Application Note

Avaya Definity CM 2.0 to a Cisco IAD243X using T1-CAS FXS/FXO with SIP

January 10, 2007 Initial Version

Table of Contents

Introduction

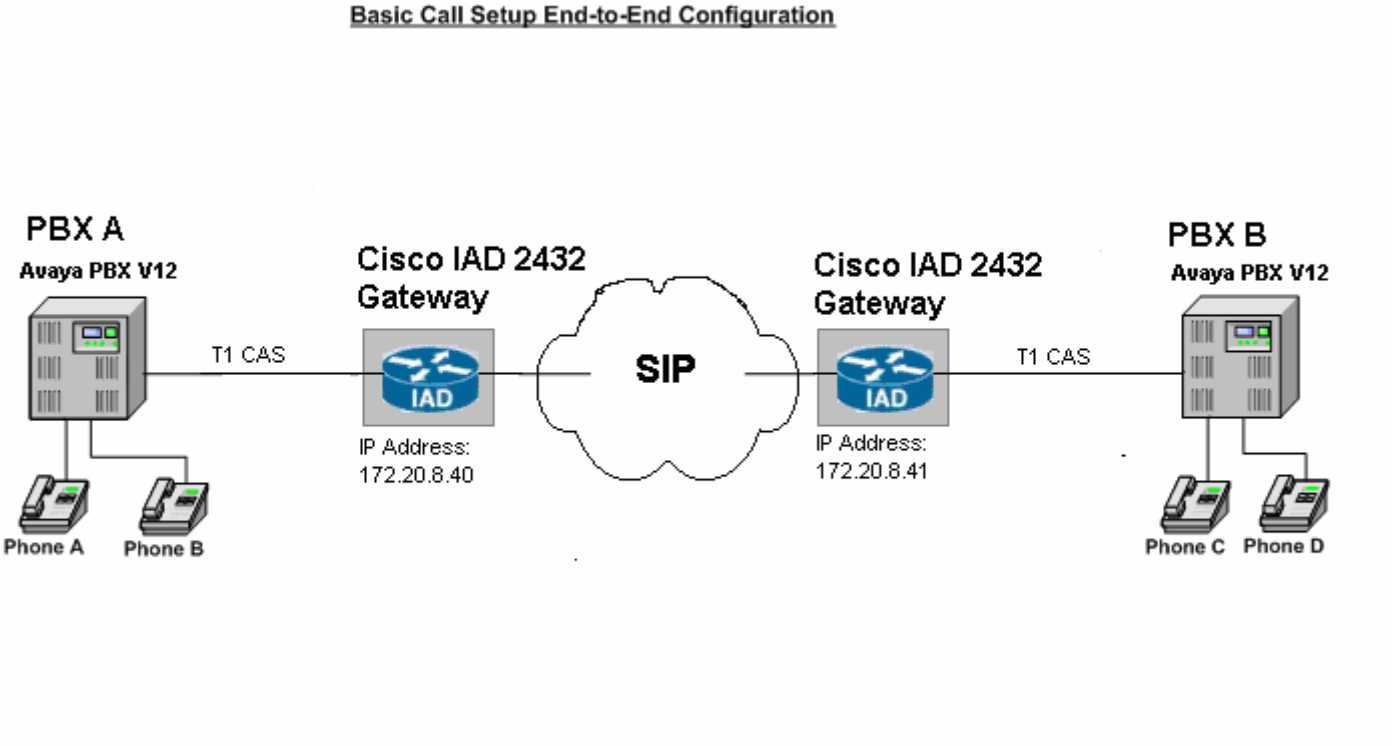
This is an application note for connectivity to the Avaya Definity G3 Communications Manager 2.0 with Cisco IAD243X Gateway via T1 CAS FXS/FXO-to-SIP communication (10/100baseT).

The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with the Cisco IAD243X Gateway connected to the PBX via T1-CAS FXS/FXO signaling. IP trunk connectivity between the IAD243X's is achieved by using SIP protocol.

Test Results obtained are based on FXS/FXO loop-start and ground-start. All features tested yielded the same results for both CAS signaling types (except for Disconnect Supervision, see limitation section for details); this Application Note covers both CAS signaling types.

Network Topology

Figure 1. Basic Call Setup



Limitations

ANI (Automatic Number Identification) is not supported with the detailed Avaya configuration.

The FXS/FXO trunk configuration on Avaya does not allow DID. The incoming call into the Avaya PBX always reaches the same destination (i.e. ATTD or dedicated digital station)

Loop-Start limitation only; on a call, when the originating calling phone hangs-up the called phone will not release the circuit. The called phone must be placed on-hook or a re-order tone will be heard after a timer expiration period.

External Call Transfer is not supported (e.g. Phone A calls Phone C and Phone C transfers to Phone B). Avaya detailed configuration limitation.

CallForward on an external incoming call fails. Avaya detailed config limitation

Hardware Requirements

2 Cisco IAD2432 24FXS

2 Avaya Definity G3 w/ TN464F circuit pack

4 Avaya Digital stations 8410D

1 Cisco Catalyst switch (CAT6500)

Software Requirements

Avaya PBX: G3 Version 12 Communications Manager 2.0

Cisco IOS Release: c2430-ik9o3s-mz-124-9.T1

Features

Features Supported

Basic end-to-end calls

Call Transfer – Local only

Call Waiting

Call on-hold

Features Not Supported

ANI

Call Forward

Call Transfer – External

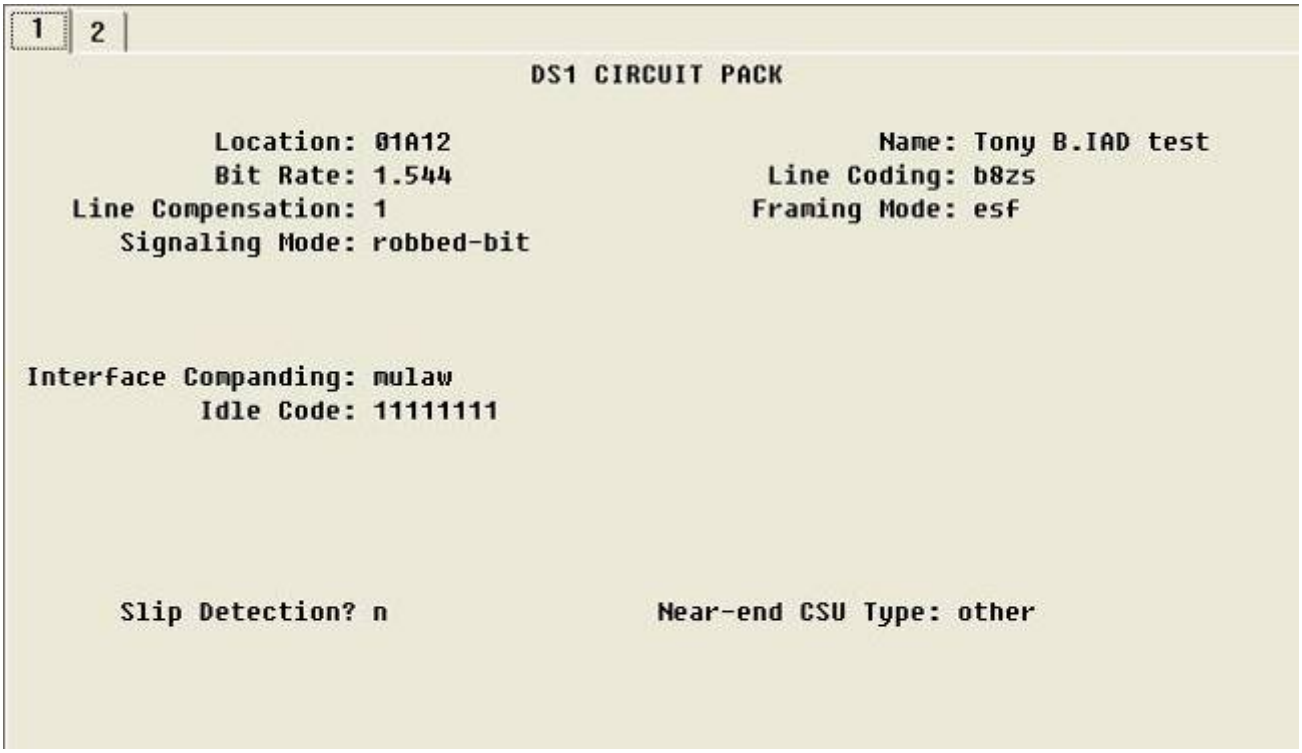
Conferencing

Configuration

Configuration Sequence and Tasks for the Avaya System

1. DS1 Configuration
2. Trunk group
3. Assign trunk members
4. Uniform-dialing
5. ARR
6. Route Pattern
7. Digital station config

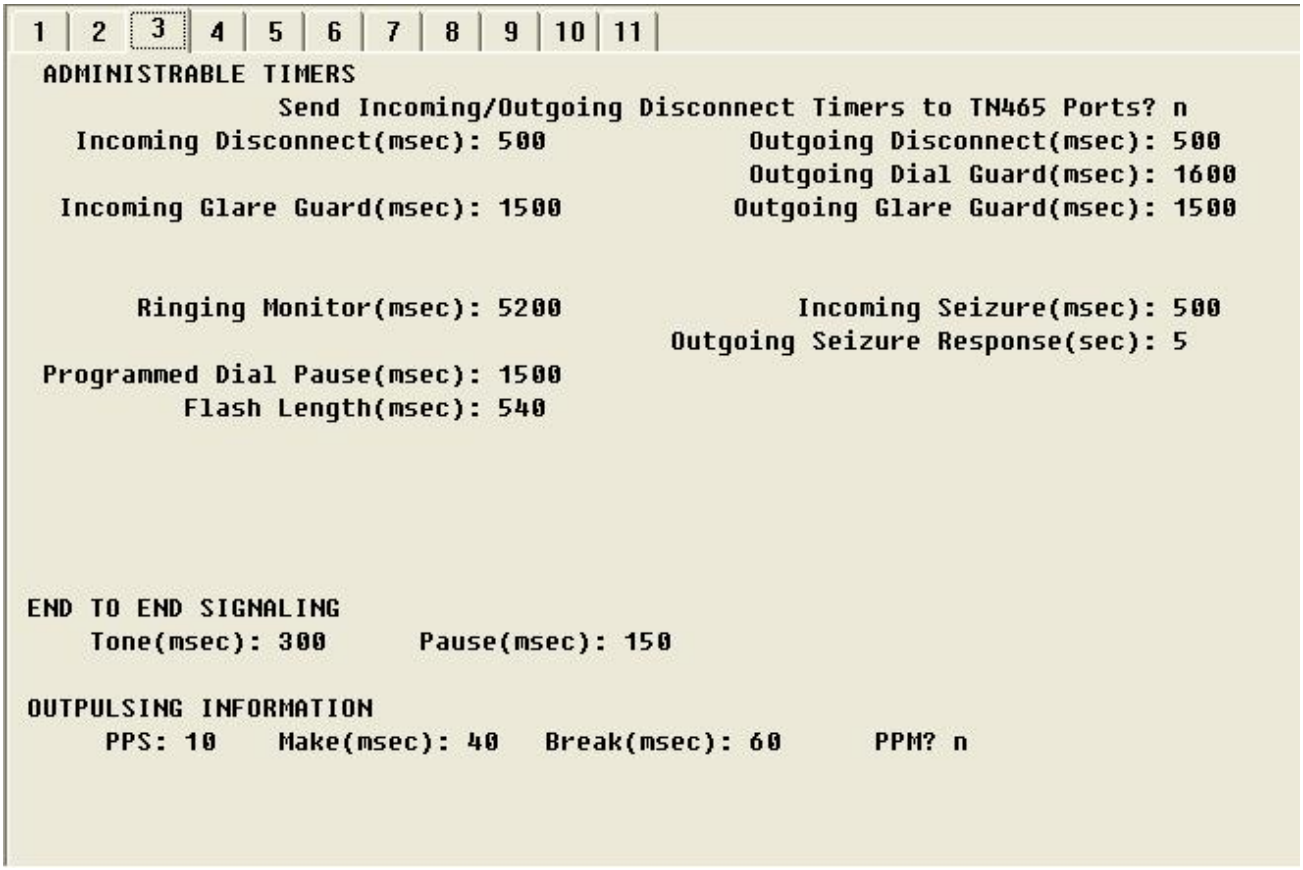
Avaya PBX Configuration

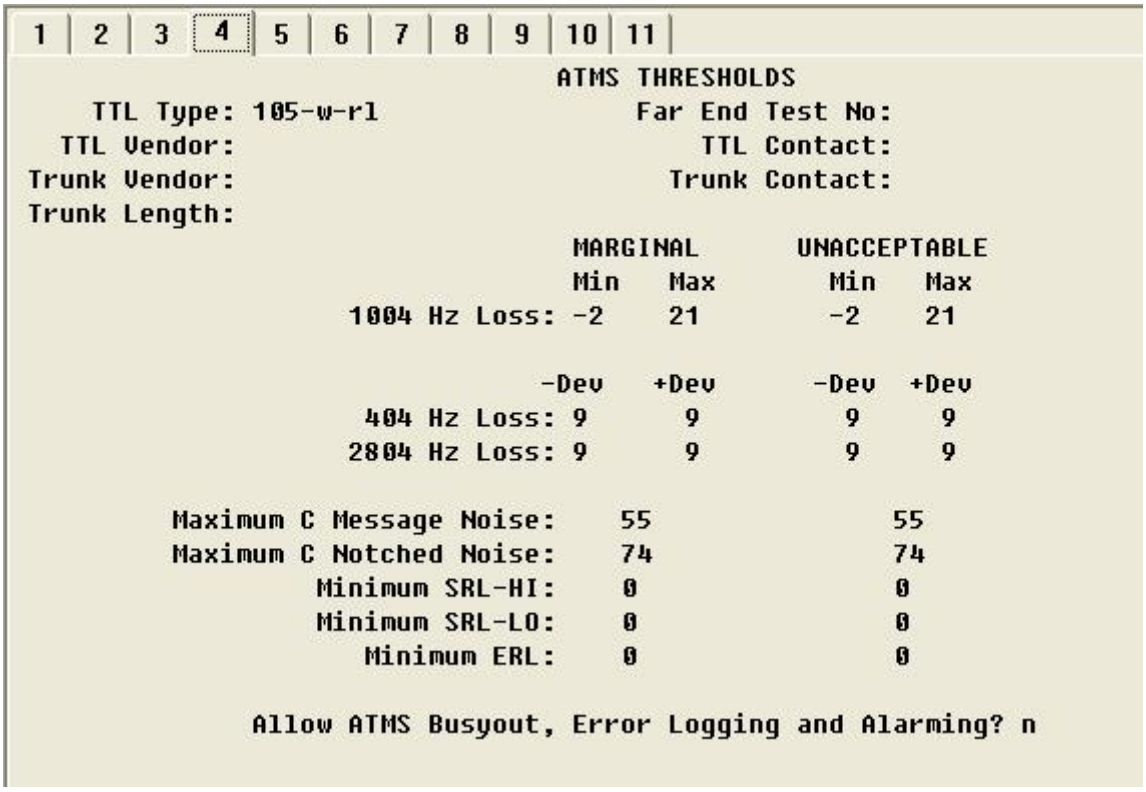


FX-Loop-Start

```
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
                              TRUNK GROUP

Group Number: 12                    Group Type: co            CDR Reports: y
  Group Name: Tony B. IAD testing         COR: 1        TN: 1        TAC: 612
   Direction: two-way        Outgoing Display? n
 Dial Access? y                Busy Threshold: 99        Night Service:
Queue Length: 0           Country: 1              Incoming Destination: 2004
   Comm Type: voice                  Auth Code? n   Digit Absorption List:
    Prefix-1? y                    Trunk Flash? n         Toll Restricted? y

TRUNK PARAMETERS
            Trunk Type: loop-start
    Outgoing Dial Type: tone                                Cut-Through? n
     Trunk Termination: rc                    Disconnect Timing(msec): 750

            Auto Guard? n    Call Still Held? n     Sig Bit Inversion: none
     Analog Loss Group: 6                           Digital Loss Group: 11
                                Trunk Gain: high

 Disconnect Supervision - In? y  Out? n                 Cyclical Hunt? y
 Answer Supervision Timeout: 0             Receive Answer Supervision? y
```

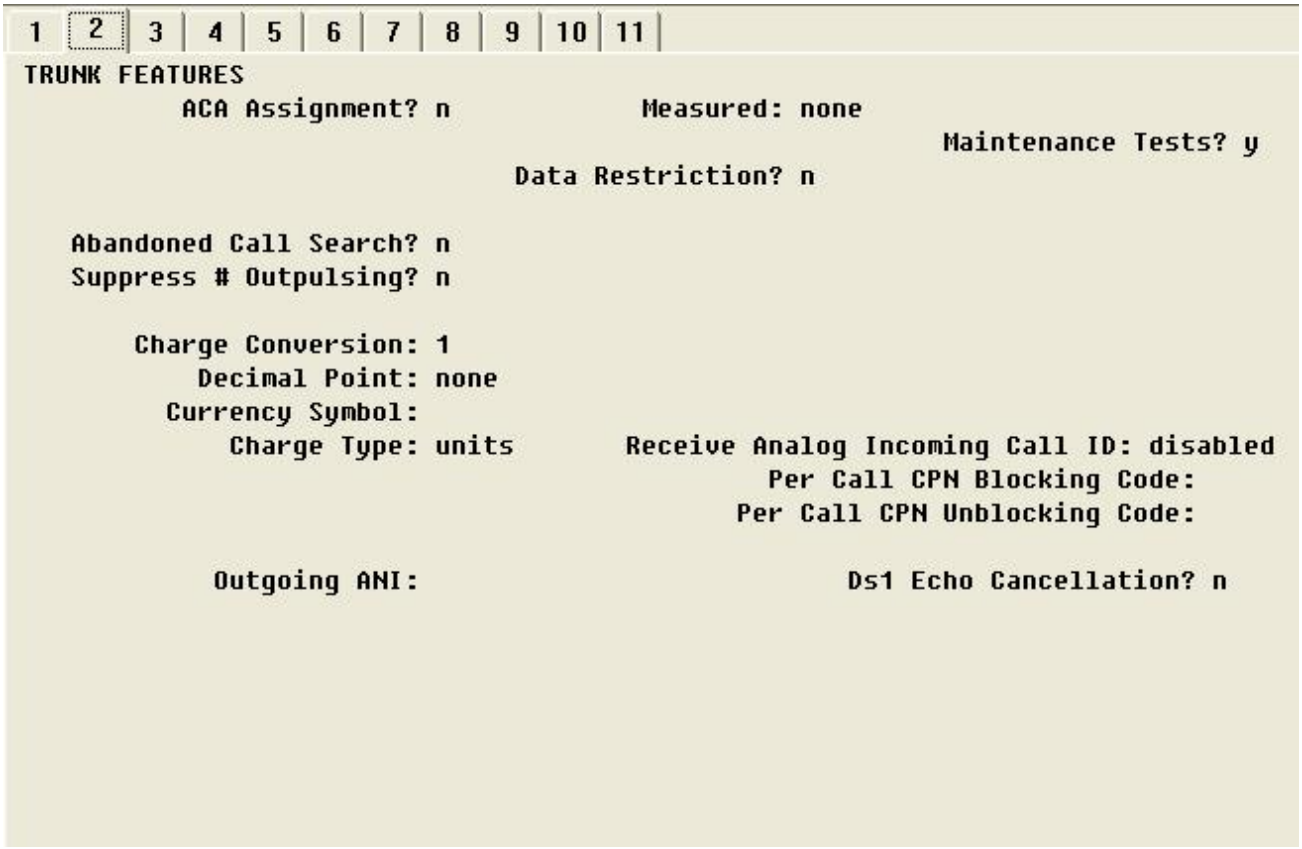
```
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
TRUNK FEATURES
          ACA Assignment? n            Measured: none
                                                      Maintenance Tests? y
                               Data Restriction? n

   Abandoned Call Search? n
   Suppress # Outpulsing? n

       Charge Conversion: 1
           Decimal Point: none
         Currency Symbol:
             Charge Type: units       Receive Analog Incoming Call ID: disabled
                                              Per Call CPN Blocking Code:
                                            Per Call CPN Unblocking Code:

           Outgoing ANI:                           Ds1 Echo Cancellation? n
```

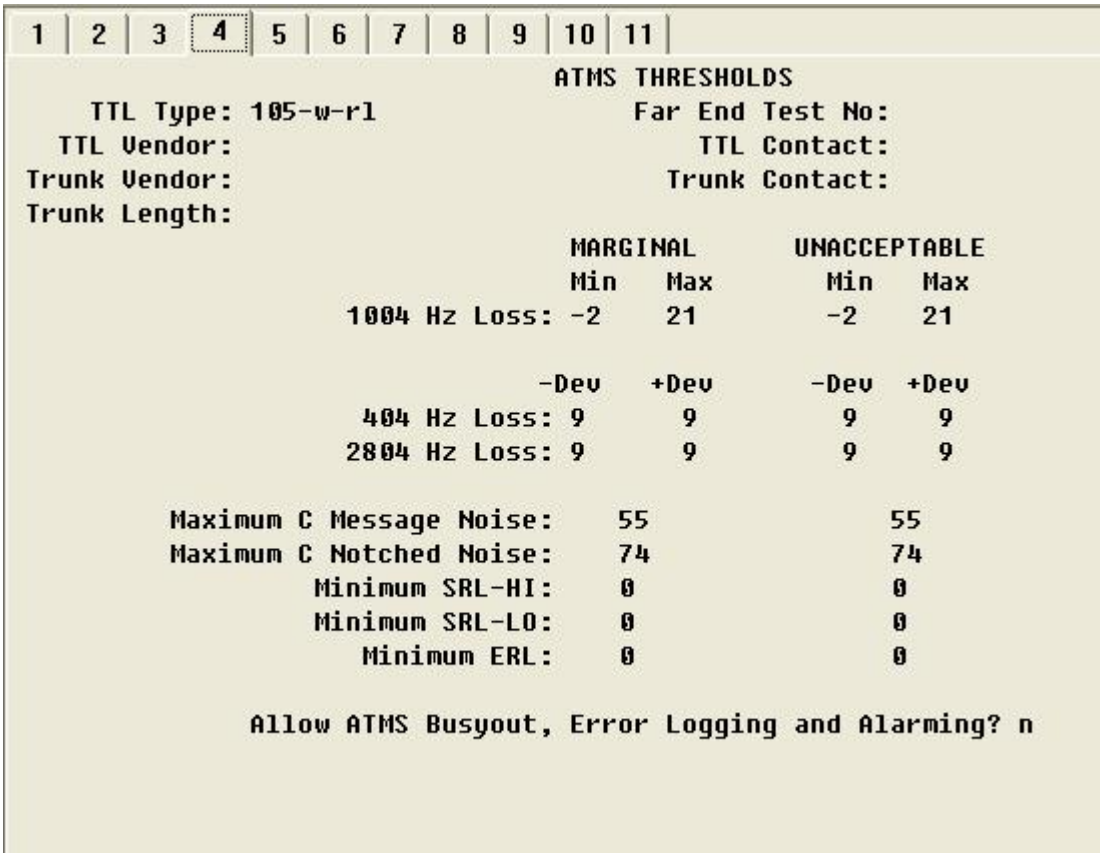




FX-Ground-Start

```
 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
                              TRUNK GROUP

Group Number: 12                    Group Type: co            CDR Reports: y
  Group Name: Tony B. IAD testing         COR: 1       TN: 1        TAC: 612
   Direction: two-way         Outgoing Display? n
 Dial Access? y                 Busy Threshold: 99        Night Service:
Queue Length: 0            Country: 1               Incoming Destination: 2004
   Comm Type: voice                  Auth Code? n   Digit Absorption List:
    Prefix-1? y                    Trunk Flash? n         Toll Restricted? y

TRUNK PARAMETERS
            Trunk Type: ground-start
    Outgoing Dial Type: tone                                Cut-Through? n
     Trunk Termination: rc                    Disconnect Timing(msec): 750

            Auto Guard? n    Call Still Held? n     Sig Bit Inversion: none
     Analog Loss Group: 6                          Digital Loss Group: 11
                                Trunk Gain: high

 Disconnect Supervision - In? y  Out? n
 Answer Supervision Timeout: 0             Receive Answer Supervision? y
```





```
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

                                TRUNK GROUP
                                     Administered Members (min/max):   1/4
GROUP MEMBER ASSIGNMENTS                 Total Administered Members:   4

      Port    Code Sfx Name        Night           Mode      Type   Ans Delay
 1: 01A1201  TN464  F
 2: 01A1202  TN464  F
 3: 01A1203  TN464  F
 4: 01A1204  TN464  F
 5:
 6:
 7:
 8:
 9:
10:
11:
12:
13:
14:
15:
```

Note: When adding members to the trunk group you will need to add all available ports to the trunk group. For T1 you will configure all 24 available timeslots (e.g. 01A1201 thru 01A1224). Do so in a sequential manner.

```
1 | 2 |

                    UNIFORM DIAL PLAN TABLE
                                                          Percent Full

  Matching          Insert          Node   Matching          Insert
  Pattern  Len Del  Digits Net Conv Num    Pattern  Len Del Digits Net Conv
  4001       4   0   612    aar  n                                    n
  4002       4   0   612    aar  n                                    n
```

```
1 | 2 |

                      AAR DIGIT ANALYSIS TABLE
                                                        Percent Full:    9

         Dialed           Total     Route    Call    Node  ANI
         String          Min  Max  Pattern   Type    Num   Reqd
    612                  7    7     12       aar           n
```

```
                 Pattern Number: 12  Pattern Name:

   Grp FRL NPA Pfx Hop Toll No.  Inserted                              DCS/ IXC
   No          Mrk Lmt List Del  Digits                              QSIG
                            Dgts                                     Intw
1: 12   0                    3                                       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 BAND  No. Numbering LAR
   0 1 2 3 4 W     Request                                   Dgts Format
                                                          Subaddress
1: y y y y y n  y  none      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
```

```
1 | 2 | 3 | 4 |
                                STATION

Extension: 2004                    Lock Messages? n          BCC: 0
     Type: 8410D                   Security Code:             TN: 1
     Port: 01A0604              Coverage Path 1: 103         COR: 1
     Name: PBX-Ken1             Coverage Path 2:             COS: 1
                                Hunt-to Station:

STATION OPTIONS
             Loss Group: 2          Personalized Ringing Pattern: 1
           Data Module? n                     Message Lamp Ext: 2004
         Speakerphone: 2-way                Mute Button Enabled? y
       Display Language: english

                                          Media Complex Ext:
                                               IP SoftPhone? n
```

1 2 3 4

STATION

FEATURE OPTIONS

```
          LWC Reception: spe              Auto Select Any Idle Appearance? n
         LWC Activation? y                        Coverage Msg Retrieval? y
  LWC Log External Calls? n                                  Auto Answer: none
            CDR Privacy? n                             Data Restriction? n
   Redirect Notification? y                   Idle Appearance Preference? n
Per Button Ring Control? n
  Bridged Call Alerting? n                     Restrict Last Appearance? n
 Active Station Ringing: single

       H.320 Conversion? n          Per Station CPN - Send Calling Number?
      Service Link Mode: as-needed
        Multimedia Mode: basic                    Audible Message Waiting? y
   MWI Served User Type:                       Display Client Redirection? y
                                              Select Last Used Appearance? n
                                               Coverage After Forwarding? s
                                                  Multimedia Early Answer? n
                                              Direct IP-IP Audio Connections? y
Emergency Location Ext: 2004                         IP Audio Hairpinning? y
```

1 2 3 4

STATION

SITE DATA

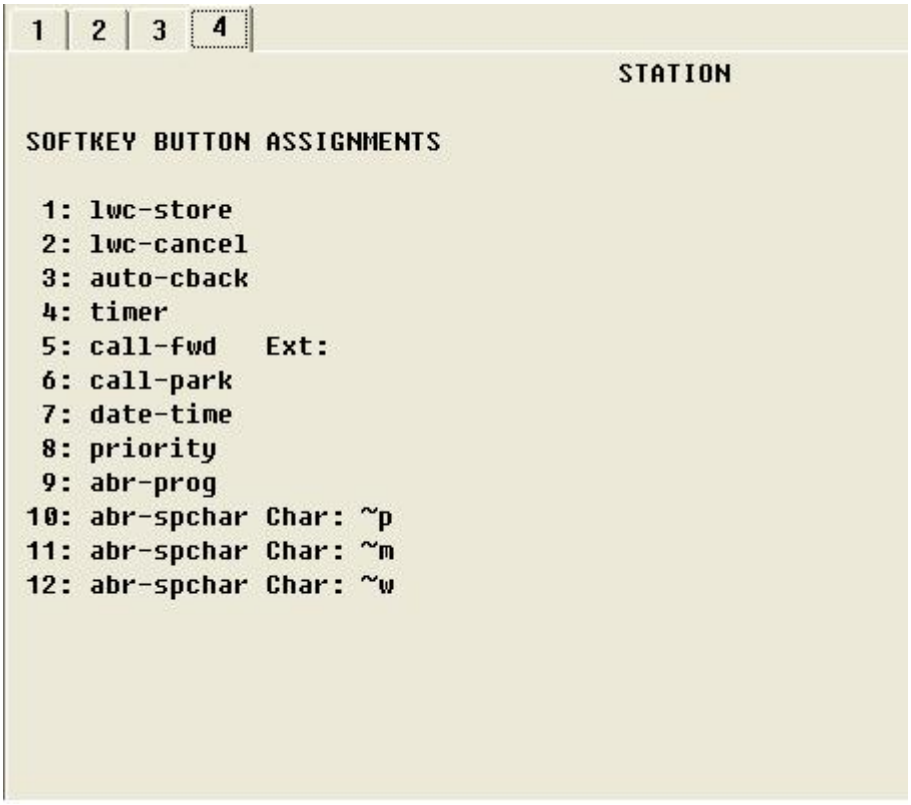
```
      Room:                                          Headset? n
      Jack:                                          Speaker? n
     Cable:                                         Mounting: d
     Floor:                                     Cord Length: 0
  Building:                                       Set Color:
```

ABBREVIATED DIALING

```
    List1:                  List2:                  List3:
```

BUTTON ASSIGNMENTS

```
 1: call-appr                          6:
 2: call-appr                          7:
 3: cfwd-bsyda Ext:                    8:
 4:                                    9:
 5:                                   10: last-numb
```



Cisco IAD2432 24FXS Configuration

```
IAD_SIP1_V7#sh run
Building configuration...

Current configuration : 1647 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname IAD_SIP1_V7
!
boot-start-marker
boot-end-marker
!
card type t1 1
enable password cisco
!
no aaa new-model
!
resource policy
!
network-clock-participate T1 1/0
network-clock-participate T1 1/1
ip subnet-zero
!
!
!
!
```

```
!
voice-card 0
!
!
!
!
!
!
!
!
!
!
!
!
controller T1 1/0
 framing esf
 linecode b8zs
!
controller T1 1/1
 mode cas
 framing esf
 linecode b8zs
 ds0-group 0 timeslots 1-4 type e&m-immediate-start -
!
!
!
!
interface FastEthernet0/0
 ip address 172.20.8.40 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
!
ip default-gateway 172.20.8.1
ip http server
!
ip classless
ip route 0.0.0.0 0.0.0.0 172.20.8.1
!
!
!
!
!
control-plane
!
!
!
voice-port 1/1:0
!
voice-port 2/0
!
voice-port 2/1
!
voice-port 2/2
!
voice-port 2/3
!
voice-port 2/4
!
voice-port 2/5
```

For FXS-loopstart or FXS-groundstart you specify the signaling required here.

```
!
voice-port 2/6
!
voice-port 2/7
!
voice-port 2/8
!
voice-port 2/9
!
voice-port 2/10
!
voice-port 2/11
!
voice-port 2/12
!
voice-port 2/13
!
voice-port 2/14
!
voice-port 2/15
!
voice-port 2/16
!
voice-port 2/17
!
voice-port 2/18
!
voice-port 2/19
!
voice-port 2/20
!
voice-port 2/21
!
voice-port 2/22
!
voice-port 2/23
!
!
!
!
dial-peer voice 4000 voip
 destination-pattern 4...
 session protocol sipv2
 session target ipv4:172.20.110.254
 supplementary-service pass-through
!
dial-peer voice 2000 pots
 destination-pattern 2...
 supplementary-service pass-through
 port 1/1:0
 forward-digits all
!
!
line con 0
 password cisco
line aux 0
line vty 0 4
 password cisco
 login
!
end

IAD_SIP1_V7#
```

Acronyms

Acronym	Definitions
IAD	Integrated Access Device
SIP	Session Initiation Protocol

Important Information

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Corporate Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters

Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters

Cisco Systems, Inc.
Capital Tower
168 Robinson Road
#22-01 to #29-01
Singapore 068912
www.cisco.com
Tel: +65 317 7777
Fax: +65 317 7799

Cisco Systems has more than 200 offices in the following countries and regions. Addresses, phone numbers, and fax numbers are listed on the Cisco Web site at www.cisco.com/go/offices.

Argentina • Australia • Austria • Belgium • Brazil • Bulgaria • Canada • Chile • China PRC • Colombia • Costa Rica • Croatia • Czech Republic • Denmark • Dubai, UAE • Finland • France • Germany • Greece • Hong Kong SAR • Hungary • India • Indonesia • Ireland • Israel • Italy • Japan • Korea • Luxembourg • Malaysia • Mexico • The Netherlands • New Zealand • Norway • Peru • Philippines • Poland • Portugal • Puerto Rico • Romania • Russia • Saudi Arabia • Scotland • Singapore • Slovakia • Slovenia • South Africa • Spain • Sweden • Switzerland • Taiwan • Thailand • Turkey Ukraine • United Kingdom • United States • Venezuela • Vietnam • Zimbabwe

Printed in the USA