



VOLKSWAGEN

T··Systems···

**rvsMVS**

rvsMVS Release 04.02.02

**Addendum XOT**

This documentation is valid for rvsMVS release 4.

For rvsMVS the following documentations are provided:

rvsMVS Installation Manual (english)  
Installation of rvs. Usefull for System Programmers

rvsMVS Benutzer Handbuch (german)  
Manual for rvs Users

rvsMVS Operator Handbuch (german)  
Manual for rvs Operator

rvsMVS Operation Manual (english)  
Manual for rvs Operator

rvsMVS Messages and Codes (english)  
Overview about rvs messages and abend codes

**Distribution information will be given kindly:**

T-Systems / gedas deutschland GmbH  
Silke Peigert / Stephanie Begehold  
BU rvs Systems  
Pascalstr. 11  
D-10587 Berlin

Tel. +49-30-3997-1367 / +49-30-3997-1537  
Fax +49-30-3997-1994  
Email <mailto:Silke.Peigert@gedas.de>  
Email <mailto:Stephanie.Begehold@gedas.de>

**Technical information will be given kindly:**

T-Systems / gedas deutschland GmbH  
BU rvs Systems  
Pascalstr. 11  
D-10587 Berlin

Tel. +49-30-3997-1777  
Fax +49-30-3997-1994  
Email <mailto:rvs-service@gedas.de>

## Contents

<b>1. Introduction.....</b>	<b>4</b>
<b>2. System requirements .....</b>	<b>5</b>
<b>3. CISCO Configuration .....</b>	<b>6</b>
3.1. <b>CISCO 801 .....</b>	<b>6</b>
3.2. <b>CISCO 2600.....</b>	<b>6</b>
3.3. <b>Links for more information .....</b>	<b>6</b>
3.4. <b>Examples of CISCO Router Configuration .....</b>	<b>7</b>
3.4.1.    Example: CISCO 801 direction "receive" .....	7
3.4.2.    Example: CISCO 801 direction "send" .....	8
3.4.3.    Example: CISCO 2600 .....	9
<b>4. BINTEC X4300 Configuration.....</b>	<b>13</b>
4.1. <b>Configuration of the BINTEC router X4300 for XOT and XOI .....</b>	<b>13</b>
4.1.1.    Define an XOT Interface ( <i>xotIfTable</i> ) .....	13
4.1.2.    Define an XOI interface ( <i>x25OverIsdnIfTable</i> ).....	14
4.1.3.    Define a route from an XOT interface to an XOI interface ( <i>x25RouteTable</i> ).....	15
4.1.4.    Define an route from an XOI interface to an XOT interface ( <i>x25RouteTable</i> )...	16
4.1.5.    Define the incoming call answering ( <i>isdnDispatchTable</i> ) .....	17
4.1.6.    Define for every interface default X.25 parameters ( <i>x25LinkPresetTable</i> ).....	18
4.2. <b>Example of BINTEC X4300 Configuration .....</b>	<b>18</b>
<b>Index.....</b>	<b>19</b>

## 1. Introduction

In this document we will give some recommendations for the configuration of XOT routers.

XOT (X.25 over TCP/IP) routers are able to route X.25 packets between a TCP/IP network on one side and an X.25 or ISDN network on the other side. Please read the Installation Manual for details how to configure rvs<sup>®</sup> for XOT.

## 2. System requirements

To use the XOT functionality in rvs<sup>®</sup> you need an IP connection to the XOT-capable router (e.g. CISCO 801, CISCO 2600 or BINTEC X4300).

XOT as a new network type in rvs<sup>®</sup> is at the moment available for the following platforms:

- z/OS
- LINUX
- Windows XP.

We tested rvs<sup>®</sup> and XOT with the following routers:

- CISCO 801
- CISCO 2600 and
- BINTEC X4300.

**Note:** If you use a CISCO router, you have two possibilities: either you have a router with 2 controllers or if you have a router with one controller, you need two of them: one for incoming calls and the other for outgoing calls.

### **3. CISCO Configuration**

In the following chapter we will describe our test scenario and give some examples for CISCO router configuration.

#### **3.1. CISCO 801**

We used one CISCO 801 router for the direction „send“ and another CISCO 801 router for the direction „receive“. Our tests and consultations with CISCO specialists show, that you can use a BRI interface for X.25 encapsulation only in one direction (DTE or DCE). So we used two CISCO 801 routers. Before we tested the CISCO router with rvs<sup>®</sup> and XOT, we checked the X.25 function with PAD commands directly on CISCO-IOS.

We used firmware 12.3. We had some trouble with firmware 12.2.

#### **3.2. CISCO 2600**

We used one BRI interface for the direction „send“ and another BRI interface for the direction „receive“. Our tests and consultations with CISCO specialists show, that you can use a BRI interface for X.25 encapsulation only in one direction (DTE or DCE). So we used two BRI interfaces. Before we tested the CISCO router with rvs<sup>®</sup> and XOT, we checked the X.25 function with PAD commands directly on CISCO-IOS.

We used firmware 12.2. We had some trouble with firmware 12.0.

#### **3.3. Links for more information**

For further information about XOT and CISCO see CISCO manuals. Here some interesting links:

[http://www.cisco.com/en/US/tech/tk713/tk730/tech\\_digests\\_list.html](http://www.cisco.com/en/US/tech/tk713/tk730/tech_digests_list.html)

[http://www.cisco.com/en/US/products/sw/iosswrel/ps1818/products\\_configuration\\_guide\\_chapter09186a0080087858.html](http://www.cisco.com/en/US/products/sw/iosswrel/ps1818/products_configuration_guide_chapter09186a0080087858.html)

[http://www.cisco.com/en/US/tech/tk713/tk730/technologies\\_q\\_and\\_a\\_item09186a00800a3c0b.shtml](http://www.cisco.com/en/US/tech/tk713/tk730/technologies_q_and_a_item09186a00800a3c0b.shtml)

[http://www.cisco.com/en/US/products/hw/routers/ps380/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/hw/routers/ps380/tsd_products_support_series_home.html)

<http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122relnt/800/rn800xi.htm#1075191>

<http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123relnt/800/rn800xa.htm>

### 3.4. Examples of CISCO Router Configuration

In this chapter we'll give some advices for configuration of CISCO router:

- You must configure the outgoing BRI interface with **encapsulation x25 DTE**.
- The incoming BRI interface must be configured with **encapsulation x25 DCE**.
- There is an idle-Timer for incoming ISDN-connections. This timer does not recognize x25 packets over ISDN, so it is possible that the connection will hang up during transmission. You should set this timer in the incoming BRI interface to a big value, e.g. **dialer idle-timeout 700000**.
- Please ensure that the outgoing BRI interface will not accept an incoming call. You should set the isdn answering to a MSN, which does not exists, e.g. **isdn answer1 9999, isdn answer2 9999**.
- You have to configure the routing for both directions. The first direction is an incoming call from XOT to the BRI interface. In our example we use DIALER interfaces. Every DIALER represents a partner station with its own ISDN number.
  - So you can route incoming XOT calls with the following routing-entry: **x25 route [called x25-Address in the XOT-packet] interface DIALER[number]** .
  - The second direction is an incoming call on the BRI interface to XOT. You can route it with the following routing entry: **x25 route [called x25-Address in the x25-packet] XOT [IP of the XOT-station]** .

Here are some configuration examples for CISCO routers:

#### 3.4.1. Example: CISCO 801 direction "receive"

```

version 12.3
service pad to-xot
service pad from-xot
service tcp-keepalives-in
service tcp-keepalives-out
!
hostname Receiver
!
isdn switch-type basic-net3
x25 routing
!
interface Ethernet0
 ip address [IP-ADDRESS]
 no cdp enable
!
interface BRI0
 no ip address
 encapsulation x25 dce
 no ip mroute-cache
 dialer idle-timeout 700000
 dialer-group 1
 x25 htc 1
 x25 win 7
 x25 wout 7
 isdn switch-type basic-net3
 isdn point-to-point-setup
 isdn answer1 [ISDN-NUMBER-FOR-INCOMING-CALLS]
 no cdp enable
!
x25 route [X.25-ADDRESS-1] xot [IP-ADDRESS-RVS]
x25 route [X.25-ADDRESS-2] xot [IP-ADDRESS-RVS]
x25 host Receiver [X.25-ADDRESS-ROUTER]

```

**3.4.2. Example: CISCO 801 direction "send"**

```
version 12.3
service pad to-xot
service pad from-xot
service tcp-keepalives-in
service tcp-keepalives-out
!
hostname Sender
!
isdn switch-type basic-net3
x25 routing
!
interface Ethernet0
 ip address [IP-ADDRESS]
 no cdp enable
!
interface BRI0
 no ip address
 encapsulation x25
 no ip mroute-cache
 dialer pool-member 1 max-link 1
 dialer pool-member 2 max-link 1
 dialer idle-timeout 700000
 x25 htc 1
 x25 win 7
 x25 wout 7
 isdn switch-type basic-net3
 isdn point-to-point-setup
 isdn reject data
 no cdp enable
!
interface Dialer1
 no ip address
 encapsulation x25
 no ip mroute-cache
 dialer pool 1
 dialer idle-timeout 700000
 dialer string [ISDN-NUMBER-1]
 dialer max-call 1
 dialer-group 1
 x25 htc 1
 x25 win 7
 x25 wout 7
 no cdp enable
!
interface Dialer2
 no ip address
 encapsulation x25
 no ip mroute-cache
 dialer pool 2
 dialer idle-timeout 700000
 dialer string [ISDN-NUMBER-2]
 dialer max-call 1
 dialer-group 1
 x25 htc 1
 x25 win 7
 x25 wout 7
 no cdp enable
!
ip classless
!
x25 route [X.25-ADDRESS-1] interface Dialer1
x25 route [X.25-ADDRESS-2] interface Dialer2
!
x25 host Sender [X.25-ADDRESS-ROUTER]
!
end
```



### 3.4.3. Example: CISCO 2600

```
service pad to-xot
service pad from-xot
service tcp-keepalives-in
service tcp-keepalives-out
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname C2600
!
!
ip subnet-zero
isdn switch-type basic-net3
x25 routing
!
!
!
!
interface Ethernet0/0
 ip address 192.168.2.4 255.255.252.0
 no ip directed-broadcast
 no cdp enable
!
interface Serial0/0
 no ip address
 no ip directed-broadcast
 shutdown
!
interface BRI1/0
 description Dialin IF fuer x25 over ISDN
 no ip address
 no ip directed-broadcast
 encapsulation x25 dce
 no ip mroute-cache
 dialer idle-timeout 700000
 dialer-group 1
 x25 htc 1
 x25 win 7
 x25 wout 7
 isdn switch-type basic-net3
 isdn answer1 05361123456
 isdn answer2 05361987654
 no cdp enable
!
interface BRI1/1
 description Dialout IF fuer x25 over ISDN
 no ip address
 no ip directed-broadcast
 encapsulation x25
 no ip mroute-cache
 dialer idle-timeout 600
 dialer pool-member 1 max-link 1
 dialer pool-member 2 max-link 1
 dialer pool-member 3 max-link 1
 dialer pool-member 4 max-link 1
 dialer pool-member 5 max-link 1
 dialer pool-member 6 max-link 1
 dialer pool-member 7 max-link 1
 dialer pool-member 8 max-link 1
 dialer pool-member 9 max-link 1
 dialer pool-member 10 max-link 1
 dialer pool-member 11 max-link 1
 x25 htc 1
 x25 win 7
 x25 wout 7
 isdn answer1 9999
 isdn answer2 9999
```

```
isdn switch-type basic-net3
no cdp enable
!
interface BRI1/2
no ip address
no ip directed-broadcast
shutdown
!
interface BRI1/3
no ip address
no ip directed-broadcast
shutdown
!
interface BRI1/4
no ip address
no ip directed-broadcast
shutdown
!
interface BRI1/5
no ip address
no ip directed-broadcast
shutdown
!
interface BRI1/6
no ip address
no ip directed-broadcast
shutdown
!
interface BRI1/7
no ip address
no ip directed-broadcast
shutdown
!
interface Dialer1
no ip address
encapsulation x25
no ip mroute-cache
dialer pool 1
dialer string 030123456647
dialer max-call 1
dialer-group 1
x25 htc 1
x25 win 7
x25 wout 7
no cdp enable
!
interface Dialer2
no ip address
encapsulation x25
no ip mroute-cache
dialer pool 2
dialer string 030123456648
dialer max-call 1
dialer-group 1
x25 htc 1
x25 win 7
x25 wout 7
no cdp enable
!
interface Dialer3
no ip address
encapsulation x25
no ip mroute-cache
dialer pool 3
dialer string 030123456649
dialer max-call 1
dialer-group 1
x25 htc 1
x25 win 7
x25 wout 7
no cdp enable
```

```
!  
interface Dialer4  
  no ip address  
  encapsulation x25  
  no ip mroute-cache  
  dialer pool 4  
  dialer string 030123456649  
  dialer max-call 1  
  dialer-group 1  
  x25 htc 1  
  x25 win 7  
  x25 wout 7  
  no cdp enable  
!  
interface Dialer5  
  no ip address  
  encapsulation x25  
  no ip mroute-cache  
  dialer pool 5  
  dialer string 030123456650  
  dialer max-call 1  
  dialer-group 1  
  x25 htc 1  
  x25 win 7  
  x25 wout 7  
  no cdp enable  
!  
interface Dialer6  
  no ip address  
  encapsulation x25  
  no ip mroute-cache  
  dialer pool 6  
  dialer string 030123456652  
  dialer max-call 1  
  dialer-group 1  
  x25 htc 1  
  x25 win 7  
  x25 wout 7  
  no cdp enable  
!  
interface Dialer7  
  no ip address  
  encapsulation x25  
  no ip mroute-cache  
  dialer pool 7  
  dialer string 030123456653  
  dialer max-call 1  
  dialer-group 1  
  x25 htc 1  
  x25 win 7  
  x25 wout 7  
  no cdp enable  
!  
interface Dialer8  
  no ip address  
  encapsulation x25  
  no ip mroute-cache  
  dialer pool 8  
  dialer string 030123456654  
  dialer max-call 1  
  dialer-group 1  
  x25 htc 1  
  x25 win 7  
  x25 wout 7  
  no cdp enable  
!  
interface Dialer9  
  no ip address  
  encapsulation x25  
  no ip mroute-cache  
  dialer pool 9
```

```
dialer string 030123456655
dialer max-call 1
dialer-group 1
x25 htc 1
x25 win 7
x25 wout 7
no cdp enable
!
interface Dialer10
no ip address
encapsulation x25
no ip mroute-cache
dialer pool 10
dialer string 05361272616
dialer max-call 1
dialer-group 1
x25 htc 1
x25 win 7
x25 wout 7
no cdp enable
!

interface Dialer11
no ip address
encapsulation x25
no ip mroute-cache
dialer pool 11
dialer string 05361272757
dialer max-call 1
dialer-group 1
x25 htc 1
x25 win 7
x25 wout 7
no cdp enable
!

ip classless
!
dialer-list 1 protocol ip permit
dialer-list 1 protocol lc2 permit
dialer-list 1 protocol bridge permit
no cdp run
x25 route 030123456647 interface Dialer1
x25 route 030123456648 interface Dialer2
x25 route 030123456649 interface Dialer3
x25 route 030123456650 interface Dialer4
x25 route 030123456651 interface Dialer5
x25 route 030123456652 interface Dialer6
x25 route 030123456653 interface Dialer7
x25 route 030123456654 interface Dialer8
x25 route 030123456655 interface Dialer9
x25 route 05361272616 interface Dialer10
x25 route 05361272757 interface Dialer11

x25 route 111 xot 192.168.2.10

x25 host Router 222
!
line con 0
line aux 0
line vty 0 4
  login
!
end
```

## 4. BINTEC X4300 Configuration

In this chapter we will give an example for the BINTEC X4300 router configuration.

In our tests we used BINTEC X4300 with firmware version 7.1 Rev. 1.

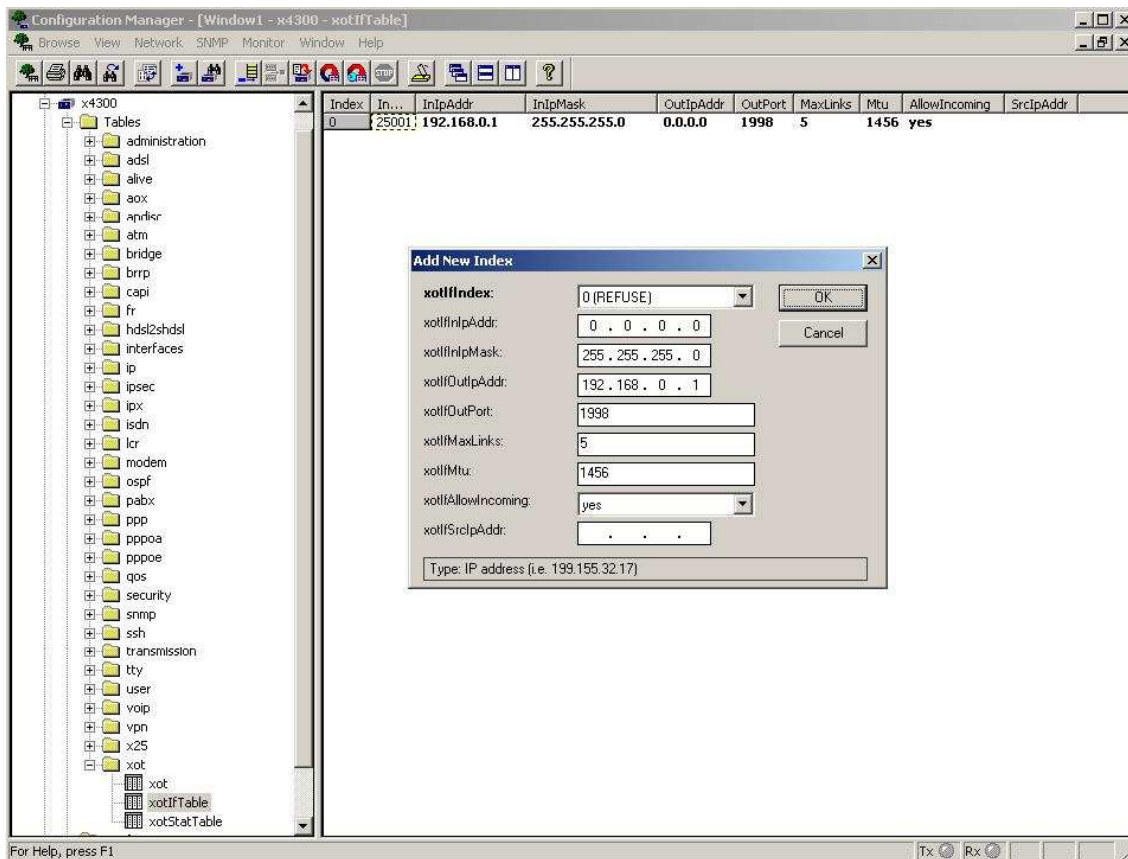
More information about the BINTEC X4300 you can find here:

[http://www.funkwerk-ec.com/dl\\_bintec\\_x4x00\\_family\\_en.17190.837.html](http://www.funkwerk-ec.com/dl_bintec_x4x00_family_en.17190.837.html)

### 4.1. Configuration of the BINTEC router X4300 for XOT and XOI

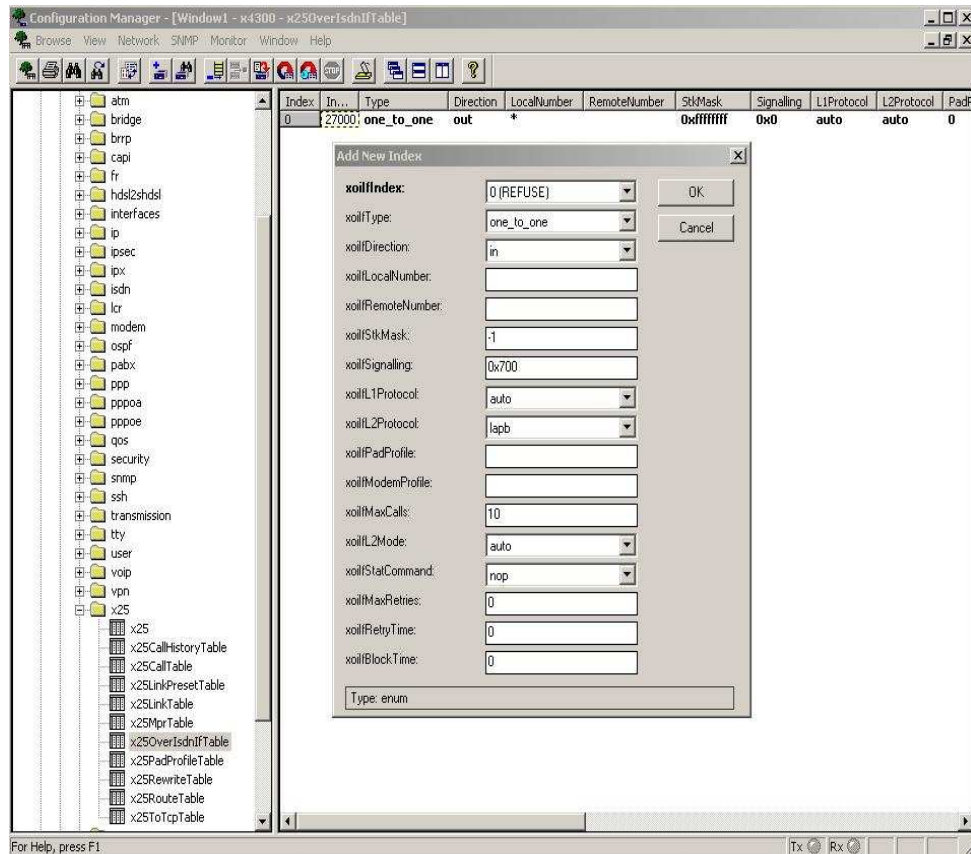
#### 4.1.1. Define an XOT Interface (*xotIfTable*)

- You have to specify one interface for every communication-partner and direction (incoming/outgoing)
- For an incoming XOT connection you have to set the parameter `xotIfOutIpAddr` to 0.0.0.0 and the parameter `xotIfInIpAddr` to the IP address of the partner station.
- For an outgoing XOT connection you have to set the parameter `xotIfInIpAddr` to 0.0.0.0 and the parameter `xotIfOutIpAddr` to the IP address of the partner station.



#### 4.1.2. Define an XOI interface (x25OverIsdnIfTable)

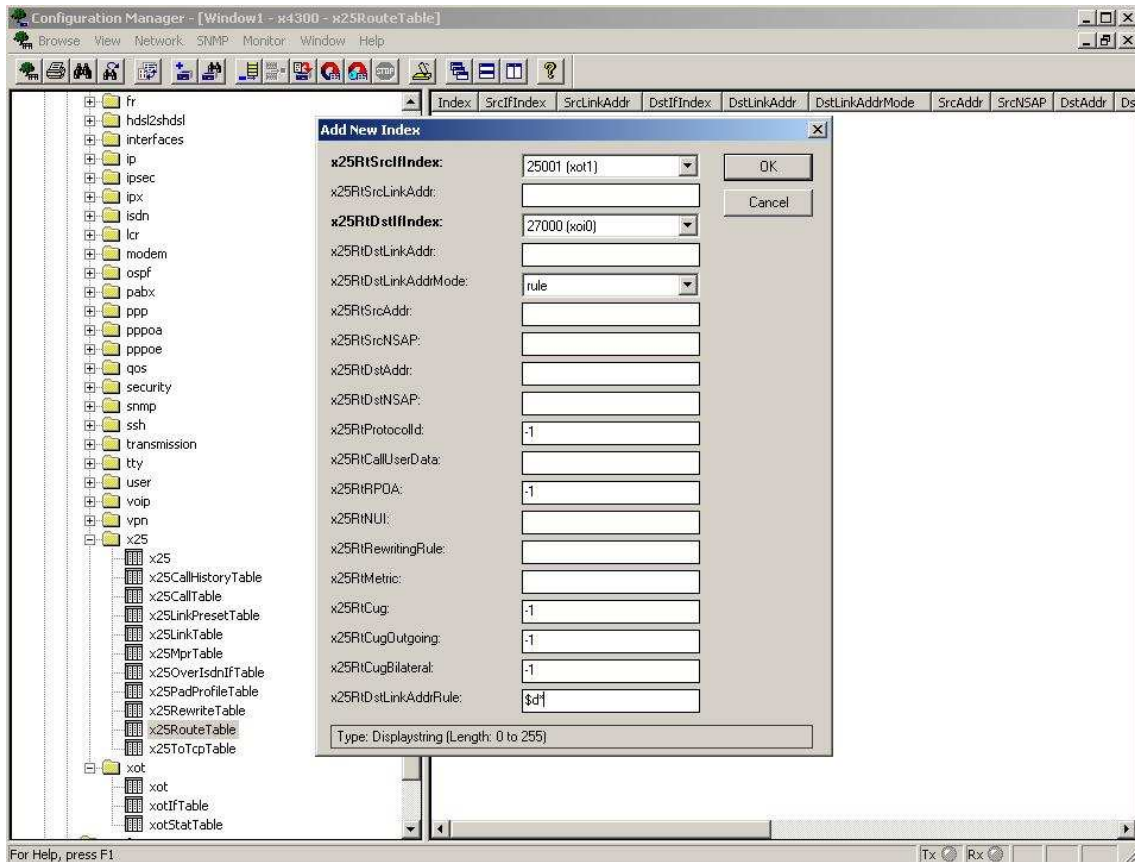
- You have to specify one interface for every communication-direction
- For an incoming ISDN connection you have to set the parameter `xoiIfDirection` to `in`, the parameter `xoiIfSignalling` to `0x700` and the parameter `xoiIfL2Protocol` to `LAPB`.
- For an outgoing ISDN connection you have to set the parameter `xoiIfRemoteNumber` to \* and the parameter `xoiIfDirection` to `out`.
- For the values of the other parameters you can use the defaults.



After these configuration steps you should save the configuration and restart the configuration manager.

#### 4.1.3. Define a route from an XOT interface to an XOI interface (x25RouteTable)

- For every route you have to specify a separate entry. You can also enter a substitution rule for the ISDN number (this will replace the target ISDN number with the X.25 address of the X.25 packet)
- Set the parameter `x25RtDstLinkAddrRule` to `$d*` (this will replace the ISDN number with the X25 address)
- Set the parameter `x25RtDstLinkAddrMode` to `rule` (this will activate the substitution rule)
- You have to set `x25RtSrcIfIndex` to the incoming XOT interface and `x25RtDstIfIndex` to an outgoing XOI interface



**4.1.4. Define an route from an XOI interface to an XOT interface (x25RouteTable)**

- You have to specify for every route a separate entry.
- For an incoming XOI connection you have to enter the X.25 address of the target station (parameter x25RtDstAddr). The BINTEC router uses this address for routing incoming X.25 packets to the right destination.
- You have to set the parameter x25RtDstLinkAddrMode to default.
- You have to set x25RtSrcIfIndex to the incoming XOI interface and x25RtDstIfIndex to an outgoing XOT interface.

**Add New Index**

x25RtSrcIfIndex: 27001 (incoming XOI)

x25RtSrcLinkAddr:

x25RtDstIfIndex: 25012 (xot12)

x25RtDstLinkAddr:

x25RtDstLinkAddrMode: default

x25RtSrcAddr:

x25RtSrcNSAP:

x25RtDstAddr: 888

x25RtDstNSAP:

x25RtProtocolId: -1

x25RtCallUserData:

x25RtRPOA: -1

x25RtNUI:

x25RtRewritingRule:

x25RtMetric:

x25RtCug: -1

x25RtCugOutgoing: -1

x25RtCugBilateral: -1

x25RtDstLinkAddrRule:

Type: Displaystring (Length: 0 to 255)

**Configuration Manager - [Window1 - x4300 - x25RouteTable]**

Browse View Network SNMP Monitor Window Help

Description	6	11
SrcIfIndex	25011 (xot11)	27001 (incoming XOI)
SrcLinkAddr		
DstIfIndex	27000 (outgoing XOI)	25012 (xot12)
DstLinkAddr		
DstLinkAddrMode	rule	default
SrcAddr		
SrcNSAP		
DstAddr		888
DstNSAP		
ProtocolId	-1	-1
CallUserData		
RPOA	-1	-1
NUI		
RewritingRule	0	0
Metric	0	0
Cug	-1	-1
CugOutgoing	-1	-1
CugBilateral	-1	-1
DstLinkAddrRule	\$d*	

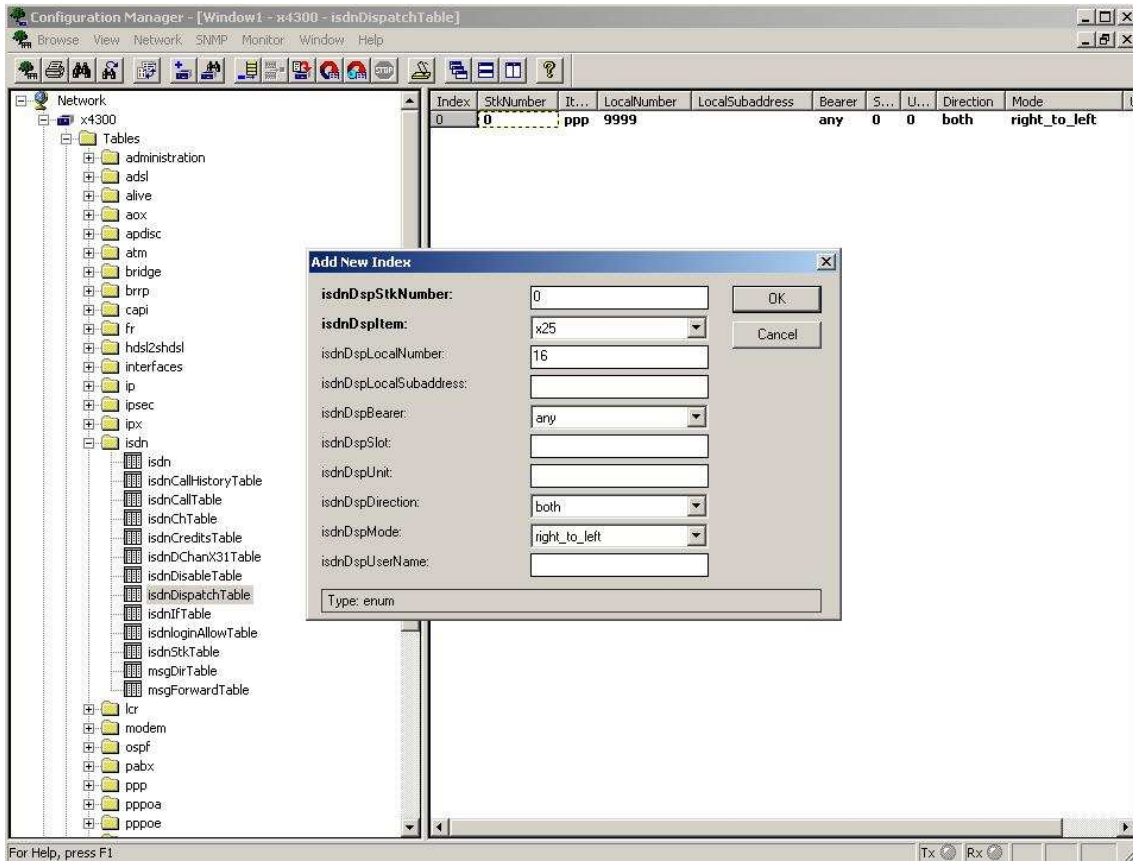
For Help, press F1

Tx Rx NUM



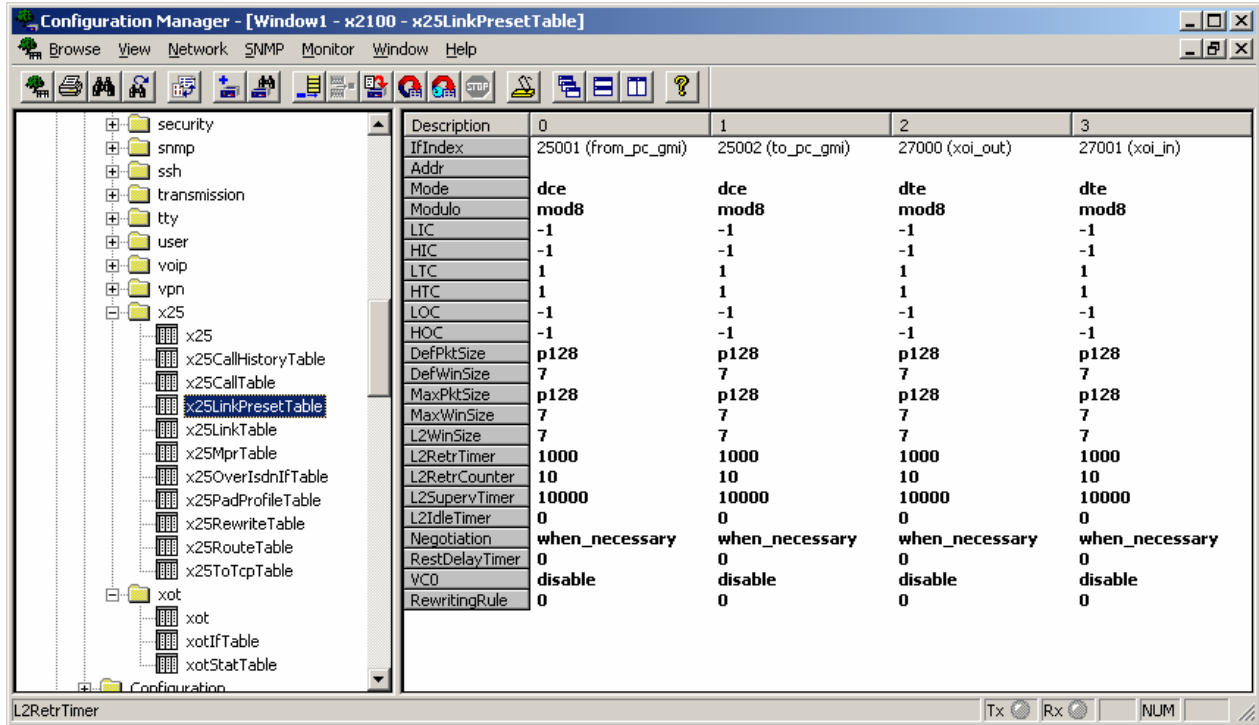
**4.1.5. Define the incoming call answering (isdndispatchTable)**

- Set the parameter `isdndspstkNumber` to 0 and the parameter `isdndspItem` to x25 (this will dispatch the call to the x25-interface).
- Set the parameter `isdndspLocalNumber` to the local number which handles the incoming call (MSN).



**4.1.6. Define for every interface default X.25 parameters (x25LinkPresetTable)**

- For every XOI- Interface you have to set the parameter x25LkPrMode to DTE
- For every XOT- Interface you have to set the parameter x25LkPrMode to DCE
- Set the parameter x25LkPrModulo to mod8
- You can change packet size and windows size according national configurations



**4.2. Example of BINTEC X4300 Configuration**

Please see the text file BINTEC\_X4300.txt (our current configuration) as an example. This textfile is to be found on the distribution CD, in the directory \_doc/ROUTER\_CONF\_EXAMPLES.

## Index

BINTEC.....	<b>14</b>
Firmware .....	14
Incoming Call Answering.....	20
ISDN Number.....	17
isdnDispatchTable.....	20
isdnDspItem.....	20
isdnDspLocalNumber .....	20
isdnDspStkNumber .....	20
LAPB .....	16
MSN.....	20
Routing.....	17, 18
x25LinkPresetTable .....	21
x25LkrPrMode	
DCE.....	21
DTE.....	21
x25LkrPrModulo .....	21
x25OverIsdnIfTable .....	16
xoiIfDirection .....	16
xoiIfL2Protocoll .....	16
xoiIfRemoteNumber .....	16
xoiIfSignalling.....	16
x25RouteTable.....	17, 18
x25RtDstAddr.....	18
x25RtDstIfIndex .....	17, 18
x25RtDstLinkAddrMode.....	17, 18
x25RtDstLinkAddrRule .....	17
x25RtSrcIfIndex .....	17
X4300.....	14
XOI .....	16
XOT .....	14
xotIfTable .....	14
xotIfInIpAddr .....	14
xotIfOutIpAddr.....	14
CISCO.....	<b>6</b>
BRI.....	6
C2600.....	6
Example .....	9
C801 .....	6
Example .....	7, 8
Dialer.....	7
Encapsulation.....	6
DCE .....	6, 7
DTE.....	6, 7
Firmware .....	6
Idle Timer.....	7
IOS.....	6
Isdn Answering.....	7
ISDN Number.....	7
MSN.....	7
PAD.....	6
Routing.....	7