



Avaya Solution & Interoperability Test Lab

Application Notes for the Aculab GroomerII 10.1.2 with Avaya Communication Manager 3.1.2 - Issue 1.0

Abstract

These Application Notes describe the configuration steps required for the Aculab GroomerII 10.1.2 to successfully interoperate with Avaya Communication Manager 3.1.2. GroomerII is a stand-alone signaling and media gateway that can be used to interconnect diverse network types; in this case GroomerII provides a H.323-to-SS7 Gateway between Avaya Communication Manager and a SS7 network. GroomerII is connected to Avaya Communication Manager via a H.323 trunk and is connected to the SS7 Network via one or more E1 ISDN-PRI lines ('trunks').

Information in these Application Notes has been obtained through interoperability compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

These Application Notes describe a compliance-tested configuration comprised of GroomerII with Avaya Communication Manager using a H.323 trunk.

GroomerII is a stand-alone signaling and media gateway that can be used to interconnect diverse network types; in this case GroomerII provides an H.323-to-SS7 Gateway between Avaya Communication Manager and a SS7 network. GroomerII is connected to Avaya Communication Manager via a H.323 trunk and is connected to the SS7 Network via one or more E1 ISDN-PRI lines ('trunks'). These trunks contain both signaling channels and voice channels, which are used to gateway calls made from Avaya IP phones connected to Avaya Communication Manager.

When GroomerII is in operation as a gateway, outbound calls are routed to the SS7 network and inbound calls are routed to Avaya Communication Manager. A call made from an Avaya IP phone is terminated on GroomerII, then a new call is set up between GroomerII into the SS7 Network, and GroomerII switches (connects) the incoming IP call to the outbound SS7-bound call.

The high-level objectives of the solution described in these Application Notes are that outbound calls are routed at all times to the SS7 Network via GroomerII and inbound calls are routed at all times to Avaya Communication Manager.

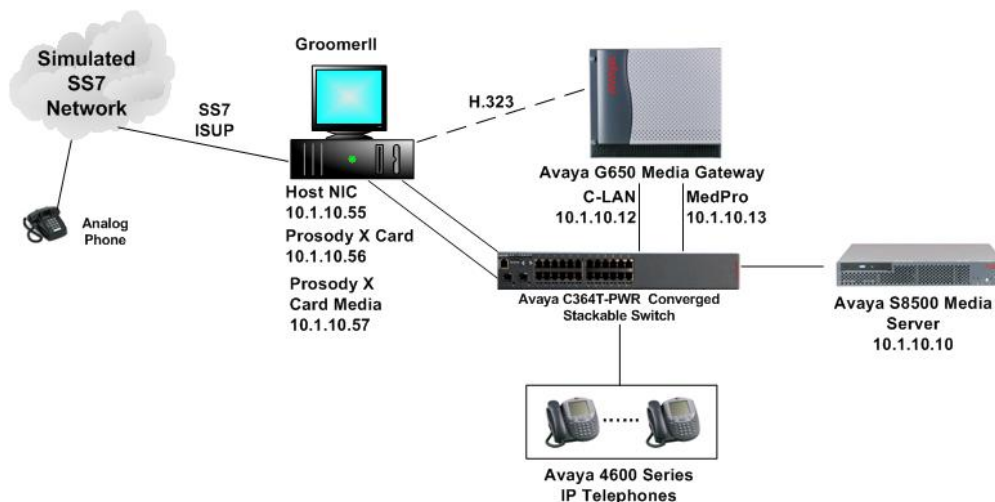


Figure 1: Avaya Communication Manager and GroomerII Compliance Test Configuration

2. Equipment and Software Validated

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

Equipment	Software
Avaya S8500 Media Server – Avaya Communication Manager	3.1.2 (03.1-01.0.632.1)
Avaya G650 Media Gateway - Control-LAN TN799DP - IP Media Processor TN2302AP	HW01 FW017 HW20 FW110
Avaya C364T-PWR Converged Stackable Switch	4.3.12
Avaya 4600 Series IP Telephones	2.2.4 (4620SW) – H.323
GroomerII - Prosody X Card H/W - Call Control S/W	10.1.2 1.4 6.4

3. Configure Avaya Communication Manager

Initial configuration of Avaya Communication Manager is beyond the scope of these Application Notes. See Section 9 for Avaya documentation references. This section illustrates the configuration of the H.323 trunk groups and signaling groups, and route patterns used in the compliance-tested configuration. The steps are performed from the System Access Terminal (SAT) interface.

3.1. H.323 Trunks and Signaling Groups

The steps in this section create an H.323 IP trunk group to the GroomerII.

Step	Description
1.	<p>Enter the change node-names ip command. Specify the node name and IP address for the GroomerII. Observe the node name and IP address of the C-LAN card shown in bold. This will be used in the GroomerII configuration in Section 4.2 Step 2. These node names will also be used in the configuration of the H.323 signalling group in Step 4.</p> <pre> change node-names ip Page 1 of 1 Name IP Address IP NODE NAMES Name IP Address AEServer 10 .1 .10 .20 . . . Abacus 10 .1 .10 .31 . . . IPO412a_DC1 10 .1 .20 .10 . . . Groomer 10 .1 .10 .55 . . . S8300a_DC1 10 .1 .30 .10 . . . clan1a_DC1 10 .1 .10 .12 . . . default 0 .0 .0 .0 . . . medpro1a_DC1 10 .1 .10 .13 . . . procr 10 .1 .10 .10 . . . </pre>

<p>2.</p>	<p>Enter the add trunk-group n command, where “n” is an available trunk group number. On Page 1 of the trunk-group form, configure the following:</p> <ul style="list-style-type: none"> • Group Type – set to “isdn”. • Group Name – enter a meaningful name/description. • TAC – enter a Trunk Access Code that is valid under the provisioned dial plan. • Carrier Medium – set to “H.323”. • Service Type – set to “tie”. <pre> add trunk-group 25 Page 1 of 21 TRUNK GROUP Group Number: 25 Group Type: isdn CDR Reports: y Group Name: H.323 Groomer COR: 1 TN: 1 TAC: 725 Direction: two-way Outgoing Display? n Carrier Medium: H.323 Dial Access? y Busy Threshold: 255 Night Service: Queue Length: 0 Service Type: tie Auth Code? n Member Assignment Method: manual </pre>
<p>3.</p>	<p>On the TRUNK FEATURES screen (Page 3 of the trunk-group form); set the Send Name, Send Calling Number and Send Connected Number to “y”.</p> <pre> add trunk-group 25 Page 3 of 21 TRUNK FEATURES ACA Assignment? n Measured: none Internal Alert? n Maintenance Tests? y Data Restriction? n NCA-TSC Trunk Member: 1 Send Name: y Send Calling Number: y Used for DCS? n Send EMU Visitor CPN? n Suppress # Outpulsing? n Format: private UII IE Treatment: service-provider Replace Restricted Numbers? n Replace Unavailable Numbers? n Send Connected Number: y Hold/Unhold Notifications? n </pre>

4. Enter the **add signaling-group n** command, where “n” is an unused signalling group number. On Page 1 of the form, configure the following:
- **Group Type** – set to “h.323”.
 - **Trunk Group for Channel Selection** – enter the number of the trunk group configured in Step 2.
 - **Near-end Node Name** – enter the node name of a local C-LAN board from Step 1.
 - **Near-end Listen Port** – specify the local listen port, typically 1720.
 - **Far-end Node Name** – enter the node name of the Groomer configured in Step 1.
 - **Far-end Listen Port** – specify the listen port, typically 1720.

```

add signaling-group 25                                     Page 1 of 5
                SIGNALING GROUP

Group Number: 25          Group Type: h.323
Remote Office? n         Max number of NCA TSC: 5
SBS? n                   Max number of CA TSC: 5
IP Video? n              Trunk Group for NCA TSC: 25

Trunk Group for Channel Selection: 25
Supplementary Service Protocol: a
T303 Timer(sec): 10

Near-end Node Name: clan1a_DC1          Far-end Node Name: Groomer
Near-end Listen Port: 1720              Far-end Listen Port: 1720
Far-end Network Region: 1

LRQ Required? n                       Calls Share IP Signaling Connection? n
RRQ Required? n                       H245 Control Addr On FACility? n
                                        Bypass If IP Threshold Exceeded? n
                                        H.235 Annex H Required? n
DTMF over IP: out-of-band              Direct IP-IP Audio Connections? y
                                        IP Audio Hairpinning? n
                                        Interworking Message: PROGRESS

```

5. Enter the **change trunk-group n** command, where “n” is the trunk group number configured in Step 2. On Page 3 of the **trunk-group** form, configure the following:
- “IP” for **Port**. The number of ports configured should be coordinated with the number of trunks available to the GroomerII gateway.
 - The number of the signaling group configured in Step 3 for **Sig Grp**.

```

change trunk-group 25                                     Page 5 of 21
                TRUNK GROUP
                Administered Members (min/max): 1/30
GROUP MEMBER ASSIGNMENTS                               Total Administered Members: 30

Port      Name      Night      Sig Grp
1: IP          25
2: IP          25
3: IP          25
4: IP          25
5: IP          25

```

3.2. AAR Table and Route Pattern

The steps in this section create the AAR table and route pattern to the GroomerII.

Step	Description
<p>1.</p>	<p>Enter the change aar analysis “0” command. Configure Dialed String entries according to customer requirements. In the example below, the entries match dialed numbers as follows:</p> <ul style="list-style-type: none"> The “5” Dialed String matches 5-digit dialed numbers that begin with 5, and routes calls to Route Pattern 5. <pre data-bbox="277 575 1446 873"> change aar analysis 0 Page 1 of 2 AAR DIGIT ANALYSIS TABLE Percent Full:0 Dialed Total Route Call Node ANI String Min Max Pattern Type Num Reqd 2 5 5 2 aar n 3 5 5 3 aar n 4 5 5 4 aar n 5 5 5 5 aar n 600 5 5 600 aar n </pre>
<p>2.</p>	<p>Enter the change route-pattern n command, where “n” is the route pattern that processes dialed numbers configured in Step 1.</p> <p>Routing Preference – H.323 IP trunk to GroomerII</p> <ul style="list-style-type: none"> Grp No – enter the trunk group number routed to the GroomerII gateway (see Section 3.1, Step 2) FRL - assign a Facility Restriction Level to this routing preference. <pre data-bbox="277 1226 1446 1661"> change route-pattern 5 Page 1 of 3 Pattern Number: 5 Pattern Name: Groomer SCCAN? n Secure SIP? n Grp FRL NPA Pfx Hop Toll No. Inserted DCS/ IXC No Mrk Lmt List Del Digits QSIG Dgts Intw 1: 25 0 2: 3: n user n user n user BCC VALUE TSC CA-TSC ITC BCIE Service/Feature PARM No. Numbering LAR 0 1 2 3 4 W Request Dgts Format Subaddress 1: y y y y y n n rest none 2: y y y y y n n rest none 3: y y y y y n n rest none </pre>


3.3. Verify Codec Configuration

Step	Description
1.	<p>Enter the display ip-codec-set <number> to display the IP codec configuration. Ensure that the codecs selected below on the IP Codec Set form are selected in the GroomerII configuration shown in Section 4.2, step 3. This configuration utilizes the default IP Network Region 1 and IP Codec Set 1.</p> <pre data-bbox="293 499 1430 827"> display ip-codec-set 1 Page 1 of 2 IP Codec Set Codec Set: 1 Audio Silence Frames Packet Codec Suppression Per Pkt Size(ms) 1: G.711A n 2 20 2: G.729 n 2 20 3: 4: </pre>

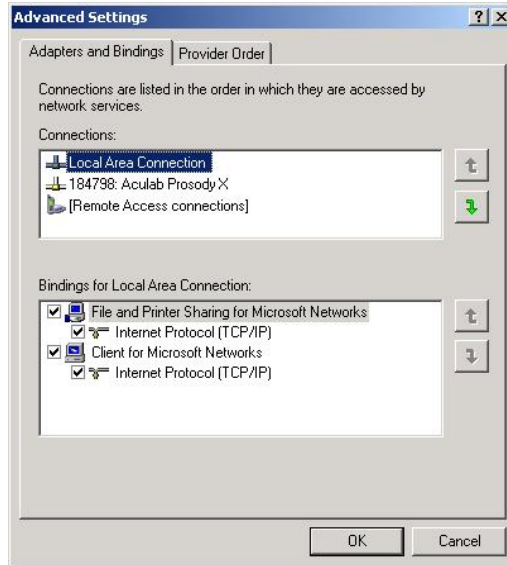
4. Configure GroomerII

The configuration provided in this section is intended to cover the minimal configuration needed to interconnect with Avaya Communication Manager. For a more extensive configuration guide of all the available options, see Section 9 for GroomerII documentation references.

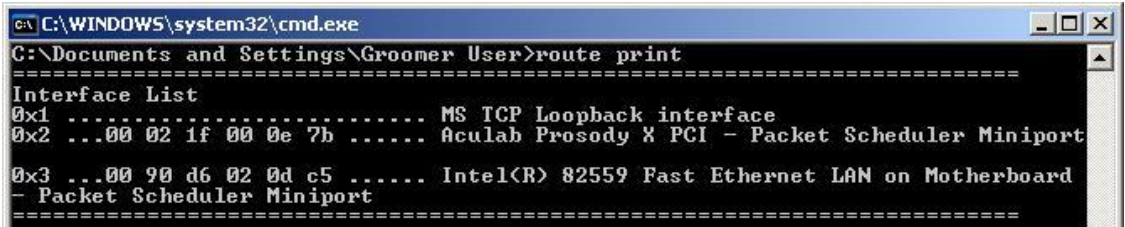
4.1. Configure Prosody X Card

Step	Description
1.	<p>After the initial GroomerII installation, set the IP address for the Local Area Connection and the Aculab Prosody X through Windows Network Connections. Click on Start → Settings → Network Connections.</p>  <p>The screenshot shows the Windows Network Connections window. The title bar reads 'Network Connections'. The menu bar includes File, Edit, View, Favorites, Tools, Advanced, and Help. The address bar shows 'Network Connections'. Under the heading 'LAN or High-Speed Internet', there are two network connections: 'Local Area Connection' (Connected, Intel(R) 82559 Fast Ethernet...) and '184798: Aculab Prosody X' (Connected, 184798: Aculab Prosody X). Under the heading 'Wizard', there are two icons: 'New Connection Wizard' and 'Network Setup Wizard'.</p>

2. In the Network Connections screen, click on **Advanced** → **Advanced Settings**, select the **Adaptors and Bindings** tab. Ensure the **Local Area Connection** is prioritized higher than the **Aculab Prosody X** card as shown below by using the up and down arrows. Click the **OK** button to save any changes.

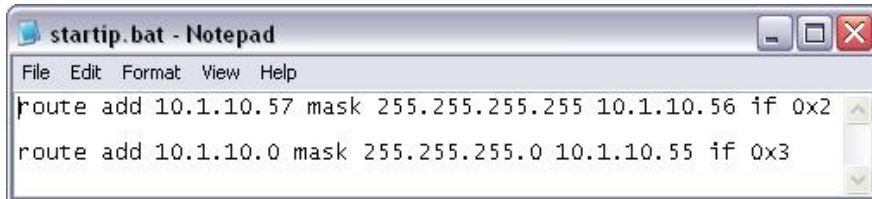


3. Open a Windows command prompt and enter the command **route print** to find out, which network adaptors relate to which network cards. From the screen below it can be seen that network adaptor number **0x2** relates to the Aculab Prosody X card and **0x3** relates to the Intel(R) 82559 Fast Ethernet LAN (Local Area Connection).



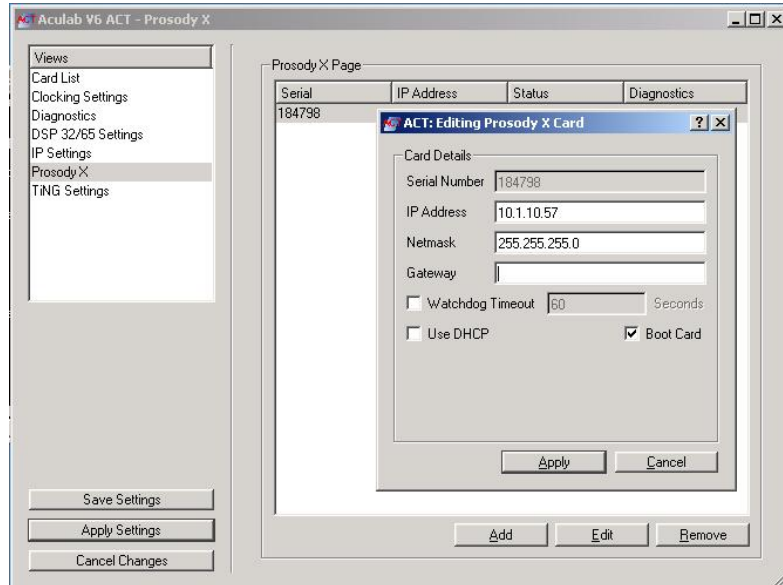
```
C:\WINDOWS\system32\cmd.exe
C:\Documents and Settings\Groomer User>route print
=====
Interface List
0x1 ..... MS TCP Loopback interface
0x2 ...00 02 1f 00 0e 7b ..... Aculab Prosody X PCI - Packet Scheduler Miniport
0x3 ...00 90 d6 02 0d c5 ..... Intel(R) 82559 Fast Ethernet LAN on Motherboard
- Packet Scheduler Miniport
=====
```

Modify the startip.bat file in the directory C:\Program Files\Aculab\GroomerII with the IP addresses as shown below. Within the GroomerII there is an internal Prosody X card media connected to Aculab Prosody X card. The first route is to direct all the traffic routed to the internal Prosody X card media IP address (which will be configured in the next step) to the IP address of the Aculab Prosody X card, configured in the initial installation. The second route is to direct all the other traffic routed within the subnet to the host (Local Area Connection) IP address. The network adaptor number at the end of the route should match the correct network adaptor for that network interface card this can be seen in the route print screen above.

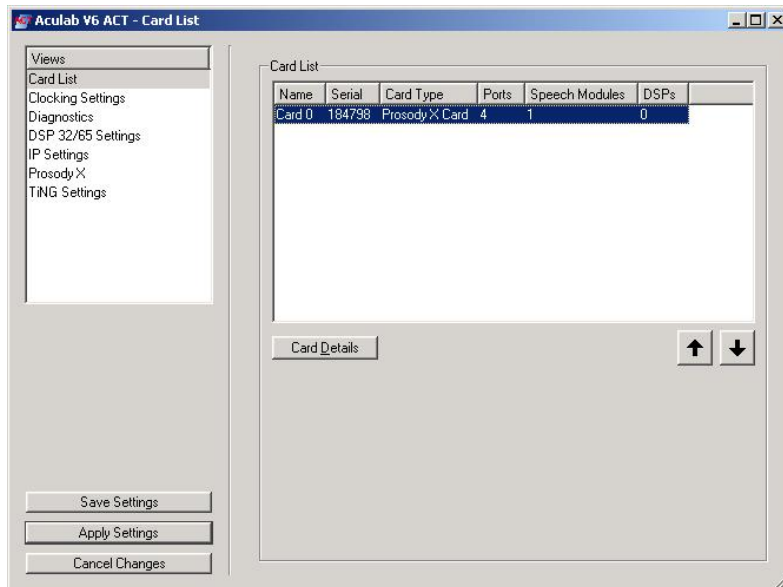


```
startip.bat - Notepad
File Edit Format View Help
route add 10.1.10.57 mask 255.255.255.255 10.1.10.56 if 0x2
route add 10.1.10.0 mask 255.255.255.0 10.1.10.55 if 0x3
```

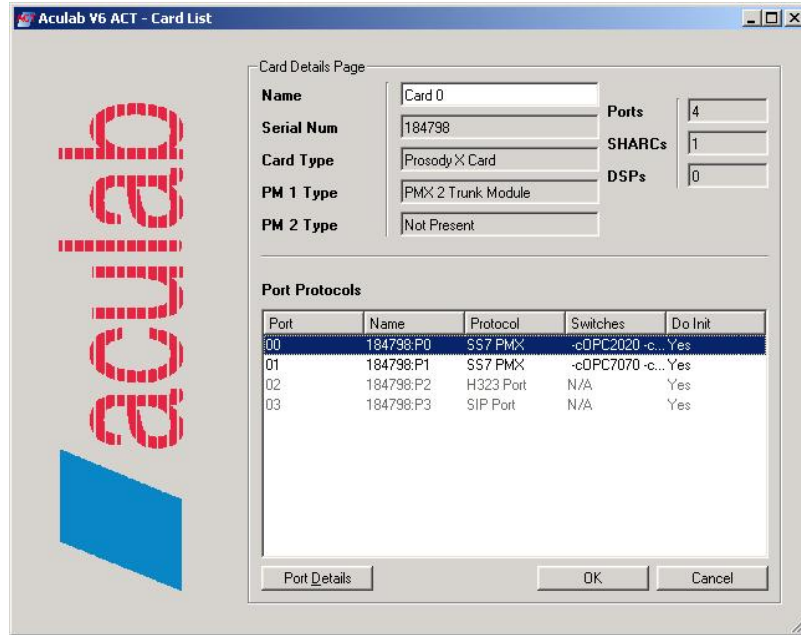
4. Click on **Start → Programs → Aculab → V6 → ACT**. In the Views section click on **Prosody X**. In the Prosody X Page section, highlight the media Prosody X card and click **Edit**. In the ACT: Editing Prosody X Card dialog box, edit the **IP Address** field and the **Netmask** field. Tick the **Boot Card** box and click **Apply**. In the Restart Prosody X card dialog box that appears, click **Yes**. This can take up to 30 seconds and asks to reconfirm the resetting the Prosody X card.



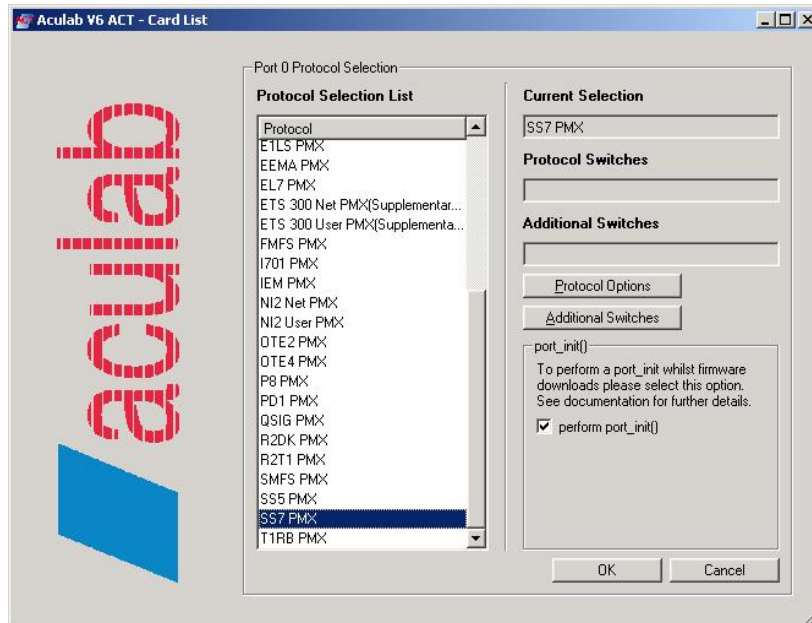
5. In the Views section click on Card List. In the Card List section, highlight the Prosody X card and click **Card Details**.



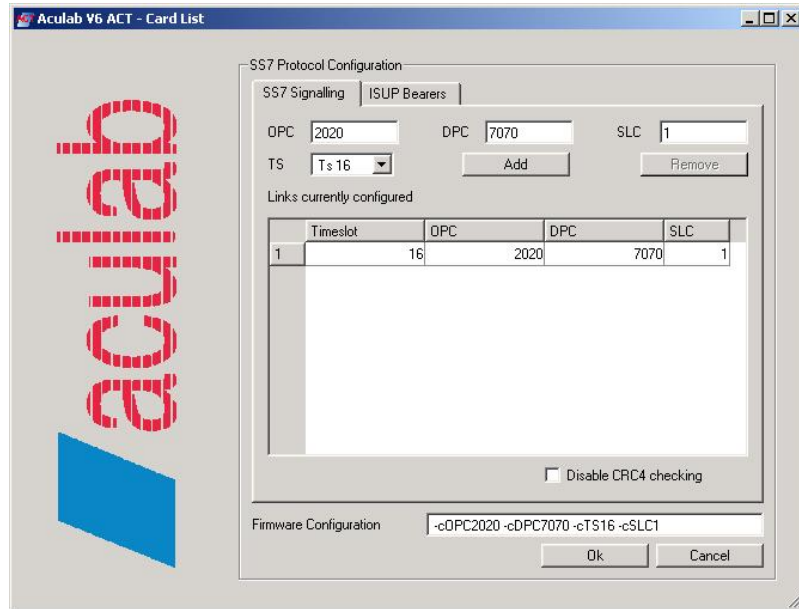
6. In the Port Protocols section, highlight Port **00** and click on **Port Details**.



7. From the Protocol Selection List, select **SS7PMX** and click on **Protocol Options**.



8. Click on the **SS7 Signalling** tab. In the **OPC** (Originating Point Code) field enter “2020”. This is the OPC of the GroomerII and can be any 14 bit binary code converted to decimal. In the **DPC** (Destination Point Code) field enter “7070”. This is the DPC of the SS7 test equipment. Enter “1” in the **SLC** (Signalling Link Code) field and select “Ts16” from the drop down list in the **TS** field. Click **Add**.

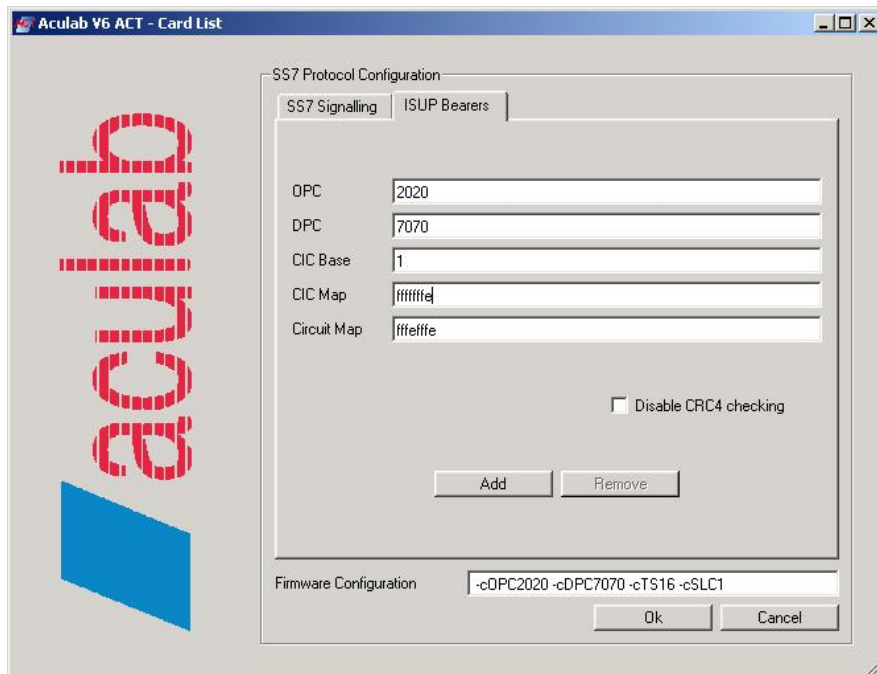


9.

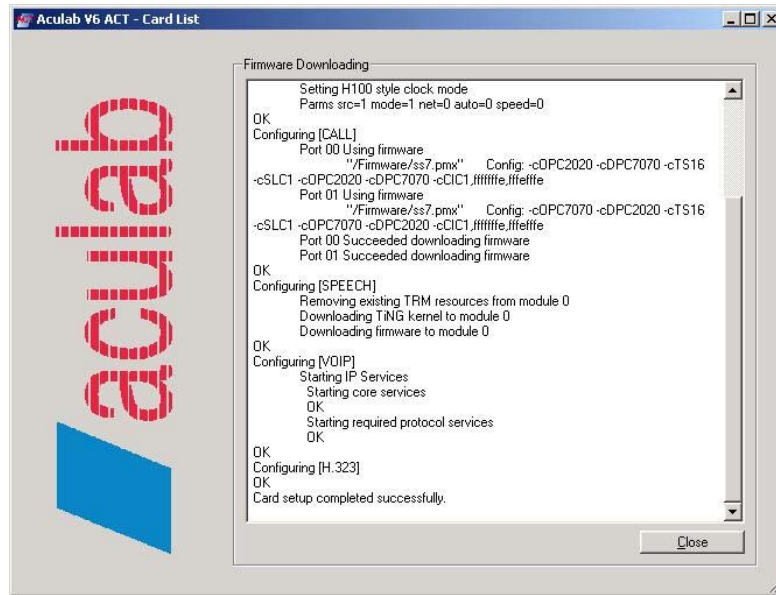
Click on the **ISUP Bearers** tab and configure the following:

- **OPC & DPC** fields are pre-populated.
- **CIC Base** – Set CIC (Circuit Identifier Code) to “1”. This is the CIC value of the first timeslot that has been assigned a CIC.
- **CIC Map** – Set to “ffffffe”. The CIC map is a 32-bit vector representing which timeslots will be assigned a circuit identifier. For example, assuming that we want to assign a CIC number to all timeslots apart from timeslot 0, the vector would be 11111111111111111111111111111110 or fffffffe.
- **Circuit Map** – The circuit map is a 32-bit vector representing which channels can be used as bearers and is pre-populated given the signalling settings. In this example, all timeslots may be used as bearers apart from 0 (framing) and 16 (signalling). The resulting map is therefore fffefff.

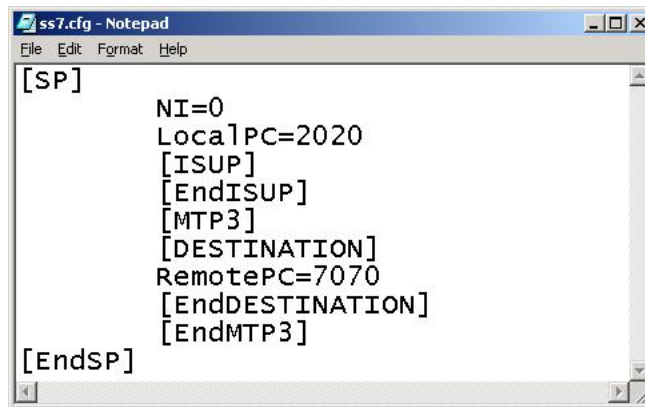
Click **Add** and then click **Ok**.



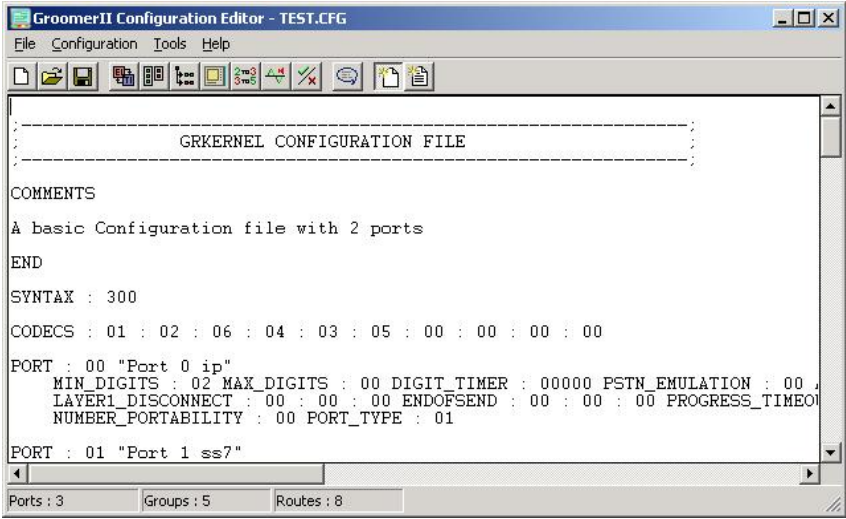
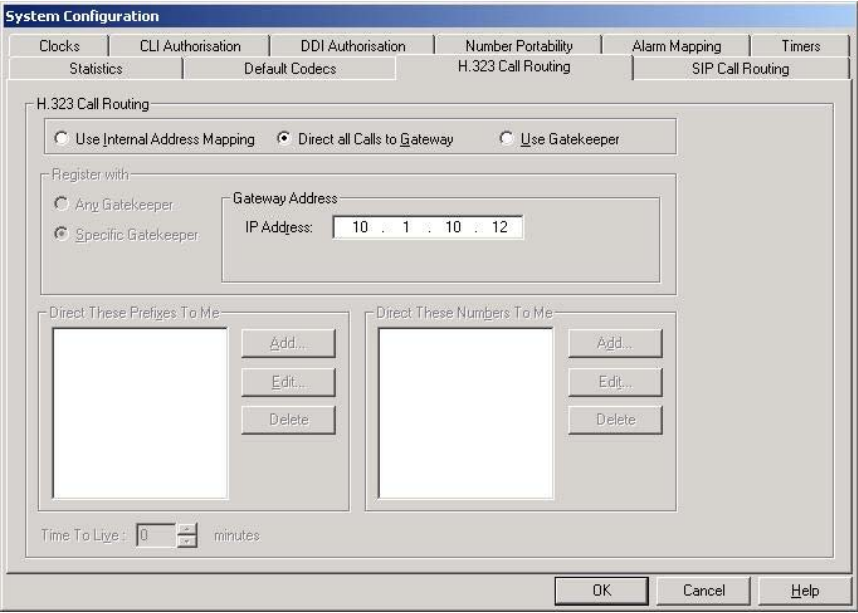
10. In the Apply Settings dialog that appears, click Yes. The following screen will be displayed indicating the Card setup completed successfully.



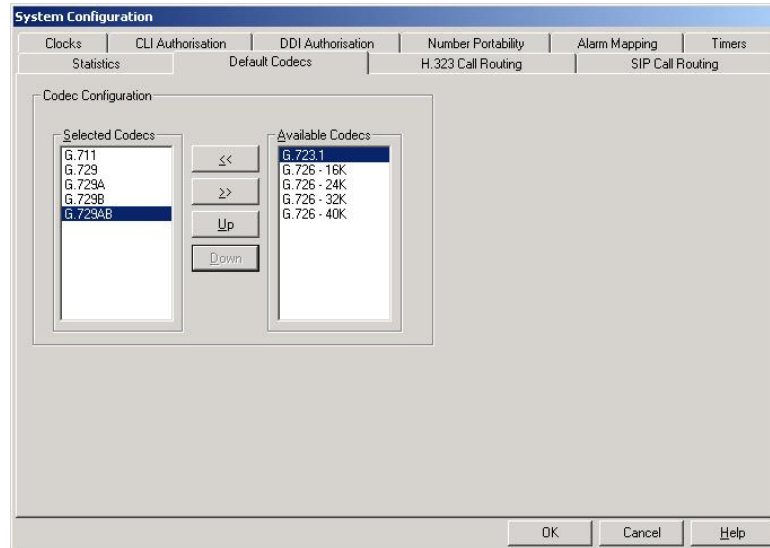
11. Edit the ss7.cfg file in C:\Program Files\Aculab\v6\bin to reflect your settings. In this case, the **LocalPC** (Local Point Code)= “2020”, **RemotePC** (Remote Point Code)= “7070”, **NI** (Network Indicator)= “0”.



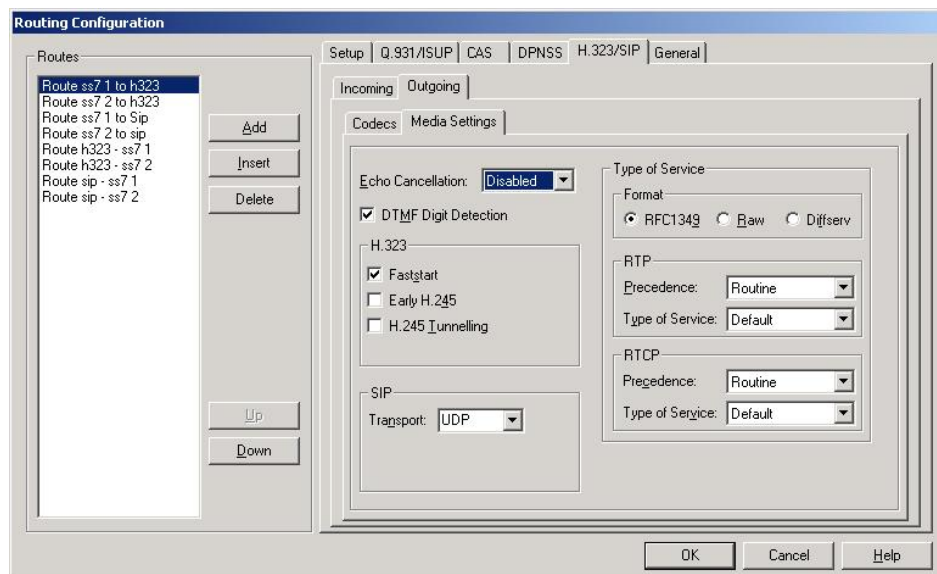
4.2. Configure GroomerII Routing

Step	Description
1.	<p>Click on Start → Programs → Aculab GroomerII → Configuration Editor. In the GroomerII Configuration Editor screen click on File → Open and select the TEST.cfg file. Click on Configuration → System.</p>  <p>The screenshot shows the 'GroomerII Configuration Editor - TEST.CFG' window. The main text area contains the following configuration:</p> <pre> GRKERNEL CONFIGURATION FILE ----- COMMENTS A basic Configuration file with 2 ports END SYNTAX : 300 CODECS : 01 : 02 : 06 : 04 : 03 : 05 : 00 : 00 : 00 : 00 PORT : 00 "Port 0 ip" MIN_DIGITS : 02 MAX_DIGITS : 00 DIGIT_TIMER : 00000 PSTN_EMULATION : 00 LAYER1_DISCONNECT : 00 : 00 : 00 ENDOFSEND : 00 : 00 : 00 PROGRESS_TIMEOUT : 00 NUMBER_PORTABILITY : 00 PORT_TYPE : 01 PORT : 01 "Port 1 ss7" </pre> <p>At the bottom, a status bar indicates: Ports : 3 Groups : 5 Routes : 8</p>
2.	<p>Click on the H.323 Call Routing tab and ensure Direct all Calls to Gateway option is enabled. Enter the IP address of the Avaya Communication Manager's C-LAN board displayed in Section 3.1 Step 1, in the IP Address field.</p>  <p>The screenshot shows the 'System Configuration' dialog box with the 'H.323 Call Routing' tab selected. The 'Direct all Calls to Gateway' radio button is selected. The 'Gateway Address' field is set to '10 . 1 . 10 . 12'. There are also sections for 'Direct These Prefixes To Me' and 'Direct These Numbers To Me', each with 'Add...', 'Edit...', and 'Delete' buttons. A 'Time To Live' field is set to 0 minutes. The 'OK', 'Cancel', and 'Help' buttons are at the bottom.</p>

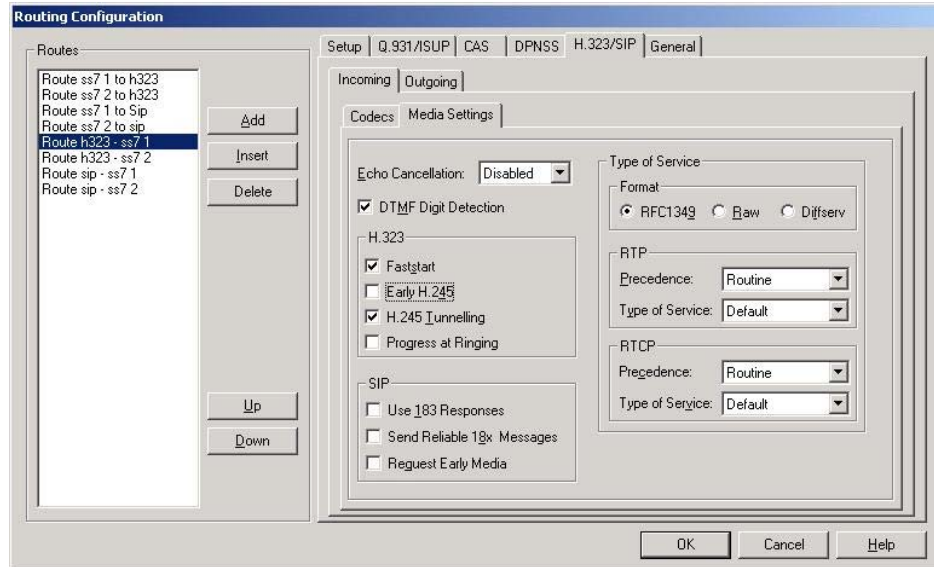
- Click on the **Default Codecs** tab. Highlight the Codecs configured in Section 3.3 Step 1 from the list in Available Codecs section and click the << button to move the codecs into the Selected Codecs section as shown below. Click **OK**.



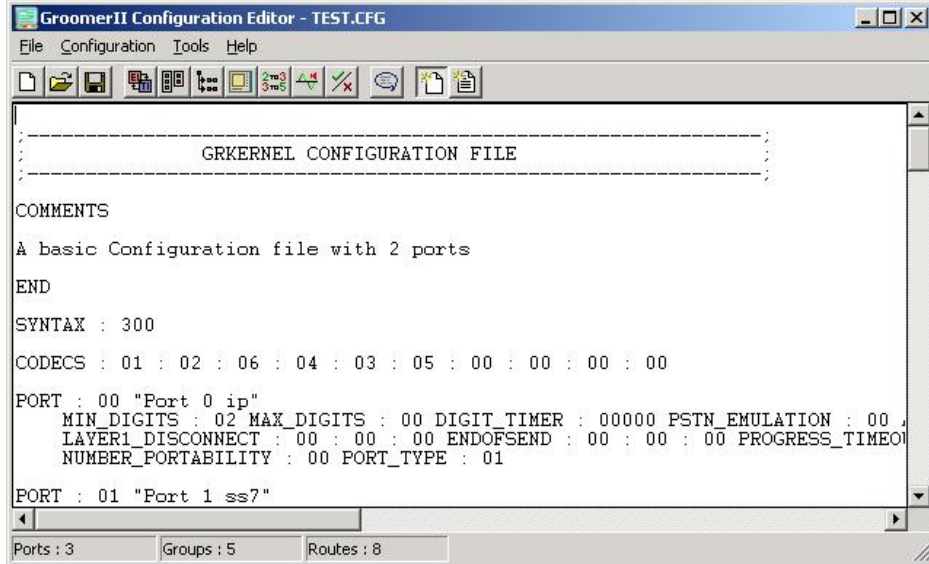
- In the GroomerII Configuration Editor screen shown in Step 1, click on **Configuration** → **Routes**. Click on the H.323/SIP tab. The Routes available on the left hand side under the section Routes are configured by default. Additional routes can also be configured. For outbound GroomerII calls from SS7 to H.323, select **Route ss7 1 to h323** from Routes section. Click on the **Outgoing** tab and then on the **Media Settings** tab. In the H.323 section, tick **Faststart**, un-tick **Early H.245** and un-tick **H.245 Tunnelling**. The other options can be left with default values.



- For inbound GroomerII calls from H.323 to SS7, select **h323 to Route ss7 1** from Routes section. Click on the **Incoming** tab and then on the **Media Settings** tab. In the H.323 section tick **Faststart**, un-tick **Early H.245** and tick **H.245 Tunnelling**. The other options can be left with default values. Click **OK**.



- Click **File → Save**. In the Config Update dialog box that appears click **OK**.



5. Interoperability Compliance Testing

The interoperability compliance testing focused on verifying the routing of inbound and outbound calls from Avaya IP phones through the GroomerII to the SS7 network.

5.1. General Test Approach

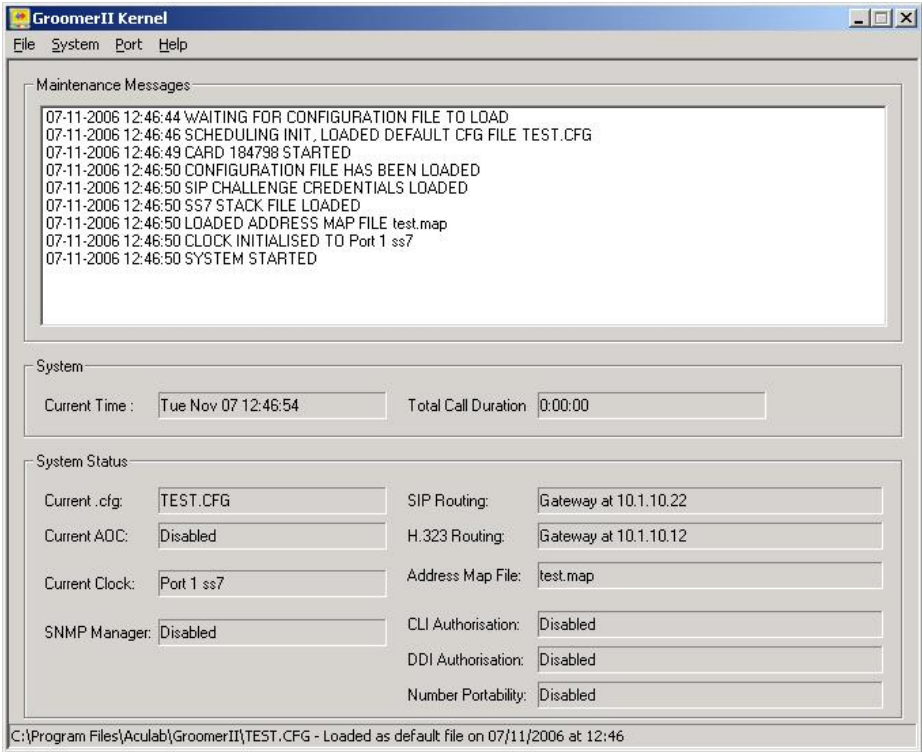
The general approach was to place inbound and outbound calls from Avaya IP phones through the GroomerII to the SS7 network and verify successful call completion. Outbound calls are routed at all times to the SS7 Network via GroomerII and inbound calls are routed at all times to Avaya Communication Manager. Transfers and conferences between Avaya Communication Manager stations complete properly on outbound and inbound calls routed through the GroomerII.

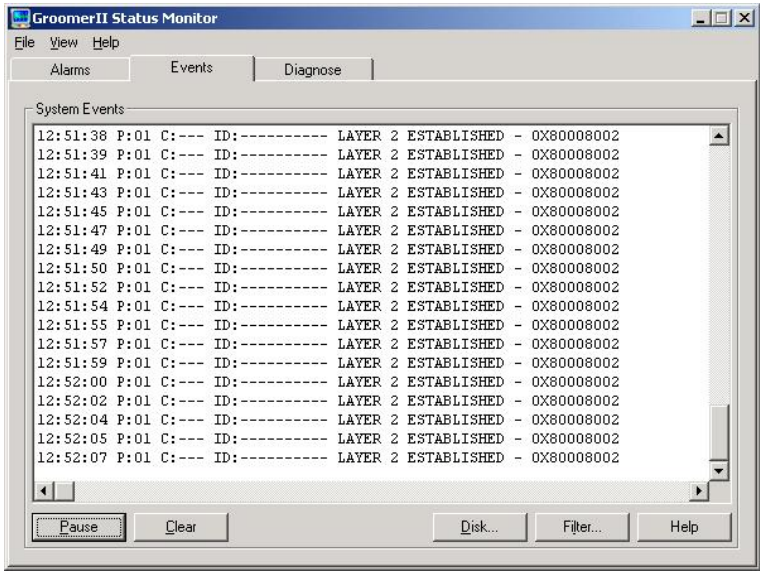
5.2. Test Results

All feature and performance tests passed. During compliance testing, outbound calls from Avaya Communication Manager were successfully routed over an H.323 IP trunk to GroomerII and in turn to the SS7 network. Similarly, inbound calls from the SS7 network to GroomerII were successfully forwarded to Avaya Communication Manager over the H.323 IP trunk.

6. Verification Steps

This section provides the tests that can be performed to verify proper configuration of Avaya Communication Manager and Groomer.

Step	Description
1.	<p>From the SAT, enter the command status signaling-group s, where s is the number of a signaling group configured in Section 3.1, and verify that the Group State is “in service”.</p> <p>From the SAT, enter the command status trunk-group t, where t is the number of a trunk group configured in Section 3.1, and verify that the Service States of all trunks are “in-service/idle” or “in-service/active”.</p>
2.	<p>Click on Start → Programs → Aculab GroomerII → GroomerII Kernel. Check that the Maintenance Messages display “SYSTEM STARTED”.</p>  <p>The screenshot shows the GroomerII Kernel application window. The title bar reads "GroomerII Kernel" and the menu bar includes "File", "System", "Port", and "Help". The main window is divided into several sections:</p> <ul style="list-style-type: none"> Maintenance Messages: A text area containing the following log entries: <ul style="list-style-type: none"> 07-11-2006 12:46:44 WAITING FOR CONFIGURATION FILE TO LOAD 07-11-2006 12:46:46 SCHEDULING INIT. LOADED DEFAULT CFG FILE TEST.CFG 07-11-2006 12:46:49 CARD 184798 STARTED 07-11-2006 12:46:50 CONFIGURATION FILE HAS BEEN LOADED 07-11-2006 12:46:50 SIP CHALLENGE CREDENTIALS LOADED 07-11-2006 12:46:50 SS7 STACK FILE LOADED 07-11-2006 12:46:50 LOADED ADDRESS MAP FILE test.map 07-11-2006 12:46:50 CLOCK INITIALISED TO Port 1 ss7 07-11-2006 12:46:50 SYSTEM STARTED System: A section with two input fields: "Current Time : Tue Nov 07 12:46:54" and "Total Call Duration : 0:00:00". System Status: A section with several configuration fields: <ul style="list-style-type: none"> Current .cfg: TEST.CFG Current ADC: Disabled Current Clock: Port 1 ss7 SNMP Manager: Disabled SIP Routing: Gateway at 10.1.10.22 H.323 Routing: Gateway at 10.1.10.12 Address Map File: test.map CLI Authorisation: Disabled DDI Authorisation: Disabled Number Portability: Disabled <p>At the bottom of the window, a status bar reads: "C:\Program Files\Aculab\GroomerII\TEST.CFG - Loaded as default file on 07/11/2006 at 12:46".</p>

Step	Description
3.	<p>Click on Start → Programs → Aculab GroomerII → Status Monitor and then click on the Events tab. This displays all the channels have been established. For more details on the events displayed in the Status Monitor and how to filter them, please refer to the GroomerII User Guide.</p> 

7. Support

For technical support for GroomerII, please contact your Avaya reseller.

8. Conclusion

These Application Notes describe the configuration steps required for GroomerII 10.1.2 to successfully interoperate with Avaya Communication Manager 3.1.2 via H.323 trunks. All feature functionality, performance and serviceability test cases were completed successfully.

9. Additional References

This section references the Avaya and Aculab contact centre product documentation that are relevant to these Application Notes.

The following Avaya Documents are available at <http://support.avaya.com>:

- Administrator Guide for Avaya Communication Manager, Document ID 03-300509, Issue 2, Feb 2006.
- Administration for Network Connectivity for Avaya Communication Manager, Document ID 555-233-504, Issue 11, Feb 2006.

The following documents can be obtained from Aculab:

- GroomerII User Guide - http://www.aculab.com/support/pdf_documents/GroomerII.pdf.
- Aculab SS7 Installation and Administration Guide - http://www.aculab.com/support/pdf_documents/ss7_installation_administration_guide.pdf

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