ca/>. This is a great tool for finding locations, showing them as maps, satellite images, or a hybrid of the two, with a street map overlaid on a satellite image. And, the site gives really good driving directions between your house and the target location - or vice-versa - in case you’re really drunk on the drive home! Of course, in the latter case, what you really must do is to use “Local” and search for “taxi” in “Ottawa, ON”.

If you are a user of G-mail, there’s a whole chapter on that system for you to read. If you want to be a user of G-mail there’s a whole raft of tips on how to obtain a G-mail invite. In fact, if anyone with such an invite and who, having read this article, is feeling particularly grateful – probably because you weren’t singled out like Chris! – you can donate your invite to a very worthy cause. You will find my E-mail address on the back page of the newsletter! (See! I really did read the book. This is Hack #71 in action!)

As promised, here are some of the really weird and wonderful things that you can find in the book, most of which require scripting. How about finding a recipe based on the contents of your refrigerator, generating a random page view, or running permutations on a number of keywords automatically? Or, there’s my particular favourite - the Red Green special - making a “search engine belt buckle” by fastening a PDA onto a belt with (duct) tape, and programming it to generate scrolling Google results! For non-programmers, there are also some ready-to-go systems available on the web. You can try the “easy expert search” at <http://www.sooople.com/> as an alternative to Google’s advanced search engine. And, if you find a real use for Touchgraph (a visualization tool for results

(Continued on page 8)

Handheld... *(Continued from page 1)*

a convenient medium for transferring those photos, etc. to your friends' computing devices.

My experience with using Wi-Fi for wireless communications presented its share of teething problems. On one hand I experienced roaming charges I hadn't foreseen when I was traveling through the US. On the other, I found that while hotels and airports had become proficient in helping their laptop clients make their wireless connections, I typically received an "Oh, you're my first pocket PC user; I'll need to contact Tech Support." reaction. Often Tech Support lacked the definitive information they needed to get me functionally connected to the Internet, even after spending hours trying to do so. Happily, I can report that they have now become more proficient in dealing with mobile devices like our handhelds. The advent of the Windows Mobile 2003 Second Edition has almost automated making connections for the user such that Tech Support's precious time can be devoted to other issues.

Infrared beaming of information between devices – This works fine with other Windows devices, but not with Palm Pilots.

When using Instant Messaging I have found that it's best to keep the text short, otherwise you'll spend too much time scrolling up and down trying to follow the conversation's thread. You can only have 1 person at a time in a chat session, but can have several simultaneous chats running. A good task-switcher helps make this easier.

For our OPCUG meetings, I wished several times that I had bought a Presentation Kit.

Be sure to have full backups done before doing Operating System or ROM upgrades. These can take several hours to do on a fully loaded handheld depending on the amount of memory you're backing up or restoring.

In IE, use Tools, Create Mobile Favorite ..., to add a link that you want on your mobile device (I'm hoping this eccentric approach disappears in the future).

The award-winning PIM (Personal Information Manager) Pocket Informant is my most frequently used handheld application apart from Outlook, IE, and AvantGo (for reading downloaded website pages). Pocket Genealogist is a favourite at family get-togethers as are the Photo and Media Player albums. For my travels, Pocket Streets and Trips is a valuable companion.

A remote control application I purchased needed to be completely retrained after the OS upgrade, a time-consuming process that I decided not to pursue since I wasn't using it that much. It was handy to have as a backup remote for the TV's though.

The Today Theme Changer app I use allows me to change the desktop's background image daily such that it's like viewing a virtual album of my favourite photos and wallpapers.

Now, after 4 years of use, I have found that the costs of my handheld computing have worked out to be roughly the cost of a daily coffee, about \$1. I have so fully loaded my 'dinosaur' that I ran out of room to add newer applications. So I ordered a newer, higher capacity, faster processor model (there's that Moore's Law factor again) to give me something to write for you in Part 3!

Happy Computing,
Bob Thomas,
OPCUG

Change in Newsletter Contest Rules

In order to accept as many articles as possible in our Contest for Best Newsletter Article, the BOD has decided to relax one of the rules. Originally, the articles were supposed to be 1000 words or less. Two articles have now been submitted in excess of this. As we do not want to refuse articles and discourage participation, there is no longer a word limit. Lengthy articles will be made available online from the OPCUG website and two or three pages will be published in the newsletter. If an article can be broken into two parts of two or three pages each, then it may be published in two subsequent monthly issues, space permitting.

As well, the deadline for submitting articles has been advanced to April 16th, 2006, so that the last article(s) will appear in the May newsletter. This will give the membership ample time to vote for their favourite article and for the BOD to tabulate the votes before the June meeting.

I hope this spurs those of you out there who are holding back their lengthy articles to submit them and submit them soon! :-)

Sincerely,
Brigitte Lord
Editor, Ottawa PC News



To (US)B or not... *(Continued from page 3)*

SCSI is a well-known parallel alternate to all these serial protocols. SCSI offers internal and external connections, hot swapping (conditions apply), high data bandwidth and fast transfer rates (up to 640 MBps - yes, that's Megabytes). The downside: since it requires a controller card, is viewed as expensive and is more complicated to configure, it never made significant inroads on non-enterprise systems. Even SCSI has admitted defeat with parallel architectures since future high-speed iterations will utilize a serial interface called serial attached SCSI.

With the arrival of USB (particularly, the much faster Version 2.0 or Hi-Speed) integrated onto the motherboard, the external option became increasingly relevant. External connections serve to hookup more than traditional mass storage devices: for example, thumb drives or USB flash memory storage devices (for both data and digital camera images), digital camera interfaces, web cameras, scanners, digital tablets, sound cards, wireless and Bluetooth adapters, and printers. Even the keyboard and mouse have joined the conversion. For portable users you can find miniature keyboard lights and personal fans. For those with too much time on their hands, here is a USB toothbrush:

<http://www.watch.impress.co.jp/akiba/hotline/20030222/image/tooth1.jpg>.

Of course, there are always horror stories: "I lost all my data/pictures!" seems to be a common refrain. Is this completely preventable? While nothing remains foolproof (backup, backup,...) let's have a look at these high-speed serial buses, their problems and some solutions.

USB Architecture

USB was designed as a master-slave topology and the interconnecting cables are polarized to reflect this relationship. While ATA/EIDE also used this terminology to describe the relationship of two more-or-less equal devices on the same bus, for USB the relationship is between defined unequals: the "boss" or master - usually the computer - and its

peripherals (printer, mass storage, etc). USB originally did not envision direct peripheral-to-peripheral talk: unlike FireWire which allows devices this capability without an intervening computer. USB has recently introduced a peer-to-peer protocol (USB On-the-Go) to compete but, to date, few commercial products have implemented it and I won't discuss it further.

While USB is capable of providing electric power (500 milliamps or 0.5 amps) to peripherals, this often becomes a source of grief. This is the maximum available to all the devices on that port. For some devices it is clearly inadequate and manufacturers of those power-hungry peripherals supply "bricks" to convert household power. Powered hubs are also available: in part to offset the added electrical burden of the hub itself. Hubs will be examined later in more detail. While unpowered hubs are available they should generally be avoided.

The total cable length, for technical reasons (that need not be explored), should not exceed five metres/16 feet from hub to 12 Mbps full speed device: practically, the shorter the better. Connectors are polarized to prevent improper connections and to assure the correct master-slave relationship. Some hardware manufacturers supply a dedicated cable to address specific technical requirements; in that case, use it. Cables for USB 2.0, while outwardly identical to their earlier cousins, are different: they incorporate shielding to minimize interference from signal radiation. While USB Version 2.0 cables on Version 1.1 installations are acceptable, the reverse is untrue. Store these cables (and FireWire cables, for that matter) loosely coiled and avoid sharp bends to prevent kinking, straining or breaking the wires. Once kinked internally, data errors are guaranteed.

USB hubs allow you to expand a root hub (on the motherboard or expansion card) up to five levels of depth to accept many peripherals. The specification states a maximum of 127 devices using a tiered-star topology but that is

remote from a more practical maximum of eight devices per hub. Although this number of devices is generous it does not magically increase the bandwidth: in other words, the more devices installed per hub, the less bandwidth per device. One heavy user can disrupt the whole port. Some devices refuse to work with an interposed hub and demand a root connection (in my experience, scanners, cameras and all-in-ones head the list).

USB offers a good selection of adapters that allow flexibility for peripheral hardware connections. As an example, some parallel port printers can be connected to USB. Never use these adapters to convert other parallel port hang-ons like scanners and Zip drives.

USB was incorporated into Windows machines as Version 1.1. Technically, there were two flavors: 1.5 Mbps (megabits per second - divide by eight for Megabytes) Low Speed and 12 Mbps Full Speed. Mice and keyboards were the main users of low speed USB; the full speed was essential for the proper operation of scanners and printers.

USB 1.1 support is flaky (particularly hot plugging) with all Windows releases before Windows 2000 Professional. Yes, the drivers are available for some earlier versions of Windows (Windows 95b onwards) but the service provided was often cranky. USB 2.0 support was available for Windows 98 onward: however, other factors - inadequate system Bios support, for example - often conspired to thwart implementation until Windows 2000 Professional and its contemporary hardware systems. Although not the sole consideration, a useful rule-of-thumb requires the computer's system speed (in MHz) be double the bit rate of a port; therefore, USB 2.0 or FireWire equipped systems require approximately a one GHz system clock speed.

FireWire Architecture

FireWire was developed as a peer-to-peer, daisy chained architecture that

(Continued on page 7)

To (US)B or not... (Continued from page 6)

allowed devices to talk directly among themselves. Bandwidth and power are shared among all the devices on the node ("1394ese" for a port or each connector on the expansion card). FireWire offers considerably more electrical power - up to 1.5 amps (three times that available from USB); again, provisions exist for self-powered devices (usually a camcorder or external hard drive/optical drive). Hubs are available although they are rarities on most systems.

Cables are polarized to prevent improper connections. Without hubs, a daisy chain arrangement can connect 16 devices per node to a theoretical maximum of 63 devices for all nodes. Maximum individual cable length is 4.5 metres although the maxim - the shorter the better - prevails.

Despite the difference in announced raw data transfer rates for USB Hi-Speed (Version 2.0) and FireWire 1394a, the combatants are likely fairly evenly matched. While USB (480 Mbps) is the raw bandwidth winner, FireWire (400 Mbps) profits from less main processor involvement (recall that FireWire devices can exchange data without requiring a computer to mediate) and faster, more efficient transfer algorithms. I have seen FireWire perform very ably on Macintosh equipment where it seems problems are practically non-existent. My system (Windows XP with SP2) has both USB 2.0 and FireWire. My personal assessment (not a controlled test by any means) would give a slight preference to FireWire as it has, to date, generated slightly fewer irritants (mainly devices not recognized). On the other hand, these glitches have not resulted in any data losses (Right... so far!). Speed for both is quite satisfactory although FireWire might edge slightly ahead. On a strictly economic basis, USB leads since expansion cards and peripherals tend to be slightly cheaper. Since I have not personally performed any controlled environment testing, I'm inclined to call it a draw.

I expect for some readers these discussions appear on their radar somewhere between indifference and boredom. Specifications and statistics accomplish nothing. How do you get recalcitrant hardware to work?

Problems and Solutions - USB

A useful site for USB problem-solving assistance is <http://www.pcbuyerbe-ware.co.uk/USBProblems.htm#firewire> (scroll down). Many problems have a reference to the corresponding Microsoft Knowledge Base article as well as some general technical information. Another worthwhile site discusses not only the rationale - why the problem is occurring - but also the fix or options. Visit <http://www.guidenet.net/resources/usb.html>. You can certainly overwhelm your curiosity with suitable queries on the Internet (for example, Google "USB problems" or "FireWire problems").

First, you should determine the present status of your ports. Navigate to Control Panel | System | Hardware tab | Device Manager and scroll down to Universal Serial Bus controllers. Click once on the "+" in the box at the left. Right-click on any device of interest and select Properties. Note the tabs for Power and Power Management. A look at the former will inform you if the USB peripheral requires more power than the hub can provide.

Installation instructions

Most USB devices require software installation before the hardware is attached and powered. Windows prefers to know for certain what the hardware will be and not have to guess - perhaps incorrectly. While this is the most frequent approach, it is not the only one. When all else fails...first, read the manual.

Diagnostics

Various products help to make the task easier. Have a look at <http://lpt.usbfireinfo.com/> for USBInfo. This commercial product (trial available) provides every conceivable detail in a graphical tree. Hardware testers (called loopback plugs/cables) are an alternate for large-scale managers but the price is high (\$50 US) for a single end user (<http://www.passmark.com>).

Rules of speed

1. Low speed devices should work properly when attached to a Hi-Speed (Version 2.0) port.
2. A Hi-Speed device attached to a Version 1.1 (Full Speed) port may work (but at 12 Mbps maximum, not its full rated speed) or it may not. If working, the

speed may be very slow and impractical; in other cases, it will malfunction. Moral: don't mix them.

3. Running USB Hi-Speed (Version 2.0) hardware on Windows 9x or Me may be disaster-in-the-making. Recall the need for Bios support and the minimum system clock frequency. Using an add-in board and suitable drivers might improve your chances but nothing is guaranteed.

Root hubs (on the motherboard or an expansion card)

1. Depending on your motherboard you may need to implement in the Bios some or all of: USB ports, Hi-Speed, and the total number of active ports.
2. These ports, while physically separate, usually exist in electrical pairs on the backplane. Each pair - not each one - constitutes the root hub. Splitting hairs, you say. Well, if this is a Version 2.0 hub, that pair of connectors - together - has a combined 480 Mbps and not 480 Mbps for each one. Heavy hitters on each one will quickly overload the port and the fun will begin. I suspect that this might cause problems with many external mass storage devices.
3. As well as data bandwidth, each root hub has power limitations. For example, for their size, some makes/models of flash (thumb) drives demand a lot of power. I don't want to suggest that inadequate power is the sole cause of all data losses or corruption, however.
4. Some motherboards offer additional root hubs as multi-pin connectors on the motherboard. A header cable set directs these ports onto the computer backplane or to those convenient connectors on the case front. Make absolutely certain that the pinout connections are correct. Cross data and power... well, you absolutely do not want to do it. Another hidden danger: some headers include a shield connection that may or may not be on the motherboard pins. Never connect this shield as a ground pin.

Dunc's article continues next month with external hubs, thumb drives and chipset conflicts.

OTTAWA PC NEWS

Ottawa PC News is the newsletter of the Ottawa PC Users' Group (OPCUG), and is published monthly except in July and August. The opinions expressed in this newsletter may not necessarily represent the views of the club or its members.

Member participation is encouraged. If you would like to contribute an article to Ottawa PC News, please submit it to the newsletter editor (contact info below). Deadline for submissions is three Sundays before the next General Meeting.

Group Meetings

OPCUG meets on the second Wednesday in the month, except July and August, at the Canada Museum of Science and Technology, 1867 St. Laurent Blvd, Ottawa. Meetings are 7:30–9:00 p.m. and Special Interest Groups go until 10 p.m.

Fees:	OPCUG membership:	\$25 per year
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Google Hacks *(Continued from page 4)*

from entering a URL), <http://www.touch-graph.com/TGGoogleBrowser.html>, please let me know!

Finally, for those who, like me, have no idea what a screen scraper is, it refers to the process of extracting information automatically from a web page, as in "spidering and scraping". A program can wander around the Internet, capturing information from various web pages, for use outside of the context of the actual pages, e.g. in an indexing application like Google.

Google Hacks is packed with useful tips although, as noted, many require scripting and may be beyond the capabilities (or interests) of most of us. The good news is that the text is written with exceptional clarity, so that the simpler tasks are easy to follow and put into practice. While you can purchase the book on-line from O'Reilly (see below), you can also preview the full text at no charge for a trial period of 14 days by signing up at: <http://safari.oreilly.com/?Xmllid=0596008570>.

Bottom Line

Google Hacks
 Second Edition, December 2004
 by Tara Calishain and Rael Dornfest
 O'Reilly Media, Inc.
 ISBN 0-596-00857-0

Available on-line (\$36.95) at:
<http://www.oreilly.com/catalog/googlehks2/chapter/index.html>

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¹Editor's note (Sorry Chris, I couldn't resist): I believe Alan is referring to the computer 'enhanced' image on page 8 of the *September 2002* newsletter. Chris was a little surprised, to say the least.

