Introduction

This document discusses, at a high-level, the startup and shutdown steps for the new System 1 software (Version 9) which uses the recently installed 16-bit encoders. It will discuss with some detail, how to startup and shutdown the "12-bit" and "16-bit" Raspberry PIs. The Raspberry PIs provide the software/hardware interface to the 12-bit and 16-bit encoders. The "12-bit" Raspberry PI interfaces to the two 12-bit legacy encoders, via a Digital I/O interface. The "16-bit" Raspberry PI interfaces to the two new 16-bit encoders, via TCP/IP protocol. The "12-bit" Raspberry PI is located in the white enclosure box at the top of the mount pedestal. The "16-bit" Raspberry PI is located in the Operations Facility on the Operator Workstation desk.

Nominal Site State on System 1 Startup

When the Operator arrives on site, the different site components should be in the following state:

- The Mount Pedestal: The Mount power breaker bar should be off. With the power off, the 12-bit and 16 bit encoders and the "12-bit" Raspberry PI should be powered off.
- The Operations Facility: The Operator Console PC and the "16-bit" Raspberry PI should be powered off. The VFD switch should be in the off position.

If the "16-bit" Raspberry PI is still on when the operator arrives, it should be shut down. Please see the section *Raspberry PI Hardware Shutdown Options – Item 3 - Shutting down from the Raspberry PI LCD Display.*

Site Startup Sequence

The site components should be brought up in the following order:

1. Power up the Pedestal, by turning on the power breaker bar located at the bottom on the Pedestal. This turns on power to "12-bit" Raspberry PI and the two different encoder systems (12-bit and 16-bit)
2. Power up the "16-bit" Raspberry PI located on the Operator Workstation in the Operations Facility.
3. Power up the Operator Console hardware.
4. Move the VFD switch to the on position.
5. Start the System 1 software. You can start up either or both of the 12-bit or 16-bit systems. Typically the 16-bit system is started by clicking on the "16 bit system auto" icon located on the Operator Console Desktop. Additionally, the 12-bit system can be started in "Manual" mode by clicking on the "Operator Console Manual" icon located on the Operator Console Desktop – For both icons see Figure 1. Please note only one of the two systems can physically control the mount at a time. So when running both systems in parallel, one system must be in "auto" mode and the other in "manual" mode.
6. Operate the system as required.

Please note that I did not discuss the use of the "Jones" plug. At this time, I believe the "Jones" plug should remain plugged into the System 1 Hardware Interface Tray. It should only be moved when manual operations of the mount are required.

Figure 1 – Operator Console Desktop

Site Shutdown Sequence

At the completion of an operating session, the system components should be brought down in the following order:

1. Shutdown the System 1 software on the Operator Console.
2. Move the VFD switch to the off position
3. Shutdown the “12-bit” and “16-bit” Raspberry PIs. This is accomplished by clicking on the “Shutdown PIs” Icon on the Operator Console Desktop – See Figure 1. Please note: This shuts down the Linux Operating System (OS) running on both PIs. For the “16-bit” Raspberry PI the hardware must be turned off using the power switch located on the USB power cord connected to the PI. Please wait approximately 30 seconds before turning off the PI to allow the OS time to completely shut down. The “12-bit” PI hardware will be automatically turned off when the Pedestal Power is turned off.
4. Shutdown the Operator Console hardware.
5. In the Pedestal, power off the power breaker bar located in the bottom of the Pedestal. This will power off the “12-bit” Raspberry PI and the two encoder systems.

Raspberry PI Hardware Shutdown Options

It should be noted that at this time the "12-bit" Raspberry PI is always powered up when the Pedestal power is applied. Because this PI is always running, it should be brought down when the "16-bit" Raspberry PI is shut down. There are three ways of shutting down one or both Raspberry PIs. They are:

1. Use the "Shutdown PIs" Icon on the Operator Console Desktop (as discussed above). This method shuts down both Raspberry PIs (if both are up, elsewise it will shut down a single PI). No errors will be reported if both PIs are not up.

2. Shutdown a single Raspberry PI from the System 1 Software – See Figure 2.

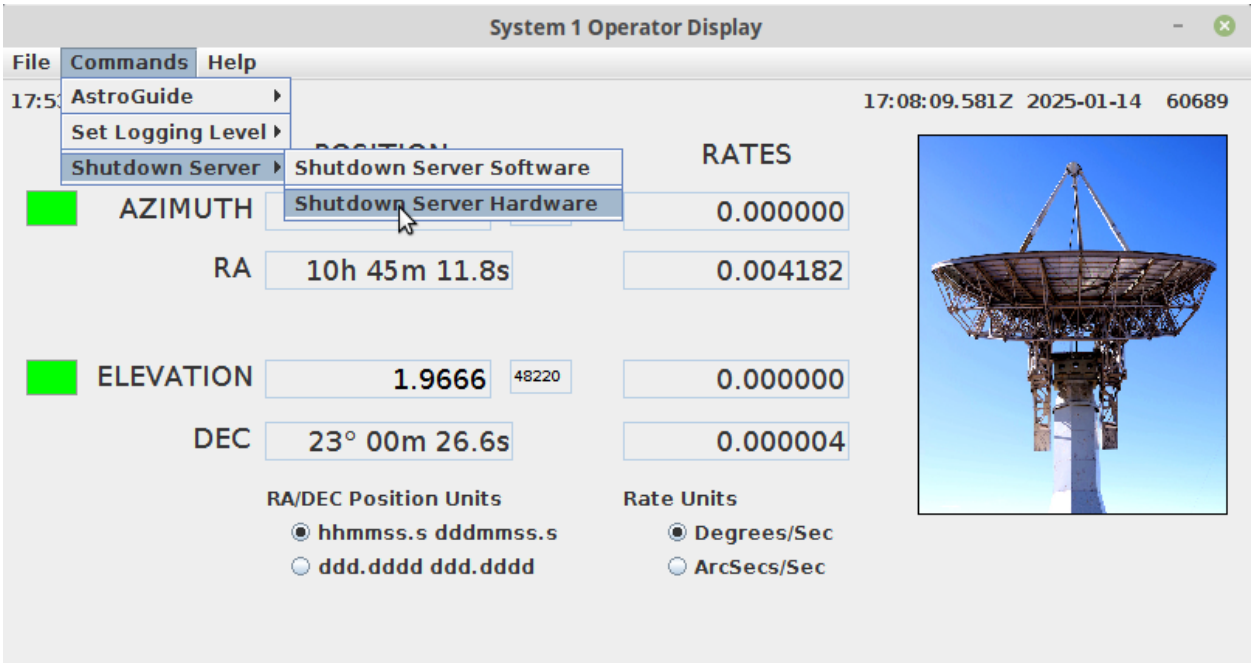

Figure 2 – Shutting Down a Connected Raspberry PI

On the *System 1 Operator Display* select and pull down the "Commands" pull down menu item. Select the "Shutdown Server" pull down menu item. From this pull down menu, select "Shutdown Server Hardware". When this pull down menu item is selected, the Raspberry PI connected to this Operator Display will have its OS shutdown and halted. The hardware can then be powered off when the OS completely shuts down (approximately 30 seconds). As stated above, this will only shut down the connected Raspberry PI. Any other Raspberry PIs will remain running. Additional information: The "Shutdown Server Software" menu item selection will cause the connected Raspberry PI to **reboot.** When a reboot occurs the OS shuts down then automatically restarts. When the restart occurs the System 1 Server Software will also restart. This is a way to restart the Server Software on the fly.

3. Shutting down from the Raspberry PI LCD Display – See the following figures:

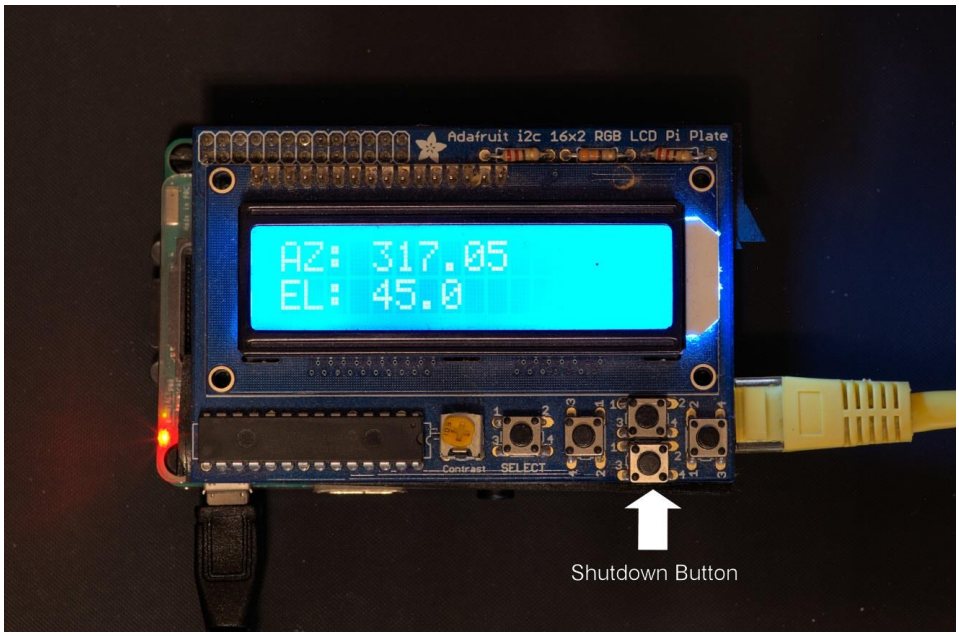

Figure 3 – Select the Shutdown Button

To begin the shutdown process, select the Shutdown Button on the Raspberry PI LCD display.

Figure 4 – Push the Select Button

To complete shutting down the Raspberry PI hardware, push the Select Button.

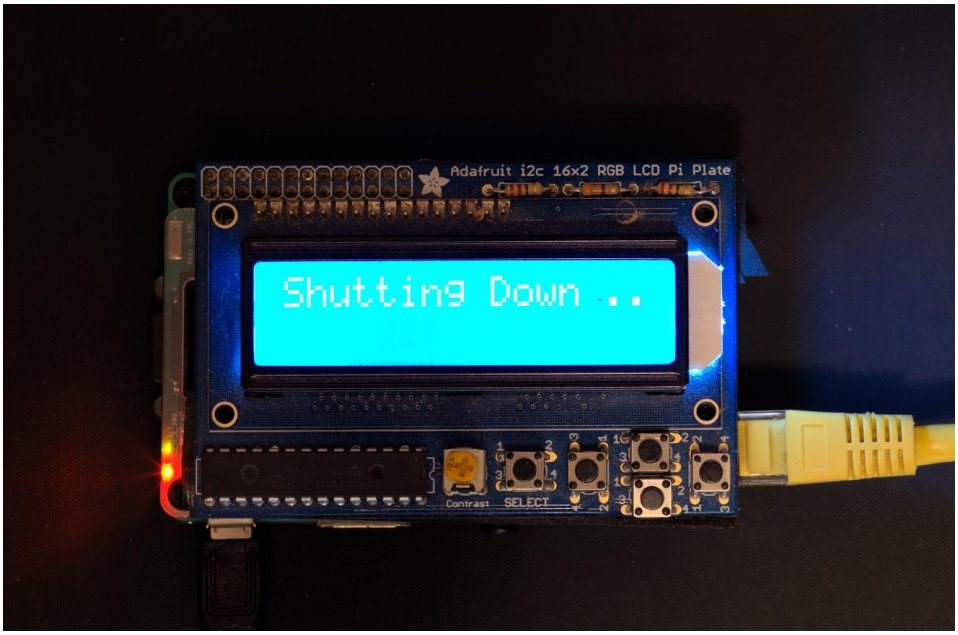

Figure 5 – The Hardware is Shutting Down

Once the “Shutting Down ..” text is displayed, wait 30 seconds before turning off the Raspberry PI hardware. In the case of the Pedestal, power off the power breaker bar located in the bottom of the Pedestal. In the case of the Operations Facility, the hardware must be turned off using the power switch located on the USB power cord connected to the PI.

Cancelling a Shutdown from the LCD Display:

When the Shutdown Select button has been pushed, a Shutdown Command can be cancelled using the Cancel Button on the LCD Display.

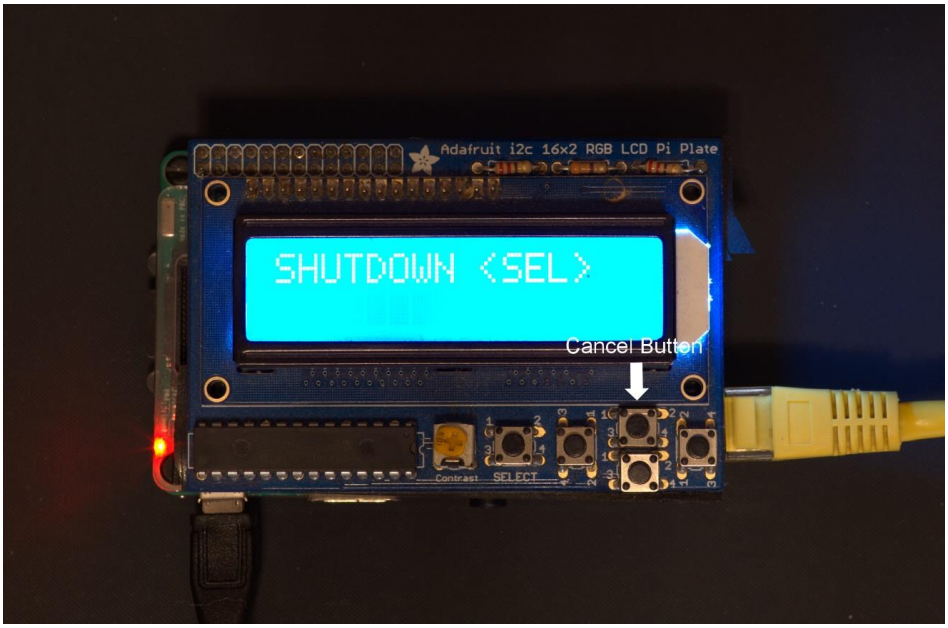

Figure 6 – Cancel Button Selection

Push the Cancel Button to cancel the shutdown command.

Figure 7 – Pushing the Select Button for a Cancel

Push the Select Button to cancel the Shutdown Processing

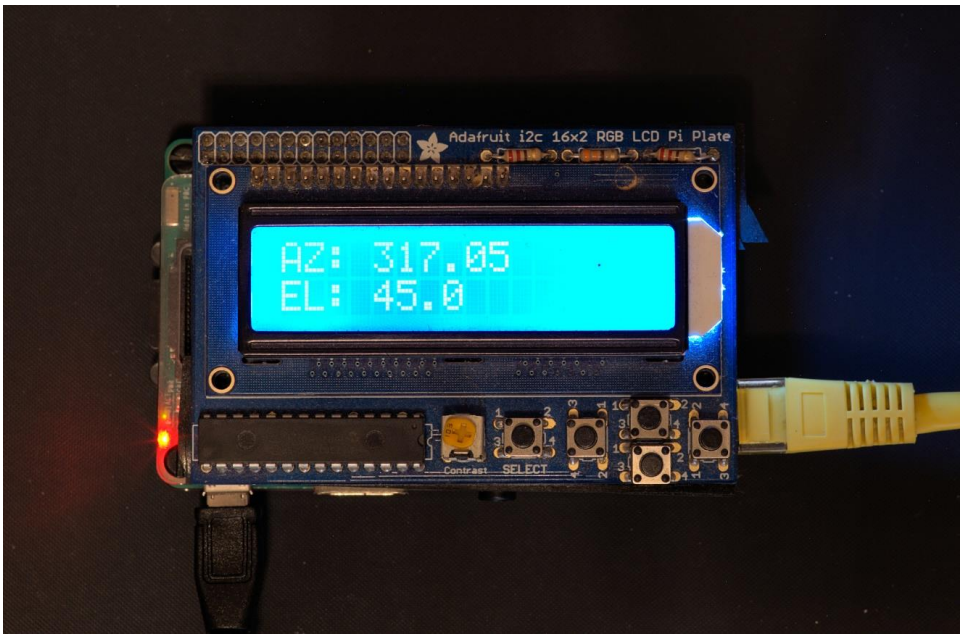

Figure 8 – Return to the Nominal Execution State

The Raspberry PI returns to a nominal execution state.