



Midland Michigan

BITS AND BYTES

February 2014

<http://mcc.apcug.org/>



President Piper's Ponderings

It is hard to overestimate the importance of electronic miniaturization in our life. Vacuum tubes were the i-thing of the early 20th century as every home sported a radio that was a major piece of

furniture in their living room. I read that 50% of the wood in the furniture business went into radios. But tubes had a short life expectancy, and you could practically heat a room with the power they consumed. The transistor allowed the hand-held, battery operated devices to be created, but these hardly qualified as "wearable" electronics. It was the integrated circuit, IC, that squeezed more transistors into smaller spaces—think about Moore's Law that doubles this process every 18 months—which has given rise to unbelievable computer power in a tiny space that requires negligible power. ICs were first manufactured by Intel in 1971.

This brings me to February's General Meeting topic: Gadgets, and how we use them. Consider some of the categories: phones, tablets, book readers, wearable (watches, clothing and glasses), home appliances, and extras for your car. A couple of our Board members will be talking about how they use some of their gadgets. Be ready to tell the Club about some of your favorite gadgets and how you use them. Also, be ready to talk about the oldest, and likely unworkable, gadget you have lying around your house.

It was pointed out at our last meeting that one member of our Club has an outlet for old computer boards. Bring them to the meeting and he will find them a good home. On a similar note, I can see lots of TVs hitting the scrap heap now that Charter has "locked down" their service so that one must have a rental decoder box to get ANY reception. So far no one seems to be pushing antennas as an alternative.

I would remind you that we are in the middle of tax season, and the AARP in conjunction with the Community Center offers free tax preparation in the room where we meet.

(The above comments are the opinion of the author and do not necessarily reflect the views of the Midland Computer Club.)

GENERAL CLUB MEETING 7:00 P.M.

4th Wednesday of the month at the
Midland Community Center
2001 George St., Midland, MI

This month's date:

Wednesday, February 26, 2014

This month's topic:

What you can do with your gadgets.

What you missed!

Data Privacy

Program Coordinators

Howard Lewis lewis3ha@chartermi.net

Bill Tower tower.w@gmail.com

Please let Howard or Bill know of topics you would like covered at future meetings.

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Useful, useless and strange (in no particular order) Web Sites:

<http://www.foodbycountry.com/>

For those interested in cooking, this site talks about foods and some of the recipes for almost all of the countries in the world. In looking through their recipes, you may find something that your taste buds might find interesting.

<http://tinyurl.com/npj9bs5>

See what people are searching for real-time on Google. You can even change the site to show a 5x5 grid to watch 25 real-time searches at a time.

<http://historyexplorer.si.edu/home/>

If you are a history aficionado, you should be visiting the Smithsonian's History Explorer. You can find out all sorts of things about history of the U.S. or the World.

<http://www.thejigsawpuzzles.com/>

For those who enjoy doing jigsaw puzzles, this site offers hundreds of fun puzzles to solve. All of them run in Flash within your browser, so enjoy.

<http://www.today.com/id/53963638>

Some beautiful macro photos of snow flakes, snow crystals, ice bubbles, and ice crystals.

Board Meeting

First Thursday of the month
 7:00 PM
 Chapel Lane Presbyterian Church,
 5501 Jefferson Ave., Midland MI

Membership Enrollment Form

NAME _____ PHONE _____

ADDRESS _____

CITY _____ ZIP _____

EMAIL ADDRESS _____

Membership dues FAMILY (\$20) STUDENT (\$15) New Member ____ Renewal ____

Please fill out the above form and mail it along with payment of check or money order to :

MIDLAND COMPUTER CLUB
 1816 Bauss Ct
 Midland, MI 48642-4023

Attn: Membership Chairman

You may also pay for membership at a regular club meeting

Tips, Tricks & Techniques (submitted by Howard Lewis)

A Quick Way To Hide The Ribbon In Windows 8 File Explorer

With Windows 8, Microsoft changed Windows Explorer's name to **File Explorer**. One very significant change made with the new File Explorer was the adoption of the **Ribbon (Figure 1)**, which Microsoft introduced with the Office 2007 applications. Although most people seem to have adapted to the new ribbon fairly well, some people find that it takes up a significant amount of screen space and therefore reduces the amount of space available for displaying documents. This tip was published in 2012, showing how to reduce the size of the Ribbon and therefore become more like the menu system of old. I have updated this tip to now include File Explorer and any other Microsoft applications that use a ribbon.

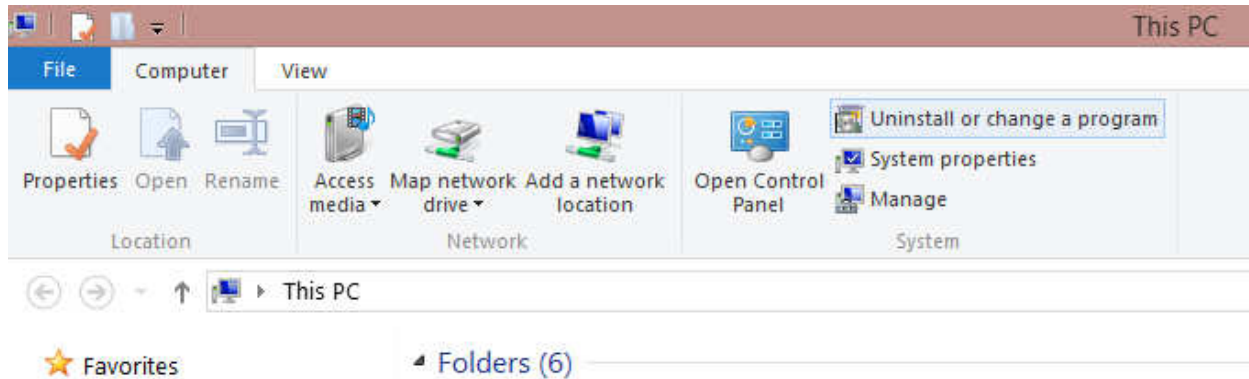


Figure 1. File Explorer Ribbon - Visible

If you would like more of your window space to be used for showing information, there is a simple shortcut to actually hide the Ribbon in most Microsoft applications. Any time you would like to hide the Ribbon, simply *double-click on one of the tabs* located above the ribbon (**Figure 2**). To make the Ribbon reappear, simply *double-click on the tab again*. If you *single-click on a tab*, the Ribbon will reappear for a brief time, showing the options for that particular tab.

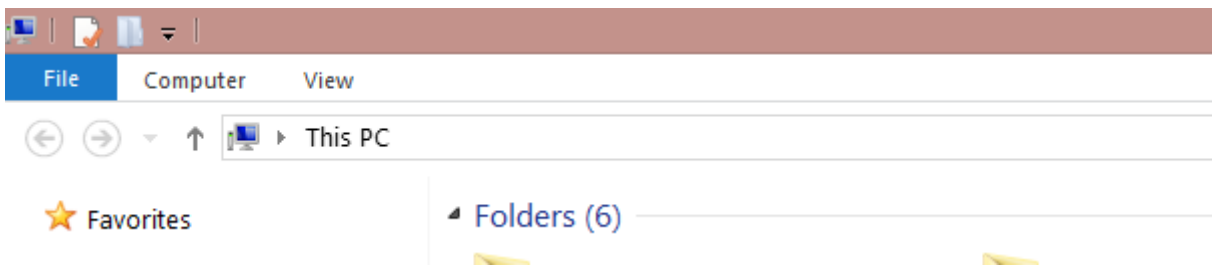


Figure 2 File Explorer Ribbon - Hidden

If you would like to further remove the Ribbon from being needed, you might consider the use of the Quick Access Toolbar (next tip).

Customizing the Quick Access Toolbar

The **Quick Access Toolbar** was a new feature incorporated in the Microsoft Office applications in 2007. Since then, the toolbar has been modified in Office 2010 and in Office 2013. With Windows 8, the Quick Access Toolbar has been incorporated into a number of the Windows 8 based applications (File Explorer, Paint and Wordpad, This feature significantly reduces the need for the use of the Ribbon and is extremely useful for common tasks. Although the items that can be incorporated into the toolbar varies between the applications, the method of using it is the same. Microsoft Word's toolbar will be demonstrated in this tip.

(Continued from page 3)

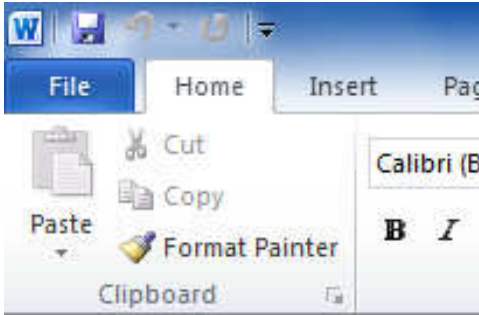


Figure 1. Quick Access Toolbar Default Configuration

Figure 1 shows the default options on the Quick Access Toolbar (QAT) which are included with Word 2013. (Although the options may vary between ribbons in the different Microsoft applications, the concepts are the same.) For Word, the standard options include **Save, Undo** and **Redo**. These are pretty much standard options, although keyboard shortcuts can be faster if you prefer.

By clicking on the right side of the QAT, a pull-down menu will open up other frequently used commands that you might want to add to the QAT (Figure 2).

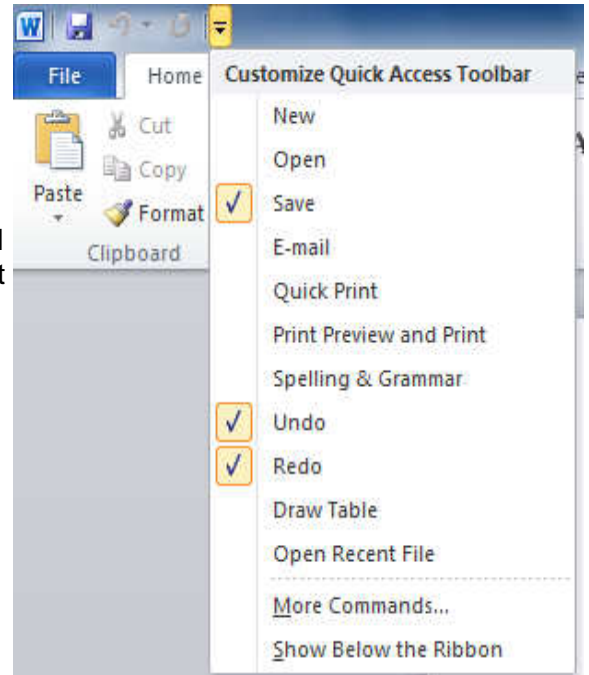


Figure 2. Standard Options Available for QAT

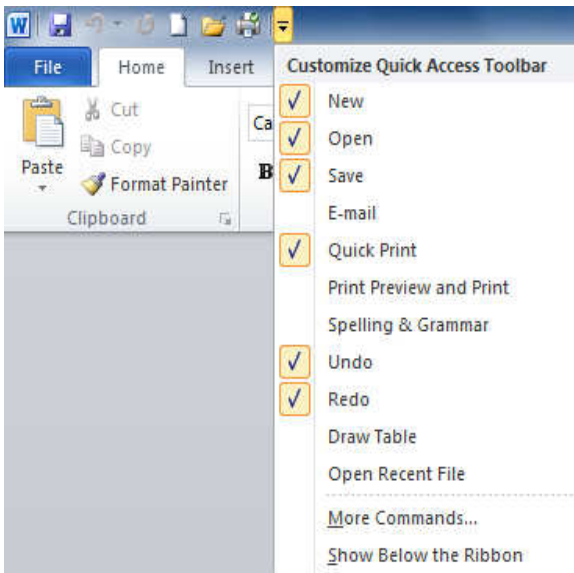


Figure 3. QAT After Selection of Options

Now, Figure 3 shows the QAT after several of the options have been added.

(Continued on page 5)

Although there are several options available to add to the QAT on the toolbar, virtually anything that is included on the ribbon can be also be added to the toolbar. There are two primary ways to add things

from the ribbon. The simplest way is to right-click the item on the ribbon and select *Add to Quick Access Toolbar*.

Figure 4, shows how to add the **Spelling & Grammar** function from the ribbon.

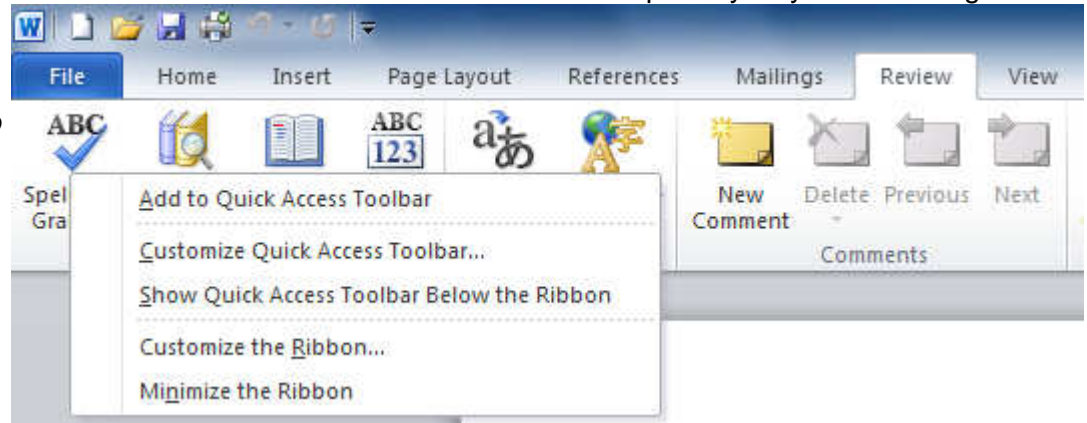
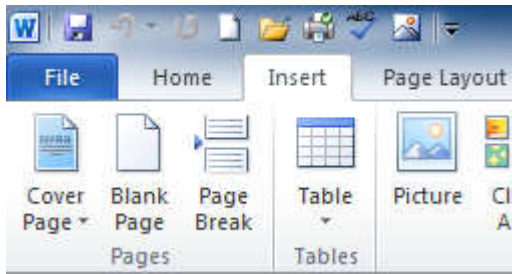


Figure 4 Add Spell & Grammar Check to QAT



After also adding **Insert Picture from File** from the **Insert** tab on the Ribbon, the Quick Access Toolbar looks as in **Figure 5**.

Figure 5. QAT After Adding Several Commands

There are some items, however, that cannot be added to the toolbar from the Ribbon which brings us to the second way to add items to the Quick Access Toolbar. One of the Commands that cannot be added from the Ribbon is the **Save As** option. To add any option available (including Save As), click on *More Commands...*, found on the pull-down menu to the right of the QAT. The result of this action is shown in **Figure 6**.

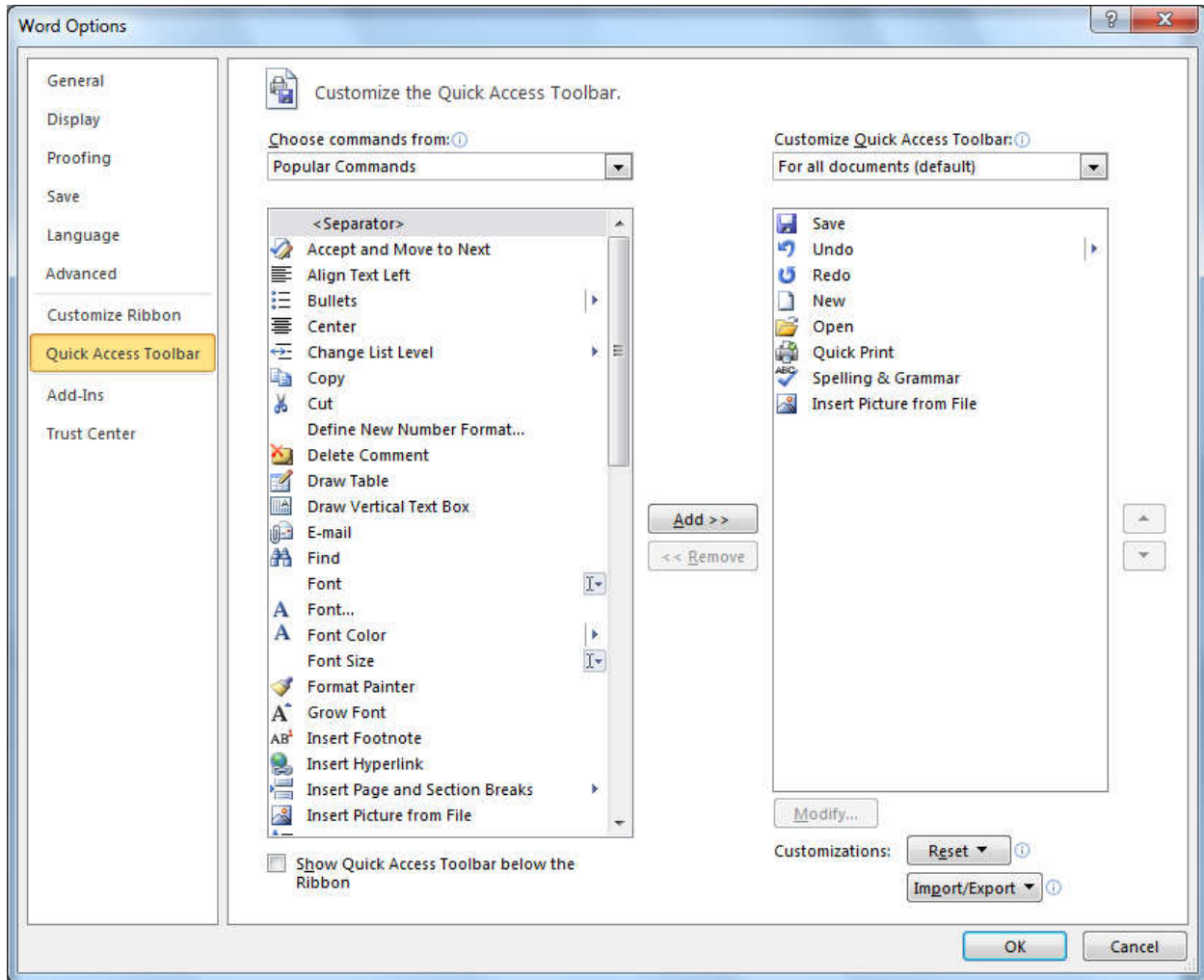


Figure 6. More Commands Option in the QAT

Once you have the **Word Options** window displayed, you can select various groups of commands by clicking on the down arrow under **Choose commands from**. By default, **Popular Commands** are shown. One of the other command categories is **All Commands**, which will show hundreds of options available across all categories. To add one command, simply click on the desired command and press the *Add* button between the two display boxes. The box on the right, shows all of the current QAT commands and any new ones that you add. After you have added any commands that you wish, you may sort them in your preferred order in the right-hand box by selecting a command and pressing the *Up* and *Down* arrows to the right of the box. Once you have them in an order that makes sense to you, then click on *OK* and your new Quick Access Toolbar will show those commands in your preferred order. An example is shown in **Figure 7**.



Figure 7. Final QAT After Sorting Commands

If you forget the meaning of one of the icons on the QAT, simply hover your cursor over the icon and a text balloon will be displayed with its name.

Although no limit on the number of items to be placed on the toolbar is known, it soon loses its usefulness if too many options are used.

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808 Headphones

Review by George Harding, Treasurer, Tucson Computer Society, AZ

October 2013 issue, TCS eJournal, www.aztcs.org, [georgehardingsbd \(at\) earthlink.net](mailto:georgehardingsbd@earthlink.net)

Our mobile devices usually play sound, especially music. Most cell phones and all MP3 players come with earbuds, which are convenient and easy to carry.

But cords often get so tangled that using them is too much trouble.

The earpieces may not be the right size or may be irritating to one's ear. An elegant solution to these problems is a set of headphones, but the best ones are quite expensive.

808 Headphones are reasonably priced and give you all the advantages over earbuds.

They are elegant in design, being smooth in appearance. They fit snugly over your ears, so there's no problem with fit or irritation. The earpads are very comfortable. Each earpad is adjustable so as to fit different head sizes and shapes.

Probably the best feature is the sound quality. You get very good bass response as well as treble (although my ears are too old to benefit from those high notes!). The rated frequency response is 20 – 20K Hz. The power capability is 20mW, 60mW maximum. The headphones come in a very nice flexible case with a zipper closure.



(Continued from page 7)

One of the earpads folds in so as to fit compactly in the case. There are two cables supplied with the headphones, stowed in a net pocket inside the case. The company describes them as “tangle-free,” and they appear to be so. One is a plain cable with 3.5 mm plug on each end. The other is a flat cable with a control for play/pause, for those devices that permit that. A 6 .3mm adapter is also supplied.

These are really nice headphones and are reasonably priced.

About 808 Headphones
Vendor: 808 Headphones
www.808headphones.com
Price: About \$90

Get Plain Text

By Linda Gonse, Editor & Webmaster, Orange County PC Users' Group, CA
October 2013 issue, Nibbles & Bits, www.orcopug.org, editor (at) orcopug.org

It's probably safe to say that everyone has copied text from a webpage at some time and pasted it into an email or into a Word-like program. So, of course, you can relate to my dismay of pasting the type complete with its formatting riding piggyback on it.

I always have to stop what I'm doing and unformat and reformat the type, so it blends in with what I'm working on.

I can hear “old timers” yelling, “Notepad! Use Notepad!”

That's true. And, it's a good option. I'm using Windows XP (still), so I have a shortcut to Notepad on my Start menu. It's very easy to click on Start while I have my browser open and click to open Notepad to paste the web text, then recopy it from Notepad, and repaste the text into a document.

But, I found a simpler method.

Really. There is no learning curve.

I only have to click once after copying from a webpage and then I can immediately paste unformatted text into anything anywhere!

With our typical complicated programs to work with, this just doesn't seem possible. Or, maybe alchemy might be involved!

The short of it is that this is true, no hocus pocus. It is possible with a tiny program called Get Plain Text.

It's only 70Kb and it doesn't add an icon to your system tray or grab any memory when you use it.

It works in less than a second to remove text formatting, including fonts, sizes, colors, and embedded images. It just leaves plain text.

Download the program from the developer's webpage (clipdiary.com) at <http://bit.ly/1bzFuea> or a secondary download site at <http://www.softpedia.com/get/PORTABLE-SOFTWARE/Office/Clipboard/Portable-Get-Plain-Text.shtml>. Save it to your preferred disk location. Click on the program to run it.

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Add the icon that launches Get Plain Text to your Quick Launch bar or favorite program launcher.

I keep it on my Quick Launch bar. As soon as I copy something to the clipboard, I click on the Get Plain Text icon. Then, I paste the text anywhere I desire. That's it.

When I use Get Plain Text, no window opens. There are no dialog boxes or preferences to select. There are no flags, bells, or whistles to tell me it is finished. It simply works fast, silently, and unobtrusively.

What else? Oh, yeah. It's free!

Interesting Internet Finds

By Steve Costello, President / Editor, Boca Raton Computer Society
October 2013 issue, Boca Bits, <http://sefcug.com/>, president (at) brcs.org

In the course of going through the more than 200 news feeds, I often run across things that I think might be of interest to other user group members.

The following are some items I found interesting during the month of October 2013.

How risky will it be to keep running Windows XP?

<http://askleo.com/how-risky-will-it-be-to-keep-running-windows-xp/>

POP vs. IMAP: What Do They Mean and Which One Should You Use?

<http://www.ilovefreesoftware.com/31/windows/pop-vs-imap.html>

Talk to your Navigating Device: Android or iPhone

<http://geeksontour.tv/2013/08/talk-to-your-navigating-device-android-or-iphone/>

Can You Really Be Anonymous Online?

<http://www.makeuseof.com/tag/can-you-really-be-anonymous-online/>

Why You Don't Need an Outbound Firewall On Your Laptop or Desktop PC

<http://www.howtogeek.com/172349/why-you-dont-need-an-outbound-firewall-on-your-laptop-or-desktop-pc/>

How To Use the New Google+ Photo Editing Tools

<http://www.groovypost.com/howto/google-plus-photo-editing-tools/>

Where to Donate Your Used Tech

<http://www.wonderoftech.com/where-to-donate-your-used-tech/>

How to Keep Your Internet Usage Private [INFOGRAPHIC]

<http://socialmediatoday.com/socialbarrel/1765451/online-privacy-how-keep-your-internet-usage-private-infographic>

How to View and Work on Google Drive Files When You're Offline

<http://www.guidingtech.com/24186/google-drive-offline/>

Most Fridays, more interesting finds will be posted on the Computers, Technology, and User Groups Blog: <http://ctublog.sefcug.com/>

Filter Out Junk Email with Outlook 2010

By Lynn Page, Editor, Crystal River Users Group, Florida
November 2013 Issue, CRUG Newsletter, www.crug.com, [lpag46 \(at\) tampabay.rr.com](mailto:lpag46@tampabay.rr.com)

I have used Outlook for my email since my first version of Office (97). I keep my junk email protection level at high and have Outlook disable links in messages considered to be phishing and warn me about suspicious domain names.

Outlook's junk email filter is designed to keep spam and junk from getting to the inbox. It is on by default and will place the junk in its own folder. One of the default options is to have Outlook automatically delete suspected junk but it only takes a second to open the junk folder and glance to be sure something wanted didn't end up there. I changed the filtering protection from the default level to high.

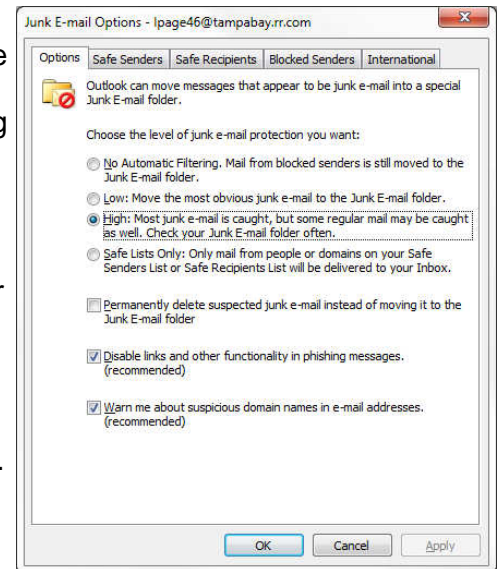
Junk Email Options

To control Junk Email options while in Mail on Home tab in the Delete group click the down arrow by Junk. On the dialog box Options tab select the level of protection desired. Selecting No Automatic Filtering turns the junk email filter off but you can still block senders and that email goes into the Junk folder.

The Safe Senders tab lists email addresses that you trust and have noted so. Email addresses and/or domain names in this list are never considered junk, regardless of message content.

The Safe Recipients tab lets you add specify an email address you use for a mailing or distribution list. All email sent to that address is never considered junk. I use this for my Corel PaintShop Pro Groups.

All email from addresses or domain names on the Blocked Senders list are automatically considered junk.



Add Senders to Safe Senders List

I mentioned that I keep the filter set to high so occasionally Outlook flags message I want as junk. That is not a problem. For an occasional email I simply drag it from the Junk to the Inbox. If the email is from someone I expect to continue to receive email from I add the address to the Safe Senders List. Simply select the email in the Junk folder and in the Junk drop down menu (Home tab Delete group) select Not Junk and respond as required.

Block a Sender

Conversely a few times email slips through from someone I do not know and I don't want to continue receiving messages from them. In this case select the message and in the Junk drop down menu select Block Sender.

Otterbox Cases

Review by George Harding, Treasurer, Tucson Computer Society, AZ
October 2013 issue, TCS eJournal, www.aztcs.org, [georgehardingsbd \(at\) earthlink.net](mailto:georgehardingsbd@earthlink.net)

Here's a company that has grown by providing just what the customer wants. It started with a line of waterproof cases and continued with cases through which the enclosed device could be manipulated. From that point on it was a matter of adapting cases to the continuing flow of new types of devices, still keeping each case waterproof and protective.

(Continued from page 10)

Every time I go to a computer show, Otterbox is there and has a new case to give away. I currently have two new cases, the Pursuit and the Armor, which the Company describes as “The toughest case ever made.”

The Pursuit is about the width and height of a cell phone, but is a good bit thicker, a bit over an inch. It has a latch that brings the top snugly down to the bottom. The top has a flexible strip just inside its rim, which is what makes the interior waterproof (up to 100 feet deep). Protection also includes crush (up to 1,000 pounds), drop and impact, as well as dust and debris. It's designed to provide super protection for outdoor activities.

The exterior of the case has hard plastic “bumpers” on each corner and end. There is a flexible loop attached to make it easy to fasten the case to your belt. Inside, both the top and bottom have semi-rigid pads to help soften impacts.

The Armor is a cell phone case sized for the iPhone 5, iPhone 4 or Samsung Galaxy, but could be used for others as well. The case is described as waterproof, drop proof, dust proof and crush proof.

For Otterbox waterproof is no big deal; all their cases are waterproof! For this case, however, “water proof” means submersion for 30 minutes at 6.6 feet of water. “Drop proof” for this case means protection for drops up to 10 feet. “Crush proof” is probably the most amazing – up to 2 tons! Soft foam on the interior provides a custom fit and cushioning. There is also a screen protector built in that prevents scratches and damage to the glass display. It's hard to imagine any type of action that would damage your cell phone!

About:

Otterbox Pursuit and Armor cases

Vendor: Otterbox

www.otterbox.com

Price: Pursuit about \$20, Armor about \$100



Have You Upgraded to iOS7?

By Bill Crowe, 2nd VP, Sarasota PCUG, Florida

October 2013 issue, PC Monitor, www.spcug.org, editor (at) spcug.org

Apple's iPhone/iPad operating system, called iOS, got a huge makeover and you may be considering not upgrading. After all I am just getting the hang of iOS6. The changes, while numerous, are not difficult.

The new operating system, called iOS 7, involves hundreds of interface changes and adds a new "control center" (sweet up from the bottom of the screen) that gives you access to important features like the camera, clock, and music player.

It even includes a new way to multi-task between programs and a built-in flashlight. In short, it makes your iPhone look brand new.

But what are you really getting when you upgrade to iOS 7?

Here are some of some favorite features.

1. It looks completely different. The first thing you'll notice about the new iPhone OS is how different it is.

All the icons have been "flattened" with a lot of the textures associated with Steve Jobs' efforts removed.

Instead of rich leather lookalikes, you get clean, clear, and crisp text and lines. Instead of photo-realistic icons you get images that "suggest" their purpose.

2. It is truly secure. This is an interesting feature: when you lose your phone, you can lock it completely and thieves won't be able to reactivate it even if they want to. In short, in 99 percent of cases, a thief will never be able to use your stolen phone again. This should, Apple hopes, reduce iPhone theft.

3. Photo browsing got a lot easier. When you take photos in iOS 7 they are automatically organized into moments. For example, when you shoot a bunch of photos at the petting zoo and then come home and shoot a few more, these photos are broken up by time and location.

4. Expect better battery life. The phone should perform better thanks to upgraded multi-tasking and improvements to the base software. While you probably will still suffer if your phone has horrible battery life now -- it probably means your actual battery is broken -- new users can expect snappier performance.

5. Siri is smarter. First, Siri doesn't sound like a robot anymore, which is good news. Second, Siri offers more information in a more pleasing way and it can now search more sources of information and do more

6. It has some 3D tricks up its sleeve. One of the coolest features is one of the most subtle: the icons on the screen "float" over the background. In other words, when you move the phone the icons move around to reveal parts of the wallpaper underneath. It's a very cute feature that lets you see more of your favorite photos and offers a much cleaner view of the interface.

7. It includes iTunes Radio, a cool way to discover new music. If you've used services like Pandora or Radio, you're probably familiar with how iTunes Radio works. In short, it lets you stream music (and buy it) right from your music player. This means you can listen to almost as much new music as you want whenever you want as well as playlists of popular hits.

Think of it as a way to preview iTunes purchases and a fun way to discover new music.

strobist.com - Lighting 101

By Mike Lyons, ORCOPUG President

October 2013 issue, Nibbles & Bits, www.orcopug.org, editor (at) orcopug.org

It's been quite a while since I mentioned one of the best photo education sites on the web — Strobist.com.

Started in March 2006, David Hobby created a lighting tutorial to help beginning photo students learn flash photography with a minimum of equipment. What is really cool is he explains in understandable terms and gives you his thoughts behind the instructions.

Between 2006 and 2013, David learned a lot about lighting and how to do things better. In addition, lighting equipment and lighting styles have evolved.

David has just completed a rewrite of Lighting 101, called Lighting 102. If you haven't read Lighting 101, I'd start there and move onto Lighting 102 (although you don't have to).

He also has a bunch of behind the scene shots with his thought process included. It's another great resource on the site.

The Jeopardy Answer Is...What?

By Linda Gonse, Editor & Webmaster, Orange County PC Users' Group, CA

October 2013 issue, Nibbles & Bits, www.orcopug.org, editor (at) orcopug.org

The final question on Jeopardy on its September 26 episode was based on the category "Internet." The question was "The animal for which this computer program is named is actually a red panda."

Do you have any idea what that program is? When I tell you the answer, you will shake your head — as I did — and you will say "What? That's not right!" — just as I did.

Are you ready? The answer is "What is Firefox (the internet browser)?"

"Fire fox," in Chinese, is another name for the red panda.

In fact, Mozilla launched a website called "Firefox Live" in November 2011 to educate and raise awareness of the endangered red panda species.

Live videos of three baby red pandas, Bernadette, Dolly, and Winston, that were sheltered at the Knoxville Zoo, were streamed on the Firefox Live website until March 2012. When the babies reached maturity they were sent to breed and become part of the animal families at the Virginia Zoo (Norfolk, Virginia) and the Zoo Boise (Boise, Idaho). Subsequently, the Firefox Live website was retired.

If you'd like to find a red panda in a zoo near you, go to http://redpandanetwork.org/red_panda/find-a-red-panda-near-you/

Tiny Computers

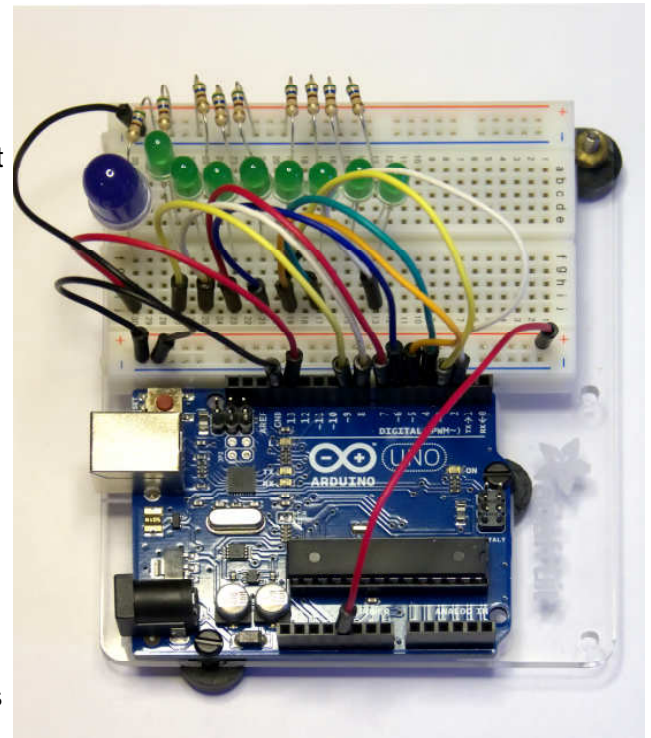
By Dick Maybach, Member, Brookdale Computer Users' Group, NJ
November 2013 issue, BUG Bytes, www.bcug.com, n2nd (@) att.net

Personal computers are vital appliances for most of us. We use them to balance our checkbooks, calculate our taxes, communicate with friends and family, store our memories, and keep us informed. This is much different than when they were first introduced, when we felt free to perform experiments using them that today are unthinkable because of the risk of losing valuable data. As a result, we have the ironic situation that as our PCs become more and more complex, we know less and less about them. A solution is to acquire a smaller and simpler computer just to play with. Ideally, it won't take up much space on our crowded computer desk and will be cheap to replace if something goes horribly (or wonderfully, if you're adventuresome) wrong.

There are dozens of these tiny computers, but here I'll talk about just two, the Arduino and the Raspberry Pi. Both are supported by active on-line communities, both are described in several books, both are open source, which means you are free to make any changes you like to their software, and both are cheap – less than \$50. (Although you will probably pay more for a complete starter or experimenter's kit.) Both were developed by educators, the Arduino in Italy and the Raspberry Pi in the UK, for the purpose of helping people learn about computers and computing. However, the two are quite different. The Arduino is really a controller, about as smart as your washing machine, and its inputs and outputs are Voltages on its pins. It runs only one program at a time, and once started, runs it forever. As you use an Arduino, you'll be learning programming and electronics. The Raspberry Pi is a real computer that runs Linux and comes with a full complement of PC software, including a Web browser. Its inputs and outputs are a keyboard, mouse, graphical display, and Ethernet and USB ports. As you use the Raspberry Pi, you'll learn programming, networking, and operating system operation and configuration.

The Arduino (<http://www.arduino.cc/>), like the Raspberry Pi, is about the size of a credit card. In the photo below, the Arduino is the blue card in the foreground. Normally, it's programmed and powered through the USB connector at the rear of the left edge. Once, a program has been loaded, it can be powered via the black connector at the front of the left edge (for example by a 9-volt battery). This unit illustrated is mated to a solder less breadboard, on which you can build circuits just by pushing component leads into its holes. Jumpers connect the breadboard with the Arduino's input/output pins along its front and rear edges. The Arduino is almost always used as a circuit element, and many experimenter's kits are available to get you started. These usually include an Arduino, a breadboard, and a collection of jumpers and electronic parts, e.g., LEDs, switches, motors, and sensors. Make an Internet search, and you will certainly find many interesting products and projects. My favorite vendor is Adafruit, but it has many fine competitors.

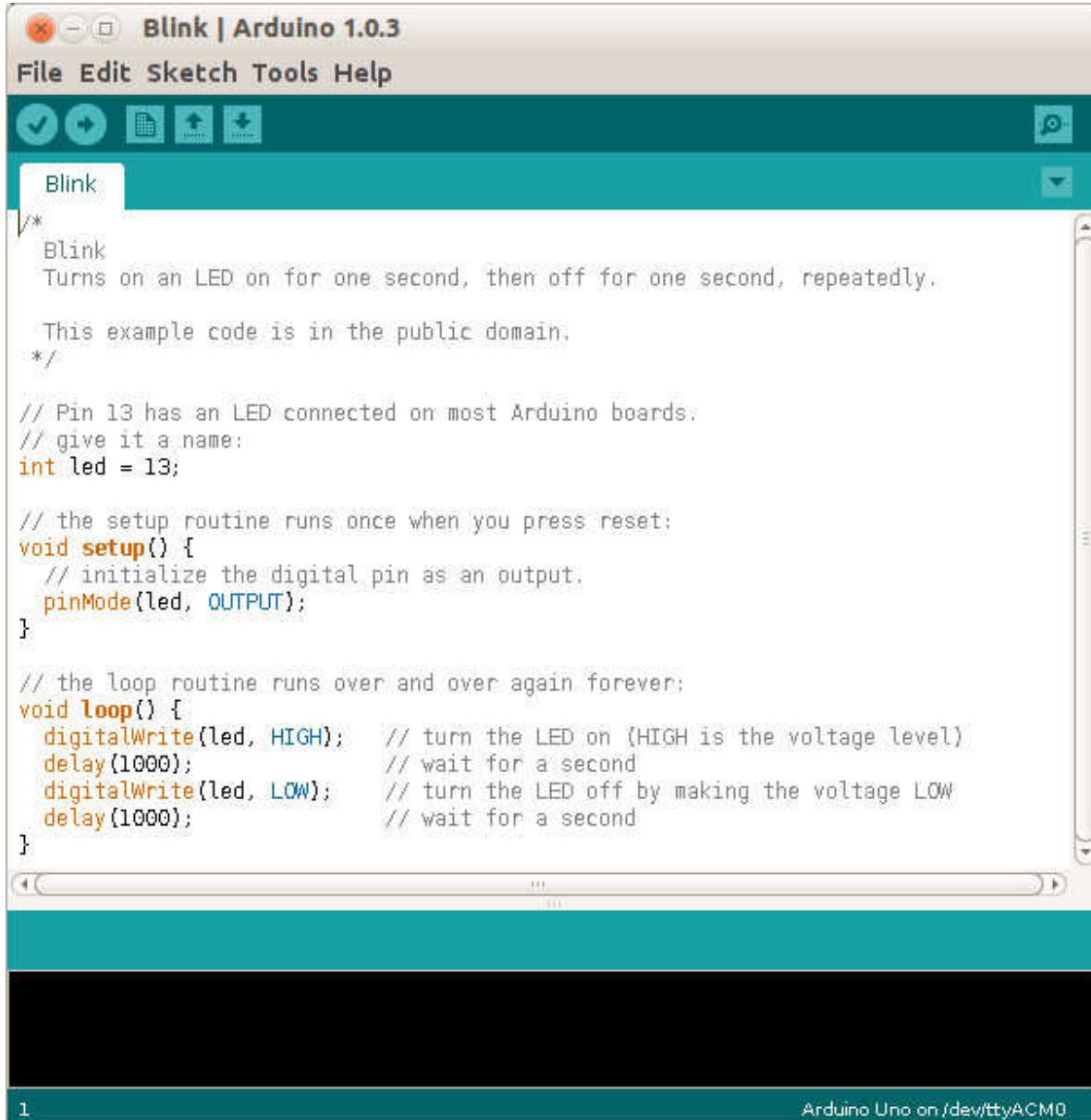
Getting started with the Arduino is quite easy. Go to their home page, <http://www.arduino.cc/>, and download the Integrated Development Environment (IDE), which is available for Linux, Mac OS X, and Windows. (Linux users can also find it in their repositories.) Connect an Arduino board to a USB port and start the IDE. As you may be able to tell from the screenshot, the Arduino uses a variant of the C programming language. The example



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here is the program blink, which just cycles an LED on and off. This is the equivalent of the classic “Hello World” program that is almost every C programmer's first effort.

A screenshot of the Arduino IDE window titled "Blink | Arduino 1.0.3". The window has a menu bar with "File", "Edit", "Sketch", "Tools", and "Help". Below the menu bar is a toolbar with icons for running, uploading, and saving. The main text area contains the following code:

```
/*
 * Blink
 * Turns on an LED on for one second, then off for one second, repeatedly.
 *
 * This example code is in the public domain.
 */

// Pin 13 has an LED connected on most Arduino boards.
// give it a name:
int led = 13;

// the setup routine runs once when you press reset:
void setup() {
  // initialize the digital pin as an output.
  pinMode(led, OUTPUT);
}

// the loop routine runs over and over again forever:
void loop() {
  digitalWrite(led, HIGH); // turn the LED on (HIGH is the voltage level)
  delay(1000);             // wait for a second
  digitalWrite(led, LOW); // turn the LED off by making the voltage LOW
  delay(1000);             // wait for a second
}
```

The status bar at the bottom shows "1" on the left and "Arduino Uno on /dev/ttyACM0" on the right.

The Arduino's capabilities are quite modest – typically the processor runs at 16 MHz, has about 20 I/O pins (some analog, some digital), and is equipped with 32 kbytes of EEPROM (for programs) and 2 kbytes of RAM (for data). Normally, you would use the Arduino just to control the hardware and send any data it collects to a PC for analysis. To make this easier, consider using the Processing language on your computer, available at <http://processing.org/>. It's very close to what the Arduino uses and has an almost identical IDE.

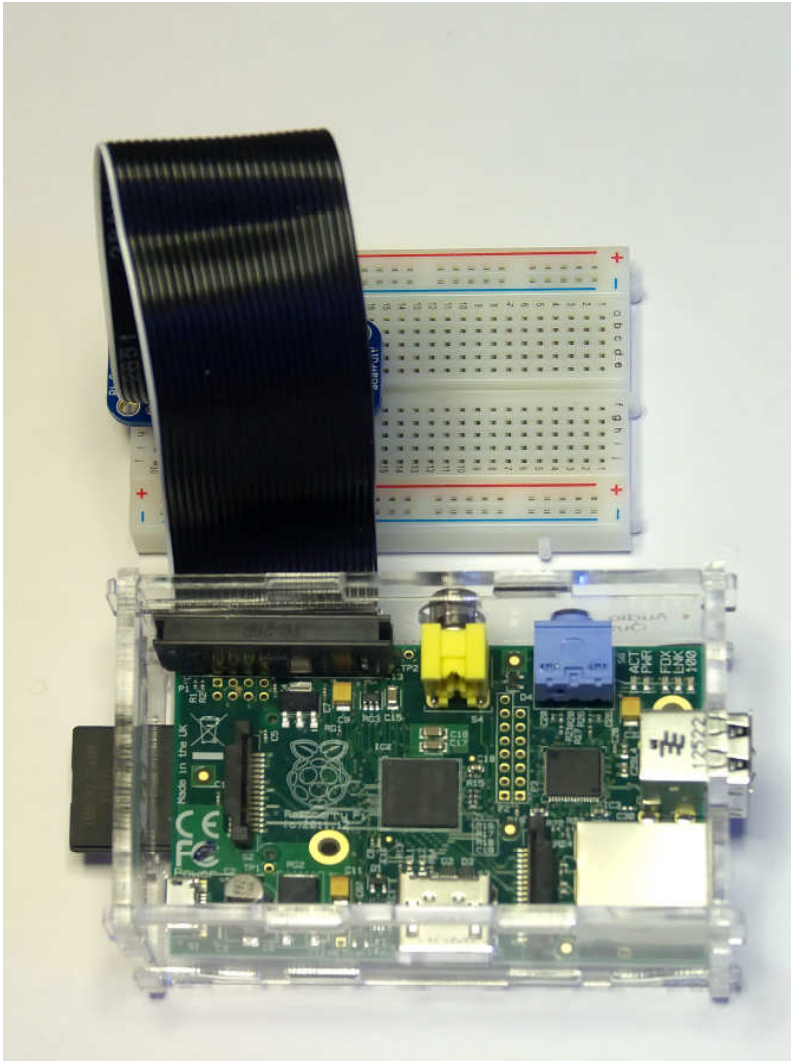
You should be able to get started using only information available from the Internet, but if you prefer a book, look at *Getting Started with Arduino* by Massimo Banzi. Many others are available, some for the beginner and others describing advanced projects.

While the Arduino is a simple controller, the Raspberry Pi, <http://www.raspberrypi.org/>, is a real computer that uses the Linux operating system. The kit I purchased (from Adafruit) included a clear plastic case and a solder less breadboard, but many projects won't need the latter. The Pi has two USB ports (silver connectors on the center right), an Ethernet port (silver connector on the front right), a HDMI port for the

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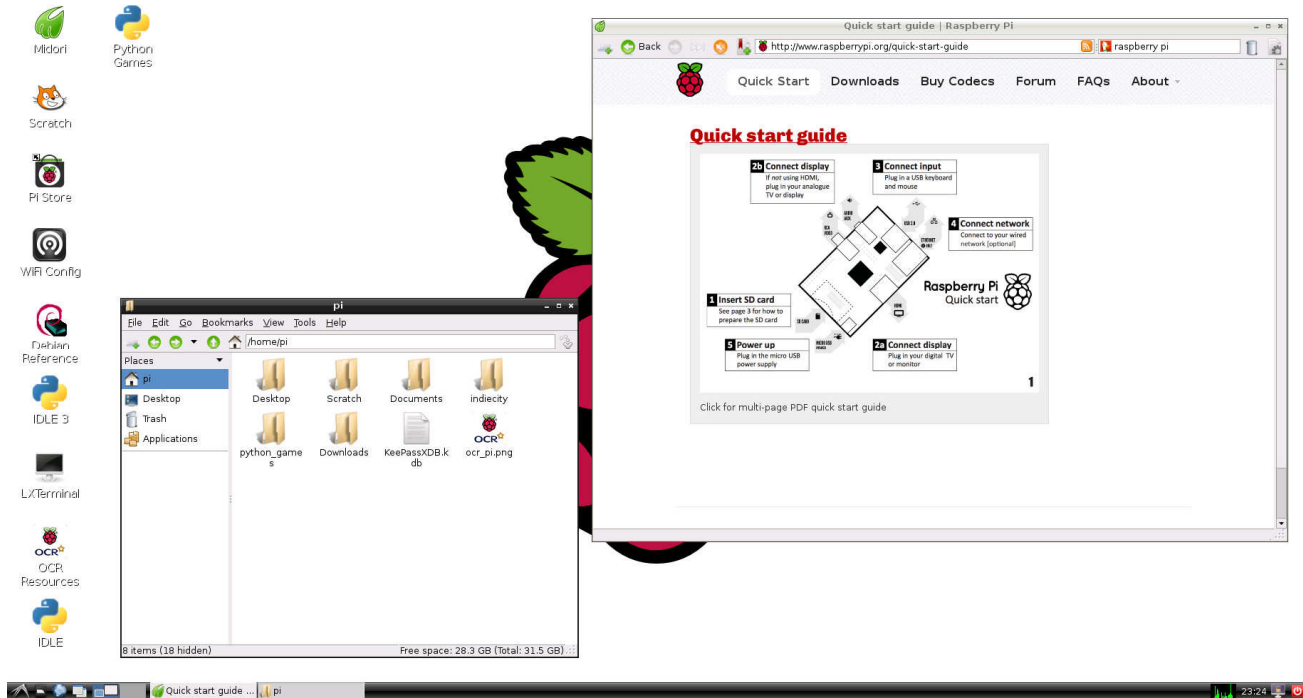
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display (silver connector on the center front), a power connector (micro USB connector on the front left), a SD connector for storage (a SD card protrudes from the case on the left), a collection of ports (connected to the breadboard by a black ribbon cable at the left rear), an analog video port (yellow connector at the rear), and a stereo audio jack (blue connector at the rear).



The Raspberry Pi is more powerful than the Arduino, with a 700-MHz ARM CPU and 512 Mbytes of RAM. (These specs are for the model B. The model A is much less capable and costs only a few Dollars less.) The processor is not Intel compatible; however, its overall performance is similar to a 300MHz Pentium 2, but with much better graphics. Clearly, it isn't an acceptable replacement for any modern home computer. However, it does act like a (slow) PC, as you can see from the screen-shot below, which shows the desktop with windows open for the Internet browser and file manager.

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Getting a Raspberry Pi running is more involved than with the Arduino. Although it's powered through a USB port, PC USB ports can't supply enough current; you will need either a cell phone recharger or a powered USB hub. Be careful of cell phone rechargers though; many cheap units can't supply the current they claim. The safe approach is to purchase one from the vendor from whom you buy your Pi. You will need a USB keyboard and mouse; if you don't have an extra set, they are quite cheap. Hopefully, you have a HDMI display, either for your PC or a flat-screen TV; if not, you could try an old analog TV set, but its resolution will be poor. Finally, connect any USB peripherals through a powered hub, rather than ask the Pi to power them. I bought a no-name 10-port hub that had good user reports on Amazon, and it can also power the Pi. Finally, unlike the Arduino, which comes with its control software installed, you must supply the SD card for the Raspberry Pi and install Linux and its applications on it. This requires a SD card burner, and unfortunately many on the market aren't up to the job. Again, purchasing one from your Pi supplier is the safe approach.

As with the Arduino, you can probably get started with the Pi using only what you learn on the Internet, but there are also numerous books. The project has published *Raspberry Pi User Guide* by Eben Upton. There are numerous others, as well as magazine and Internet articles. I've seen descriptions of a media center, an Internet radio, a time-lapse camera control, a network file server, a firewall, and a wireless access point. (Many of these don't require a keyboard, mouse, or display once they are running, so you could disconnect these for use elsewhere once the project is on line.) You could even connect an Arduino to a Raspberry to obtain a portable sophisticated hardware control and data processing system.

Both these devices are ideal for experimenting. No matter how badly you screw up the software, you can just download a new program to your Arduino or reburn the SD card on your Raspberry Pi. Even if you manage to fry the electronics, you can replace either card for less than \$50. Both are wonderful platforms for introducing electronics and computers to young people. There are many Arduino projects that can be completed in less than an hour, including building the circuit and writing the program. The Raspberry Pi software includes Scratch, a programming language for children that builds animated graphics with sound, and Python, a more sophisticated language for older kids and adults.
