



Avaya Solution & Interoperability Test Lab

Application Notes for Spirent Abacus 5000 with Avaya Communication Manager and Avaya IP Office using the H.323 Interface – Issue 1.0

Abstract

These Application Notes describe the configuration steps required for Spirent Abacus 5000 to successfully interoperate with Avaya Communication Manager and Avaya IP Office using the H.323 interface. Information in these Application Notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the *DeveloperConnection* Program at the Avaya Solution and Interoperability Test Lab.

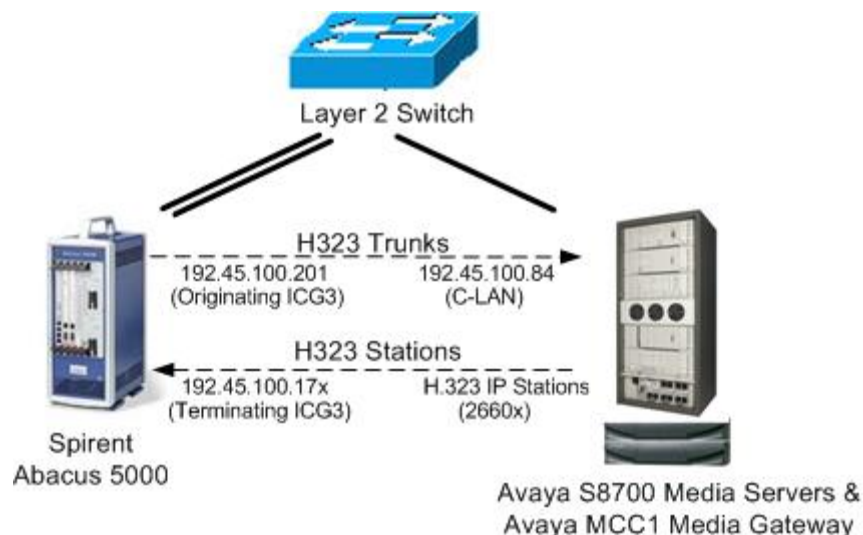
1. Introduction

Spirent Abacus 5000 is an integrated IP and PSTN telephony test system with analog, TDM, and Ethernet interfaces. The system generates real voice streams to simulate real-world loads and performs real time voice quality measurements.

Abacus 5000 can function as a call generator or a switch. The compliance testing focused on Abacus 5000 as a H.323 call generator to load Avaya Communication Manager and Avaya IP Office. The testing involved two separate test configurations, one for Abacus 5000 integration with Avaya Communication Manager and the other for Abacus 5000 integration with Avaya IP Office. The procedural steps for both test configurations are presented together in these Application Notes for user comparison purposes.

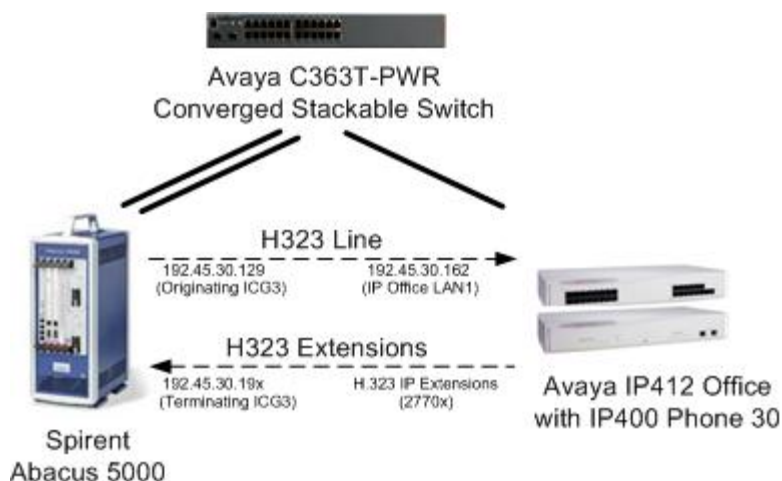
1.1. Abacus 5000 Integration with Avaya Communication Manager

In the H.323 integration of Abacus 5000 with Avaya Communication Manager, Abacus 5000 utilizes a H.323 capable ICG3 card to originate calls to Avaya Communication Manager, and another H.323 capable ICG3 card to terminate the calls. The outgoing H.323 calls from Abacus 5000 arrive on Avaya Communication Manager via H.323 IP trunks, and are routed back out to Abacus 5000 acting as generic H.323 IP stations. Each port on the Abacus 5000 terminating ICG3 card is administered as a H.323 station on Avaya Communication Manager, and therefore registers with Avaya Communication Manager via a C-LAN circuit pack as the gatekeeper.



1.2. Abacus 5000 Integration with Avaya IP Office

In the H.323 integration of Abacus 5000 with Avaya IP Office, Abacus 5000 utilizes a H.323 capable ICG3 card to originate calls to Avaya IP Office, and another H.323 capable ICG3 card to terminate the calls. The outgoing H.323 calls from Abacus 5000 arrive on Avaya IP Office via a H.323 line, and are routed back out to Abacus 5000 acting as generic H.323 extensions. Each port on the Abacus 5000 terminating ICG3 card is administered as a H.323 extension on Avaya IP Office, and therefore registers with Avaya IP Office as the gatekeeper.



1.3. Other Possible Test Scenarios

The compliance testing involved originating calls from the Abacus 5000 across a H.323 trunk and terminating these same calls on the Abacus 5000 as generic H.323 endpoints. The information from these Application Notes can easily be extended to other possible test scenarios such as:

Originating From	Terminating To
Abacus Trunks	Avaya Endpoints
Abacus Trunks	Abacus Trunks
Abacus Endpoints	Abacus Endpoints

1.4. Abacus 5000 ICG3 Capacity

For the compliance testing, five simultaneous calls were configured and launched on Abacus 5000, thus involving 5 endpoints/channels on each of the originating and terminating ICG3 cards. Below is a table listing of the capacity of the ICG3 card from the Abacus 5000 documentation:

Channel Densities of Abacus 5000 VoIP Subsystems			
CG Acronym	CG Subsystem Type	Ethernet Ports per Subsystem	Endpoints (Channels) per Subsystem
ICG3	Voice (PESQ)	1	128
ICG3	Voice (PSQM)	1	256
ICG3/ICL3	RTP (using packet path confirmation only)	1	1,024
ICG3/ICL3	Signaling only	1	4,096 (8,192 for SIP only)

Users need to keep in mind that the endpoint capacity for the ICG3 card can also be impacted by the complexity of the WAV file used for path confirmation, and by the signaling modes used for communication.

2. Equipment and Software Validated

The following equipment and software were used for the configurations provided:

Equipment	Software
Avaya S8700 Media Servers	Communication Manager 3.0.1, load 346.0
Avaya MCC1 Media Gateway <ul style="list-style-type: none">TN799DP C-LAN Circuit PackTN2302AP IP Media Processor Circuit Pack	HW01 FW015 HW13 FW095
Avaya C363T-PWR Converged Stackable Switch	4.3.12
Avaya IP Office 412	3.1, load 41
Spirent Abacus 5000	3.2, patch 14

3. Configure Abacus 5000 with Avaya Communication Manager

This section provides the procedures for configuring the H.323 trunks and stations between Avaya Communication Manager and Abacus 5000.

3.1. Configure Avaya Communication Manager

The procedures for configuring the H.323 interfaces on Avaya Communication Manager include the following areas:

- Verify Avaya Communication Manager License
- Administer IP codec set and network region
- Administer IP node names for C-LAN and Abacus 5000 ICG3
- Administer IP interface and data module for C-LAN
- Administer H.323 trunk group
- Administer H.323 signaling group
- Administer H.323 trunk group members
- Administer H.323 stations

3.1.1. Verify Avaya Communication Manager License

Log into the System Access Terminal (SAT) to verify that the Avaya Communication Manager license has proper permissions for features illustrated in these Application Notes. Use the “display system-parameters customer-options” command to verify that there is sufficient remaining capacity for H.323 trunks by comparing the **Maximum Administered H.323 Trunks** field value with the corresponding value in the **USED** column on **Page 2**. The difference between the two values needs to be greater than or equal to the desired number of simultaneous H.323 calls to be launched by Abacus 5000. Repeat this same type of comparison for the two field values associated with **Maximum Concurrently Registered IP Stations**.

display system-parameters customer-options		Page 2 of 11
OPTIONAL FEATURES		
IP PORT CAPACITIES		USED
Maximum Administered H.323 Trunks: 100		82
Maximum Concurrently Registered IP Stations: 100		4
Maximum Administered Remote Office Trunks: 0		0
Maximum Concurrently Registered Remote Office Stations: 0		0
Maximum Concurrently Registered IP eCons: 0		0
Max Concur Registered Unauthenticated H.323 Stations: 0		0
Maximum Video Capable H.323 Stations: 0		0
Maximum Video Capable IP Softphones: 0		0
Maximum Administered SIP Trunks: 100		10
Maximum Number of DS1 Boards with Echo Cancellation: 0		0
Maximum TN2501 VAL Boards: 1		0
Maximum G250/G350/G700 VAL Sources: 0		0
Maximum TN2602 Boards with 80 VoIP Channels: 0		0
Maximum TN2602 Boards with 320 VoIP Channels: 0		0
Maximum Number of Expanded Meet-me Conference Ports: 0		0

Navigate to **Page 4**, and verify that the **IP Stations** customer option is set to “y”, as shown below.

```
display system-parameters customer-options                                Page 4 of 11
                                OPTIONAL FEATURES

Emergency Access to Attendant? y                                IP Stations? y
    Enable 'dadmin' Login? y                                Internet Protocol (IP) PNC? n
    Enhanced Conferencing? y                                ISDN Feature Plus? y
        Enhanced EC500? y                                ISDN Network Call Redirection? n
Enterprise Survivable Server? n                                ISDN-BRI Trunks? n
    Enterprise Wide Licensing? n                                ISDN-PRI? y
        ESS Administration? n                                Local Survivable Processor? n
        Extended Cvg/Fwd Admin? y                                Malicious Call Trace? y
    External Device Alarm Admin? n                                Media Encryption Over IP? n
Five Port Networks Max Per MCC? n                                Mode Code for Centralized Voice Mail? n
    Flexible Billing? n
Forced Entry of Account Codes? y                                Multifrequency Signaling? y
    Global Call Classification? n Multimedia Appl. Server Interface (MASI)? n
        Hospitality (Basic)? y                                Multimedia Call Handling (Basic)? y
Hospitality (G3V3 Enhancements)? y                                Multimedia Call Handling (Enhanced)? y
    IP Trunks? y

IP Attendant Consoles? n
(NOTE: You must logoff & login to effect the permission changes.)
```

Proceed to **Page 10**, and verify that there is sufficient remaining capacity for H.323 stations by comparing the two field values associated with **IP_Phone**. The difference between the **Limit** and **Used** field values need to be greater than or equal to the desired number of H.323 endpoints to be simulated by Abacus 5000.

```
display system-parameters customer-options                                Page 10 of 11
                                MAXIMUM IP REGISTRATIONS BY PRODUCT ID

Product ID  Rel. Limit      Used
IP_API_A    : 100          0
IP_API_B    : 100          0
IP_API_C    : 100          0
IP_Agent    : 300          0
IP_IR_A     : 0            0
IP_Phone   : 12000       1
IP_ROMax    : 12000        0
IP_Soft     : 300          0
IP_eCons    : 0            0
            : 0            0
            : 0            0
            : 0            0
            : 0            0
            : 0            0
            : 0            0

(NOTE: You must logoff & login to effect the permission changes.)
```

3.1.2. Administer IP Codec Set and Network Region

Use the “change ip-codec-set n” command, where “n” is an existing codec set number that will be used for integration with Abacus 5000. Select an audio codec type in the **Audio Codec** field, in this case “G.711MU”. The actual codec set number and codec type may vary. **Section 3.2.2.2** contains a table listing of the audio codec types that successfully interoperated between Abacus 5000 and Avaya Communication Manager during the compliance testing. Retain the default values for the remaining fields on the screen, and submit these changes.

change ip-codec-set 7				Page	1 of	2
IP Codec Set						
Codec Set: 7						
Audio	Silence	Frames	Packet			
Codec	Suppression	Per Pkt	Size(ms)			
1: G.711MU	n	2	20			
2:						

Use the “change ip-network-region n” command, where “n” is an existing network region number that will be used for integration with Abacus 5000. Enter the audio codec set number from the **IP Codec Set** screen above into the **Codec Set** field. Enable the following fields to allow for audio shuffling: **Intra-region IP-IP Direct Audio**, **Inter-region IP-IP Direct Audio**, and **IP Audio Hairpinning**. Retain the default values for the remaining fields, and submit these changes.

Note that the audio shuffling feature enables the originating and terminating endpoints to exchange audio streams directly, without using the media resources in the Avaya MCC1 Media Gateway.

change ip-network-region 7		Page	1 of	19
IP NETWORK REGION				
Region: 7				
Location:		Authoritative Domain:		
Name:				
MEDIA PARAMETERS		Intra-region IP-IP Direct Audio: yes		
Codec Set: 7		Inter-region IP-IP Direct Audio: yes		
UDP Port Min: 2048		IP Audio Hairpinning? y		
UDP Port Max: 65535				
DIFFSERV/TOS PARAMETERS		RTCP Reporting Enabled? y		
Call Control PHB Value: 34		RTCP MONITOR SERVER PARAMETERS		
Audio PHB Value: 46		Use Default Server Parameters? y		
Video PHB Value: 26				
802.1P/Q PARAMETERS				
Call Control 802.1p Priority: 7				
Audio 802.1p Priority: 6				
Video 802.1p Priority: 5		AUDIO RESOURCE RESERVATION PARAMETERS		
H.323 IP ENDPOINTS		RSVP Enabled? n		
H.323 Link Bounce Recovery? y				
Idle Traffic Interval (sec): 20				
Keep-Alive Interval (sec): 5				
Keep-Alive Count: 5				

3.1.3. Administer IP Node Names for C-LAN and Abacus 5000 ICG3

Use the “change node-names ip” command, and add entries for the C-LAN and Abacus 5000 originating ICG3. In this case, “clan-1b04” and “192.45.100.84” are entered as **Name** and **IP Address** for the C-LAN, and “abacus-h323-trk” and “192.45.100.201” are entered as **Name** and **IP Address** for the Abacus 5000 ICG3 card. The actual node names and IP addresses may vary. Submit these changes.

Note that for the compliance testing, the same C-LAN circuit pack was used for interfacing with the Abacus 5000 originating ICG3 card for incoming H.323 calls, and for registration of H.323 stations that reside on the Abacus 5000 terminating ICG3 card. Separate C-LAN circuit packs may be used for these two distinct purposes.

change node-names ip		Page 1 of 1	
IP NODE NAMES			
Name	IP Address	Name	IP Address
aes98	192.45 .95 .98	.	.
cceserver	192.45 .120.15	.	.
clan-1a03	192.45 .100.97	.	.
clan-1b09	192.45 .100.87	.	.
clan-1c04	192.45 .120.140	.	.
clanP2-1a04	192.168.61 .21	.	.
clanP27-2a03	172.16 .252.200	.	.
clanP7-3a04	192.168.1 .10	.	.
default	0 .0 .0 .0	.	.
devcon32-1a03	192.45 .100.36	.	.
devcon33-1a03	192.45 .100.16	.	.
ipoffice-room3	192.45 .30 .162	.	.
medpro-1b05	192.45 .100.85	.	.
medpro-1c05	192.45 .120.141	.	.
clan-1b04	192.45 .100.84	.	.
abacus-h323-trk	192.45 .100.201	.	.
(14 of 23 administered node-names were displayed)			
Use 'list node-names' command to see all the administered node-names			
Use 'change node-names ip xxx' to change a node-name 'xxx' or add a node-name			

3.1.4. Administer IP Interface and Data Module for C-LAN

Add the C-LAN to the system configuration using the “add ip-interface 1b04” command. Note that the actual slot number may vary. In this case, “1b04” is used as the slot number. Enter the C-LAN node name assigned from **Section 3.1.3** into the **Node Name** field, and then the **IP Address** will be populated automatically.

Enter proper values for the **Subnet Mask** and **Gateway Address** fields. In this case, “255.255.255.0” and “192.45.100.1” are used to correspond to the network configuration in these Application Notes. Set the **Enable Ethernet Port** field to “y”, and the **Network Region** field to the network region number from **Section 3.1.2**. Default values may be used in the remaining fields. Submit these changes.

```
add ip-interface 1b04
                                     IP INTERFACES

                                Type: C-LAN
                                Slot: 01B04
                                Code/Suffix: TN799  D
                                Node Name: clan-1b04
                                IP Address: 192.45 .100.84
                                Subnet Mask: 255.255.255.0
                                Gateway Address: 192.45 .100.1
                                Enable Ethernet Port? y
                                Network Region: 7
                                VLAN: n

Number of CLAN Sockets Before Warning: 400
Receive Buffer TCP Window Size: 8320
                                     ETHERNET OPTIONS
                                Auto? y
```

Next, add a new data module using the “add data-module n” command, where “n” is an available extension. Enter the following values, and submit these changes.

- **Name:** A descriptive name.
- **Type:** “ethernet”
- **Port:** Same slot number from the **IP INTERFACES** screen above and port “17”.
- **Link:** An available link number.

```
add data-module 2001
                                     DATA MODULE

Data Extension: 2001                Name: CLAN 1B04 Data Module
Type: ethernet
Port: 01B0417
Link: 11

Network uses 1's for Broadcast Addresses? y
```

3.1.5. Administer H.323 Trunk Group

Administer a H.323 trunk group to interface with the originating ICG3 card from Abacus 5000. Use the “add trunk-group n” command, where “n” is an available trunk group number. On **Page 1** of the **TRUNK GROUP** screen, enter the following values for the specified fields, and retain the default values for the remaining fields.

- **Group Type:** “isdn”
- **Group Name:** A descriptive name.
- **TAC:** An available trunk access code.
- **Carrier Medium:** “IP”
- **Service Type:** “tie”

add trunk-group 66		Page 1 of 20
TRUNK GROUP		
Group Number: 66	Group Type: isdn	CDR Reports: y
Group Name: H323 Trunk to CM	COR: 1	TN: 1 TAC: 1066
Direction: two-way	Outgoing Display? n	Carrier Medium: IP
Dial Access? n	Busy Threshold: 255	Night Service:
Queue Length: 0		
Service Type: tie	Auth Code? n	TestCall ITC: rest
	Far End Test Line No:	
TestCall BCC: 4		
TRUNK PARAMETERS		
Codeset to Send Display: 6	Codeset to Send National IEs: 6	
Max Message Size to Send: 260	Charge Advice: none	
Supplementary Service Protocol: a	Digit Handling (in/out): enbloc/enbloc	
Trunk Hunt: cyclical		
	Digital Loss Group: 18	
Incoming Calling Number - Delete:	Insert:	Format:
Bit Rate: 1200	Synchronization: async	Duplex: full
Disconnect Supervision - In? y Out? n		
Answer Supervision Timeout: 0		

Proceed to **Page 2** of the **TRUNK GROUP** screen, and enable the **Send Name** and **Send Calling Number** fields if desired. Submit these changes.

```
add trunk-group 66                                     Page 2 of 20
TRUNK FEATURES
    ACA Assignment? n                                Measured: none        Wideband Support? n
                                           Internal Alert? n      Maintenance Tests? y
                                           Data Restriction? n    NCA-TSC Trunk Member:
                                           Send Name: y         Send Calling Number: y
    Used for DCS? n
    Suppress # Outpulsing? n      Format: public
    Outgoing Channel ID Encoding: preferred    UII IE Treatment: service-provider

                                           Replace Restricted Numbers? n
                                           Replace Unavailable Numbers? n
                                           Send Connected Number: n
                                           Hold/Unhold Notifications? n
                                           Modify Tandem Calling Number? n
    Send UII IE? y
    Send UCID? n
    Send Codeset 6/7 LAI IE? Y

                                           Network (Japan) Needs Connect Before Disconnect? n
```

3.1.6. Administer H.323 Signaling Group

Administer a H.323 signaling group for the newly added trunk group to use for signaling. Use the “add signaling-group n” command, where “n” is an available signaling group number. Enter the following values for the specified fields, and retain the default values for all remaining fields. Submit these changes.

- **Group Type:** “h.323”
- **Trunk Group for Channel Selection:** Trunk group number from **Section 3.1.5.**
- **Near-end Node Name:** C-LAN node name from **Section 3.1.3.**
- **Far-end Node Name:** Abacus 5000 ICG3 node name from **Section 3.1.3.**
- **Far-end Listen Port:** “1720”
- **Far-end Network Region:** Network region number from **Section 3.1.2.**

add signaling-group 66		Page 1 of 5
SIGNALING GROUP		
Group Number: 66	Group Type: h.323	
	Remote Office? n	Max number of NCA TSC: 0
	SBS? n	Max number of CA TSC: 0
	IP Video? n	Trunk Group for NCA TSC:
Trunk Group for Channel Selection: 66		
	Supplementary Service Protocol: a	
	T303 Timer(sec): 10	
Near-end Node Name: clan-1b04		Far-end Node Name: abacus-h323-trk
Near-end Listen Port: 1720		Far-end Listen Port: 1720
	Far-end Network Region: 7	
LRQ Required? n	Calls Share IP Signaling Connection? n	
RRQ Required? 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? y	
	Interworking Message: PROGRESS	
	DCP/Analog Bearer Capability: 3.1kHz	

3.1.7. Administer H.323 Trunk Group Members

Use the “change trunk-group n” command, where “n” is the trunk group number added in **Section 3.1.5**. Enter “ip” into the **Port** field, and enter the signaling group number from **Section 3.1.6** into the **Sig Grp** field. Repeat this procedure for the desired number of trunk group members, which would be the same as the desired number of simultaneous H.323 calls. For the compliance testing, five trunk group members are used, and hence five simultaneous H.323 calls can be supported. Submit these changes.

display trunk-group 66				Page 4 of 20	
				TRUNK GROUP	
				Administered Members (min/max): 1/5	
GROUP MEMBER ASSIGNMENTS				Total Administered Members: 5	
	Port	Code Sfx	Name	Night	Sig Grp
1:	ip				66
2:	ip				66
3:	ip				66
4:	ip				66
5:	ip				66
6:					
7:					

3.1.8. Administer H.323 Stations

Use the “add station n” command, where “n” is an available extension number. Enter the following values for the specified fields, and retain the default values for the remaining fields. Submit these changes.

- **Type:** “H.323”
- **Name:** A descriptive name.
- **Security Code:** A desired security code. In this case, “123456” is used.

```
add station 26601
```

Page 1 of 3

STATION

Extension: 26601	Lock Messages? n	BCC: 0
Type: H.323	Security Code: *	TN: 1
Port: IP	Coverage Path 1:	COR: 1
Name: H323 Endpoint-1 on CM	Coverage Path 2:	COS: 1
	Hunt-to Station:	Tests? y

STATION OPTIONS

Loss Group: 19	Message Waiting Indicator: none
----------------	---------------------------------

Survivable COR: internal
Survivable DTMF over IP: in-band

IP Video? n

Repeat the “add station n” command to add the desired number of H.323 stations, which would also be the same as the desired number of simultaneous H.323 calls. For the compliance testing, five H.323 stations were administered as shown below. When possible, use consecutive extension numbers for the H.323 stations, for ease of configuring Abacus 5000.

```
list station 26601 count 5
```

STATIONS									
Ext/ Type	Port/ Hunt-to	Name/ Surv GK NN	Move	Room/ Data Ext	Cv1/ Cv2	COR/ COS	Cable/ Jack		
26601	S00020	H323 Endpoint-1 on CM				1			
H.323			no			1			
26602	S00021	H323 Endpoint-2 on CM				1			
H.323			no			1			
26603	S00022	H323 Endpoint-3 on CM				1			
H.323			no			1			
26604	S00023	H323 Endpoint-4 on CM				1			
H.323			no			1			
26605	S00024	H323 Endpoint-5 on CM				1			
H.323			no			1			

3.2. Configure Abacus 5000

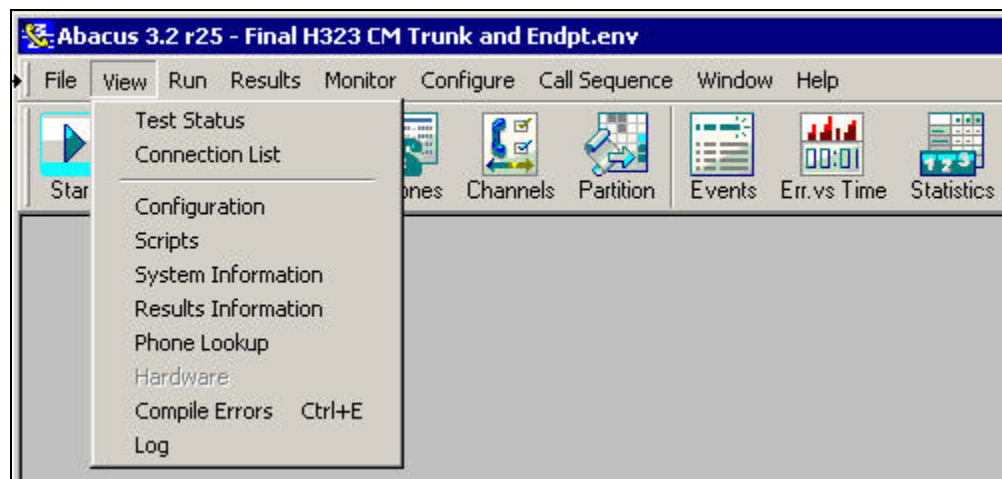
The procedures for configuring the originating and terminating H.323 interfaces on Abacus 5000 to interoperate with Avaya Communication Manager include the following areas:

- Verify system information
- Administer protocol selection
- Administer custom protocol development
- Administer phones
- Administer channels
- Administer custom H.323 script
- Administer partitioning and timing

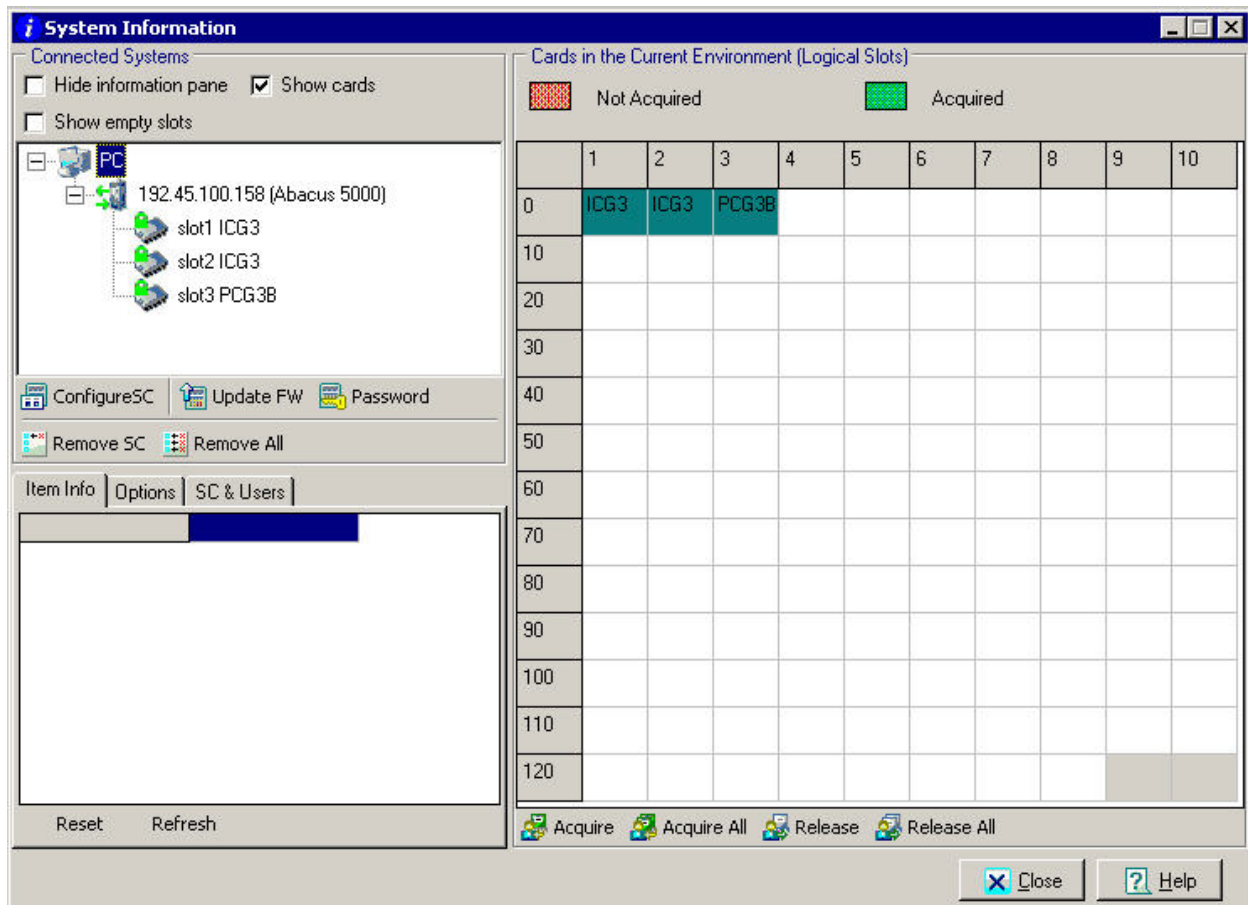
As part of the installation, the Abacus 5000 user interface software was installed on a standalone PC, and used to configure the IP address for the system and to connect to the system.

3.2.1. Verify System Information

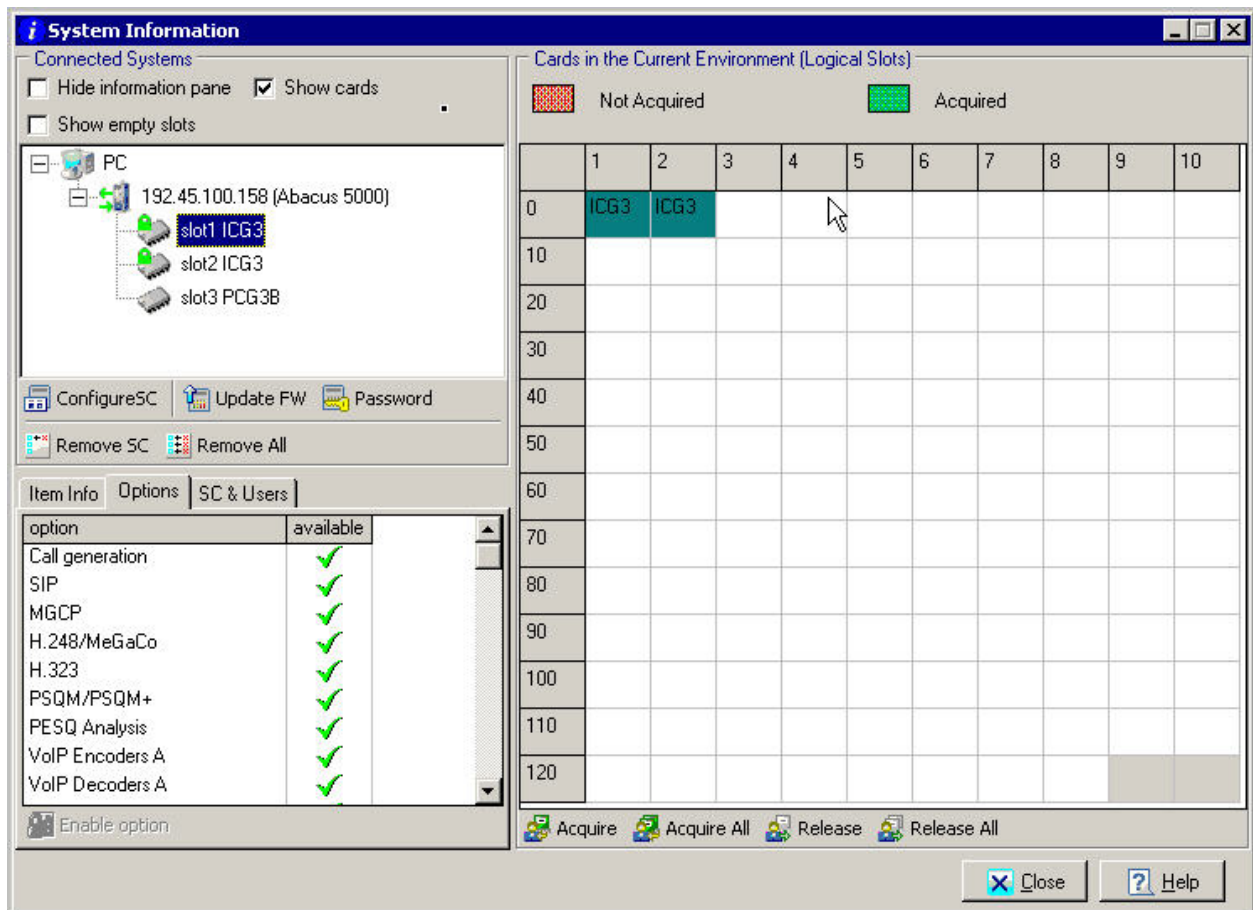
From the PC running the Abacus 5000 user interface, navigate to **Start > Programs > Abacus 5000 > 3.2 > Abacus** to open the Abacus 5000 window. Select **View > System Information** from the main menu bar as shown below.



The System Information screen is displayed, and shows the cards that are available in the system. For the compliance testing, two ICG3 cards are used, one to originate H.323 calls over the H.323 trunks to Avaya Communication Manager, and the other to terminate the H.323 calls to the H.323 stations from Avaya Communication Manager. Release any extra card by selecting the green grid that corresponds to the card in the right pane, in this case “PCG3B”, and click on the **Release** button in the bottom of the pane to release the card. Repeat this procedure to release all extra cards.



Next, verify the license on each ICG3 card by selecting the **ICG3** card in the directory pane in the upper left section of the window, and clicking on the **Options** tab in the lower left pane to view the available options the card supports. Verify that the **Call generation, H.323, PSQM/PSQM+ or PESQ Analysis** options are enabled with a corresponding check mark in the **available** column. Also verify that the appropriate **VoIP Encoders/Decoders** options are enabled, if an audio codec other than G.711 is desired. Consult the Abacus 5000 documentation for the appropriate codec option. After verifying the options on both of the ICG3 cards, click on **Close**.



3.2.2. Administer Protocol Selection

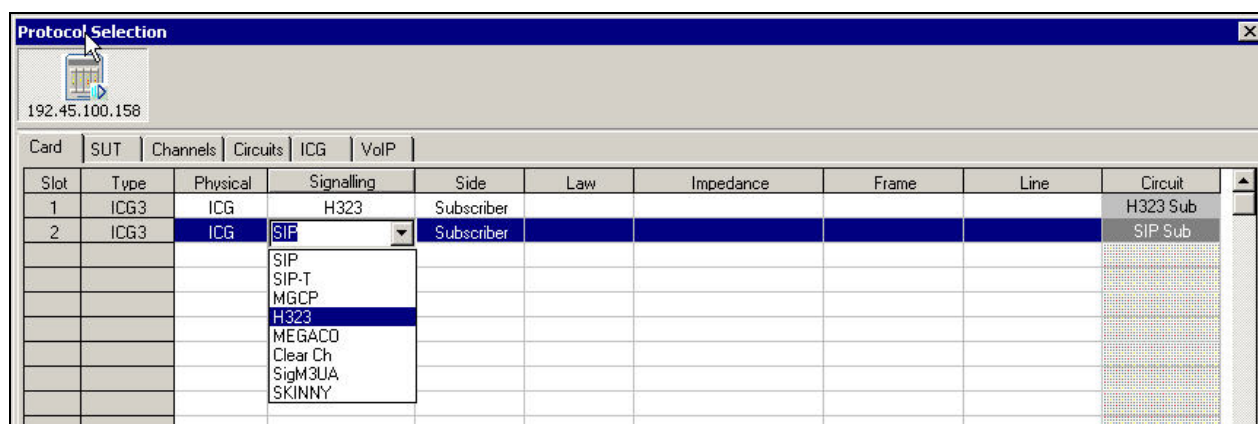
Click on the **Ptl Selection** icon from the main menu bar shown below.



3.2.2.1 Administer Protocol Selection Card

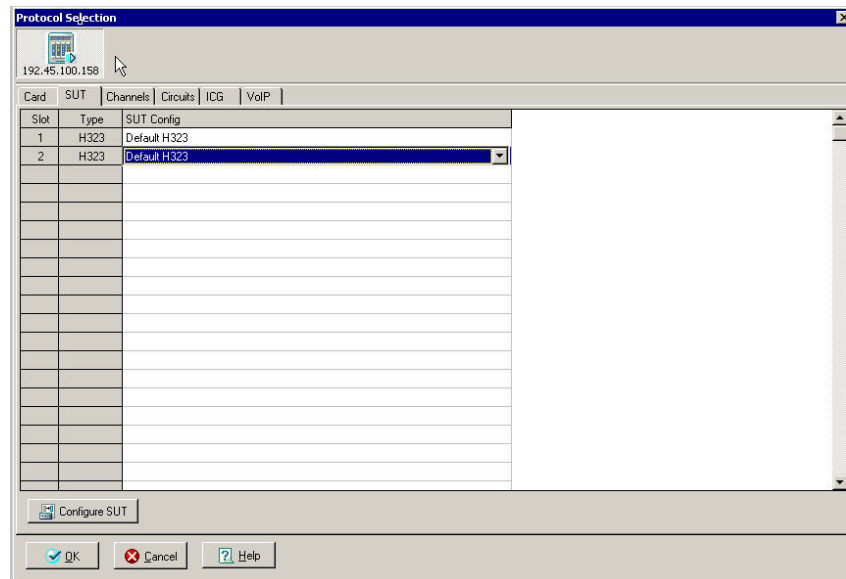
In the **Card** tab, right click in the **Signalling** field for the first ICG3 card, and select the option **Select From List** from the drop down (not shown below). This sets the clicking option for all **Signalling** fields on this screen.

Left click on the same **Signalling** field to now get a drop down, and select “H323” from the list. After the selection, the default value for the **Circuit** field will automatically be changed from “SIP Sub” to “H323 Sub”. Left click on the **Signalling** field for the second ICG3 card, and select “H323” from the drop down list as shown below.

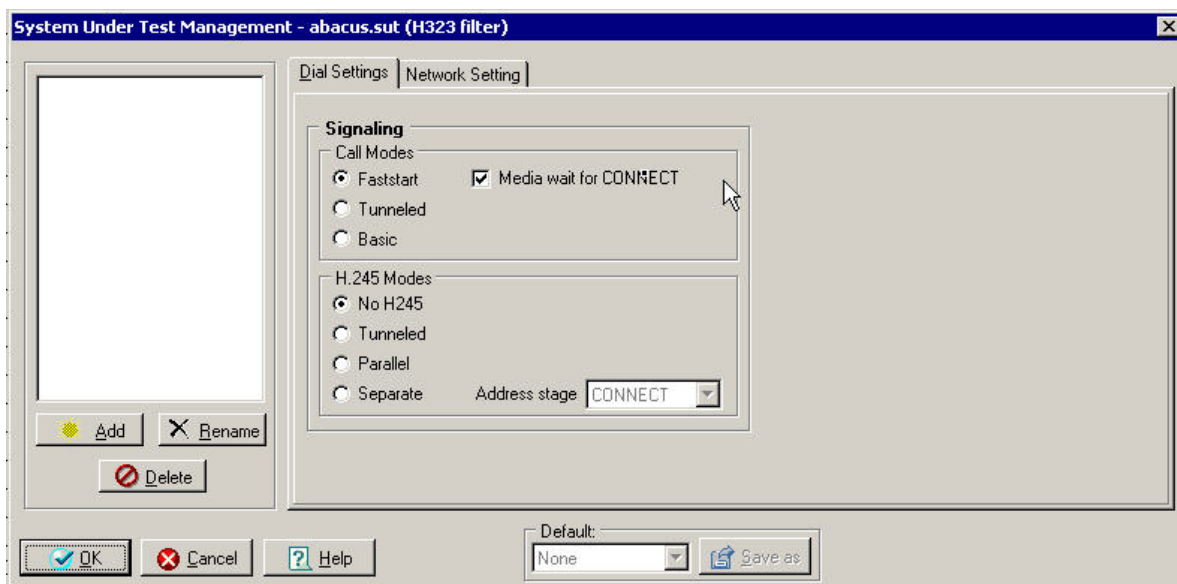


3.2.2.2 Administer Protocol Selection SUT

Select the **SUT** tab. Retain the default value in the **SUT Config** field for the first card, to be used to originate the H.323 calls. Select the **SUT Config** field for the second card, and click on the **Configure SUT** button in the lower left of the screen.



The **System Under Test Management** screen below is displayed on top of the **Protocol Selection** screen. Click on the **Add** button in the lower left pane to add a new SUT for the terminating ICG3 card. This will be used to administer the signaling modes and C-LAN gatekeeper information, to enable registration of H.323 endpoints on the terminating ICG3 card to Avaya Communication Manager.



The **New SUT Configuration Record** screen below is displayed on top of the **System Under Test Management** screen. Enter a descriptive name and click on **OK**.



The **System Under Test Management** screen is displayed next, and shows the newly added SUT in the top left pane. In the **Dial Settings** tab, select **Tunneled** under both **Call Modes** and **H.245 Modes** as shown below.



Select the **Network Setting** tab, followed by the **Gatekeeper** sub tab. Enter the following values into the specified fields, and retain the default values for all remaining fields. Click on **OK** at the end.

- **Use Gatekeeper:** Select this field to enable external gatekeeper registration.
- **Identifier:** C-LAN node name from **Section 3.1.3**.
- **Address:** C-LAN IP address from **Section 3.1.3**.
- **Gatekeeper discovery mode:** “Manual”
- **Security profile:** “Avaya”

System Under Test Management - abacus.sut (H323 filter)

Avaya H323 CM SUT

Dial Settings Network Setting

Gatekeeper Signaling Transportation

☒ Use Gatekeeper

Identifier: clan-1b04

Address: 192.45.100.84

Port number: 1719

☐ Use both user and terminal alias in registration/admission request

Registration time To live: 30 sec

Response timeout: 1 sec

Number of retries: 5

RR time: 20 ms

Gatekeeper discovery mode: Manual

Security profile: Avaya

☒ Check Incoming Messages

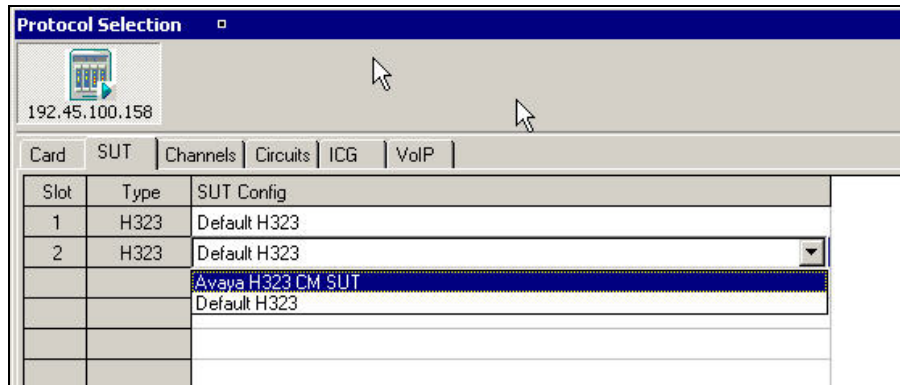
Messages allowed interval: 86400 sec

Add Rename Delete

OK Cancel Help

Default: None Save as

The **Protocol Selection** screen is displayed next. Click on the **SUT Config** field for the second ICG3 card, and select the newly created SUT from the drop down list. In this case, “Avaya H323 CM SUT”. This enables the terminating ICG3 card to register H.323 endpoints with Avaya Communication Manager, using the C-LAN gatekeeper information in the newly created SUT.



Maintain the defaults in the **Channels** and **Circuits** tabs. Should audio codec other than the default G.711 be desired, then this needs to be administered in the **Channels** tab. The following are the audio codec types that successfully interoperated between Abacus 5000 and Avaya Communication Manager during the compliance testing.

Abacus 5000	Avaya Communication Manager
G.711	G.711MU
G.723	G.723-5.3K, G.723-6.3K
G.729AB	G.729
G.729B	G.729

3.2.2.3 Administer Protocol Selection ICG

Select the **ICG** tab, and click on the **Port 0** field that corresponds to the first ICG3 card. Enter the following values for the specified fields, and retain the default values for the remaining fields. Note that the number of channels and IP addresses may vary.

- **Number of channels:** The desired number of originating channels, in this case “5”.
- **Gateway:** Gateway IP address for the network configuration.
- **Local address:** IP address for originating ICG3 card from **Section 3.1.3**.
- **Subnet Mask:** Subnet mask for the network configuration.

The screenshot shows the 'Protocol Selection' dialog box with the 'ICG' tab selected. The 'ICG configuration' section on the left shows a tree view with 'ICG3 #1' expanded, and 'Port 0' selected. The 'ICG Port configuration' section on the right shows the following settings:

- Signaling: H323 Slot: 1 Port: 0
- Number of channels: 5
- L1 Ethernet Mode: Auto
- L2 VLAN Tagging Enabled: ☐ VLAN ID: 2
- MAC Address: 00:40:9E:00:92:FA
- L3 Local DomainName: company1.com
- DHCP Enable: ☐
- IPv4 Gateway: 192.45.100.1
- Local address: 192.45.100.201
- DNS: 10.2.16.50
- Subnet Mask: 255.255.255.0
- IPv6 Gateway v6: :::::1
- Local address v6: 2001:ABCD:0:0:0:0:0:11
- DNS v6: :::::1
- Prefix length: 64

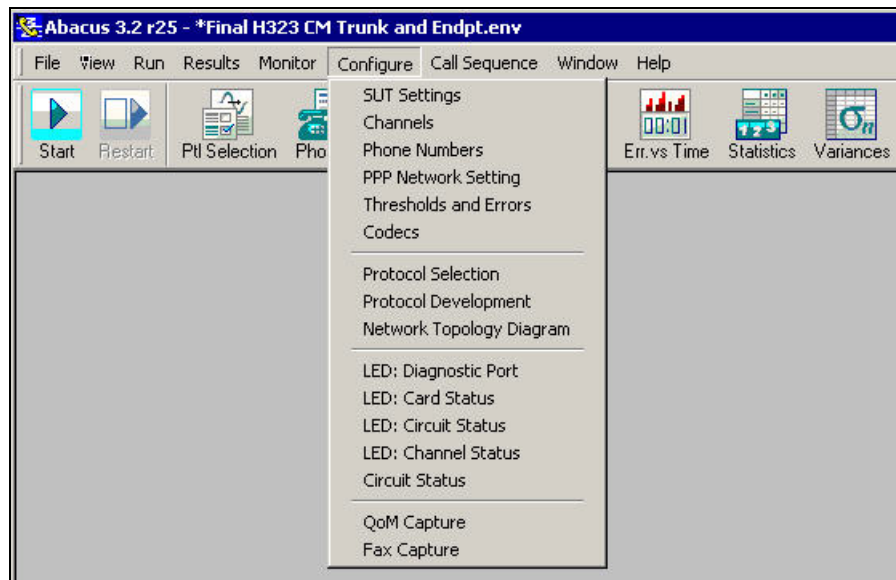
Repeat the same procedures for **Port 0** in the second ICG3 card, and enter an available IP address for the terminating ICG3 card in the **Local address** field. Click on **OK**.

The screenshot shows the 'Protocol Selection' dialog box with the 'ICG' tab selected. The 'ICG configuration' section on the left shows a tree view with 'ICG3 #2' expanded, and 'Port 0' selected. The 'ICG Port configuration' section on the right shows the following settings:

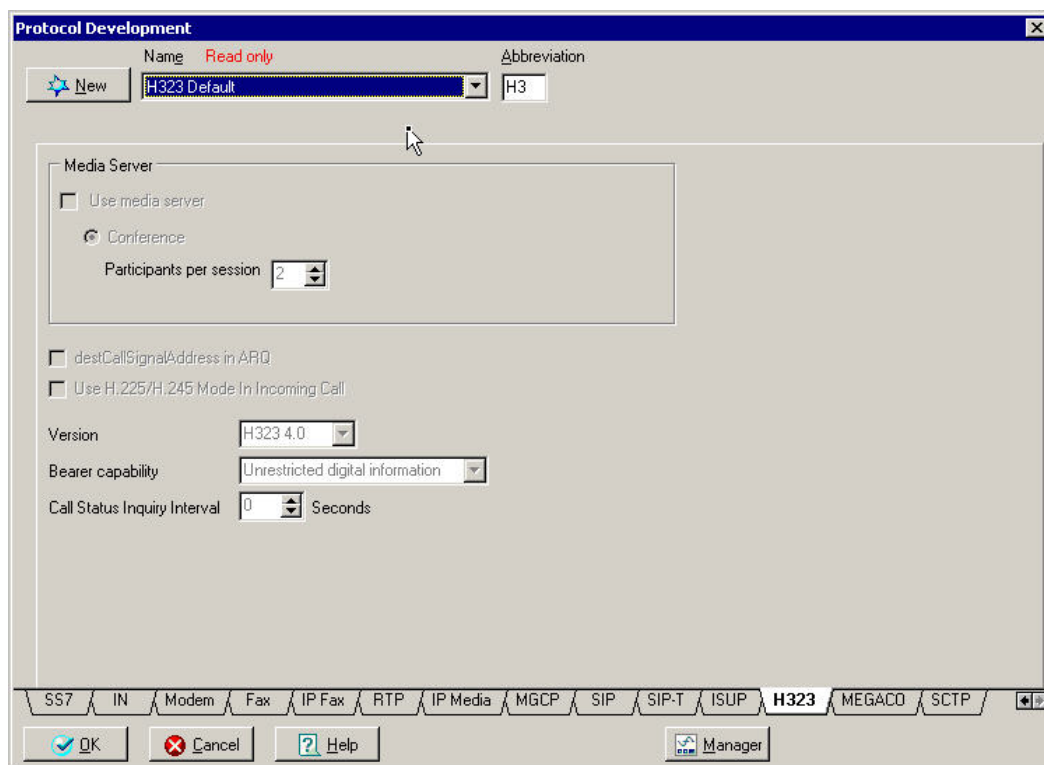
- Signaling: H323 Slot: 2 Port: 0
- Number of channels: 5
- L1 Ethernet Mode: Auto
- L2 VLAN Tagging Enabled: ☐ VLAN ID: 2
- MAC Address: 00:40:9E:00:81:CC
- L3 Local DomainName: company2.com
- DHCP Enable: ☐
- IPv4 Gateway: 192.45.100.1
- Local address: 192.45.100.170
- DNS: 10.2.16.50
- Subnet Mask: 255.255.255.0
- IPv6 Gateway v6: :::::1
- Local address v6: 2001:ABCD:0:0:0:0:0:12
- DNS v6: :::::1
- Prefix length: 64

3.2.3. Administer Custom Protocol Development


Select **Configure > Protocol Development** from the main menu bar, to create the customized H.323 protocol settings to use to communicate with Avaya Communication Manager.



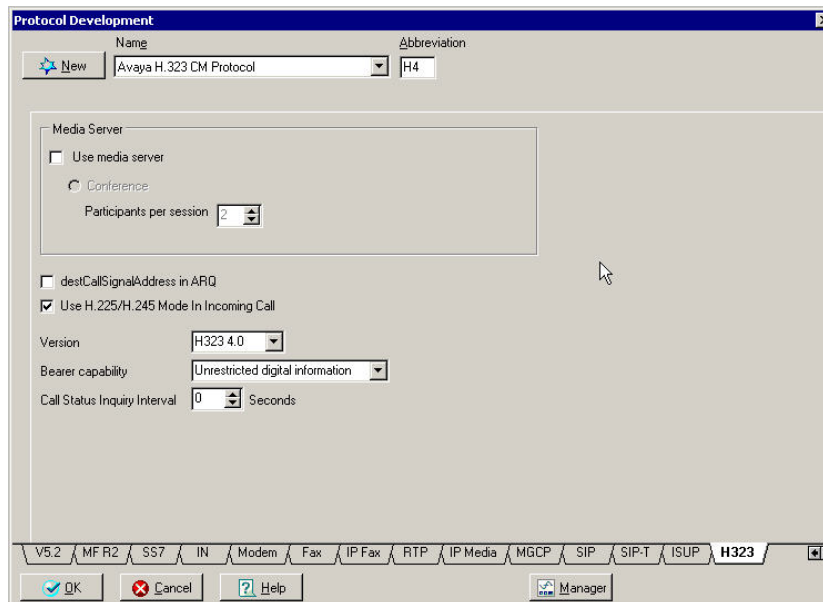
The **Protocol Development** screen is displayed as shown below. Click the right arrow in the lower right corner of the screen until the **H323** tab is displayed. Select the **H323** tab, and click on the **New** button located on the upper left side of the screen.



The **New Protocol** screen is displayed on top of the **Protocol Development** screen. Enter a descriptive name into the **Full name** field. The **Short name** field value is automatically filled in by Abacus 5000, and can be changed if it conflicts with an existing short name. In this case, the **Short name** is changed to “H4”. Click on **OK**.

A dialog box titled "New Protocol" with a close button (X) in the top right corner. It contains three input fields: "Full name" with the text "Avaya H.323 CM Protocol", "Short name" with the text "H4", and "Base" which is empty. At the bottom, there are three buttons: "OK" with a checkmark icon, "Cancel" with a red X icon, and "Help" with a question mark icon.

In the **Protocol Development** screen below, the newly created “Avaya H.323 CM Protocol” is now displayed. Check the **Use H.225/H.245 Mode In Incoming Call** field. Click on **OK** at the bottom left of the screen.

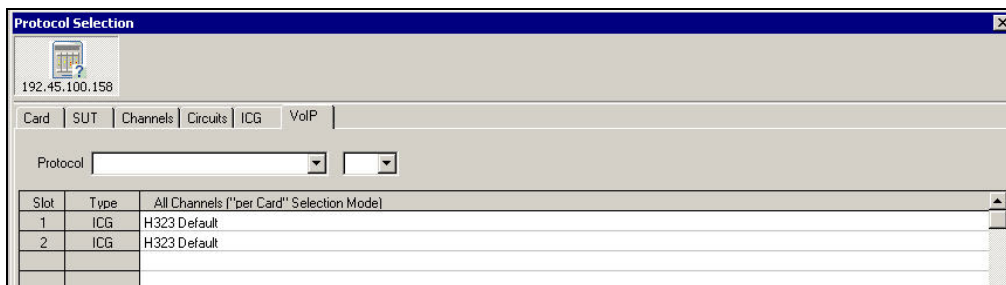
A screenshot of the "Protocol Development" window. At the top, there's a "Name" dropdown menu showing "Avaya H.323 CM Protocol" and an "Abbreviation" field showing "H4". Below this is a "Media Server" section with a checkbox "Use media server" (unchecked) and a "Conference" section with a "Participants per session" spinner set to "2". Further down, there's a checkbox "destCallSignalAddress in ARQ" (unchecked) and a checked checkbox "Use H.225/H.245 Mode In Incoming Call". Below these are "Version" (H323 4.0), "Bearer capability" (Unrestricted digital information), and "Call Status Inquiry Interval" (0 seconds). At the bottom, there's a tabbed interface with tabs for V5.2, MF R2, SS7, IN, Modem, Fax, IP Fax, RTP, IP Media, MGCP, SIP, SIP-T, ISUP, and H323 (selected). At the very bottom are "OK", "Cancel", "Help", and "Manager" buttons.

3.2.3.1 Administer Protocol Section VoIP

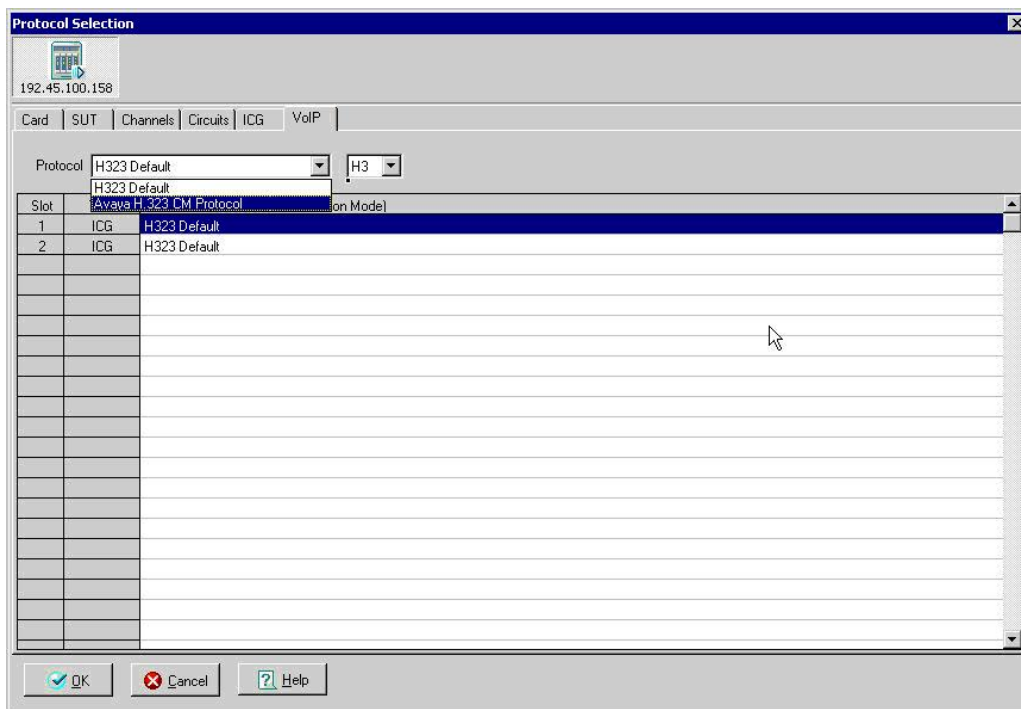
Click on the **Ptl Selection** icon from the main menu bar to display the **Protocol Selection** screen again.



In the **Protocol Selection** screen shown below, click on the **VoIP** tab. Select the **All Channels** ("per Card" Selection Mode) field for the first ICG3 card.



Click on the **Protocol** drop down list to change the default value to the newly created "Avaya H.323 CM Protocol". Repeat this procedure for the second ICG3 card. Click on **OK**.



3.2.4. Administer Phones

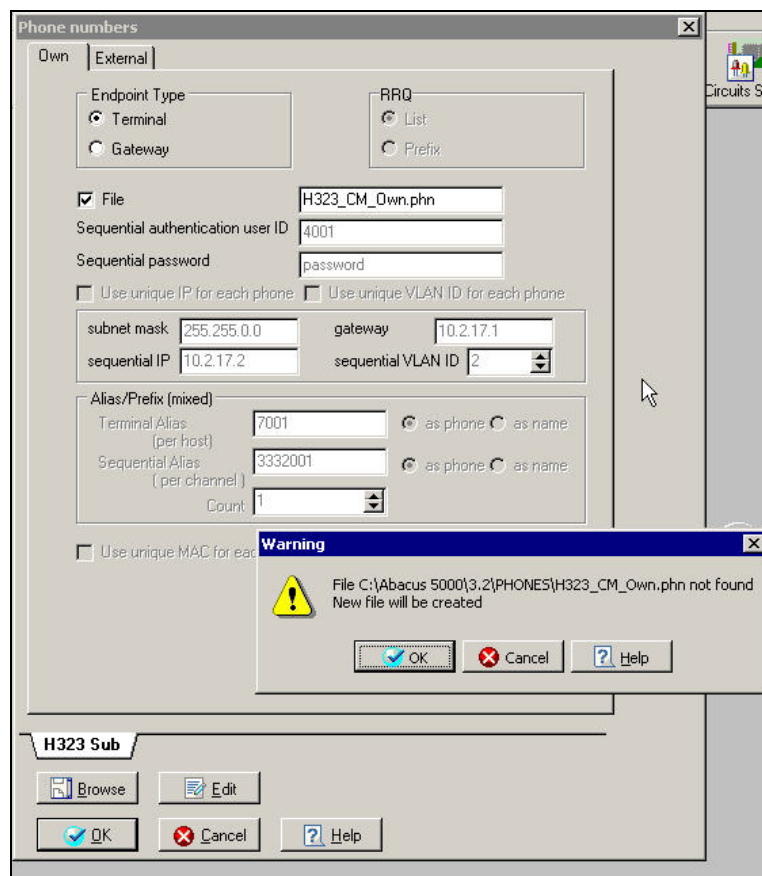
Click on the **Phones** icon from the main menu bar.



3.2.4.1 Administer Phones Own

The **Phone numbers** screen is displayed, as shown below. The **Own** tab is used to create internal telephone numbers for the channels on the two ICG3 cards, and the **External** tab is used to create external telephone numbers for the originating channels to dial.

Select the **Own** tab. Click on **File** and replace the default “H323_Sample.phn” with a desired file name. In this case, “H323_CM_Own.phn” is used. Click on the **Edit** button at the bottom left of the screen. A **Warning** pop up window is displayed as shown below. Click on **OK** to proceed to create the new file.



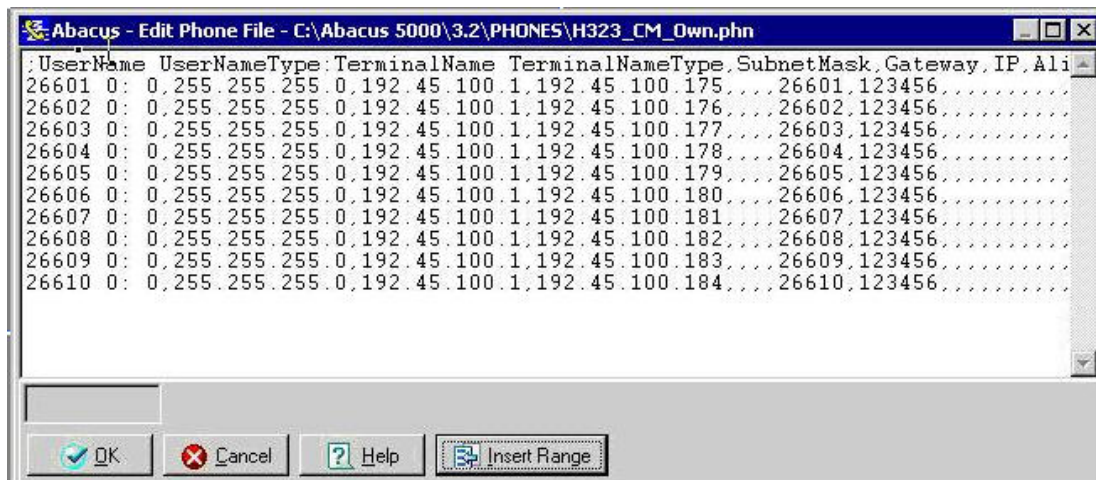
An empty **Edit Phone File** screen is displayed next. Click on **Insert Range** at the bottom of the screen to display the **Phone Ranges** screen as shown below. Scroll down the **Phone Ranges** screen as needed to enter the following values, and click on **OK** at the end.

- **Number to insert:** The total number of originating and terminating channels.
- **Side:** Select “Own” from the drop down list.
- **User Alias:** The starting H.323 station number from **Section 3.1.8**.
- **Increment by:** Incremental value for the station extensions.
- **Subnet Mask:** Subnet Mask for the network configuration.
- **Gateway:** Gateway for the network configuration.
- **IP Address:** The starting value of a series of available IP addresses.
- **Increment by:** Incremental value for the available IP addresses.
- **Authentication User ID:** The same value as the **User Alias** field.
- **Increment by:** The same value as the **Increment by** field for **User Alias**.
- **Password:** The H.323 station password from **Section 3.1.8**.

	Start with	Increment by
User Alias	26601	1
Terminal Alias		
Subnet Mask	255.255.255.0	N/A
Gateway	192.45.100.1	N/A
IP Address	192.45.100.175	1
Alias Count		N/A
VLAN ID		
MAC Address		

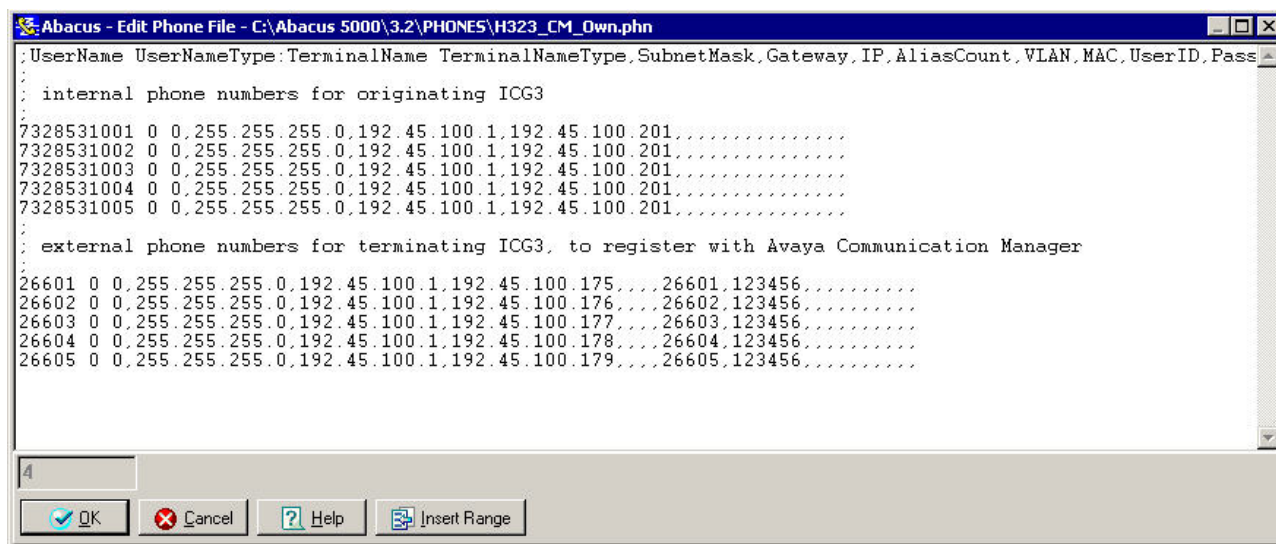
	Start with	Increment by
Gateway	192.45.100.1	N/A
IP Address	192.45.100.175	1
Alias Count		N/A
VLAN ID		
MAC Address		
Authentication User ID	26601	1
Password	123456	

The **Edit Phone File** screen is displayed and filled in with the information entered from the **Phone Ranges** screen. Manually edit the file as necessary.



Below is the result of the file after it has been manually edited. Note that lines preceded by “;” are the comment lines, and as many comment lines as desired may be added. The first five entries are the internal telephone numbers for the five channels on the originating ICG3 card. The “266xx” extensions are replaced with the desired digits to be passed to Avaya Communication Manager as calling party numbers. The “.” after the **UsernameType** of “0” needs to be removed. The **IP** are changed to be the IP address of the originating ICG3 card, as administered in **Section 3.1.3**. Remove the values for the **User ID** and **Password** fields, as no external registration will be necessary for the originating endpoints.

The next five entries are the internal telephone numbers for the five channels on the terminating ICG3 card. The “266xx” extensions should match the H.323 station numbers created in **Section 3.1.8**. The “.” after the **UsernameType** of “0” needs to be removed. The **IP** are changed to unique and available IP addresses in the network configuration. Click on **OK**.



3.2.4.2 Administer Phones External

Select the **External** tab. Under **Signaling Address**, select **same IP**, and enter the C-LAN IP address used for H.323 signaling on Avaya Communication Manager from **Section 3.1.6**. Under **Sequential User Alias**, select **phone number**, and enter the first sequential number of the H.323 stations on Avaya Communication Manager from **Section 3.1.8**. In the case that the H.323 station numbers are not sequential, then a file needs to be created and manually edited, similar to the procedures that were taken in the previous **Section 3.2.4.1**.

The screenshot shows a Windows-style dialog box titled "Phone numbers" with a close button (X) in the top right corner. The dialog has two tabs: "Open" and "External". The "External" tab is selected. Inside the dialog, there is a "File" checkbox which is unchecked, followed by a text field containing "H323_Sample.phn". Below this is a "Signaling Address" section with two radio buttons: "sequential IP" (unchecked) and "same IP" (checked). To the right of these radio buttons is a text field containing "192.45.100.84". Below that is a "Sequential User Alias" section with two radio buttons: "phone number" (checked) and "name" (unchecked). To the right of these radio buttons is a text field containing "26601". At the bottom of the main area is a "Count" label followed by a spinner box set to "1". At the bottom of the dialog, there is a tab labeled "H323 Sub" and a row of four buttons: "Browse" (with a folder icon), "Edit" (with a pencil icon), "OK" (with a checkmark icon), and "Cancel" (with a red X icon). A "Help" button (with a question mark icon) is located to the right of the "Cancel" button.

3.2.5. Administer Channels

Click on the **Channels** icon from the main menu bar.

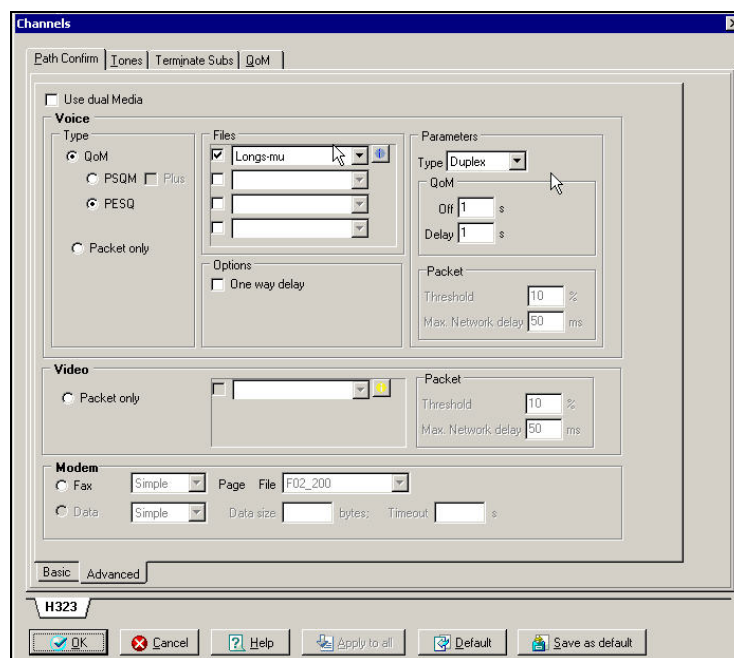


3.2.5.1 Administer Channels Path Confirm

The **Channels** screen is displayed next. The **Path Confirm** tab is used to select the two-way speech verification mechanism for the originating and terminating channels for each call. The remaining tabs are not used and can retain the default values.

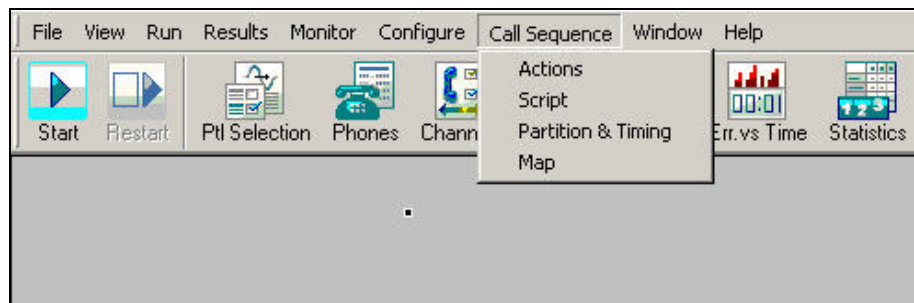
Select the **Path Confirm** tab, and click on the **Advanced** sub tab in the bottom left of the screen. Select **QoM**, **PESQ**, and “Duplex” from the **Type** drop down list under **Parameters**. Retain the default values for all remaining fields, and click **OK**.

Note that PSQM and PESQ are ITU standards P.861 and P.862 respectively for assessment of speech quality. PESQ is the more recent standard with a higher accuracy than PSQM, based on the comparison results published by the Audio Engineer Society Convention. If PSQM is optioned on the ICG3 card instead of PESQ, then select **PSQM** and enable the **Plus** field. The “Longs-mu” file is a longer WAV file to use for voice path confirmation, and other WAV files may be used. The “Duplex” type is a more stringent test with simultaneous two-way speech on the voice path as opposed to a polite conversation with “Simplex”.

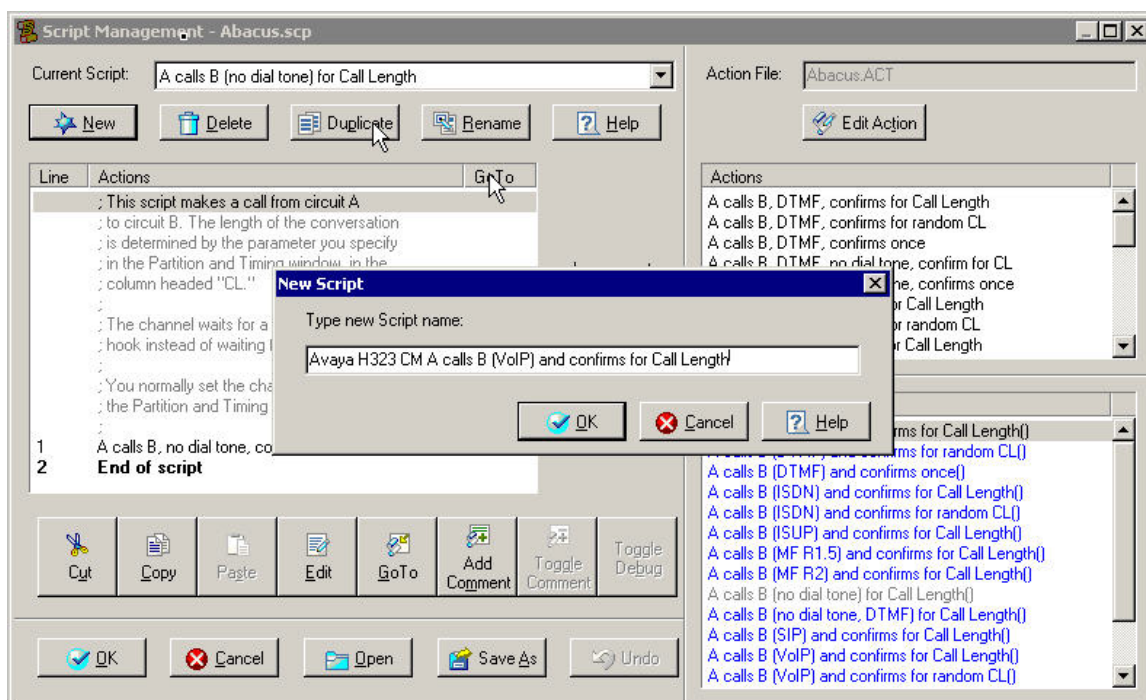


3.2.6. Administer Custom H.323 Script

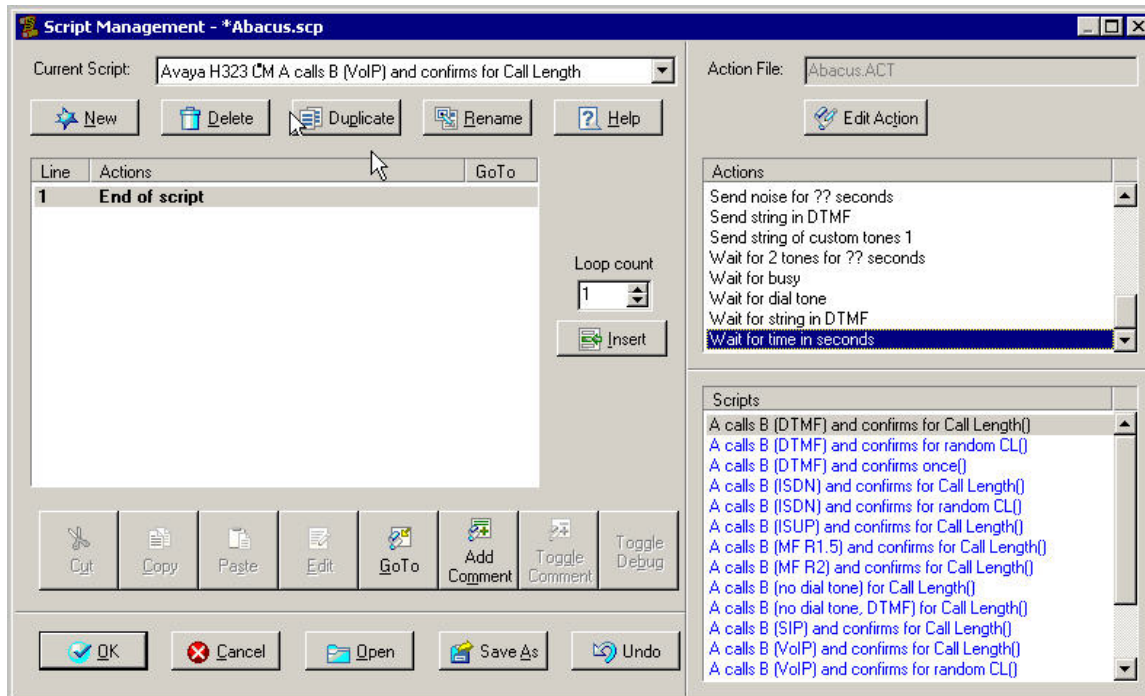
A customized H.323 script needs to be created to use for communication with Avaya Communication Manager. Note that this customized script is only necessary for scenarios that require media shuffling. Select **Call Sequence > Script** from the main menu bar as shown below.



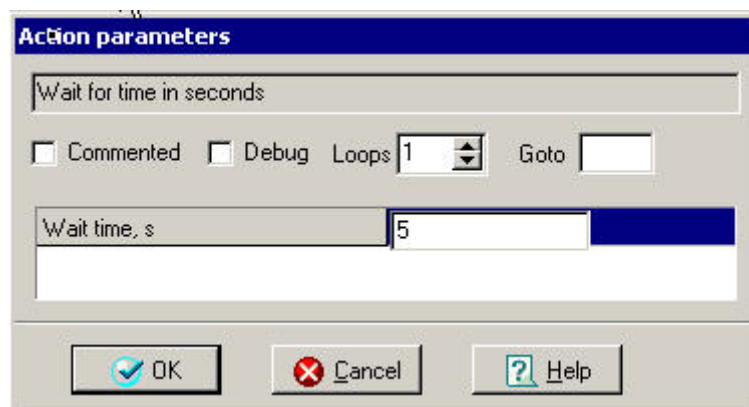
The **Script Management** screen is displayed next. Click on the **New** button in the upper left side of the screen, and a **New Script** dialogue box will be displayed on top of the **Script Management** screen, as shown below. Enter a descriptive name for the new script, and click **OK**. The custom H.323 script that needs to be created essentially has the same actions as the basic “A calls B (VoIP) and confirms for Call Length()” script, except for an additional wait step of 5 seconds initially to allow for Abacus 5000 and Avaya Communication Manager to shuffle the media before starting path confirmation. Note that this additional 5 seconds is essential for successful media shuffling and subsequent path confirmation.



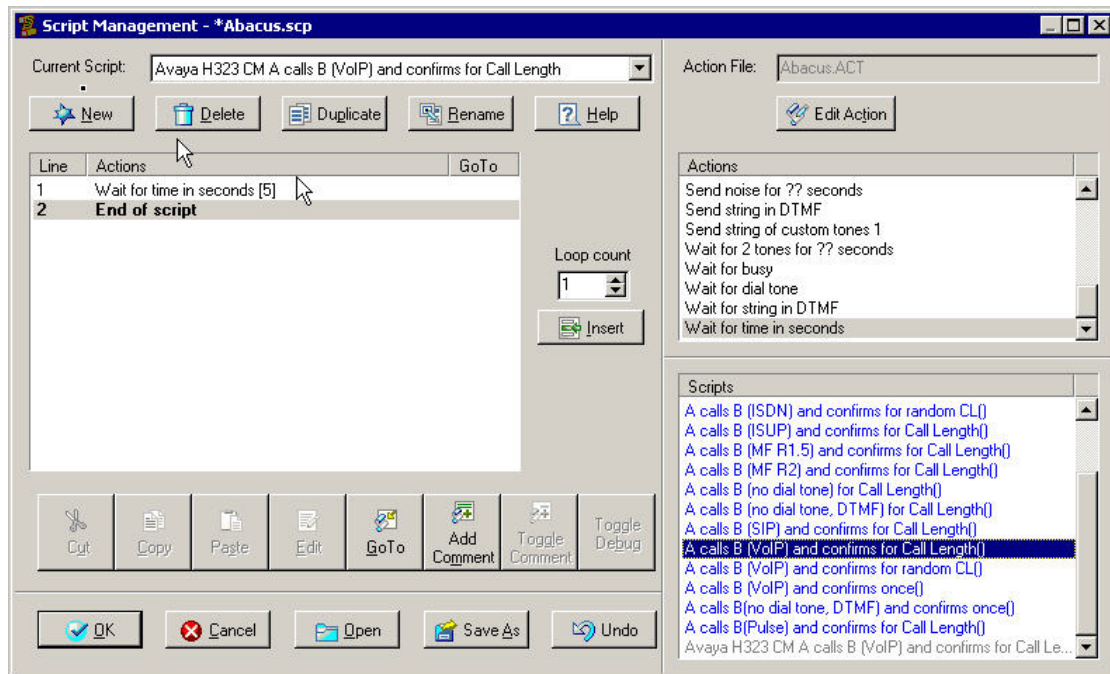
The **Script Management** screen is displayed next, and shows the new script in the **Current Script** field. Scroll down in the **Actions** pane in the upper right side of the screen. Select the “Wait for time in seconds” action and click on the **Insert** button in the center of the screen.



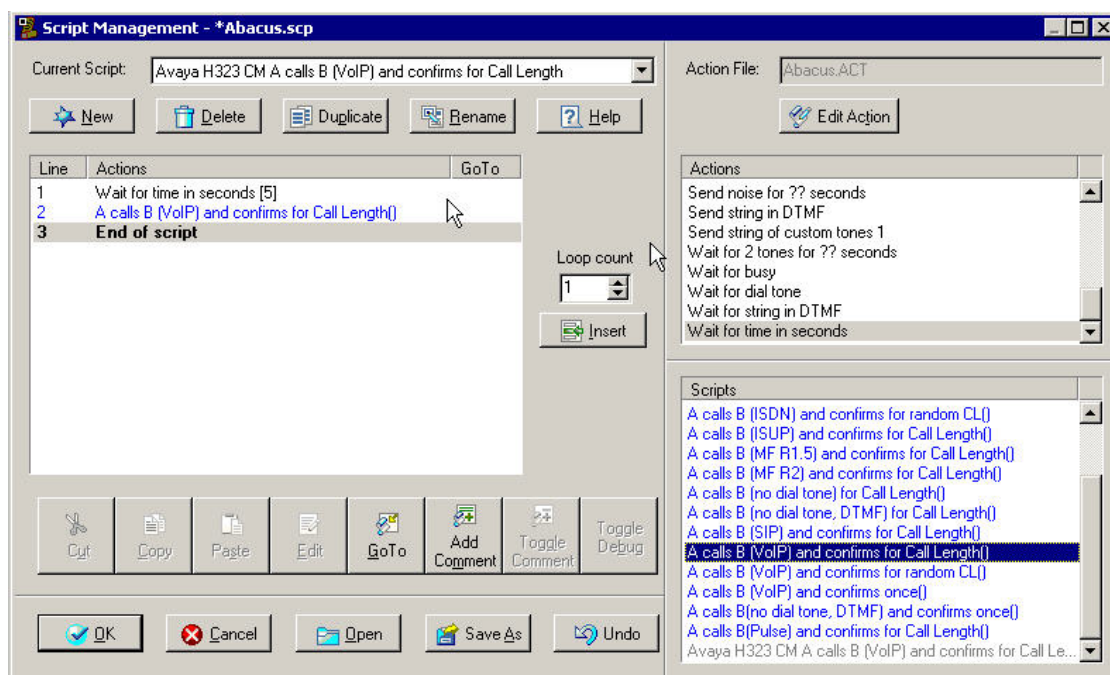
The **Action parameters** screen below is displayed on top of the **Script Management** screen. Click on the blank field next to **Wait time, s** and enter “5” to denote a wait of 5 seconds. Click on **OK** to add this action.



The **Script Management** screen is now updated with the newly added wait step as shown in the left pane of the screen below. Scroll down in the Scripts pane in the lower right side of the screen, and select “A calls B (VoIP) and confirms for Call Length()”. Click on the **Insert** button in the center of the screen.

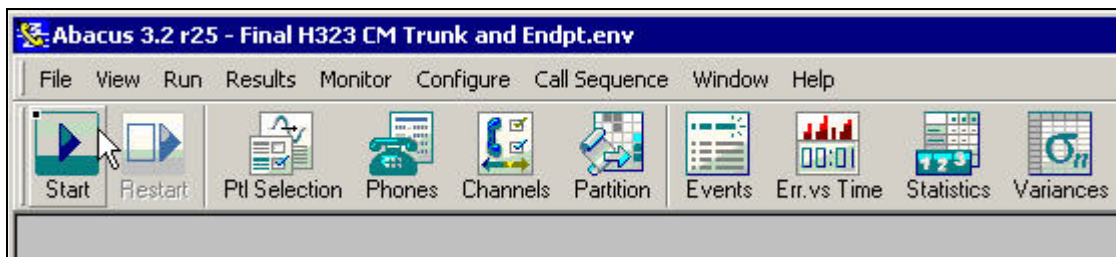


The **Script Management** screen is updated with the newly added step as shown below. Click on **OK**.



3.2.7. Administer Partitioning and Timing

Click on the **Partition** icon from the main menu bar.




3.2.7.1 Administer Association

The **Partition and Timing** screen is displayed. Select the **Association** tab, and update the following field:

- **Set:** Click to enter a check mark next to **1** and **2**.
- **From and To:** Update to reflect the range of channels on each ICG3 card.
- **Total:** Will be updated automatically by Abacus 5000.
- **Configuration:** Select “all originate” for Set 1, and “all terminate” for Set 2.
- **Links:** Select “External” for both Set 1 and Set 2.

Set 1 corresponds to the originating ICG3 card, which has 5 channels administered (from **Section 3.2.2.3**) and will be used to originate the H.323 calls. Set 2 corresponds to the terminating ICG3 card, which also has 5 channels, and will be used to terminate the H.323 calls.

The “Default” value can be retained for the **Path Confirmation** fields, as the path confirmation method has already been administered in **Section 3.2.5.1**.

Partition and Timing								
 192.45.100.158								
Association Timing and Scripts Protocols Phones								
Set	From	To	Total	Configuration	Toggle	Links	Path Confirmation	
1 <input checked="" type="checkbox"/>	1	5	5	all originate		External	Default	
2 <input checked="" type="checkbox"/>	6	10	5	all terminate		External	Default	
3 <input type="checkbox"/>								
4 <input type="checkbox"/>								

3.2.7.2 Administer Timing and Scripts

Select the **Timing and Scripts** tab, and update the **ST**, **SS**, **CL**, **IC**, and **CC** fields to the desired values. Below is a brief description of what each abbreviated field stands for from the Abacus 5000 documentation:

		Resolution	Maximum Time
ST	Start	1 second	1023 seconds
SS	Start to Start	0.1 second	99.9 seconds
CL	Call Length	1 second	99999 seconds
IC	Inter-Call	0.1 second	99.9 seconds
CC	Call to Call	1 second	1023 seconds

Select the customized H.323 script created from **Section 3.2.6**, in this case “Avaya H323 CM A calls B (VoIP) and confirms for Call Length()”, for the **Script originate** field for Set 1 and for the **Script terminate** field for Set 2. Note that for test scenarios that do not require media shuffling, the generic “A calls B (VoIP) and confirms for Call Length()” script may be used for the **Script originate** field, and the “Default” value may be retained for the **Script terminate** field.

Maintain the default values in the **Protocols** and **Phones** tabs, and click on **OK**.

Partition and Timing

192.45.100.158

Association Timing and Scripts Protocols Phones

Set	From	To	Total	ST	SS	CL	IC	CC	BHCA	Script originate	Script terminate
1 <input checked="" type="checkbox"/>	1	5	5	0	1	30	2	32		H323 CM A calls B (VoIP) and confirms for Call Length()	Default
2 <input checked="" type="checkbox"/>	6	10	5	0	1	30	10	10		A calls B (DTMF) and confirms for Call Length()	H323 CM A calls B (VoIP) and confirms for Call Length()
3 <input type="checkbox"/>											
4 <input type="checkbox"/>											
5 <input type="checkbox"/>											
6 <input type="checkbox"/>											
7 <input type="checkbox"/>											
8 <input type="checkbox"/>											
9 <input type="checkbox"/>											
10 <input type="checkbox"/>											

H323 Subscriber: 10

Map ☐ Enable

Channels ☒ Contiguous ☐ Active terminates ☐ Attachments ☐ Non-contiguous

Phones

Sets

4. Configure Abacus 5000 with Avaya IP Office

This section provides the procedures for configuring the H.323 line and extension interfaces between Avaya IP Office and Spirent Abacus 5000.







4.1. Configure Avaya IP Office

The procedures for configuring the H.323 interfaces on Avaya IP Office include the following areas:

- Verify Avaya IP Office license
- View System configuration
- Administer H.323 gatekeeper
- Administer H.323 line
- Administer IP route
- Administer IP extensions
- Administer IP users

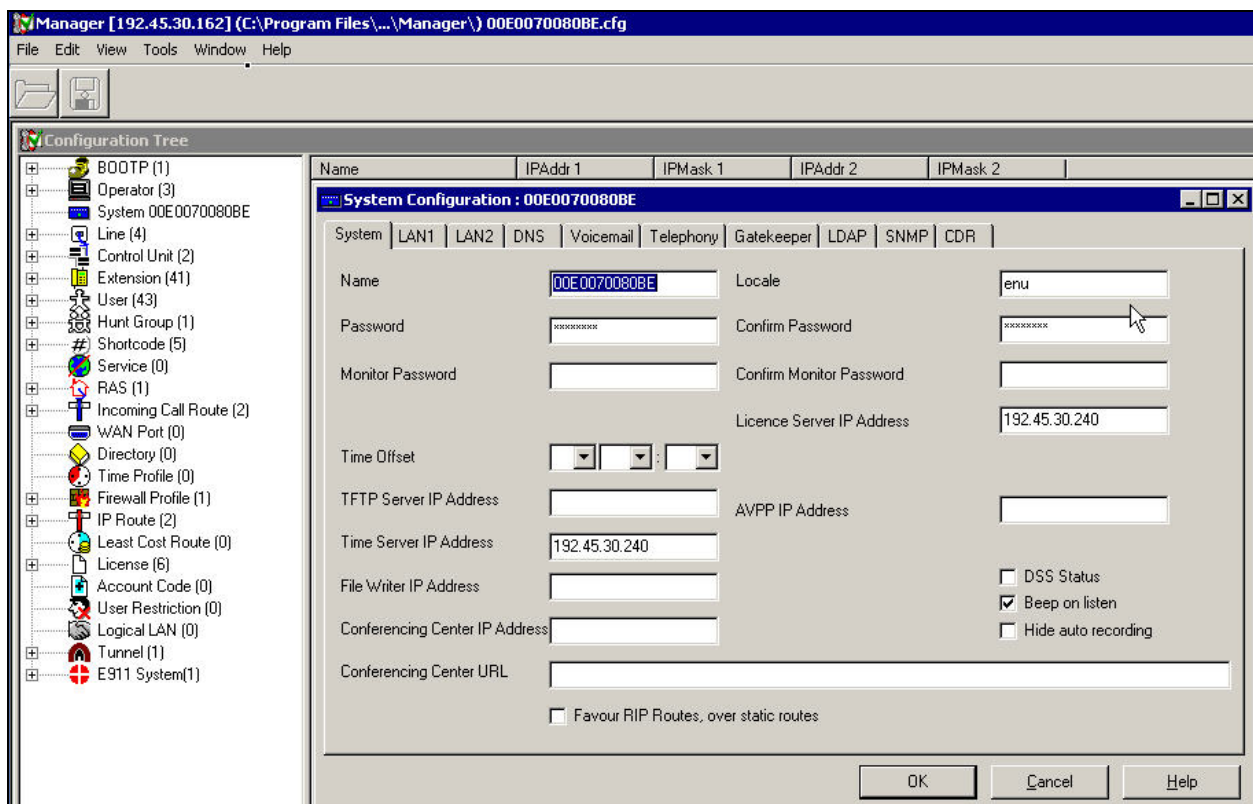
4.1.1. Verify Avaya IP Office License

Navigate to **Start > Programs > IP Office > Manager** to open the IP Office Manager Window. From the main **Manager** screen, double click on **License** under the **Configuration Tree** in the left pane. The license information is displayed in the right pane as shown below. Verify that the license allows for **IP End-points** with an associated **Status** of “Valid”.

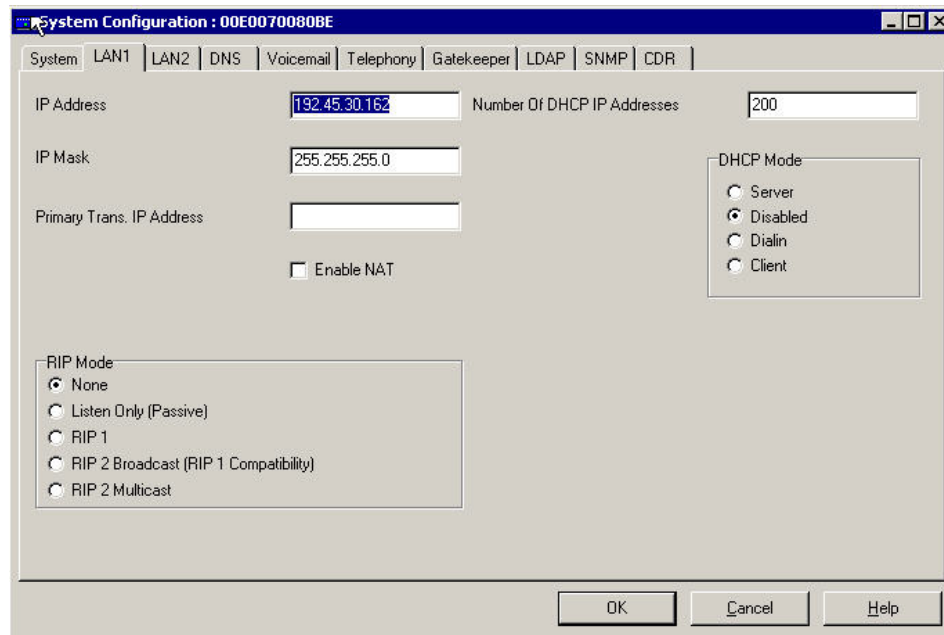
Status	License	Instances	Expires
 Invalid	Invalid	0	0 000 0
 Valid	IP End-points	Unlimited	Never
 Valid	IPSec Tunnelling	Unlimited	Never
 Valid	Phone Manager Pro	Unlimited	Never
 Valid	Phone Manager Pro (per seat)	Unlimited	Never
 Valid	Phone Manager Pro IP Audio Enabled (us...	Unlimited	Never

4.1.2. View System Configuration

Navigate to **Start > Programs > IP Office > Manager** to open the IP Office Manager Window. From the main **Manager** screen, double click on **System** under the **Configuration Tree** in the left pane. The **System Configuration** screen is displayed in the right pane as shown below. Make a note of the value in the **Name** field under the **System** tab, in this case “00E0070080BE”, as this will be used later to configure Abacus 5000.



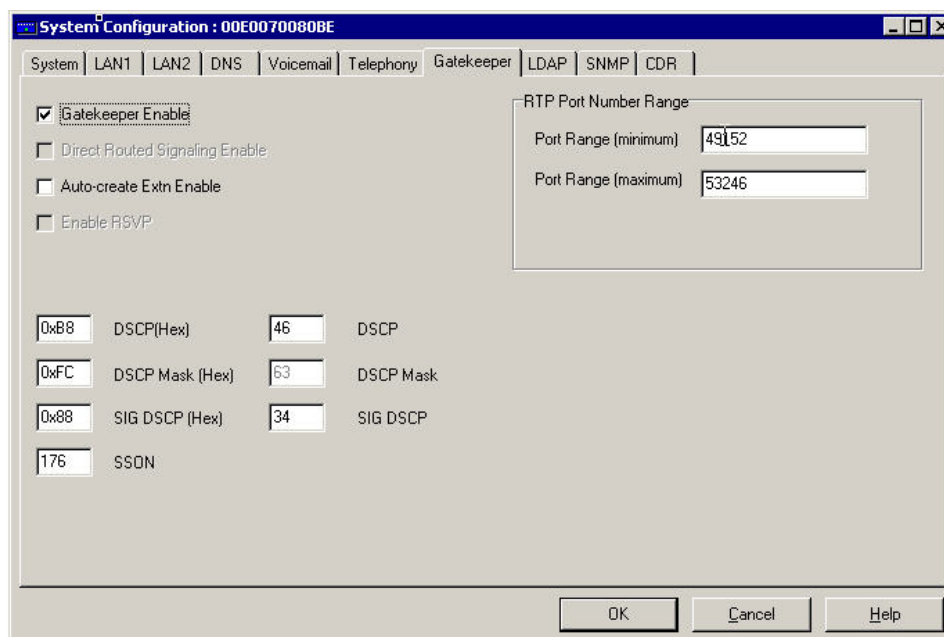
Select the **LAN1** tab, and make a note of the value in the **IP Address** field, in this case “192.45.30.162”. This will also be needed later to configure Abacus 5000.



The screenshot shows the 'System Configuration' window for device 00E0070080BE, with the 'LAN1' tab selected. The 'IP Address' field is highlighted and contains the value '192.45.30.162'. Other fields include 'IP Mask' (255.255.255.0), 'Primary Trans. IP Address' (empty), 'Number Of DHCP IP Addresses' (200), and 'Enable NAT' (unchecked). The 'DHCP Mode' section has radio buttons for 'Server', 'Disabled' (selected), 'Dialin', and 'Client'. The 'RIP Mode' section has radio buttons for 'None' (selected), 'Listen Only (Passive)', 'RIP 1', 'RIP 2 Broadcast (RIP 1 Compatibility)', and 'RIP 2 Multicast'. At the bottom are 'OK', 'Cancel', and 'Help' buttons.

4.1.3. Administer H.323 Gatekeeper

Select the **Gatekeeper** tab in the **System Configuration** screen, and check the **Gatekeeper Enable** field. This will enable gatekeeper support to accept registration of H.323 extensions from Abacus 5000. Retain the default values for all other fields, and click on **OK**.



The screenshot shows the 'System Configuration' window for device 00E0070080BE, with the 'Gatekeeper' tab selected. The 'Gatekeeper Enable' checkbox is checked. Other checkboxes include 'Direct Routed Signaling Enable' (unchecked), 'Auto-create Extn Enable' (unchecked), and 'Enable RSVP' (unchecked). The 'RTP Port Number Range' section has 'Port Range (minimum)' (49152) and 'Port Range (maximum)' (53246). The 'DSCP' section has four rows: 'DSCP(Hex)' (0xB8) with value 46, 'DSCP Mask (Hex)' (0xFC) with value 63, 'SIG DSCP (Hex)' (0x88) with value 34, and 'SSON' (176). At the bottom are 'OK', 'Cancel', and 'Help' buttons.

4.1.4. Administer H.323 Line

Select **Line** under the **Configuration Tree** in the left pane of the main **Manager** screen, and right click in the right pane to get a drop down list (not shown below). Select **New** from the drop down list, and the **IP Line** screen will be displayed into the right pane. Enter an available **Line Number**, **Incoming Group ID**, and **Outgoing Group ID**. Update the **Number Of Channels**, **Outgoing Channels**, **Voice Channels**, and **Data Channels** by the number of simultaneous H.323 calls to be launched by Abacus 5000, in this case “5” as shown below.

The screenshot shows the 'IP Line 08' configuration window with the 'Line' tab selected. The fields are as follows:

Field	Value
Line Number	08
Telephone Number	
Outgoing Channels	5
Voice Channels	5
Incoming Group ID	8
Outgoing Group ID	8
Number Of Channels	5
Prefix	
Data Channels	5
TEI	0
National Prefix	0
International Prefix	00

Buttons at the bottom: OK, Cancel, Help.

Select the **VoIP** tab. Enter the IP address of the Abacus 5000 originating ICG3 card from **Section 4.2.2.3** into the **Gateway IP Address** field. Select an audio **Compression Mode**, in this case “G.711 ULAW 64K”. Select “None” for **H450 Support**. Retain the default values for the remaining fields, and click on **OK**.

The screenshot shows the 'IP Line 08' configuration window with the 'VoIP' tab selected. The fields and checkboxes are as follows:

Field	Value
Gateway IP Address	192.45.30.129
Voice Pkt. Size	160
Compression Mode	G.711 ULAW 64K
H450 Support	None

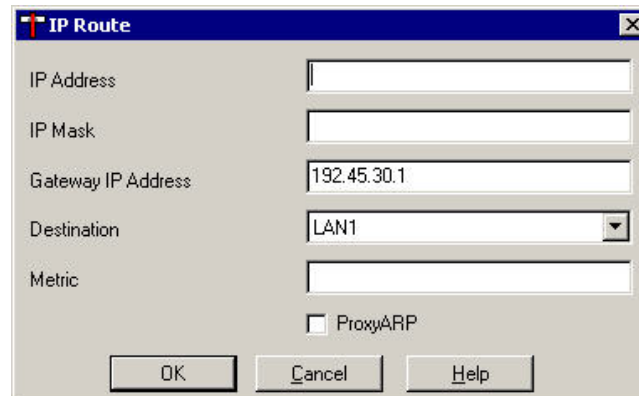
Checkboxes:

- ☐ Silence Suppression
- ☐ Enable Faststart
- ☐ Local Hold Music
- ☐ Local Tones
- ☐ Enable RSVP
- ☒ Out Of Band DTMF
- ☒ Allow Direct Media Path
- ☐ Voice Networking
- ☐ Fax Transport Support

Buttons at the bottom: OK, Cancel, Help.

4.1.5. Administer IP Route

Select **IP Route** under the **Configuration Tree** in the left pane of the main **Manager** screen, and right click in the right pane to get a drop down list (not shown below). Select **New** from the drop down list, and the **IP Route** screen will be displayed into the right pane. Enter the default gateway IP address for the network configuration into the **Gateway IP Address** field, in this case “192.45.30.1”. Select “LAN1” from the **Destination** drop down list, and click on **OK**.

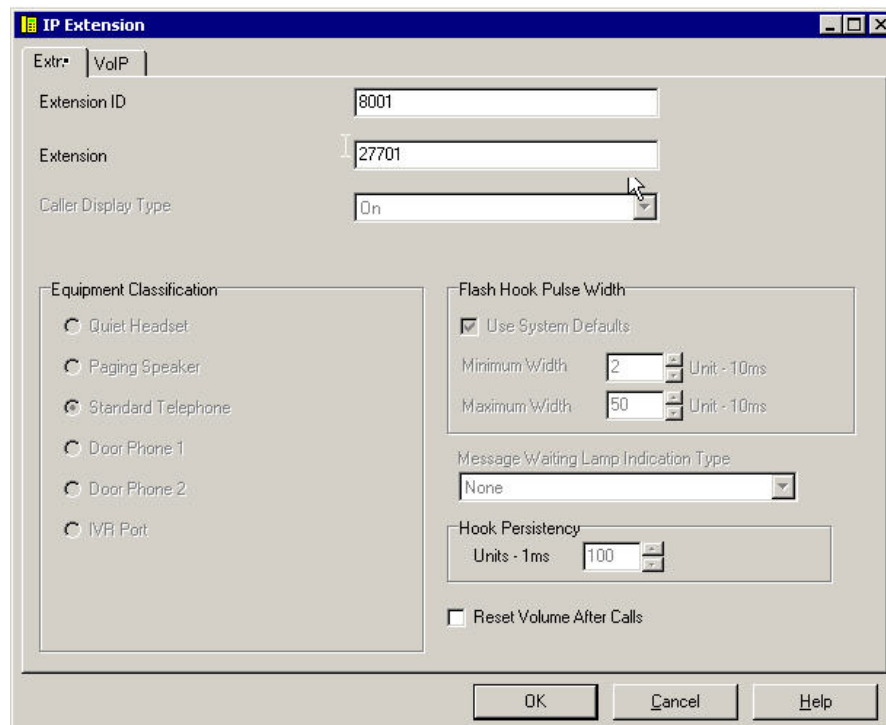


The IP Route dialog box contains the following fields and controls:

- IP Address: [Empty text field]
- IP Mask: [Empty text field]
- Gateway IP Address: 192.45.30.1
- Destination: LAN1 (selected from a dropdown menu)
- Metric: [Empty text field]
- ☐ ProxyARP
- Buttons: OK, Cancel, Help

4.1.6. Administer IP Extensions

Select **Extension** under the **Configuration Tree** in the left pane of the main **Manager** screen, and right click in the right pane to get a drop down list (not shown below). Select **New** from the drop down list, and the **IP Extension** screen will be displayed into the right pane. In the **Extn** tab, enter an available extension number as shown below. The **Extension ID** field is automatically populated by IP Office.



The IP Extension dialog box contains the following fields and controls:

- Extn: VolP (selected tab)
- Extension ID: 8001
- Extension: 27701
- Caller Display Type: On (selected from a dropdown menu)
- Equipment Classification:
 - ☐ Quiet Headset
 - ☐ Paging Speaker
 - ☒ Standard Telephone
 - ☐ Door Phone 1
 - ☐ Door Phone 2
 - ☐ IVR Port
- Flash Hook Pulse Width:
 - ☒ Use System Defaults
 - Minimum Width: 2 Unit - 10ms
 - Maximum Width: 50 Unit - 10ms
- Message Waiting Lamp Indication Type: None (selected from a dropdown menu)
- Hook Persistency: Units - 1ms 100
- ☐ Reset Volume After Calls
- Buttons: OK, Cancel, Help

Select the **VoIP** tab. In the **Compression Mode** field, select the same audio compression mode that was administered for the H.323 line in **Section 4.1.3**. After selecting the audio compression mode to “G.711 ULAW 64K”, the default value in the **Voice Pkt. Size** field is automatically changed to “160” as shown below. Retain the default values in the remaining fields, and click on **OK**.

The screenshot shows a window titled "IP Extension 27701" with a "VoIP" tab selected. The window contains several configuration fields and checkboxes. The "IP Address" field is empty. The "Voice Pkt. Size" field is set to "160". The "Compression Mode" field is set to "G.711 ULAW 64K". The "MAC Address" field is set to "000000000000". The "Gain" field is set to "Default". On the right side, there are several checkboxes: "Silence Suppression" (unchecked), "Enable Faststart for non-Avaya IP phones" (unchecked), "Fax Transport Support" (unchecked), "Local Hold Music" (unchecked), "Local Tones" (unchecked), "Enable RSVP" (unchecked), "Out Of Band DTMF" (checked), and "Allow Direct Media Path" (checked). At the bottom of the window are three buttons: "OK", "Cancel", and "Help".

Repeat this section to add the desired number of H.323 extensions, which would be the same as the desired number of simultaneous H.323 calls. For the compliance testing, five H.323 extensions were administered. When possible, use consecutive numbers for the H.323 extensions, for ease of configuring Abacus 5000 later on.

4.1.7. Administer IP Users

Select **User** under the **Configuration Tree** in the left pane of the main **Manager** screen, and right click in the right pane to get a drop down list (not shown below). Select **New** from the drop down list, and the **User** screen will be displayed into the right pane. In the **User** tab, enter the following values for the specified fields, and retain the default values for the remaining fields. Click on **OK** at the end. Repeat these procedures for each extension created in **Section 4.1.5**

- **Name:** The desired user name, in this case “IPO27701”.
- **Password:** The desired password, in this case “123456”.
- **Confirm Password:** The same value entered for the **Password** field.
- **Extension:** The extension number from **Section 4.1.5**.
- **Phone Manager Type:** Select “VoIP” from the drop down list.

The screenshot shows the 'User IPO27701' configuration window. The 'User' tab is selected, displaying the following fields and values:

Field	Value
Name	IPO27701
Password	[Masked]
Confirm Password	[Masked]
Full Name	
Extension	27701
Locale	
Priority	5
Restrictions	
Phone Manager Type	VoIP

Additional options include checkboxes for 'Ex Directory' and 'Book with Conference Centre in Phone Manager'. The bottom of the window features 'OK', 'Cancel', and 'Help' buttons.

4.2. Configure Abacus 5000

The procedures for configuring the originating and terminating H.323 interfaces on Abacus 5000 to interoperate with Avaya IP Office include the following areas:

- Verify system information
- Administer protocol selection
- Administer phones
- Administer channels
- Administer partitioning and timing

Many of the procedures are exactly the same as the procedures for H.323 interoperability with Avaya Communication Manager. In those cases, the readers will be referred back to the relevant previous sections for procedural steps.

There is no need for creation of custom protocol development and H.323 scripts for interoperability with Avaya IP Office.

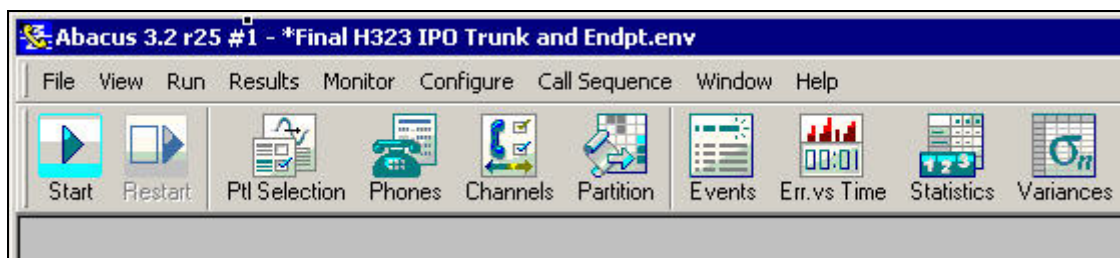
4.2.1. Verify System Information

The procedures for verifying system information for interoperability with IP Office are exactly the same as the procedures for interoperability with Avaya Communication Manager. Refer to **Section 3.2.1** for detailed descriptions of the procedures.

Note that one ICG3 card is used to originate H.323 calls to the H.323 line on Avaya IP Office, and the other ICG3 card is used to terminate the H.323 calls from the H.323 extensions on Avaya IP Office.

4.2.2. Administer Protocol Selection

Click on the **Ptl Selection** icon from the main menu bar shown below.

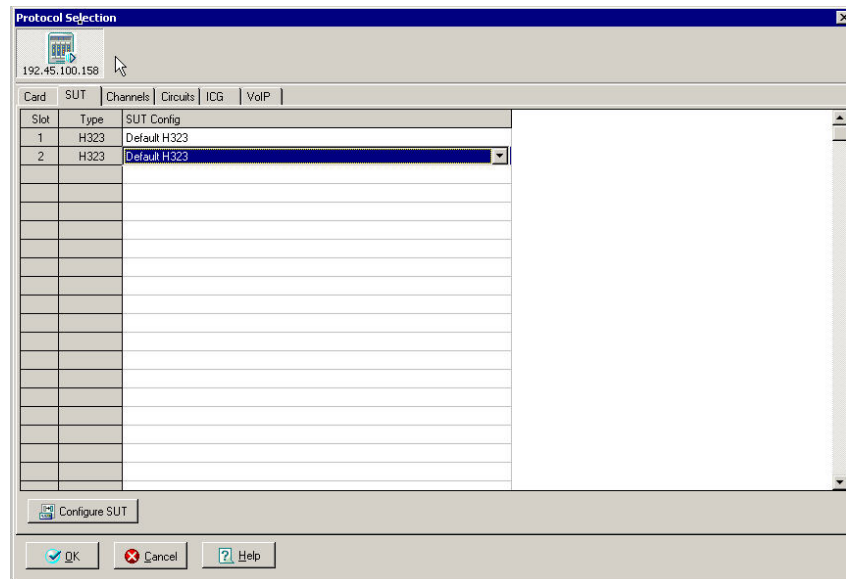


4.2.2.1 Administer Protocol Selection Card

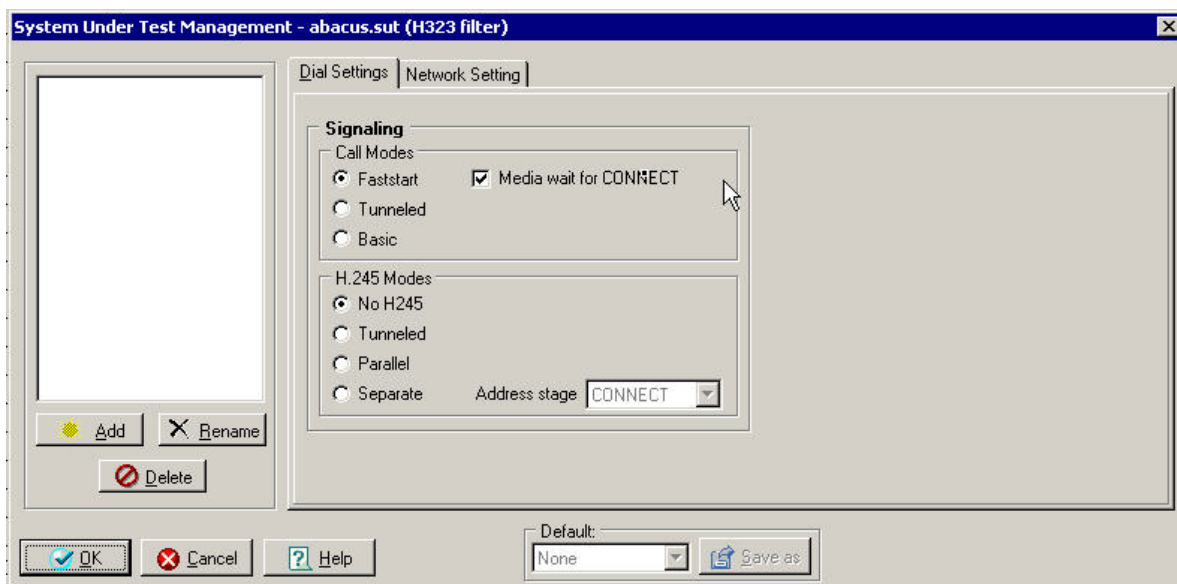
The procedures for administering the Protocol Selection Card tab for interoperability with IP Office are exactly the same as the procedures for interoperability with Avaya Communication Manager. Refer to **Section 3.2.2.1** for detail descriptions of the procedures.

4.2.2.2 Administer Protocol Selection SUT

Select the **SUT** tab. Retain the default value in the **SUT Config** field for the first card, to be used to originate the H.323 calls. Select the **SUT Config** field for the second card, and click on the **Configure SUT** button in the lower left of the screen.



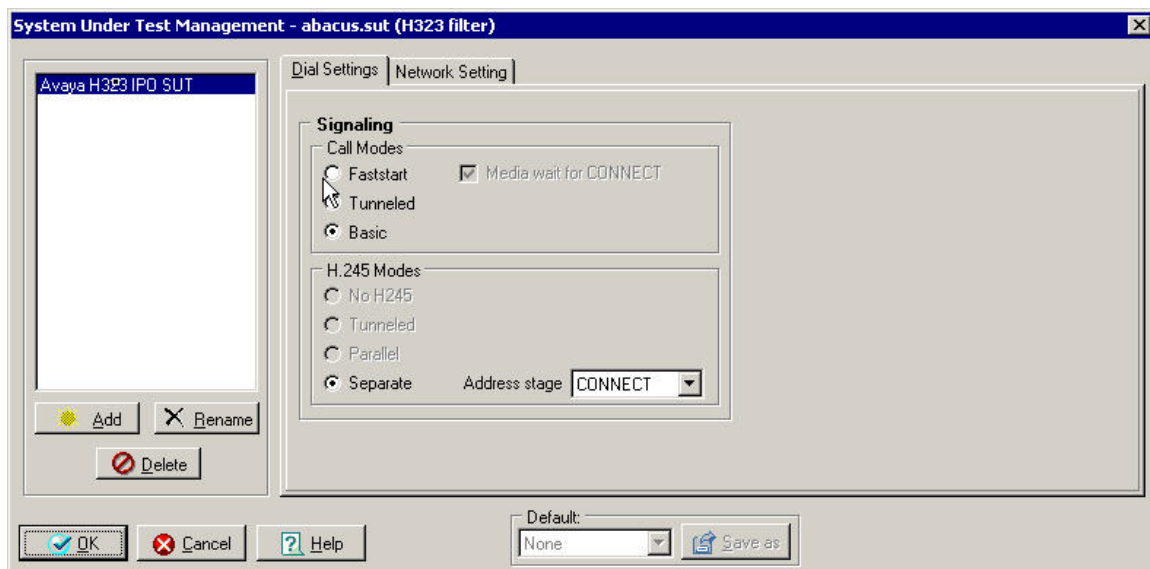
The **System Under Test Management** screen below is displayed on top of the **Protocol Selection** screen. Click on the **Add** button in the lower left pane to add a new SUT for the terminating ICG3 card. This will be used to administer the signaling mode and IP Office gatekeeper information, to enable registration of H.323 endpoints on the terminating ICG3 card to Avaya IP Office.



The **New SUT Configuration Record** screen below is displayed on top of the **System Under Test Management** screen. Enter a descriptive name and click on **OK**.



The **System Under Test Management** screen is displayed next, and shows the newly added SUT in the top left pane. In the **Dial Settings** tab, select **Basic** under **Call Modes**, and **Separate** under **H.245 Modes** as shown below.



The

Select the **Network Setting** tab, followed by the **Gatekeeper** sub tab. Enter the following values into the specified fields, and retain the default values for all remaining fields. Click on **OK** at the end.

- **Use Gatekeeper:** Select this field to enable external gatekeeper registration.
- **Identifier:** Avaya IP Office system name from **Section 4.1.1**.
- **Address:** Avaya IP Office LAN1 IP address from **Section 4.1.1**.
- **Gatekeeper discovery mode:** “Manual”
- **Security profile:** “Avaya”

System Under Test Management - abacus.sut (H323 filter)

Network Setting

Gatekeeper

☒ Use Gatekeeper

Identifier: 00E0070080BE

Address: 192.45.30.162

Port number: 1719

Gatekeeper discovery mode: Manual

Security profile: Avaya

☐ Use both user and terminal alias in registration/admission request

☒ Check Incoming Messages

Registration time To live: 3600 sec

Response timeout: 4 sec

Number of retries: 3

RR time: 20 ms

Messages allowed interval: 86400 sec

Buttons: Add, Rename, Delete, OK, Cancel, Help, Default: None, Save as

The **Protocol Selection** screen is displayed next. Click on the **SUT Config** field for the second ICG3 card, and select the newly created SUT from the drop down list. In this case, “Avaya H323IPO SUT”. This enables the terminating ICG3 card to register H.323 endpoints with Avaya IP Office, using the IP Office gatekeeper information in the newly created SUT.

Slot	Type	SUT Config
1	H323	Default H323
2	H323	Avaya H323 IPO SUT

Maintain the defaults in the **Channels** and **Circuits** tabs. Should audio codec other than the default G.711 be desired, then this needs to be administered in the **Channels** tab. The following are the audio codec types that successfully interoperated between Abacus 5000 and Avaya Communication Manager during the compliance testing.

Abacus 5000	Avaya IP Office
G.711	G.711 ULAW 64K
G.723	G.723.1 6K3 MP-MLQ
G.729AB	G.729(a)8K CS-ACELP, G.729 Simple
G.729B	G.729(a)8K CS-ACELP, G.729 Simple

Unlike Avaya Communication Manager, no custom protocol development is necessary for interoperability with Avaya IP Office, therefore also keep the default values in the **VoIP** tab.

4.2.2.3 Administer Protocol Selection ICG

Select the **ICG** tab, and click on the **Port 0** field that corresponds to the first ICG3 card. Enter the following values for the specified fields, and retain the default values for the remaining fields. Note that the number of channels and IP addresses may vary.

- **Number of channels:** The desired number of originating channels, in this case “5”.
- **Gateway:** Gateway IP address for the network configuration.
- **Local address:** IP address for the originating ICG3 card from **Section 4.1.3**.
- **Subnet Mask:** Subnet mask for the network configuration.

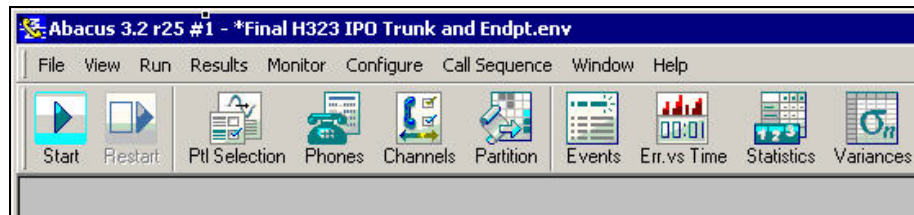
The screenshot shows the 'Protocol Selection' dialog box with the 'ICG' tab selected. The 'ICG configuration' section is active, showing a tree view on the left with 'ICG3 #1' selected and 'Port 0' highlighted. The 'ICG Port configuration' section on the right shows 'Signaling: H323', 'Slot: 1', and 'Port: 0'. The 'Number of channels' is set to 5. The 'L1' section shows 'Ethernet Mode' set to 'Auto'. The 'L2' section shows 'VLAN Tagging Enabled' checked, 'VLAN ID' set to 2, and 'MAC Address' set to 00:40:9E:00:81:CC. The 'L3' section shows 'Local DomainName' set to 'company1.com' and 'DHCP Enable' unchecked. The 'IPv4' section shows 'Gateway' set to 192.45.30.1, 'Local address' set to 192.45.30.129, 'DNS' set to 10.2.16.50, and 'Subnet Mask' set to 255.255.255.0. The 'IPv6' section shows 'Gateway v6' as a series of colons, 'Local address v6' set to 2001:ABCD:0:0:0:0:0:11, 'DNS v6' as a series of colons, and 'Prefix length' set to 64. The bottom of the dialog has 'OK', 'Cancel', and 'Help' buttons.

Repeat the same procedures for **Port 0** in the second ICG3 card, and enter an available IP address for the terminating ICG3 card in the **Local address** field. Click on **OK**.

The screenshot shows the 'Protocol Selection' dialog box with the 'ICG' tab selected. The 'ICG configuration' section is active, showing a tree view on the left with 'ICG3 #2' selected and 'Port 0' highlighted. The 'ICG Port configuration' section on the right shows 'Signaling: H323', 'Slot: 2', and 'Port: 0'. The 'Number of channels' is set to 5. The 'L1' section shows 'Ethernet Mode' set to 'Auto'. The 'L2' section shows 'VLAN Tagging Enabled' checked, 'VLAN ID' set to 2, and 'MAC Address' set to 00:40:9E:00:92:FA. The 'L3' section shows 'Local DomainName' set to 'company2.com' and 'DHCP Enable' unchecked. The 'IPv4' section shows 'Gateway' set to 192.45.30.1, 'Local address' set to 192.45.30.102, 'DNS' set to 10.2.16.50, and 'Subnet Mask' set to 255.255.255.0. The 'IPv6' section shows 'Gateway v6' as a series of colons, 'Local address v6' set to 2001:ABCD:0:0:0:0:0:12, 'DNS v6' as a series of colons, and 'Prefix length' set to 64. The bottom of the dialog has 'OK', 'Cancel', and 'Help' buttons.

4.2.3. Administer Phones

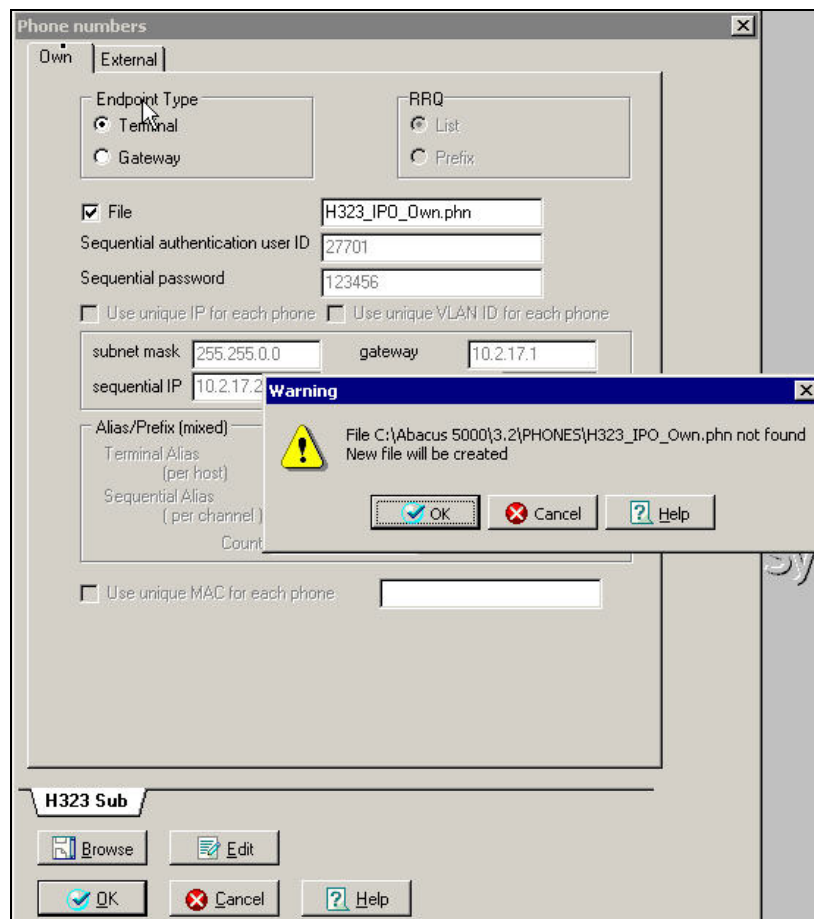
Click on the **Phones** icon from the main menu bar.



4.2.3.1 Administer Phones Own

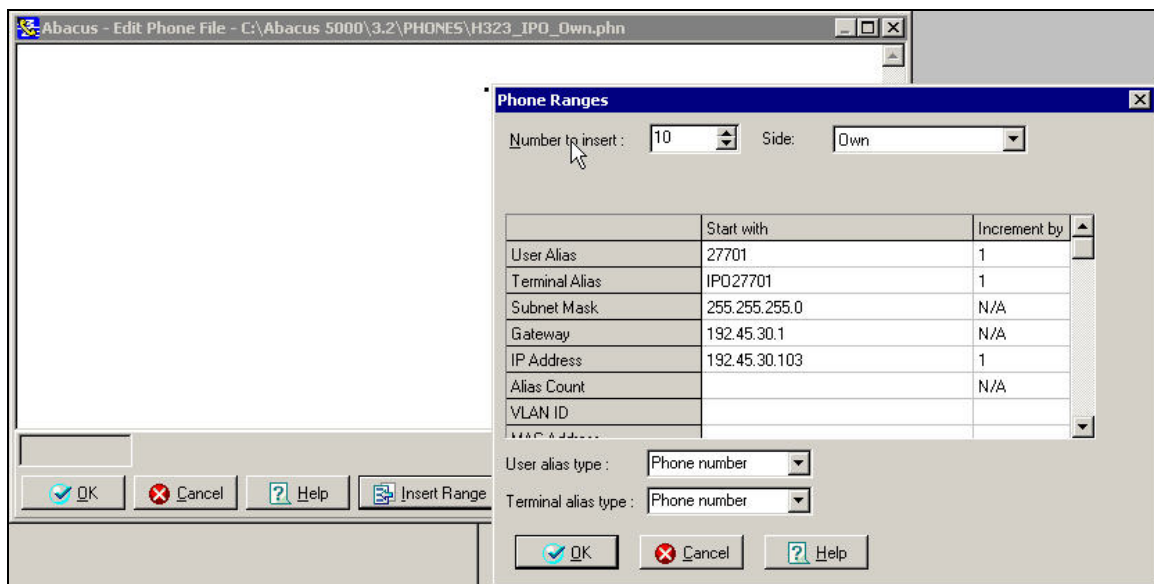
The **Phone numbers** screen is displayed, as shown below. The **Own** tab is used to create internal telephone numbers for the channels on the two ICG3 cards, and the **External** tab is used to create external telephone numbers for the originating channels to dial.

Select the **Own** tab. Click on **File** and replace the default “H323_Sample.phn” with a desired file name. In this case, “H323_IPO_Own.phn” is used. Click on the **Edit** button at the bottom left of the screen. A **Warning** pop up window is displayed as shown below. Click on **OK** to proceed to create the new file.

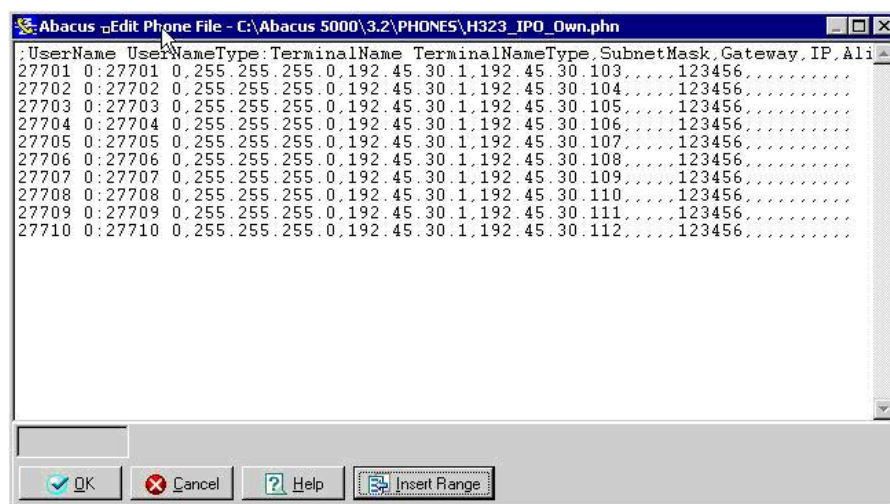


An empty **Edit Phone File** screen is displayed next. Click on **Insert Range** at the bottom of the screen to display the **Phone Ranges** screen as shown below. Scroll down the **Phone Ranges** screen as needed to enter the following values, and click on **OK** at the end.

- **Number to insert:** The total number of originating and terminating channels.
- **Side:** Select “Own” from the drop down list.
- **User Alias:** The starting H.323 extension number from **Section 4.1.6**.
- **Increment by:** Incremental value for the H.323 extensions.
- **Terminal Alias:** H.323 extension number prefixed with “IPO”.
- **Increment by:** Incremental value for the terminal aliases.
- **Subnet Mask:** Subnet Mask for the network configuration.
- **Gateway:** Gateway for the network configuration.
- **IP Address:** The starting value of a series of available IP addresses.
- **Increment by:** Incremental value for the available IP addresses.
- **Password:** The H.323 extension password, in this case “123456”.

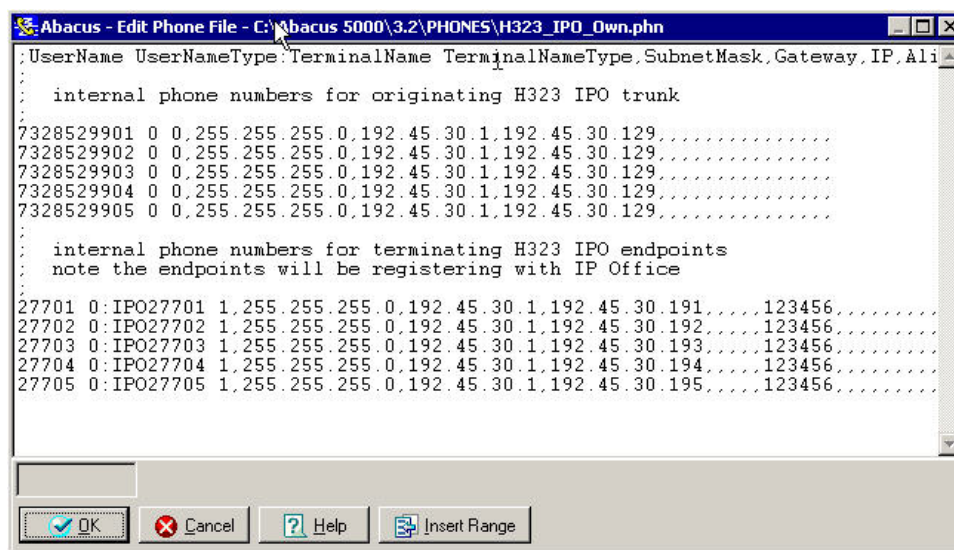


The **Edit Phone** File screen is displayed and filled in with the information entered from the **Phone Ranges** screen. Manually edit the file as necessary.



Below is the result of the file after it has been manually edited. Note that lines preceded by “;” are the comment lines, and as many comment lines as desired may be added. The first five entries are the internal telephone numbers for the five channels on the originating ICG3 card. The “277xx” extensions are replaced with the desired digits to be passed to Avaya IP Office as calling party numbers. The “:277xx” after the **UserNameType** of “0” needs to be removed. The **IP** are changed to be the IP address of the originating ICG3 card, as administered in **Section 4.2.2.3**. Remove the values for the **Password** field, as no external registration will be necessary for the originating endpoints.

The next five entries are the internal telephone numbers for the five channels on the terminating ICG3 card. The “277xx” extensions should match the H.323 extensions created in **Section 4.1.6**. The “:277xx” after the **UserNameType** of “0” are changed into “IPO277xx”. The **IP** are changed to unique and available IP addresses in the network configuration. Click on **OK**.



4.2.3.2 Administer Phones External

Select the **External** tab. Under **Signaling Address**, select **same IP**, and enter the IP Office LAN1 IP address from **Section 4.1.2**. Under **Sequential User Alias**, select **phone number**, and enter the first sequential number of the H.323 extensions on Avaya IP Office from **Section 4.1.6**. In the case that the H.323 extensions are not sequential, then a file needs to be created and manually edited, similar to the procedures that were taken in the previous **Section 4.2.3.1**.

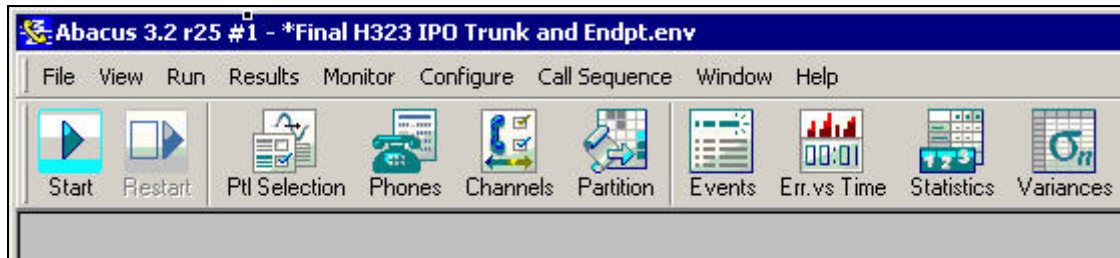
The screenshot shows a window titled "Phone numbers" with a close button (X) in the top right corner. It has two tabs: "Own" and "External", with "External" being the active tab. Inside the "External" tab, there is a checkbox labeled "File" which is unchecked, followed by a text field containing "H323_Sample.phn". Below this is a section titled "Signaling Address" containing two radio buttons: "sequential IP" (unchecked) and "same IP" (checked). To the right of these radio buttons is a text field containing the IP address "192.45.30.162". Below that is a section titled "Sequential User Alias" containing two radio buttons: "phone number" (checked) and "name" (unchecked). To the right of these radio buttons is a text field containing the number "27701". At the bottom of this section is a label "Count" followed by a spinner box set to "1". At the bottom of the window, there is a tab labeled "H323 Sub" and a row of four buttons: "Browse" (with a folder icon), "Edit" (with a pencil icon), "OK" (with a green checkmark icon), and "Cancel" (with a red X icon). A "Help" button (with a question mark icon) is also present at the bottom right.

4.2.4. Administer Channels

The procedures for administering the Channels and path confirmation for interoperability with IP Office are exactly the same as the procedures for interoperability with Avaya Communication Manager. Refer to **Section 3.2.5** and **Section 3.2.5.1** for detail descriptions of the procedures.

4.2.5. Administer Partitioning and Timing

Click on the **Partition** icon from the main menu bar.



4.2.5.1 Administer Association

The procedures for administering the Association tab for interoperability with IP Office are exactly the same as the procedures for interoperability with Avaya Communication Manager. Refer to **Section 3.2.7.1** for detail descriptions of the procedures.

Select the **Timing and Scripts** tab, and update the **ST**, **SS**, **CL**, **IC**, and **CC** fields to the desired values. Refer to **Section 3.2.7.2** for a brief description of what each abbreviated field stands for. Note that the value for the **IC** (Inter-Call) field needs to be a minimum of “5” seconds, this is to allow for call tear-down time for the type of H.323 signaling used.

Select the “A calls B (VoIP) and confirms for Call Length()” generic script for the **Script originate** field for Set 1, and keep the “Default” value for the **Script terminate** field for Set 2. Note that unlike Avaya Communication Manager, no customized script is necessary for the media shuffling scenario.

Maintain the default values in the **Protocols** and **Phones** tabs, and click on **OK**.

Partition and Timing

IP Address: 192.45.100.158

Association	Timing and Scripts			Protocols			Phones				
Set	From	To	Total	ST	SS	CL	IC	CC	BHCA	Script originate	Script terminate
1 <input checked="" type="checkbox"/>	1	5	5	0	1	30	5	35		A calls B (VoIP) and confirms for Call Length	Default
2 <input checked="" type="checkbox"/>	6	10	5		1	30	10	80		A calls B (VoIP) and confirms for Call Length	Default
3 <input type="checkbox"/>											
4 <input type="checkbox"/>											
5 <input type="checkbox"/>											
6 <input type="checkbox"/>											
7 <input type="checkbox"/>											
8 <input type="checkbox"/>											
9 <input type="checkbox"/>											
10 <input type="checkbox"/>											

H323 Subscriber: 10

Map

☐ Enable Map

Channels

☒ Contiguous ☐ Active terminates
☐ Non-contiguous ☐ Attachments

Phones

 Address Book

Sets

5. Interoperability Compliance Testing

The Interoperability compliance testing focused on the following areas in Abacus 5000:

- Registration of H.323 endpoints with Avaya Communication Manager & IP Office.
- Generation of moderate H.323 telephony load to Avaya Communication Manager via the trunk interface, and back out to Abacus 5000 via the station interface.
- Generation of moderate H.323 telephony load to Avaya IP Office via the line interface, and back out to Abacus 5000 via the extension interface.
- Support of various H.323 audio codecs with Avaya Communication Manager & IP Office.
- Voice quality as measured by PESQ scores with path confirmation.
- Support of non-direct audio, and direct audio with media shuffling.
- Recovery from adverse conditions during the load test.

5.1. General Test Approach

The feature test cases were conducted by using Abacus 5000 to originate and terminate H.323 calls to Avaya Communication Manager and to Avaya IP Office. The audio codec test calls were held up for 90 seconds. The serviceability test cases were performed by disconnecting and reconnecting the LAN cables to the Abacus 5000 originating and terminating ICG3 cards.

The verification included monitoring of various reports from Abacus 5000 during and after the traffic runs, and checking the status of various H.323 resources on Avaya Communication Manager and Avaya IP Office.

5.2. Test Results

All test cases were executed and passed.

There were two observations from the compliance testing. The first is any customized setting of the Protocol Selection SUT will not be preserved in the environment file. The workaround is to manually change the “H323 Default” value corresponding to the second ICG3 card back to the custom SUT, upon each loading of the environment file.

The second observation is that during a test run, when the LAN cable is pulled from the ICG3 card for longer than 30 seconds and then restored, no further calls can be completed. The workaround is to manually stop and restart the test run.

6. Verification Steps

This section provides the tests that can be performed to verify proper configuration of H.323 between Avaya Communication Manager and Abacus 5000, and between Avaya IP Office and Abacus 5000.

6.1. Verify Abacus 5000 with Avaya Communication Manager

6.1.1. Verify Avaya Communication Manager

Verify that H.323 stations are registered with Avaya Communication Manager by using the “list registered-ip-stations” command.

```
list registered-ip-stations
```

REGISTERED IP STATIONS							
Station	Set	Product	Prod	Station	Net Orig	Gatekeeper	
Ext	Type	ID	Rel	IP Address	Rgn Port	IP Address	
22715	4610	IP_Phone	2.300	192.45.30.107	2	192.45.100.97	
22721	4612	IP_Phone	1.830	192.45.30.106	2	192.45.100.97	
22735	4620	IP_Phone	2.130	192.45.30.121	7	192.45.100.84	
26601	H.323	Abacus5K I	0. 0	192.45.100.175	7	192.45.100.84	
26602	H.323	Abacus5K I	0. 0	192.45.100.176	7	192.45.100.84	
26603	H.323	Abacus5K I	0. 0	192.45.100.177	7	192.45.100.84	
26604	H.323	Abacus5K I	0. 0	192.45.100.178	7	192.45.100.84	
26605	H.323	Abacus5K I	0. 0	192.45.100.179	7	192.45.100.84	
26611	4612	IP_Phone	1.830	192.45.30.101	2	192.45.100.97	

Verify the status of a H.323 station during an active call using the “status station n” command, where “n” is the extension of the connected station. On **Page 1**, verify the **Service State** is “in-service/off-hook” as shown below.

status station 26601		Page 1 of 6
GENERAL STATUS		
Administered Type: H.323	Service State: in-service/off-hook	
Connected Type: N/A	Parameter Download: not-applicable	
Extension: 26601	SAC Activated? no	
Port: S00020	User Cntrl Restr: none	
Call Parked? no	Group Cntrl Restr: none	
Ring Cut Off Act? no	CF Destination Ext:	
Active Coverage Option: 1		
EC500 Status: N/A	Off-PBX Service State: N/A	
Message Waiting:		
Connected Ports: T00536		

On **Page 4**, verify the station is connected to the Abacus 5000 originating ICG3 card, in this case “192.45.100.201” and “abacus-h323-trk”. Also verify that audio shuffling took place with “ip-direct” in the **Audio Connection Type** field. Note the specific registration information for the station.

status station 26601				Page 4 of 6	
AUDIO CHANNEL					
Port: S00020					
	Switch	IP		IP	
	Port	Other-end IP Addr	:Port	Set-end IP Addr	:Port
G.711MU	Audio:	192. 45.100.201	:6000	192. 45.100.175	:6000
	Node Name:	abacus-h323-trk			
	Network Region:	7		7	
Audio Connection Type: ip-direct					
Port: S00020					
Shared Port:					
Product ID and Release: Abacus5K I 0. 0					
H.245 Tunneled in Q.931? yes					
Registration Status: registered-authenticated					
MAC Address: unavailable					
Native NAT Address: not applicable					
ALG - NAT WAN IP address: not applicable					
Authentication Type: DES-56-plus					

On **Page 5**, verify the audio codec for the source and destination ports have the proper value as shown below. In this case “g711u”.

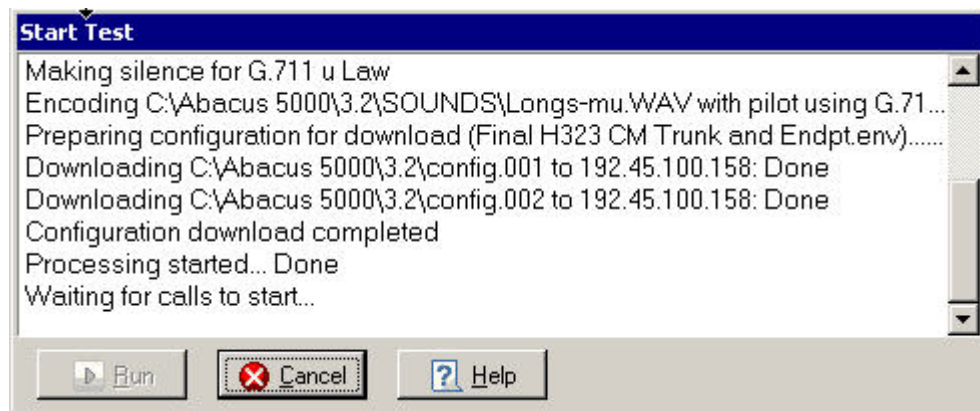
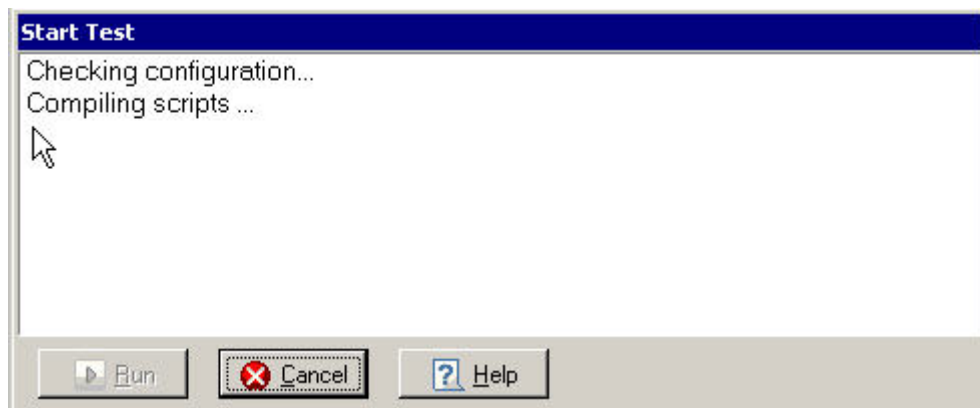
status station 26601		Page	5 of	6
SRC PORT TO DEST PORT TALKPATH				
src port: S00020				
S00020:TX:192.45.100.175:6000/g711u/20ms				
T00536:RX:192.45.100.201:6000/g711u/20ms				
dst port: T00536				

6.1.2. Verify Abacus 5000

Click on the **Start** icon from the main menu bar.



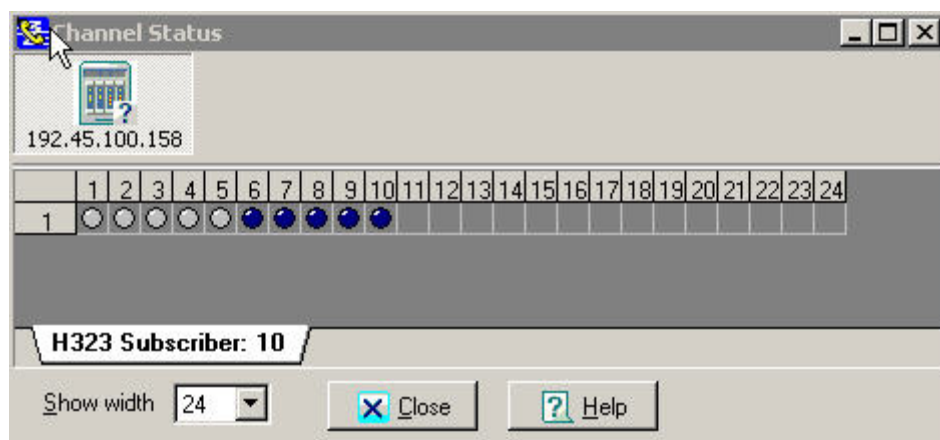
Verify that the scripts can be compiled successfully without any errors, as shown in the screens below.



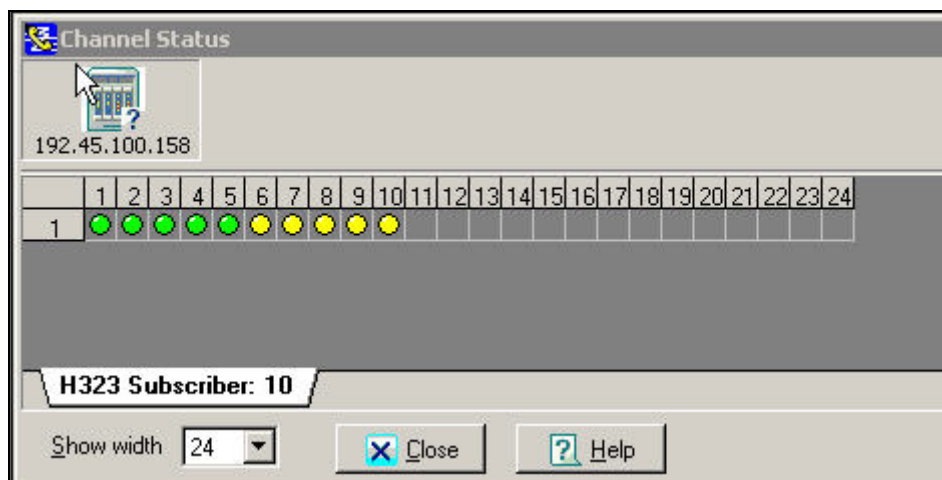
Verify the channel status by clicking on the **Channel Status** icon from the main menu bar.



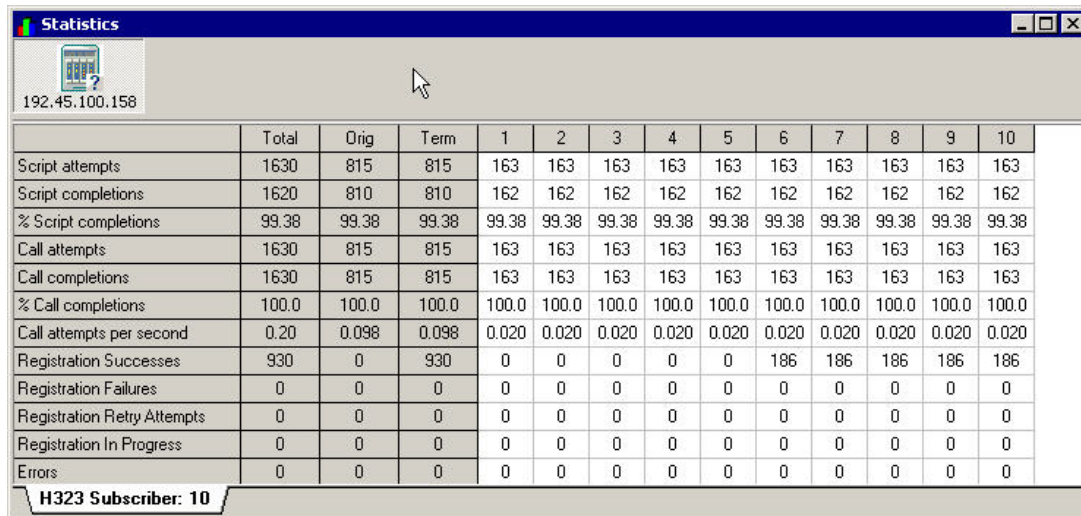
The **Channel Status** screen will have the terminating channels, in this case channels 6-10, in navy color upon initial registration with Avaya Communication Manager.



After the H.323 calls have been established, the color code for the corresponding channels will become green for the originating channels, and yellow for the terminating channels, as shown below. In this case, channels 1-5 are the originating channels, and channels 6-10 are the terminating channels.



Verify the statistics by clicking on the **Statistics** icon from the main menu bar. In the **Statistics** screen displayed below, look for **Script completions**, **Registration Successes**, and the absence of any **Errors**. The **Statistics** screen below was captured during a traffic run, therefore the number in the **Script completions** fields shown are one behind the number in the **Script attempts** fields.

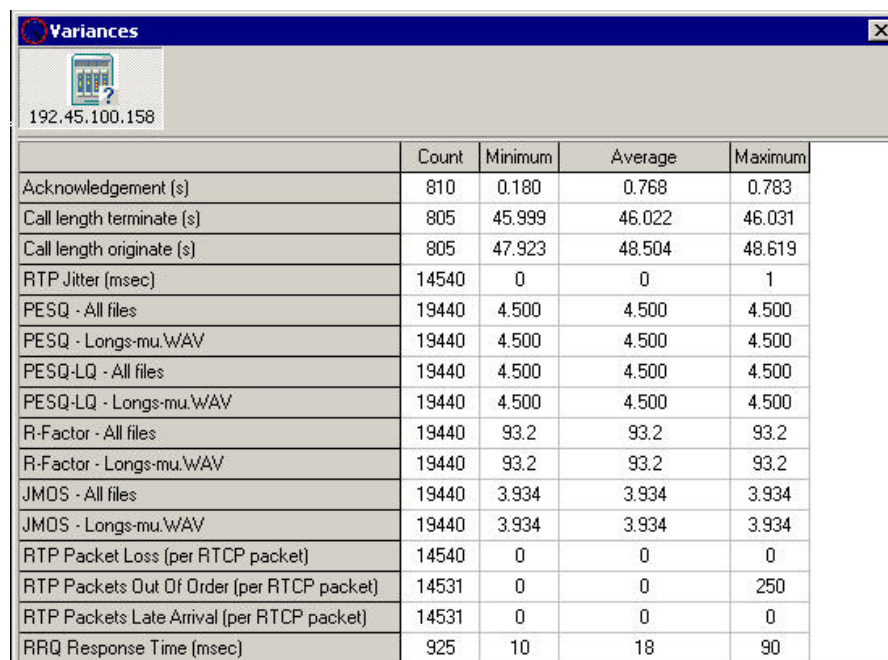


The screenshot shows a window titled "Statistics" with a toolbar containing a calculator icon and a help icon. Below the toolbar is the IP address "192.45.100.158". The main area contains a table with 13 columns: Total, Orig, Term, and ten numbered columns (1-10). The table lists various statistics including Script attempts, Script completions, % Script completions, Call attempts, Call completions, % Call completions, Call attempts per second, Registration Successes, Registration Failures, Registration Retry Attempts, Registration In Progress, and Errors. At the bottom, a status bar indicates "H323 Subscriber: 10".

	Total	Orig	Term	1	2	3	4	5	6	7	8	9	10
Script attempts	1630	815	815	163	163	163	163	163	163	163	163	163	163
Script completions	1620	810	810	162	162	162	162	162	162	162	162	162	162
% Script completions	99.38	99.38	99.38	99.38	99.38	99.38	99.38	99.38	99.38	99.38	99.38	99.38	99.38
Call attempts	1630	815	815	163	163	163	163	163	163	163	163	163	163
Call completions	1630	815	815	163	163	163	163	163	163	163	163	163	163
% Call completions	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Call attempts per second	0.20	0.098	0.098	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Registration Successes	930	0	930	0	0	0	0	0	186	186	186	186	186
Registration Failures	0	0	0	0	0	0	0	0	0	0	0	0	0
Registration Retry Attempts	0	0	0	0	0	0	0	0	0	0	0	0	0
Registration In Progress	0	0	0	0	0	0	0	0	0	0	0	0	0
Errors	0	0	0	0	0	0	0	0	0	0	0	0	0

H323 Subscriber: 10

Verify the variances by clicking on the **Variances** icon from the main menu bar. In the **Variances** screen displayed below, look for **PESQ** scores. PESQ scores range from -0.5 to 4.5, where 4.5 indicates there is no perceptible difference between the speech sample and the degraded signal. The perfect PESQ scores below were accomplished with direct media shuffling and G.711 audio codec. The scores may be lower for scenarios with non-media shuffling and use of audio codec that requires compression.



The screenshot shows a window titled "Variances" with a toolbar containing a calculator icon and a help icon. Below the toolbar is the IP address "192.45.100.158". The main area contains a table with 5 columns: Count, Minimum, Average, and Maximum. The table lists various variance metrics including Acknowledgement (s), Call length terminate (s), Call length originate (s), RTP Jitter (msec), PESQ - All files, PESQ - Longs-mu.WAV, PESQ-LQ - All files, PESQ-LQ - Longs-mu.WAV, R-Factor - All files, R-Factor - Longs-mu.WAV, JMDS - All files, JMDS - Longs-mu.WAV, RTP Packet Loss (per RTCP packet), RTP Packets Out Of Order (per RTCP packet), RTP Packets Late Arrival (per RTCP packet), and RRQ Response Time (msec).

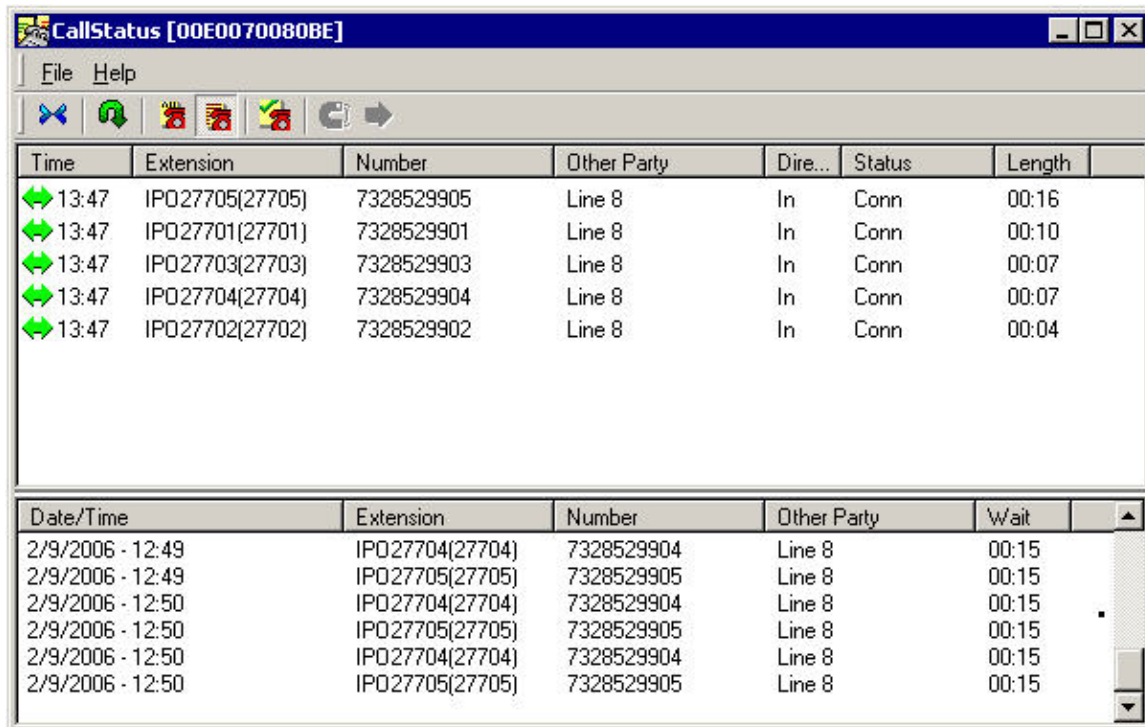
	Count	Minimum	Average	Maximum
Acknowledgement (s)	810	0.180	0.768	0.783
Call length terminate (s)	805	45.999	46.022	46.031
Call length originate (s)	805	47.923	48.504	48.619
RTP Jitter (msec)	14540	0	0	1
PESQ - All files	19440	4.500	4.500	4.500
PESQ - Longs-mu.WAV	19440	4.500	4.500	4.500
PESQ-LQ - All files	19440	4.500	4.500	4.500
PESQ-LQ - Longs-mu.WAV	19440	4.500	4.500	4.500
R-Factor - All files	19440	93.2	93.2	93.2
R-Factor - Longs-mu.WAV	19440	93.2	93.2	93.2
JMDS - All files	19440	3.934	3.934	3.934
JMDS - Longs-mu.WAV	19440	3.934	3.934	3.934
RTP Packet Loss (per RTCP packet)	14540	0	0	0
RTP Packets Out Of Order (per RTCP packet)	14531	0	0	250
RTP Packets Late Arrival (per RTCP packet)	14531	0	0	0
RRQ Response Time (msec)	925	10	18	90

6.2. Verify Abacus 5000 with Avaya IP Office

6.2.1. Verify Avaya IP Office

Navigate to **Start > Programs > IP Office > Call Status** to open the **CallStatus** window.

Verify and monitor the status of the H.323 extensions during active calls. Look for proper values in the **Extension**, **Number**, **Other Party**, and **Status** columns as shown below.



The screenshot shows the CallStatus window with a menu bar (File, Help) and a toolbar. The main area displays a table of active calls. Below this is a scrollable table showing a history of calls.

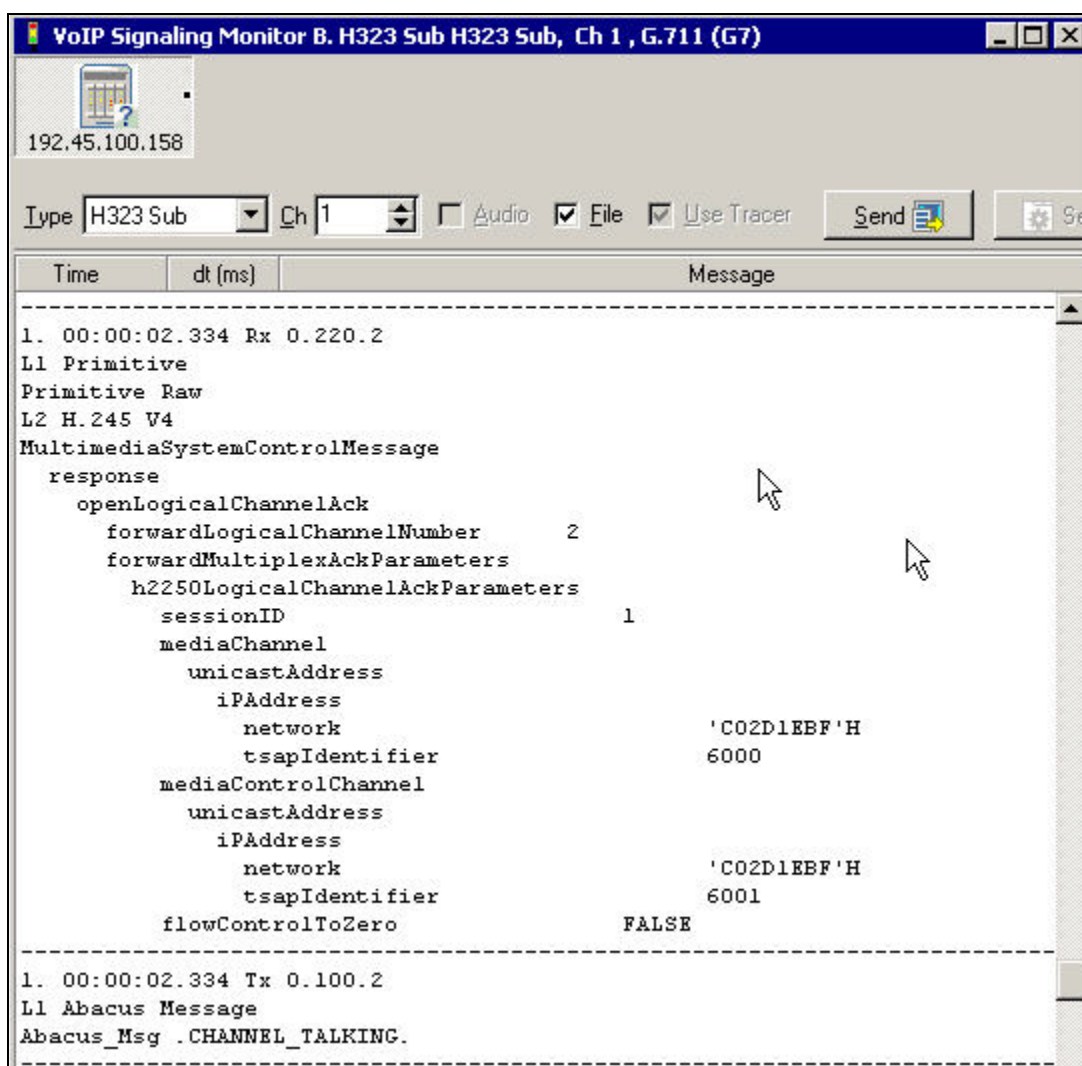
Time	Extension	Number	Other Party	Dire...	Status	Length
13:47	IP027705(27705)	7328529905	Line 8	In	Conn	00:16
13:47	IP027701(27701)	7328529901	Line 8	In	Conn	00:10
13:47	IP027703(27703)	7328529903	Line 8	In	Conn	00:07
13:47	IP027704(27704)	7328529904	Line 8	In	Conn	00:07
13:47	IP027702(27702)	7328529902	Line 8	In	Conn	00:04

Date/Time	Extension	Number	Other Party	Wait
2/9/2006 - 12:49	IP027704(27704)	7328529904	Line 8	00:15
2/9/2006 - 12:49	IP027705(27705)	7328529905	Line 8	00:15
2/9/2006 - 12:50	IP027704(27704)	7328529904	Line 8	00:15
2/9/2006 - 12:50	IP027705(27705)	7328529905	Line 8	00:15
2/9/2006 - 12:50	IP027704(27704)	7328529904	Line 8	00:15
2/9/2006 - 12:50	IP027705(27705)	7328529905	Line 8	00:15

6.2.2. Verify Abacus 5000

The procedures for verifying the interoperability of Abacus 5000 with Avaya IP Office are exactly the same as the procedures for interoperability with Avaya Communication Manager. Refer to **Section 6.1.2** for detail descriptions of the procedures.

In addition, select **Monitor > VoIP Signaling Monitor B** from the main menu bar, and select an originating channel number in the **Ch** field. In this case, channel “1” is selected. Look for the IP address in the **MultimediaSystemControlMessage** message right before the **CHANNEL_TALKING** message. In the case that media shuffling takes place, the value will reflect the IP address of the connected extension (“C02D1EBF” in this case, which is the hexadecimal representation of “192.45.30.191”). Without media shuffling, the value will reflect the IP address of Avaya IP Office IP address.



7. Support

Technical support on Spirent Abacus 5000 can be obtained through the following:

- Email the Spirent support center via support@spirentcom.com.
- Call the Spirent support center at 1-800-SPIRENT.

8. Conclusion

These Application Notes describe the configuration steps required for Spirent Abacus 5000 Release 3.2 to successfully interoperate with Avaya Communication Manager 3.0.1 and Avaya IP Office 3.1. All feature and serviceability test cases were completed successfully.

There were two observations from the compliance testing. The first is any customized setting of the Protocol Selection SUT will not be preserved in the environment file. The workaround is to manually change the “H323 Default” value corresponding to the second ICG3 card back to the custom SUT, upon each loading of the environment file.

The second observation is that during a test run, when the LAN cable is pulled from the ICG3 card for longer than 30 seconds and then restored, no further calls can be completed. The workaround is to manually stop and restart the test run.

9. Additional References

This section references the product documentation relevant to these Application Notes.

- *Administrator Guide for Avaya Communication Manager*, Document 03-300509, Issue 1, June 2005, available at <http://support.avaya.com>
- *Avaya IP Office 3.1 Manager*, Issue 17i, October 2005, available at <http://support.avaya.com>
- *Abacus 5000 IP Telephony Migration Test System*, available from the Spirent Abacus 5000 Version 3.2 Installation CD.

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