



Cisco Catalyst 6000 Series Gateway-PBX Interoperability: Ericsson MD-110 with E1 PRI Signaling

This document describes the interoperability and configuration of a Cisco Catalyst 6000 series voice gateway with an Ericsson MD-110 PBX using E1 PRI signaling. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

System Components

PBX Model	Ericsson MD-110
PBX Release	BC9
Telephony Signaling	E1 PRI
Voice Gateway	Cisco Catalyst 6608
Gateway Release	5.5(6)a
Call Manager Release	3.1.1
VoX Protocol	MGCP

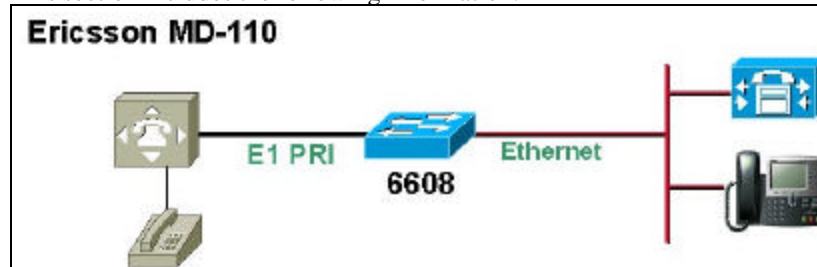
Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Ericsson PBX Configuration
- Call Manager Configuration
- Cisco Catalyst 6608 Gateway Configuration

Set Up

This section includes the following information:



- Connectivity Diagrams
- Set Up Notes

Connectivity Diagrams

Figure 1: Test Configuration

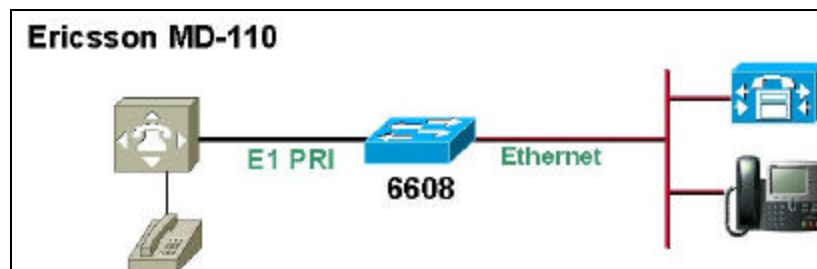


Figure 1 represents the configuration used for testing: an Ericsson MD-110 PBX connected to a Cisco Catalyst 6608 voice gateway via an E1 PRI connection.

Set Up Notes

- The Cisco 6608-E1 Gateway with an ISDN protocol type setting of PRI-EURO supports both protocol sides by selecting “Network/User” in the protocol field when configuring the Gateway via the Cisco CallManager.
- The Ericsson MD-110 PBX supports both “USER” (slave) and “NETWORK” (master) protocol sides by using the **RODAI** command.
- The following option is of particular interest:
 - Trunk **interface type** must be set to **TLU76/1**.

Ericsson PBX Configuration

Ericsson PBX Version Information

- Software: Version BC9
- Hardware: TLU76/1

Ericsson PBX Sample Configuration

Configure in the following sequence:

1. **ROCAI**Route Category Initiate
2. **RODAI**Route Data Initiate
3. **ROEQI**Route Equipment Initiate
4. **RODDI**Route External Destination Data Initiate

Route Category Initiate

Setup internal characteristics for the route. Ex. Traffic direction, services, Bearer capabilities.

```
< ROCAP:ROU=20;
ROUTE CATEGORY DATA

ROU SEL          TRM SERV          NODG DIST DISL TRAF          SIG          BCAP
20  711000000000 7  3110000010 0  5  20  03151515 211100000031 111111
END
```

Route Data Initiate

E1-PRI Route Protocol Characteristics, protocol side "User"

```
< RODAP:ROU=20;
ROUTE DATA

ROU  TYPE  VARC          VARI          VARO          FILTER
20   SL60  H'00000010  H'05400000  H'06110000  NO
END
```

E1-PRI Route Protocol Characteristics, protocol side "Network"

```
< RODAP:ROU=20;
ROUTE DATA

ROU  TYPE  VARC          VARI          VARO          FILTER
20   SL60  H'00000010  H'05400000  H'06310000  NO
END
```

Route Equipment Initiate

E1-PRI trunk lines (B-channels)

```
< ROEDP:ROU=20,TRU=ALL;
ROUTE EQUIPMENT DATA

ROU          TRU          EQU          SQU          INDDAT
```

```
20          001-1          001-1-40-01          H'00000000000000
20          001-2          001-1-40-02          H'00000000000000
20          001-3          001-1-40-03          H'00000000000000
20          001-4          001-1-40-04          H'00000000000000
20          001-5          001-1-40-05          H'00000000000000
20          001-6          001-1-40-06          H'00000000000000
20          001-7          001-1-40-07          H'00000000000000
20          001-8          001-1-40-08          H'00000000000000
20          001-9          001-1-40-09          H'00000000000000
20          001-10         001-1-40-10          H'00000000000000
20          001-11         001-1-40-11          H'00000000000000
20          001-12         001-1-40-12          H'00000000000000
20          001-13         001-1-40-13          H'00000000000000
20          001-14         001-1-40-14          H'00000000000000
20          001-15         001-1-40-15          H'00000000000000
20          001-17         001-1-40-17          H'00000000000000
20          001-18         001-1-40-18          H'00000000000000
20          001-19         001-1-40-19          H'00000000000000
20          001-20         001-1-40-20          H'00000000000000
20          001-21         001-1-40-21          H'00000000000000
20          001-22         001-1-40-22          H'00000000000000
20          001-23         001-1-40-23          H'00000000000000
20          001-24         001-1-40-24          H'00000000000000
20          001-25         001-1-40-25          H'00000000000000
20          001-26         001-1-40-26          H'00000000000000
20          001-27         001-1-40-27          H'00000000000000
20          001-28         001-1-40-28          H'00000000000000
20          001-29         001-1-40-29          H'00000000000000
20          001-30         001-1-40-30          H'00000000000000
20          001-31         001-1-40-31          H'00000000000000
```

END

Route External Destination Data Initiate

Route and Access Code for the trunk Information- Note PRI uses Route 20

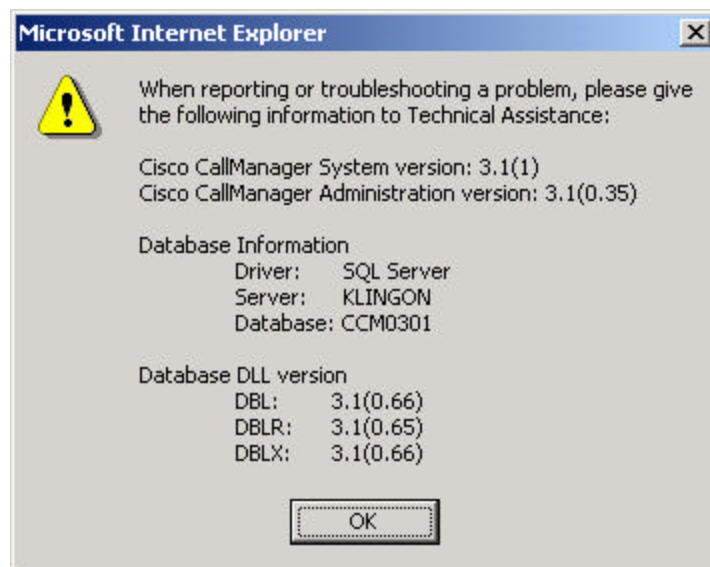
```
< RODDP:DEST=ALL;
EXTERNAL DESTINATION ROUTE DATA
```

DEST	DRN	ROU	CHO	CUST	ADC	TRC	SRT	NUMACK	PRE
2		20			1005000000000025000	0	1	0	
30		1			1005000000000025000	0	3	0	
31		2			1005000000000025000	0	3	0	
32		3			1005000000000025000	0	3	0	
33		4			1005000000000025000	0	3	0	
34		5			1005000000000025000	0	3	0	
35		6			0005000000000025000	0	3	0	
36		7			0005000000000025000	0	3	0	
37		8			0005000000000025000	0	3	0	
39		21			1005000000000025000	0	3	0	
40		11			1005000000000025000	0	3	0	

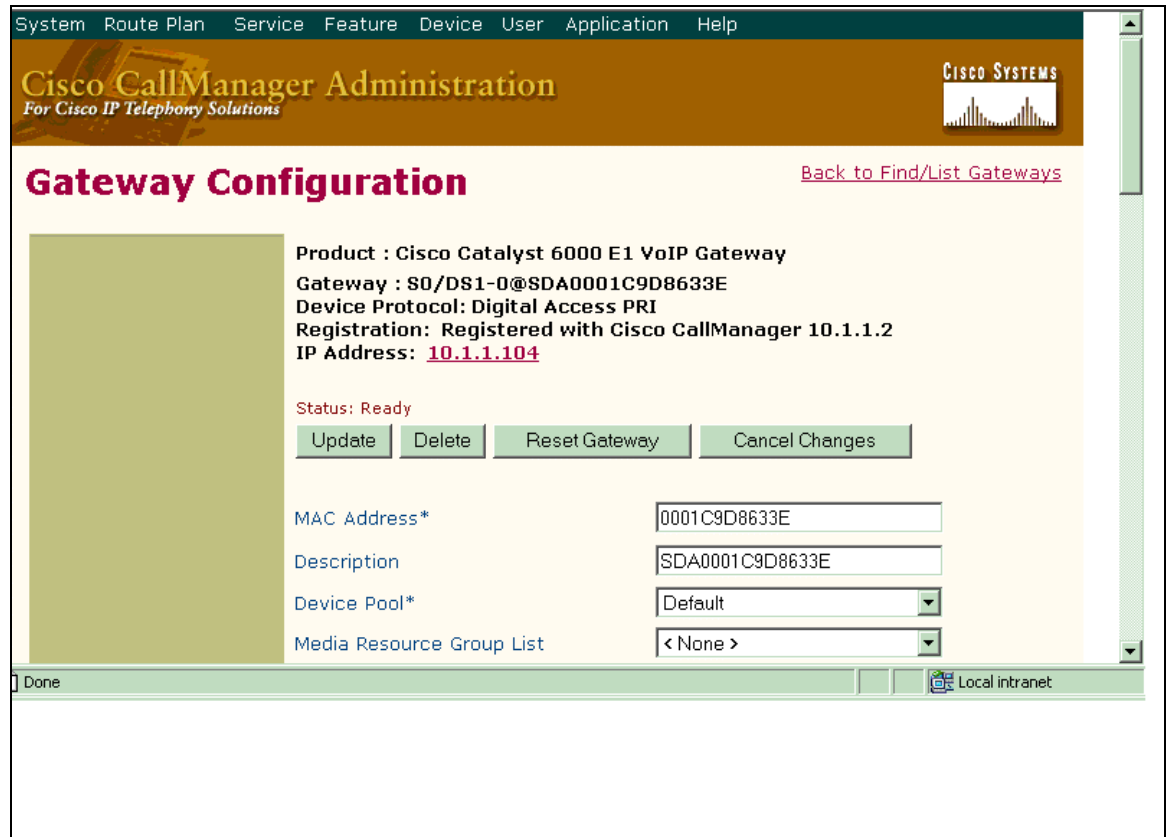
END

Call Manager Configuration

Call Manager Version Information



Cisco Catalyst 6608 Gateway Configuration



The screenshot shows the Cisco CallManager Administration web interface for Gateway Configuration. The page title is "Gateway Configuration" and it includes a "Back to Find/List Gateways" link. The configuration details for a Cisco Catalyst 6000 E1 VoIP Gateway are as follows:

- Product : Cisco Catalyst 6000 E1 VoIP Gateway
- Gateway : SO/DS1-0@SDA0001C9D8633E
- Device Protocol: Digital Access PRI
- Registration: Registered with Cisco CallManager 10.1.1.2
- IP Address: [10.1.1.104](#)

The status is "Ready". Action buttons include "Update", "Delete", "Reset Gateway", and "Cancel Changes". The configuration fields are:

MAC Address*	0001C9D8633E
Description	SDA0001C9D8633E
Device Pool*	Default
Media Resource Group List	< None >

The interface also shows a "Done" button and a "Local intranet" icon at the bottom.

Delay between restarts (1/8 sec ticks)	<input type="text" value="4"/>
Num Digits*	<input type="text" value="23"/>
Sig Digits	<input checked="" type="checkbox"/>
Prefix DN	<input type="text"/>
Presentation Bit*	<input type="text" value="Allowed"/>
Called party IE number type unknown*	<input type="text" value="Cisco CallManager"/>
Calling party IE number type unknown*	<input type="text" value="Cisco CallManager"/>
Called Numbering Plan*	<input type="text" value="Cisco CallManager"/>
Calling Numbering Plan*	<input type="text" value="Cisco CallManager"/>
PRI Protocol Type*	<input type="text" value="PRI EURO"/>
Inhibit restarts at PRI initialization	<input checked="" type="checkbox"/>
Enable status poll	<input type="checkbox"/>
Number of digits to strip*	<input type="text" value="0"/>
Country Code*	<input type="text" value="North America"/>
Setup non-ISDN Progress Indicator IE Enable***	<input type="checkbox"/>

Local intranet

Network Hold Audio Source	< None >
User Hold Audio Source	< None >
Calling Search Space	< None >
Location	< None >
Load Information	
Channel Selection Order*	Top Down
PCM Type*	A-law
Protocol Side*	User
Caller ID DN	
Calling Party Selection*	Originator
Channel IE Type*	Use Number when 1B
Interface Identifier Present**	<input type="checkbox"/>
Interface Identifier Value**	0
Display IE Delivery	<input type="checkbox"/>
Redirecting Number IE Delivery	<input checked="" type="checkbox"/>
Delay for first restart (1/8 sec ticks)	32

Local intranet

Product Specific Configuration

Clock Reference*	Network
Framing*	CRC4
Audio Signal Adjustment into IP Network*	NoDbPadding
Audio Signal Adjustment from IP Network*	NoDbPadding
Zero Suppression*	HDB3

* indicates required item
** applicable to DMS-100 protocol only
*** may be required to force ringback from some PBXs

[Back to Find/List Gateways](#)

Local intranet

Route Pattern Configuration

The screenshot displays the Cisco CallManager Administration web interface for configuring a route pattern. The page title is "Route Pattern Configuration" and the current route pattern is "6.XXXX". The status is "Ready". A note states: "Any update to this route pattern automatically resets the associated gateway/route list". There are buttons for "Copy", "Update", "Delete", and "Cancel Changes". The "Pattern Definition" section includes fields for "Route Pattern*" (6.XXXX), "Partition" (<None >), "Numbering Plan*" (North American Numbering Plan), "Route Filter" (<None >), "Gateway/Route List*" (S0/DS1-0@SDA0001C9D8633E) with an "(Edit)" link, and "Route Option" with radio buttons for "Route this pattern" (selected) and "Block this pattern". The interface also shows a navigation menu at the top, a Cisco Systems logo, and a "Local intranet" icon at the bottom right.

System Route Plan Service Feature Device User Application Help

Cisco CallManager Administration
For Cisco IP Telephony Solutions

CISCO SYSTEMS

Route Pattern Configuration

[Add a New Route Pattern](#)
[Back to Find/List Route Patterns](#)

Route Pattern: 6.XXXX
Status: Ready
Note: Any update to this route pattern automatically resets the associated gateway/route list

Copy Update Delete Cancel Changes

Pattern Definition

Route Pattern*	<input type="text" value="6.XXXX"/>
Partition	<input type="text" value="<None >"/>
Numbering Plan*	<input type="text" value="North American Numbering Plan"/>
Route Filter	<input type="text" value="<None >"/>
Gateway/Route List*	<input type="text" value="S0/DS1-0@SDA0001C9D8633E"/> (Edit)
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern

Local intranet

Partition	< None >
Numbering Plan*	North American Numbering Plk
Route Filter	< None >
Gateway/Route List*	S0/DS1-0@SDA0001C9D8633E (Edit)
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern
	<input checked="" type="checkbox"/> Provide Outside Dial Tone <input type="checkbox"/> Urgent Priority
Calling Party Transformations	
	<input type="checkbox"/> Use Calling Party's External Phone Number Mask
Calling Party Transform Mask	<input type="text"/>
Prefix Digits (Outgoing Calls)	<input type="text"/>
Called Party Transformations	
Discard Digits	PreDot
Called Party Transform Mask	<input type="text"/>
Prefix Digits (Outgoing Calls)	<input type="text"/>
* indicates required item.	

Cisco Catalyst 6608 Gateway Configuration

The following is the configuration of the Cisco Catalyst 6608 voice gateway connected to the Ericsson MD-110 PBX E1 PRI interface.

Cisco Catalyst 6608 Voice Gateway Version Information

```

Console> sh version
WS-C6006 Software, Version NmpSW: 5.5(6a)
Copyright (c) 1995-2001 by Cisco Systems
NMP S/W compiled on Feb 23 2001, 10:23:18
  
```

System Bootstrap Version: 5.3(1)

Hardware Version: 2.0 Model: WS-C6006 Serial #: TBA04511172

Mod	Port	Model	Serial #	Versions
1	2	WS-X6K-SUP1A-2GE	SAD05010NBK	Hw : 7.0 Fw : 5.3(1) Fw1: 5.4(2) Sw : 5.5(6a) Sw1: 5.5(6a)
3	48	WS-F6K-PFC	SAD05020221	Hw : 1.1
		WS-X6348-RJ-45	SAD04420N7B	Hw : 1.4 Fw : 5.4(2)

Cisco Catalyst 6000 Series Gateway-PBX Interoperability: Ericsson MD-110 with E1 PRI Signaling

```

Sw : 5.5(6a)
4 24 WS-F6K-VPWR SAD050203M8 Hw : 1.0
WS-X6624-FXS Hw : 3.0
Fw : 5.4(2)
Sw : 5.5(6a)
5 8 WS-X6608-T1 SAD04400EM0 HP : A00203010007; DSP : A003C031 (3.3.30)
Hw : 1.1
Fw : 5.4(2)
Sw : 5.5(6a)
HP1: D00403010013; DSP1: D005C031 (3.3.30)
HP2: D00403010013; DSP2: D005C031 (3.3.30)
HP3: D00403010013; DSP3: D005C031 (3.3.30)
HP4: D00403010013; DSP4: D005C031 (3.3.30)
HP5: D00403010013; DSP5: D005C031 (3.3.30)
HP6: D00403010013; DSP6: D005C031 (3.3.30)
HP7: D00403010013; DSP7: D005C031 (3.3.30)
HP8: D00403010013; DSP8: D005C031 (3.3.30)
6 8 WS-X6608-E1 SAD04380DW1 Hw : 1.1
Fw : 5.4(2)
Sw : 5.5(6a)
HP1: D00403010013; DSP1: D005C031 (3.3.30)
HP2: D00403010013; DSP2: D005C031 (3.3.30)
HP3: D00403010013; DSP3: D005C031 (3.3.30)
HP4: D00403010013; DSP4: D005C031 (3.3.30)
HP5: D00403010013; DSP5: D005C031 (3.3.30)
HP6: D00403010013; DSP6: D005C031 (3.3.30)
HP7: D00403010013; DSP7: D005C031 (3.3.30)
HP8: D00403010013; DSP8: D005C031 (3.3.30)

```

Module	DRAM			FLASH			NVRAM		
	Total	Used	Free	Total	Used	Free	Total	Used	Free
1	65408K	37541K	27867K	16384K	11546K	4838K	512K	198K	314K

Uptime is 27 days, 4 hours, 16 minutes
Console>

Cisco Catalyst 6608 Voice Gateway Sample Configuration

Console> **sh module**

Mod	Slot	Ports	Module-Type	Model	Sub	Status
1	1	2	1000BaseX Supervisor	WS-X6K-SUPLA-2GE	yes	ok
3	3	48	10/100BaseTX Ethernet	WS-X6348-RJ-45	yes	ok
4	4	24	FXS	WS-X6624-FXS	no	ok
5	5	8	T1	WS-X6608-T1	no	ok
6	6	8	E1	WS-X6608-E1	no	ok

Mod	Module-Name	Serial-Num
1		SAD05010NBK
3		SAD04420N7B
4		SAD050203M8
5		SAD04400EM0
6		SAD04380DW1

Mod	MAC-Address(es)	Hw	Fw	Sw
1	00-04-c0-f8-42-02 to 00-04-c0-f8-42-03	7.0	5.3(1)	5.5(6a)
	00-04-c0-f8-42-00 to 00-04-c0-f8-42-01			
	00-04-9b-f0-78-00 to 00-04-9b-f0-7b-ff			
3	00-02-fc-20-5e-50 to 00-02-fc-20-5e-7f	1.4	5.4(2)	5.5(6a)
4	00-03-32-ba-2e-35	3.0	5.4(2)	5.5(6a)
5	00-01-c9-d9-3a-98 to 00-01-c9-d9-3a-9f	1.1	5.4(2)	5.5(6a)
6	00-01-c9-d8-63-3e to 00-01-c9-d8-63-45	1.1	5.4(2)	5.5(6a)

```

Mod Sub-Type                Sub-Model                Sub-Serial  Sub-Hw
-----
1   L3 Switching Engine     WS-F6K-PFC              SAD05020221 1.1
3   Inline Power Module     WS-F6K-VPWR              1.0
Console>

```

Console> sh port 6

```

Port Name                   Status      Vlan      Duplex Speed Type
-----
6/1                          connected  1         full   2.048 E1
6/2                          notconnect 1         full   2.048 E1
6/3                          notconnect 1         full   2.048 E1
6/4                          notconnect 1         full   2.048 E1
6/5                          notconnect 1         full   2.048 E1
6/6                          notconnect 1         full   2.048 E1
6/7                          notconnect 1         full   2.048 E1
6/8                          notconnect 1         full   2.048 E1

```

```

Port      DHCP      MAC-Address      IP-Address      Subnet-Mask
-----
6/1      enable   00-01-c9-d8-63-3e 10.1.1.104      255.255.255.0
6/2      enable   00-01-c9-d8-63-3f 10.1.1.118      255.255.255.0
6/3      enable   00-01-c9-d8-63-40 10.1.1.123      255.255.255.0
6/4      enable   00-01-c9-d8-63-41 10.1.1.117      255.255.255.0
6/5      enable   00-01-c9-d8-63-42 10.1.1.120      255.255.255.0
6/6      enable   00-01-c9-d8-63-43 10.1.1.121      255.255.255.0
6/7      enable   00-01-c9-d8-63-44 10.1.1.122      255.255.255.0
6/8      enable   00-01-c9-d8-63-45 10.1.1.124      255.255.255.0

```

```

Port      Call-Manager(s)  DHCP-Server      TFTP-Server      Gateway
-----
6/1      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
6/2      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
6/3      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
6/4      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
6/5      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
6/6      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
6/7      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
6/8      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7

```

```

Port      DNS-Server(s)   Domain
-----
6/1      -               -
6/2      -               -
6/3      -               -
6/4      -               -
6/5      -               -
6/6      -               -
6/7      -               -
6/8      -               -

```

```

Port      CallManagerState DSP-Type
-----
6/1      registered       C549
6/2      registered       C549
6/3      registered       C549
6/4      registered       C549
6/5      registered       C549
6/6      registered       C549
6/7      registered       C549
6/8      registered       C549

```

```

Port      NoiseRegen NonLinearProcessing
-----
6/1      enabled    enabled
6/2      enabled    enabled

```

```
6/3 enabled enabled
6/4 enabled enabled
6/5 enabled enabled
6/6 enabled enabled
6/7 enabled enabled
6/8 enabled enabled
Console>
```

Caveats

- The Ericsson MD-110 PBX user interface is very cryptic. All parameters and options are mapped to position-dependent numeric fields within the various commands listed below. The user must have the correct revision of the Ericsson MD-110 PBX Administration manual to be able to decipher each field position to determine its meaning. Therefore it is advised not to make changes to an MD-110 PBX unless you are experienced in this interface. A single number out of place in a command string can cause unusual behavior on the PBX.
- Calling Name delivery and presentation features are not supported by the Ericsson MD-110 PBX.
- When calling from a Cisco 7960 IP phone to an Ericsson digital phone, Calling/Called Number is displayed on both phones after the call is answered.
- When calling from an Ericsson digital phone to a Cisco 7960 IP phone, the IP phone displays “Connected Number” after the call is answered. The Ericsson phone however does NOT get updated when the call is answered. It displays the trunk name.