Avaya Solution & Interoperability Test Lab

How to Configure ISDN-PRI and Digital Loop Start T1 Interfaces between Avaya Communication Manager and Avaya Interactive Response (IR) using a single Telephony Card – Issue 1.0

Abstract

These Application Notes describe the steps for configuring ISDN-PRI and Digital Loop Start T-1 interfaces for interconnection between Avaya Communication Manager and an Avaya IR system with a single telephony card supporting different trunk parameters on each port.

1. Introduction

Avaya Interactive Response (IR) is an Interactive Voice Response (IVR) system that supports advanced applications of customer self-service solutions. Avaya IR Release 2.0 supports the assignment of different trunk parameters to each port on the quad (four T-1 or E-1 ports) telephony card. In previous releases of Avaya IR software, only one trunk protocol could be assigned to all the trunks of a T-1 telephony card. Telephony cards provide the telephony interface to the Avaya IR system.

Natural Microsystems (NMS) manufactures the commercial AG4040 T-1/E-1 telephony cards for the Avaya IR system. The Avaya IR 2.0 system supports a maximum of two quad-port AG4040 cards with either the Sun Fire 280R or the Sun Fire V240 platform. The AG4040 card offers T-1, E-1 (75 Ohm), and E-1 (120 Ohm) interfaces on a single card. The type of interface can be selected through Avaya IR system administration. A quad AG4040 telephony card can support the following:

- Four different T-1 protocols from amongst Integrated Service Digital Network (ISDN)-Primary Rate Interface (PRI), Digital Loop Start, and Digital Wink Start
- Four different E-1 protocols from amongst ISDN-PRI Interface, Digital Loop Start, and R2 MFC

The quad AG4040 telephony card cannot support both T-1 and E-1 interfaces on the same card. For more information on the NMS AG4040 telephony card, please refer to references [1] & [4] in **Section 7**.

These Application Notes also describe how to configure the T-1 interfaces on Avaya Communication Manager and describe how to use the Avaya IR Web Administration interface to administer the following:

- Digital interfaces including the assignment of a digital interface protocol on a T-1 telephony card.
- The assignment of telephone numbers to channels.
- The assignment of a service (application) to a channel or channels
- The assignment of Dialed Number Identification Service (DNIS) called numbers.

1.1. Reference Network Configuration

The configuration depicted in **Figure 1** is utilized to verify these Application Notes. **Figure 1** represents a typical multi-location enterprise with centralized control at the Main Office offered by the primary Avaya S8720 Media Server pair running Avaya Communication Manager. The Main Office also consists of an Avaya G650 Media Gateway and an Avaya IR system. Site 2 has an Enterprise Survivable Server (ESS) S8710 Media Server pair and an Avaya G650 Media Gateway as Port Network # 2. Site 4 contains a G350 Media Gateway and a Local Survivable Processor (LSP) S8500 Media Server. All site Port Networks, Media Gateways, and IP endpoints register to the C-LANs located in the Main Office G650 Media Gateway. Each site has Public Switched Telephone Network (PSTN) access via Time Division Multiplexed (TDM) trunks and private WAN access. There are three T-1 interfaces for interconnection between Avaya Communication Manager and the Avaya IR, which are the following:

- An ISDN-PRI T-1 between the Avaya G650 Media Gateway and Avaya IR within the Main Office
- A private Digital Loop Start T-1 between the Site 2 G650 Media Gateway and the Avaya IR located at the Main Office.
- A private Digital Loop Start T-1 between the Site 4 G350 Media Gateway and the Avaya IR located at the Main Office.

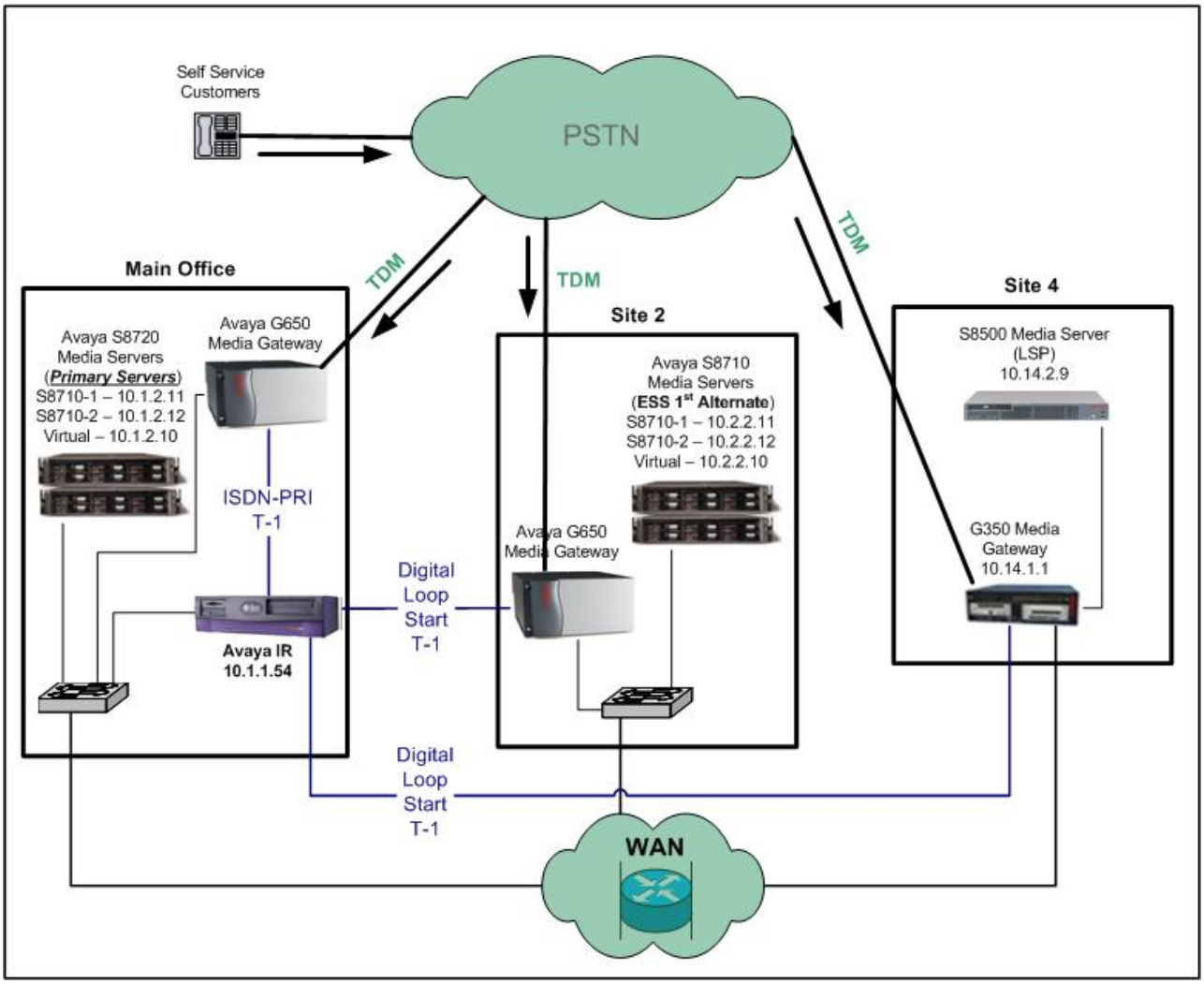


Figure 1: Reference Network Configuration

Note: These Application Notes assume that the configuration, excluding the T-1 interfaces to the Avaya IR, is already in place.

2. Equipment and Software Validated

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

Equipment – Main Office	Software
Avaya S8720 Media Server	Avaya Communication Manager R3.1.2 (R013x.01.2.632.1)
Avaya G650 Media Gateway • Avaya TN2312BP IPSI Circuit Pack • Avaya TN464F DS1 Circuit Packs (2) • Avaya TN779DP C-LAN Circuit Pack • Avaya TN2602AP MedPro Circuit Pack	 HW 12 FW 031 HW 20 FW 018 HW 01 FW 017 HW 02 FW 024
Avaya Converged Stackable Switch C363T-PWR (2)	4.5.14
Avaya Interactive Response (Sun Fire V240 platform) • Natural Microsystems (NMS) AG4040 T1	R2.0.221 Natural Access 2005-1
Cisco 6506 Switch Router	12.4(5)

Table 1: Main Office

Equipment	Software
Avaya G650 Media Gateway • Avaya TN2312BP IPSI Circuit Pack • Avaya TN464F DS1 Circuit Packs (2) • Avaya TN779DP C-LAN Circuit Pack • Avaya TN2602AP Medpro Circuit Pack	 HW 12 FW 031 HW 20 FW 018 HW 01 FW 017 HW 02 FW 024
Avaya S8710 Media Server • Enterprise Survivable Server (ESS)	Avaya Communication Manager R3.1.2 (R013x.01.2.632.1)
Avaya Converged Stackable Switch C363T-PWR	4.5.14
Cisco 1841 Router	12.4(5)

Table 2: Site 2

Equipment	Software
Avaya G350 Media Gateway • MM710AP (2)	25.30.0 HW 05 FW 015
Avaya S8500 Media Server (LSP)	Avaya Communication Manager R3.1.2 (R013x.01.2.632.1)

Table 3: Site 4

Equipment	Software
Avaya Site Administration (ASA)	3.1.13
Cisco 3845 WAN Router (2)	12.4(5)
PC Workstations: Microsoft Windows XP Professional	Version 2002

Table 4: Common Use Equipment and Software

3. Configure Avaya Communication Manager

These Application Notes assume all equipment in **Table 1** through **Table 4** has been previously administered with the exception of the configuration parameters required to interconnect the Avaya IR system to multiple Avaya Media Gateways. The following pages detail instructions on how to verify and administer the required configuration parameters. For additional information, please refer to reference [3] in **Section 7**.

3.1. Verify Avaya Communication Manager Licenses

To set up ISDN-PRI T-1 connectivity to the Avaya IR system, certain Avaya Communication Manger licenses must be active. The next steps verify these required licenses. If any licenses are missing, contact your Avaya Authorized Sales representative.

All commands were entered on an Avaya Communication Manager System Access Terminal (SAT) connected to the active S8720 Media Server at the Main Office. Use a login and password with the appropriate access permissions.

Step	Description
1.	Issue the command "**display system-parameters customer options"** to display the active licensed features. On page 1, the "**Platform Maximum Ports**" and "**Maximum Stations**" fields display the maximum number of station and ports allowed in the system. Verify that there are stations and ports available to configure the ISDN-PRI and Digital Loop Start T1 interfaces between the Avaya IR and Avaya Communication Manager.

```
display system-parameters customer-options                    Page   1 of  11
                              OPTIONAL FEATURES

     G3 Version: V13
       Location: 1                             RFA System ID (SID): 1
       Platform: 8                             RFA Module ID (MID): 1

                                                            USED
                                 Platform Maximum Ports: 44000 732
                                       Maximum Stations: 36000 544
                              Maximum XMOBILE Stations: 0     0
                    Maximum Off-PBX Telephones - EC500: 0     0
                    Maximum Off-PBX Telephones -   OPS: 50    0
                    Maximum Off-PBX Telephones - SCCAN: 0     0









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

Step	Description
2.	Go to Page 4 and verify that the "**ISDN Feature Plus**" and "**ISDN-PRI**" fields are set to "**y**". These fields provide ISDN-PRI software and signaling. 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? y Enhanced Conferencing? y **ISDN Feature Plus? y** Enhanced EC500? y ISDN Network Call Redirection? y Enterprise Survivable Server? n ISDN-BRI Trunks? y Enterprise Wide Licensing? n **ISDN-PRI? y** ESS Administration? y Local Survivable Processor? n Extended Cvg/Fwd Admin? n Malicious Call Trace? y External Device Alarm Admin? n Media Encryption Over IP? y Five Port Networks Max Per MCC? n Mode Code for Centralized Voice Mail? n Flexible Billing? n Forced Entry of Account Codes? n 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? y (NOTE: You must logoff & login to effect the permission changes.)
3.	Go to Page 5 and verify that the "**Uniform Dialing Plan**" field is set to "**y**". This provides 3- to 7- digit Uniform Dial Plan (UDP) and 1 to 7 digit steering. display system-parameters customer-options Page 5 of 11 OPTIONAL FEATURES Multinational Locations? n Station and Trunk MSP? n Multiple Level Precedence & Preemption? n Station as Virtual Extension? n Multiple Locations? y System Management Data Transfer? n Personal Station Access (PSA)? y Tenant Partitioning? n Posted Messages? y Terminal Trans. Init. (TTI)? y PNC Duplication? n Time of Day Routing? y Port Network Support? y **Uniform Dialing Plan? y** Usage Allocation Enhancements? y Processor and System MSP? n TN2501 VAL Maximum Capacity? y Private Networking? y Processor Ethernet? y Wideband Switching? y Wireless? n Remote Office? y Restrict Call Forward Off Net? y Secondary Data Module? y (NOTE: You must logoff & login to effect the permission changes.)

3.2. ISDN-PRI DS1 Board, Trunk Group and Routing Administration for the Main Office to Avaya IR Link

Step	Description

1.	Enter the command "**add ds1 *x***" where ***x*** is the location for the unassigned TN464F DS1-board in the Main Office G650 Media Gateway for the ISDN-PRI T-1 interface to the Avaya IR. Assign the following DS1 parameters:
	a. In the "**Name**" field, enter a descriptive name for the DS1 circuit pack.
	b. Set the "**Line Coding**" field to "**b8zs**" for bipolar eight zero substitution support on the T-1 facility. This setting must match the "**Line Code**" setting in the Avaya IR ISDN-PRI T1 parameters screen (step 4 in Section 4.3).
	c. Leave the "**Framing Mode**" field at the default of "**esf**" for Extended Superframe. This setting must match the "**Frame Type**" setting in the Avaya IR ISDN-PRI T1 parameters screen (step 4 in Section 4.3).
	d. Set the "**Signaling Mode**" field to "**isdn-pri**" for T-1 ISDN service.
	e. Set the "**Connect**" field to "**pbx**" since the ISDN connection to the Avaya IR will be on a private network.
	f. Set the "**Interface**" field to "**network**". The Avaya IR must have the complementary setting of "**user**" for the "**PRI Side**" setting in the Avaya IR ISDN-PRI T1 parameters screen (step 4 in Section 4.3).
	g. Set the "**Protocol Version**" field to "**b**" for ISDN interconnectivity on a private network.
	All other fields may be left at the default setting.
	`add ds1 01a12 Page 1 of 2`
	`DS1 CIRCUIT PACK`
	`Location: 01A12 **Name: IR Port 1**`
	`Bit Rate: 1.544 **Line Coding: b8zs**`
	`Line Compensation: 1 Framing Mode: esf`
	`**Signaling Mode: isdn-pri**`
	`**Connect: pbx** **Interface: network**`
	`TN-C7 Long Timers? n Country Protocol: 1`
	`Interworking Message: PROGress **Protocol Version: b**`
	`Interface Companding: mulaw CRC? n`
	`Idle Code: 11111111`
	`DCP/Analog Bearer Capability: 3.1kHz`
	`T303 Timer(sec): 4`
	`Slip Detection? n Near-end CSU Type: other`
	`Block Progress Indicator? n`

Step	Description

2.	Enter the command "**add signaling-group *y***" where ***y*** is an unassigned Signaling Group number. Set the "**Primary D-Channel**" field to "***x*24**"where ***x*** is the assigned TN464F DS1-board in step 1, and 24 is the standard signaling port (D-Channel) for the ISDN PRI. Leave all other fields at the default setting.
	`add signaling-group 12 Page 1 of 5`
	`SIGNALING GROUP`
	`Group Number: 12 Group Type: isdn-pri`
	`Associated Signaling? y Max number of NCA TSC: 0`
	`Primary D-Channel: 01A1224` `Max number of CA TSC: 0`
	`Trunk Group for NCA TSC:`
	`Trunk Group for Channel Selection:`
	`Supplementary Service Protocol: a Network Call Transfer? n`

3.	Enter the command "**add trunk-group *z***" where ***z*** is an unassigned Trunk Group number. Assign the following Trunk Group parameters:
	a. In the "**Group Name**" field, enter a descriptive name for the Trunk Group.
	b. Set the "**Group-Type**" field to "**isdn**".
	c. Based on the format defined in the Dial Plan Analysis table (to view, use the "**display dial-plan analysis**" command) for dial access codes, assign a number in the "**TAC**" field for the Trunk Group.
	d. Set the "**Service Type**" field to "**tie**" to designate general-purpose use.
	The remaining fields on page 1 through page 4 may be left at the default settings.
	Note: To send the Calling Party number from the incoming call to Avaya IR, set the "**Send Calling Number**" field on page 3 (not shown) to "**y**".
	`add trunk-group 12 Page 1 of 21`
	`TRUNK GROUP`
	`Group Number: 12` **`Group Type: isdn`** `CDR Reports: y`
	`Group Name: Main Office to IR` `COR: 1 TN: 1` **`TAC: 1112`**
	`Direction: two-way Outgoing Display? n Carrier Medium: PRI/BRI`
	`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`

Step	Description
4.	Go to Page 5 and assign the following parameters for each Trunk Group Member 1 through 15 and 16 through 23 on Page 6: **a.** Set the "**Port**" field to "***x*01**" where ***x*** is the assigned TN464F DS1-board in step 1, and 01 is the first Trunk Group Member of the ISDN-PRI (B-Channels). **b.** In the "**Name**" field, enter a descriptive name for the Trunk Group Member. **c.** Set the "**Sig Grp**" field to "***y***" where ***y*** is the assigned Signaling Group number in step 2. **d.** Repeat steps **a** through **c** for each Trunk Group Member of the ISDN-PRI (23 B-Channels total).

```
add trunk-group 12                                              Page   5 of  21
                                TRUNK GROUP
                                     Administered Members (min/max):   0/0
GROUP MEMBER ASSIGNMENTS                 Total Administered Members:  0

       Port    Code Sfx Name        Night           Sig Grp
  1: 01A1201  TN464  F  IR CH-00                      12
  2: 01A1202  TN464  F  IR CH-01                      12
  3: 01A1203  TN464  F  IR CH-02                      12
  4: 01A1204  TN464  F  IR CH-03                      12
  5: 01A1205  TN464  F  IR CH-04                      12
  6: 01A1206  TN464  F  IR CH-05                      12
  7: 01A1207  TN464  F  IR CH-06                      12
  8: 01A1208  TN464  F  IR CH-07                      12
  9: 01A1209  TN464  F  IR CH-08                      12
 10: 01A1210  TN464  F  IR CH-09                      12
 11: 01A1211  TN464  F  IR CH-10                      12
 12: 01A1212  TN464  F  IR CH-11                      12
 13: 01A1213  TN464  F  IR CH-12                      12
 14: 01A1214  TN464  F  IR CH-13                      12
 15: 01A1215  TN464  F  IR CH-14                      12
```

```
add trunk-group 12                                              Page   6 of  21
                                TRUNK GROUP
                                     Administered Members (min/max):   0/0
GROUP MEMBER ASSIGNMENTS                 Total Administered Members:  0

       Port    Code Sfx Name        Night           Sig Grp
 16: 01A1216  TN464  F  IR CH-15                      12
 17: 01A1217  TN464  F  IR CH-16                      12
 18: 01A1218  TN464  F  IR CH-17                      12
 19: 01A1219  TN464  F  IR CH-18                      12
 20: 01A1220  TN464  F  IR CH-19                      12
 21: 01A1221  TN464  F  IR CH-20                      12
 22: 01A1222  TN464  F  IR CH-21                      12
 23: 01A1223  TN464  F  IR CH-22                      12
```

Step	Description
5.	Enter the command "**change route-pattern *z***" where ***z*** is an unassigned Route Pattern Number. The first row indicates the preference trunk group and the subsequent rows indicate the alternate trunk groups in respective order (if any). Assign the following parameters: **a.** In the "**Pattern Name**" field, enter a descriptive name for the Route Pattern that will be utilized to route incoming calls to the Avaya IR. **b.** For the first row "**1**" under the "**Grp No**" field, enter the Trunk Group Number "***z***" assigned in step 3. **c.** For the first row "**1**" under the "**FRL**" field, enter the Facility Restriction Level (FRL) number (0 to 7, 0 being the least restrictive) associated with this trunk group preference. The calling party's FRL must be higher or equal to the entered FRL to allow access to the trunk group. The remaining fields on page 1 through page 3 may be left at the default settings.

```
change route-pattern 12                                          Page   1 of   3
                   Pattern Number: 12  Pattern Name: Main to IR
                                SCCAN? n     Secure SIP? n
   Grp FRL NPA Pfx Hop Toll No.  Inserted                              DCS/ IXC
   No          Mrk Lmt List Del  Digits                              QSIG
                                 Dgts                                 Intw
1: 12   0                                                            n   user
2:                                                                   n   user
3:                                                                   n   user
4:                                                                   n   user
5:                                                                   n   user
6:                                                                   n   user

     BCC VALUE  TSC CA-TSC    ITC BCIE Service/Feature PARM  No. Numbering LAR
    0 1 2 3 4 W     Request                                    Dgts Format
                                                            Subaddress
 1: y y y y y n  n           rest                                        none
 2: y y y y y n  n           rest                                        none
 3: y y y y y n  n           rest                                        none
 4: y y y y y n  n           rest                                        none
 5: y y y y y n  n           rest                                        none
 6: y y y y y n  n           rest                                        none
```

Step	Description
6.	Enter the command "**change uniform-dialplan 0**" to enter and list the parameters that provide uniform dialing between Avaya Communication Manager and Avaya IR. Assign the following parameters: **a.** Set the "**Matching Pattern**" field to the leading digits that Avaya Communication Manager will match to the user-dialed numbers. For this example, the entry "**432075**" is for the extension range 4320750 through 4320759. **b.** Set the "**Len**" field to the number of user-dialed digits Avaya Communication Manager collects to match to the "**Matching Pattern**" field. **c.** Set the "**Del**" field to the number of digits to delete before routing the call. For this example, "**0**" is entered and all entered digits will be used to route the call. **d.** Set the "**Net**" field to "**aar**" so that the digit string is forwarded to the Automatic Alternate Routing (AAR) table (**Step 7**) for analysis. **e.** Repeat steps **a** through **d** for each extension range that will route to the Avaya IR.

```
change uniform-dialplan 0                                    Page   1 of   2
                     UNIFORM DIAL PLAN TABLE
                                                           Percent Full: 0

  Matching          Insert          Node   Matching         Insert          Node
  Pattern  Len Del  Digits Net Conv Num    Pattern  Len Del Digits Net Conv Num
  3          5   0         aar  n                                      n
  432075     7   0         aar  n                                      n
  432076     7   0         aar  n                                      n
  432077     7   0         aar  n                                      n
```

Step	Description
7.	Enter the command "**change aar analysis 0**" to list and add additional AAR table entries. Avaya Communication Manager utilizes the AAR table to compare the user-dialed number with the "**Dialed String**" entry that most closely matches, which then determines the route pattern to use. Assign the following parameters: a. Set the "**Dialed String**" field to the digits that the call processing server analyzes. For this example, the entry "**432075**" is for the extension range 4320750 through 4320759. b. Set the "**Total Min**" and "**Total Max**" fields to the minimum number and maximum number of user-dialed digits Avaya Communication Manager collects to determine a match to the "**Dialed String**" entry. c. Set the "**Route Pattern**" field to the route pattern number assigned in **Step 5**. d. Set the "**Call Type**" field to "**aar**" for regular AAR calls. e. Repeat steps **a** through **d** for each extension range that will route to the Avaya IR.

```
change aar analysis 0                                        Page   1 of   2
                          AAR DIGIT ANALYSIS TABLE
                                                          Percent Full:    2

          Dialed           Total      Route    Call   Node  ANI
          String         Min  Max  Pattern    Type   Num   Reqd
    3                    5    5    1          aar           n
    30331                5    5    30         aar           n
    38                   5    5    14         aar           n
    4                    5    5    11         aar           n
    40                   5    5    13         aar           n
    401                  3    3    401        aar           n
    5                    7    7    999        aar           n
    432075               7    7    12         aar           n
    432076               7    7    12         aar           n
    432077               7    7    12         aar           n
```

3.3. Digital Loop DS1 Board and Station Administration for the Site 2 to Avaya IR Link

Step	Description
1.	Enter the command "**add ds1 *w***" where ***w*** is the location for the unassigned TN464F DS1-board in the Site 2 G650 Media Gateway for the T-1 interface to the Avaya IR. Assign the following T-1 parameters: **a.** In the "**Name**" field, enter a descriptive name for the DS1 circuit pack. **b.** Leave the "**Line Coding**" field at the default setting of "**ami-zcs**" for Alternate Mark Inversion – Zero Code Suppression support on the T-1 facility. **c.** Set the "**Framing Mode**" field to "**d4**" for basic DS1 Superframe. **d.** Set the "**Signaling Mode**" field to "**robbed-bit**" for in-band signaling with the T-1 service. These settings must match in the Avaya IR Digital Loop-Start T1 screen (**step 7** in **Section 4.3**) for "**Trunk 2**". All other fields may be left at the default setting.

```
change ds1 02a04                                              Page   1 of   2
                              DS1 CIRCUIT PACK

            Location: 02A04                          Name: IR Port 3
            Bit Rate: 1.544                   Line Coding: ami-zcs
   Line Compensation: 1                      Framing Mode: d4
      Signaling Mode: robbed-bit



Interface Companding: mulaw
           Idle Code: 11111111




      Slip Detection? n                Near-end CSU Type: other
```

Step	Description

2.	A station must be administered for each Avaya IR Digital-Loop Channel. Enter the command "**add station *v***", where ***v*** is an available extension for the station. The extension of this station must match the assigned "**Phone Number**" in Avaya IR for the Digital-Loop channel (Refer to **step 2** in **Section 4.5**). Assign the following parameters for the station:
	a. Set the "**Type**" field to "**DS1FD**".
	b. Set the "**Port**" field to "***w*01**" where ***w*** is the location for the assigned TN464F DS1-board in the Site 2 G650 Media Gateway for the T-1 interface to the Avaya IR (step 1), and **01** is the first port on that board.
	c. In the "**Name**" field, enter a descriptive name for the station.
	All other fields on pages 1 through 3 may be left at the default setting.
	`add station 4322750 Page 1 of 3`
	`STATION`
	`Extension: 4322750 Lock Messages? n BCC: 0`
	`**Type: DS1FD** Security Code: TN: 1`
	`**Port: 02A0401** Coverage Path 1: COR: 1`
	`**Name: B02 IR Station 1** Coverage Path 2: COS: 1`
	`Hunt-to Station: Tests? y`
	`STATION OPTIONS`
	`Loss Group: 4`
	`Off Premises Station? y`
	`R Balance Network? n`
	`Survivable COR: internal`
	`Survivable Trunk Dest? y`

3.	Repeat **step 2** using the "**duplicate station**" command to add a station extension for each Avaya IR Digital Loop Start channel and port on the assigned TN464F DS1-board.

Step	Description

4.	Enter the command "**add hunt-group *s*"**, where ***s*** is an available hunt group number. Assign the following parameters:
	a. In the "**Group Name**" field, enter a descriptive name for the hunt group
	b. Assign an available extension number in the **"Group Extension"** field. The Avaya IR Digital Loop Start channels are accessed via this assigned extension number.
	c. Set the "**Group Type"** field to "**ucd-mia**".
	`add hunt-group 92 Page 1 of 60`
	`HUNT GROUP`
	`Group Number: 92 ACD? n`
	`**Group Name: IR (TDM) Ports** Queue? n`
	`**Group Extension: 4322590** Vector? n`
	`**Group Type: ucd-mia** Coverage Path:`
	`TN: 1 Night Service Destination:`
	`COR: 1 MM Early Answer? n`
	`Security Code: Local Agent Preference? n`
	`ISDN/SIP Caller Display: grp-name`

5.	Go to Page 3 and enter the station extensions assigned in steps 2 and 3 as group members under the "**Ext**" fields as shown below.
	`add hunt-group 92 Page 3 of 60`
	`HUNT GROUP`
	`Group Number: 92 Group Extension: Group Type: ucd-mia`
	`Member Range Allowed: 1 - 1500 Administered Members (min/max): 0 /0`
	`Total Administered Members: 0`
	`GROUP MEMBER ASSIGNMENTS`
	`**Ext** Name (24 characters) **Ext** Name (24 characters)`
	`1: **4322750** 14: **4322763**`
	`2: **4322751** 15: **4322764**`
	`3: **4322752** 16: **4322765**`
	`4: **4322753** 17: **4322766**`
	`5: **4322754** 18: **4322767**`
	`6: **4322755** 19: **4322768**`
	`7: **4322756** 20: **4322769**`
	`8: **4322757** 21: **4322770**`
	`9: **4322758** 22: **4322771**`
	`10: **4322759** 23: **4322772**`
	`11: **4322760** 24: **4322773**`
	`12: **4322761** 25:`
	`13: **4322762** 26:`
	`At End of Member List`

3.4. Digital Loop DS1 Board and Station Administration for the Site 4 to Avaya IR Link

Step	Description
1.	Enter the command "**add ds1 *u***" where ***u*** is the location for the unassigned DS1 Media Module (MM710AP) in the Site 4 G350 Media Gateway for the T-1 interface to the Avaya IR. Assign the following T-1 parameters: **a.** In the "**Name**" field, enter a descriptive name for the DS1 circuit pack. **b.** Set the "**Line Coding**" field to "**b8zs**" for bipolar eight zero substitution support on the T-1 facility. **c.** Set the "**Signaling Mode**" field to "**robbed-bit**" for in-band signaling with the T-1 service. These settings must match in the Avaya IR Digital Loop-Start T1 screen (**step 10** in **Section 4.3**) for "**Trunk 3**". All other fields may be left at the default setting.

```
add ds1 004v3                                                Page   1 of   2
                                DS1 CIRCUIT PACK

            Location: 004V3                          Name: IR Port 2
            Bit Rate: 1.544                   Line Coding: b8zs
   Line Compensation: 1                      Framing Mode: esf
      Signaling Mode: robbed-bit



Interface Companding: mulaw
           Idle Code: 11111111




      Slip Detection? n                Near-end CSU Type: other

   Echo Cancellation? n
```

Step	Description

2.	A station must be administered for each Avaya IR Digital-Loop Channel. Enter the command "**add station *t***", where ***t*** is an available extension for the station. The extension of this station must match the assigned "**Phone Number**" in Avaya IR for the Digital Loop Start channel (Refer to step 2 in Section 4.6). Assign the following parameters for the station:
	a. Set the "**Type**" field to "**DS1FD**".
	b. Set the "**Port**" field to "***u*01**" where ***u*** is the location for the assigned DS1 Media Module (MM710AP) in the Site 4 G350 Media Gateway for the T-1 interface to the Avaya IR (step 1), and **01** is the first port on that board.
	c. In the "**Name**" field, enter a descriptive name for the station.
	All other fields on pages 1 through 3 may be left at the default setting.
	`add station 4324750 Page 1 of 3`
	`STATION`
	`Extension: 4324750 Lock Messages? n BCC: 0`
	`Type: DS1FD Security Code: TN: 1`
	`Port: 004V301 Coverage Path 1: COR: 1`
	`Name: B04 IR Station 1 Coverage Path 2: COS: 1`
	`Hunt-to Station: Tests? y`
	`STATION OPTIONS`
	`Loss Group: 4`
	`Off Premises Station? y`
	`R Balance Network? n`
	`Survivable COR: internal`
	`Survivable Trunk Dest? y`

3.	Repeat **step 2** using the "**duplicate station**" command to add a station extension for each Avaya IR Digital Loop Start channel and port on the assigned DS1 Media Module.

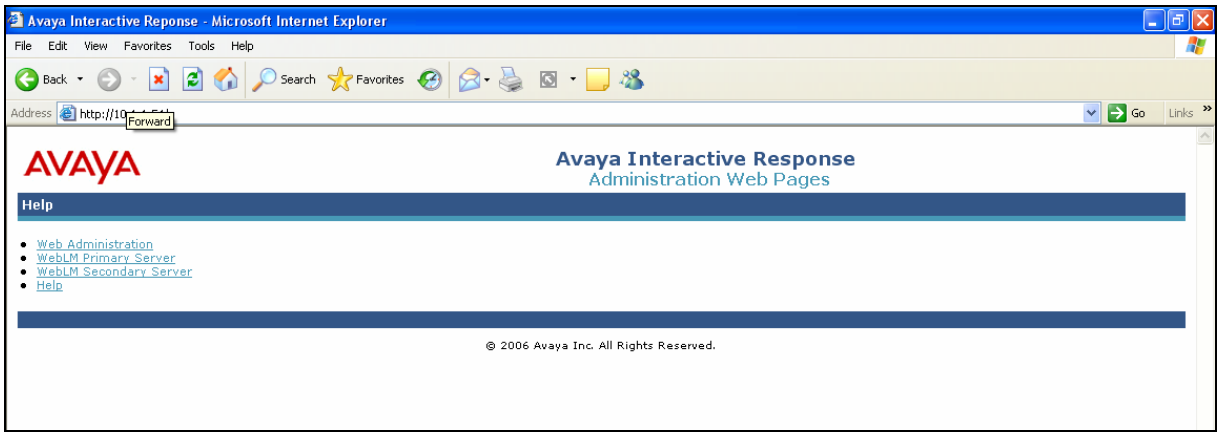
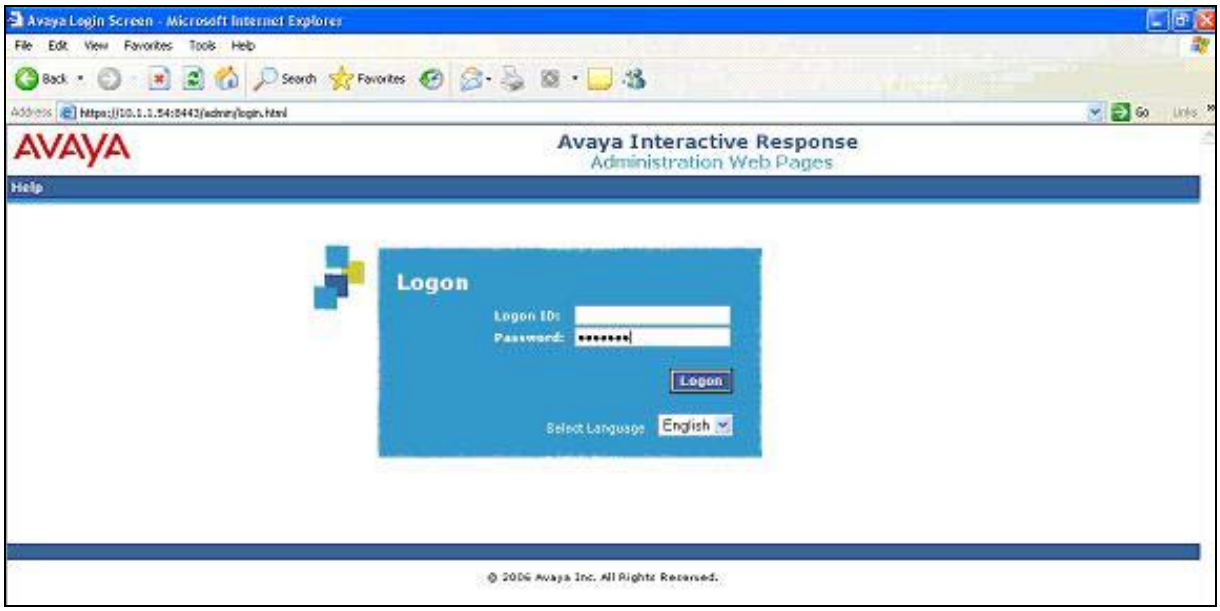
Step	Description

4.	Enter the command "**add hunt-group *r*"**, where ***r*** is an available hunt group number. Assign the following parameters:
	a. In the "**Group Name**" field, enter a descriptive name for the hunt group
	b. Assign an available extension number in the **"Group Extension"** field. The Avaya IR Digital Loop Start channels are accessed via this assigned extension number.
	c. Set the "**Group Type"** field to "**ucd-mia**".
	`add hunt-group 94 Page 1 of 60`
	`HUNT GROUP`
	`Group Number: 94 ACD? n`
	`**Group Name: IR (TDM) Ports** Queue? n`
	`**Group Extension: 4324590** Vector? n`
	`**Group Type: ucd-mia** Coverage Path:`
	`TN: 1 Night Service Destination:`
	`COR: 1 MM Early Answer? n`
	`Security Code: Local Agent Preference? n`
	`ISDN/SIP Caller Display: grp-name`

5.	Go to Page 3 and enter the station extensions assigned in steps 2 and 3 as group members under the "**Ext**" fields as shown below.
	`add hunt-group 94 Page 3 of 60`
	`HUNT GROUP`
	`Group Number: 94 Group Extension: Group Type: ucd-mia`
	`Member Range Allowed: 1 - 1500 Administered Members (min/max): 0 /0`
	`Total Administered Members: 0`
	`GROUP MEMBER ASSIGNMENTS`
	`**Ext** Name (24 characters) **Ext** Name (24 characters)`
	`1: **4324750** 14: **4324763**`
	`2: **4324751** 15: **4324764**`
	`3: **4324752** 16: **4324765**`
	`4: **4324753** 17: **4324766**`
	`5: **4324754** 18: **4324767**`
	`6: **4324755** 19: **4324768**`
	`7: **4324756** 20: **4324769**`
	`8: **4324757** 21: **4324770**`
	`9: **4324758** 24: **4324771**`
	`10: **4324759** 23: **4324772**`
	`11: **4324760** 24: **4324773**`
	`12: **4324761** 25:`
	`13: **4324762** 26:`
	`At End of Member List`

4. Configure Avaya Interactive Response

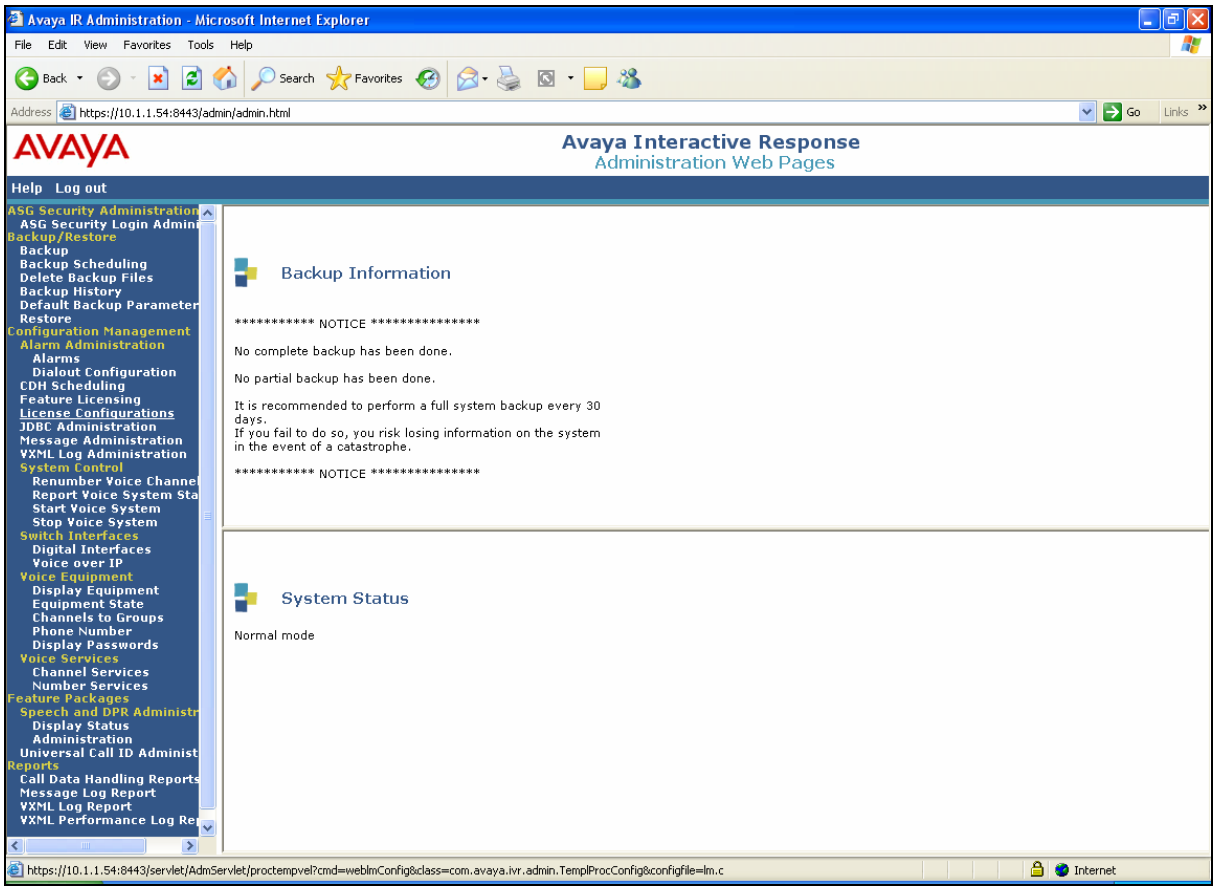
The following steps illustrate how to configure Avaya IR using a Web Graphical User Interface (GUI).

Step	Description
1.	Open a Windows Explorer browser and enter the IP address or DNS entry of the Avaya IR system **(**For Example **http://10.1.1.54** or **http://sa-ir.solar.com)** to display the main Web Administration page. Click the **"Web Administration"** button to enter the secure Web Administration pages. 
2.	Enter a username and password with administrator privileges as shown below. Click the "**Logon**" button to enter Web Administration. 

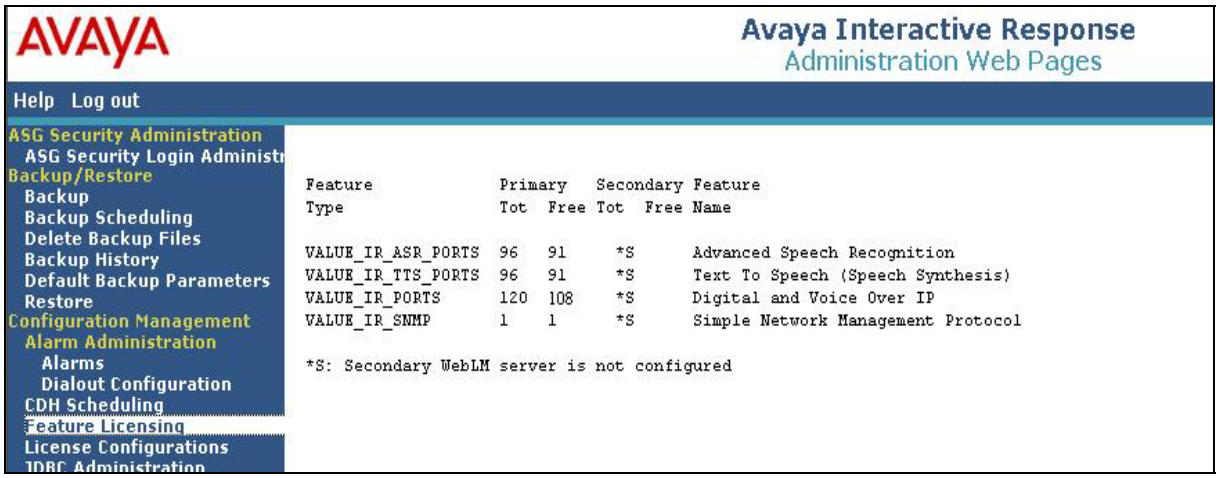
4.1. Verifying Licenses

Avaya IR R2.0 utilizes Primary and Secondary WebLM servers for implementation of feature licenses. If activation of additional features or ports is required, an updated license file must be obtain and installed on WebLM server. The license file contains details about the features and number of ports purchased. To obtain an updated license file, please contact your Avaya Authorized Sales representative.

The following illustrates how to verify the feature licenses on the Avaya IR.

Step	Description
1.	Upon successful login to Web Administration, the following page appears. The windowpane on the left of the web page contains all the Avaya IR Web Administration functions. To administer additional digital or VoIP (Channel) ports on the Avaya IR system requires the availability of free feature port licenses. To verify the Avaya IR System feature licenses, click on "**Feature Licensing"** under the "**Configuration Management**" section. 

Step	Description
2.	Verify that the number of free licenses for the feature type "**VALUE_IR_PORTS**" is a value equal to or greater than the number of ports/channels to be configured on the Avaya IR system. **Note:** Licenses will be requested by the Avaya IR system for only the number of "**Enabled Channels**" starting with channel 0. Refer to **steps 4**, **7 & 10** in **Section 4.3**.



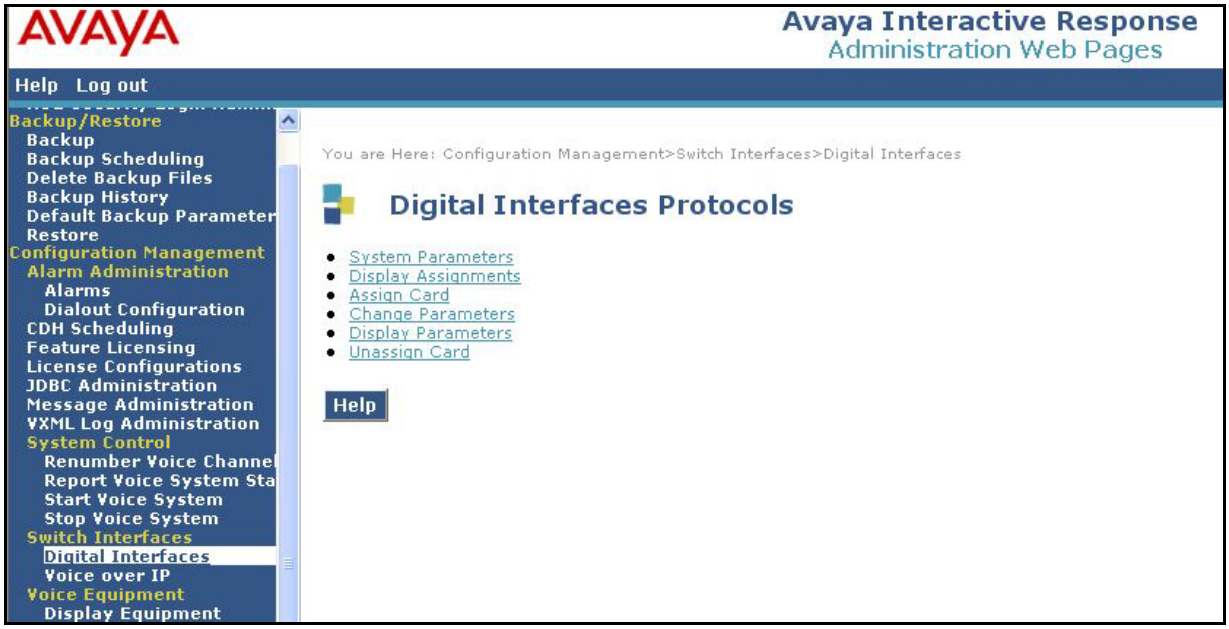
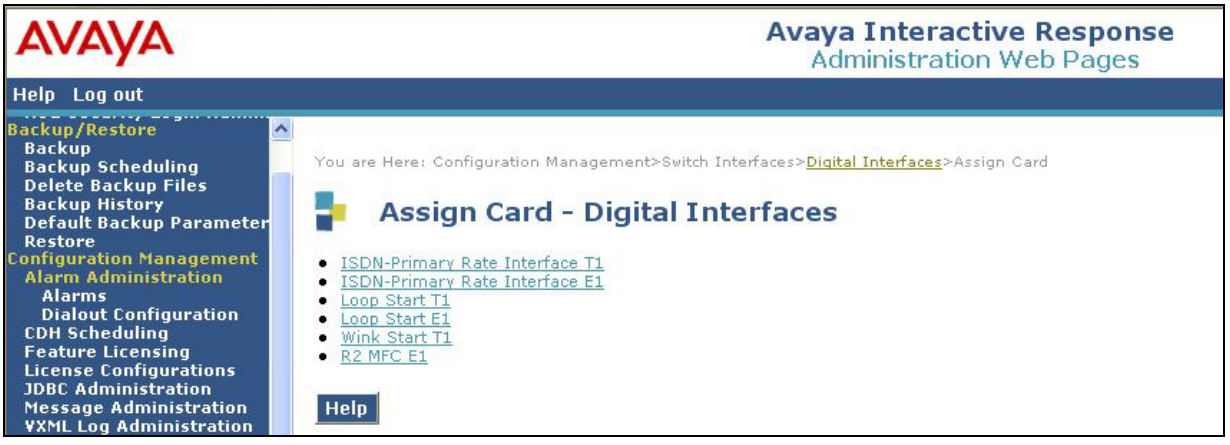
4.2. Verifying Installed NMS Package

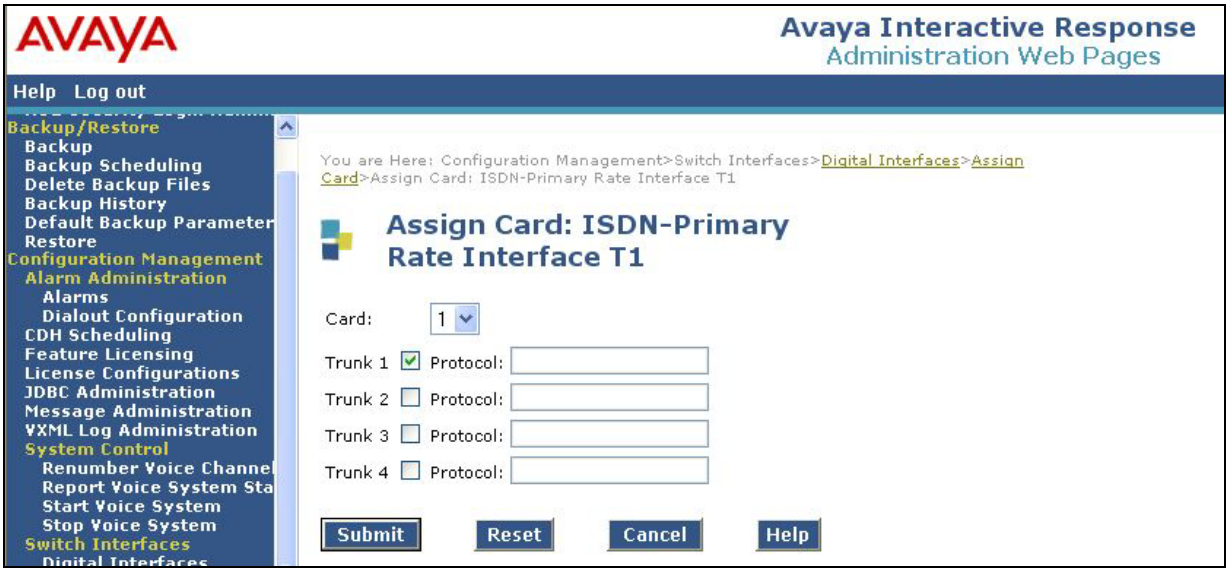
Log into the Avaya IR Command Line Interface (CLI) and issue the command "**naver**" to verify that the installed NMS package is "**Natural Access 2005-1**" or later version.

```
*************************************************************************
*     N a t u r a l   A c c e s s   software version utility            *
*     This program will list the installed NMS Communications software  *
*************************************************************************

Natural Access 2005-1

ag-cas version 2.29
ag-isdn version 1.92
cnf version 2.15
ctaccess version 4.16
dlcp-cg version 1.15
naabstrct version 4.16
nabase version 4.16
nacore version 4.16
nademos version 4.16
nadriver version 4.16
nadrv64 version 4.16
nadsp version 4.16
naruntime version 4.16
nfx version 4.25
oam version 1.15
sa-ir(root)#
```

4.3. Digital Interface Configuration

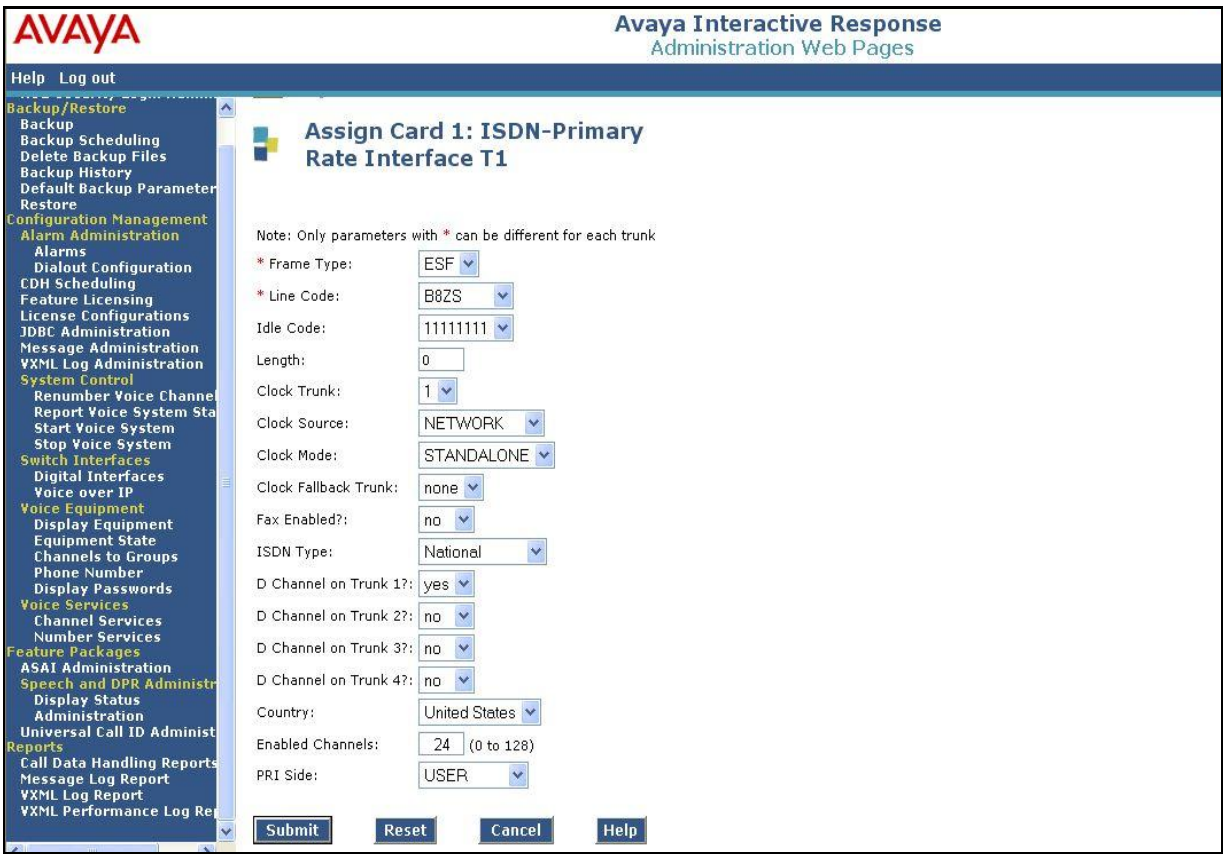
Continue by returning to Avaya IR Web Graphical User Interface (GUI).

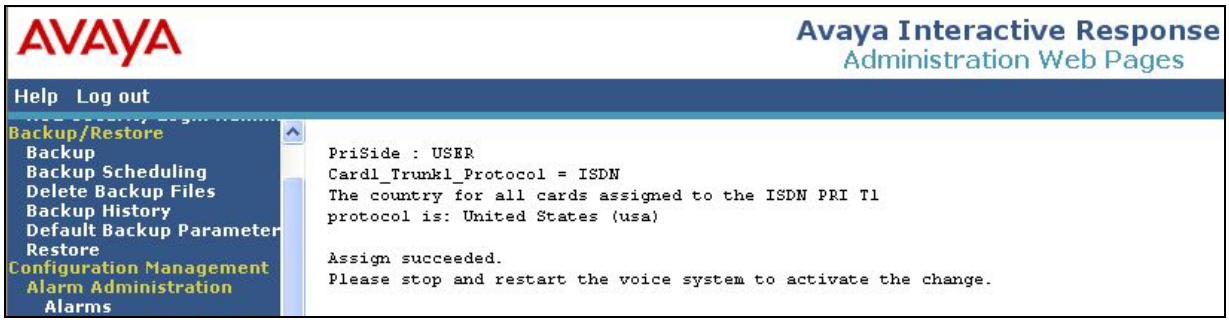
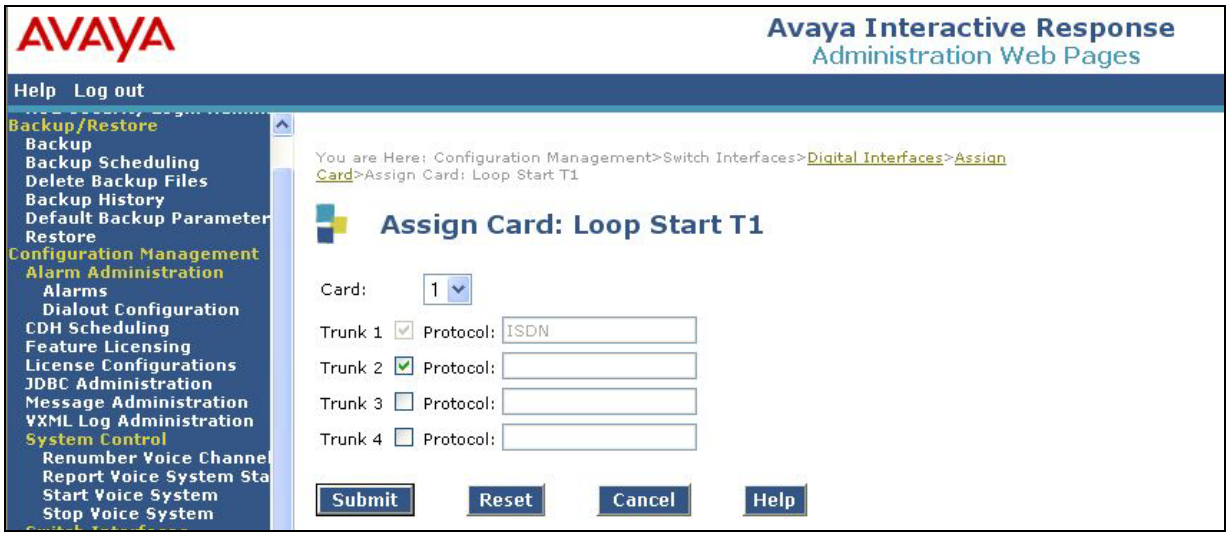
Step	Description
1.	To configure the NMS AG 4040 card, click on "**Digital Interfaces"** under the "**Switch Interfaces**" section. Click on the "**Assign Card**" link. 
2.	Click on the "**ISDN-Primary Rate Interface T1**" link to assign ISDN-PRI interface to the NMS AG 4040 card. 

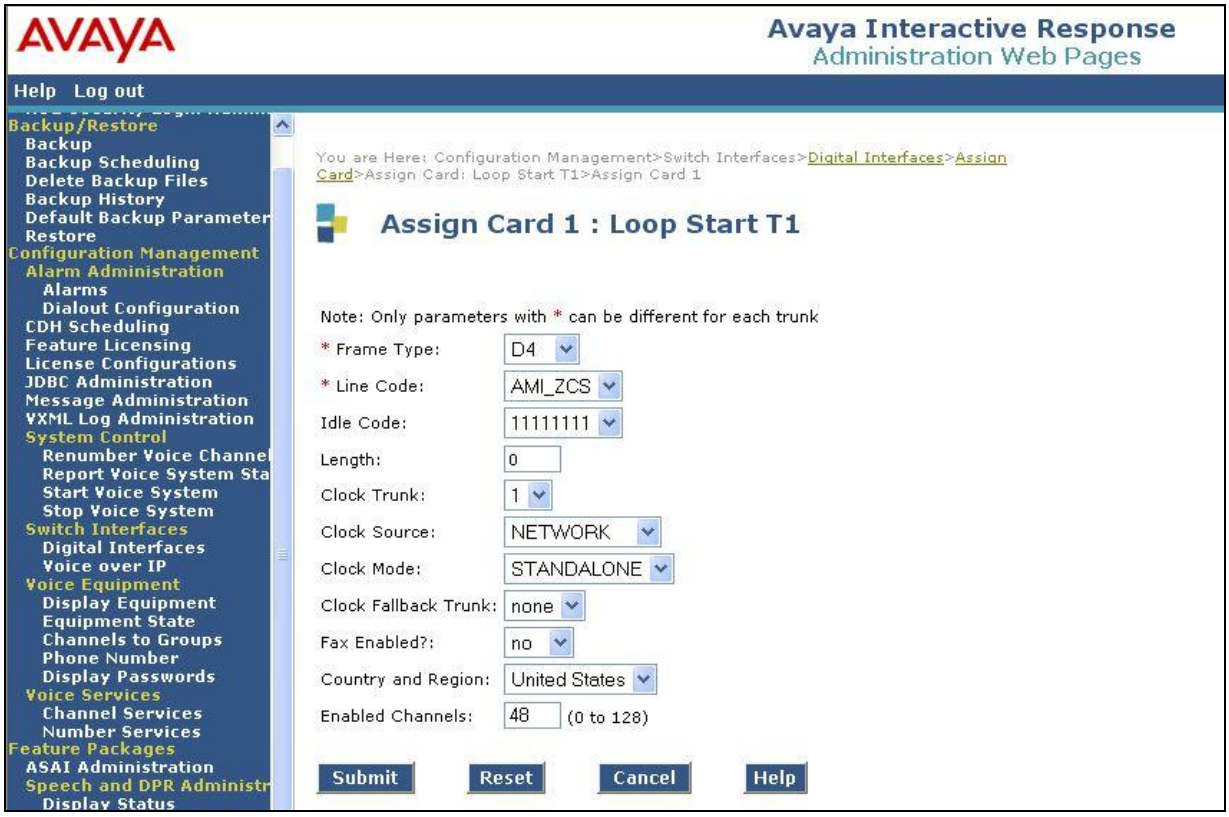
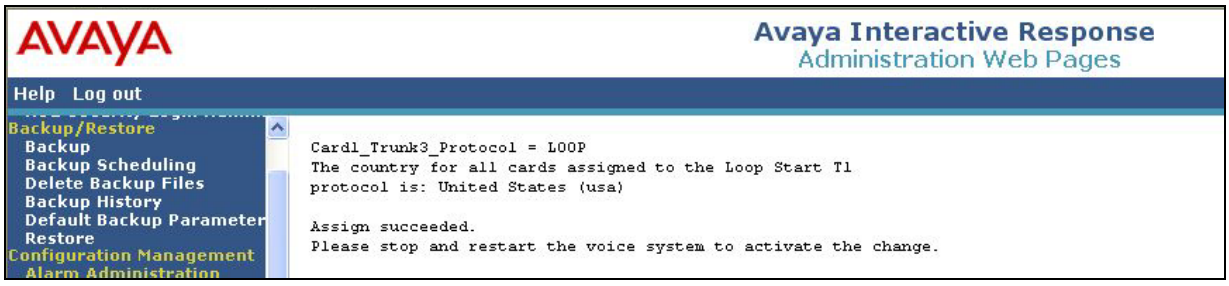
Step	Description
3.	The NMS AG 4040 card is the first card in the Avaya IR. To select the first trunk to configure on the NMS AG 4040 card, click on the check box to the right of the "**Trunk 1**" field (as shown below). Then click the "**Submit**" button when complete. 

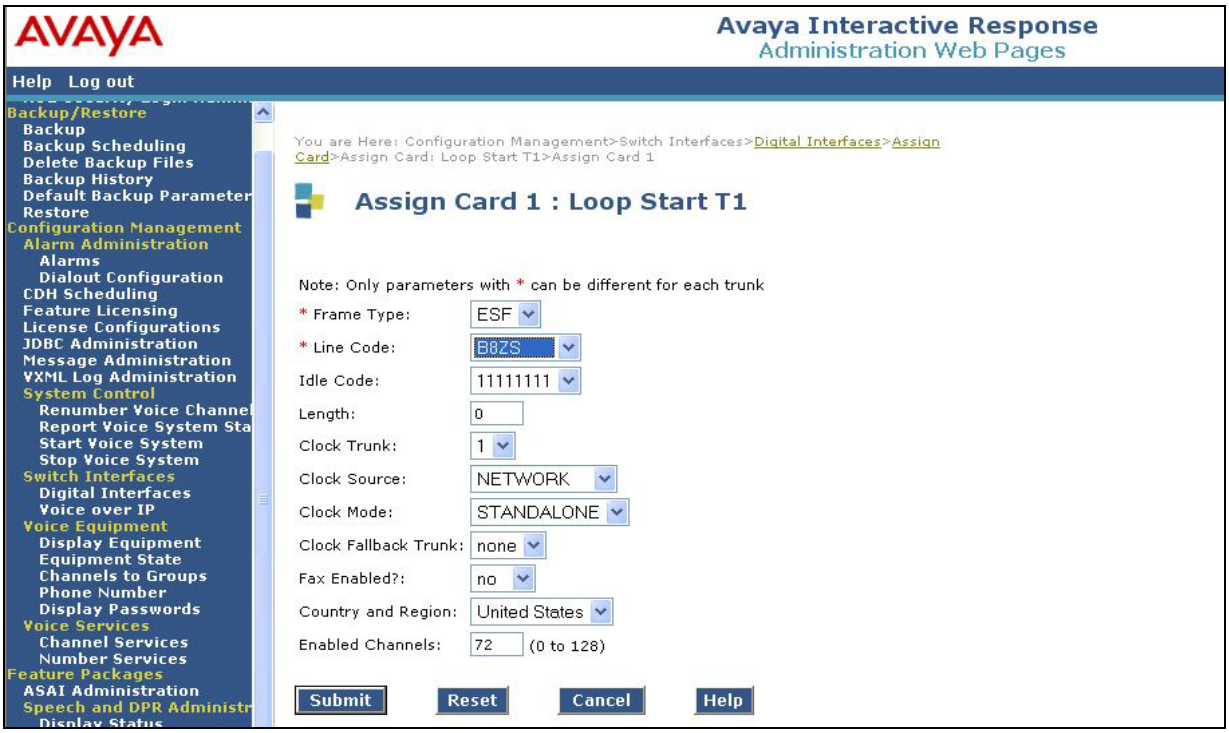
Step	Description
4.	Assign the following ISDN-PRI T-1 parameters for the Avaya IR to Main Office Link: **a.** The table below contains the ISDN-PRI T-1 parameters that must match the settings in Avaya Communication Manager for the Main Office DS1 configuration (Refer to **step 1** in **Section 3.1**): **b.** Set the "**ISDN Type**" field to "**National**". **c.** Set the "**D Channel on Trunk <2 to 4>**" to "**No**". **d.** Set the "**Enabled Channels**" field to "**24**" to enable the first 24 channels. **e.** Set the "**PRI Side**" field to "**USER**". Avaya Communication Manager must have the complementary setting of "**network**" for the Main Office DS1 configuration (Refer to **step 1** in **Section 3.1**). All other fields may be left at the default setting. Click on the "**Submit**" button to save the changes.

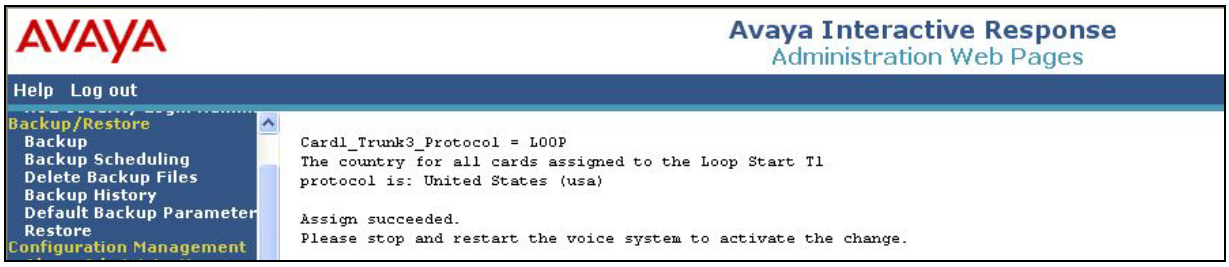
Avaya IR	Avaya Communication Manager	Field
Frame Type	Framing Mode	ESF
Line Code	Line Coding	B8ZS
Idle Code	Idle Code	11111111



Step	Description
5.	Avaya IR confirms the assignment of "**Trunk 1**" for the NMS AG 4040 "**Card 1**". 
6.	Repeat step 1 and then click on the "**Loop Start T1**" link to assign a Digital Loop Start interface to the NMS AG 4040 card. To select the second trunk to configure on the NMS AG 4040 card, click on the check box to the right of the "**Trunk 2**" field (as shown below). Then click the "**Submit**" button when complete. 

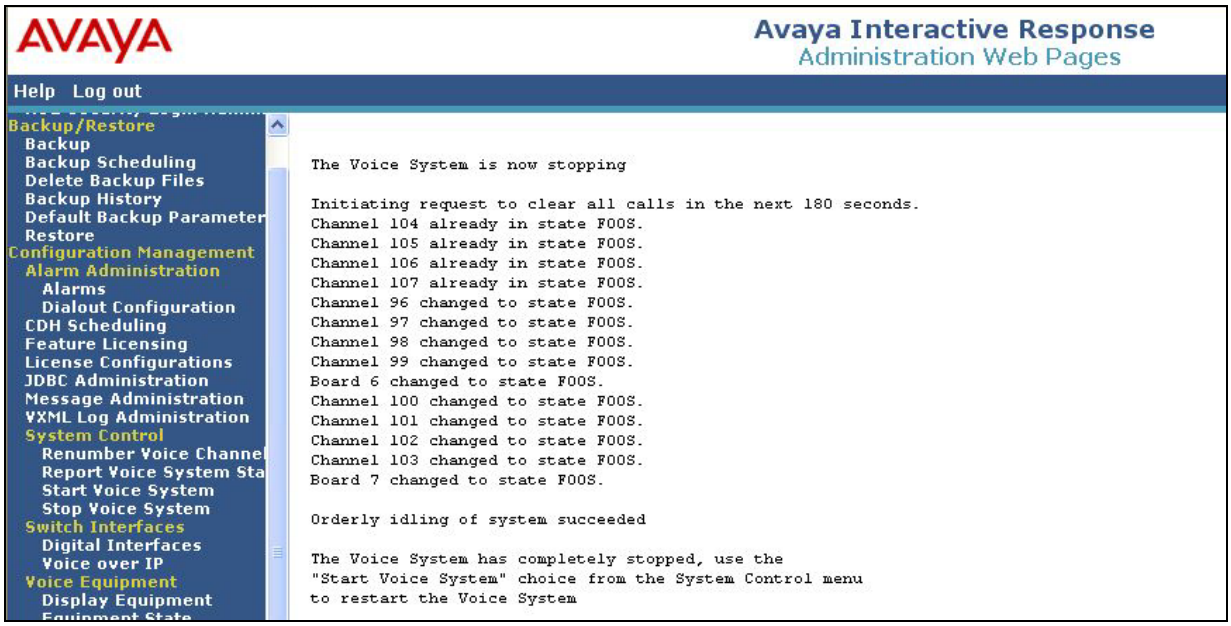
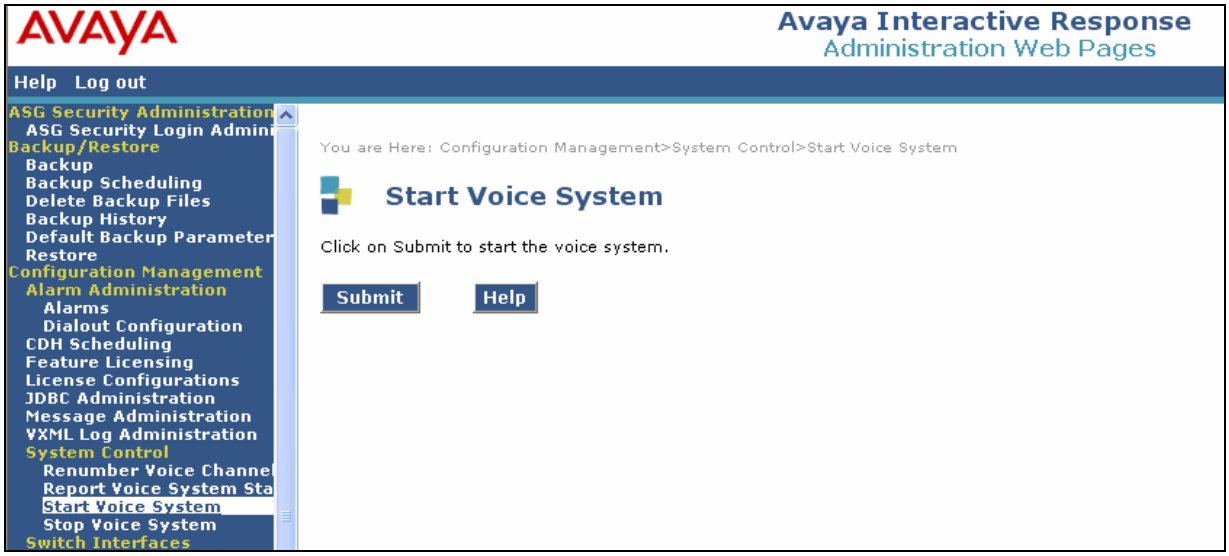
Step	Description
7.	The Loop Start T1 parameters must match the settings in Avaya Communication Manager for the Site 2 DS1 configuration (Refer to **step 1** in **Section 3.3**). Set the "**Enabled Channels**" field to "**48**" to enable all the channels for Trunk 1 and Trunk 2 on the NMS AG 4040 card. All other fields may be left at the default setting. Click on the "**Submit**" button to save the changes. 
8.	Avaya IR confirms the assignment of "**Trunk 2**" for the NMS AG 4040 "**Card 1**". 

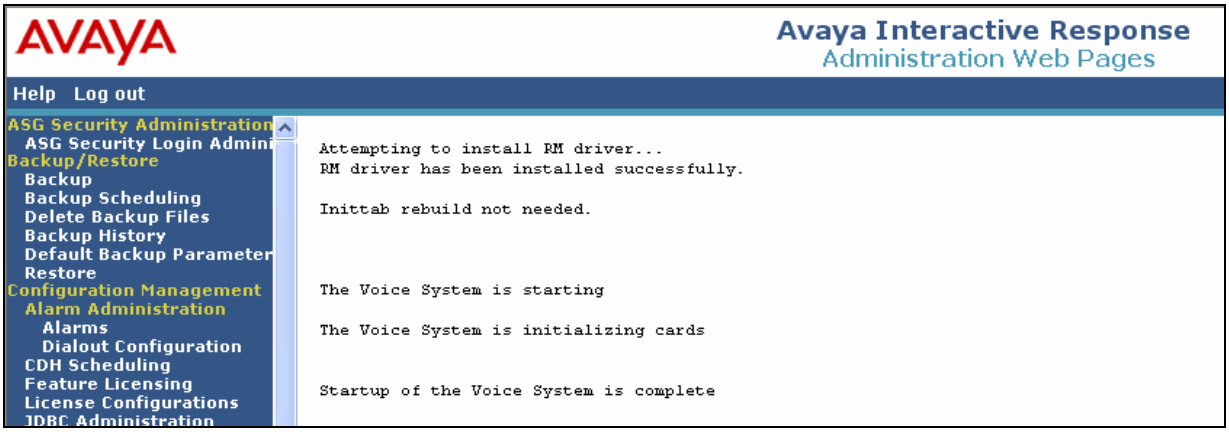
Step	Description
9.	Repeat step 1 and then click on the "**Loop Start T1**" link to assign the second Digital Loop Start interface to the NMS AG 4040 card. To select the third trunk to configure on the NMS AG 4040 card, click on the check box to the right of the "**Trunk 3**" field (as shown below). Then click the "**Submit**" button when complete. 
10.	The Loop Start T1 parameters must match the settings in Avaya Communication Manager for the Site 4 DS1 configuration (Refer to **step 1** in **Section 3.4**). Set the "**Enabled Channels**" field to "**72**" to enable all the channels for Trunk 1, Trunk 2, and Trunk 3 on the NMS AG 4040 card. All other fields may be left at the default setting. Then click the "**Submit**" button when complete. 

Step	Description
11.	Avaya IR confirms the assignment of "**Trunk 3**" for the NMS AG 4040 "**Card 1**". 

4.4. Activating the Digital Interface Configuration

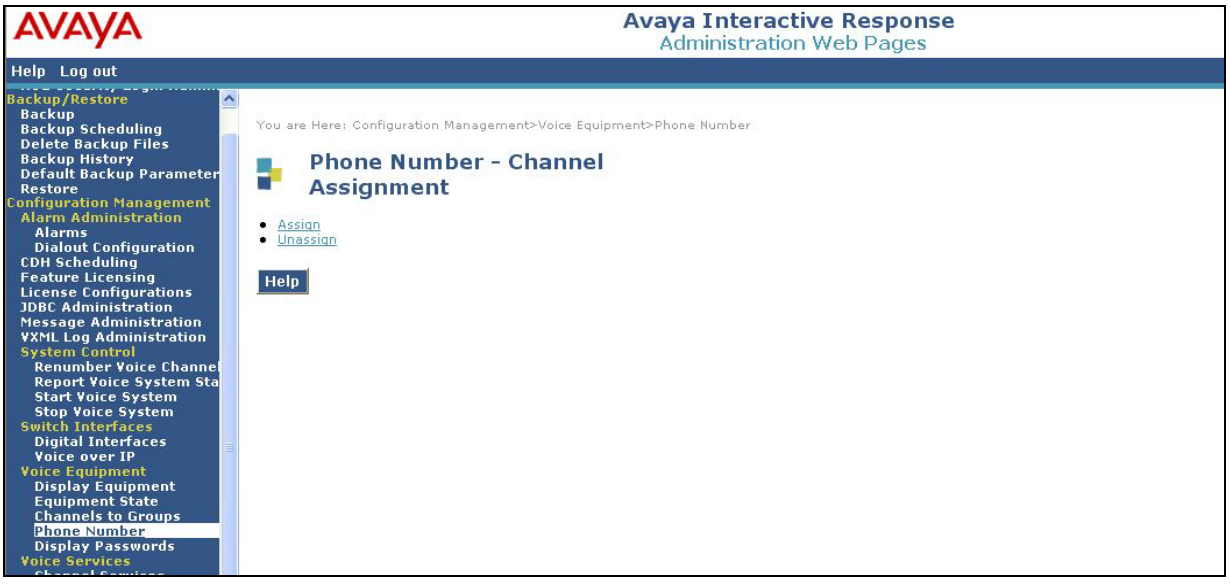
Step	Description
1.	To activate the configuration changes, stop and then restart the voice system. Click on "**Stop Voice System"** under the "**System Control**" section to stop the voice system. 

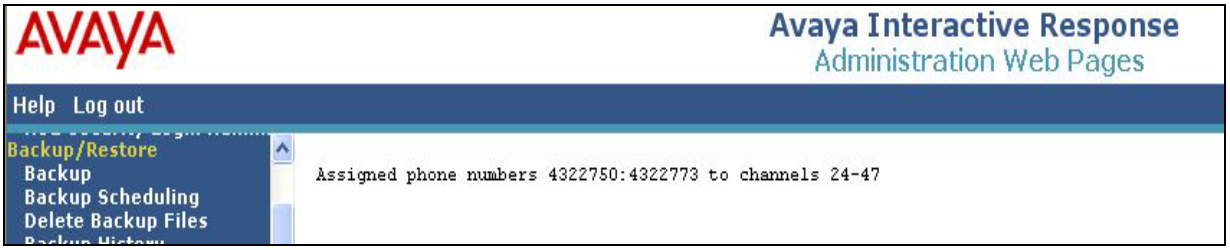
Step	Description
2.	Click on the "**Submit**" button. Avaya IR confirms the voice system has completely stopped. 
3.	To restart the voice system, click on "**Start Voice System**" under the "**System Control**" section. Click on the "**Submit**" button. 

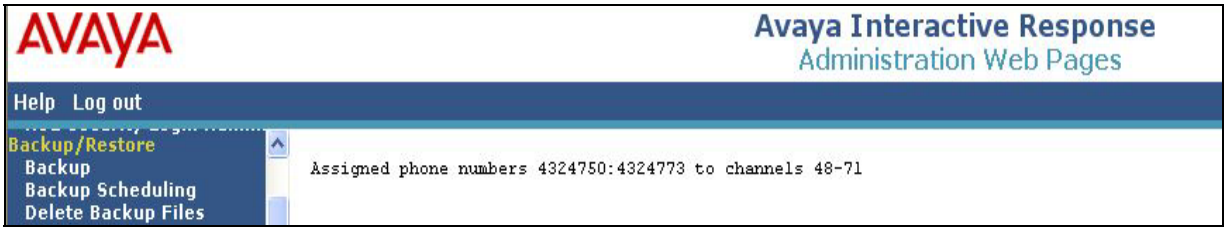
Step	Description
4.	Avaya IR confirms the voice system has completed Voice System startup. 

4.5. Assigning Phone Numbers

For Digital Loop Start channels, each channel must be assigned a phone number that matches the assigned station extension and corresponding port address in Avaya Communication Manager. This does not apply to the ISDN-PRI channels.

Step	Description
1.	To assign phone numbers to Digital Loop Start channels, click on "**Phone Number"** under the "**Voice Equipment"** section. Click on the "**Assign**" link to continue. 

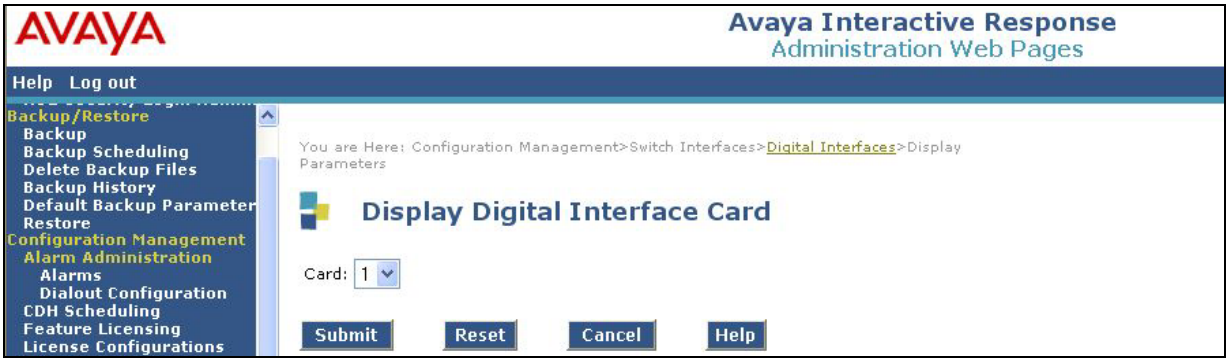
Step	Description
2.	Enter the extension range for the Site 2 Digital Loop Start channels in the "**Phone Number**" fields and the channel range in the "**Channel Number**" fields as shown below. Click the "**Submit**" button. **Note:** Phone Number range must be the same length as the Channel Number range. 
3.	Avaya IR confirms the assignment of the phone number to each channel for the submitted range. 

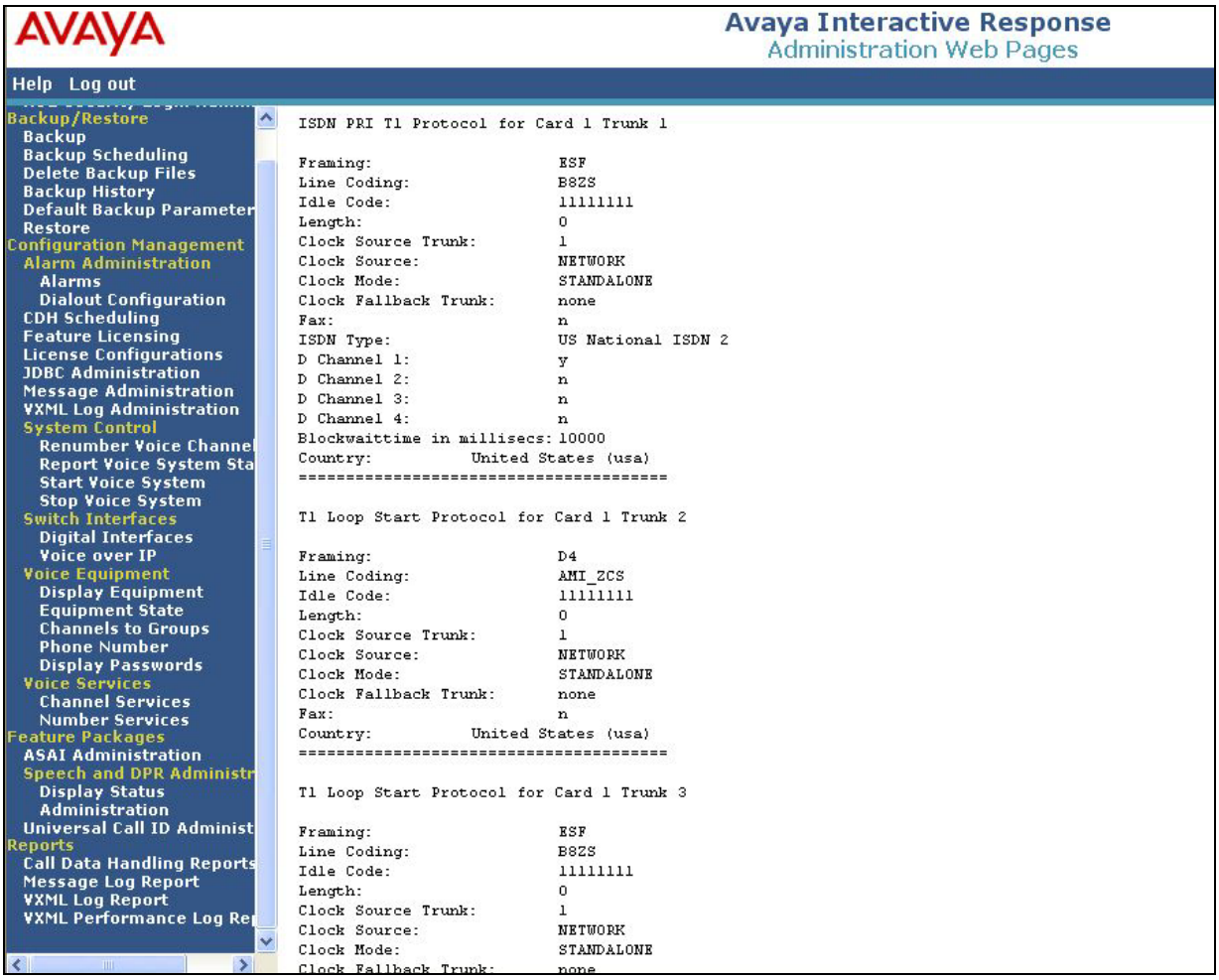
Step	Description
4.	Repeat **step 1** to enter the extension range for the Site 4 Digital Loop Start channels in the "**Phone Number**" fields, the channel range in the "**Channel Number**" fields as shown below. Click the "**Submit**" button. **Note:** Phone Number range must be the same length as the Channel Number range. 
5.	Avaya IR confirms the assignment of the phone number to each channel for the submitted range. 

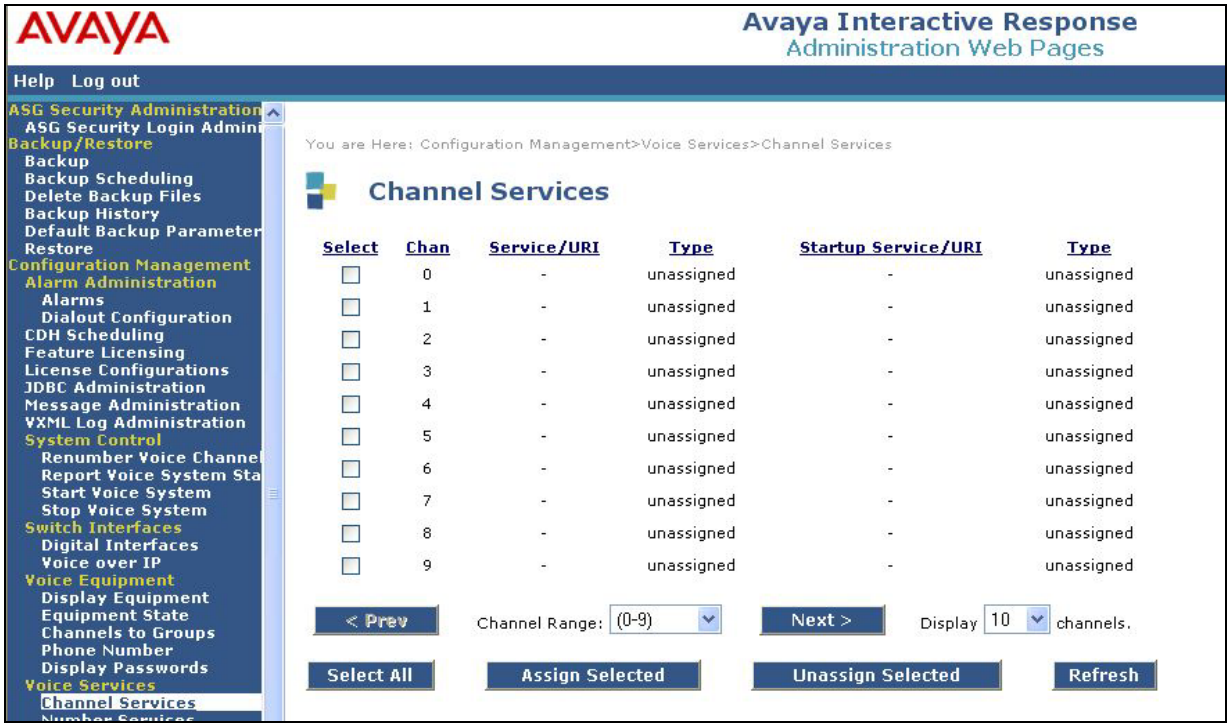
5. Verification Steps

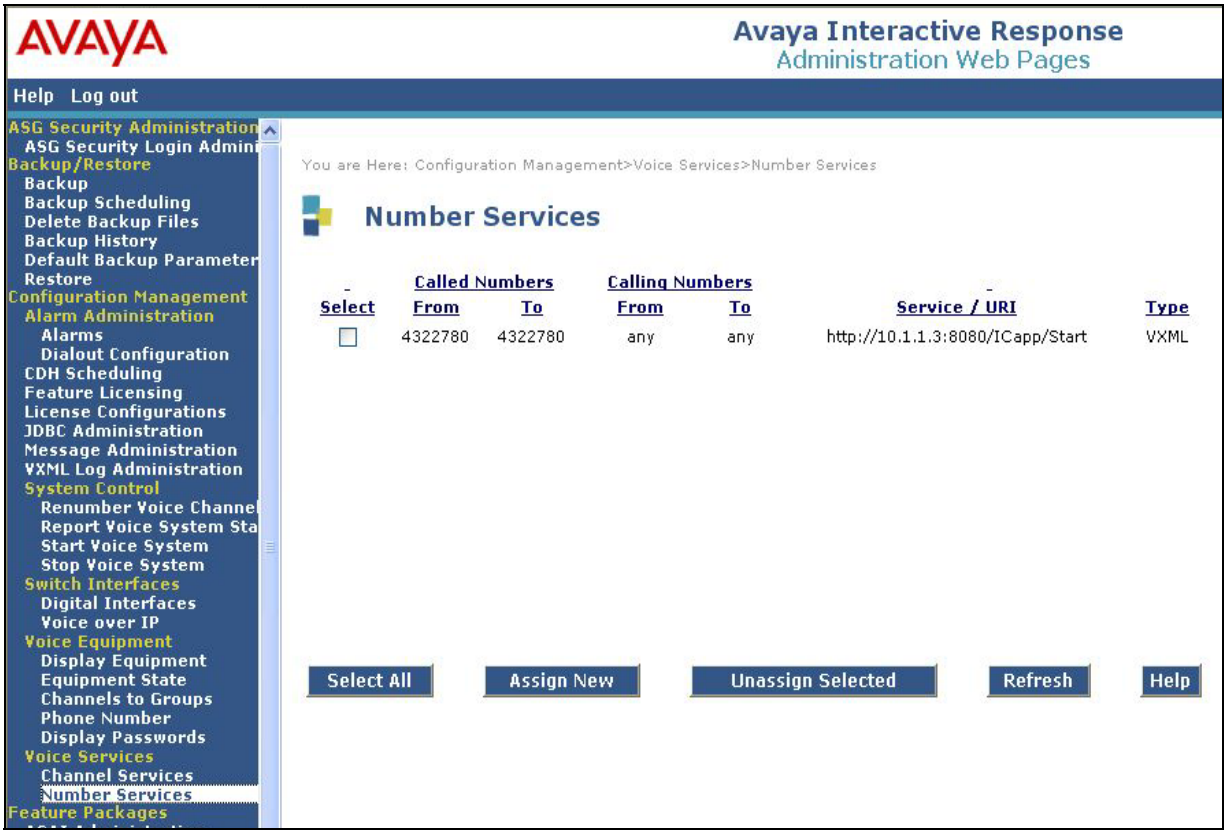
Perform the following steps to test and verify the Avaya IR Digital Interface Configuration.

Step	Description
1.	To display the assigned NMS AG 4040 Card 1 parameters, click on "**Digital Interfaces"** and click the "**Display Parameters**" link. Click on the "**Submit**" button. (output shown below)



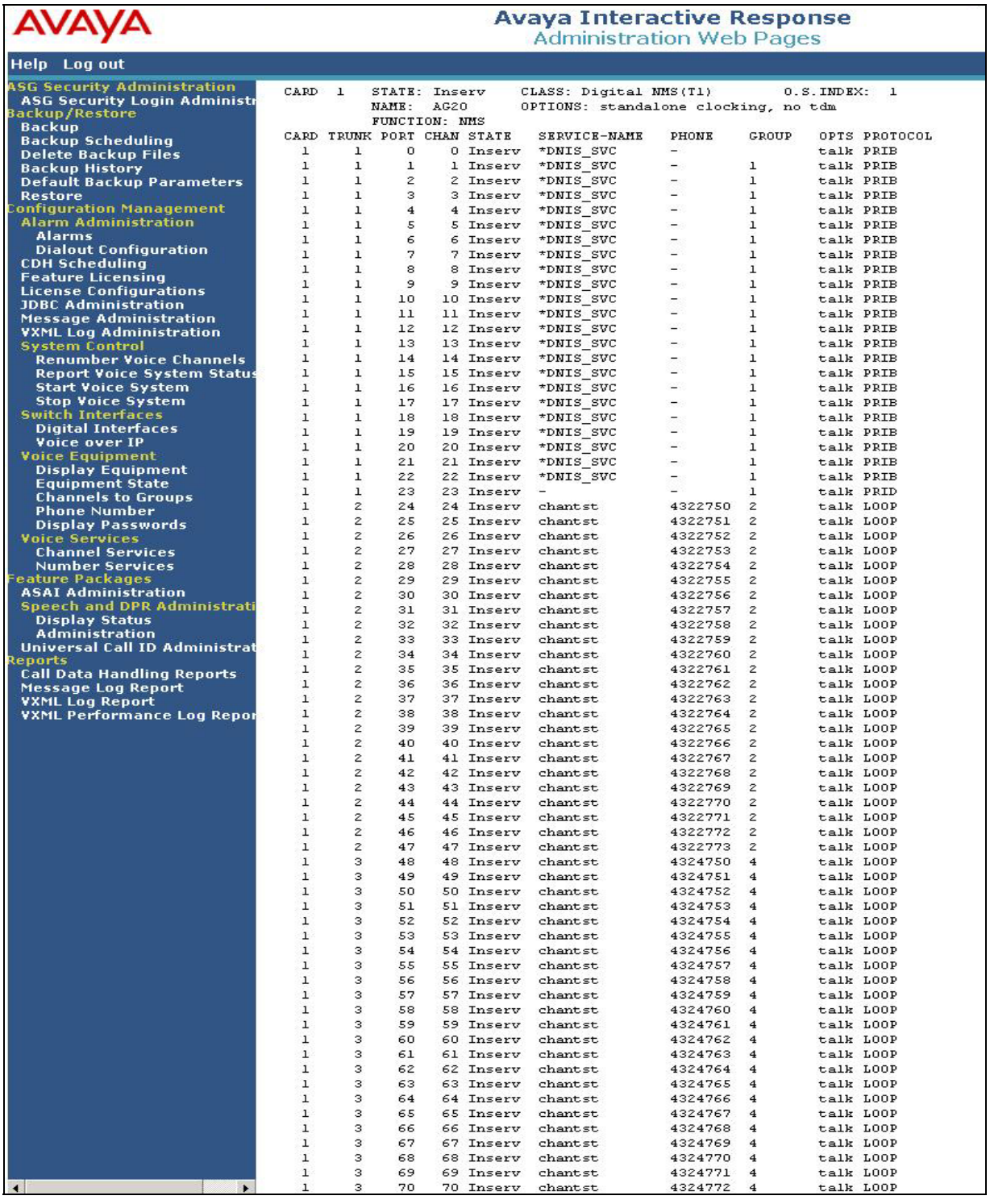


Step	Description
2.	To terminate a call to Avaya IR, an application must be assigned to the Avaya IR channels. Click on "**Channel Services**" under the "**Voice Services**" section. The resulting Web administration page is shown below. Click on the "**Assign Selected**" button without selecting any channels. This will bring up the "**Assign Services to Channels**" Web page. 
3.	Select "**chantst**" for the "**Service**" and "**Startup Service**" fields as the test application, and enter the channel range "**24-72**" in the "**To Chan(s)**" field. Click on the "**Submit**" button to complete the administration. **Note:** The "**chantst**" is one of the Transaction Assembler Script (TAS) applications installed by default on the Avaya IR system for testing purposes. 

Step	Description
4.	Repeat **step 2** to assign DNIS Service application to the ISDN-PRI channels. Select "***DNIS_SVC**" for the "**Service**" and "**Startup Service**" fields and enter the channel range "**0-22**" (channel 23 is the d-channel) in the "**To Chan(s)**" field. Click on the "**Submit**" button to complete the administration. 
5.	To assign a DNIS number or range of numbers, click on "**Number Services**" under the "**Voice Services**" section. Click on the "**Assign New**" button. 

Step	Description
6.	Enter the DNIS number (Example: "**4320770**") or DNIS range in the "**Called Numbers**" field. In the "**Calling Numbers**" field, enter "**any**" so that the Avaya IR accepts any incoming calling party via the ISDN-PRI T-1. Select "**chantst**" for the "**Service Name**" field as the test application. Click on the "**Submit**" button to complete the administration. (output shown below)

Step	Description
7.	Click on "**Display Equipment**" under the "**Voice Equipment**" section. View and verify that all assigned channels ("**CHAN**") for the Main Office (0 – 23), Site 2 (24 – 47) and Site 4 (48-71) locations are in the "**Inserv**" (in-service) state. (Only the enabled channels are displayed.)



Step	Description

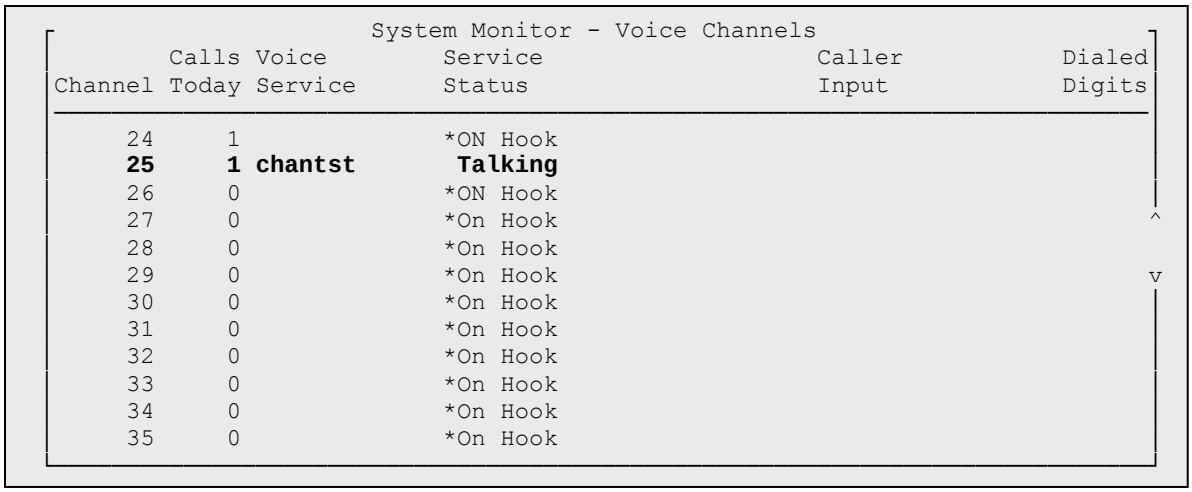
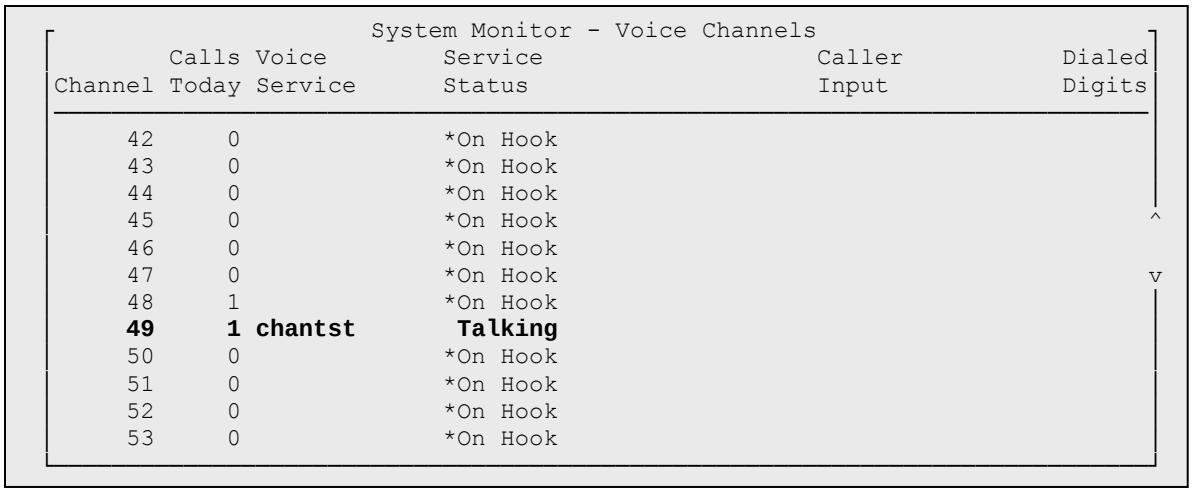
8.	From the Avaya Communication Manager SAT terminal, enter the command "**status signaling-group *y*"**, where ***y*** is the assigned signaling-group number (**step 2** in **Section 3.2**) for the d-channel associated with the Main Office to Avaya IR ISDN-PRI T-1. Verify that the "**Group State**" and "**Level 3 State**" fields display "**in-service**".
	
	`status signaling-group 12`
	`STATUS SIGNALING GROUP`
	
	`Group ID: 12 Active NCA-TSC Count: 0`
	`Group Type: isdn-pri Active CA-TSC Count: 0`
	`Signaling Type: facility associated signaling`
	`Group State: in-service`
	
	`Primary D-Channel`
	
	`Port: 01A1224` **`Level 3 State: in-service`**
	
	`Secondary D-Channel`
	
	`Port: Level 3 State: no-link`

9.	Enter the command "**status trunk *z*"**, where ***z*** is the assigned trunk group number (**step 3** in **Section 3.2**) for the Main Office to Avaya IR ISDN-PRI T-1. Verify that the "**Service State**" fields display "**in-service/idle**" for each trunk group "**Member**".
	
	`status trunk 12 Page 1`
	
	`TRUNK GROUP STATUS`
	
	`Member Port` **`Service State`** `Mtce Connected Ports Busy`
	
	`0012/001 01A1201` **`in-service/idle`** `no`
	`0012/002 01A1202` **`in-service/idle`** `no`
	`0012/003 01A1203` **`in-service/idle`** `no`
	`0012/004 01A1204` **`in-service/idle`** `no`
	`0012/005 01A1205` **`in-service/idle`** `no`
	`0012/006 01A1206` **`in-service/idle`** `no`
	`0012/007 01A1207` **`in-service/idle`** `no`
	`0012/008 01A1208` **`in-service/idle`** `no`
	`0012/009 01A1209` **`in-service/idle`** `no`
	`0012/010 01A1210` **`in-service/idle`** `no`
	`0012/011 01A1211` **`in-service/idle`** `no`
	`0012/012 01A1212` **`in-service/idle`** `no`
	`0012/013 01A1213` **`in-service/idle`** `no`
	`0012/014 01A1214` **`in-service/idle`** `no`
	
	`press CANCEL to quit -- press NEXT PAGE to continue`

Step	Description
10.	Enter the command "**status station *v*"**, where ***v*** is the assigned station (**step 2** in **Section 3.3**) for the Site 2 to Avaya IR Digital Loop Start T-1. Verify that the "**Service State**" field should display "**in-service/on-hook**". Repeat command to verify each station/channel.
11.	Enter the command "**status station *t"***, where ***t*** is the assigned station (**step 2** in **Section 3.4**) for the Site 4 to Avaya IR Digital Loop Start T-1. Verify that the "**Service State**" field should display "**in-service/on-hook**". Repeat command to verify each station/channel.
12.	Log into the Avaya IR system using a Terminal Emulator Application with a terminal type of 615 and appropriate login credentials. At the prompt, type "**sysmon**" to run the "**System Monitor – Voice Channels**" application that provides real-time monitoring service. Place an incoming call using the DNIS number assigned in step 5 (4320770). Verify that Avaya IR answers the call within the (0 to 22) channel range, and by the "**chantst**" voice application.

```
status station 4322750                                        Page   1 of   3
                              GENERAL STATUS
     Administered Type: DS1FD              Service State: in-service/on-hook
        Connected Type: N/A
             Extension: 4322750
                  Port: 02A0401       Parameter Download: not-applicable
           Call Parked? no                 SAC Activated? no
      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:




 User Cntrl Restr: none                        HOSPITALITY STATUS
Group Cntrl Restr: none                     Awaken at:
                                             User DND: not activated
                                            Group DND: not activated
                                          Room Status: non-guest room
```

```
                      System Monitor - Voice Channels
        Calls Voice        Service                    Caller           Dialed
Channel Today Service      Status                     Input            Digits
──────────────────────────────────────────────────────────────────────────────
      0     1              *On Hook
      1     1 chantst       Talking
      2     0              *ON Hook                                          ^
      3     0              *On Hook
      4     0              *On Hook
      5     0              *On Hook                                          v
      6     0              *On Hook
      7     0              *On Hook
      8     0              *On Hook
      9     0              *On Hook
     10     0              *On Hook
     11     0              *On Hook
```

Step	Description
13.	Place an incoming call using the "**Group Extension**" (4322590) assigned for Site 2 (**step 4** in **Section 3.3**). Verify that Avaya IR answers the call within the (24 to 47) channel range, and by the "**chantst**" voice application.  System Monitor - Voice Channels Channel / Calls Today / Voice Service / Service Status / Caller Input / Dialed Digits 24 1 *ON Hook **25 1 chantst Talking** 26 0 *ON Hook 27 0 *On Hook 28 0 *On Hook 29 0 *On Hook 30 0 *On Hook 31 0 *On Hook 32 0 *On Hook 33 0 *On Hook 34 0 *On Hook 35 0 *On Hook
14.	Place an incoming call using the "**Group Extension**" (4324590) assigned for Site 4 (**step 4** in **Section 3.4**). Verify that Avaya IR answers the call within the (48 to 71) channel range, and by the "**chantst**" voice application.  System Monitor - Voice Channels Channel / Calls Today / Voice Service / Service Status / Caller Input / Dialed Digits 42 0 *On Hook 43 0 *On Hook 44 0 *On Hook 45 0 *On Hook 46 0 *On Hook 47 0 *On Hook 48 1 *On Hook **49 1 chantst Talking** 50 0 *On Hook 51 0 *On Hook 52 0 *On Hook 53 0 *On Hook

6. Conclusion

These Application Notes described the steps for configuring ISDN-PRI and Digital Loop Start T-1 interfaces on an Avaya IR system that supports multiple trunk parameter administration with a single quad-port T-1 telephony card. Administration details were shown on both Avaya Communication Manager and Avaya IR products including steps that verified their configuration.

7. References

Product documentation for Avaya products may be found at http://support.avaya.com.

1. *"Avaya Interactive Response (IR), Release 2.0, Documentation CD-ROM"*, Issue 1.0, April 2006, Comcode: 700397003
2. *"Avaya Interactive Response, Release 2.0, Security"*, Issue 1.0, April 2006
3. *"Administrator Guide for Avaya Communication Manager"*, Issue 2, February 2006, Document ID 03-300509.
4. *"AG 4040 Installation and Developer's Manual"*, NMS Communications Corporation, P/N 9000-62337-14.

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 Solution & Interoperability Test Lab at interoplabnotes@list.avaya.com