



## **Avaya Solution & Interoperability Test Lab**

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# **Application Notes for Avaya IP Office and American Power Conversion InfraStruXure Products – Issue 1.0**

### **Abstract**

These Application Notes describe the procedure for configuring American Power Conversion InfraStruXure products, specifically a Smart-UPS and Switched Rack PDU, to provide backup power for Avaya IP Office. The American Power Conversion solution prevents blackouts and power surges from affecting equipment that is connected to it by isolating equipment from the public utility line when large power fluctuations are detected. Testing was conducted via the *DeveloperConnection* Program at the Avaya Solution and Interoperability Test Lab.

# 1. Introduction

These Application Notes describe the procedure for configuring American Power Conversion InfraStruXure products, specifically a Smart-UPS and Switched Rack PDU, to provide backup power for Avaya IP Office.

The APC InfraStruXure architecture supports the Avaya IP Office architecture in a variety of ways.

The Smart-UPS UPS prevents blackouts and power surges from affecting equipment that is connected to it by isolating equipment from the public utility line when large power fluctuations are detected. When a disturbance is detected, the UPS internally disconnects the equipment from the public utility line and provides backup power until the internal battery runs out or when the restoration of public utility power is detected.

The Switched Rack PDU features individual outlet control, power on and off delays, current monitoring, alarm thresholds, and network management. Individual outlet control to turn outlets on, turn outlets off, or recycle power to equipment allows users to reboot locked-up equipment and avoid unauthorized use of outlets. Power delays allow users to determine the order in which equipment is powered up or down. The Switched Rack PDUs provide an aggregate current draw, which can be viewed remotely or locally, via digital display.

The Network Management Card in the APC products allows a user to access information about the current state of the system as well as logs that provide information about past events. Simple Network Management Protocol (SNMP) alarms can trigger email to be sent to appropriate users when an event happens (power is lost or returned).

The Network Management Card has a LAN connection. Information about the environmental conditions and battery life can be sent to a PC. The APC PowerChute Network Shutdown feature uses this information. This feature allows a PC plugged into the APC solution to be gracefully shut down when the backup battery is running low. The APC PowerChute Network Shutdown feature requires the installation of the APC client software on all PCs that will use the feature. The APC client software indicates that the feature is available on the PC and is also used for the PC shut down.

The APC InfraStruXure solution consists of the following:

1. Smart-UPS or Extended Run UPS – This provides power to Avaya IP Office when the utility power is lost.
2. Switched Rack (PDU) – the Avaya IP Office power cords connect to this.
3. Network Management Card – This hardware is installed into the Smart-UPS and Switched Rack PDU and can be used with a web-based application, Telnet or SNMP interface to provide environmental and power information.
4. Extended Run Battery – This is installed in the Smart-UPS and can provide longer power duration for the equipment.

There are different models of the Power Distribution Units and Uninterruptible Power Supplies. The APC models depend on the system power, the total number of outlets needed and the length of battery backup required. The following should be considered when choosing which models to use with Avaya IP Office:

1. The total number of modules that will be connected. This includes the Control Unit as well as all expansion modules.
2. The total number of PCs, including the IP Office Manager PC and the IP Office Voicemail Pro PC.
3. IP telephones and the number of Power Over Ethernet switches that will be used.

Avaya IP Office power requirements can be found in Reference 1 in Section 11.

Once all the input power has been calculated, the APC configurator can be used to determine the correct APC equipment needed. The APC configuration tool is available at the APC website (<http://www.apc.com>).

Compliance testing included a configuration with an Avaya IP Office 406V2, documented in these Application Notes, and an Avaya IP Office 412 with twelve expansion modules, a Power Over Ethernet switch and a PC running Voicemail Pro. The APC 750 Rack Mount Smart-UPS (this will be referred to as Smart-UPS throughout the document) and APC Switched Rack PDU Model AP7900 (referred to as Rack PDU throughout the document) were used for the IP Office 406V2 testing. The APC Smart-UPS 1400 Rack Mount XL with the APC Basic PDU were used for the IP Office 412 testing. Both solutions used the APC Network Management Card AP9616.

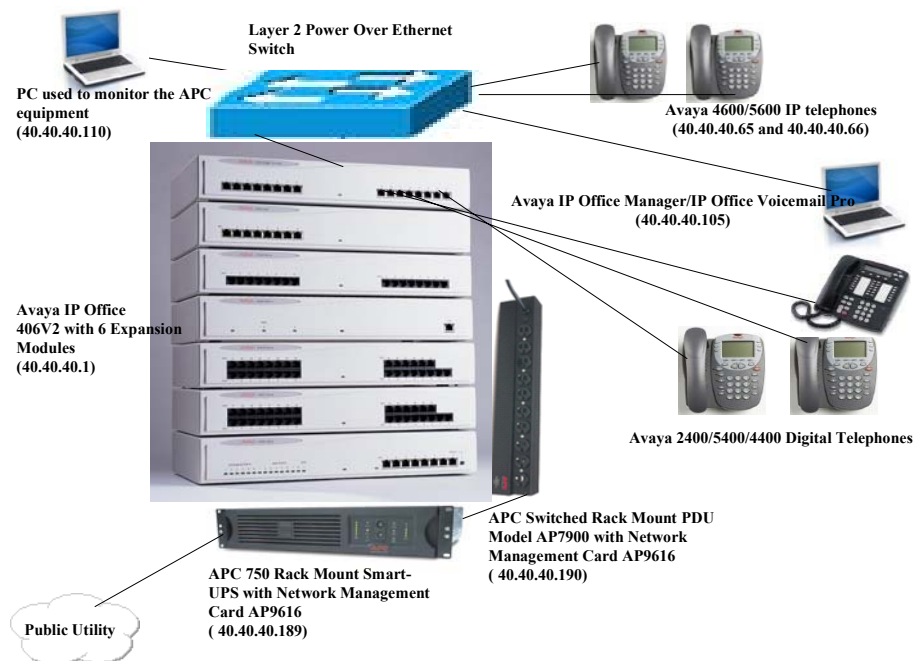
The IP Office 406V2 tested configuration is displayed in **Figure 1**. The APC 750 Rack Mount Smart-UPS had the APC Network Management Card AP9616 installed. There was an APC Switched Rack PDU Model AP7900 with an APC Network Management Card AP9616, which provided eight additional power outlets. The following were connected to the Switched Rack PDU:

- The Avaya IP Office 406V2.
- The Power Over Ethernet switch.
- The PC running Avaya IP Office Voicemail Pro and IP Office Manager.
- A subset of the IP Office expansion modules.

The additional IP Office expansion modules and the PC used to monitor the APC equipment were connected to the Smart-UPS. The Switched Rack PDU was plugged into the Smart-UPS, which was connected to the public utility power. The APC PowerChute Network Shutdown APC client software was installed on the PC running the Avaya IP Office Voicemail Pro and IP Office Manager.

The following rules should be followed with the APC equipment:

1. The Smart-UPS should be mounted at the bottom of the rack and the batteries should be removed before installing it in the rack.
2. The onboard battery should be calibrated.
3. The IP Office network hub should be plugged into the Smart-UPS as well as the Avaya IP Office Voicemail Pro PC. This will allow a clean power down of those PCs
4. Off the shelf power strips may be connected to the Smart-UPS, but surge protectors must not be used in this configuration.
5. Label all cables that come with the APC equipment, as these are the only ones that can be used with the equipment.



**Figure 1 – Sample Test Configuration**

## 2. Equipment and Software Validated

The following equipment and software/firmware were used for the sample configuration:

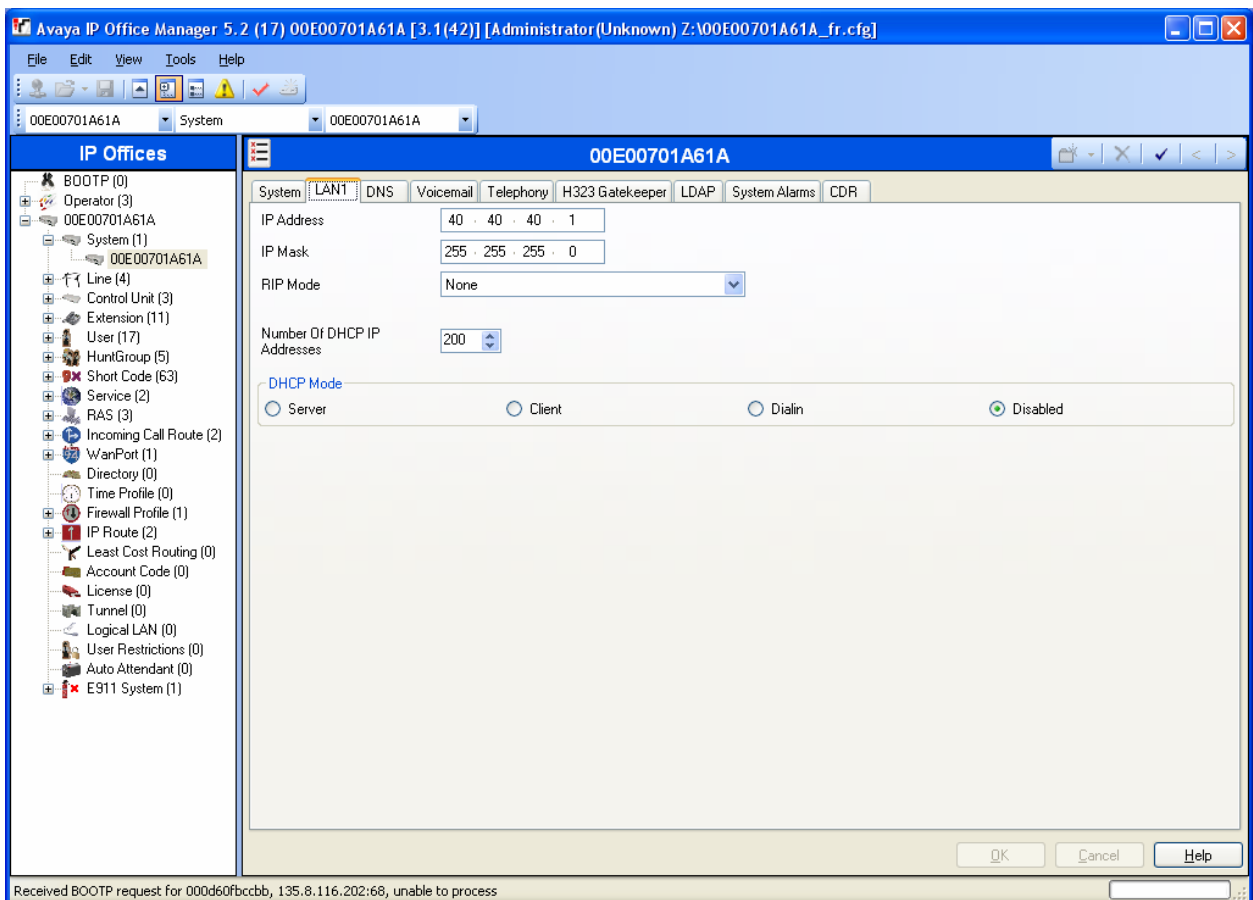
Equipment	Software/Firmware
Avaya IP Office 406v2	3.2.17
Avaya IP Office 412	3.2.17
Avaya IP Office DS30 Expansion Module	5.2.17
Avaya IP Office Phone30 Expansion Module	5.2.17
Avaya IP Office Phone30V2 Expansion Module	5.2.17
Avaya IP Office WAN3 Expansion Module	5.2.17
Avaya IP Office ATM16 Expansion Module	5.2.17
Avaya IP Office Phone8 Expansion Module	5.2.17
Avaya IP Office DS16 Expansion Module	5.2.17
Avaya IP Office Manager	5.2.17
Avaya IP Office Voicemail Pro	3.2.15
Avaya 4600 Series IP Telephones	2.3
Avaya 5400 Digital Telephones	N/A
Avaya 4400 Digital Telephones	N/A
Avaya 2400 Digital Telephones	N/A
APC 750 RM Smart-UPS	619.3.D
APC Switched Rack PDU Model AP7900	AOS: 2.7.0 SUMX: 2.7.3
APC Network Management Card AP9616	AOS: 2.6.4 SUMX: 2.6.1
APC Smart-UPS 1400 RM XL	73.14.D
APC Basic PDU	N/A
APC PowerChute Network Shutdown Software for Windows	2.21

**Table 2: Equipment and Software Validated**

### 3. Configure Avaya IP Office

There is no special configuration needed for Avaya IP Office. This section describes how to find the IP Address of the IP Office, which is acting as the Default Gateway for the APC equipment.

1. From the IP Office Manager PC, select **Start** → **Programs** → **IP Office** → **Manager** to launch the Manager application. Log into the Manager application using the appropriate credentials.
2. In the Manager window that appears, double-click on the item under **System** and select the **LAN1** Tab. Note the **IP Address**. This will be used as the Default Gateway for the APC Smart-UPS as described in Section 4.



## 4. Configure the APC Smart-UPS

### 4.1. Configure IP Parameters

By default, the Smart-UPS is configured for DHCP and BOOTP mode. If static IP Addresses are being used, perform the following steps.

1. Connect a PC to the Smart-UPS with the black serial cable that is provided with the UPS. The cable is NOT a pass thru cable and is the only one that works with the Smart-UPS. Start a terminal emulation program and use the following settings:
  - Bits per second: 2400
  - Data bits: 8
  - Parity: None
  - Stop bits: 1
  - Flow Control: None
2. Configure the IP Address, Subnet Mask and Default Gateway of the Network Management Card.

```
----- Control Console -----  
  
1- Device Manager  
2- Network  
3- System  
4- Logout  
  
<ESC>- Main Menu, <ENTER>- Refresh, <CTRL-L>- Event Log  
##Select 2 for the Network Settings  
> 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
```

**## Select 1 for TCP/IP settings**

**> 1**

----- TCP/IP -----

Network not started. Currently making a BOOTP request...

-----  
MAC Address : 00 C0 B7 80 06 10

- 1- Boot Mode : DHCP & BOOTP
- 2- Advanced...

<ESC>- Back, <ENTER>- Refresh, <CTRL-L>- Event Log

**## Select 1 to modify the Boot Mode**

**> 1**

----- Boot Mode -----

- 1- DHCP & BOOTP
- 2- DHCP only
- 3- BOOTP only
- 4- Manual

<ESC>- Back, <ENTER>- Refresh

**##Select 4 to change the Boot Mode to manual and press Enter**

**> 4**

----- TCP/IP -----

Network not started. Currently making a BOOTP request...

-----  
MAC Address : 00 C0 B7 80 06 10

\* Changes will take effect on logout.

- 1- System IP : 0.0.0.0
- 2- Subnet Mask : 0.0.0.0
- 3- Default Gateway: 0.0.0.0
- 4- Boot Mode : Manual
- 5- Advanced...

<ESC>- Back, <ENTER>- Refresh, <CTRL-L>- Event Log

**##Select 1 to change the Network Management Card IP Address**

**> 1**

**##Type the IP Address of the Network Management card and press Enter**



System IP : 40.40.40.189

----- TCP/IP -----

Network not started. Maximum retries reached.

-----  
MAC Address : 00 C0 B7 80 06 10

\* Changes will take effect on logout.

- 1- System IP : 40.40.40.189
- 2- Subnet Mask : 0.0.0.0
- 3- Default Gateway: 0.0.0.0
- 4- Boot Mode : Manual
- 5- Advanced...

<ESC>- Back, <ENTER>- Refresh, <CTRL-L>- Event Log

**##Select 2 to change the Subnet Mask of the Network Management Card**

> 2

**##Type the Subnet Mask of the Network Management card and press Enter**

Subnet Mask : 255.255.255.0

----- TCP/IP -----

Network not started. Maximum retries reached.

-----  
MAC Address : 00 C0 B7 80 06 10

\* Changes will take effect on logout.

- 1- System IP : 40.40.40.189
- 2- Subnet Mask : 255.255.255.0
- 3- Default Gateway: 0.0.0.0
- 4- Boot Mode : Manual
- 5- Advanced...

<ESC>- Back, <ENTER>- Refresh, <CTRL-L>- Event Log

**##Select 3 to change the Default Gateway**

> 3

**##Type the Default Gateway and press Enter**

Default Gateway : 40.40.40.1

----- TCP/IP -----

Network not started. Maximum retries reached.

-----  
MAC Address : 00 C0 B7 80 06 10

\* Changes will take effect on logout.

- 1- System IP : 40.40.40.189
- 2- Subnet Mask : 255.255.255.0
- 3- Default Gateway: 40.40.40.1
- 4- Boot Mode : Manual
- 5- Advanced...

<ESC>- Back, <ENTER>- Refresh, <CTRL-L>- Event Log

**##Press Esc two times. The Network Management Card will reboot.**

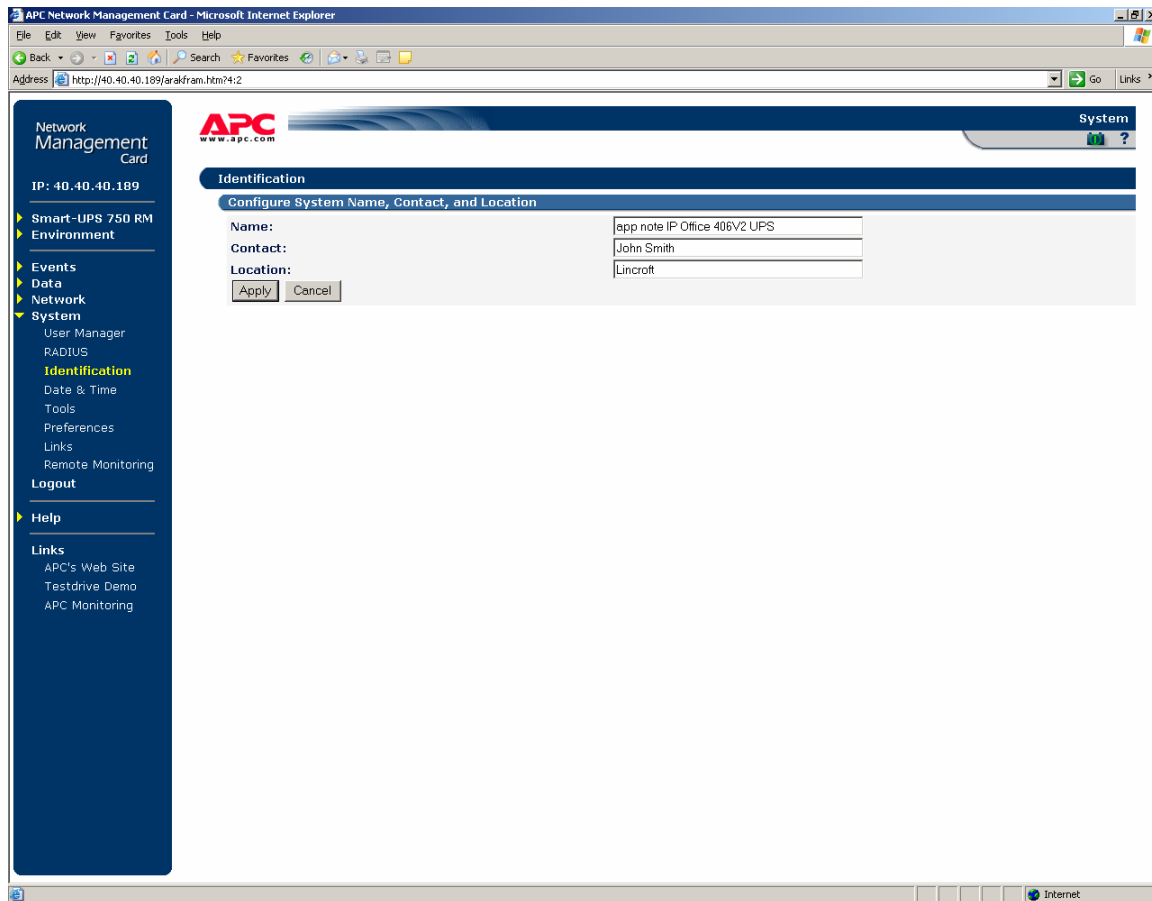
>

The reboot of the Network Management Card performed at the end of this step does not affect the Smart-UPS. The Smart-UPS continues to keep all the power connections during the reboot.

This completes the IP Address administration.

## 4.2. Management of the Smart-UPS

The management of the Smart-UPS is done via a web browser from a PC on the network. Enter the IP address of the Smart-UPS as the URL and log in with the appropriate credentials. The following screen is presented.



1. *Configure the contact information.* Select **System** → **Identification**. Enter a unique **Name** for the Smart-UPS, the **Contact** and **Location**. Press the **Apply** button.

APC Network Management Card - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://40.40.40.189/arakfram.htm?4:2 Go Links

Network Management Card

IP: 40.40.40.189

Smart-UPS 750 RM

Environment

Events

Data

Network

System

User Manager

RADIUS

Identification

Date & Time

Tools

Preferences

Links

Remote Monitoring

Logout

Help

Links

APC's Web Site

Testdrive Demo

APC Monitoring

APC www.apc.com

System

Identification

Configure System Name, Contact, and Location

Name: app note IP Office 406V2

Contact: John Smith

Location: Lincroft

Apply Cancel

Internet

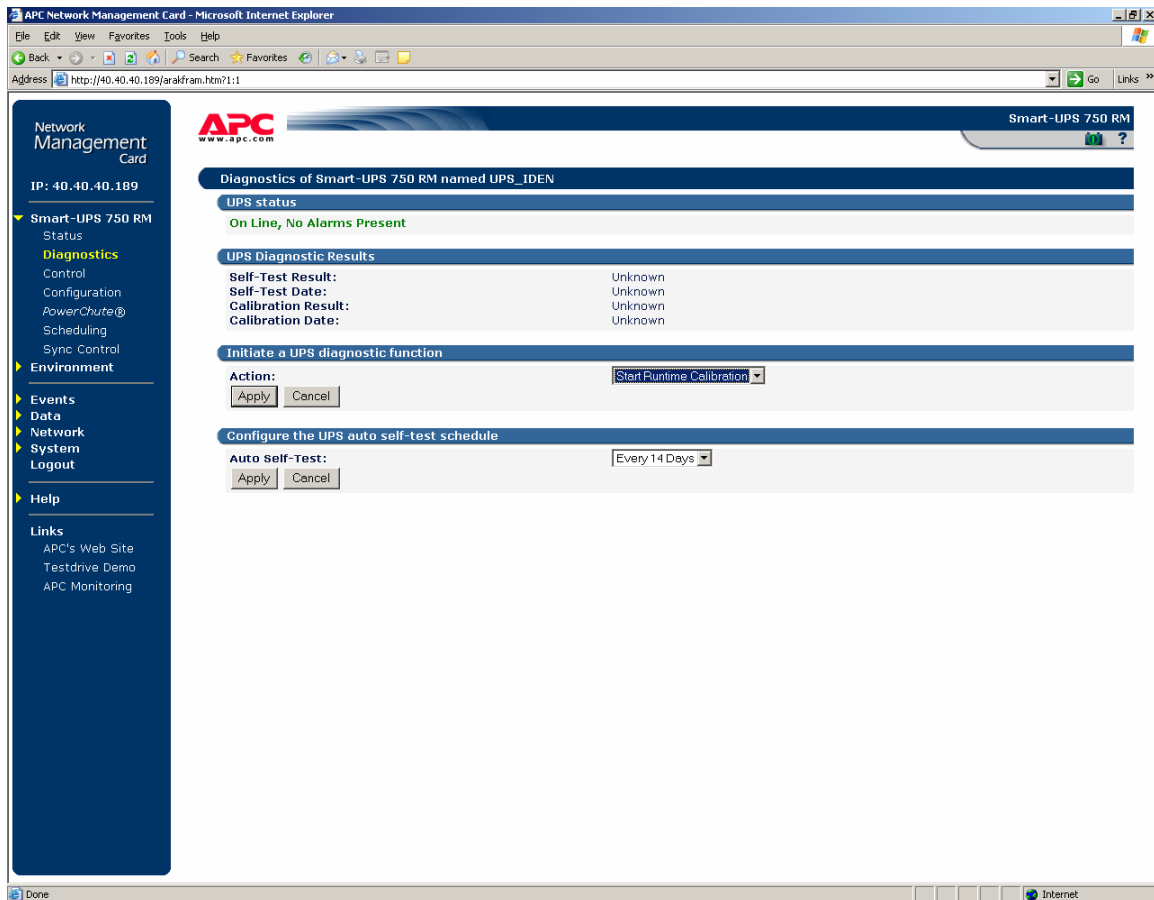
2. *Configure the environmental alarms.* When a temperature or humidity probe is in use, follow this step, otherwise proceed to Step 3. Select **Environment** → **Probes**. Set the **High Temp**, **Low Temp**, **High Humidity** and **Low Humidity** to appropriate values for the environment. Select **Enabled** for all drop down boxes that will generate events. Press the **Apply** button.

The screenshot shows a web browser window titled "APC Network Management Card - Microsoft Internet Explorer". The address bar shows "http://40.40.40.189/arakfram.htm?2:1". The page has a blue header with the APC logo and the text "www.apc.com". On the left is a navigation menu with links: "Network Management Card", "IP: 40.40.40.189", "Smart-UPS 750 RM", "Environment" (selected), "Status", "Probes", "Input Contacts", "Output Relay", "Events", "Data", "Network", "System", "Logout", "Help", "Links", "APC's Web Site", "Testdrive Demo", and "APC Monitoring". The main content area is titled "Environmental Monitor Probe Configuration" and "Integrated EM Probe Settings". It contains a table with three columns: "Setting" and "Event Generation". The table has four rows: "Probe Name:" (Integrated), "High Temp:" (50, 32-104 °F), "Low Temp:" (32, 32-104 °F), "High Humidity:" (90, 10-90% RH), and "Low Humidity:" (10, 10-90% RH). The "Event Generation" column has dropdown menus for each row, all set to "Enabled". At the bottom of the table are "Apply" and "Cancel" buttons.

Setting	Event Generation
Probe Name: Integrated	Enabled
High Temp: 50 32-104 °F	Enabled
Low Temp: 32 32-104 °F	Disabled
High Humidity: 90 10-90% RH	Disabled
Low Humidity: 10 10-90% RH	Disabled

3. *Calibrate the Battery.* Select **Smart-UPS 750 RM** → **Diagnostics**. In the **Initiate a UPS diagnostic function** section, set the **Action** to **Start Runtime Calibration** and press **Apply**.

**Note:** This will start the test. The test takes some time to run based on the power load and battery size. The Smart-UPS can still be managed while this test is in progress. The **Calibration Result** in the **UPS Diagnostic Results** section will change from **Unknown** to the result when the test completes.



4. *Configure the PowerChute Network Shutdown PCs.* This feature can be used to gracefully shutdown the PCs or servers when the battery power is running out on the Smart-UPS. This can be used for the Avaya IP Office Voicemail Pro PC. In order to use this feature, the APC client software needs to be installed on all PCs that the Smart-UPS will shut down. See Section 6 for details. Once the APC client software is installed, the PC's IP address is displayed in the **Configured Client IP Addresses** box.

Select **Smart-UPS 750 RM** → **PowerChute**. Select **2 minutes** for the **Maximum Shutdown Time**, **Reboot On-Line Return** for **On-Battery Shutdown Behavior** and select all IP Addresses for the PCs in the **Configured Client IP Addresses** box. Leave all other values as defaults. Press the **Apply** button.

APC Network Management Card - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Go Links

Address http://40.40.40.189/arakfram.htm?1:4

Network Management Card

IP: 40.40.40.189

Smart-UPS 750 RM

- Status
- Diagnostics
- Control
- Configuration
- PowerChute®**
- Scheduling
- Sync Control
- Environment
- Events
- Data
- Network
- System
- Logout
- Help
- Links
  - APC's Web Site
  - Testdrive Demo
  - APC Monitoring

PowerChute® network shutdown

Shutdown Behavior Settings

Maximum Shutdown Time: 2 minutes

On-Battery Shutdown Behavior: Reboot On Line Return

Authentication Phrase: <hidden auth\_phrase>

Apply Cancel

Add PowerChute® Clients

Add Client IP Address: 0.0.0.0

Add Cancel

Remove PowerChute® Clients

40.40.40.108  
0.0.0.0  
0.0.0.0  
0.0.0.0  
0.0.0.0  
0.0.0.0  
0.0.0.0  
0.0.0.0  
0.0.0.0  
0.0.0.0

Configured Client IP Addresses:

Remove Cancel

5. *Configure the shutdown parameters.* The approximate time that it takes to shutdown the PC should be known when performing this step. These parameters are used to determine when to power up the PCs that were shutdown in the previous step. If the PC takes a longer time to shut down, then these values need to be raised to allow for proper shutdown to occur. Select **Smart-UPS 750 RM** → **Configuration**. In the **Shutdown Parameters** section, fill in the **Return Battery Capacity**, **Low-Battery Duration**, **Shutdown Delay** and **Return Delay** (if needed). Press the **Apply** button.

**Note:** Not all PCs BIOS support the PowerChute Shutdown feature, so in some cases, PCs may need to be manually turned back on after the power restores.

APC Network Management Card - Microsoft Internet Explorer

Address: http://40.40.40.189/arakfram.htm?1:3

Network Management Card  
IP: 40.40.40.189

Smart-UPS 750 RM  
Status  
Diagnostics  
Control  
**Configuration**  
PowerChute®  
Scheduling  
Sync Control  
Environment  
Events  
Data  
Network  
System  
Logout  
Help  
Links  
APC's Web Site  
Testdrive Demo  
APC Monitoring

Configuration of Smart-UPS 750 RM named UPS\_IDEN

**Utility Line Settings**

Output Voltage: 120 VAC  
High Transfer Voltage: 127 VAC  
Low Transfer Voltage: 106 VAC  
Sensitivity: Low  
[Apply] [Cancel]

**Shutdown Parameters**

Return Battery Capacity: 15 %  
Low-Battery Duration: 02 Minutes  
Maximum Shutdown Time: 2 Minutes  
Shutdown Delay: 000 Seconds  
Return Delay: 000 Seconds  
Sleep Time: 0.0 Hours  
[Apply] [Cancel]

**General Settings**

UPS Name: UPS\_IDEN  
Last Battery Replacement: 03/17/06  
Audible Alarm: Power Fail  
External Batteries: 000  
Simple Signal Shutdowns: Disabled  
[Apply] [Cancel]

**Reset UPS Defaults**

Action: No Action  
[Apply] [Cancel]

This completes the administration and management that is specific to Avaya IP Office.



## 5. Configure the APC Switched Rack PDU

If an APC Switched Rack PDU is part of the configuration, follow these steps.

### 5.1. Configure IP Parameters

By default, the APC Switched Rack PDU is configured for DHCP and BOOTP mode. If static IP Addresses are being used, perform the following steps.

1. Connect a PC to the APC Switched Rack PDU with the gray serial cable that is provided with the APC Switched Rack PDU. The cable is the only one that works with the APC Switched Rack PDU. Start a terminal emulation program and use the following settings:
  - Bits per second: 9600
  - Data bits: 8
  - Parity: None
  - Stop bits: 1
  - Flow Control: None
2. Follow Step 2 in Section 4.1 to change the IP Address, Subnet Mask and Default Gateway.

## 5.2. Management of the Switched Rack PDU

The administration of the Switched Rack PDU is done via a web browser from a PC on the network. Enter the IP address of the Switched Rack PDU as the URL and log in with the appropriate credentials.

1. *Configure the Contact information.* Follow Step 1 in Section 4.2 to configure the Contact information.
2. *Configure the Outlet names.* Each outlet presented on the screen corresponds to a physical outlet on the Switched Rack PDU. Naming the outlets makes the system easier to manage. Select **Outlets** → **Configuration**. Press the **Configure** link in the **Outlet Name Configuration** section.

The screenshot shows the APC Switched Rack PDU web interface in a Microsoft Internet Explorer browser. The address bar shows the URL <http://40.40.40.190/switchedRack.htm?1:1>. The interface has a left sidebar with navigation links: Switched Rack PDU, Outlets, Configuration, Outlet Groups, Events, Data, Network, System, Logout, and Help. The main content area is titled "Switched Rack PDU named RackPDU Outlet Configuration". It contains two sections: "Outlet Settings" and "Outlet Name Configuration".

**Outlet Settings**

#	Name	Power On Delay	Power Off Delay	Reboot Duration
1	Outlet 1	Immediate	Immediate	5 Seconds
2	Outlet 2	Immediate	Immediate	5 Seconds
3	Outlet 3	Immediate	Immediate	5 Seconds
4	Outlet 4	Immediate	Immediate	5 Seconds
5	Outlet 5	Immediate	Immediate	5 Seconds
6	Outlet 6	Immediate	Immediate	5 Seconds
7	Outlet 7	Immediate	Immediate	5 Seconds
8	Outlet 8	Immediate	Immediate	5 Seconds

**Outlet Name Configuration**

#	Name	Links
1	Outlet 1	../aracfram.htm?1:1
2	Outlet 2	../aracfram.htm?1:1
3	Outlet 3	../aracfram.htm?1:1
4	Outlet 4	../aracfram.htm?1:1
5	Outlet 5	../aracfram.htm?1:1
6	Outlet 6	../aracfram.htm?1:1
7	Outlet 7	../aracfram.htm?1:1
8	Outlet 8	../aracfram.htm?1:1

A red box highlights the "Configure" link in the bottom right corner of the "Outlet Name Configuration" section.

3. *Enter the Outlet Names.* In the **Outlet Name Configuration** section, enter a unique **Name** and check the appropriate **Apply to** box next to the Outlet. Press the **Apply** button. Repeat for all outlets.

The screenshot shows the APC Switched Rack PDU web interface in a Microsoft Internet Explorer browser window. The address bar shows the URL <http://40.40.40.190/walfram.htm?1>. The interface has a blue sidebar on the left with navigation links: Switched Rack PDU, Outlets, Control, Configuration, Outlet Groups, Events, Data, Network, System, Logout, and Help. The main content area is titled "Switched Rack PDU" and "Switched Rack PDU named RackPDU Outlet Configuration". It contains two sections: "Outlet Settings" and "Outlet Name Configuration".

**Outlet Settings**

Power On Delay:  0-7200 Seconds or ☐ Never  
Power Off Delay:  0-7200 Seconds or ☐ Never  
Reboot Duration:  5-60 Seconds  
Apply to: ☐ All Outlets

#	State	Name
1	On	Outlet 1
2	On	Outlet 2
3	On	Outlet 3
4	On	Outlet 4
5	On	Outlet 5
6	On	Outlet 6
7	On	Outlet 7
8	On	PoE Switch

Apply Cancel

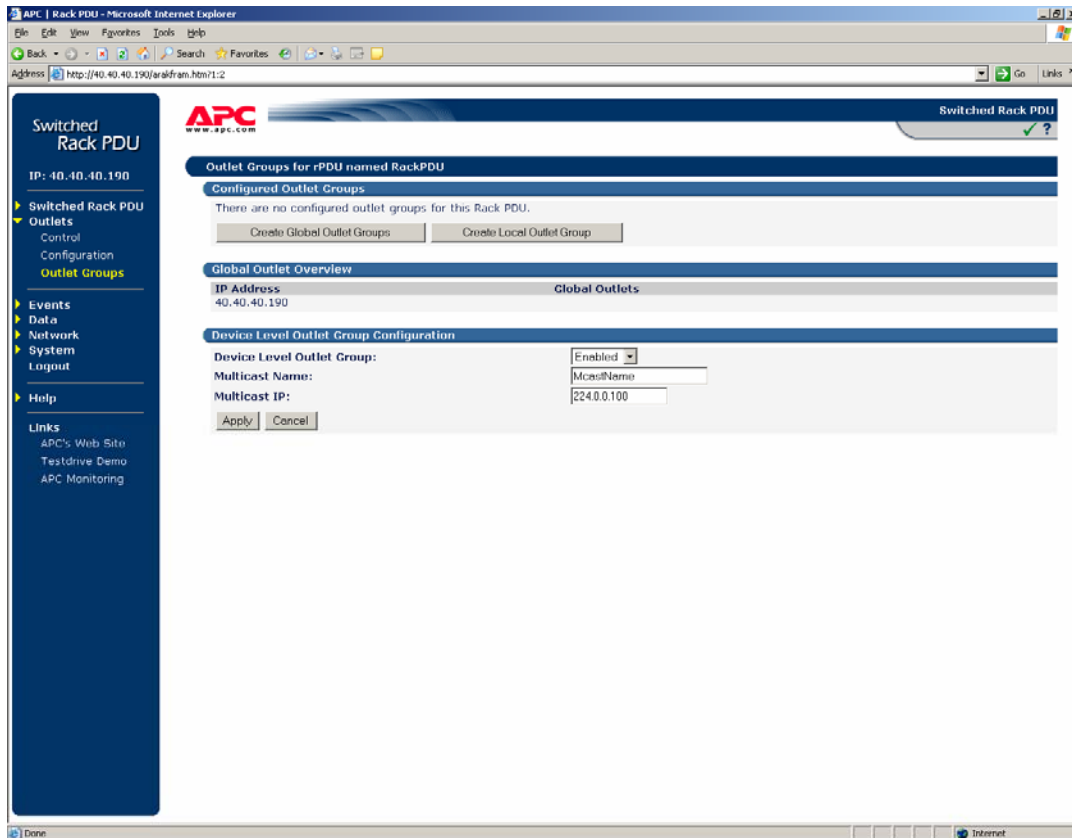
**Outlet Name Configuration**

Name:   
Link:   
Apply to: ☐ All Outlets

#	State	Name
1	On	Outlet 1
2	On	Outlet 2
3	On	Outlet 3
4	On	Outlet 4
5	On	Outlet 5
6	On	Outlet 6
7	On	Outlet 7
8	On	PoE Switch

Apply Cancel

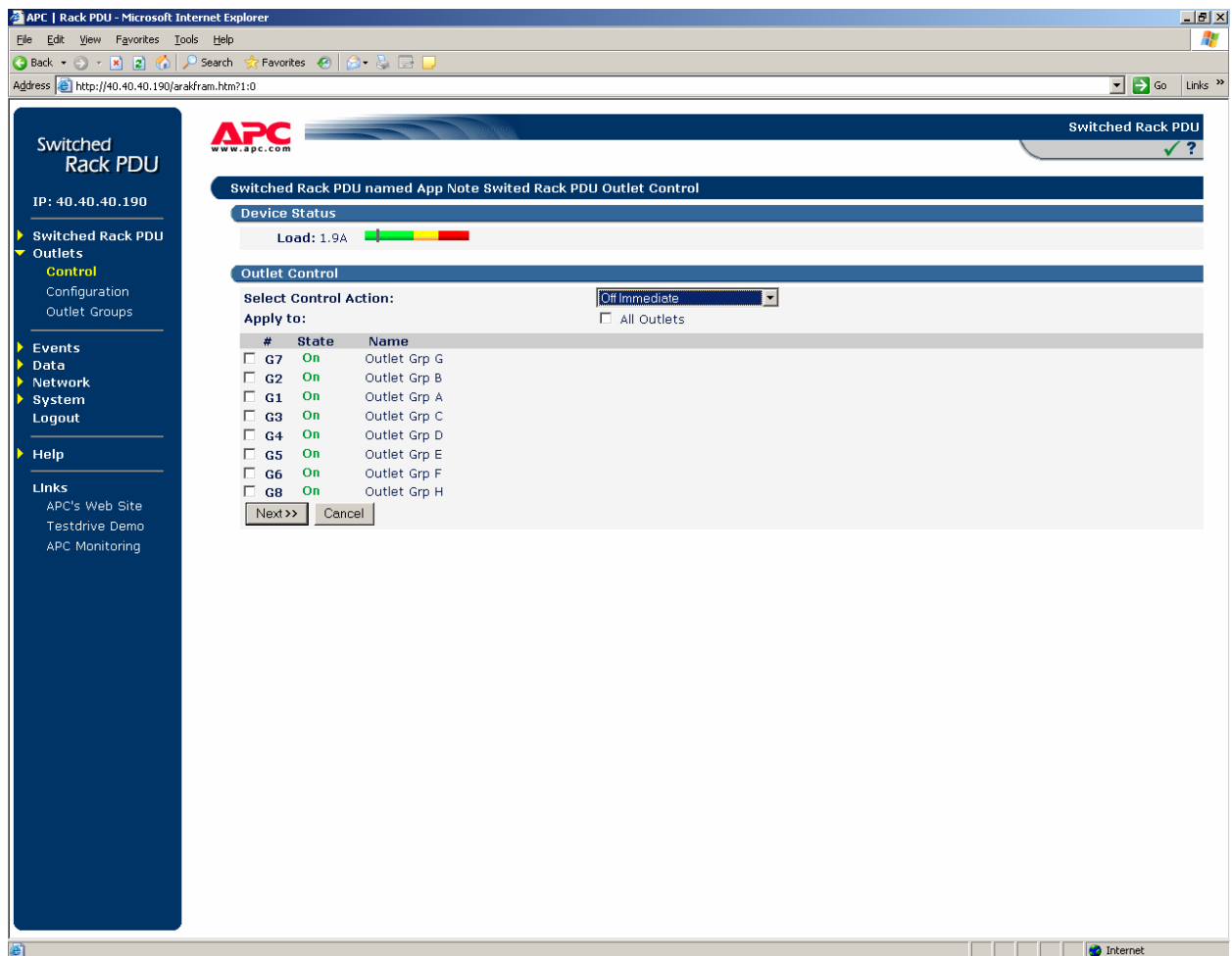
4. *Create Outlet Groups.* The Switched Rack PDU allows an administrator to turn on and off sets of outlets in addition to rebooting them. The Outlet Name is automatically generated by the APC software and cannot be modified. Outlets should be grouped together according to function. It is suggested that there be separate outlet groups for the Avaya IP Office Control Unit, the Avaya IP Office Voicemail Pro PC, Avaya IP Office Expansion modules and the Power Over Ethernet Switch. This allows a user to turn off specific outlets to conserve battery power, while still keeping the Control Unit on for as long as possible. Select **Outlets** → **Outlet Groups**. Press the **Create Global Outlet Groups** button.



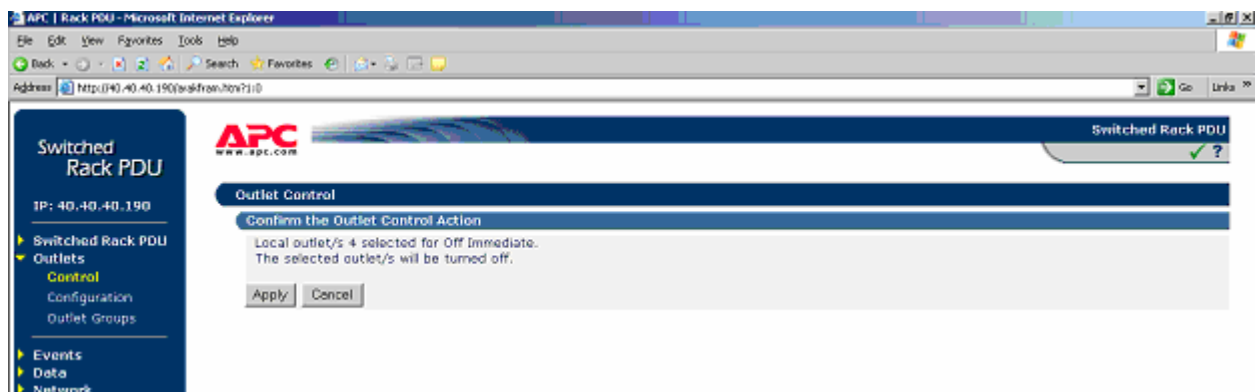
5. *Assign Outlets to the Group.* Check the box next to all outlets that will be part of the group and press the **Apply** button. Repeat Steps 4 and 5 for all outlet groups.



6. *Modify the state of an outlet group.* To change the state of an outlet group, select **Outlets** → **Control**. Select the appropriate action in the **Select Control Action** drop down box and check all Outlet Groups to which the action will apply. Press the **Next** button.



7. *Confirm the selection.* Press the **Apply** button.



## 6. Install the APC PowerChute Network Shutdown Software

The APC PowerChute Network Shutdown APC client software is available on the APC support website as documented in Section 9. The APC client software needs to be installed on all PCs that the Smart-UPS will gracefully shut down when battery power reaches a configured threshold. Once the software is installed, the IP addresses will be displayed in the screen in Step 4 of Section 4.2.

1. *Start the Installation.* Execute the installation application. Press the **Next** button on the first screens. On the third screen, select **Typical Install**.



2. *Enter the Management IP Address.* On the fourth screen enter the Network Management Card of the Smart-UPS IP Address in the **Management Card IP** field and press the **Next** button.

Management Card Information

Management Card IP: 40.40.40.189

Management Card Port #: 80

PowerChute HTTP Port #: 3052

Cancel << Back Next >>

3. *Complete the installation.* Press the **Next** button on the rest of the screens to complete installation.

## 7. Interoperability Compliance Testing

Interoperability compliance testing evaluated the ability of the American Power Conversion InfraStruXure products to successfully provide backup power for an Avaya IP Office system.

### 7.1. General Test Approach

The general test approach was to have an IP Office Control Unit with the maximum number of expansion modules and disconnect the public utility power. This was tried on an idle system and one with calls to ensure that the system was not affected by the power loss and that the calls remained active.



The APC PowerChute Network shutdown feature was tested to ensure that there was no loss of Voicemail files.

## 7.2. Test Results

The APC Smart-UPS and APC Switched Rack PDU can successfully provide backup power to an Avaya IP Office system.

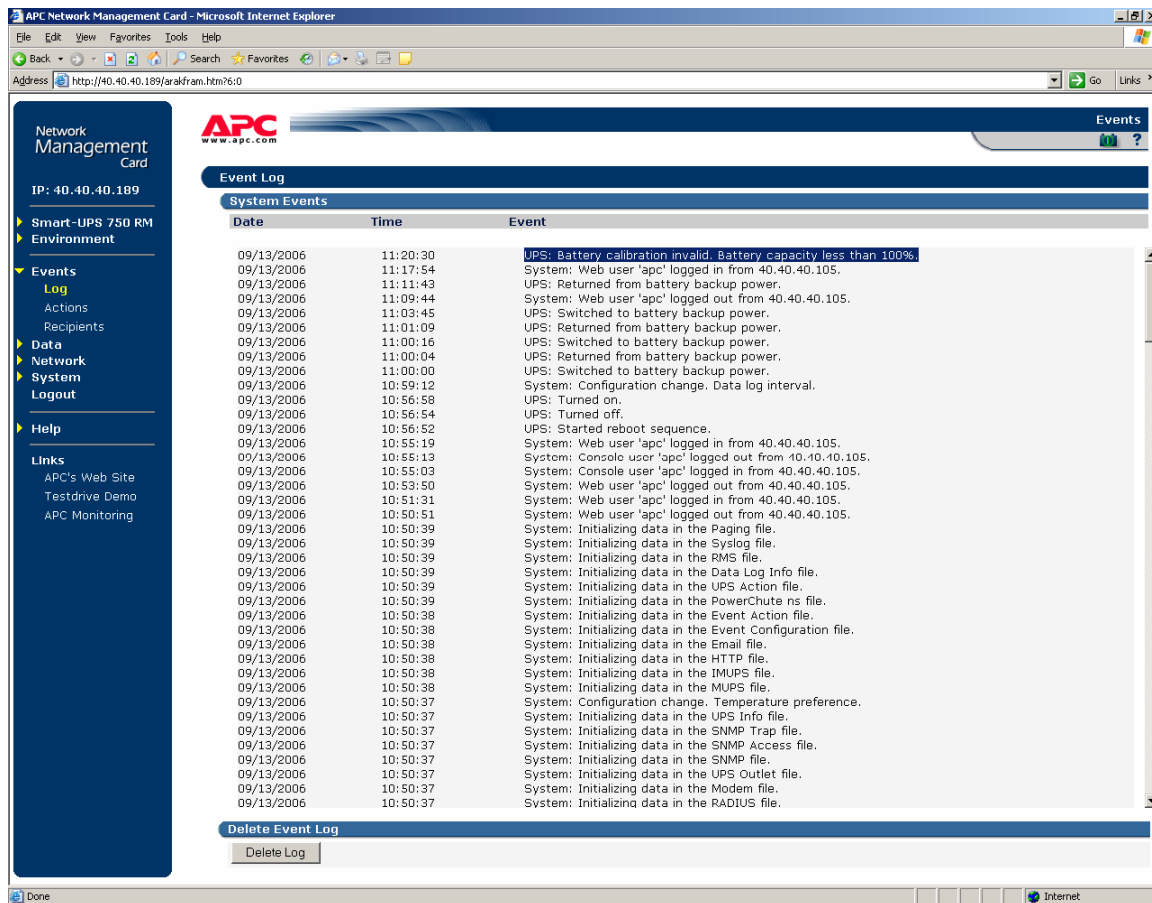
## 8. Verification Steps

Verification included an Avaya IP Office 406V2 with six expansion modules, Avaya IP 4600 and 5600 series telephones with thirty 4400/5400/6400 telephones connected to an APC Smart-UPS 750 RM UPS and Switched Rack PDU. A PC running Voicemail Pro and IP Office Manager was connected to the APC equipment as was the Power Over Ethernet switch for the IP telephones. Utility power was disconnected and the APC equipment switched to battery power. This was tried on an idle system and also a system with active calls. Verification included ensuring no reboots on the Avaya IP Office occurred, and that calls stayed connected over the change to battery power (and back again). Voicemail operation was verified during the change. Calls included those on handsets and speaker. User and Group buttons were used to verify that the sets could be properly powered. Outlet groups were turned off for the expansion modules. The Control Unit and Voicemail Pro could successfully operate. The PowerChute Network shutdown was used to turn off the Voicemail PC. No saved messages were lost on shutdown. APC's shutdown agent successfully protected the integrity of stored voicemails on the Voicemail PC by gracefully shutting it down during an extended loss of power.

Although not shown in **Figure 1**, tests were repeated for the Avaya IP Office 412 and the APC Smart-UPS 1400 RM XL UPS with a Basic PDU. For these cases, the outlet group functionality was not used.

### 8.1. Troubleshooting

An event log is available for the APC products. The log can be viewed on line (as described here), or can be FTP'd to be viewed offline. This log supplies information about changes that were made to the hardware via administration as well as any environmental events (change in temperature, power loss or restore). To access the log, select **Events** → **Log**.



## 9. Support

For technical support on APC products, visit <http://www.apc.com/support/index.cfm>.

## 10. Conclusion

These Application Notes describe the steps for configuring the APC 750 Rack Mount Smart-UPS, the APC Switched Rack PDU Model AP7900APC and the APC Network Management Card AP9616, to provide backup power for Avaya IP Office Release 3.2.

## 11. Additional References

Documentation can be found at the following:

1. Product documentation for Avaya IP Office is available at <http://marketingtools.avaya.com/knowledgebase/>
2. APC documentation is available on the CD that comes with the products.

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