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enterprise communications

User's Guide

bintec R4100 / R4300

Frame Relay

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Version 0.9

1   FR Menu

The *FR* menu is described below.

```
R4100 Setup Tool              Funkwerk Enterprise Communications GmbH
[FRAME RELAY]: Frame Relay Configuration                    MyGateway


     Link Configuration
     Switching
     Multiprotocol over Frame Relay

     EXIT


```

Your gateway can be used as a Frame Relay Switch or a Frame Relay Router and supports the following official and defacto standards:

■   RFC 1490 Multiprotocol Interconnect over Frame Relay

■   RFC 1293 Inverse Address Resolution Protocol

■   ITU-T Q933a, Appendix II, X6 Line Management Extensions

■   FRF 1.1 Congestion Management

Note   Frame Relay requires a separate license to be installed on the gateway and may be purchased online in the Online Services section at www.funkwerk-ec.com.

Frame Relay is a connection-oriented technology that provides a fast packet-switching service for accessing Wide Area Networks. It makes optimum use of the available bandwidth using a complex statistical multiplexing algorithm. Due to the omission of some layer three network functions, Frame Relay is often thought of as a "streamlined version for X.25".

Frame Relay is a flexible and cost-effective alternative to existing WAN technologies best suited for network installations with any of the following characteristics:

■ Applications generate significant amounts of bursty traffic.

■ Network traffic is delay-sensitive.

■ High network availability is a major priority.

■ Dispersed enterprise (locations separated by long distances).

■ Integration with existing public and/or private, packet-switched networks is required.

Frame Relay Technology As the name suggests, it works by breaking data streams into variable length frames and forwards (relays) these frames into the network via predetermined logical connections called Permanent Virtual Circuits, or PVCs.

Some of the key concepts of Frame Relay are listed below:

■ Small, variable length frames are used to transport user data; this makes Frame Relay well suited for data applications (particularly those generating bursty-traffic) - but not suited for video and voice transmissions.

■ Improved overall performance compared to X.25 - a result of limited error correction and acknowledgment routines.

■ Users are guaranteed a minimum amount of bandwidth which is always available (the Committed Information Rate, or CIR).

■ High network availability is achieved through statistically multiplexing virtual connections (data streams) onto logical connections, or Permanent Virtual Circuits (PVCs).

Integrated bandwidth allocation (true bandwidth on demand) allows users to take up additional bandwidth, when available, at no extra charge - based on the user's Committed Burst Rate (CBR) and Excess Burst Rate (EBR).

There are different types of equipment found in a typical Frame Relay Network based on the various tasks they perform.

■ End Systems
End systems are typically end-user devices that make use of the underlying Frame Relay network. Depending on the application running on the end system, bandwidth requirements of end systems on the LAN can differ. Some applications generate large amounts of intermittent bursty traffic (typical of

data applications, telnet, ftp, www) while others (like voice or video) require a constant bitrate.

■   Frame Relay Routers
Frame Relay Routers are used to connect point–to–multipoint networks (LANs) to a public (or private) Frame Relay network. It is the router's job to encapsulate data into Frame Relay frames to be transported over the network link. A Frame Relay Router encapsulates LAN frames in Frame Relay frames and feeds those frames to a Frame Relay Switch for transmission across the network. A Frame Relay Router also receives Frame Relay frames from the network, strips the Frame Relay frame off each frame to produce the orig-inal LAN frame, and passes the LAN frame on to the end device. A Frame Relay Router communicates directly with one or more Frame Relay Switches to negotiate the opening/closing of virtual circuits and to control network congestion.

■   Frame Relay Switches
Switches are typically owned by public network providers but may be owned by private sites implementing private Frame Relay Networks. Aside from the FECN, BECN, and DE frame fields (used for congestion management) the content and final destination of individual frames is of no interest to the switch. Using a simple mapping scheme, frames are passed from one interface (DLCI) to another.

Frame Relay Services   Frame Relay access can be purchased in a variety of configurations depending of your site's needs. Characteristics of the service you will receive include:

1.   The type of physical connection you have to the Frame Relay network, ISDN or X.21.

2.   The amount (from 56Kbps up to 2Mbps) and type of bandwidth available via this connection; this will include your guaranteed and excess rates. See CIR, CBR, and EBR earlier.

3.   The number of PVCs you are receiving.

Committed Information Rate

When purchasing Frame Relay services from your provider, you will be assigned a Committed Information Rate. This defines the minimum amount of bandwidth that your provider guarantees to be available to your site at all times.

Committed Burst Rate

You will also receive a Committed Burst Rate with your service package. This is an additional amount of bandwidth (in excess of your CIR) you may use when network resources are available. The CBR is free of charge, but be aware that all frames that are in excess of your CIR will be DE (Discard Eligible) flagged and may be discarded by intermediate switches if the network becomes congested.

Excess Burst Rate

An Excess Burst Rate is also available; it defines the maximum data rate the service provider's network will attempt to sustain. Also note that all EBR traffic is flagged Discard Eligible.

Configuration is carried out in the following submenus:

■ *LINK CONFIGURATION*

■ *SWITCHING*

■ *MULTIPROTOCOL OVER FRAME RELAY*

2   Link Configuration Submenu

The *LINK CONFIGURATION* menu is described below. (The screenshot contains example values.)

```
R4100 Setup Tool                 Funkwerk Enterprise Communications GmbH
[FRAME RELAY][LINK]: Frame Relay Link Configuration          MyGateway


 Select link to configure

framerelay




  EXIT

```

The *FR* ➜ *LINK CONFIGURATION* menu contains the settings relating to layer 2 of the Frame Relay interface.

This menu lists the available links that may be configured as the transport layer of a Frame Relay interface.

```
R4100 Setup Tool              Funkwerk Enterprise Communications GmbH
[FRAME RELAY][LINK][EDIT]                                    MyGateway



   Link                          framerelay
   Line Management               none
   Mode                          dce


   Advanced Settings >




           SAVE                                  CANCEL

```

Configuration is carried out in *FR* ➜ *LINK CONFIGURATION* ➜ *EDIT*.

The menu consists of the following fields:

Field	Decription
Link	Shows the link that is currently being edited.
Line Management	Determines whether or not link management is being performed on this link and if, which method is to be used. Possible values: ■ *none* (default value) ■ *q933a* ■ *ansiT1_617D* ■ *original_lmi:* Cisco LMI for Frame Relay
Mode	Defines the mode (DTE or DCE) the gateway operates at for this connection. Note that one side of the link must operate as DTE and one as DCE.

Table 2-1:   *LINK CONFIGURATION* ➜ *EDIT* menu fields

The menu leads to the *ADVANCED SETTINGS* submenu.

2.1   Advanced Settings Submenu

The *ADVANCED SETTINGS* submenu is described below.

```
R4100 Setup Tool              Funkwerk Enterprise Communications GmbH
[FRAME RELAY][LINK]..[ADVANCED]: Advanced Frame Relay        MyGateway
                            Link Configuration




   Supported Virtual Channels     250






      OK                                       CANCEL

```

This menu can be used to configure special settings relating to line manage-
ment for Frame Relay interfaces on the gateway. Some options only apply to
gateways operating in DTE or DCE mode.

The menu consists of the following fields:

Field	Description
Supported Virtual Channels	This field can be used to control how many Virtual Channels this Link supports; a maximum of 250 (default) VCs are possible.

Field	Description
Polling Interval	When DTE mode (client) is set and q933a line management is enabled, this field determines the number of seconds between successive status enquiry messages sent out by the gateway. (Default 10 seconds).
Full Enquiry Interval	When DTE mode (client) is set and q933a line management is enabled, this field determines the number of status enquiry intervals that pass before issuing a full status enquiry message (default 6 intervals).
Idle Interval	When DCE mode (server) is set and line management is enabled, this field defines the number of seconds within which status enquiry messages should be received (default 15 seconds).
Error Threshold	When line management is enabled, this field defines the maximum number of unanswered Status Enquiries the gateway accepts before declaring the interface down (default 3 messages).
Monitored Events	When line management is enabled, this field defines the number of status polling intervals over which the error threshold (previous field) is counted. For example, if the station receives the number of errors defined in **Error Threshold** within the number declared in *MONITORED EVENTS*, the interface is marked as down (default 4 intervals).

Table 2-2:   *ADVANCED SETTINGS* menu fields

3   Switching Submenu

The *SWITCHING* menu is described below.

```
R4100 Setup Tool               Funkwerk Enterprise Communications GmbH
[FRAME RELAY][SWITCHING][ADD]: Frame Relay Switching          MyGateway


    Source Interface              0
    Source DLCI                   16

    Destination Interface         0
    Destination DLCI              16
    Burst committed (Bc)          0
    Burst excess (Be)             0
    Committed Information Rate (CIR) 0




            OK                                    CANCEL

```

The *FR ➔ SWITCHING* menu lists settings for each Frame Relay Virtual Circuit.

This menu is used to configure Frame Relay switching functionality on the gateway. When used as a Frame Relay switch, this menu can be used to configure routes, or mappings (i.e., from incoming interface/DLCI to outgoing interface DLCI).

Frame Relay routes can be added, removed, or changed here.

Configuration is carried out in *FR ➔ SWITCHING➔ ADD/EDIT*.

The menu consists of the following fields:

Field	Value
Source Interface	Use the spacebar and scroll through the list of Frame Relay interfaces to select the source interface for this route.
Source DLCI	Defines the DLCI of the source interface for this route.

Field	Value
Destination Interface	Use the spacebar to scroll through the list of Frame Relay interfaces and select the destination interface.
Destination DLCI	Use the spacebar to scroll through the list of Frame Relay interfaces and select the destination interface.
Burst committed (Bc)	This field defines the maximum amount of data (in bits) to transfer under normal conditions.
Burst excess (Be)	This field defines the maximum amount of uncommitted data (in bits) to attempt deliver.
Committed Information Rate (CIR)	This field defines the physical throughput for this interface (and defaults to *IFSPEED*).

Table 3-1:   *SWITCHING* ➜ *ADD/EDIT* menu fields

4   Multiprotocol over Frame Relay Submenu

The fields of the *MULTIPROTOCOL OVER FRAME RELAY* menu are described below.

```
R4100 Setup Tool              Funkwerk Enterprise Communications GmbH
[FRAME RELAY][MPR][ADD]: Configure Frame Relay            MyGateway
                       MPR Partner


 Partner Name                    mpfr1

 Interface Type                  point to point
 Inverse Arp                     disabled




 Virtual Circuits >

 IP >
 Bridge >


                       SAVE                          CANCEL

```

The *FR* ➜ *MULTIPROTOCOL OVER FRAME RELAY* menu lists all existing MPFR interfaces configured on the gateway.

This menu is used to create (or change) MPFR (Multi-Protocol routing over Frame Relay) interfaces on the gateway.

Configuration is carried out in *FR* ➜ *MULTIPROTOCOL OVER FRAME RELAY* ➜ *ADD/EDIT*.

The menu consists of the following fields:

Field	Value
Partner Name	Define a unique name to identify this MPFR partner.

Field	Value
Interface Type	Determines the interface type as being either "multipoint" or "point to point".
Inverse Arp	Enables/disables inverse ARP over this interface.

Table 4-1:   *MULTIPROTOCOL OVER FRAME RELAY* menu fields

The menu *MULTIPROTOCOL OVER FRAME RELAY* provides access to the following submenus:

■ *VIRTUAL CIRCUITS*

■ *IP*

■ *BRIDGE*

4.1   Virtual Circuits Submenu

The fields of the *VIRTUAL CIRCUITS* menu are described below.

```
R4100 Setup Tool              Funkwerk Enterprise Communications GmbH
[FRAME RELAY][MPR][ADD][SWITCHING][ADD]                     MyGateway


    Source Interface              0
    Source DLCI                   16


    Burst committed (Bc)          0
    Burst excess (Be)             0
    Committed Information Rate (CIR) 0




            OK                         CANCEL

```

This menu should only be used by sites receiving multiple DLCIs from their Frame Relay service provider. Depending on the number of DLCIs and type of service being received, use this menu to define the appropriate data rates.

Configuration is carried out in *FR* ➜ *MULTIPROTOCOL OVER FRAME RELAY* ➜ *ADD/EDIT* ➜ *VIRTUAL CIRCUITS* ➜ *ADD/EDIT*.

The menu consists of the following fields:

Field	Description
Source Interface	Using the spacebar, scroll through the list of Frame Relay interfaces.
Source DLCI	Defines the DLCI used on this interface.
Committed Burst Rate	The maximum amount of data that is guaranteed to be transferred by the service provider.
Excess Burst Rate	The amount of additional data that is uncommitted by the service provider.
Throughput	The physical throughput of this interface.

Table 4-2:   *VIRTUAL CIRCUITS* menu fields

4.2   IP Submenu

The *IP* menu is described below.

The *FR* ➜ *MULTIPROTOCOL OVER FRAME RELAY* ➜ *ADD/EDIT* ➜ *IP* submenu is used for making routing settings specifically for a connection partner.

The *IP* submenu consists of the following additional submenus:

■ *BASIC IP SETTINGS*

■ *MORE ROUTING*

■ *ADVANCED SETTINGS*

4.2.1   Submenu Basic IP-Settings

The fields of the *BASIC IP-SETTINGS* submenu are described below. When *TRANSIT NETWORK* is set to *yes*, the following screen is displayed (example addresses are used here):

```
R4100 Setup Tool            Funkwerk Enterprise Communications GmbH
[FRAME RELAY][MPR][ADD][IP][BASIC]: IP-Settings (mpfr1)     MyGateway


 IP Transit Network                    yes



 Local IP Address                      192.168.100.1
 Partner IP Address                    192.168.100.2


 Default Route                         no

 Remote IP Address                     192.168.1.0
 Remote Netmask                        255.255.255.0


        SAVE                                  CANCEL


```

To be able to transfer IP datagrams between two remote LANs, the gateway must know the route to the respective destination network. In this menu you can define the basic routing or generate a default route to the partner gateway.

Default route   All data is sent automatically to the connection partner on a default route, if no other route matches.

You can configure several default routes on your gateway, but only one can be active. Make sure that you set different values for *METRIC*, if you configure more than one default route.

Transit network   You use an additional ISDN IP address each for your gateway and the connection partner. This sets up a virtual IP network – called a transit network – during the connection. You do not normally need this setting, but it is necessary for some special configurations.

The menu consists of the following fields:

Field	Description
IP Transit Network	Defines whether your gateway uses a transit network to the connection partner. Possible values:
	■ *yes*: The transit network is used.
	■ *no* (default value): The transit network is not used.
	■ *dynamic client*: Your gateway receives an IP address dynamically.
	■ *dynamic server*: Your gateway assigns IP addresses to the remote gateway dynamically.
Local IP Address	Only for *IP TRANSIT NETWORK* = *yes, no*.
	■ if *yes* = WAN IP address of your gateway
	■ if *no* = LAN IP address of your gateway
Partner IP Address	Only if *yes* is set for *IP TRANSIT NETWORK*.
	Connection partner's WAN IP address in the transit network.
Enable NAT	Only if *dynamic client* is set for *IP TRANSIT NETWORK*. Possible values:
	■ *yes*: NAT is activated for this connection partner.
	■ *no* (default value): NAT is deactivated for this connection partner.
	The settings in this menu correspond to NAT activation in the *IP ➜ NETWORK ADDRESS TRANSLATION ➜ EDIT* menu.

Field	Description
Default Route	Only if *dynamic client, no* or *yes* is set for *IP **TRANSIT NETWORK***. Possible values: ■ *yes*: Route to this connection partner is defined as default route. ■ *no* (default value): Route to this connection partner is not defined as default route.
Remote IP Address	Only if *yes* or *no* is set for *IP **TRANSIT NETWORK***. connection partner's LAN IP address.
Remote Netmask	Only if *yes* or *no* is set for *IP **TRANSIT NETWORK***. connection partner's LAN netmask.

Table 4-3:   *BASIC IP SETTINGS* menu fields

4.2.2   Submenu More Routing

The fields of the *MORE ROUTING* submenu are described below.

If a route has been entered for a specific connection partner in *BASIC IP-SETTINGS*, a routing entry is created automatically in your gateway's routing table. The submenu *MORE ROUTING* appears in the *MULTIPROTOCOL OVER FRAME RELAY* ➜ *ADD/EDIT* ➜ *IP* menu. In this menu you can edit the routing entries of a specific connection partner and add other entries.

The IP routes for a specific connection partner are listed in the *MULTIPROTOCOL OVER FRAME RELAY* ➔ *ADD/EDIT* ➔ *IP* ➔ *MORE ROUTING* menu:

```
R4100 Setup Tool              Funkwerk Enterprise Communications GmbH
[FRAME RELAY][MPR][ADD][IP][ROUTING]: IP Routing (mpfr1)     MyGateway


 The flags are:  U (Up), D (Dormant), B (Blocked),
                 G (Gateway Route), I (Interface Route),
                 S (Subnet Route), H (Host Route), E (Extended Route)

 Destination   Gateway       Mask          Flags Met.  Interface   Pro
 192.168.1.0   192.168.100.2 255.255.255.0 DG    1     branch      loc
 192.168.100.2 192.168.100.1 255.255.255.0 DH    1     branch      loc



   ADD                 ADDEXT           DELETE            EXIT

```

FLAGS shows the current status (*Up*, *Dormant*, *Blocked*) and the type of route (*Gateway Route*, *Interface Route*, *Subnet Route*, *Host Route*, *Extended Route*). The protocol with which your gateway has "learned" the routing entry is displayed under *PRO*, e.g. *loc* = local, i.e. manually entered.

More routes are added in the *MULTIPROTOCOL OVER FRAME RELAY* ➔ *ADD/EDIT* ➔ *IP* ➔ *MORE ROUTING* ➔ *ADD* menu. Existing entries can be edited by tagging the desired list entry and pressing the Return key.

```
R4100 Setup Tool              Funkwerk Enterprise Communications GmbH
[FRAME RELAY][MPR][ADD][IP][ROUTING][ADD]                    MyGateway


 Route Type              Network route
 Network                 WAN with transit network

 Destination IP Address  192.168.1.0
 Netmask                 255.255.255.0

 Gateway IP-Address      192.168.100.2
 Metric                  0


          SAVE                            CANCEL

```

The *MORE ROUTING* ➜ *ADD/EDIT* menu consists of the following fields:

Field	Description
Route Type	Type of route. Possible values: ■ *Host route* (default value): Route to a single host ■ *Network route*: Route to a network ■ *Default route*: The route is applied for all IP addresses and if no other suitable route is available.
Network	Defines the type of connection. For possible values see table "Selection options in Network field," on page 21. The displayed value cannot be modified in this menu. It depends on the setting of *IP TRANSIT NETWORK* in *MULTIPROTOCOL OVER FRAME RELAY* ➜ *ADD/EDIT* ➜ *IP* ➜ *BASIC IP-SETTINGS.*
Destination IP Address	Only for *ROUTE TYPE* = *Host route* or *Network route*. IP address of the destination host or network.
Netmask	Only for *ROUTE TYPE* = *Network rout*e Netmask for *DESTINATION IP ADDRESS* If no entry is made the gateway uses a standard netmask.
Gateway IP Address	Only for *NETWORK =* *WAN with transit network*. IP address of the host to which your gateway should forward the IP packets.
Partner / Interface	Only for *NETWORK* = *WAN without transit network* Displays the connection partner. Field cannot be modified.

Field	Description
Metric	The lower the value, the higher the priority of the route (possible values *0...15*). The default value is *1*.

Table 4-4: **MORE ROUTING** menu fields

NETWORK offers the following selection options:

Description	Meaning
WAN without transit network	Route to a destination host or LAN that can be reached via a connection partner without including any transit network available.
WAN with transit network	Route to a destination host or LAN that can be reached via a connection partner via a transit network.

Table 4-5: Selection options in **NETWORK** field

In addition to the normal routing table, the gateway can also make routing decisions based on an extended routing table. Apart from the source and destination address, the gateway can also include the protocol, source and destination port, type of service (TOS) and the status of the gateway interface in the decision.

Entries in the Extended Routing Table are treated preferentially compared with entries in the normal routing table.

To create extended IP routing entries, press the **ADDEXT** button to open the relevant menu.

Example Extended IP Routing (XIPR) is useful, for example, if two networks are connected via ISDN with a LAN-LAN connection, but certain services (e.g. Telnet) should be routed over an X.25 link and not over an ISDN switched connection. By making entries in the Extended Routing Table, you can allow part of the IP traffic to run over the ISDN switched connection and part of the IP traffic (e.g. for Telnet) to run over an X.25 link.

Configuration is made in the Setup Tool menu *MULTIPROTOCOL OVER FRAME RELAY* ➜ *ADD/EDIT* ➜ *IP* ➜ *MORE ROUTING* ➜ *ADDEXT*.

```
R4100 Setup Tool                Funkwerk Enterprise Communications GmbH
[FRAME RELAY][MPR][ADD][IP][ROUTING][ADD]: IP Routing        MyGateway
                                     - Extended Route


 Route Type                    Host route
 Network                       WAN without transit network

 Destination IP Address

 Partner / Interface           mprf1            Mode  always

 Metric                        1
 Source Interface              don't verify
 Source IP Address
 Source Mask
 Type of Service (TOS)         00000000         TOS Mask  00000000
 Protocol                      don't verify


              SAVE                                   CANCEL

```

The menu contains the following fields:

Field	Description
Route Type	Type of route. Possible values: ■ *Host route* (default value): Route to a single host ■ *Network route*: Route to a network ■ *Default route*: The Route is applied for all IP addresses and if no other suitable route is available.
Network	Defines the type of connection, see table "Selection options in Network field," on page 21. The displayed value cannot be modified in this menu. It depends on the setting of *IP TRANSIT NETWORK* in *MULTIPROTOCOL OVER FRAME RELAY* ➜ *ADD/EDIT* ➜ *IP* ➜ *BASIC IP-SETTINGS.*

Field	Description
Destination IP Address	Only for *ROUTE TYPE* = *Host route* or *Network route* IP address of the destination host or LAN.
Netmask	Only for *ROUTE TYPE* = *Network route* Netmask for *DESTINATION IP-ADDRESS*.
Partner / Interface	Only for *NETWORK* = *WAN without transit network* Displays the connection partner. Field cannot be modified.
Mode	Only for *NETWORK* = *WAN without transit network*. Defines when the connection partner is to be used. Possible values see table "Mode selection options," on page 24
Metric	The lower the value, the higher the priority of the route (possible values *0...15*). Default value is *1*.
Source Interface	Interface over which the data packets reach the gateway. Default value is *don't verify*.
Source IP-Address	IP address of the source host or LAN.
Source Mask	Netmask for *SOURCE IP-ADDRESS*.
Type of Service (TOS)	Possible values: *0..255* as bit string.
TOS Mask	Bit mask for *TYPE OF SERVICE*.
Protocol	Defines a protocol. Possible values: *don't verify, icmp, ggp, tcp, egp, pup, udp, hmp, xns, rdp, rsvp, gre, esp, ah, igrp, ospf, l2tp.* Default value is *don't verify*.

Field	Description
Source Port	Only for **PROTOCOL** = *tcp* or *udp*
	Source port number or range of source port numbers.
Destination Port	Only for **PROTOCOL** = *tcp* or *udp*
	Destination port number or range of destination port numbers.

Table 4-6: **ADDEXT** menu fields

The **MODE** field includes the following selection options:

Description	Meaning
always	Always use the route.
dialup wait	Use the route if the interface is "*up*". If the interface is "*dormant*", dial and wait until the interface is "*up*". Otherwise reroute.
dialup continue	Use the route if the interface is "*up*". If the interface is "*dormant*", dial but reroute until the interface is "*up*". Otherwise reroute.
up only	Use the route if the interface is "*up*". Otherwise reroute.

Table 4-7: **MODE** selection options

The **SOURCE PORT** and **DESTINATION PORT** fields contain the following selection options:

Description	Meaning
any (default value)	The route is valid for all ➤➤ **port** numbers.
specify	Enables the entry of a port number.
specify range	Enables the entry of a range of port numbers.
priv (0...1023)	Privileged port numbers: 0 ... 1023.

Description	Meaning
server (5000....32767)	Server port numbers: 5000 ... 32767.
clients 1 (1024....4999)	Client port numbers: 1024 ... 4999.
clients 2 (32768....65535)	Client port numbers: 32768 ... 65535.
unpriv (1024...65535)	Unprivileged port numbers: 1024 ... 65535.

Table 4-8: Selection options of *SOURCE PORT* and *DESTINATION PORT*

4.2.3   Submenu Advanced Settings

The fields of the *ADVANCED SETTINGS* submenu are described below.

```
R4100 Setup Tool              Funkwerk Enterprise Communications GmbH
[FRAME RELAY][MPR][ADD][IP][ADVANCED]: Advanced X.25       MyGateway
                                   MPR Settings (mpfr1)


RIP Send                        none
RIP Receive                     none

IP Accounting                   off
Back Route Verify               off
Route Announce                  up or dormant
Proxy Arp                       off

Van Jacobson Header Compression off
Dynamic Name Server Negotiation yes


             OK                              CANCEL

```

Extended routing settings and other adjustments for the respective connection partner can be made in the *MULTIPROTOCOL OVER FRAME RELAY* ➜ *ADD/EDIT* ➜ *IP* ➜ *ADVANCED SETTINGS* menu.

RIP The entries in the routing table can be defined statically or the routing table can be updated constantly by a dynamic exchange of routing information between several gateways. This exchange is controlled by a Routing Protocol, e.g. RIP (Routing Information Protocol).

Gateways use ➤➤ **RIP** to exchange information stored in routing tables by communicating with each other at regular intervals. The gateway supports both version 1 and version 2 of RIP, either individually or together.

RIP is configured separately for LAN and WAN.

Active and passive

Gateways can be defined as active or passive gateways: Active gateways offer their routing entries to other gateways via ➤➤ **broadcasts**. Passive gateways accept the information from the active gateways and store it, but do not pass on their own routing entries. The gateway can be either active or passive.

Connection partner

If you negotiate with a connection partner to receive and/or send RIP packets, your gateway can exchange routing information dynamically with the gateways in the LAN of the remote gateway.
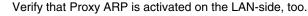
> Receiving routing tables via the RIP is a possible security loophole, as external computers or gateways can change the routing functionality of the gateway.
>
> **Note**   RIP packets do not set up or hold dialup connections.

IP Accounting   This option is for activating or deactivating the creation of IP accounting messages for this connection partner. If IP accounting is activated, a statistics message is generated (and entered in the **biboAdmSyslogTable**), which contains detailed information about the connections to this connection partner. (Settings for storage of accounting messages into a file can be done in *SYSTEM* ➔ *EXTERNAL SYSTEM LOGGING*.)

Back Route Verification   This term conceals a simple but very powerful function of the gateway. If Back-route Verification is activated for a connection partner, data packets are only accepted at the interface if answering packets would be routed over the same interface. You can therefore prevent packets with fake IP addresses being accepted – even without filters.

Route Announce   This option enables you to set when routing protocols (e.g. RIP), that have been activated if applicable, propagate the IP routes defined for this interface.

Proxy ARP   ➤➤ **Proxy ARP** enables the gateway to answer ➤➤ **ARP** requests from its own LAN acting for the defined connection partner. If a host in the LAN wants

to set up a connection to another host in the LAN or to a connection partner, but doesn't know its hardware address (MAC address), it sends an ARP request as a ➤➤ **broadcast** to the network. If Proxy ARP is activated on the gateway and the desired target host can be reached e.g. via a host route, the gateway answers the ARP request with its own hardware address. The ➤➤ **data packets** are sent to the gateway, which then forwards them to the desired host.

Verify that Proxy ARP is activated on the LAN-side, too.

Note

The *ADVANCED SETTINGS* menu consists of the following fields:

Field	Description
RIP Send	Enables RIP packets to be sent via the interface to the WAN partner. Possible values: see table "Selection options for RIP Send and RIP Receive," on page 29.
RIP Receive	For receiving RIP packets via the interface to the WAN partner. Possible values: see table "Selection options for RIP Send and RIP Receive," on page 29.
IP Accounting	For generating accounting messages for e.g. ➤➤ **TCP**, ➤➤ **UDP** and ICMP sessions. Possible values: *on*, *off* (default value).
Back Route Verify	Activates Back Route Verification for the interface to the WAN partner. Possible values: *on, off* (default value).

Field	Description
Route Announce	Possible values: ■ *up or dormant* (default value): Routes are propagated if the interface's status is *up* or *dormant*. ■ *always*: Routes are always propagated independent of operational status. ■ *up only*: Routes are only propagated if the interface status is *up*.
Proxy ARP	Enables the gateway to answer ARP requests from the own LAN acting for the defined WAN partner. Possible values: see table "Proxy ARP selection options," on page 29.
Van Jacobson Header Compression	Reduces the size of the TCP/IP packet. Possible values: ■ *on*: VJHC activated. ■ *off*: VJHC deactivated.

Table 4-9: *ADVANCED SETTINGS* menu fields

RIP SEND and *RIP RECEIVE* contain the following selection options:

Description	Meaning
none (default value)	Not activated.
RIP V2 multicast	Only for *RIP SEND* The gateway waits for version 2 RIP packets with RIP V2 multicast address 224.0.0.9.
RIP V1 triggered	RIP V1 messages are sent rsp. received and processed as per RFC 2091 (Triggered ➤➤ **RIP**).

Description	Meaning
RIP V2 triggered	RIP V2 messages are sent rsp. received and processed as per RFC 2091 (Triggered ➤➤ **RIP**).
RIP V1	For sending and receiving version 1 RIP packets.
RIP V2	For sending and receiving version 2 RIP packets.
RIP V1 + V2	For sending and receiving RIP packets of both version 1 and 2.

Table 4-10:   Selection options for *RIP SEND* and *RIP RECEIVE*

PROXY ARP offers the following selection options:

Description	Meaning
off (default value)	Deactivates Proxy ARP for this WAN partner.
on (up or dormant)	The gateway answers an ARP request only if the status of the connection to the WAN partner is *up* (active) or *dormant* (idle). In the case of *dormant*, the gateway only answers the ARP request; the connection is not set up until someone actually wants to use the route.
on (up only)	The gateway answers an ARP request only if the status of the connection to the WAN partner is *up* (active), i.e. a connection already exists to the WAN partner.

Table 4-11:   *PROXY ARP* selection options

4.3   Bridge Submenu

The *BRIDGE* submenu is described below.

```
R4100 Setup Tool                 Funkwerk Enterprise Communications GmbH
[FRAME RELAY][MPR][ADD][BRIDGE]: Bridge Configuration        MyGateway
                                 (mpfr1)



        Enable Bridging              no




             OK                                    CANCEL

```

The gateway can be operated in Bridging Mode.

In contrast to a ➤➤ **router**, bridges operate at layer 2 of the ➤➤ **OSI model**, are independent of higher-level protocols and transmit data packets using ➤➤ **MAC addresses**.

Bridges are used to physically decouple networks and to reduce network data traffic. This is done by using filter functions that allow data packets to pass to certain network segments only.

To operate the gateway in Bridging Mode, the function must be activated in the field *BRIDGING* for the respective Ethernet interface of the LAN.

To include the defined connection partner in the bridging function, the value in the *ENABLE BRIDGING* field is set to *yes* (default value is *no*).

> Note that this feature is not available for PPP interfaces using a Frame Relay encapsulation.

Note

Index: Frame Relay