

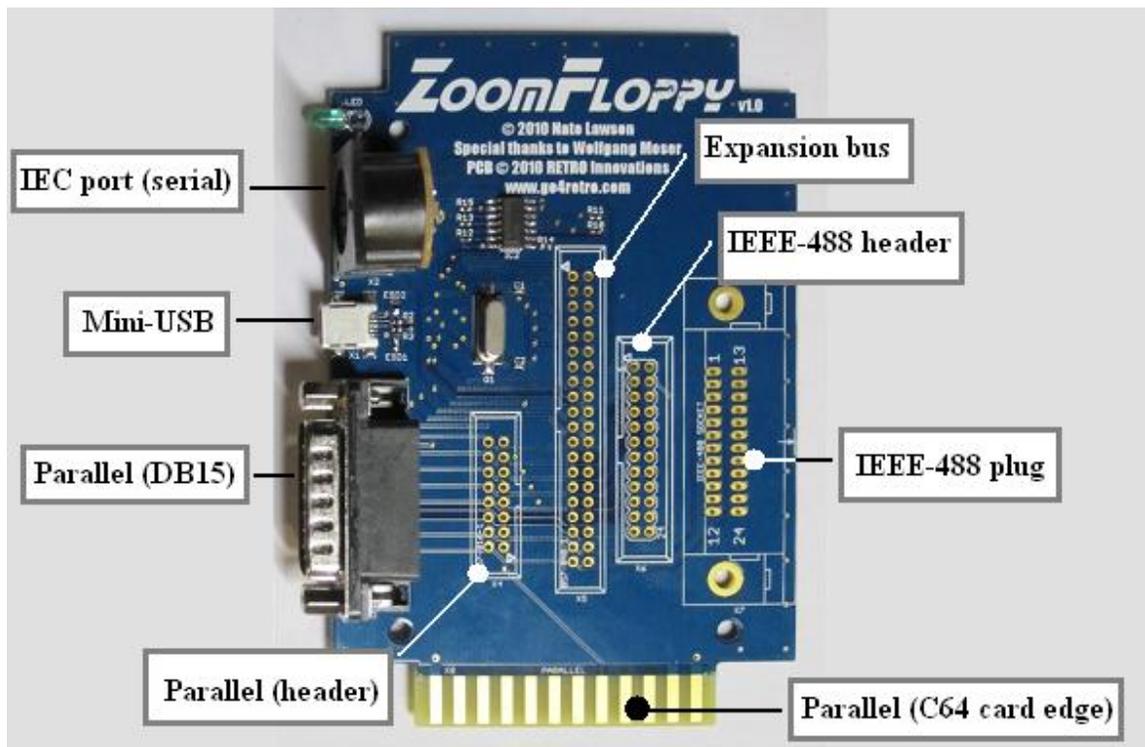
# ZoomFloppy Manual

v2.0 – Sept 24, 2011

This manual describes how to install and use the ZoomFloppy USB floppy adapter. The ZoomFloppy connects your Commodore 1541/1571/1581 and CBM IEEE-488 drives (and even serial printers) to a Windows, Mac, or Linux computer. This allows you to read and write files or entire disk images from the original media. Unprotected disks can be read to or written from D64 image files, say for use with emulators. Protected disks can be read to or written from NIB or G64 files, provided you have a 1571 drive or install a parallel cable in your 1541 drive.

PLEASE READ THE "WARNINGS" SECTION AT THE END OF THIS DOCUMENT BEFORE PROCEEDING. IMPROPER USE OF THE ZOOMFLOPPY MAY DAMAGE YOUR DRIVES OR THE ZOOMFLOPPY ITSELF.

## Introduction to the ZoomFloppy



At a minimum, the ZoomFloppy must be connected to one or more floppy drives via the IEC serial port (6-pin DIN) and to a computer via USB. It is powered over USB, so no external supply is needed. This configuration gives basic access to read and write disks. OpenCBM provides some faster serial transfer routines and defaults to auto-selecting the best one for your configuration.

For higher performance and to copy protected disks, you may want to install a parallel cable in your drive (not included). This cable was originally produced for Speed DOS and Burst Nibbler. It is attached to one of the VIA chips (1541) or CIA chip (1571), either by removing the chip and installing a socket or by soldering. It gives an 8-bit parallel channel to transfer raw GCR bytes at

a higher speed. These cables usually add a DB15 female connector to the drive, also known as a game port on the PC. With a 1571 drive, high-speed serial nibbling can be used and the parallel cable isn't necessary.

Once this is installed, the drive can be connected to the ZoomFloppy in one of three ways. If you already have a C64 cartridge plug to DB15-M cable, it attaches to the card edge at the bottom of the ZoomFloppy. Be sure to note which side is up since the connector fits both ways. If you don't, it's usually cheaper and easier to get a DB15-F to DB15-M cable. This connects to the DB15 plug on the left side of the ZoomFloppy. Finally, if you're building your own cable, you can solder a 2x8 header onto connector X4.

The firmware now supports IEEE-488 floppy drives, which were produced for the PET. Either the large GPIB plug can be soldered onto the board on the right or a 2x12 header can be added at X6.

Finally, a 2x20 expansion header can be added at X5. This maps all signals from the microcontroller for debugging or some unknown future use.

### **Optional case**

While it works just fine as a bare board, the ZoomFloppy was designed to be placed in a case, Hammond part number 1591XXTSBK. This case is available from many suppliers, such as Digi-key. You'll have to cut at least one side of the case to allow for the connectors.

<http://www.hammondmfg.com/dwg2XXS.htm>

<http://www.hammondmfg.com/scpg.htm>

The case dimensions in inches are 4.853 wide x 3.278 long x 2.2 deep (without lid). More info on the exact dimensions can be found on the above pages.

### **Windows installation (2000, XP, Vista, 7)**

This distribution provides Windows binaries for OpenCBM, supporting the ZoomFloppy USB interface. The code has not been customized, so you can also install from stock OpenCBM source code, although that procedure is a bit more complicated. It is expected that future builds will be available directly from the OpenCBM project.

You should have gotten the installer and this manual from the following site. Do *not* install the 0.4.x series of binary installers from the OpenCBM website as they do not support the ZoomFloppy.

<http://www.root.org/~nate/c64/xum1541/>

Below are the directions for installing OpenCBM for ZoomFloppy on Windows. Mac OS X and Linux also work with the ZoomFloppy, but OpenCBM installation for them is not described here.

Even if you have previously installed OpenCBM, you'll need to install this newer version in order to get ZoomFloppy support. Do not install an older copy of OpenCBM, such as 0.4.x, since it does not support the ZoomFloppy.

## A. Run the file "install.bat" by double-clicking on it

This installs the OpenCBM package in C:\opencbm\bin and the Windows system dir. If you want to install to a different dir, edit the install.bat file to change this path. You can run this script multiple times without uninstalling first. To uninstall, just run "instcbm --remove".

To use the OpenCBM utilities, you can install a separate GUI such as GUI4OPENCBM or CBMXfer (see below for links to these). The command line utilities can be used directly from the shell by adding C:\opencbm\bin to your PATH environment variable.

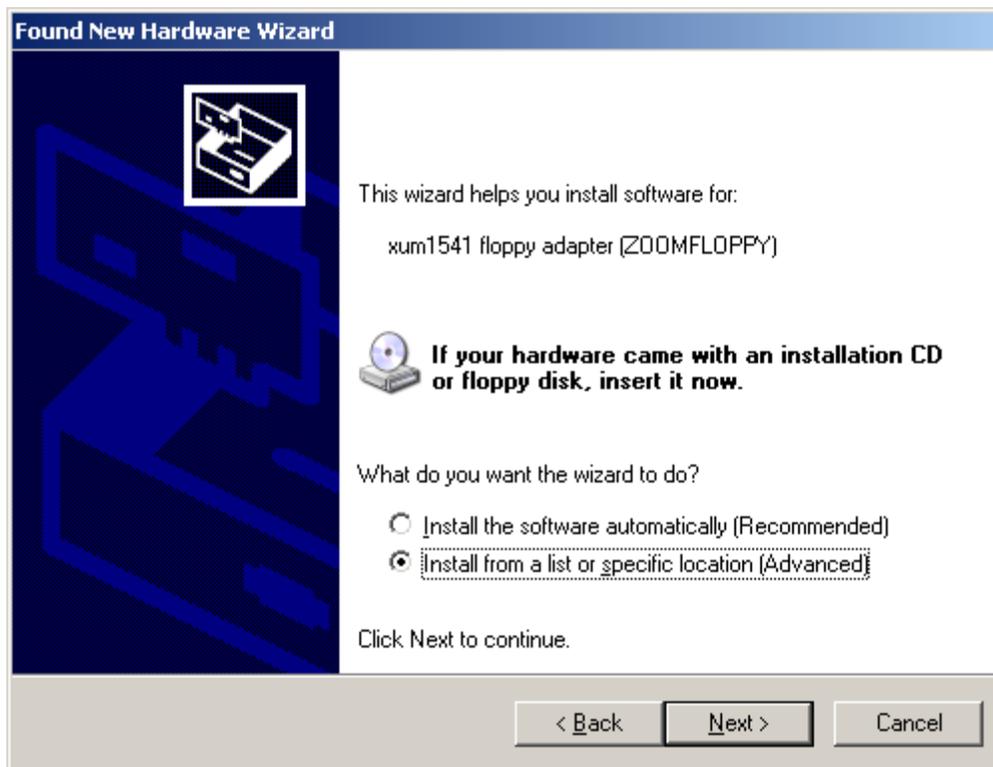
## B. Plug in the ZoomFloppy via USB and install the Windows driver

Once you plug in the ZoomFloppy, you'll see a standard device driver installation prompt. We'll be installing a driver extracted from this zip file, located under the "windrv" folder. You do not need to reboot after installing the drivers.

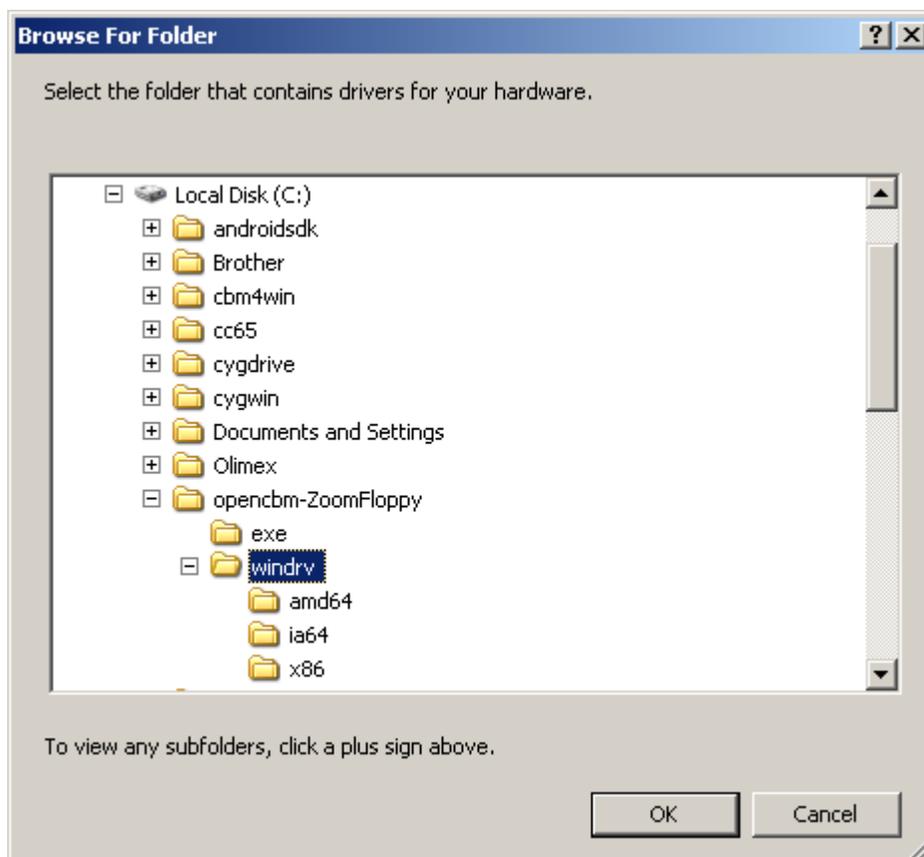
After plugging in the ZoomFloppy, you'll see the following dialog. This example uses Windows XP – other versions vary but the basic steps are the same. See the next section for Windows 7.



1. Select "No, not this time" when prompted by the New Hardware Wizard
2. Click Next



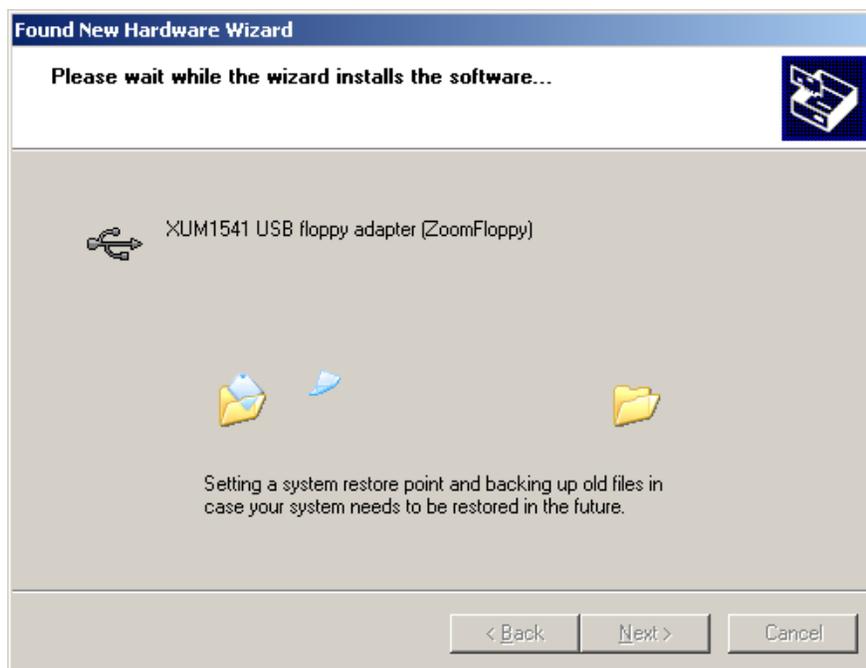
3. Select "Install from a list or specific location"
4. Click Next



5. Browse to the "windrv" folder extracted from the OpenCBM zip file
6. Click "OK"



7. Verify your screen looks like the above and click Next.



The drivers are now being installed and you can click Finish when done.

### **C. Update your ZoomFloppy's firmware**

New features are added regularly to the ZoomFloppy, so you'll need to update it as well. Even if you just purchased it, you can always give this a try. If your device is up-to-date, the updater will detect this and not change anything.

Just double-click on the "firmware-update.bat" file in the installation folder or see the section below on "Updating your firmware" for more info.

### **D. Unplug the ZoomFloppy from USB and connect it to your floppy drive**

1. Plug in your drive's power cord if it's not connected already.
2. Plug an IEC serial cable (round, 6-pin plug) into both the ZoomFloppy and your drive.
3. Optional: if you have installed a drive parallel cable, connect it also. The ZoomFloppy has three plugs for parallel devices: the 15-pin D-SUB connector, 16-pin rectangular header (Z3), and the card edge connector at the bottom (similar to the C64 cartridge port).

### **E. Plug the ZoomFloppy back into USB**

The LED on it should come on but you shouldn't get a driver installation prompt this time. If you do, something went wrong installing the drivers and you should repeat step B, above, or see the troubleshooting section below.

### **F. Turn on your floppy drive(s)**

### **G. Test that the ZoomFloppy is working**

Run the file "runtest.bat" by double-click on it. This will run the command "cbmctrl detect", which will print out any IEC devices that are connected and powered on.

Example:

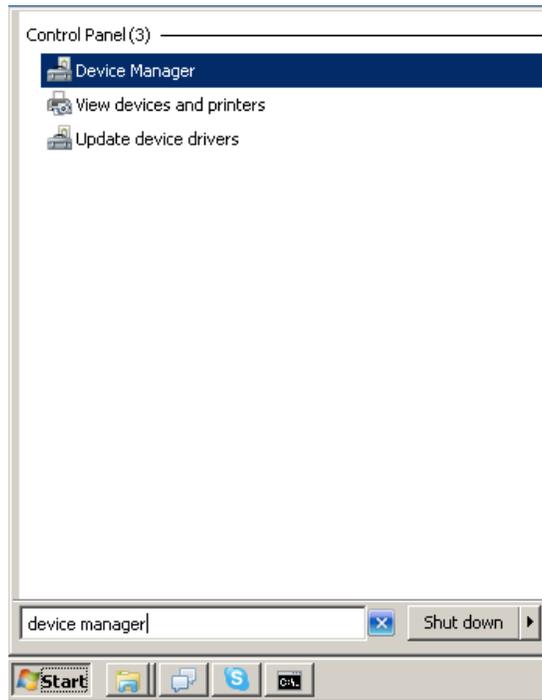
```
8: 1540 or 1541
```

If you see something like this, you're done! If not, check that the floppy drive is plugged in and powered on. If there are still problems, see the troubleshooting section below.

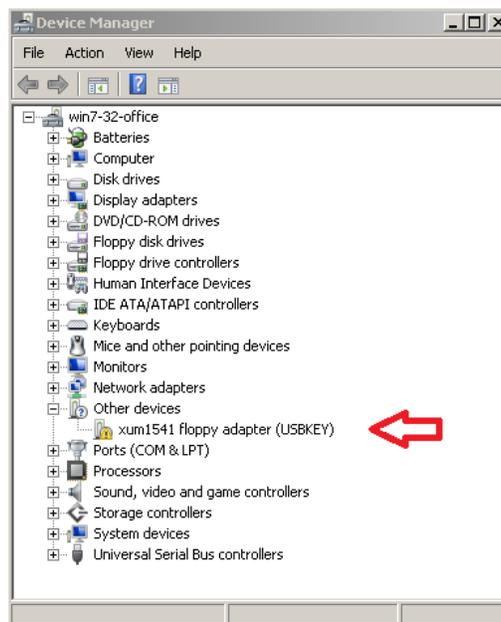
## Windows 7 driver Installation

This works mostly the same way as the Windows XP install above. Here are the step-by-step instructions for installing the drivers on Windows 7.

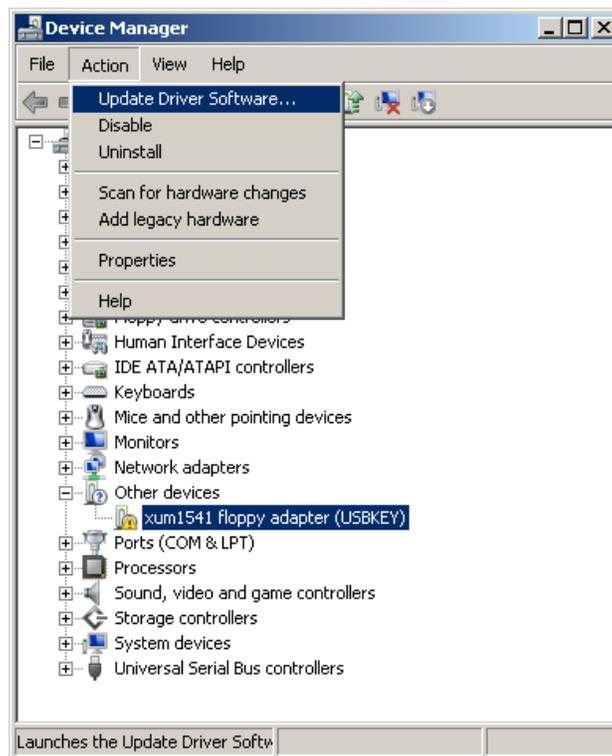
First, plug in the ZoomFloppy via USB. You may see a brief message about looking for drivers and no driver found in your status tray at the lower right. Go to your Start button and click on the search box. Type in “device manager” and click on the first entry.



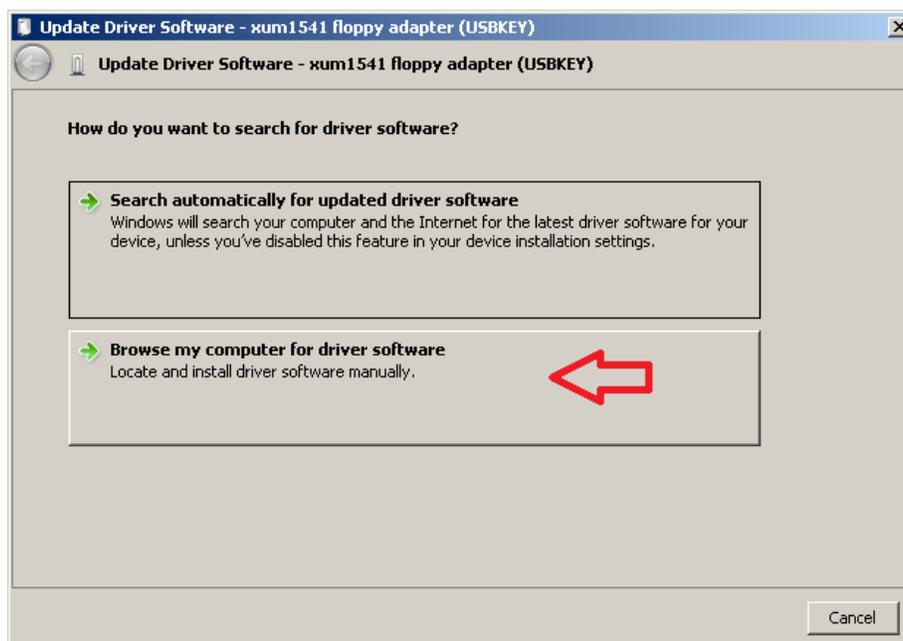
The device manager will open and you'll see a ZoomFloppy (xum1541) device with a yellow exclamation mark. This means no drivers are installed yet.



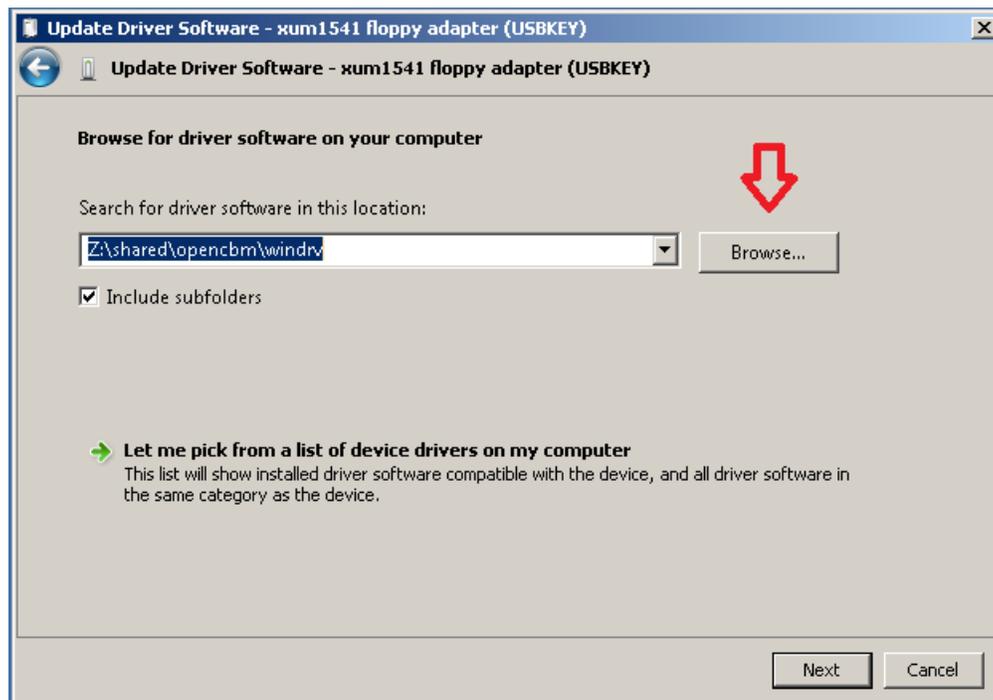
Click on the xum1541 item in the list and select “Update Driver Software...” from the Action menu at the top.



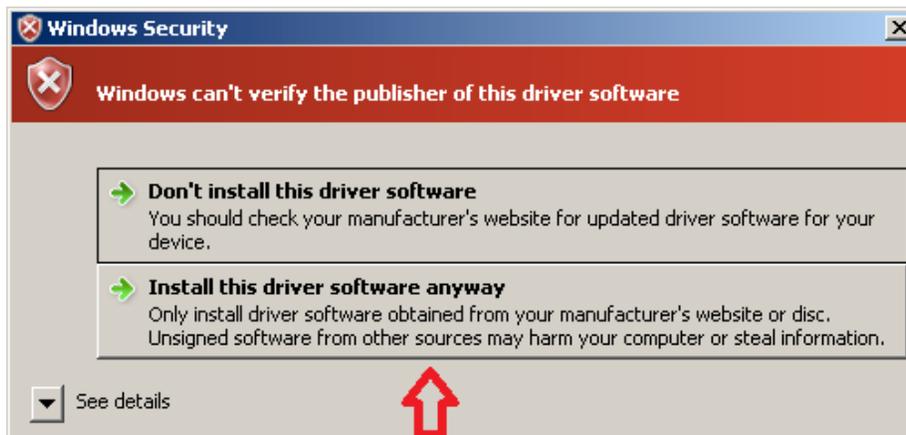
Select the “Browse my computer for driver software” button.



Now, click the “Browse...” button and navigate to the folder called “windrv” in your ZoomFloppy installer folder. Then click “Next” at the bottom right.



Windows will complain because our device driver was not reviewed and signed by them. This is ok, as long as you got the ZoomFloppy installer from a trusted source. Select “Install this driver software anyway”.



The installation will continue for a little while. If it succeeds, click “Close” to exit the installer. The device manager should now show the ZoomFloppy device with a little USB plug icon next to it. If so, you’re done!

If there is still a yellow exclamation mark as at the beginning, please try again or see the Troubleshooting section below.

## Updating your firmware

If you're installing this software as an update, you'll also need to update the firmware in your ZoomFloppy. This is a simple process and has seatbelts to make sure things go properly.

For Windows users, just double-click on the "firmware-update.bat" file in the ZoomFloppy installation folder. It should print the following messages:

```
updating firmware...
Validating...
update completed ok!
```

The update tool itself can be run from the command line by Mac and Linux users. Usage:

```
xum1541cfg update xum1541-ZOOMFLOPPY.hex
```

Do not unplug the ZoomFloppy from USB while it is updating. You should turn off all connected drives before running the update utility. If you have any problems, please report them to the mailing lists in the Support section.

## Mac OS X and Linux installation

Both of these operating systems are supported by the ZoomFloppy, but you'll have to install from source code. For the Mac, installation is easiest via Mac Ports and these instructions:

<http://lallafa.de/blog/opencbm-on-mac/>

For Linux, this discussion thread may be useful.

[http://groups.google.com/group/zoomfloppy-users/browse\\_thread/thread/cca46a7c456ff0c/](http://groups.google.com/group/zoomfloppy-users/browse_thread/thread/cca46a7c456ff0c/)

## Using OpenCBM and related software

Here are some documents on how to use OpenCBM. All the commands are supported by the ZoomFloppy. Do *not* download the binaries for OpenCBM 0.4.x as they do not support the ZoomFloppy.

<http://opencbm.trikaliotis.net/>  
<http://www.trikaliotis.net/opencbm>

There are several GUIs for OpenCBM.

<http://www.6502.org/users/sjgray/software/cbmxf/cbmxf.html>  
<http://sourceforge.net/projects/opencbm/files/gui4cbm4win/>

You can get nibtools from the C64 Preservation website.

<http://c64preservation.com/dp.php?pg=nibtools>

## **Adding a parallel port to your drive**

For copying protected software with nibtools or the highest speed transfers, adding a parallel port to your 1541 drive is a must. These cables, originally designed for SpeedDOS and Burst Nibbler, connect the VIA or CIA chip in your 1541 or 1571 drive to a 15-pin D-SUB female connector, aka game port. Note that the 1571 supports serial nibbling, so a parallel cable is not necessary.

The best way to attach the cable is the solderless approach. You remove the VIA in your drive, plug in a socket, and then plug the VIA into the socket. The D-SUB port is then attached to the case or routed out the back. Peter Schepers sells these cables (see section “Disk Drive Parallel Ports & Cables”, solderless options).

<http://ist.uwaterloo.ca/~schepers/cables.html>

Then you need a cable to connect the drive to the ZoomFloppy. The easiest route is to get a 15-pin D-SUB male-to-female cable. If you want to use your new parallel port with a C64 also, you should get the “C64 user port parallel cable”, also available from the above site. It plugs into the card edge connector on the ZoomFloppy.

## Troubleshooting

Here are some steps to help you solve common problems. The ZoomFloppy is pretty reliable and simple to use, so there aren't many things that can go wrong. If you suspect a hardware problem, get help on the zoomfloppy-users mailing list or contact RETRO Innovations to make a return.

Observation	Problem	Things to try
ZoomFloppy LED does not turn on when plugged into the computer via USB	USB port inactive	Plug the ZoomFloppy into another port or computer. If using a USB hub, try using a port on the PC instead.
	Bad USB cable	Try another cable
	Firmware not installed or has been erased	Reinstall the ZoomFloppy firmware. Note this only needs to be done if the firmware was erased or if upgrading.
"cbmctrl detect" returns an error ("no xum1541 device found")	PC's drivers not installed or improperly installed	Reinstall the drivers
	ZoomFloppy not plugged into USB	Check the USB connection and try again. Unplug the USB cable and plug it in again to reset the board.
"cbmctrl detect" returns nothing (no error)	Drive not connected via IEC cable or not powered on	Unplug ZoomFloppy from USB to power it off. Then, connect drive cable, plug in ZoomFloppy, power on drive

## Support

If you are still having problems, there are mailing lists to contact. If you completed the installation and drive detection succeeds as described above, try the OpenCBM mailing list for general questions about using the software:

<https://lists.sourceforge.net/lists/listinfo/opencbm-user>

If the installation failed and you tried the troubleshooting steps, you can report your problem to the ZoomFloppy users list. RETRO Innovations and the xum1541 developers monitor this list and can handle hardware problems or other similar issues.

<http://googlegroups.com/group/zoomfloppy-users>

## **WARNINGS**

Do not plug or unplug any cables to the floppy drive when the drive is powered on or the ZoomFloppy is connected to a PC via USB. When the ZoomFloppy is plugged into USB, it is powered on and could zap your drive if you connect or remove a floppy drive. This is also the same way you should treat floppy drives attached to your Commodore computers.

Do not attach more than 4 floppy drives to a single ZoomFloppy. If you need more drives, get another ZoomFloppy. The OpenCBM software allows you to use more than one ZoomFloppy at the same time (subject to PC performance limitations).

Do not connect more than one drive to the ZoomFloppy parallel ports. While there are multiple connectors, only one should be used at a time.

When accessing floppy drives, all devices connected to the IEC bus must be turned on. Even if you are only going to use one drive, for example, all other connected drives must also be turned on. Unpowered IEC devices may interfere with proper operation of other drives.

Be careful of static electricity discharge when plugging/unplugging any electronic equipment. Consider getting a case for your ZoomFloppy board if you are concerned about the environment you will be using it in.

## **Proper power-on sequence**

We have tested leaving the ZoomFloppy connected to powered-on drives for days with no problems, even though it was not connected via USB. You also can leave the ZoomFloppy plugged into USB with the drive(s) off with no problems. But while the ZoomFloppy is designed to be robust, you can avoid unnecessary wear by following these instructions for starting up and shutting it down.

1. Start with drive off and ZoomFloppy unplugged from the PC's USB
2. Plug in all cable(s) between ZoomFloppy and drive
3. Plug in ZoomFloppy via USB
4. Turn on drive power switch(es)

Turn off the equipment via the same sequence in reverse, at least doing steps 4 and 3. You don't need to unplug the floppy drive from ZoomFloppy while not in use. The 15x1 drives with an internal power supply tend to get hot if left on for a long time, so you may want to power them off when not in use.

## Credits

- Nate Lawson designed the ZoomFloppy over several years. He built the prototype boards and wrote the firmware, OpenCBM plugin, nibtools mods, and this manual.
- Jim Brain at RETRO Innovations did the PCB design, manufacturing, and hardware sales and support.
- Wolfgang Moser provided design advice and lots of debugging assistance with his complex drive setup.
- Thomas Winkler implemented the IEEE-488 support.
- Arnd Menge implemented the 1571 serial nibbling support.
- Christian Vogelsang did the Mac port and was an early tester.
- Spiro Trikaliotis, Joe Forster, and Thomas Kindler all helped review changes and provide advice, in addition to other code they've written.
- Peter Rittwage continues to update nibtools to support reading/writing protected disks. Original code for mnib was by Markus Brenner.
- Dean Camera provided the very useful LUFA AVR USB library