Cisco 3600 Series Gateway-PBX Interoperability: Lucent Definity G3 with E1 R2 Signaling

This document describes the interoperability and configuration of a Cisco3600 series voice gateway with a Lucent Definity G3 PBX using E1 R2 signaling. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

## System Components

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PBX Model</td>
<td>Lucent DEFINITY G3</td>
</tr>
<tr>
<td>PBX Release</td>
<td>G3V7i.01.0.343.7</td>
</tr>
<tr>
<td>Telephony Signaling</td>
<td>E1 R2</td>
</tr>
<tr>
<td>Voice Gateway</td>
<td>Cisco 3640</td>
</tr>
<tr>
<td>Gateway Release</td>
<td>Cisco IOS™ 12.1.2XH</td>
</tr>
<tr>
<td>VoX Protocol</td>
<td>H.323</td>
</tr>
</tbody>
</table>

## Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Lucent PBX Configuration
- Cisco 3640 Gateway Configuration
Set Up

This section includes the following information:
- Connectivity Diagrams
- Set Up Notes

Connectivity Diagrams

Figure 1: Test Configuration

Figure 1 represents the configuration used for testing: a Lucent Definity G3 PBX connected to a Cisco 3640 voice gateway via an E1 R2 connection.

Set Up Notes

- Lucent Definity G3 has no provision for the E1 interface to receive a clock. Because it always wants to provide clock on the interface, the Cisco 3640 E1 interface must be set to line clock to work with it.
- Lucent Definity G3 uses the same TN464F “DS1 INTFC 24/32” card for both T1 and E1 trunking. To select E1 functionality, some database entries are made in the Lucent trunk configuration screen, and there are two DIP switches on the card itself:
  - 24CH/30CH – Set to 24CH for T1, 30CH for E1.
  - 120Ω/75Ω -- Set to 120Ω to use with a twisted pair E1 circuit. If set to 75Ω to use with a coaxial wire E1 circuit, an external adapter provided by Lucent must be used.
- Lucent DEFINITY G3 PBX does not support R2-Digital Line Signaling (ITU-T Q.421). It supports R2-Analog version (ITU-T Q.411).
- Lucent DEFINITY G3 PBX has specific country settings for the R2 forward and backward multifrequency combinations. For each country specific settings, refer to:
  DEFINITY Enterprise communications Server Manual
  Application Notes for Type Approval
  Comcode 108343302
  Issue 1
  June 1999
Table 1 summarizes E1 R2 country variant setting on both the Lucent Definity PBX and the Cisco 3640 gateway.

Table 1: Country Variant Settings

<table>
<thead>
<tr>
<th>LUCENT V7 SETTING</th>
<th>3640 SETTING</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country Code 16</td>
<td>R2-analog, R2-compelled, ani country Argentina dnis-digits min 4 max 5</td>
<td>“send-ani” signal must be defined as A-5 tone for incoming backward signal types in Lucent MF-signaling-related Sys. Param.</td>
</tr>
<tr>
<td>Country Code 2</td>
<td>R2-analog, R2-compelled, ani country Australia dnis-digits min 4 max 5</td>
<td>No R2 settings available for Australia on Lucent PBX</td>
</tr>
<tr>
<td>Country Code 16</td>
<td>R2-analog, R2-compelled, ani country Bolivia dnis-digits min 4 max 5</td>
<td>“free” signal must be defined as B-6 (not B-1) tone for incoming backward signal types in Lucent MF-signaling-related Sys. Param.</td>
</tr>
<tr>
<td>Country Code 1</td>
<td>R2-analog, R2-compelled, ani country ITU dnis-digits min 4 max 5</td>
<td>“free” signal must be defined as B-6 (not B-1) tone for incoming backward signal types in Lucent MF-signaling-related Sys. Param. for Chile</td>
</tr>
<tr>
<td>Country Code 14</td>
<td>R2-analog, R2-compelled, ani country Bulgaria dnis-digits min 4 max 5</td>
<td>Use Lucent MF-signaling-related Sys. Param. for Czech Republic</td>
</tr>
<tr>
<td>Country Code 18</td>
<td>R2-analog, R2-compelled, ani country China dnis-digits min 4 max 5</td>
<td></td>
</tr>
<tr>
<td>Country Code 1</td>
<td>R2-analog, R2-compelled, ani country Costa Rica dnis-digits min 4 max 5</td>
<td>Country code 1 is used for Costa Rica per Lucent Application Notes for Type Approval</td>
</tr>
</tbody>
</table>

Refer to Lucent’s Application Notes for Type Approval, Comcode 108343302 document, Issue 1, for details on MF-signaling-related System Parameters.

Refer to page 29 for details on MF-signaling-related System Parameters for Argentina.

Refer to page 60, for details on MF-signaling-related System Parameters for Bolivia.

Refer to page 73, for details on MF-signaling-related System Parameters for Brazil.

Refer to page 93, for details on MF-signaling-related System Parameters for Chile.

3640 router does not have country option for Chile. Use ITU defaults.

Refer to page 141, for details on MF-signaling-related System Parameters for Bulgaria.

Refer to page 110, for details on MF-signaling-related System Parameters for China.

Refer to page 124, for details on MF-signaling-related System Parameters for Costa Rica.
| Country Code 14 | MF signaling related system parameters. | R2-analog, R2-compelled, ani country Croatia
dnis-digits min 4 max 5 | Use Lucent MF-signaling-related Sys. Param. for Czech Republic
Call is completed after ~19 seconds delay from end of signaling. |
|----------------|----------------------------------------|-------------------------------------------------|---------------------------------------------------------------------|
| Not Available  | R2-analog, R2-compelled, ani country Ecuador
dnis-digits min 4 max 5 | No R2 settings available for Ecuador on Lucent PBX |
| Country Code 17 | R2-analog, R2-compelled, ani country Greece
dnis-digits min 4 max 5 | No R2 settings available for Greece on Lucent PBX |
| Not Available  | R2-analog, R2-compelled, ani country Guatemala
dnis-digits min 4 max 5 | No R2 settings available for Guatemala on Lucent PBX |
| Country Code 19 | R2-analog, R2-compelled, ani country Hong-Kong-China
dnis-digits min 4 max 5 | No R2 settings available for Hong Kong on Lucent PBX |
| Country Code 1 | MF signaling related system parameters. | R2-analog, R2-compelled, ani country India
dnis-digits min 4 max 5 | Country code 1 is used for India per Lucent Application Notes for Type Approval |
| Not Available  | R2-analog, R2-compelled, ani country Indonesia
dnis-digits min 4 max 5 | No R2 settings available for Indonesia on Lucent PBX |
| Not Available  | R2-analog, R2-compelled, ani country Israel
dnis-digits min 4 max 5 | No R2 settings available for Israel on Lucent PBX |
| Country Code 13 | MF signaling related system parameters. | R2-analog, R2-compelled, ani country ITU
dnis-digits min 4 max 5 | Used Lucent MF-signaling-related Sys. Param. for Argentina (ITU variant) |
| Not Available  | R2-analog, R2-compelled, ani country Korea
dnis-digits min 4 max 5 | No R2 settings available for Korea on Lucent PBX |
| Not Available  | R2-analog, R2-compelled, ani country Laos
dnis-digits min 4 max 5 | No R2 settings available for Laos on Lucent PBX |
| Not Available  | R2-analog, R2-compelled, ani country Malaysia
dnis-digits min 4 max 5 | No R2 settings available for Malaysia on Lucent PBX |
| Not Available  | R2-analog, R2-compelled, ani country Malta
dnis-digits min 4 max 5 | No R2 settings available for Malta on Lucent PBX |
| Country Code 2 | R2-analog, R2-compelled, ani country New Zealand
dnis-digits min 4 max 5 | No R2 settings available for New Zealand on Lucent PBX |
| Not Available  | R2-analog, R2-compelled, ani country Paraguay
dnis-digits min 4 max 5 | No R2 settings available for Paraguay on Lucent PBX |

9 Refer to page 141, for details on MF-signaling-related System Parameters for Croatia.
10 Refer to page 254, for details on MF-signaling-related System Parameters for India.
11 Refer to page 29 for details on MF-signaling-related System Parameters for Argentina.
<table>
<thead>
<tr>
<th>Country Code</th>
<th>MF signaling related system parameters.</th>
<th>R2-analog, R2-compelled, ani country</th>
<th>dnis-digits min 4 max 5</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>R2-analog, R2-compelled, ani country</td>
<td>Peru</td>
<td></td>
<td>No R2 settings available for Peru on Lucent PBX</td>
</tr>
<tr>
<td>6</td>
<td>R2-analog, R2-compelled, ani country</td>
<td>Philippines</td>
<td></td>
<td>No R2 settings available for Philippines on Lucent PBX</td>
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<tr>
<td>13</td>
<td>R2-analog, R2-compelled, ani country</td>
<td>Saudi Arabia</td>
<td></td>
<td>Used Lucent MF-signaling-related Sys. Param. for Mexico</td>
</tr>
<tr>
<td>13</td>
<td>R2-analog, R2-compelled, ani country</td>
<td>Telmex Corporation (Mexico)</td>
<td></td>
<td>Used Lucent MF-signaling-related Sys. Param. for Mexico</td>
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<tr>
<td>20</td>
<td>R2-analog, R2-compelled, ani country</td>
<td>Thailand</td>
<td></td>
<td>No R2 settings available for Thailand on Lucent PBX</td>
</tr>
<tr>
<td>20</td>
<td>R2-analog, R2-compelled, ani country</td>
<td>Uruguay</td>
<td></td>
<td>No R2 settings available for Uruguay on Lucent PBX</td>
</tr>
<tr>
<td>20</td>
<td>R2-analog, R2-compelled, ani country</td>
<td>Venezuela</td>
<td></td>
<td>No R2 settings available for Venezuela on Lucent PBX</td>
</tr>
<tr>
<td>20</td>
<td>R2-analog, R2-compelled, ani country</td>
<td>Vietnam</td>
<td></td>
<td>No R2 settings available for Vietnam on Lucent PBX</td>
</tr>
</tbody>
</table>

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12 Refer to page 370 for details on MF-signaling-related System Parameters for Saudi Arabia.
13 Refer to page 378, for details on MF-signaling-related System Parameters for Singapore.
14 Refer to page 407, for details on MF-signaling-related System Parameters for South Africa.
15 Refer to page 313, for details on MF-signaling-related System Parameters for Mexico.
16 Refer to page 313, for details on MF-signaling-related System Parameters for Mexico.
Lucent PBX Configuration

PBX Version Information

- G3V7i.01.0.343.7

Sample PBX Configuration

See the following figures for sample PBX configuration:

- Figure 2: Country Code Argentina
- Figure 3: Dial Plan Record
- Figure 4: Pattern Number
- Figure 5: Signaling-Related System Parameters
- Figure 6: Signaling-Related System Parameters II
- Figure 7: Signaling-Related Parameters III
- Figure 8: Signaling-Related Parameters IV
- Figure 9: Trunk Group
- Figure 10: Trunk Features
- Figure 11: Trunk Group II
- Figure 12: ATMS Thresholds
- Figure 13: Trunk Group III
Figure 2: Country Code Argentina
Figure 3: Dial Plan Record
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Figure 10: Trunk Features
Figure 11: Trunk Group II
Figure 12: ATMS Thresholds
Cisco 3640 Gateway Configuration

The following is the configuration of the Cisco 3640 gateway connected to the Lucent Definity G3 PBX E1 R2 interface.

Cisco 3640 Voice Gateway Version Information

Cisco_3640# show version
Cisco Internetwork Operating System Software
IOS (tm) 3600 Software (C3640-JS-M), Experimental Version 12.1(20000530:031732)
[liha-v121_2_xd_throttle.LATEST 104]
Copyright (c) 1986-2000 by cisco Systems, Inc.
Compiled Tue 30-May-00 08:18 by liha
Image text-base: 0x600088F0, data-base: 0x61444000

ROM: System Bootstrap, Version 11.1(19)AA, EARLY DEPLOYMENT RELEASE SOFTWARE (fc 1)
Cisco_3640 uptime is 4 days, 7 hours, 35 minutes
System returned to ROM by power-on
System image file is "flash:c3640-js-mz"
cisco 3640 (R4700) processor (revision 0x00) with 60416K/5120K bytes of memory.
Processor board ID 09195735
R4700 CPU at 100Mhz, Implementation 33, Rev 1.0
Channelized E1, Version 1.0.
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TNS270 Emulation software.
Primary Rate ISDN software, Version 1.1.
2 Ethernet/IEEE 802.3 interface(s)
2 Channelized E1/PRI port(s)
2 Voice FXO interface(s)
2 Voice FXS interface(s)
DRAM configuration is 64 bits wide with parity disabled.
125K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)

Configuration register is 0x0

Cisco 3640 Voice Gateway Sample Configuration

Cisco_3640# show configuration
Using 1338 out of 129016 bytes
!
version 12.1
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
no service dhcp
!
hostname Cisco_3640
!
!
!
!
!
!
!
!
voice-card 1
!
ip subnet-zero
no ip domain-lookup
ip host whiz 171.69.1.162
ip host dirt 171.69.1.129
ip host danube 171.69.17.14
!
lane client flush
isdn voice-call-failure 0
cns event-service server
!
!
!
!
!
controller E1 1/0
!
controller E1 1/1
framing NO-CRC4
ds0-group 1 timeslots 1 type r2-analog r2-compelled ani
cas-custom 1
country argentina use-defaults
metering
!
!
interface Ethernet0/0
ip address 192.168.71.6 255.255.255.0
no ip mroute-cache
no cdp enable
!
interface Ethernet0/1
ip address 100.100.100.2 255.255.255.0
Caveats