Teldat Router

Configuration of Frame Relay Interfaces over BRI ISDN

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Chapter 1
Configuration of FR over BRI ISDN

1. Introduction

This chapter describes the function of Frame Relay interface over BRI ISDN.

The information given in this chapter is divided into the following sections:

- Generic FR interface assignment.
- Configuration of the Generic FR interface.
- Configuration of the Basic Rate Interface ISDN.

Should you have any doubts over the meaning of any of the Frame Relay interface own concepts, please consult manual Dm 703-I “Frame Relay”.

2. Generic FR Interface Assignment

Should you wish to configure a Frame Relay interface over an ISDN BRI link B channel, you must enter the following command:

```
Config>ADD DEVICE FR
Interface Id[9999-1]? 1
Added FR interface fr1
Config>
```

You can check that the new interface has been correctly added by listing the current interfaces present in the router (and verifying that the *Generic FR* interface has been generated):

```
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
 fr1             ---    Generic FR                       0              0
Config>
```

The Generic Frame Relay interface is one of the interfaces which act as 'users' for the BRI ISDN base interfaces. This deals with a logical interface devoid of a physical connector.

You can configure various Generic Frame Relay interfaces over a single BRI ISDN base interface. The BRI ISDN interface can also be configured to support switched or semipermanent connections. This latter case does not require a call to be established in order to transmit data through the B channel.

NOTE: Please remember that you must save any changes made to the configuration and restart the device in order for the changes to take effect.

3. Configuration of the Generic FR Interface

In order to configure a *Generic FR* interface over a BRI interface you need to enter **NETWORK name** in the general configuration menu, where **name** is the name of the associated interface. For example to access the FR1 interface, you need to enter:

```
Config>NETWORK FR1
Generic FR User Configuration
GenFR config>
```

The following are the options presented in the Generic FR interface configuration menu:

```
GenFR config>?
BASE-INTERFACE
FR
EXIT
GenFR config>
```

3.1. BASE-INTERFACE

Through the **BASE-INTERFACE** command you can access thebase interface configuration menu (in this case a BRI ISDN interface). In the *Base IFC config>* configuration menu, the parameters related with the FR link association over a BRI ISDN interface channel are specified.

```
GenFR config>BASE-INTERFACE
Base Interface Configuration
Base IFC config>
```

The following commands are available from the *Base IFC config>* prompt:

```
Base IFC config>?
BASE-INTERFACE
NO
LIST
EXIT
Base IFC config>
```

a) BASE –INTERFACE

The **BASE-INTERFACE** command permits you to specify the number of the associated ISDN BRI interface, the number of the B channel through which you wish to establish the FR link (only used for semipermants) and the call profile name you wish to associate.

```
Base IFC config>BASE-INTERFACE
Base interface: [ethernet0/0]? bri0/0
Base circuit id:[255]?255
link         add this interface to the dial group
profile      dial profile to use with this interface
Type an option [profile]?
Assign profile name []? prueba
Base IFC config>
```

NOTE: The channel number (Base circuit id) is only significant in cases of FR connections over SEMIPERMANT channels as in the case of switched channels, the channel is assigned when the call is executed (the configured value must be 255). Value 255 indicates that no channel is associated so if you are dealing with semipermanent connections, the link will not be operative.

In cases where both B channels have been grouped in the ISDN BRI base interface, in order to configure the link over the said group, you can indicate either of the two channels that pertain to the group. However, we do recommend as a general rule to assign the lowest numbered channel i.e. number 1.

The *Dial Profile* permits you to associate the link with the indicated profile (which contains data such as the type of permitted calls, where the outgoing calls are directed, permitted incoming calls, the idle time etc.) If there is no dal profile associated, the link cannot be established (if you associate a non-existing profile, a warning message appears indicating that this must be configured later).

For further information on Dial Profiles please see manual Dm 732-I "Dial Profile".

b) LIST

This command permits you to view the options configured in the base interface section.

```
Base IFC config>LIST

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

         bri0/0      bri/0    prueba                  255                1

Base IFC config>
```

"Base interface" this refers to the name of the base interface over which the FR interface is established (in this case it must be the number of the BRI ISDN interface associated). The text that appears after the interface name (bri/0) provide information on the interface type. This is useful when dealing with serial lines as it indicates whether the line is synchronous or asynchronous.

"Profile name" is the name of the call profile associated to the FR link. This identifier relates the circuit to the call characteristics it is going to have (source address, destination address, type of permitted calls etc.). This is only applicable for the Primary ISDN interface, as the E1 does not carry out calls.

"Base Circuit id" this is the B channel number over which you wish to establish the connection. Either of the two available B channels may appear in the BRI (values 1 or 2) and additionally the value 255 (this indicates that the channels are switched and therefore the channel number is assigned on establishing the call). In cases where the two B channels are grouped in the ISDN BRI base interface, the connection is established over the group of two B channels and therefore the binary transfer rate will be 128 Kbps.

c) NO

· NO BASE-INTERFACE

The **NO BASE-INTERFACE** permits you to delete the current association with a base interface. You must specify the number of the associated ISDN BRI interface and the channel number that was assigned as parameters.

```
Base IFC config>NO BASE-INTERFACE
Base interface: [ethernet0/0]? bri0/0
Base circuit id:[0]? 255
Base IFC config>
```

d) EXIT

This command exits the *Base IFC config>* configuration prompt.

```
Base IFC config>EXIT
GenFR config>
```

3.2. FR

The FR command takes you to the Frame Relay configuration prompt.

```
GenFR config>FR

-- Frame Relay user configuration --
FR config>
```

The commands that can be used within the Frame Relay configuration menu are the same as those described for normal interfaces over a serial line.

NOTE: The use of configuration commands for Frame Relay interfaces over a serial line are also valid for Frame Relay interfaces over ISDN. For further information please consult manual Dm 703-I "Frame Relay".

IMPORTANT: In cases of configuring Frame Relay connections over ISDN with inverse ARP, it's convenient to configure an ARP retry period distinct to zero in order to ensure correct running.

Non-configurable parameters

Some specific Frame Relay parameters are not configurable in the Frame Relay interfaces over BRI ISDN. If you try to configure these, the following message will appear:

```
Option not supported on dial FR interfaces
```

The commands detailed below are not operative in this protocol:

- SET ENCODING NRZ
- SET ENCODING NRZI
- SET IDLE FLAG
- SET IDLE MARK
- SET LINE-SPEED
- SET TRANSMIT-DELAY

These commands refer to the configuration of the serial line physical and HDLC parameters (these do not exist in Frame Relay interfaces over BRI ISDN).

3.3. EXIT

Through the **EXIT** command you return to the general configuration prompt, *Config>*.

```
GenFR config>EXIT
Config>
```

4. Configuration of the BRI ISDN interface

In the **Teldat Router**, there does exist the possibility to configure the BRI ISDN base interface. Generally, the parameters configured in this interface permit the router to adapt to the peculiarities of the distinct ISDN standards that exist. However, in the majority of cases, the default configuration is valid and it is unnecessary to configure any of the parameters within the BRI ISDN interface.

In order to correctly establish a FR link over a BRI ISDN interface with semipermanent B channels you must correctly configure certain BRI ISDN interface parameters. The possibilities are:

a) Generic FR link over BRI ISDN interface semipermanent channel

In this case, you need to configure the channel where you wish to establish the FR connection as semipermanent (*PERMANENT*).

b) Generic FR link over BRI ISDN interface switched channel

There must be a BRI ISDN interface channel configured as switched (*SW*). The two B channels appear configured as switched in the default configuration.

The B channel type is configured through the **SET CIRCUIT TYPE** command. Firstly access the BRI ISDN interface configuration menu:

```
Config>NETWORK BRI0/0

-- BRI ISDN Configuration --
BRI config>
```

The options presented in the BRI ISDN interface configuration menu are as follows:

```
BRI config>?
JOIN B1+B2       Associates B channels in a single pipeline at 128 Kbps
LEAVE B1+B2      Separates B channels that were previously associated
LIST             Displays the interface configuration information
SET              Configures interface parameters
EXIT
BRI config>
```

You can now configure the B channels. The two possible options are semipermanent (PERMANENT) or switched (SWITCHED).

```
BRI config>SET CIRCUIT TYPE ?
PERMANENT      Permanent connection type (Not Q.931 signalling)
SWITCHED       Switched connection type
```

Example:

```
BRI config>SET CIRCUIT TYPE SWITCHED
Enter circuit (1-2)[1]?
BRI config>
```

```
BRI config>SET CIRCUIT TYPE PERMANENT
Enter circuit (1-2)[1]?
BRI config>
```

In addition to the type of B channel, you can also configure the maximum frame size used (MTU) in the interface, the maximum frame size for each channel and the grouping of the two B channels so that the total binary rate reaches 128 Kbps (provided the Network supports this). Other parameters related to the ISDN are also configurable, e.g. the numeration plan, standard used etc. In order to find out how to configure these parameters, please see manual Dm 729-I "BRI ISDN Interface".

Chapter 2
Monitoring of FR over BRI ISDN

1. Generic FR interface statistics

The Generic FR interface over BRI ISDN statistics are displayed by entering the **DEVICE** command followed by interface name for the statistics you wish to obtain at the monitoring prompt (+).

```
+DEVICE FR1

                                    Auto-test   Auto-test     Maintenance
Interface            CSR    Vect      valids    failures       failures
fr1                    0       0           0           6              0
+
```

2. Generic FR interface monitoring

2.1. Accessing the Generic FR monitoring prompt

In order to access the Frame Relay over BRI ISDN monitoring prompt, you need to enter **NETWORK** following by the interface name.

```
+NETWORK FR1
Generic FR Console
GenFR>
```

2.2. Generic FR monitoring commands

All Generic FR interface monitoring commands must be entered at the prompt specified above, *GenFR>*.

The available commands are described below.

a) ? (HELP)

This command permits you to view the available options from the menu you are in and to list the possible command options. The commands available for monitoring in the Generic FR console menu are:

```
GenFR>?
BASE-INTERFACE
FR
EXIT
GenFR>
```

b) BASE-INTERFACE

The **BASE-INTERFACE** command takes you to the monitoring prompt for the parameters related to the base interface, which in this case is an BRI ISDN interface.

```
GenFR>BASE-INTERFACE
Base Interface Console
Base IFC>
```

The monitoring console has the following commands:

· *? (HELP)*

This lists the available commands.

```
Base IFC>?
LIST
EXIT
Base IFC>
```

· *LIST*

Displays the parameters related to the base interface.

```
Base IFC>LIST
Destination address    : 384200
Local address          :
Base interface         : 4
Circuit id request     : 255
Dial circuit status    : OPEN
Circuit id assigned    : 1
Base IFC>
```

The meaning of the information displayed is as following:

"Destination address", this is the link destination address i.e. the ISDN number called.

"Local address", local address (Local ISDN number).

"Base interface", base interface number (BRI ISDN).

"Circuit id request", the number of the channel through which you request the Frame Relay link establishment.

"Dial circuit status", current circuit status. The possible values are:

OPEN, the circuit is open (established).
CLOSED, the circuit is closed (not established).
DOWN, the BRI ISDN interface is not active.

"Circuit id assigned", the circuit number (channel B) associated to the link (in cases of Frame Relay links over switched circuits, although a determined circuit is configured, this is assigned when the call is established and does not, therefore, have to coincide with that requested).

· *EXIT*

Exits the monitoring prompt for the parameters related to the base interface.

```
Base IFC>EXIT
GenFR>
```

c) *FR*

Through this command you can access the monitoring menu for Frame Relay interface own parameters. This is described in more detail in manual Dm 703-I Frame Relay.

```
GenFR>FR

-- Frame Relay Console --
FR>
```

d) *EXIT*

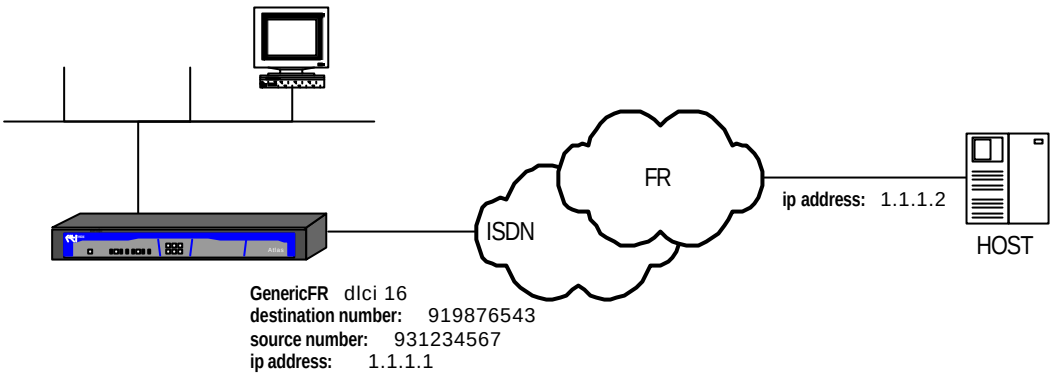
This command exits the Generic FR interface monitoring prompt and returns to the previous prompt.

```
GenFR>EXIT
+
```

Chapter 3
Example of FR over BRI ISDN configuration

1. Configuration example of FR over BRI ISDN

Supposing we have a scenario such as the one that is displayed in the below figure. This deals with accessing a HOST through a Frame Relay PVC. The HOST is connected to the Frame Relay Network through a point-to-point line. The router accesses through ISDN, calling a determined telephone number which the operator has provided as the access point for the Frame Relay Network.



1.1. Configuring the Interfaces

Add the Generic FR interface.

```
Teldat              (c)1996-2002

Router model XXXXX 2 8 CPU MPC860      S/N: 0403/00113
1 LAN, 3 WAN Lines, 1 ISDN Line


*p 4
User Configuration
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>ADD DEVICE FR
Interface Id[9999-1]? 1
Added FR interface fr1
Config>
```

1.2. Configuring IP

Add the Generic FR interface IP address (the rest of the IP configuration that the router may have is not detailed here).

```
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
 fr1             ---    Generic FR                       0              0
Config>PROTOCOL IP

-- Internet protocol user configuration --
IP config>ADDRESS FR1 1.1.1.1
Address mask [255.0.0.0]?
IP config>EXIT
Config>
```

1.3. Configuring the BRI ISDN interface

You do not need to configure any of the parameters as we are going to use switched circuits with MTU 2048 and without channel grouping. This is the default configuration. The local address is not configured either as this is not mandatory. The local address however is configured in the dial profile.

```
Config>NETWORK bri0/0

-- BRI ISDN Configuration --
BRI config>LIST

ISDN Standard            : EURO-ISDN
Type of number           : Unknown
Numbering Plan Identific : Unknown
Sending Complete         : Enabled
Alerting incoming calls  : Disabled
Calling number presentat : Allowed
TEI Negotiation option   : First Call
Local address            :
SPID Value for B1        :
SPID Value for B2        :
Maximum frame length     : 2048

             B1   B2
---------- ---- ----
MTU        2048 2048
Type        SW   SW
B1+B2

BRI config>EXIT
Config>
```

1.4. Configuring the Dial Profile

Here is where the parameters to be used in order to make and receive calls are configured. Introduce the name selected for the profile, the local number, the remote and the release time without data. The time, in this case, is configured with a zero value (through this value the call once established is maintained and not released).

```
Config>SET DIAL-PROFILE
-- DIAL PROFILE CONFIGURATION --
DIALPROF config>PROFILE frprueba local-address 931234567
DIALPROF config>PROFILE frprueba remote-address 919876543
DIALPROF config>PROFILE frprueba no inbound
DIALPROF config>LIST
DIAL PROFILE..: frprueba
Local Address.: 931234567
Remote Address: 919876543             Alternative Remote:
Permissions...: Outbound
Idle Time.....: 0                     Access Control: Yes
Shutdown Calls: Yes
Callback......: None
ISDN Class....: 64 Kbps
Call Retry....: Disabled

DIALPROF config>
```

1.5. Configuring the base interface and the channel associated to the Generic FR Interface

Configure the profile you wish to use for this interface and the associated BRI ISDN base interface. The channel is set to 255 as the ISDN interface in this example is switched and therefore the channel is assigned by the Network during the call establishment process.

```
Config>NETWORK FR1
Generic FR User Config
GenFR config>BASE-INTERFACE
Base Interface Configuration
Base interface: [ethernet0/0]? bri0/0
Base circuit id:[255]?
link         add this interface to the dial group
profile      dial profile to use with this interface
Type an option [profile]?profile
Assign profile name []? frprueba
Base IFC config>LIST

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

         bri0/0      bri/0    frprueba               255                1

Base IFC config>
```

1.6. Configuring the FR part of the Generic FR Interface

The FR part is configured in exactly the same way as an FR interface over a WAN line. In this example, we are going to configure PVC 16 and a protocol address (association between the destination IP address and DLCI).

```
Config>NETWORK FR1
GenFR config>FR

-- Frame Relay user configuration --
FR config>PVC 16 default
FR config>PROTOCOL
IP Address [0.0.0.0]? 1.1.1.2
Circuit number[16]? 16
FR config>EXIT
GenFR config>EXIT
Config>
```

The configuration is now complete. This needs to be saved and the router restarted.

```
Config>SAVE
Save configuration [n]? Y

Saving configuration...OK
Config>
*RESTART
Are you sure to restart the system?(Yes/No)? Y
Restarting. Please wait ..........................................
```

In order to obtain the device configuration execute the **SHOW CONFIG** command:

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

add device fr 1
set data-link x25 serial0/0
set data-link x25 serial0/1
set data-link x25 serial0/2
network fr1
; -- Generic FR User Configuration --
   base-interface
; -- Base Interface Configuration --
      base-interface bri0/0 255 link
      base-interface bri0/0 255 profile frprueba
;
   exit
;
   fr
; -- Frame Relay user configuration --
      pvc 16 default
;
      protocol-address 1.1.1.2 16
   exit
;
exit
;
set dial-profile
; -- DIAL PROFILE CONFIGURATION --
   profile frprueba default
   profile frprueba remote-address 919876543
   profile frprueba local-address 931234567
   profile frprueba no inbound
;
exit
;
protocol ip
; -- Internet protocol user configuration --
   address  fr1             1.1.1.1          255.0.0.0
exit
;
Config>
```