Avaya Solution & Interoperability Test Lab

A Sample Configuration for Computer Instruments e-IVR Automated Attendant and Voicemail 3.0 with Avaya™ IP Office System 1.4 - Issue 1.0

Abstract

These Application Notes describe the configuration steps required for the Computer Instruments e-IVR Automated Attendant and Voicemail to successfully interoperate with the Avaya™ IP Office System. Features and functionality were validated and performance testing was conducted in order to verify operation under load. 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 the compliance-tested configuration utilizing Avaya IP Office 1.4 and Computer Instruments e-IVR Auto Attendant and Voicemail 3.0.

Computer Instruments Enhanced Interactive Voice Response (e-IVR) is a customer premise multi-application e-business and Customer Relationship Management (CRM) solution. e-IVR is a suite of Windows 2000 applications that contain all of the necessary functionality to act as a Web server, an electronic commerce storefront server, a value-added interactive voice response (IVR) platform, a fax response platform and a messaging server.

e-IVR Auto Attendant is a flexible feature-rich Auto Attendant that offers call answering and multiple menu services. Recorded menus allow the caller to select a department, individual extension, or an operator. In addition, the Auto Attendant is integrated with all other e-IVR applications such as Form Survey and Fax Back. e-IVR Auto Attendant supports:

- Voice Menus
- Extension Transfers
- Launch of any e-IVR service (Menus, Audio Text Messages, Form Filler surveys, Data Locators, Fax-On-Demand, etc.) or custom application
- Transfer to internal extensions or external numbers
- "Hide" VIP extensions behind an admin extension
- Integrated dial-by-name directory

e-IVR Voicemail is fully integrated with the e-IVR suite. Night callers interested in additional information can leave messages in a "request" box for daytime retrieval. e-IVR supports direct access from other e-IVR applications for "phantom" message boxes. e-IVR Voicemail supports:

- Operation in integrated or simple mode
- Voicemail boxes with up to 5 greetings
- Dial-By-Name directory
- Subscriber registration wizard to train new users
- Hands-Free-Playback option
- Select playback order
- Optional shared access to voicemail boxes

In the tested configuration shown in **Figure 1**, e-IVR interfaces with the IP Office System via 4-port Intel Dialogic voice cards. The Intel Dialogic cards are connected to analog station ports on the IP Office and/or IP Office Phone Expansion Modules. IP Office is configured to route all inbound calls to a hunt group that includes the analog station ports connected to e-IVR.

Upon receipt of the inbound calls, e-IVR Auto Attendant transfers the caller to the appropriate destination extension based on caller input in response to the programmed menu listed below:

- Press 1 for Sales
- Press 2 for Marketing
- Press 3 for Tech Support

- Press 8 if you know your party's extension

If the destination extension is not answered, IP Office routes the caller to the Voicemail Server, in this case, e-IVR Voicemail. e-IVR Voicemail either plays the greeting recorded for the extension or the default system greeting. The caller can either leave a message or hang-up.

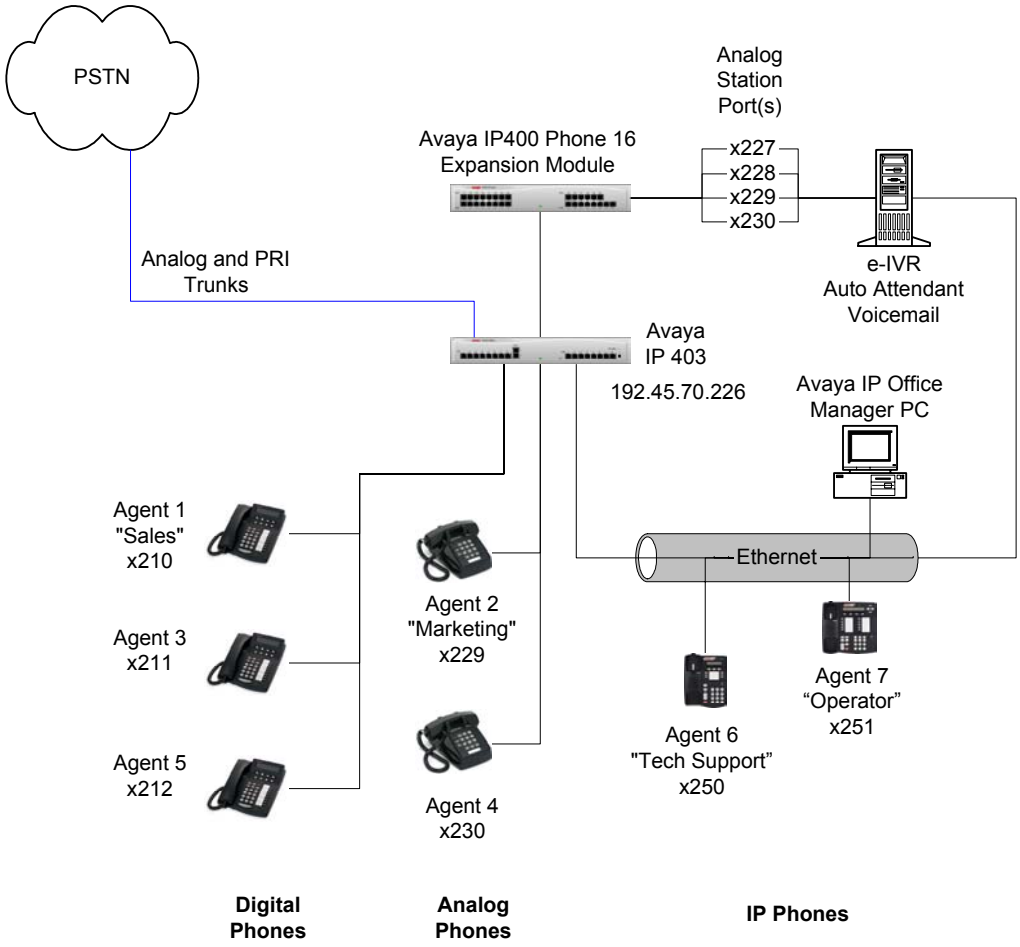


Figure 1: Computer Instruments e-IVR and Avaya IP Office Configuration

1.1. Observations / Limitations / Caveats

During the course of compliance testing, the following were noted:

- MWI lamp takes 1 – 3 seconds following call disconnect before lighting up.
- Call Routing by DNIS (Auto Attendant functionality) did not work at the time of publication. This is under investigation by Computer Instruments.
- Call Routing by ANI (Auto Attendant functionality) and other TAPI-based features (Agent e-IVR Screen Pops) were beyond the scope of this compliance test, and were not validated.

- e-IVR Record A Call is not available on IP Office due to functionality not available in IP Office 1.4.

2. Equipment and Software Validated

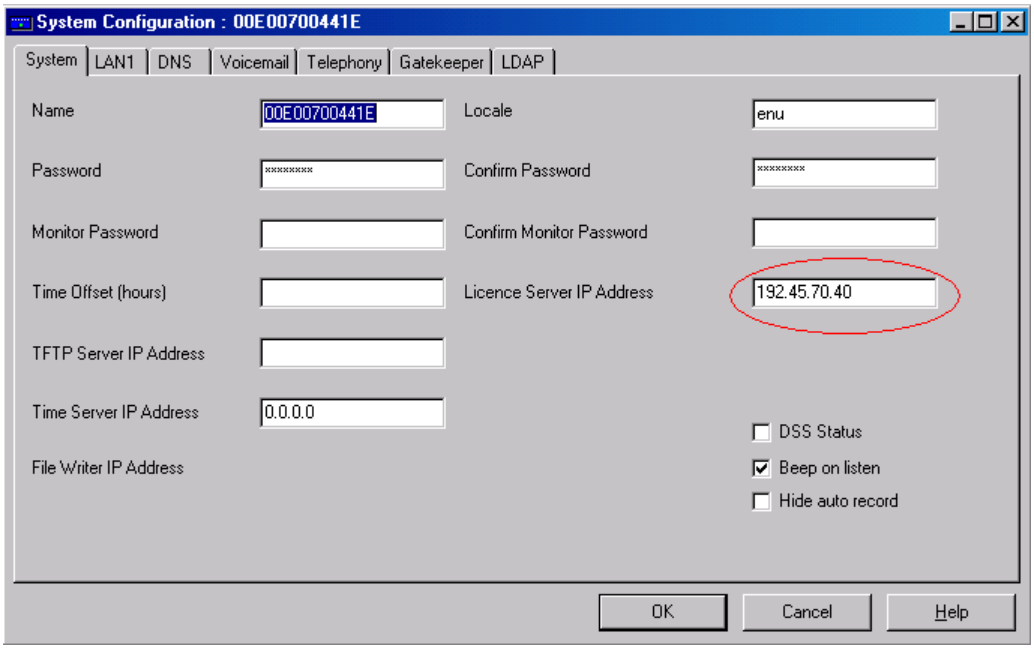
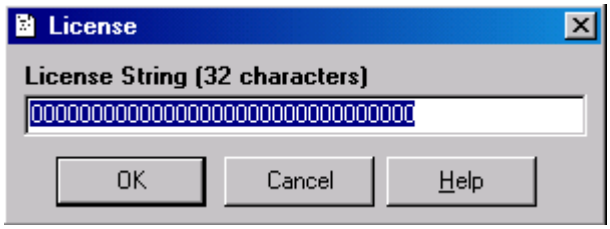
The following equipment and software were used for the configuration provided in **Figure 1**.

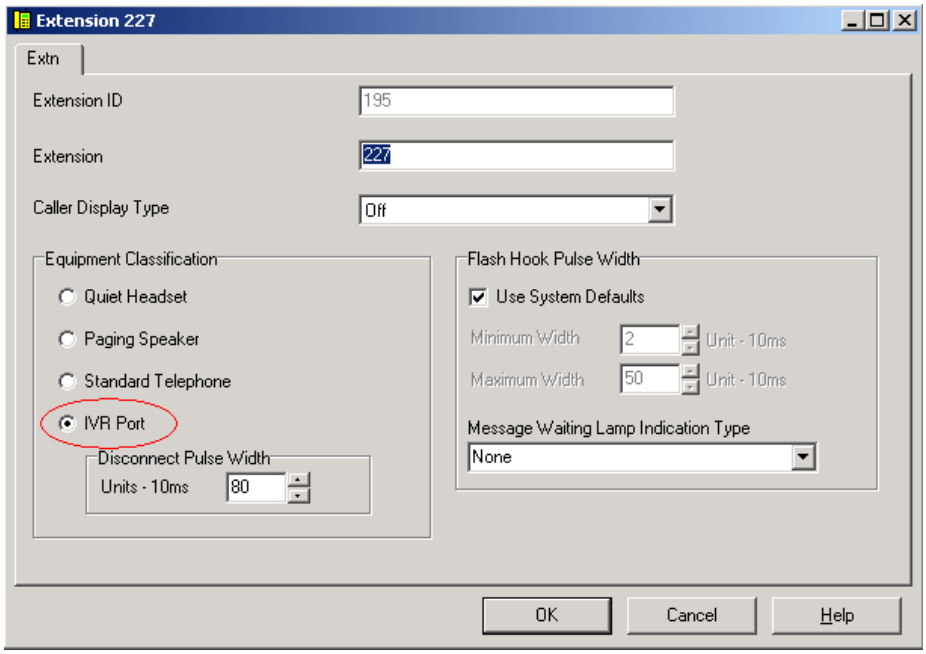
Equipment	Software
Avaya™ IP 403 Office System	1.4(22)
Avaya™ IP 400 Phone 16 Expansion Module	-
Avaya™ IP Office Manager	3.4(16)
Avaya™ 6408D+, 6416D+M Digital Telephones	-
Avaya™ 4612 IP Telephones	1.73
Computer Instruments e-IVR	3.0.6
Windows 2000 PC for IP Office Manager	Windows 2000 Professional
Generic Analog Telephones	-

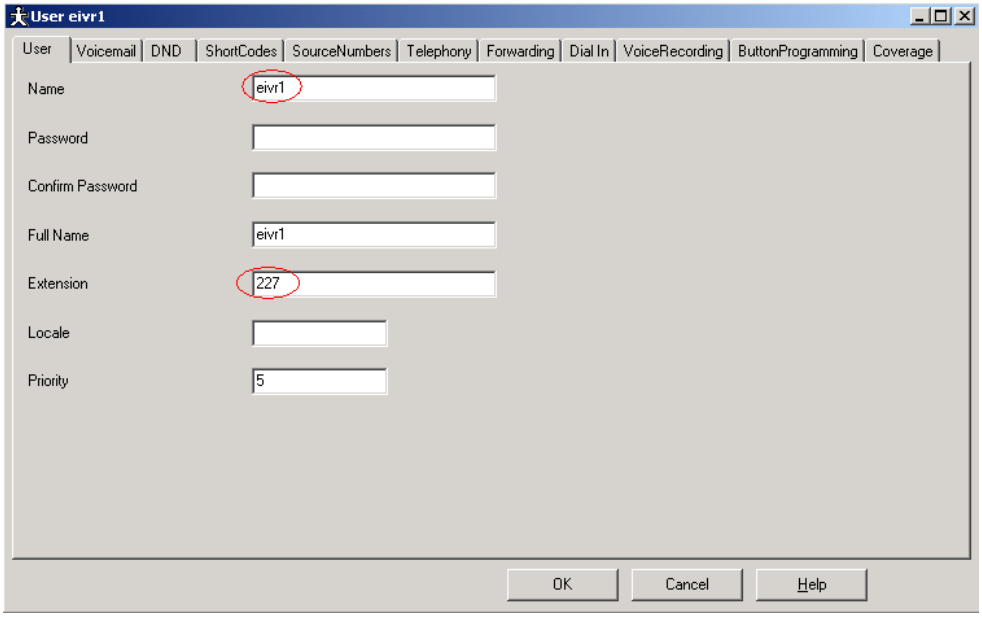
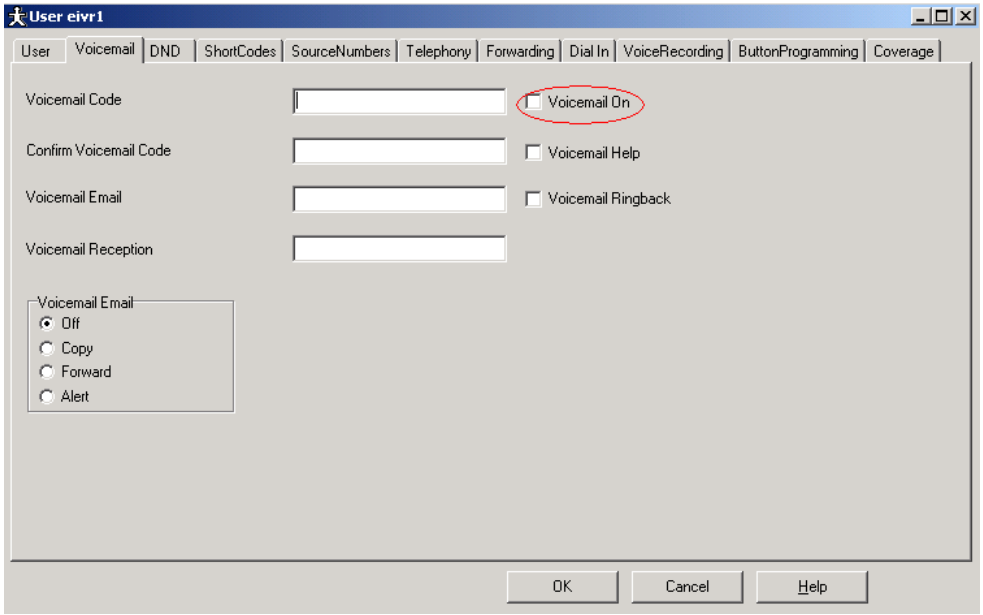
3. Configure Avaya IP Office

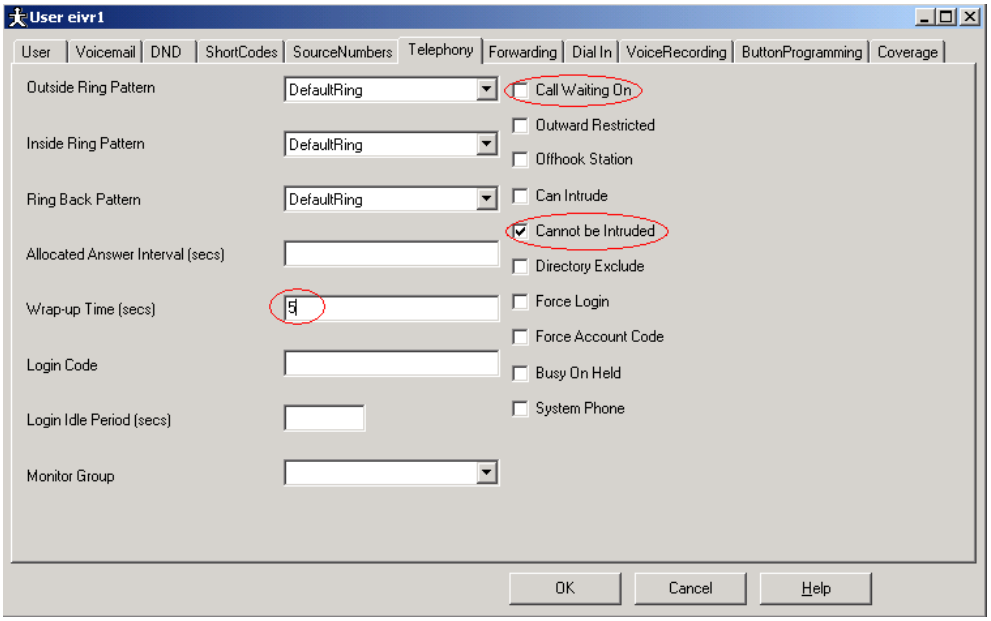
These Application Notes address provisioning of IP Office as it relates to the integration with e-IVR Automated Attendant and Voicemail features. For all other provisioning information such as provisioning of the trunks for outbound dialing, call coverage, extensions, etc., please refer to the IP Office Product documentation.

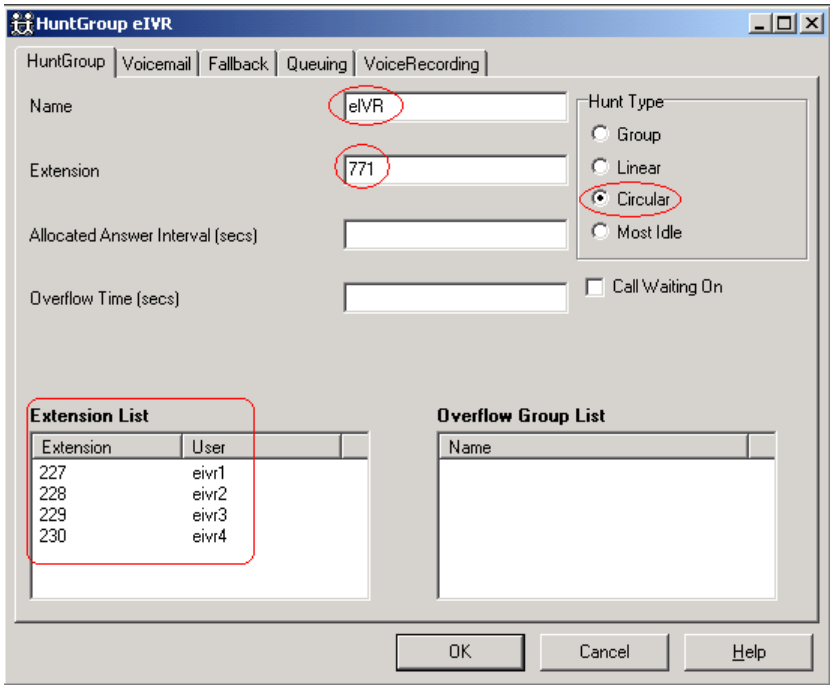
Step	Description
	IP Office License Key Physical Installation
1.	Physically connect or plug in the red Avaya Software Sentinel key into the parallel port of the IP Office Manager PC.
	Configure License Key Server IP Address
2.	Login to the IP Office Manager PC and go to **Start → Programs → IP Office → Manager** to launch the Manager application. Login to the Manager application using the appropriate credentials.
3.	In the Manager window that appears, select **File → Open** to search for the IP Office system in the network.
4.	Login to the IP Office system using the appropriate login credentials to receive its configuration.

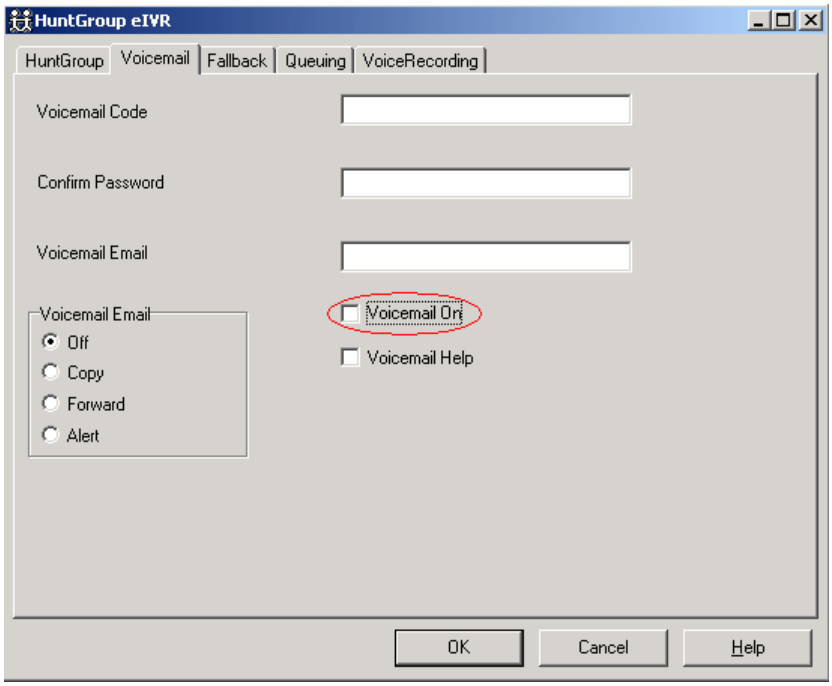
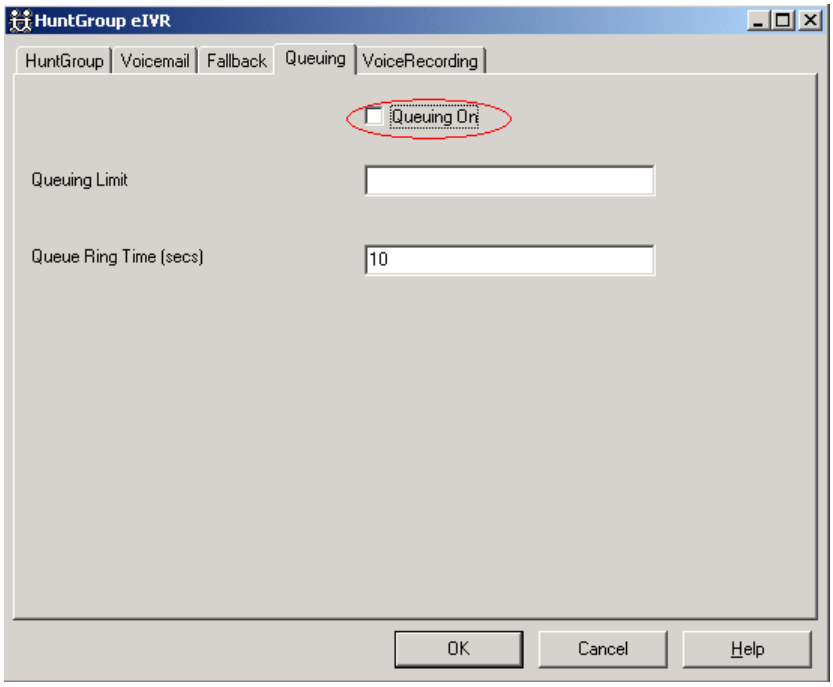
Step	Description
5.	In the Manager window, go to the Configuration Tree and double-click System. In the System Configuration window that appears, select the System Tab and set *License Server IP Address* to the IP address of the machine where the red Avaya Software Sentinel key is connected, which is typically the IP Office Manager PC. 
6.	In the Manager window, go to the Configuration Tree and double-click License to open the list of licenses installed in the IP Office system.
7.	Right click in the license list window and select **New**. In the License window that appears, enter the CTI Link Pro License Key and click **OK**. In this example, 0…0 is shown. 
8.	In the Manager window, select **File → Save** to save the license to the IP Office system and wait for the system to update. **Note 1**: Before the system reloads, the new licenses will be listed with an Unknown status. After the system reloads, the new licenses will list with a valid status.
	Configure e-IVR extensions
9.	Login to the IP Office Manager PC and go to **Start → Programs → IP Office → Manager** to launch the Manager application. Login to the Manager application using the appropriate credentials.

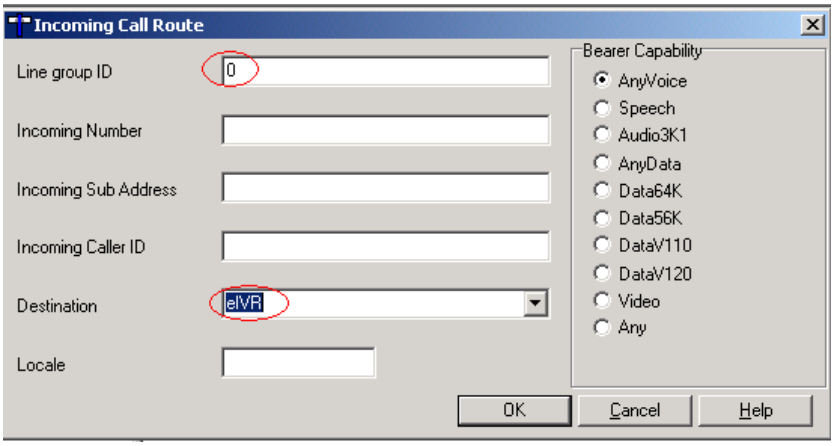
Step	Description
10.	In the Manager window that appears, select **File → Open** to search for the IP Office system in the network.
11.	Login to the IP Office system using the appropriate login credentials to receive its configuration.
12.	Select an analog station port on the IP Office Phone Expansion module that will be connected to the e-IVR. Record the extension number, and attach a phone to it. Verify the extension by placing a call to the extension number and confirm the phone rings.
13.	In the Manager window, go to the Configuration Tree and double-click Extension to open the list of extensions on the IP Office system.
14.	Select the extension number recorded in Step 12 from the Extension list and double-click it.
15.	In the Extension window that appears, click the *IVR Port* radio button in the Equipment Classification section and click **OK**. 
16.	Repeat Steps 12 - 15 for each analog station port connected to the e-IVR. For the purposes of this document, 4 ports were used.
	Configure User settings of e-IVR extensions
17.	In the Manager window, go to the Configuration Tree and double-click User to open the list of users on the IP Office system.

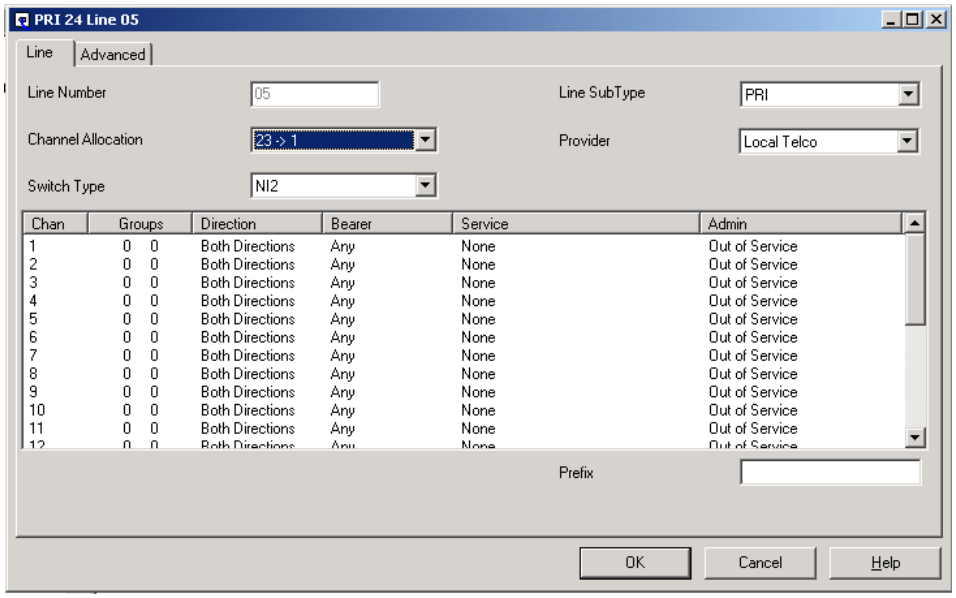
Step	Description
18.	In the User list window that appears, find the user assigned to the e-IVR extension, e.g., Extn227. Double-click the user in the User list window. In the User window that appears, set *Name* to eivr1 (or any other name that you wish to associate with the e-iVR extension) and *Extension* to the extension number to be used. 
19.	In the Voicemail tab of the User window, uncheck *Voicemail On*. 

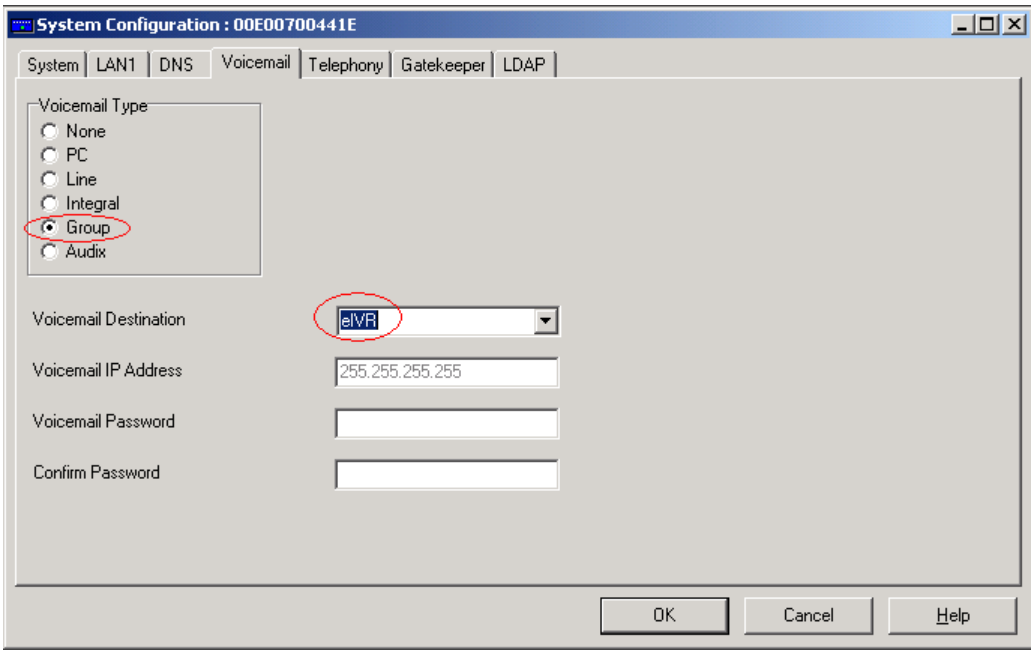
Step	Description
20.	In the Telephony tab of the User window, set *Wrap-up Time* to 5 seconds as suggested by Computer Instruments, uncheck *Call Waiting On*, check *Cannot be Intruded*, and click **OK**. 
21.	Repeat Steps 18 - 20 for each e-IVR extension needed. For the purposes of this document, four e-IVR extensions were configured.
	Configure Hunt Group
22.	In the Manager window, go to the Configuration Tree and double-click HuntGroup to open the list of hunt groups on the IP Office system.

Step	Description
23.	Right click in the HuntGroup list window and select **New**. In the HuntGroup window that appears, add extensions to the Extension List that will be part of the hunt group by right clicking in the Extension List section and selecting Add. Then, set *Name* to **eIVR**, *Extension* to the extension number to be used for the hunt group, and *Hunt Type* to **Circular**. 

Step	Description
24.	In the Voicemail tab of the HuntGroup window, uncheck *Voicemail On*. 
25.	In the Queuing tab of the HuntGroup window, uncheck *Queuing On* as suggested by Computer Instruments and click **OK.** 

Step	Description
26.	In the Manager window, select **File → Save** to save the configuration to the IP Office system and wait for the unit to reboot.
27.	Verify the hunt group is operating properly by placing calls to the hunt group extension defined, e.g., 771. Confirm one of the analog phones belonging to the hunt group rings. Subsequent calls to the hunt group should make the other phones ring in a circular order.
	Select Inbound Call Route
28.	In the Manager window, go to the Configuration Tree and double-click Incoming Call Route to open the list of incoming call routes on the IP Office system. Right click in the Line Group list window and select **New**.
29.	In the Incoming Call Route window that appears, set *Line group ID* to 0 and *Destination* to eIVR (same name as the e-IVR hunt group). Click **OK**.  **Note 2**: For the purposes of this document, all incoming calls are directed to the e-IVR, so the default Line Group ID (0) is used. However, if only a specific group of trunks is to be directed to the e-IVR, another number should be used.
	Assign Trunks to the Incoming Call Route
30.	In the Manager window, go to the Configuration Tree and double-click Line to open the list of lines (trunks) available on the IP Office system. Double-click the Line (analog or digital) whose incoming calls are to be routed to the e-IVR.

Step	Description
31.	In the Line window that appears, assign the line to the Line group ID identified in Step 29.  For example, each channel in the PRI line window must be assigned to the Line group ID from Step 29. To do so, double-click the channel and edit the Incoming Group field in the Edit Channel pop up that appears. A similar procedure is used on the analog lines.
32.	Repeat Steps 30 - 31 for each line (trunk) assigned to the incoming call route.
33.	In the Manager window, select **File → Save** to push the configuration to the IP Office system and wait for the unit to reboot.
34.	Verify the incoming call route is properly operating by placing calls through the selected inbound line (trunk) and confirming one of the phones assigned to the hunt group rings.
	Set e-IVR as the Voicemail Server
35.	In the Manager window, go to the Configuration Tree and double-click System to open the System Configuration window of the IP Office system.

Step	Description
36.	In the Voicemail tab of the System Configuration window, set *Voicemail Type* to Group, *Voicemail Destination* to eIVR and click **OK**. 
37.	In the Manager window, select **File → Save** to push the configuration to the IP Office system and once the unit is done rebooting, the IP Office configuration is complete.

4. Configure Computer Instruments e-IVR Server

These Application Notes address provisioning of e-IVR as it relates to integration with IP Office. For all other provisioning information such as Computer Instruments e-IVR software installation, Dialogic card installation and configuration, etc., please refer to the e-IVR product documentation available on the Computer Instruments website.

4.1. Configure e-IVR Initialization File

Step	Description

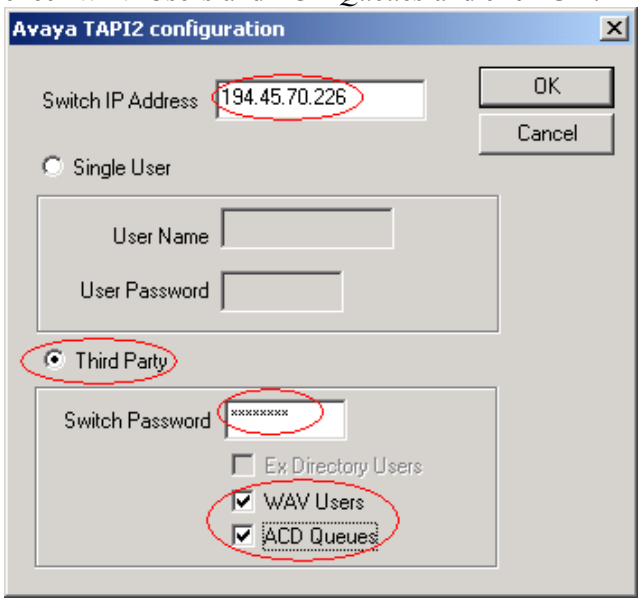
1.	Open C:\Winnt\EIVR.ini (using notepad or another text editor). In the INI file, look for the [Switch] section and set IPOffice, TapiRing and TapiDrop to 1. If either the [Switch] section or the entries are missing, add them to the file.
	`[Switch]`
	`IPOffice=1`
	`TapiRing=1`
	`TapiDrop=1`

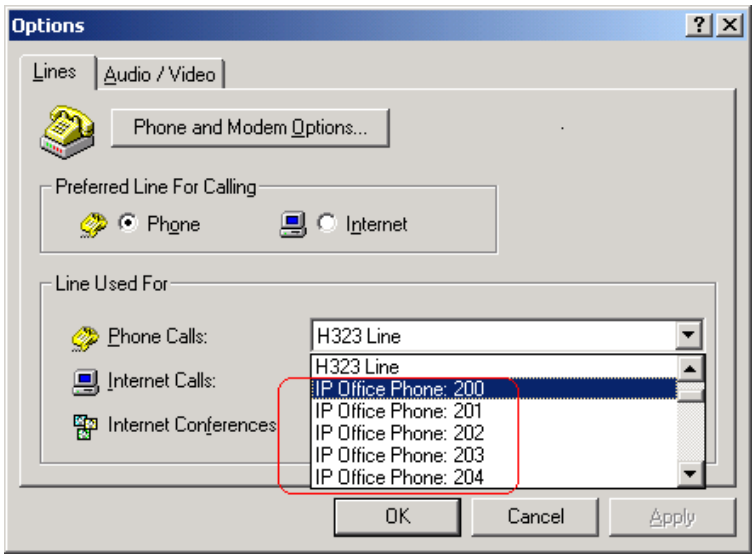
Step	Description

2.	In the same INI file, look for the [IPOffice] section and set up a channel entry for each eIVR extension configured in the IP Office switch. For example, IP Office extensions 227 through 230 are set up as eIVR extensions. The IP Office port associated with each of these extensions will be connected to one of the four ports on the e-IVR server's Dialogic board. The INI entries depicted below provide the mapping used.
	`[IPOffice]`
	`Chan1=227`
	`Chan2=228`
	`Chan3=229`
	`Chan4=230`
	Note 3: Failure to properly match ports to extensions will prevent the system from operating properly.

4.2. Installing and Configuring Avaya IP Office TAPI Service Provider

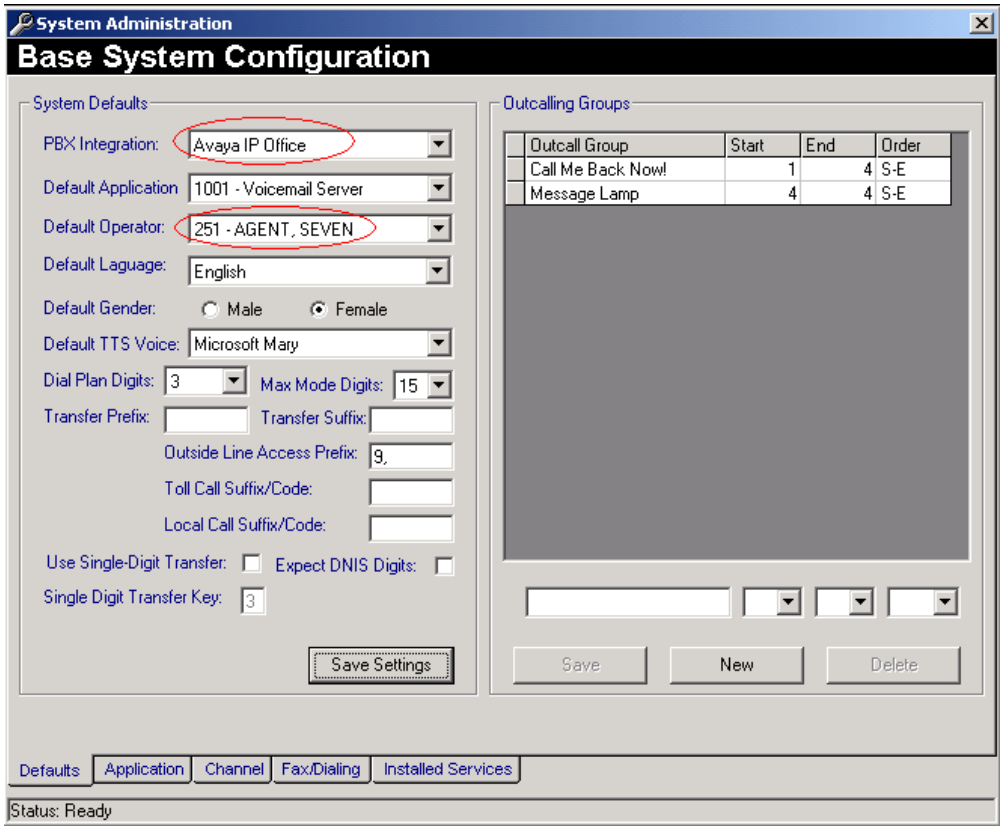
Please refer to the Avaya IP Office CTI Link Installation Manual, 40DHB0002UKCC – Issue 4 (05/08/2002) for additional information.

Step	Description
1.	Install the Avaya IP Office TAPI Service Provider driver and DevLink driver from the Avaya IP Office User Applications CD on the e-IVR server. NOTE: do not install the Phone Manager.
2.	After system reboot, login to the system again as "administrator" and go to **Start** → **Settings** → **Control Panel**. In the **Control Panel** window that appears, double-click Phone and Modem Options.
3.	In the Advanced tab of the Phone and Modem Options window, double-click Avaya IP Office TAPI2 Service Provider.
4.	In the Avaya TAPI2 configuration window that appears, set *Switch IP Address* to the IP Address of the IP Office System, check *Third Party*, set *Switch Password* to the IP Office System password, check *WAV Users* and *ACD Queues* and click **OK**. 
5.	Reboot the system.

Step	Description
	Verify Connectivity with the IP Office
6.	After system reboot, login to the system and go to **Start → Programs → Accessories → Communications → Phone Dialer**.
7.	In the Phone Dialer window that appears, select **Edit → Options**.
8.	In the Lines tab of the Options window that appears, drop-down the Phone Calls: list. If one or more "IP Office Phone: XXX" (where XXX is an extension number) entries appear, then the IP Office TAPI Driver is installed and working properly. 

4.3. Configuring e-IVR

Step	Description
	Set up Base Configuration
1.	On the e-IVR Server, go to **Start → Programs → Voice System → Voice Administrator** (or the matching icon on the desktop) to launch the e-IVR Administrator application.
2.	In the e-IVR Administration window that appears, select the System Config icon (wrench) on the left side menu.

Step	Description
3.	In the Defaults tab of the Base System Configuration window that appears, verify *PBX Integration* is set to Avaya IP Office, and *Default Operator* is set to the designated operator on the system and click **Save Settings**.  **Note 4**: On a brand new installation, the default operator would default to 100 and another extension could not be set until the destination extension has been provisioned.

Step	Description
4.	In the Channel tab of the Base System Configuration window, verify all e-IVR ports (channels) are associated to an application, in this instance, Voicemail Server. This determines what happens when an inbound call is received.

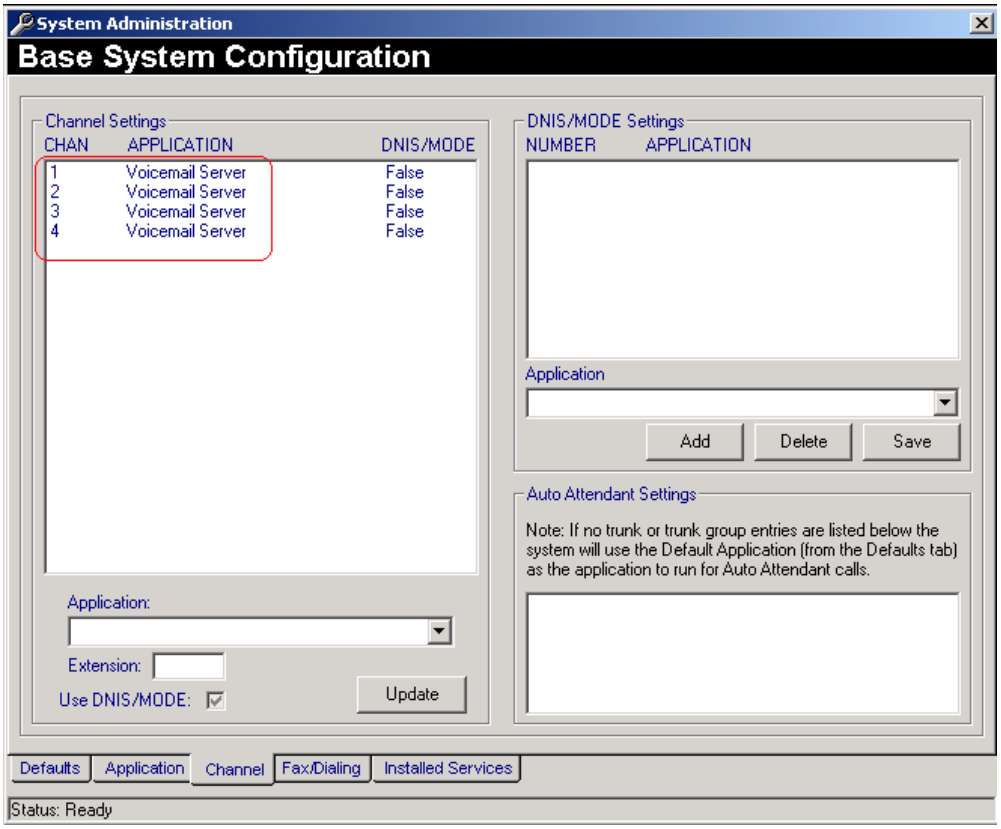
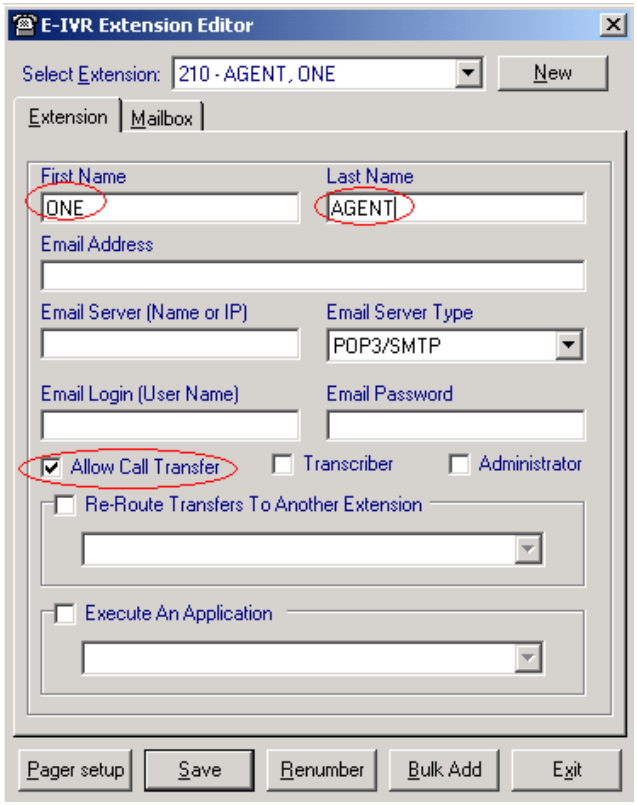
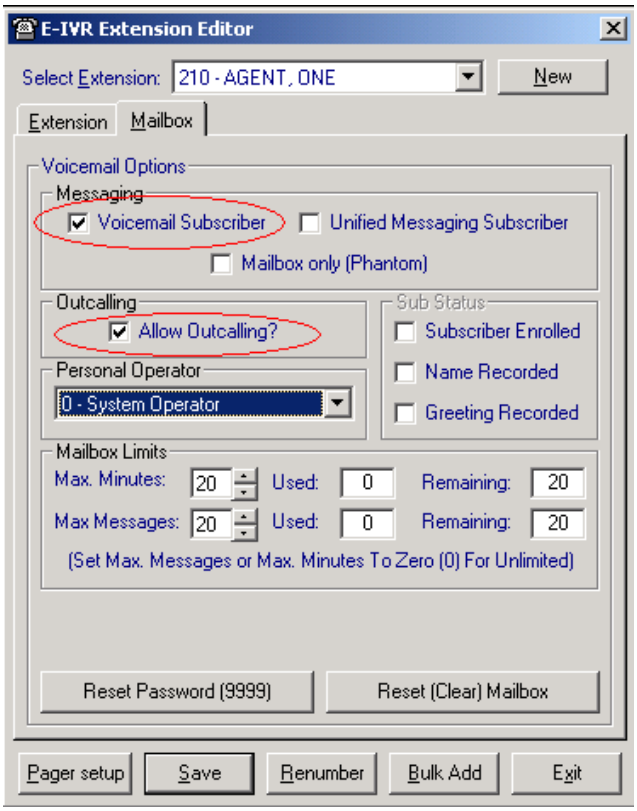
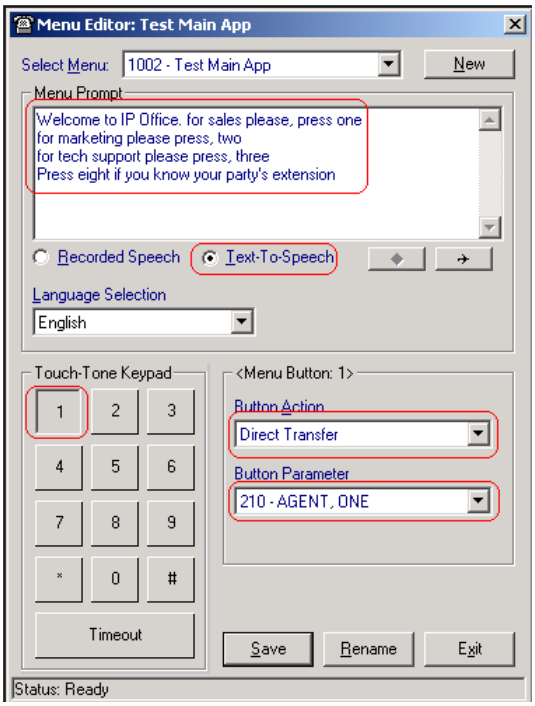
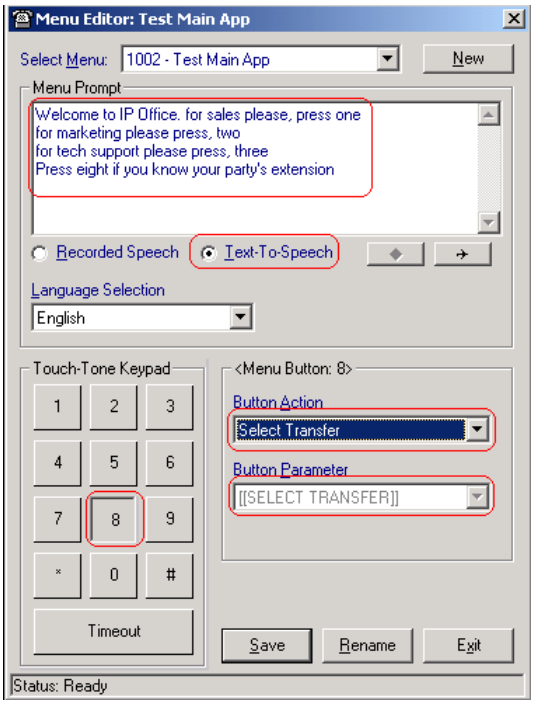


Figure 1 – e-IVR System Configuration – Channel Tab

	Set up User Extensions
5.	In the e-IVR Administration window, select the Extension Manager icon (hand holding phone) on the left side menu.
6.	In the e-IVR Extension Editor window that appears, click **New** and enter a valid IP Office User extension in the popup that appears.

Step	Description
7.	Returning to Extension tab of the e-IVR Extension Editor window, enter the User's First Name, Last Name, and check *Allow Call Transfer*. 

Step	Description
8.	In the Mailbox tab of the e-IVR Extension Editor window, check *Voicemail Subscriber* and *Allow Outcalling?* then click **Save**. 
9.	Repeat Steps 7 and 8 for every user that needs voicemail on the IP Office system. **Note 5**: For systems with a large number of users, the e-IVR has a Bulk Add feature. Please refer to the e-IVR documentation for further information.
	Configure Welcome Menu Application
10.	In the e-IVR Administration window, select the Menu Manager icon (telephone) on the left side menu.
11.	In the Menu Editor window that appears, click **New** and enter a new Menu Application Name, for example, Test Main App, in the popup that appears and click **Save**.

Step	Description
12.	In the Menu Editor window, go to the Menu Prompt field and type the prompt you wish the Menu to play to the caller, select Text-to-Speech, and configure Button Action and Button Parameter values for the menu by selecting the desired button. For example, the figures below show the Button Action for pressing 1 and pressing 8. Click **Save** when finished.  
13.	Return to the Channel tab of the Base System Configuration window (see **Figure 1**) and set *Application* for each Channel to **Test Main App** and click **Update**.

5. Interoperability Compliance Testing

This Interoperability Compliance Test included feature, functionality and performance load testing. Feature and functionality testing examined e-IVR Auto Attendant's ability to properly transfer inbound and internal calls to the appropriate destination extension (digital, analog, IP phone) based on caller input in response to the menu prompt played as well as e-IVR Voicemail's ability to properly record and playback voicemail messages. Performance load tests verified the configuration to continue when operating under load.

5.1. General Test Approach

Feature and functionality testing was performed manually. Inbound calls were made to the IP Office system from analog and PRI trunks as well as internal extensions. The IP Office system routed the calls to the e-IVR, which transferred the calls based on caller input. Analog loop start trunks from the central office were connected to the IP Office. A PRI trunk was provisioned between the IP Office and Avaya Communication Manager systems. Performance testing was accomplished by utilizing call generation tools for placing and receiving calls through analog

station ports. Analog station ports on the call generation tools were connected to analog station ports on the IP Office Phone Expansion Module. Call generation tool scripts were written to place calls to the e-IVR configured hunt group on the IP Office system. Each script barged in on the Menu prompt and provided a valid and distinct user extension for the destination of the call transfer. The e-IVR then transferred the calls to the appropriate destination extension. The call generation tool script on the destination extension verified the incoming call was from the proper source.

5.2. Test Results

All feature, functionality, and performance test cases passed successfully. Overnight performance testing at a rate of approximately 250 BHCC using 3 ports[*] was conducted on the 4-port e-IVR system provided for compliance testing. Performance statistics were captured on the e-IVR server to ensure that it was able to handle the call volume. During the course of compliance testing, the following were noted:

- MWI lamp takes 1 – 3 seconds following call disconnect before lighting up.
- Call Routing by DNIS (Auto Attendant functionality) did not work at the time of publication. This is under investigation by Computer Instruments.
- Call Routing by ANI (Auto Attendant functionality) and other TAPI-based features (Agent e-IVR Screen Pops) were beyond the scope of this compliance test, and were not validated.
- e-IVR Record A Call is not available on IP Office due to functionality not available in IP Office 1.4.

6. Verification Steps

The following verification Steps can be used in the field to verify correct system operation:

- To verify the e-IVR hunt group is operating properly: connect analog phones to all analog station ports assigned to the hunt group and call the hunt group. Verify that one of the phones rings.
- To verify incoming calls are properly routed to the e-IVR hunt group: connect analog phones to the ports assigned to the hunt group and place calls through the trunks assigned to the hunt group. Verify that one of the phones rings.
- To verify connectivity between e-IVR and IP Office, open Phone Dialer on the e-IVR Server and verify the IP Office extensions are listed in the Lines Used for Phone Calls pull down list.
- To verify e-IVR Auto Attendant is operating properly for internal calls: place a call to the e-IVR hunt group. Verify the e-IVR Menu prompt is played, enter '8', and then enter a valid extension number on the IP Office system. Verify the call is transferred to the correct extension. Repeat for inbound trunk calls.
- To verify e-IVR Voicemail is operating properly for internal calls: place a call from one IP Office extension to another and allow it to go to coverage. Verify e-IVR Voicemail

[*] During load testing, one of the ports on the call generation tool failed to work properly and forced the load testing to be performed on 3 of the 4 e-IVR ports. Time constraints prevented another attempt to repeat the load test.

plays the proper welcome greeting and record a message and hang up. After a minute or two, retrieve the message (IP Office Shortcode *17) and verify it plays back properly. Repeat for inbound trunk calls.

7. Support

Customers should call Computer Instruments Technical Support when having problems related to the e-IVR. Computer Instruments will then determine the nature of the problem and recommend the best plan to the customer, whether it is to:

- Fix the problem through remote access.
- Dispatch, at Computer Instruments' discretion, on-site technical support.

For technical support on e-IVR, contact the Computer Instruments Customer Service Center at 1-888-451-0851 and press 2 for technical support.

8. Conclusion

These Application Notes describe the required configuration steps for Computer Instruments' e-IVR Auto Attendant and Voicemail to successfully interoperate with Avaya™ IP Office System. The e-IVR and IP Office features, functionality, and performance were validated with the following limitations / caveats previously identified: e-IVR Auto Attendant - Route by ANI was beyond the scope of this testing, and e-IVR Auto Attendant - Route by DNIS did not work and is being investigated by Computer Instruments.

9. Additional References

- Avaya IP Office Installation Manual, 40DHB0002USCL, Issue 8 (03/07/2003).
- e-IVR – User Manual for Interactive Voice Response Core System Features, Copyright 2003.
- Installing e-IVR on IP Office, Version 3.0, and Copyright 2003.

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya Developer*Connection* Program at devconnect@avaya.com.