

\$3.00

(membership includes monthly subscription)

The Digital

# Viking



## Twin Cities

PC USER GROUP

NEWSLETTER

Minneapolis & St. Paul, Minnesota USA • Vol. 35 No.5 • December 2014

*TC/PC Exists to Facilitate and Encourage the Cooperative Exchange of PC Knowledge and Information Across All Levels of Experience*

**December 2014**

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## General Meeting Tuesday, December 9, 2014 7:00 PM

### Tour: Microsoft Store- Mall of America

**Location: Mall of America  
162 South Avenue  
Bloomington, MN 55425**

We will be meeting at the Microsoft Store at the Mall of America where Brady Mutter, Marketing Manager, or his store manager will be giving us a tour of the current products available and their features as well as upcoming products we can look forward to in the new year. This is always an exciting visit and sometimes includes coupons for our group, but we'll have to wait and see.

**6:00-6:50PM TC/PC Board Meeting** at Caribou Coffee, 380 South Avenue, Mall of America—2 floors up from the Microsoft Store. All members are welcome.



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**December 20th MS Office SIG canceled. SIG resumes in January.**

TC/PC is a Member of



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**24-Hour Information • [www.tcpc.com](http://www.tcpc.com)**  
Application form inside back cover

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## TC/PC Business Members

Friendship Village

Metro Sales

**Thank You!**

## The Digital Viking

The Digital Viking is the official monthly publication of the Twin Cities PC User Group, an all-volunteer organization dedicated to users of IBM-compatible computers. Subscriptions are included in membership. We welcome articles and reviews from members. The Digital Viking is a copyrighted publication and reproduction of any material is expressly prohibited without permission. Exception: other User Groups may use material if unaltered and credited.

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## Advertising

Full page (7½ x 9½)	\$100.00
Two-thirds page (7½ x 6)	80.00
Half page (7½ x 4¾)	65.00
One-third page (7½ x 3)	50.00
Quarter page (3½ x 4¾)	40.00
Member Bus. Card (2 x 3½)	10.00

**Multiple insertion discounts available.**

Contact Sharon Walbran at: SQWalbran@yahoo.com

Deadline for ad placement is the 1<sup>st</sup> of the month prior to publication. All rates are per issue and for digital or camera-ready ads. Typesetting and other services are extra and must be requested in advance of submission deadlines.

Payment must accompany order unless other arrangements are made in advance. Please make checks payable to: Twin Cities PC User Group

## TC/PC Member Benefits

Product previews  
and demonstrations

Special Interest Groups  
Monthly Newsletter

Discounts on products  
and services

Contests and prizes

## Business Member Benefits

All of the above PLUS:

**FREE ½ page ad on  
payment of each renewal**

**20% discount on all ads  
Placed in the *Digital  
Viking* Newsletter**

**Up to 5 newsletters mailed to  
your site  
(only a nominal cost for each  
additional 5 mailed)**

## TC/PC 2014-2015 Board of Directors

Meets once or twice per year. All members welcome to attend.

Visit [www.tcpc.com](http://www.tcpc.com) for meeting details.

<b>President</b> —Jim Grotz	<a href="mailto:jim.grotz@raymondjames.com">jim.grotz@raymondjames.com</a>
<b>Vice President</b> —Curt Trout	<a href="mailto:ctrout@troutreach.com">ctrout@troutreach.com</a>
<b>Secretary</b> - Sharon Walbran	<a href="mailto:sqwalbran@yahoo.com">sqwalbran@yahoo.com</a>
<b>Treasurer</b> - Sheri Trout	<a href="mailto:strout@troutreach.com">strout@troutreach.com</a>
<b>Membership -- Open Position --</b>	
<b>Meeting Coordinator-- Open Position --</b>	
<b>Newsletter Publisher</b> Sharon Walbran	952-925-2726 <a href="mailto:SQWalbran@yahoo.com">SQWalbran@yahoo.com</a>
<b>Web Master</b> Jack Ungerleider	<a href="mailto:jack@jacku.com">jack@jacku.com</a>
Jeannine Sloan	Ambassador for Friendship Village
Joel Hedland	<a href="mailto:joelh@spacestar.net">joelh@spacestar.net</a>
Jim Schlaeppi	<a href="mailto:jschlaeppi@charter.net">jschlaeppi@charter.net</a>
Lon Ortner	612-824-4946 <a href="mailto:csacomp@comcast.net">csacomp@comcast.net</a>
Steve Kuhlmeier	<a href="mailto:steve@kuhlmeysystems.com">steve@kuhlmeysystems.com</a>
Gary Grau	<a href="mailto:oxygen2389@yahoo.com">oxygen2389@yahoo.com</a>
Ross Held	<a href="mailto:RHeld3745@aol.com">RHeld3745@aol.com</a>
David Van Dongen	<a href="mailto:davidvandongen@yahoo.com">davidvandongen@yahoo.com</a>

## Newsletter Staff

**Editor Sharon Walbran**

**Contributors:**

**Jeannine Sloan**

**Jack Ungerleider**


## Last Month's Meeting—Build Your Own PC with Lee Kaphingst

Lee Kaphingst, an active member of TC/PC, walked us through the process of building a PC from scratch, using the experience he gained from building four different PCs over the past few years. He readily admits that the first one was quite a challenge, but he learned from his mistakes and the next three were much easier.

Lucky for us, Lee makes really practical use of his digital camera and captured the state of the PC he was building at each stage, keeping a historical record of the “innards” of the computer as well as the labels on hard drives and other parts with critical information. Using this picture history, he showed us the components of the motherboard, the different slots for RAM and devices, CPUs and heat sinks and fans (and their importance in preventing meltdowns), and the difference between IDE and SATA cables for hard drives. He explained how to calculate the size of power supply required by the system. He also passed around several motherboards so we could see first-hand the parts he was describing.

He recommended using a good local resource like Microcenter for parts and advice. Their staff can be invaluable when you run into problems. Also, if you are interested in trying this yourself, you might start out with one of the Build-Your-Own-PC bundles that Microcenter sells since they have put together the necessary parts for you. It's not that you will be saving a lot of money building your own PC, but you will have a much better understanding of what goes into your computer and you can customize it to fit your particular needs.

Lee mentioned after the meeting that he also photographs each screen with the settings in the system set up menus before he makes changes to them. In that way, if he runs into trouble he can take the system back to the way it was before he made changes. A terrific tip that can be applied whenever you are making major changes to a system or software set up!

Thanks so much, Lee, for the excellent presentation! The audience appreciated all the work you did to prepare and walked away with a lot of good information.  [Go to Page 1](#)

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## Upcoming Meetings

**Tuesday, January 13, 7PM—3D Printing Update.** Jack Ungerleider and Bill Ryder will bring us up to date on the progress they are making using their 3D printers and give us a demo and offer tips on what the latest models are featuring.

**Tuesday, February 10, 7PM - Computers I Have Known (many if which I owned).** Jack Ungerleider takes a random walk through the history of PCs and other computing devices with the help of the Museum at [old-computers.com](http://old-computers.com) and other web sites.

[Go to Page 1](#)

# How I Almost Cut the Cord

By Jack Ungerleider, Twin Cities PC Users Group

“Cutting the cord” is the term applied to people who toss their cable or satellite TV service in favor of streaming media and/or “old fashion” over the air TV. It is a close relative to the art of provider hopping that some people do to maximize their savings by always being a “new” customer.

## How it started

This whole thing started when my mother, in New York, informed me that her email address would be changing. She is a veteran “hopper” and was switching back to Verizon’s FiOS service. This is third hop she’s made in about 10 years. At the same time my 2 year “loyalty” discount with Comcast expired. When the new bill came in I decided to take a look at what options I had. What follows is a look at what I learned over the week or so that I considered these options.

## Step 1: Maximizing Internet

If you’re going to stream media at home you’ll want to make sure that you have maximum Internet speed for the best results. Since I was looking to dump Comcast, I checked the options from Centurylink. At my location (near downtown St. Paul) the maximum available speed is 40 Mbps. This is faster than what Comcast provides as part of my bundle. Best of all its just \$30/month. As it turns out that’s only for the first twelve months. I was doing my cost comparisons based on 24 months because that’s the term I’d get from Comcast if I re-upped with them. For the second year with CenturyLink that service would cost me \$70/month. You only find this out by looking at the *more details* link on the website. As a result I would pay \$50/month on average over the two years. It’s worth noting that I could get a 36 month price lock if I bundled Centurylink’s ultimate phone package (\$45/month) with the 40 Mbps Internet service (\$24.95/month).

## Step 2: Home phone service

We keep a landline number for various reasons, not the least of which is the location ability it provides when calling 911. I found an option for home phone from Verizon wireless that was just \$20/month. Because I didn’t want to extend my contract in the middle of the term I was prepared to pay the \$100 for the box (a cell phone with an analog phone port) that allows you to connect your regular phone to the cell system.

As noted above there were options from CenturyLink, all of them more expensive.


## Step 3: Streaming media and OTA Television

The biggest area we would see a change was in our television service. We would be exchanging the 200+ channels (some redundant, many music only) for the 20 or so over the air channels that can be pulled in via a good indoor antenna. When reviewing the requirements for TV service we determined that CBS was a must. (My wife enjoys the NCIS series of shows.) We also enjoy the Daily Show and Colbert Report on Comedy Central. My one requirement was Dr. Who from BBC America. While getting CBS over the air is no problem, my wife’s schedule doesn’t always allow viewing when the shows air. This led to considering digital video recorders (DVR) for OTA television. This would have been the most costly part of the package. Eventually we ditched that idea when I discovered that CBS has a new subscription streaming service that allows you to view most of their popular shows the day after they air. For most of the other shows on our list, including the ones mentioned above, we found Hulu Plus was the answer. The intention was to purchase a Google Chromecast stick with its Hulu Plus membership offer.

All of this would have provided most of what we wanted to watch, at less than the cable company was charging.

### Conclusion: Status quo

In the end we decided to stay with what we had. But it’s my intention to explore some of the streaming options and be prepared to possibly drop the television service and do just faster Internet from Comcast or Centurylink the next time around.

Join me for a special Web SIG session prior to the January 2015 meeting where we’ll discuss some of the options for streaming video on your computer and/or your TV.  [Go to Page 1](#)

# The Economics of XP Conversion

By Russ Merritt, Secretary, The Computer Club, Inc., Sun City Center, FL, June 2014 issue, The Journal, [www.scccomputerclub.org/](http://www.scccomputerclub.org/), ilonamerritt7201 (at) gmail.com

With the Microsoft decision to drop all support for their XP Operating System, those still using XP now face the decision of what to do. Do nothing? Convert to Windows 7? Or to Windows 8? Or buy a new computer.

To do nothing invites some risks to be considered. If all you do is play some computer games like solitaire and maybe prepare private correspondence that you print and mail – then the only risk is computer failure, and that has always existed. If, however, you use email or do any transaction on the Web, then there is the unknown risk of virus attacks. The risk is unknown because the vulnerability of the current XP system is unknown. It is assumed that there are yet unknown ways that XP is open to virus attack. What is known is that Microsoft will make no further changes to XP to fix those problems when they do occur.

So then perhaps you should consider converting to Windows 7 or Windows 8. Step one is to turn to Microsoft for advice. They have two free programs that can evaluate your computer. To find this support — from your search engine enter Windows 8 Upgrade Assistant or Windows 7 Upgrade Adviser. This will lead you to the free upload site for either test. Use the one that addresses your choice of the Operating System. Or run them both, if you are thinking about making a choice based on the capability of your current computer. Don't be too disappointed if you find that you cannot convert to either system. Your PC is a little old, and technology has advanced at a rather rapid pace.

Assume your equipment can handle an upgrade. At Amazon on April 16, 2014, the following prices were quoted:

Windows 7, Home Edition: 64 bit - \$99.99; 32 bit – 89.99; Professional Edition: 64 bit - \$139.99; 32 bit – \$129.99; Ultimate Edition: 64 bit - \$189.99.

Windows 8.1, full version - \$133.28; Windows 8.1 Pro, full version – \$173.35

One thing is known about upgrades from XP – any upgrade must be a clean install. That means the hard drive will be erased. To prepare for this, an external copy of all data must be made before the upgrade is started. Once the upgrade is complete, the data can then be copied back into the computer, but all programs will have to be re-installed. There is an unknown risk here. The older programs may not run on the newer Operating System. The other factor is – do you still have the installation disks for all your programs? Some unknown costs are at play here.


Also unknown is the impact of a new operating system on external equipment such as printers. Will they still work? If not, can you download new drivers so that the equipment will be operational?

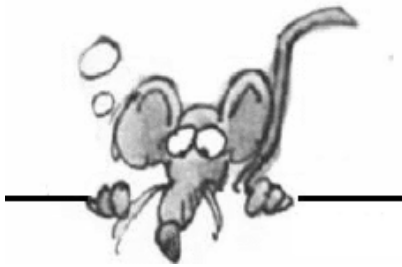
Next Question. Can you do all this or are you going to have to hire some help?

The other option is buy a new computer. If your needs are basic and simple, a new computer could cost as little as \$300.00 and there's been some on sale recently for under that figure. In my opinion, you will need 4 gigabytes of RAM. Storage (hard drive size) that comes with your new PC will be big enough for your immediate needs (maybe even big enough forever). You may not get a CD/DVD drive, and if you need one with what you do, buying an external CD/DVD drive would be the answer – maybe \$30.00 or so. There might be some compatibility issues with old CRT monitors, but with the newer flat screen monitors, they should work with any new PC (check on the monitor's cable connections, just to be sure).

As with the update plan above, the data from your old PC still has to be transferred and the programs installed on the new PC. How much help you will need with this step is determined by you.

So there you have the basics – buy and install a new Operating System or buy and set up a new Computer. There are extra costs you have to add as appropriate for whichever method you choose to solve the lack of support for Windows XP.

While the various electronic parts of a computer rarely fail, hard drives always do – it's only a matter of time. So, which solution appeals to you, investing in a new computer or updating an old one? This is an individual choice that only you can make.  [Go to Page 1](#)



# NIBBLERS

By Jeannine Sloan

## Polifiller

A new computer tool lets you plug in the text of any politician's speech and, with one click, it draws red lines through jargon. It is called Polifiller, as in "political filler," and searches for phrases in what it calls the Hall of Shame. <http://polifiller.com/>

## FactCheck

We are a nonpartisan, nonprofit "consumer advocate" for voters that aims to reduce the level of deception and confusion in U.S. politics. We monitor the factual accuracy of what is said by major U.S. political players in the form of TV ads, debates, speeches, interviews and news releases. Our goal is to apply the best practices of both journalism and scholarship, and to increase public knowledge and understanding. <http://www.factcheck.org/>

## Politics and Psychology

APA's Psychology Help Center is an online consumer resource featuring articles and information related to psychological issues affecting your daily physical and emotional well-being. This site had an article about the Science of Political Advertising that is interesting. <http://www.apa.org/monitor/2012/04/advertising.aspx#>

## Microsoft Does Some Things Right

The Windows team invests a mind-boggling amount of time, hardware, and people into maintaining compatibility. There are bugs in Windows that could have been fixed years ago, but can't be, because that would break applications that (deliberately or accidentally) depend on those bugs.

<http://www.makeuseof.com/tag/stop-bashing-microsoft-5-ways-theyre-awesome/>

## Mosaically

**Photo Mosaic Maker:** If you are thinking of creating a photo mosaic without downloading any additional software, then you can look for free and reliable mosaic generators online.

<http://mosaically.com/>

## Ancient Incans Earthquake Proof Walls

The brilliant ancient civilization figured out how to make seismically stable structures using stones that fit together like Legos. Now it's time to learn from the past. Over 500 years ago, when Incan workers built Machu Picchu, they devised an ingenious building technique to prevent building collapse during Peru's frequent earthquakes. It worked a little like an ancient form of Legos: Every stone fit together perfectly without any mortar. Now California-based architects are using 3-D-printers to create a similar design.

<http://www.fastcoexist.com/3037227/>

## Find Large Files

Big files clog up your hard drive and many of them are just garbage that you can delete. Instead of downloading a utility to find them, you can use Windows Explorer. Simply type 'size:gigantic' into the Search box and Windows will show you all the files that are larger than 128MB in the folder (and subfolders) you're currently browsing. Delete any you're sure you don't need.

## Make text pin-sharp

Windows provides a utility to fine tune text to match your display. This is called the ClearType Text Tuner and unless you've made use of it, your text won't necessarily be as sharp as it could be. You'll find this utility at Control Panel > Appearance and Personalization > Fonts > Adjust ClearType text.

## Household Repair

DIY guides for many household repairs, ranging from furniture to plumbing solutions.  
<https://www.ifixit.com/Device/Household>

## FIXITS

Do it Yourself Tips and Helpful Household Hints on Everything Plus the Kitchen Sink  
<http://www.mrsfixit.com/Fixits/index.asp>

## Clean Microwave Oven Easily

The inside of your microwave should be white. If it isn't, you better get to cleaning. The process is incredibly easy and will only take about five minutes.

**Step 1** - Fill a microwave-safe bowl with water and add either a drizzle of dish soap or a tablespoon of white vinegar, whichever you have handy.

**Step 2** - Let it cook for about two minutes depending on how strong your microwave is. You want it to get nice and steamy but not boil over.

**Step 3** - Keep the door closed and let the steam do its work for about three minutes.

**Step 4** - Carefully remove the bowl, because it's going to be hot.

**Step 5** - Wipe off all the sides with a paper towel, and clean the plate like a normal plate. If you don't have dish soap or vinegar, cut a lemon in half, put it in a bowl full of water, and cook it for five minutes. This option is the most natural and the warm lemon makes your kitchen smell nice for a few hours.

<http://www.digitaltrends.com/home/how-to-clean-microwave-without-chemicals/#ixzz3lxtKlhzi>

## Export Favorites/Bookmarks From Your Browser

- To export your bookmarks from Chrome: Click the Chrome menu icon at the top-right corner of your browser window, select Bookmarks, then Bookmark Manager or Ctrl+Shift+o. Click the down arrow beside the Organize menu and select Export bookmarks to HTML file.
- To export bookmarks from IE. Click the Favorites icon in upper right corner of browser window, select Add Favorites, click the down arrow next to Add to Favorites, select Import/Export, then Export to a file.
- To export bookmarks from Firefox. Click the Show your bookmarks icon (Ctrl-Shift-B) in upper right of browser window. This opens the Library window. Select Import and Backup, then Export bookmarks to HTML.

Contributed by Dianne Runnels

## What Everyone Gets Wrong in the Debate Over Net Neutrality

Interesting article points out that the giants like Google, Netflix and Facebook already have fast lane servers within the ISPs. Suggests we should be more concerned about competition (or lack of it) between ISPs. [http://www.wired.com/2014/06/net\\_neutrality\\_missing](http://www.wired.com/2014/06/net_neutrality_missing)

Contributed by Dianne Runnels

## The Ultimate Manuals Library

A handy library of PDF user manuals for almost anything. <http://www.manualslib.com/>

## Fax Zero

Fax Zero allows you to send faxes to US and Canada for free. Additionally, it enables you to send faxes to countries outside North America at a fixed pay per use cost. <http://faxzero.com/>

## Screen Capture

Enter the address (URL) of any web page and the screen capture tool will generate a high-resolution screenshot of the full web page as a PNG image that you can download. <http://ctrlq.org/screenshots/>

## Use Hidden Characters

A site for copying the 'hidden' characters that come with the computer's typefaces, to be pasted into emails, tweets, text documents, forums and whatever else you might need. Left click on character to copy, Ctrl+v to paste. <http://copypastecharacter.com/all-characters>

## Ask a Kid

Ask a 10-year-old how to solve the problem of cleaning up trash, and you might end up with a concept like the "De-Waster 5000," a helicopter that scoops plastic out of landfills and the ocean— and then uses a solar-powered flamethrower to melt the trash into beds for homeless people. In other words, you'll get something that probably wouldn't occur to an adult designer.

<http://www.fastcoexist.com/3038720/>

## Two Factor Authentication

List of websites and whether or not they support two factor authentication.

<https://twofactorauth.org>

## Most Productive Ways To Waste Time

"Every time you decide to work, the payoff gets evaluated twice: once by the limbic system and a second time by the prefrontal cortex," according to Steel. In other words, it's a battle of impulse against rationality. <http://www.fastcompany.com/3038695/>

## How To Use The Windows Speech Recognition Feature

Microsoft Windows Vista, Windows 7, and Windows 8 include a speech recognition feature

<http://www.computerhope.com/issues/ch001561.htm>

## Unbreakable Gorilla Glass

Corning, the makers of Gorilla Glass, which probably protects the screen on the smartphone you're using now, has decided it needs to tell us exactly how cool its product really is. To do so, it has hired

the Mythbusters team and come up with the videos you can watch here:  
<http://www.digitaltrends.com/mobile/coming-and-mythbusters-gorilla-glass-videos/#ixzz3JdF8PiGK>

## This to That

Find out which adhesive to use to attach one material to another. <http://www.this-to-that.com/>

## Crooks Don't Want Anything I Have on My Computer

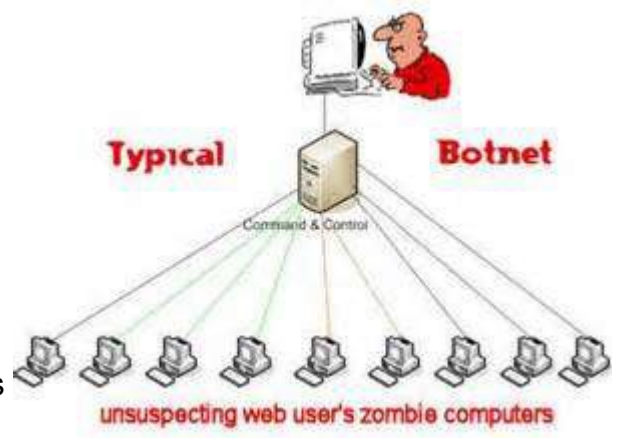
Oh, yes they do. They want to infect your computer with a Trojan and make your computer a zombie for their botnet. Criminals use botnets to send out spam email messages, spread viruses, attack computers and servers, and commit other kinds of crime and fraud. If your computer becomes part of a botnet, your computer might slow down and you might inadvertently be helping criminals.  
<http://tinyurl.com/lrfo7>

## Windows Task Manager

The Windows Task Manager is one of the core programs that ships with every version of the Windows operating system. Designed to provide users with an overview of what is running and happening on the system, it is considered an advanced tool by many. The Task Manager is more or less identical on Windows 7 and earlier versions of Windows while it has changed in Windows 8 and newer versions. <http://tinyurl.com/kgldd8b>

*Thanks, Jeannine, for another great year of Nibblers tips.*

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# Special Interest Groups (SIGs)

w Work phone h Home phone c Cell phone  
\* Meets at an alternate location

Most SIGs will meet at Edina Executive Plaza, Conference Room #102, 5200 Willson Road, Edina, MN

Confirm with a SIG group if they meet elsewhere.  
For more info contact the SIG Leader(s) listed here.

Get SIG announcements!  
Link from [www.tcpc.com](http://www.tcpc.com)

## Board of Directors\*

All members are welcome! Check [www.tcpc.com](http://www.tcpc.com) for location.

Selected Saturday mornings

## Linux on Saturday

This is for the Linux newbie and those trying to come over from Microsoft to a different operating system.

First Saturday @ 9 AM-Noon

Note: No Meetings June-August

Jack Ungerleider 612/418-3494 c  
[jack@jacku.com](mailto:jack@jacku.com)

## Picture Perfect

Explore how to use your digital camera and learn how to use a variety of software for editing, organizing, and sharing images and video.

Second Tuesday 6:00—7:00 PM

Every other month

Right before the general meeting

Sharon Walbran [SQWalbran@yahoo.com](mailto:SQWalbran@yahoo.com)

## Microsoft Access

All levels. Presentations by expert developers within the group and by MS reps.

Third Saturday 9:00 AM—Noon

Note: No Meetings June-August

Steve Kuhlmeiy 952/934-8492  
[steve@kuhlmeysystems.com](mailto:steve@kuhlmeysystems.com)

## Microsoft Office

Addresses the use, integration, and nuances of the Microsoft Office applications.

Combined with Systems on Saturday

Third Saturday of the Month

Note: No Meetings June-August

Steve Kuhlmeiy 952/934-8492  
[steve@kuhlmeysystems.com](mailto:steve@kuhlmeysystems.com)

## Web Page Design

Discussion and demonstration of HTML, web publishing software and page design.

Second Tuesday @ 6:00-7:00 PM

Every other month

Right before the general meeting.

Jack Ungerleider 612/418-3494 c  
[jack@jacku.com](mailto:jack@jacku.com)

## Microsoft Word for PC & Mac

Any level user can be proficient and efficient in basics and advanced features of Word..

Combined with Systems on

Third Saturday 9:00 AM—Noon

Note: No Meetings June-August

Tom Ostertag 612/951-5520 w  
651/488-9979 h

Curt Trout 651/484-4569 h  
[ctrout@troutreach.com](mailto:ctrout@troutreach.com)

## Systems on Saturday

For all levels of computer challenges and any type of computer-related question. Incl. Q&A

Meets 3rd Saturdays 9:00 AM-Noon

Note: No Meetings June-August

Curt Trout 651/484-4569 h  
[ctrout@troutreach.com](mailto:ctrout@troutreach.com)

### Directions to Summit Place for General Meetings:

Proceed to Eden Prairie Center Flying Cloud Drive . [Flying Cloud Drive runs along the West side of the Eden Prairie Center.] Once you have driven past Eden Prairie Center (on the left) along Flying Cloud Drive you will come to a stop light at Prairie Center Drive. The next intersection with a stop light and left turn lane is Fountain Place. Turn left at Fountain Place and go straight into the parking lot. Turn left again to the first covered entry way of Summit Place. There is plenty of parking in the large parking lot in front of the first Summit Place covered entry way. When you enter the door at the first covered entry way, ask to be directed to the Performance Room for the TC/PC meeting. For a map of more detailed directions and *info on Web SIG and Board meeting*, check the TC/PC website.

Directions to Edina Executive Plaza for Systems on Saturday, Access, Word and Picture Perfect SIGs: Take Highway 100 to the 50th Street/Vernon exit. [If you have come from the north, cross back over Highway 100 to the east side.] Take the first right and go past Perkins [The golf course will be on your left.] and continue on the east frontage road (Willson Road) to the next building—5200 . There is ample parking in the building's lot. Conference Room #102 is on 1st floor.

## Help yourself by helping others!

## Join the team & share your knowledge with others.

Contact TC/PC at [www.tcpc.com](http://www.tcpc.com)

Meetings start at 7:00 PM (9:00 AM on Saturday) unless otherwise noted. \*Meets at Edina Executive Plaza.

# December

# January

SUN	MON	TUES	WED	THU	FRI	SAT
	1	2	3	4	5	6 Linux and Open Source on Saturdays 9:00—Noon
7	8	9 Gen Mtg 7:00 PM Tour Microsoft Store- Mall of America 6:00 PM Board Mtg	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3 Linux and Open Source on Saturdays 9:00—Noon
4	5	6	7	8	9	10
11	12	13 Gen Mtg 7:00 PM 3D Printing Update—Bill Ryder & Jack Ungerleider 6PM Web SIG-Streaming Options	14	15	16	17 Windows & MS Office (including Access) 9:00-Noon
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## Image Processing Software, Part 2

By Dick Maybach, Member, Brookdale Computer Users' Group, NJ, March 2014 issue, BUG Bytes, [www.bcug.com](http://www.bcug.com) / n2nd (@) att.net

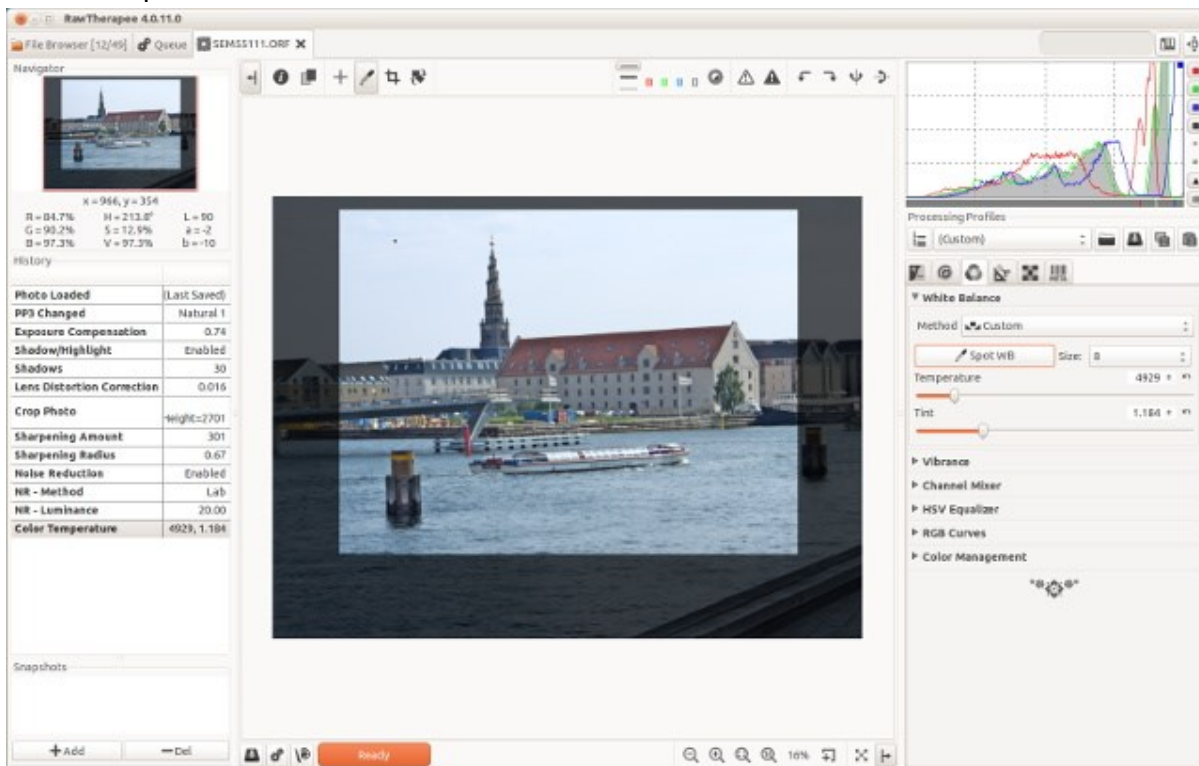
In the first article (February 2014 newsletter available at [www.bcug.com](http://www.bcug.com)) we discussed photo retouching using GIMP (GNU Image Processing Program). However, GIMP does not develop raw files; for that you need a program such as RawTherapee. Why would you want to bother with this extra step? In the picture inside a church, the frame on the left is the JPEG image as produced by my camera, while the one on the right is the same image, but I used RawTherapee to process it from a raw file. (I have my camera set up to save every picture as both a JPEG and a raw image and decide what processing to use after I see the results.) This example shows one advantage of working with a raw images. In the JPEG, the roof is essentially black with no visible detail, while in the processed raw image, the details are visible. This is not a simple exposure compensation, as you can see by noting that the highlights in the two images (for example as seen through the open door on the right) have about the same brightness. While adjusting the brightness, I also compensated for the perspective distortion resulting from the wide-angle lens. As a result, the image on the right is much closer to what your eye would see. (The changes here are modest, in an attempt to keep the result realistic. You can easily go off the rails and produce results that belong in a comic strip.) The improvement is possible because the camera records 12 bits per pixel per color, while a JPEG image has only 8. In other words, the raw image has 16 times the dynamic range of the JPEG one. In photo terms, this means that the raw image has two to three more f-stops of range than a corresponding JPEG.



The screen-shot below shows an image being processed by RawTherapee (<http://rawtherapee.com/> for Linux, OS X, and Windows). The panel on the right shows the tools available, and these are grouped with tabs. The color adjustment tab has been selected and the white balance tool within it. From left to right the tabs are exposure, detail, color, transform, raw processing, and metadata. Histograms for luminance, and the three primary colors are visible at the top of this panel. The left panel shows the history of the changes, and the center one the current state of the image. If you look carefully, you will see a button on the bottom, just to the left of the orange "Ready" button. Clicking this develops the image and sends it to GIMP as a 16-bit TIFF file. (As I noted in the previous article, the current version of GIMP is capable of only 8-bit processing, so it immediately

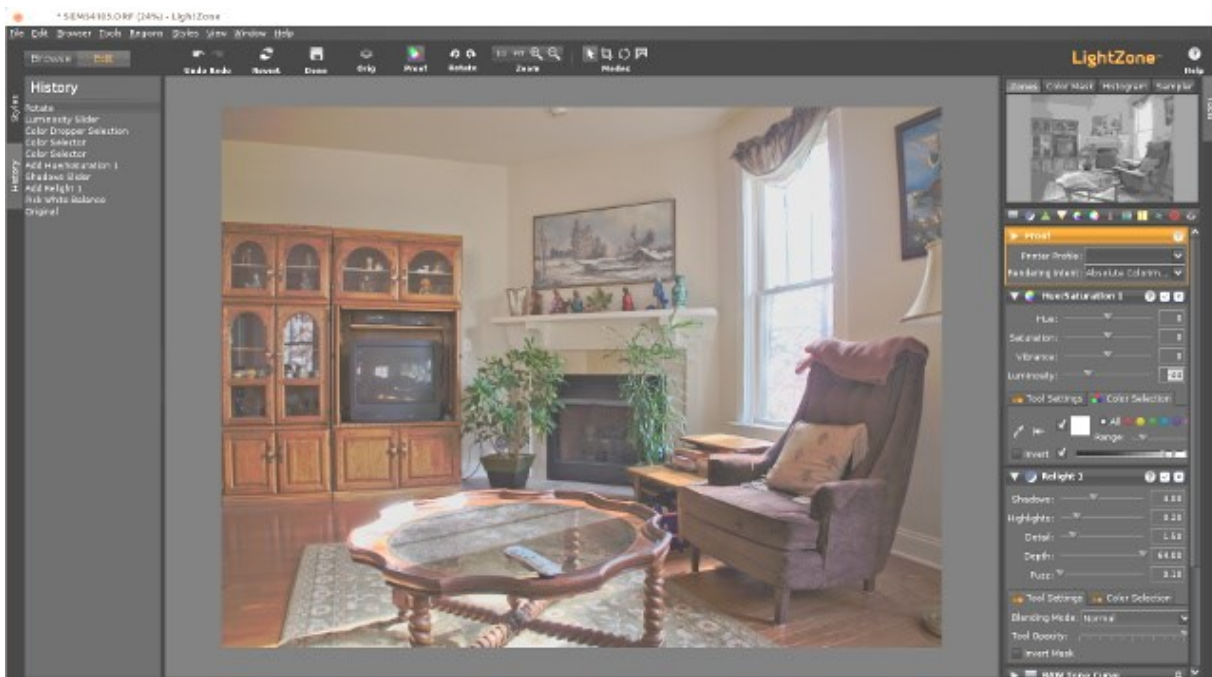
converts the file to 8-bit TIFF. Hopefully, this butchering will stop with the next version of GIMP.) The next button to the left outputs a JPEG, TIFF, or PNG file directly. I frequently skip GIMP altogether as RawTherapee can often do all the processing I need. RawTherapee is a non-destructive editor; that is, it makes no changes to the image file. Instead, it creates a separate script file that specifies the processing to be done when the raw image is developed. The processing occurs in the order the program deems optimal. As a result, the order in which you perform your editing is unimportant. This is much different than with a program such as GIMP, which changes the image directly in sync with what you do. In the latter case, the order of the editing steps is quite important. RawTherapee requires some persistence to master, partly because it has no help file. Expect to spend some time reading the manual and searching the Web for examples before you become comfortable with it. Finally, although it should run on a 32-bit operating system without difficulty, a 64-bit one is recommended.

RawTherapee has a unique ability to correct for lens distortion. When your camera saves an image in raw format, the file includes a JPEG thumbnail in which the lens distortion has been corrected (providing that if your camera has a removable lens, it's compatible with the camera). The program uses the thumbnail to correct any distortion in the raw image. All other programs that incorporate automatic distortion correction, including Photoshop, use databases, and these don't cover all combinations of cameras and lenses. Indeed, RawTherapee can use the same Adobe camera and lens profiles used by Photoshop, but it is a non-trivial process to adapt them.



Lightzone (<http://www.lightzoneproject.org/> for Linux, OS X, and Windows) is a raw developer with a much different approach. For one, you can specify only a portion of the image for a particular processing step, while RawTherapee always works on the entire image. It can also show you which portions of the image have similar luminosities, which is frequently helpful. The screen-shot below shows an image being edited in LightZone. In the right-hand panel, the icons below the thumbnail bring up windows, a new one each time you click on an icon. Each window is one application of an editing tool, which can apply to the whole image or just a portion. If you delete a window, the changes you made using that step are also discarded. When you develop the image, the processing is done in the same order as the tool windows, so unlike RawTherapee, their order can be important. You can reorder the processing by drag-and-drop moving of the tool windows. You can also change the way in which the effects of each tool are combined in the final image. The left-hand panel shows the editing history. Here, I've adjusted the white balance, applied the relight tool (which lightened the shadows and darkened the highlights) and further lightened the shadows. Then I used the color selector to select the very bright areas (the window and the sun-lit highlights on the table) and reduced the luminosity

of only those regions. Finally, I rotated the image. All this takes longer to describe than to do. The screen-shot shows a region selected based on its luminosity, but I could have based it on color, or just by drawing an outline.



Like RAWTherapee, LightZone has several pre-defined styles, and often applying one of these is the only thing you need do to obtain a satisfactory result. Unlike RawTherapee and UFRaw, LightZone has no provisions for correcting distortions. (If you look carefully at the window frame and the bookcase, you can see some curvature, which results from my particular lens, a wide-range zoom. Better lenses have less distortion and some cameras correct for it in their raw images.)

To get the best results from LightZone you must start from a raw image, as JPEG has discarded much of the photo's dynamic range. Since the program can't correct lens distortion, you would pass the developed image file to GIMP in TIFF format (to avoid degrading it with JPEG compression). There, you would correct the image in GIMP, perhaps by comparing it to a JPEG version of a photo as processed by your camera.

The combination of GIMP, RawTherapee, and LightZone will provide the tools to do almost all your image processing. I've introduced these because they have good reputations and I'm familiar with them. However, an Internet search using "image processing software" will reveal dozens of alternatives, both free and commercial.

#### References

- Montabone: Beginning Digital Image processing Using Free Tools for Photographers – provides a good overview of the tools I've discussed, although the book is less helpful than it could be as all the example images are in black and white.
- <http://www.cambridgeincolour.com/> – contains many very valuable tutorials on photography and image processing. If you check only one photo Web site, this should be the one.
- Make a search for "RawTherapee 4 User Manual" to find a very good manual (hosted on Google Books). This is essential as the program has no help feature  
<http://sunburntandinneedofashave.blogspot.com/2010/03/lightzone-beginners-tutorial-well-sort.html> – will get you started with LightZone, although the program does have very good help. 🖨

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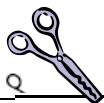
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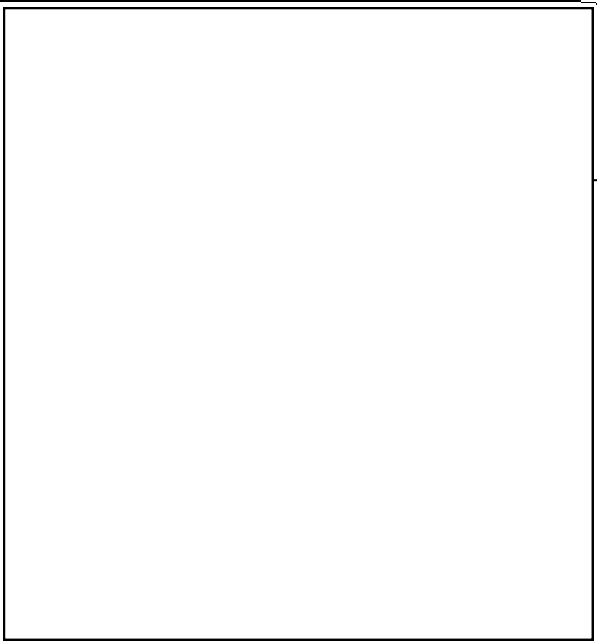
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