

***Setting up the APC Smart UPS VT for use with  
the AARTS System***

***Rev B – November 4, 2007***

*Accel-RF Corporation specializes in the design, development, manufacture, and sales of accelerated life-test/burn-in test systems for RF and Microwave semiconductor devices. This white paper describes technical information related to the AARTS Hardware. For more information contact:*

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## ***Table Of Contents***

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1	System Description and Overview .....	1
2	System Configuration .....	2
2.1	Configuring the Smart VT for Auto Shutdown .....	2
2.2	Configuring the Smart VT Network Management Card IP Settings .....	4
2.3	Configuring the Smart VT Network Management Card Functional Settings.....	7
2.4	Configuring the Smart VT Power Chute Shutdown Settings.....	9
2.5	Configuring Windows to Run the Shutdown Script .....	12
2.6	Configuring Windows TCP/IP settings .....	13
3	Testing the Setup .....	14
4	Contact Information .....	15

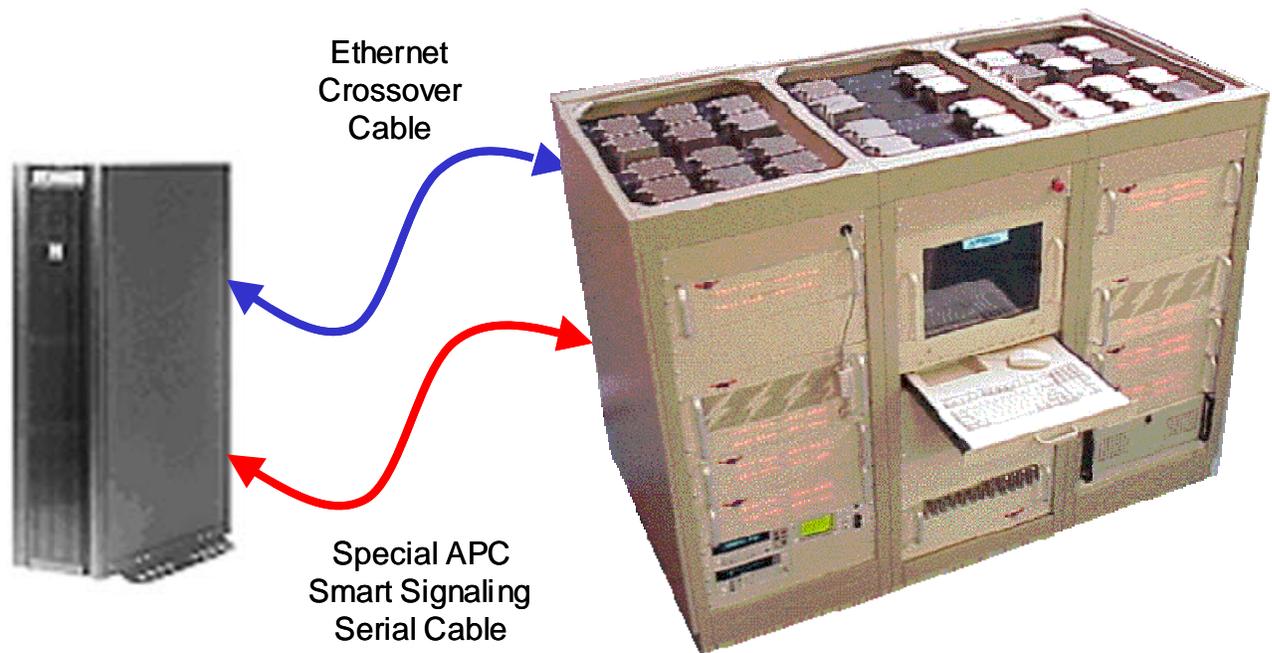
### 1 System Description and Overview

This documents a procedure to setup and configure the APC Smart VT UPS with the Accel-RF Corporation Automated Accelerated Reliability Test Station (AARTS). Note that the exact model of the UPS should be sized appropriately for the expected maximum load of the system. A maximum load map for each phase of the 208V 3-phase circuits should have been supplied with the model delivered by Accel-RF.

The connections required for this setup are shown in Figure 1. The Power Chute monitoring and shutdown control interface is designed to ONLY work through an Ethernet communication interface. Since the UPS for the AARTS system is dedicated, it is undesirable to presume a corporate LAN is active and available for routing communications between the two systems during a facility power failure event. Therefore, the AARTS/UPS interface must incorporate a dedicate direct Ethernet interface between the two instruments, as shown in Figure 1.

The UPS comes from the APC factory configured to operate in a DHCP IP-assigned environment. In order to change the IP settings in the Smart VT UPS to a fixed IP address, the APC smart signaling serial cable must be used to access the Management Card serial port interface.

**Figure 1: AARTS to UPS connections**



There are several steps required to properly configure the UPS to work with the AARTS system. The following sections describe step-by-step instructions for configuring both systems.

## 2 System Configuration

Several steps are required to configure the UPS for proper operation with the AARTS system. The following Sections describe these steps in detail.

### 2.1 Configuring the Smart VT for Auto Shutdown

The following screens show the steps required to configure the Smart VT for automatic shutdown. If this is not configured, the UPS will not turn OFF after the computer shutdown process.

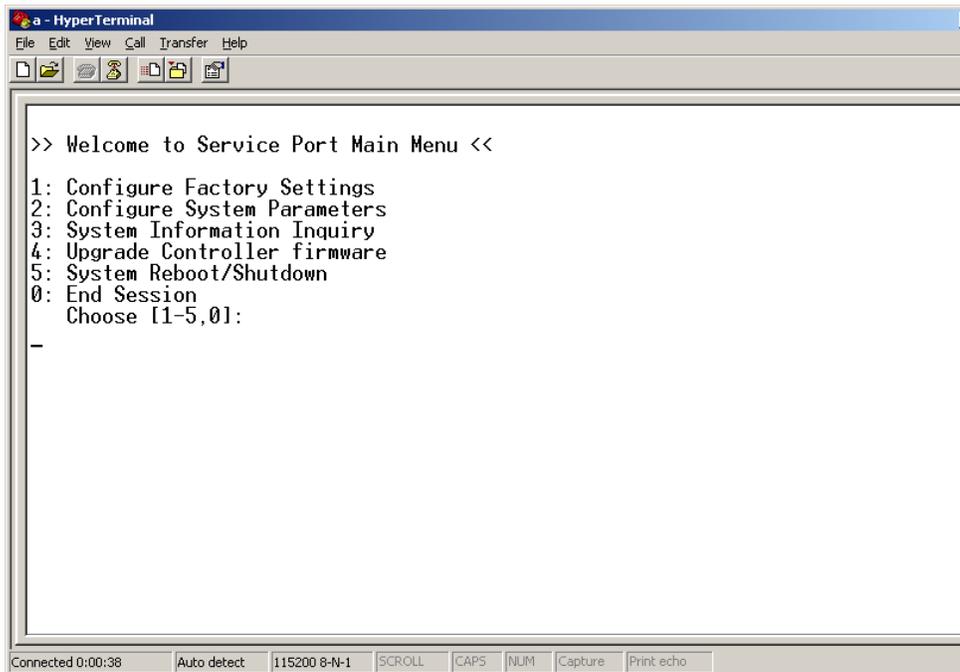
Step 1: Connect the special APC smart signaling serial cable to the upper 9-pin DSub located in the top right area at the front of the Smart VT UPS rack.

Step 2: Launch Hyper Terminal within Windows and configure the settings as follows:

Bits per second: 115,200  
Data Bits: 8  
Parity: None  
Stop bits: 1  
Flow control: None

Step 3: Select File->Properties from the Hyper Terminal menu options and click on the Settings tab, then click on “ASCII Setup...” and check the “Echo typed characters locally” check box. Click OK to save and exit the Properties options.

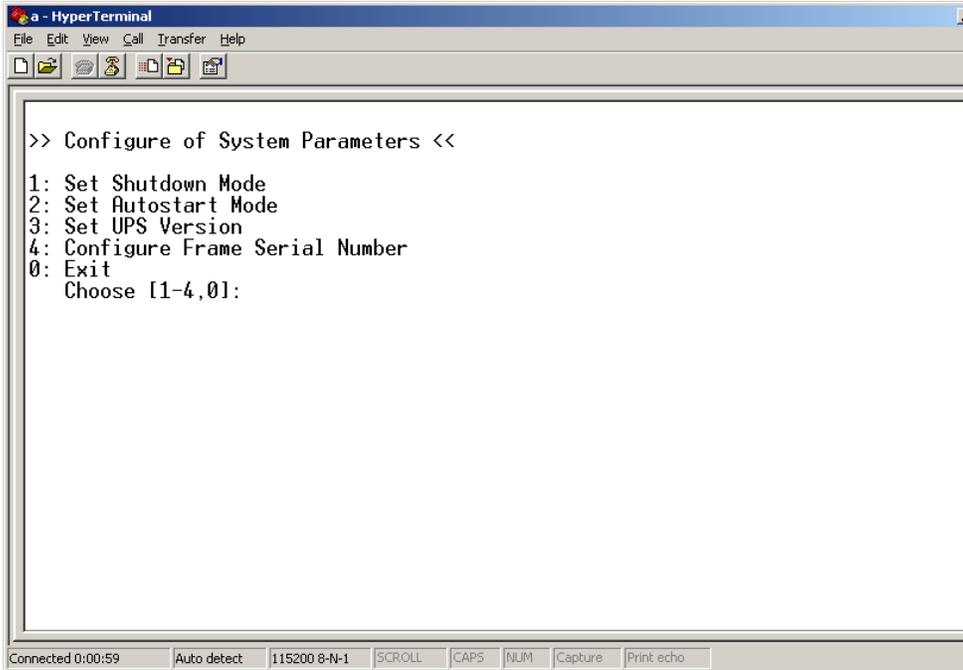
Step 4: In the main activity window, type “APC” and press Enter to establish communication with the UPS.  
Note: if a password comes up, enter APC again. The following screen should appear:



## APC UPS Setup – Rev B

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Step 5: Enter Option 2 “Configure System Parameters” – the following screen should appear:

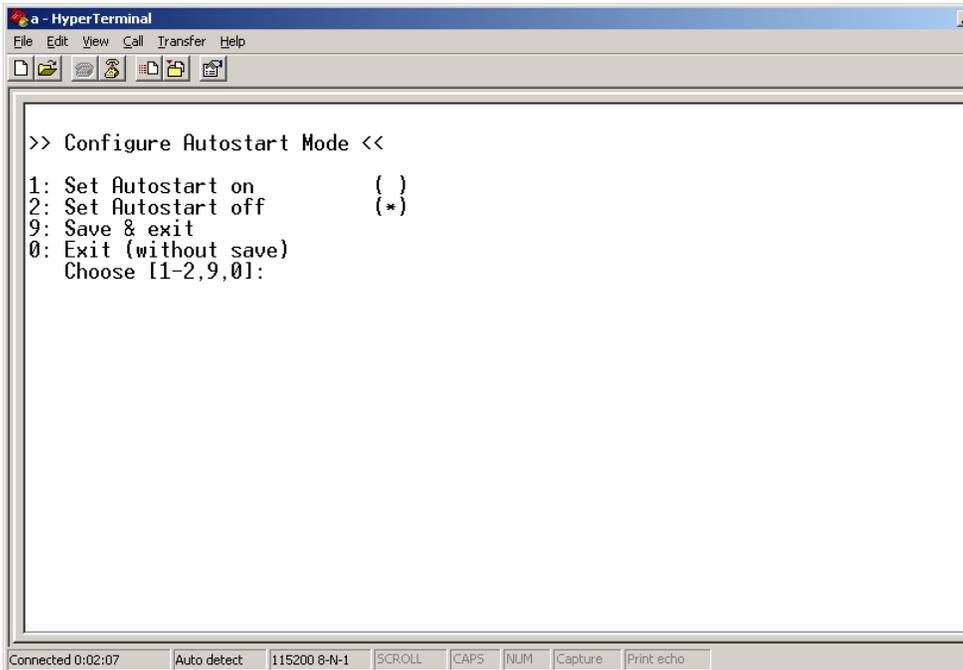


```
a - HyperTerminal
File Edit View Call Transfer Help
[Icons]

>> Configure of System Parameters <<
1: Set Shutdown Mode
2: Set Autostart Mode
3: Set UPS Version
4: Configure Frame Serial Number
0: Exit
  Choose [1-4,0]:

Connected 0:00:59  Auto detect  115200 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

Step 6: Enter Option 2 “Set Autostart Mode” – the following screen should appear:



```
a - HyperTerminal
File Edit View Call Transfer Help
[Icons]

>> Configure Autostart Mode <<
1: Set Autostart on      ( )
2: Set Autostart off    (*)
9: Save & exit
0: Exit (without save)
  Choose [1-2,9,0]:

Connected 0:02:07  Auto detect  115200 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

Step 7: Enter Option 2 to “Set Autostart off”.

Step 8: Enter 9 to Save & Exit, then 0s to exit out of each mode screen and return control to the UPS.

Step 9: remove the serial cable from the Smart VT.

### 2.2 Configuring the Smart VT Network Management Card IP Settings

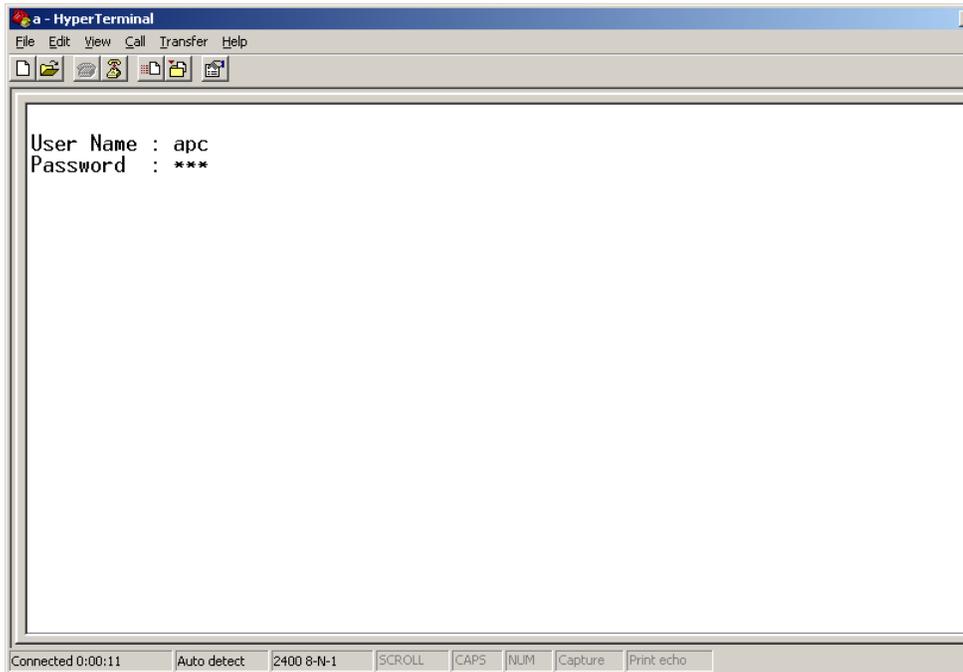
The following screens show the steps required to configure the IP settings for the Smart VT. If this is not configured, the UPS will not be able to communicate with the computer over the dedicated Ethernet link to perform the required clean shutdown tasks.

Step 1: Connect the special APC smart signaling serial cable to the bottom 9-pin DSub located at the top right of the front of the rack.

Step 2: Launch Hyper Terminal within Windows and configure the settings as follows:

Bits per second: 2,400  
Data Bits: 8  
Parity: None  
Stop bits: 1  
Flow control: None

Step 3: Click Enter to elicit the login User Name and Password as shown below:



## APC UPS Setup – Rev B

Step 4: Entering “apc” for both User Name and Password should bring up the screen shown below:

```
a - HyperTerminal
File Edit View Call Transfer Help
-----
User Name : apc
Password  : ***

American Power Conversion      Network Management Card AOS    v2.6.4
(c) Copyright 2004 All Rights Reserved Smart-UPS & Matrix-UPS APP    v2.6.1
-----
Name       : Unknown           Date : 10/16/2001
Contact    : Unknown           Time  : 03:41:46
Location   : Unknown           User  : Administrator
Up Time    : 0 Days 8 Hours 57 Minutes Stat  : P+ N+ A+

Environment : Threshholds Disabled, Contact Alarms Disabled, Relay Disabled
Smart-UPS VT 10 kVA named UPS_IDEN : On Line, No Alarms Present

----- Control Console -----
1- Device Manager
2- Network
3- System
4- Logout

<ESC>- Main Menu, <ENTER>- Refresh, <CTRL-L>- Event Log
> _
Connected 0:00:31 Auto detect 2400 8-N-1 SCROLL CAPS NUM Capture Print echo
```

Step 5: Enter 2 to launch the “Network” settings screen below:

```
a - HyperTerminal
File Edit View Call Transfer Help
-----
1- Device Manager
2- Network
3- System
4- Logout

<ESC>- Main Menu, <ENTER>- Refresh, <CTRL-L>- Event Log
> 2

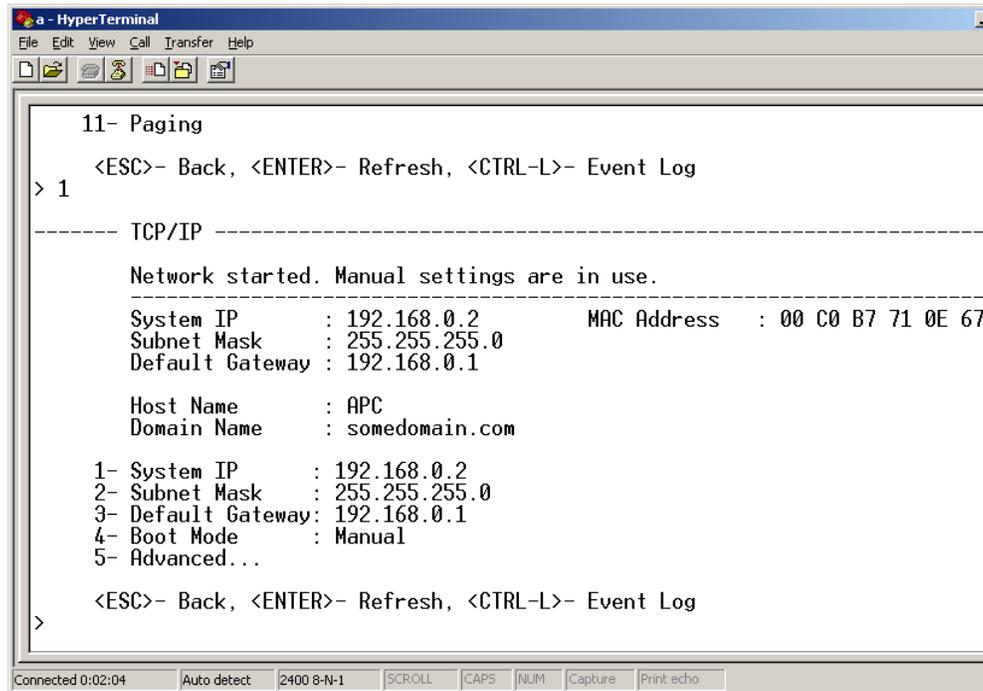
----- Network -----
1- TCP/IP
2- DNS
3- Ping Utility
4- FTP Server
5- Telnet/SSH
6- Web/SSL/TLS
7- WAP
8- SNMP
9- Email
10- Syslog
11- Paging

<ESC>- Back, <ENTER>- Refresh, <CTRL-L>- Event Log
> _
Connected 0:01:51 Auto detect 2400 8-N-1 SCROLL CAPS NUM Capture Print echo
```

## APC UPS Setup – Rev B

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Step 6: Enter 1 to launch the “TCP/IP” settings screen below (note: boot mode must be set to “Manual”):



```
a - HyperTerminal
File Edit View Call Transfer Help
-----
11- Paging
  <ESC>- Back, <ENTER>- Refresh, <CTRL-L>- Event Log
> 1
----- TCP/IP -----
Network started. Manual settings are in use.
-----
System IP       : 192.168.0.2       MAC Address    : 00 C0 B7 71 0E 67
Subnet Mask    : 255.255.255.0
Default Gateway : 192.168.0.1

Host Name      : APC
Domain Name    : somedomain.com

1- System IP   : 192.168.0.2
2- Subnet Mask : 255.255.255.0
3- Default Gateway: 192.168.0.1
4- Boot Mode   : Manual
5- Advanced...

  <ESC>- Back, <ENTER>- Refresh, <CTRL-L>- Event Log
>
-----
Connected 0:02:04  Auto detect  2400 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

Step 7: Configure the IP settings as shown in the previous screen shot, and set the Boot Mode to “Manual”.

Step 8: Press ESC several time to exit out of the configuration menus and return to “Pass through mode”.

Step 9: remove the serial cable from the Smart VT.

## 2.3 Configuring the Smart VT Network Management Card Functional Settings

Once the IP settings are correct, the Network Management Card may be accessed through a standard Web Browser interface. Enter “http://192.168.0.2” into the path for the browser and a login prompt should appear. Use “apc” for both Username and Password.

A Status window may be viewed by selecting “Status” option under the “Smart UPS xxx” icon at the top. A typical Status screen is shown below. A screen shot of the “Configuration” option is also shown below.

Note: the default functional settings are acceptable to proper operation. This section simply illustrates additional control access.

The screenshot displays the APC Network Management Card web interface in Microsoft Internet Explorer. The browser address bar shows the URL http://192.168.0.2. The interface includes a navigation menu on the left with options like Status, Configuration, and Events. The main content area shows the status of a Smart-UPS VT 10 kVA unit, including sections for UPS status, Utility power status, Output power status, Battery status, and Intelligence Module.

**UPS status**  
**On Line, No Alarms Present**  
Reason For Last Transfer To Battery: No transfers have occurred.  
Internal Temperature: 027.4 °C  
Runtime: 2 hours 46 minutes

**Utility power status**

Phase:	L1	L2	L3	
Input Voltage:	125.8	127.4	125.9	VAC @ 60.04 Hz
Bypass Input Voltage:	126.5	126.7	126.8	VAC
Input Current:	02.69	03.13	03.21	Amps
Maximum Input Voltage:	125.9	127.6	126.2	VAC
Minimum Input Voltage:	125.6	127.2	125.9	VAC

**Output power status**

Phase:	L1	L2	L3	
Output Voltage:	119.8	119.8	119.8	VAC @ 59.92Hz
Output Current:	0006	0003	0001	Amps
Output Load:	000.8	000.4	000.2	kVA
Output Percent Load:	024	012	006	% kVA
Output Percent Power:	023	010	005	% Watts

**Battery status**

Battery Capacity:	100.0	%
Nominal Battery Voltage:	192.0	VDC
Actual Battery Bus Voltage:	217.2	VDC
Battery Current:	+0000.0	Amps
External Battery Cabinet Rating:	0000	Amp-Hour
Number of Batteries:	008	
Number of Bad Batteries:	000	
Self-Test Result:	Invalid	
Self-Test Date:	10/09/2001	
Calibration Result:	Unknown	
Calibration Date:	Unknown	

**Intelligence Module**

Firmware Revision:	08.01
Manufacture Date:	04/13/05
Serial Number:	WE0516110458
Hardware Revision:	1

# APC UPS Setup – Rev B

The screenshot displays the APC Network Management Card configuration interface for a Smart-UPS VT 10 kVA. The browser address bar shows the URL `http://192.168.0.2/psid/psid.html?1-3`. The left sidebar contains navigation options: Network Management Card (IP: 192.168.0.2), Smart-UPS VT 10 kVA (Status, Diagnostics, Control), Configuration (PowerChute®, Scheduling, Sync Control), Environment, Events, Data, Network, System, Logout, Help, and Links (APC's Web Site, Testdrive Demo, APC Monitoring).

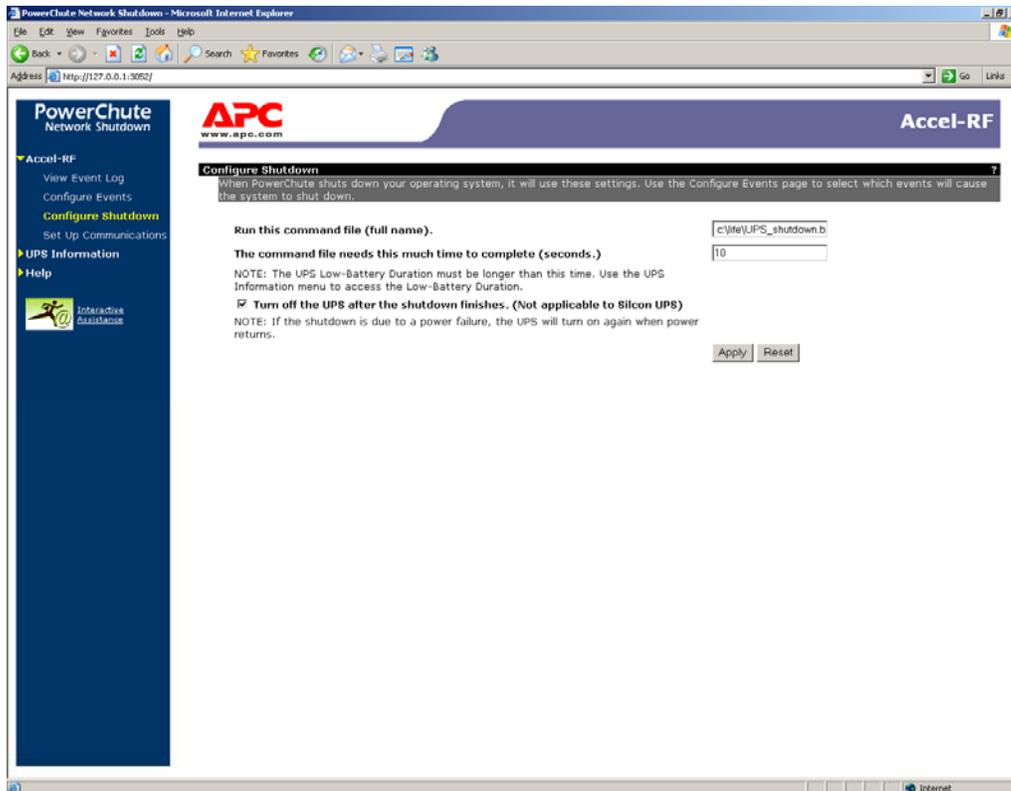
The main configuration area is titled "Configuration of Smart-UPS VT 10 kVA named UPS\_IDEN" and includes the following sections:

- Utility Line Settings:** Output Voltage: 200 VAC; Output Frequency Range: 60 +/- 10; Shutdown Mode: Normal. Buttons: Apply, Cancel.
- Alarm Thresholds:** Alarm If Load Over: 10.0 KVA; Alarm If Runtime Under: Never Minutes. Buttons: Apply, Cancel.
- Shutdown Parameters:** Return Battery Capacity: 00 %; Low-Battery Duration: 02 Minutes; Maximum Shutdown Time: 7 Minutes; Shutdown Delay: 020 Seconds; Return Delay: 000 Seconds; Sleep Time: 0.0 Hours. Buttons: Apply, Cancel.
- General Settings:** UPS Name: UPS\_IDEN; Batteries: 008; External Battery Cabinet Rating: 0000 Amp-Hour; Last Battery Replacement: 04/01/01; Audible Alarm: On; Simple Signal Shutdowns: Disabled. Buttons: Apply, Cancel.
- Reset UPS Defaults:** Action: No Action. Buttons: Apply, Cancel.

## 2.4 Configuring the Smart VT Power Chute Shutdown Settings

For the computer to properly communicate with the LifeTest software facilitating orderly and graceful shutdown of the parts under test, the Power Chute software must be installed on the computer. After installation, launch the Power Chute interface. If a Username and Password are requested, answer “apc” for both. The following describes the setup changes required:

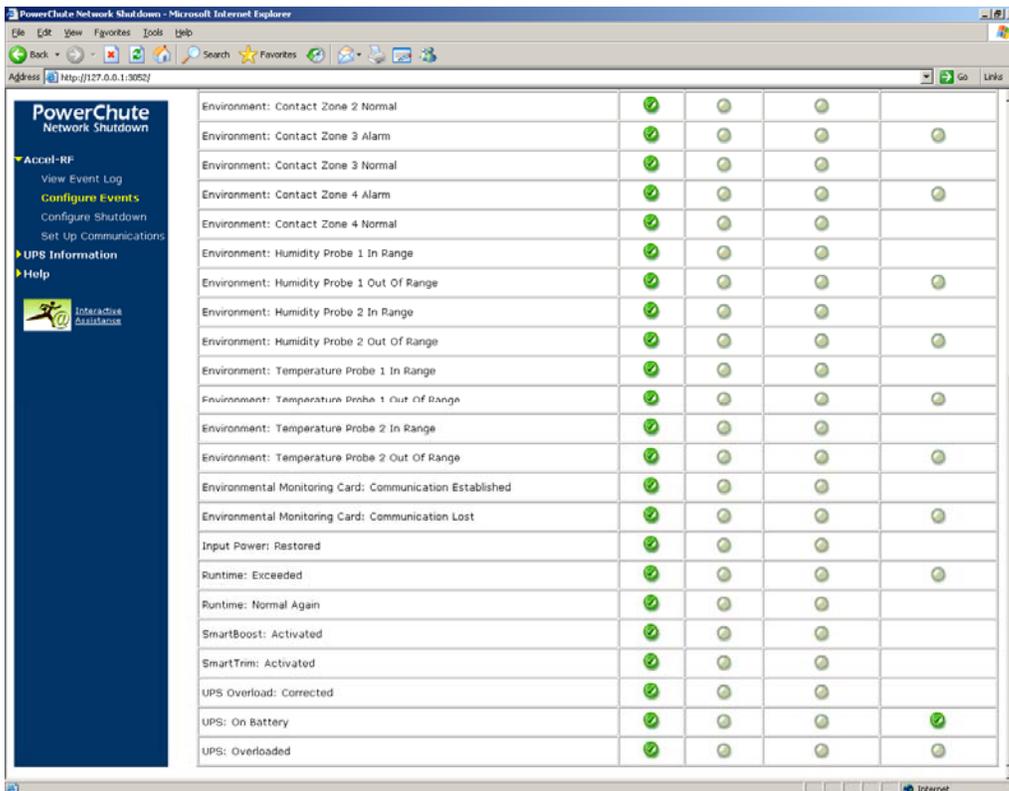
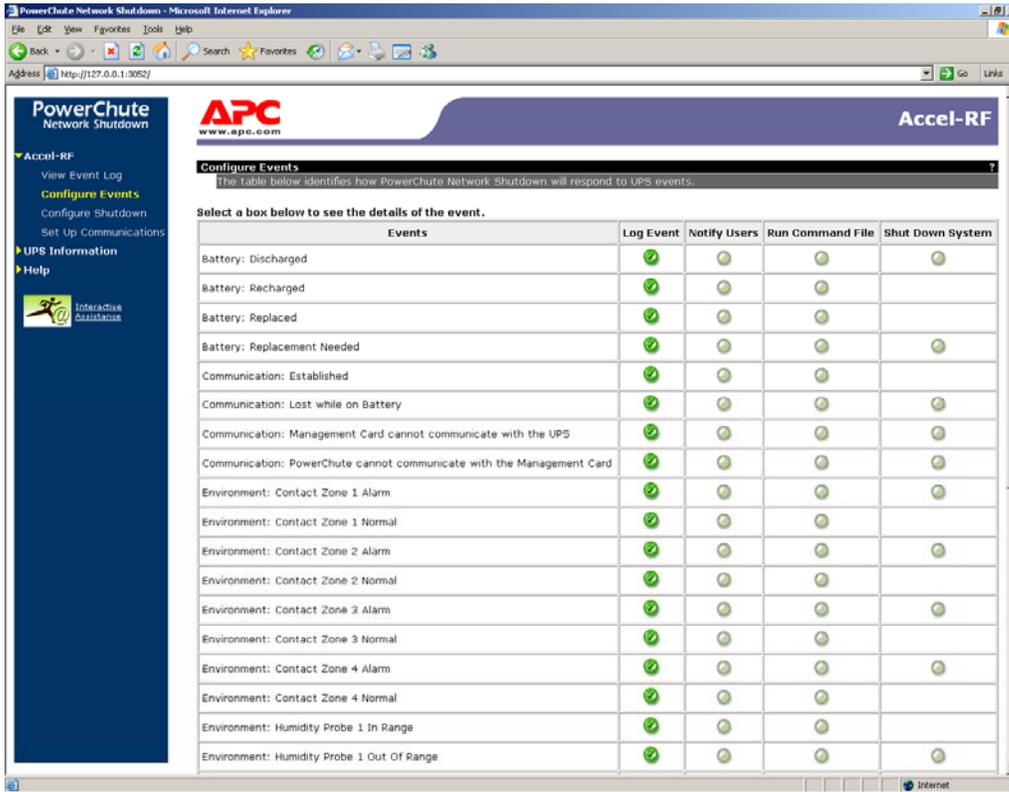
Step 1: Select the “Configure Shutdown” menu item under the Accel-RF icon on the top left. This controls the actions taken upon any shutdown event initiated for any reason. The following screen should be displayed:



Step 2: Enter the following command file script to run upon shutdown: “C:\LIFE\UPS\_Shutdown.BAT” (note: replace “C:\LIFE” with the application folder if different). For testing purposes, enter 10 seconds for time to complete (note: the actual setting should be ~300 seconds, or 5 minutes, after confirmation of shutdown events is complete). Check the “Turn off UPS...” option. Finally, click on Apply.

# APC UPS Setup – Rev B

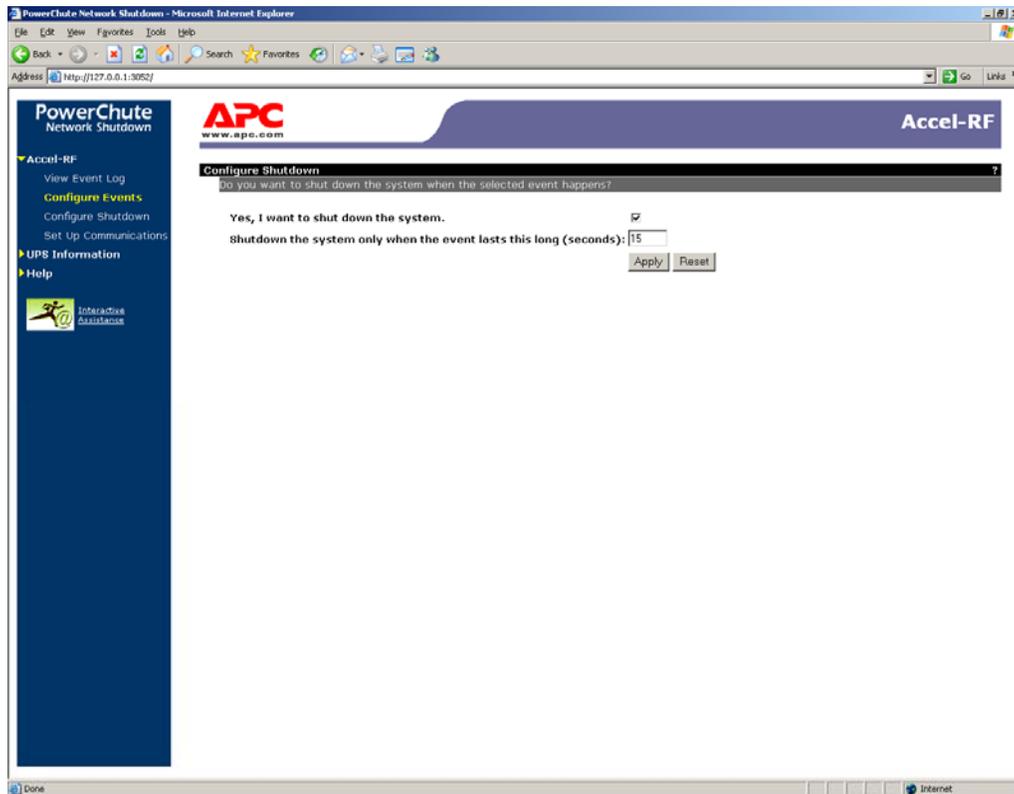
Step 3: Select the “Configure Events” menu item under the Accel-RF icon on the top left. We must configure a “shutdown” event for “UPS On Battery” (see following screen shots)



## APC UPS Setup – Rev B

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Step 4: On the “UPS on Battery” line, select the “Shut Down System” option to launch the following screen:



Step 5: Check the “... shut down system” check box. For testing purposes, enter 15 seconds to wait for shutdown after the UPS goes on battery (note: the actual setting should be ~600 seconds, or 10 minutes, after confirmation of shutdown events is complete). Finally, click on Apply to store the settings.

## 2.5 Configuring Windows to Run the Shutdown Script

Once the Power Chute is configured properly to initiate the shutdown sequence, and the shutdown conditions are met, the script defined in Section 2.4, Step 2, is launched. That file should contain one line as follows:

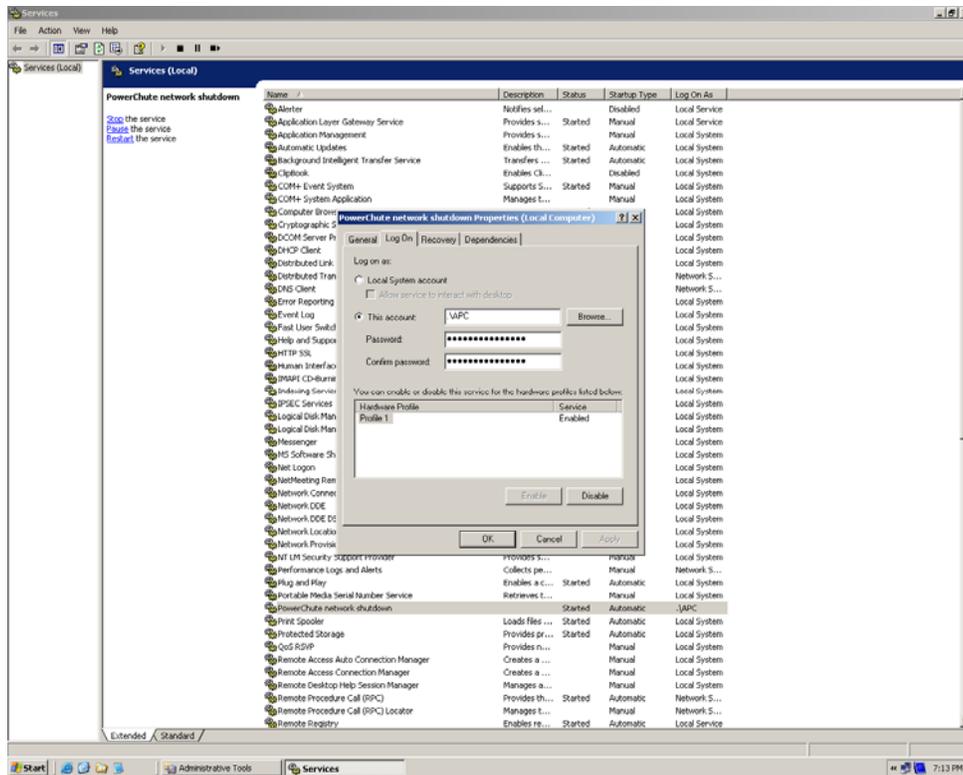
```
copy C:\LIFE\UPS_Shutdown.BAT C:\LIFE\UPSSHUT
```

Note that the full pathname is required. The LifeTest program periodically checks for the existence of a file named “UPSSHUT” in the application installation folder. If it exists, it immediately shuts down all channels and terminates itself. After power is restored, and upon initialization, the LifeTest program will check for the existence of this file and delete it if found; hence, the operator need not remember to do so manually.

For some reason, some configurations do not allow the Power Chute application, that continually runs as a Windows service in the background, to run the script. Hence, the Power Chute service must be set up with a “Log on as” account that has privileges to run the script. The following describes that process.

Step 1: Create a user account with Administratrir privileges called “APC”, password “apc”.

Step 2: Launch the “Services” control window from the “Administrative Tools” (found in the Control Panel). the following screen should be launched.



Step 3: Right-Click on the “PowerChute network shutdown” and select Properties. Check the “Log on as” “This account” and enter the dedicated APC account information. Click “OK” to store the changes.

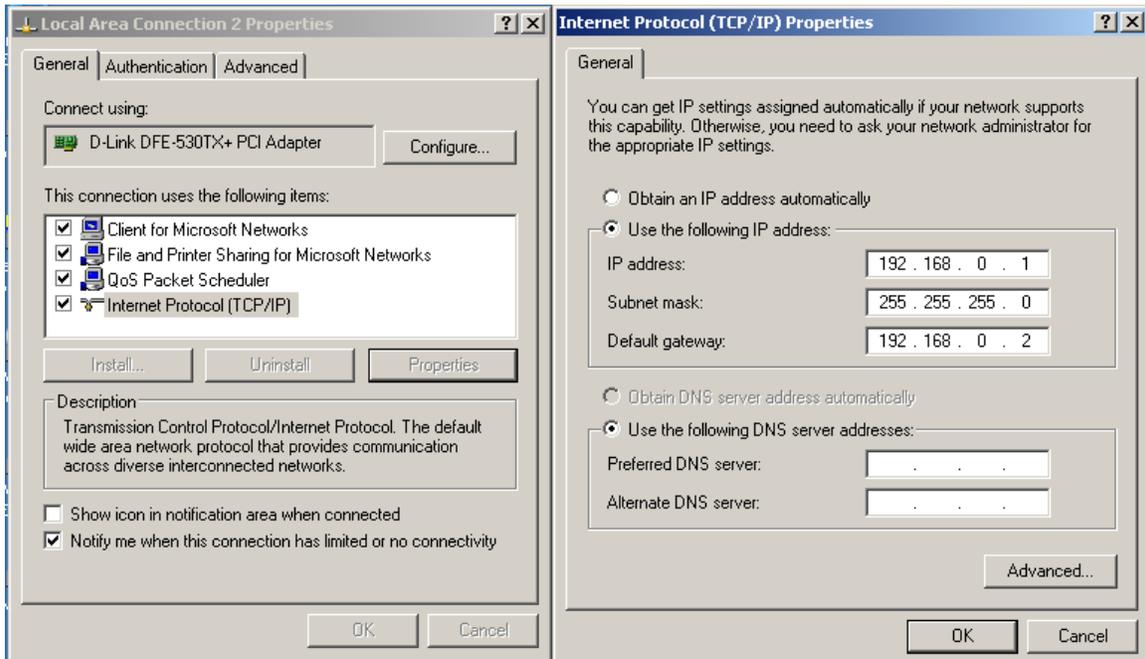
Step 4: Right-Click on the “PowerChute network shutdown” and select Properties. Select “Stop”, and then “Start”, to cause the changes to be activated.

## 2.6 Configuring Windows TCP/IP settings

The Ethernet LAN adaptor must be configured to complementary settings that will work with the dedicated settings entered into the UPS (see Section 2.2). This section describes a method for setting the appropriate values.

Step 1: Open the Properties selection for the dedicated Ethernet card (note: the LAN may be accessed through the device manager, or Network settings in the Control Panel). The window shown below in the upper left should be displayed.

Step 2: Select the “Internet Protocol TCP/IP” item and click on Properties. The right-hand window, shown below should appear.

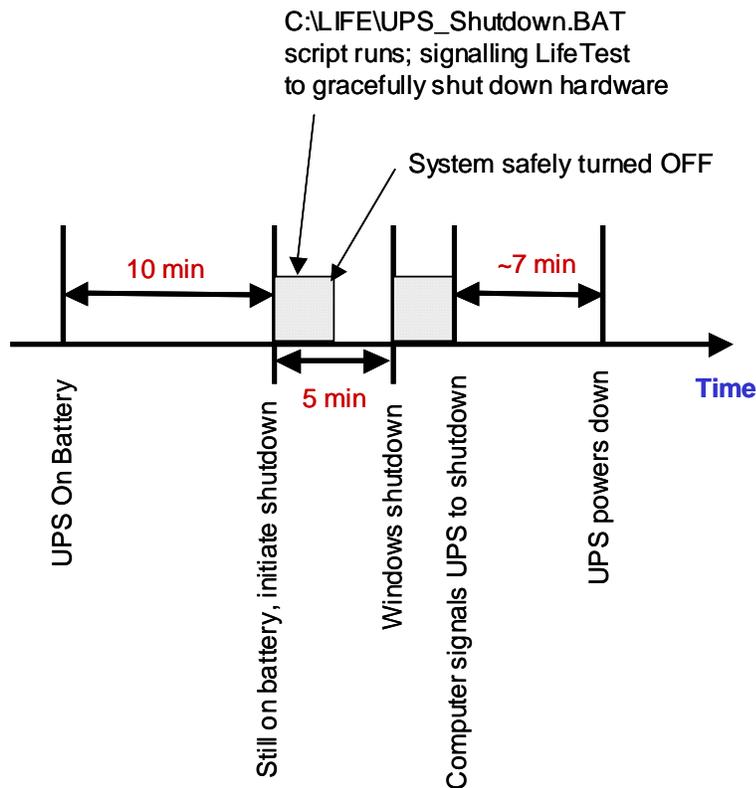


Step 3: Select the “Use the following IP address:” option and enter the values shown in the Figure above. Click “OK” to save the new settings.

### 3 Testing the Setup

Once everything has been configured, the shutdown paradigm should be tested. By following the configuration settings described in the preceding Sections, the shutdown parameters should have been set to very small times (10 seconds for the application to terminate and 15 seconds for the shutdown process to be initiated) (note: after verification, the values should be reset to 10 minutes on battery and 5 minutes for the script to complete). Figure 2 illustrates the pertinent events timing.

**Figure 2: AARTS/UPS Shutdown Events Timing**



Note that if the main power is restored after the shutdown is initiated, but before the UPS has actually de-powered, the UPS Load On/Off must be cycled to clear the shutdown process. Otherwise, the UPS will continue signaling Windows to shutdown after boot up; hence, immediately causing the computer to shutdown again. If main power is restored after the UPS outputs are shut down, then the UPS will automatically reset itself and the power cycling reset is unnecessary.

## **4 Contact Information**

For additional support configuring the UPS, please contact Accel-RF or APC at the following numbers:

APC

800-800-4272 [4,1] (APC technical support 8:00AM to 5:00PM Eastern Time Zone)

Accel-RF

858-332-0708 (8:00AM to 5:00PM Pacific Time Zone)