Configuration of Frame Relay Interfaces over BRI ISDN

bintec Dm731-I

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Table of Contents

I Related Documents

bintec Dm703-I Frame Relay

bintec Dm729-I BRI ISDN Interface

bintec Dm732-I Dial Profile

bintec Dm772-I Common Configurations for Interfaces

Chapter 1 Configuring FR over ISDN BRI

1.1 Introduction

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

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

- Creating the Generic FR interface.
- Configuring the Generic FR interface.
- Configuring the ISDN Basic Rate Interface.

If you are unsure of the meaning of a Frame Relay interface term, please see bintec manual *Dm703-I Frame Relay*.

1.2 Creating the Generic FR Interface

To configure a Frame Relay interface over an ISDN BRI link B channel, enter the following command:

```
Config>add device fr <identifier>
```

Where **<identifier>** is a number (between 1 and 10000) used to distinguish between existing interfaces of the same type.

Example:

```
Config>add device fr ?
  <1..10000>    Interface Id
Config>add device fr 1 ?
  <cr>
Config>add device fr 1
Config>
```

You can check that the new interface has been correctly added by listing the existing interfaces in the device (and verifying that the new *Generic FR* interface has been created):

```
Config>list devices

Interface          Connector     Type of interface
ethernet0/0        LAN1          Fast Ethernet interface
serial0/0          SERIAL0/WAN1  X25
serial0/1          SERIAL1/WAN2  X25
serial0/2          SERIAL2/WAN3  X25
bri0/0             BRI/ISDN1     ISDN Basic Rate Int
x25-node           ---           Router->Node
fr1                ---           Generic FR
Config>
```

The Generic FR interface acts as an ISDN BRI interface user. It is a logical interface without any physical elements.

You can configure as many Generic Frame Relay interfaces as you wish over an ISDN BRI base interface. The ISDN BRI interface can also be configured to support switched or semi permanent connections. In this latter case, a call does not need to be established to transmit data over the B channel.

> **Note**
>
> Remember to save your configuration changes and restart the device so that the changes take effect.

1.3 Configuring the Generic FR Interface

To configure a Generic FR interface over a BRI interface, run **network <interface_name>** from the general configuration menu, where **interface_name** is the name of the associated interface. For example, to access the FR1 interface, enter:

```
Config>network fr1
```

```
-- Generic FR User Configuration --
fr1 config>
```

The Generic FR interface configuration menu presents the following options:

```
frX config>?
  base-interface    Access the base interface configuration menu
  fr                Takes you to the Frame Relay configuration prompt
  exit
frX config>
```

In addition to the above commands, there are some others that are common to all the device's interfaces. These commands are described in bintec manual *Dm772-I Common Configurations for Interfaces*.

1.3.1 BASE-INTERFACE

Run base-interface to access the base interface configuration menu (in this case a BRI ISDN interface). In the *Base frX IFC config>* configuration menu, parameters related to the FR link association over a BRI ISDN interface channel are specified.

```
frX config>base-interface


-- Base Interface Configuration --
frX Base IFC config>
```

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

```
frX Base IFC config>?
  base-interface    Specify a base interface
  list              List current configuration
  no                Negate a command or set its default
  exit
frX Base IFC config>
```

1.3.1.1 BASE –INTERFACE

Run **base-interface** to specify the associated ISDN BRI interface, the number of the B channel through which you wish to establish the FR link (only used for semi-permanents connections) and the call profile name you wish to associate (for switch links).

Syntax:

```
frX Base IFC config>base-interface <interface> <circuit_id> {link | profile <profile_name>}
```

Specifically, for switch connections, the syntax is as follows:

```
frX Base IFC config>base-interface <interface> 255 profile <profile_name>
```

If you want a FR link to establish over a semi-permanent ISDN connection, given that it is not necessary to execute calls, the call profile does not require configuring (and should one be specified, it will not be used). The syntax therefore is:

```
frX Base IFC config>base-interface <interface> <circuit_id> link
```

Example:

```
fr1 Base IFC config>base-interface ?
  <interface>    Base interface
fr1 Base IFC config>base-interface bri0/0 ?
  <1..255>    Base circuit id
fr1 Base IFC config>base-interface bri0/0 255 ?
  link       Add this interface to the dial group
  profile    Dial profile to use with this interface
fr1 Base IFC config>base-interface bri0/0 255 profile ?
  <word>    Text
fr1 Base IFC config>base-interface bri0/0 255 profile prueba ?
  <cr>
fr1 Base IFC config>base-interface bri0/0 255 profile prueba
fr1 Base IFC config>
```

> **Note**
>
> The channel number (circuit_id) is only significant for 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 semi-permanent connections, the link will not be operative.
>
> Where both B channels have been grouped in the ISDN BRI base interface, to configure the link over said group, you can indicate either of the two channels pertaining to the group. However, as a general rule, we recommend assigning the lowest numbered channel i.e. number 1.

The *Dial Profile* allows you to associate the link with the indicated profile (that 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 dial profile associated, the link cannot be established (if the ISDN connection is switch).

For further information on Dial Profiles please see manual bintec Dm732-I Dial Profile.

1.3.1.2 LIST

Displays the options configured in the base interface section.

```
fr1 Base IFC config>list


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


       bri0/0      bri/0   prueba                  255               1

fr1 Base IFC config>
```

"Base interface"; this refers to the name of the base interface the FR interface is established over (in this case it must be the number of the associated BRI ISDN interface). The text that appears after the interface name (bri/0) provides 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"; name of the call profile associated to the FR link. This identifier relates the circuit to the call characteristics it will 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 the channels are switched and therefore the channel number is assigned on establishing the call). When the two B channels are grouped in the ISDN BRI base interface, the connection is established over the group of two B channels making the binary transfer rate 128 Kbps.

"Number of circuits"; the number of base interface circuits going to be used. FR interfaces always use a single circuit.

1.3.1.3 NO

1.3.1.3.1 NO BASE-INTERFACE

The **no base-interface** command deletes the current association with a base interface. You must specify the associated ISDN BRI interface and the channel number assigned as parameters.

```
fr1 Base IFC config>no ?
  base-interface    Specify a base interface
fr1 Base IFC config>no base-interface ?
  <interface>    Base interface
fr1 Base IFC config>no base-interface bri0/0 ?
  <1..255>    Base circuit id
  <cr>
fr1 Base IFC config>no base-interface bri0/0 255 ?
  <cr>
fr1 Base IFC config>no base-interface bri0/0 255
fr1 Base IFC config>
```

1.3.1.4 EXIT

Exits the *frX Base IFC config>* configuration prompt.

```
frX Base IFC config>exit
frX config>
```

1.3.2 FR

Takes you to the Frame Relay configuration prompt.

```
frX config>fr

-- Frame Relay user configuration --
frX 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 is also valid for Frame Relay interfaces over ISDN. For further information, please consult bintec manual *Dm703-I Frame Relay*.

> **Important**
>
> When configuring Frame Relay connections over ISDN with inverse ARP, it's convenient to configure an ARP retry period distinct to zero to ensure correct operations.

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:

```
CLI Error: Option not supported on dial FR interfaces
CLI Error: Command error
```

The commands that cannot be used are displayed below:

- invert-txc
- 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).

1.3.3 EXIT

Returns to the general configuration prompt, *Config>.*

Example:

```
fr1 config>exit
Config>
```

1.4 Configuring the BRI ISDN interface

Our router allows you to configure the BRI ISDN base interface. Generally speaking, the parameters set in this interface allow the router to adapt to the characteristics of the different ISDN standards available. In most cases, however, the default configuration can be used and there is no need to set any parameters in the the BRI ISDN interface.

To correctly establish an FR link over a BRI ISDN interface with semi-permanent B channels, you will need to correctly configure certain parameters in the BRI ISDN interface. The possibilities are:

1.4.1 Generic FR link over BRI ISDN interface semi-permanent channel

Here, configure the channel where you wish to establish the FR connection as semi-permanent (*permanent*).

1.4.2 Generic FR link over BRI ISDN interface switched channel

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

The B channel type is configured by running **set circuit type**. First, access the BRI ISDN interface configuration menu:

```
Config>network bri0/0

-- BRI ISDN Configuration --
bri0/0 BRI config>
```

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

```
bri0/0 BRI config>?
  description    Enter interface description
  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
  no             Negate a command or set its defaults
  set            Configures interface parameters
  shutdown       Change state to administratively down
  update         Update a level indicator
  exit
bri0/0 BRI config>
```

Now configure the B channels. The two possible options are semi-permanent (*permanent*) or switched (*switched*).

```
bri0/0 BRI config>set circuit type ?
  permanent    Permanent connection type (Not Q.931 signalling)
  switched     Switched connection type
```

Example 1:

```
bri0/0 BRI config>set circuit type switched ?
  <1..2>    Enter circuit
bri0/0 BRI config>set circuit type switched 1
bri0/0 BRI config>
```

Example 2:

```
bri0/0 BRI config>set circuit type permanent ?
  <1..2>    Enter circuit
bri0/0 BRI config>set circuit type permanent 1
bri0/0 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 the total binary rate is 128 Kbps, provided the network supports this). There are also a number of other parameters related to ISDN that can be configured, e.g., the numbering plan, standard used, etc. For further information on these parameters, please see bintec manual *Dm729-I BRI ISDN Interface*.

Chapter 2 Monitoring FR over BRI ISDN

2.1 Generic FR interface statistics

To display the statistics for the Generic FR over ISDN BRI interface, run **device** followed by the 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
+
```

2.2 Generic FR interface monitoring

2.2.1 Accessing the Generic FR monitoring prompt

To access the monitoring prompt for the Frame Relay over ISDN BRI interface, run **network** followed by the interface name.

```
+network fr1

Generic FR Console

fr1+
```

2.2.2 Generic FR monitoring commands

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

The available commands are described below.

2.2.2.1 ? (HELP)

Shows the options available for the current menu and lists the command options that can be entered. The commands available in the corresponding console menu for monitoring Generic FR are as follows:

```
frX+?
  base-interface    Base interface monitor
  fr                Frame Relay protocol monitor
  exit
frX+
```

2.2.2.2 BASE-INTERFACE

Run **base-interface** to reach the monitoring prompt for parameters related to the base interface, which in this case is a BRI ISDN interface.

```
frX+base-interface

Base Interface Console

frX Base IFC+
```

The following commands are available at this level:

2.2.2.2.1 ? (HELP)

Lists the available commands.

```
frX Base IFC+?

                 list    Display base interface parameters
```

```
  exit
frX Base IFC+
```

2.2.2.2.2 LIST

Displays the parameters related to the base interface.

```
frX Base IFC+list
Destination address    : 384200
Local address          :
Base interface         : bri0/0
Circuit id request     : 255
Dial circuit status    : OPEN
Circuit id assigned    : 1
frX Base IFC+
```

The meaning of the displayed information is as follows:

"Destination address"

Link destination address i.e. the ISDN number called.

"Local address"

Local address (Local ISDN number).

"Base interface"

Base interface name or identification (BRI ISDN).

"Circuit id request"

The number of the channel you request Frame Relay link establishment through.

"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 with the link (for 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).

2.2.2.2.3 EXIT

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

```
frX Base IFC+exit
frX+
```

2.2.2.3 FR

Accesses the monitoring menu for Frame Relay interface own parameters. This is described in more detail in manual bintec Dm703-I Frame Relay.

```
frX+fr

-- Frame Relay Console --

frX FR+
```

2.2.2.4 EXIT

Exits the Generic FR interface monitoring prompt and returns to the previous prompt.

```
frX+exit
+
```

Chapter 3 Example of FR over BRI ISDN configuration

3.1 Configuration example of FR over BRI ISDN

Supposing we have a scenario such as the one displayed below. 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.
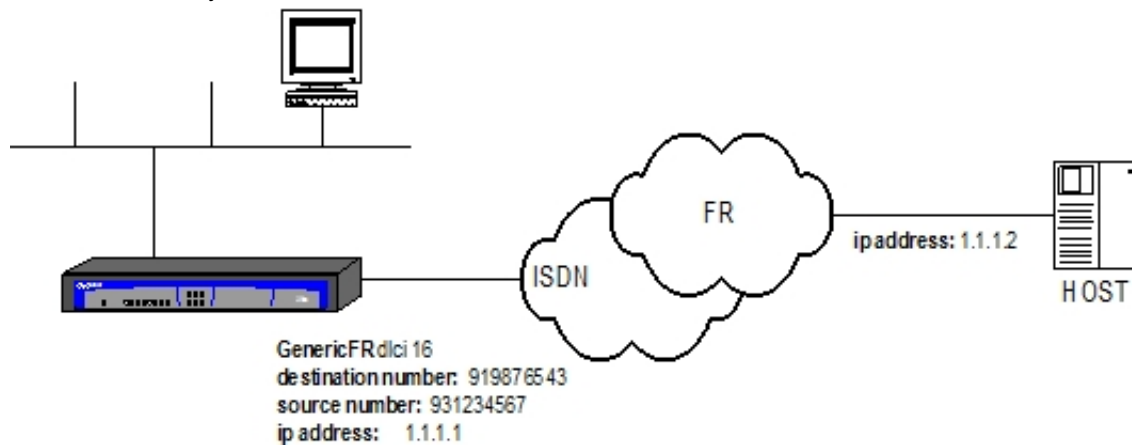
3.1.1 Configuring the Interfaces

Add the Generic FR interface.

```
*config

Config>add device fr 1
Config>list devices

Interface          Connector      Type of interface
ethernet0/0        LAN1           Fast Ethernet interface
serial0/0          SERIAL0/WAN1   X25
serial0/1          SERIAL1/WAN2   X25
serial0/2          SERIAL2/WAN3   X25
bri0/0             BRI/ISDN1      ISDN Basic Rate Int
x25-node           ---            Router->Node
fr1                ---            Generic FR
Config>
```

3.1.2 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 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 --
bri0/0 BRI config>list

ISDN Standard           : EURO-ISDN
Emulation               : User
Type of number          : Unknown
Numbering Plan Identific : Unknown
Sending Complete        : Enabled
Alerting incoming calls : Disabled
Calling number presentat : Allowed
TEI Negotiation option  : First Call
Supervision interval    : 0
Supervision fails to down: 3
```

```
Local address         :
SPID Value for B1     :
SPID Value for B2     :
Maximum frame length  : 2048


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


bri0/0 BRI config>exit
Config>
```

3.1.3 Configuring the Dial Profile

Here, we configure the parameters to make and receive calls. Enter the name selected for the profile, the local num-
ber, the remote and the release time without data. The time, in this case, is configured with a zero value (i.e. once
the call is established, it's maintained and not released).

```
Config>global-profiles dial

-- Dial Profiles Configuration --
Dial Profiles config>profile frprueba local-address 931234567
Dial Profiles config>profile frprueba remote-address 919876543
Dial Profiles config>list

DIAL PROFILE..: frprueba
Local Address.: 931234567
Remote Address: 919876543              Alternative Remote:
Permissions...: Outbound
Idle Time.....: 0
Shutdown Calls: Yes
Priority......: Normal
Callback......: None
ISDN Call type: Digital unrestricted data
ISDN Class....: 64 Kbps
Hold queue....: 0
3GPP Acc Ctrl.: None
3GPP APN......: None
3GPP PDPType .: IP
3GPP CBST.....: 0,0,1
Call Retry....: Disabled
Call List.....: None

Dial Profiles config>exit
Config>
```

3.1.4 Configuring the base interface and the channel associated to the Generic FR Interface

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

```
Config>network fr1

-- Generic FR User Configuration --
fr1 config>base-interface

-- Base Interface Configuration --
fr1 Base IFC config>base-interface bri0/0 255 profile frprueba
fr1 Base IFC config>list

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

        bri0/0     bri/0    frprueba              255                1
```

```
fr1 Base IFC config>exit
fr1 config>exit
Config>
```

3.1.5 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

-- Generic FR User Configuration --
fr1 config>fr

-- Frame Relay user configuration --
fr1 FR config>pvc 16 default
fr1 FR config>protocol-address 1.1.1.2 16
fr1 FR config>exit
fr1 config>exit
Config>
```

3.1.6 IP Configuration

Adds the Generic FR interface IP address (the rest of the configuration that the router may have, has not been detailed).

```
Config>network fr1

-- Generic FR User Configuration --
fr1 config>ip address 1.1.1.1 255.0.0.0
fr1 config>exit
Config>
```

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

```
Config>save
Save configuration (Yes/No)? y

Building configuration as text... OK
Writing configuration... OK on Flash
Config>

*restart
Are you sure to restart the system(Yes/No)? y
  Done

Restarting. Please wait ........................................................
```

Run **show config** to display the device configuration:

```
Config>show config
; Showing System Configuration for access-level 15 ...

log-command-errors
no configuration
add device fr 1
set data-link x25 serial0/0
set data-link x25 serial0/1
set data-link x25 serial0/2
global-profiles dial
; -- Dial Profiles Configuration --
   profile frprueba default
   profile frprueba dialout
   profile frprueba remote-address 919876543
   profile frprueba local-address 931234567
;
exit
```

```
;
network fr1
; -- Generic FR User Configuration --
   ip address 1.1.1.1 255.0.0.0
;
   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
;
dump-command-errors
end
; --- end ---
Config>
```