How To Configure
PowerChutePlus onLinux with the APC BackUPS Pro 280VA

(v1.0, 7Feb2002 written by: Jay Sklar)

This How-To explains the steps involved in setting up a Dell or Penguin computer system with Red Hat Linux v7.1 for use with the APC BackUPS Pro 280VA uninterruptible power supply (UPS) and PowerChute Plus UPS software. The document is divided into 7 sections:

1. Requirements
2. Hardware Configuration
3. Software, Part 1 (installation and configuration)
4. OS Configuration
5. Software, Part 2 (configuration)
6. Testing
7. Troubleshooting

1. Requirements:

Red Hat Linux v7.1 (RH7.1)
PowerChutePlus-4.5.3-1_RedHat.i386.rpm
APC BackUPS Pro 280VA
APC UPS cable (SN: 940-0095B)

Note that the version of PowerChutePlus listed here is built for RH7.1. Other versions are available at the APC ftp site for download:

ftp://ftp.apc.com/apc/public/software/unix/linux/pcplus/

ftp directory listing showing available versions (as of 6 Feb 2002):

```
09/13/1999 12:00AM       Directory 451
10/10/2000 12:00AM       Directory 452
10/10/2000 12:00AM       Directory 4521
03/14/2001 12:00AM       Directory 453
```

2. Hardware Configuration

Choose one COM port dedicated to the UPS software and connect the UPS using the APC UPS cable with part number 940-0095B. The cable should have been supplied with the UPS unit. Otherwise request one from APC and they will send it out free of charge.

Turn the computer on and enter the BIOS settings display. Shortly after you power on the computer system you should see a brief message showing how to do this. Usually, depressing the F2 or DEL key during the boot process will get you there.

Once in, look for power settings and ensure that the following requirement is met:

state after AC power failure should be ON upon power restore

Save the change and continue booting.

3. Software Installation and Configuration, Part 1

Obtain a copy of PowerChutePlus-4.5.3-1_RedHat.i386.rpm. This should be available for download at:

```
http://www.unavco.ucar.edu/project_support/network/software/PowerChutePlus-4.5.3-1_RedHat.i386.rpm
```

Log in as root and put the powerchute rpm in /root, then issue the command (from within the same directory, of course):

```
rpm -Uvh PowerChutePlus-4.5.3-1_RedHat.i386.rpm
```

Cd to the newly created /usr/lib/powerchute directory and run the command:

```
./Config.sh
```

The configuration program will prompt you with a series of questions such as what port, what type of UPS, etc. This should be very straight-forward.

4. OS Configuration

Edit system file:

```
/etc/rc.d/init.d/halt
```

Just about at the end of file you'll find these lines:

```
HALTARGS="-i -d"
   if [ -f /poweroff -o ! -f /halt ]; then
   HALTARGS="HALTARGS -p"
fi
```

Remove the *-p* option from `HALTARGS="HALTARGS -p"`

Explanation:

-p tells the computer to power-down after a shutdown command. If the computer is powered down in this manner (with *-p* option enabled) the system will not power-up automatically after a utility power restore. The BIOS interprets this as a normal shutdown procedure; i.e., shutdown not due to a power failure. Removing the '-p' flag results in a properly shutdown OS but not physically powered down. Therefore, once the inverter in the UPS is killed the BIOS interprets this event as a power failure. When power is restored and the inverter is reset the BIOS automatically turns the system back on.

Now reboot the machine

5. Software Configuration, Part 2

xpowerchute is the GUI for modifying the operating parameters of the UPS. It also offers diagnostic and monitoring tools to view the current state of the UPS, line voltage conditions, battery charge, load, etc.

Log in as root and start the Xserver. Open a terminal window and cd to:

```
/usr/lib/powerchute
```

Now run *xpowerchute* (can only be run within the powerchute directory) by issuing command:

```
./xpowerchute
```

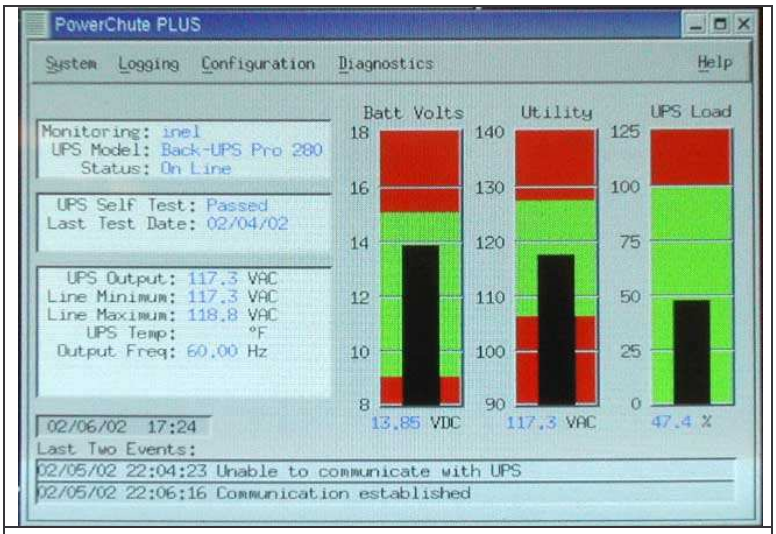

Fig 1. PowerChutePlus main screen.

Under the *Configuration* menu, select *UPS Shutdown Paramters* and change the settings to match the example listed in **Figure 2** below. Note that *Automatic Reboot* is selected.

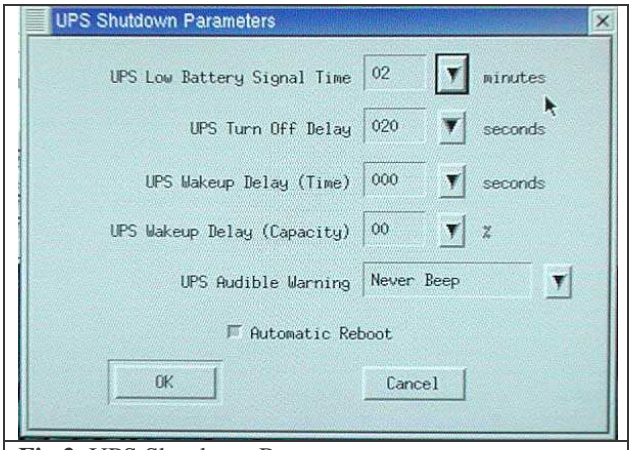

Fig 2. UPS Shutdown Parameters

From the *Configuration* menu, select *Communication Parameters*. Match the settings in **Figure 3** below under *UPS Communications.* Your port may, of course, differ. Disregard the *Paging Modem* settings as they are not used at this time.

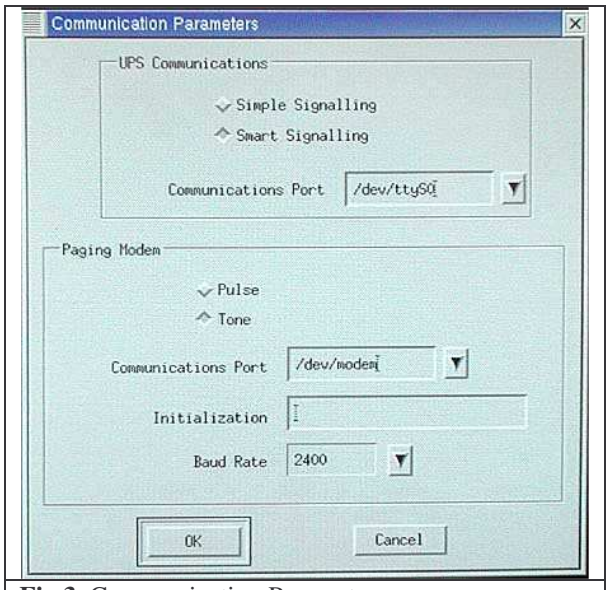

Fig 3. Communication Parameters

From the *Operating Parameters* window as seen below in **Figure 4** you may modify voltage switching and sensitivity of the UPS. This allows you to customize the UPS for a particular location where the utility power charactaristics may be other than ideal. Also shows serial number, manufacture date, and date of last battery replacement.

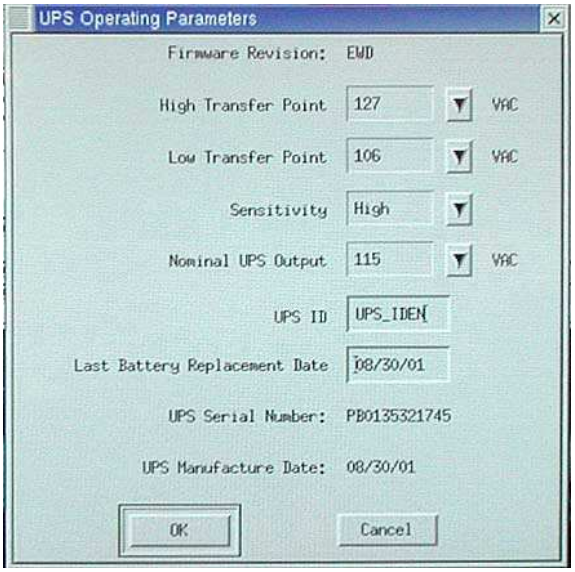

Fig 4. UPS Operating Parameters

Parameter explanation:

High Transfer Point:
The maximum line voltage threshold. A line voltage spike above this value will trigger a switch to the battery. Four settings to choose from.

Low Transfer Point:
The minimum line voltage threshold. A line voltage dip below this value will trigger a switch to the battery. Four settings to choose from.

Sensitivity:
Three settings to choose from. Generally leave on HIGH.

Nominal UPS Output:
Only one value available.

Once you have made all changes save the settings and exit. The next step is to edit the PowerChute init file:

```
/usr/lib/powerchute/powerchute.ini
```

You must manually change *all* instances of the `ShutDownDelay` and `AdminShutdownDelay` variables to 120 (seconds). Depending upon the utility voltage characteristics you may want a different value. However, 120 seconds is standard.

```
      ***
ShutdownDelay 120
      ***
AdminShutdownDelay 120
      ***
```

6. Testing

Simulate a power failure to test the system. Perform the following three tests to confirm a properly working system:

i) disconnect power, wait for full shutdown (inverter kill), restore power
ii) disconnect power *during bootup*, wait for full shutdown, restore power
iii) disconnect power, wait for shutdown process to begin, then *restore power during shutdown* process

The computer should recover from all these circumstances. Keep in mind the time delays you have set. Impatience may bring about the appearance of a system not working properly. Just wait and see what happens keeping in mind the time delay you set. For the purpose of expediency you may want to temporarily set the ShutdownDelay variables to 30 seconds, for example. Just remember to change them back after confirming positive test results. If the system does not appear to be functioning as you would expect, refer to the troubleshooting section of this document.

7. Troubleshooting

Problem	Remark
1. PowerChutePlus does not appear to install properly or won't install.	a. Check that the version of PowerChutePlus matches the version of Red Hat Linux OS b. Make sure your RPM version is compatible with the RPM package.
2. Config.sh script can't open port to detect UPS	a. Make sure the port is available and no other processes are using it. E.g., mgetty, lapdogs or other GPS download software, etc. b. Is the UPS cable plugged into the right port? Did you choose the port the UPS is plugged into?
3. Config.sh script can't communicate with UPS properly.	a. Make sure you're using the correct UPS serial cable. b. Did you choose the right UPS from the list?
4. Computer won't shut down after disconnecting utility power.	a. Did you reboot machine after installing the software? b. Refer to Remarks for Problem #2
5. Computer powers down completely after disconnecting utility power. Does not reboot automatically after restoring utility power. Must manually turn it back on.	Remove the *-p* option from the `HALTARGS="HALTARGS -p"` line in `/etc/rc.d/init.d/halt` file.
6. Computer remains on after cutting utility power to the UPS and the UPS inverter shuts down.	Did you plug the computer into the UPS in the first place???
7. The OS is halted (proper shutdown) after utility power disconnect but the inverter does not shut off.	The *UPS Turn Off Delay* time (found within the *UPS Shutdown* Parameters window) should be set to 20 seconds. If after 20 seconds passes and nothing happens, double-check this value. It is probably set to a higher value.
8. The OS is halted (proper shutdown) and the inverter shuts off after utility power disconnect but after restoring the utility power the UPS turns back on but the computer doesn't.	a. Make sure the BIOS power settings are set so that the computer is on after a power failure recovery.
9. If all else fails…	APC tech support (800) 890-4272 option #3