Teldat Router

Dial Routing

Doc. *DM744-I* Rev. *10.00*
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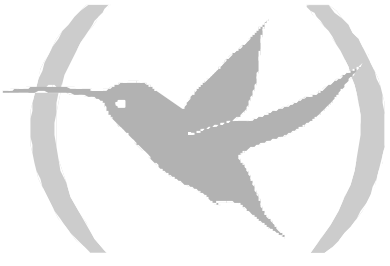
INDEX

Chapter 1
Introduction



1. Dial Routing Interface

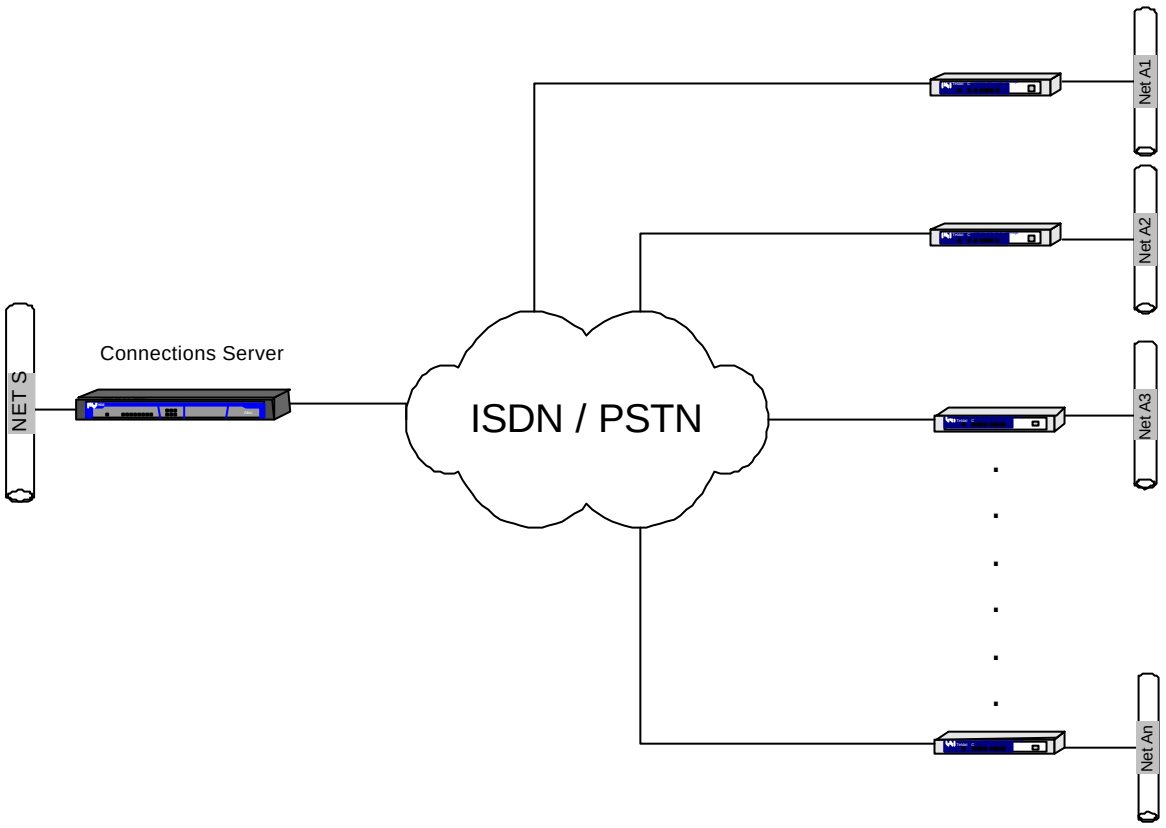
The *Dial Routing* interface is a virtual interface that distributes IP traffic via a pool of "Dial PPP" interfaces. A series of connections is defined in the configuration of the said interface such as the Dial PPP interfaces pool name. Each profile has an identifier (ID) which uniquely identifies this as well as a set of associated parameters (called number, user and password). Each Dial PPP interface can be registered in the pool through configuration; on enabling the *Dial Routing* facility, you need to introduce the pool name configured within the *Dial Routing* interface.

2. Static Routes ID

The static routes ID are static routes whose next hop is a *Dial Routing* interface with an extra parameter: the ID (profile identifier). By default, these routes have cost 3 assigned.

3. Function

Through the combination of the static routes ID and the *Dial Routing* interface, you can make the router act as a Dial PPP connections server. Supposing we have the following network:



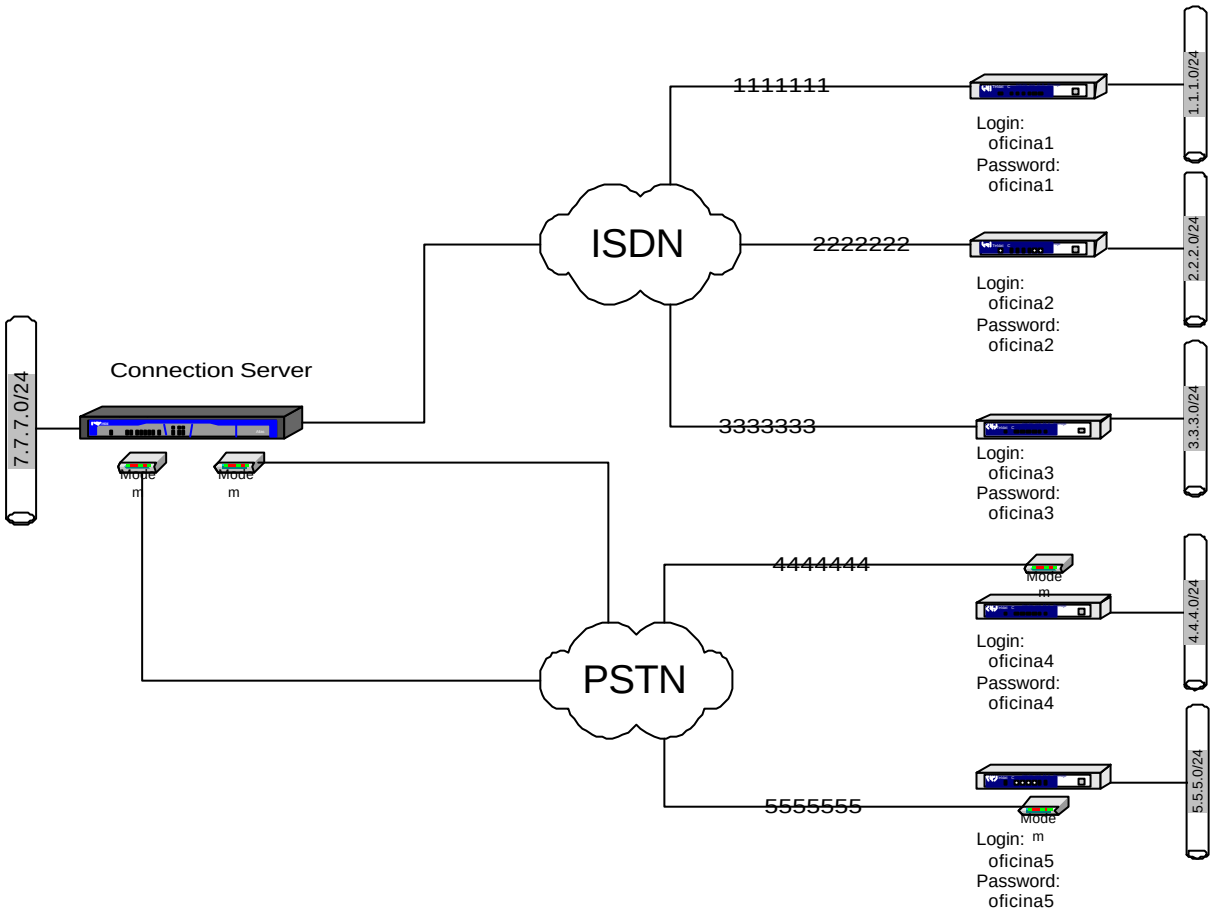
In the connections server, you add as many routes ID as distinct BRANCHES networks that exist. In the example case, supposing we add a route to the LAN network of each branch (A1, A2 …..An). If a device located in network S needs to address branch X LAN (AX), the IP packets exit with source S with destination AX, will reach the connections server in the first hop. In the initial state, assuming that an alternative lower cost route to the said destination network does not exist, the first IP packet uses the route ID. This packet will pass to the specified *Dial Routing* interface in the next route hop together with the ID. The *Dial Routing* interface will check if the said ID is in use and in contrary cases will search for a free PPP Dial interface among those that are registered. If one is found, this will reserve it, dynamically configured it with the ID profile parameters and will run over all the routes IDs whose next hop is the *Dial Routing* Interface and whose ID is the past ID and will add for each of these a static route dynamically created with the same destination and mask, but with the next hop being the reserved Dial PPP interface and with cost 1. The rest of the IP packets will use the new static route. When the call is released due to release time without data or due to another cause, this dynamically created static route will disappear.

4. Configuring correctly

- Create as many PPP interfaces as B channels or modem connections you wish to reserve for the connections (you create as many simultaneous connections as you wish to have).
- Create the *Dial Routing* interface.
- From the *Dial Routing* interface configuration, add as many connections as existing destinations. Each profile is composed of a unique identifier, an ISDN telephone number, a login and a password; these parameters must be the parameters of the branch they represent.
- From the *Dial Routing* interface configuration, configure the connections pool name.
- From the configuration for each Dial PPP that you wish to participate in the pool, enable the *Dial Routing* facility and configure the same pool name as assigned in the previous step.
- Add unnumbered addresses to the Dial PPP and *Dial Routing* interfaces. Configure the internal IP address. Enable IP Classless.
- Add static routes ID: destination and mask corresponding to the each branch's network, next hop the *Dial Routing* interface and ID corresponding to the profile associated to the said branch.
- If a determined branch has more than one network, you can configure as many routes ID (with the same ID) as distinct networks pertaining to the branch.
- Configuration of the connections and the routes ID is dynamic: you do not need to restart the device.

5. Configuration Procedure

Below, you can see through an example, the sequence of steps required to establish an adequate configuration for a typical scenario where you need to access networks located through PSTN and ISDN connections. The following figure displays the user scenario in the example.



The steps required to carry out the configuration of the previous graphic connections server are as follows:

In this example, we start from the ATLAS default configuration, which will act as the connections server, however you can use any Teldat Router that possesses this function.

5.1. Creating interfaces

The first step is to decide which interfaces are required for the said scenario:

- You need to configure as AT interfaces as many serial lines as simultaneous connections to PSTN destinations are required without surpassing the number of modems you have. Additionally you need to create a PPP interface for each AT interface. In the example we have two modems and assume that you wish to use both. Therefore, configure line 1 and 2 as AT interfaces and add two PPP interfaces that will operate over the said AT interfaces.
- You need to create as many PPP interfaces as simultaneous connections to ISDN destinations as required without surpassing the number of ISDN B channels you have available. In this example

we have a BRI interface with two B channels and assume that both will be used in this scenario. Therefore create two more PPP interfaces that will operate over a BRI interface B channel.

- Additionally, you need to configure a *Dial Routing* interface that manages the PSTN connections and uses the PPP interfaces that operate over AT and another that manages the connections with ISDN destinations using the PPPs that are configured to operate over the BRI interface.

In short, you need to configure lines 1 and 2 as AT interfaces and add four PPP interfaces and two *Dial Routing*.

Below you can see the displayed result of the device configuration in text mode. Further down the configuration of the interfaces is also shown so you can see which interfaces are already available and which ones require changes.

```
*P 4
Config>SHOW CONFIG
; Showing System Configuration ...
; Router ATLAS 2 8 Version 10.0.0

set data-link x25 serial0/0
set data-link x25 serial0/1
set data-link x25 serial0/2
Config>list devices

 Interface       Con    Type of interface             CSR     CSR2  int
 ethernet0/0     LAN1   Fast Ethernet interface   fa200e00             27
 serial0/0       WAN1   X25                       fa200a00 fa203c00   5e
 serial0/1       WAN2   X25                       fa200a20 fa203d00   5d
 serial0/2       WAN3   X25                       fa200a60 fa203f00   5b
 bri0/0          ISDN1  ISDN Basic Rate Int       fa200a40 fa203e00   5c
 x25-node        ---    Router->Node                     0              0
Config>
```

As you can see the serial lines are in X.25 mode and therefore require changing. Additionally you do not have any PPP interfaces or *Dial Routing* which means these need to be added.

The following sequence of commands shows how to execute this operation. Firstly you need to add the PPP interfaces.

```
Config>add device ppp 1
Added PPP interface ppp1
Config>add device ppp 2
Added PPP interface ppp2
Config>add device ppp 3
Added PPP interface ppp3
Config>add device ppp 4
Added PPP interface ppp4
Config>list devices

 Interface       Con    Type of interface             CSR     CSR2  int
 ethernet0/0     LAN1   Fast Ethernet interface   fa200e00             27
 serial0/0       WAN1   X25                       fa200a00 fa203c00   5e
 serial0/1       WAN2   X25                       fa200a20 fa203d00   5d
 serial0/2       WAN3   X25                       fa200a60 fa203f00   5b
 bri0/0          ISDN1  ISDN Basic Rate Int       fa200a40 fa203e00   5c
 x25-node        ---    Router->Node                     0              0
 ppp1            ---    Generic PPP                      0              0
 ppp2            ---    Generic PPP                      0              0
 ppp3            ---    Generic PPP                      0              0
 ppp4            ---    Generic PPP                      0              0
Config>
```

Subsequently, the *Dial Routing* interfaces are created.

```
Config>add device dial-routing 1
Added DIAL ROUTING interface dialroute1
Config>add device dial-routing 2
Added DIAL ROUTING interface dialroute2
Config>list devices

 Interface       Con    Type of interface             CSR     CSR2  int
 ethernet0/0     LAN1   Fast Ethernet interface   fa200e00             27
 serial0/0       WAN1   X25                       fa200a00 fa203c00   5e
 serial0/1       WAN2   X25                       fa200a20 fa203d00   5d
 serial0/2       WAN3   X25                       fa200a60 fa203f00   5b
 bri0/0          ISDN1  ISDN Basic Rate Int       fa200a40 fa203e00   5c
 x25-node        ---    Router->Node                     0              0
 ppp1            ---    Generic PPP                      0              0
 ppp2            ---    Generic PPP                      0              0
 ppp3            ---    Generic PPP                      0              0
 ppp4            ---    Generic PPP                      0              0
 dialroute1      ---    Dial Routing                     0              0
 dialroute2      ---    Dial Routing                     0              0
Config>
```

And finally, change the serial lines configuration.

```
Config>set data-link at
Interface name [serial0/0]? serial0/0
Config>set data-link at
Interface name [serial0/0]? serial0/1
Config> Config>list devices

 Interface       Con    Type of interface             CSR     CSR2  int
 ethernet0/0     LAN1   Fast Ethernet interface   fa200e00             27
 serial0/0       WAN1   AT COM                    fa200a00 fa203c00   5e
 serial0/1       WAN2   AT COM                    fa200a20 fa203d00   5d
 serial0/2       WAN3   X25                       fa200a60 fa203f00   5b
 bri0/0          ISDN1  ISDN Basic Rate Int       fa200a40 fa203e00   5c
 x25-node        ---    Router->Node                     0              0
 ppp1            ---    Generic PPP                      0              0
 ppp2            ---    Generic PPP                      0              0
 ppp3            ---    Generic PPP                      0              0
 ppp4            ---    Generic PPP                      0              0
 dialroute1      ---    Dial Routing                     0              0
 dialroute2      ---    Dial Routing                     0              0
Config>
```

Below you can see the results of the configuration, once the interfaces have been created, in text mode.

```
Config>SHOW CONFIG
; Showing System Configuration ...
; Router ATLAS 2 8 Version 10.0.0

add device ppp 1
add device ppp 2
add device ppp 3
add device ppp 4
add device dial-routing 1
add device dial-routing 2
set data-link at serial0/0
set data-link at serial0/1
set data-link x25 serial0/2
;
;
;
;
Config>
```

5.2. Configuring the Dial Routing Interfaces

Dial Routing interface configuration consists of two main steps.

The first step is to configure the name of the Pool corresponding to the interface. This pool name joins the interface with the PPP interfaces that can be used to carry out the connections. This must be the same as that configured when enabling *Dial Routing* in the PPP interfaces.

The second step is to configure the connection destinations that are going to be carried out through this interface.

There also exists the possibility of configuring a time period in which a PPP interface will remain in quarantine (i.e. without being used by the *Dial Routing*) when a local error occurs (failure to establish the physical level in the ISDN interface for example).

Below we will show how to configure the first two parameters which are vital. To see all the configuration possibilities, please see the section on configuration commands further on in this manual.

a) Configuring the Pool name

As already indicated, you need to configure a pool name that refers to the PPP interfaces in order to "register" these in a *Dial Routing* interface on starting up the device. The command used to configure this parameter is displayed below where we will configure "ISDN" as the pool name so the *Dial Routing* manages the ISDN connections and "PSTN" for managing connections via the modem.

```
Config>net dialroute1

-- DR interface configuration --
DR config>pool-name RDSI
DR config>list interface
Interface Configuration
-----------------------
Pool Name:          RDSI
Quarantine time:    4 min.
DR config>exit
Config>net dialroute2
-- DR interface configuration --
DR config> pool-name RTC
DR config>list interface
Interface Configuration
-----------------------
Pool Name:          RTC
Quarantine time:    4 min.
DR config>
```

The following list shows the router global configuration once this operation has been completed.

```
DR config>exit
Config>show config
; Showing System Configuration ...
; Router ATLAS 2 8 Version 10.0.0

add device ppp 1
add device ppp 2
add device ppp 3
add device ppp 4
add device dial-routing 1
add device dial-routing 2
set data-link at serial0/0
set data-link at serial0/1
```

```
set data-link x25 serial0/2
network dialroute1
; -- DR interface configuration --
   pool-name RDSI
;
;
exit
;
network dialroute2
; -- DR interface configuration --
   pool-name RTC
;
;
exit
;
Config>
```

b) *Configuring the destination connections*

The second step is to configure the required parameters to connect to each of the possible destinations. For each destination you need to configure a telephone number, a user and a password which shape the profile for this destination.

In the following example, you have five connection destinations (as many connections as remote branches) with the following parameters:

- ISDN Destinations
  - Profile 1: telephone number 1111111, user oficina1 and password oficina1.
  - Profile 2: telephone number 2222222, user oficina2 and password oficina2
  - Profile 3: telephone number 3333333, user oficina3 and password oficina3
- PSTN Destinations
  - Profile 1: telephone number 4444444, user oficina4 and password oficina4
  - Profile 2: telephone number 5555555, user oficina5 and password oficina5

The ISDN destination connections are configured in the **dialroute1** interface which manages the ISDN connections and the PSTN destinations are configured in the **dialroute2** interface.

Below you can see all the commands required to carry out this configuration and the list of connections once created.

```
Config>net dialroute1

-- DR interface configuration --
DR config>connection 1 default
DR config>connection 1 destination-address
Type destination address (20 chars max.)[]? 1111111
DR config>connection 1 user
Type PPP username (31 chars max.) []? oficina1
DR config>connection 1 password
Type PPP password (31 chars max.) []?  []? ********
Confirm PPP password (31 chars max.) []? []? ********
DR config>connection 2 default
DR config>connection 2 destination-address
Type destination address (20 chars max.)[]? 2222222
DR config>connection 2 user
Type PPP username (31 chars max.) []? oficina2
DR config>connection 2 password
Type PPP password (31 chars max.) []?  []? ********
Confirm PPP password (31 chars max.) []? []? ********
DR config>connection 3 default
DR config>connection 3 destination-address
```

```
Type destination address (20 chars max.)[]? 3333333
DR config>connection 3 user
Type PPP username (31 chars max.) []? Oficina3
DR config>connection 3 password
Type PPP password (31 chars max.) []?  []? ********
Confirm PPP password (31 chars max.) []? []? ********
DR config>list connection
Connections
-----------

ID          Destination Address   Username
----------  --------------------  --------------------------------
         1  1111111               oficina1
         2  2222222               oficina2
         3  3333333               oficina3
DR config>exit
Config>net dialroute2

-- DR interface configuration --
DR config>connection 1 default
DR config>connection 1 destination-address
Type destination address (20 chars max.)[]? 4444444
DR config>connection 4 user
Type PPP username (31 chars max.) []? oficina4
DR config>connection 4 password
Type PPP password (31 chars max.) []?  []? ********
Confirm PPP password (31 chars max.) []? []? ********
DR config>connection 2 default
DR config>connection 2 destination-address
Type destination address (20 chars max.)[]? 5555555
DR config>connection 2 user
Type PPP username (31 chars max.) []? oficina5
DR config>connection 2 password
Type PPP password (31 chars max.) []?  []? ********
Confirm PPP password (31 chars max.) []? []? ********
DR config>list connection
Connections
--------

ID          Destination Address   Username
----------  --------------------  --------------------------------
         1  4444444               oficina4
         2  5555555               oficina5
DR config>
```

The following list shows the device global configuration once this operation has been executed.

```
DR config> exit
Config>show config
; Showing System Configuration ...
; Router ATLAS 2 8 Version 10.0.0

add device ppp 1
add device ppp 2
add device ppp 3
add device ppp 4
add device dial-routing 1
add device dial-routing 2
set data-link at serial0/0
set data-link at serial0/1
set data-link x25 serial0/2
network dialroute1
; -- DR interface configuration --
   pool-name RDSI
;
   connection 1 default
   connection 1 destination-address 1111111
```

```
   connection 1 username oficina1
   connection 1 password oficina1 oficina1
;
   connection 2 default
   connection 2 destination-address 2222222
   connection 2 username oficina2
   connection 2 password oficina2 oficina2
;
   connection 3 default
   connection 3 destination-address 3333333
   connection 3 username oficina3
   connection 3 password oficina3 oficina3
;
;
exit
;
network dialroute2
; -- DR interface configuration --
   pool-name RTC
;
   connection 1 default
   connection 1 destination-address 4444444
   connection 1 username oficina4
   connection 1 password oficina4 oficina4
;
   connection 2 default
   connection 2 destination-address 5555555
   connection 2 username oficina5
   connection 2 password oficina5 oficina5
;
;
exit
;
Config>
```

5.3. Configuring the AT Interfaces

A possible next step would be to configure the AT interfaces so that the installed modems operate correctly. The necessary parameters are as follows:

- Speed: The possible speeds that can be configured are as follows: 2400, 4800, 9600, 19200, 38400, 57600 and 115200. We recommend configuring the speed immediately above the speed of your modem. I.e. if you have a 33.6K modem (33600), configure 38400; if you have a 56K modem then configure 57600 etc.
- AT Commands: AT commands configuration depends on your modem. The majority of the modems operate with the default configuration in the device. Please consult the manufacturers manual for the modem to find out which commands are valid for your modem.
- It is also very important to stress that the data bits must be 8 therefore the **Data bits** parameters should not be modified. It's also quite common for the **Parity** parameter to be set to **NONE** and the **Stop bits** to **1**.

Subsequently, we will show the commands sequence in order to configure the speed and the AT commands. As you can see the default configuration has been respected, as it is perfectly valid for the modem in the example, however this serves as an example for the commands syntax.

```
Config>net 1

-- Interface AT. Configuration  --
AT config>?
ADDITIONAL-CONTROL-COMMAND      Set aditional AT commands
```

```
CONNECTION-MODE                 Set connection mode (Dial command or DTR)
CTS-CONTROL-COMMAND             Set AT command for CTS signal control
DATA-BITS                       Set number of bits per character
DCD-CONTROL-COMMAND             Set AT command for DCD signal control
DIAL-MODE                       Set dial mode (tone or pulse)
DISABLE                         Disable some features
DSR-CONTROL-COMMAND             Set AT command for DSR signal control
DTR-CONTROL-COMMAND             Set AT command for DTR signal control
ENABLE                          Enable some features
FLOW-CONTROL-COMMAND            Set AT command for flow control
FRAME-SIZE                      Set frame size
LIST                            List configuration
NO                              Set default config
NUMBER-RINGS                    Set number of rings for auto answer
PARITY                          Set number character parity
RING-TONE-LENGTH                Set ring tone and silence lengths
SPEED                           Set speed
STOP-BITS                       Set number of stop bits per character
V42-CONTROL-COMMAND            Set AT command for V.42 comp. and error correct.
WAIT-TIME                       Set maximum connection time
EXIT                            Return to previous menu
AT config>SPEED
Line speed (bps)                   : [57600]? 57600
AT config>ADDITIONAL-CONTROL-COMMAND
Additional AT commands[]?
AT config>CTS-CONTROL-COMMAND
CTS control command   = [&R0]? &R0
AT config>DCD-CONTROL-COMMAND
DCD control command   = [&C1]? &C1
AT config>DSR-CONTROL-COMMAND
DSR control command   = [&S0]? &S0
AT config>DTR-CONTROL-COMMAND
DTR control command   = [&D2]? &D2
AT config> V42-CONTROL-COMMAND
V.42/V.42 bis command = [&Q5]? &Q5
AT config>
```

NOTE: For further information on AT configuration, please consult manual Dm705-I Generic Serial Interfaces.

5.4. Configuring the ISDN Interfaces (BRI)

Here we will begin to configure the ISDN base interface. Normally the device default configuration is adequate provided its base interface corresponds to the European standards. In this case we recommend that you do not modify any of the parameters.

For American standards, it will be necessary to at least configure the standard and the SPIDs of the two circuits. If you do not know these values, please consult your telecommunications operator.

In the following example, you can see how to configure these two parameters where the standard is configured to NI-1 which is the most common for American standards.

```
BRI config>SET CIRCUIT SPID
Enter circuit (1-2)[1]? 1
Service Profile IDentifier (SPID)[]? 9876543210100
BRI config> SET CIRCUIT SPID
Enter circuit (1-2)[1]? 2
Service Profile IDentifier (SPID)[]? 9876543210101
BRI config>SET GLOBAL STANDARD NI-1
BRI config>
```

NOTE: For further information on configuring the BRI interface, please consult manual Dm729-I BRI ISDN Interface.

5.5. Configuring the PPP Interfaces

The configuration process continues with the configuration of the PPP interfaces. Firstly you need to create a dial profile or calls profile for the interfaces. Here you need to give permission in order to carry out outbound calls, as the purpose of *Dial Routing* is to be able to make calls to a number of destinations using a limited number of PPP interfaces. Additionally it is possible that you may want to receive calls. If you want all the interfaces to be able to receive calls you create a single dial profile used by all the interfaces. If you wish for only a few PPP links to receive calls (and therefore reserve the rest of the PPP interfaces to make calls only) then you will have to create a profile with inbound and outbound calls enabled and another profile with outbound calls only.

In the following commands sequence, you are shown how to create a dial profile. In the example we have assumed that all the profiles can both make and receive calls. Create a profile named DIALROUTING which will be used by all the PPP links. As you can see the profile is created by default with both inbound and outbound calls permitted and therefore does not require changing.

```
DIALPROF config>profile DIALROUTING default
DIALPROF config>profile DIALROUTING idle-time 70
DIALPROF config>list
DIAL PROFILE..: DIALROUTING
Local Address.:
Remote Address:                        Alternative Remote:
Permissions...: Inbound & Outbound
Idle Time.....: 70                     Access Control: Yes
Shutdown Calls: Yes
Callback......: None
ISDN Class....: 64 Kbps
Call Retry....: Disabled
Call List.....: No

DIALPROF config>
```

Subsequently, we are going to link the PPP interfaces with the base interface over which they will operate (BRI or AT depending on what suits). In the example, the ppp1 and ppp2 interfaces are configured to operate over ISDN and interfaces ppp3 and ppp4 to operate over serial lines 0 and 1 respectively.

```
Config>net ppp1

-- Generic PPP User Configuration --
GenPPP config>base

-- Base Interface Configuration --
Base IFC config>base bri0/0 255 link
Base IFC config>base bri0/0 255 profile DIALROUTING
Base IFC config>list

      Base Interface        Profile Name     Base Circuit Id  Number of circuits
--------------------------  ------------     ---------------  ------------------

         bri0/0      bri/0    DIALROUTING            255                1

Base IFC config>exit
GenPPP config>exit
Config>net ppp2

-- Generic PPP User Configuration --
GenPPP config>base

-- Base Interface Configuration --
Base IFC config>base bri0/0 255 link
```

```
Base IFC config>base bri0/0 255 profile DIALROUTING
Base IFC config>list

      Base Interface        Profile Name     Base Circuit Id  Number of circuits
-------------------------  ------------     ---------------  ------------------

         bri0/0      bri/0    DIALROUTING            255                1

Base IFC config>exit
GenPPP config>exit
Config>net ppp3

-- Generic PPP User Configuration --
GenPPP config>base serial0/0 link

-- Base Interface Configuration --
Base IFC config>base serial0/0 link
Base IFC config>base serial0/0 profile DIALROUTING
Base IFC config>list

      Base Interface        Profile Name     Base Circuit Id  Number of circuits
-------------------------  ------------     ---------------  ------------------

      serial0/0       at/0    DIALROUTING            1                  1

Base IFC config>Base IFC config>exit
GenPPP config>exit
Config>net ppp4

-- Generic PPP User Configuration --
GenPPP config>base

-- Base Interface Configuration --
Base IFC config>base serial0/1 link
Base IFC config>base serial0/1 profile DIALROUTING
Base IFC config>list

      Base Interface        Profile Name     Base Circuit Id  Number of circuits
-------------------------  ------------     ---------------  ------------------

      serial0/1       at/1    DIALROUTING            1                  1

Base IFC config>exit
GenPPP config>exit
Config>
```

Consequently we need to create the configurations of PPP itself. First of all create the users. You need to create one user per remote branch and another for the central.

```
Config>global-profiles ppp

-- PPP Profiles Configuration --
PPP Profiles config>user 1 default
PPP Profiles config>user 1 login
  Login:     []? central
PPP Profiles config>user 1 password
  Password:  []? **********
  Retype Password:  []? **********
PPP Profiles config>user 1 secret
  Password:  []? ***********
  Retype Password:  []? ***********
PPP Profiles config>user 11 default
PPP Profiles config>user 11 oficina1
No option found
PPP Profiles config>user 11 login
  Login:     []? oficina11
PPP Profiles config>user 11 password
```

```
  Password:  []? *********
  Retype Password:  []? ********
  Wrong password. Aborted
PPP Profiles config>user 11 login
  Login:     [oficina11]? oficina1
PPP Profiles config>user 11 password
  Password:  []? ********
  Retype Password:  []? ********
PPP Profiles config>user 11 secret
  Password:  []? ********
  Retype Password:  []? ********
PPP Profiles config>user 12 default
PPP Profiles config>user 12 login
  Login:     []? oficina2
PPP Profiles config>user 12 password
  Password:  []? ********
  Retype Password:  []? ********
PPP Profiles config>user 12 secret
  Password:  []? ********
  Retype Password:  []? ********
PPP Profiles config>user 13 default
PPP Profiles config>user 13 login
  Login:     []? oficina3
PPP Profiles config>user 13 password
  Password:  []? ********
  Retype Password:  []? ********
PPP Profiles config>user 13 secret
  Password:  []? ********
  Retype Password:  []? ********
PPP Profiles config>user 14 default
PPP Profiles config>user 14 login
  Login:     []? oficina4
PPP Profiles config>user 14 password
  Password:  []? ********
  Retype Password:  []? ********
PPP Profiles config>user 14 secret
  Password:  []? ********
  Retype Password:  []? ********
PPP Profiles config>user 15 default
PPP Profiles config>user 15 login
  Login:     []? oficina5
PPP Profiles config>user 15 password
  Password:  []? ********
  Retype Password:  []? ********
PPP Profiles config>user 15 secret
  Password:  []? ********
  Retype Password:  []? ********
PPP Profiles config>lis user
+------------------------------------------------------------------------------+
+ USER Profiles                                                                 +
+------------------------------------------------------------------------------+
***  Profile number: 1 ***
  Login:    central
  Password: **********
  Secret:   ***********

***  Profile number: 11 ***
  Login:    oficina1
  Password: ********
  Secret:   ********

***  Profile number: 12 ***
  Login:    oficina2
  Password: ********
  Secret:   ********

***  Profile number: 13 ***
  Login:    oficina3
  Password: ********
```

```
  Secret:   ********

***  Profile number: 14 ***
  Login:    oficina4
  Password: ********
  Secret:   ********

***  Profile number: 15 ***
  Login:    oficina5
  Password: ********
  Secret:   ********

PPP Profiles config>
```

Subsequently, create two lists of permitted users. One for the ISDN connections and the other for the PSTN connections.

```
PPP Profiles config>users-list 1 user oficina1
PPP Profiles config>users-list 1 user oficina2
PPP Profiles config>users-list 1 user oficina3
PPP Profiles config>users-list 2 user oficina4
PPP Profiles config>users-list 2 user oficina5
PPP Profiles config>list users-list
+------------------------------------------------------------------------+
+ USERS-LIST Profiles                                                     +
+------------------------------------------------------------------------+
***  Profile number: 1 ***
  Login:    oficina1
  Login:    oficina2
  Login:    oficina3

***  Profile number: 2 ***
  Login:    oficina4
  Login:    oficina5

PPP Profiles config>
```

Next, we need to enable CHAP authentication (i.e. this device demands that a PPP remote end authenticates through CHAP) and configure the *Dial Routing* pool name to which each PPP interface pertains to. Please note that it is essential that the pool name coincides with that configured in the corresponding *Dial Routing* interface.

```
PPP Profiles config>facilities 1 default
PPP Profiles config>facilities 1 dial-routing-pool RDSI
PPP Profiles config>facilities 1 authentication chap
PPP Profiles config>facilities 2 default
PPP Profiles config>facilities 2 dial-routing-pool RTC
PPP Profiles config>facilities 2 authentication chap
PPP Profiles config>lis facilities
+------------------------------------------------------------------------+
+ FACILITIES Profiles                                                    +
+------------------------------------------------------------------------+
***  Profile number: 1 ***
  Authentication Enabled: CHAP
  Validation by Keys
  Multilink PPP Disabled
  CCP Disabled
  CRTP Compression Disabled
  RIP no-dial Disabled
  Dial Routing Pool Name: RDSI

***  Profile number: 2 ***
  Authentication Enabled: CHAP
  Validation by Keys
```

```
  Multilink PPP Disabled
  CCP Disabled
  CRTP Compression Disabled
  RIP no-dial Disabled
  Dial Routing Pool Name: RTC

PPP Profiles config>
```

Finally create the PPP global profiles.

```
PPP Profiles config>ppp 1 default
PPP Profiles config>ppp 1 authentication 1
PPP Profiles config>ppp 1 users-list 1
PPP Profiles config>ppp 1 facilities 1
PPP Profiles config>ppp 2 default
PPP Profiles config>ppp 2 authentication 1
PPP Profiles config>ppp 2 users-list 2
PPP Profiles config>ppp 2 facilities 2
PPP Profiles config>lis ppp
+------------------------------------------------------------------------+
+ GLOBAL PPP Profiles                                                     +
+------------------------------------------------------------------------+
***  Profile number: 1 ***
  BACKUP Profile Number.........:   0 (default)
  CCP Profile Number............:   0 (default)
  FACILITIES Profile Number....:   1
  IPCP Profile Number...........:   0 (default)
  LCP PARAMETERS Profile Number:   0 (default)
  MULTILINK PPP Profile Number.:   0 (default)
  NCP Profile Number............:   0 (default)
  AUTHENTICATION Profile Number:   1
  USERS-LIST Profile Number....:   1

***  Profile number: 2 ***
  BACKUP Profile Number.........:   0 (default)
  CCP Profile Number............:   0 (default)
  FACILITIES Profile Number....:   2
  IPCP Profile Number...........:   0 (default)
  LCP PARAMETERS Profile Number:   0 (default)
  MULTILINK PPP Profile Number.:   0 (default)
  NCP Profile Number............:   0 (default)
  AUTHENTICATION Profile Number:   1
  USERS-LIST Profile Number....:   2

PPP Profiles config>
```

With this last step the two PPP profiles have been configured, one for the ISDN connections, which request CHAP authentication, accept users corresponding to branches 1, 2 and 3, is a member of the ISDN *dial routing* pool and authenticates with the "central" user. The second one is for PSTN connections which request CHAP authentication, accepts users corresponding to branches 4 and 5, is a member of the PSTN *dial routing* pool and authenticates with the "central" user.

Finally the last thing to do is to assign the first profile to the PPPs which operate over ISDN and the second profile to those operating over AT.

```
Config>net ppp1

-- Generic PPP User Configuration --
GenPPP config>ppp

-- PPP Configuration --
PPP config>profile 1
PPP config>exit
```

```
GenPPP config>exit
Config>net ppp2

-- Generic PPP User Configuration --
GenPPP config>ppp

-- PPP Configuration --
PPP config>profile 1
PPP config>exit
GenPPP config>exit
Config>net ppp3

-- Generic PPP User Configuration --
GenPPP config>ppp

-- PPP Configuration --
PPP config>profile 2
PPP config>exit
GenPPP config>exit
Config>net ppp4

-- Generic PPP User Configuration --
GenPPP config>ppp

-- PPP Configuration --
PPP config>profile 2
PPP config>exit
GenPPP config>exit
Config>
```

The following list displays the device global configuration in text mode after these configuration adjustments have been made.

```
Config>SHOW CONFIG
; Showing System Configuration ...
; Router ATLAS 2 8 Version 10.0.0

add device ppp 1
add device ppp 2
add device ppp 3
add device ppp 4
add device dial-routing 1
add device dial-routing 2
set data-link at serial0/0
set data-link at serial0/1
set data-link x25 serial0/2
global-profiles ppp
; -- PPP Profiles Configuration --
   facilities 1 default
   facilities 1 authentication chap
   facilities 1 dial-routing-pool RDSI
;
   facilities 2 default
   facilities 2 authentication chap
   facilities 2 dial-routing-pool RTC
;
   user 1 default
   user 1 login central
   user 1 password centralpap centralpap
   user 1 secret centralchap centralchap
;
   user 11 default
   user 11 login oficina1
   user 11 password oficina1 oficina1
   user 11 secret oficina1 oficina1
;
   user 12 default
   user 12 login oficina2
```

```
   user 12 password oficina2 oficina2
   user 12 secret oficina2 oficina2
;
   user 13 default
   user 13 login oficina3
   user 13 password oficina3 oficina3
   user 13 secret oficina3 oficina3
;
   user 14 default
   user 14 login oficina4
   user 14 password oficina4 oficina4
   user 14 secret oficina4 oficina4
;
   user 15 default
   user 15 login oficina5
   user 15 password oficina5 oficina5
   user 15 secret oficina5 oficina5
;
   users-list 1 default
   users-list 1 user oficina1
   users-list 1 user oficina2
   users-list 1 user oficina3
;
   users-list 2 default
   users-list 2 user oficina4
   users-list 2 user oficina5
;
   ppp 1 default
   ppp 1 facilities-profile 1
   ppp 1 authentication-profile 1
   ppp 1 users-list-profile 1
;
   ppp 2 default
   ppp 2 facilities-profile 2
   ppp 2 authentication-profile 1
   ppp 2 users-list-profile 2
;
exit
;
network ppp1
; -- Generic PPP User Configuration --
   ppp
; -- PPP Configuration --
      profile 1
   exit
;
   base-interface
; -- Base Interface Configuration --
      base-interface bri0/0 255 link
      base-interface bri0/0 255 profile DIALROUTING
;
   exit
;
exit
;
network ppp2
; -- Generic PPP User Configuration --
   ppp
; -- PPP Configuration --
      profile 1
   exit
;
   base-interface
; -- Base Interface Configuration --
      base-interface bri0/0 255 link
      base-interface bri0/0 255 profile DIALROUTING
;
   exit
```

```
;
exit
;
network ppp3
; -- Generic PPP User Configuration --
   ppp
; -- PPP Configuration --
      profile 2
   exit
;
   base-interface
; -- Base Interface Configuration --
      base-interface serial0/0 link
      base-interface serial0/0 profile DIALROUTING
;
   exit
;
exit
;
network ppp4
; -- Generic PPP User Configuration --
   ppp
; -- PPP Configuration --
      profile 2
   exit
;
   base-interface
; -- Base Interface Configuration --
      base-interface serial0/1 link
      base-interface serial0/1 profile DIALROUTING
;
   exit
;
exit
;
;
network dialroute1
; -- DR interface configuration --
   connection 1 default
   connection 1 destination-address 1111111
   connection 1 username oficina1
   connection 1 password oficina1 oficina1
;
   connection 2 default
   connection 2 destination-address 2222222
   connection 2 username oficina2
   connection 2 password oficina2 oficina2
;
   connection 3 default
   connection 3 destination-address 3333333
   connection 3 username oficina3
   connection 3 password oficina3 oficina3
;
;
exit
;
;
network dialroute2
; -- DR interface configuration --
   connection 1 default
   connection 1 destination-address 4444444
   connection 1 username oficina4
   connection 1 password oficina4 oficina4
;
   connection 2 default
   connection 2 destination-address 5555555
   connection 2 username oficina5
   connection 2 password oficina5 oficina5
;
```

```
;
exit
;
set dial-profile
; -- DIAL PROFILE CONFIGURATION --
   profile DIALROUTING default
   profile DIALROUTING idle-time 70
;
exit
;
Config>
```

a) Configuring with multilink PPP

Sometimes occasions arise where you wish to connect to a remote device at a higher speed, using the two B channels from the ISDN base interface for example. In these cases, the PPP protocol permit various PPP links to be aggregated through a mechanism known as multilink PPP (MP). This facility can be used over any two PPP links. The most common use is that described above, to join two B channels and achieve a bandwidth of 128 Kbps. However it is also possible to carry out MP over two modem connections provided that both ends have two modem connections.

It is possible in the given scenario to make use of this mechanism to obtain wider bandwidth connections, however it is necessary to emphasis various aspects:

- A PPP is going to simultaneously use various channels; therefore the number of simultaneous connections is reduced. I.e. if we have two ISDN channels available and multilink can be carried out over them, when this facility is in use, you cannot access other remote devices.
- The destination telephone numbers must be the same for all the connections that are going to participate in the same MP link as, in the *Dial Routing* connections, only one telephone number can be configured.

Various variations can be proposed over the above scenario where multilink use can intervene. The simplest would be to permit all ISDN destinations for example to execute multilink. In this case you would only need to configure the involved PPP interfaces so that they can operate with multilink.

Another possible variation is where you only need to access some destinations with multilink. This latter configuration means you need to create another *Dial Routing* interface which handles the PPPs that can carry out multilink, configure these PPP interfaces to operate with multilink and register the connections with destinations which you wish to access with multilink in this *Dial Routing* interface.

Below you can see the configuration process for the first of these scenarios.

The first step is to modify the base interfaces configuration which use the PPPs over ISDN to permit the use of the two BRI channels. For this we need to execute the following sequence of commands.

```
Config>network ppp1

-- Generic PPP User Configuration --
GenPPP config>base

-- Base Interface Configuration --
Base IFC config>base-interface bri0/0 255 number-of-circuits 2
Base IFC config>list

      Base Interface        Profile Name     Base Circuit Id  Number of circuits
-------------------------  ------------     ---------------  ------------------

         bri0/0      bri/0    DIALROUTING             255                 2

Base IFC config>exit
GenPPP config>exit
Config>network ppp2

-- Generic PPP User Configuration --
GenPPP config>base

-- Base Interface Configuration --
Base IFC config>base-interface bri0/0 255 number-of-circuits 2
Base IFC config>lis

      Base Interface        Profile Name     Base Circuit Id  Number of circuits
-------------------------  ------------     ---------------  ------------------

         bri0/0      bri/0    DIALROUTING             255                 2

Base IFC config>
```

Subsequently, we need to configure the multilink parameters in the PPP profiles of the interfaces that are going to operate with multilink. The PPP interfaces over ISDN use PPP profile 1; consequently this one must be modified.

Firstly, we need to enable multilink in the facilities profile.

```
Base IFC config>exit
GenPPP config>exit
Config>global ppp
PPP Profiles config>facilities 1 multilink
PPP Profiles config>list facilities
+-------------------------------------------------------------------------+
+ FACILITIES Profiles                                                     +
+-------------------------------------------------------------------------+
***  Profile number: 1 ***
  Authentication enabled: CHAP
  Validation by Keys
  Multilink PPP enabled
  CCP disabled
  CRTP Compression disabled
  RIP no-dial disabled
  Dial Routing Pool Name: RDSI

***  Profile number: 2 ***
  Authentication enabled: CHAP
  Validation by Keys
  Multilink PPP disabled
  CCP disabled
  CRTP Compression disabled
  RIP no-dial disabled
  Dial Routing Pool Name: RTC

PPP Profiles config>
```

And subsequently configure the multilink parameters themselves. **We strongly recommend enabling the option that only permits you to add new links to the multilink if the PPP has been initiated from our side**. In addition to other possible parameters, you can configure the following:

- Activation Interval: This is the period of time that the traffic load on the line must remain above the activation threshold so a new link is added.
- Deactivation Interval: This is the period of time that the traffic load on the line must remain below the activation threshold so a link is released.
- Activation Threshold: This is the previously mentioned activation threshold.
- Deactivation Threshold: This is the previously mentioned deactivation threshold.
- Traffic Load: This is the direction of the traffic taken into account in order to calculate the amount of traffic on the line (inbound, outbound or both).
- Max Links per Bundle: Maximum number of links that can be added to the same multilink.

We recommend that the remaining parameters take their default values.

```
PPP Profiles config>multilink 1 call-out
PPP Profiles config>multilink 1 activation interval 60
PPP Profiles config>multilink 1 activation threshold 80
PPP Profiles config>multilink 1 deactivation interval 90
PPP Profiles config>multilink 1 deactivation threshold 25
PPP Profiles config>list multilink
+------------------------------------------------------------------------+
+ MULTILINK Profiles                                                     +
+------------------------------------------------------------------------+
***  Profile number: 1 ***
  MRRU...: 1524
  Use SSN: NO
  Endpoint Discriminator Class: 0
  ED value (Null Class): None
  Activation Interval...: 60
  Deactivation Interval.: 90
  Activation Threshold..: 80
  Deactivation Threshold: 25
  Traffic Load..........: Inbound & Outbound traffic
  Max Links per Bundle.....: 2
  Forced Fragmentation Size: 0 (disabled)
  Permission to add/remove links: Only in outgoing connections

PPP Profiles config>
```

In this example, a multilink has been configured. This will attempt to add a new link if the line traffic load remains above 80% of the accumulated bandwidth during 60 consecutive seconds and will attempt to eliminate the link if the traffic load remains below 25% of the said bandwidth during 80 seconds taking into account both inbound and outbound traffic. Please note that the percentage of traffic is taken over the whole of the bandwidth that the multilink currently has enabled. I.e. if there is a single PPP over ISDN, the activation level will be 51.2 Kbps (80% of 64 Kbps) and when there are two links, the deactivation threshold is 32 Kbps (25% of 128 Kbps). We recommend that these calculations be made when configuring. You need to make sure that you do not configure an activation time below the deactivation time, contrariwise the result will be the constant adding and eliminating of links.

Lastly, you need to assign the multilink profile created for the adequate PPP profile.

```
PPP Profiles config>ppp 1 mppp 1
PPP Profiles config>lis ppp 1
+------------------------------------------------------------------------+
+ GLOBAL PPP Profiles                                                     +
+------------------------------------------------------------------------+
***  Profile number: 1 ***
  BACKUP Profile Number........:   0 (default)
  CCP Profile Number...........:   0 (default)
  FACILITIES Profile Number....:   1
  IPCP Profile Number..........:   0 (default)
  LCP PARAMETERS Profile Number:   0 (default)
  MULTILINK PPP Profile Number.:   1
  NCP Profile Number...........:   0 (default)
  AUTHENTICATION Profile Number:   1
  USERS-LIST Profile Number....:   1

***  Profile number: 2 ***
  BACKUP Profile Number........:   0 (default)
  CCP Profile Number...........:   0 (default)
  FACILITIES Profile Number....:   2
  IPCP Profile Number..........:   0 (default)
  LCP PARAMETERS Profile Number:   0 (default)
  MULTILINK PPP Profile Number.:   0 (default)
  NCP Profile Number...........:   0 (default)
  AUTHENTICATION Profile Number:   1
  USERS-LIST Profile Number....:   2

PPP Profiles config>
```

The command that displays the configuration in text mode provides the following result:

```
Config>SHOW CONFIG
; Showing System Configuration ...
; Router ATLAS 2 8 Version 10.0.0

add device ppp 1
add device ppp 2
add device ppp 3
add device ppp 4
add device dial-routing 1
add device dial-routing 2
set data-link asdp serial0/2
set data-link at serial0/0
set data-link at serial0/1
global-profiles ppp
; -- PPP Profiles Configuration --
   facilities 1 default
   facilities 1 authentication chap
   facilities 1 mp
   facilities 1 dial-routing-pool RDSI
;
   facilities 2 default
   facilities 2 authentication chap
   facilities 2 dial-routing-pool RTC
;
   multilink 1 default
   multilink 1 activation interval 60
   multilink 1 deactivation interval 90
   multilink 1 activation threshold 80
   multilink 1 deactivation threshold 25
   multilink 1 call-out
;
   user 1 default
   user 1 login central
   user 1 password centralpap centralpap
```

```
   user 1 secret centralchap centralchap
;
   user 11 default
   user 11 login oficina1
   user 11 password oficina1 oficina1
   user 11 secret oficina1 oficina1
;
   user 12 default
   user 12 login oficina2
   user 12 password oficina2 oficina2
   user 12 secret oficina2 oficina2
;
   user 13 default
   user 13 login oficina3
   user 13 password oficina3 oficina3
   user 13 secret oficina3 oficina3
;
   user 14 default
   user 14 login oficina4
   user 14 password oficina4 oficina4
   user 14 secret oficina4 oficina4
;
   user 15 default
   user 15 login oficina5
   user 15 password oficina5 oficina5
   user 15 secret oficina5 oficina5
;
   users-list 1 default
   users-list 1 user oficina1
   users-list 1 user oficina2
   users-list 1 user oficina3
;
   users-list 2 default
   users-list 2 user oficina4
   users-list 2 user oficina5
;
   ppp 1 default
   ppp 1 facilities-profile 1
   ppp 1 mppp-profile 1
   ppp 1 authentication-profile 1
   ppp 1 users-list-profile 1
;
   ppp 2 default
   ppp 2 facilities-profile 2
   ppp 2 authentication-profile 1
   ppp 2 users-list-profile 2
;
exit
;
network ppp1
; -- Generic PPP User Configuration --
   ppp
; -- PPP Configuration --
      profile 1
   exit
;
   base-interface
; -- Base Interface Configuration --
      base-interface bri0/0 255 link
      base-interface bri0/0 255 profile DIALROUTING
      base-interface bri0/0 255 number-of-circuits 2
;
   exit
;
exit
;
network ppp2
; -- Generic PPP User Configuration --
   ppp
; -- PPP Configuration --
      profile 1
```

```
   exit
;
   base-interface
; -- Base Interface Configuration --
      base-interface bri0/0 255 link
      base-interface bri0/0 255 profile DIALROUTING
      base-interface bri0/0 255 number-of-circuits 2
;
   exit
;
exit
;
network ppp3
; -- Generic PPP User Configuration --
   ppp
; -- PPP Configuration --
      profile 2
   exit
;
   base-interface
; -- Base Interface Configuration --
      base-interface serial0/0 link
      base-interface serial0/0 profile DIALROUTING
;
   exit
;
exit
;
network ppp4
; -- Generic PPP User Configuration --
   ppp
; -- PPP Configuration --
      profile 2
   exit
;
   base-interface
; -- Base Interface Configuration --
      base-interface serial0/1 link
      base-interface serial0/1 profile DIALROUTING
;
   exit
;
exit
;
;
network dialroute1
; -- DR interface configuration --
   connection 1 default
   connection 1 destination-address 1111111
   connection 1 username oficina1
   connection 1 password oficina1 oficina1
;
   connection 2 default
   connection 2 destination-address 2222222
   connection 2 username oficina2
   connection 2 password oficina2 oficina2
;
   connection 3 default
   connection 3 destination-address 3333333
   connection 3 username oficina3
   connection 3 password oficina3 oficina3
;
;
exit
;
;
network dialroute2
; -- DR interface configuration --
   connection 1 default
   connection 1 destination-address 4444444
   connection 1 username oficina4
```

```
   connection 1 password oficina4 oficina4
;
   connection 2 default
   connection 2 destination-address 5555555
   connection 2 username oficina5
   connection 2 password oficina5 oficina5
;
;
exit
;
set dial-profile
; -- DIAL PROFILE CONFIGURATION --
   profile DIALROUTING default
   profile DIALROUTING idle-time 70
;
exit
;
Config>
```

NOTE: For further information on configuring PPP, please see manual Dm710-I PPP Interface.

5.6. Configuring IP

Once you have configured everything relating to the interfaces, you need to configure the IP protocol.

a) Configuring IP addresses

Configure the Ethernet IP address and the internal IP address is set to coincide with the said address.

```
IP config>address ethernet0/0 7.7.7.7 255.255.255.0
IP config>internal-ip-address 7.7.7.7
IP config>lis addresses
IP addresses for each interface:
 ethernet0/0     7.7.7.7         255.255.255.0   NETWORK broadcast,  fill 0
 serial0/0                                       IP disabled on this ifc
 serial0/1                                       IP disabled on this ifc
 serial0/2                                       IP disabled on this ifc
 bri0/0                                          IP disabled on this ifc
 x25-node                                        IP disabled on this ifc
 ppp1                                            IP disabled on this ifc
 ppp2                                            IP disabled on this ifc
 ppp3                                            IP disabled on this ifc
 ppp4                                            IP disabled on this ifc
 dialroute1                                      IP disabled on this ifc
 dialroute2                                      IP disabled on this ifc
Internal IP address: 7.7.7.7
IP config>
```

The PPP and *Dial Routing* interfaces are configured as unnumbered.

```
Config>protocol ip

-- Internet protocol user configuration --
IP config>address ppp1 unnumbered
IP config>address ppp2 unnumbered
IP config>address ppp3 unnumbered
IP config>address ppp4 unnumbered
IP config>address dialroute1 unnumbered
IP config>address dialroute2 unnumbered
IP config>list addresses
IP addresses for each interface:
 ethernet0/0     7.7.7.7         255.255.255.0   NETWORK broadcast,  fill 0
 serial0/0                                       IP disabled on this ifc
 serial0/1                                       IP disabled on this ifc
 serial0/2                                       IP disabled on this ifc
 bri0/0                                          IP disabled on this ifc
 x25-node                                        IP disabled on this ifc
 ppp1            unnumbered      0.0.0.0         NETWORK broadcast,  fill 0
 ppp2            unnumbered      0.0.0.0         NETWORK broadcast,  fill 0
 ppp3            unnumbered      0.0.0.0         NETWORK broadcast,  fill 0
 ppp4            unnumbered      0.0.0.0         NETWORK broadcast,  fill 0
 dialroute1      unnumbered      0.0.0.0         NETWORK broadcast,  fill 0
 dialroute2      unnumbered      0.0.0.0         NETWORK broadcast,  fill 0
Internal IP address: 7.7.7.7
IP config>
```

b) Enabling Ip Classless

```
IP config>classless
IP config>list ip-protocol
Directed broadcasts: enabled
RIP: disabled
OSPF: disabled
Per-packet-multipath: disabled
Ip classless: enabled
Icmp redirects: enabled
IP config>
```

5.7. Adding ID static routes

This last step configures the routes with identifier which link the IP destinations with the *Dial Routing* interfaces connections. To do this a route to the destination address/subnet is created with the gateway being the *Dial Routing* interface used for access together with the identifier corresponding to the *Dial Routing* connection. This connection should be used to connect to the device providing access to the said network.

In this example, a route with identifier has been created for branch 1 towards network 1.1.1.0, with mask 255.255.255.0, whose gateway is the dialroute1 interface and whose identifier is 1, as this is the connection created with the parameters to access branch 1. A similar process is carried out with the rest of the branches and the result is shown below:

```
IP config>id-route
IP destination [0.0.0.0]? 1.1.1.0
Address mask [0.0.0.0]? 255.255.255.0
Via gateway at [0.0.0.0]? dialroute1
ID Id[1]? 1
IP config>id-route
IP destination [0.0.0.0]? 2.2.2.0
Address mask [0.0.0.0]? 255.255.255.0
Via gateway at [0.0.0.0]? dialroute1
```

```
ID Id[1]? 2
IP config>id-route
IP destination [0.0.0.0]? 3.3.3.0
Address mask [0.0.0.0]? 255.255.255.0
Via gateway at [0.0.0.0]? dialroute1
ID Id[1]? 3
IP config>id-route
IP destination [0.0.0.0]? 4.4.4.0
Address mask [0.0.0.0]? 255.255.255.0
Via gateway at [0.0.0.0]? dialroute2
ID Id[1]? 1
IP config>id-route
IP destination [0.0.0.0]? 5.5.5.0
Address mask [0.0.0.0]? 255.255.255.0
Via gateway at [0.0.0.0]? dialroute2
ID Id[1]? 2
IP config>list routes

ID route to 1.1.1.0,255.255.255.0 via dialroute1, Id 1, cost 3
ID route to 2.2.2.0,255.255.255.0 via dialroute1, Id 2, cost 3
ID route to 3.3.3.0,255.255.255.0 via dialroute1, Id 3, cost 3
ID route to 4.4.4.0,255.255.255.0 via dialroute2, Id 1, cost 3
ID route to 5.5.5.0,255.255.255.0 via dialroute2, Id 2, cost 3
IP config>
```

NOTE: For further information on configuring IP, please see manual Dm702-I TCP/IP.

5.8. Configuration Summary

Lastly, we are going to display the definitive device global configuration in text mode for our scenario. This configuration can be used as a base to carry out any required modifications and to send the resulting commands sequence to the device in order to obtain the required configuration. **This configuration does not include the multilink configuration.**

```
Config>show config
; Showing System Configuration ...
; Router ATLAS 2 8 Version 10.0.0

add device ppp 1
add device ppp 2
add device ppp 3
add device ppp 4
add device dial-routing 1
add device dial-routing 2
set data-link at serial0/0
set data-link at serial0/1
set data-link x25 serial0/2
global-profiles ppp
; -- PPP Profiles Configuration --
   facilities 1 default
   facilities 1 authentication chap
   facilities 1 dial-routing-pool RDSI
;
   facilities 2 default
   facilities 2 authentication chap
   facilities 2 dial-routing-pool RTC
;
   user 1 default
   user 1 login central
   user 1 password centralpap centralpap
```

```
   user 1 secret centralchap centralchap
;
   user 11 default
   user 11 login oficina1
   user 11 password oficina1 oficina1
   user 11 secret oficina1 oficina1
;
   user 12 default
   user 12 login oficina2
   user 12 password oficina2 oficina2
   user 12 secret oficina2 oficina2
;
   user 13 default
   user 13 login oficina3
   user 13 password oficina3 oficina3
   user 13 secret oficina3 oficina3
;
   user 14 default
   user 14 login oficina4
   user 14 password oficina4 oficina4
   user 14 secret oficina4 oficina4
;
   user 15 default
   user 15 login oficina5
   user 15 password oficina5 oficina5
   user 15 secret oficina5 oficina5
;
   users-list 1 default
   users-list 1 user oficina1
   users-list 1 user oficina2
   users-list 1 user oficina3
;
   users-list 2 default
   users-list 2 user oficina4
   users-list 2 user oficina5
;
   ppp 1 default
   ppp 1 facilities-profile 1
   ppp 1 authentication-profile 1
   ppp 1 users-list-profile 1
;
   ppp 2 default
   ppp 2 facilities-profile 2
   ppp 2 authentication-profile 1
   ppp 2 users-list-profile 2
;
exit
;
network ppp1
; -- Generic PPP User Configuration --
   ppp
; -- PPP Configuration --
      profile 1
   exit
;
   base-interface
; -- Base Interface Configuration --
      base-interface bri0/0 255 link
      base-interface bri0/0 255 profile DIALROUTING
;
   exit
;
exit
;
network ppp2
; -- Generic PPP User Configuration --
   ppp
; -- PPP Configuration --
      profile 1
```

```
   exit
;
   base-interface
; -- Base Interface Configuration --
      base-interface bri0/0 255 link
      base-interface bri0/0 255 profile DIALROUTING
;
   exit
;
exit
;
network ppp3
; -- Generic PPP User Configuration --
   ppp
; -- PPP Configuration --
      profile 2
   exit
;
   base-interface
; -- Base Interface Configuration --
      base-interface serial0/0 link
      base-interface serial0/0 profile DIALROUTING
;
   exit
;
exit
;
network ppp4
; -- Generic PPP User Configuration --
   ppp
; -- PPP Configuration --
      profile 2
   exit
;
   base-interface
; -- Base Interface Configuration --
      base-interface serial0/1 link
      base-interface serial0/1 profile DIALROUTING
;
   exit
;
exit
;
;
network dialroute1
; -- DR interface configuration --
```

```
   connection 1 default
   connection 1 destination-address 1111111
   connection 1 username oficina1
   connection 1 password oficina1 oficina1
;
   connection 2 default
   connection 2 destination-address 2222222
   connection 2 username oficina2
   connection 2 password oficina2 oficina2
;
   connection 3 default
   connection 3 destination-address 3333333
   connection 3 username oficina3
   connection 3 password oficina3 oficina3
;
;
exit
;
;
network dialroute2
; -- DR interface configuration --
   connection 1 default
   connection 1 destination-address 4444444
   connection 1 username oficina4
   connection 1 password oficina4 oficina4
;
   connection 2 default
   connection 2 destination-address 5555555
   connection 2 username oficina5
   connection 2 password oficina5 oficina5
;
;
exit
;
set dial-profile
; -- DIAL PROFILE CONFIGURATION --
   profile DIALROUTING default
   profile DIALROUTING idle-time 70
;
exit
;
protocol ip
; -- Internet protocol user configuration --
   internal-ip-address 5.5.5.5
;
   address  ethernet0/0     5.5.5.5          255.255.255.0
   address  ppp1            unnumbered       0.0.0.0
   address  ppp2            unnumbered       0.0.0.0
   address  ppp3            unnumbered       0.0.0.0
   address  ppp4            unnumbered       0.0.0.0
   address  dialroute1      unnumbered       0.0.0.0
   address  dialroute2      unnumbered       0.0.0.0
;
   classless
;  ID-ROUTE IP-Destination, Address mask, Via gateway at, ID
   id-route 1.1.1.0         255.255.255.0   dialroute1      1
   id-route 2.2.2.0         255.255.255.0   dialroute1      2
   id-route 3.3.3.0         255.255.255.0   dialroute1      3
   id-route 4.4.4.0         255.255.255.0   dialroute2      1
   id-route 5.5.5.0         255.255.255.0   dialroute2      2
exit
;
Config>
```

Chapter 2
Configuration

1. Dial Routing Interface Configuration Commands

This section describes all the commands to configure the *Dial Routing* interface. In order to access the configuration environment for the said interface, you need to proceed as for the rest of the device interfaces, through the **NETWORK** command in the device configuration followed by the interface identifier:

```
*PROCESS 4

Config> NETWORK dialroute1
-- DR interface configuration --
DR config>
```

1.1. Configuring connections

a) Adding a new connection

In order to add a new connection, use the **CONNECTION** command.

```
DR config>CONNECTION <id> default
```

This command creates a connection with the default values for the distinct parameters. The way to modify the parameter values will be explained further on in this manual.

The <id> parameter is a number that uniquely identifies the connection. This connection identifier must be distinct to already existing connections. Contrariwise, the command will modify the previously configured connection parameters that have the said identifier.

Additionally, this identifier serves to link the connection with the IP destination accessed through the said connection. For this, the ID static route identifier must coincide with the *Dial Routing* connection identifier that provides access to the subnet specifying this route.

b) Modifying connection parameters

Once the connection has been created, in order to assign parameter values or change the previously assigned value use the **CONNECTION** command with the different permitted options.

· *Modifying the destination telephone number*

```
DR config>CONNECTION <id> destination-address
```

· *Modifying the user*

```
DR config>CONNECTION <id> username <name>
```

· *Modifying the password*

```
DR config>CONNECTION <id> password <password> <password>
```

c) Deleting a connection

This command is used to delete a connection and is displayed below.

```
DR config>NO CONNECTION <id>
```

d) Example of a connection configuration

First of all, create the connection

```
DR config>connection 5 default
```

Secondly, assign the values to the different parameters

```
DR config>connection 5 destination-address 918076565
DR config>connection 5 username usuario1
DR config>connection 5 password password1 password1
DR config>list connection
Connections
-----------

ID          Destination Address   Username
----------  --------------------  ------------------------------
         5  918076565             usuario1
```

Change the value of a parameter that was incorrectly introduced. E.g. if its necessary to enter a 0 before the telephone number in order to access the external line, the command is as follows:

```
DR config>connection 5 destination-address 0918076565
DR config>list connection
Connections
-----------

ID          Destination Address   Username
----------  --------------------  ------------------------------
         5  0918076565             usuario1
```

Lastly, when you wish to delete a connection, enter:

```
DR config>no connection 5
DR config>list connection
No connections found.
DR config>
```

1.2. Configuring the pool name

The connections pool name is used to link the *Dial Routing* interface with the PPP interfaces which are used to establish the connections. For this, on enabling *Dial Routing* in the PPP facilities profile you must configure the same profile name as configured here.

To configure the PPP links pool name that will use this interface, use the following command:

```
DR config>POOL-NAME <pool-name>
```

Example:

```
DR config>POOL-NAME
Type pool name  []? POOL1
DR config>
```

1.3. Configuring the quarantine time

When a PPP interface suffers a local source error detectable only when you try and carry out a connection (ISDN cable disconnection for example), a mechanism is used to avoid the situation where successive connections unsuccessfully try to use this interface. This mechanism places the interface in "quarantine" during a determined period of time during which the *Dial Routing* will not use the said PPP link. The duration time of this quarantine period is configurable through the command given below.

```
DR config>QUARANTINE-TIME <number of minutes>
```

Example:

```
DR config>QUARANTINE-TIME
Type quarantine time (2-60 minutes) [4]?
DR config>
```

1.4. Displaying the configuration

a) Listing the configuration common to all connections

In order to list the configuration affecting all the connections, use the following command:

```
DR config>LIST INTERFACE
```

Example:

```
DR config>LIST INTERFACE
Interface Configuration
-----------------------
Pool Name:          POOL1
Quarantine time:    4 min.
DR config>
```

b) Listing specific connection parameters

In order to list the configured connections, use the following command:

```
DR config>LIST CONNECTION
```

Example:

```
DR config>LIST CONNECTION
Connections
-----------

ID          Destination Address   Username
----------  --------------------  ------------------------------
         1  918076565             USUARIO1@teldat
DR config>
```

c) Listing all the configuration

In order to list the whole of the configuration for this interface, execute the command given below:

```
DR config>LIST ALL
```

Example:

```
DR config>LIST ALL
Interface Configuration
-----------------------
Pool Name:          POOL1
Quarantine time:    4 min.

Connections
-----------

ID          Destination Address   Username
----------  --------------------  ------------------------------
         1  918076565             USUARIO1@teldat
DR config>
```

1.5. Return to the previous menu

In order to exit the interface configuration menu and to return to the device main configuration menu, use the command shown below which is the same in the entire device configuration.

```
DR config>EXIT
```

Example:

```
DR config>EXIT
Config>
```

2. ID Static Routes Configuration Commands

In this section, all the commands to configure the ID static routes are described. In order to access the configuration environment for the said routes, access the IP configuration menu introducing the following commands:

```
*P 4
User Configuration

Config>PROTOCOL IP
Internet protocol user configuration
IP config>
```

2.1. Adding a static route with identifier

In order to add an ID static route, enter the following command:

```
IP config>ID-ROUTE <dest> <mask> <next-gw> <id>
```

The parameters are, in this order, destination network, destination mask, next hop and identifier.

In the next hop parameter, you need to introduce the *Dial Routing* interface identifier which contains the connection to reach the said destination network.

Example:

```
IP config>ID-ROUTE
IP destination [0.0.0.0]? 2.2.2.2
Address mask [0.0.0.0]? 255.255.255.255
Via gateway at [0.0.0.0]? dialroute1
ID Id[1]? 25
IP config>
```

2.2. Deleting a static route with identifier

To delete an ID static route, enter the following command:

```
IP config>NO ID-ROUTE <dest> <mask> <next-gw>
```

These parameters, in this order, are: destination network, destination mask, next hop and identifier.

Example:

```
IP config> NO ID-ROUTE 2.2.2.2 255.255.255.255 dialroute1
IP config>
```

2.3. Listing configured ID routes

In order to list the configured static routes use the following command.

Syntax:

```
IP config>LIST ROUTE
```

Note: The ID routes are those in the list that begin with "ID Route…". The rest are normal static routes.

Example:

```
IP config>LIST ROUTE
route to 0.0.0.0,0.0.0.0 via 192.168.1.1, cost 1
ID route to 5.5.5.5,255.255.255.255 via dialroute1, Id 5, cost 3
ID route to 3.3.3.3,255.255.255.255 via dialroute1, Id 3, cost 3
ID route to 1.1.1.1,255.255.255.255 via dialroute1, Id 1, cost 3
ID route to 192.80.0.120,255.255.255.255 via dialroute2, Id 2, cost 3
IP config>
```

NOTE: For further information on IP configuration, please see manual Dm702-I TCP/IP.

3. Configuring the PPP interface

In this section, the commands used to configure the PPP interface to use the *DIAL ROUTING* facility are described.

The steps required to carry out this configuration are as follows:

- Enable *Dial Routing* in a PPP facilities profile, configuring a pool name.
- Assign the created facilities profile to a PPP global profile.
- Assign the PPP global profile to the PPP interfaces that pertain to the said *Dial Routing* pool.

To access the PPP profiles configuration environment, execute the following sequence of commands:

```
*PROCESS 4

Config>GLOBAL-PROFILES PPP

-- PPP Profiles Configuration --
PPP Profiles config>
```

So that a PPP interface participates in the *Dial routing* process, it only needs to pertain to a *Dial routing pool*. In this way, the DIAL ROUTING interface which is configured to use the said *pool* has this PPP interface available to carry out the necessary connections.

3.1. Enable *Dial Routing*

The command that enables the *dial routing* facility in a PPP interface is as follows:

Syntax:

```
PPP Profiles config>FACILITIES <id> dial-routing-pool <pool-name>
```

Example:

```
PPP Config>FACILITIES 5 dial-routing-pool
 Dial Routing Pool name  []?POOL1
PPP Profiles config>
```

To list the PPP facilities profiles, execute the following command:

```
PPP Config>LIST FACILITIES
```

Example:

```
PPP Profiles config>LIST FACILITIES
+------------------------------------------------------------------------+
+ FACILITIES Profiles                                                    +
+------------------------------------------------------------------------+
***  Profile number: 5 ***
  Authentication Disabled
  Validation by Keys
  Multilink PPP Disabled
  CCP Disabled
  CRTP Compression Disabled
  RIP no-dial Disabled
  Dial Routing Pool Name: POOL1

PPP Profiles config>
```

3.2. Configuring a PPP global profile

To assign the created/modified facilities profile to a PPP global profile, use the following command:

Syntax:

```
PPP Profiles config>PPP <id> facilities-profile <facilities profile id>
```

Example:

```
PPP Profiles config>PPP 5 facilities-profile
  Facilities Profile Number(0=default)[0]? 5
PPP Profiles config>list ppp
+------------------------------------------------------------------------+
+ GLOBAL PPP Profiles                                                    +
+------------------------------------------------------------------------+
***  Profile number: 5 ***
  BACKUP Profile Number........:   0 (default)
  CCP Profile Number...........:   0 (default)
  FACILITIES Profile Number....:   5
  IPCP Profile Number..........:   0 (default)
  LCP PARAMETERS Profile Number:   0 (default)
  MULTILINK PPP Profile Number.:   0 (default)
  NCP Profile Number...........:   0 (default)
  AUTHENTICATION Profile Number:   0 (default)
  USERS-LIST Profile Number....:   0 (default)

PPP Profiles config>
```

3.3. Assigning a PPP profile to an interface

The final step is to assign the global PPP profile to a PPP interface. For this you need to access the interface configuration menu:

Syntax:

```
Config>NETWORK <identifier>
```

Example:

```
Config>NETWORK ppp1

-- Generic PPP User Configuration --
GenPPP config>
```

Once in this menu, you need to enter the PPP menu:

```
GenPPP config>PPP
```

Example:

```
GenPPP config>PPP

-- PPP Configuration --
PPP config>
```

And execute the command to assign a PPP global profile:

```
PPP config>PROFILE <id>
```

Example:

```
PPP config>PROFILE 5
```

NOTE: For further information on configuring PPP, please see manual Dm710-I PPP Interface.

Chapter 3
Monitoring

1. Monitoring the Dial Routing Interface

This section describes the commands used to monitor the state of the *Dial Routing* interface links and connections. To access this monitoring, introduce the following commands:

```
*PROCESS 3

+NETWORK <id>
DR monitor+
```

Example:

```
*PROCESS 3

+NETWORK diaroute1
DR monitor+
```

1.1. Displaying the monitoring information

a) Link information

To list the state of the PPP interfaces that participate in the *dial routing* process directed by this interface, use the following command:

```
DR monitor+LIST LINKS
```

Example:

```
DR monitor+LIST LINKS
Links status
------------
PPP Interface    Status                    Connection ID
---------------  ------------------------  -------------
ppp1             IDLE
ppp2             IDLE
DR monitor+
```

This list contains an entry for each PPP interface that can be used by this Dial Route interface to carry out a connection. The *Status* field indicates if the interface is active or available. In cases where it is active, the *Connection ID* field indicates the identifier of the connection you are using.

In cases where the link list contains less interfaces than expected, check the pool name configuration both in the *Dial Routing* interface and the PPP interfaces.

b) Connection Status

To list the status of the *dial routing* connections in an interface, use the following command:

```
DR monitor+LIST CONNECTIONS
```

Example:

```
DR monitor+LIST CONNECTIONS
Connections status
------------------
Connection Id  Destination address   Username                          Status
-------------  --------------------  --------------------------------  --------
            1  918076565             USUARIO1@teldat                   INACTIVE
DR monitor+
```

A list is displayed with an entry for each connection profile where you can see the identifier, the destination telephone number, the user name and if this is being used by a link or not.

1.2. Return to the previous menu

The EXIT command exits the interface monitoring menu.

```
DR monitor+EXIT
```

Example:

```
DR monitor+EXIT
Config>
```

2. Monitoring the ID Static Routes

In this section, the commands used to monitor the ID static routes are described. In order to access the monitoring menu for these routes, introduce the following commands:

```
*P 3
Console Operator
+PROTOCOL IP
IP>
```

The following table summarizes the ID static routes monitoring commands.

Command	Function
DUMP	Lists the active routes table.
ROUTE	Lists the next hop to a determined destination.
STATIC-ROUTES	Lists the static routes table.
EXIT	Returns to the previous prompt.

2.1. Active routes Table

The DUMP command displays the active routes table:

```
IP>DUMP
```

Example:

```
IP>DUMP
Type      Dest net         Mask     Cost Age  Next hop(s)

Stat(1)   0.0.0.0          00000000  1    0    192.168.1.1
Sbnt(0)   1.0.0.0          ff000000  1    0    None
Stat(1)   1.1.1.1          ffffffff  3    0    DR/0
Sbnt(0)   3.0.0.0          ff000000  1    0    None
Stat(1)   3.3.3.3          ffffffff  3    0    DR/0
Sbnt(0)   4.0.0.0          ff000000  1    0    None
 Dir(1)   4.4.4.4          ffffffff  1    0    SNK/0
Sbnt(0)   5.0.0.0          ff000000  1    0    None
Stat(1)   5.5.5.5          ffffffff  3    0    DR/0
Sbnt(0)   192.80.0.0       ffffff00  1    0    None
Stat(1)   192.80.0.120     ffffffff  3    0    DR/1
 Dir(1)   192.168.1.0      ffffff00  1    0    PPP/0

Default gateway in use.
Type Cost Age  Next hop
Stat 1    0    192.168.1.1

Routing table size: 768 nets (52224 bytes), 12 nets known
IP>
```

The ID static routes are those that are shown in bold. These differ from the rest of the static routes in the next hop (DR/X), apart from that they are identical.

2.2. Calculating the next hop

The **ROUTE** command displays the next hop to a determined destination.

```
IP>ROUTE <dest>
```

Example:

```
IP>ROUTE 1.1.1.1
Destination:    1.1.1.1
Mask:           255.255.255.255
Route type:     Stat
Distance:       3
Age:            0
Tag:            0
Next hop(s):     1.1.1.1          (DR/0)
IP>
```

If the next hop to access a determined destination is a *Dial Routing* interface, "DR/X" will appear in the "Next hop".

2.3. Active routes Table

The **STATIC-ROUTES** command displays the configured static routes table:

```
IP>STATIC-ROUTES
```

Example:

```
IP>STATIC-ROUTES
Net             Mask            Cost  Next_hop        Int    SubInt       State
---             ----             ----  --------        ---    ------       -----
0.0.0.0         0.0.0.0          1     192.168.1.1     PPP/0  N/A           UP
1.1.1.1         255.255.255.255 3     0.0.0.9         DR/0   1             UP
3.3.3.3         255.255.255.255 3     0.0.0.9         DR/0   3             UP
5.5.5.5         255.255.255.255 3     0.0.0.9         DR/0   5             UP
192.80.0.120    255.255.255.255 3     0.0.0.10        DR/1   2             UP
IP>
```

The ID static routes are highlighted in bold. These differ from the rest in the next hop (DR/X) and in the subinterface: the configured ID.