AspeQt-2-Raspberry Pi (any, including the Zero-W) for the old 1980s 8-bit computers.

Intro:

AspeQt (AspeQt-2020) Server is a Peripheral Emulator for the old 8-bit computers of the 1980s, and acts like a virtual floppy / hard-drive. This tutorial shows how to setup AspeQt on the popular Raspberry Pi family of single-board microcomputers, and on the RasPi Zero-W[ireless] in particular.

This tutorial assumes that you have a basic working knowledge of how to setup a RasPi.
Recommend: https://www.youtube.com/watch?v=NqBmfVUjh9I
Raspbian OS: https://www.raspberrypi.org/software/

Very Short History:

I bought my first computer, an Atari 800, for $999.99 in 1979. I held on to this computer for 30+ years and in 2020 I discovered that there was still a huge 8-bit Atari computer community all over the world thanks to our 21st century Internet. Unfortunately most people don't necessarily want to use the old school 5-1/4 inch floppies / drives anymore, so why not use 21st century tech?

In 1980 a 10MB Hard Drive would set you back approximately $3,400.00USD!!! The vast majority of 8-bit Atari owners in the 1980s did NOT own hard drives. In 2020 hard drive (and computer prices in general) are cheap compared to the 1980s. In the year 2020, the smallest capacity SD Card I can find is 2GigaBytes at a cost of $8.99. So lets use 2020 tech for our 1980s 8-bit computers then.

Lets do this!:

The two basic ways to setup AspeQt-2020 on a RasPi Zero-W presented here are:
1) The quick and easy way,
2) The hard way.

But first you must gather up all the pieces you need. The pieces/part you will need are:

a) Raspberry Pi Zero-W (or any other model Raspberry Pi):
https://www.adafruit.com/product/3400

b) OTG-USB hub with Power:
https://www.amazon.com/gp/product/B07H4JV6ZF/ref=ppx_yo_dt_b_search_asin_title?ie=UTF8&psc=1

c) 5v Power Supply for RasPi:
https://www.adafruit.com/product/1995

For those who will be using **AspeQt** on an 8-bit Atari computer system you will need to also buy, or build, a SIO2PC (Serial I/O –to- PC) cable/adapter. If you just want to buy a pre-built SIO2PC this is the one I use made by Lotharek and is a dual use, 10502PC/SIO2PC-USB:
https://www.lotharek.pl/productdetail.php?id=157)

To build your own cable version, these are the parts you will need for your SIO2PC:

a) https://13leader.net/download/SIO2PC_Build_Instructions.pdf
(build instructions)

b) https://www.amazon.com/PL2303TA-RS232-Converter-Serial-module/dp/B01MSS4Z9A

c) SIO connector/Plug:
Buy (https://www.vintagecomputercenter.com/product/sio-plug)
or 3D print (https://www.thingiverse.com/thing:1831769); you will need to buy some connector pins also.

Setup the RasPi Zero-W...:

The "Easy" way is to make an image (copy) of my working RasPi Zero-W's fully functioning Micro-SD Card. You will need to use Win32 Disk Imager (For PC/Windows machines, Apple OS versions do exist) to accomplish this. You can download the imager at:

https://sourceforge.net/projects/win32diskimager/

Then merely copy my RasPi's 8GB micro-SD card image onto your your own 8GB (or greater) Micro-SD card. RasPi Zeros use only Micro-SD cards. Then plug your Micro-SD into your RasPi Zero-W, connect the SIO2PC cable and fire it up!

The RasPi Zero's 1Ghz, Signle-Core ARM processor is NOT the fastest in the world, and when you invoke X-Window (Graphical User Interface) to come up the RasPi Zero's CPU maxes out and things on the screen happen…eventually! You have to be patient with it. At times is will seem like the RasPi Zero has locked-up, but it is just crunching away so hang in there! Eventually the blank/black screen will produce a mouse pointer, and eventually the X-Window itself. Navigate down to the lower left corner of the X-Window and find the "Open Application Menu", and click on it. When the menu comes up, click on "RUN". When the small window comes up type into it "./AspeQt" (don't include the quotes). This will finally bring up AspeQt and you can start using the virtual drives on it.

For the AspeQt Manual goto:
http://aspeqt.sourceforge.net/AspeQt%20User%20Manual-English.html

So what's **the "Hard" way**? That's rolling your own SD card from scratch! This option will eventually get you to the point where I made the disk (SD Card) image of my RasPi Zero, but it takes a LOOOONG time! There is lots of waiting around for the RasPi Zero to download and install packages on to the Pi's Micro-SD card. If you are still interested in doing this the hard way for yourself (or your ego?) then please continue on.

Get ready!!!!

Files for this project can be downloaded from
http://13leader.net via SourceForge.net

https://sourceforge.net/projects/respeqt/files/AspeQt-r5v13l-RaspberryPi.tar.xz/download

Be sure to unpack/extract/unzip it before you start the project. I placed the AspeQt folder into my RasPi's /home/pi/ directory.

You should have already installed at minimum the Raspbian Lite (Command Line Interface: CLI version) OS on the RasPi Memory Card.
Raspbian OS: https://www.raspberrypi.org/software/

Steps #:

1- Build a SIO2PC cable outlined in SIO2PC_Build_Instructions.pdf

a) https://13leader.net/download/SIO2PC_Build_Instructions.pdf

b) https://www.amazon.com/PL2303TA-RS232-Converter-Serial-module/dp/B01MSS4Z9A

c) SIO connector: Buy (https://www.vintagecomputercenter.com/product/sio-plug)
or 3D print (https://www.thingiverse.com/thing:1831769); you will need to buy some connector pins also
Video Reference on how to build a cable for yourself:
https://www.youtube.com/watch?v=-xXBNQIFKLE

The pre-manufactured solution I use is Lotharek's **10502PC/SIO2PC-USB** (click the "USD" button to see US-$ pricing):
https://lotharek.pl/productdetail.php?id=157

There are other purchase options you can find over the Internet, just do a web search for Atari SIO2PC.

2- Connect your RasPi Zero-W to a TV or Monitor, plug in the power adapter and Micro-SD card, and fire it up! Enter the commands below into the Command Line Interface (CLI) to Update & Upgrade your RasPi first. These two steps will take much time - so be patient. Comments below in parenthesis are NOT commands, only comments for you, the reader. Linux commands all begin with "$":

```
$ sudo apt update
```
(answer Y to the y/n question)

```
$ sudo apt upgrade
```
(answer Y to the y/n question)

3- Install Qt libraries and gcc (these steps will take several minutes each):

```
$ sudo apt install make gcc qt5-default
```
(answer Y to the y/n question)

```
$ sudo apt-get install libqt5serialport5
```

```
$ sudo apt-get install libqt5serialport5-dev
```

4- Compile and install AspeQt

Change Directory ($ cd) to the "AspeQt-r5v13l-RaspberryPi" source folder, wherever you put it? The .tar.xz files must have already been Extraced/Unpacked/UnZipped etc...:

$ cd /home/pi/AspeQt-r5v13l-RaspberryPi /AspeQt

(or wherever you put it? If you don't know where it is, try using the "find" command: https://www.bitpi.co/2015/02/15/using-find-command-raspbian/)

$ make clean

$ qmake

*(If you don't have permissions to make changes you may need to do: "$ sudo chmod a+rwx *.*")*
(You may also see several lines of "Empty filenames passed to function", just disregard it!)

$ make

(this takes a long time on ta RasPi ZERO W, possibly 30-60 min, or more!!! It will appear as though the Pi has locked-up, just be patient)

5- Plug in the SIO2PC cable and run the AspeQt server.

$ ./AspeQt

(this assumes you are still in the same source directory where you had placed the AspeQt source file(s))

*NOTE: If you installed Raspbian **Lite** onto your Micro-SD card you will probably get an error saying "unable to open x display",*
you will likely need to run the following commands to load ldxe, x11 & lightdm:

a) $ sudo apt-get install lxde lxde-core lxterminal lxappearance

(answer Y for y/n question... this takes a loooong time to install)

b) $ sudo apt-get install lightdm

(this also takes a long time to load - be patient)

c) $ sudo apt-get install xserver-xorg

d) $ sudo apt-get install xinit

e) $ sudo apt-get install x11-xserver-utils

(answer Y for y/n question)

f) $ sudo apt-get install xterm

g) $ startx

(Opens X window)

The X Window comes up slowly with a black/blank screen, so be patient again. Eventually you will see a mouse pointer and then the Window will eventually come up. Navigate the mouse down to the lower left corner and find and click on the "Open Application Menu".

Now find and click on "RUN" and type into the window "./AspeQt" (don't include the Quote marks). You should see the AspeQt window open up…eventually

For the AspeQt Manual goto:
http://aspeqt.sourceforge.net/AspeQt%20User%20Manual-English.html

Keep in mind the Bigger Brothers to the Ras Pi Zero, such as the RasPi 2B, 3, 4, 400, are much more powerful and are able to work faster than the Pi Zero, but also cost more!
https://www.adafruit.com/category/105

HOLD THE DOOR!!!

Soon after doing all this work, to get AspeQt working on the RasPi Zero-W, and to make this Instructable, I discovered…wait-for-it!...

AspeQt for Android app:
https://play.google.com/store/apps/details?id=org.qtproject.example.AspeQt&hl=en_US&gl=US

Once installed on my cheapo RCA Android Tablet (you could also use an Android Mobile Phone) I plugged the SIO2PC-USB cable directly into the tablet, did a few minor configuration checks, and started the SIO2PC connection with my Atari 800 computer. It works great!... albeit a little buggy? And actually much faster than the AspeQt on the RasPi Zero W. Something to consider.