Displaying Xpanxion Wallboard via Raspberry Pi

Objective:

The goal of this document is to walk you through setting up a TV to display the Xpanxion Wallboard using a Raspberry Pi. The Pi will be set up to automatically start displaying the wallboard without human interaction upon powering on.

Hardware:

- Raspberry Pi (Model B+ 512MB)
- Micro SD card (minimum 8GB class 4)
- Memory card reader (only if your computer cannot read/write micro SD cards)
- Mouse and keyboard (to connect to Raspberry Pi)
- HDMI cable
- Ethernet cable with access to internet
- TV w/ HDMI port (Preferably with USB port also to power the Pi. If not, it is possible to power it from a normal outlet)

Software:

- Raspbian OS
  - http://www.raspberrypi.org/downloads/
- Win32DiskImager utility
  - http://sourceforge.net/projects/win32diskimager/
- Putty
  - http://www.putty.org/

Procedure:

The first thing we are going to need to do is load the Raspbian OS onto the micro SD card. To do this, follow these steps:

1. Go to the downloads page for the Raspbian OS given above, download the ZIP file, and extract it to your desired folder. The resulting file will be a Disk Image File.
2. Be sure that Win32DiskImager is installed on your machine (link given above).

3. Insert the micro SD card into your card reader and be sure to note the drive letter that it was assigned.
4. In Win32DiskImager, select the Raspbian Disk Image File to be written and select the drive letter assigned to the micro SD card.

*** Warning (from Raspberry Pi website): Be careful to select the correct drive; if you get the wrong one you can destroy your data on the computer's hard disk! ***

5. Click "Write" and wait for the write to complete.
6. Exit the imager and eject the micro SD card.

Now the Raspbian OS is written onto the micro SD card. We can simply insert the SD card into the Raspberry Pi, which is located on the underside of the Pi.

We are now ready to boot up the Raspberry Pi. Be sure that you have a monitor, keyboard, mouse, and Ethernet cable hooked up to the Pi. When all this is done, connect the micro USB to a power supply and it should start.

When the Pi is done initializing, you will be prompted with a terminal window. The first thing we wish to do is to update the package list and upgrade any packages on the device. To do this, type the following:

```
sudo apt-get update && sudo apt-get upgrade -y
```

Next we want to install the Chromium web browser to use for this project because Chromium has a kiosk mode we will use to make the wallboard full screen. To do this, enter the following into the terminal window:

```
sudo apt-get install chromium x11-xserver-utils unclutter
```

We now have Raspberry Pi set up with all the updated packages and software we will need. Now we can move to setting up an SSH to the Pi so that we don't have to have a keyboard and mouse connected to it the whole time.

SSH Setup

The first thing we are going to want to do is setup a static IP address for the Pi on the network. Make sure the Pi is connected to the network and in a terminal window type the following:

```
ifconfig
```

Be sure to note the address, gateway, broadcast, and mask.

Note: When first attempting this, I noticed that the gateway was not written anywhere on the screen. If this is the case, it is good to know that the gateway is usually the address of your router so you can obtain the gateway this way if need be.

Now in the terminal we are going to edit your network settings and setup the static address. To do this type the following:

```
sudo nano /etc/network/interfaces
```

This will open up your network interfaces file. The first thing we will do is change the line that reads

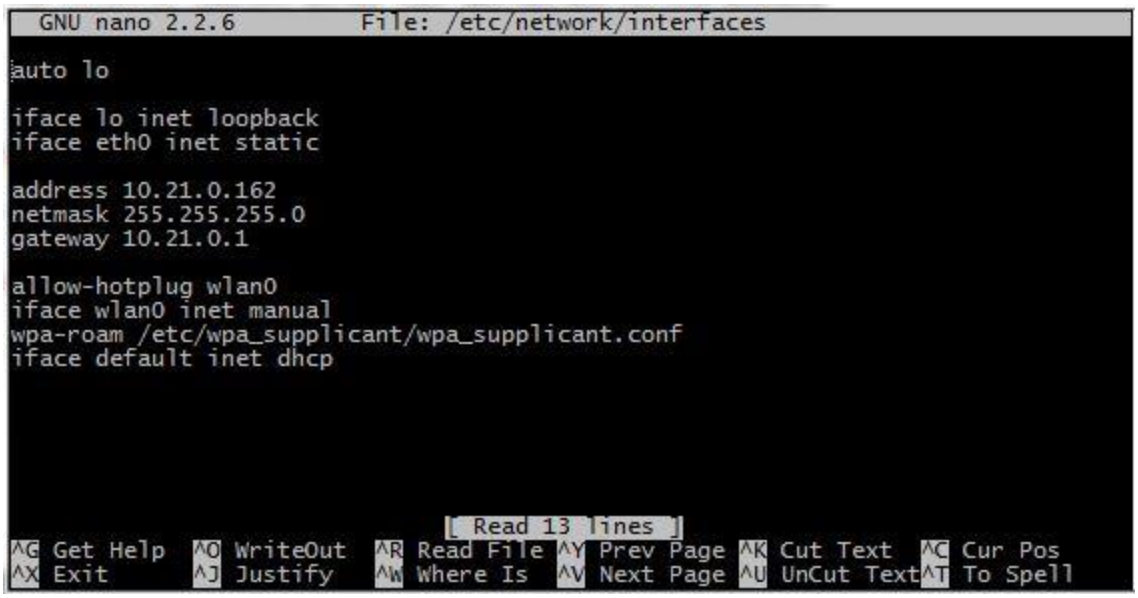
```
iface eth0 inet dhcp
```

to

```
iface eth0 inet static
```

Three more lines will need to be added to the file right after the line you just changed:

```
address xxx.xxx.xxx.xxx
netmask 255.255.255.0
gateway xxx.xxx.xxx.xxx
```



Adding the static address you would like to use next to the address line and then your gateway address also. Remember to use an address that isn't in the DHCP pool for your router to avoid any conflicts later on with other users on your network. Now hit ctrl-O to write the file and then ctrl-X to get you back to the terminal.

Your static address is not set up. Now that this is complete, we now need to enable SSH on the Raspberry Pi. We will use the Raspbian wizard to complete this. In the terminal window type the following:

```
sudo raspi-config
```

Here, the first thing we need to do is change the user password which should be option 2. The default username is "pi" and the default password is "raspberry".

Once you have changed your password, we now need to enable the SSH. To do this go into option 8, and inside there, go to option A4, which is SSH. Hit 'enable'.

The last thing we will need to do is make sure that the Raspberry Pi boots up to the desktop. To do this, navigate to option 3, Enable Boot to Desktop/Scratch and set it to the boot Desktop option.

This should complete the process to enabling SSH on the Pi. We will now try it out to make sure it works.

Head to a computer on the same network and install Putty. When installed, type the IP address of the Pi into the space provided and make sure the option is checked to SSH. Click connect. You will need to login with the credentials you just set. After this you should be greeted with a command prompt controlling your Pi. Congrats! You don't need the keyboard or mouse hooked up to the Pi anymore to control it! The rest of this document can be carried out by SSH.

Kiosk Mode Setup

The first thing we will need to do is disable a few settings, such as the screensaver and any energy saving settings as we don't want our screen to go to sleep at all when it's in use, as you can imagine.

To do this, in a terminal window enter the following:

```
sudo nano /etc/xdg/lxsession/LXDE-pi/autostart
```

This is the file that will run when the Pi boots up. First off, we need to comment out the following line in the file:

```
@xscreensaver -no-splash
```

To comment out this line, simply add # to the beginning of the line. After this is complete, add the following lines under the screensaver line:

```
@xset s off
@xset -dpms
@xset s noblank
```

These three lines disable power management settings and stops the screen from blanking after a period of inactivity.

We now want to prevent any error messages from popping up on the screen if someone accidentally powers the Pi off without going through the shutdown procedure. We will accomplish this by adding the following line below the lines you just added:

```
@sed –i 's/"exited_cleanly": false/"exited_cleanly": true/'
~/.config/chromium/Default/Preferences
```

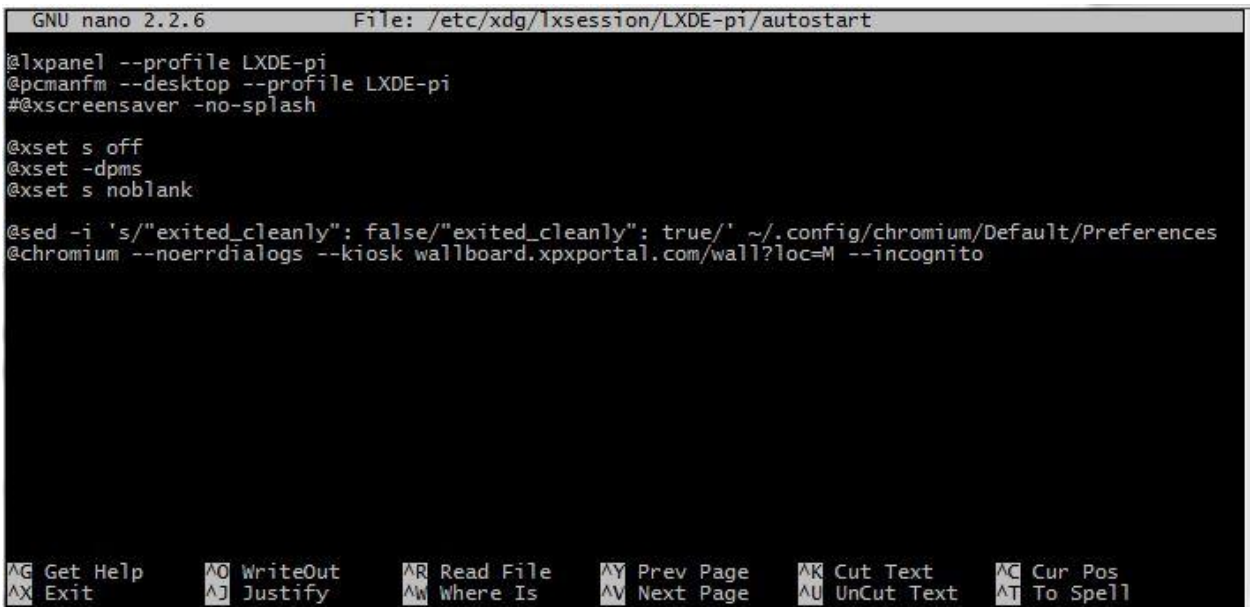
Be sure that this line is one line, not two. The break in the line of code is simply a space.

Finally we need to let chromium know what webpage to load once the Pi has booted. To do this add the following line of code to the bottom of this autostart file:

```
@chromium --noerrdialogs --kiosk wallboard.xpxportal.com/wall?loc=M
```

You can change the `loc=M` portion of the code to whatever you wish, depending on your location. It may need to be necessary to add an incognito flag to the end of this line to ensure no warnings are displayed. To do this, simply add the following to the end of this line of code:

```
--incognito
```



Remember to hit ctrl-O to write the file and ctrl-X to exit back to the terminal. Now we want to reboot the Raspberry Pi and see if it works! Type the following into the terminal to reboot the Pi:

```
sudo reboot
```

Watch the screen to make sure that the Raspberry Pi automatically loads the Xpanxion Wallboard to the screen. If it is displayed with no issues, you are done!

I feel that it's worth noting that sometimes there may be a black border around the screen which is annoying. To fix this problem, type the following into the terminal:

```
sudo nano /boot/config.txt
```

When inside, find the line of code which will be commented out with a # that needs to be uncommented that reads

```
disable_overscan=1
```

Simply uncomment this line and you should be good to go! Reboot the Pi once again and verify that this fixes the problem.

One last note: If you wish to shut down the Raspberry Pi, simply type the following into the terminal:

```
sudo poweroff
```

Congratulations on your Raspberry Pi that now displays the Xpanxion Wallboard automatically when you boot it up!

Sources

https://www.danpurdy.co.uk/web-development/raspberry-pi-kiosk-screen-tutorial/

http://www.raspberrypi.org/documentation/installation/installing-images/windows.md

http://www.raspberrypi.org/forums/viewtopic.php?f=46&t=47152

http://www.raspberrypi.org/help/quick-start-guide/