



Ericsson MD110 BC12 using DPNSS to Westell IiQ2000 using QSIG to Cisco Unified Unified CallManager 4.1.3

October 26, 2007 Revision 3

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Introduction

This application note provides configuration guidelines for connecting a DPNSS trunk from an Ericsson MD-110 Release BC12 PBX to Cisco Unified CallManager Release 4.1 via Cisco IOS voice gateways using ISO QSIG protocol. A Westell Interchange iQ2000 was used for interworking DPNSS and QSIG.

The Ericsson MD110 PBX was connected via an E1 DPNSS trunk circuit to a DPNSS port on a Westell IiQ2000 protocol converter box. The QSIG port on the Westell IiQ2000 was connected to a QSIG port on a Cisco IOS voice gateway. The voice gateway was connected to Cisco Call Manager via IP over Ethernet, and configured for VoIP using MGCP. Cisco 7960 IP phones were also connected in similar manner to the Cisco Call Manager, and controlled via Cisco “skinny” protocol. End-to-end calls were placed between the PBX digital stations and the 7960 IP phones to exercise and test basic calls as well as DPNSS supplementary services such as caller ID, call transfer, call conference, and call back. The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with the Cisco Unified CallManager connected to the PBX as described.

Connectivity is achieved by using the E1 PRI QSIG protocol type on the Cisco IOS voice gateway with Cisco Unified CallManager Service parameter QSIG variant of ISO and ISO switch type on the Westell IiQ2000. The IiQ2000 provides a protocol “conversion” from ISO QSIG on the Cisco Unified CallManager to DPNSS, which is supported natively on the Ericsson MD110 PBX.

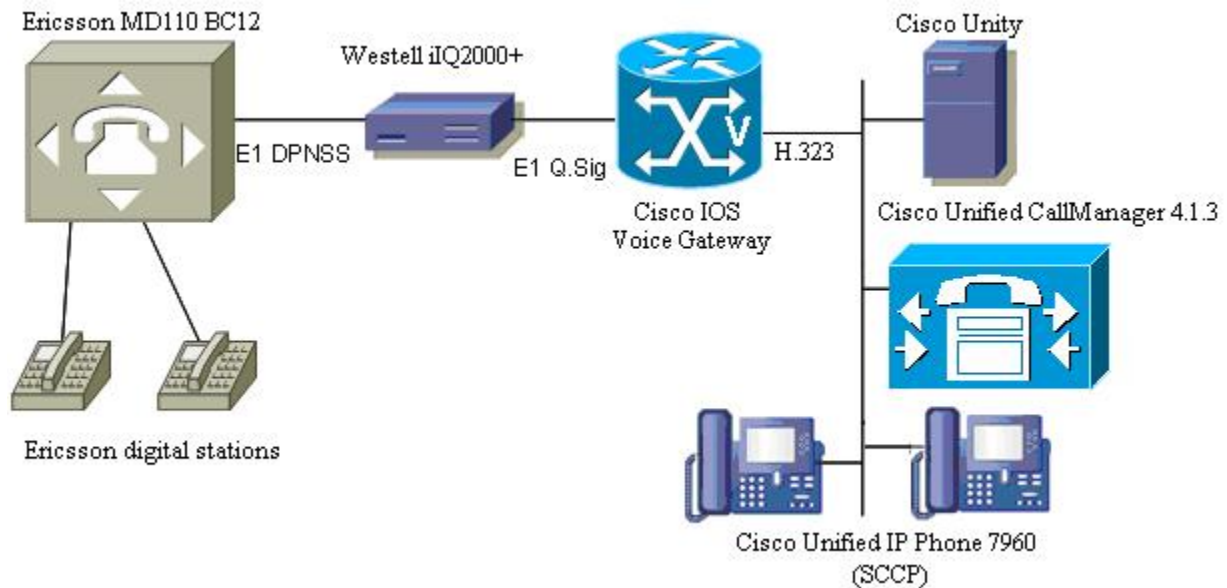
This Application Note uses the Cisco 3845 voice gateway. However it also applies to other Cisco voice gateways, since Unified CallManager QSIG implementation does not depend on the physical platform.

Using the Ericsson PBX configuration, Westell IiQ2000 configuration, and Cisco IOS voice gateway configuration in this application note, successful toll bypass integration was achieved. This includes basic call, caller ID (calling and connected number only), call transfer, call conference, and call back, with some limitations on Call Diversion and Caller ID features during these scenarios.



Network Topology

Figure 1. Network Topology or Test Setup



System Components

Hardware Requirements

- Cisco 3845 with NM-HDV and VWIC-2MFT-E1
- Cisco MCS 7800
- (2) Cisco 7960 IP phones
- Ericsson MD110 including TLU76/1 E1 interface card
- (2) Ericsson MD110 digital stations
- Westell IiQ2000

Software Requirements

- Cisco Unified CallManager Release 4.1.3.
- Ericsson MD110: Release BC12 SP5
- Cisco IOS Release 12.3
- Westell IiQ2000 software: Vision iQ Ver. 3.2.2.



Features

Features Supported

- Basic Call
- Caller ID: Calling and Connected Number
- Blind Local Transfer
- Blind Network / External Transfer
- Supervised Local Transfer
- Supervised Network / External Transfer
- Call Conference
- Call Back When Free
- Call Back When Next Used
- Route Optimization (with Supervised Network/External Transfers)
- MWI (See Limitations Section)

Features Not Supported

The Ericsson MD110 does not support Calling/Called/Connected Name presentation using DPNSS.



Limitations

No testing with the Operator Console was performed because there was not an operator console at the time of test.

The MD110 does not support (Calling/Called/Connected) Name presentation with DPNSS.

The MD110 supports Connected Number, not Called Number, with DPNSS.

On Supervised Transfers, the Calling Number was updated on the final destination phone upon the transfer completion, which happened after the destination answered in a supervised transfer.

On Blind Transfers, the Calling Number was updated on the final destination phone upon the transfer completion, which happened before the destination answered in a blind transfer.

For Blind Network/External Transfers originating on an IP phone, transferred by an Ericsson MD110 phone, with the final destination as another IP phone (i.e., Phone C calls Phone A, and Phone A transfers to Phone D) DPNSS Call Diversion did not work correctly. The call transfer completed, but resulted in a hairpin call (both trunk circuits were still up). This is normal operation for Cisco Unified CallManager. If the converse call is made (i.e., Phone A calls Phone C, and Phone C transfers to Phone B), DPNSS Call Diversion worked correctly, following transfer completion, to remove PBX – Cisco Unified CallManager trunks. The difference is because ISO QSIG states that the call trunk shall not perform Path Replacement (“Route Optimization” in DPNSS parlance), until there is a connected path in both directions. In a blind transfer, the second leg is not connected when the transfer is completed. The PBX is DPNSS, and the Cisco Unified CallManager is QSIG.

MWI:

With BC12 where the Voicemail system is directly integrated to the MD110, although an MWI message is generated by the PBX, the format is incorrect, and consequently it will be dropped by the Westell. This is due to the MWI NSI string containing illegal characters according to the DPNSS specification BTNR 188. This fault has been demonstrated not to occur on customer sites running BC9 and BC10.

MWI generated from a Unified CallManager attached voicemail platform such as Cisco Unity is able to signal MWI to MD110 phones via the NSI string on all tested versions of Ericsson software (BC9, BC10 and BC12).

Further, where the MWI is generated by a voicemail system itself attached using DPNSS to the MD110, the NSI string relevant to MWI is that generated by the voicemail platform itself and not the MD110. In those instances, the version of MD110 software has no impact on the MWI NSI string. From customer experience, there are instances of external voicemail bureaus connected over DPNSS trunks to an MD110 running BC12 which is able to generate an MWI message to a CCM-attached phone.



Configuration

Configuring the Ericsson MD 110 PBX

<rocap:rou=11;

ROUTE CATEGORY DATA

ROU SEL TRM SERV NODG DIST DISL TRAF SIG BCAP

11 7110000000000010 5 3110000000 0 20 10 03151515 111110000011 111111

END

<rodap:rou=11;

ROUTE DATA

ROU TYPE VARC VARI VARO FILTER

11 TL50 H'00000001 H'00000000 H'00000000 NO

END

<roddp:dest=40;

EXTERNAL DESTINATION ROUTE DATA

DEST DRN ROU CHO CUST ADC TRC SRT NUMACK PRE



40 11 0505000000000250005001100 0 1 0

END

<roedp:rou=11,tru=all;

ROUTE EQUIPMENT DATA

ROU	TRU	EQU	IP ADDRESS	SQU	INDDAT	CNTRL
-----	-----	-----	------------	-----	--------	-------

11	001-1	001-0-40-01				H'0000000000FF
11	001-2	001-0-40-02				H'0000000000FF
11	001-3	001-0-40-03				H'0000000000FF
11	001-4	001-0-40-04				H'0000000000FF
11	001-5	001-0-40-05				H'0000000000FF
11	001-6	001-0-40-06				H'0000000000FF
11	001-7	001-0-40-07				H'0000000000FF
11	001-8	001-0-40-08				H'0000000000FF
11	001-9	001-0-40-09				H'0000000000FF
11	001-10	001-0-40-10				H'0000000000FF
11	001-11	001-0-40-11				H'0000000000FF
11	001-12	001-0-40-12				H'0000000000FF
11	001-13	001-0-40-13				H'0000000000FF
11	001-14	001-0-40-14				H'0000000000FF
11	001-15	001-0-40-15				H'0000000000FF
11	001-17	001-0-40-17				H'0000000000FF
11	001-18	001-0-40-18				H'0000000000FF



11	001-19	001-0-40-19	H'0000000000FF
11	001-20	001-0-40-20	H'0000000000FF
11	001-21	001-0-40-21	H'0000000000FF
11	001-22	001-0-40-22	H'0000000000FF
11	001-23	001-0-40-23	H'0000000000FF
11	001-24	001-0-40-24	H'0000000000FF
11	001-25	001-0-40-25	H'0000000000FF
11	001-26	001-0-40-26	H'0000000000FF
11	001-27	001-0-40-27	H'0000000000FF
11	001-28	001-0-40-28	H'0000000000FF
11	001-29	001-0-40-29	H'0000000000FF
11	001-30	001-0-40-30	H'0000000000FF
11	001-31	001-0-40-31	H'0000000000FF

END

<

<cadap;

CALENDAR DATA

IDENTITY=DANDS-EURO

VERSION=CXP1010101/2/BC12SP5/R2A

15:07:52

THU 13 OCT 2005



END

<aspap:parnum=223;

APPLICATION SYSTEM PARAMETERS

PARNUM PARVAL

223 7

END

<aspap:parnum=66;

APPLICATION SYSTEM PARAMETERS

PARNUM PARVAL

66 1

END



Configuring Cisco Unified CallManager

Figure 2. ISO Protocol Service Parameter

Parameter Name	Parameter Value	Suggested Value
ASN.1 ROSE OID Encoding*	<input type="text" value="Use Local Value"/>	Use Local Value
QSIG Variant*	<input type="text" value="ISO (Protocol Profile 0x9F)"/>	ISO (Protocol Profile 0x9F)
Caller ID	<input type="text"/>	
Calling Name Not Available Timeout (msec)*	<input type="text" value="2000"/>	2000
Calling Party Number Screening Indicator*	<input type="text" value="CallManager sets the screening indicator value - Default setting"/>	CallManager sets the screening indicator value - Default setting
Change B- Channel Maintenance Status 1	<input type="text"/>	
Change B- Channel Maintenance Status 2	<input type="text"/>	
Change B- Channel Maintenance Status 3	<input type="text"/>	
Change B- Channel Maintenance Status 4	<input type="text"/>	
Change B- Channel Maintenance Status 5	<input type="text"/>	
Clear Calls Flag When Datalink Is Down*	<input type="text" value="True"/>	True
Device Status Poll Interval (msec)*	<input type="text" value="3000"/>	3000
Disable		



Figure 3. CMM-E1 Gateway Configuration

Cisco CallManager Administration
For Cisco IP Telephony Solutions

CISCO SYSTEMS

Gateway Configuration

[Back to Find/List Gateways](#)

Product: Communication Media Module
Protocol: MGCP
MGCP : CMM-E1

Status: Ready

[Update](#) [Delete](#) [Reset Gateway](#)

Domain Name*

Description

Cisco CallManager Group*

Installed Voice Interface Cards

Endpoint Identifiers

Module in Slot 1	<input type="text" value="WS-X6600"/>				
Subunit	<input type="text" value="WS-X6600-6E1"/>	(1/0)	(1/1)	(1/2)	(1/3)
		(1/4)	(1/5)		
Module in Slot 2	<input type="text" value=" < None >"/>				
Module in Slot 3	<input type="text" value=" < None >"/>				
Module in Slot 4	<input type="text" value=" < None >"/>				


Product Specific Configuration


Global ISDN Switch Type	<input type="text" value="4ESS"/>
Switchback Timing*	<input type="text" value="Graceful"/>
Switchback uptime-delay (min)	<input type="text" value="10"/>
Switchback schedule (hh:mm)	<input type="text" value="12:00"/>
Fax mode*	<input type="text" value="Fax Relay"/>

* indicates required item

[Back to Find/List Gateways](#)

Figure 4. CMM-E1 Gateway Configuration (continued)





Gateway Configuration

[Back to MGCP Configuration](#)
[Back to Find/List Gateways](#)
[Dependency Records](#)

Product : Communication Media Module
Gateway : S1/DS1-1@CMM-E1
Device Protocol: Digital Access PRI
Registration: Registered with Cisco CallManager CM-MARS
IP Address: 172.20.231.51

Status: Ready

Update
Delete
Reset Gateway

Device Information

End-Point Name*	<input type="text" value="S1/DS1-1@CMM-E1"/>
Description	<input type="text" value="CM-MARS to Ericsson E1"/>
Device Pool*	<input type="text" value="Default"/>
Call Classification*	<input type="text" value="Use System Default"/>
Network Locale	<input type="text" value="United States"/>
Media Resource Group List	<input type="text" value=" < None >"/>
Location	<input type="text" value=" < None >"/>
AAR Group	<input type="text" value=" < None >"/>
Load Information	<input type="text"/>

Multilevel Precedence and Preemption (MLPP) Information

MLPP Domain (e.g., "0000FF")	<input type="text"/>
MLPP Indication	Not available on this device
MLPP Preemption	Not available on this device

Interface Information

PRI Protocol Type*	<input type="text" value="PRI QSIG E1"/>
Protocol Side*	<input type="text" value="Network"/>
Channel Selection Order*	<input type="text" value="Top Down"/>
Channel IE Type*	<input type="text" value="Continuous Number"/>



Figure 5. CMM-E1 Gateway Configuration (continued)

PCM Type*	A-law
Delay for first restart (1/8 sec ticks)	32
Delay between restarts (1/8 sec ticks)	4
<input checked="" type="checkbox"/> Inhibit restarts at PRI initialization	
<input type="checkbox"/> Enable status poll	
Call Routing Information	
Inbound Calls	
Significant Digits*	All
Calling Search Space	Incoming Trunk
AAR Calling Search Space	< None >
Prefix DN	
Outbound Calls	
Calling Line ID Presentation*	Default
Calling Party Selection*	Originator
Called party IE number type unknown*	National
Calling party IE number type unknown*	National
Called Numbering Plan*	Private
Calling Numbering Plan*	Private
Number of digits to strip*	0
Caller ID DN	
SMDI Base Port*	0
PRI Protocol Type Specific Information	
<input checked="" type="checkbox"/> Display IE Delivery	
<input checked="" type="checkbox"/> Redirecting Number IE Delivery - Outbound	
<input checked="" type="checkbox"/> Redirecting Number IE Delivery - Inbound	
<input checked="" type="checkbox"/> Send Extra Leading Character In DisplayIE***	
<input type="checkbox"/> Setup non-ISDN Progress Indicator IE Enable****	
<input type="checkbox"/> MCDN Channel Number Extension Bit Set to Zero**	



Figure 6. CMM-E1 Gateway Configuration (continued)

<input checked="" type="checkbox"/>	Display IE Delivery
<input checked="" type="checkbox"/>	Redirecting Number IE Delivery - Outbound
<input checked="" type="checkbox"/>	Redirecting Number IE Delivery - Inbound
<input checked="" type="checkbox"/>	Send Extra Leading Character In DisplayIE***
<input type="checkbox"/>	Setup non-ISDN Progress Indicator IE Enable****
<input type="checkbox"/>	MCDN Channel Number Extension Bit Set to Zero**
<input type="checkbox"/>	Send Calling Name In Facility IE
<input type="checkbox"/>	Interface Identifier Present**
Interface Identifier Value**	<input type="text" value="0"/>
Connected Line ID Presentation (QSIG Inbound Call)*	<input type="text" value="Default"/>

UUIE Configuration

<input type="checkbox"/>	Passing Precedence Level Through UUIE
Security Access Level	<input type="text" value="2"/>

Product Specific Configuration

Line Coding*	<input type="text" value="HDB3"/>
Framing*	<input type="text" value="CRC4"/>
Clock*	<input type="text" value="External"/>
Input Gain (-6..14 db)*	<input type="text" value="0"/>
Output Attenuation (-6..14 db)*	<input type="text" value="0"/>
Echo Cancellation Enable*	<input type="text" value="Enable"/>
Echo Cancel Coverage (ms)*	<input type="text" value="64"/>

* indicates required item
** applicable to DMS-100 protocol only
*** applicable to DMS-100 protocol and DMS-250 protocol only
**** may be required to force ringback from some PBXs

[Back to MGCP Configuration](#)
[Back to Find/List Gateways](#)



Figure 7. Enbloc Route Pattern Configuration

Route Pattern: 11XX
Status: Ready
Note: Any update to this Route Pattern automatically resets the associated gateway or Route List

CopyUpdateDelete

Pattern Definition

Route Pattern*	11XX		
Partition	< None >		
Description	CM-MARS to Ericsson 1		
Numbering Plan*	North American Numbering Plan		
Route Filter	< None >		
MLPP Precedence	Default		
Gateway or Route List*	S1/DS1-1@CMM-E1		(Edit)
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern — Not Selected —		
Call Classification*	OnNet	<input type="checkbox"/> Allow Device Override	<input type="checkbox"/> Urgent Priority
<input type="checkbox"/> Provide Outside Dial Tone	<input type="checkbox"/> Allow Overlap Sending		
<input type="checkbox"/> Require Forced Authorization Code	Authorization Level 0		
<input type="checkbox"/> Require Client Matter Code			

Calling Party Transformations

☐ Use Calling Party's External Phone Number Mask

Calling Party Transform Mask	551XXXX
Prefix Digits (Outgoing Calls)	
Calling Line ID Presentation	Default
Calling Name Presentation	Default


Connected Party Transformations

Connected Line ID Presentation	Default
Connected Name Presentation	Default

Called Party Transformations

Discard Digits	< None >
Called Party Transform Mask	
Prefix Digits (Outgoing Calls)	

Figure 8. MWI lamp On/Off Configuration



The screenshot displays the Cisco CallManager Administration web interface. At the top is a navigation bar with links: System, Route Plan, Service, Feature, Device, User, Application, and Help. Below this is a header banner with the text "Cisco CallManager Administration" and "For Cisco IP Telephony Solutions", along with the Cisco Systems logo. The main content area is titled "Message Waiting Configuration" in large red font. To the right of the title are two links: "Add a New Message Waiting Number" and "Back to Find/List Message Waiting Numbers". Below the title, it shows "Message Waiting Number : 7001" and "Status: Ready". There are three buttons: "Copy", "Update", and "Delete". The configuration fields include: "Message Waiting Number*" with the value "7001", "Description" (empty), "Message Waiting Indicator" with radio buttons for "On" (selected) and "Off", "Partition" with a dropdown menu showing "phones", and "Calling Search Space" with a dropdown menu showing "phones". A footnote at the bottom left states "* indicates required item".

System Route Plan Service Feature Device User Application Help

Cisco CallManager Administration
For Cisco IP Telephony Solutions

Cisco Systems

Message Waiting Configuration

[Add a New Message Waiting Number](#)
[Back to Find/List Message Waiting Numbers](#)

Message Waiting Number : 7001
Status: Ready

Copy Update Delete

Message Waiting Number* 7001

Description

Message Waiting Indicator ☒ On ☐ Off

Partition phones

Calling Search Space phones

* indicates required item



Figure 9. MWI lamp On/Off Configuration (continue)

[System](#) [Route Plan](#) [Service](#) [Feature](#) [Device](#) [User](#) [Application](#) [Help](#)

Cisco CallManager Administration
For Cisco IP Telephony Solutions

CISCO SYSTEMS

Message Waiting Configuration

[Add a New Message Waiting Number](#)
[Back to Find/List Message Waiting Numbers](#)

Message Waiting Number : 7000
Status: Ready

[Copy](#) [Update](#) [Delete](#)

Message Waiting Number*

Description

Message Waiting Indicator ☐ On ☒ Off

Partition

Calling Search Space

* indicates required item



Figure 10. MWI Activate Translation Pattern Configuration

Translation Pattern Configuration

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

Translation Pattern: 7701
Status: Ready

Copy Update Delete

Pattern Definition

Translation Pattern	7701
Partition	phones
Description	
Numbering Plan*	North American Numbering Plan
Route Filter	< None >
Calling Search Space	phones
MLPP Precedence	Default
Route Option	<div><input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern — Not Selected —</div>
<input checked="" type="checkbox"/> Provide Outside Dial Tone	<input checked="" type="checkbox"/> Urgent Priority

Calling Party Transformations

☐ Use Calling Party's External Phone Number Mask

Calling Party Transform Mask	1154
Prefix Digits (Outgoing Calls)	
Calling Line ID Presentation	Default
Calling Name Presentation	Default

Connected Party Transformations

Connected Line ID Presentation	Default
Connected Name Presentation	Default

Called Party Transformations

Discard Digits	< None >
Called Party Transform Mask	7001
Prefix Digits (Outgoing Calls)	

* indicates required item.



Figure 11. MWI Deactivate Translation Pattern Configuration

Translation Pattern Configuration

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

Translation Pattern: 7700
Status: Ready

Copy Update Delete

Pattern Definition

Translation Pattern	7700
Partition	phones
Description	
Numbering Plan*	North American Numbering Plan
Route Filter	< None >
Calling Search Space	phones
MLPP Precedence	Default
Route Option	<div><input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern — Not Selected —</div>
<input checked="" type="checkbox"/> Provide Outside Dial Tone	<input checked="" type="checkbox"/> Urgent Priority

Calling Party Transformations

☐ Use Calling Party's External Phone Number Mask

Calling Party Transform Mask	1154
Prefix Digits (Outgoing Calls)	
Calling Line ID Presentation	Default
Calling Name Presentation	Default

Connected Party Transformations

Connected Line ID Presentation	Default
Connected Name Presentation	Default

Called Party Transformations

Discard Digits	< None >
Called Party Transform Mask	7000
Prefix Digits (Outgoing Calls)	

* indicates required item.



Figure 12. CallBack Service Parameters

Parameter Name	Parameter Value	Suggested Value
Callback Notification Audio File Name*	<input type="text" value="CallBack.raw"/>	CallBack.raw
Connection Proposal Type*	<input type="text" value="Connection Retention"/>	Connection Release
Connection Response Type*	<input type="text" value="Default to Connection Retention"/>	Default to Connection Retention
Callback Request Protection Timer (T1) (sec)*	<input type="text" value="10"/>	10
Callback Recall Timer (T3) (sec)*	<input type="text" value="20"/>	20
Callback Calling Search Space	<input type="text" value=" < None >"/>	



Figure 13. CallBack Softkey Configuration

System Route Plan Service Feature Device User Application Help

Cisco CallManager Administration
For Cisco IP Telephony Solutions

Softkey Template Configuration

[Add New Softkey Template](#)
[Configure Softkey Layout](#)
[Dependency Records](#)
[Back to Find/List Softkey Templates](#)

Softkey Template: Standard User CallBack
Status: Ready

Softkey Template Name*

Description

Application

* indicates required item



Figure 14. CallBack Softkey Configuration (continued)

[System](#) [Route Plan](#) [Service](#) [Feature](#) [Device](#) [User](#) [Application](#) [Help](#)

Cisco CallManager Administration
For Cisco IP Telephony Solutions

Softkey Layout Configuration

[Softkey Template Configuration](#)

Call States

- Connected
- Connected Conference
- Connected Transfer
- Digits After First
- Off Hook
- Off Hook With Feature
- On Hold
- On Hook**
- Remote In Use
- Ring In
- Ring Out

Softkey Template: Standard User CallBack
Status: Ready

Update

Restart Devices

Unselected Softkeys

- Conference List (30)(ConfList)
- Direct Transfer (28)(DirTrfr)
- Immediate Divert (31)(iDiverf)
- Join (15)(Join)
- Quality Report Tool (22)(QRT)
- Remove Last Conference Party (19)
- Select (29)(Select)
- Undefined (0)(Undefined)
- Video Mode Command (33)(VidMoc

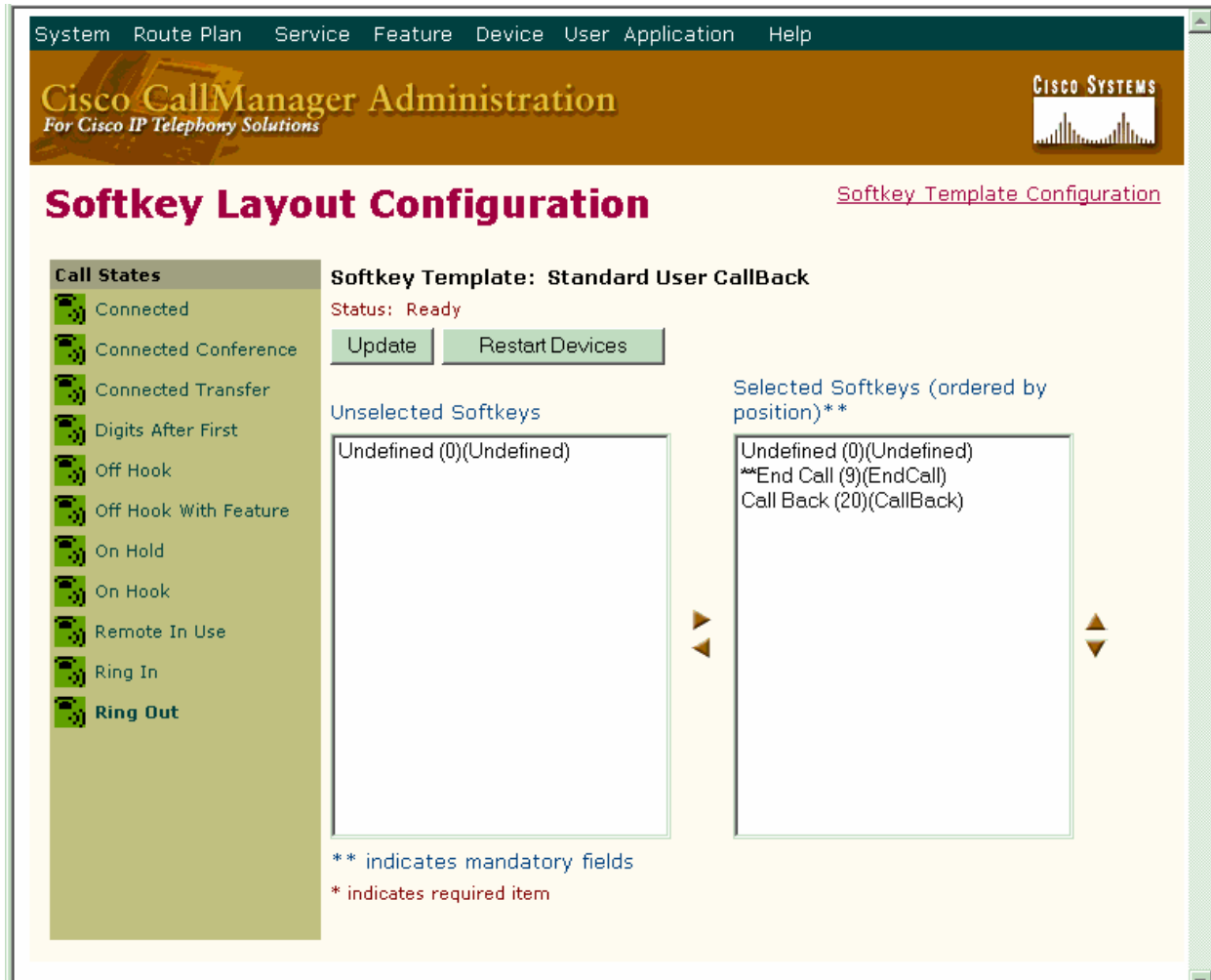
Selected Softkeys (ordered by position)**

- Redial (1)(Redial)
- **NewCall (2)(NewCall)
- Forward All (5)(CfwdAll)
- Call Back (20)(CallBack)

** indicates mandatory fields

* indicates required item

Figure 15. CallBack Softkey Configuration (continued)



The screenshot displays the Cisco CallManager Administration web interface. At the top, a navigation bar includes links for System, Route Plan, Service, Feature, Device, User, Application, and Help. Below this is a header banner with the Cisco CallManager Administration logo and the Cisco Systems logo. The main content area is titled "Softkey Layout Configuration" and includes a link for "Softkey Template Configuration".

On the left, a "Call States" sidebar lists various call states with corresponding icons: Connected, Connected Conference, Connected Transfer, Digits After First, Off Hook, Off Hook With Feature, On Hold, On Hook, Remote In Use, Ring In, and Ring Out. The "Ring Out" state is currently selected.

The main configuration area is titled "Softkey Template: Standard User CallBack" and shows a "Status: Ready". It contains two buttons: "Update" and "Restart Devices".

Below the buttons, there are two columns of softkey configurations:

- Unselected Softkeys:** A list box containing "Undefined (0)(Undefined)".
- Selected Softkeys (ordered by position):**** A list box containing "Undefined (0)(Undefined)", "**End Call (9)(EndCall)", and "Call Back (20)(CallBack)".

Arrows between the two list boxes indicate the ability to move softkeys between the unselected and selected states. A double arrow on the right side of the selected list box indicates the ability to reorder the softkeys.

At the bottom, a legend explains the notation: "** indicates mandatory fields" and "* indicates required item".



Figure 16. Path Replacement Service Parameters

Clusterwide Parameters (Feature - Path Replacement)		
Parameter Name	Parameter Value	Suggested Value
Path Replacement Enabled*	<input type="text" value="True"/>	False
Path Replacement on Tromboned Calls*	<input type="text" value="True"/>	True
Start Path Replacement Minimum Delay Time (sec)*	<input type="text" value="2"/>	0
Start Path Replacement Maximum Delay Time (sec)*	<input type="text" value="4"/>	0
Path Replacement T1 Timer (sec)*	<input type="text" value="30"/>	30
Path Replacement T2 Timer (sec)*	<input type="text" value="15"/>	15
Path Replacement PINX Id	<input type="text" value="551"/>	
Path Replacement Calling Search Space	<input type="text" value="PathReplacementCSS"/>	
Clusterwide Parameters (Feature - Call Back)		



Figure 17. Path Replacement Service Parameters

[System](#) [Route Plan](#) [Service](#) [Feature](#) [Device](#) [User](#) [Application](#) [Help](#)

Cisco CallManager Administration
For Cisco IP Telephony Solutions

CISCO SYSTEMS

Call Pickup Configuration

[Add a New Call Pickup Number](#)
[Back to Find/List Call Pickup Numbers](#)
[Dependency Records](#)

Call Pickup Number: 551 - Incoming Trunk

Status: Ready

Call Pickup Number*

Description

Partition

* indicates required item



Figure 18. Forward by Reroute Service Parameter

Clusterwide Parameters (Feature - Forward)		
Parameter Name	Parameter Value	Suggested Value
Forward Maximum Hop Count*	<input type="text" value="12"/>	12
Forward No Answer Timer (sec)*	<input type="text" value="12"/>	12
Max Forwards Hops to DN*	<input type="text" value="12"/>	12
Retain Forward Information*	<input type="text" value="False"/>	False
Forward By Reroute Enabled*	<input type="text" value="True"/>	False
Forward By Reroute T1 Timer (sec)*	<input type="text" value="15"/>	15

Clusterwide Parameters (Feature - Path Replacement)



Figure 19. IP phone Configuration

Phone Configuration

[Add a new phone](#)
[Add/Update Speed Dials](#)
[Subscribe/Unsubscribe Services](#)
[Dependency Records](#)
[Back to Find/List Phones](#)

Directory Numbers

Base Phone

7912

7919

Line 1 - 4000 in phones

7912

7919

Line 2 - Add new DN

Phone: SEP003094C331AD (Auto 4000)

Registration: Registered with Cisco CallManager 172.20.231.254

IP Address: [172.20.231.102](#)

Status: Ready

Copy

Update

Delete

Reset Phone

Phone Configuration (Model = Cisco 7960)

Device Information

MAC Address*

003094C331AD

Description

Auto 4000

Owner User ID

([Select User ID](#))

Device Pool*

Default

([View details](#))

Calling Search Space

< None >

AAR Calling Search Space

< None >

Media Resource Group List

< None >

User Hold Audio Source

1 - SampleAudioSource

Network Hold Audio Source

< None >

Location

< None >

User Locale

< None >

Network Locale

< None >

Device Security Mode

Use System Default

Signal Packet Capture Mode

None

Packet Capture Duration

0

Built In Bridge

Default

Privacy

Default

☒ Retry Video Call as Audio

☐ Ignore Presentation Indicators (internal calls only)

Phone Button Template Information

Phone Button Template* Standard 7960 ([View button list](#))

Softkey Template Information

Softkey Template Standard User CallBack



Figure 20. IP phone Configuration (continued)

Expansion Module Information	
Module 1	< None >
Module 2	< None >
Firmware Load Information (leave blank to use default)	
Phone Load Name	
Module 1 Load Name	(Module 1 selection required)
Module 2 Load Name	(Module 2 selection required)
Cisco IP Phone - External Data Locations (leave blank to use default)	
Information	
Directory	
Messages	
Services	
Authentication Server	
Proxy Server	
Idle	
Idle Timer (seconds)	
Extension Mobility (Device Profile) Information	
<input type="checkbox"/> Enable Extension Mobility Feature	
Log Out Profile	— Not Selected —
Log In User ID	< None >
Log In Time	< None >
Log Out Time	< None >
Certification Authority Proxy Function (CAPF) Information	
Certificate Operation	No Pending Operation
Authentication Mode	By Authentication String
Authentication String	<input type="text"/> <input type="button" value="Generate String"/>
Key Size (bits)	1024
Operation Completes By**	: : : (YYYY : MM : DD : HH)
Certificate Operation Status : None	
Multilevel Precedence and Preemption (MLPP) Information	
MLPP Domain	(e.g., "0000FF")
MLPP Indication	Default



Figure 21. IP phone Configuration (continued)

Multilevel Precedence and Preemption (MLPP) Information	
MLPP Domain	<input type="text" value=""/> (e.g., "0000FF")
MLPP Indication	Default
MLPP Preemption	Default

Product Specific Configuration	
Disable Speakerphone	<input type="checkbox"/>
Disable Speakerphone and Headset	<input type="checkbox"/>
Forwarding Delay*	Disabled
PC Port*	Enabled
Settings Access*	Enabled
Gratuitous ARP*	Enabled
PC Voice VLAN Access*	Enabled
Video Capabilities*	Disabled
Auto Line Select*	Disabled

* indicates a required item.
** Indicates time on Publisher.

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[Back to Find/List Phones](#)



Figure 22. IP phone Configuration (continued)

Directory Number Configuration

[Configure Device \(SEP003094C331AD\)](#)
[Dependency Records](#)

Associated With
 SEP003094C331AD
7960 (Line 1)

Directory Number: 4000 (phones)
Status: Ready
Note: Any update to this Directory Number automatically resets the associated devices

UpdateRemove from DeviceReset Devices

Directory Number

Directory Number*
Partition

Directory Number Settings

Voice Mail Profile
(Choose <None> to use default)

Calling Search Space

AAR Group

User Hold Audio Source

Network Hold Audio Source

Auto Answer

Call Forward and Pickup Settings

	Voice Mail	Coverage/ Destination	Calling Search Space
Forward All	<input type="checkbox"/>	<input type="text"/>	<input type="text" value=" < None >"/>
Forward Busy Internal	<input type="checkbox"/>	<input type="text"/>	<input type="text" value=" < None >"/>
Forward Busy External	<input type="checkbox"/>	<input type="text"/>	<input type="text" value=" < None >"/>
Forward No Answer Internal	<input type="checkbox"/>	<input type="text"/>	<input type="text" value=" < None >"/>
Forward No Answer External	<input type="checkbox"/>	<input type="text"/>	<input type="text" value=" < None >"/>
Forward No Coverage Internal	<input type="checkbox"/>	<input type="text"/>	<input type="text" value=" < None >"/>
Forward No Coverage External	<input type="checkbox"/>	<input type="text"/>	<input type="text" value=" < None >"/>
No Answer Ring Duration		<input type="text"/> (seconds)	
Call Pickup Group		<input type="text" value=" < None >"/>	

MLPP Alternate Party Settings

Target (Destination)

Calling Search Space

No Answer Ring Duration (seconds)



Figure 23. IP phone Configuration (continued)

No Answer Ring Duration	<input type="text"/> (seconds)
Call Pickup Group	< None >
MLPP Alternate Party Settings	
Target (Destination)	<input type="text"/>
Calling Search Space	< None >
No Answer Ring Duration	<input type="text"/> (seconds)
Line Settings for all Devices	
Alerting Name	MARS 0
Line Settings for this Device	
Display (Internal Caller ID)	MARS 0
Line Text Label	MARS 0
External Phone Number Mask	<input type="text"/>
Message Waiting Lamp Policy	Use System Policy
Ring Setting (Phone Idle)	Use System Default
Ring Setting (Phone Active)**	Use System Default
Multiple Call / Call Waiting Settings	
Maximum Number of Calls*	4 (1 - 200)
Busy Trigger*	2 (<= Max. Calls)
Forwarded Call Information Display	
<input checked="" type="checkbox"/> Caller Name	<input checked="" type="checkbox"/> Caller Number
<input checked="" type="checkbox"/> Redirected Number	<input checked="" type="checkbox"/> Dialed Number
<p>* indicates required item; changes to Line or Directory Number settings require restart.</p> <p>** Ring Setting (Phone Active) applies to this line when any line on the phone has a call in progress.</p> <p>Note: If you are using a language other than English for Display (Internal Caller ID) or Line Text Label text, make sure the correct character set (shown below) is selected. Text displays incorrectly if the wrong character set is selected. (English characters are included in all character sets.)</p>	
Character Set	Western European (Latin 1)



Configuring the Cisco IOS Gateway

```
tony3845#sh run
```

```
Building ...
```

```
Current configuration : 2066 bytes
```

```
!
```

```
version 12.3
```

```
service timestamps debug datetime msec
```

```
service timestamps log datetime msec
```

```
no service password-encryption
```

```
!
```

```
hostname tony3845
```

```
!
```

```
boot-start-marker
```

```
boot-end-marker
```

```
!
```

```
enable password cisco
```

```
!
```

```
no aaa new-model
```

```
!
```

```
resource policy
```

```
!
```

```
no network-clock-participate slot 4
```

```
no network-clock-participate wic 0
```

```
voice-card 0
```

```
no dspfarm
```

```
!
```



```
voice-card 4

dspfarm

!

ip subnet-zero

ip cef

!

!

no ip dhcp use vrf connected

!

!

ip host CM-MARS 172.20.231.254

no ftp-server write-enable

isdn switch-type primary-4ess

!

!

!

controller T1 0/0/0

framing esf

linecode b8zs

!

controller T1 0/0/1

framing esf

linecode b8zs

!

controller E1 4/0/0

pri-group timeslots 1-31 service mgcp

!

controller E1 4/0/1

!
```




!

!

interface GigabitEthernet0/0

ip address 172.20.231.245 255.255.255.0

duplex half

speed 100

media-type rj45

negotiation auto

!

interface GigabitEthernet0/1

no ip address

shutdown

duplex auto

speed auto

media-type rj45

negotiation auto

!

interface Serial4/0/0:15

no ip address

isdn switch-type primary-qsig

isdn protocol-emulate network

isdn incoming-voice voice

isdn T310 120000

isdn bind-13 ccm-manager

no cdp enable

!

ip default-gateway 172.20.231.1

ip classless

ip route 0.0.0.0 0.0.0.0 172.20.231.1



```
!  
ip http server  
!  
!  
control-plane  
!  
!  
!  
voice-port 4/0/0:15  
!  
ccm-manager mgcp  
ccm-manager music-on-hold  
ccm-manager config server CM-MARS  
ccm-manager config  
!  
mgcp  
mgcp call-agent CM-MARS 2427 service-type mgcp version 0.1  
mgcp dtmf-relay voip codec all mode out-of-band  
mgcp rtp unreachable timeout 1000 action notify  
mgcp modem passthrough voip mode nse  
mgcp package-capability rtp-package  
no mgcp package-capability res-package  
mgcp package-capability sst-package  
no mgcp package-capability fxr-package  
mgcp package-capability pre-package  
no mgcp timer receive-rtcp  
mgcp sdp simple  
mgcp fax t38 inhibit  
mgcp rtp payload-type g726r16 static
```



```
!  
mgcp profile default  
!  
!  
!  
!  
line con 0  
password cisco  
stopbits 1  
line aux 0  
stopbits 1  
line vty 0 4  
password cisco  
login  
!  
scheduler allocate 20000 1000  
!  
end  
  
tony3845#
```



Configuring the Westell liQ2000

Figure 24. liQ2000 Shelf Definitions

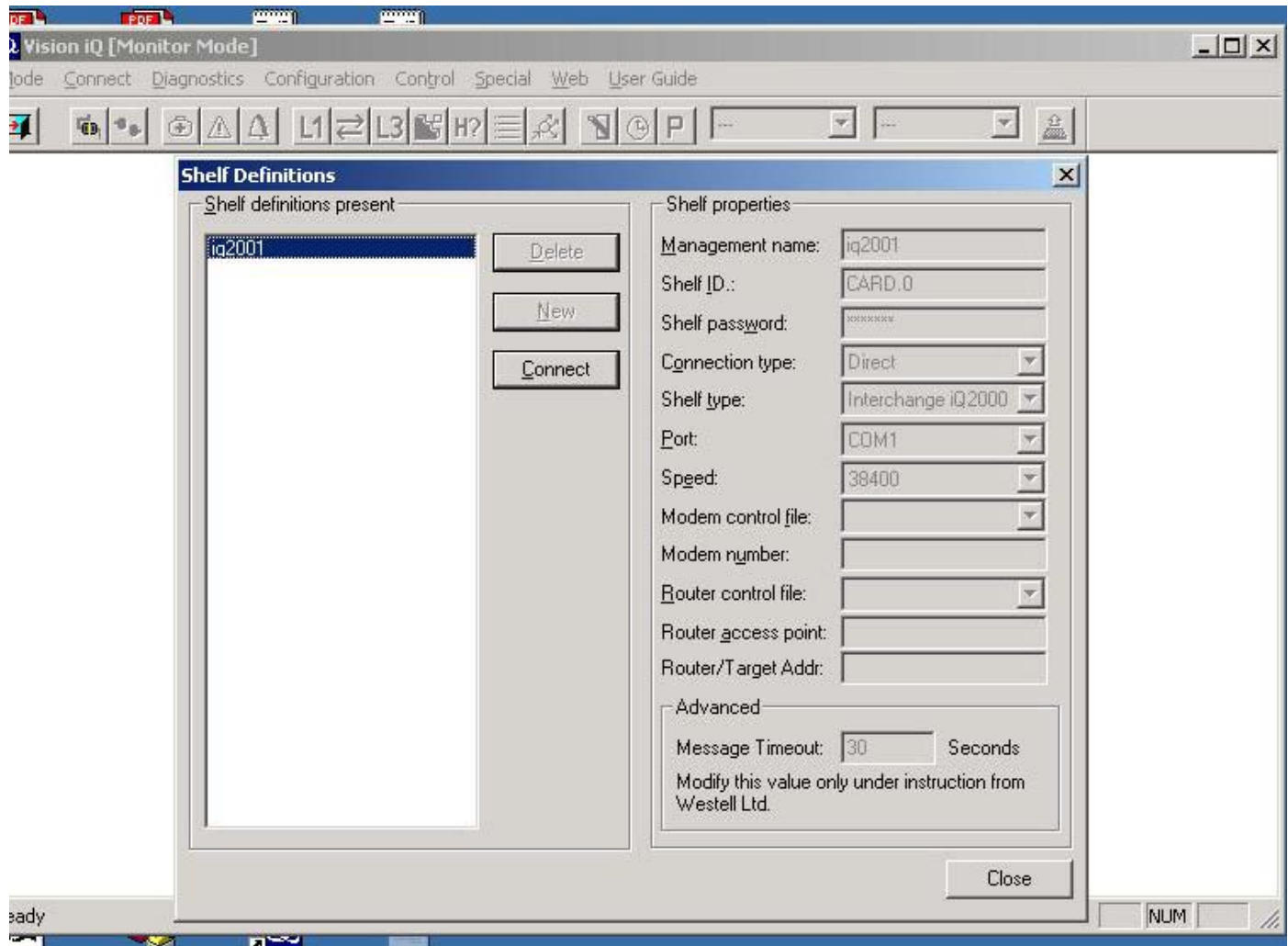




Figure 25. Entering the IQ2000 configuration

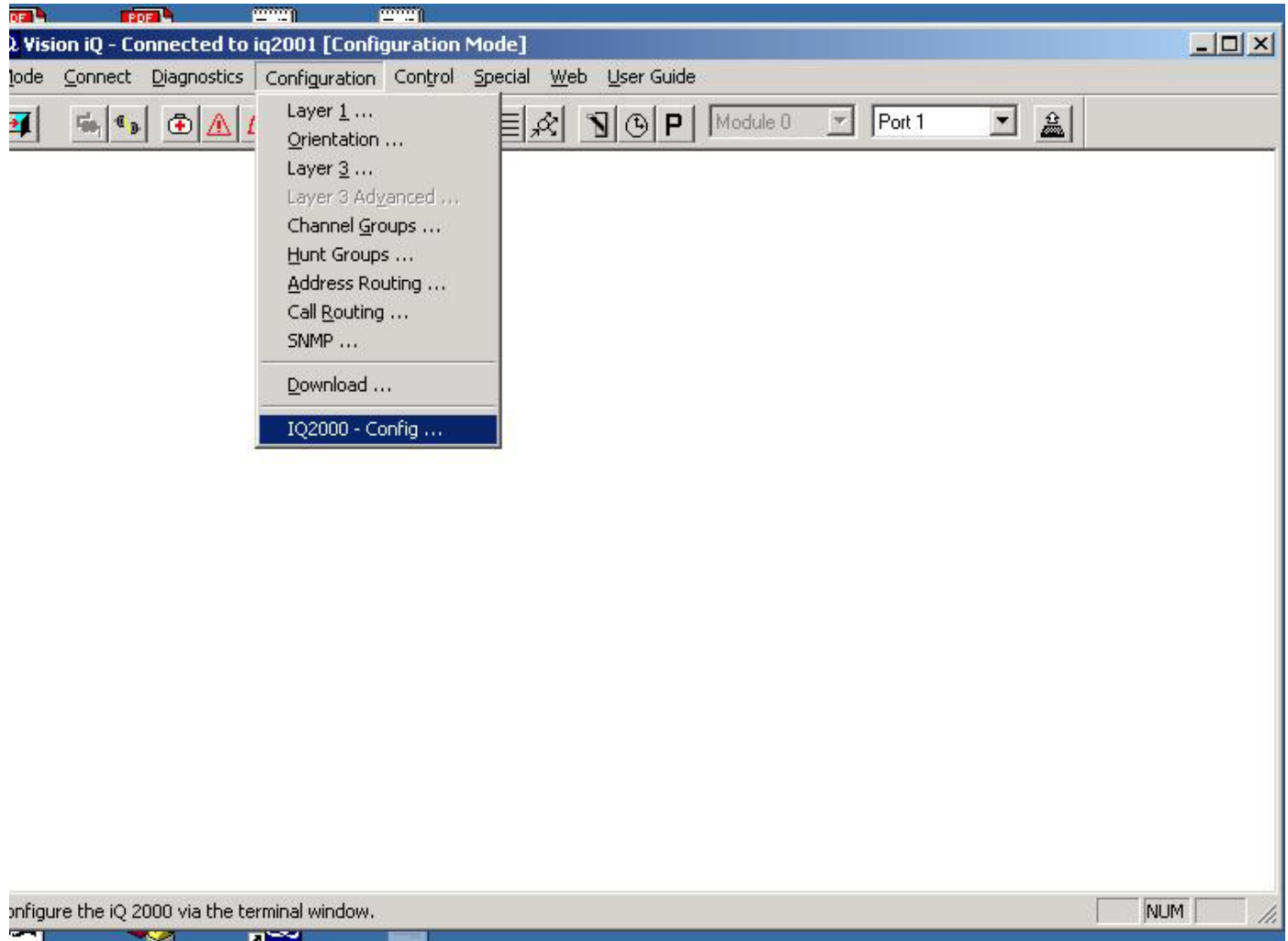




Figure 26. Configuration Warning: Click "yes".

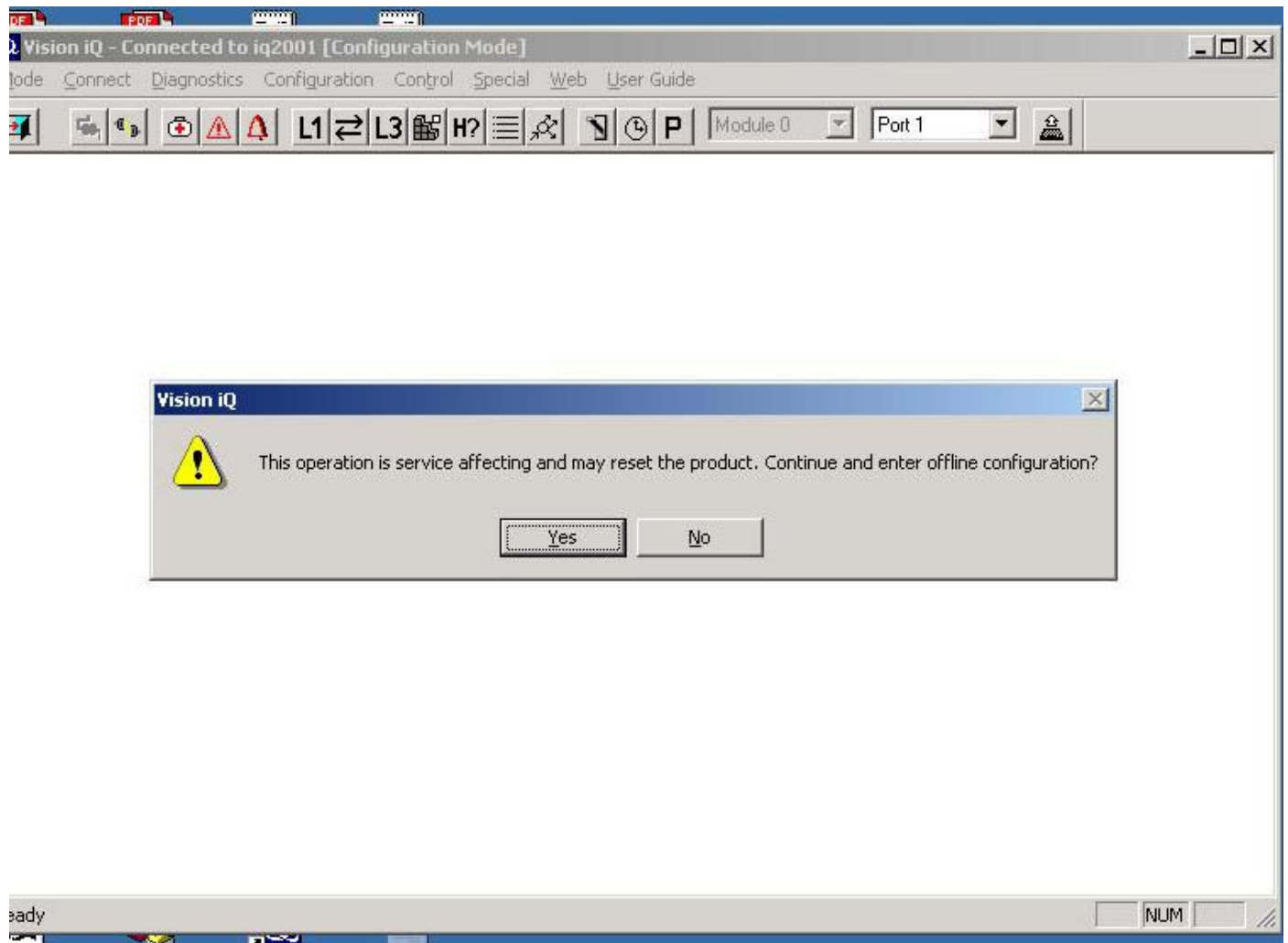




Figure 27. IiQ2000 Configuration Command Line Interface: Hit RETURN.

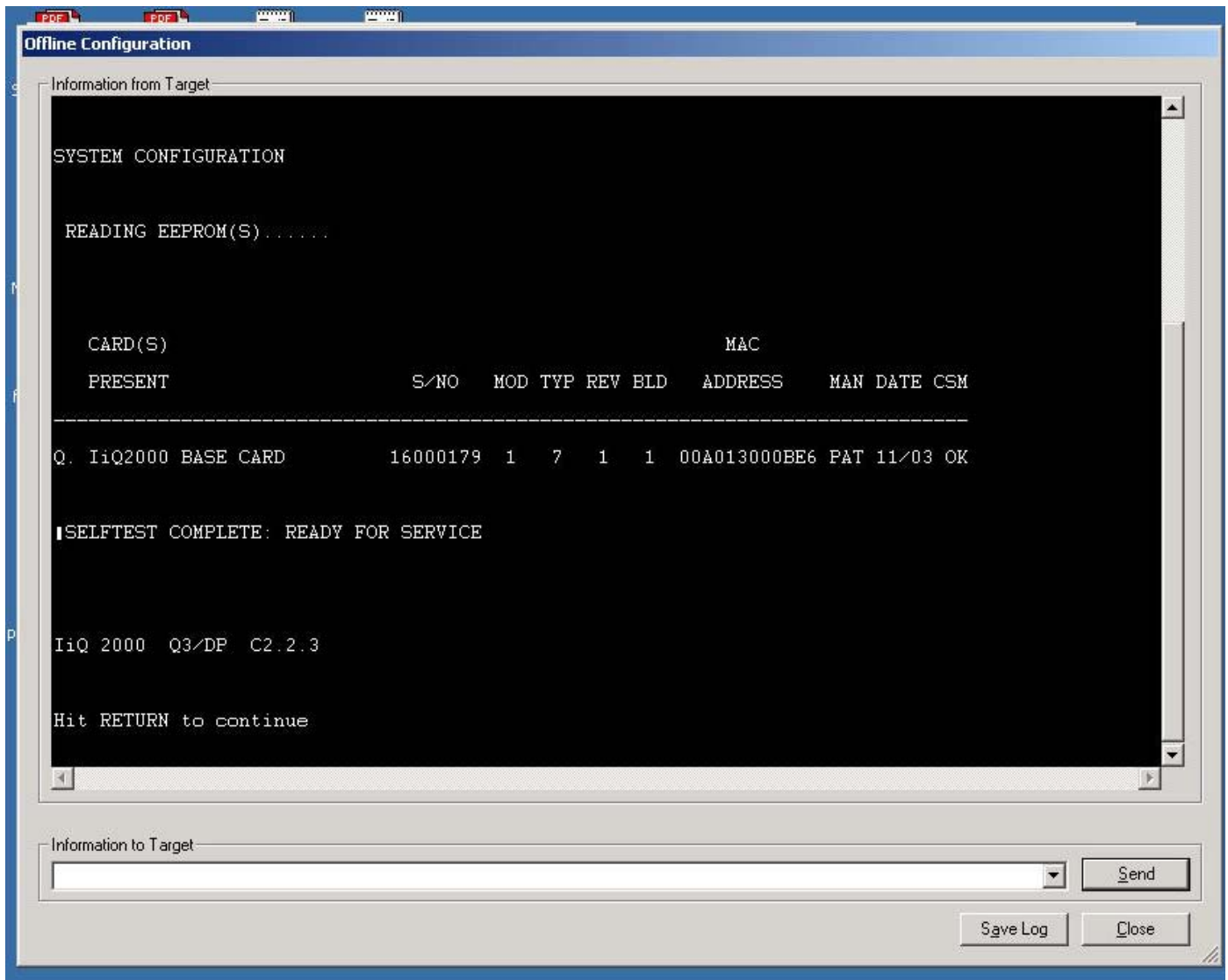




Figure 28. Selecting configuration option: Select QUICK.

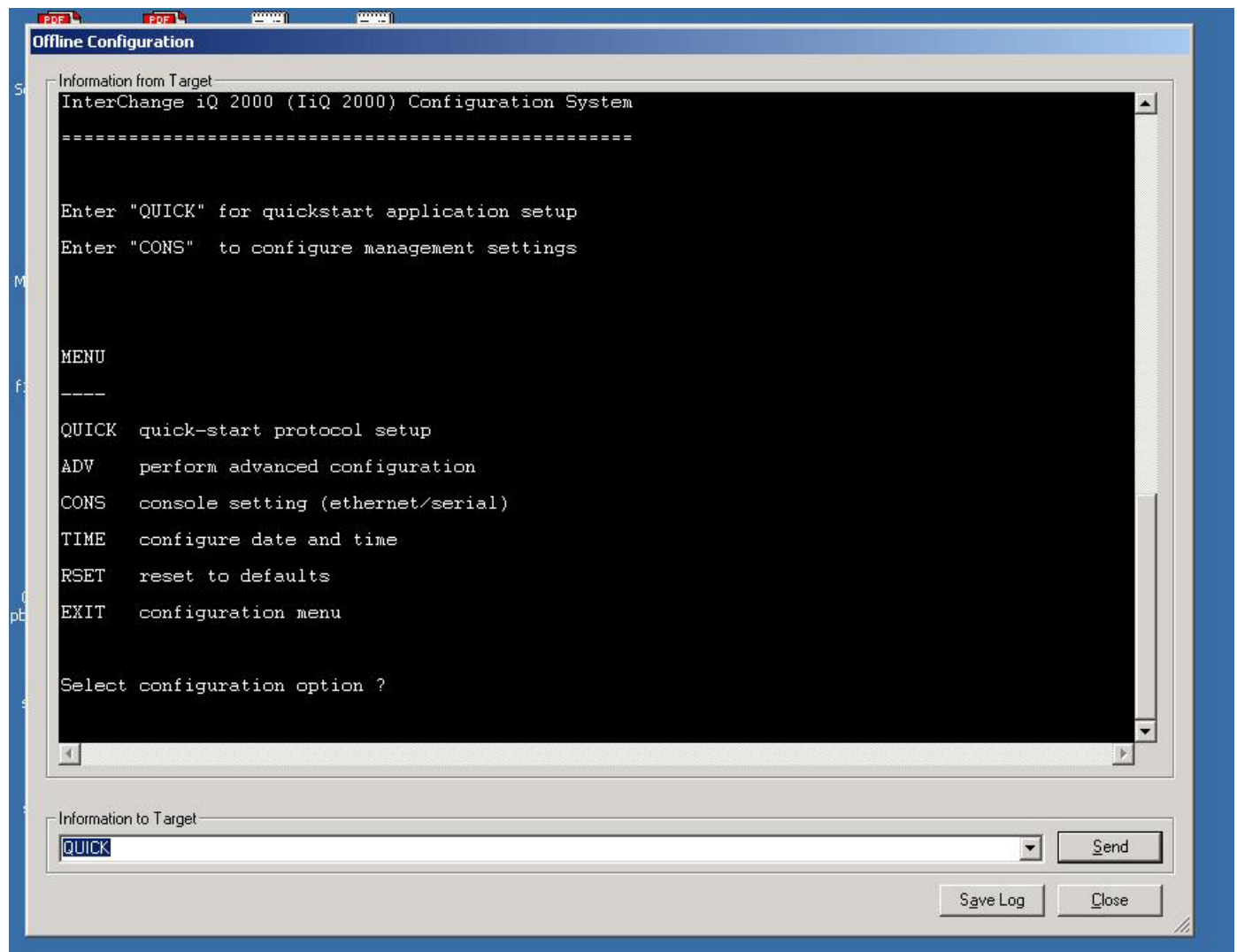




Figure 29. Configuration Instructions: Hit RETURN.

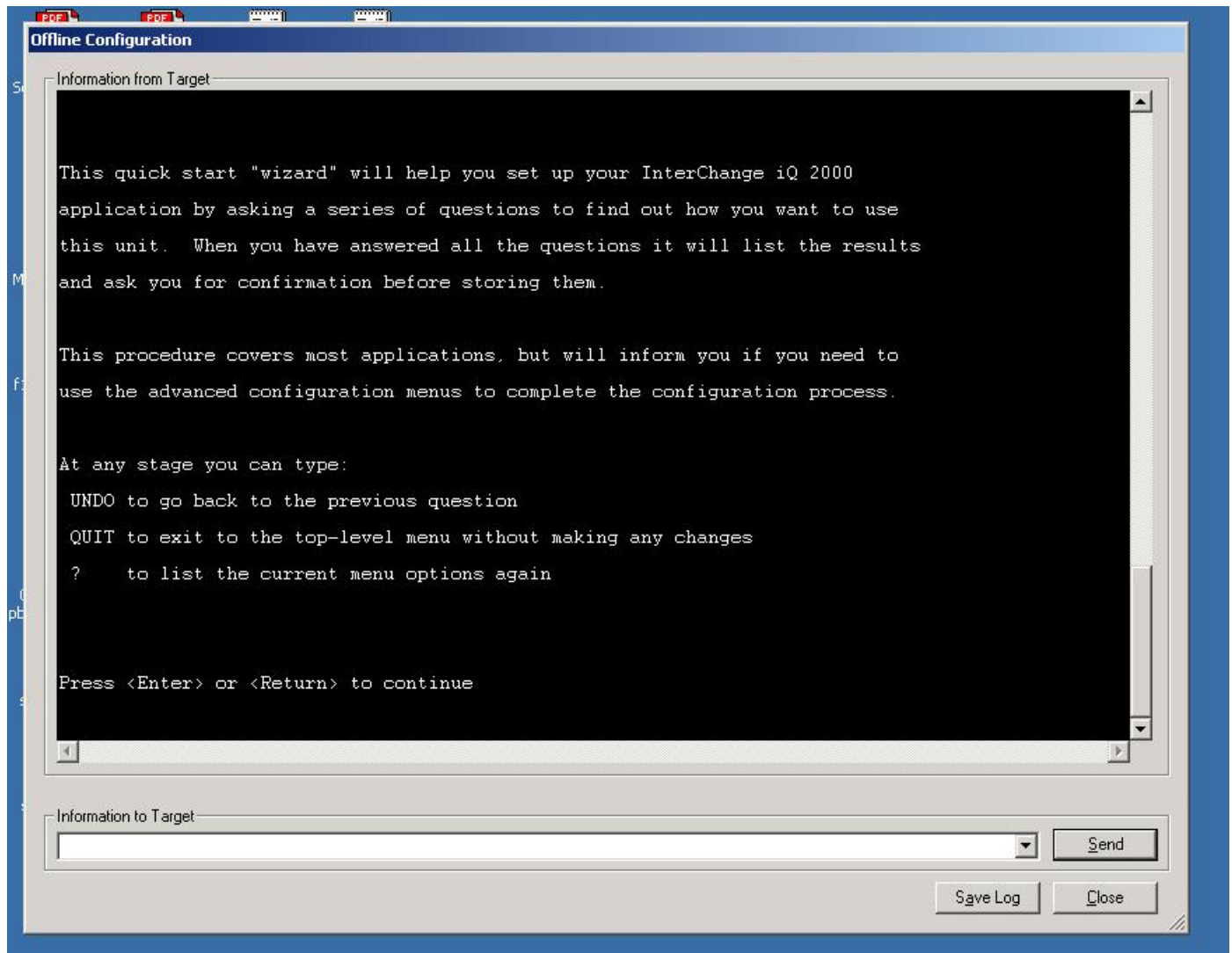




Figure 30. Application description menu: Select QSIG.

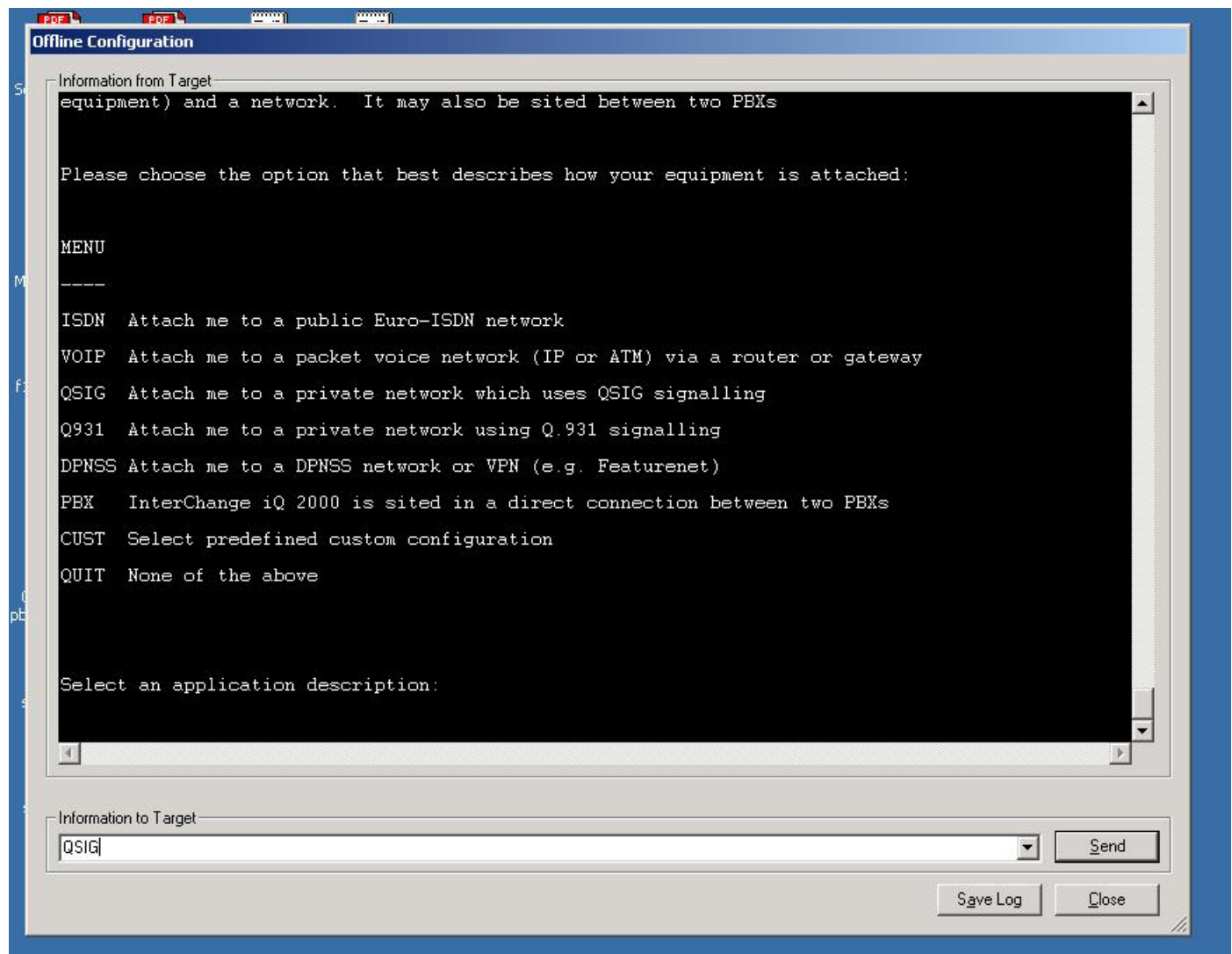




Figure 31. Selecting a QSIG variant: Select ISO.

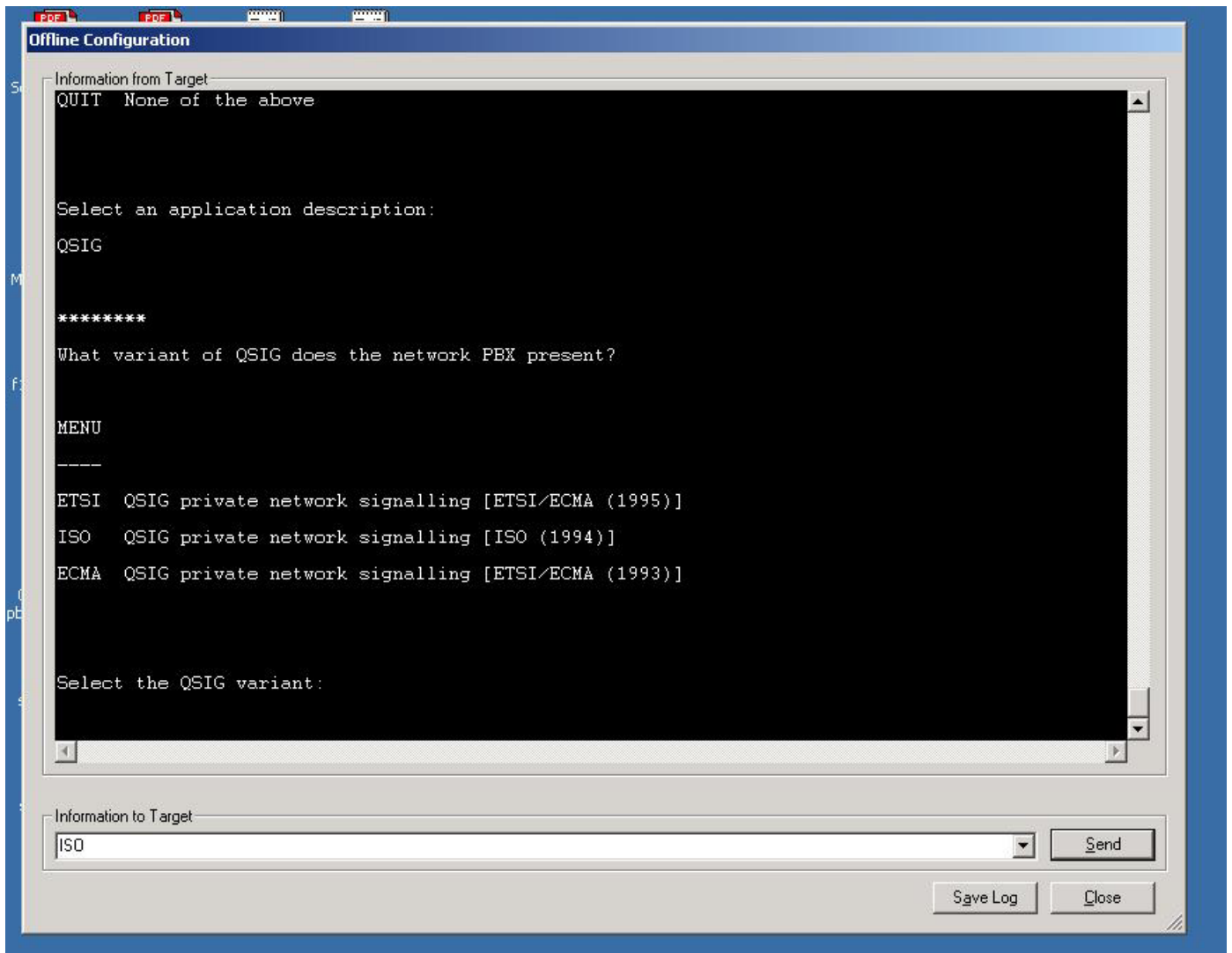




Figure 32. Selecting Network/User: Select NET.

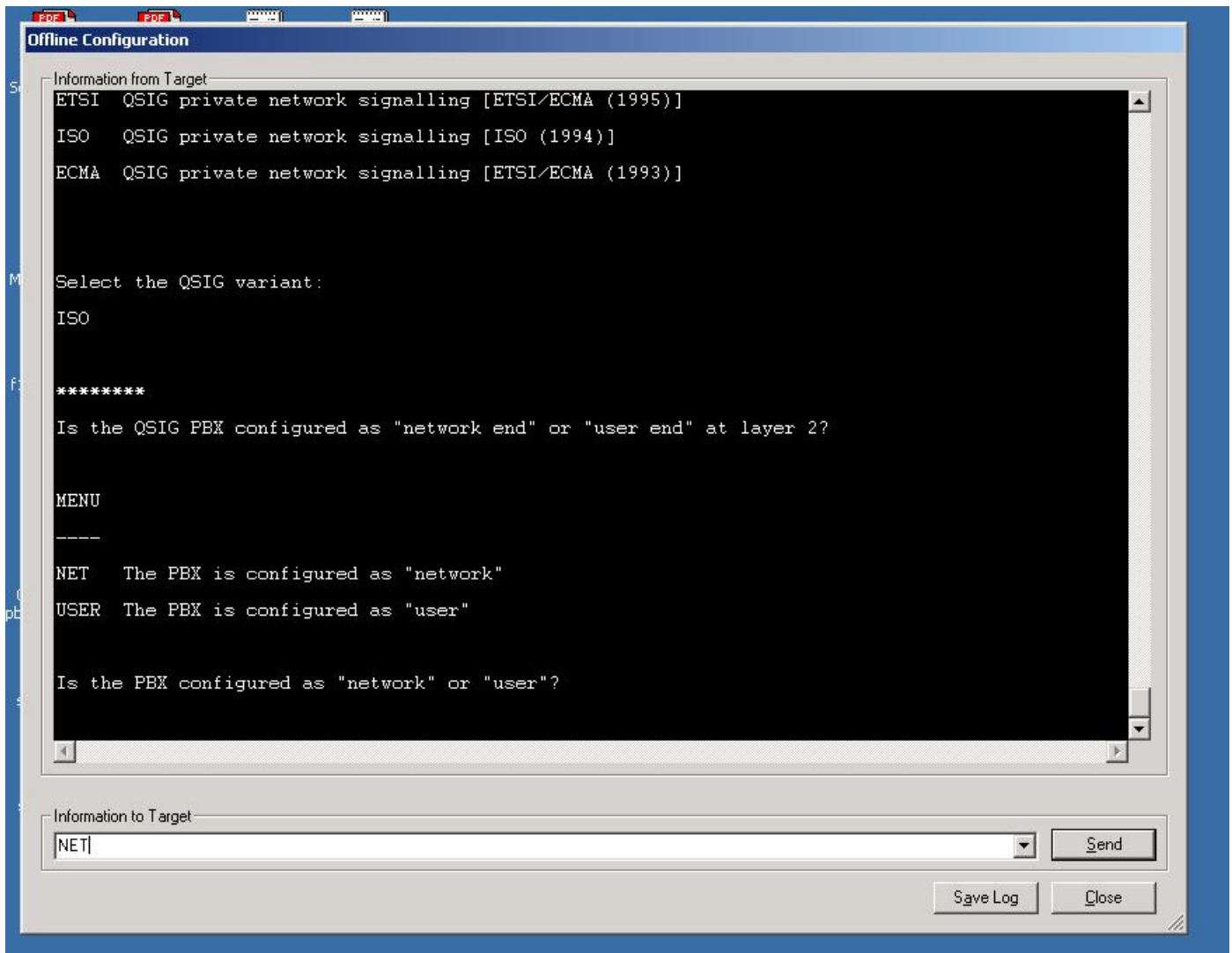




Figure 33. Selecting A/B sides: Select 'A'.

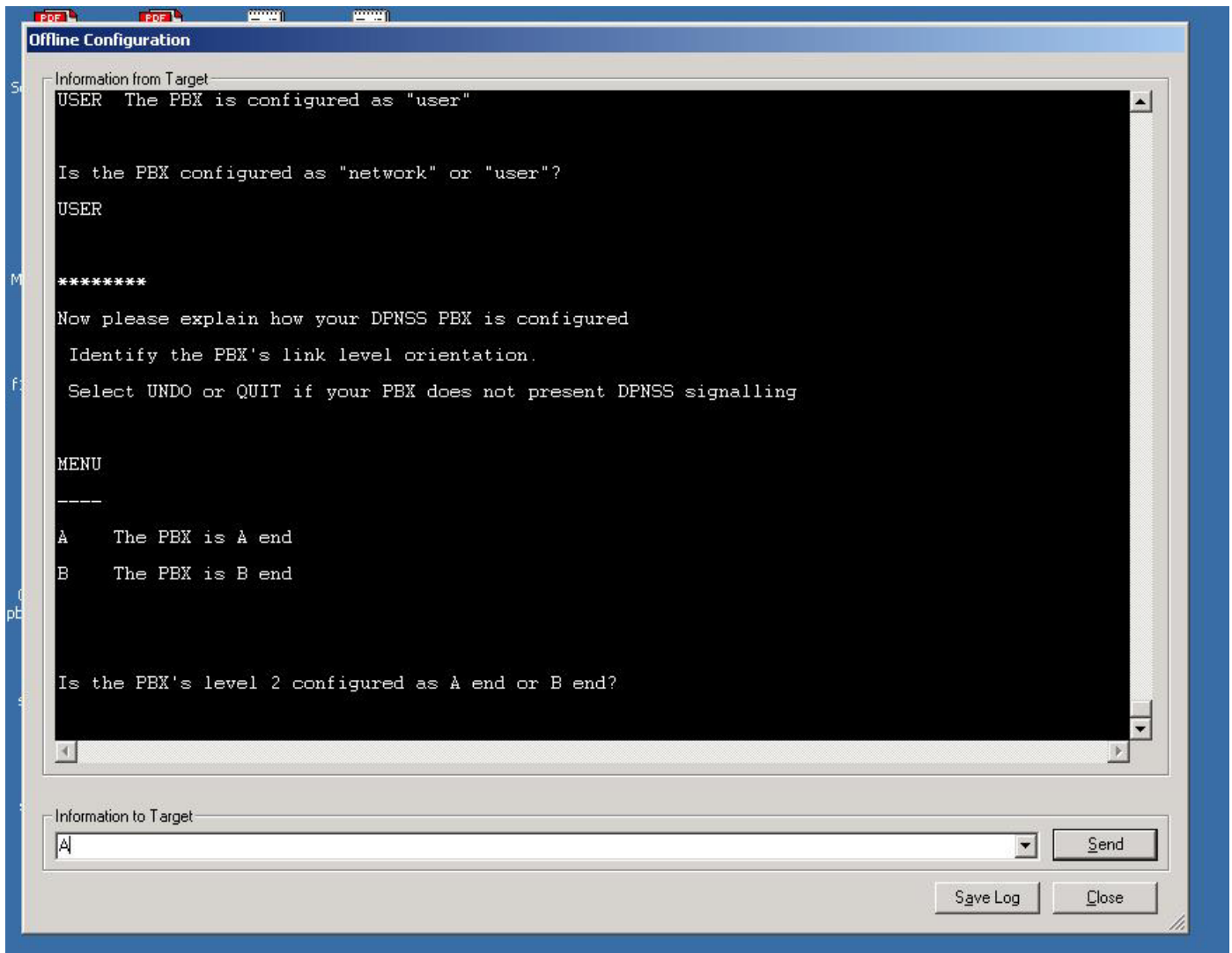




Figure 34. Selecting channel priorities: Select 'XX'.

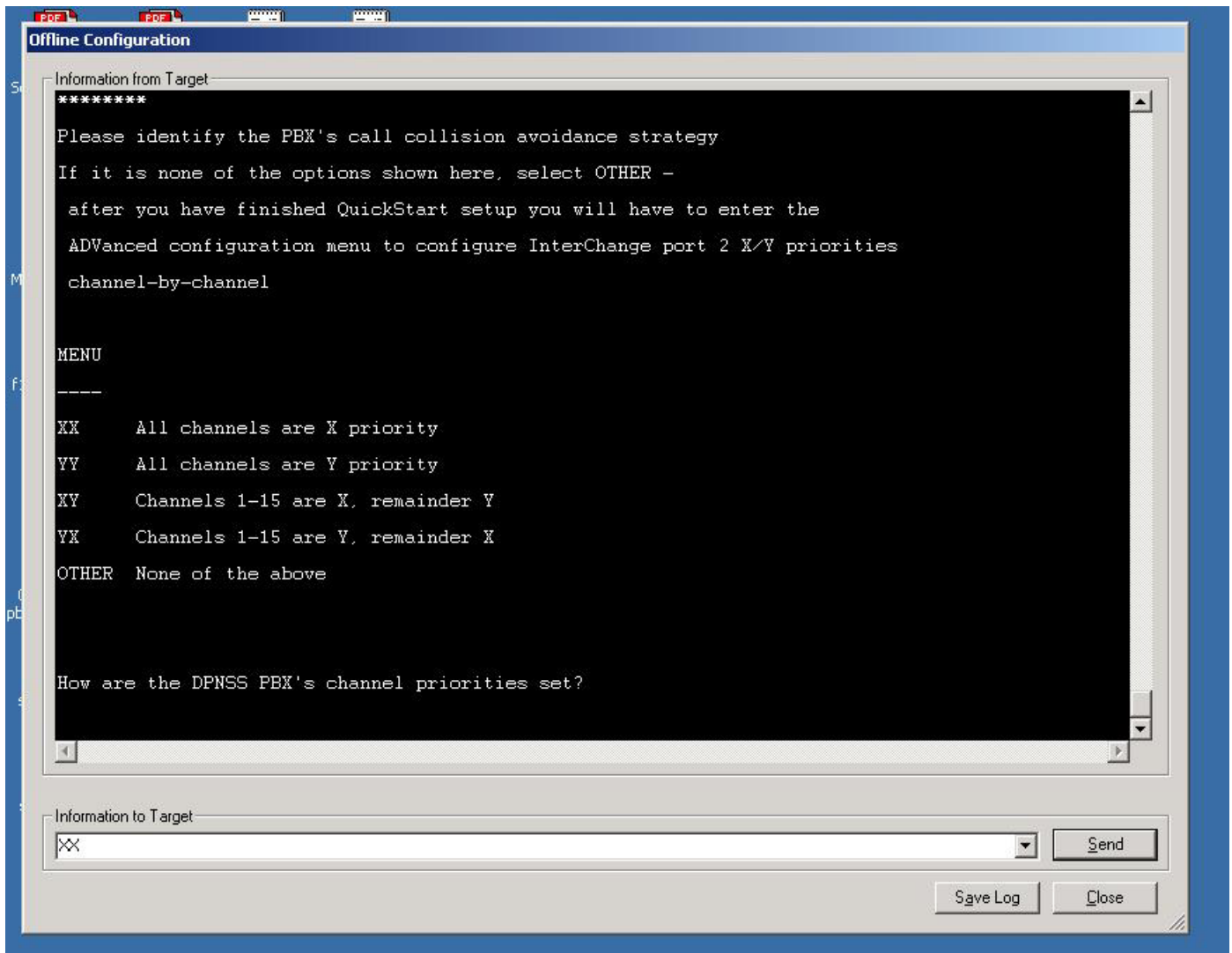




Figure 35. Prompt for PBXs connected to network without IiQ2000: Select NO.

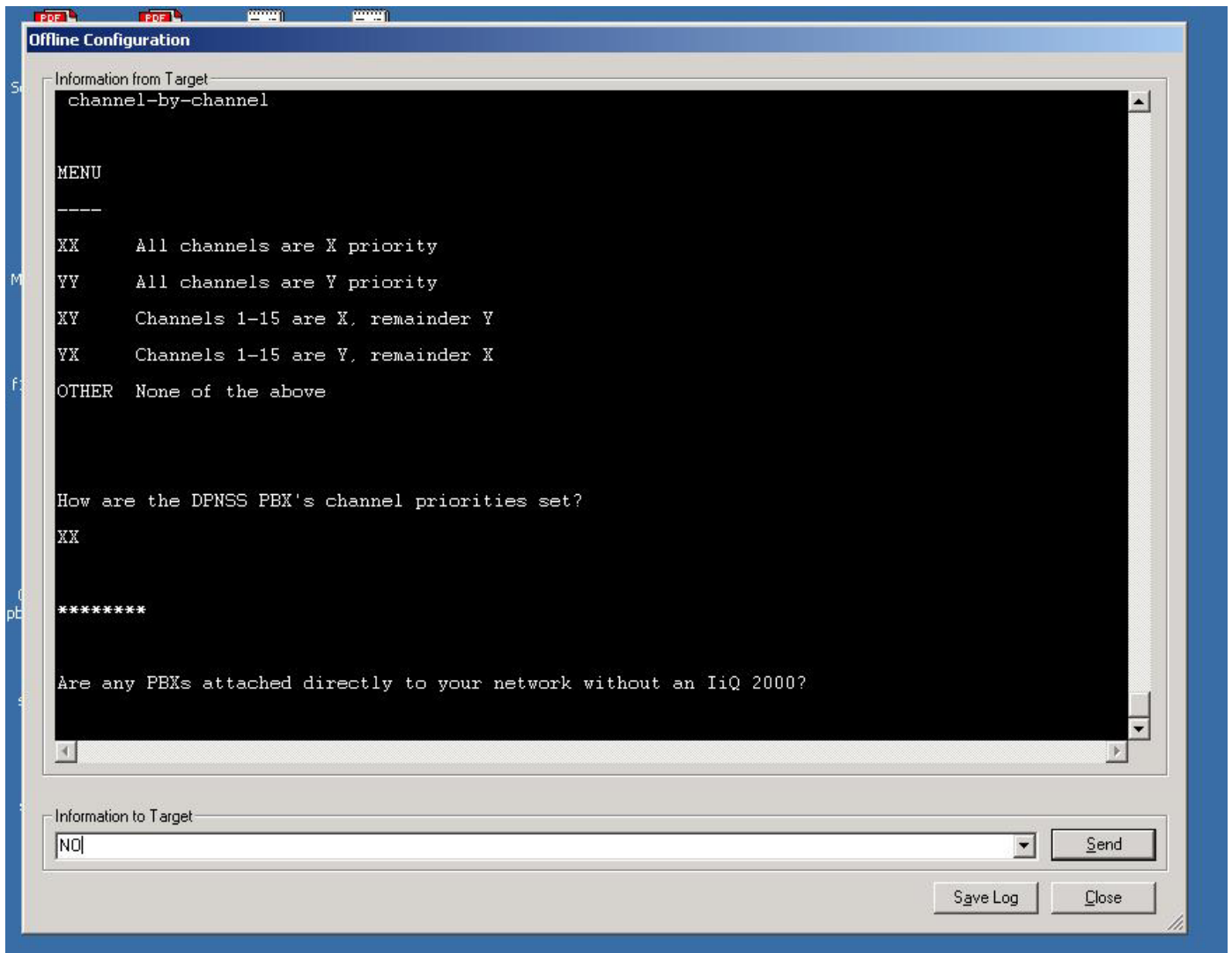




Figure 36. Transparent DPNSS signaling: Select YES.

The screenshot shows the 'Offline Configuration' window with a terminal-style interface. The main text area contains the following content:

```
Information from Target

Are any PBXs attached directly to your network without an IiQ 2000?
NO

*****

You must choose whether InterChange is to:
- Transport DPNSS signalling transparently between these DPNSS PBXs.
- Perform simple Supplementary Services interworking for all calls,
  without full transparency between DPNSS PBXs.

MENU
----
YES  Transparent DPNSS transport
NO   Simple services interworking only

Do you want to carry DPNSS signalling transparently across your network?
```

At the bottom of the window, there is a section labeled 'Information to Target' with a dropdown menu set to 'YES' and a 'Send' button. Below this are 'Save Log' and 'Close' buttons.



Figure 37. Confirm application: Select YES.

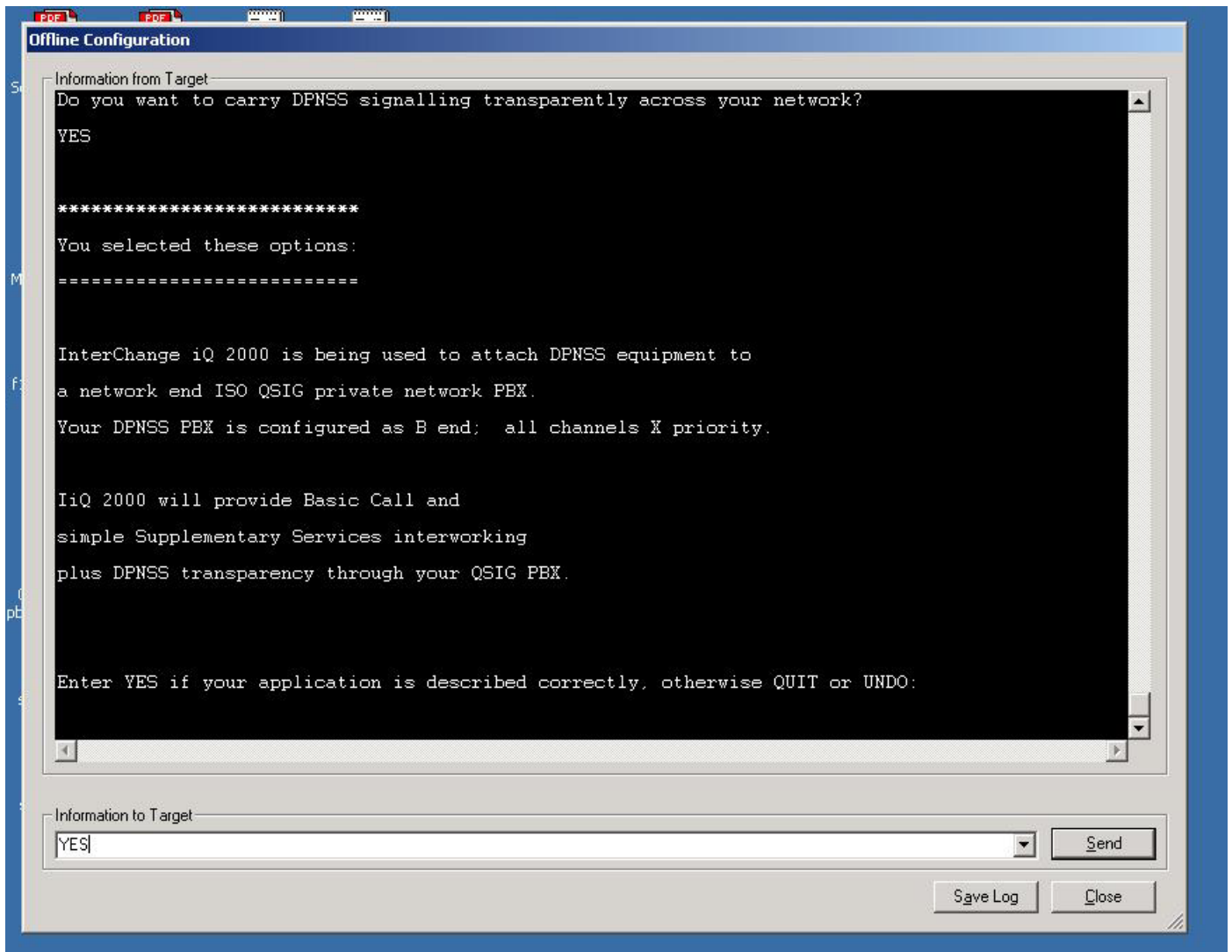




Figure 38. Confirm settings: Select CONF.

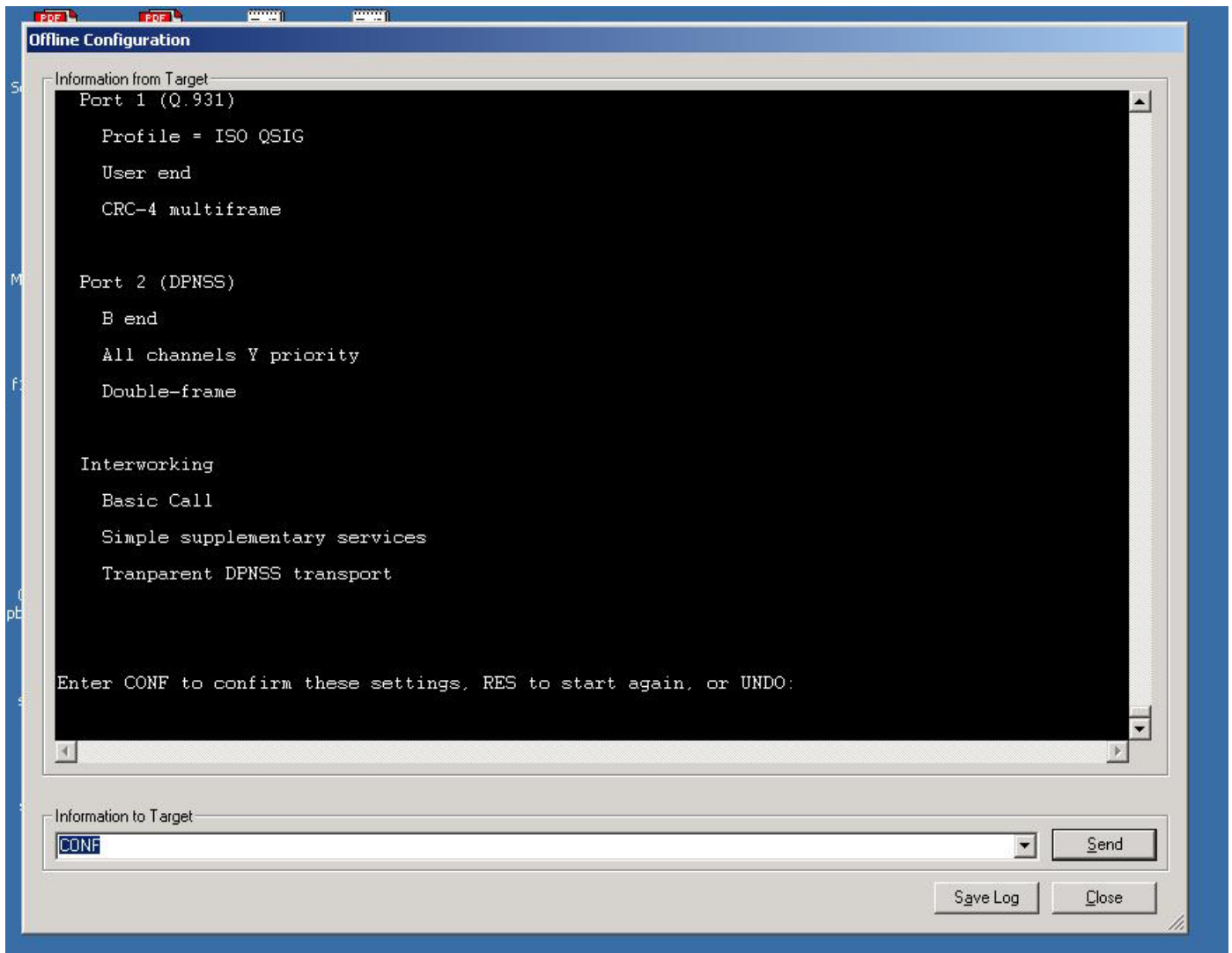




Figure 39. Exiting Configuration: Select EXIT.

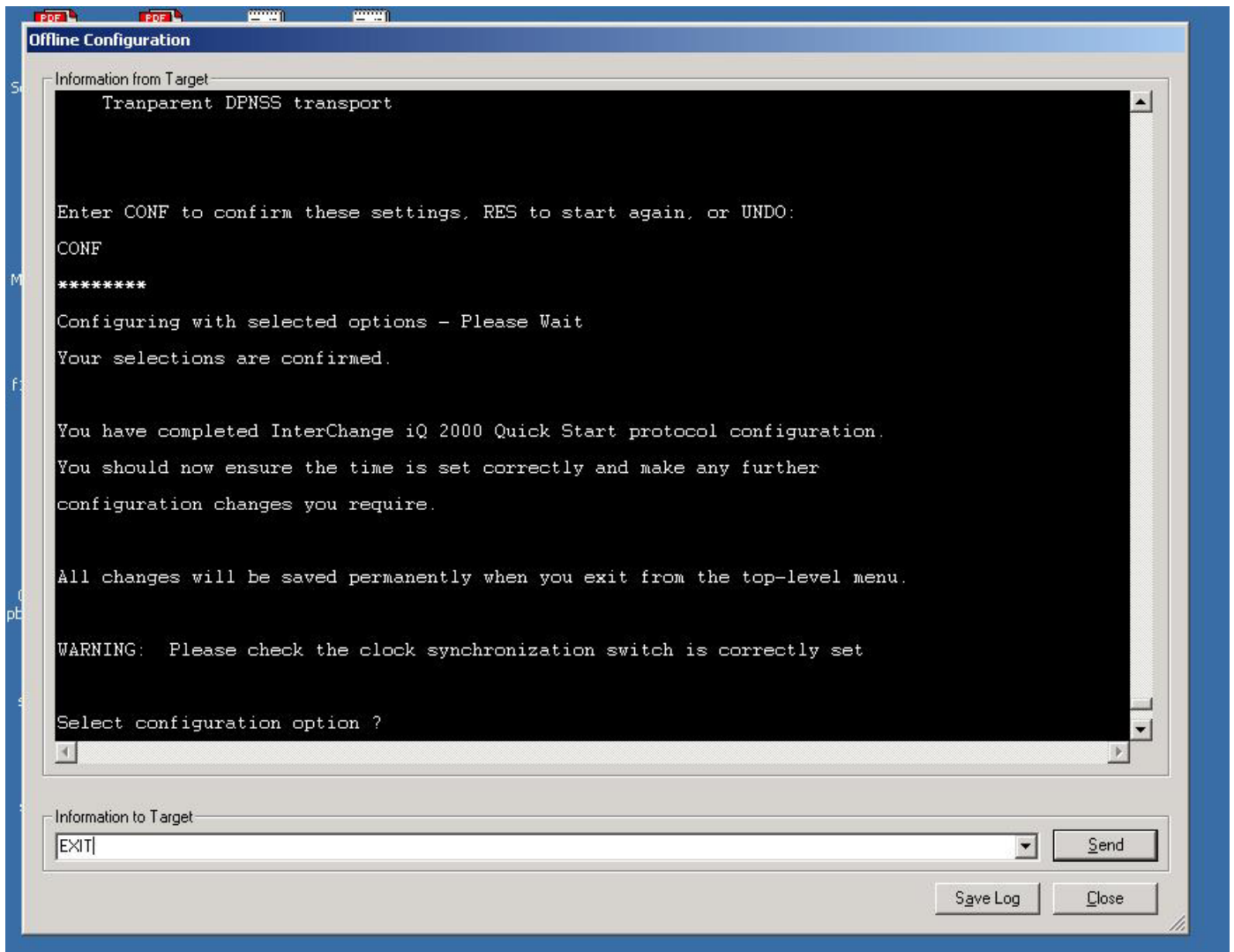
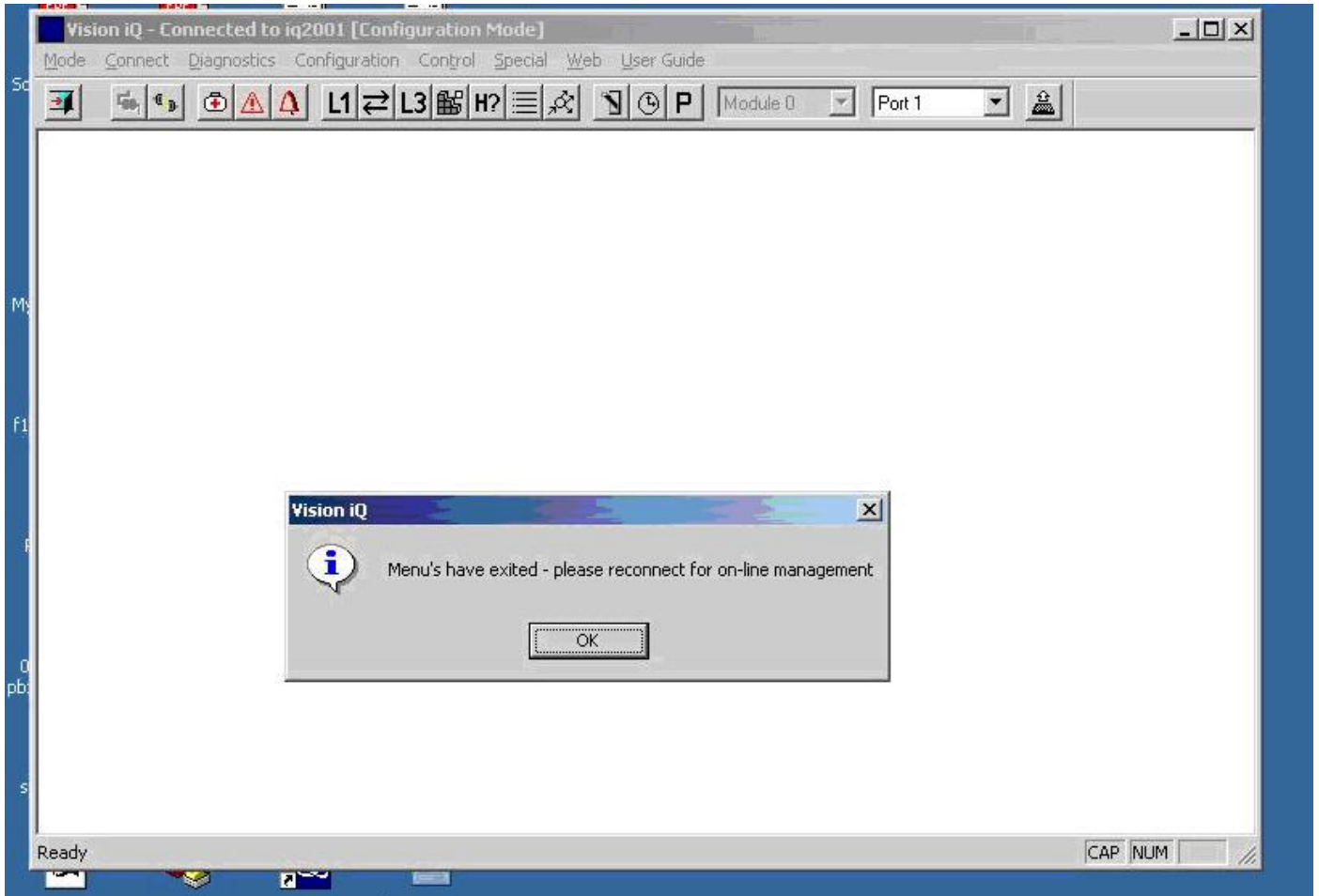




Figure 40. Vision iQ screen after exiting command line configuration screens.





Reconnect to the IiQ2000 and select Monitor Mode. Check the settings.

Figure 41. iQ Diagnostics: Select Module 0.

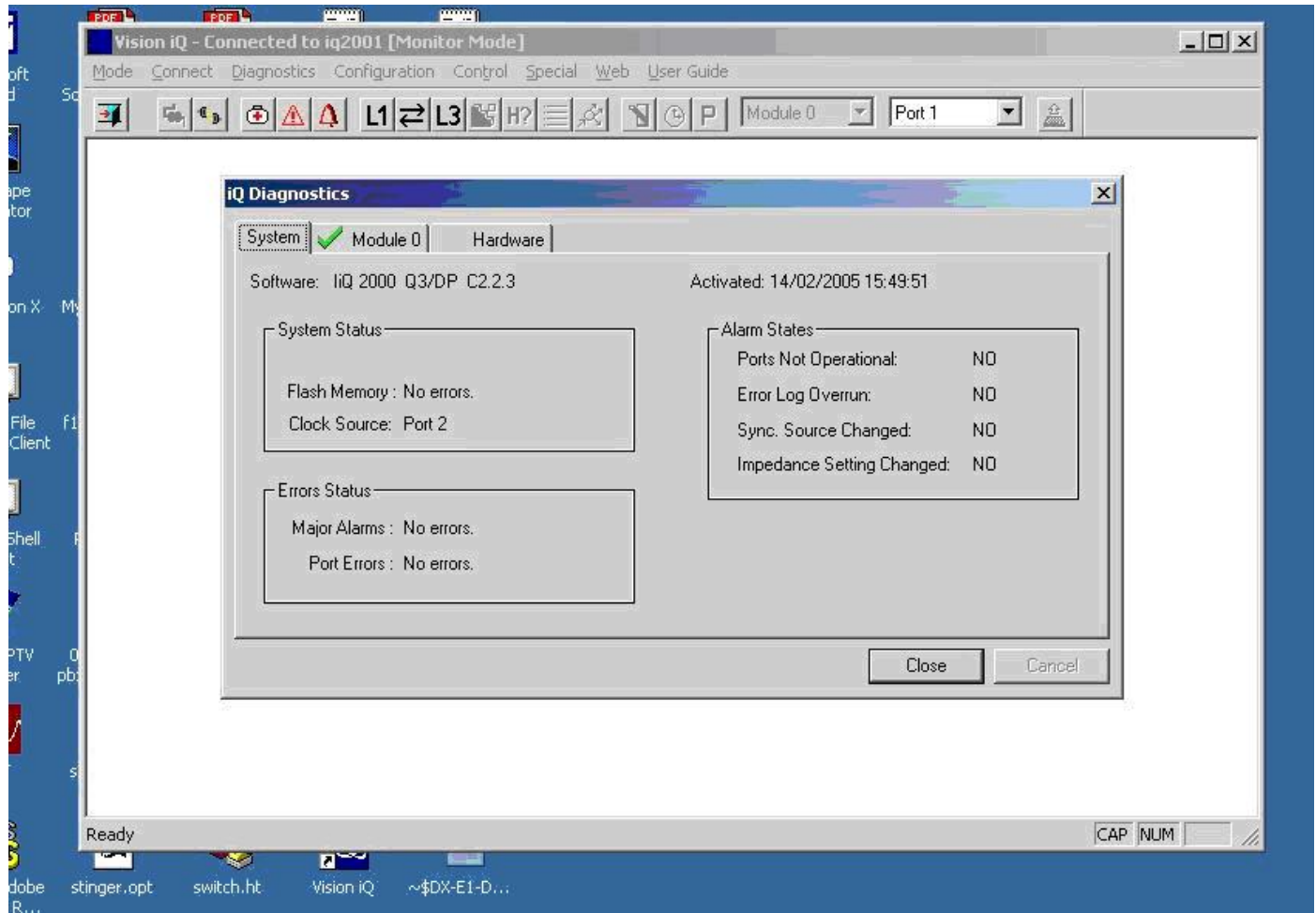
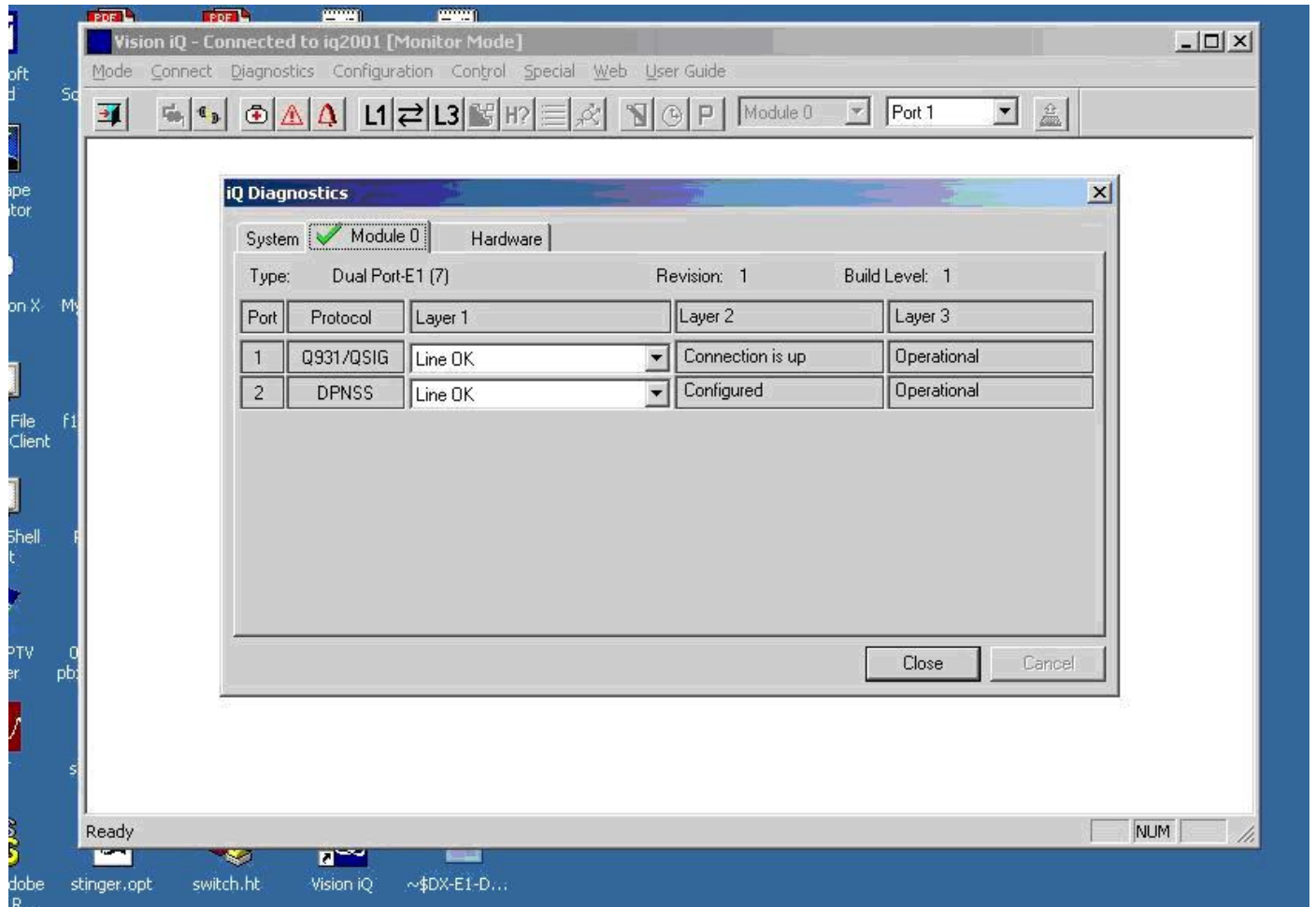




Figure 42. iQ Diagnostics: Check the Link Status.





Westell liQ2000 Configuration – MWI

Figure 43. Entering the liQ2000 configuration

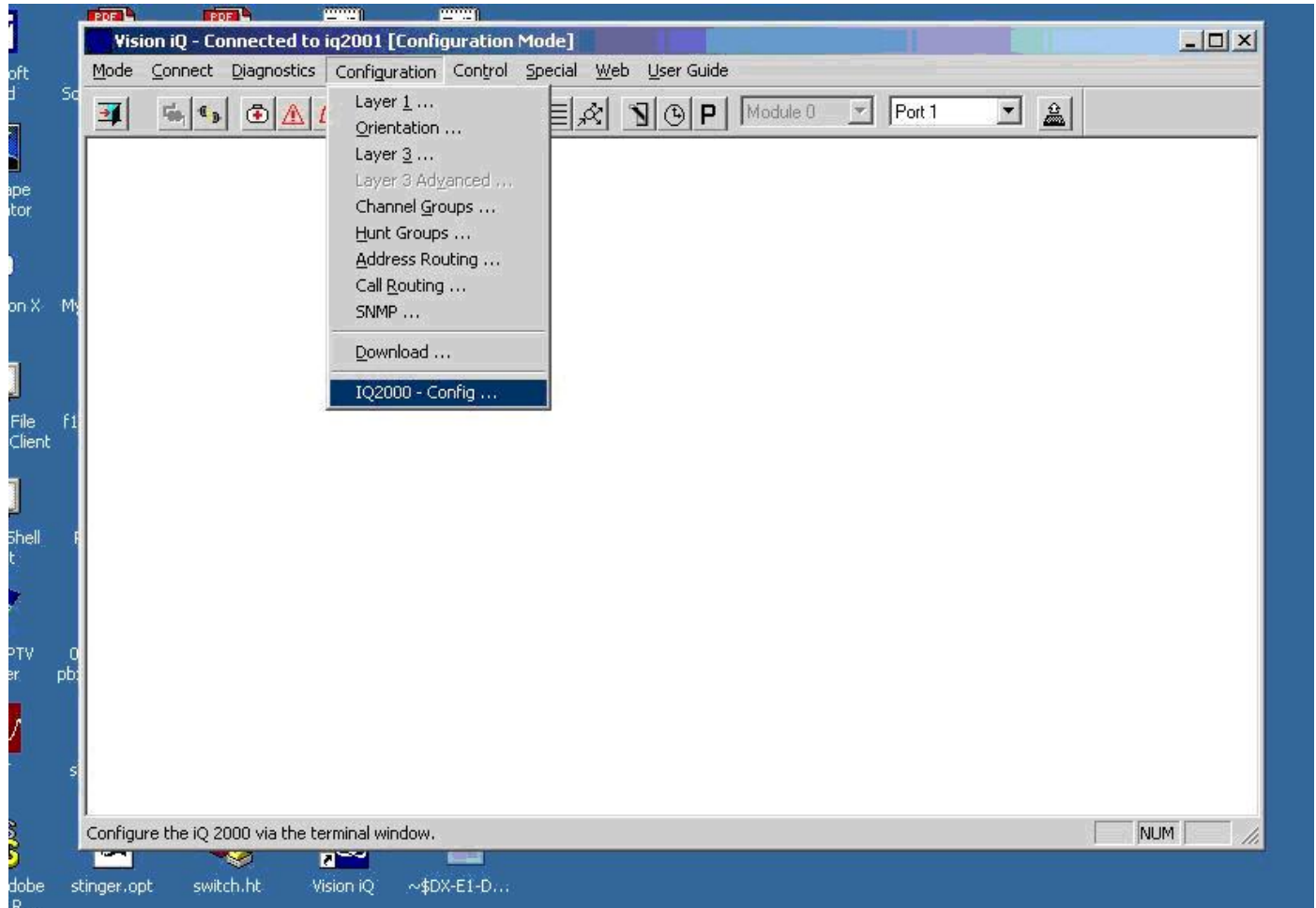




Figure 44. Configuration Warning: Click "yes".

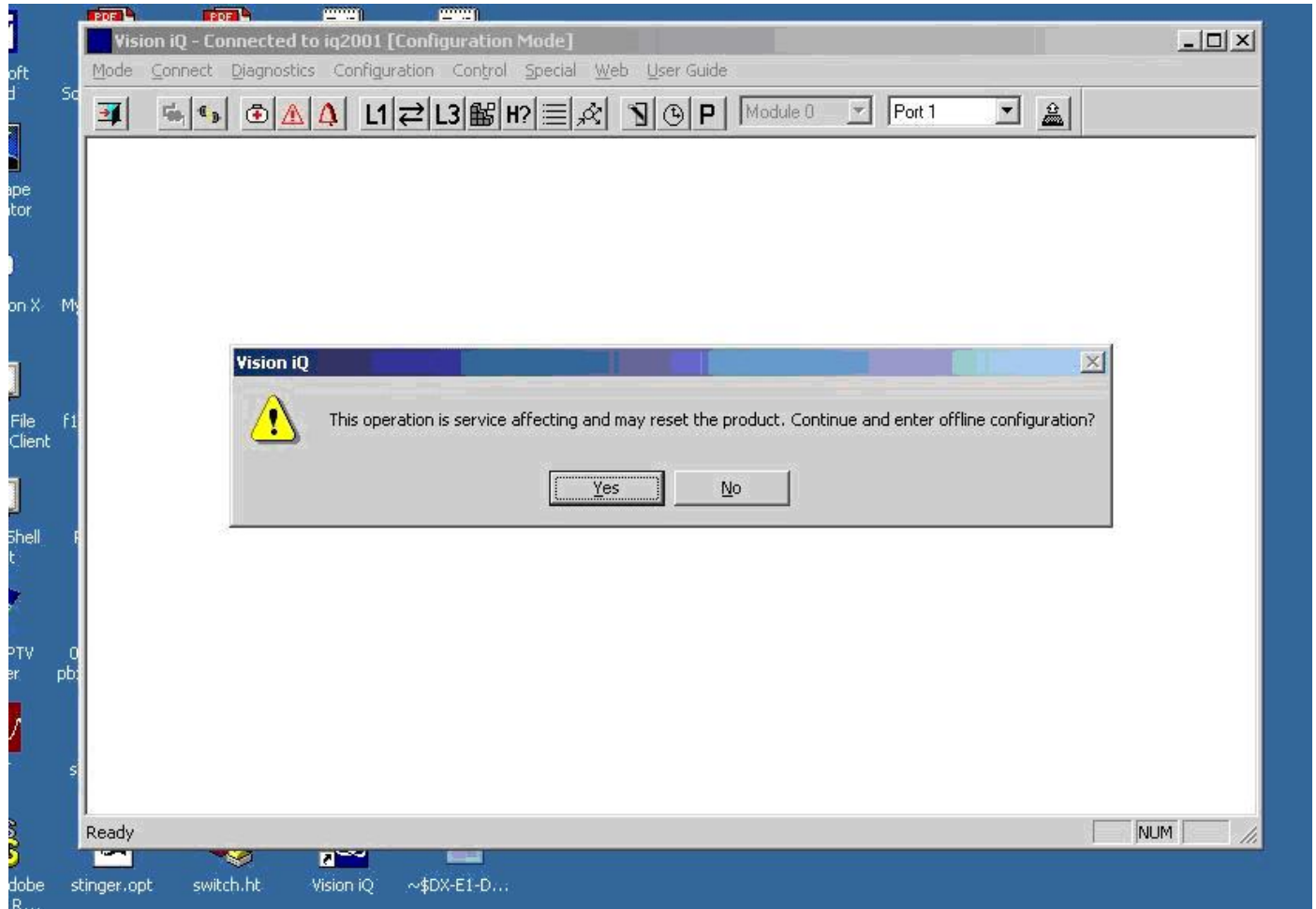




Figure 45. IiQ2000 Configuration Command Line Interface: Hit RETURN.

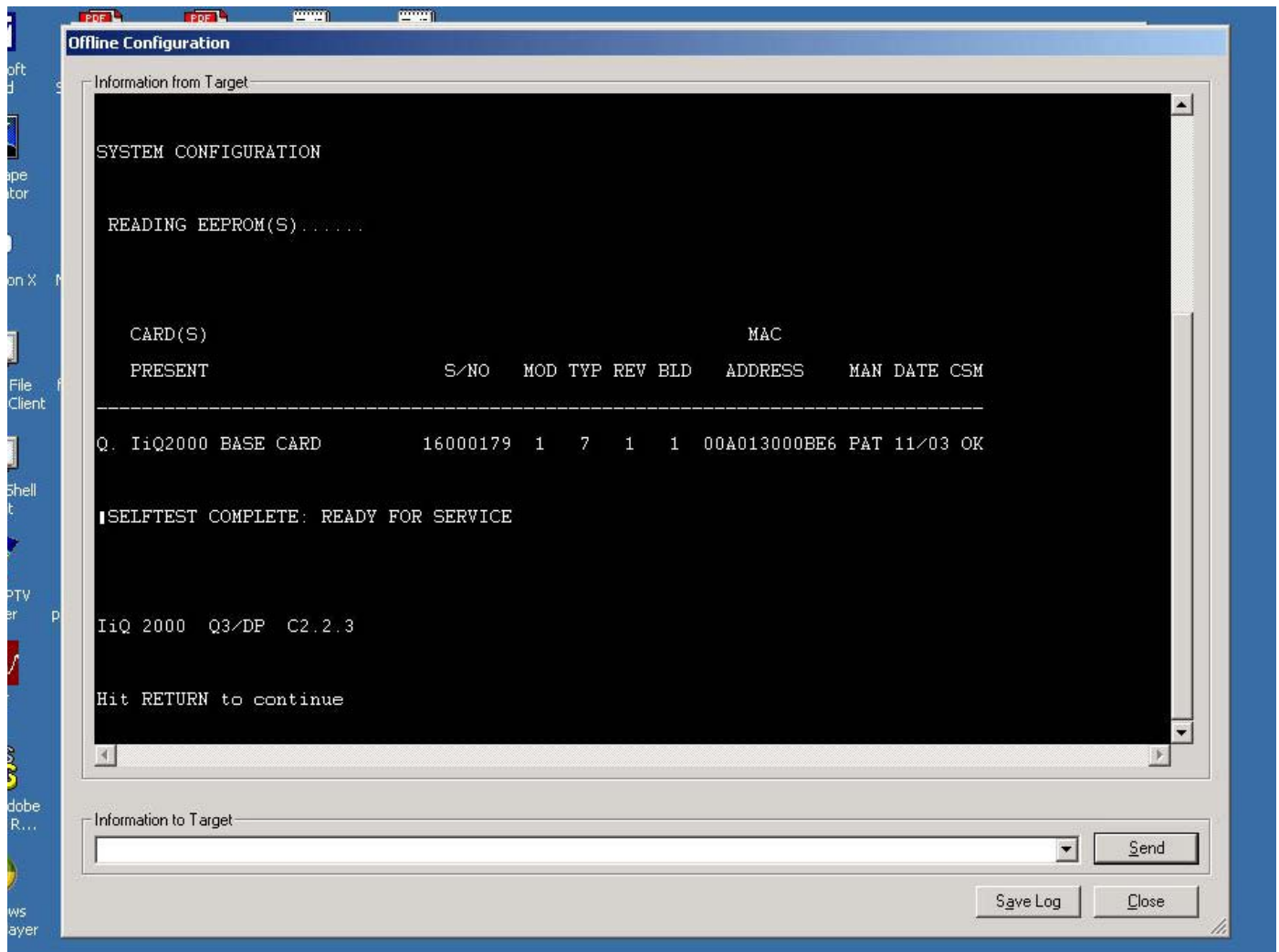




Figure 46. Selecting configuration option: Select ADV.

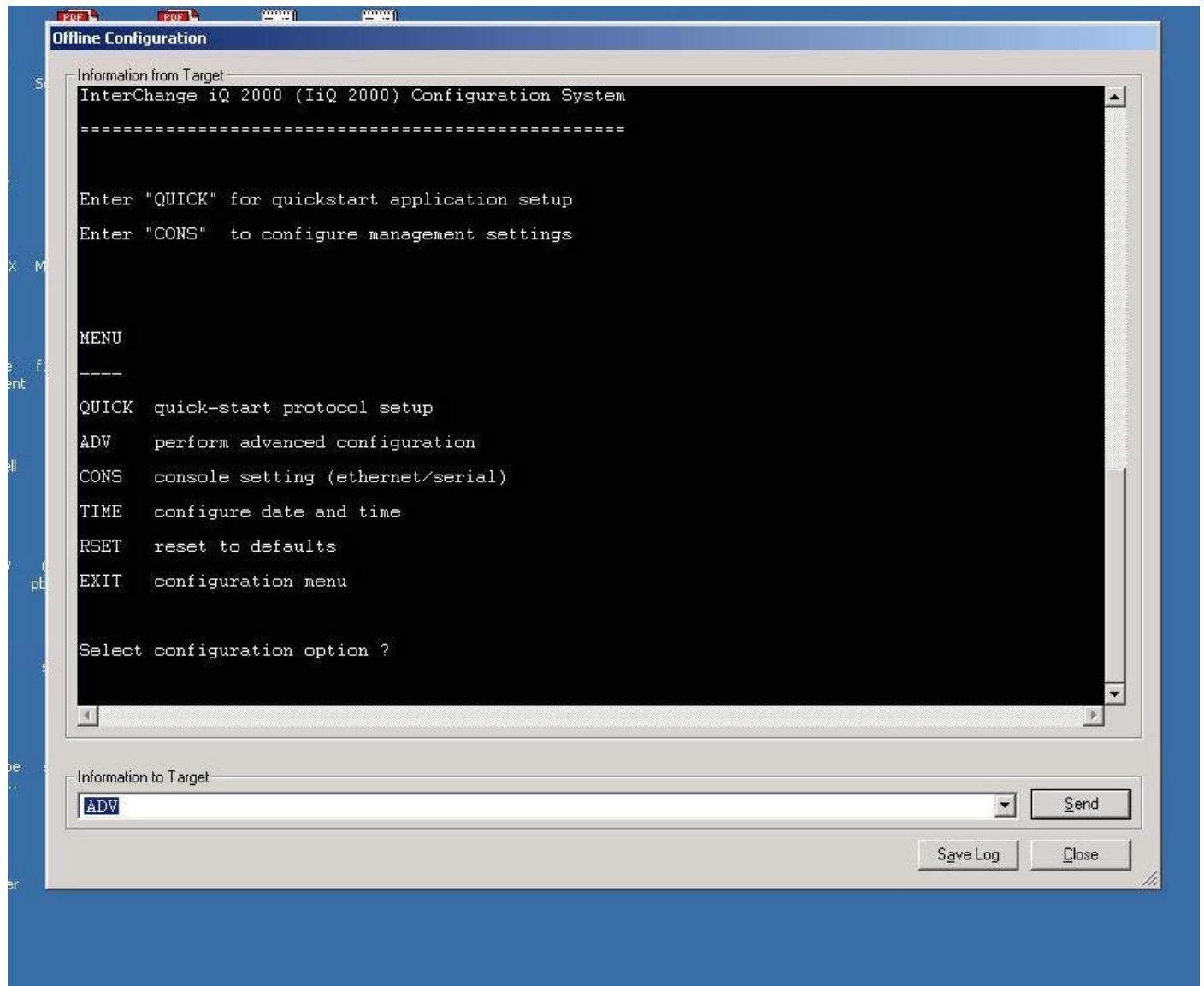




Figure 47. Advanced Configuration Menu: Select IWRK.

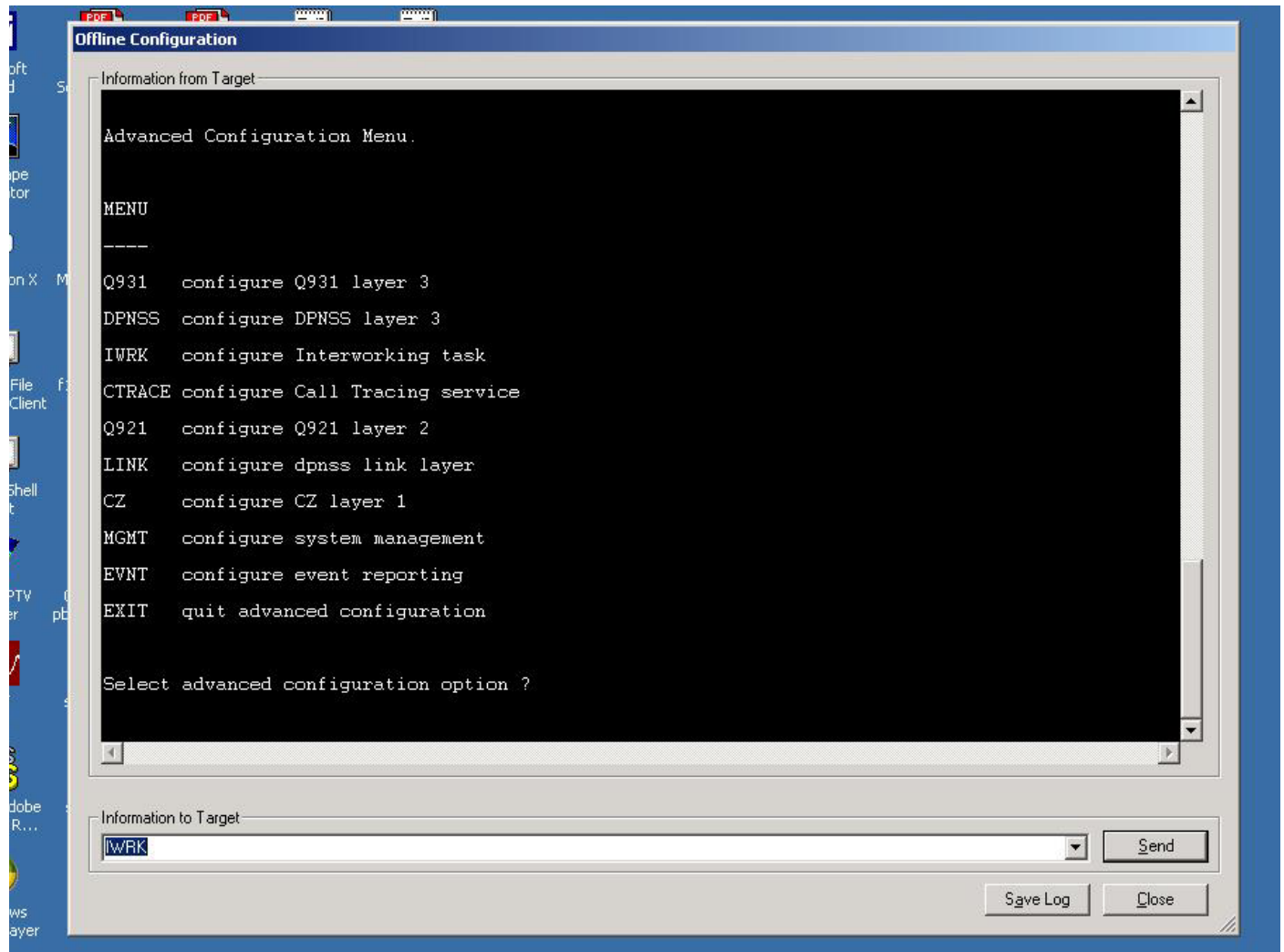




Figure 48. Interworking Parameters. Enter "?" for choices.

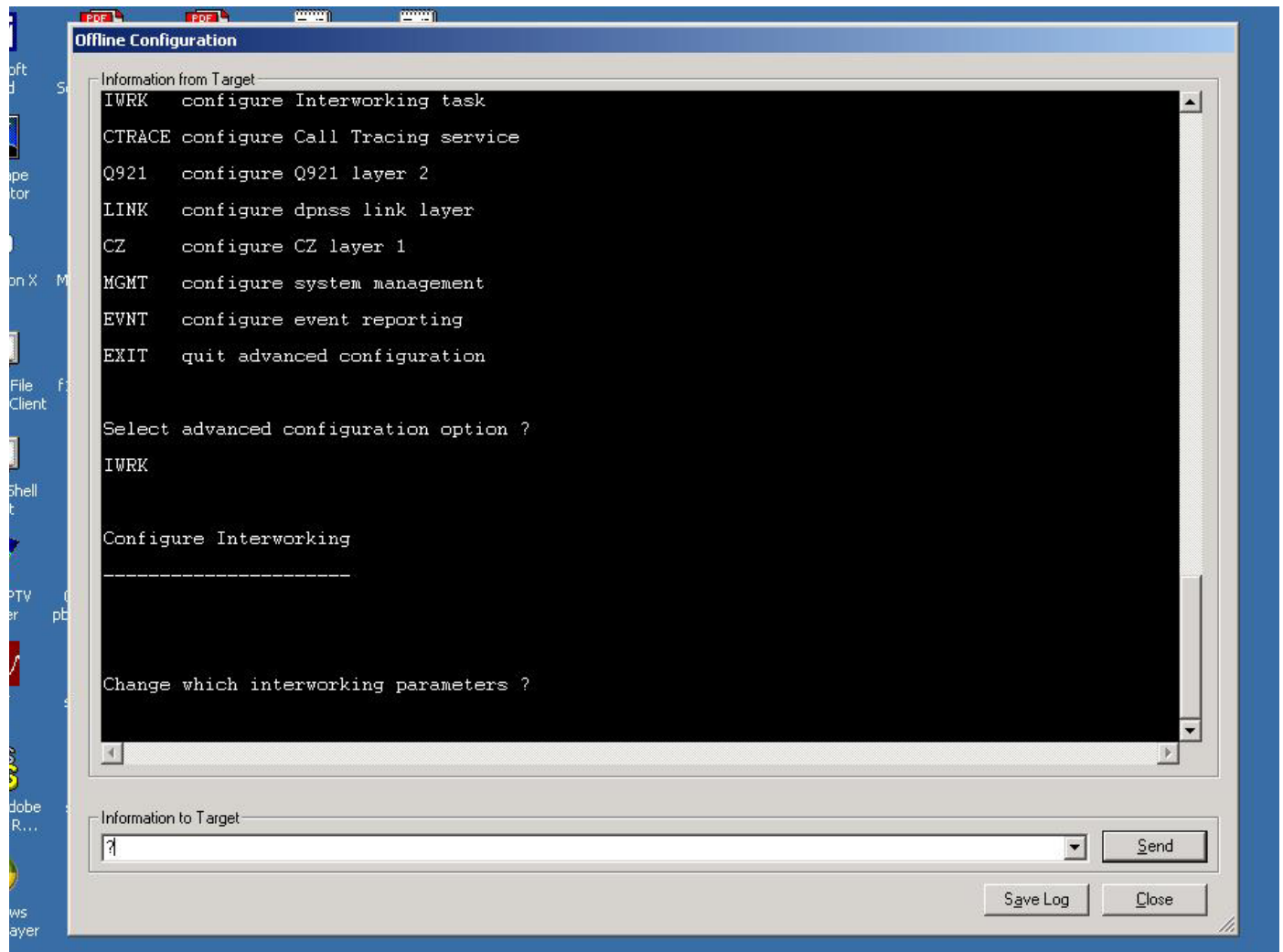




Figure 49. Interworking Parameters Menu: Select NSI.

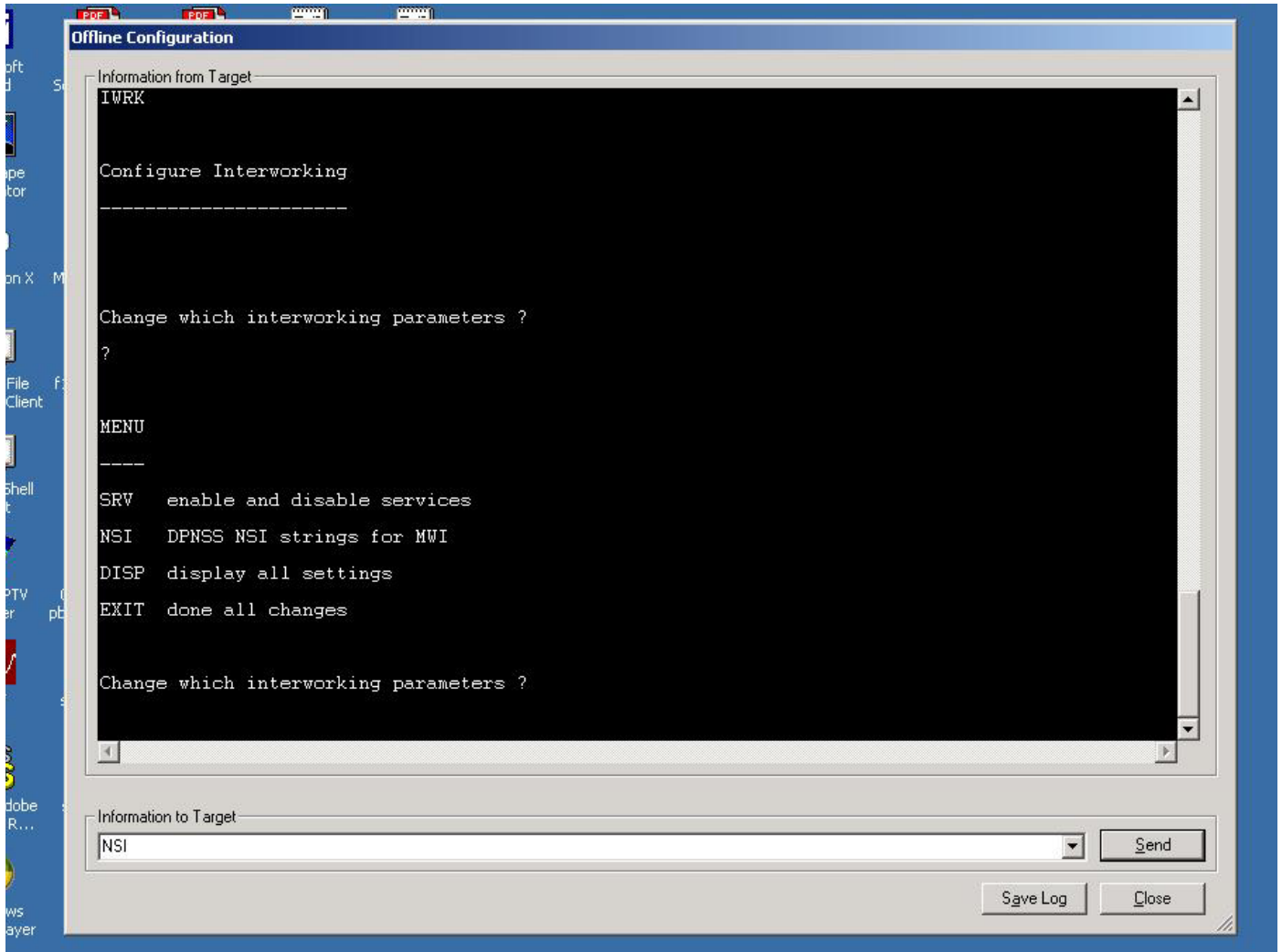




Figure 50. NSI string. Enter "?" for choices.

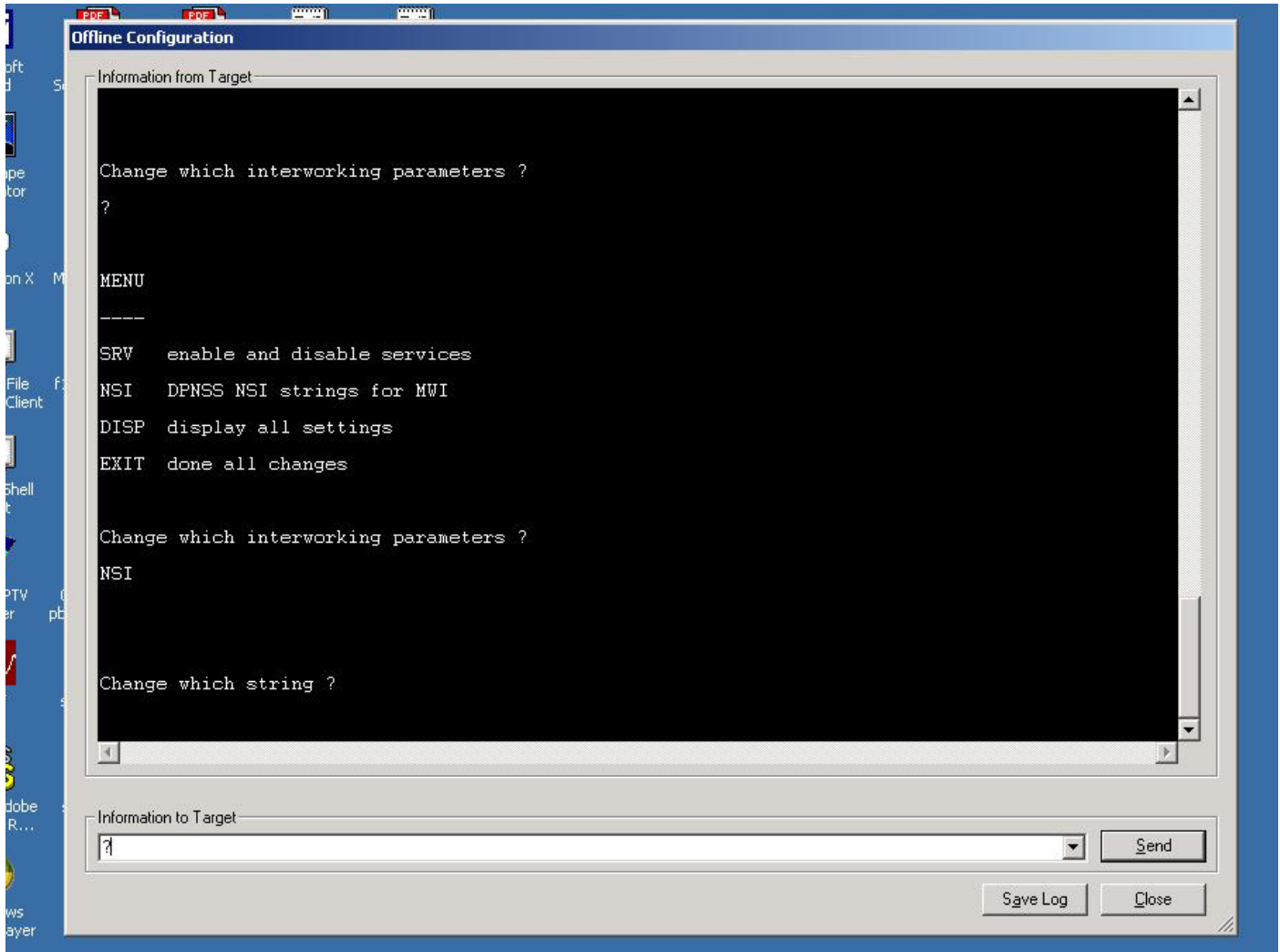




Figure 51. NSI string menu: Select DISP for display.

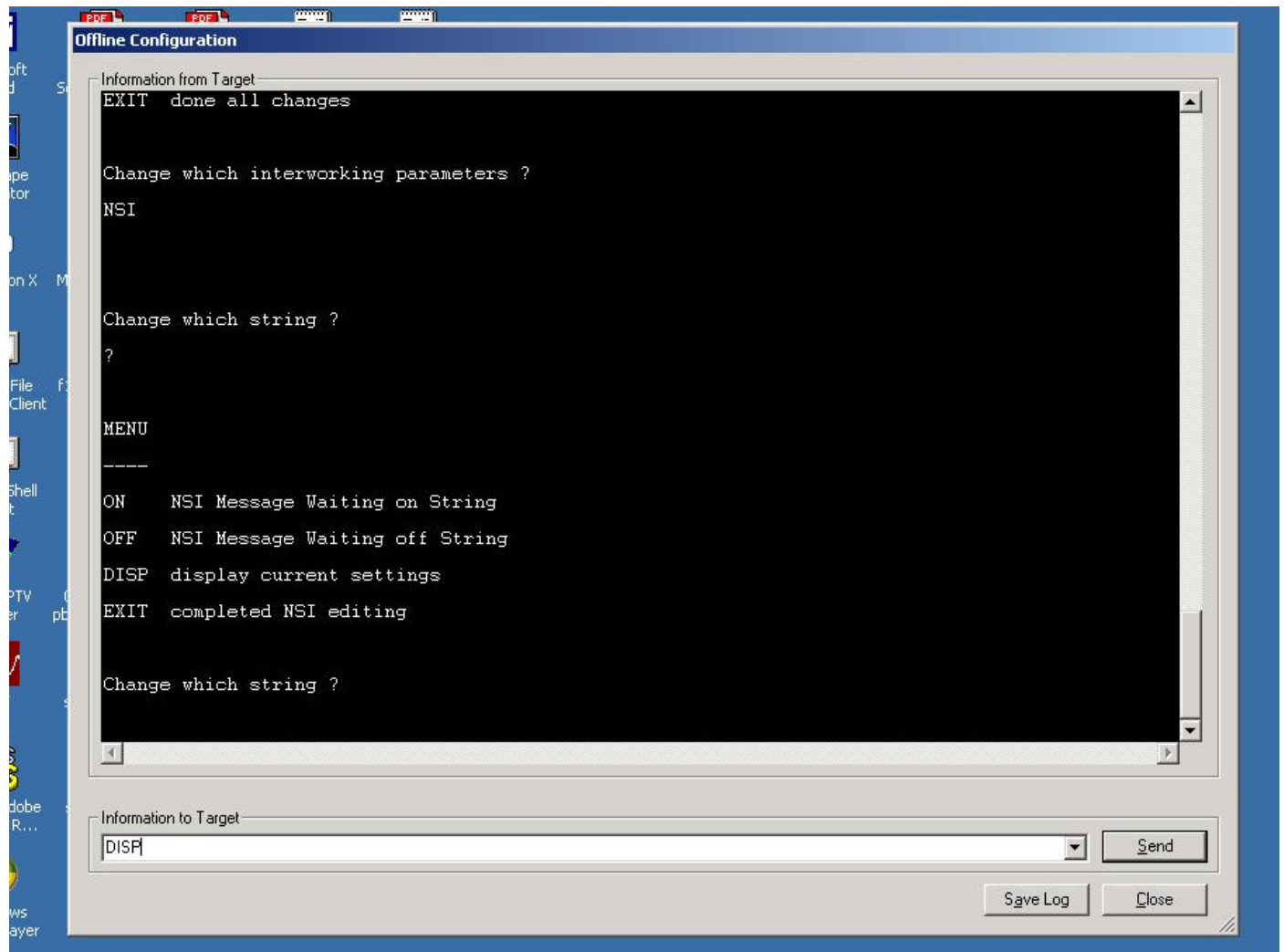




Figure 52. Sample NSI string display for DPNSS MWI ON/OFF: Select ON.

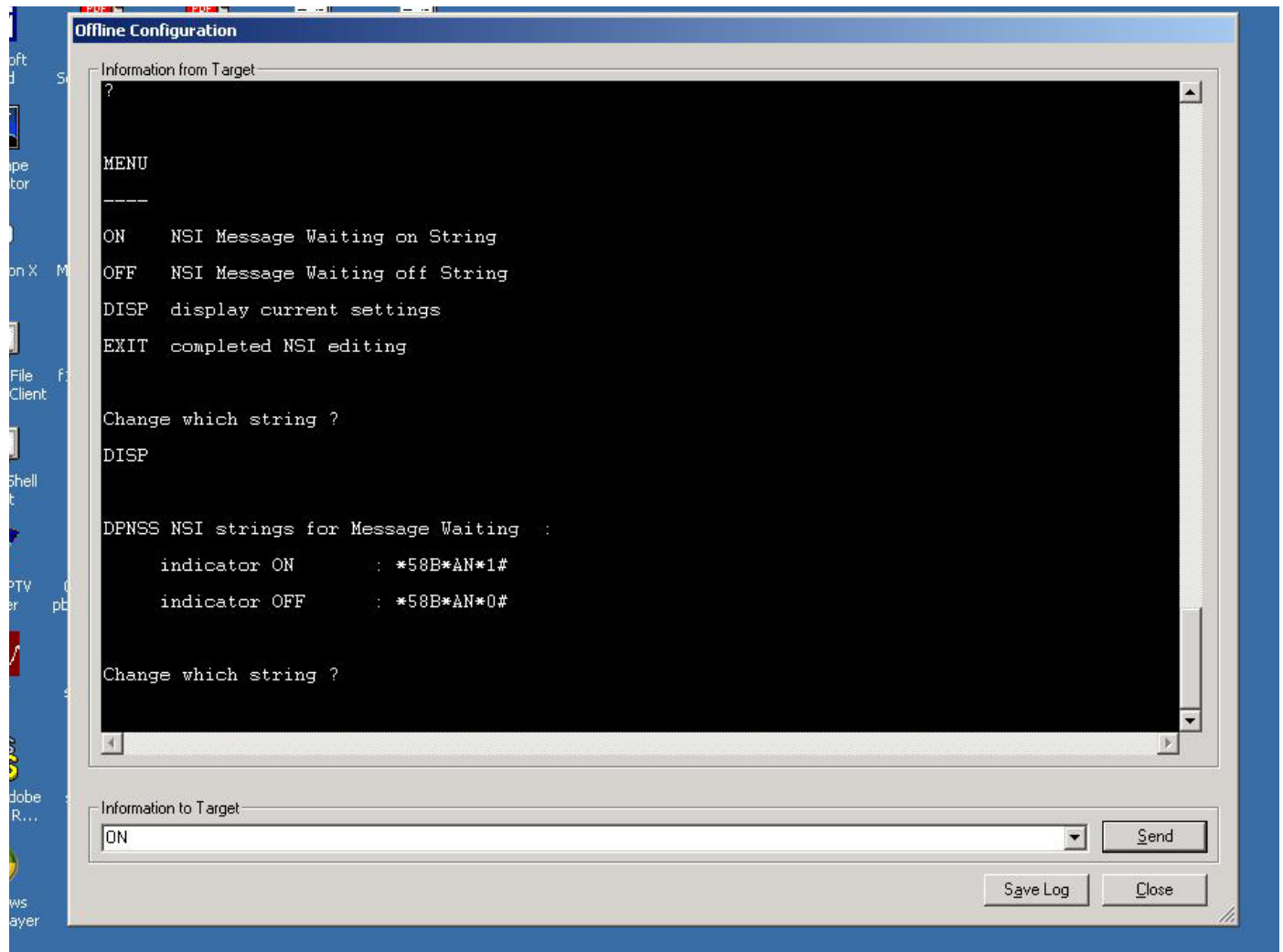




Figure 53. Changing the DPNSS MWI ON string. Enter "?" for choices.

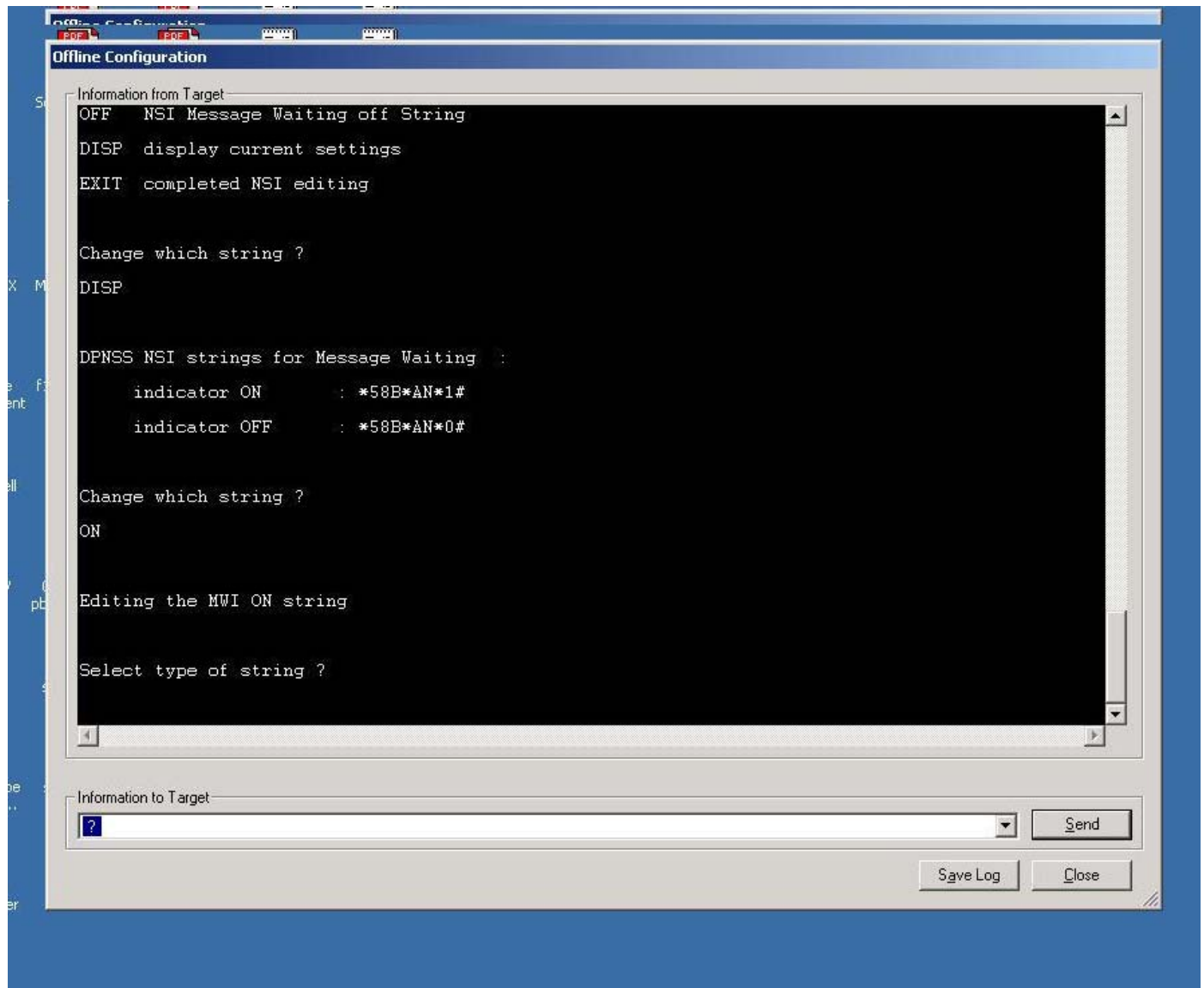




Figure 54. Changing the DPNSS MWI ON string: Select MD110.

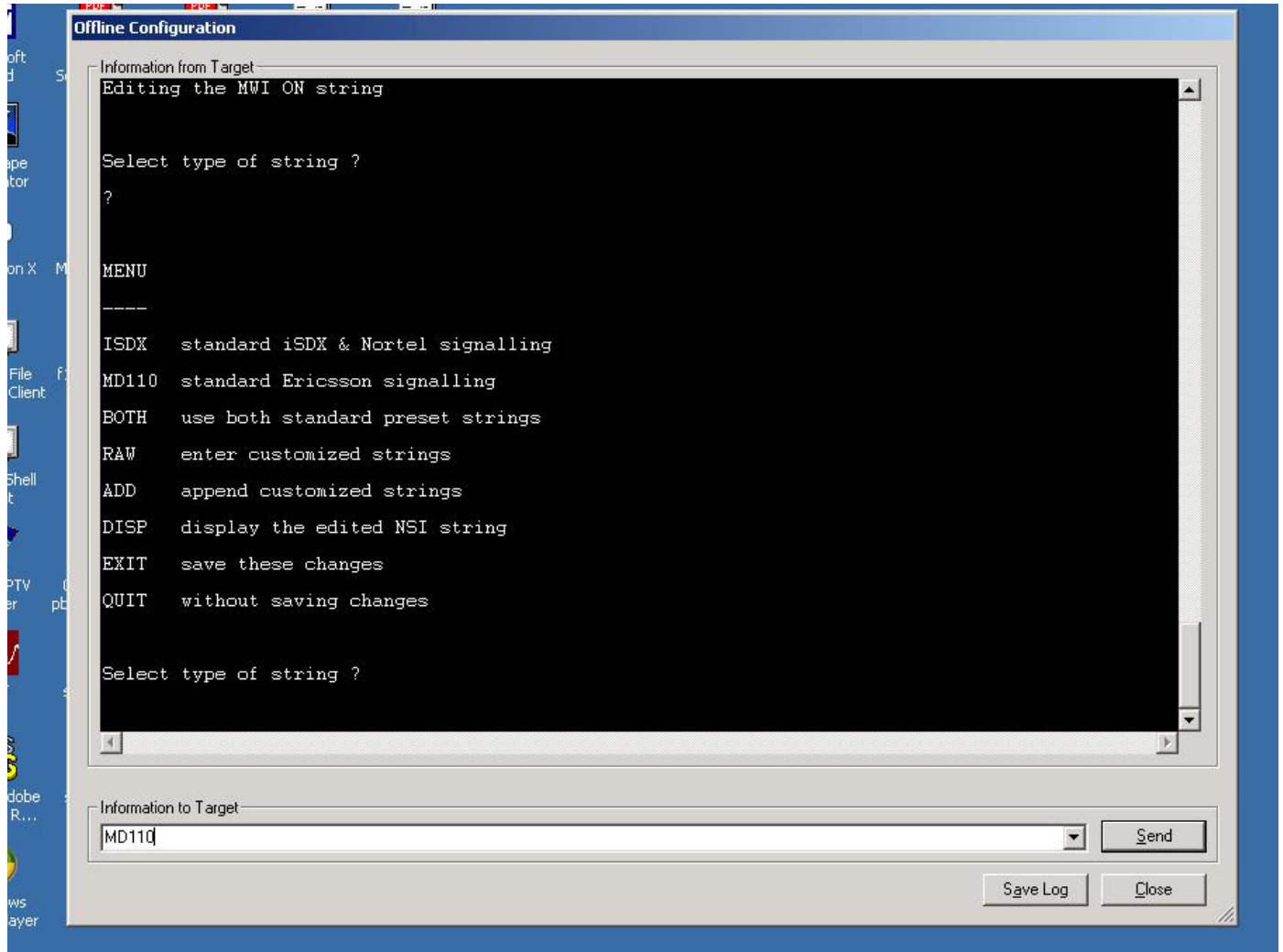




Figure 55. Changing the DPNSS MWI ON string: Select NO call center number.

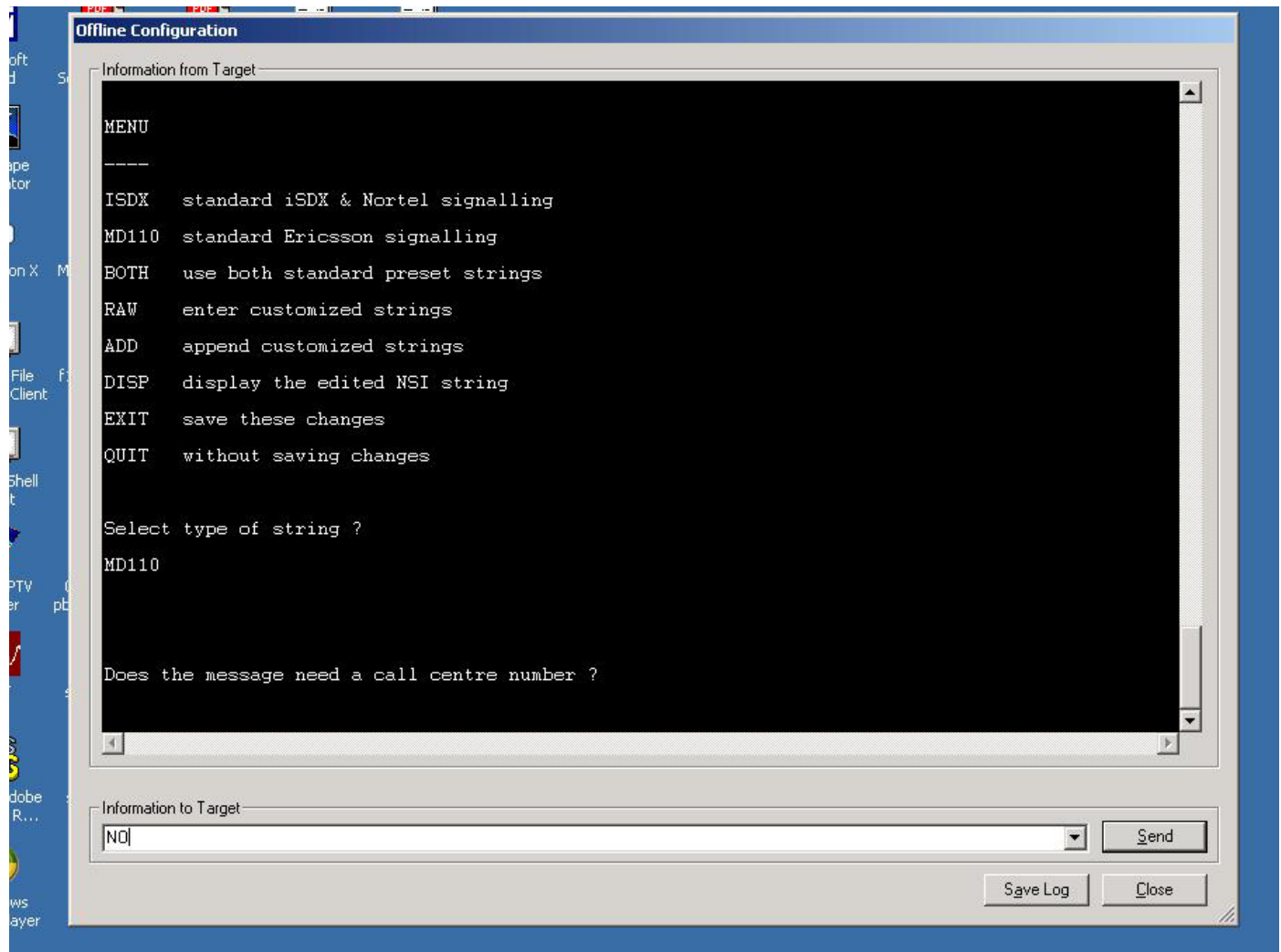




Figure 56. Changing the DPNSS MWI ON string: Select EXIT from submenu.

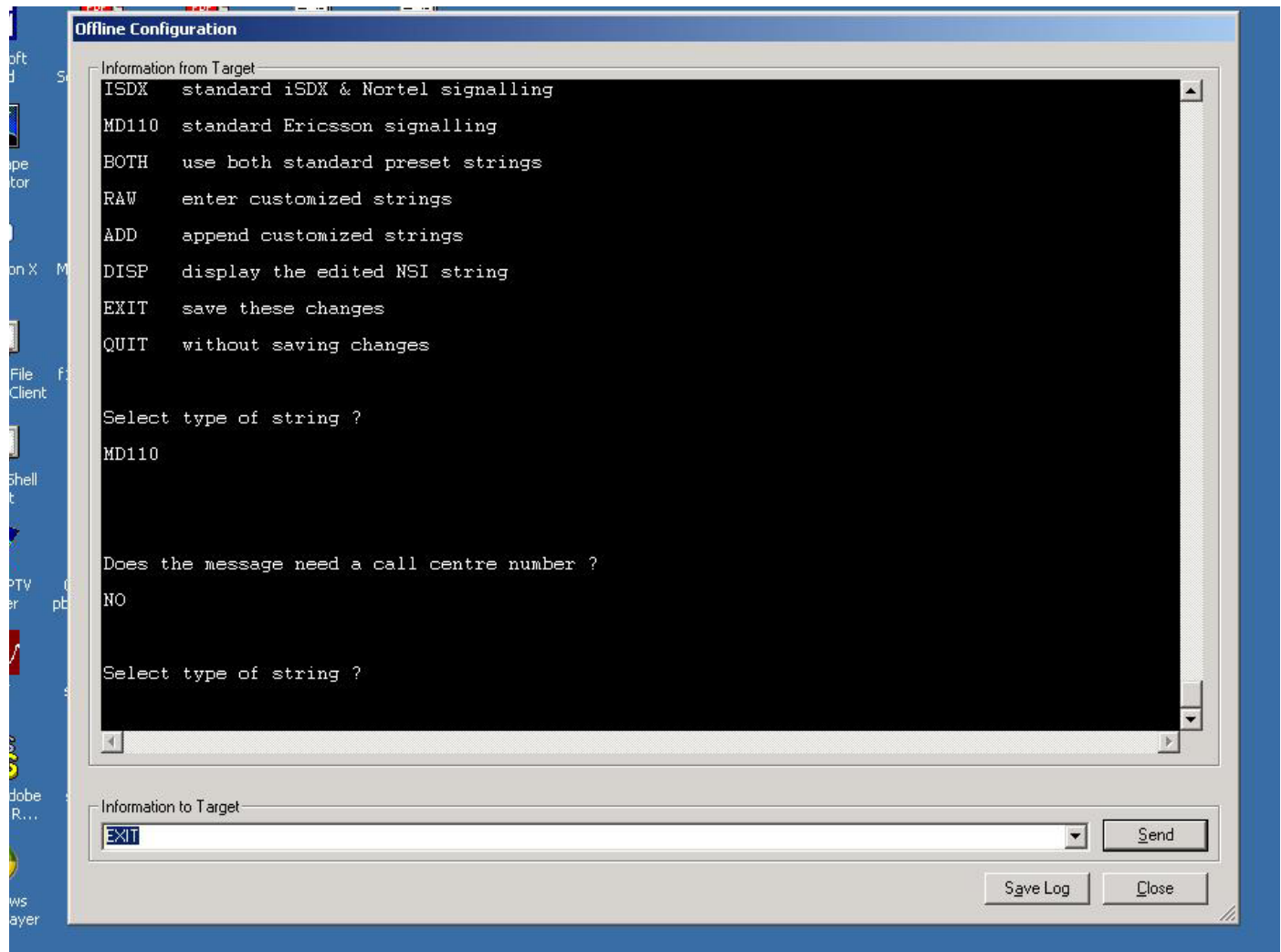




Figure 57. NSI string display for DPNSS MWI ON/OFF: Select OFF

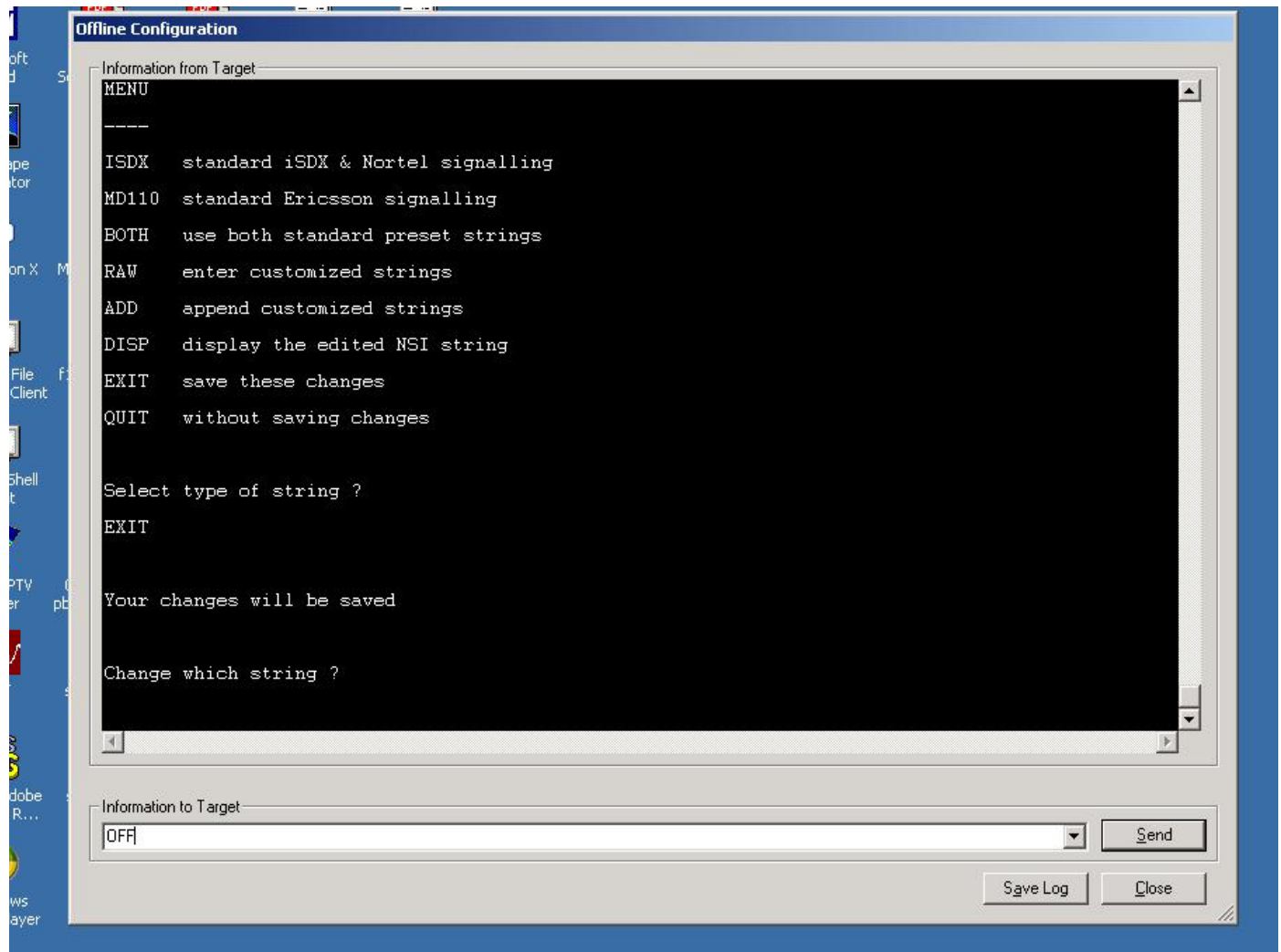




Figure 58. Changing the DPNSS MWI OFF string: Select MD110.

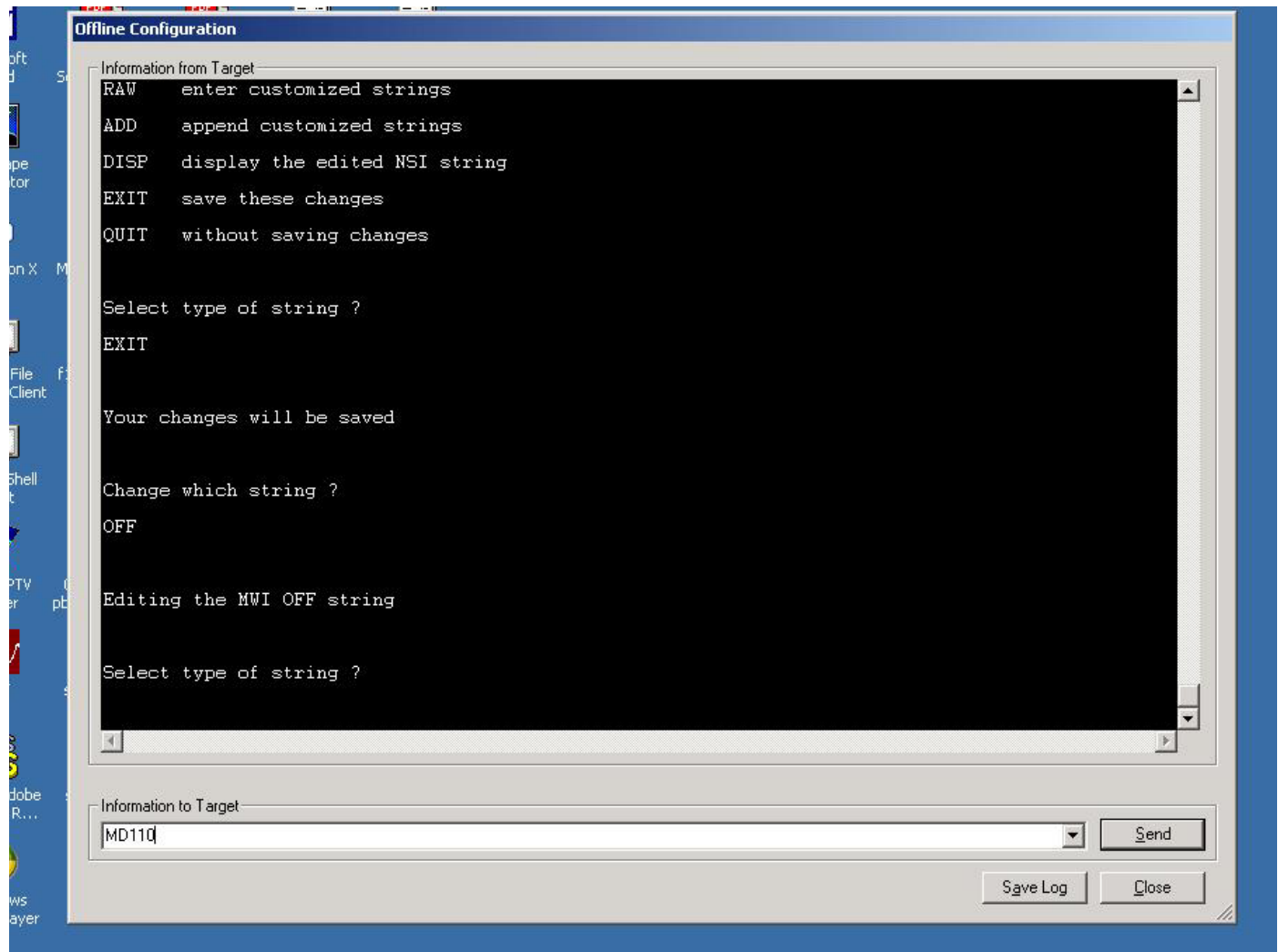




Figure 59. Changing the DPNSS MWI OFF string: Select NO call center number.

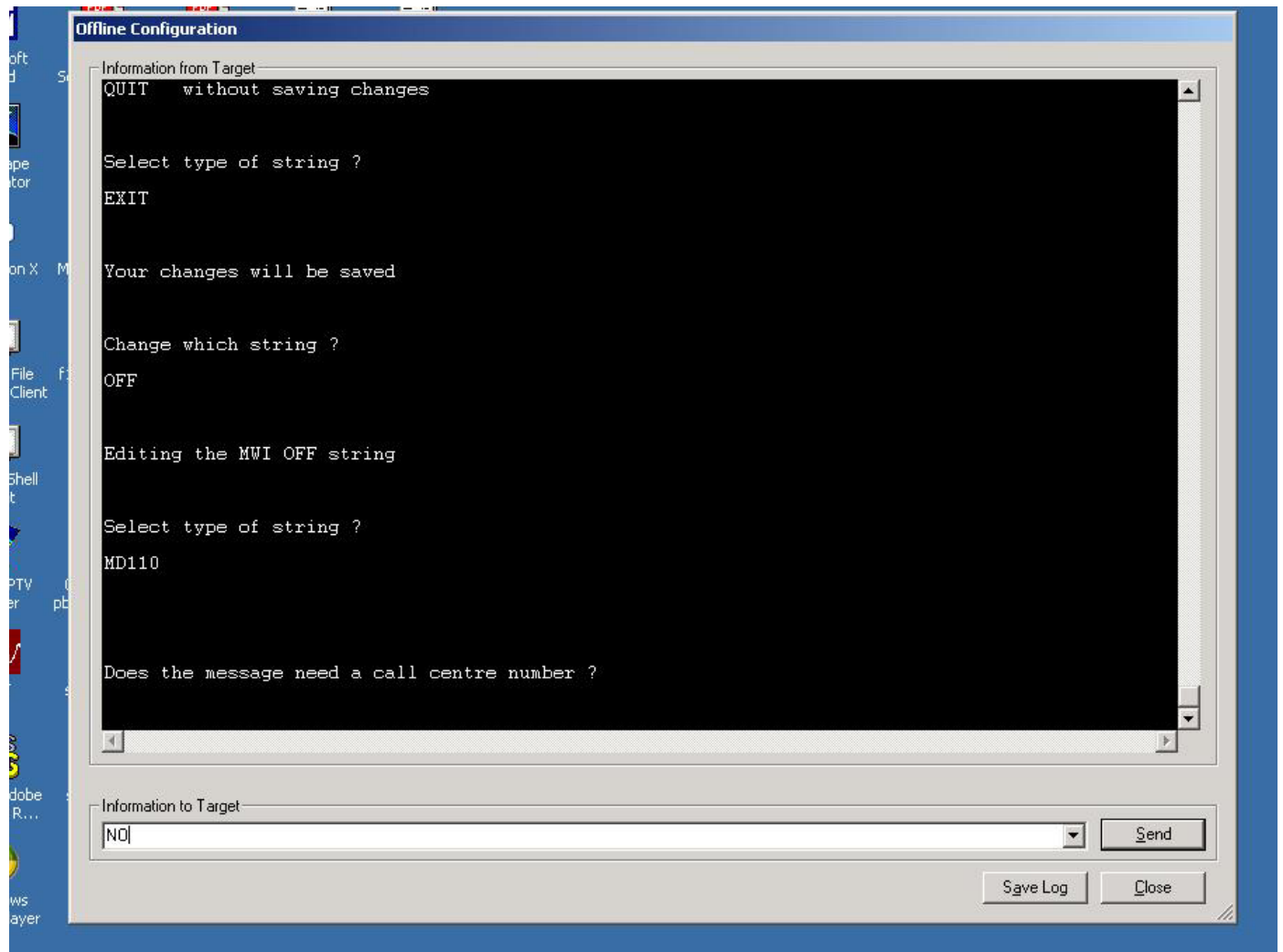




Figure 60. Changing the DPNSS MWI ON string: Select EXIT from submenu.

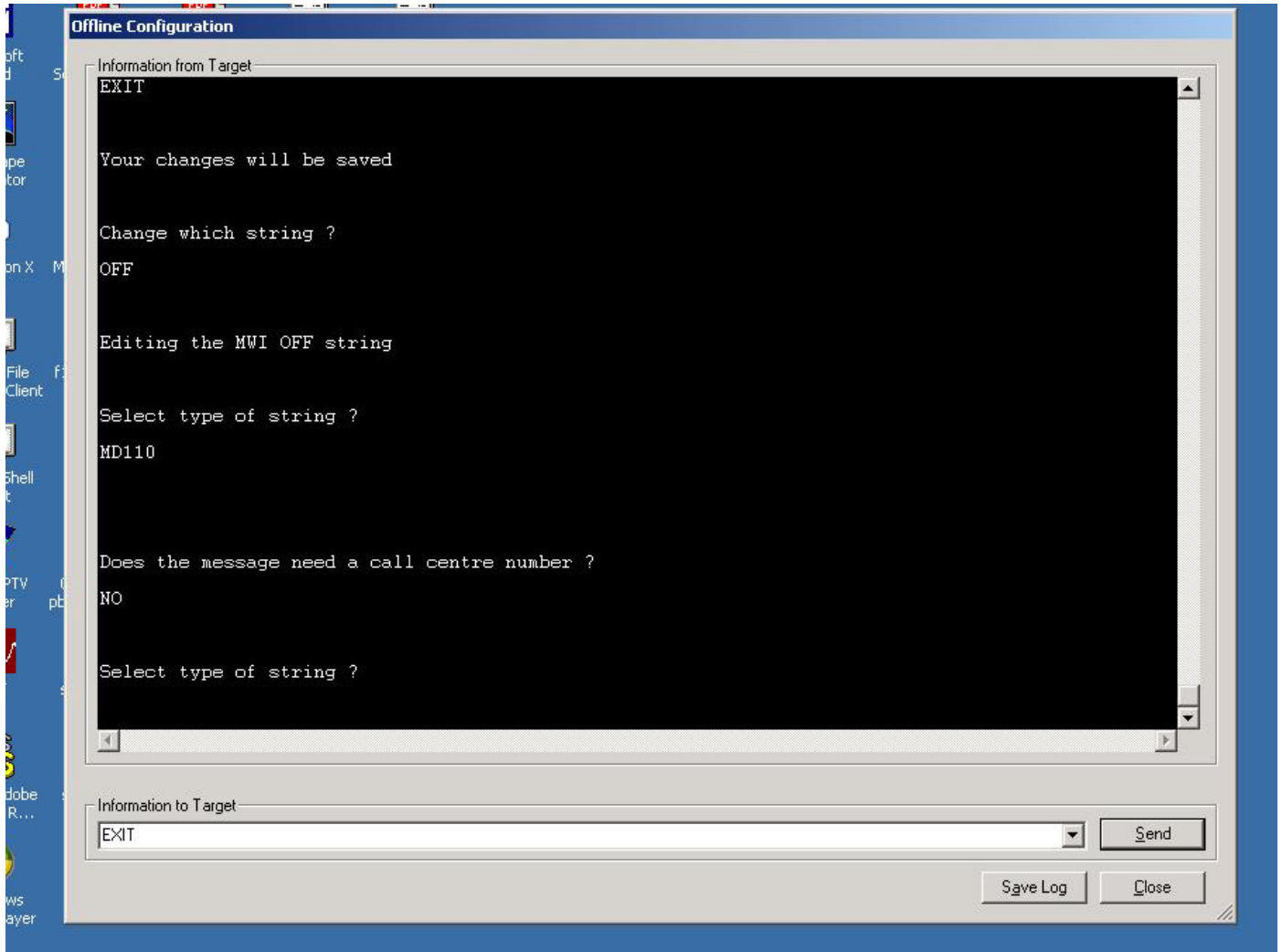




Figure 61. NSI string menu: Select DISP to display new NSI strings.

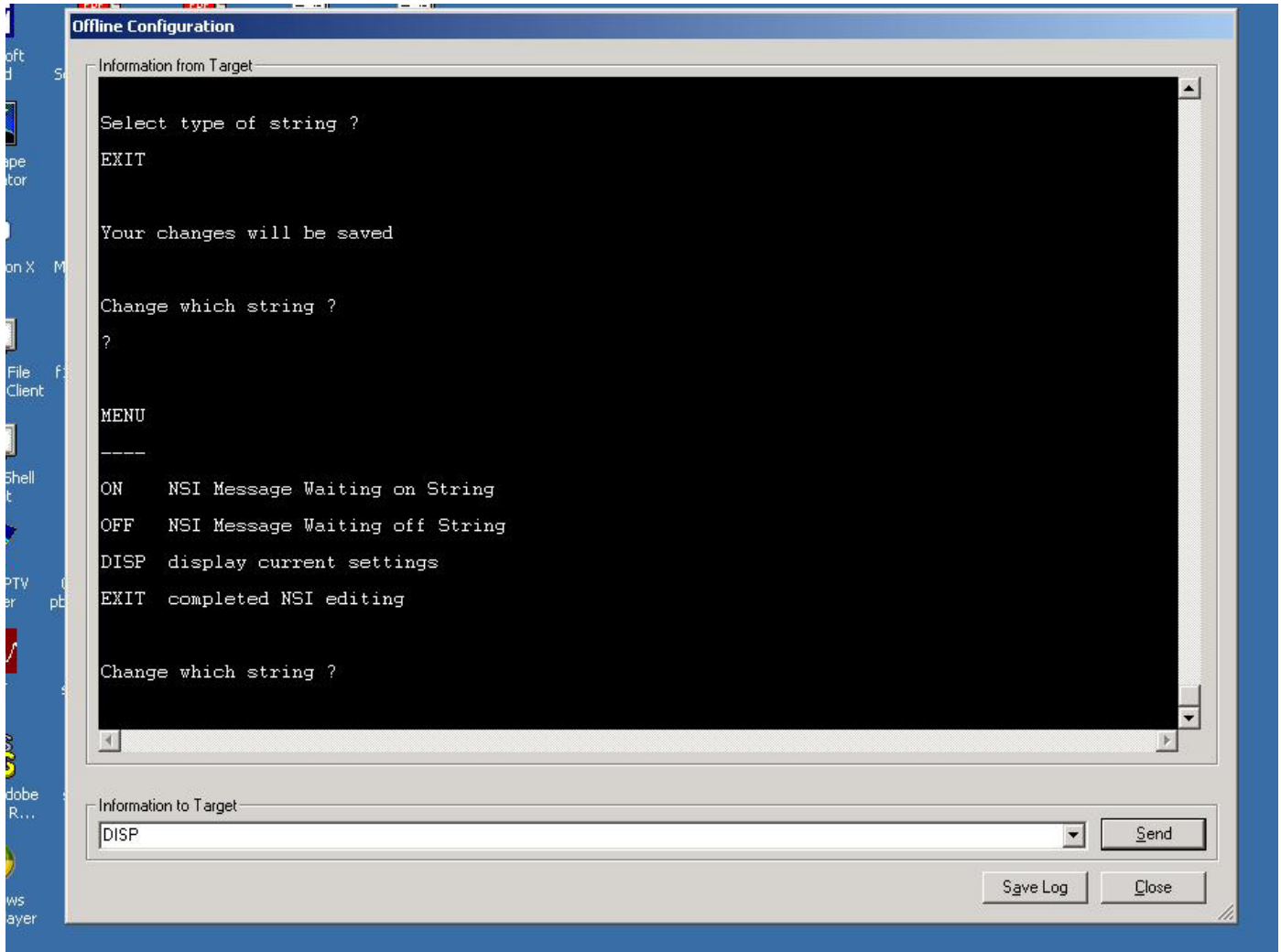




Figure 62. New NSI settings for DPNSS MWI ON/OFF. Select EXIT from submenu.

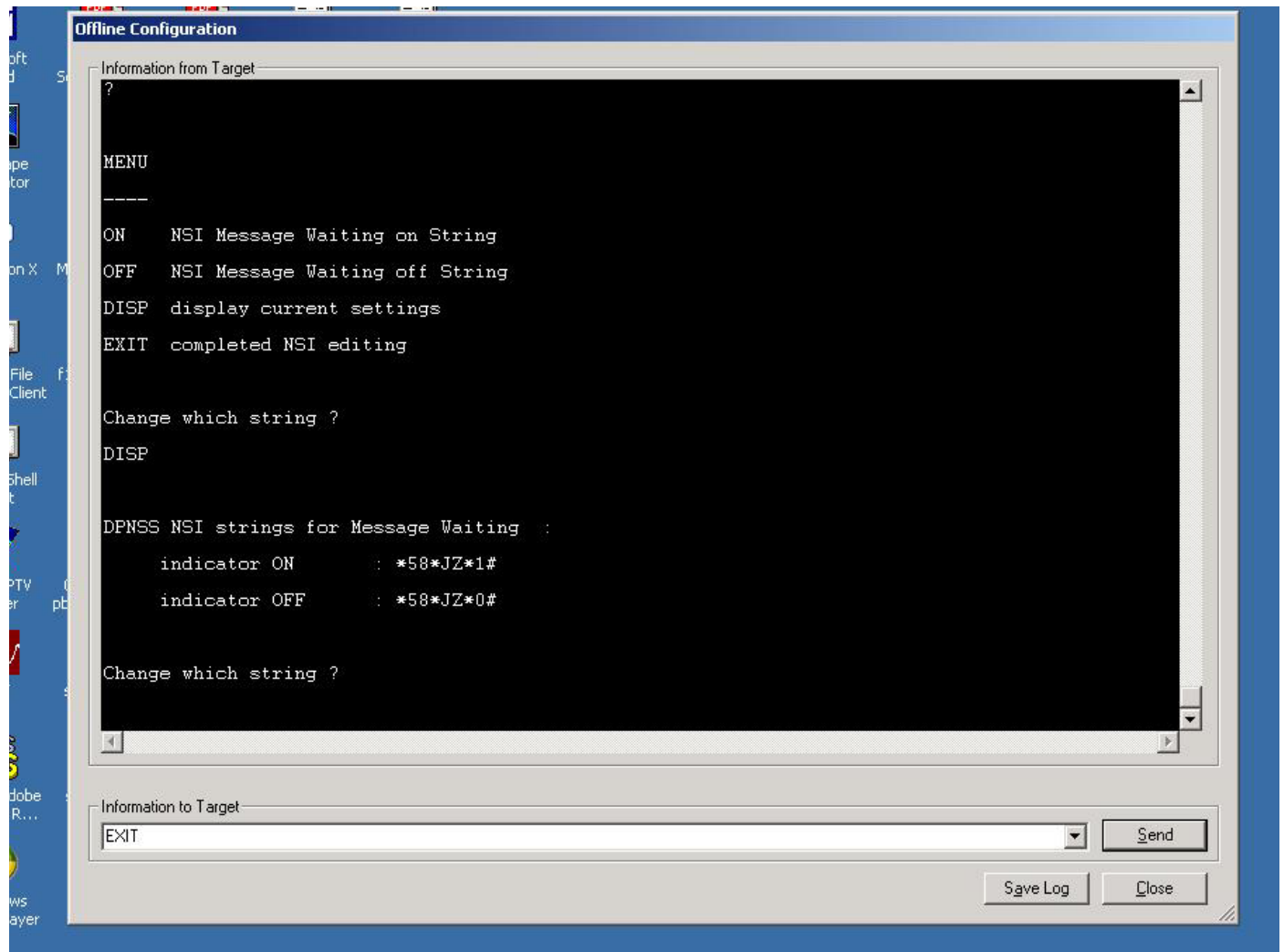




Figure 63. Interworking Parameters Menu. Select Exit from submenu.

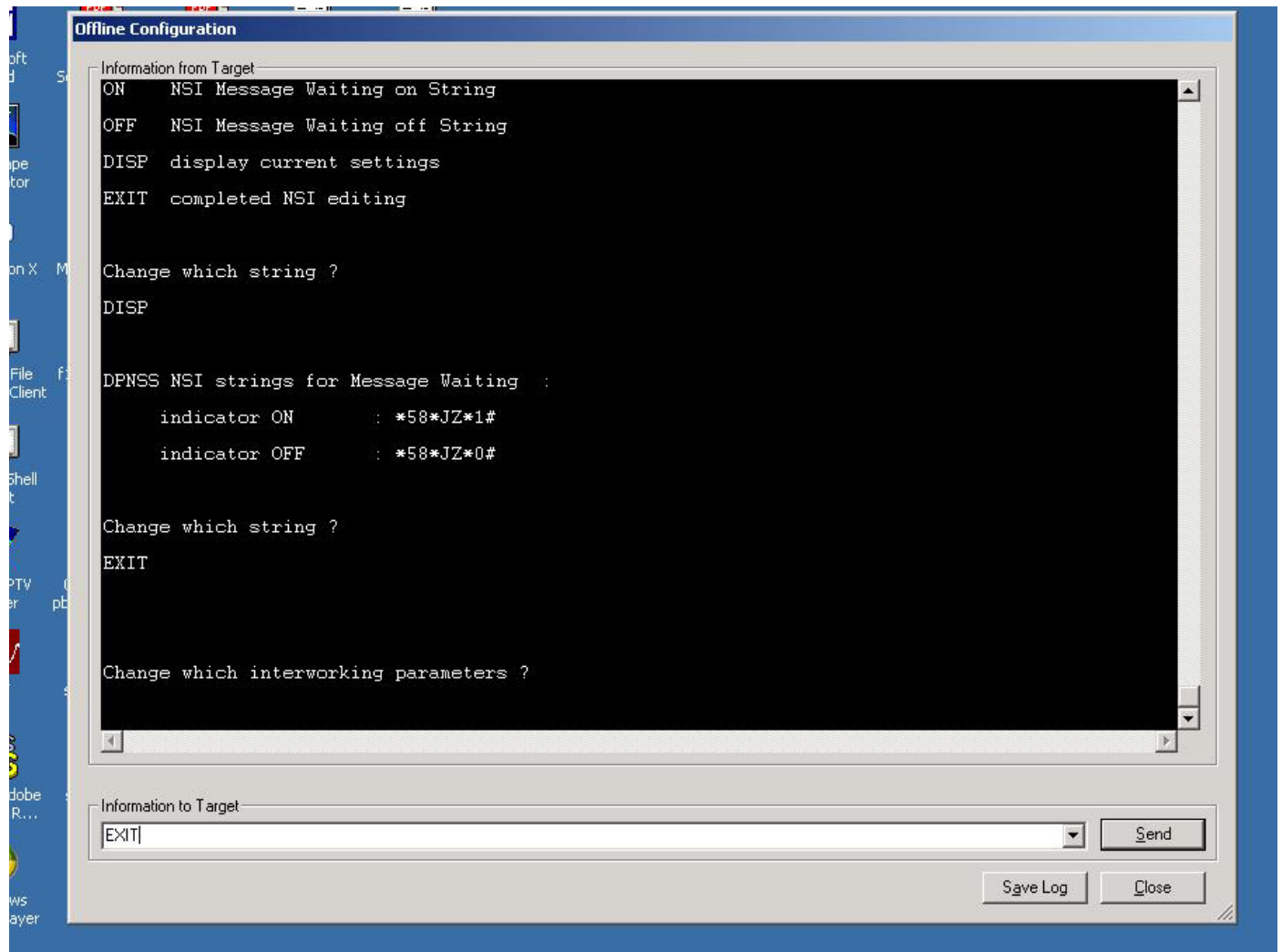




Figure 64. Advanced Configuration Menu: Select EXIT from menu.

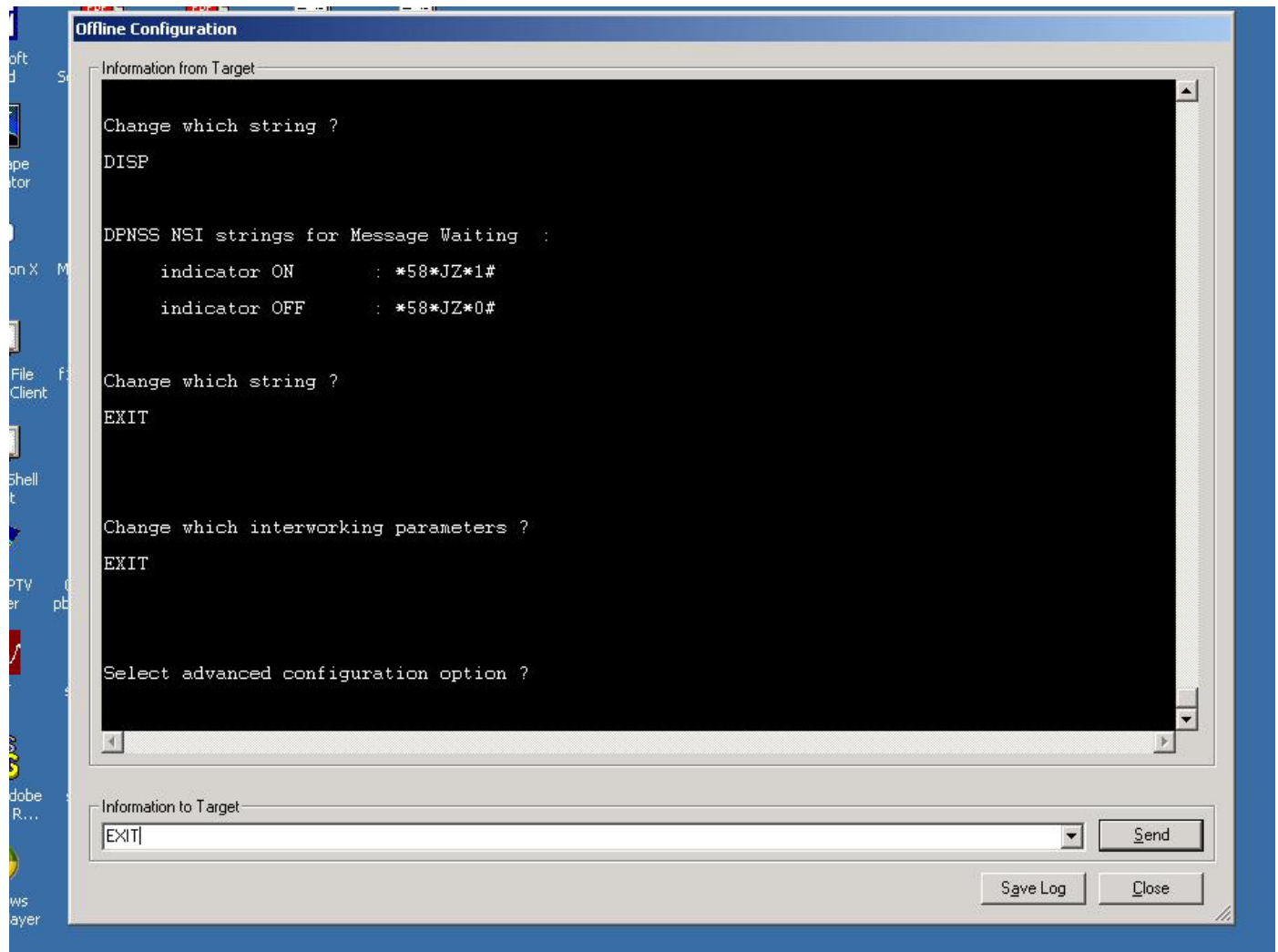




Figure 65. liQ2000 main configuration menu. Select EXIT from command line configuration.

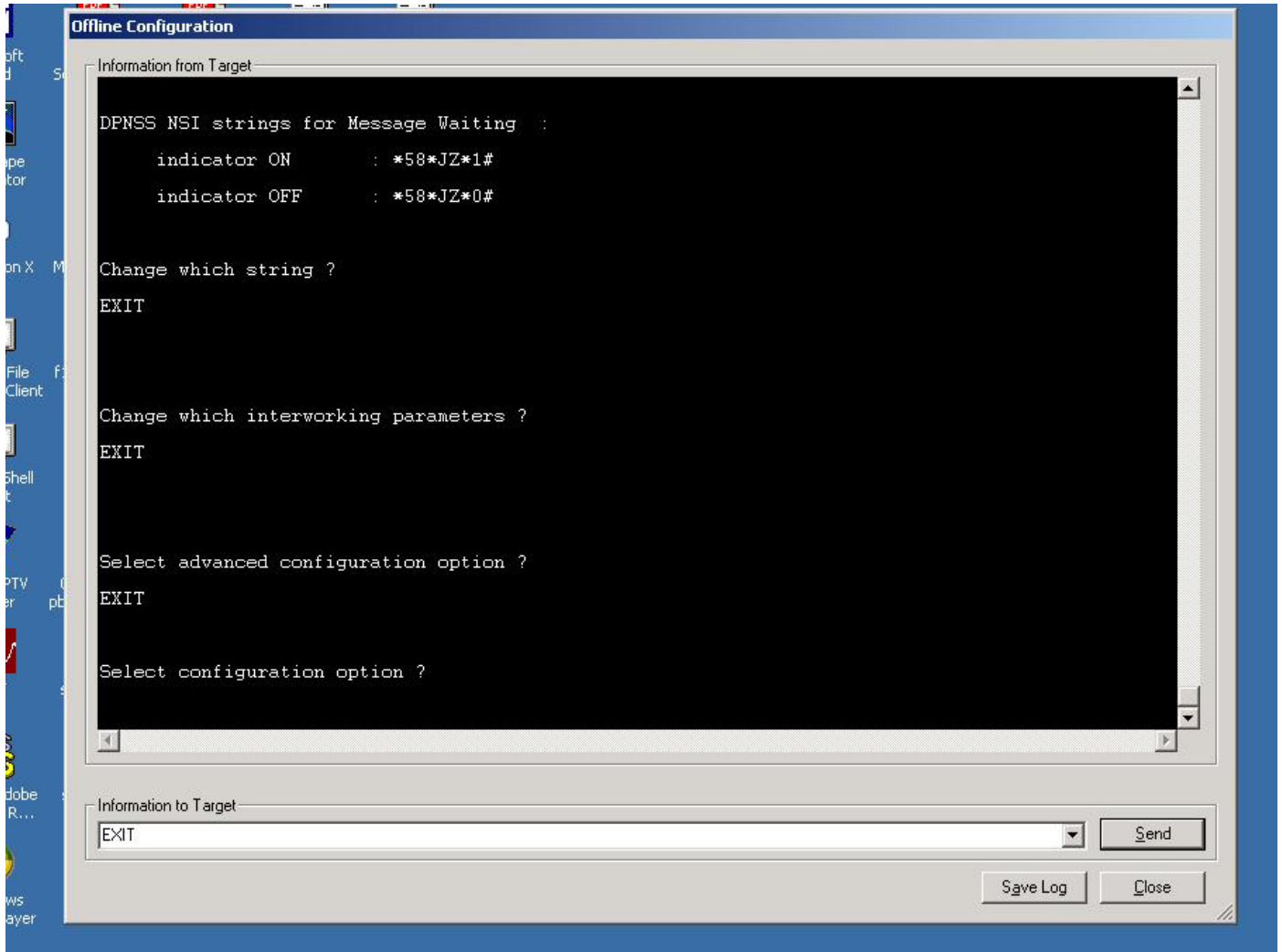
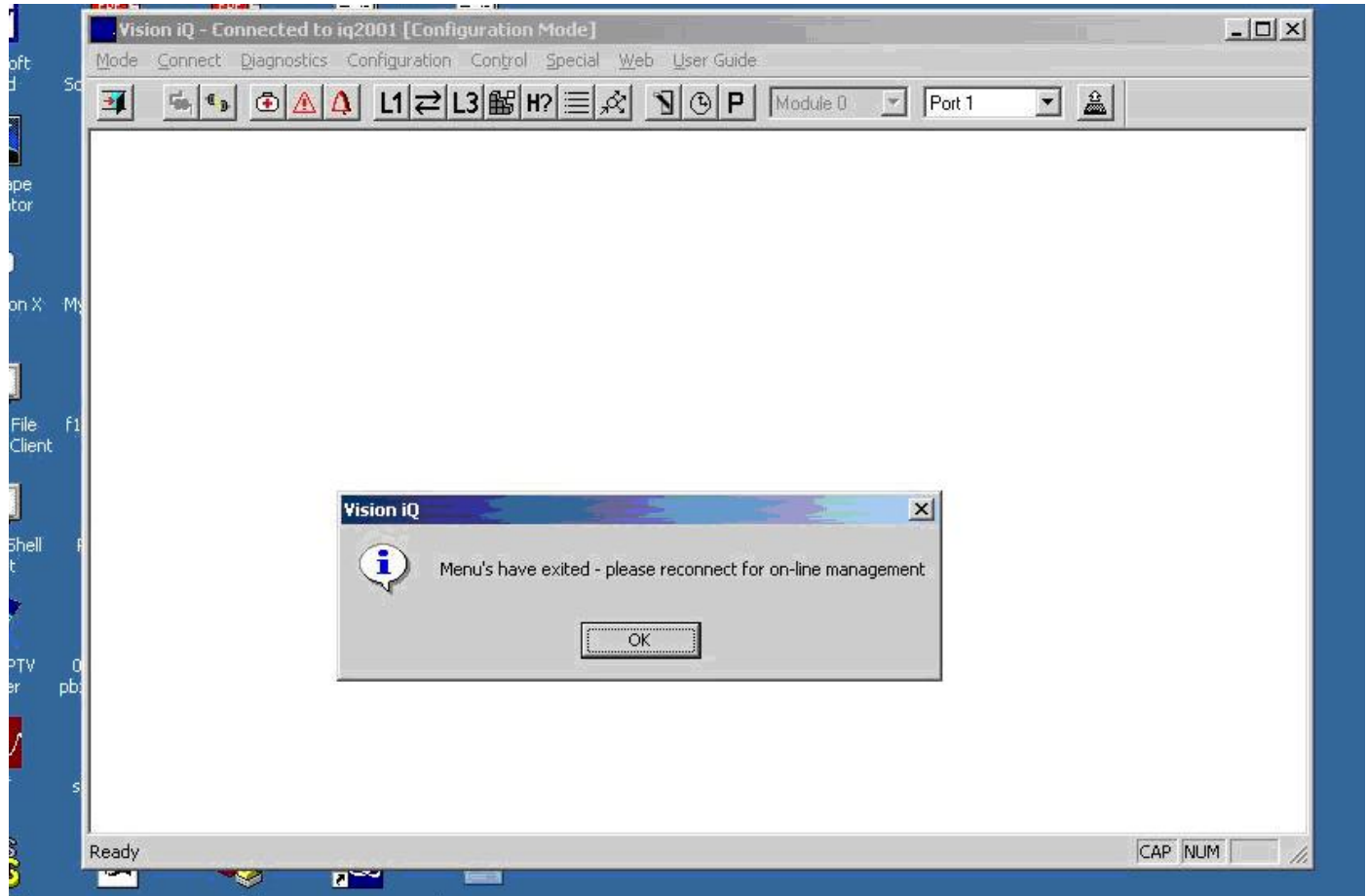




Figure 66. Vision iQ screen after exiting command line configuration screens.





Acronyms

Acronym	Definitions
DPNSS	Digital Private Network Signaling System as detailed in BTNR 188 and 189
NSI	Non-Specified Information – vendor specific free-form PBX-to-PBX messaging
IPT	IP Telephony
CCM	Cisco Unified CallManager
Q.931	ITU ISDN protocol at level 3
Q.Sig	ITU ISDN protocol enhancement to q.931 carrying additional features
MGCP	Media Gateway Control Protocol
PBX	Private Branch Exchange
MMI	Man Machine Interface – specifically on iSDX/Realitis, a VT100 style console
COS	Class Of Service – on an iSDX, the ability to activate features on a particular line
TAC	Trunk Access Class – the ability for an extension to use a specific trunk



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