Application Note

Alcatel 4400 Release 5.0 and 5.1 to Cisco IOS Voice Gateway using E1 QSIG with H.323

October 30, 2007 Revision 4

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Introduction

- Although specific gateway router models were used to validate its content, this application note also applies to all Cisco 1700/2600/3600/3700/2800/3800 series Cisco IOS voice gateways.
- This application note provides configuration guidelines for a toll-bypass network using Cisco IOS voice gateways to connect Alcatel 4400 Release 5.0 and 5.1 PBXs. The PBXs are connected to the Cisco IOS voice gateways by E1 QSIG trunk circuits. The Cisco IOS voice gateways "extend" the E1 QSIG trunk circuits with VoIP, using the H.323 protocol.
- An Alcatel 4400 Release 5.0 PBX and an Alcatel 4400 Release 5.1 PBX were each connected via E1 QSIG trunk circuits to a Cisco IOS voice gateway. The two voice gateways were connected via IP over Ethernet, and configured for VoIP using H.323. End-to-end calls were placed between the PBXs to exercise and test basic calls as well as QSIG supplementary services such as call transfer, call conference, and call forward.
- Using the Alcatel PBX configurations and Cisco IOS voice gateway configurations in this application note, successful toll bypass integration was achieved. This includes basic call, call transfer, call conference, and call forward, with some limitations on Called Name features during call forward scenarios.

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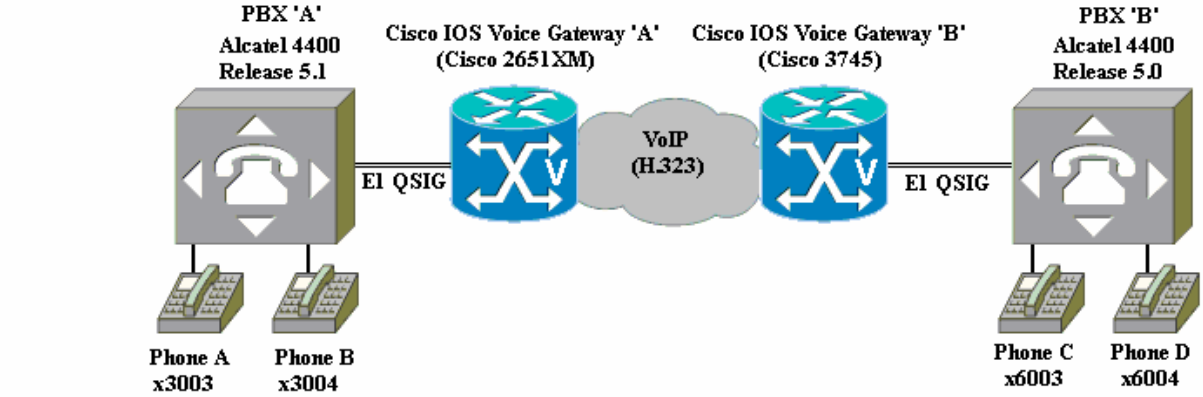
Network Topology

Figure 1. Network Topology or Test Setup



System Components

Hardware Requirements

- (2) Cisco IOS voice gateways with E1 VWICs (voice/WAN interface cards)
- (2) Alcatel 4400 PBX
- (4) Alcatel digital station telephones

Software Requirements

- Alcatel Release 5.0 (or higher).
- Cisco IOS voice gateways: Cisco IOS Release Version 12.4(1.8)T or later.

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Features

Features Supported

- Basic Call (ENBLOC and Overlap)
- Caller ID (Calling Name/Number and Called and/or Connected Name/Number)
- Call Transfer: Supervised Local Transfer
- Call Transfer: Supervised Network/External Transfer
- Call Conference: Local
- Call Conference: Network/External
- Call Forward: Local
- Call Forward: Network/External
- Call Hold

Limitations

- On basic calls, Calling Number was displayed only after the destination picked up. This is inherent to the PBXs and also occurs with the PBXs connected directly via an E1 QSIG trunk.
- On basic calls, the Called Number displayed was actually dialled number or Connected number. This is inherent to the PBXs and also occurs with the PBXs connected directly via an E1 QSIG trunk.
- On basic calls using Overlap Sending, the Called Name displayed was actually Connected Name, and displays only after the destination answers. This is inherent to the PBXs and also occurs with the PBXs connected directly via an E1 QSIG trunk.
- On Supervised Transfers, the originating Calling Name and Number were displayed on the final destination phone only after the destination answered and the transfer was completed. This is inherent to the PBXs and also occurs with the PBXs connected directly via an E1 QSIG trunk.
- On forwarded calls, the originatinating Calling Number was displayed on the final destination only after the destination answered and the transfer was completed. This is inherent to the PBXs and also occurs with the PBXs connected directly via an E1 QSIG trunk.
- On forwarded calls, the forwarding Called Name was not passed to the final destination. This is inherent to the PBXs and also occurs with the PBXs connected directly via an E1 QSIG trunk.
- MWI was not tested, as a local voice mail system was not available on the PBXs at the time of testing.

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Configuration

Configuring the Alcatel 4400, Release 5.1

Figure 2. Configure “ISO function” System Parameter

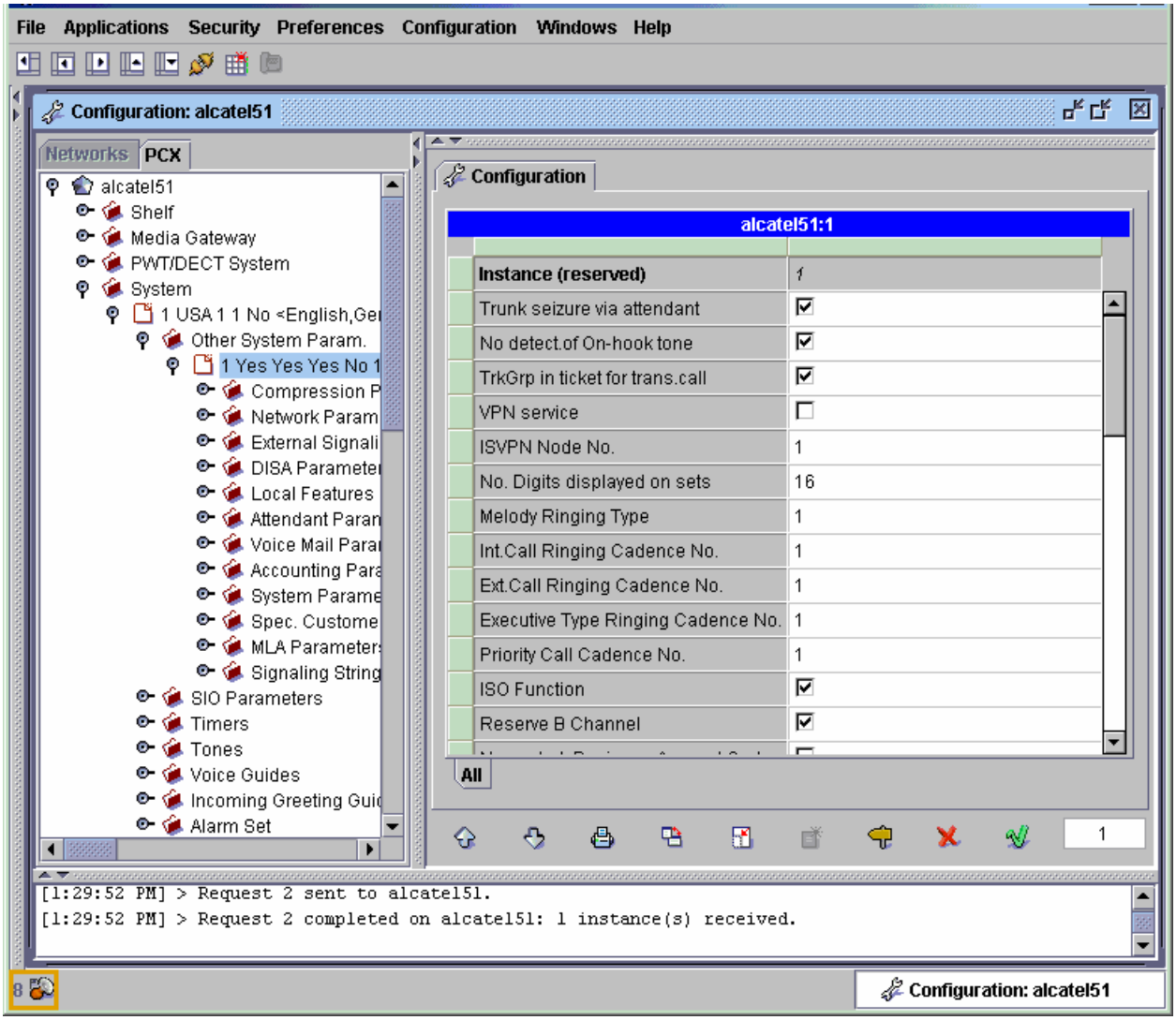

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Figure 3. Configure “ISO function” System Parameter (continued)

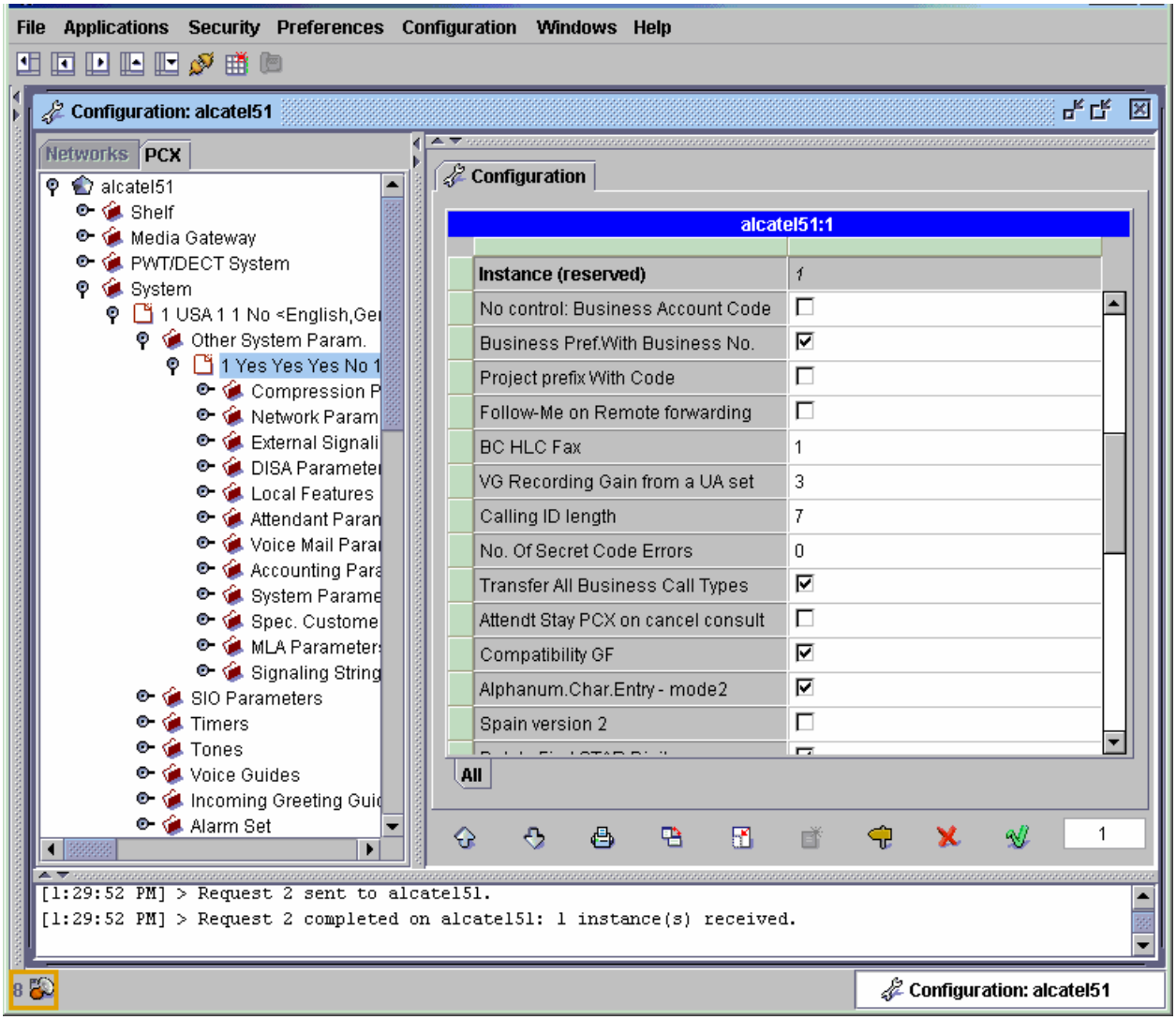

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Figure 4. Configure “ISO function” System Parameter (continued)

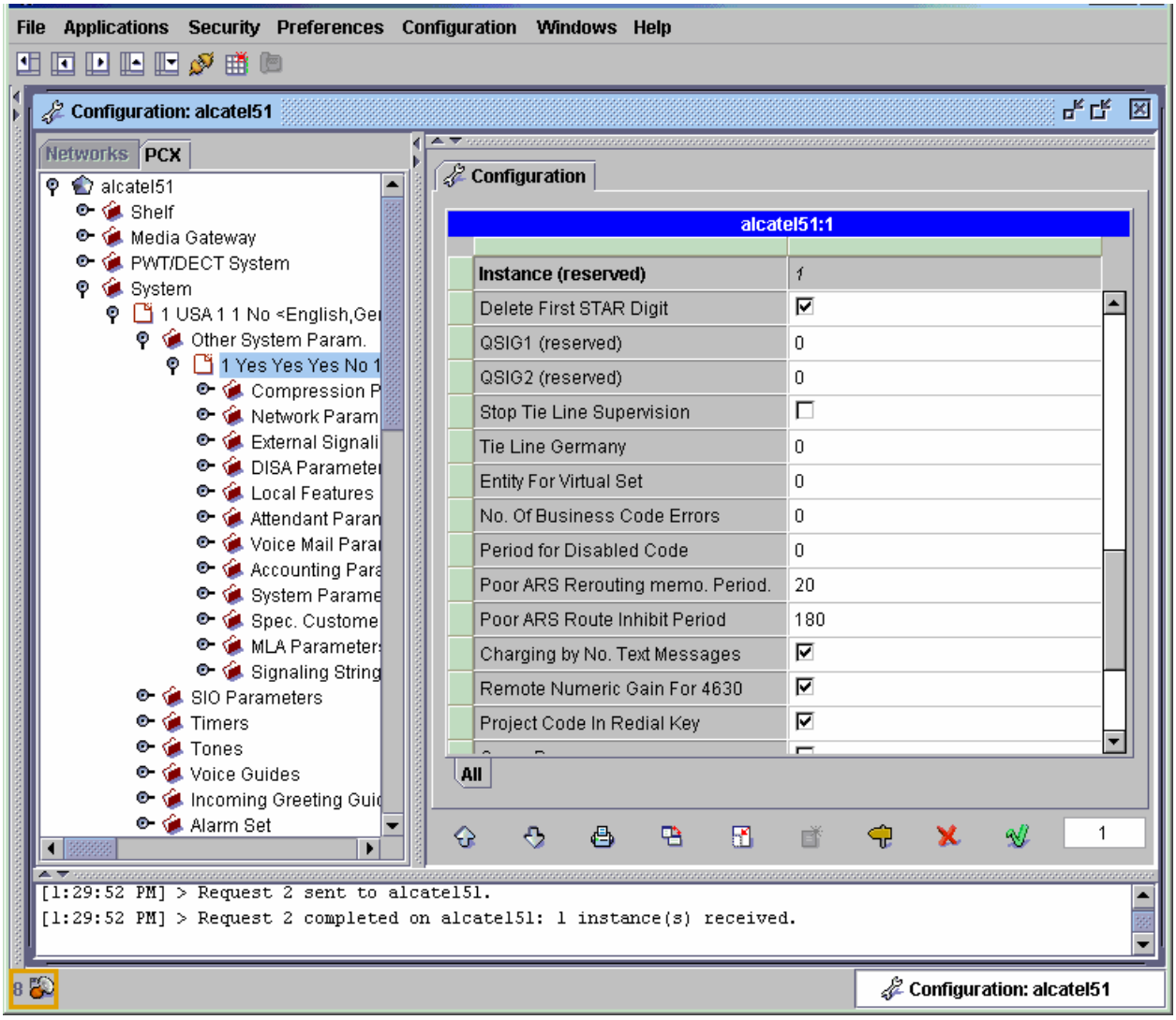

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Figure 5. Configure “ISO function” System Parameter (continued)

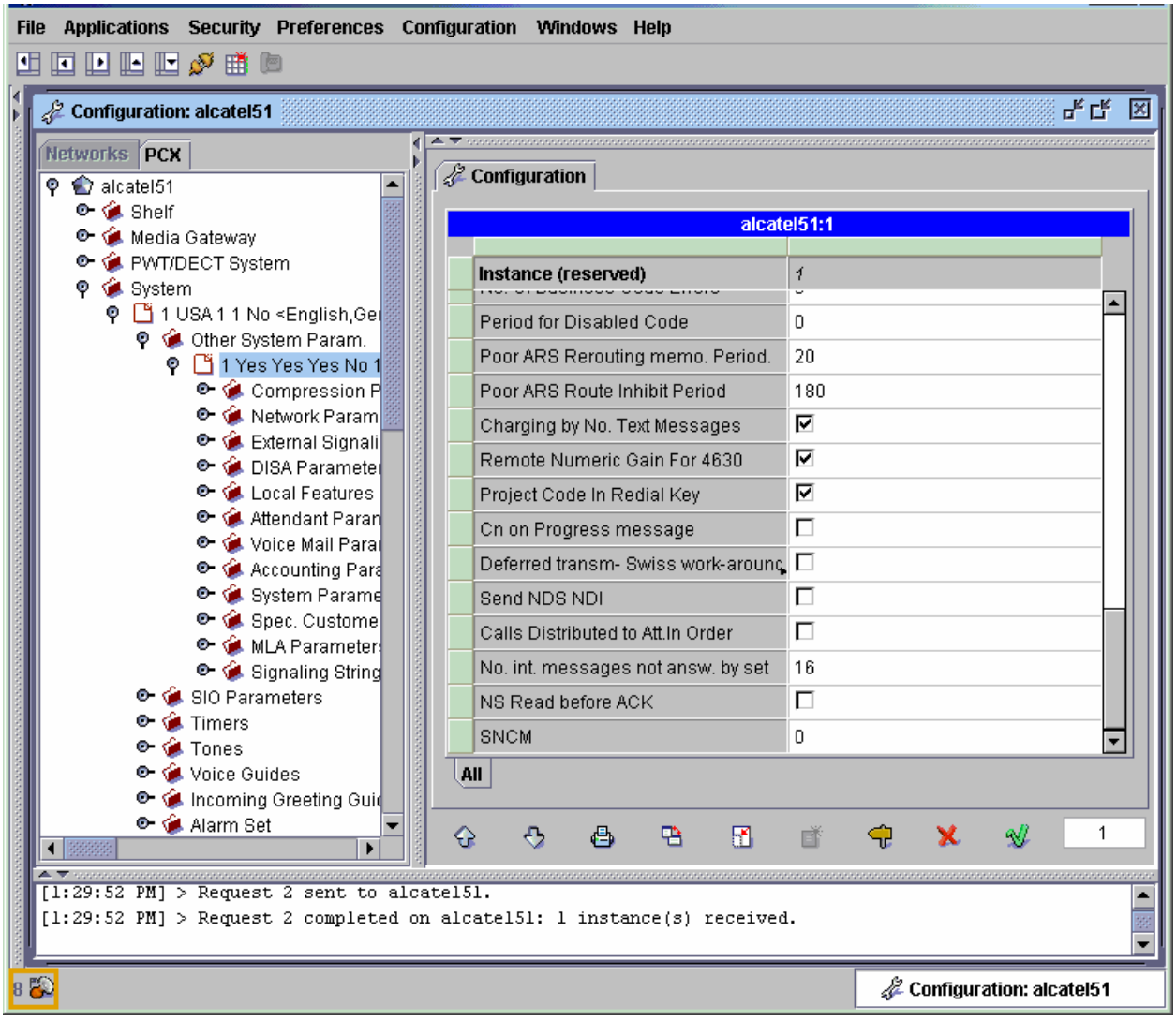

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Figure 6. Configure Board 4

`Interface type must be set to` **`PRA2`**

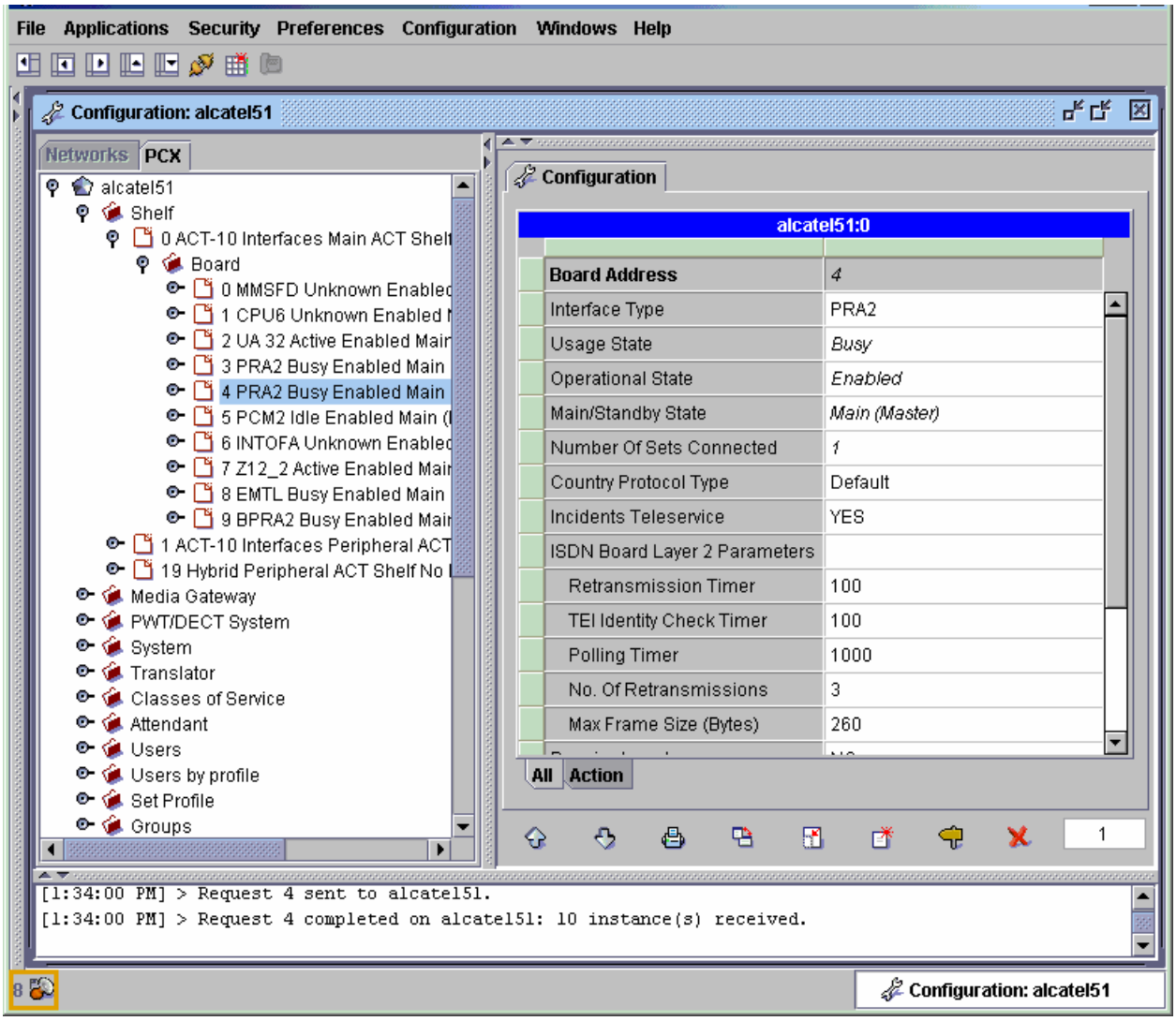

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Figure 7. Configure Board 4

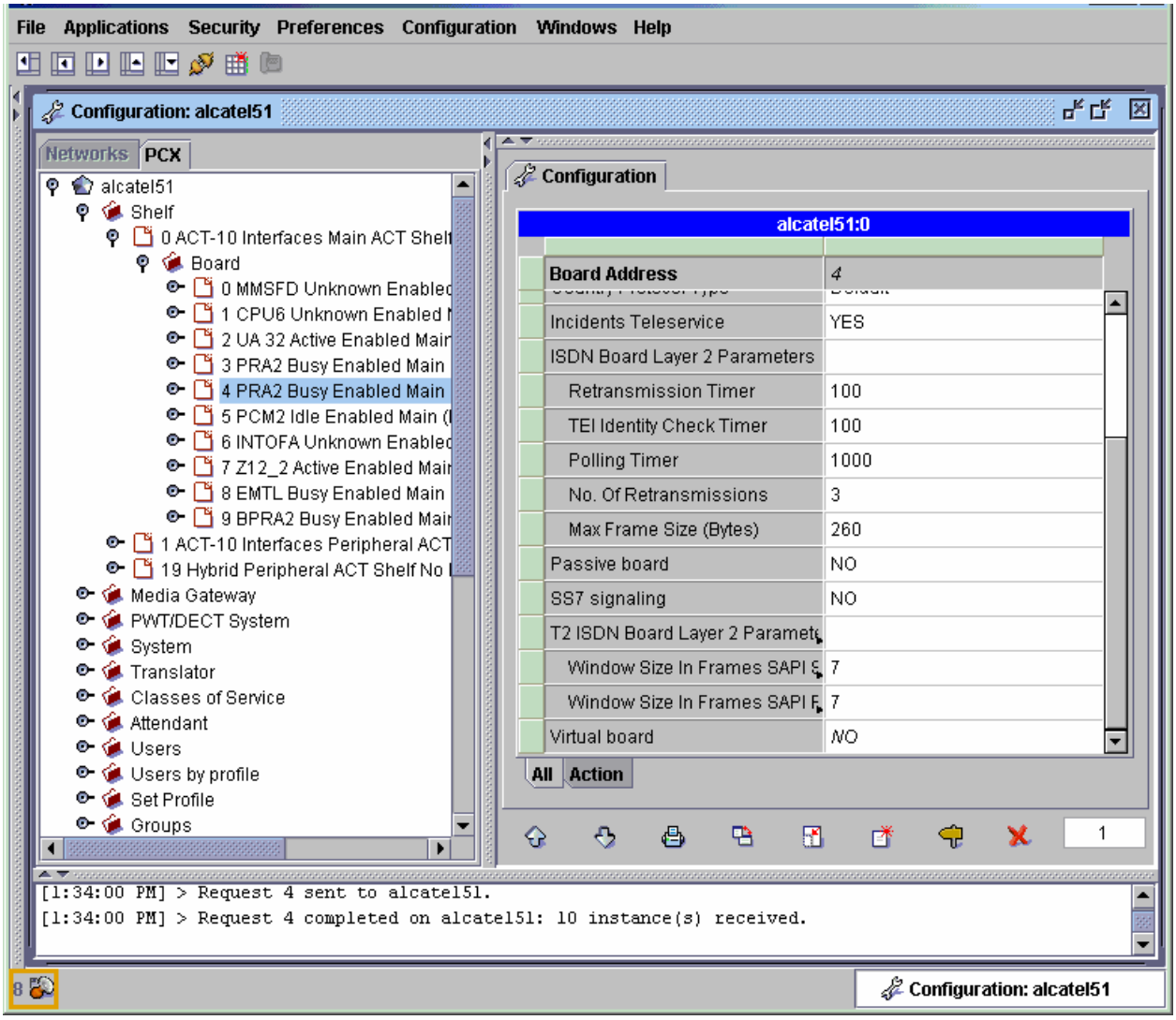

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Figure 8. Configure Board 4 Digital Access Options

Network mode must be set to **Yes** for (Master/Network) or **No**- (Slave/User).
Access Type must be set to **T2.**

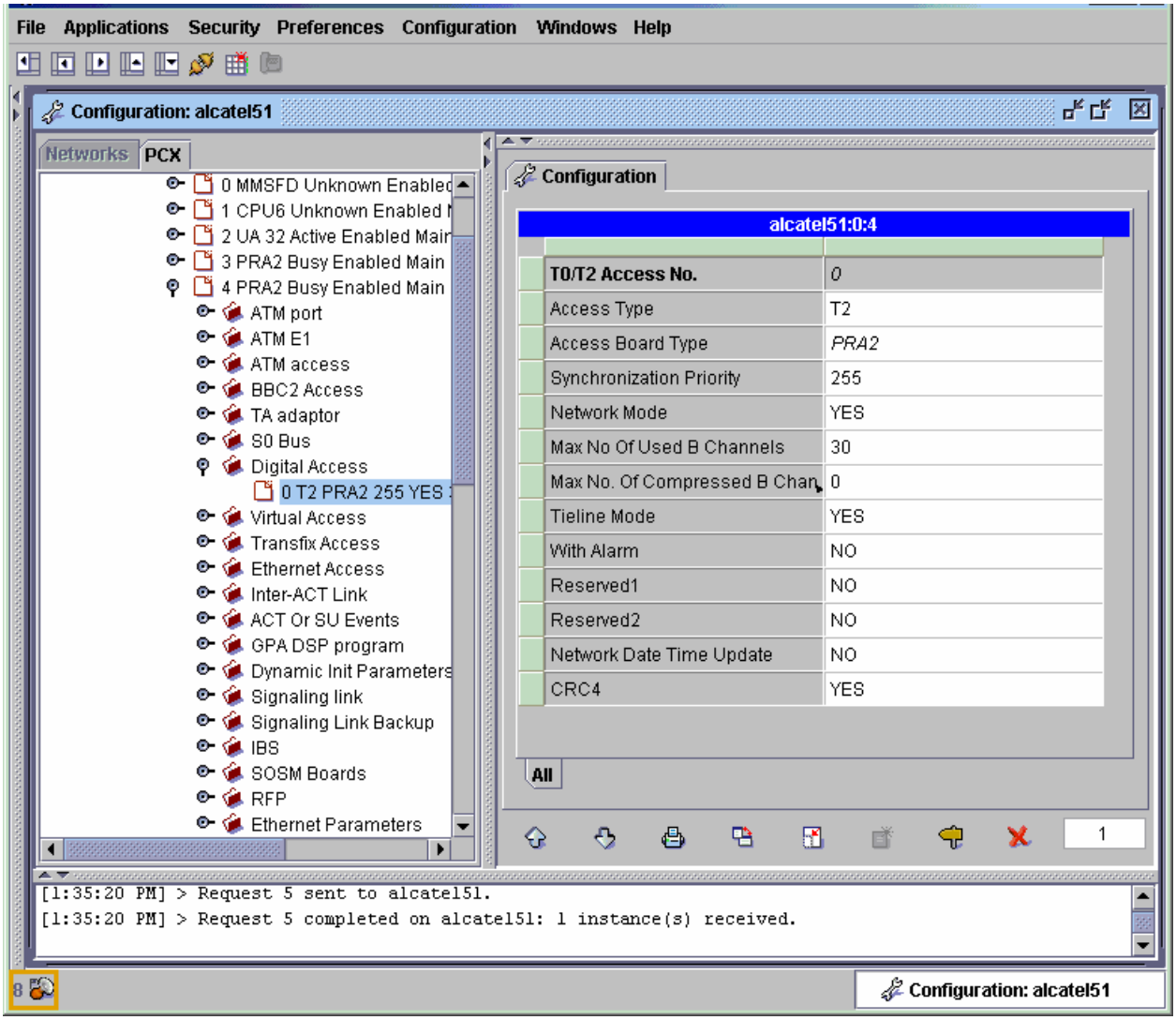

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Figure 9. Configure Trunk Group 1

Q931 signal variant is used to set the protocol type to **ABC-F**

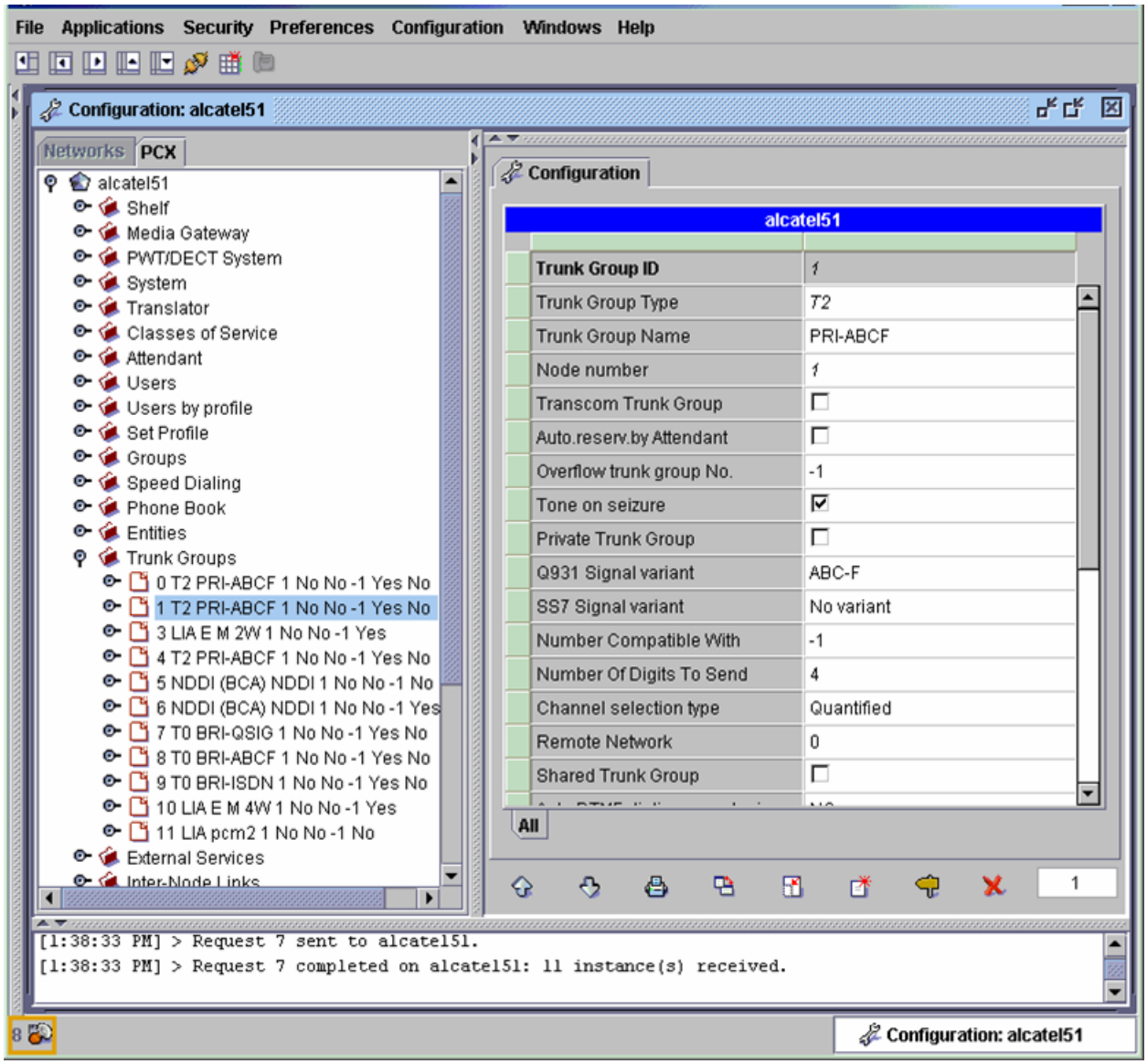

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Figure 10. Configure Trunk Group 1 (continued)

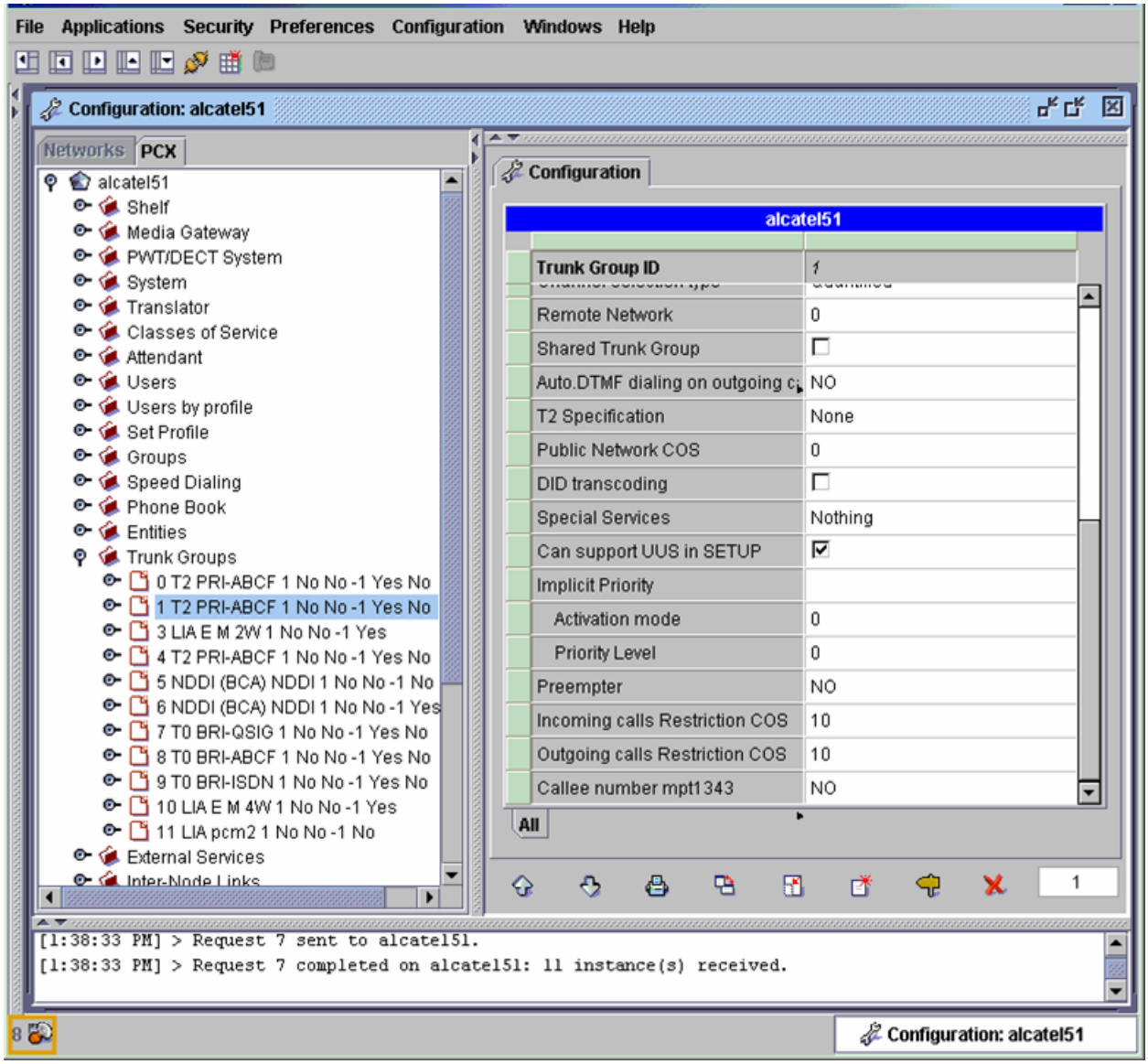

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Figure 11. Configure Trunk Detail

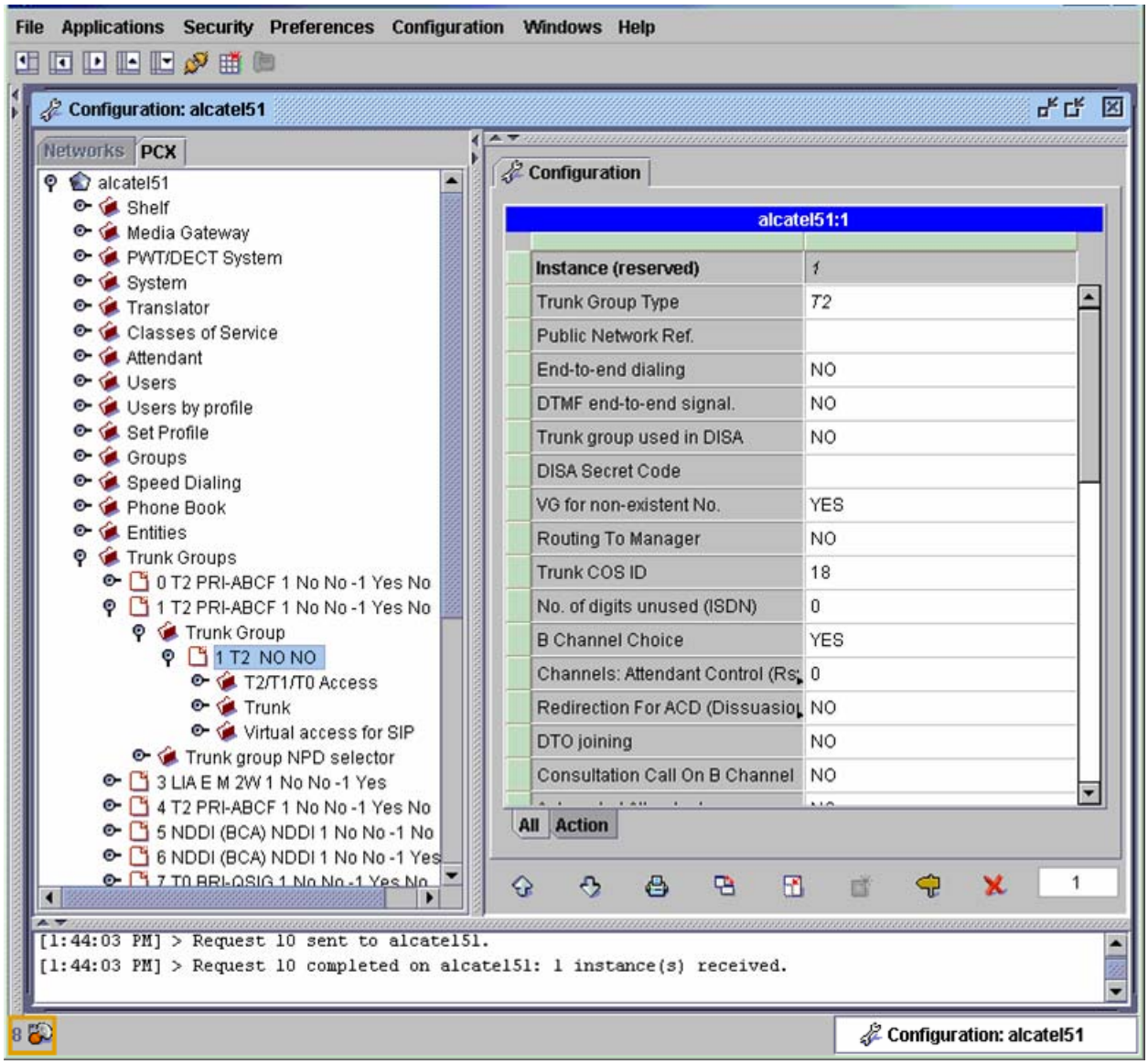

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Figure 12. Configure Trunk Detail (continued)

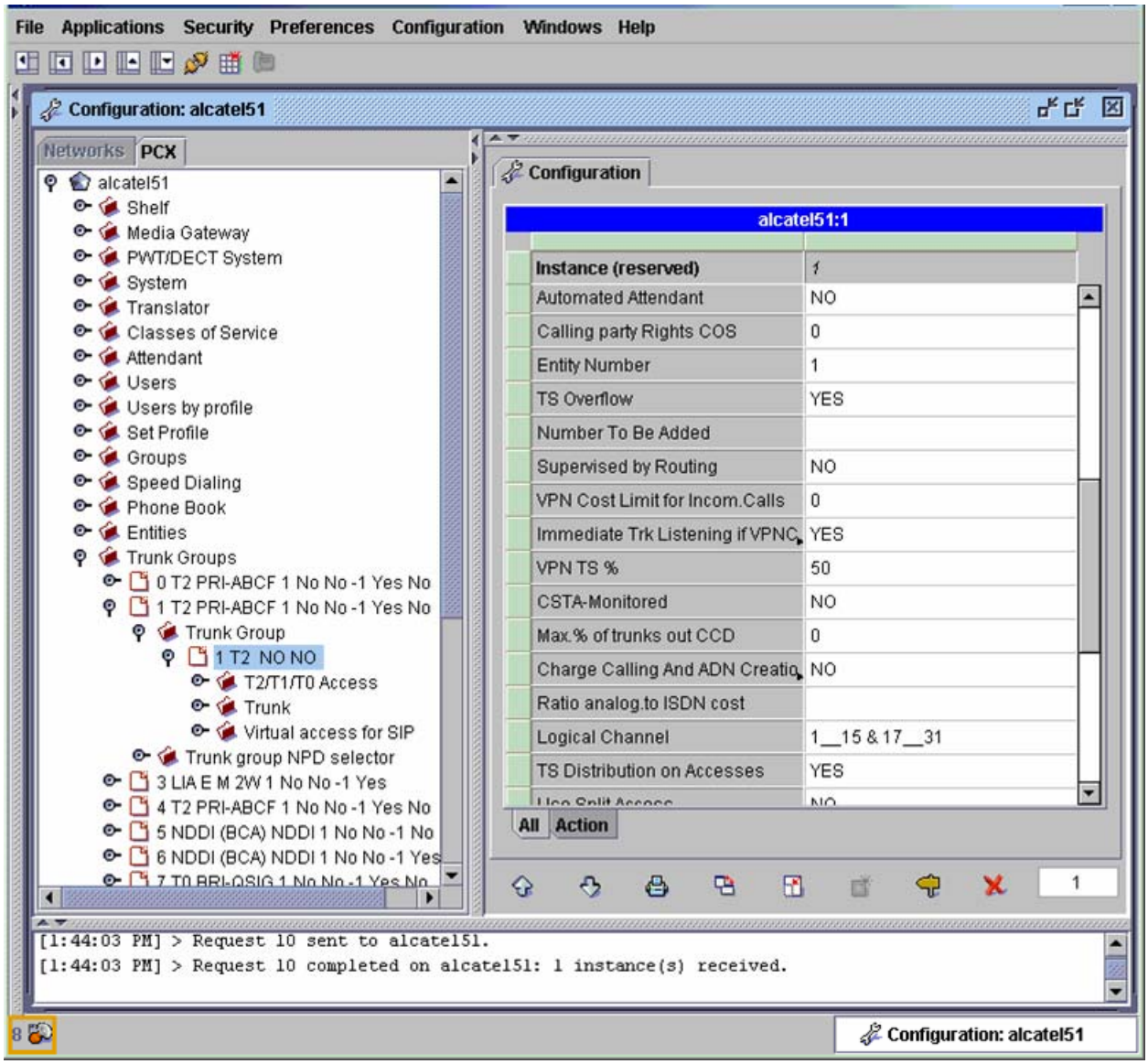

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Figure 13. Configure Trunk Detail (continued)

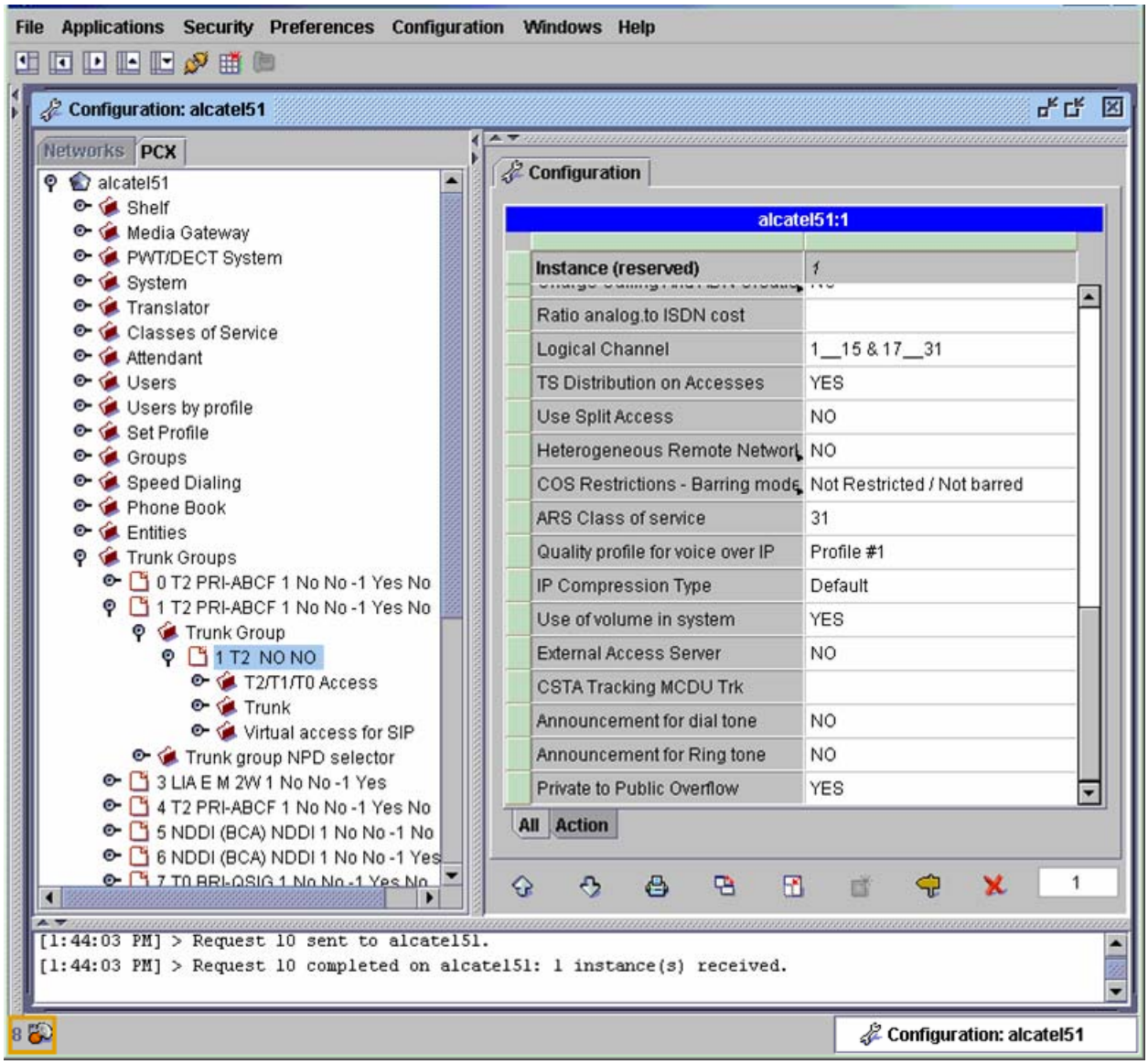

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Figure 14. T2 Access

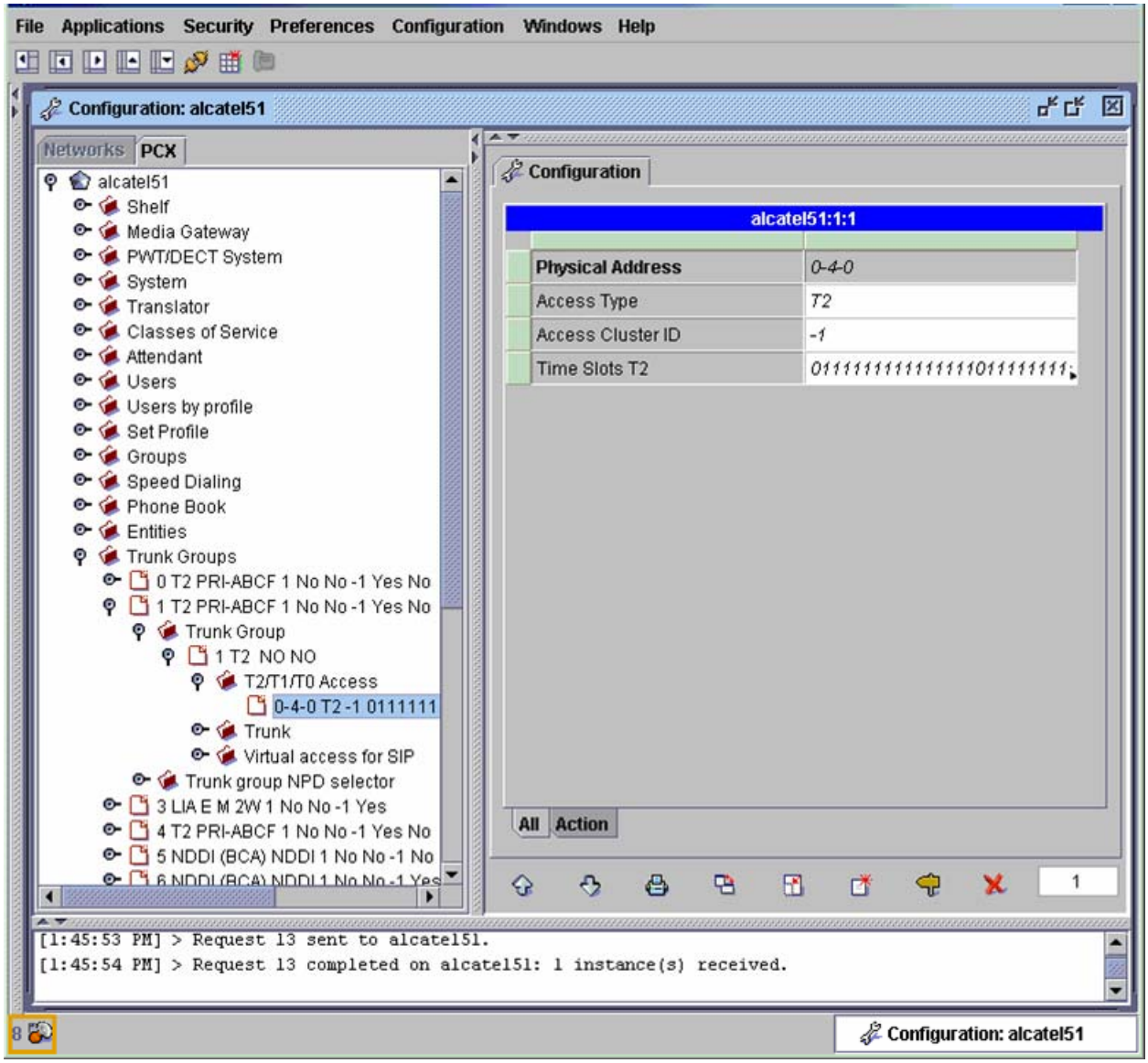

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Figure 15. Network Routing Table

*Ensure that **Protocol Type** is configured for QSIG-GF which ensures that all Alcatel proprietary QSIG signaling messages are stripped from outgoing calls.*

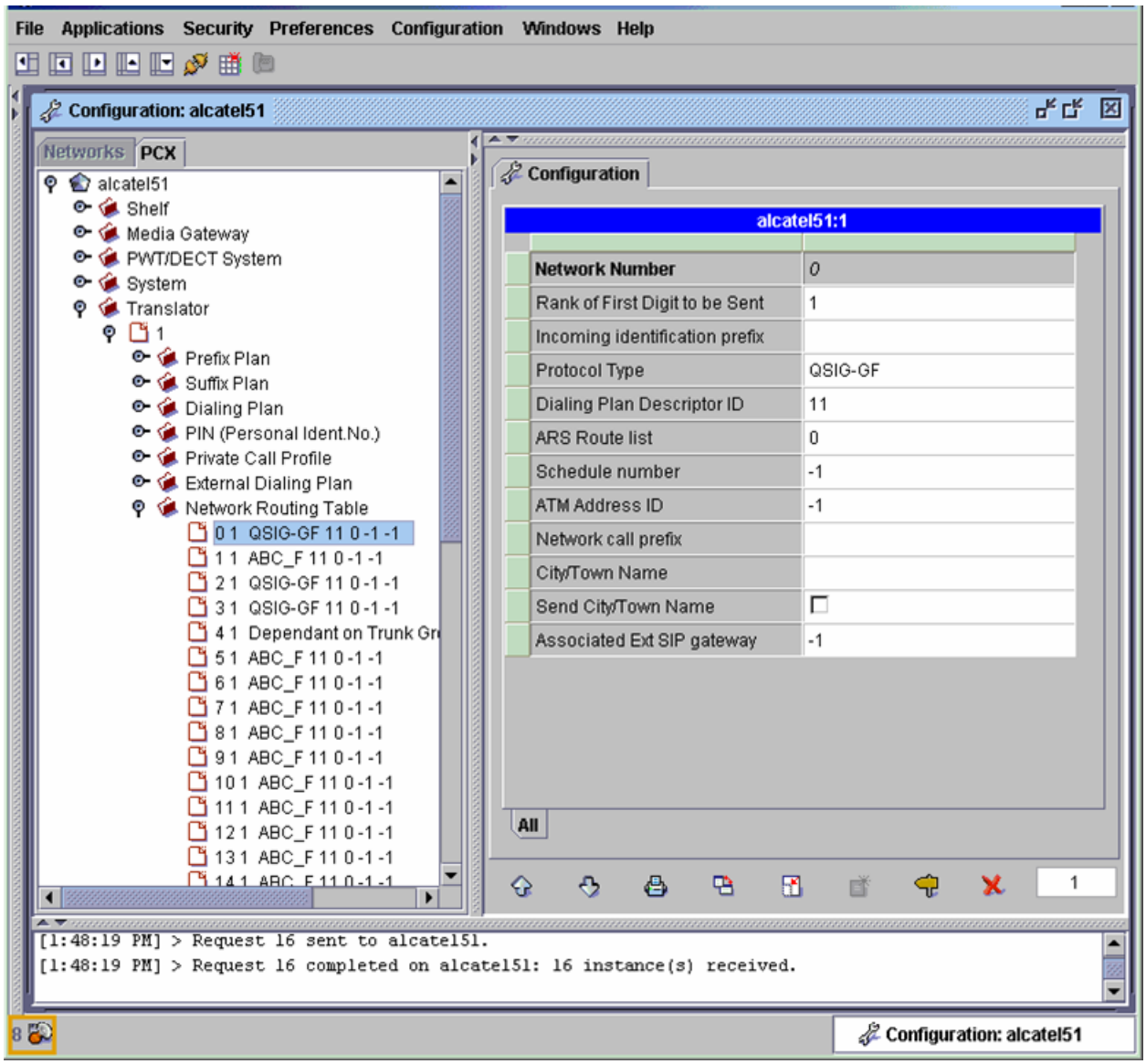

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Figure 16. Prefix Plan

Alcatel51/translator/prefix plan/6

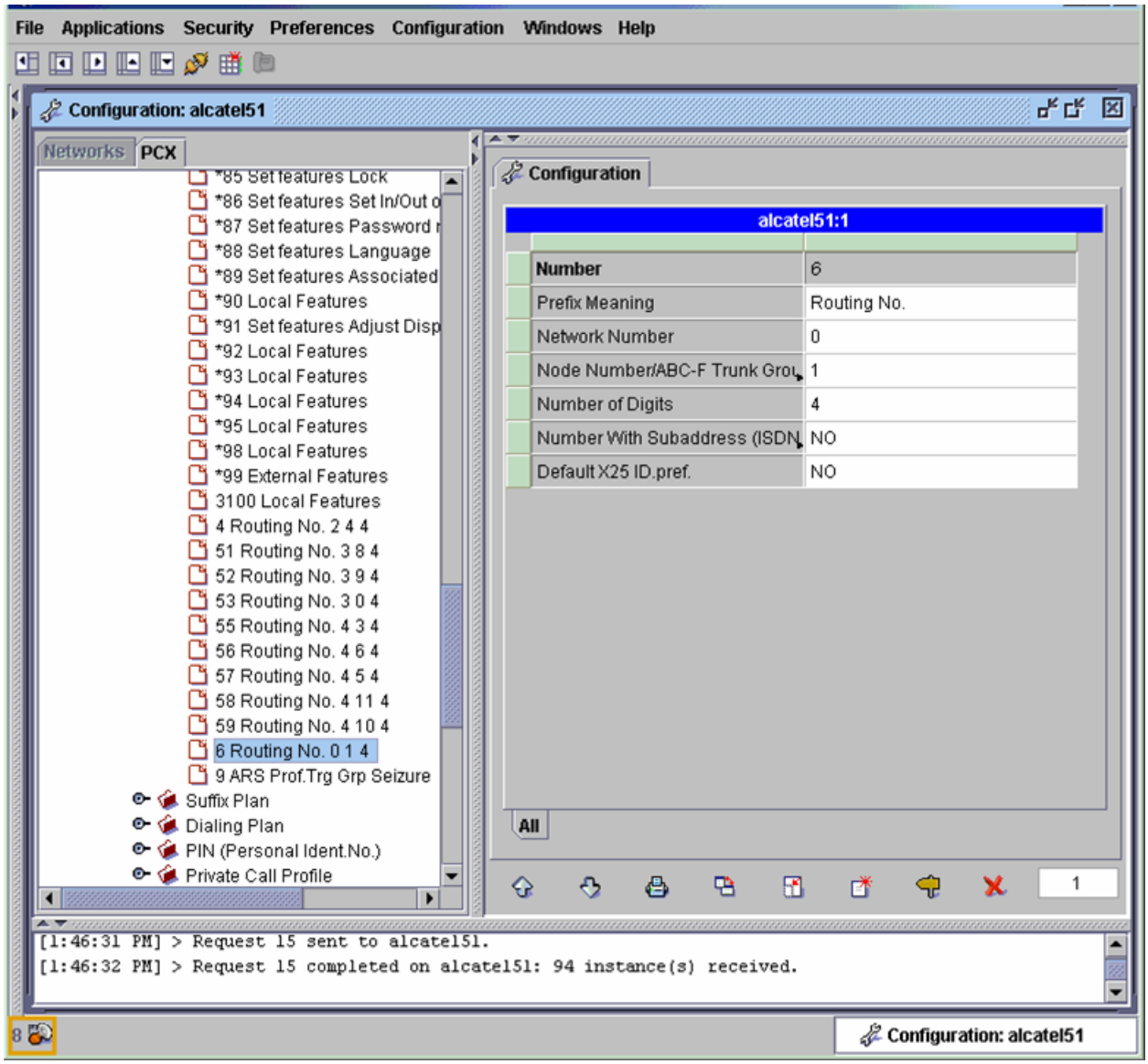

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Figure 17. Configure User (Station)

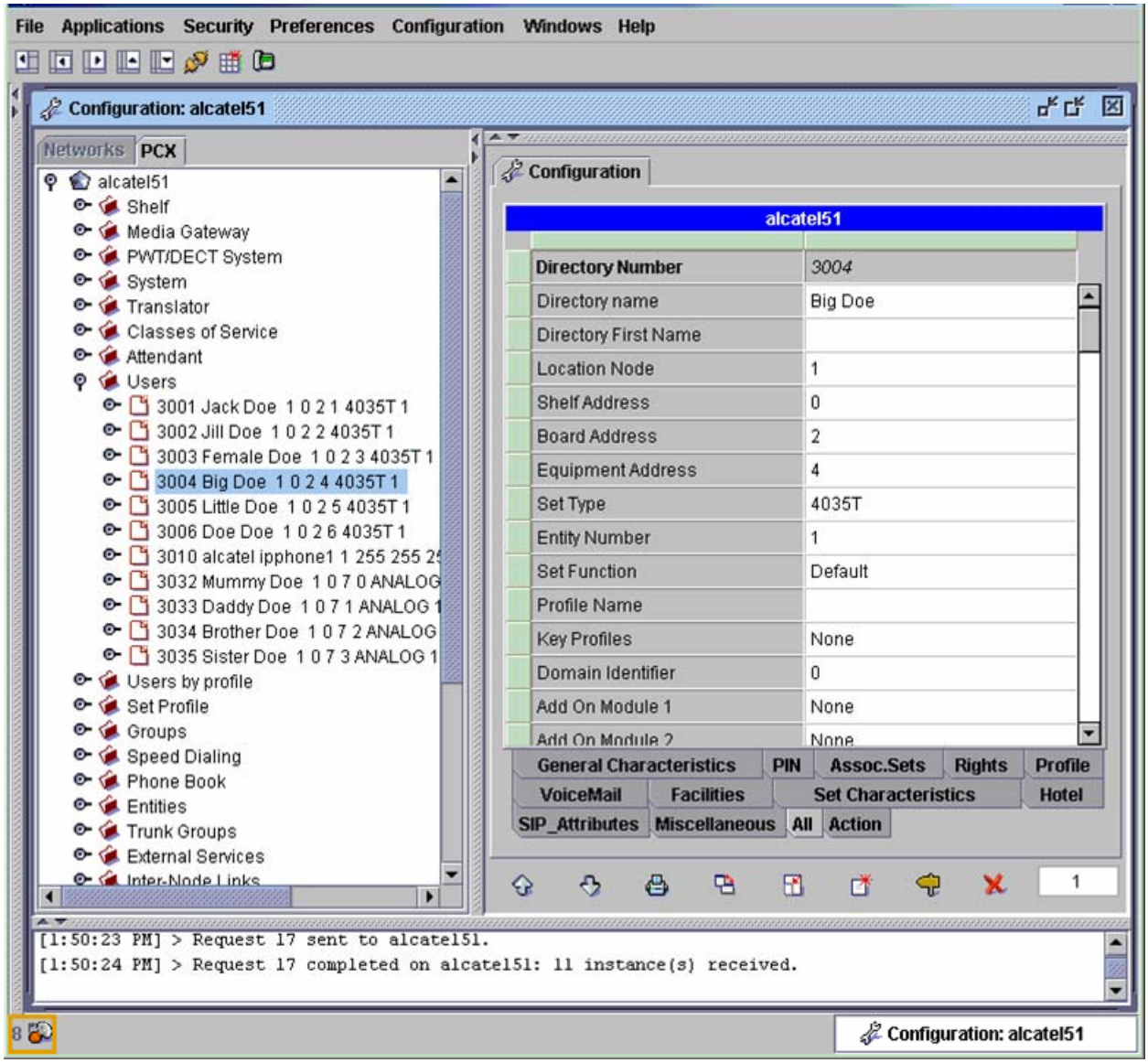

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Figure 18. Configure User (Station, Continued)

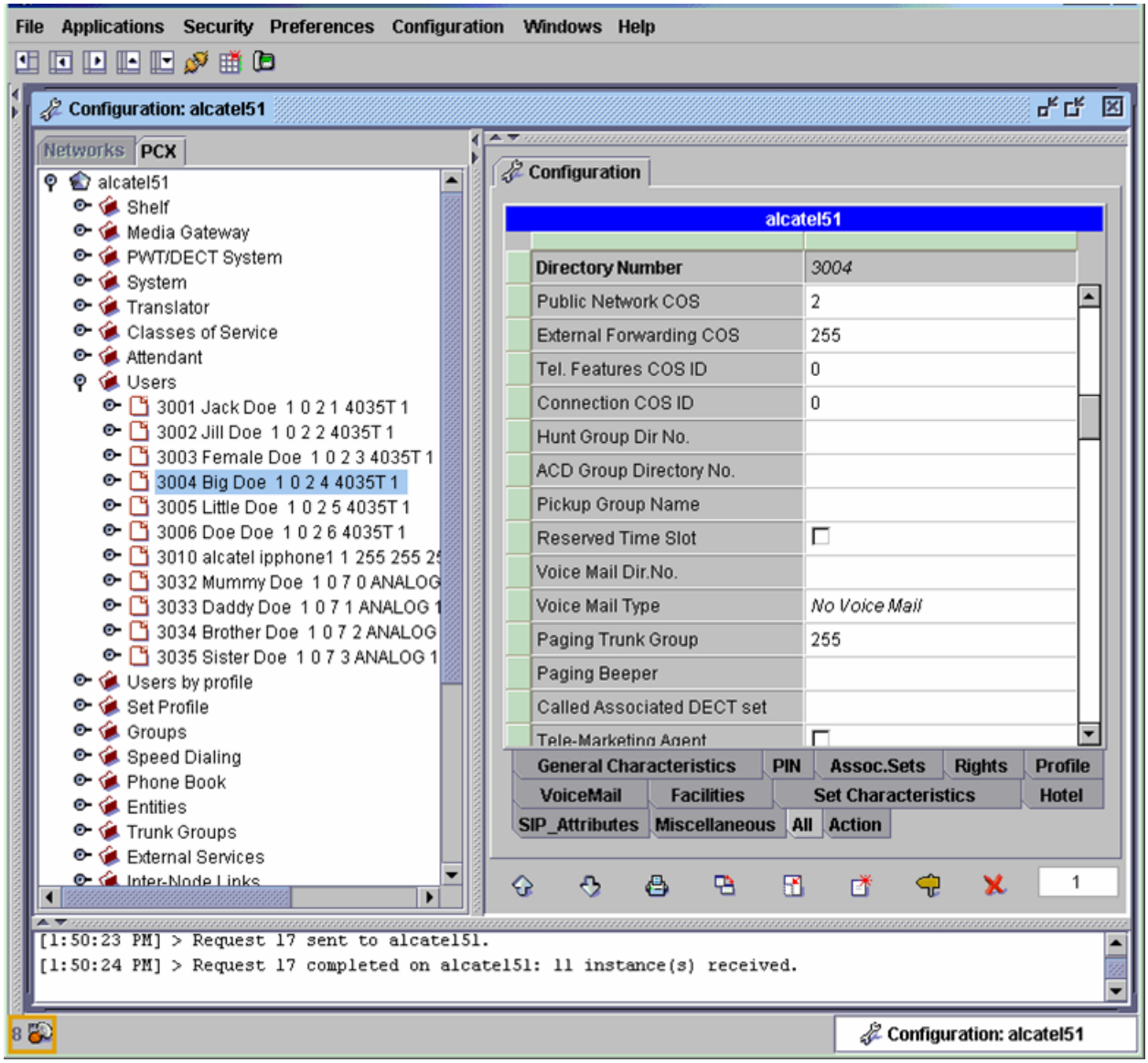

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Figure 19. Configure User (Station, Continued)

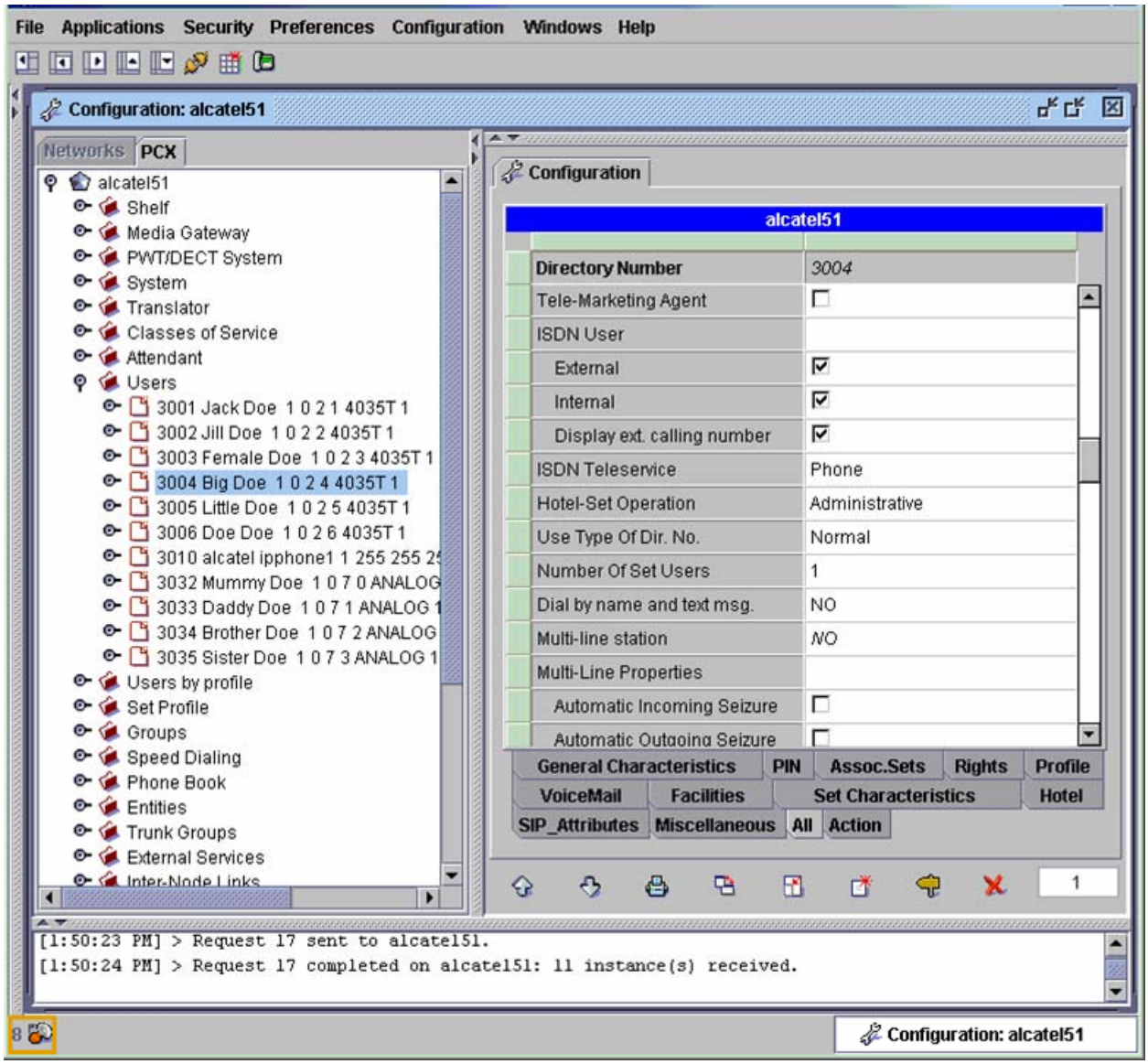

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Figure 20. Configure User (Station, Continued)

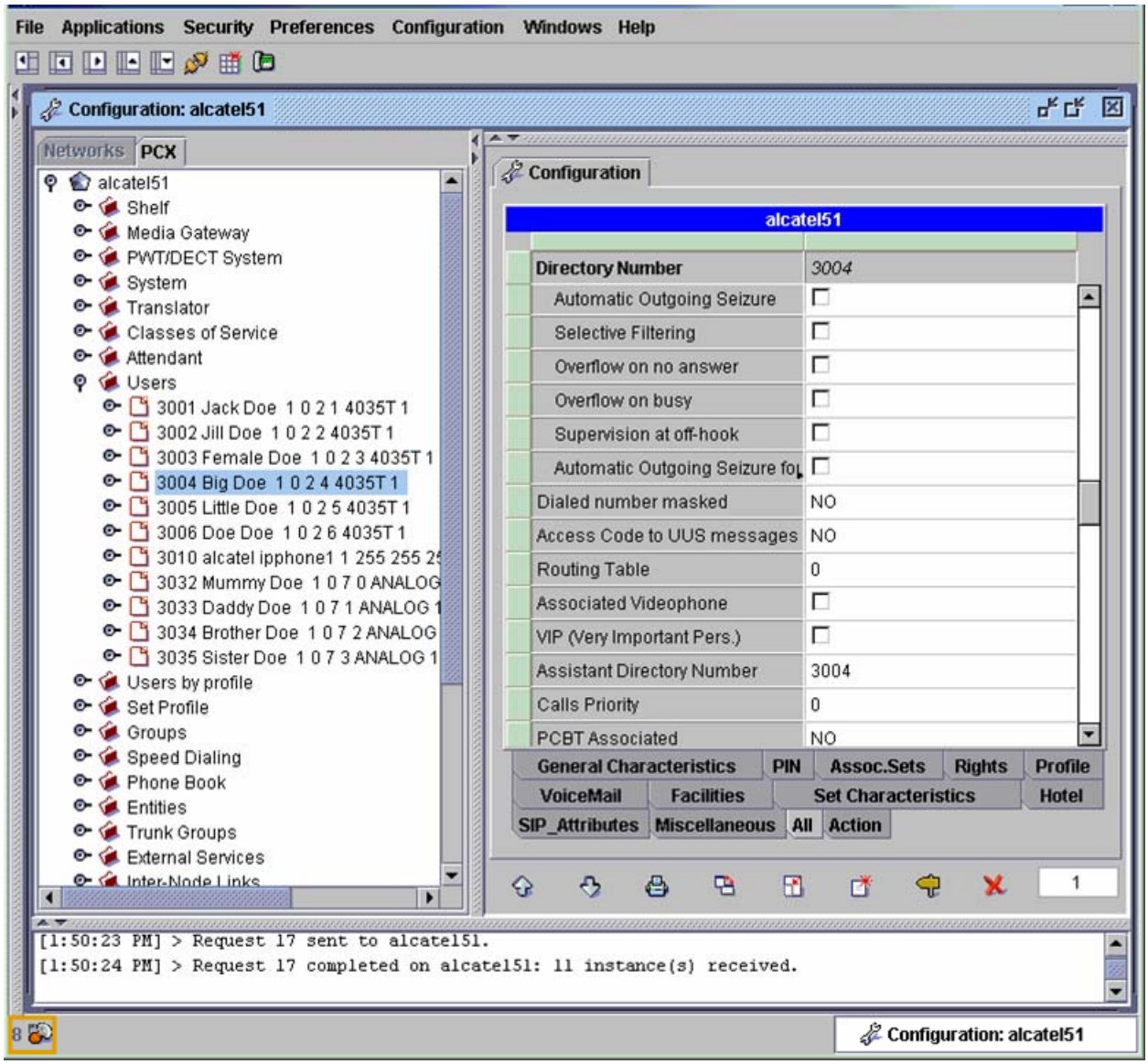

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Figure 21. Configure User (Station, Continued)

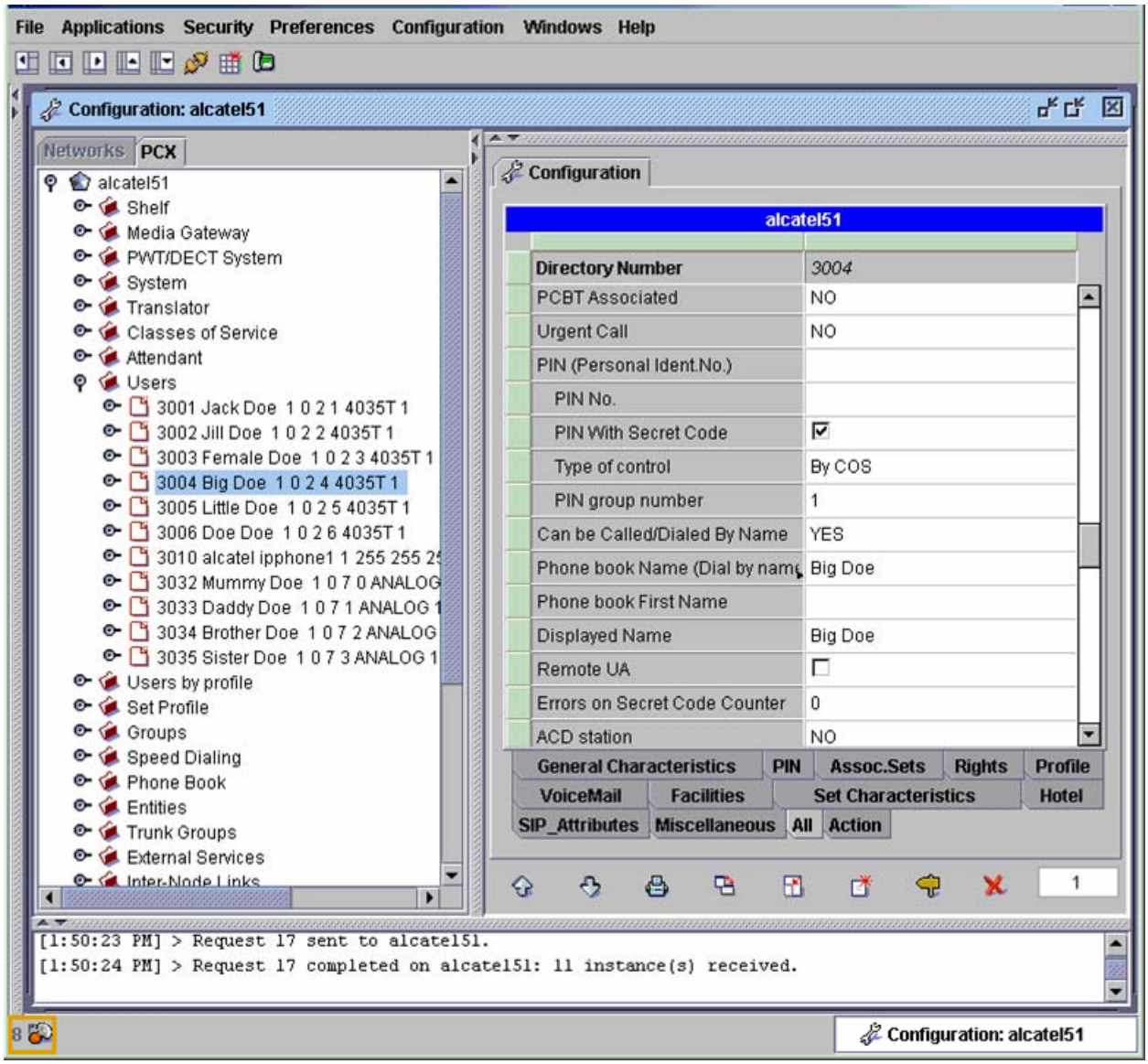

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Figure 22. Configure User (Station, Continued)

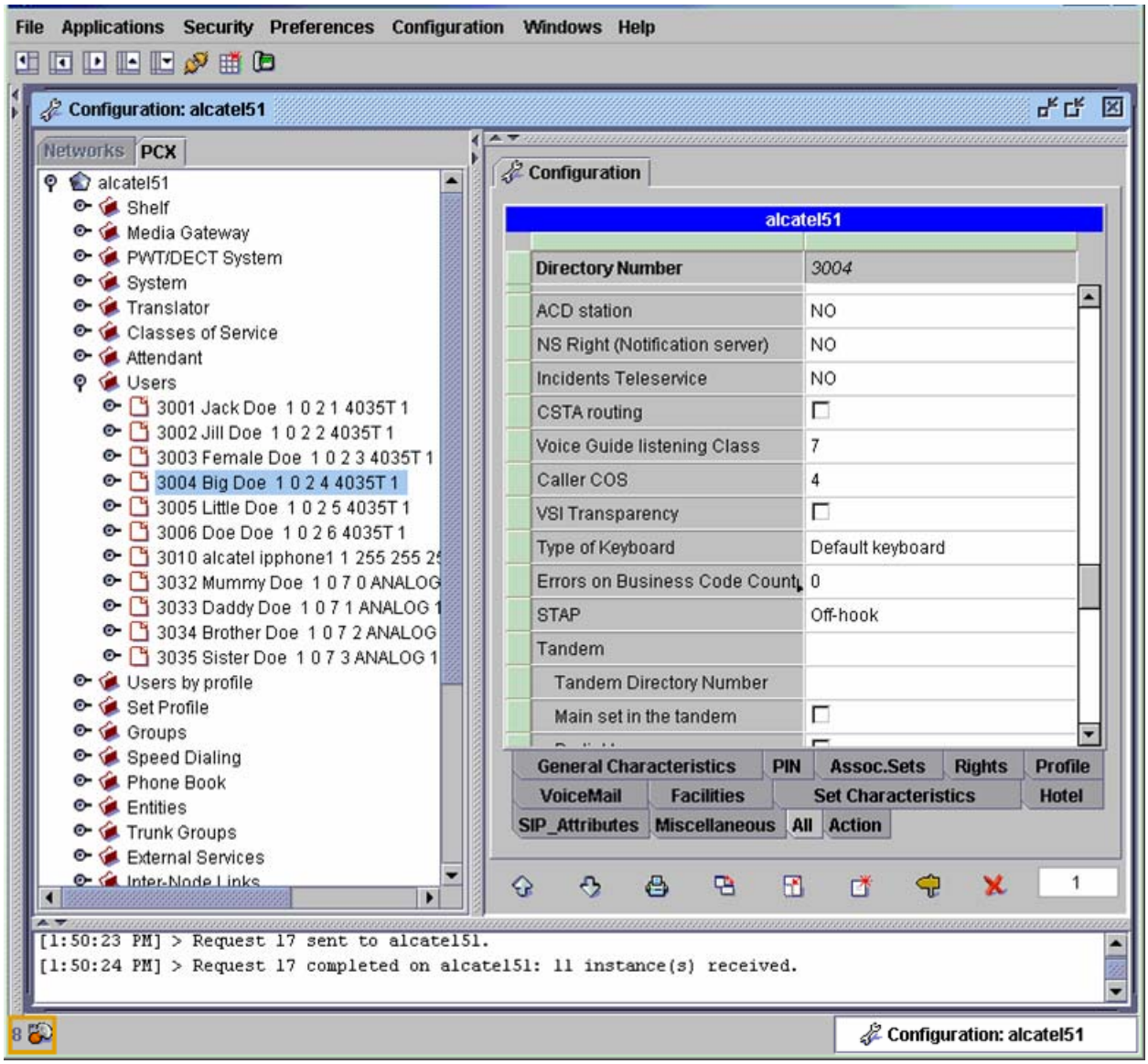

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Figure 23. Configure User (Station, Continued)

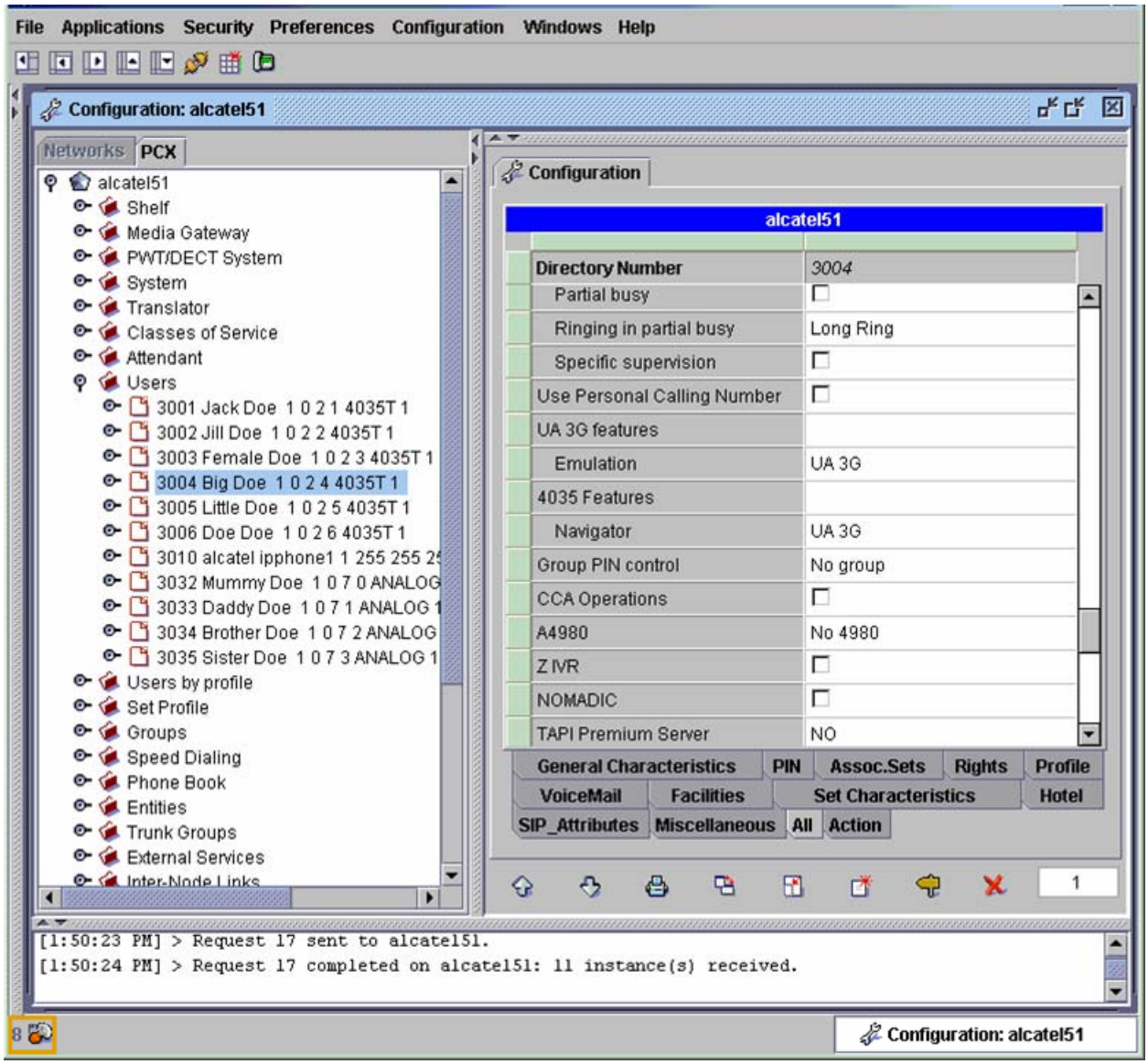

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Figure 24. Configure User (Station, Continued)

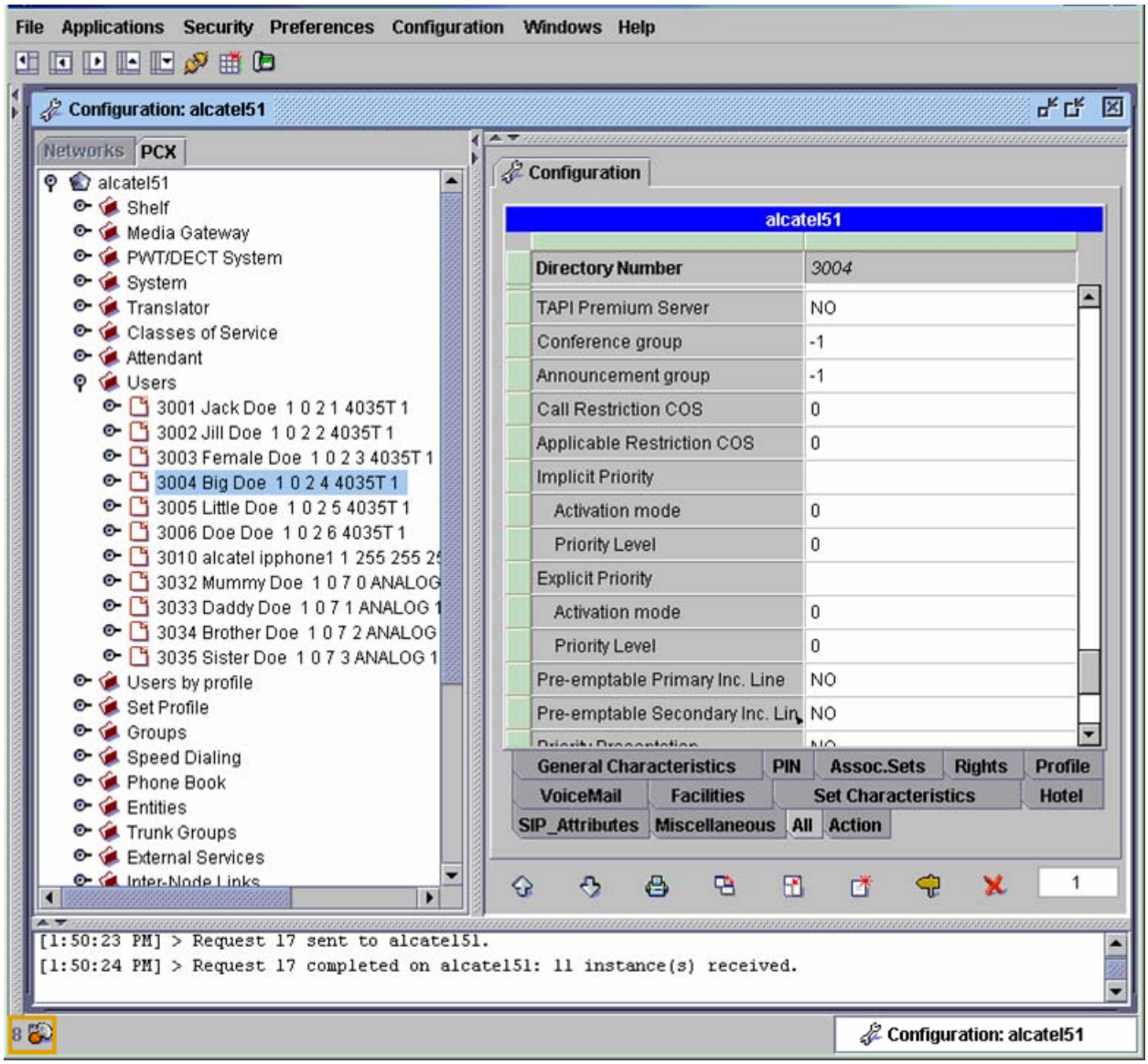

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Figure 25. Configure User (Station, Continued)

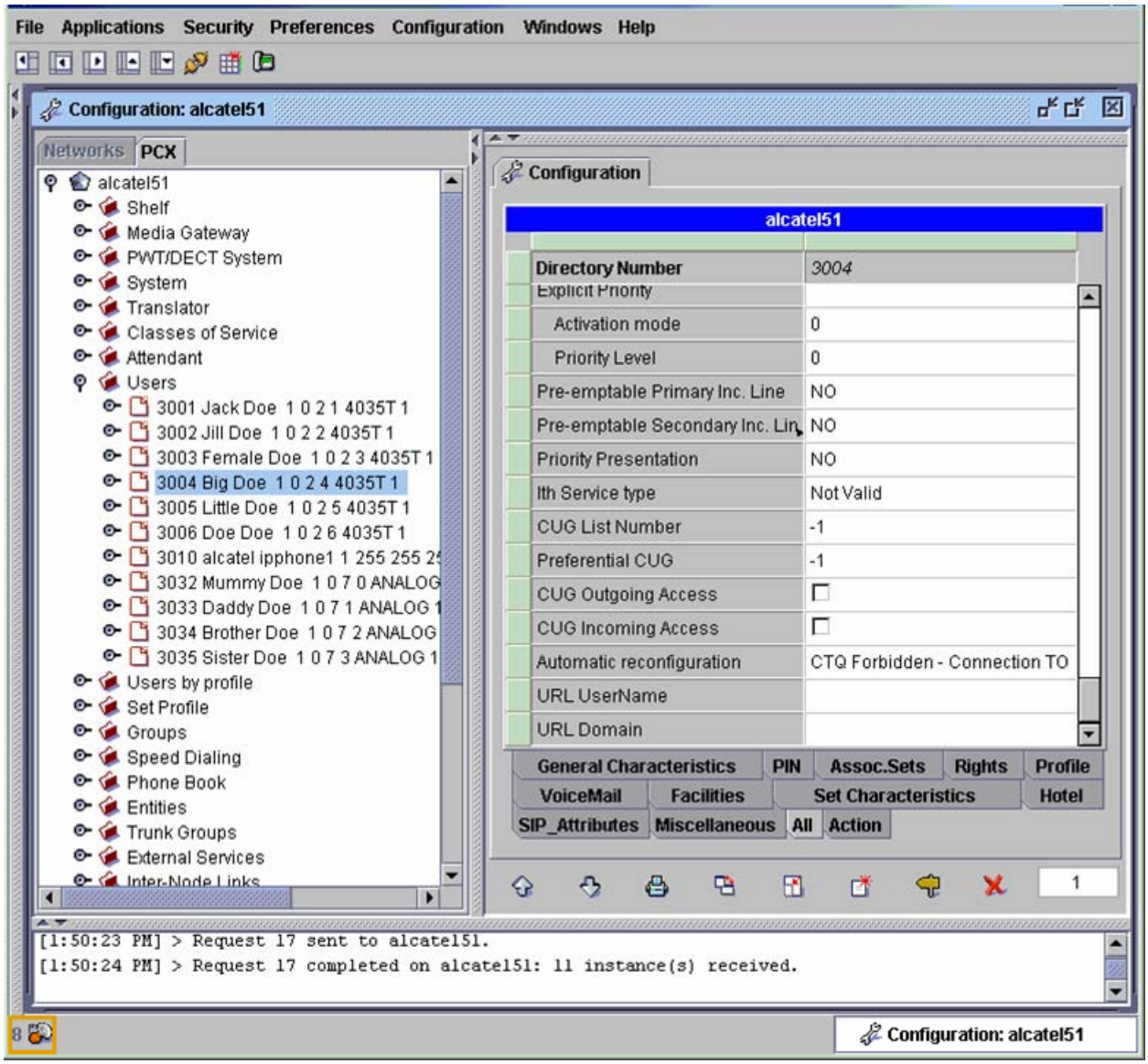

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Figure 26. Alcatel 4400 Software release 5.1

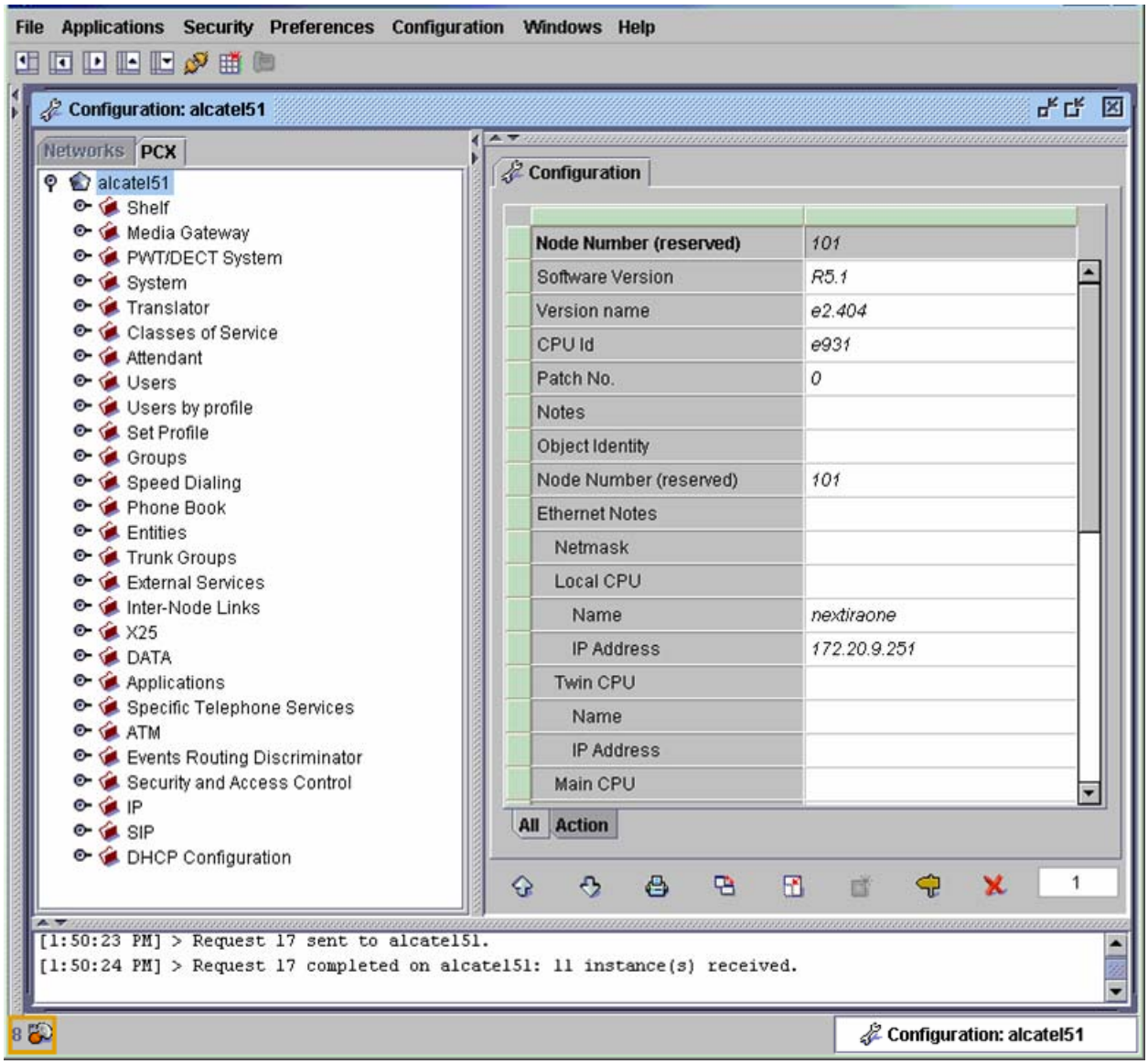

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Figure 27. Alcatel 4400 Software release 5.1 (continued)

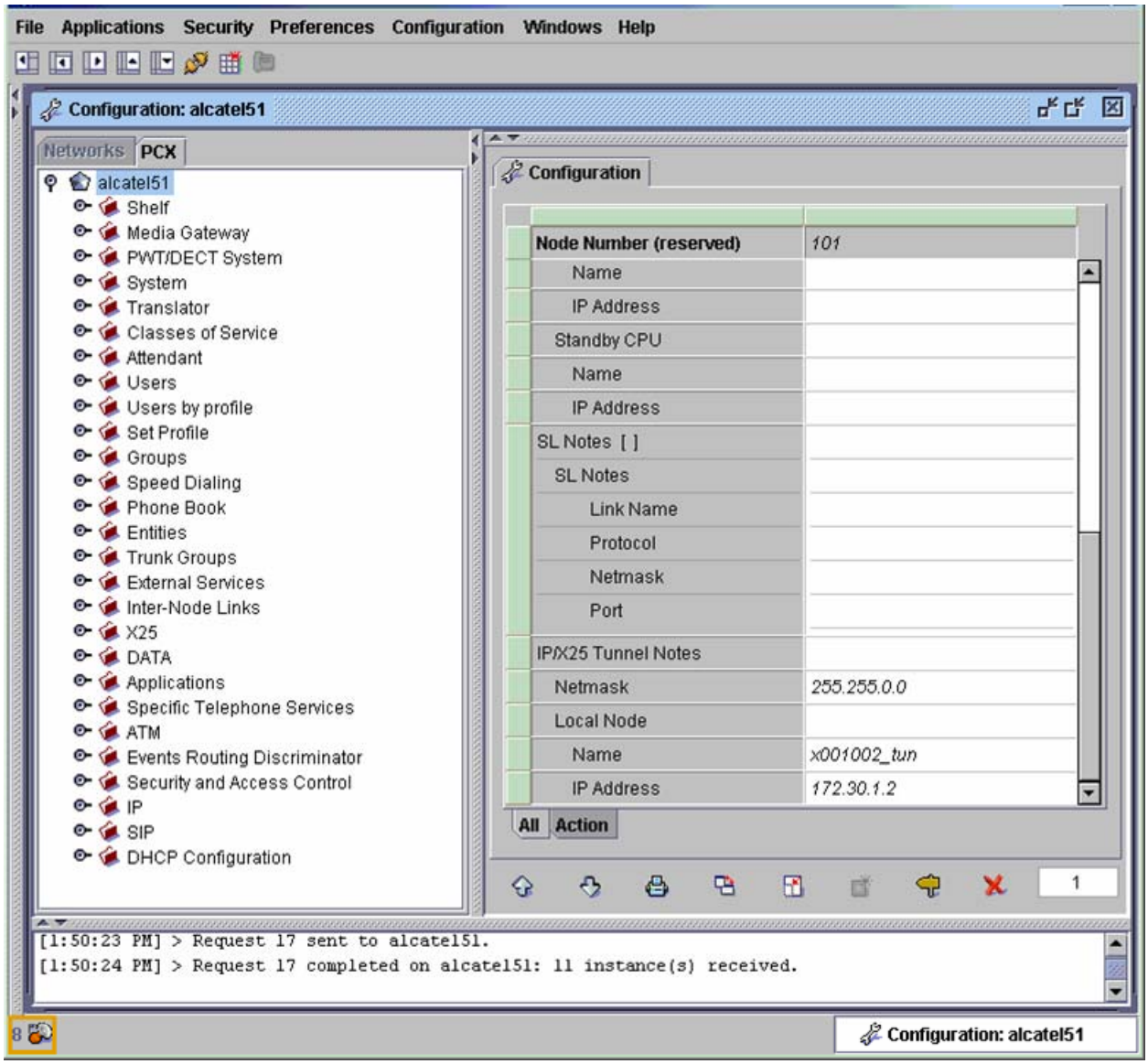

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Figure 28. Configure “ISO function” System Parameter

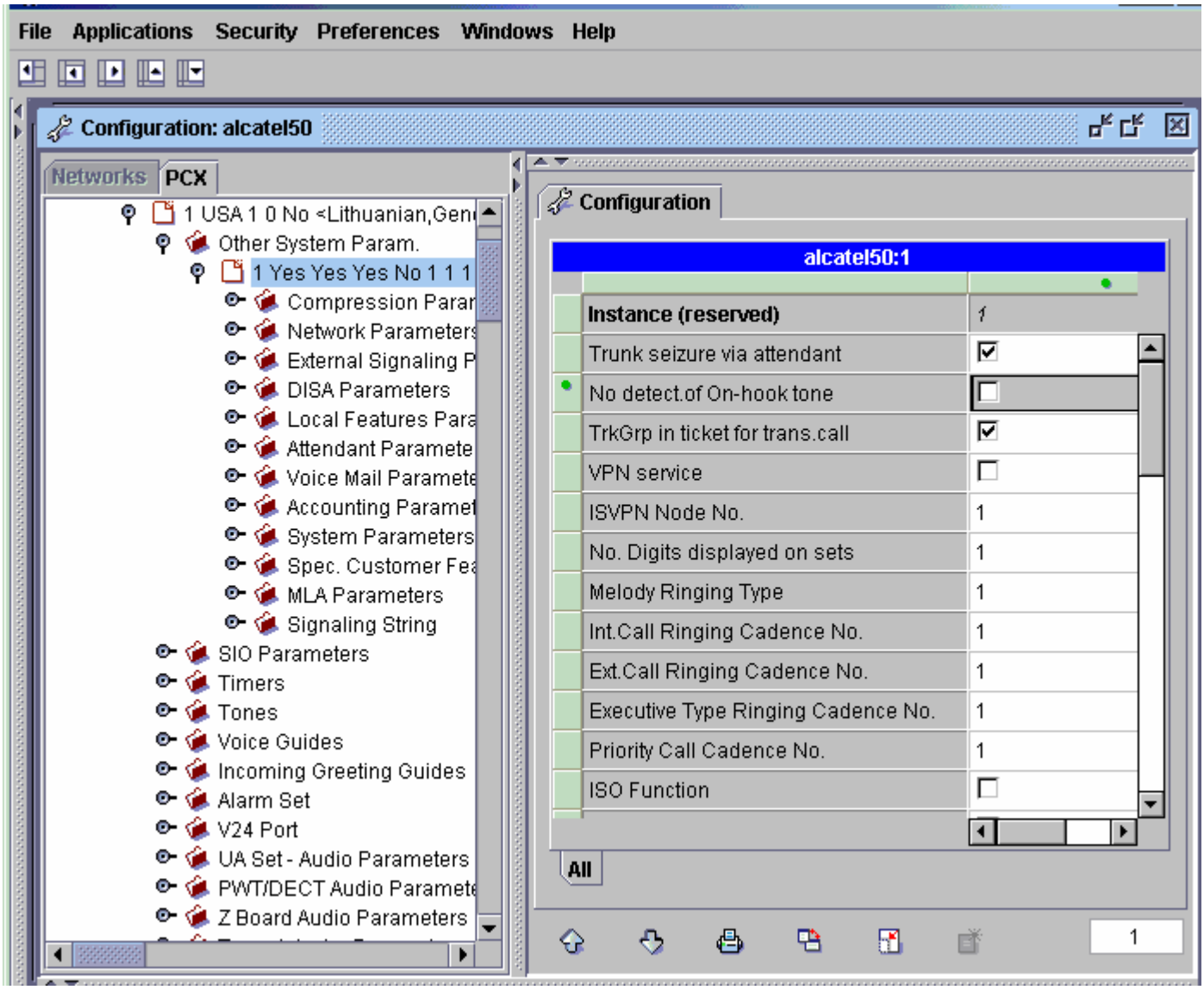

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Figure 29. Configure “ISO function” System Parameter, continued

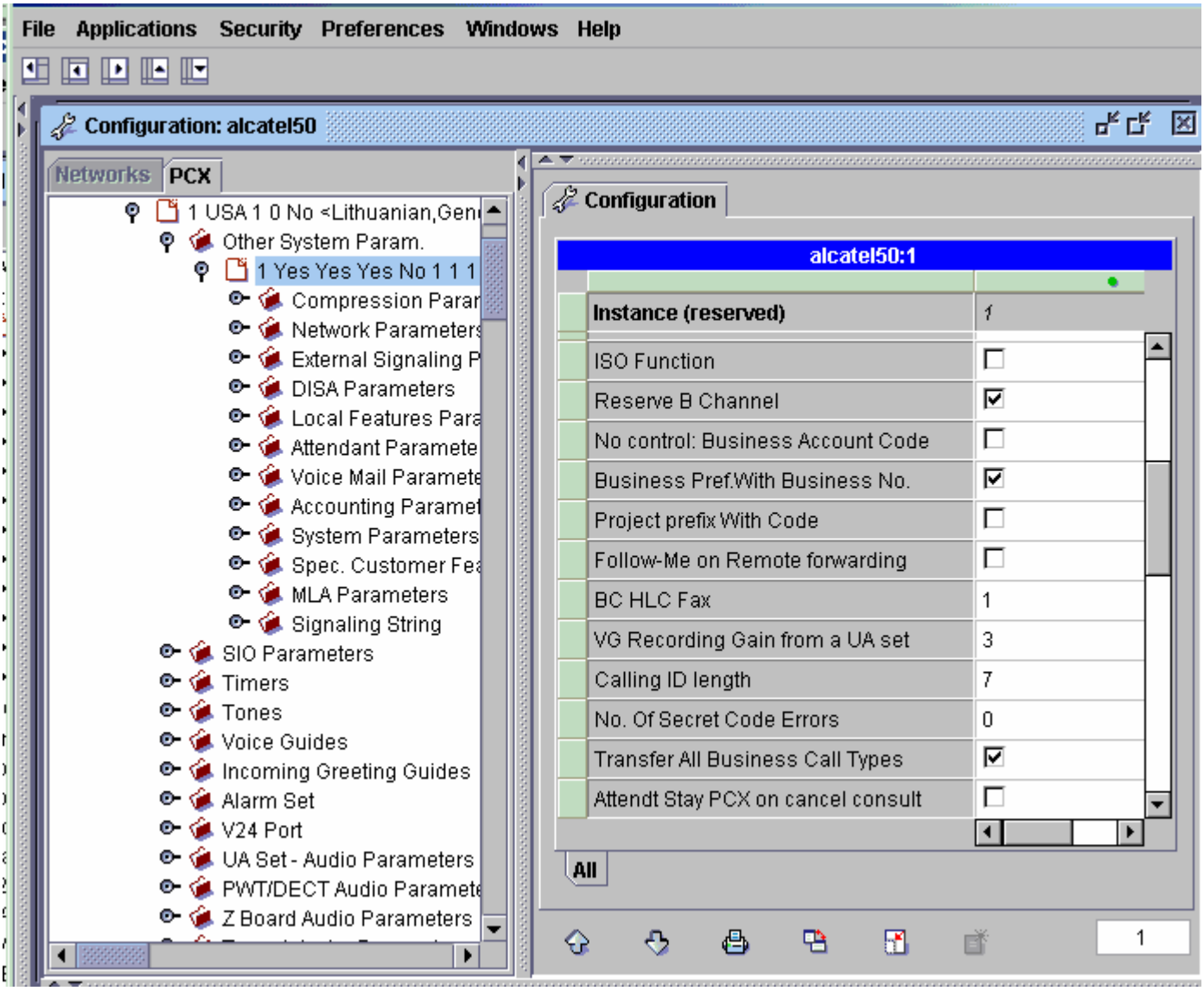

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Figure 30. Configure “ISO function” System Parameter, continued

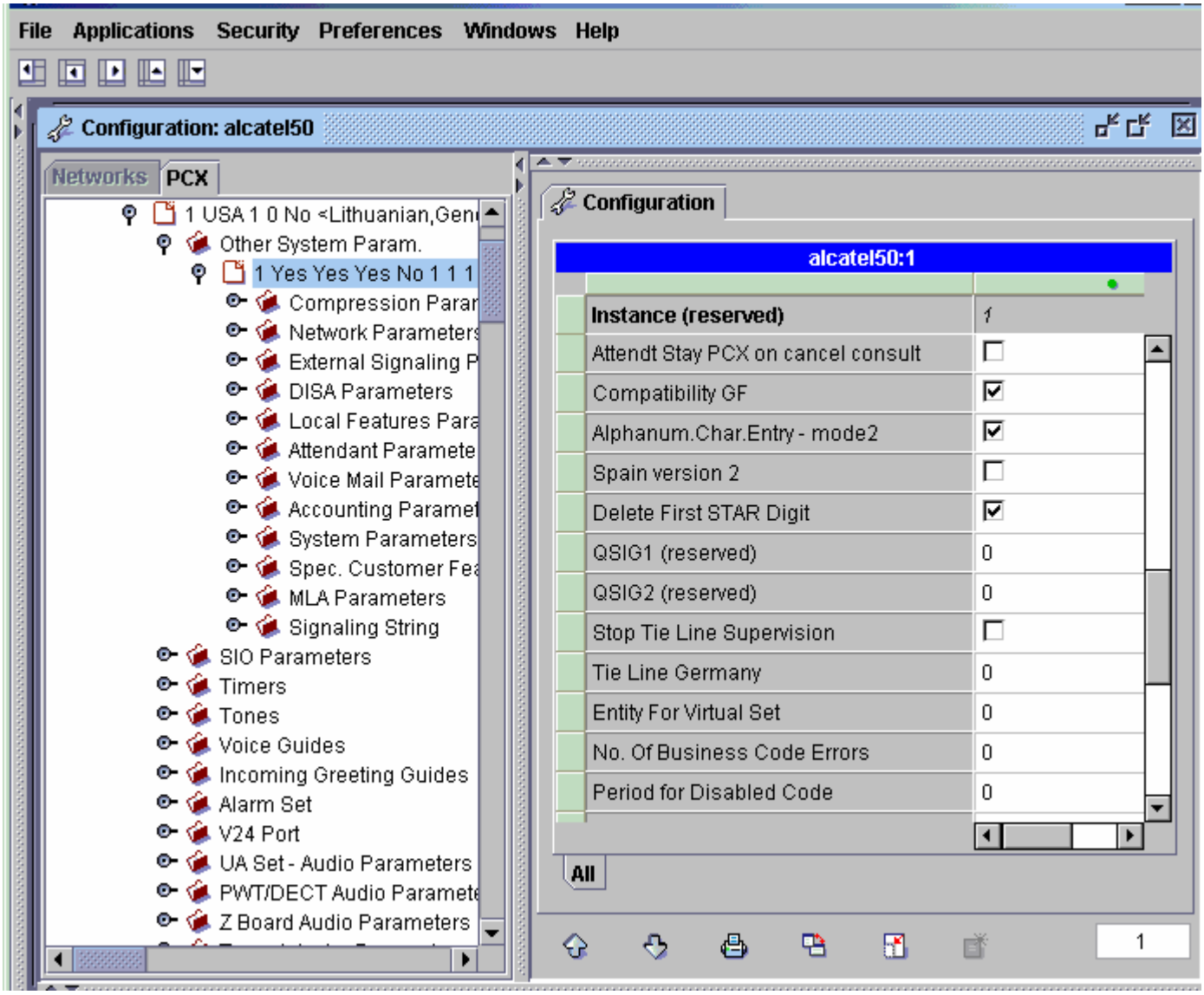

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Figure 31. Configure “ISO function” System Parameter, continued

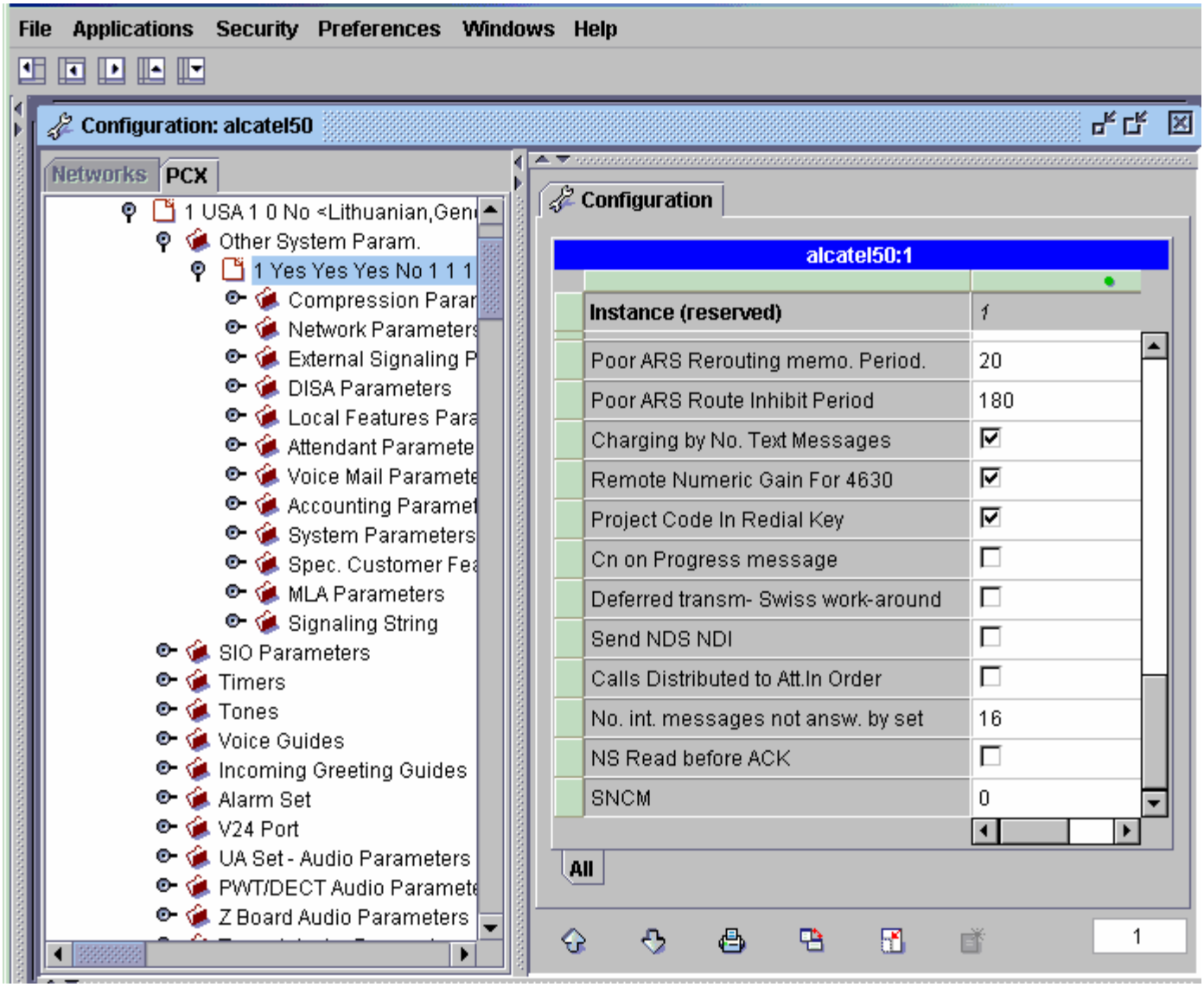

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Figure 32. Configure Board 4

`Interface type must be set to` **PRA2**

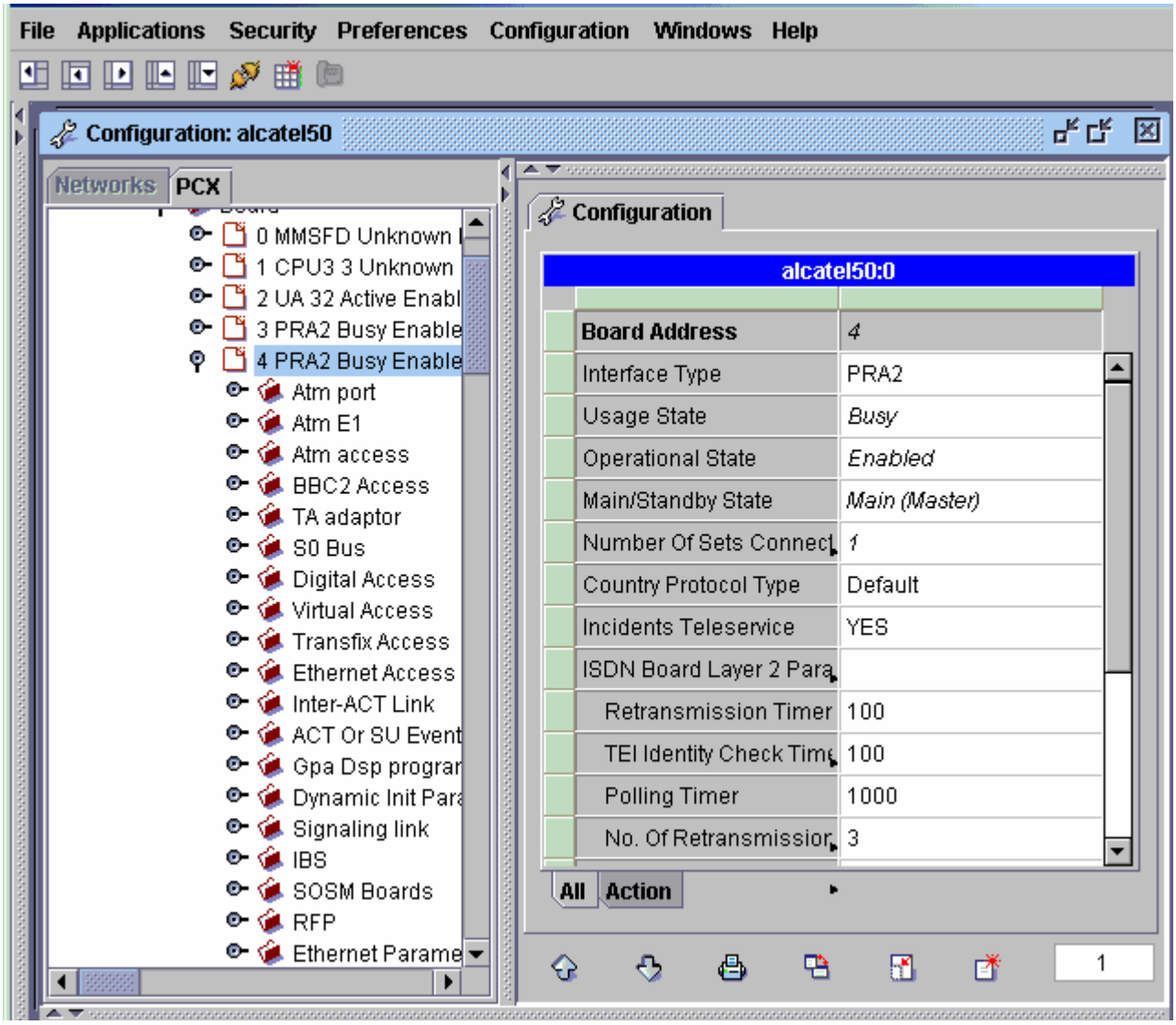

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Figure 33. Configure Board 4, continued

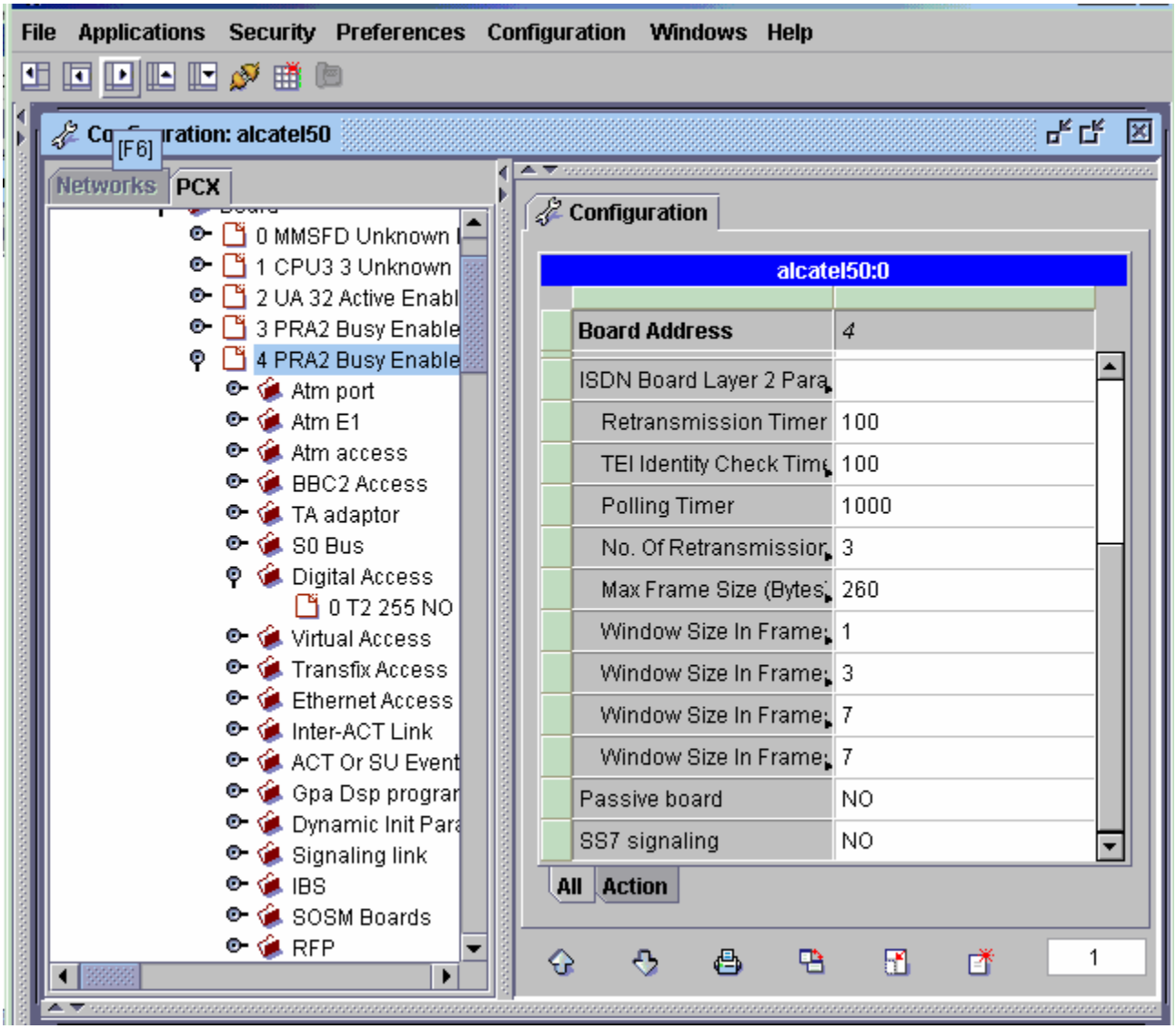

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Figure 34. Configure Board 4 Digital Access Options

Network mode must be set to **Yes** for (Master/Network) or **No**- (Slave/User).
Access Type must be set to **T2.**

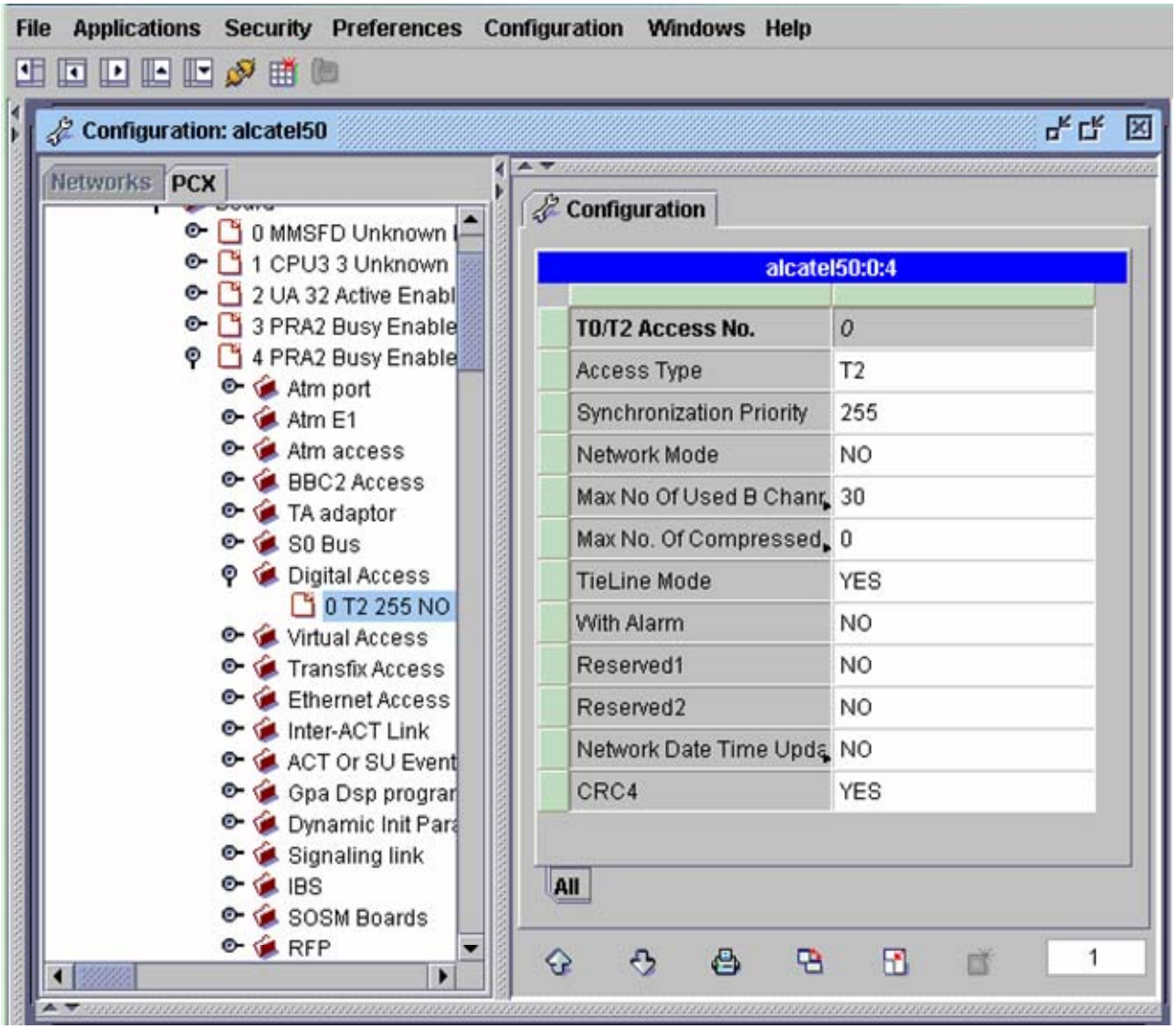

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Figure 35. Configure Trunk Group 1

Q931 signal variant is used to set the protocol type to **ABC-F**

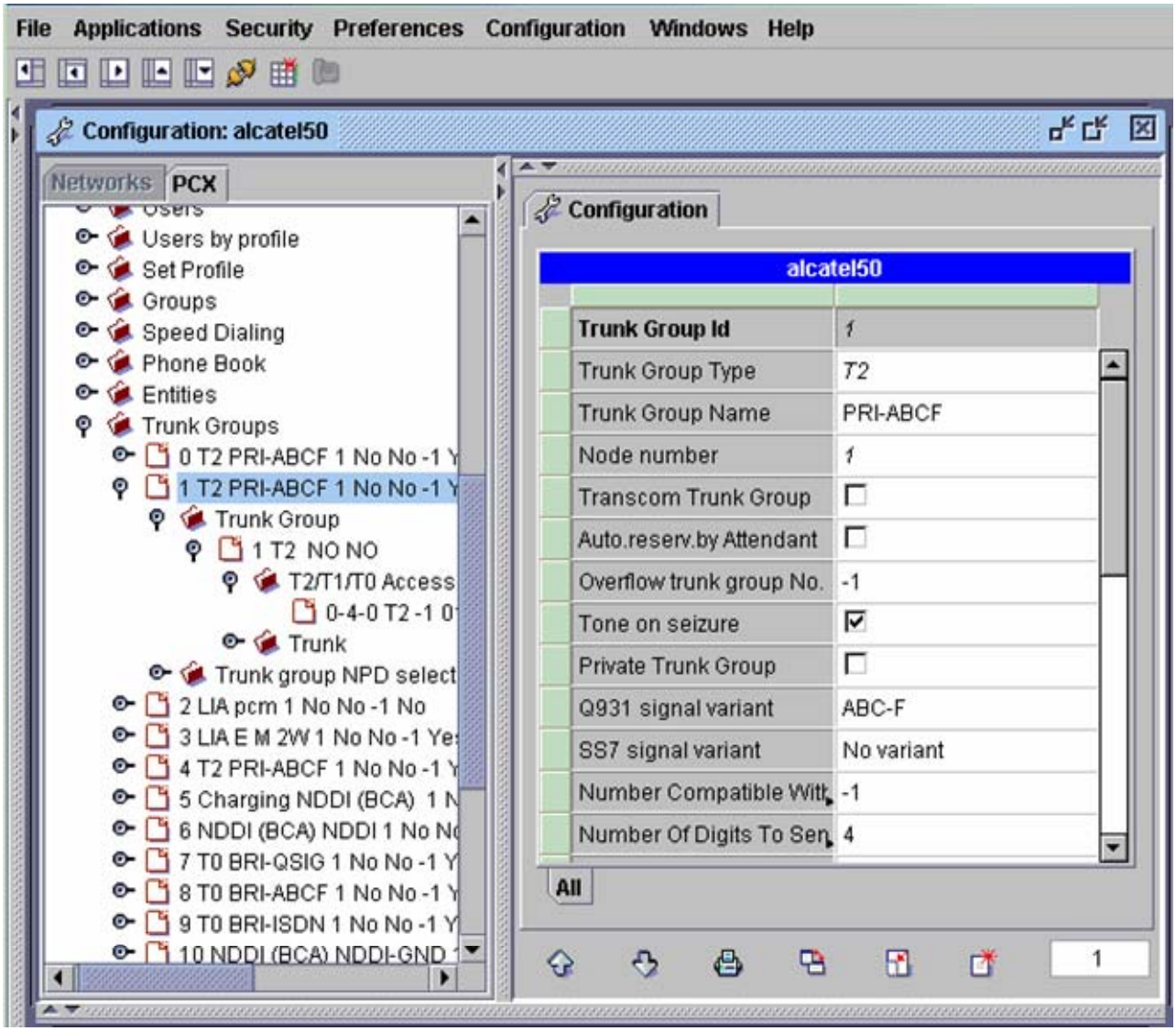

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Figure 36. Configure Trunk Group 1, continued

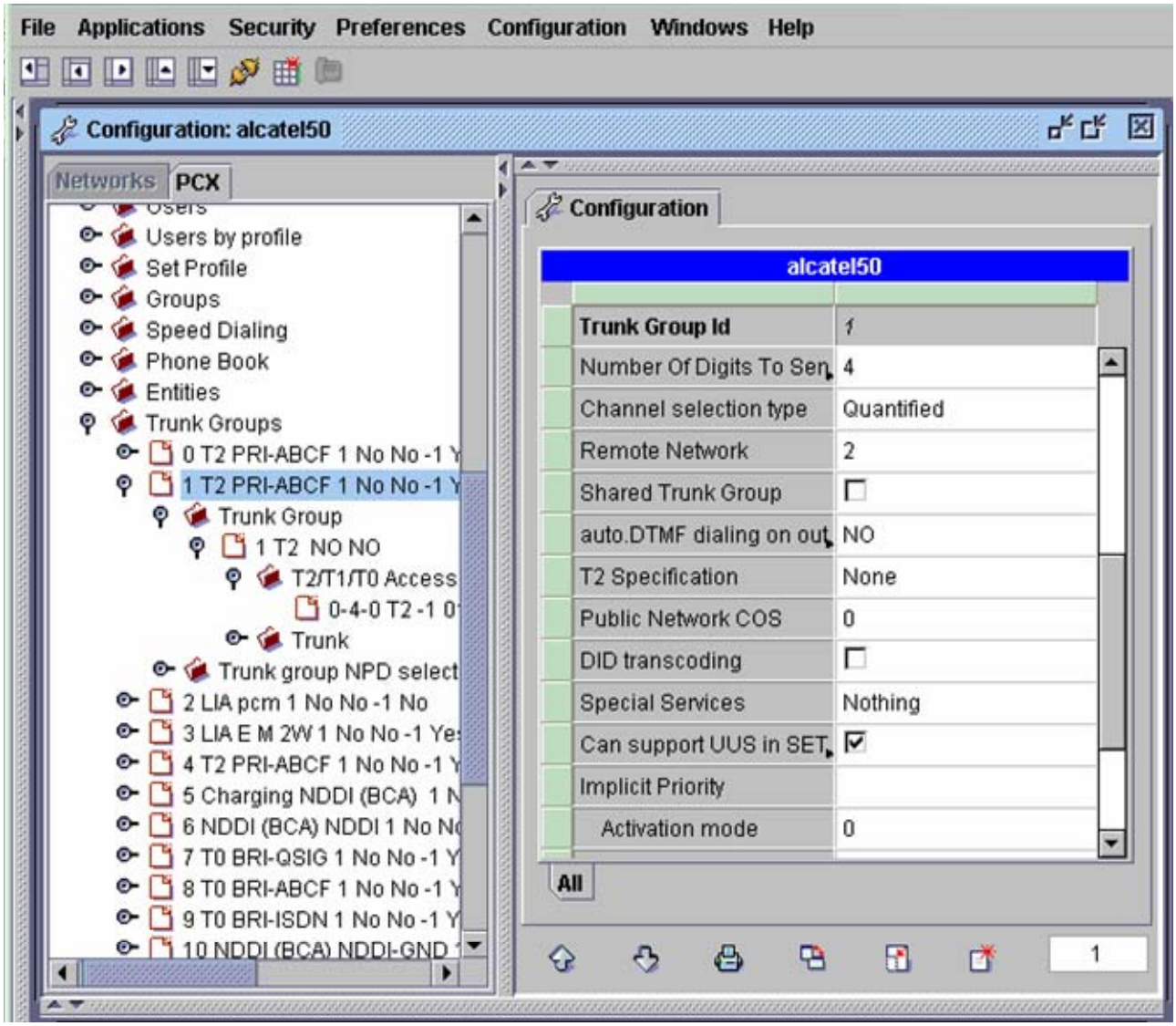

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Figure 37. Configure Trunk Group 1, continued

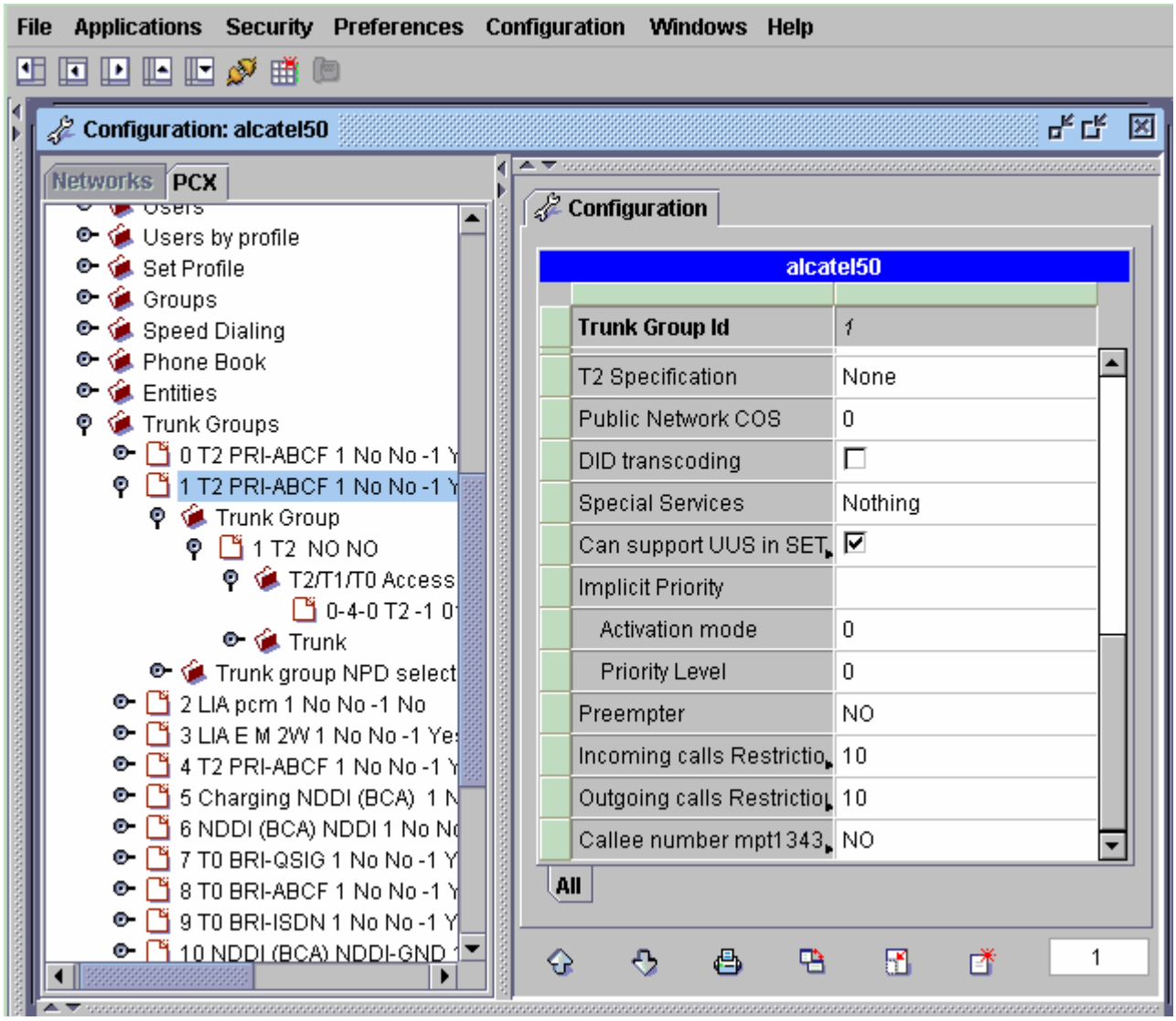

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Figure 38. Configure Trunk Detail

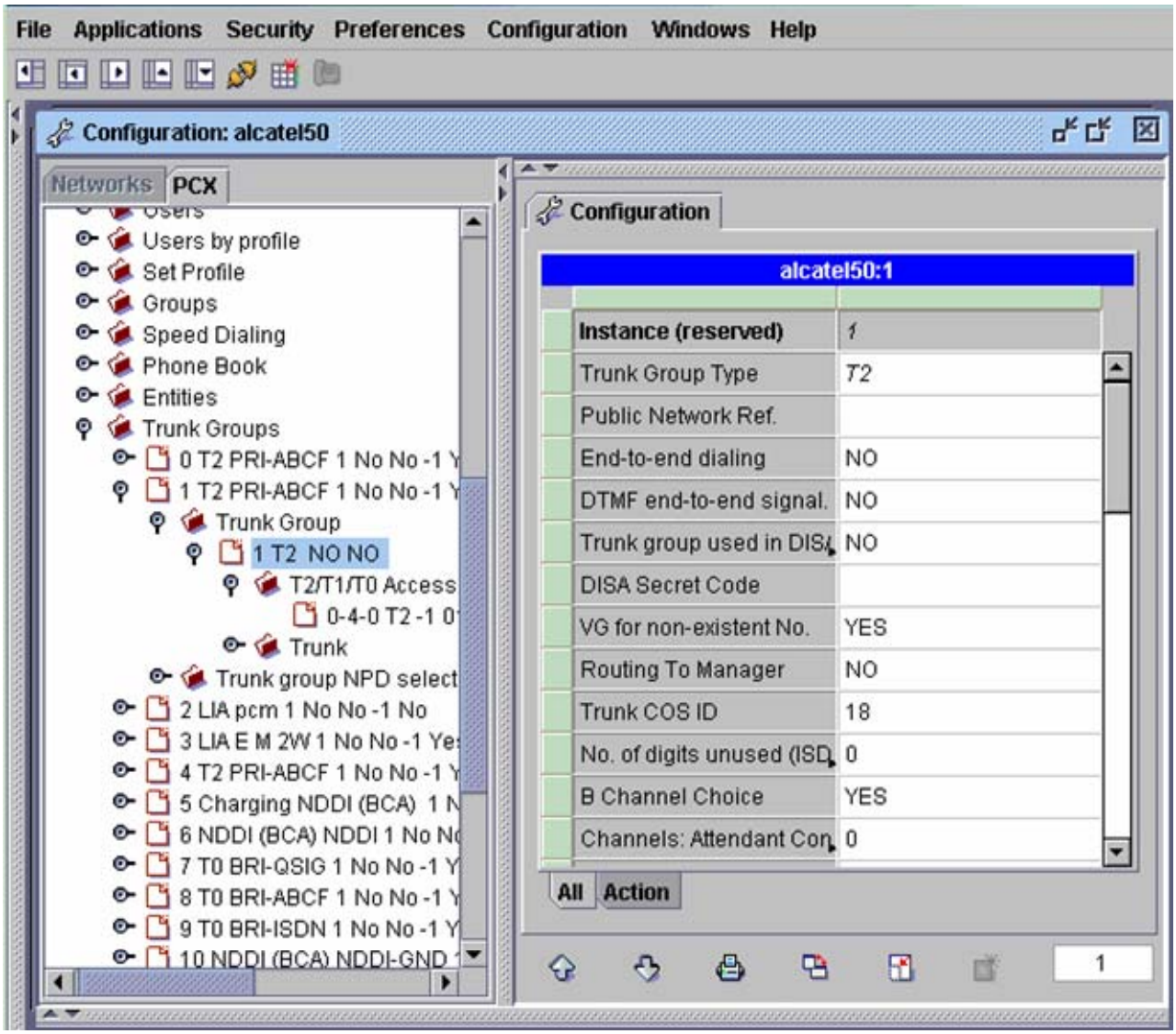

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Figure 39. Configure Trunk Detail, continued

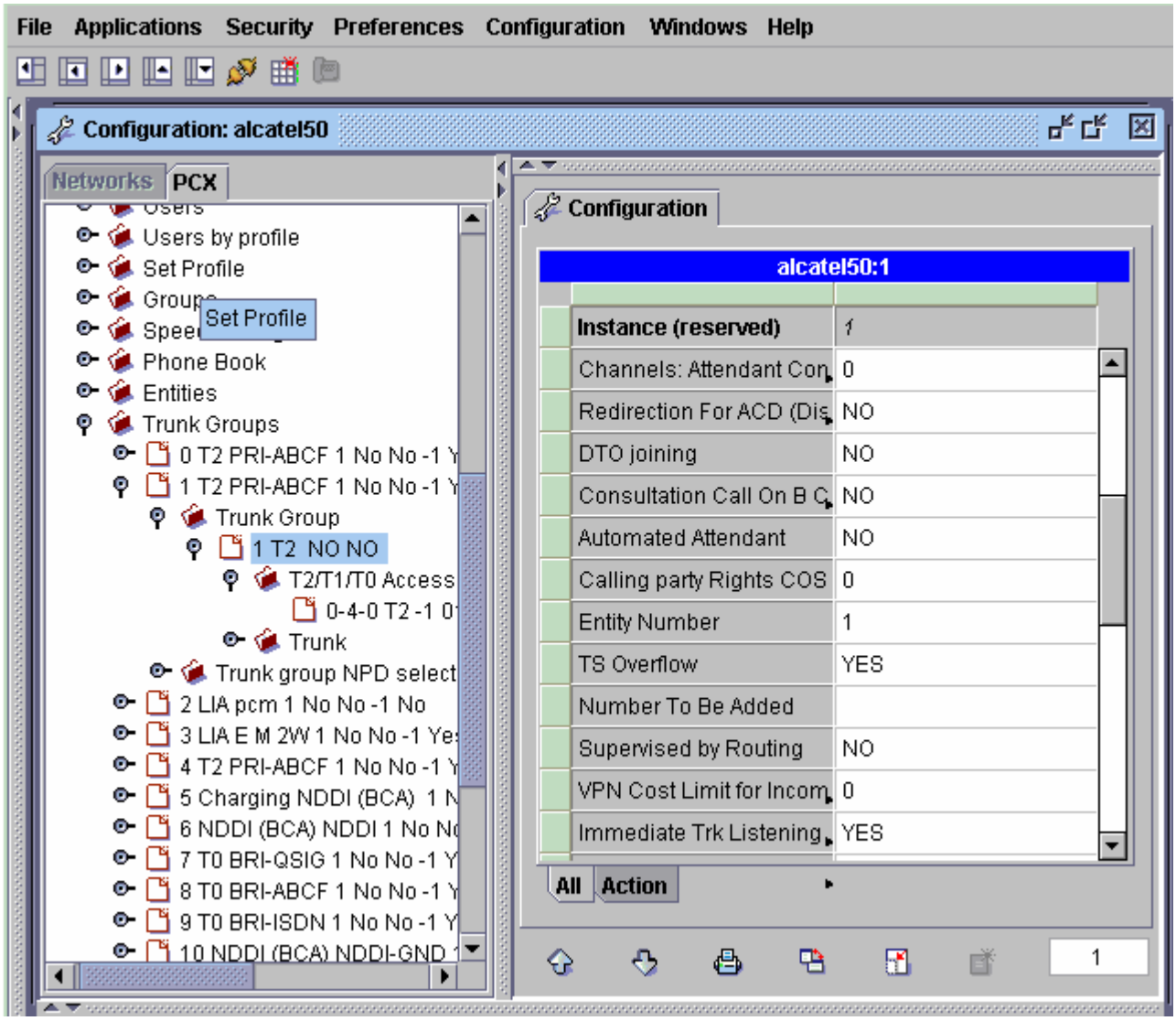

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Figure 40. Configure Trunk Detail, continued

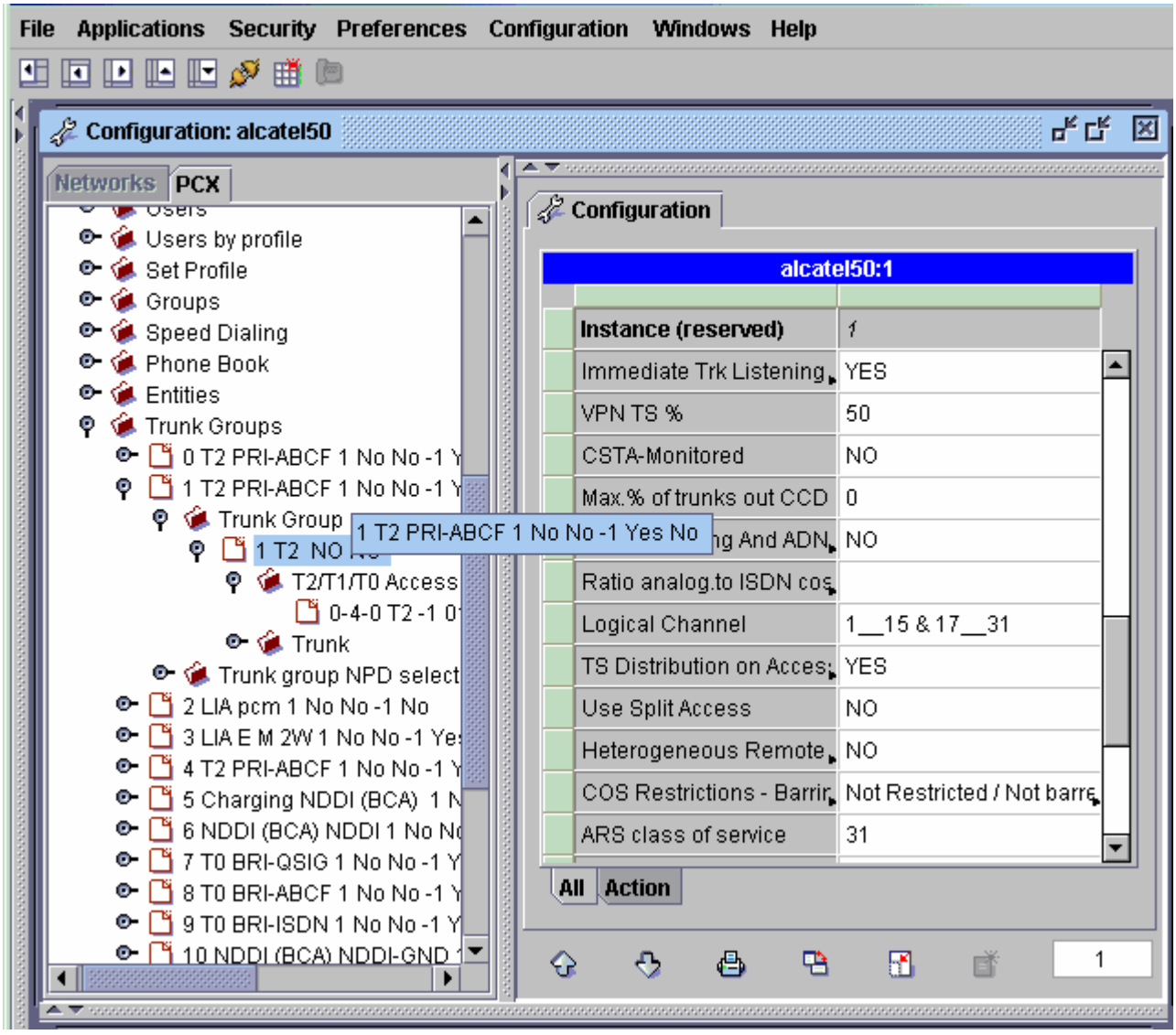

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Figure 41. Configure Trunk Detail, continued

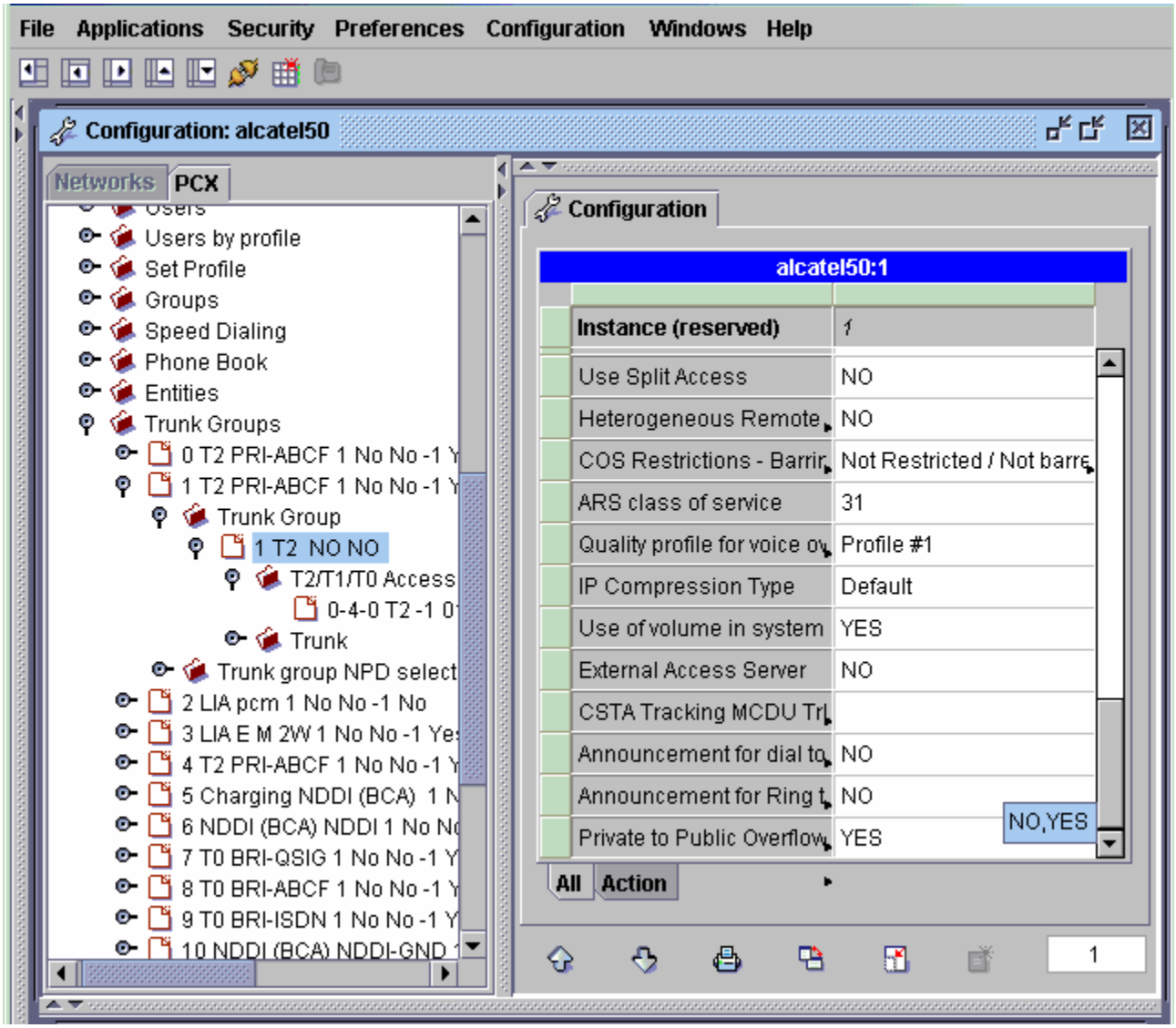

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Figure 42. T2 Access

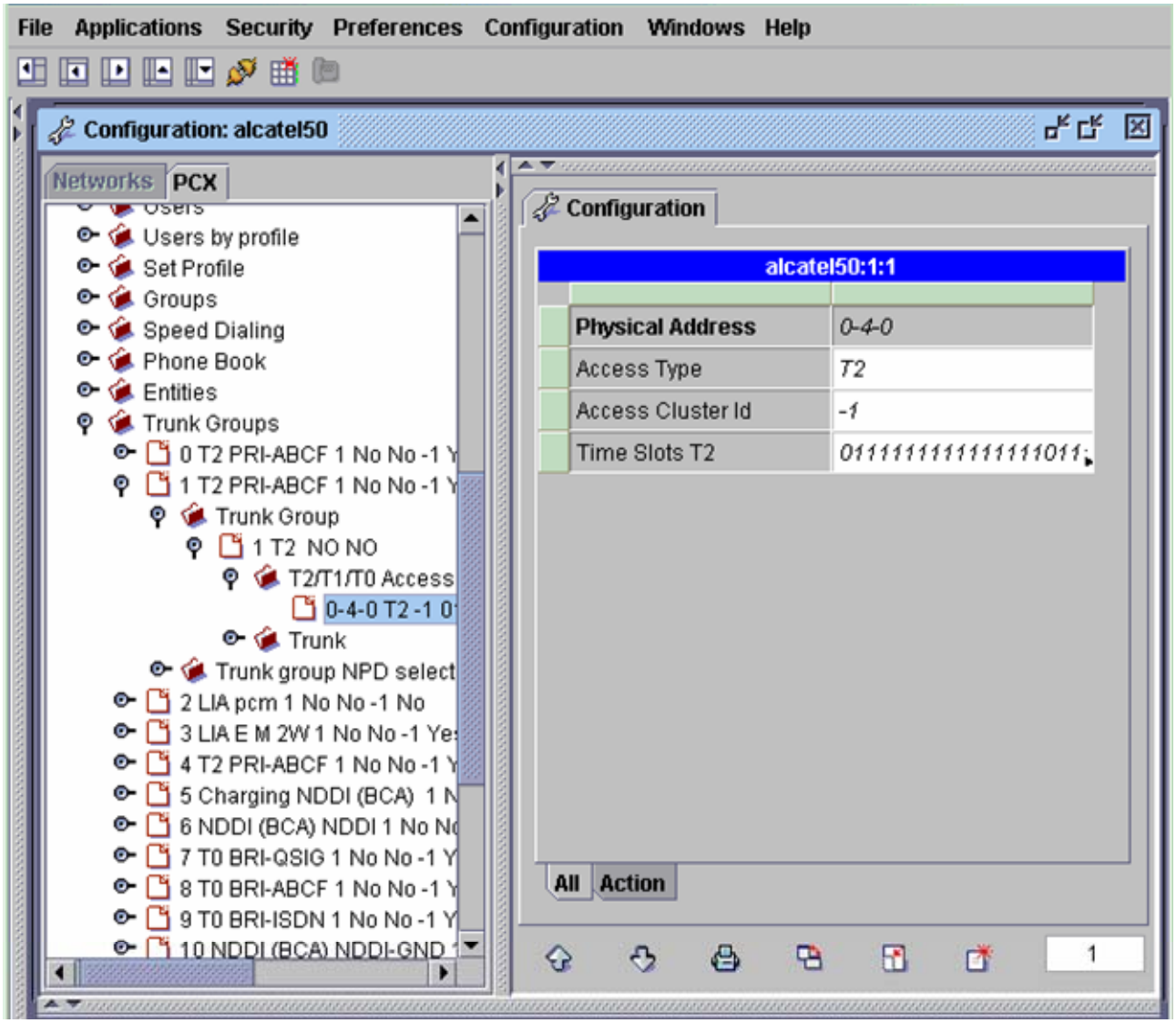

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Figure 43. Network Routing Table

*Ensure that **Protocol Type** is configured for QSIG-GF which ensures that all Alcatel proprietary QSIG signaling messages are stripped from outgoing calls.*

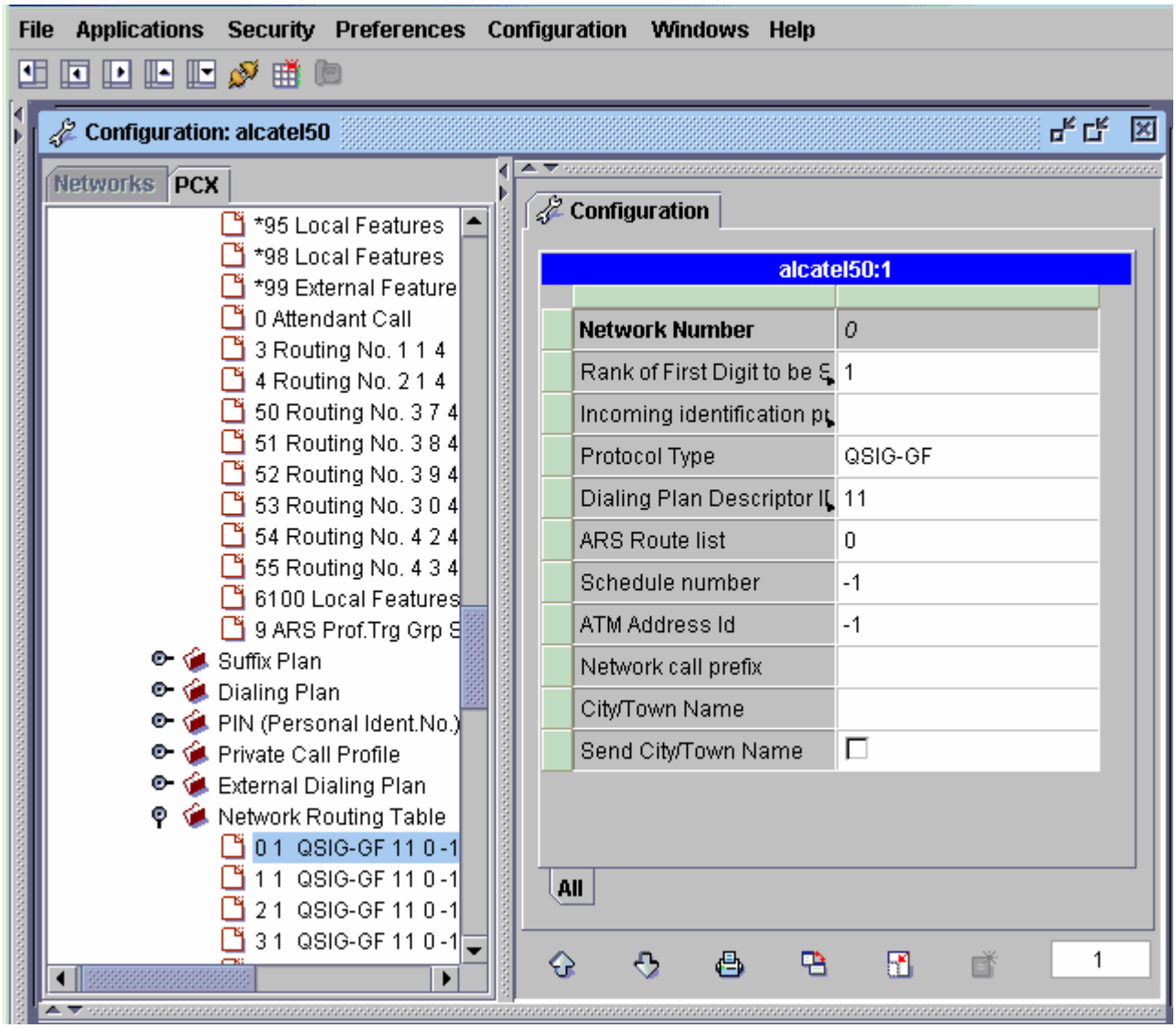

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Figure 44. Prefix Plan

Alcatel51/translator/prefix plan/3

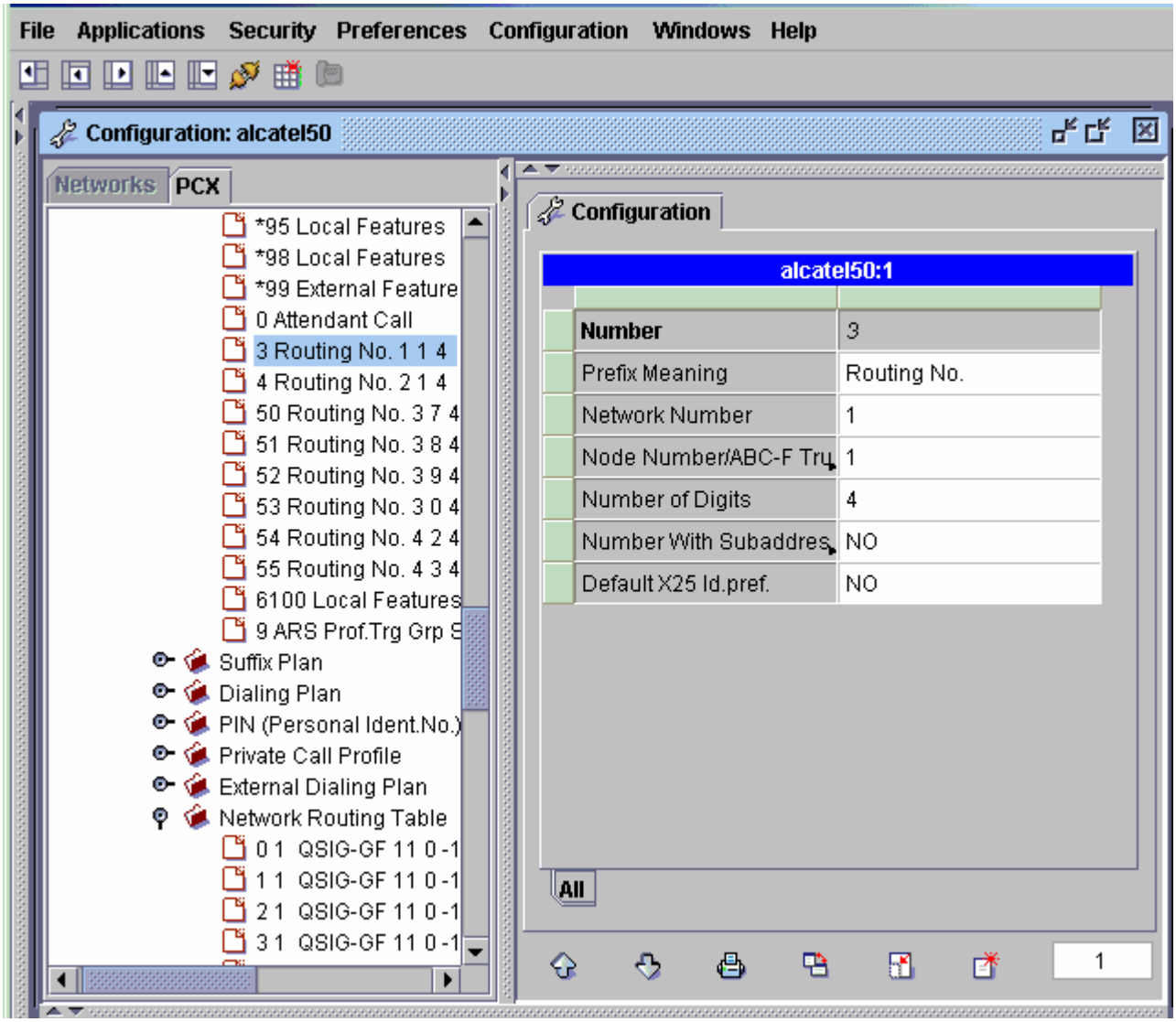

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Figure 45. Configure User (Station)

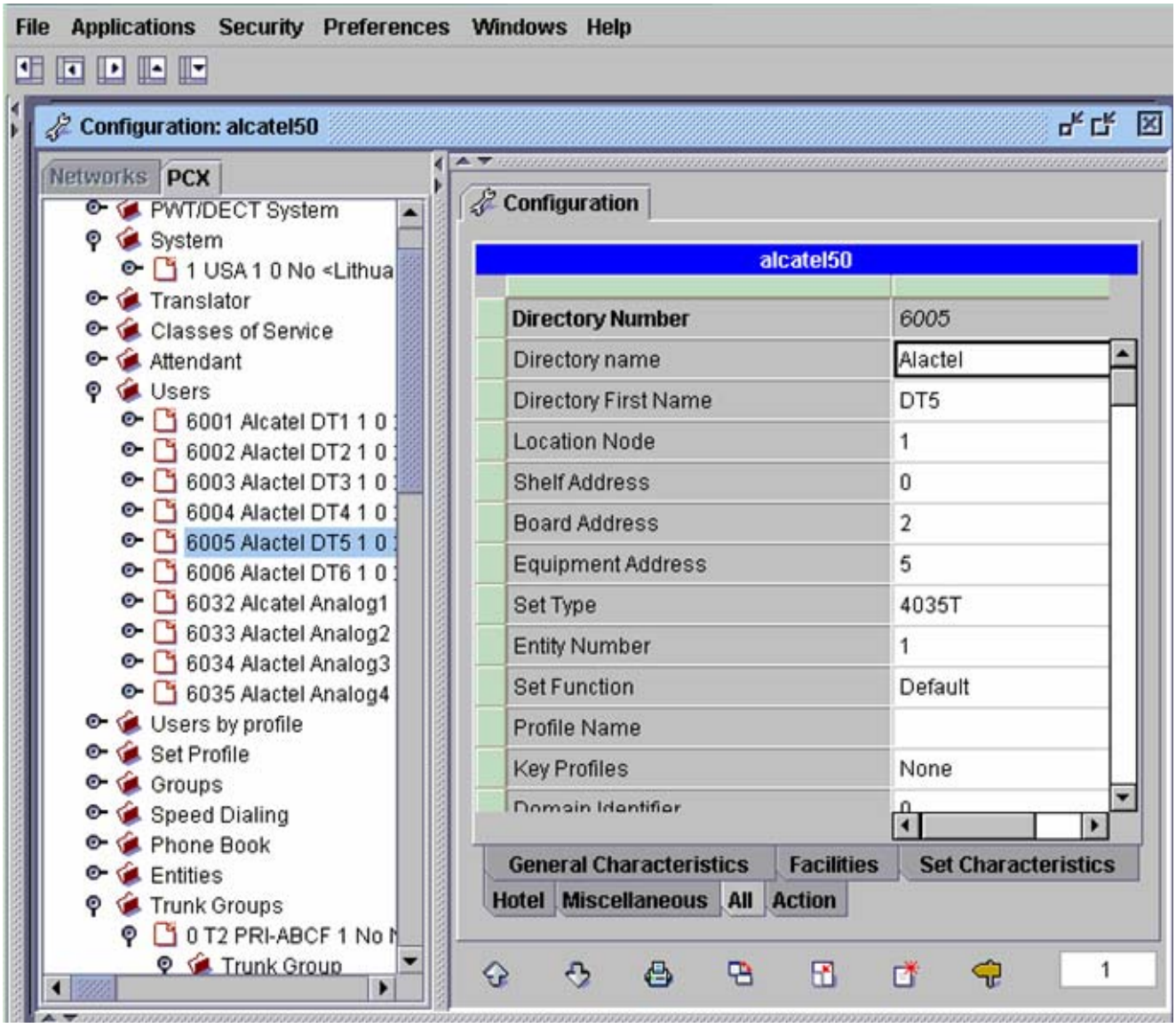

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Figure 46. Configure User (Station, continued)

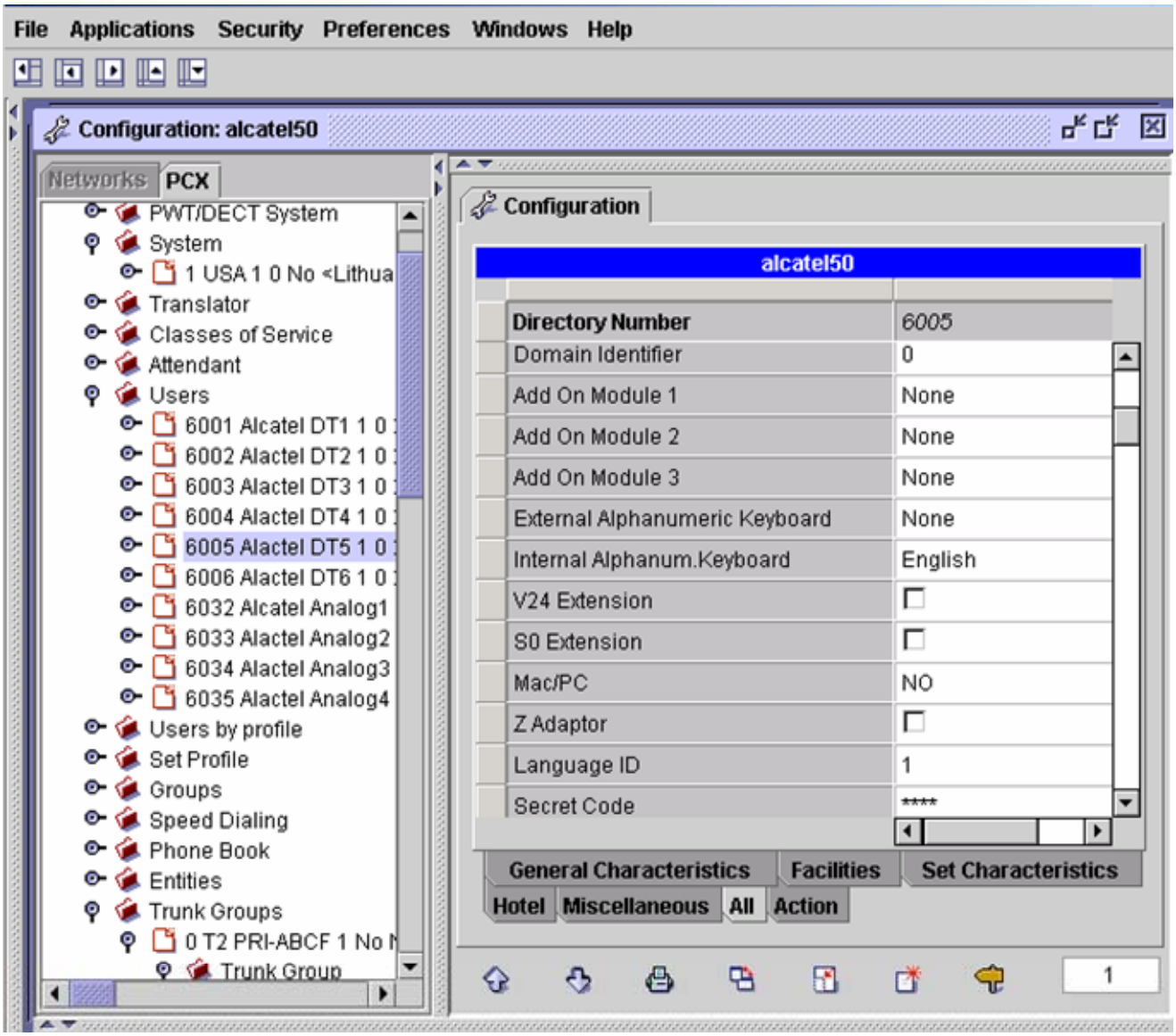

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Figure 47. Configure User (Station, continued)

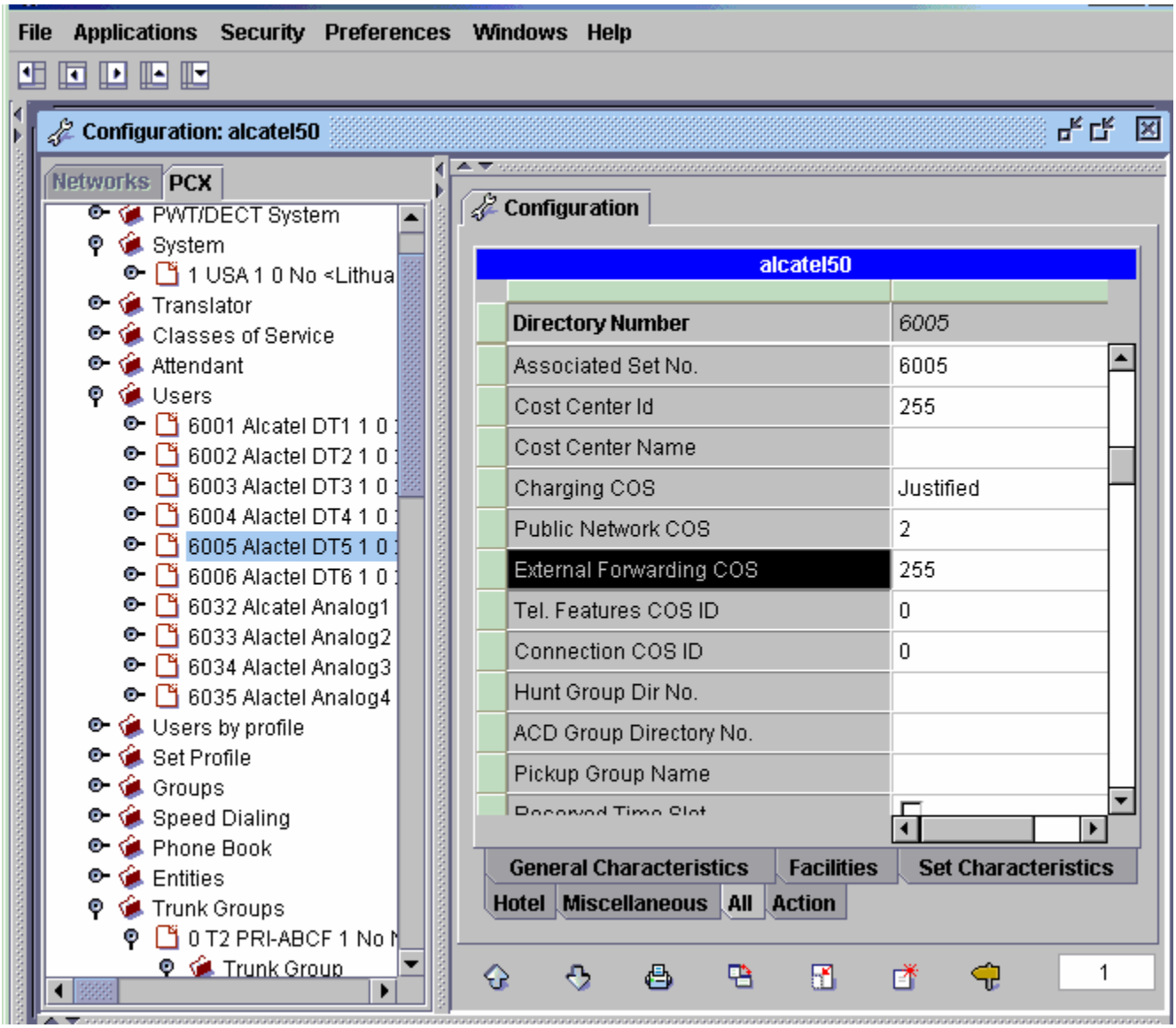

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Figure 48. Configure User (Station, continued)

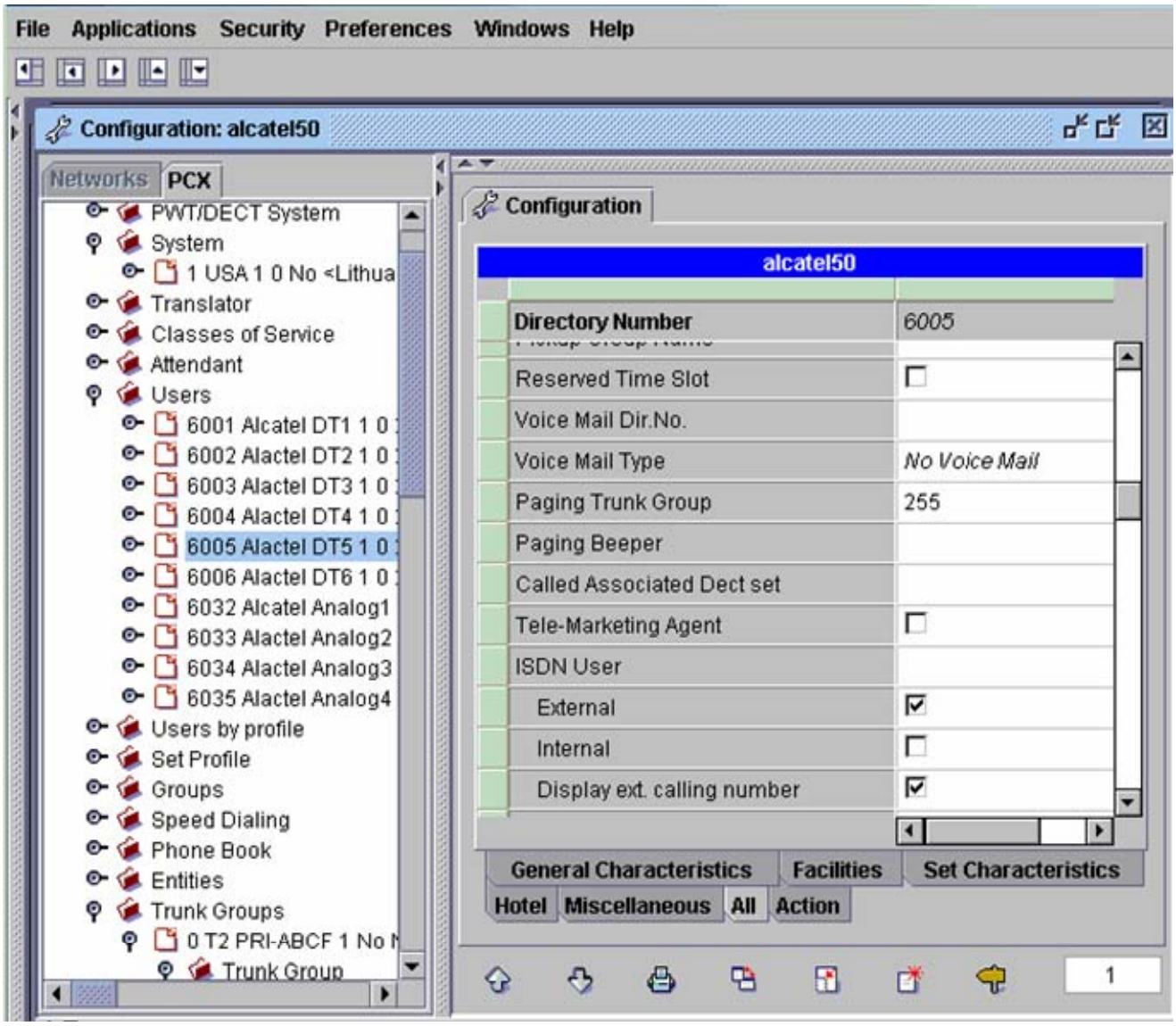

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Figure 49. Configure User (Station, continued)

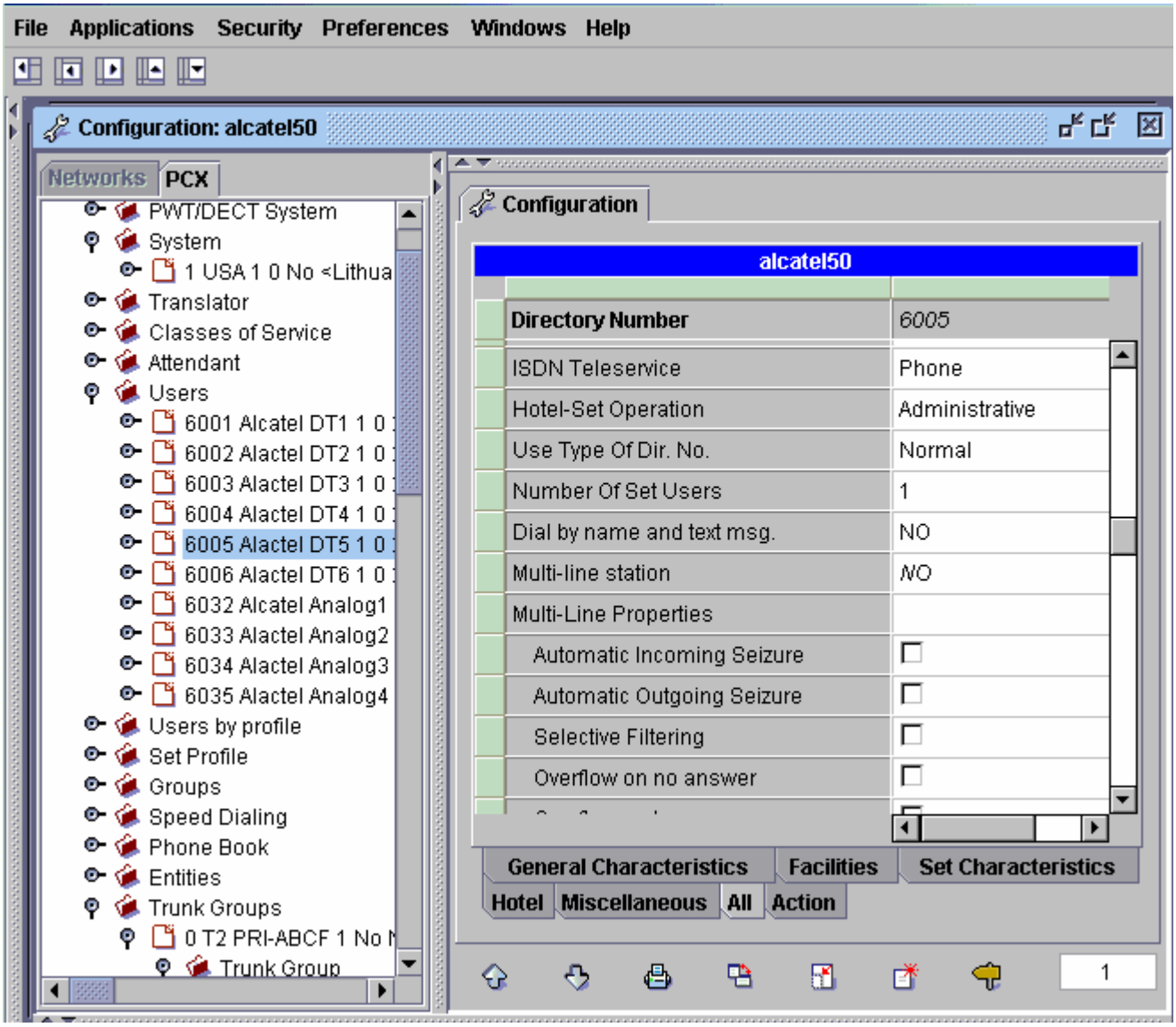

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Figure 50. Configure User (Station, continued)

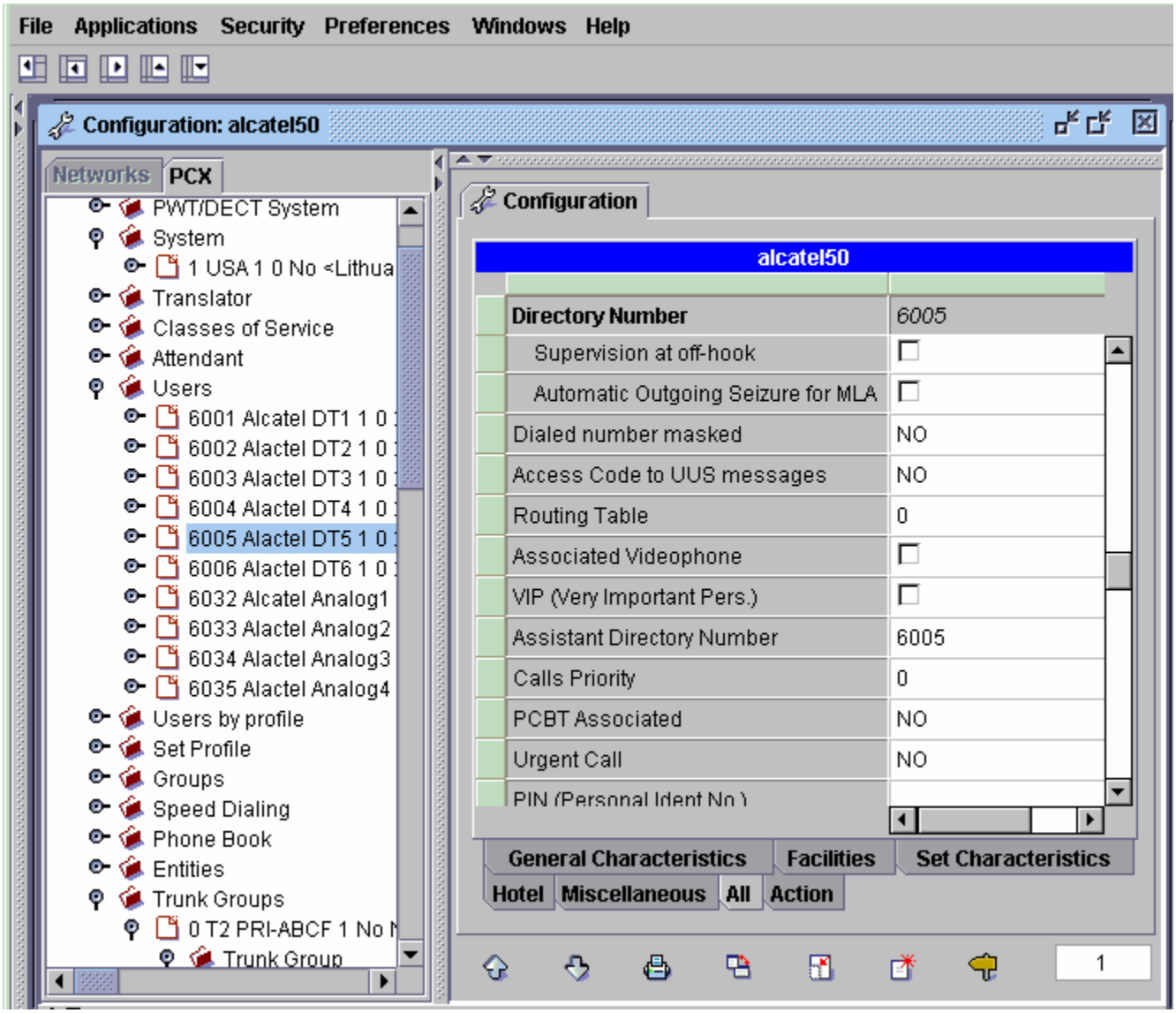

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Figure 51. Configure User (Station, continued)

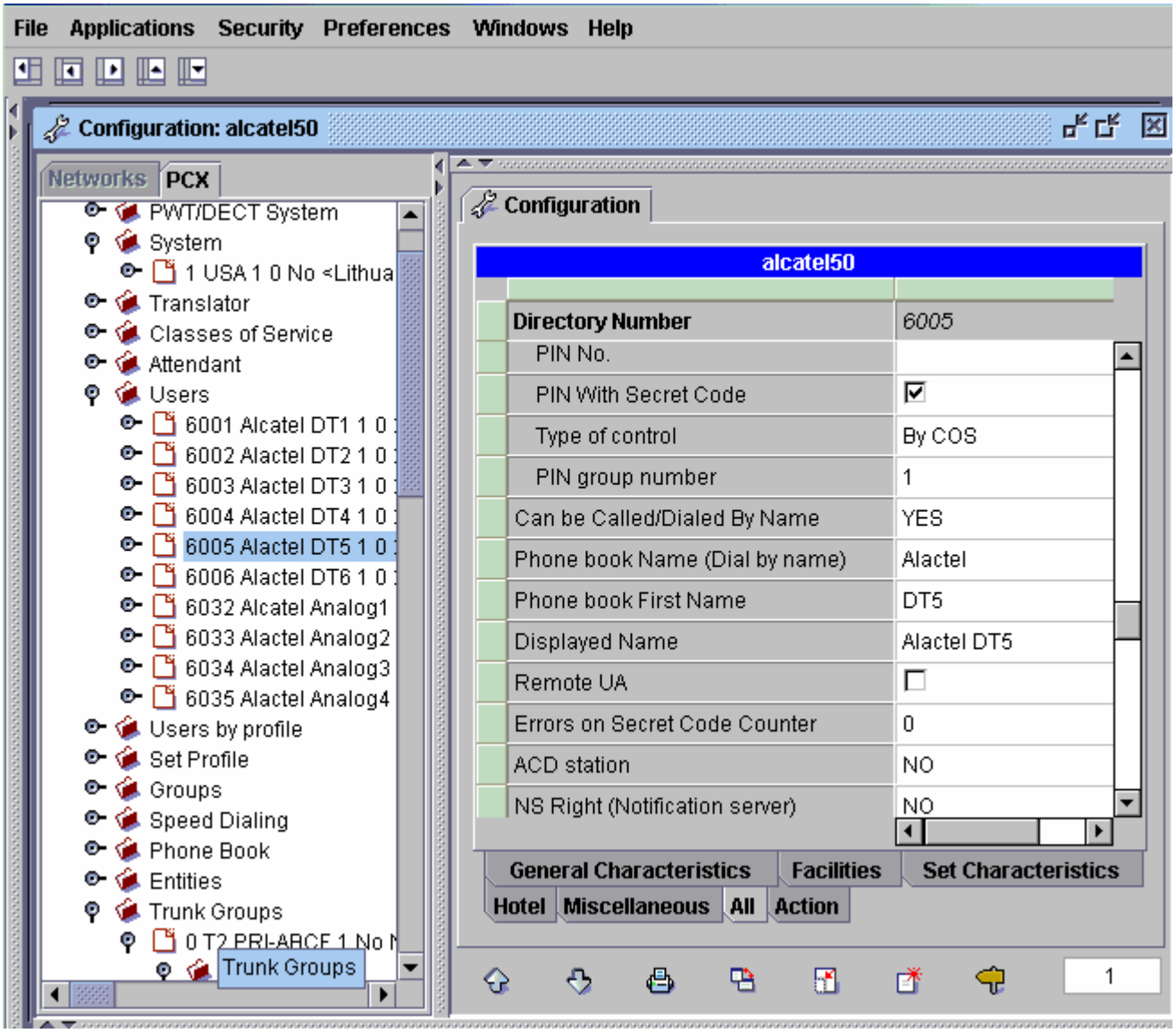

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Figure 52. Configure User (Station, continued)

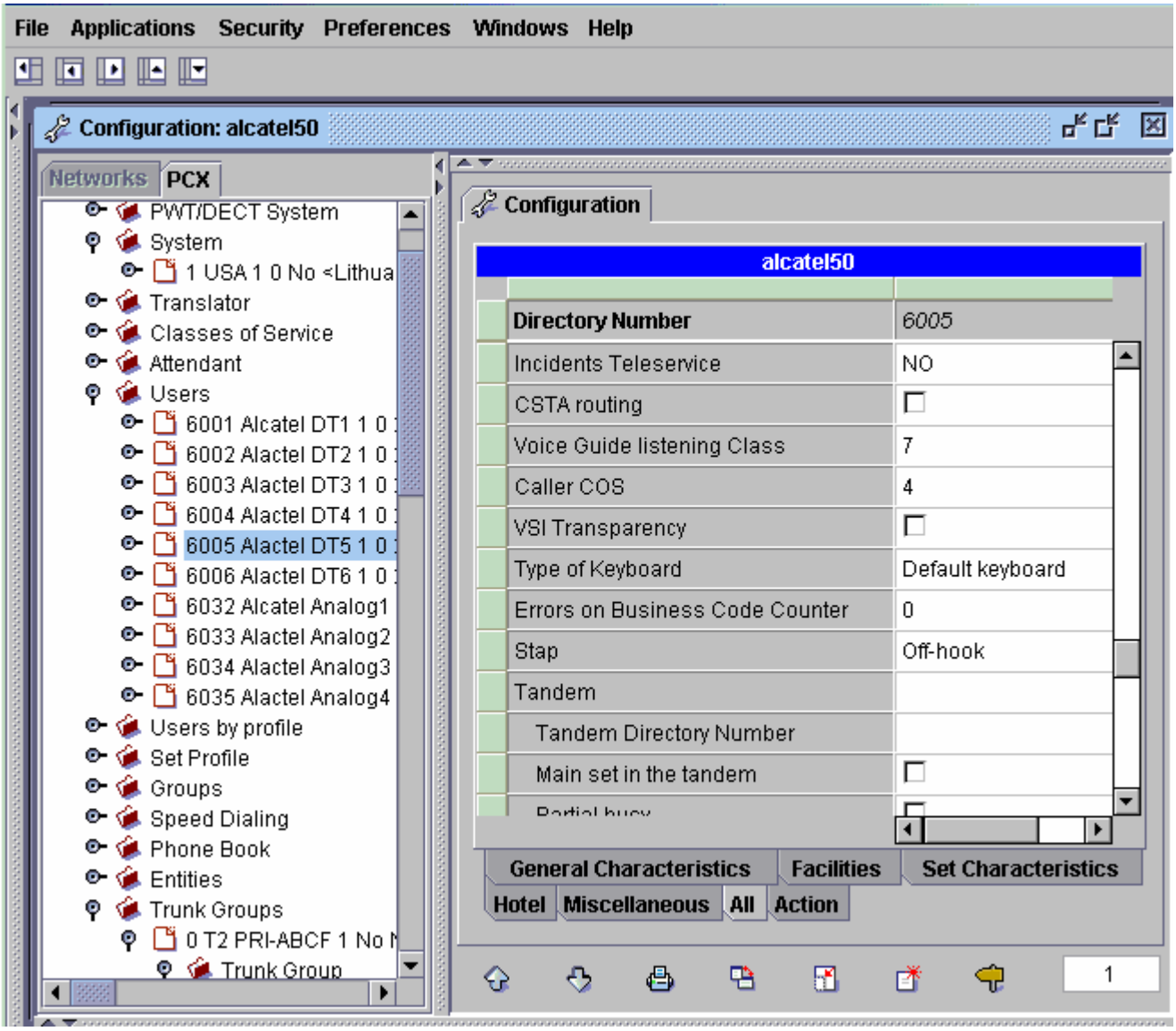

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Figure 53. Configure User (Station, continued)

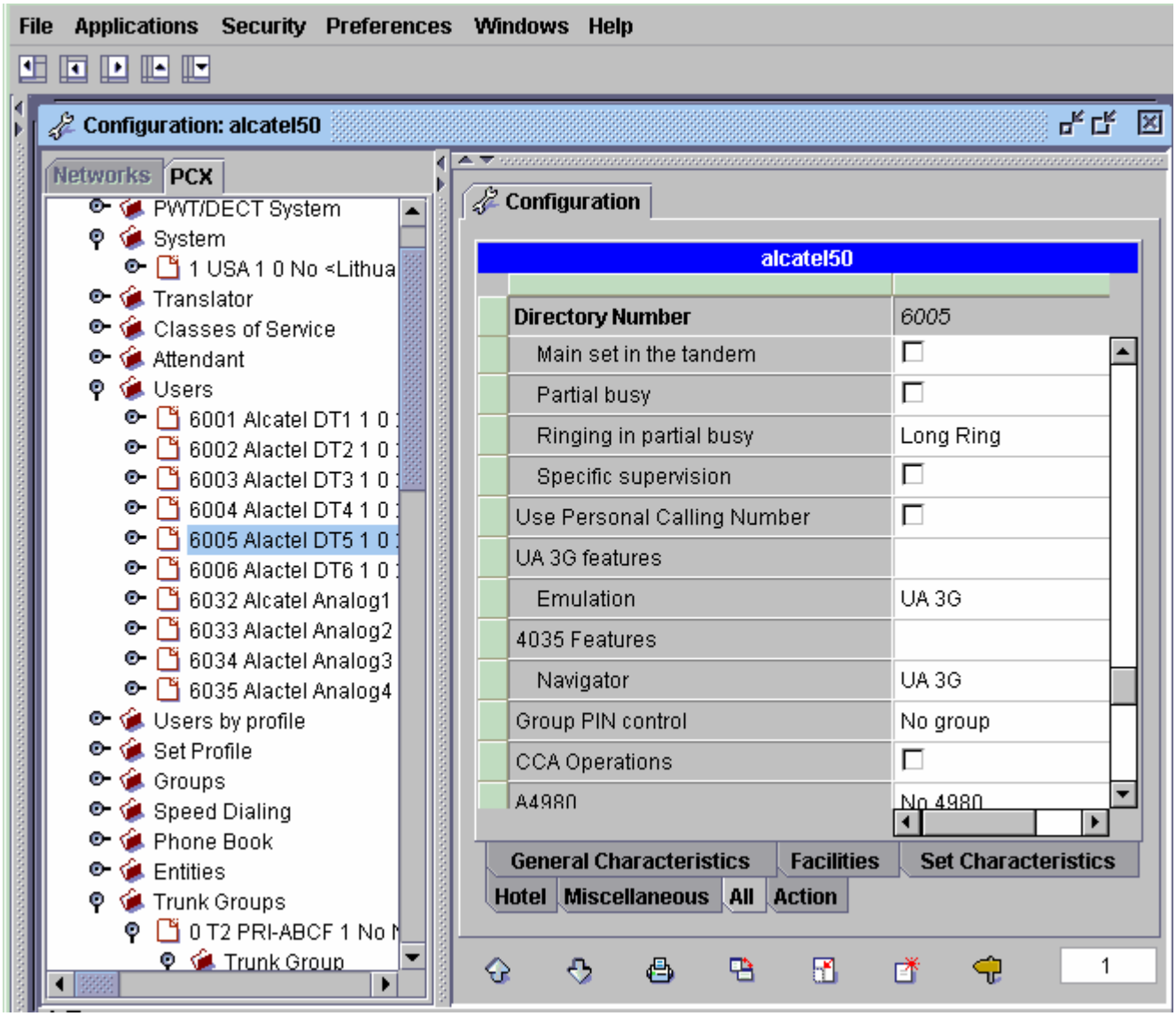

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Figure 54. Configure User (Station, continued)

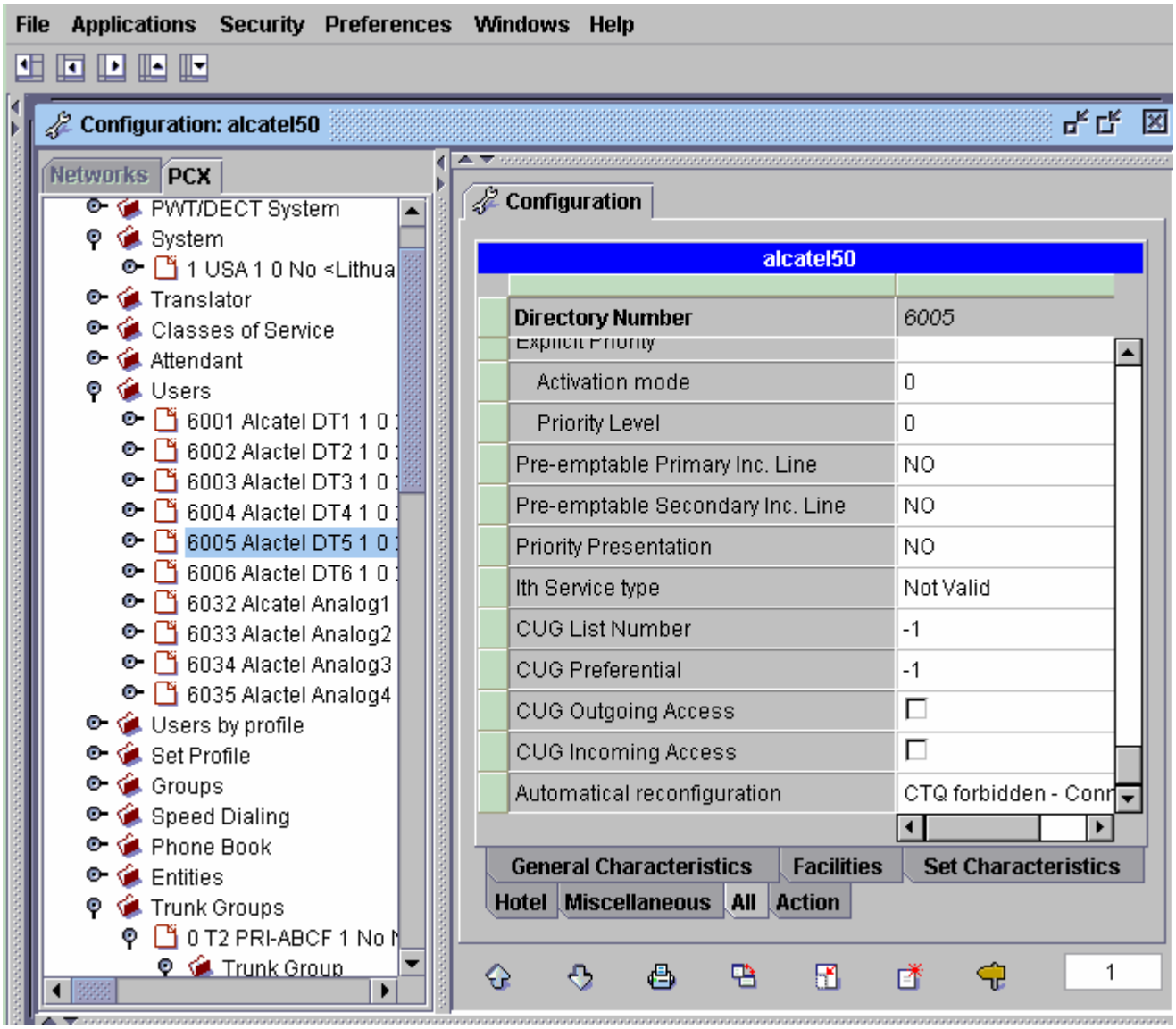

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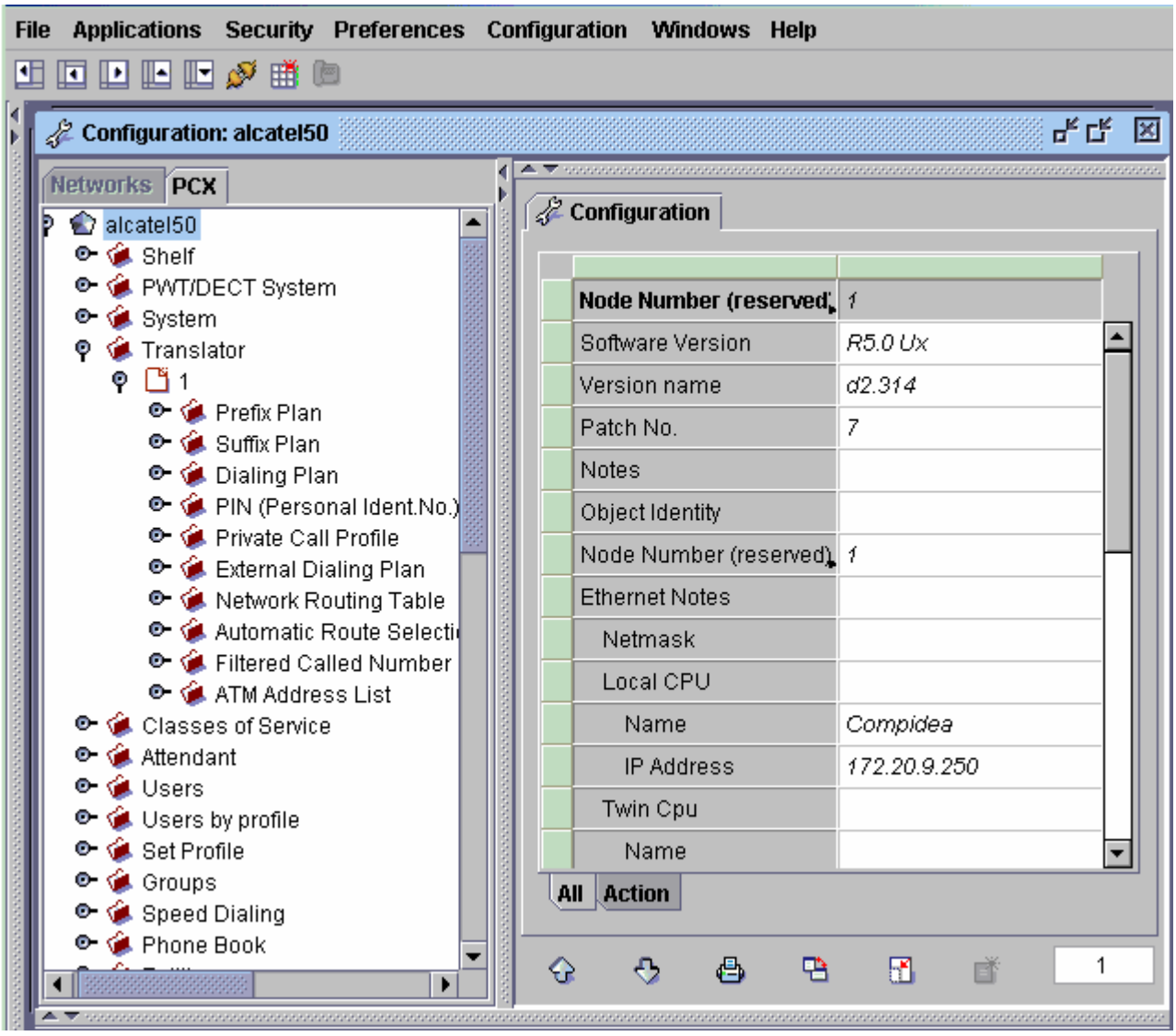
Figure 55. Alcatel 4400 Software release 5.0



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Configuring the Cisco 2651XM

2651XM_West#sho ver

Cisco IOS Software, C2600 Software (C2600-IPVOICE-M), Version 12.4(1.8)T, INTERI

M SOFTWARE

Technical Support: http://www.cisco.com/techsupport

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Compiled Thu 05-May-05 06:32 by kellmill

ROM: System Bootstrap, Version 12.2(8r) [cmong 8r], RELEASE SOFTWARE (fc1)

2651XM_West uptime is 1 week, 1 day, 1 hour, 33 minutes

System returned to ROM by reload

System image file is "flash:c2600-ipvoice-mz.124-1.8.T"

Cisco 2651XM (MPC860P) processor (revision 0x300) with 125770K/5302K bytes of me

mory.

Processor board ID JAE0817EK5Z (1672255744)

M860 processor: part number 5, mask 2

2 FastEthernet interfaces

31 Serial interfaces

2 Channelized E1/PRI ports

32K bytes of NVRAM.

49152K bytes of processor board System flash (Read/Write)

Configuration register is 0x2102

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2651XM_West#sho run

Building configuration...

Current configuration : 1528 bytes

!

version 12.4

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

!

hostname 2651XM_West

!

boot-start-marker

boot system flash

boot-end-marker

!

!

no aaa new-model

!

resource policy

!

no network-clock-participate slot 1

no network-clock-participate wic 0

voice-card 1

!

ip subnet-zero

ip cef

!

!

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```
no ip dhcp use vrf connected
!
!
no ip domain lookup
isdn switch-type primary-qsig
!
!
voice class codec 1
 codec preference 1 g729r8
 codec preference 2 g711ulaw
 codec preference 3 g711alaw
!
!
controller E1 1/0
 pri-group timeslots 1-31
 description ECN-4
!
controller E1 1/1
!
!
interface FastEthernet0/0
 ip address 172.20.4.7 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 shutdown
 duplex auto
```

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```
 speed auto
!
interface Serial1/0:15
 description D-channel for ECN-4
 no ip address
 no logging event link-status
 isdn switch-type primary-qsig
 isdn overlap-receiving
 isdn incoming-voice voice
 isdn bchan-number-order ascending
 no cdp enable
!
ip classless
ip route 0.0.0.0 0.0.0.0 FastEthernet0/0
!
ip http server
!
!
control-plane
!
!
voice-port 1/0:15
 description voice port for ECN-4
!
!
dial-peer voice 323 voip
 destination-pattern 6...
 session target ipv4:172.20.4.9
!
```

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```
dial-peer voice 1015 pots
 destination-pattern 3...
 direct-inward-dial
 port 1/0:15
 forward-digits all
!
!
line con 0
line aux 0
line vty 0 4
 exec-timeout 0 0
 password cisco
 login
 transport input telnet
!
!
end
```

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Configuring the Cisco 3745

3745_West#sho ver

Cisco IOS Software, 3700 Software (C3745-IPVOICE-M), Version 12.4(1.8)T, INTERIM

SOFTWARE

Technical Support: http://www.cisco.com/techsupport

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Compiled Thu 05-May-05 02:04 by kellmill

ROM: System Bootstrap, Version 12.2(8r)T2, RELEASE SOFTWARE (fc1)

3745_West uptime is 1 week, 1 day, 53 minutes

System returned to ROM by reload

System image file is "flash:c3745-ipvoice-mz.124-1.8.T"

Cisco 3745 (R7000) processor (revision 2.0) with 110592K/20480K bytes of memory.

Processor board ID JMX0813L0Z3

R7000 CPU at 350MHz, Implementation 39, Rev 3.3, 256KB L2, 2048KB L3 Cache

2 FastEthernet interfaces

31 Serial interfaces

4 Channelized E1/PRI ports

2 Voice FXS interfaces

DRAM configuration is 64 bits wide with parity disabled.

151K bytes of NVRAM.

31168K bytes of ATA System CompactFlash (Read/Write)

Configuration register is 0x2102

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```
3745_West#sho run
Building configuration...

Current configuration : 1732 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname 3745_West
!
boot-start-marker
boot system flash
boot-end-marker
!
card type e1 1 1
logging buffered 5000000 debugging
!
no aaa new-model
!
resource policy
!
no network-clock-participate slot 1
ip subnet-zero
ip cef
!
!
```

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```
no ip dhcp use vrf connected
!
!
no ip domain lookup
isdn switch-type primary-qsig
voice-card 1
 dspfarm
!
!
voice call carrier capacity active
!
!
voice class codec 1
 codec preference 2 g711ulaw
 codec preference 3 g711alaw
!
!
controller E1 1/0
 pri-group timeslots 1-31
 description ECN10
!
controller E1 1/1
!
controller E1 1/2
!
controller E1 1/3
!
!
interface FastEthernet0/0
```

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```
 ip address 172.20.4.9 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
!
interface Serial1/0:15
 description D-channel for ECN10
 no ip address
 no logging event link-status
 isdn switch-type primary-qsig
 isdn overlap-receiving
 isdn protocol-emulate network
 isdn incoming-voice voice
 isdn T310 120000
 no cdp enable
!
router eigrp 10
 network 172.20.0.0
 no auto-summary
!
ip classless
ip route 0.0.0.0 0.0.0.0 FastEthernet0/0
!
ip http server
```

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```
!
!
control-plane
!
!
voice-port 1/0:15
 description voice port for ECN10
!
voice-port 3/0/0
!
voice-port 3/0/1
!
!
dial-peer cor custom
!
!
dial-peer voice 323 voip
 destination-pattern 3...
 session target ipv4:172.20.4.7
!
dial-peer voice 1015 pots
 destination-pattern 6...
 direct-inward-dial
 port 1/0:15
 forward-digits all
!
!
line con 0
line aux 0
```

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```
line vty 0 4
 exec-timeout 0 0
 password cisco
 login
 transport input telnet
!
!
end
```

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Acronyms

Acronym	Definitions

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