DI-1132
Ethernet Bridge/Router

PPP Menus

Reference Manual

Issue 5

Software Version 5AP2.6.X

1/98

Throughout this manual, information that is presented by the router and entered into the router will be shown in a bordered box, as shown here.

```
Screen information being displayed or entered.
```

Initial Router & Management Console Power-Up

The following screen information will be seen on the console connected to the router when it is first powered on:

```
Self tests in progress...
Proc A ROM, local RAM, Common RAM, Address PROM
System startup
Loopback completes normally.

Terminals supported:

  ansi, avt, ibm3101, qvt109, qvt102, qvt119, tvi925, tvi950, vt52, vt100,
  wyse-50, wyse-vp, teletype

Enter terminal type:
```

As the terminal type is not yet defined at the very first power-up, this screen may be slightly mixed up. Enter at least one <RETURN> (up to three if necessary) on the Network Console in order for the router to determine the baud rate of the terminal used for the console (i.e. auto-baud) and then proceed.

Select your terminal if listed and enter its name in lower case at the prompt, or choose the terminal type **teletype** if your terminal is not listed. The **teletype** terminal type operates in scroll mode and may be used successfully until a custom terminal definition is created.

Menu Command Entry

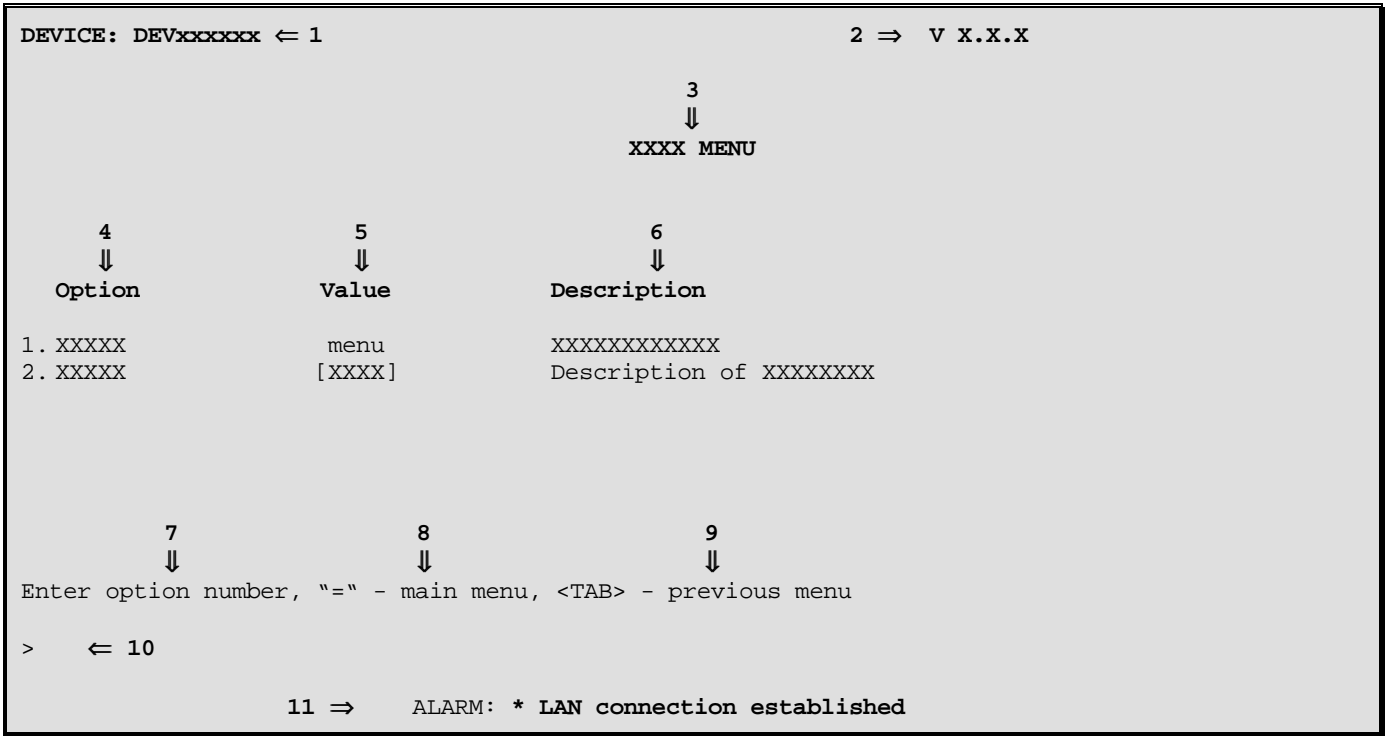Once the terminal type is specified, the MAIN (LOGIN) MENU will be displayed.

The DI-1132 Ethernet router uses a "hotkey " Menu. A menu option is chosen by selection of the desired option number.

Entry of parameters is from the ">" prompt. When a parameter is required, enter the necessary string and end it with a <Return>. If the entry is not accepted, an error message will be reported and the parameter will have to be re-entered. Should you make an error, the <BACKSPACE> key (for most terminals) deletes the most recently entered characters.

Important

The DI-1132 uses FLASH memory to store the configuration information. Configuration settings are stored to FLASH memory after there has been 30 seconds of idle time. Idle time is when there is no selection or modification of the value in the built-in menu system.

Menu Structure

```
DEVICE: DEVxxxxxx ⇐ 1                                    2 ⇒  V X.X.X

                                              3
                                              ⇓
                                          XXXX MENU


        4                  5                  6
        ⇓                  ⇓                  ⇓
     Option              Value            Description

1. XXXXX              menu             XXXXXXXXXXXX
2. XXXXX              [XXXX]           Description of XXXXXXXX




           7                  8                  9
           ⇓                  ⇓                  ⇓
Enter option number, "=" - main menu, <TAB> - previous menu

>      ⇐ 10

                    11 ⇒     ALARM: * LAN connection established
```

The Menu Screens are structured with 11 primary elements:

1. Device Name
2. Software Version
3. Menu Name
4. Option Number and Option Name
5. Option Value
6. Option Description
7. Choosing an Option
8. Returning to the Main Menu
9. Returning to the Previous Menu
10. Command Prompt
11. ALARM display for a just-happened alarm event

Elements of the Menu Screens:

1. **Device Name**

    A default Device Name in the format DEVxx-xx-xx is supplied by the system for each router. (xxxxxx are the last 6 digits of the MAC address of the router). The Device Name may be changed in the Device Set-Up Menu.

2. **Software Version**

    The version of the software currently installed in the router is shown in the upper right-hand corner of each menu display.

3. **Menu Name**

    Each MENU is named to indicate its grouped Options..

4. **Option Number and Option Name**

    Choosing the number for the Option makes the selection. If you prefer a command-style interface, typing the first few unique letters of the desired Option is enough to identify the Option. Enter the selection with a <Return>.

5. **Option Value**

    The Value of an Option may indicate several parameters—for example:

    State [enabled], [disabled], [present], [not_present], ...
    Setting   [5 sec.], [5 min.], ...
    Path   "menu" indicates a sub-menu
    Name   [vt100], [Bridge_5], [none]

6. **Option Description**

    This is a single-line description of the Option.

7. **Choosing an Option**

    Select the Option by entering its number or unique first letters at the prompt.

8. **Returning to the Main Menu**

    The equals ("=") sign returns you to the Main Menu. (All major menu paths start at the Main Menu. If you want to switch major paths, simply enter " = ").

9. **Returning to the Previous Menu**

    To go back one menu step, enter a <TAB>.

10. **Command Prompt >**

    All data entry is made at the Command Prompt.

11. **ALARM display for an occurring event**

    The display of an ALARM notifies a viewing router manager that an event of significance has occurred. Since not every ALARM can be viewed as it occurs, the latest 42 ALARMs are recorded and can be viewed from the Network Events Menu.

Note: Some options are not always displayed. Theie presence on the display depends on configuration settings. Display lines with these options are in italics.

Login Menu

```
                        LOGIN MENU

    Option            Description
 1. Login           - Initiate operator session
 2. Help            - Read menu introduction














Enter option number



>
```

This is the **LOGIN MENU** seen when powering up a console connected to the router.

1 - Login

The Login option allows entry of the password for the router. The default password is "BRIDGE"; change it if security is desired. See the Installation & Applications Guide for information on restoring the default password to the router.

> **Action to Take:**
>
> Choose the Login Option and use the default password "BRIDGE." The characters will not be echoed on the screen. Once the password is accepted, you will be given the expanded MAIN MENU for full access to router management features.

2 - Help

The Help option provides a brief description of menu format and usage.

Main Menu

```
                        MAIN MENU

    Option               Value         Description
 1. Quick start          menu        - Quick start configuration menu
 2. Configuration        menu        - Define operating parameters
 3. Statistics           menu        - Device LAN and WAN statistics
 4. Diagnostics          menu        - Access troubleshooting tools
 5. Network events       menu        - View network event history
 6. Save configuration               - Save configuration immediately
 7. Logout                           - End operator session
 8. Help                             - Read menu introduction


 Enter option number

 >
```

The **MAIN MENU** is a starting and ending point for management of the router. This menu allows access to menus and provides the Logout Option. Options 1-5 are major paths. To switch major paths, return to the MAIN MENU by entering "=".

1 - Quick Start

The Quick Start option takes you to the Quick Start Menu, where a directly dialed ISDN call may be placed without having to configure a large number of parameters. The configuration parameters required to establish a direct dial ISDN call are definable within the Quick Start menu.

2 - Configuration

The Configuration option takes you to the Configuration Menu, where all the various router parameters can be defined. Take this path to define the operating parameters of the terminal used for the router console.

3 - Statistics

The Statistics option takes you to the Statistics Menu, where statistics can be examined to evaluate router, LAN, and link performance.

4 - Diagnostics

The Diagnostics option takes you to the Diagnostics Menu, where special diagnostic functions can be used to analyze LAN, link, and router problems.

5 - Network Events

The Network Events option takes you to the Network Events Menu, where the 42 latest Alarms can be examined.

6 - Save Configuration

The Save Configuration option performs an immediate save of the configuration to flash memory.

7 - Logout

The Logout option terminates your session and secures the router. The next user must log in and enter the correct password to view or change the router configuration.

8 - Help

The Help option provides a brief, one-screen description of menu format and usage.

Quick Start Menu

```
                    QUICK START MENU

    Option              Value           Description
 1. ISDN set-up         menu          - Configure ISDN
 2. Device name         "DEV050607"   - Name this device
 3. Security level      [none]        - Set security protocol
 4. IP address          [none]        - Define IP address and mask
 5. Default gateway     [none]        - Define default gateway
 6. Direct dial                       - Make a manual ISDN call
 7. Force disconnect                  - Disconnect a call
 8. Link status                       - View status of link
 9. Soft reset                        - Reset device (retain configuration)




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **QUICK START MENU** provides configuration options to make an ISDN direct dial connection.

1 - ISDN set-up

The ISDN set-up option takes you to a menu where the switch type, dial prefix number and directory number(s) may be set. Depending on the switch type selected, Service Profile ID(s) may also be entered.

2 - Device name

The Device Name option allows you to name (or rename) this device for identification purposes. The router name will be displayed in both the Value column of this option and in the upper left-hand corner of all menu screens. If the router has not been named, the device name defaults to a prefix of "DEV" followed by the last six digits of the LAN port MAC address (eg. DEV050607).

3 - Security level

The Security Level option allows you to choose the type of security authentication to request from remote site PPP routers. The choises are none, PAP or CHAP.

Default: [none]

```
Enter :
    none, PAP, CHAP

>
```

4 - IP Address

The IP Address option allows the definition of an Internet Protocol (IP) address and corresponding subnet size for the router. The router requires an IP address.

The IP address consists of 4 octets and is represented by 4 fields separated by periods ("**.**"), where each field is specified by a decimal number (e.g. 92.3.1.10). Each decimal number must be less than or equal to 255, that is the maximum value of each 8-bit field.

The Subnet Size variable partitions the host field of an IP address into two parts: a *subnet number* and a *host number*. This is used when a site uses multiple logical networks within a single IP network address. The subnet size must be the same as the subnet mask used on the subnet this router is connected to. The subnet mask is defined as a series of contiguous bit locations from the start of the IP address.

Default:　　　[none]

```
Enter :
    none, internet address (up to 15 characters)
>

Enter :
    size of subnet mask (from 8 to 32)
>
```

5 - Default gateway

The Default Gateway option allows the identification of a default gateway (i.e. *router*). Messages destined for hosts not on this (sub-)network are forwarded to the default gateway. The default gateway may be located on the local LAN or may be one of the remote site peer IP routers.

If the IP address of the remote site peer IP router is not known, the default gateway may be defined as the remote site ID. This will cause the default gateway to become whatever device is currently connected at that remote site.

When an SNMP message is to be sent to an NMS, first the routing table is checked for a known route. If a route to the NMS is unknown, the SNMP message will then be sent to the default gateway. If the default gateway cannot provide the best route, it will send the message to the gateway that can provide the best route. After the default gateway sends the message to the other gateway for delivery, the default gateway will send an ICMP Redirect message back to the router that points to the best route gateway. In this manner, the router is informed of the best route for future SNMP message delivery.

A configured Default Gateway will override a default route learned from RIP.

If there are more than one default gateways defined within the routing table, the default gateway with the lowest cost will be used and displayed in this option.

Default:　　　[none]

```
Enter :
    none, gateway IP address, remote site ID or alias (up to 18 characters)
>
```

6 - Direct dial

The Directl Dial option is used to establish a manual Direct Dial ISDN PPP call to a remote site PPP router. A direct dial connection may be made by entering the ISDN phone number of the remote site PPP router.

When a Direct Dial is made from the Quick Start menu, any call parameters that are not specified when the call is made will be taken from the "INITIAL_PROFILE" remote site profile. These options include LCP (Link Control Protocol) parameters such as Multilink status.

If the Direct Dial results in a connection to a valid remote site that has already been configured; once the authentication process is finished, the BCP, IPCP, IPXCP, and CCP (Compression) parameters will be used from the configured remote site and not from the "INITIAL_PROFILE" remote site profile.

Please refer to the Remote Site Set-Up Menu for more information on configuring remote site profiles.

```
Enter :
     ISDN_number (up to 35 characters)
>
```

7 - Force Disconnect

The Force Disconnect option will cause the chosen link to be disconnected.

```
Enter :
     Link to disconnect (1 or 2), all
>
```

8 - Link Status

The Link Status option displays the status of the links, either individually (more statistics), or together (provides overview).

Please refer to the Link Status displays for more detailed information.

9 - Soft Reset

Selecting the Soft Reset option resets the router software and restarts the router. The current configuration is retained.

Note that a hardware (and software) reset may be performed by toggling the switch behind the small access hole at the bottom of the faceplate on the right side.

ISDN Menu

```
                        ISDN MENU

    Option               Value           Description
1. Switch type          [Net3]          - Set switch type
2. Dial Prefix          [none]          - Set dial prefix
3. Directory number 1 [none]            - Set directory number
4. Directory number 2 [none]            - link 2 directory number
5. SPID 1               [none]          - link 1 service profile identifier
6. SPID 2               [none]          - link 2 service profile identifier




Enter option number, "=" - main menu, <TAB> - previous menu


>
```

The **ISDN MENU**

This menu allows the ISDN switch type to be set and connection numbers to be entered. For switch types NET3, 5ESS-PP, KDD, NTT and TPH1962, only a single directory number option is shown. For types DMS-100, NI-1, NI-2 and 5ESS-MP, the Directory number for a second link and Service profile identifier numbers for both links may be entered.

1 - Switch type

Choosing this option defines the ISDN switch (signaling) type that the router is connected to.

When the switch type is changed, a **Soft Reset** must be performed before the change will take effect.

Default: [NET3]

Choises: DMS-100, NI-1, NI-2, 5ESS-MP, NET3, TPH1962, KDD, SWEDEN, and NTT

2 - Dial prefix

If the ISDN Orbiter is attached to an ISDN PBX and a dialing prefix is required to connect to an outside line, this option must be filled in with the required number. Enter the dial prefix code of the B-channel (up to 5 characters).

Default: [none]

3 - Directory number *1*

Enter the ISDN number of the B-channel (up to 15 characters). The ISDN number is available from the ISDN circuit provider.

When the Directory Number is changed, a **Soft Reset** must be performed for this to take effect. The router will be reset and begin operation with the new directory number.

Default: [none]

 The following options appear when a switch type DMS-100, NI-1, NI-2, or 5ESS-MP is selected:

4 - Directory number 2

Enter the ISDN number assigned to this B-channel. The ISDN number is available from the ISDN circuit provider.

When the Directory Number is changed, a **Soft Reset** must be performed for this to take effect. The router will be reset and begin operation with the new directory number.

5 - SPID 1

Enter the ISDN Service Profile Identifier (SPID) number assigned to this B-channel. The SPID number is available from the ISDN circuit provider.

6 - SPID 2

Enter the ISDN Service Profile Identifier (SPID) number assigned to this B-channel. The SPID number is available from the ISDN circuit provider.

When the SPID is changed, a **Soft Reset** must be performed for this to take effect. The router will be reset and begin operation with the new SPID.

Configuration Menu

```
                        CONFIGURATION MENU

     Option                 Value           Description
  1. Access set-up          menu        - Establish access parameters
  2. Internet set-up        menu        - Define IP environment
  3. Applications set-up    menu        - Configure Internet applications
  4. WAN set-up             menu        - Configure WAN operation
  5. Bridging set-up        menu        - Define bridging environment
  6. IP routing set-up      menu        - Define IP routing environment
  7. IPX routing set-up     menu        - Define IPX environment
  8. Voice set-up           menu        - Configure VOICE Interface
  9. Filter set-up          menu        - Filter operations




Enter option number, "=" - main menu, <TAB> - previous menu


>
```

The **CONFIGURATION MENU** provides paths to menus for total device configuration.

1 - Access Set-Up

The Access Set-up option takes you to the Access Set-Up Menu, where passwords, names, dates, and times are set and viewed. From this menu, you can save or restore the router configuration and connect to another router in the network of routers.

2 - Internet Set-Up

The Internet Set-up option takes you to the Internet Set-Up Menu, where the parameters for the Internet configuration are selected.

3 - Applications Set-Up

The Applications Set-up option takes you to the Applications Set-up Menu, where a number of internet connection management applications may be accessed.

4 - WAN Set-Up

The WAN Set-up option takes you to the WAN Set-Up Menu, where the Wide Area Network links are configured and controlled.

5 - Bridging Set-Up

The Bridging Set-up option takes you to the Bridging Set-Up Menu, where the parameters for bridging are selected.

6 - IP Routing Set-Up

The IP Routing Set-up option takes you to the IP Routing Set-Up Menu, where the parameters for IP routing are selected. IP routing may be enabled or disabled in this menu.

7 - IPX Routing Set-Up

The IPX Routing Set-up option takes you to the IPX Routing Set-Up Menu, where the parameters for IPX routing are selected. IPX routing may be enabled or disabled in this menu.

8 - VOICE Set-Up

The Voice Set-up option takes you to the Voice Set-Up Menu, where the parameters for the Voice interfaces on this device are configured.

This menu option is not available when the voice module hardware is not installed in this DI-1132.

9 - Filter Set-Up

The Filter Set-up option takes you to the Filter Set-Up Menu, where you can create filters based on protocol types and custom specifications.

Access Set-Up Menu

```
                    ACCESS SET-UP MENU

   Option              Value         Description
1. Terminal set-up     menu       - Define operator's console
2. Device set-up       menu       - Set security/time/names
3. Telnet set-up       menu       - Establish remote communications
4. Upgrade device      menu       - Perform feature upgrade
5. Load FLASH set-up   menu       - Prepare for software update
6. Hardware status                - Display hardware information
7. TFTP access       [disabled]   - Allow TFTP configuration saves/loads
8. Dump                           - Back-up configuration from console
9. Restore                        - Load configuration from console




Enter option number, "=" - main menu, <TAB> - previous menu



>
```

The **ACCESS SET-UP MENU** provides options for saving and restoring the router configuration as well as paths to menus for terminal, device, and remote access configuration.

1 - Terminal Set-Up

The Terminal Set-up option takes you to the Terminal Set-Up Menu, where the terminal parameters used for the router console are selected.

2 - Device Set-Up

The Device Set-up option takes you to the Device Set-Up Menu, where the device name, password, dates, and times are set and viewed.

3 - Telnet Set-up

The Telnet Set-up option takes you to the Telnet Access Menu, where you can connect to another router in the network of routers.

4 - Upgrade Device

The Upgrade Device option takes you to the Upgrade Device Menu, where you can upgrade this device. Options include unlimited station count, data compression, firewall security and IPX routing. This menu option does not appear on routers with all functions enabled.

4/5 - Load FLASH Set-Up

The Load FLASH Set-up option takes you to the Load FLASH Set-Up Menu, where you can update the software in this device using TFTP or console Z-modem transfers.

5/6 - Hardware Status

The Hardware Status option displays the status of the router hardware.

```
                    Hardware Status

Boot Code version    : xxxxxx
Boot Code revision   : xxxxxx
Ram size             : 4 MB
MAC address          : 02-03-04-05-06-07
MAC check code       : 23d4a6
Service reference    : 0/0
LAN interface type   : 10BaseT
Link 1 interface type : BRI ST
Link 2 interface type : BRI ST
ROM size             : 4MB
Compression          : enabled
Full management      : enabled
Voice interface      : installed revision xxx
```

Boot Code version	The software boot code version currently intalled in this DI-1132. This is the number that is displayed in the upper right of the menu screens
Boot Code revision	The software boot code revision number currently installed in this DI-1132. A control number for tracking minor software revisions.
RAM size	The amount of RAM in this router.
MAC Address	The MAC Address of the LAN port for this router.
MAC Check Code	Check code used for feature upgrades.
Service Reference	Internal factory reference number.
LAN Interface Type	The type of LAN interface currently in use on this router.
Link 1 Interface Type	The type of link interface of this router.
Link 2 Interface Type	The type of link interface of this router.
ROM Size	Indicates the size of the FLASH EEPROM installed.
Compression	Indicates whether data compression is enabled or disabled.
Full Management	Indicates whether the current management level is Full or Limited.
Voice interface	Indicates whether or not a voice interface is installed and the revision number.

6/7 - TFTP Access

The TFTP Access option determines whether a remote LAN device will be allowed to make a TFTP connection to this router to dump (get) or restore (put) the configuration.

The TFTP application must be in "netascii" or "ascii" mode for configuration transfers.

When you need to change the battery, you can dump the configuration to a PC disk. Then, when the new battery is installed, you can reload the configuration.

Default: [disabled]

Procedures for performing a Configuration Dump using TFTP:

1) Start the TFTP application to be used for transfers to the router.
   (The IP address of the router may be found in the Internet Set-Up menu.)

2) Get the file "config.txt" from the router.

3) Use a text editor to check the configuration file saved to the PC disk to confirm that the information is still in order. If minor errors occurred, they may be corrected with the text editor. If errors were major, get the configuration file again.

4) Once you are satisfied that the configuration dump was successful, the battery may be safely changed (if this was the reason for the dump).

Procedures for performing a Configuration Load using TFTP:

1) Start the TFTP application to be used for transfers to the router.
   (The IP address of the router may be found in the Internet Set-Up menu.)

2) Put the file "config.txt" to the router.

3) When the transfer is complete, the configuration will have been restored to the router.

7/8 - Dump

The Dump option lists the configuration so it may be captured and stored to a disk on a PC running a terminal-emulation package. This is an important step after configuration of the router, since the configuration would be lost in case of battery failure or replacement.

The Dump option should not be used during a connection to another router.

The command "Configuration Access_Set-Up erase_config", is used at the time the dumped configuration is loaded back into the router. At that time, this command prepares the database by first clearing any information back to the default settings, and then allows the restoration of the saved configuration. The last command, "Configuration Access_Set-Up end_load", completes the loading of the saved configuration.

Two kinds of settings are not considered part of the configuration, and therefore are not included in the dump: trace settings and the password.

Procedures for performing a Configuration Dump:

1) Prepare the emulation package so that it is ready to accept the transfer of the configuration file.

2) Send the file (dump) to the PC disk using the Dump command.

3) Use a text editor to check the configuration file saved to the PC disk to confirm that information is still in order. If minor errors occurred, they may be corrected with the text editor. If errors were major, check the emulation package settings and dump the configuration again.

4) Once you are satisfied that the configuration dump was successful; the battery may be safely changed (if this was the reason for the dump).

8/9 - Restore

The Restore option restores a configuration to the router that was previously saved to a disk file with the Dump command.

Considerations:

The terminal-emulation package selected should have the capability to pace the loading of commands into the router. This may be done through the setting of a delay timer (character or line pacing) or a wait for the echo of the character before transmitting the next character.

The pacing function is commonly available, although pacing procedures will vary with each emulation package.

The Load option should not be used during a connection to another router.

Procedures for performing a Configuration Load:

1) Prepare the PC to transfer the configuration file.

2) Execute the Load command.
    Confirmation is required. Enter "yes" to proceed.

3) Send the file from the PC disk.

4) When the transfer is complete, the configuration will have been restored to the router.

Terminal Set-Up Menu

```
                    TERMINAL SET-UP MENU

    Option        Value          Description
1. Terminal    [vt100]        - Define console terminal type
2. Show                       - Display terminal definitions
3. Add                        - Create a custom terminal definition
4. Remove                     - Delete a terminal definition








Enter option number, "=" - main menu, <TAB> - previous menu



>
```

From the **TERMINAL SET-UP MENU,** the terminal used for the router console is defined. A custom definition can be added if the terminal to be used is not presently supported by the router.

1 - Terminal

The Terminal option defines the terminal type to be used for the router console. The current terminal type is displayed in the Value column for this option. When this option is selected, the available terminal types are displayed.

Default: **Terminal type chosen at first power-up**

Choices: ansi, avt, ibm3101, qvt109, qvt102, qvt119, tvi925, tvi950, vt52, vt100,
                      wyse-50, wyse-vp, teletype

Considerations:

If your terminal is not listed:

1) Choose another of the same make to try the features it provides; or,

2) Choose the terminal type **teletype**. This terminal type operates in scroll mode and does not offer the highlighting that may be provided with the pre-defined or custom terminal types. Operating in this mode does not prevent any of the operations of the router.

3) For a complete solution, create your own custom terminal type and add it to the types supported by the router using the Add option.

2 - Show

The Show option displays all terminal definitions. This listing may be of use if you need to create a custom terminal definition.

3 - Add

The Add option allows you to define a custom terminal type if you will be using a terminal that is not supported as one of the Terminal option choices.

4 - Remove

The Remove option deletes a terminal definition. This will delete a newly created definition. To delete a terminal definition, enter the name of the terminal as shown when the Add or Show option is selected.

Device Set-Up Menu

```
                        DEVICE SET-UP MENU

    Option              Value           Description
 1. Password                            - Change login password
 2. Device name      "DEV050607"        - Name this device
 3. Show time                           - Display current date and time
 4. Set time                            - Set date and time




 Enter option number, "=" - main menu, <TAB> - previous menu



 >
```

The **DEVICE SET-UP MENU** allows the definition of the Device name, and a password to control local/remote access to the router management console. You can also set the real-time clock and date. Note that the clock is a 24-hour real-time clock.

1 - Password

The Password option allows you to change the router's login password. (The characters will **not** be echoed on the screen.) (If you have no need for a password, enter <NONE> in CAPS, and the entry of a password will be bypassed.) The password is case sensitive and must be entered precisely. An example is given below:

```
Enter:
  new password (1 to 8 characters)
> EURRNO\1

Enter:
  verification of new password (1 to 8 characters)
> EURRNO\1
New password installed
```

2 - Device Name

The Device Name option allows you to name (or re-name) this device for identification purposes. The router name will be displayed both in the Value column of this option and in the upper left-hand corner of all menu screens. If the router has not been named, the device name in the upper left-hand corner of the screen and the information in the Value column will show a prefix of DEV followed by the last six characters of the LAN port MAC address (e.g. DEV006045).

```
Enter:
  Device name string (up to 16 characters)
> Bridge5
```

3 - Show Time

The Show Time option allows you to view the current date and time.

4 - Set Time

Use the Set Time option to set the date and 24-hour Time Clock. Note that if your network uses the Bandwidth-On-Demand features of the DI-1132 Ethernet router across time zones, you must standardize on one time zone on the routers.

```
Enter:
  Date in format yy/mm/dd, no_change
93/07/27

Enter:
  Time in format hh: mm: ss
14: 25: 00
```

Telnet Set-Up Menu

```
                      TELNET SET-UP MENU

   Option          Value         Description
1. Telnet access [enabled]     - Allow incoming Telnet connection
2. Telnet                      - Connect to a remote device
3. Telnet port   [default}     - Alternate remote device port
3. Show names                  - Display known remote device names
4. Add name                    - Name remote devices
5. Remove name                 - Delete remote device name




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **TELNET SET_UP MENU** allows telnet connections to be made to other routers in the network.

1 - Telnet Access

The Telnet Access option allows LAN devices to make Telnet connections to this router for management. Once the connection is established, the LAN device will be presented with the menu interface for configuration management and statistics viewing.

Default: [enabled]

Considerations:

When a Telnet connection is made to a router, ensure that the Telnet session is in character mode, and carriage return padding (or translation) is set to NULL (or no translation). The extra character sent when carriage return padding is on will cause some displays to behave erratically.

2 - Telnet

Choosing the Telnet option, and specifying the name or IP address of the router you wish to connect to, connects to the other router for configuration purposes and viewing of statistics.

Noting the Device name at the top left of each Menu may identify the router being controlled.

If there is no data transmitted or received for a period of 5 minutes, the Telnet session will be disconnected. This time limit cannot be modified.

To disconnect from the router being controlled, enter Control-C (**^C**).

Considerations:

If the Internet Address of a remotely connected router is changed, immediately disconnect from the remote router by entering a Control-C (**^C**) and re-establish a new Telnet connection using the new Internet Address of the remote router.

3 - Telnet Port

The Telnet port option allows you to choose an alternate port number that a remote device can use for Telnet access to this router. This is necessary when Telnet is one of the exported services offered under Network Address Translation (NAT), as the well known port number will be used for the network Telnet server. An alternate port number must be supplied to Telnet to this router.

4 - Show Names

The Show Names option displays a listing of device names, their IP addresses and a user entered note of up to 75 characters.

```
Device Name            IP Address        Notes
----------------       ---------------   -----------------
Tokyo                  92.0.0.1          current device
Kyoto                  92.0.0.2          on link 1
Amsterdam              92.0.0.5          on link 2


Type: [s] to redraw, [=] main menu, any other key to end.
```

5 - Add Name

Use the Add Name option to add a device name, IP address and any desired notes. Note that when a note is added, if spaces are desired within the note, you must enclose the note in quotations ("). Ensure that the note is not more than 75 characters in length.

```
Enter:
  Device name (up to 10 characters)
>



Enter:
  IP address
>



Enter:
  Notes
>
```

6 - Remove Name

The Remove Name option allows you to remove a selected name. Note that the removal of a name also automatically removes the IP address and any notes associated with the name.

```
Enter:
  all, Device name
>
```

Upgrade Device Menu

```
                    UPGRADE DEVICE MENU

    Option                Description
 1. Station count      - Upgrade to
 2. Firewall           - Upgrade to support Firewall
 3. Compression        - Upgrade to support data compression
 4. IPX router         - Upgrade to IPX router capability
 5. Activate upgrade   - Enable the upgrade




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

From the **UPGRADE DEVICE MENU,** the DI-1132 may be upgraded to include unlimited station count, Firewall security, data compression and IPX router support. Options which are already enabled on this router will not appear.

This menu will not appear on devices having all options enabled.

1 – Station Count

The Station Count option prompts you for an activation key to upgrade this device from a ten station limit to unlimited connection station count.

The upgrade key is available from your local representative. Each upgrade key is unique for each device, and cannot be used to upgrade more than one device.

Once the upgrade key is correctly entered, the option will no longer be available and the Activate Upgrade option will become available. This allows more than one activation key to be entered before the device is reset and restarted.

2 - Firewall

The IP Router option prompts you for an activation key to upgrade this device to support Firewall.

The upgrade key is available from your local representative. Each upgrade key is unique for each device, and cannot be used to upgrade more than one device.

Once the upgrade key is correctly entered, the option will no longer be available and the Activate Upgrade option will become available. This allows more than one activation key to be entered before the device is reset and restarted.

3 - Compression

The IP Router option prompts you for an activation key to upgrade this device to support data compression.

The upgrade key is available from your local representative. Each upgrade key is unique for each device, and cannot be used to upgrade more than one device.

Once the upgrade key is correctly entered, the option will no longer be available and the Activate Upgrade option will become available. This allows more than one activation key to be entered before the device is reset and restarted.

4 - IPX Router

The IPX Router option prompts you for an activation key to upgrade this device to support IPX routing. Note: choosing to upgrade from IP to IPX will automatically add the compression and firewall upgrades as well.

The upgrade key is available from your local representative. Each upgrade key is unique for each device, and cannot be used to upgrade more than one device.

Once the upgrade key is correctly entered, the option will no longer be available and the Activate Upgrade option will become available. This allows more than one activation key to be entered before the device is reset and restarted.

5 - Activate Upgrade

The Activate Upgrade option becomes available when at least one of the upgrade activation keys has been successfully entered. This option will cause the device to reset and then restart with the new features enabled.

Load FLASH Set-Up Menu

```
                      LOAD FLASH SET-UP MENU

    Option                     Description
 1. Console (ZMODEM)       - Load through serial port
 2. Network (TFTP)         - Load through IP network













 Enter option number, "=" - main menu, <TAB> - previous menu



 >
```

From the **LOAD FLASH SET-UP MENU,** the software in the router may be updated to the latest version. The downlod file, referred to in this section as "###.all", will be found in the directory with the new software release number ###
(eg. 2CI.07.05.28).

When installing a new version of operating software in a router, ensure that the current configuration is backed up before the installation process is started (see Access Setup Menu: Dump and Restore options) .

1 - Console (ZMODEM)

Resets the router and places it in Console load mode. Once the router is in Console load mode, the "###.all" file may be sent using the ZMODEM transfer protocol. The Console load mode may only be used with a direct connection to the serial management port of the router.

The ZMODEM application **must** be in 32 bit CRC mode for software upgrade transfers.

This option must be confirmed before operation by typing "yes" when prompted.

Procedures for performing a Console ZMODEM Flash Load to upgrade the operating software of the router:

1) Execute the Console (ZMODEM) command from the Load FLASH Set-Up menu.
   Confirmation is required. Enter "yes" to proceed.

2) After the router restarts, the router will be in receive ZMODEM mode. The router will display the following messages on the console port.

   ```
   System startup
   Receiving ZMODEM ...
   **B0100000023be50
   ```

3) Start the ZMODEM transfer and send the file "###.all" from the Operational Code diskette.

4) Once the ZMODEM transfer is complete, the router will verify the file "###.all" in memory, program and verify the FLASH, clear the configuration to default values (except the password), and then reset. After the reset, the router will operate normally using the newly upgraded software. A byte status message will be displayed on the console port during the programming of the FLASH.

   On the rare occasion that during the programming of the FLASH something happens to the bridge/router (power hit or hardware reset), causing the FLASH to become corrupted, the bridge/router will restart in ZMODEM receive mode only. If the bridge/router does not start in ZMODEM receive mode: power down the bridge/router, remove the case cover, remove the jumper on pins 2-5 of strap W1, power up the bridge/router, power down the bridge/router, re-install jumper on W1 pins 2-5, replace the case cover and power up the bridge/router. The bridge/router should now restart and be in ZMODEM receive mode. Please refer to the Servicing Information section of the Installation & Applications Guide for information on removing the case and changing the strap settings.

The ZMODEM Load Flash operation may be aborted (by aborting the ZMODEM transfer and then entering 5 control-X characters "^X" from the console keyboard. After the control-X characters are sent, the router will display a limited menu system. Choose the Abort Load option from the Load FLASH Set-Up menu. This will cause the router to reset and return to normal operations operating from the existing software.

If the ZMODEM transfer operation needs to be restarted after it has been canceled or after loading the first file, simply choose the Console (ZMODEM) option from the Load FLASH Set-Up menu once again.

Considerations:

When the router is placed in Console load BOOT mode, the LAN interface and both WAN interfaces will be disabled. The router will only accept information from the console management port.

The BOOT code of the DI-1132 may be upgraded by performing a load of the "###.all" file from the BOOT Code directory on the upgrade diskette. Upgrading the BOOT code will allow the DI-1132 to load compressed system code in future upgrades.

2 - Network (TFTP)

Resets the router and places it in Network Load mode. Once the router is in Network Load mode, a TFTP connection may be made to the router to upgrade to a new version of software. Make sure to disconnect any telnet sessions to the router before starting the TFTP transfer

The TFTP application must be in "octet" or "binary" mode for software upgrade transfers.

Procedures for performing a Flash Load to upgrade the operating software of the router:

1) Execute the Network (TFTP) command from the Load FLASH Set-Up menu.

2) Enter "none" to connect locally or enter the remote site ID number or alias to connect to a remote site. Login when connected.

3) Start the TFTP application to be used for transfers to the router.
   (The IP address of the router may be found in the Internet Set-Up menu.).

4) Put the file "###.all" to the router from the Operational Code diskette.
   (Any router not in Network Load BOOT mode will respond with an access violation error.)

5) The router will verify the file "###.all" in memory, program and verify the FLASH, clear the configuration to default values (except: IP Address, IP Routing state, IP Forwarding state, WAN Environment, Link 1 & 2 State, the Switch Type, Directory Numbers, SPIDs, Password and connection data for the remote site, if applicable), and then reset. After the reset, the router will operate normally using the newly upgraded software. In some upgrade situations the Directory Numbers and SPIDs may be corrupted after the upgrade and will need to be re-entered.

   - The router may take up to two (2) minutes to program and verify the FLASH. The console will not respond during this time.

   To check on the router's current state during this process, get the file "status.txt" from the router. This file will report the router's state: both the mode and version if no errors have occurred, or an error message.

   On the rare occasion that during the programming of the FLASH something happens to the bridge/router (power hit or hardware reset), causing the FLASH to become corrupted, the bridge/router will restart in ZMODEM receive mode only. If the bridge/router does not start in ZMODEM receive mode, power down the bridge/router, remove the case cover, remove the jumper on pins 2-5 of strap W1, power up the bridge/router, power down the bridge/router, re-install jumper on W1 pins 2-5, replace the case cover and power up the bridge/router. The bridge/router should now restart and be in ZMODEM receive mode. Please refer to the Servicing Information section of the Installation & Applications Guide for information on removing the case and changing the strap settings.

The TFTP Load Flash operation may be aborted by re-connecting to the console of the router and choosing the Abort Load option from the Load FLASH Set-Up menu. This will cause the router to reset and return to normal operations operating from the existing software.

Considerations:

When the router is placed in Network (TFTP) load mode, the router will restart and then remain idle.

In the following diagram of a cluster of routers, when upgrading the three DI-1132 routers in the diagram, the upgrade order should be Router C, then Router B, and finally Router A.

A TFTP software load to router Router C would be performed as follows:
- Using TFTP, get config.txt from each router and save.
- Telnet to Router C. Enter the ID or alias of Router B in the Network (TFTP) option to put Router C in Network Load mode. When Router C restarts in Network Load mode, the connection to "Router B" will be re-established only if autocall is enabled on router B.
- The TFTP transfer of the upgrade code may now be performed from the PC to Router C. Once Router C has completed programming the flash and has restarted in operational mode, the connection to Router B will be re-established only if autocall is enabled on router B.

Router B upgrades would be performed using the ID or alias of Router A. Router A upgrades would not require a remote site ID as the PC used for TFTP transfers is located on the same LAN as Router A.

Once all the routers are operating with the new software, the PC may be used to reload the config.txt file back to Router C, then Router B, then Router A.
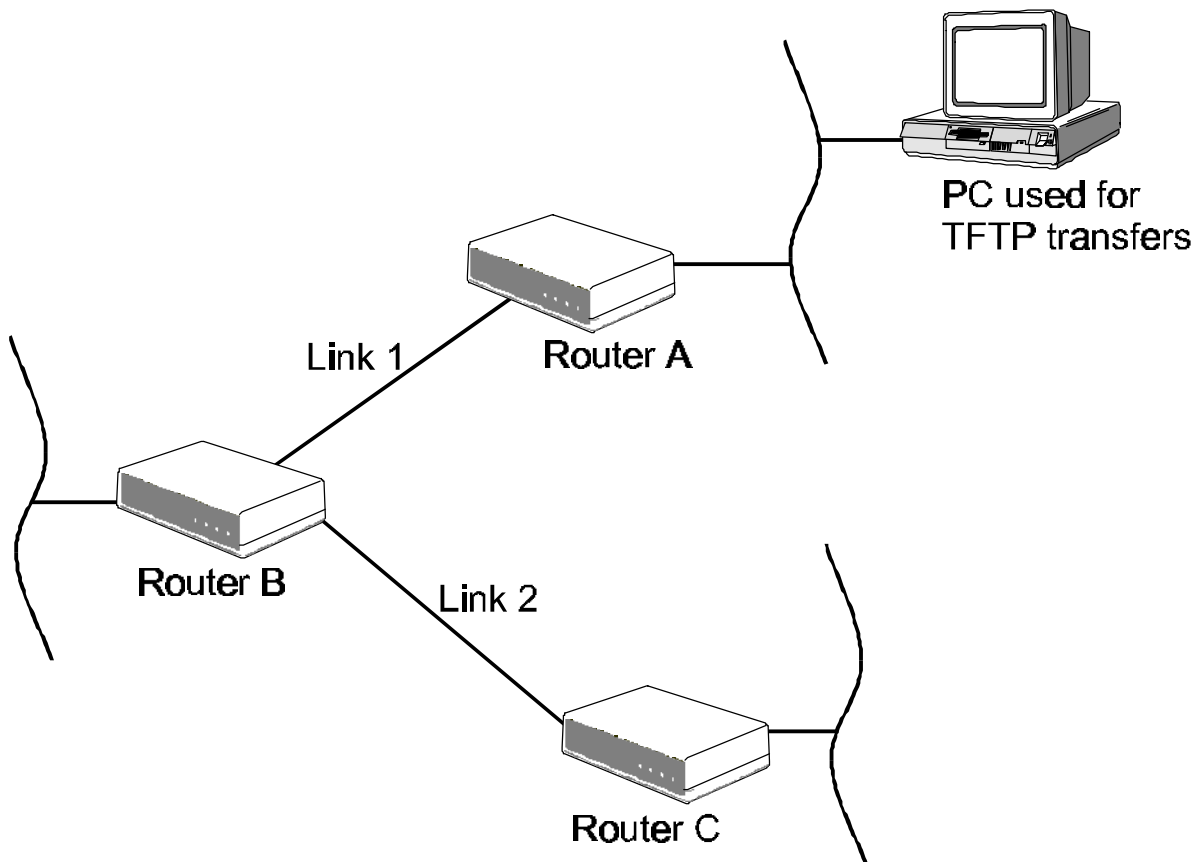
Internet Set-Up Menu

```
                    INTERNET SET-UP MENU

   Option                  Value          Description
 1. ARP set-up             menu          - Configure ARP operation
 2. DNS set-up             menu          - Define DNS address(es)
 3. Nonstandard subnets    [enabled]     - Allow subnet zero
 4. IP address             [none]        - Define IP address
 5. Default gateway        [none]        - Define default gateway
 6. Time to live           [32]          - Router hops allowed
 7. Ping                                 - Generate ICMP echo requests


Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **INTERNET SET-UP MENU** contains options used to enable the router to be recognized as a device on the network. This is important to be able to route IP data and connect to other routers across the LAN, and for SNMP Network Management Stations to be able to access the router's SNMP agent.

1 - ARP Set-Up

The ARP Set-up option directs you to the ARP Set-Up Menu, where the ARP timers may be set and the ARP table may be viewed.

2 - DNS Set-Up

The DNS Set-up option directs you to the DNS Set-Up Menu, where the Primary and Secondary DNS (Domain Name Server) addresses may be set.

3 - Nonstandard Subnets

The Nonstandard Subnets option allows the use of subnet addresses containing all zeroes or all ones.

Allows the definition of a subnet size starting at 1 instead of 2. When this option is enabled, the subnet size may be defined as values from 1 to 22. The use of a subnet size of 1 allows a single IP network address to be split into two equal sized sub-networks each containing half of the number of allowable hosts of the original IP network address. A subnet size of 1 is accomplished by using all zeroes or all ones in the subnet portion of the address, this is not allowable with standard subnet masks.

Default: [enabled]

4 - IP Address

The IP Address option allows the definition of an Internet Protocol (IP) address and corresponding subnet size for the router. The router requires an IP address.

The DI-1132 Ethernet router supports SNMP that uses UDP for message transmission, and UDP runs on top of IP. An IP address is also required to connect to other routers across the LAN by using Telnet (for example, from a remote router to a local bridge).

The IP address consists of 4 octets and is represented by 4 fields separated by periods ("**.**"), where each field is specified by a decimal number (e.g. 92.3.1.10). Each decimal number must be less than or equal to 255, that is the maximum value of each 8-bit field.

The Subnet Size variable partitions the host field of an IP address into two parts: a *subnet number* and a *host number*. This is used when a site uses multiple logical networks within a single IP network address. The subnet size must be the same as the subnet mask used on the subnet this router is connected to. The subnet mask is defined as a series of contiguous bit locations from the start of the IP address.

Default: [none]

```
Enter :
    none, internet address (up to 15 characters)
>

Enter :
    size of subnet mask (from 2 to 30)
>
```

5 - Default Gateway

The Default Gateway option allows the identification of a default gateway (i.e. *router*). Messages destined for hosts not on this (sub-)network are forwarded to the default gateway. The default gateway may be located on the local LAN or may be one of the remote site peer IP routers.

If the IP address of the remote site peer IP router is not known, the default gateway may be defined as the remote site ID. This will cause the default gateway to become whatever device currently connected at that remote site.

When an SNMP message is to be sent to an NMS, first the routing table is checked for a known route. If a route to the NMS is unknown, the SNMP message will then be sent to the default gateway. If the default gateway cannot provide the best route, it will send the message to the gateway that can provide the best route. After the default gateway sends the message to the other gateway for delivery, the default gateway will send an ICMP Redirect message back to the router that points to the best route gateway. In this manner, the router is informed of the best route for future SNMP message delivery.

A configured Default Gateway will override a default route learned from RIP.

If there are more than one default gateways defined within the routing table, the default gateway with the lowest cost will be used and displayed in this option.

Default: [none]

```
Enter :
    none, gateway IP address, remote site ID or alias (up to 18 characters)
>
```

6 - Time To Live

The Time To Live option sets the maximum number of router hops that an IP packet generated by the router is allowed before being discarded.

IP packets that are being routed through the DI-1132 Ethernet router will have their time-to-live value decremented by two.

Default: [32]

Range: 1 - 255

7 - Ping

The Ping option generates ICMP Ping messages to the specified destination IP address. The size and number of packets transmitted is entered within the command options. If you enter a broadcast address, you will be additionally prompted for LAN or Remote Site ID information. The ping broadcast will then be sent out the LAN port or to the remote site router.

The results of the Ping messages received will be displayed on the screen. The example below shows the results of an unsuccessful Ping command.

```
Enter :
    Destination (up to 15 characters)
> 25.25.25.25


Enter :
    Length of data in bytes (1472 or lower)
> 15


Enter :
    Number of packets to send (from 1 to 32767)
> 1
```

```
Ping to 25.25.25.25, 15 bytes, count 1

Enter <Tab> or <Esc> to stop

No Reply from 25.25.25.25 sequence 0 for 2.0 seconds
Ping results for 25.25.25.25, packets transmitted 1, received 0


Press any key to return to menu.
```

ARP Set-Up Menu

```
                        ARP SET-UP MENU

   Option              Value           Description
1. ARP aging timer    [2 min]       - Interval to remove entries
2. ARP retry timer    [2 sec]       - Interval to retry ARP
3. Show ARP table                   - View ARP table




Enter option number, "=" - main menu, <TAB> - previous menu



>
```

The **ARP SET-UP MENU** contains options used to view and maintain the ARP table for this device.

1 - ARP Aging Timer

The ARP Aging Timer option sets the ARP (Address Resolution Protocol) aging timer. Upon the expiration of the ARP aging timer, unused entries are removed from the ARP cache.

Default: [2 min]

Range: 1 to 1440 minutes (1 day)

2 - ARP Retry Timer

The ARP Retry Timer option sets the time-out value after which an ARP message will be resent.

Default: [2 sec]

Range: 1 - 20 seconds

3 - Show ARP Table

The Show ARP Table option displays all of the devices that have responded to ARP requests from this router and the devices that this router has responded to with an ARP reply. IP address information learned (possibly via RIP) will also be added to the table to eliminate the need for generating an ARP request when data needs to be sent to that address in the future.

```
                    Arp Table

 Interface       IP Address              MAC Address        Type
 -------------------------------------------------------------
 LAN             164.44.25.142           00-00-d0-00-23-24  dynamic
 LAN             164.44.25.98            00-00-d0-00-24-24  dynamic
 LAN             164.44.25.37            00-00-d0-00-25-24  dynamic
 LAN             164.44.25.13            00-00-d0-00-26-24  dynamic
 LAN             164.44.25.33            00-00-d0-00-27-24  dynamic
 Link 1          164.44.26.53            00-00-d0-00-28-24  dynamic
 Link 2          164.44.27.76            00-00-d0-00-23-25  dynamic

 Type: [s]tart, [n]ext, [=] main menu, any other key to end.
```

Interface:	Interface on which the ARP mapping applies.
IP Address:	IP address of the device in the ARP table.
MAC Address:	MAC address of the device in the ARP table.
Type:	Type of entry in the table, either dynamic (learned via ARP requests) or static (configured via SNMP).

DNS Set-up Menu

```
                        DNS SET-UP MENU

    Option           Value          Description
 1. Primary DNS     [none]        - Address of Primary DNS
 2. Secondary DNS   [none]        - Address of Secondary DNS
 3. Domain name     [none]        - Network name







 Enter option number, "=" - main menu, <TAB> - previous menu
 >
```

The **DNS SET-UP MENU** contains options used to configure and maintain the DNS parameters for this device. The DHCP server will supply the IP address of the primary and secondary Domain Name Servers when this router is configured as a DHCP server. The DHCP server will not return an IP address if the DNS entries in this menu are set to none.

1 - Primary DNS

The Primary DNS option defines the IP address of the primary network Domain Name Server (DNS).

Default: [none]

2 - Secondary DNS

The Secondary DNS option defines the IP address of the secondary network Domain Name Server (DNS)

Default: [none]

3 - Domain Name

The Domain Name option allows the specification of a domain name of up to 256 characters. xxx

Default: [none]

Considerations:

When setting up a router using IP addressing that will have a DNS server on the local network as well as a connection to an external DNS server (such as in Internet Service Provider), the local DNS server should be set as the Primary DNS and the external DNS server as the Secondary DNS.

Applications Set-Up Menu

```
                     APPLICATIONS SET-UP MENU

    Option              Value             Description

1.  SNMP set-up         menu              - Define SNMP communications
2.  DHCP set-up         menu              - Define DHCP configuration
3.  Firewall set-up     menu              - Define firewall parameters
4.  NAT exports         menu              - Define exported services for NAT




Enter option number, "=" - main menu, <TAB> - previous menu
>
```

The **APPLICATIONS SET-UP MENU** provides paths to menus for Internet communication management applications.

1 - SNMP Set-Up

The SNMP Set-up option takes you to the SNMP Set-Up Menu, where you to define the parameters necessary to allow the router's SNMP agent and corresponding MIB information to be accessed by an SNMP Network Management Station. Traps (Alarms) will also be sent by the router to the NMS to inform it of a significant event (cold start, warm start, link up, link down, and authentication failure).

2 - DHCP Set-Up

The DHCP Set-up option directs you to the DHCP Set-Up Menu, where the DHCP (Dynamic Host Configuration Protocol) parameters may be set and the IP address pool may be viewed.

3 - Firewall Set-Up

The Firewall Set-up option directs you to the Firewall Set-Up Menu, where the IP Firewall parameters may be set. This menu is only available when Firewall Support is enabled for this device.

4 - NAT Exports

The NAT Exports option directs you to the NAT Exports Menu, where xxx

SNMP Set-Up Menu

```
                      SNMP SET-UP MENU

     Option              Value            Description
  1. Edit community      menu           - Modify SNMP community
  2. Message size        [1472 bytes]   - Define maximum message size
  3. Show communities                   - View SNMP communities
  4. Remove community                   - Delete SNMP community




  Enter option number, "=" - main menu, <TAB> - previous menu


  >
```

The **SNMP SET-UP MENU** allows the display and configuration of the SNMP parameters for the router. For information on the DI-1132s compliance with the SNMP MIBs and details of the proprietary MIB, please refer to the MIB diskette included with the unit.

The SNMP Set Up Menu contains two default communities:
   - "public" which is a read-only community accessible by all NMS addresses
   - "GUI_Config" which is a read-write community accessible by all NMS addresses

1 - Edit Community

The Edit Community option takes you to the Define Community Menu, where the router's agent and NMS are brought under a management community.

2 - Message Size

The Message Size option allows the setting of the maximum message size sent by the router's SNMP agent.

Default: [1472 bytes]

Range: 484 to 1472 bytes

Considerations:

The message size sent by the router is determined by what the NMS can accept. The default size of 1472 bytes, combined with the "overhead," totals the maximum Ethernet frame size.

3 - Show Communities

The Show Communities option displays the defined SNMP communities.

```
SNMP Communities

Number of defined communities  :  2

Community Name      Write Access      NMS Addresses      Trap Addresses
GIU_Config          enabled           all

public              disabled          all

NMS_1               enabled           92.0.0.1           92.0.0.2
                                      111.1.1.1          111.1.1.2




Type: [s] to redraw, [=] main menu, any other key to end.
```

4 - Remove Community

The Remove Community option deletes the specified SNMP community from the list of available communities. Enter either the community name for a single deletion or "all" if the entire SNMP community list is to be deleted. Note that removing all communities will prevent access from any NMS until replacements are added.

Edit Community Menu

```
                            EDIT COMMUNITY MENU

     Option                    Value           Description
  1. Write access            [          ]    - Allow write access
  2. Show addresses                          - View address lists
  3. Add NMS address                         - Insert NMS address into list
  4. Add trap address                        - Insert trap address into list
  5. Remove NMS address                      - Delete NMS address from list
  6. Remove trap address                     - Delete trap address from list
  7. Help                                    - Read address list description




Enter:
     community name string (up to 32 characters)

>
```

Note only alphanumeric characters and the underscore ("_") character may be used in the community name. In addition, the characters are case-sensitive. Once the community name is defined, it is added to the Menu title (as shown below), and the options become available.

```
                       EDIT COMMUNITY Marketing MENU

     Option                    Value           Description
  1. Write access            [disabled]      - Allow write access
  2. Show addresses                          - View address lists
  3. Add NMS address                         - Insert NMS address into list
  4. Add trap address                        - Insert trap address into list
  5. Remove NMS address                      - Delete NMS address from list
  6. Remove trap address                     - Delete trap address from list
  7. Help                                    - Read address list description




Enter:

>
```

1 - Write Access

The Write Access option defaults to [disabled] when a SNMP Community name string is entered. This allows an NMS to have read-only access to this SNMP Community. Write access [enabled] allows a NMS to have read/write access to the SNMP community.

Considerations:

If several NMSs are available at one site, a community might be named "Public" with read-only access. This allows all NMS managers to view SNMP information for the router, although only the community(ies) with read/write access [enabled] will be able to modify parameters. (Note that the community name "all" should not be used, since, if it were ever removed, other defined communities would be removed along with it).

2 - Show Addresses

The Show Addresses option provides a display of existing NMS and trap addresses for this Community name (e.g. Marketing).

```
Address Lists for Community Marketing

Total NMS addresses      :  2
Total Trap Addresses     :  3

NMS Addresses            Trap Addresses
92.0.0.1                 92.0.0.2
111.1.1.1                94.0.1.1
                         111.1.1.2
```

3 - Add NMS Address

Up to five NMS addresses may be added to the NMS address list. If the address list is empty, the router's SNMP agent will not accept requests from a NMS, even if it correctly provides this community name. If the list contains the single entry "all," the router's SNMP agent will accept requests from any NMS providing this community name. Addresses must be entered in standard IP format (four fields separated by a periods, with each field specifying a decimal number).

Considerations:

If "all" is initially chosen for the NMS address list, and (one or more) specific NMS addresses are desired as a replacement, remove "all" with *Option 5, Remove NMS address,* to allow the addition of the new address(es).

4 - Add Trap Address

The Add Trap Address option allows the addition of up to five trap addresses to the trap address list. When a trap is generated by the router's SNMP agent, it will be sent (along with the Community name) to each of the destination addresses specified. Addresses must be entered in standard IP format (four fields separated by a periods, with each field specifying a decimal number). If the list is empty, traps will not be sent.

5 - Remove NMS Address

The Remove NMS Address option deletes the specified NMS address associated with the SNMP Community. Other NMS addresses and the Trap addresses remain unaffected. (If "all" is specified, all NMS addresses are deleted.)

6 - Remove Trap Address

The Remove Trap Address option deletes the specified trap address associated with the SNMP Community. Other trap addresses and the NMS addresses remain unaffected. (If "all" is specified, all trap addresses are deleted.)

7 - Help

The Help option offers a brief description of the address list's purpose and format.

DHCP Set-Up Menu

```
                        DHCP SET-UP MENU

   Option                      Value          Description
1. Server IP address pool      menu         - Range of allowable addresses
2. NetBIOS setup               menu         - NetBIOS parameters
3. DHCP services               [none]       - Set DHCP operational mode
4. Relay destination           [none]       - BOOTP/DHCP server IP address
5. ICMP echo verification      [enabled]    - Ping allocated IP address
6. Lease period                [60]         - Length of lease (minutes)




Enter option number, "=" - main menu, <TAB> - previous menu


>
```

The **DHCP SET-UP MENU** contains options used to dynamically configure and maintain the DHCP parameters for remote devices on a network via a central DHCP server. Dynamic Host Configuration Protocol allows configuration of devices (DHCP clients) to be handled from a central DHCP server. This allows devices to be added and removed from a network with all of the network information (i.e. IP address, DNS, subnet mask, etc.) being configured automatically. It is designed to allocate network addresses to a number of hosts on the DI-1132's LAN and supply minimal configuration needed to allow hosts to operate in an IP network.

1 - Server IP Address Pool

The Server IP address pool option directs you to the Server IP address pool Menu, where the range of allowable IP addresses may be set.

2 - NetBIOS Set-Up

The NetBIOS set-up option directs you to the NetBIOS set-up Menu, where the NetBIOS parameters may be set.

3 - DHCP Services

The DHCP services option sets the DHCP operational mode as none, server or relay. Selecting "none" disables the option. Selecting "server" enables this DI-1132 to act as a simple DHCP server for its LAN. Selecting "relay" enables the DI-1132 to relay DHCP service data to a remote DHCP server.

Default: none

Choises: none, server, relay

4 - Relay Destination

The Relay destination option allows you to enter the IP address of the remote DHCP server to which DHCP client data will be routed. **Note:** BootP Relay should only be used with leased line connections, it is not recommended when using any form of connection management (spoofing, IP address connect) on a dial-up line.

Default: none

5 - ICMP Echo Verification

The ICMP echo verification option enables or disables the ping allocated IP address. If enabled, ICMP Ping messages may be sent to the specified IP address when a Ping command is issued.

Default:　　　enabled

6 - Lease Period

The Lease period option sets the length of time (in minutes) that an assigned IP address will be allocated to a DHCP client.

Default:　　　60

Range:　　　1 to 65535 minutes

Server IP Address Pool Menu

```
                    SERVER IP ADDRESS POOL MENU

   Option                 Value          Description
1. IP address pool     [none]         - Specify IP address pool
2. Show address pool                  - Display allocated addresses
3. Add static Address                 - Specify clients IP/MAC address
4. Remove static address              - Remove static IP address




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **SERVER IP ADDRESS POOL MENU** contains options used to view and maintain the Server IP address pool
for the DHCP server of this device.

1 - IP Address Pool

The IP address pool option sets the IP address pool. A block of IP addresses may be configured from which the
server will hand out IP addresses. The first address in the range must be specified followed by the number of
addresses desired.

Default: none

Range: 1 to 253 addresses

Considerations:

IP address assigned to the pool must be on the same IP network or the LAN of which this DI-1132 is a part.

2 - Show Address Pool

```
                    DHCP Server IP Address Pool
Pool Address          Type      Hardware Address        Lease Remaining
---------------       ----      ----------------        ---------------
129.0.0.25            Dynamic   00-00-D0-00-12-34             45
129.0.0.26            Dynamic   00-00-D0-00-12-35          Reserved
129.0.0.27            Static    00-00-D0-00-12-36             55
129.0.0.28            Static    00-00-D0-00-12-3           Reserved
129.0.0.29            Dynamic      Available

Type: [s] to redraw, [=] main menu, any other key to end.
```

3 - Add Static Address

The Add static address option assigns a specific IP address to a specific device, such as a network server, from the central DHCP server. When this option is selected, first enter the IP address to be assigned to the device, then the MAC of the device.

4 - Remove Static Address

The Remove static address option removes the static address assignment from a device. Devices may be removed individually by entering the MAC of the device to be taken off, or the entire list of static address assignments may be cleared by entering "all".

NetBIOS Set-Up Menu

```
                        NETBIOS SETUP MENU

   Option                   Value                 Description
1. Send NetBIOS node type  [enabled]          - Send node type to client
2. Send NetBIOS scope      [enabled]          - Send scope identifier
3. Send NetBIOS name srv   [enabled]          - Send name server address
4. NetBIOS node type       [B]                - Type of name resolution
5. NetBIOS scope Id        "DEV050607_scope"  - Scope identifier
6. NetBIOS name server     [none]             - IP address of name server




Enter option number, "=" - main menu, <TAB> - previous menu


>
```

The **NETBIOS SET-UP MENU** contains options used to configure and maintain the NetBIOS parameters for this device. NetBIOS is used by Windows NT clients to advertise themselves and to locate resources. When a netBIOS client initializes, it must advertise its machine name; the Windows NT server then finds the IP address associated with that name.

1 - Send NetBIOS Node Type

The Send NetBIOS node type option sends the node type to the client when enabled. If disabled, broadcasts will be used to advertise and locate resources.

Default: disabled

2 - Send NetBIOS Scope

The Send NetBIOS scope option sends the scope identifier to the client when enabled. The scope identifier is a name for the group of computers to which the NetBIOS name of this router is known

Default: disabled

3 - Send NetBIOS Name Srv

The Send NetBIOS name srv option sends the name server address to the client when enabled.

Default: disabled

4 - NetBIOS Node Type

The NetBIOS node type option allows you to set the type name resolution. The Send NetBIOS node type option must be enabled before this option will be displayed.

Default: disabled

Choises: B - broadcasts node names and queries
P - point-to-point communication with the NetBIOS name server to resolve and register NetBIOS names.
M - mixed; a combination of B and P communication. Traffic is first broadcast on the local segment and attached segments configured to propogate NetBIOS broadcasts. Once a NetBIOS name server is located, point-to-point communication across routers is allowed.
H -hybrid; a mixture of B and P communications. P is used if a NetBIOS name server is available, otherwise B is used.

5 -NetBIOS Scope Id

The NetBIOS scope Id option allows you to set the scope identifier. The default scope identifier will be the device name followed be "_scope" (i.e. DEVXXX_scope). The Send NetBIOS scope option must be enabled before this option will be displayed.

Default: DEVXXX_scope

6 - NetBIOS Name Server

The NetBIOS name server option allows you to set the IP address of the NetBIOS name server. The Send NetBIOS name srv option must be enabled before this option will be displayed.

Default: none

Firewall Set-Up Menu

```
                          FIREWALL SET-UP MENU

    Option                     Value          Description
 1. Designated servers         menu        - Edit entry for a specific server
 2. Edit firewall entry        menu        - Edit/Add firewall entries
 3. Firewall support          [disabled]   - Enable/disable firewall support
 4. Block src IP spoofing      [disabled]   - Discard WAN pkts with local src IP
 5. Firewall statistics                     - View firewall statistics
 6. Show firewall entries                   - Display firewall entries
 7. Remove entry                            - Remove a firewall entry
 8. Clear statistics                        - Clear firewall statistics




 Enter option number, "=" - main menu, <TAB> - previous menu
 >
```

The **FIREWALL SET-UP MENU** contains options used to view and maintain the IP firewall settings for this device.

Remember that when the firewall function is enabled, **all incoming IP traffic EXCEPT normal TCP traffic** from the Wide Area Network (WAN) will be **filtered**. This means that only regular TCP connection traffic will be allowed through the firewall. Other IP traffic like UDP, (ping), and TCP connection initiation data received from remote sites will be filtered and not allowed through the firewall.

To allow specific IP traffic to be passed from the connected remote site to this local LAN, either a firewall entry must be specified or a designated server must be specified or a combination of the two.

TCP connections initiated from the local LAN will be allowed to remote site resources. Once the TCP connections have been established, normal TCP connection traffic will be allowed between the local and remote device.

1 - Designated Servers

The Designated Servers option directs you to the Designated Servers Menu, where the IP addresses may be defined for the designated servers on the local LAN. A designated server is a device that is legally accessible from the remote site locations. Such designated servers may be the HTTP server and the FTP server on the local LAN that may be accessed by devices located on remote site LANs.

2 - Edit Firewall Entry

The Edit Firewall Entry option directs you to the Edit Firewall Entry Menu, where firewall table entries are defined. A firewall entry may be allowing all IP traffic from a specific remote site IP network to access the local LAN.

3 - Firewall support

The Firewall Support option enables or disables the IP Firewall functions of this DI-1132. **All incoming IP traffic EXCEPT normal TCP traffic** from the Wide Area Network (WAN) will be **filtered**. This means that only regular TCP connection traffic will be allowed through the firewall. Other IP traffic like UDP, ICMP (ping), and TCP connection initiation data received from remote sites will be filtered and not allowed through the firewall.

Incoming TCP connections that are allowed must be defined within the Firewall Set-up menu. To allow specific IP traffic to be passed from the connected remote site to this local LAN, either a firewall entry must be specified or a designated server must be specified or a combination of the two.

TCP connections initiated from the local LAN will be allowed to external remote site resources. Once the TCP connections have been established, normal TCP connection traffic will be allowed between the local and remote device.

Once the Firewall function is enabled, the IP traffic that is allowed to be received from the remote sites must be defined within the Firewall Set-Up Menu.

Default: [disabled]

4 - Block Source IP Spoofing

When the Block Source IP Spoofing option is enabled, all of the WAN traffic that uses a source IP address the same as the local network IP address will be filtered. This prevents devices located on a remote site network from attempting to gain access to the local network by using a local IP address as their source address. The DI-1132 will discard any IP traffic that is received from the WAN with a source IP address the same as an IP address located on the locally connected LAN.

Default: [disabled]

5 - Firewall Statistics

The Firewall Statistics option displays a summary of the number of frames discarded by the firewall function.

The firewall statistics may be cleared with the Clear All Statistics option in the Statistics Set-up menu.

```
                         Firewall Statistics

Frames discarded                      Totals
-----------------------------------------------------------------------
Source IP spoofed                       0

Source IP address                       0
Destination IP address                  0
Protocol number                         0
Port number                             0

Total frames discarded                  0
```

Source IP Spoofed: Incoming WAN frames discarded due to source IP address being the same as an IP address already on the local network.

Source IP Address: Incoming WAN frames discarded because the source IP address on the remote site network is not allowed to access this local network.

Destination IP Address: Incoming WAN frames discarded because the destination IP address on the local network is not allowed to be accessed from any remote site network.

Protocol Number: Incoming WAN frames discarded because the protocol type is not allowed.

Port Number: Incoming WAN frames discarded because the port number is not allowed..

Total Number: Total number of incoming WAN frames discarded due to firewall filtering.

6 - Show Firewall Entries

The Show Firewall Entries option displays all of the entries in the Firewall table. Entries marked with a "**" indicate an entry from the Designated Servers menu.

```
                          Firewall Entries
        Source /            Source /
 #   Dest address      Destination mask   Type  Port 1  Port n  Alias
 --  ---------------   ----------------   ----  ------  ------  --------------
 **  All addresses          None          TCP   20      21      FTP server
     199.167.3.145          None
 **  All addresses          None          TCP   80      80      WWW server
     199.167.3.139          None
  1  199.167.4.0       255.255.255.0       TCP   1       65535   Manual entry
     199.167.3.0       255.255.255.0
```

#:	Entry number in the Firewall table.
Source/Destination Address:	IP addresses to be checked for in the incoming IP traffic from the WAN.
Source/Destination Mask:	IP address masks to be used for checking the source and destination addresses.
Type:	Type of IP packet. TCP, UDP, or another user defined value.
Port 1:	Starting port of the range of ports to allow through the firewall.
Port n:	Ending port of the range of ports to allow through the firewall.
Alias:	Name used to indicate the type of entry in the port, either a manual entry or a name from the Designated Servers menu.

7 - Remove Entry

The Remove Entry option deletes individual entries or all of the entries from the Firewall table.

```
Enter :
    all, index number (from 1 to 15)

>
```

8 - Clear Statistics

The Clear Statistics option clears all of the firewall statistics.

Designated Servers Menu

```
                    DESIGNATED SERVERS MENU

   Option                    Value          Description
1. E-mail (SMTP) server      [none]      - Specify E-Mail server IP address
2. POP 2/3 server            [none]      - Specify E-Mail POP server address
3. FTP server                [none]      - Specify FTP server IP address
4. WWW (HTTP) server         [none]      - Specify WWW server IP address
5. Telnet server             [none]      - Specify Telnet IP address
6. Local DNS                 [none]      - Specify local DNS IP address
7. Remote DNS                [none]      - Specify remote DNS IP address
8. Gopher server             [none]      - Specify Gopher server IP address

Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **DESIGNATED SERVERS MENU** contains options used to define the IP address of specific local network services that may be accessed by remote site network devices. Defining a Designated Server allows for simpler set up when configuring what traffic is to be allowed through the firewall.

1 - E-mail (SMTP) Server

The E-mail Server option defines the IP address of the local network E-mail (SMTP) Server that may be accessed by remote site network devices.

Default: [none]

2 - POP 2/3 Server

The POP Server option defines the IP address of the local network POP 2/3 Server that may be accessed by remote site network devices.

Default: [none]

3 - FTP Server

The FTP Server option defines the IP address of the local network FTP Server that may be accessed by remote site network devices.

Note: depending on the FTP software used, a client may not be able to reach an FTP server through a router using NAPT with firewall security enabled unless a port is opened for user authentication communications. This port may be set up in the Edit Firewall Entry Menu.

Default: [none]

4 - WWW (HTTP) Server

The WWW Server option defines the IP address of the local network WWW (HTTP) Server that may be accessed by remote site network devices.

Default: [none]

5 - Telnet Server

The Telnet Server option defines the IP address of the local network Telnet Server that may be accessed by remote site network devices.

Default: [none]

6 - Local DNS

The Local DNS option defines the IP address of the local network Domain Name Server (DNS) that may be accessed by remote site network devices. This entry allows access to the designated IP address only on port 53.

Default: [none]

7 - Remote DNS

The Remote DNS option defines the IP address of the remote network Domain Name Server (DNS) that may be accessed by local network devices. This setting would be used when connecting to an ISP for example and the DNS is located external to your network within the ISP. This entry allows access to the designated IP address on port 53 as well as on ports 1024 to 65535.

Default: [none]

8 - Gopher Server

The Gopher Server option defines the IP address of the local network Gopher Server that may be accessed by remote site network devices.

Default: [none]

Edit Firewall Entry Menu

```
                    EDIT FIREWALL ENTRY MENU

   Option              Value        Description
1. Dest IP address     [         ]  - Incoming IP destination address
2. Destination mask    [         ]  - Destination subnet mask
3. Source IP address   [         ]  - Incoming IP source address
4. Source mask         [         ]  - Source subnet mask
5. Protocol type       [         ]  - Allow specific protocol types
6. Initial port        [         ]  - First port to allow traffic in
7. Last port           [         ]  - Last port in range
8. Description         [         ]  - describe the entry




Enter :
    Firewall filter id (from 1 to 15)

> 1
```

The above display is the first level of the **EDIT FIREWALL ENTRY MENU**. Once the firewall entry index number is entered, the number specified is added to the menu title bar and the Options are as shown below:

```
                    EDIT FIREWALL ENTRY 1 MENU

   Option              Value        Description
1. Dest IP address     [none]       - Incoming IP destination address
2. Destination mask    [none]       - Destination subnet mask
3. Source IP address   [all]        - Incoming IP source address
4. Source mask         [none]       - Source subnet mask
5. Protocol type       [TCP]        - Allow specific protocol types
6. Initial port        [1]          - First port to allow traffic in
7. Last port           [65535]      - Last port in range
8. Description         [         ]  - describe the entry




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

A Firewall entry allows the creation of a specific IP connection type of communication path to be allowed through the firewall. The Source IP address of a known remote site network may be defined to be allowed to access either a specific local device or the entire local network.

1 - Destination IP Address

The Destination IP Address option defines the IP address of a local device that may be accessed through the firewall for this entry. On all incoming frames from the WAN, this address will be the destination IP address.

The IP address consists of 4 octets and is represented by 4 fields separated by periods ("**.**"), where each field is specified by a decimal number (e.g. 92.3.1.10). Each decimal number must be less than or equal to 255, that is the maximum value of each 8-bit field.

   Default: [none]

2 - Destination Mask

The Destination Mask option defines the address mask to be used on the Destination IP Address defined in option 1 for this entry. To have the firewall entry apply to an individual IP address a mask of none should be used.

The address mask consists of 4 octets and is represented by 4 fields separated by periods ("**.**"), where each field is specified by a decimal number (e.g. 255.255.255.0). Each decimal number must be less than or equal to 255, that is the maximum value of each 8-bit field.

   Default: [none]

3 - Source IP Address

The Source IP Address option defines the IP address of a remote site device or network that may be allowed access through the firewall for this entry. On all incoming frames from the WAN, this address will be the source IP address. By default, this option allows all remote site source IP addresses to access the local device specified. Specifying a specific remote site IP address for an individual device or a network allows for greater restrictions on incoming frames.

The IP address consists of 4 octets and is represented by 4 fields separated by periods ("**.**"), where each field is specified by a decimal number (e.g. 92.3.1.10). Each decimal number must be less than or equal to 255, that is the maximum value of each 8-bit field.

   Default: [all]

4 - Source Mask

The Source Mask option defines the address mask to be used on the Source IP Address defined in option 3 for this entry. To have the firewall entry apply to an individual IP address a mask of none should be used.

The address mask consists of 4 octets and is represented by 4 fields separated by periods ("**.**"), where each field is specified by a decimal number (e.g. 255.255.255.0). Each decimal number must be less than or equal to 255, that is the maximum value of each 8-bit field.

   Default: [none]

5 - Protocol Type

The Protocol Type option defines the protocol type to allow through the firewall for this entry. The protocol type may be defined as TCP, UDP, or any other protocol type. Other protocols are defined as a valid IP protocol type in hex.

Default: [TCP]

Choices: TCP, UDP, (any protocol type number in hex)

6 - Initial Port

The Initial Port option defines the starting port number to be allowed through the firewall for this entry.

Default: [1]

Range: 1 to 65535

7 - Last Port

The Last Port option defines the last port number to be allowed through the firewall for this entry. Specifying a port number greater than the Initial Port number allows all of the port numbers within the range to be allowed.

Default: [1]

Range: 1 to 65535

8 - Description

This option allows a text description of up to 19 characters of this entry in the firewall table

NAT Exports Menu

```
                     NAT EXPORTS MENU

   Option                 Value          Description
1. Edit Services          menu        - Add/remove exported services
2. Router port            menu        - Change router server ports for export
3. Show services                      - Display exported services
4. Clear services                     - Clear all exported services




Enter option number, "=" - main menu, <TAB> - previous menu



>
```

The **NAT Exports Menu** has options for setting, clearing and reviewing exported Internet services available on this network. Using Network Address Translation (NAT). NAT maps arbitrary internal network IP addrsses to valid global IP addresses used on the Internet. Network Address Port Translation (NAPT) allows a number of internal hosts to map to the same global IP address via port assignment to that address. NAT exported services are only available through port translation.

NOTE: Exported services from a remote site are only available if NAPT is enabled for that site (under the Configuration/WAN Set-up/Remote Site Set-up/Edit Remote Site/Protocol Set-up/IP Parameters menu).

1 - EDIT Services

The Edit Services option takes you to the Edit Services Menu, where the hoste devices for the various Internet services that will be offerred on this network may be added to or removed from the export services table.

2 - Router Port

The Router Port option takes you to the Router Port Menu where the port number for services provided by this router may be assigned.

3 - Show Services

Displays a list if the Internet services available for export on this network.

4 - Clear Services

Clears the NAPT table of IP addresses of services available for export on this network.

Edit Services Menu

```
                     EDIT SERVICES MENU

   Option                  Value          Description
1. Other Services          menu        - Add/remove other exported services
2. E-mail                  [none]      - E-mail server's IP address
3. POP2/POP3               [none]      - POP2/POP3 server's IP address
4. FTP                     [none]      - FTP server's IP address
5. WWW (HTTP)              [none]      - WWW (HTTP) server's IP address
6. Telnet                  [none]      - Telnet server's IP address
7. DNS                     [none]      - DNS server's IP address
8. Gopher                  [none]      - Gopher server's IP address


Enter option number, "=" - main menu, <TAB> - previous menu


>
```

The **EDIT SERVICES MENU** allows you to set the internal IP address of the device where each Internet service that will be available for export on this network can be accessed. The NAT port used for Network Address Port Translation for the services in options 2 through 8 will be the well known port number for that service.

When a service is added using this menu, it will also be automatically added to the firewall designated servers list, even if firewall is not enabled.

1 - Other Services

The Other Services option takes you to a menu where the internal IP address of an Internet service not offered in the list below may be set up.

2 - E-mail

The IP address of the E-mail server on this network may be set. (port 25)

3 - POP2/POP3

The IP address of the POP2/POP3 server on this network may be set. (POP2 - port 109, POP3 – port 110)

4 - FTP

The IP address of the FTP server on this network may be set. (port 21, FTP data – port 20)

Note: depending on the FTP software used, a client may not be able to reach an FTP server through a router using NAPT with firewall security enabled unless a port is opened for user authentication communications. See Main/Configuration/Applications/Firewall/ Edit Firewall Entry Menu..

5 - WWW (HTTP)

The IP address of the WWW (HTTP) server on this network may be set. (port 80)

6 - Telnet

The IP address of the Telnet server on this network may be set. (port 23)

7 - DNS

The IP address of the DNS server on this network may be set. (port 53)

8 - Gopher

The IP address of the Gopher server on this network may be set. (port 70)

Other Services Menu

```
                        EDIT SERVICES MENU

   Option                 Value          Description
1. NAT port              *[      ]       - Port number exported by NAT
2. Status                *[      ]       - Is service in export's table?
3. Host IP address        [      ]       - Enter location of service
4. Host port              [      ]       - Enter port number of service on host
5. Description            [      ]       - Describe the service
6. Remove                                - Remove the service



Enter option number, "=" - main menu, <TAB> - previous menu



>
```

The **OTHER SERVICES MENU** allows the set up of an Internet service not listed in the Edit Services menu.

1 - NAT Port

This option displays the port number that NAT will use to export this service

Range: 1 to 65535

2 - Status

This option displays whether or not this port has an IP address present in the export table and is being used by another sevice. If the port is already present in the table, the host address and port will be displayed and may be changed.; the NAT Port and Status for this entry may not be changed if already present – you must return to the previous menu, re-enter this one and use another port number.

Default: [not present]

3 - Host IP Address

Enter the internal IP address of the host for this service.

Default: [0.0.0.0]

4 - Host Port

Enter the internal port number of the host for this service.

Default: [port number entered for NAT Port]

Range: 1 to 65535

5 - Description

Enter a description of the service.

Range: up to 20 characters

6 - Remove

Remove this service from the export table. The service must be present in the export table before this option will be displayed.

Router Port Menu

```
                    ROUTER PORT MENU

    Option              Value           Description
 1. Telnet            [default]       - Change telnet server ports for export
 2. TFTP              [default]       - Change TFTP server ports for export
 3. SMNP              [default]       - Change SMNP server ports for export




 Enter option number, "=" - main menu, <TAB> - previous menu



 >
```

The **EDIT ROUTER SERVICES MENU** contains options to set alternate port numbers to export the Telnet, TFTP and SNMP services of this router. If one of these services is offered on another server through NAT, then that server will use the well known port number for that service; this router must use a different port number for its service.

1 - Telnet

The Telnet option defines a port number to use for Telnet services on this router.

2 - TFTP

The TFTP option defines a port number to use for TFTP services on this router.

3 - SNMP

The SNMP option defines a port number to use for SNMP services on this router.

WAN Set-Up Menu

```
                         WAN SET-UP MENU

    Option                Value          Description
 1. ISDN set-up           menu        - Configure ISDN
 2. Link set-up           menu        - Configure link parameters
 3. Remote site set-up    menu        - Configure remote site access
 4. Security set-up       menu        - Configure security
 5. PPP set-up            menu        - Configure PPP parameters
 6. IP address connect    menu        - Configure IP address connect




 Enter option number, "=" - main menu, <TAB> - previous menu



 >
```

The **WAN SET-UP MENU** allows the definition of link operation for the router.

1 - ISDN Set-Up

The ISDN Set-Up Menu allows you to set ISDN switch types and other ISDN parameters.

2 - Link Set-Up

The Link Set-up option takes you to the Link Set-Up Menu, where the link interfaces are configured. Directory numbers and Service Profile Identifiers are defined for the ISDN B-channels.

3 - Remote Site Set-Up

The Remote Site Set-up option takes you to the Remote Site Set-Up Menu, where configuration parameters required to establish PPP ISDN connections to remote devices are maintained.

4 - Security Set-Up

The Security Set-up option takes you to the Security Set-Up Menu, where PPP security options are maintained.

5 - PPP Set-Up

The PPP Set-up option takes you to the PPP Set-Up Menu, where general PPP options are maintained.

6 - IP Address Connect

The IP Address Connect Menu allows you to define PPP remote sites to be called depending upon the destination IP address of IP traffic on the local LAN.

ISDN Set-Up Menu

```
                     ISDN SET-UP MENU

   Option                    Value          Description
1. Switch type               [NET3]         - Set switch type
2. Dial prefix               [none]         - Set dial prefix
3. Force 56K                 [disabled]     - Force 56K rate adaption
4. Phantom power detect      [disabled]     - Detect phantom power
5. Digital leased circuit                   - Set permanent ISDN service
6. Link 1 B channel          [B1]           - Assign B channel
7. Link 2 B channel          [B2]           - Assign B channel



Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **ISDN SET-UP MENU** provides for stored ISDN number set-up, ISDN call security set-up, and ISDN switch type definition. The ISDN interface may also be set to operate as a leased line using a permanent ISDN service, such as Super Digital or Monopole.

1 - Switch Type

Choosing the Switch Type option defines the ISDN switch (signaling) type that this ISDN router is connected to.

When the Switch Type is changed, a **Soft Reset** must be performed for this to take effect. This allows the router to initiate operation with the new switch type.

Default: [NET3]

Choices: DMS-100, NI-1, NI-2, 5ESS-PP, 5ESS-MP, NET3, TPH1962, KDD, SWEDEN, and NTT

   Considerations:

   The 5ESS switch types are split into two versions: 5ESS-PP (point to point) and 5ESS-MP (multipoint). In ISDN, point to point means that one device (phone, computer, DI-1132) is connected to the phone line, so if an ISDN call comes in, it's for that device. Multipoint means that several devices can be connected to the line, so there may be a phone, computer, fax machine, and DI-1132, all connected to the same line, and when an ISDN call comes in, the call type will determine which machine will answer (voice means the phone picks it up, fax means the fax machine, etc.).

2 - Dial Prefix

The Dial Prefix option is used when the ISDN DI-1132 is attached to an ISDN PBX. If a dialing prefix is required before an outside line is obtained, the dialing prefix must be entered here.

Default: [none]

   Considerations:

   This option is not required and therefore not available when the Digital Leased Circuit option is set to enabled.

3 - Force 56K

This option forces both B-channels on this DI-1132 router to use V.110 rate adaption for incoming and outgoing calls.

If the path to a destination number passes through a 56 Kbps digital circuit or the destination itself is a 56 K switched digital service, V.110 rate adaption must be performed to allow the data to be sent at 56 K on the 64 K ISDN lines. When an ISDN call is placed, the local ISDN service must be informed that V.110 rate adaption is required to fully complete this connection. Adding a percent symbol "%" in the ISDN number will cause the DI-1132 to send a message to the local ISDN service requesting V.110 rate adaption.

Default: [disabled]

4 - Phantom Power Detect

Most NT-1s provide a signal to the connected ISDN device to indicate that the NT-1 is powered up and functioning correctly. This signal is generally called phantom power. Some NT-1s do not support phantom power. This option should be disabled if the NT-1 connected to the ISDN link module does not support phantom power.

If the DI-1132 is having difficulty obtaining a connection to the NT-1, this option should be disabled.

Default: [disabled]

   <u>**Considerations**</u>**:**

      This option is not required and therefore not available when the ISDN switch type is set to NET3, KDD, NTT, and TPH1962.

5 - Digital Leased Circuit

The Digital Leased Circuit option is used when a permanent leased ISDN circuit is available from your ISDN service provider. A digital leased circuit is permanently established by your service provider and does not require ISDN phone numbers or dialing functionality. When a digital leased circuit is established, the DI-1132 will treat it as if it were a normal 64 Kbps leased line connection, or 128 Kbps if both B channels are used.

When enabling digital leased circuit, always choose link number 1 and then enable. When changing the operation of Digital Leased Circuit (either enable or disable), the DI-1132 will soft reset and then start up operating in the chosen mode. Once the DI-1132 restarts in digital leased circuit mode, the ISDN B-channels must be assigned to the appropriate link number. The current B-channel assignments may be viewed with Option 6.

When the ISDN DI-1132 is set to use digital leased circuits instead of switching circuits, all of the ISDN call establishing functions are not required and therefore not available.

The Force Disconnection option in the Quick Start menu may be used to manually restart the ISDN circuits.

Default: [disabled]

   <u>**Considerations**</u>**:**

      The state of the Digital Leased Circuit option is saved when performing a software upgrade. This means that when the DI-1132 restarts, it will return to the leased circuit operation state if the Digital Leased Circuit option was enabled before the upgrade was performed.

      If the DI-1132 is experiencing ISDN activation problems, try changing the Switch Type to NI-1 and then performing a Soft Reset.

6 - Link 1 B Channel

When the digital leased circuit option is enabled for the ISDN interface on this DI-1132, the ISDN B-channels must be assigned to link numbers for normal operation. When a B-channel is assigned to a link number, the DI-1132 then treats the ISDN B-channel as a 64 Kbps leased line connection.

Link 1 may be assigned B channel 1, B channel 2, both channels (B1-B2), or none.

If link 1 is assigned a single channel, the other channel is available to sevice another connection.

If link 1 is assigned none, it is not available for user data connection. It may still be used as the second channel for 128 Kbps communication or for voice (if enabled).

If link 1 is assigned both channels, then the unit is set up for 128 Kbps communication. If the B1-B2 option is selected for link 1, link 2 must be set to none

This option is available only when the Digital Leased Circuit option is enabled.

```
Enter :
    B1, B2, B1-B2, none

>
```

7 - Link 2 B Channel

Link 2 may be assigned B channel 1, B channel 2, both channels (B1-B2), or none.

If link 2 is assigned a single channel, the other channel is available to sevice another connection.

If link 2 is assigned none, it is not available for user data connection. It may still be used as the second channel for 128 Kbps communication or for voice (if enabled).

If link 2 is assigned both channels, then the unit is set up for 128 Kbps communication. If the B1-B2 option is selected for link 2, link 1 must be set to none

This option is available only when the Digital Leased Circuit option is enabled.

```
Enter :
    B1, B2, B1-B2, none

>
```

Considerations:

To use any B channel already claimed, you must first remove its selection from the link which claimed it (select "none"); otherwise, the following error diplay will appear:

```
Warning: B Channel selected already in use.
```

Link Set-Up Menu

```
                        LINK SET-UP MENU

   Option                   Value          Description
1. Link 1 operation       [enabled]      - Allow link 1 to communicate
2. Link 2 operation       [enabled]      - Allow link 2 to communicate
3. Directory number 1     [none]         - Set directory number
4. Directory number 2     [none]         - link 2 directory number
5. SPID 1                 [none]         - link 1 service profile identifier
6. SPID 2                 [none]         - link 2 service profile identifier




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **LINK SET-UP MENU** allows the configuration of the Directory Numbers and Service Profile Identifiers of the B-channels on the ISDN interface of this DI-1132.

1 - Link 1 Operation

The Link 1 Operation option toggles between [enabled] and [disabled] to allow ISDN link 1 to be used for ISDN connections.

Default: [enabled]

2 - Link 2 Operation

The Link 2 Operation option toggles between [enabled] and [disabled] to allow ISDN link 2 to be used for ISDN connections.

Default: [enabled]

3 - Directory Number 1

Enter the ISDN number of the B-channel (up to 15 characters). The ISDN number is available from the ISDN circuit provider.

When the Directory Number is changed, a **Soft Reset** must be performed for this to take effect. The router will be reset and begin operation with the new directory number.

Default: [none]

 The following options appear when a switch type DMS-100, NI-1, NI-2, or 5ESS-MP is selected:

4 - Directory Number 2

Enter the ISDN number assigned to this B-channel. The ISDN number is available from the ISDN circuit provider.

When the Directory Number is changed, a **Soft Reset** must be performed for this to take effect. The router will be reset and begin operation with the new directory number.

5 - SPID 1

Enter the ISDN Service Profile Identifier (SPID) number assigned to this B-channel. The SPID number is available from the ISDN circuit provider.

When the SPID is changed, a **Soft Reset** must be performed for this to take effect. The router will be reset and begin operation with the new SPID.

6 - SPID 2

Enter the ISDN Service Profile Identifier (SPID) number assigned to this B-channel. The SPID number is available from the ISDN circuit provider.

When the SPID is changed, a **Soft Reset** must be performed for this to take effect. The router will be reset and begin operation with the new SPID.

Remote Site Set-Up Menu

```
                        REMOTE SITE SET-UP MENU

     Option                  Value            Description
  1. Edit remote site        menu           - Modify/add a remote site entry
  2. Display summary                        - Display summary of remote sites
  3. Remove remote site                     - Delete remote site entry
  4. Manual call                            - Make a manual call to a remote site
  5. Force disconnect                       - Disconnect a call to a remote site



 Enter option number, "=" – main menu, <TAB> - previous menu

 >
```

The **REMOTE SITE SET-UP MENU** allows the display, configuration, and creation of remote site profiles. Remote site profiles are used to establish PPP connections to other PPP IP/IPX routers.

Important: When configuring this DI-1132 to be the originator of PPP ISDN calls, always define a remote site for each of the possible remote partner IP/IPX routers that this DI-1132 may connect to. Each of the remote sites created stores all of the configuration information required to properly maintain the PPP connection to that remote PPP router. The remote site alias is used to match against the incoming user name during authentication. If an authenticated user name is the same as one of the configured remote site profiles, that ISDN call will use the configuration defined within the remote site profile.

A remote site profile with the alias name "INITIAL_PROFILE" (remote site ID: 41) is used to define the Multilink state, the compression parameters, the bridging parameters, and the IP & IPX parameters for the two Direct Dial (ISDN) and the two Incoming remote site profiles.

When an ISDN Direct Dial is made from the Quick Start menu, the Multilink status is taken from the "INITIAL_PROFILE" remote site profile. If the Direct Dial results in a connection to a valid remote site that has already been configured; once the authentication process is finished, the BCP, IPCP, IPXCP, and CCP parameters will be used from the configured remote site profile and not from the "INITIAL_PROFILE" remote site profile.

When the DI-1132 receives an incoming ISDN call, the Multilink state is taken from the "INITIAL_PROFILE" remote site profile. Note that if Multilink is disabled in the "INITIAL_PROFILE" and an incoming call requests Multilink, the DI-1132 will negotiate to have Multilink enabled. After the authentication process is finished, if the remote site is a valid remote site that has already been configured, the remaining call parameters are taken from the configured remote site profile. If the remote site does not match one of the configured remote site profiles, then the remaining call parameters will be taken from the "INITIAL_PROFILE" remote site profile.

When displaying status or statistic information on the connections to a remote site PPP router, most of the information is displayed according to a particular remote site. Within the Statistics section, a remote site is chosen and then the ISDN PPP call information for that connection may be displayed. The remote site chosen for statistics display will depend on the type of connection that was established to the remote site PPP router. The name of the remote site that the connection has been attached to may be viewed in the Event log file available within the Network Events menu.

There are 40 configurable remote sites available, numbered 1 to 40. Each of these remote sites will have a remote site alias associated with them. When an ISDN call is made to a particular remote site, the call will be attached to that remote site profile after the connection has been established. For viewing the statistics for that ISDN call, you must view the statistics for that particular remote site profile alias.

Five internal system remote sites are used during the connection process. A cross-reference of these internal remote sites is described here:

Remote Site ID	Remote Site Alias	Description
1 - 40	(user configurable)	Remote site used for outgoing calls to these specific remote sites. Configuration parameters for the outgoing call are taken completely from the parameters defined in the remote site.
		Remote site profile used for incoming calls that have been authenticated and the incoming user name matches the name of one of the configured remote sites.
41	INITIAL_PROFILE	Remote site profile used for incoming calls. Multilink state is taken from this profile. If the incoming user name matches the name of one of the configured remote sites, the remaining call parameters will be negotiated from the values defined for that remote site.
		If the incoming user name does not match any of the remote sites defined, the connection is attached to one of the INCOMING profiles. The remaining negotiating parameters, such as BCP, IPCP, IPXCP, and CCP, will be taken from the INITIAL_PROFILE settings.
42	DIRECTDIAL1	Remote site used when a direct dial ISDN call is placed from the Quick
	LEASED1	Start menu. LCP parameters are taken from the INITIAL_PROFILE remote site for negotiations. When the ISDN interface is defined as a Digital Leased Circuit, this remote site profile will be named LEASED1.
		If the remote site authenticates and matches one of the user configurable remote sites, then the BCP, IPCP, IPXCP, CCP, and remaining parameters will be taken from the remote site configuration.
		If the remote site authenticates and does not match one of the user configurable remote sites, the BCP, IPCP, and IPXCP parameters will be taken from the options defined in the Quick Start menu. The Quick Start menu is where the direct dial call is initiated.
		When viewing statistics for an ISDN call that has been attached to the DIRECTDIAL1 remote site, you may specify either the name DIRECTDIAL1 or the id 42.
43	DIRECTDIAL2	This remote site functions the same as DIRECTDIAL1 (LEASED1) and is
	LEASED2	used for the second ISDN call available for connections.
44	INCOMING1	Remote site used when an incoming call is established to this DI-1132 PPP router and the user name reported by the remote PPP router during the authentication process does not match one of the configured remote sites.
		When viewing statistics for an ISDN call that has been attached to the INCOMING1 remote site, you may specify either the name INCOMING1 or the id 44.
		When CallerID security is enabled, incoming calls will not be accepted on INCOMING1 and INCOMING2. There must be a valid remote site profile created.
45	INCOMING2	This remote site functions the same as INCOMING1 and is used for the second ISDN call that may be established to this DI-1132 PPP router.

1 - Edit Remote Site

The Edit Remote Site option directs you to the Edit Remote Site Menu where the remote site profiles are maintained.

40 remote sites may be defined.

2 - Display Summary

The Display Summary option displays an overview of the remote site profiles configured on this DI-1132. Each of the options is shown as "E" for enabled, "D" for disabled or "NA" for not available.

```
                        E - Enabled  D - Disabled   NA - Not Available
  Id  Alias            AC MP   Pri/Sec        BACP BCP IPCP IPXCP CCP CMCP
  --  ----------------  -- --  -----------    ---- ---- --- ---   --- ----
   1  New York          D  E   444-1234/none  E    E    E   E     D   E
   2  Vancouver         D  E   555-1212/none  E    E    E   E     D   E
  41  INITIAL_PROFILE   D  E   none/none      E    E    E   E     D   D
  42  DIRECTDIAL1       E  E   LINK1/none     E    E    E   E     D   D
  43  DIRECTDIAL2       E  E   LINK2/none     E    E    E   E     D   D
  44  INCOMING1         D  E   none/none      E    E    E   E     D   D
  45  INCOMING2         D  E   none/none      E    E    E   E     D   D
```

Id: Entry number in the Remote Site table. The Index number may be used to reference this entry in the IP Address Connect table or for viewing statistics.

Alias: Text name used to easily reference this entry in the table. The Alias may be used to reference this entry in the IP Address Connect table or for viewing statistics.

AC: The state of the Auto-call option for this remote site profile.

MP: The state of the Multilink option for this remote site profile.

Pri/Sec: The type of primary and secondary links configured for this remote site profile. ISDN/none indicates that the circuit will only use ISDN calls. Link1 or Link2 entries indicates that the ISDN circuit has been defined as a digital leased circuit. When defined as a digital leased circuit, the ISDN B-channels are treated as leased line links and are assigned to remote site profiles accordingly.

BACP   The state of the BACP option for this remote site profile.

BCP: The state of the BCP (bridging) option for this remote site profile.

IPCP: The state of the IPCP (IP routing) option for this remote site profile.

IPXCP: The state of the IPXCP (IPX routing) option for this remote site profile.

CCP: The state of the CCP (compression) option for this remote site profile.

CMCP: The state of the CMCP (connection management) option for this remote site profile.

3 - Remove Remote Site

The Remove Remote Site option deletes individual entries or all of the entries from the Remote Site table.

```
Enter:
    all, id or alias to delete
>
```

4 - Manual Call

The Manual Call option is used to establish a manual PPP call to a configured remote site.

```
Enter :
      remote site id or alias to dial (1 to 16 characters)
>
```

5 - Force Disconnect

The Force Disconnect option will cause the chosen remote site ISDN connection to be disconnected.

```
Enter :
      remote site id or alias to disconnect
>
```

Edit Remote Site Menu

```
                        EDIT REMOTE SITE MENU

    Option                  Value           Description
 1. Protocol set-up         menu            - Configure protocols
 2. Security parameters     menu            - Configure security parameters
 3. Remote site alias       [         ]     - Alias of remote site entry
 4. Multilink operation     [         ]     - Allows multilink operation




Enter:
    Remote site id or alias (1 to 16 characters)

>
```

The above display is the first level of the **EDIT REMOTE SITE MENU**. Enter the ID number or alias of the site you wish to edit. Note: the options are not active on this level of this menu; they become active at the next level

When creating a new remote site profile, an alias must be entered for the new site. The first empty identifier number will be assigned to this alias and the remote site profile created. You will then be prompted for the "Remote site type (interoperable or spoofing)". Defaults for the new remote site will be set based on the selected type as follows:

	Interoperable	Spoofing
CMCP	disabled	enabled
IP Triggered RIP	disabled	link_up_only
IPX Demand RIP	disabled	link_up_only

All other defaults are the same for either type. As spoofing is a proprietry operation, if spoofing is enabled it is assumed that the remote site router will be an DI-1132, so the above options can be made available on both ends of the link.

```
Enter :
     remote site type (interoperable or spoofing)
>
```

After the remote site id or alias is supplied, the next level menu specific to that site appears

```
                        EDIT REMOTE SITE  MENU

    Option                  Value                   Description
 1. Circuit set-up          menu                  - Configure circuits
 2. Primary activation      menu                  - Configure primary activation
 3. Secondary activation    menu                  - Configure secondary activation
 4. Protocol set-up         menu                  - Configure protocols
 5. Security parameters     menu                  - Configure security parameters
 6. Remote site alias    *"INITIAL_PROFILE"       - Alias of remote site entry
 7. Multilink operation [enabled]                 - Allows multilink operation




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

1 - Circuit Set-Up

The Circuit Set-up option takes you to the Circuit Set-Up Menu for the chosen remote site. Here you define which circuits will be used to establish the connection to the remote site device. ISDN dialing parameters as well as the Auto-Call values are set within this menu.

2 - Primary Activation

The Primary Activation option takes you to the Primary Activation menu for the chosen remote site, where activation conditions are defined for the main ISDN call that is made to this remote site. The activation conditions for the primary ISDN call consist of the activation schedule, which determines when the ISDN call may be operational.

The Primary Activation conditions are not applicable when placing a manual call to this remote site.

3 - Secondary Activation

The Secondary Activation option takes you to the Secondary Activation menu for the chosen remote site, where activation conditions are defined for the second ISDN call that is made to this remote site when the connection to the remote site is using Multilink protocol. The activation conditions for the secondary ISDN call consist of Bandwidth-on-Demand settings as well as the activation schedule.

This option is only available if Multilink Operation is set to enabled.

4 - Protocol Set-Up

The Protocol Set-up option takes you to the Protocol Set-up menu for the chosen remote site, where the BCP, IPCP, IPXCP, CCP, CMCP and BACP protocol parameters are configured.

5. - Security Parameters

The Security Parameters option allows you to set the password that this remote site will use for incoming security authorization and to set a user name and password for outgoing security authorization.

6 - Remote Site Alias

The Remote Site Alias option defines the name used to represent this remote site. The remote site alias is used to match against the incoming user name during authentication. If an authenticated user name is the same as one of the configured remote site profiles, that ISDN call will use the configuration defined within the corresponding remote site profile.

The remote site alias is case sensitive and may consist of 1 to 16 alphanumeric characters. Use the underscore character instead of a space character.

7 - Multilink Operation

The Multilink Operation option defines the type of link operation that will be established to the router defined for this remote site.

When the DI-1132 receives an incoming ISDN call, the Multilink state is taken from the "INITIAL_PROFILE" remote site profile. Note that if Multilink is disabled in the "INITIAL_PROFILE" and an incoming call request Multilink, the DI-1132 will negotiate to have Multilink enabled.

Default: [disabled]

  <u>**Considerations:**</u>

When a PPP DI-1132 with Multilink disabled attempts to establish an ISDN connection to an Ascend router with Multilink enabled, the Ascend router will shut down the ISDN call. Simply set the Multilink values on each of the routers to be the same value and then establish the ISDN connection.

Circuit Set-Up Menu

```
            EDIT REMOTE SITE 1 CIRCUIT SET-UP MENU

    Option              Value           Description
 1. ISDN call set-up    menu          - Configure ISDN calls
 2. Inactivity timer    [60 sec]      - Set traffic inactivity timer
 3. Usage limit         [unlimited]   - Set line use limit per day
 4. Call limit          [unlimited]   - Set outgoing call limit per day
 5. Restart time        "07:00"       - Set time-of-day to restart limits
 6. Auto-call           [disabled]    - Activate auto-call


 1. Inactivity timer    [60 sec]      - Set traffic inactivity timer
 2. Usage limit         [unlimited]   - Set line use limit per day
 3. Call limit          [unlimited]   - Set outgoing call limit per day
 4. Restart time        "07:00"       - Set time-of-day to restart limits
 5. Auto-call           [disabled]    - Activate auto-call
 6. Primary link        [none]        - Configure primary link number
 7. Secondary link      [none]        - Configure secondary link number


Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **REMOTE SITE CIRCUIT SET-UP MENU** allows the setting of parameters used for ISDN call establishment to the remote site PPP router. The second set of options shown in *italics* will be shown when the ISDN link is in digital leased circuit mode.

1 - ISDN Call Set-Up

The ISDN Call Set-up option takes you to the ISDN Call Set-Up Menu for the chosen remote site. Here you set parameters such as the ISDN numbers of the remote partner ISDN routers and redial timers that pertain to ISDN circuit activation. This option is not available when the ISDN interface on this DI-1132 has been set as a Digital Leased Circuit.

2 - Inactivity Timer

The Inactivity Timer option defines the **Connection Management Idle Timer** that is used to determine when an ISDN call will be suspended or terminated. This timer monitors traffic on the link. If the link traffic is idle, this DI-1132 is set to use Connection Management, and there are LAN sessions using the link, the ISDN call will be suspended.

When the Inactivity Timer is set to off, this DI-1132 will not suspend or terminate the ISDN call. This may be used to allow only one of the DI-1132s to monitor the link traffic to determine when to suspend or terminate the ISDN call.

The Inactivity Timer is also used for **IP Address Connect** configurations. If connection management is not used, the inactivity timer will monitor link traffic. If the traffic on the link is idle for a time longer than the inactivity timer, the link will be terminated and then be made available for the next IP address connect request.

Default: [60 sec]

Range: off, 20 to 3600 seconds

3 - Usage Limit

The Usage Limit option defines the maximum ISDN connection time for this remote site. The time limit is defined in minutes of connection time and is the maximum connection time per day. The Restart Time option determines when the DI-1132 will restart the usage limit timer.

Default: [unlimited]

Range: 1 to 2880 minutes or unlimited

4 - Call Limit

The Call Limit option defines the maximum number of ISDN connections allowed to this remote site per day.

Default: [unlimited]

Range: 1 to 86400 calls or unlimited

5 - Restart Time

The Restart Time option defines the time of day that the call limit and usage limit timers will start recounting.

Default: [07:00]

6 - Auto-Call

The Auto-Call option is used to define this remote site as one that the DI-1132 will attempt to establish a connection to at all times. Each time the DI-1132 is powered up an ISDN connection will be attempted to this remote site.

Default: [disabled]

The following options are available when the DI-1132 has Digital Leased Circuit enabled.

6 - Primary Link Number

The Primary Link Number option is used to define which link interface will be used as the primary leased ISDN B channel to the remote site PPP router on leased line only DI-1132s.

When a link is removed from another remote site profile to be assigned to this remote site profile, the link will be force disconnected and then re-assigned.

Default: [none]

7 - Secondary Link Number

The Secondary Link Number option is used to define which link interface will be used as the secondary leased ISDN B channel to the remote site PPP router on leased line only DI-1132s when the connection is using Multilink protocol. The secondary link may be used all of the time or may be defined to be used conditionally. The Secondary Activation menu provides the parameters that control the activation of the secondary link. This option is only available if Multilink Operation is set to enabled.

When a link is removed from another remote site profile to be assigned to this remote site profile, the link will be force disconnected and then re-assigned.

Default: [none]

ISDN Call Set-Up Menu

```
              EDIT REMOTE SITE 1 ISDN CALL SET-UP MENU

    Option                   Value           Description
 1. ISDN number              [none]          - Set ISDN number
 2. Alternate ISDN number    [none]          - Set alternate ISDN number
 3. Wildcard                 [none]          - Set Wildcard ISDN Number
 4. Call you                 [none]          - Set Call You prefix
 5. Call me                  [none]          - Set Call Me prefix
 6. Callback                 [disabled]      - Enable/disable Callback
 7. Redial timer             [10 sec]        - Time to wait until redial
 8. Redial count             [5]             - Number of redials to try




 Enter option number, "=" - main menu, <TAB> - previous menu

 >
```

The **REMOTE SITE ISDN CALL SET-UP MENU** allows the setting of parameters used for ISDN call establishment to the remote site PPP router. This menu is not required and therefore not available when the Digital Leased Circuit option is enabled for the ISDN interface.

1 - ISDN Number

The ISDN Number option defines the ISDN number to be called to establish a connection to the remote partner PPP router.

Default: [none]

2 - Alternate ISDN Number

The alternate ISDN number is used for two different situations when Multilink operation is set to enabled for this remote site.

1. ISDN number called when Bandwidth on Demand settings require a second ISDN call to be made after an initial Auto-Call or IP Address Connect call has been placed to the remote site. When the secondary activation conditions are set to conditional, the first ISDN Number will be used to place the first ISDN call according to the IP Address Connect table, and the Alternate ISDN Number will be used to place the second ISDN call according to the Bandwidth on Demand options defined within the Secondary Activation menu.

2. ISDN number called when both the primary and secondary activation conditions are set to unconditional and an Auto-Call or IP Address Connect call is placed. This will cause this alternate ISDN call to be placed to the remote site PPP router once the main ISDN call has been established and Multilink operation has been successfully negotiated.

Default: [none]

3 - Wildcard

The Wildcard option defines the ISDN number used when checking for a match on an incoming callerID identified call. The incoming call is checked for a match against the configured values for the ISDN number, the alternate ISDN number, and then the wildcard number.

This wildcard number may contain don't care values to allow for a broader matching possibility. Don't care values are defined with an "X" in the wildcard number. When the DI-1132 checks the incoming call's callerID against this wildcard value, the DI-1132 starts at the rightmost digit and checks each digit from there. The number of digits compared is determined by the ISDN number with the least amount of digits. This means that the checking will only be done to the maximum number of digits of either the incoming callerID or the wildcard value, whichever is less.

For example: The wildcard value is set to 931-1XXX. Refer to the following list for accept and reject examples.

Incoming callerID	Result
328	accepted
931-1328	accepted
2328	rejected
555-1212	rejected

Default: [none]

4 - Call You

Dialing prefix used to make the ISDN call to the remote site PPP router. The Call You dialing prefix is used to define the area codes, country codes, long distance dialing prefixes, or any other information required to establish an ISDN call to the remote site PPP router.

Default: [none]

5 - Call Me

Dialing prefix used by the remote partner router to make an ISDN call to this DI-1132. When Connection Management is enabled, this ISDN DI-1132 will pass its directory numbers as well as the Call Me dialing prefix to the remote partner ISDN DI-1132. This allows the remote partner ISDN DI-1132 to correctly dial this DI-1132 when the ISDN circuit needs to be resumed.

The Call Me dialing prefix is used to define the area codes, country codes, long distance dialing prefixes, or any other information required for the remote partner ISDN DI-1132 to establish an ISDN call to this ISDN DI-1132.

Default: [none]

6 - Callback

The Callback option when set to enabled causes this DI-1132 to refuse an incoming ISDN call for this remote site profile and then initiate an outgoing ISDN call to this remote site. Once a match of an incoming ISDN call is made to an existing remote site profile, the matching remote site profile is checked to determine whether the incoming call is answered or refused and a callback ISDN call initiated.

The Callback option may be used to provide a single point of ISDN billing. By allowing only one of the DI-1132s to establish ISDN calls, the ISDN charges may be centralized in one location.

The CallerID option when enabled will take precedence on determining whether an incoming call is ignored or answered. The delay between the refusal of the incoming call and the initiation of the callback call is set to 1 second. When calling back this remote site, both the ISDN number and the alternate ISDN number will be tried.

Default: [disabled].

7 - Redial Timer

The Redial Timer option specifies the time the router will wait before attempting to redial an incomplete ISDN call.

Default: [10 sec]

Range: 4 to 255 seconds

Considerations:

When the ISDN switch type is set to KDD or NTT, the default, and minimum redial timer value is 90 seconds.

8 - Redial Count

The Redial Count option specifies the number of times the router will attempt to redial an incomplete ISDN call.

Default: [5] redials

Range: 0 to 255 redials

Auto-Call Considerations:

When two ISDN numbers are defined in the ISDN Call Set-Up menu of the remote site entry, the DI-1132 will alternate between the two numbers when re-dialing.

When the DI-1132 attempts to establish an Auto-Call ISDN call and the PPP router at the remote site does not respond, the DI-1132 will try up to the number of times defined in the Redial Count to establish the ISDN call. The interval between the successive attempts is defined by the Redial Timer. If after the defined number of redials the DI-1132 cannot establish a call to the remote partner, the DI-1132 will wait for one minute and then try to establish the ISDN call again using the Redial Count and the Redial Timer values. If the call is not established after these attempts, the DI-1132 will wait for 2 minutes and then try again. The DI-1132 will keep trying to establish the call (according to Redial Count & Redial Time) in blocks with the time intervals: 4 minutes, 8 minutes, 15 minutes, 15 minutes, etc.) until the remote partner answers the call.

When the ISDN switch type is set to KDD or NTT, the minimum time between re-dialing blocks is 3 minutes.

When the Redial Count is set to zero (0), the DI-1132 will redial the remote partner indefinitely using the defined ISDN numbers for the remote site according to the redial blocks explained earlier. The DI-1132 will alternate between the two defined ISDN numbers for the partner in blocks of #1, #2 with a time between the two ISDN numbers of 4 seconds.

Address Connect Considerations:

When the DI-1132 attempts to establish an Address Connect ISDN call and the remote partner does not respond, the DI-1132 will not attempt to redial the remote partner until the next Address Connect connection is required.

If two ISDN numbers are defined in the ISDN Call Set-Up menu of the remote site entry, the DI-1132 will dial the alternate ISDN number after waiting 4 seconds if the first ISDN number does not respond.

Primary Activation Menu

```
            EDIT REMOTE SITE 1 PRIMARY ACTIVATION MENU

   Option                  Value           Description
1. Activation schedule                     - Set activation intervals
2. Display schedule                        - View activation timetable
3. Display time                            - View current date and time
4. Conditional operation  [disabled]       - Allow conditional operation







Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **PRIMARY ACTIVATION MENU** allows the setting of the activation schedule for the primary link (ISDN call) to be used to connect to the remote site PPP router.

The Primary Activation conditions are not applicable when placing a manual call to this remote site.

1 - Activation Schedule

The Activation Schedule option defines the times that the primary link (ISDN call) will be activated or deactivated.

Set link establish time:

```
Enter:
  activate, deactivate, remove, clear
> activate

Enter:
  Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday,
  Weekends, Weekdays
> Weekdays

Enter:
  Time (hour or hour: 00 or hour: 30)
> 07
```

The above Time can be specified in any one of three ways: 7, 07, or 7: 00. Valid hour values are 0 to 23. Settings on the half-hour are also permissible, e.g. 7: 30.

The Clear option will clear the entire table of all activation times.

The Remove option will remove one of the activation times.

Set link disconnect time:

```
> deactivate
> Weekdays
> 23
```

For a deactivation time of midnight on a given day, you must specify hour 0 of the next day. Note that hour 0 starts a given day and hour 23: 30 is the last time specifiable for a given day.

Add Saturday:

```
> activate
> Saturday
> 10

> deactivate
> Saturday
> 17
```

2 - Display Schedule

```
                    Call 1 Activation Schedule

     0  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17 18 19 20 21 22 23
Sun -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
Mon -- -- -- -- -- -- -- AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA --
Tue -- -- -- -- -- -- -- AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA --
Wed -- -- -- -- -- -- -- AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA --
Thu -- -- -- -- -- -- -- AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA --
Fri -- -- -- -- -- -- -- AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA --
Sat -- -- -- -- -- -- -- -- -- -- AA AA AA AA AA AA AA -- -- -- -- -- -- -- --

Activation Schedule Entries
 Weekdays -  7: 00 Act      Weekdays - 23: 00 Deact     Saturday - 10: 00 Act
 Saturday - 17: 00 Deact

Type: [s] to redraw, [=] main menu, any other key to end.
```

3 - Display Time

The Display Time option displays the current router time and date.

4 - Conditional Operation

The Conditional Operation option determines if the Activation Schedule will take effect for the primary link (ISDN call) to the remote site PPP router. When enabled, the primary link may only be established and active during the times defined within the activation schedule.

Default: [disabled]

Secondary Activation Menu

```
            EDIT REMOTE SITE 1 SECONDARY ACTIVATION MENU

   Option                   Value        Description
 1. Activation schedule                  - Set activation intervals
 2. Display schedule                     - View activation timetable
 3. Display time                         - View current date and time
 4. Conditional operation [disabled]     - Allow conditional operation
 5. Traffic level         [disabled]     - Activate upon primary call saturation
 6. Up threshold          [80 %]         - Set activation traffic level
 7. Up stability timer     [5 min]       - Define up level steady state time
 8. Down threshold        [60 %]         - Set deactivation traffic level
 9. Down stability timer  [10 min        - Define down level steady state time



Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **SECONDARY ACTIVATION MENU** allows the setting of the activation schedule for the secondary link (ISDN call) to be used to connect to the remote site PPP router. Traffic activation levels may also be set that allows the secondary link to be used when the throughput of the primary link exceeds the defined levels.

When defining a remote site to use **Auto-call** mode, the secondary activation conditions should be set so that the secondary B-channel will be always active to avoid the call not activating if it should drop. This means that when operating in Multilink mode and the secondary B-channel drops for any reason, the channel will not be re-established on an auto-call configuration until the circuit (both B-channels) have dropped. To avoid this condition, simply set the circuit activation conditions to have Traffic Level enabled, the Up Threshold set to 1, the Up Stability Timer set to 1, and the Down Threshold set to 0. With these settings configured, if the second B-channel should ever drop, it will re-establish in 1 minute.

1 - Activation Schedule

The Activation Schedule option defines the times that the secondary link (ISDN call) will be activated or deactivated.

Set link establish time:

```
Enter:
  activate, deactivate, remove, clear
> activate

Enter:
  Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday,
  Weekends, Weekdays
> Weekdays

Enter:
  Time (hour or hour: 00 or hour: 30)
> 07
```

The above Time can be specified in any one of three ways: 7, 07, or 7: 00. Valid hour values are 0 to 23. Settings on the half-hour are also permissible, e.g. 7: 30.

The Clear option will clear the entire table of all activation times.

The Remove option will remove one of the activation times.

Set link disconnect time:

```
> deactivate
> Weekdays
> 23
```

For a deactivation time of midnight on a given day, you must specify hour 0 of the next day. Note that hour 0 starts a given day and hour 23: 30 is the last time specifiable for a given day.

Add Saturday:

```
> activate
> Saturday
> 10

> deactivate
> Saturday
> 17
```

2 - Display Schedule

```
                      Call 2 Activation Schedule

     0  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17 18 19 20 21 22 23
Sun -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
Mon -- -- -- -- -- -- -- AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA --
Tue -- -- -- -- -- -- -- AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA --
Wed -- -- -- -- -- -- -- AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA --
Thu -- -- -- -- -- -- -- AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA --
Fri -- -- -- -- -- -- -- AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA --
Sat -- -- -- -- -- -- -- -- -- -- AA AA AA AA AA AA AA -- -- -- -- -- -- --


Activation Schedule Entries
 Weekdays -  7: 00 Act      Weekdays - 23: 00 Deact     Saturday - 10: 00 Act
 Saturday - 17: 00 Deact
```

3 - Display Time

The Display Time option displays the current router time and date.

4 - Conditional Operation

The Conditional Operation option determines if the Activation Schedule or traffic level conditions will take effect for the secondary link (ISDN call) to the remote site PPP router. When enabled, the secondary link may only be established and active during the times defined within the activation schedule and/or the traffic levels set.

Default: [disabled]

5 - Traffic Level

The Traffic Level option enables or disables the ability to activate this secondary link according to the traffic levels of the primary link to the remote site PPP router.

When this option is disabled, the traffic level definition options are not available.

Default: [disabled]

6 - Up Threshold

The Up Threshold value determines the percentage of primary link's capacity that will cause the secondary link to be activated. The primary link must sustain a throughput (either receive or transmit) of greater than the up threshold for a period greater than the up stability timer in order for the secondary link to be activated.

```
Enter:
  Percent of main link capacity (from 1 to 100)
> 80
```

7 - Up Stability Timer

To prevent the unnecessary activation of the secondary link if the Up Threshold is only reached for a brief period, the Up Stability Timer is used. It defines how long the primary link's throughput must be at or above the Up Threshold before the secondary call is activated. Using the default values, if an Up Threshold of 80% is maintained on the primary link for a period of 5-min. (length of time the secondary link is "held inactive"), then the secondary link will be activated.

```
Enter:
  time in minutes when link is down (from 1 to 60)
> 5
```

8 - Down Threshold

The Down Threshold determines when the secondary link is shut down again. It must be set lower than the Up Threshold.

After the secondary link comes on-line, it will begin to share the load that would have gone across the primary link. For example, if the primary link brings the secondary link on-line at a threshold of 80%, then both calls will be carrying the load.

The Down Threshold looks at the total throughput (both links together) to determine if the second link will be brought down. The total throughput is compared to the throughput of a single link. When the total throughput drops below the Down Threshold, the second link will be dropped.

```
Enter:
  Percent of main link capacity (95 or lower)
> 60
```

9 - Down Stability Timer

The Down Stability Timer is similar in operation to the Up Stability Timer. When the total link throughput drops below the value set by the Down Threshold for a period of time defined by the Down Stability Timer, the secondary link will be disconnected and placed back in the stand-by mode.

For example, if the total throughput (both links together) drops below 60% of the bandwidth of a single link (64 Kbps) for a period of 10 minutes, the secondary link will be disconnected.

```
Enter:
  time in minutes when link is up (from 1 to 60)
>10
```

Protocol Set-Up Menu

```
                EDIT REMOTE SITE 2 PROTOCOL SET-UP MENU

    Option              Value           Description
 1. Bridge parameters   menu         - Configure bridge parameters
 2. IP parameters       menu         - Configure IP parameters
 3. IPX parameters      menu         - Configure IPX parameters
 4. CCP parameters      menu         - Configure CCP parameters
 5. CMCP parameters     menu         - Configure connection management
 6. BACP set-up         menu         - Configure BACP parameters



Enter option number, "=" – main menu, <TAB> - previous menu

>
```

1 - Bridge Parameters

The Bridge Parameters option takes you to the Bridge Parameters menu for the chosen remote site, where the bridge parameters are configured.

2 - IP Parameters

The IP Parameters option takes you to the IP Parameters menu for the chosen remote site, where the IP parameters are configured. The type of link is specified as numbered or unnumbered. The type of IP routing is set within this menu: either RIP1 or RIP2. Both local and peer IP addresses are defined here as well.

3 - IPX Parameters

The IPX Parameters option takes you to the IPX Parameters menu for the chosen remote site, where the IPX parameters are configured. The type of link is specified as numbered or unnumbered. Both local and peer IPX addresses are defined here as well.

4 - CCP Parameters

The CCP Parameters option takes you to the CCP Parameters menu for the chosen remote site, where the CCP (Compression) parameters are configured.

5 - CMCP Parameters

The CMCP Parameters option takes you to the CMCP Parameters menu for the chosen remote site, where the CMCP (Connection Management) parameters are configured. The Connection Management parameters determine when the ISDN calls will be suspended and spoofed or when they will be terminated.

6 - BACP Set-UP

The BACP Parameters menu allows you to activate the BACP (Bandwidth Allocation Control Protocol) and set the call conditions used. BACP reduces network charges by adding or dropping the second link based on traffic demands. BACP mediates control of the link between the routers to prevent "link bobbing".

Bridge Parameters Menu

```
                  EDIT REMOTE SITE 1 BRIDGE PARAMETERS MENU

     Option                Value            Description
  1. STP parameters         menu          - Define port specific options
  2. Bridge enabled       [enabled]       - Enable BCP negotiations
  3. Tinygram             [disabled]      - Enable tinygram compression
  4. FCS preservation     [enabled]       - Preserve FCS across WAN




  Enter option number, "=" - main menu, <TAB> - previous menu

  >
```

The **BRIDGE PARAMETERS MENU** allows the setting of the type of Bridge link connection to the remote site PPP router. The parameters defined here are used by the BCP (Bridge Control Protocol) functions of the router for negotiating bridging during call establishment.

1 - STP Parameters

The STP Parameters option directs you to the STP Parameters Menu where STP Port parameters for this remote site are set.

2 - BCP Enabled

The BCP Enabled option enables or disables the Bridge Control Protocol negotiations for this remote site. When a connection to this remote site does not require bridging, this option may be disabled causing BCP not to be negotiated.

Default: [enabled]

3 - Tinygram

The Tinygram option enables or disables the compression of bridge frames that are smaller than the minimum frame size of 64 bytes. Tinygram compression simply suppresses the trailing zeroes of a small frame.

Default: [disabled]

4 - FCS Preservation

The FCS Preservation option enables or disables the transmission of the Frame Check Sequence (FCS) for bridge frames that are passed to the remote site PPP device.

When set to disabled, this DI-1132 will not send the FCS on bridge frames sent to the remote site PPP partner.

This option may need to be disabled when connecting to some Cisco routers.

Default: [enabled]

STP Parameters Menu

```
           EDIT REMOTE SITE 1 BRIDGE PARAMETERS STP PARAMETERS MENU


    Option        Value          Description
 1. State        [enabled]    - Enable/disable port
 2. Path cost    [100]        - Define network cost for port
 3. Priority     [128]        - Set port priority






Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **STP PARAMETERS MENU** allows the setting of the STP port parameters used by the BCP (Bridge Control Protocol) functions of the router for negotiating bridging during call establishment. All of the settings in this menu will be ignored when STP is disabled within the Bridging Set-up menu.

1 - State

The State option toggles between enabling and disabling this WAN port when running Spanning Tree Protocol on the WAN connection to this remote site device.

2 - Path Cost

The Path Cost option allows the setting of the contributing path cost to the Root for this port.

Contribution of Path Cost to Root Path Cost:

The path cost to the Root Bridge is added to path costs of other bridges along the same stream to the Root Bridge. The result is the Root Path Cost.

Once the Root Bridge is selected, a determination of which bridge(s) will become blocked where necessary is made. This determination is made by comparing the sum of the path costs (i.e. the Root Path Cost) to the Root Bridge. Where redundant paths exist, the bridge with the lowest Root Path Cost to the Root Bridge will become the *Designated Bridge* for the LAN. If all contending bridges' ports have the same Root Path Costs, then first their Bridge IDs (Priority/MAC address) and second their Port IDs (Port Priority) will be used as tiebreakers.

Default: [100]

Range: 1 to 65535

Considerations:

Increasing this value increases the total cost of the path to the Root Bridge. This may (depending on the topology) cause a bridge along the path to the Root bridge to be taken out of service and a blocked bridge to come into service.

Decreasing the value may have the opposite effect.

3 - Priority

The Priority option allows the setting of the port priority. This value is entered in decimal format and appears in hex format in the Port ID/Designated Port identifier (as applicable) of the Port Status display.

Default: [128] (decimal)

Range: 0 - 255

   Considerations:

   Increasing this value lowers the probability of this port becoming the Root port to the Root Bridge. Decreasing this value increases the probability.

IP Parameters Menu

```
          EDIT REMOTE SITE 1 PROTOCOL SET-UP IP PARAMETERS MENU

    Option                 Value                   Description
 1. IP routing             menu                  - Configure IP routing
 2. NAT advanced setup     menu                  - Configure NAT address pool
 3. IP enabled            [enabled]              - Enable IP protocol
 4. NAPT enabled          [disabled]             - Enable port address translation
 5. Link IP type          [unnumbered]           - Define numbered link
 6. Peer IP address        "0.0.0.0" [none]      - Define peer IP address
 7. Negotiate address     [enabled]              - IPCP address negotiation
 8. VJ compression        [disabled]             - Enable VJ header compression



 1. IP routing             menu                  - Configure IP routing
 2. NAT advanced setup     menu                  - Configure NAT address pool
 3. IP enabled            [enabled]              - Enable IP protocol
 4. NAPT enabled          [disabled]             - Enable port address translation
 5. Link IP type          [numbered]             - Define numbered link
 6. Local IP address       "0.0.0.0" [none]      - Define local IP address
 7. Peer IP address        "0.0.0.0"             - Define peer IP address
 8. Private route         [disabled]             - Do not advertise this route
 9. VJ compression        [disabled]             - Enable VJ header compression


Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **IP PARAMETERS MENU** allows the setting of the type of IP link connection to the remote site PPP router. The parameters defined here are used by the IPCP (Internet Protocol Control Protocol) functions of the router for negotiating IP routing during call establishment. The menu options are shown in the above screen with the defaults for both the numbered and unnumbered link IP type settings.

Each side of the ISDN connection must have an IP address assigned to the router in order to properly route IP packets between the two routers.

The IP routing parameters defined here are for this connection to the remote site peer IP router only. The IP routing performed on the local LAN is defined within the IP Routing menu under the Configuration menu. This allows the IP routing to be set independently for each interface on this DI-1132 router.

1 - IP Routing

The IP Routing option directs you to the IP Routing Parameters Menu where the IP routing parameters for this remote site are set. The parameters include the type of IP routing, the use of triggered RIP, and others.

2 – NAT Advanced Setup

The NAT Advanced Setup option takes you to NAT Advanced Setup menu where parameters for the Network Address Translation pool for this remote site may be assigned.

3 - IP Enabled

The IP Enabled option enables or disables the Internet Protocol negotiations for this remote site. When a connection to this remote site does not require IP routing, this option may be disabled causing IP not to be negotiated.

Default: [enabled]

4 - NAPT Enabled

Network Address Translation (NAT) is a technique which translates private IP addresses on a private network to valid global IP addresses for access to the Internet. Network Address Port Translation (NAPT) translates both the IP address and the port. The advantage of port translation is that more than one private IP address can be translated to the same single global IP address. NAPT allows data exchanges initiated from hosts with private IP addresses to be sent to the Internet via the DI-1132 using a single global IP address. Port translation can also be used from one private network to another private network if the two networks have conflicting IP addresses.

A global IP address must be assigned to the WAN link upon which NAPT is enabled for NAPT to work. The global IP address may be configured locally or negotiated if numbered links are enabled. If unnumbered links are enabled, the router must accept an IP address for the WAN link from the remote site.

When NAPT is enabled this router will not send RIP messages out. The router will be able to receive RIP requests. IP pattern filters and Firewall use the non-translated IP address. (ie. the private IP address that is used on the private network).

Remember: if NAPT is enabled with IP addressing (under the NAT Advanced menu) and Firewall is enabled, then the IP address for this remote site must be in the firewall table.

Default: [disabled]

5 - Link IP Type

The Link IP Type option defines the type of link connection that will be established with the remote site PPP router. The link may be numbered, in which both sides of the WAN connection have IP addresses assigned; or unnumbered, in which the peer (remote partner PPP router) and the calling router use their device IP address.

When operating in unnumbered mode, each of the two IP routers operates as half of a complete router. The WAN connection is considered a common internal data path with the IP routing actually taking place between the two remote LANs.

When the link IP type is set to unnumbered, the Local IP Address option is not available. For an unnumbered link, the local IP address is taken from the IP address assigned to this router in the Internet Set-Up menu.

Default: [numbered]

Choices: numbered, unnumbered

6 - Local IP Address

The Local IP Address option allows the definition of an Internet Protocol (IP) address and corresponding subnet size for the link of this router.

When the link IP type is set to unnumbered, the Local IP Address option is not available. For an unnumbered link, the local IP address is taken from the IP address assigned to this router in the Internet Set-Up menu.

The IP address consists of 4 octets and is represented by 4 fields separated by periods ("**.**"), where each field is specified by a decimal number (e.g. 92.3.1.10). Each decimal number must be less than or equal to 255, that is the maximum value of each 8-bit field.

The Subnet Mask Size variable partitions the host field of an IP address into two parts: a *subnet number* and a *host number*. The subnet mask is defined as a series of contiguous bit locations from the start of the IP address.

Default: [none]

```
Enter :
    IP address (up to 15 characters)
>

Enter :
    subnet mask size(from 2 to 30)
>
```

Caution: when using numbered links, both the local IP address AND the subnet mask size MUST be entered. If only the IP address is entered and no subnet mask size,the router has no way of determining the subnet location – the link will not operate.

6/7 - Peer IP Address

The Peer IP Address option allows the definition of an Internet Protocol (IP) address and corresponding subnet size for link side of the PPP IP router at the remote site.

The IP address consists of 4 octets and is represented by 4 fields separated by periods ("**.**"), where each field is specified by a decimal number (e.g. 92.3.1.10). Each decimal number must be less than or equal to 255, that is the maximum value of each 8-bit field.

The subnet mask size is not specified when the link IP type is set to numbered. The subnet mask is defined as a series of contiguous bit locations from the start of the IP address.

Default: [none]

```
Enter :
    IP address (up to 15 characters)
>

Enter :
    subnet mask size(from 2 to 30)
>
```

7 - Negotiate Address

The Negotiate Address option is only available when the **Link IP Type is set to unnumbered**. Address negotiation causes this DI-1132 to negotiate with the peer IP router to determine the IP addresses of each device. This allows this DI-1132 to supply an IP address to the peer IP router if the Peer IP Address option is defined.

When address negotiation is enabled, this DI-1132 will accept an IPCP PPP connection from a peer IP router even if the global IP address of this DI-1132 is not configured. This DI-1132 will use the negotiated address that the peer has provided.

When address negotiation is disabled, this DI-1132 will not initiate address negotiations but will respond to address negotiations if requested by the peer IP router.

Default: [enabled]

8 - Private Route

The Private Route option is only available when the **Link IP Type is set to numbered**. Setting this numbered link connection to be a private link causes the IP connection to the peer IP router to not be advertised in the RIP information.

Default: [disabled]

8/9 - VJ Compression

The VJ Compression option enables or disables Van Jacobson header compression on packets send to this remote site.

Default: [disabled]

IP Parameters - IP Routing Menu

```
        EDIT REMOTE SITE 1 PROTOCOL SET-UP IP PARAMETERS IP ROUTING MENU


     Option                   Value                 Description
 1. Routing protocol      [rip1_compatible]     - Define link routing protocol
 2. RIP mode              [both]                - Define RIP send/receive mode
 3. Triggered RIP         [disabled]            - Define triggered RIP
 4. Auto Default Route    [disabled]            - Add default route on connect
 5. Link cost             [0]                   - Define cost added to routes




 Enter option number, "=" - main menu, <TAB> - previous menu

 >
```

The **IP PARAMETERS - IP ROUTING MENU** allows the setting of the IP routing parameters to use for this IPCP connection to the peer IP router. The parameters defined here are used by the IPCP (Internet Protocol Control Protocol) functions of the router for negotiating IP routing during call establishment.

1 - Routing Protocol

The Routing Protocol option defines the type of IP routing protocol to be used on this link interface. The DI-1132 may be set up to use different types of IP routing protocols on each of it's interfaces: LAN and links.

When the routing protocol is defined as none, the DI-1132 will operate as an IP router but will NOT participate in the exchange of RIP messages between the other IP routers in the network. All IP routing is accomplished by using the static routes table. All routes within the network must be manually entered in the static routing table.

When the routing protocol is defined as rip1, the DI-1132 will operate as a RIP1 IP router. All routing information will be sent and received via broadcast RIP packets.

When the routing protocol is defined as rip1_compatible, the DI-1132 will operate as a RIP2 IP router in broadcast mode. All routing information will be sent via broadcast RIP2 packets. Routing information may be received as broadcast RIP1, broadcast RIP2, or multicast RIP2.

When the routing protocol is defined as rip2, the DI-1132 will operate as a RIP2 IP router. All routing information will be sent via multicast RIP2 packets. Routing information may be received as broadcast RIP2 or multicast RIP2.

Partner routers connected on the WAN do not need to have their IP routing protocols set to the same values. An IP router at a central site may have it's routing protocol set to RIP so that it may continue to listen to RIP messages and adapt to the changes of the local network, while the remote locations, with their default routes back to the main router, cannot propagate any incorrect routing information that might be present on the remote segments. Each of the routers at the remote sites would have their routing protocol set to none.

Default: [rip1_compatible]

Choices: none, rip1, rip1_compatible, rip2

2 - RIP Mode

The RIP Mode option defines how this DI-1132 will participate in RIP IP routing messages over the link to this remote site.

When the RIP mode is set to both, the DI-1132 will send and receive RIP routing messages over the link to this remote site.

When the RIP mode is set to send_only, the DI-1132 will only send RIP routing messages over the link to this remote site.

When the RIP mode is set to receive_only, the DI-1132 will only receive RIP routing messages over the link to this remote site.

Default: [both]

Choices: both, send_only, receive_only

3 - Triggered RIP

The Triggered RIP option disables or defines the type of triggered RIP to use on the link to this remote site.

Disabling this option will cause the RIP routing tables to be transmitted every 60 seconds.

Entering "standard" enables triggered RIP; the DI-1132 will only send RIP messages over the link to this remote site when the routing information has actually changed.

Entering "link_up_only" enables triggered RIP; the DI-1132 will only send RIP messages over the link to this remote site when the routing information has changed **and** the link is currently up. If the link is down due to suspension, the routing information will be queued and then sent the next time the link is brought up for user data.

When triggered RIP is enabled, if the remote site router refuses to negotiate triggered RIP on the initial connection, this router will attempt to negotiate triggered RIP for 5 minutes. During the 5 minutes, this router will use normal RIP and SAP. If triggered RIP has not been negotiated after the 5 minutes, this router will fall back to using normal RIP and SAP.

Default: [disabled]

Choices: disabled, standard, link_up_only

4 - Auto Default Route

The Auto Default Route option allows a default IP route to be added to the routing tables when a connection is established to this remote site. When the link to this remote site goes down, the auto default route will be removed from the routing table.

Default: [disabled]

5 - Link Cost

The Link Cost option defines the amount of extra routing cost to add to routes that are learned from this link connection. This added link cost may be useful in forcing learned routes to have a higher cost when they are across a slower link connection.

Default: [0]

IP Parameters – NAT Advanced Set-Up Menu

```
   EDIT REMOTE SITE 1 PROTOCOL SET-UP IP PARAMETERS NAT ADVANCED SETUP MENU


   Option                 Value                    Description
1. Translation type     [port]               - Define translation method
2. Show address pool                         - Display IP mappings
3. Dynamic IP pool      [none]               - Dynamically assigned mappings
4. Add static entry                          - Specify IP-IP mappings
5. Remove static entry                       - Remove static IP mapping




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The NAT Advanced Set-Up Menu allows you to set parameters for the NAT address pool for this remote site router.

1 - Translation Type

This option sets the address translation method to be used for NAT. The address may be translated as either a port or an internal IP address. With IP address tanslation, each internal IP address is mapped to one global IP address; with port translation, several internal IP addresses may be mapped to a single global IP address.

Default: [port]

2 - Show Address Pool

This option displays the IP address pool for this remote site.

```
                        NAT ADDRESS POOL

Pool Address        Type    Actual Address              Status
--------------      -----   ---------------             ---------
12.34.5.6           Static  196.23.45.6                 In use
12.34.5.12          Static  196.23.45.24                Reserved
23.45.6.10          Dynamic 123.45.67.8                 In use
23.45.6.11          Dynamic None assigned               Available
23.45.6.12          Dynamic None assigned               Available
23.45.6.13          Dynamic None assigned               Available
```

The Pool Address is the internal adress to be used on this network, the Actual Address is the global IP address to which the internal address is assigned.

When the last dynamically assigned address in the address pool is reached, the router will automatically use port translation with that address in order to allow as many connections as possible. If there are zero or one address specified for the pool, then NAPT will be used for all connections. If zero, the address assigned by the remote router IPCP or the address specified in the "Peer IP address" option will be used. If one address is specified, that address will be used.

3 - Dynamic IP Pool

The Dynamic IP Address Pool option allocates a block of internal IP addresses from which the router will assign IP addresses. The first address in the range must be specified followed by the number of addresses in the pool

4 - Add Static Entry
.
The Add Static Address option assigns a specific internal IP address of a device to a specific global IP address. When this option is selected, first enter the internal IP address to be assigned, then the global IP address.

5 - Remove Static Address

The Remove static address option removes the static address assignment from the address pool. Addresses may be removed individually by entering the global IP address to be taken off, or the entire list of static address assignments may be cleared by entering "all".

IPX Parameters Menu

```
                 EDIT REMOTE SITE 1 IPX PARAMETERS MENU

    Option                Value                   Description
1. IPX   enabled      [enabled]            - Enable IPX protocol
2. Link IPX type       [unnumbered]         - Define numbered link
3. Static routes only [disabled]           - Only use static IPX routes
4. IPX DMR enabled     [disabled]           - Enable Demand RIP
5. Force RIP update    [disabled]           - Enable forced regular RIP updates


1. IPX   enabled      [enabled]            - Enable IPX protocol
2. Link IPX type       [numbered]           - Define numbered link
3. IPX net             "0"                  - Define IPX network number
4. Local IPX node      "00-00-00-00-00-00" - Define local IPX node number
5. Peer IPX node       "00-00-00-00-00-00" - Define peer IPX node number
6. Static routes only [disabled]           - Only use static IPX routes
7. IPX DMR enabled     [disabled]           - Enable Demand RIP
8. Force RIP update    [disabled]           - Enable forced regular RIP updates

Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **IPX PARAMETERS MENU** allows the setting of the type of IPX link connection to the remote site PPP router. The parameters defined here are used by the IPX (Internet Packet Exchange) functions of the router for negotiating IPX routing during call establishment. The menu options are shown in the above screen with the defaults for both the numbered and unnumbered link IPX type settings.

1 - IPX Enabled

The IPX Enabled option enables or disables the Internet Packet Exchange negotiations for this remote site. When a connection to this remote site does not require IPX routing, this option may be disabled.

Default: [enabled]

2 - Link IPX Type

The Link IPX Type option defines the type of link connection that will be established with the remote site PPP router. The link may be:
1. Numbered - This is where both sides of the WAN connection have IPX node addresses assigned and the WAN connection has it's own IPX network number.
2. Unnumbered - This is where the local and peer (remote partner PPP router) routers use their internal LAN side IPX node numbers.

When operating in unnumbered mode, each of the two IPX routers operates as half of a complete router. The WAN connection is considered a common internal data path with the IPX routing actually taking place between the two remote LANs.

When the link IPX type is set to unnumbered, the IPX Net, Local IPX Node, and Peer IPX Node options are not available.

When the link IPX type is set to numbered, the IPX network and local and peer IPX node numbers should be defined to ensure proper IPXCP negotiations between the local and peer IPX PPP routers.

Default: [unnumbered]

Choices: numbered, unnumbered

3 - IPX Net

The IPX Net option allows the definition of the IPX network number to use for the WAN connection when operating in numbered mode for this IPXCP link to the remote site PPP router.

Default: [0]

```
Enter :
    Network number (up to 8 characters)
>
```

4 - Local IPX Node

The Local IPX Node option allows the definition of an Internet Packet Exchange (IPX) node address for the link of this router.

When the link IPX type is set to unnumbered, the Local IPX Node option is not available.

The IPX Node address consists of 12 hexadecimal bytes. The address may be entered with or without the hyphens. An example of an IPX node address may be 00-00-d0-00-12-13, and would be entered as such or simply as 0000d0001213.

Default: [00-00-00-00-00-00]

```
Enter :
    IPX node number (up to 17 characters)
>
```

5 - *Peer IPX Node*

The Peer IPX Node option allows the definition of an Internet Packet Exchange (IPX) node address for the link side of the PPP IPX router at the remote site.

When the link IPX type is set to unnumbered, the Peer IPX Node option is not available.

Default: [00-00-00-00-00-00]

```
Enter :
    IPX node number (up to 17 characters)
>
```

3 / *6* - Static Routes Only

The Static Routes Only option determines the type of IPX routing to perform on the connection with the peer IPX router. By enabling this option, only the static IPX routes and services defined in the IPX Routing Set-up menu will be used to perform IPX routing with the peer IPX router.

Default: [disabled]

4 / *7* - IPX DMR Enabled

The IPX DMR Enabled option defines or disables demand RIP for IPX routing with the peer IPX router. Demand RIP allows the IPX routing tables to be updated only when there has been a change in the routing table.

Disabling this option will cause the IPX RIP routing tables to be transmitted every 60 seconds.

Entering "standard" enables demand RIP; the DI-1132 will only send RIP messages over the link to this remote site when the routing information has actually changed.

Entering "link_up_only" enables demand RIP; the DI-1132 will only send RIP messages over the link to this remote site when the routing information has actually changed **and** the link is currently up. If the link is down due to suspension, the routing information will be queued and then sent the next time the link is brought up for user data.

When demand RIP is enabled, if the remote site router refuses to negotiate demand RIP on the initial connection, this router will attempt to negotiate demand RIP for 5 minutes. During the 5 minutes, this router will use normal RIP and SAP. If demand RIP has not been negotiated after the 5 minutes, this router will fall back to using normal RIP and SAP.

Default: [disabled]

Choices: disabled, standard, link_up_only

5 / *8* - Force RIP Update

The Force RIP Update option determines if the DI-1132 will send a RIP update request to the WAN peer IPX router when a local LAN RIP update is sent. When operating under normal RIP update times, this forces the WAN partners to provide their RIP tables when requested to maintain proper routing information.

Default: [disabled]

Compression Parameters Menu

```
                    EDIT REMOTE SITE 1 CCP PARAMETERS MENU

    Option                 Value           Description
 1. Compression         [enabled]    - Allows compression operation
 2. Extended sequence   [disabled]   - Two byte sequence field




Enter option number, "=" - main menu, <TAB> - previous menu


>
```

The **COMPRESSION (CCP) PARAMETERS MENU** allows the setting of data compression on the link connection to the remote site PPP router. The parameters defined here are used by the CCP functions of the router for negotiating data compression during call establishment.

1 - Compression

The Compression option enables or disables the negotiation of data compression for data packets sent from the remote site PPP router and received by this router. The DI-1132 performs data compression at the bundle level and not at the link level. Link based compression will be rejected. The DI-1132 supports CCP option 17 - PPP Stac LZS Compression Protocol.

When the Compression option is enabled, this router will allow data compression to be negotiated from the remote site PPP router for data that is sent from this router to the remote site router.

When compression is disabled, this router will not allow data compression to be negotiated for the connection.

Default: [enabled]

2 - Extended Sequence

The Extended Sequence option enables or disables the use of a two-byte sequence number for inter-router communications. When disabled, the sequence number is one byte.

This option should be enabled when connecting to a PPP router that uses a two-byte sequence number instead of a one-byte sequence number. Some Cisco routers with software versions IOS 11.0 and IOS 11.1 use a two-byte sequence number.

Default: [disabled]

   Considerations:

If compression has been negotiated for the connection CCP but many data errors are received and very little data, the Extended Sequence number may need to be enabled to allow for the two byte sequence numbering.

CMCP (Connection Management) Parameters Menu

```
            EDIT REMOTE SITE 1 PROTOCOL SET-UP CMCP PARAMETERS MENU

     Option                  Value           Description
  1. IP spoofing             menu          - Configure IP spoofing
  2. IPX spoofing            menu          - Configure IPX spoofing
  3. CMCP enabled         [disabled]      - Enable CMCP negotiations
  4. Bridge traffic       [enabled]       - Spoof bridge traffic
  5. Disc after last      [disabled]      - Disconnect after last session
  6. Suspension timeout   [off]           - Set maximum suspension interval




  Enter option number, "=" - main menu, <TAB> - previous menu


  >
```

The **CONNECTION MANAGEMENT (CMCP) PARAMETERS MENU** allows the configuration of the Connection Management options for this remote site.

1 - IP Spoofing

The IP Spoofing option directs you to the IP Spoofing Parameters Menu where the IP spoofing parameters for this remote site are set. The parameters define how to interact and keep track of the TCP sessions while connection management is enabled on the link to this remote site.

2 - IPX Spoofing

The IPX Spoofing option directs you to the IPX Spoofing Parameters Menu where the IPX spoofing parameters for this remote site are set. The parameters define how to interact and keep track of the IPX sessions while connection management is enabled on the link to this remote site.

3 - CMCP Enabled

The CMCP Enabled option enables or disables the Connection Management Control Protocol negotiations for this remote site. When a connection to this remote site does not require connection management, this option may be disabled causing CMCP not to be negotiated.

Connection Management is used to minimize the amount of connection time used when connected to partner DI-1132s.

When Connection Management is enabled, the active ISDN calls are monitored for "Interesting Traffic", suspended, and resumed when required to transfer user data between DI-1132s.

Default: [disabled]

Considerations: if this remote site is set as spoofing, CMCP will be set to enabled.

4 - Bridge Traffic

The Bridge Traffic option enables or disables spoofing of bridge frame traffic while Connection Management is enabled.

When the DI-1132 is spoofing bridge traffic (this option enabled), the bridge traffic received from the LAN will not be used to resume a suspended ISDN call or to keep an existing ISDN call up. While the ISDN call is up for other reasons, the bridge traffic received from the local LAN will be passed.

When this option is disabled, the DI-1132 will pass all bridge traffic received from the local LAN. This will cause ISDN calls to be resumed if suspended.

Default: [enabled]

5 - Disconnect After Last

The Disconnect After Last option enables or disables disconnecting the link connection to this remote site after all of the connection management monitored sessions have been terminated. This allows the link connection to be disconnected sooner that waiting for the Inactivity Timer to expire.

Default: [disabled]

6 - Suspension Timeout

The Suspension Timeout option allows the definition of a maximum time that the link connection may be in the suspended state. If the link connection has been suspended for the time period defined by the suspension timeout, the link connection will be silently dropped and the sessions logged on that connection will be removed from the table. Silently dropping the link connection means that the peer remote site router will not be notified that the connection has been dropped.

Default: [off]

```
Enter :
    Time in minutes (from 1 to 10080), off
>
```

IP Spoofing Menu

```
      EDIT REMOTE SITE 1 PROTOCOL SET-UP CMCP PARAMETERS IP SPOOFING MENU

    Option              Value           Description
 1. TCP idle         [3600 sec]    - Set interval till first TCP keepalive
 2. TCP interval     [60 sec]      - Set interval between TCP keepalives
 3. TCP retries      [5]           - Set maximum TCP keepalive retries
 4. TCP aging        [7200 sec]    - Set TCP connection aging interval




 Enter option number, "=" - main menu, <TAB> - previous menu


 >
```

The **IP SPOOFING PARAMETERS MENU** allows the setting of connection management parameters that control the IP spoofing portion of the link connection. The timers and values defined within this menu will be used for each of the TCP sessions monitored by this DI-1132.

1 - TCP Idle

The TCP Idle option defines the idle time in seconds that the DI-1132 will wait before sending the first fake (spoofed) keepalive to the TCP session endpoint. Idle time is the time when the DI-1132 does not receive TCP keepalive messages for that TCP session.

When the TCP Idle option is set to off, the DI-1132 will never send out fake keepalive messages.

The TCP keepalive messages are used to determine if the station at the end of the TCP session is still alive.

Default: [3600 sec]

```
Enter :
    time in seconds (from 60 to 7200), off
>
```

2 - TCP Interval

The TCP Interval option defines the internal interval time in seconds that the DI-1132 will wait before sending the next TCP keepalive. These additional keepalive messages will be sent when there has not been a response to the initial keepalive messages sent from the DI-1132.

The TCP keepalive messages are used to determine if the station at the end of the TCP session is still alive.

Default: [60 sec]

```
Enter :
    time in seconds (from 5 to 120)
>
```

3 - TCP Retries

The TCP Retries option defines the number of unacknowledged fake TCP keepalive messages that this DI-1132 will send before the TCP session is considered dead.

The TCP keepalive messages are used to determine if the station at the end of the TCP session is still alive.

Default: [5]

```
Enter :
    Number of retries (from 1 to 20)
>
```

4 - TCP Aging

The TCP Aging option defines the amount of idle time in seconds that the DI-1132 will wait before the TCP session is aged out and considered dead. The aging timer starts counting when there is no session traffic.

The TCP aging timer can be used in conjunction with the IP address connect feature. When the TCP session traffic is idle for a time longer than the inactivity timer, the link will be suspended. If the TCP session continues to be idle, the aging timer will age out the session. Once all of the sessions are aged out, the link will be quietly taken from suspended to down. This process allows the link to be available for use with another IP address connect request.

When a TCP session has been aged out and the DI-1132 then receives a TCP keepalive for that session, the link will be re-established to send the keepalive. The link is re-established because the TCP keepalive messages are not easily discernable from normal TCP session traffic. The TCP aging timer should be se to a value larger than the frequency of TCP keepalive messages on the network. TCP keepalive messages can have intervals as long as 60 minutes.

The TCP keepalive messages are used to determine if the station at the end of the TCP session is still alive.

Default: [7200 sec]

```
Enter :
    time in seconds (from 60 to 604800), off
>
```

IPX Spoofing Menu

```
     EDIT REMOTE SITE 1 PROTOCOL SET-UP CMCP PARAMETERS IPX SPOOFING MENU


   Option            Value              Description
1. IPX type20       [enabled]        - Spoof IPX type20 frames
2. IPX broadcast    [enabled]        - Spoof IPX broadcast frames
3. IPX idle         [300 sec]        - Set interval till first IPX watchdog
4. IPX interval     [60 sec]         - Set interval between IPX watchdogs
5. IPX retries      [10]             - Set maximum IPX watchdog retries
6. IPX aging        [86400 sec]      - Set IPX connection aging interval




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **IPX SPOOFING PARAMETERS MENU** allows the setting of connection management parameters that control the IPX spoofing portion of the link connection. The timers and values defined within this menu will be used for each of the IPX sessions monitored by this DI-1132.

1 - IPX Type20

When the IPX Type20 option is enabled, this IPX router will ignore IPX type 20 packets and not re-transmit them to partner routers on the WAN. When the DI-1132 is spoofing IPX type 20 packets, the type 20 packets received from the LAN will not be used to resume a suspended ISDN call or to keep an existing ISDN call up.

Default: [enabled]

2 - IPX Broadcast

When the IPX Broadcast option is enabled, this IPX router will ignore IPX broadcast packets and not re-transmit them to partner routers on the WAN. When the DI-1132 is spoofing IPX broadcast packets, the broadcast packets received from the LAN will not be used to resume a suspended ISDN call or to keep an existing ISDN call up.

Default: [enabled]

3 - IPX Idle

The IPX Idle option defines the idle time in seconds that the DI-1132 will wait before sending the first fake (spoofed) watchdog to the client for the IPX session. Idle time is the time when the DI-1132 does not receive IPX watchdog messages for that IPX session.

When the IPX Idle option is set to off, the DI-1132 will never send out fake watchdog messages.

The IPX watchdog messages are used by servers to determine if the client at the end of the IPX session is still alive.

Default: [300 sec]

```
Enter :
    time in seconds (from 60 to 1260), off
>
```

4 - IPX Interval

The IPX Interval option defines the internal interval time in seconds that the DI-1132 will wait before sending the next IPX watchdog. These additional watchdog messages will be sent when there has not been a response to the initial watchdog messages sent from the DI-1132.

The IPX watchdog messages are used by servers to determine if the client at the end of the IPX session is still alive.

Default: [60 sec]

```
Enter :
    time in seconds (from 10 to 600)
>
```

5 - IPX Retries

The IPX Retries option defines the number of unacknowledged fake IPX watchdog messages that this DI-1132 will send before the IPX session is considered dead.

The IPX watchdog messages are used by servers to determine if the client at the end of the IPX session is still alive.

Default: [10]

```
Enter :
    Number of retries (from 5 to 100)
>
```

6 - IPX Aging

The IPX Aging option defines the amount of idle time in seconds that the DI-1132 will wait before the IPX session is aged out and considered dead. The aging timer starts counting when there is no session traffic.

When an IPX session has been aged out and the DI-1132 then receives a watchdog for that session, the DI-1132 will simply ignore the watchdog.

The IPX watchdog messages are used by servers to determine if the client at the end of the IPX session is still alive.

Default: [86400 sec]

```
Enter :
    time in seconds (from 60 to 604800), off
>
```

BACP Set-Up Menu

```
        EDIT REMOTE SITE PROTOCOL SET-UP BACP SET-UP MENU

   Option              Value         Description
1. BACP                [enable]    - Enable/disable BACP operation
2. Call mode           [local]     - Device to initiate second call
3. Request number      [disabled]  - Partner provides second call number




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **BACP PARAMETERS MENU** allows you to activate the BACP (Bandwidth Allocation Control Protocol) and set the call conditions used.

1 - BACP

The BACP option enables or disables the BACP for the secondary link. The parameters to add or drop the secondary link are set at the Secondary Link Activation Menu.

2 - Call Mode

The Call Mode option toggles between local and partner modes. Call mode allows you to set where the call to bring up the secondary link will originate from, so that all connections may be made from one router for centralized billing.

In local mode, this DI-1132 will initiate an outgoing call back to the remote site to re-establish the link.

In partner mode, this DI-1132 will send a request to the other router (via the primary link) to bring up the link from that end.

3 - Request Number

The Request Number option is functional when BACP is in local mode. When enabled, the acknowledge message from this DI-1132 tells the partner remote site router that its ISDN number does not need to be sent (it is in the lookup table already). If disabled, the partner remote site ISDN number is requested.

Security Parameters Menu

```
              EDIT REMOTE SITE SECURITY PARAMETERS MENU

     Option                    Value             Description
  1. Incoming PAP password  [none]          - Set incoming PAP password
  2. Incoming CHAP secret   [none]          - Set incoming CHAP secret
  3. Outgoing user name     "DEV050607"     - Set outgoing user name
  4. Outgoing PAP password  [none]          - Set outgoing PAP password
  5. Outgoing CHAP secret   [none]          - Set outgoing CHAP secret



Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **EDIT REMOTE SITE SECURITY PARAMETERS MENU** allows you to set outgoing and incoming password data and an outgoing user name for PPP security on the connection to this remote site router.

1 - Incoming PAP password

The Incoming PAP Password option defines the PAP password that this Orbiter PPP router expects to receive from the remote site PPP router in responce to authentication requests from this router.

Default: [none]

2 - Incoming CHAP secret

The Incoming CHAP Secret option defines the CHAP secret that this Orbiter PPP router expects to receive from the remote site PPP router in responce to authentication requests from this router.

Default: [none]

3 - Outgoing user name

The Outgoing User Name option defines the user name that this DI-1132 PPP router will be sending to the remote site PPP router when responding to authentication requests from the remote site PPP router. The outgoing user name defaults to the device name. If the device name is changed, all remote sites are searched and any remote site whose outgoing user name matches the old device name will be updated to use the new device name.

The outgoing user name must be defined the same as the user name defined in the PPP security settings for the remote site router.

The outgoing user name is case sensitive and may consist of 1 to 32 alphanumeric characters. Use the underscore character instead of a space character.

Default: [*] Default device name

4 - Outgoing PAP password

The Outgoing PAP Password option defines the PAP password that this Orbiter PPP will use when responding to authentication requests from the remote site PPP router.

Default: [none]

5 - Outgoing CHAP secret

The Outgoing CHAP Secret option defines the CHAP secret that this Orbiter PPP will use when responding to authentication requests from the remote site PPP router.

Default: [none]

Security Set-Up Menu

```
                       SECURITY SET-UP MENU

    Option                   Value                Description
 1. Security level          [none]              - Set security protocol
 2. Request security        [incoming-only] - Set security operation
 3. CHAP challenges         [once]              - CHAP Authentication
 4. CallerID security       [disabled]      - Enable/disable CallerID security


Enter option number, "=" – main menu, <TAB> - previous menu

>
```

The **SECURITY SET-UP MENU** allows the display and configuration of the security database as well as the outgoing PPP security options for this router.

1 - Security Level

The Security Level option defines the type of PPP security to use for incoming ISDN calls. When a security level is set, the DI-1132 will always require authentication on incoming ISDN calls. The DI-1132 will ask for authentication on outgoing calls when a security request is set to always (see below).

Default: [none]

Choices: none, PAP, CHAP

2 - Request security

This specifies when the remote site router should be requested to authenticate:

   - always (when this router makes an outgoing call OR receive an incoming call)
   - incoming_only (ONLY when this router receives an incoming call)

Default: [incoming only]

Choices: always, incoming only

3 - CHAP Challenges

The CHAP Challenges option defines the frequency of CHAP challenges that this DI-1132 PPP router will require when authenticating a remote site PPP router.

Default: [once]

Choices: once, continuous

4 - CallerID Security

The CallerID Security option enables or disables the use of incoming callerID information to do a security check for valid devices. This option may be used to refuse incoming ISDN calls from routers located at an unknown site. Incoming callerID information received is matched against the ISDN number, alternate ISDN number, and wildcard values of each remote site profile. If a match is not found after checking each of the three numbers in each of the remote site profiles, the incoming ISDN call will be ignored.

The CallerID Security option must only be enabled on an DI-1132 that is connected to an ISDN service that provides callerID functions. This option is only applicable to incoming data calls.

When this option is set to enabled, this DI-1132 will ignore any incoming ISDN call that does not provide callerID information or the callerID information does not match one of the configured values.

Default: [disabled]

PPP Set-Up Menu

```
                         PPP SET-UP MENU

     Option                  Value           Description
  1. Advanced PPP set-up     menu          - Configure advanced PPP parameters
  2. Restart timer          [3000 msec]    - Set restart timer
  3. Configure count        [10]           - Set configure count
  4. Failure count          [5]            - Set failure count
  5. Terminate count        [2]            - Set terminate count




 Enter option number, "=" - main menu, <TAB> - previous menu

 >
```

The **PPP SET-UP MENU** provides for general PPP circuit parameter set-up. The parameters configurable from this menu are used during LCP (Link Control Protocol) negotiations with a remote site PPP router. This DI-1132 PPP router will request the configuration parameters defined here when initiating a PPP connection to a remote site PPP router.

When negotiating the LCP parameters for incoming PPP connections initiated by the remote site PPP router, this DI-1132 will use these values as defaults but will accept a request for different values from the remote site PPP router.

If any of these LCP configuration parameters are required to be of a known value for a particular PPP connection, the parameters should be set to the same values on the routers on each end of the PPP link.

1 - Advanced PPP Set-Up

The Advanced PPP Set-up option takes you to the Advanced PPP Set-Up Menu. Here you set the advanced LCP parameters such as field compression, Quality protocol, and the type of multilink sequencing.

2 - Restart Timer

The Restart Timer option specifies the time between retransmissions of Configure Request or Terminate Request packets. When attempting to establish a PPP link connection, if the Restart Timer expires before a response is received for a Configure Request, another Configure Request will be sent.

Default: [3000 msec]

Range: 50 to 20000 msec

3 - Configure Count

The Configure Count option specifies the number of Configure Request packets that will be sent without receiving a valid Configure Ack, Configure Nak, or Configure Reject packet. If a valid response packet is not received within the count specified, it is assumed that the peer PPP router is unable to respond.

Default: [10]

Range: 1 to 100

4 - Failure Count

The Failure Count option specifies the number of Configure Nak packets that will be sent without sending a Configure Ack before assuming that the configurations requested are not converging. A Configure Nak packet is sent when one of the PPP routers wishes to negotiate the particular LCP parameter to be a different value than the one proposed by the initiating PPP router.

Default: [5]

Range: 1 to 100

5 - Terminate Count

The Terminate Count option specifies the number of Terminate Request packets that will be sent without receiving a Terminate Ack before assuming that the peer PPP router is unable to respond.

Default: [2]

Range: 1 to 10

Advanced PPP Set-Up Menu

```
                      ADVANCED PPP SET-UP MENU

    Option                 Value              Description
 1. ACFC                [enabled]        - Address/control field compression
 2. PFC                 [disabled]       - Protocol field compression
 3. Echo monitoring     [enabled]        - Allow echo monitoring of link
 4. Quality protocol    [disabled]       - Set quality protocol
 5. Quality interval    [10 sec]         - Set quality interval
 6. MP encapsulation    [enabled]        - Use MP headers for NCP negotiation
 7. MP sequencing       [normal]         - Set multilink sequence numbers
 8. MP discriminator    [MAC_address]    - Set multilink endpoint discriminator
 9. MP minimum          [50]             - Set minimum fragmentation size




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **ADVANCED PPP SET-UP MENU** provides for more advanced PPP circuit parameter set-up. The parameters configurable from this menu are used during LCP (Link Control Protocol) negotiations with a remote site PPP router. This DI-1132 PPP router will request the configuration parameters defined here when initiating a PPP connection to a remote site PPP router.

When negotiating the LCP parameters for incoming PPP connections initiated by the remote site PPP router, this DI-1132 will use these values as defaults but will accept a request for different values from the remote site PPP router.

If any of these LCP configuration parameters are required to be of a known value for a particular PPP connection, the parameters should be set to the same values on the routers on each end of the PPP link.

1 - ACFC

The ACFC (Address/Control Field Compression) option determines if this DI-1132 PPP router will request Address and Control Field Compression on the link that is established to the peer PPP router.

Default: [enabled]

2 - PFC

The PFC (Protocol Field Compression) option determines if this DI-1132 PPP router will request Protocol Field Compression on the link that is established to the peer PPP router.

Default: [disabled]

3 - Echo Monitoring

The Echo Monitoring option determines if this DI-1132 PPP router will generate Echo-Request messages on the link that is established to the peer PPP router. Echo monitoring is used to help debug a link and verify data transmission. A change to the Echo Monitoring state will take effect the next time the link starts.

Default: [enabled]

4 - Quality Protocol

The Quality Protocol option determines if this DI-1132 PPP router will request Link Quality Protocol monitoring on the link that is established to the peer PPP router.

Default: [disabled]

5 - Quality Interval

The Quality Interval option specifies the time interval between Link Quality Report packets that are generated and sent to the peer PPP router.

Default: [10 sec]

Range: 1 to 60 seconds

6 - MP Encapsulation

The MP Encapsulation option when set to enabled, specifies that the NCP negotiation messages are encapsulated within the Multilink header. When set to disabled, the NCP messages are not encapsulated within the Multilink frames.

Default: [enabled]

7 - MP Sequencing

The MP Sequencing option specifies the size of the Multilink sequencing number used in the Multilink header during frame transmission. A setting of normal will use a 4 byte sequencing number and a setting of short will use a 2 byte sequencing number.

Default: [normal]

Choices: normal, short

Considerations:

When connecting to a Combinet PPP device, the MP Sequencing should always be set to short.

8 - MP Discriminator

The MP Discriminator option specifies the type of identification used to identify this DI-1132 PPP router during a Multilink connection. The MP Discriminator allows the remote site PPP router to uniquely identify this Multilink link when it requests establishment.

Default: [MAC_address]

Choices: MAC_address, IP_address, directory_number

9 - MP Minimum

The MP Minimum option specifies the minimum size of PPP frame that will not be fragmented when sent to the remote site PPP router. PPP frames equal or larger than this value will be fragmented across the links in a Multilink connection. A value of zero causes all inter-router frames to be fragmented.

Default: [50]

Range: 0 to 1600

IP Address Connect Menu

```
                    IP ADDRESS CONNECT MENU

   Option                      Value          Description
 1. Edit IP address entry                     - Modify/add IP address entry
 2. IP address connect      [disabled]    - Activate IP address connect
 3. Show IP address entries                   - Display IP address entries
 4. Remove IP address entry                   - Delete IP address entry




Enter option number, "=" – main menu, <TAB> - previous menu

>
```

The **IP ADDRESS CONNECT MENU** allows the display and configuration of the IP Address Connect table entries. IP Address Connect is used to establish ISDN calls to specific remote sites based on specific destination IP addresses.

1 - Edit IP Address Entry

The Edit IP Address Entry option allows the definition of an entry in the IP Address Connect table. The IP Address connect table allows this DI-1132 to establish a PPP ISDN call to a specific remote site PPP router when IP traffic destined for a specific IP network is received from the local LAN. The IP addresses in the table are searched sequentially according to entry id number.

An entry of the IP address 0.0.0.0 causes any IP traffic to initiate a call to the specified remote site. Adding one of these default entries to the end of the table, e.g. id number 40, causes all IP traffic for destinations not listed in the address connect table to be sent to this default entry. Having this default entry at the end of the table causes all other entries to be checked first and then the remaining IP traffic will cause a connection to this default remote site.

To change any of the values of an entry that already exists, simply re-enter the values and substitute the new values where appropriate.

```
Enter :
    Set the IP address connect entry id (from 1 to 40)

>

Enter :
    Set the IP Address (up to 15 characters)

>

Enter :
    Size of subnet mask (from 1 to 32)

>

Enter :
    Remote site alias or id (up to 16 characters), none

>
```

2 - IP Address Connect

The IP Address Connect option enables or disables the IP Address connect operation of the router. When IP Address Connect is enabled, all IP traffic on the local LAN is checked against the IP routing table. If the IP address is not present in the IP routing table, the address is checked in the IP Address Connect table.

Default: [disabled]

3 - Show IP Address Entries

The Show IP Address Entries option displays all of the IP addresses and their corresponding remote site profile alias currently in the IP Address connect table. There may be up to 40 IP network addresses defined in the table.

```
  ID   IP Address        Subnet Mask Size   Subnet Mask       Remote Site
  --   ---------------   ----------------   ---------------   ----------------
   1   12.12.12.12                     1    128.0.0.0         Vancouver

Type: [s] to redraw, [=] main menu, any other key to end.
```

ID: Entry number in the IP Address Connect table.

IP Address: Network IP address of the remote network or device.

Subnet Mask Size: IP address mask size defined

Subnet Mask: IP address mask created from the mask size defined. The mask is used to allow all IP addresses of a destination IP network to apply to the Address connect function.

Remote Site: Remote site profile entry to be used to call a remote partner DI-1132 when IP traffic destined for the IP address is seen on the local LAN.

4 - Remove IP Address Entry

The Remove IP Address Entry option allows you to remove a selected IP Address Connect entry from the database. The entries may be removed individually by using the index number or all at once.

```
Enter :
    all, id

>
```

Bridging Set-Up Menu

```
                       BRIDGING SET-UP MENU

   Option                   Value           Description
1. Spanning tree            menu          - Configure STP communications
2. Bridge forwarding        [enabled]     - Enable/disable bridge forwarding
3. Bridge aging timer       [300 sec]     - Set MAC address aging interval
4. Show bridging table                    - View MAC address table
5. Show permanent table                   - View permanent addresses only
6. Clear bridging table                   - Delete all non-permanent entries


Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **BRIDGING SET-UP MENU** provides access to management of the bridge/router frame-routing functions. These include Spanning Tree settings, management of the address tables, and adjustment of the aging timer.

1 - Spanning Tree

The Spanning Tree option directs you to the Spanning Tree Menu, where parameters of the Spanning Tree Protocol for this bridge are set and viewed.

2 - Bridge Forwarding

The Bridge Forwarding option enables or disables the frame forwarding operation of the bridge.

Default: [enabled]

3 - Bridge Aging Timer

The Bridge Aging Timer option sets the interval after which unused, non-permanent entries are removed from the address table.

Default: [300 sec]

Range: off (disabled), 10 to 1,000,000 seconds.

Considerations:

Increasing the value of the bridge aging timer will remove unused entries less frequently. This will offer an increase in bridge performance, as the table will not be rebuilt as often when stations come on and off the LAN.

Decreasing the bridge aging timer will remove unused entries more frequently. This will cause the table to be rebuilt more often, which may, depending on the size of the network, consequently decrease bridge performance.

Balancing the bridge aging timer according to the size of the local LAN and the frequency of station usage and moves can assist in optimizing bridge performance. If a closely managed topology remains stable with high usage and few station additions or moves, it could be advantageous to initially let the bridge learn all station addresses and then increase or disable the aging timer. When a station addition/deletion or move occurs, the new location can be manually added to the table or the timer value can be temporarily reduced to learn the new change(s). In any case, learning never stops, and the new/moved station will be learned and added to the address table when encountered.

4 - Show Bridging Table

The Show Bridging Table option displays all addresses in the Bridge Filter Table, identifies the active/inactive and permanent/non-permanent addresses, identifies addresses to be filtered if they are a source and/or destination, describes their location, and gives the total number of address table entries.

```
                        ALL Known MAC Addresses
Total entries : 20

                           Filter If  WAN
Address            Active Perm Src  Dest Access Location
Start of table
01-80-c2-00-00-01                                      Internal
01-80-c2-00-00-02                                      Internal
01-80-c2-00-00-03                                      Internal
01-80-c2-00-00-04                                      Internal
01-80-c2-00-00-05                                      Internal
01-80-c2-00-00-06                                      Internal
01-80-c2-00-00-07                                      Internal
01-80-c2-00-00-08                                      Internal
01-80-c2-00-00-09                                      Internal
01-80-c2-00-00-0a                                      Internal
01-80-c2-00-00-0b                                      Internal
01-80-c2-00-00-0c                                      Internal
01-80-c2-00-00-0d                                      Internal
01-80-c2-00-00-0e                                      Internal
01-80-c2-00-00-0f                                      Internal
02-44-00-c8-9a-ff     *     *                *     LAN050607
02-44-00-c8-9a-ee     *                      *     LAN050607
12-34-56-78-99-99     *     *     *    *           LAN050607(fixed)
11-11-11-11-11-11                      *           unknown
ff-ff-ff-ff-ff-ff                                  Internal
end of table
```

Address

The sixteen addresses **01-80-c2-00-00-01** to **01-80-c2-00-00-0f** are reserved for future use in the 802.1d standard.

The address (**ff-ff-ff-ff-ff-ff**) is a permanent address that, in its default state (unknown), will not filter any frames. Only one choice—Filter if Destination is available for this broadcast address. If applied, this will prevent broadcast frames from being put onto the LAN the bridge is connected to.

The address (**12-34-56-78-99-99**) is an active, permanent address that resides on LAN050607 (in this example, this is the LAN the bridge is attached to). Frames to and from this address will not cross the bridge, since they are identified as both filter-if-destination and filter-if-source. The "(fixed)" descriptor is added when the location of the address has been identified by management action.

The address (**11-11-11-11-11-11**) is an inactive, permanent address with a currently unknown location. Frames to this address will not cross the bridge, since they are identified as filter-if-destination. Note that this address should be made permanent, because if it is not encountered within the aging-timer interval it will be removed from the table.

The address (**02-44-00-c8-9a-ff**) is an active, permanent address that resides on LAN050607 and is allowed to transmit data on the ISDN WAN connection. This address is marked permanent because the operator enabled the permanent option within the Edit MAC Address menu of the MAC Address Filters menu.

The address (**02-44-00-c8-9a-ee**) is an active address that resides on LAN050607 and is allowed to transmit data on the ISDN WAN connection. Since this address is marked as having WAN access but not marked as permanent, this indicates that this address has been learned from the local LAN and assigned to have WAN access because it was one of the first 10 addresses encountered.

Active

A * in the Active column indicates the address is active. An address is considered active if it has been encountered within the aging-timer interval. Permanent addresses are not subject to the aging timer, but will be reported as active if they are encountered.

Perm

A * in the Perm column indicates the address is permanent. An address is considered permanent if it has been identified as such by the bridge manager. Permanent addresses are not subject to the aging timer, but will be reported as active if they are encountered.

Filter if Src

This indicates that a bridge/router manager has specified that frames having this source address will be filtered.

Filter if Dest

This indicates that a bridge/router manager has specified that frames having this destination address will be filtered.

Filter if Src / Dest

This indicates that a bridge/router manager has specified that frames having this source or destination address will be filtered. (This station can neither send data across the bridge/router, nor receive data from across the bridge/router.)

WAN Access

This indicates that the LAN device with this MAC address is one of the 10 addresses that are allowed to pass data over the ISDN WAN connection to the remote site.

Location

Internal

These are the STP Multicast and LAN port MAC addresses located (internal) to the bridge/router itself. Note that the bridge/router's MAC address is used for the default bridge/router and LAN names. Partner bridge/routers MAC addresses will also be listed as internal. Internal addresses are not subject to the aging timer, but will be reported as active if they are encountered.

LANxxxxxx (unknown)

These addresses are identified as to their location on a specific LAN, or as an (unknown) location. Their LAN location is identified either by manual entry or through the Learning Process when encountered.

5 - Show Permanent Table

The Show Permanent Table option displays all of the permanent filter-table addresses entered by the bridge/router manager for which the locations were identified (Internal addresses are not displayed.) The "(fixed)" Location descriptor indicates that a manager made the entry and specified the LAN location.

```
                    Operator Defined MAC Addresses
                         Filter if  WAN
Address            Active Perm Src  Dest Access Location
Start of table
02-44-00-c8-9a-ff     *      *                *    LAN050607
12-34-56-78-99-99     *      *   *      *          LAN050607(fixed)
End of table
```

6 - Clear Bridging Table

The Clear Bridging Table option removes all non-permanent filter table addresses.

<u>Considerations</u>:

To prevent accidental removal of all non-permanent addresses, this option must be confirmed by entering "yes" at the prompt. (Refuse by entering "no" or use the TAB key to back out).

Spanning Tree Menu

```
                       SPANNING TREE MENU

     Option                 Value            Description
 1.  LAN port               menu           - Define port specific options
 2.  STP state              [enabled]      - Enable/disable Spanning Tree Protocol
 3.  Bridge priority        [32768]        - Define root bridge selection priority
 4.  Forwarding delay       [15 sec]       - Set delay before forwarding begins
 5.  Message age timer      [20 sec]       - Receive hello message interval
 6.  Hello time             [2 sec]        - Set hello message transmission interval
 7.  Show bridge                           - View bridge STP status
 8.  Show ports                            - View STP port status



 Enter option number, "=" – main menu, <TAB> - previous menu

 >
```

The **SPANNING TREE MENU** allows the management and display of the 802.1D Spanning Tree Protocol (STP) parameters.

1 - LAN Port

The LAN Port option directs you to the LAN Port Menu where STP Port parameters are set.

> NOTE: For remote bridge/routers in a WAN, the following values set on one bridge/router will be automatically set the same on all other remote bridge/routers in the WAN. (This is because all remote bridge/routers function together as one unified bridge).
>
> STP state — Option 2   Maximum age — Option 6
> Bridge Priority — Option 3   Hello time — Option 7
> Forwarding delay — Option 4
>
> If these values are set differently upon start-up, the values set on the bridge/router with the lowest MAC address will prevail.

2 - STP State

The STP State option toggles between the [enabled] / [disabled] states of the Spanning Tree Protocol for the bridge.

Considerations:

STP needs to be [enabled] only if a known or potential loop is probable in the network.

If the Spanning Tree Protocol is to be [disabled], Options 1, 3, and 5 - 8 have no relevance. Note that Option 4 (Forwarding Delay) is used as the Learning timer in a non-STP configuration.

The default state for STP is **disabled**.

3 - Bridge Priority

The Bridge Priority option specifies the bridge's priority for becoming the *Root Bridge*. The bridge with the lowest bridge priority is elected to be the Root Bridge.

Default: [32768] * (IEEE 802.1D recommendation)

Range: 0 to 65535

Considerations:

* This value is the first part of the Bridge ID   For example: 32768-0000d0111111

If you want the bridges to decide among themselves which is to be the Root bridge, then set all bridges' bridge priorities to the IEEE 802.1D default 32768. In this instance, with all bridge priorities being the same, the bridge with the lowest MAC address will be chosen as the Root Bridge.

Lower Value

If you want this bridge to become the Root Bridge, then set this number to be lower than the other bridges in the network.

Higher Value

If you want this bridge to become blocked (become the standby bridge where a redundant path exists), then set this number higher than the other bridge(s) competing to be the *designated bridge* for a LAN.

4 - Forwarding Delay

During a change in topology, the Forwarding Delay value specifies the time the bridge will wait in each of the *Listening* and *Learning States* before forwarding of frames begins.

In the *Listening State,* the bridge "listens" for the other bridges' topology and configuration information. (Non-permanent addresses are aged-out and cleared from the address table before the *Learning State* is entered.)

In the *Learning State,* the bridge learns the addresses of as many stations as possible, so when entering the *Forwarding State* it avoids flooding the network with packets destined for unknown addresses.

During the Listening and Learning State intervals, forwarding is blocked although during the Learning State, learned station information is included in the address table.

Default: [15 sec] (IEEE 802.1D recommendation)

Range: 4 to 30 seconds

Considerations:

The Forwarding Delay time of the bridge is applicable only if the bridge is, or becomes, the Root bridge, since the Root values override a non-root's Forwarding delay time value. The Root value is known as the Network Forward(ing) Delay.

Lower Value
If this bridge is the Root, or becomes the Root, setting the Forwarding Delay to a lower value might cause the network to flood with packets destined for addresses not yet learned. During the *Listening State*, the Root Bridge might also miss another bridge's information about a *Topology Change* if the Forwarding Delay is set too low.

Higher Value

Setting the value higher will increase the time spent in each of the *Listening and Learning States* when a reconfiguration is under way. A higher value will increase the time the network is unavailable for use during reconfiguration.

Recommendations:

The default value of 15 seconds is recommended by the IEEE 802.1D standard as a reasonable balance of performance. If a change is deemed necessary, increasing the value in consideration with Message (Max) Age is the recommended course of action.

The following relationship to Message (Max) Age must be maintained:
2 x (fwd_delay - 1.0) _ max_age   default: 28 _ 20

5 - Message Age Timer

The Message Age Timer option specifies the length of time stored protocol information is considered valid. If a non-root bridge hasn't received protocol confirmation from the Root within this interval, it will broadcast to the other bridges that the topology has changed, and a reconfiguration calculation will be performed.

Default: [20 sec] (IEEE 802.1D recommendation)

Range: 6 to 40 seconds

Considerations:

The Maximum Age of the bridged network is set by the Root Bridge. If a reconfiguration of the bridged network occurs and this bridge becomes the Root, the value set at this bridge becomes the Network's value.

Lower Value

A much lowered Maximum Age value may cause more frequent reconfigurations of the bridged network (even if not necessary) if configuration information is delayed. A slightly lower value may trigger a reconfiguration more quickly should a bridge fail or a management action requests a change.

Higher Value

A higher Maximum Age value will allow more time for confirmation of the network configuration. This could be beneficial if delays are introduced and the network is frequently "going down" for unnecessary reconfigurations.

Recommendations:

The default value of 20 seconds is recommended by the IEEE 802.1D standard as a reasonable balance of performance. If a change is deemed necessary, increasing the value in consideration with Forwarding Delay and Hello Time is the recommended course of action.

The following relationship to Forwarding Delay must be maintained:
2 x (fwd_delay - 1.0) _ max_age   default: 28 _ 20

The following relationship to Hello Time must be maintained:
Max Age _ 2x (Hello Time + 1.0)   default: 20 _ 6

6 - Hello Time

The Hello Time option specifies the interval between the transmission of protocol configuration information by a bridge that is, or is attempting to become, the Root. In the Spanning Tree Protocol, only one bridge can be the Root Bridge. The Root Bridge generates a Configuration message after an interval set by this timer. (The Root is saying, "Hello, I'm still here".) All other bridges in the network wait for this Configuration message within the Network Hello Time to confirm that the topology is stable. If any bridge does not receive the Configuration message within the expected time, it will send out Topology Change messages to the other bridges in order to calculate a new configuration.

Default: [2 sec] (IEEE 802.1D recommendation)

Range: 1 to 10 seconds

<u>**Considerations**</u>**:**

This value is not directly used in configuration calculations but the bridged network uses the value set at the Root Bridge. (I.e. Network Hello Time).

Lower Value

Reducing this value increases the frequency of Configuration messages on the network, potentially creating excessive network traffic.

Higher Value

A higher value results in a slower response to a change in the topology of the network (e.g. addition/deletion/failure of bridges or communications paths).

Recommendations:

The default value of 2 seconds is recommended by the IEEE 802.1D standard as a reasonable balance of performance. If a change is deemed necessary, increasing the value in small steps is the recommended action.

The following relationship to Max Age must be maintained:
Max Age _ 2 x (Hello Time + 1.0)   default: **20 _ 6**

7 - Show Bridge

The Show Bridge option displays the Spanning Tree Protocol status of the bridge. The display of a Root bridge is shown below:

```
Bridge Status

Spanning Tree Protocol : Enabled
Bridge ID              : 32768-0000d0010101
Topology change        : 0
Designated Root        : 32768-0000d0010101
Root path cost         : 0
Root port              : None
Network Forward delay  : 15 seconds
Network Max age        : 20 seconds
Network Hello time     : 2 seconds
Bridge Forward delay   : 15 seconds
Bridge Max age         : 20 seconds
Bridge Hello time      : 2 seconds
```

Spanning Tree Protocol : Enabled

Indicates whether the Spanning Tree Protocol is Enabled or Disabled.

Bridge ID : 32768-0000d0010101
Designated Root : 32768-0000d0010101

The first part of each string indicates the (default) decimal Bridge Priority (32768). Refer to Option 4.

The remaining part of the string is the MAC address of the bridge and of the Root Bridge respectively.

If the Bridge ID string is identical to the Designated Root (bridge) string, then this bridge is the Root Bridge.

The Designated Root is the bridge sending/receiving frames to/from the attached LAN towards the Root Bridge.

Topology change : 0

If the topology is stable, this value is 0.
If the topology is changing, this value is 1.

Root path cost : 0
Root port : None

If this bridge is the Root Bridge, the Root path cost is 0 and the Root port value is None, as shown in the above display.

If this bridge is a non-root bridge, the cost is determined by the sum of this bridge's path costs leading to the Root Bridge.

The Root port of a non-root bridge is the port closest to the Root Bridge. It sends and receives protocol messages to/from the bridge and the Root Bridge. If this bridge is not the Root Bridge, the Root Port value will be in the format 0x8001. The "0x" is an indicator that the values to follow are in hex. Following the "0x" is the hex value of the decimal Port Priority. (The default Port priority of decimal 128 yields a hex value of 80.) Following the hex value is the port number (01). Default port priority values therefore yield a Root port value of 0x8001.

Network Forward delay	**:**	**15 seconds ****	
Network Max age	**:**	**20 seconds ****	
Network Hello time	**:**	**2 seconds ****	

<div align="center">*******</div>

Bridge Forward delay	**:**	**15 seconds ***	
Bridge Max age	**:**	**20 seconds ***	
Bridge Hello time	**:**	**2 seconds ***	

*   These parameters are defined at each bridge with Options 4, 5, and 6.

**   These parameters are defined by the Root bridge.

*** If this bridge is the Root bridge, corresponding parameters will be the same. If it is not the Root Bridge, these values may differ. (It is very possible that these values can be the same if this is not the Root Bridge, since these are the values recommended by the IEEE 802.1D standard. Check and compare the Bridge ID to the Root ID for confirmation of the Root.)

8 - Show Ports

The Show Ports option displays the status of this bridge's STP ports.

```
Port Status Summary


                                        Designated       Designated
                                          Bridge            Port
  Name             State    Id Pri  Cost  Address     Pri  Id Pri  Cost
  ---------------- -------- --- --- ----- ------------ ----- --- --- -----
  LAN              Forward   1 128 100        Self          Self
  SITE2            Forward  44 128 100  020304050607 32768  44 128     0
```

Name

The **Name** column shows either the name of the STP port. LAN for the local LAN, or the remote site profile alias name for a properly connected remote site device.

State

The **State** column indicates the current port states that may be Disabled (by management action); or either Listen(ing), Learn(ing), Forward(ing) or Block(ing) (by STP action).

ID

In the above display, there are two indicators of the LAN port identifying numbers. They are found under the **ID** columns. They may not fall in order, as the listing is based on the MAC address of each bridge.

Cost

The **Cost** columns indicate the contributing cost of each port's path to the Root Path Cost.

Designated Bridge

If "self" is listed, then the bridge is the designated bridge for the LAN it is attached to.

Address

This is the MAC address for the designated bridge attached to the specified LAN.

Priority

This is the port priority given to the designated bridge.

Designated Port

ID

This is the Port ID number.

Priority

This is the priority of the Designated Port.

Cost

If this is the Root Port, the priority is 0.

LAN Port Menu

```
                        LAN PORT MENU

     Option        Value          Description
  1. State        [enabled]    - Enable/disable LAN port
  2. Path cost    [100]        - Define network cost for port
  3. Priority     [128]        - Set port priority




 Enter option number, "=" - main menu, <TAB> - previous menu


 >
```

The **LAN PORT MENU** allows the management of the port's state, path cost, and priority.

1 - State

The State option toggles between Enabling and Disabling of the Spanning Tree Protocol for the LAN port.

Considerations:

When the port is [enabled] the states are reported as either Listen(ing), Learn(ing), Forward(ing) or Block(ing). If the port is <u>disconnected</u>, "Disabled" is shown in the Show Ports display (even if the state is enabled).

When the port is [disabled], it does not participate in frame relay or the learning process. Also, when [disabled] the port is not included in the STP topology calculations and will not be activated by the STP should it be needed to take over from a failed bridge.

2 - Path Cost

The Path Cost option allows the setting of the contributing path cost to the Root for this port.

Contribution of Path Cost to Root Path Cost:

The path cost to the Root Bridge is added to those path costs of other bridges along the same stream to the Root Bridge. The result is the Root Path Cost.

Once the Root Bridge is selected, a determination of which bridge(s) will become blocked where necessary is made. This determination is made by comparing the sum of the path costs (i.e. the Root Path Cost) to the Root Bridge. Where redundant paths exist, the bridge with the lowest Root Path Cost to the Root Bridge will become the *Designated Bridge* for the LAN. If all contending bridges' ports have the same Root Path Costs, then first their Bridge IDs (Priority/MAC address) and second their Port IDs (Port Priority) will be used as tiebreakers.

Default: [100]

Range: 1 to 65535

   <u>**Considerations**</u>**:**

   Increasing this value increases the total cost of the path to the Root Bridge. This may (depending on the topology) cause a bridge along the path to the Root bridge to be taken out of service and a blocked bridge to come into service.

   Decreasing the value may have the opposite effect.

3 - Priority

The Priority option allows the setting of the port priority. This value is entered in decimal format and appears in hex format in the Port ID/Designated Port identifier (as applicable) of the Port Status display.

Default: [128] (decimal)

Range: 0 - 255

   <u>**Considerations**</u>**:**

   Increasing this value lowers the probability of this port becoming the Root port to the Root bridge. Decreasing this value increases the probability.

IP Routing Set-Up Menu

```
                      IP ROUTING SET-UP MENU

   Option                  Value                  Description
 1. IP routes              menu                   - Modify/view routes
 2. IP routing             [enabled]              - Enable/disable IP router
 3. IP forwarding          [enabled]              - Enable/disable IP routing
 4. LAN routing protocol   [rip1_compatible]      - Define routing protocol
 5. LAN RIP mode           [both]                 - Define RIP send/receive mode
 6. LAN route cost         [0]                    - Cost added to route learned
 7. ARP proxy              [disabled]             - Support proxy-ARP




Enter option number, "=" - main menu, <TAB> - previous menu


>
```

The **IP ROUTING SET-UP MENU** allows the display and configuration of the IP Routing parameters for the router.

1 - IP Routes

The IP Routes option directs you to the IP Routes Menu, where the routing tables are displayed and changed.

2 - IP Routing

The IP Routing option enables or disables the IP routing functions of the router.

Default: [disabled]

Considerations:

When IP Routing is disabled, all learned RIP routes will be cleared from the routing table.

3 - IP Forwarding

The IP Forwarding option enables or disables the forwarding of IP traffic when IP routing is enabled. When the IP forwarding option is disabled, IP traffic across the WAN links will be blocked

Default: [disabled]

4 - LAN Routing Protocol

The LAN Routing Protocol option defines the type of IP routing protocol to be used on the LAN interface. The DI-1132 may be set up to use different types of IP routing protocols on each of it's interfaces: LAN and links.

When the routing protocol is defined as none, the DI-1132 will operate as an IP router but will NOT participate in the exchange of RIP messages between the other IP routers in the network. All IP routing is accomplished by using the static routes table. All routes within the network must be manually entered in the static routing table.

When the routing protocol is defined as rip1, the DI-1132 will operate as a RIP1 IP router. All routing information will be sent and received via broadcast RIP packets.

When the routing protocol is defined as rip1_compatible, the DI-1132 will operate as a RIP2 IP router in broadcast mode. All routing information will be sent via broadcast RIP2 packets. Routing information may be received as broadcast RIP1, broadcast RIP2, or multicast RIP2.

When the routing protocol is defined as rip2, the DI-1132 will operate as a RIP2 IP router. All routing information will be sent via multiast RIP2 packets. Routing information may be received as broadcast RIP2 or multicast RIP2.

Default: [rip1_compatible]

Choices: none, rip1, rip1_compatible, rip2

5 - LAN RIP Mode

The LAN RIP Mode option defines how this DI-1132 will participate in RIP IP routing messages on the LAN.

When the RIP mode is set to both, the DI-1132 will send and receive RIP routing messages on the LAN.

When the RIP mode is set to send_only, the DI-1132 will only send RIP routing messages on the LAN.

When the RIP mode is set to receive_only, the DI-1132 will only receive RIP routing messages on the LAN.

Default: [both]

Choices: both, send_only, receive_only

6 - LAN Route Cost

The LAN Route Cost option defines the amount of extra routing cost to add to routes learned from the LAN.

Default: [0]

7 - ARP Proxy

The DI-1132 Ethernet router will respond to ARP requests destined for other networks, from its local network, when this option is enabled. The DI-1132 will reply to any matching route in the routing table. The DI-1132 will also reply for a station that is supposed to be on the local LAN but is connected through a remote route in the routing table.

Default: [disabled]

IP Routes Menu

```
                          IP ROUTES MENU

   Option                 Value          Description
 1. Edit route            menu           - Modify a route in the table
 2. Show all routes                      - Display the route table
 3. Show static routes                   - Display only static routes
 4. Clear static routes                  - Remove all permanent entries






 Enter option number, "=" - main menu, <TAB> - previous menu

 >
```

The **IP ROUTES MENU** allows the display and configuration of the routing tables.

1 - Edit Route

The Edit Route option directs you to the Edit Route Menu where the routing tables are modified.

2 - Show All Routes

The Show All Routes option displays all of the routes currently in use by the router. The table is sorted by destination IP address. The default gateway, either learned or defined, will be displayed as "default route."

There is a maximum of 512 route entries allowed in the table.

```
                          All IP Routes
Total entries : 9
Destination       Mask     Next Hop      Remote Site              Route
IP Address        Size     IP Address    Config Connect  Cost  Age  Type
--Start of table--
default route       0  198.168.1.1         -       -      1    0   LOCAL
+default route      0  192.168.95.190      -       -     16   74   OTHER
190.190.190.0      25  190.190.190.190     -       -      1    0   LOCAL
192.168.95.176     28  192.168.95.190      -       2      2    0   RIP
192.168.95.190     32  192.168.95.190      2       2      2    0   CONNECT
198.169.1.0        24  198.169.1.150      LAN     LAN      1    0   DIRECT
198.169.1.150      32  198.169.1.150      INT     INT      1    0   DIRECT
--End of table--
```

Destination IP Address:	Network IP address of the remote network. Routes listed with a "+" indicate that these are secondary routes to the same destination network. If the main route goes away, the secondary route will be used.
Mask Size:	Subnet mask size defined for the route.
Next Hop IP Address:	IP address of the next hop router to use to reach the Destination IP Address.

Remote Site Config:	Remote site profile ID number configured to use for this route. When a remote site profile is used as the next hop in a static route, the ID number will be displayed here and the remote site profile alias will be displayed in the next hop IP address field. LAN indicates that this route is on the local LAN.
Remote Site Connect:	Remote site ID number that this route is currently using. LAN indicates that this route is on the local LAN.
Cost:	Number of hops to reach the Destination IP Address.
Age:	Actual cost to reach the Destination IP Address. Triggered RIP routes will be indicated as RIP routes with a constant age of 0.
Route Type:	Type of route used: RIP, LOCAL, CONNECT, DIRECT, or OTHER. LOCAL is used for static routes. CONNECT indicates the route is on a connected peer IP router on an unnumbered link. DIRECT indicates that the route is directly connected to one of the interfaces. This could also indicate the peer IP router of a numbered link.

3 - Show Static Routes

The Show Static Routes option displays all of the static routes currently in use by the router.

```
                        Static IP Routes
Destination      Mask     Next Hop      Remote Site                  Route
IP Address       Size     IP Address    Config Connect   Cost  Age   Type
--Start of table--
default route      0  198.168.1.1          -        -      1     0   LOCAL
190.190.190.0     25  190.190.190.190      -        -      1     0   LOCAL
192.168.95.190    32  192.168.95.190       2        2      2     0   CONNECT
198.169.1.0       24  198.169.1.150       LAN      LAN     1     0   DIRECT
198.169.1.150     32  198.169.1.150       INT      INT     1     0   DIRECT
--End of table--
```

4 - Clear Static Routes

The Clear Static Routes option clears all of the static routes from the routing table.

Edit Route Menu

```
                        EDIT ROUTE MENU

    Option            Value           Description
 1. Network mask   *[           ]   - The network mask for the route
 2. Status         *[           ]   - Is the address in the table
 3. Remote site    *[           ]   - Remote site alias of the next hop
 4. Next hop       *[           ]   - IP address of the next hop
 5. Type           *[           ]   - Type of route
 6. Cost            [           ]   - Cost to reach destination in hops
 7. Private         [           ]   - Do not advertise route
 8. Remove                         - Remove address from table




Enter:
    destination IP address (up to 15 characters)


> 192.3.44.0
```

The above display is the first level of the **EDIT ROUTE MENU**. The destination network IP address must be entered as well as the subnet mask size associated with the destination IP address. Once the destination network IP address and mask size have been entered, the next hop IP address or remote site ID/alias must be entered.

The menu title will change to indicate the destination IP network address and the subnet size that are being edited.

```
              EDIT ROUTE 192.3.44.0 / 24 199.2.5.12 MENU

    Option             Value                Description
 1. Network mask   *"255.255.255.0"    - The network mask for the route
 2. Status         *"Added"            - Is the address in the table
 3. Remote site    *"none"             - Remote site alias of the next hop
 4. Next hop       *"199.2.5.12"       - IP address of the next hop
 5. Type           *"LOCAL"            - Type of route
 6. Cost            [1]                 - Cost to reach destination in hops
 7. Private         [disabled]          - Do not advertise route
 8. Remove                              - Remove address from table




Enter option number, "=" – main menu, <TAB> - previous menu



>
```

NOTE: A Static Route will **NOT** be replaced with a RIP route, even if the cost is lower.

1 - Network Mask

The subnet mask for the destination IP network is calculated from the entered destination IP network address and the subnet size value. The resulting subnet mask is displayed here.

2 - Status

The Status option tells whether the address is "Present" or "Not Present" in the Routing Table. When the address is first entered, "Added" is the Status value.   The * beside the value indicates that this value is changed automatically as an address is added or deleted and cannot be manually redefined.

Default: * [Not Present]

3 - Remote Site

The Remote Site option defines the remote site profile ID or alias of the remote site router to be used to reach the destination IP address.

4 - Next Hop

The Next Hop option defines the IP address of the next-hop router to be used to reach the destination IP address.

5 - Type

The Type option displays the type of route. The route type may be either RIP or LOCAL. RIP is a learned route from the RIP updates on the network. LOCAL is a static route entered by the operator of the router.

6 - Cost

The Cost option defines the number of hops required to reach the destination IP address.

Default: [1]

Range: 1 - 15

7 - Private

The Private option when set to enabled causes the DI-1132 to not advertise this route in the RIP messages.

Default: [disabled]

8 - Remove

The Remove option removes the IP address from the routing table. If the route is a RIP route, the route may be re-learned by the next RIP route update from partner routers.

IPX Routing Set-Up Menu

```
                   IPX ROUTING SET-UP MENU

   Option                     Value          Description
 1. Static routes             menu           - Edit/display static routes
 2. Static services           menu           - Edit/display static services
 3. Configure LAN networks     menu           - Configure LAN network numbers
 4. IPX routing               [enabled]      - Enable/disable IPX router
 5. IPX forwarding            [enabled]      - Enable/disable IPX routing
 6. Local networks                           - Display local network connections.
 7. Show routes                              - Display the route table
 8. Show services                            - Display the service table
 9. Help                                     - Description of IPX routing




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **IPX ROUTING SET-UP MENU** allows the display and configuration of the IPX Routing parameters for the router.

1 - Static Routes

The Static Routes option directs you to the Static Routes Menu, where user defined IPX static routes are maintained.

2 - Static Services

The Static Services option directs you to the Static Services Menu, where user defined IPX static services are maintained.

3 - Configure LAN Networks

The Configure LAN Networks option directs you to the Configure LAN Networks Menu, where network numbers may be assigned for the four frame types supported by this router.

4 - IPX Routing

The IPX Routing option enables or disables the IPX routing functions of the router.

Default: [enabled]

Considerations:

Routing information (RIP) will only be transmitted across the WAN to the partner router according to the state of the IPX DMR Enabled option within the IPX Parameters menu of the remote site profile used to establish a PPP connection. If demand RIP is enabled, RIP messages will only be transmitted when there is a change.

When IPX Routing is disabled, all learned RIP routes will be cleared from the routing table.

5 - IPX Forwarding

The IPX Forwarding option enables or disables the forwarding of IPX traffic when IPX routing is enabled. When the IPX forwarding option is disabled, IPX traffic across the WAN links will be blocked

Default: [enabled]

Considerations:

When IPX Forwarding is disabled all learned RIP routes will be cleared from the routing table.

6 - Local Networks

The Local Networks option displays all of the IPX network numbers currently in use by the router on each of its interfaces.

```
              LOCAL IPX NETWORKS

LAN Interface:
    Ethernet II          51524
    Raw 802.3            0
    IEEE 802.2           0
    802.2 Snap           0

WAN Interface:
    SITE2                14526
```

7 - Show Routes

The Show Routes option displays all of the learned IPX routes currently in use by the router.

There is a maximum of 512 route entries allowed in the table.

```
                   IPX Routes
Total entries : 7

 Network   Interface         Next Hop      Hops    Ticks
---------------------------------------------------------
 51524     local                local       0         1
 126       lan           205204239749       2        50
 14526     SITE2         992400423941       2        50
```

Network:	IPX Network Address of the remote network.
Interface:	Interface that the IPX network is located on; either local, LAN or remote site router.
Next Hop:	IPX address of the next-hop router to use to reach the Destination IPX Network.
Hops:	Number of hops to reach the Destination IPX Network.
Ticks:	Number of ticks to reach the Destination IPX Network.

Considerations:

A 9600-bps link on this router has a tick value of 5.

8 - Show Services

The Show Services option displays all of the Servers currently seen by the router. The Services table is created from information received by this router in SAP (Server Advertising Protocol) packets generated by Novell Servers.

There is a maximum of 512 server entries allowed in the table.

```
                       IPX Services
Total entries : 3
 Type       Server Address        Hops   Server Name
-------------------------------------------------
 0004  00000311:0000ff3a4001:0451   2   SQA_SERVER_311
 0004  00000312:00004ac38445:0451   6   NOVELL312
 0004  00000401:000e03448a32:0451   2   NOVELL_401
```

Type:	Novell Server types. Some possible Server types are:	

Unknown	0
Print Queue	3
File Server	4
Job Server	5
Print Server	7
Archive Server	9
Remote Bridge Server	24
Advertising Print Server	47

Server Address: IPX address of the Server.

Hops: Number of hops to reach the Server from this router.

Server Name: Name of the Server.

9 - Help

The Help option offers a brief description of the IPX routing options.

Static IPX Routes Menu

```
                        STATIC ROUTES MENU

   Option                    Value           Description
1. Edit route                menu          - Modify a route in the table
2. Convert route                           - Make a learned route static
3. Show static routes                      - Display static routes
4. Clear static routes                     - Remove groups of static routes






Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **STATIC IPX ROUTES MENU** allows the display and configuration of the static IPX routing tables.

1 - Edit Route

The Edit Route option directs you to the Edit Route Menu where the static IPX routing table entries are modified. A maximum of 50 static IPX routes may be defined.

2 - Convert Route

The Convert Route option is used to convert one of the currently learned IPX routes into an IPX static route. Enter the IPX network number of the learned route when prompted and then enter a static route id number. The learned IPX route will become a static IPX route.

```
Enter:
  network number

>


Enter:
  static route entry id
>
```

3 - Show Static Routes

The Show Static Routes option displays all of the static IPX routes currently in use by the router.

```
                        IPX Static Routes
  Total entries : 2

  ID   Network    Interface          Next Hop       Hops  Ticks
 ------------------------------------------------------------
 1     00000012   lan                000000012345   1        1
 2     00004143   SITE2              n/a            1        1
```

ID: Entry number in the static IPX routes table.

Network: IPX Network Address of the remote network.

Interface: Interface that the IPX network is located on, either LAN or remote site router.

Next Hop: IPX address of the next-hop router to use to reach the Destination IPX Network.

Hops: Number of hops to reach the Destination IPX Network.

Ticks: Number of ticks to reach the Destination IPX Network.

4 - Clear Static Routes

The Clear Static Routes option clears the specified static IPX routes from the routing table.

```
Enter:
  all, lan, remote site id or alias (up to 16 characters)
>
```

Edit Static IPX Route Menu

```
                        EDIT ROUTE MENU

    Option         Value          Description
 1. Status      *[         ]   - Is entry in static route table
 2. Network      [         ]   - Destination network number
 3. Interface    [         ]   - Interface to destination network
 4. Hops         [         ]   - Hops to destination network
 5. Ticks        [         ]   - Ticks to destination network




Enter:
     entry id (from 1 to 50)


>  1
```

The above display is the first level of the **EDIT ROUTE MENU**. The table id number must be entered to proceed to the next level.

The menu title will change to indicate the table id number that is being edited.

```
                      EDIT ROUTE 1 MENU

    Option          Value            Description
 1. Status      *"Not Present"   - Is entry in static route table
 2. Network      "0"             - Destination network number
 3. Interface    ""              - Interface to destination network
 4. Hops         [1]             - Hops to destination network
 5. Ticks        [1]             - Ticks to destination network






Enter option number, "=" - main menu, <TAB> - previous menu



>
```

NOTE: A Static Route will **NOT** be replaced with a RIP route, even if the hop and tick count is lower.

1 - Status

The Status option tells whether the static route is "Present" or "Not Present" in the Routing Table. When the route entry is first entered, "Not Present" is the Status value. The * beside the value indicates that this value is changed automatically as an entry is added or deleted and cannot be manually redefined.

Default: * [Not Present]

2 - Network

The Network option defines the destination IPX network address of the static route.

3 - Interface

The Interface option defines the interface, either LAN or remote site device, that the destination IPX network is located on. A value of LAN indicates that another IPX router located on the locally connected LAN is to be used to access the destination IPX network. When the interface is set to LAN, the option Next Hop will be available to define the MAC address of the router located on the locally connected LAN.

A value of a remote site profile name or id indicates that the destination IPX network is located on the remote site IPX router. The Next Hop option is not required and therefore not available when a remote site profile is defined for the interface.

4 - Next Hop

The Next Hop option defines the MAC address of the next-hop IPX router on the locally connected LAN to be used to reach the destination IPX network. The next-hop router must be on the local IPX network.

5 - Hops

The Hops option defines the number of hops to reach the destination IPX network.

Default: [1]

Range: 1 - 15

6 - Ticks

The Ticks option defines the number of ticks to reach the destination IPX network.

Default: [1]

Range: 1 - 64000

7 - Remove

The Remove option removes the IPX static route from the routing table.

Static IPX Services Menu

```
                        STATIC SERVICES MENU

     Option                    Value            Description
  1. Edit service              menu           - Edit a static service
  2. Convert service                          - Make a learned service static
  3. Show static services                     - Display the service table
  4. Clear static services                    - Remove groups of static services




  Enter option number, "=" - main menu, <TAB> - previous menu

  >
```

The **STATIC IPX SERVICES MENU** allows the display and configuration of the static IPX services.

1 - Edit Service

The Edit Service option directs you to the Edit Service Menu where the static IPX service entries are modified. A maximum of 50 static IPX services may be defined.

2 - Convert Service

The Convert Service option is used to convert one of the currently learned IPX services into an IPX static service. Enter the server name and service type of the learned service when prompted and then enter a static service id number. The learned IPX service will become a static IPX service.

```
Enter:
  server name

>


Enter:
  hex service type
>


Enter:
  static service entry id
>
```

3 - Show Static Services

The Show Static Services option displays all of the static IPX services currently in use by the router.

```
                           IPX Static Services
 Total entries : 2

 ID Interface         Type Server Address           Hops Server Name
--------------------------------------------------------------------
  1 lan               0017 00000002:000000015223:0000  0   Mars
```

ID: Entry number in the static IPX services table.

Interface: Interface that the IPX service is located on, either LAN or remote site router.

Type: Hex value of the type of IPX service.

Server Address: IPX Address of the server.

Hops: Number of hops to reach the server.

Server Name: Name of the server.

4 - Clear Static Services

The Clear Static Services option clears the specified static IPX services from the table.

```
Enter:
  all, lan, remote site id or alias (up to 16 characters)
>
```

Edit Static IPX Service Menu

```
                      EDIT SERVICE MENU

   Option           Value           Description
 1. Status        *[        ]    - Is entry in static route table
 2. Server name    [        ]    - Novell server name
 3. Service type   [        ]    - Novell service type
 4. Interface      [        ]    - Interface to service
 5. Network        [        ]    - Server's network number
 6. Node           [        ]    - Server's node number
 7. Socket         [        ]    - Service's socket number
 8. Hops           [        ]    - Hops to server



Enter:
    entry id (from 1 to 50)


> 1
```

The above display is the first level of the **EDIT SERVICE MENU**. The table id number must be entered to proceed to the next level.

The menu title will change to indicate the table id number that is being edited.

```
                      EDIT SERVICE 1 MENU

   Option            Value                   Description
 1. Status        *"Not Present"          - Is entry in static route table
 2. Server name    ""                     - Novell server name
 3. Service type   [0]                    - Novell service type
 4. Interface      ""                     - Interface to service
 5. Network        "0"                    - Server's network number
 6. Node           "00-00-00-00-00-00"    - Server's node number
 7. Socket         [0]                    - Service's socket number
 8. Hops           [0]                    - Hops to server




Enter option number, "=" - main menu, <TAB> - previous menu



>
```

NOTE: A Static Service will **NOT** be replaced with a SAP learned service, even if the hop count is lower.

1 - Status

The Status option tells whether the static service is "Present" or "Not Present" in the Table. When the service entry is first entered, "Not Present" is the Status value. The * beside the value indicates that this value is changed automatically as an entry is added or deleted and cannot be manually redefined.

Default: * [Not Present]

2 - Server Name

The Server Name option defines the IPX server name of the static service.

3 - Service Type

The Service Type option defines the type of IPX service as a hex value.

Default: [0]

Range: 0 - ffff

4 - Interface

The Interface option defines the interface, either LAN or remote site device, which the IPX service is located on. A value of LAN indicates that the service is located on the locally connected LAN.

A value of a remote site profile name or id indicates that the service is located on the remote site IPX router's network.

5 - Network

The Network option defines the IPX network address of the static service.

6 - Node

The Node option defines the IPX node address of the static service.

7 - Socket

The Socket option defines the socket number of the static service if applicable.

8 - Hops

The Hops option defines the number of hops to reach the IPX service.

Default: [0]

Range: 0 - 15

Configure LAN Networks Menu

```
                        CONFIGURE LAN NETWORKS MENU

     Option                Value          Description
  1. Ethernet-II frames   ”0”            - IPX network number
  2. RAW 802.3 frames     ”0”            - IPX network number
  3. IEEE 802.2 frames    ”0”            - IPX network number
  4. 802.2 SNAP frames    ”0”            - IPX network number
  5. Auto Learn           [enabled]      - Auto learn IPX network numbers
  6. Help                                - Description of IPX frame types




 Enter option number, “=“ – main menu, <TAB> – previous menu

 >
```

The **CONFIGURE LAN NETWORKS MENU** allows the configuration of the IPX network numbers on this router for each IPX frame type on the local LAN.

1 - Ethernet-II Frames
2 - RAW 802.3 Frames
3 - IEEE 802.2 Frames
4 - 802.2 SNAP Frames

A value of "0" indicates that the router will learn the network number associated with this frame type upon receiving the first IPX frame of this frame type.

Default: [0]

Range: 0 to FFFFFFFF hex

 Considerations:

Once an IPX network number is defined or learned, all further IPX frames of that frame type will use the network number. If a different network number is found for that frame type, the first network number defined or learned will continue to be used.

5 - Auto Learn

Enables or disables the auto learning of IPX network numbers for this IPX router. All IPX network numbers will be taken from the user defined values within options 1 through 4 in this menu.

Default: [enabled]

6 - Help

The Help option offers a brief description of the IPX frame types and network numbers.

Voice Set-Up Menu

```
                        VOICE SET-UP MENU

    Option                 Value          Description
 1. Country set-up          menu         - Set country specific parameters
 2. Directory number 1     [none]        - Phone 1 directory number
 3. Directory number 2     [none]        - Phone 2 directory number
 4. Phone 1 operation      [enabled]     - Enable/disable phone #1
 5. Phone 2 operation      [enabled]     - Enable/disable phone #2
 6. Data call preemption   [enabled]     - Allow data call preemption
 7. Binding                [disabled]    - Voice call link binding
 8. Multi Voice calls      [disabled]    - Allow Multiple Voice calls


Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **VOICE SET-UP MENU** allows the configuration of the two analog voice ports for the router.

1 - Country Set Up

The Country Set Up option allows you to select the country in which this router is installed. The country setting allows this router to properly ring the phone connected to the voice port when there is an incoming voice call.

Default: [Europe]

2 - Directory Number 1

The Directory Number 1 option defines the phone number of voice port number 1 on the back of this device. The two analog phone directory numbers must be unique.

On an ISDN switch type that requires the use of SPID numbers, this option is read only and the number is the same as the SPID 1 defined.

Default: [none]

3 - Directory Number 2

The Directory Number 2 option defines the phone number of voice port number 2 on the back of this device. The two analog phone directory numbers must be unique.

On an ISDN switch type that requires the use of SPID numbers, this option is read only and the number is the same as the SPID 2 defined.

Default: [none]

4 - Phone 1 Operation

The Phone 1 Operation option enables or disables voice port number 1 on the back of this device. When this voice port is disabled, any phone device attached to this port will not operate.

Default: [enabled]

5 - Phone 2 Operation

The Phone 2 Operation option enables or disables voice port number 2 on the back of this device. When this voice port is disabled, any phone device attached to this port will not operate.

Default: [enabled]

6 - Data Call Preemption

The Data Call Preemption option allows a second data connection to a multilink connected remote site router to be disconnected when a voice connection is required. When a multilink PPP connection is established to a remote site router, the second B-channel connection is being used for increased bandwidth for the data connection.

If an incoming voice call is received by this DI-1132 when Data Call Preemption is enabled, the data connection on the B-channel associated with that voice call will be disconnected and the incoming voice call will be accepted on that B-channel. The data call preemption also applies if the user at this location wishes to make a voice call and picks up the phone to dial out.

The preemption of the data B-channel connection will occur only when a multilink connection is made to one remote site router.

Default: [enabled]

7 - Binding

The Binding option enables or disables the binding of the voice ports to their associated B-channels. This option is only valid on an ISDN switch type that requires the use of SPID numbers, and is not available on all other switch types.

Binding is used to force the voice ports to use only the B-channel they correspond to. What this means is that when there is a data connection established on B-channel 1 and the phone on voice port 1 wishes to make a call, with binding enabled, the phone will only have a busy signal. With binding disabled, the DI-1132 will allow the phone on voice port 1 to use B-channel 2 to establish a connection when B-channel 1 is in use.

Binding is usually only required when the destination of the voice calls being placed requires the correct CLID (Calling Line ID) to be displayed. Because the second B-channel may be used when binding is disabled, the CLID may not be displayed properly on the destination end of the call.

Default: [disabled]

8 - Multi Voice Calls

The Multi Voice Calls option allows the DI-1132 to send or receive two simultaneous voice calls. Remember that when two voice calls are in progress, there are no B-channels available for use as a data connection.

Default: [disabled]

Country Set-up Menu

```
                        COUNTRY SET-UP MENU

   Option                 Value            Description
1. Display countries                       - Display countries supported
2. Select country         "Europe"         - Select country




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **Country Set-up Menu** screen allows you to select a listing of supported countries or to select the country in which the DI-1132 is to be installed.

1 - Display Countries

The Display Countries option will display a list of the countries with a ring format supported by this DI-1132.

```
Australia           61        Singapore         65
Austria             43        South Africa      27
Belgium             32        Spain             34
Canada-USA           1        Sweden            46
Denmark             45        Switzerland       41
Europe             999        United Kingdom    44
Finland            358        USA-Canada         1
France              39
Germany             49
Hong-Kong          852
Ireland            353
Italy               39
Japan               81
Luxembourg         352
Maylasia            60
Netherlands         31
Norway              47
Portugal           351
```

Default: [Europe]

2 - Select Country

The Select Country option lets you choose the ring format that the DI-1132 will send to the phone connected to the voice port when an incoming voice call is received. A selection may be made by entering either the country code or the name of the country. (Note: as Canada and the USA share the same country code and Canada comes first in the alphabetical listing, the name Canada-USA will be displayed if you select by number 1. To display USA-Canada, enter the name "USA-Canada")

The Europe option may be used as a "best of" setting that should work with the phones in most European countries, although it may not duplicate the ring used in a particular country.

Filter Set-Up Menu

```
                       FILTER SET-UP MENU

     Option                    Value          Description
  1. MAC address filters       menu           - Define MAC address filters
  2. Bridge pattern filters    menu           - Define bridge pattern filters
  3. IP router pattern filters menu           - Define IP pattern filters
  4. IPX router pattern filters menu          - Define IPX pattern filters




  Enter option number, "=" - main menu, <TAB> - previous menu


  >
```

The **FILTER SET-UP MENU** provides paths to Menus for complete filter configuration.

1 - MAC Address Filters

The MAC Address Filters option takes you to the MAC Address Filters Menu, where you can define parameters for Source MAC Filters.

2 - Bridge Pattern Filter

The Bridge Pattern Filter option takes you to the Bridge Pattern Filter Menu, where you can create bridge filters based on custom specifications.

3 - IP Router Pattern Filter

The IP Router Pattern Filter option takes you to the IP Router Pattern Filter Menu, where you can create IP filters based on custom specifications.

4 - IPX Router Pattern Filter

The IPX Router Pattern Filter takes you to the IPX Router Pattern Filter Menu, where you can create IPX filters based on custom specifications.

MAC Address Filters Menu

```
                    MAC ADDRESS FILTERS MENU

   Option                      Value          Description
1. Edit MAC address filter     menu         - Configure MAC address filter
2. Filter operation            [positive]   - Set operation of filters
3. Broadcast address           [forward]    - Filter MAC broadcast frames
4. Show bridging table                      - View MAC address table
5. Show permanent table                     - View permanent addresses only
6. Clear bridging table                     - Delete all non-permanent entries




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **MAC ADDRESS FILTERS MENU** allows the display and configuration of the MAC Address Filters for the router.

1 - Edit MAC Address Filter

The Edit MAC Address Filter option takes you to the Edit MAC Address Filter Menu, where the MAC Address Filters are modified.

2 - Filter Operation

The Filter Operation option changes the operation of the MAC address filters defined in the bridging table from positive to negative.

When Filter Operation is positive, all frames with MAC addresses as defined in the bridging table will be filtered.

When Filter Operation is negative, all frames with MAC addresses as defined in the bridging table will be forwarded.

Internal addresses will not be affected by the current state of the Filter Operation. All internal addresses will automatically be corrected for proper operation regardless of the current setting of Filter Operation.

3 - Broadcast Address

The Broadcast Address option allows the choice of filtering or forwarding of MAC broadcast frames for bridged data.

When set to forward, all MAC broadcast frames will be forwarded.

When set to filter, all MAC broadcast frames will be filtered.

Default: [forward]

4 - Show Bridging Table

The Show Bridging Table option displays all addresses in the Bridge Filter Table, identifies the active/inactive and permanent/non-permanent addresses, identifies addresses to be filtered if they are a source and/or destination, describes their location, and gives the total number of address table entries.

```
                        ALL Known MAC Addresses
Total entries : 20

                           Filter If  WAN
Address             Active Perm Src  Dest Access Location
Start of table
01-80-c2-00-00-01                                  Internal
01-80-c2-00-00-02                                  Internal
01-80-c2-00-00-03                                  Internal
01-80-c2-00-00-04                                  Internal
01-80-c2-00-00-05                                  Internal
01-80-c2-00-00-06                                  Internal
01-80-c2-00-00-07                                  Internal
01-80-c2-00-00-08                                  Internal
01-80-c2-00-00-09                                  Internal
01-80-c2-00-00-0a                                  Internal
01-80-c2-00-00-0b                                  Internal
01-80-c2-00-00-0c                                  Internal
01-80-c2-00-00-0d                                  Internal
01-80-c2-00-00-0e                                  Internal
01-80-c2-00-00-0f                                  Internal
02-44-00-c8-9a-ff     *      *               *     LAN050607
02-44-00-c8-9a-ee     *                      *     LAN050607
12-34-56-78-99-99     *      *    *     *           LAN050607(fixed)
11-11-11-11-11-11                       *          unknown
ff-ff-ff-ff-ff-ff                                  Internal
end of table
```

Refer to the Show Bridging Table option of the Bridging Set-up menu for more details.

5 - Show Permanent Table

The Show Permanent Table option displays all of the permanent filter table addresses entered by the router manager for which the locations were identified (Internal addresses are not displayed.) The "(fixed)" Location descriptor indicates that a manager made the entry and specified the LAN location.

```
                    Operator Defined MAC Addresses
                           Filter if  WAN
Address             Active Perm Src  Dest Access Location
Start of table
02-44-00-c8-9a-ff     *      *               *     LAN050607
12-34-56-78-99-99     *      *    *     *           LAN050607(fixed)
End of table
```

6 - Clear Bridging Table

The Clear Bridging Table option removes all non-permanent filter table addresses.

<u>Considerations</u>:

To prevent accidental removal of all non-permanent addresses, this option must be confirmed by entering "yes" at the prompt. (Refuse by entering "no" or use the TAB key to back out).

Edit MAC Address Filter Menu

```
                    EDIT MAC ADDRESS FILTER MENU

    Option                Value           Description
1.  Status             *[         ]    - Is the address in the table?
2.  Location           *[         ]    - Location of MAC address
3.  Filter if source    [         ]    - Filter all frames from this address
4.  Filter if dest      [         ]    - Filter all frames to this address
5.  Permanent           [         ]    - Address is not subject to aging
6.  Remove                             - Delete address




Enter:
    MAC address in hexadecimal (up to 17 characters)

> d0456789
```

The above display is the first level of the **Edit MAC Address Filter Menu**. Once the MAC address is entered (leading 0s are padded), the address specified is added to the menu title bar, the values are shown for the address, and the options become available, as shown below:

```
           EDIT MAC ADDRESS 00-00-d0-45-67-89 FILTER MENU

    Option                Value           Description
1.  Status            *"Not Present"  - Is the address in the table?
2.  Location          *"unknown"      - Location of MAC address
3.  Filter if source   [disabled]     - Filter all frames from this address
4.  Filter if dest     [disabled]     - Filter all frames to this address
5.  Permanent          [disabled]     - Address is not subject to aging
6.  Remove                            - Delete address





>
```

1 - Status

The Status option tells whether the address is "Present" or "Not Present" in the Address Table. When the address is first entered, "Not Present" is the Status value, and a Location value of [unknown] is shown. The * beside the value indicates that this value is changed automatically as an address is added or deleted and cannot be manually redefined.

Default: * [Not Present]

2 - Location

The Location option identifies the location of the MAC address. The locations will either be "unknown" or the LAN name of one of the partner connected DI-1132 bridge/routers. The * beside the value indicates that this value is changed automatically as the location is learned and cannot be manually redefined.

Default: * [unknown]

3 - Filter *(Forward)* If Source

The Filter If Source option toggles between Enabling and Disabling of the Source Filtering (Forwarding) feature for the specified address.

Default: [disabled]

Considerations:

When the Filter Operation is set to positive, enabling this option will prevent frames from this address from crossing the bridge/router to the associated LAN. Once Filter if Source is chosen, the Permanent value is set to [enabled]. This may be toggled back to [disabled] if a non-permanent entry is desired.

When the Filter Operation is set to negative, enabling this option will allow frames from this address to cross the bridge/router to the associated LAN. Once Forward if Source is chosen, the Permanent value is set to [enabled]. This may be toggled back to [disabled] if a non-permanent entry is desired.

4 - Filter *(Forward)* If Destination

The Filter If Destination option toggles between Enabling and Disabling of the Destination Filtering feature for the specified address.

Default: [disabled]

Considerations:

When the Filter Operation is set to positive, enabling this option will prevent access to this address from another LAN station located across the bridge/router. Once Filter if Destination is chosen, the Permanent value is set to [enabled]. This may be toggled back to [disabled] if a non-permanent entry is desired.

When the Filter Operation is set to negative, enabling this option will allow access to this address from another LAN station located across the bridge/router. Once Forward if Destination is chosen, the Permanent value is set to [enabled]. This may be toggled back to [disabled] if a non-permanent entry is desired.

5 - Permanent

The Permanent option toggles between Enabling and Disabling of the Permanent Address Value.

Default: [disabled]

Considerations:

This Value must be [enabled] if you want to make the Address Permanent. If [enabled] the Address will not be subject to removal by the expiration of the Aging Timer or the Clear Filter Table option (found in the Bridging Set-Up Menu or the MAC Address Filters Menu).

If a station is not expected to move, making the address Permanent will offer a slight increase in bridge/router performance.

6 - Remove

Select the Remove option to remove the specified address (permanent or non-permanent). Internal and system-supplied addresses cannot be removed.

Bridge Pattern Filter Menu

```
                    BRIDGE PATTERN FILTERS MENU

     Option                  Description
  1. Show alias          - View pattern filter aliases
  2. Add alias           - Create an alias for a pattern filter
  3. Remove alias        - Delete a pattern filter alias
  4. Show pattern        - View current pattern filters
  5. Add pattern         - Create a pattern filter
  6. Remove pattern      - Delete a pattern filter
  7. Help                - Read pattern filter and alias description




  Enter option number, "=" - main menu, <TAB> - previous menu



  >
```

The **BRIDGE PATTERN FILTER MENU** allows for the inclusion of custom-programmable filters in the filter table to provide increased security and maximum local LAN usage.

The bridge/router supports up to 64 patterns and 32 aliases (including the defaults). Each pattern may be up to 80 characters in length. The total number of characters in all defined patterns must not exceed 500.

EXAMPLES: Refer to the Programmable Filtering section of the Reference Manual file, for detailed filter construction information with examples.

---

1 - Show Alias

The Show Alias option displays existing default Aliases and those created with the Add Alias option.

```
                    Bridge Pattern Filter Aliases

  1. IP         - 12-0800              2. TCP        - IP & 23-06
  3. UDP        - IP & 23-11           4. ARP        - 12-0806
  5. NETWARE    - 12-8137 | 12-8138    6. APPLE      - 12-809B
  7. DECNET     - 12-6003              8. LAT        - 12-6004
  9. XNS        - 12-0807


  Type: [s] to redraw, [=] main menu, any other key to end.
```

2 - Add Alias

The Add Alias option allows the creation of an easily identifiable string of characters to identify a complex Filter Mask:

```
Enter:
  alias name (up to 8 characters)

> bmCast


Enter:
  filter pattern for alias (up to 80 characters)
> 0-ffffffffffff


Enter:
  alias ID number (from 1 to 32)

> 3
```

Once an alias is created, you must use Add Pattern to add the alias to the filter table and make it operational:

```
Enter:
  filter pattern (up to 80 characters)
> bmCast


Enter:
  pattern ID number (from 1 to 64)
>5
```

Check the alias filter assignment with the Show Pattern option:

```
                      Bridge Filter Patterns

ID    Pattern
--    ----------------------------
1     12-600x
2     0-010203040506&12-809B
...
5     bmCast
```

3 - Remove Alias

The Remove Alias option deletes an Alias from the Alias Table. (Confirm with Show Alias.)

```
Enter:
  alias ID number, alias name

> bmCast
```

"bmCast" is used on LAN 1   **(Prevents blanket removal when an alias is in use:** carefully **check usage** of the alias with **Show Pattern** and then, **if removal of the alias is still desired**, use the **Remove Pattern** option first to remove all occurrences of the alias in the Filter Pattern table, **then use** the **Remove Alias** option).

4 - Show Pattern

The Show Pattern option displays the filter masks that have been defined with the Add Pattern option:

```
Enter:
  all, global, lan, Remote site id or alias
>
```

global

```
                        Global Bridge Filter Patterns
Id     Pattern
--     ----------------------------
1      12-600x
3      LAT
```

MARKETING - (Remote Site Alias)

```
                        Bridge Filter Patterns to MARKETING
Id     Pattern
--     ----------------------------
2      0-010203040506&12-809B
```

all

```
                    Summary of all Bridge filter patterns
Type        Id     Pattern
--------    --     ----------------------------
Global      1       12-600x
            3       LAT
MARKETING   2       0-010203040506&12-809B
```

5 - Add Pattern

The Add Pattern option allows the definition of a filter mask and adds it to the filter table. *Filter masks are checked against the frame in the order of their index numbers, so those that are most likely to be encountered should have the lowest index numbers.*

```
Enter:
  global, lan, Remote site id or alias
>

Enter:
  filter pattern (up to 80 characters)
> 12-600x

Enter:
  pattern ID number (from 1 to 64)
> 1
```

A **global** filter pattern will be applied to all bridge data.

A **lan** filter pattern will be applied to all bridge data being sent to the local LAN.

A **Remote Site Id or Alias** filter pattern will be applied to all bridge data being sent to the specified remote site only. The Remote Site Alias specified must be defined on this device.

6 - Remove Pattern

The Remove Pattern option deletes a previously created filter mask (in this case, a filter mask with the pattern ID of "2"). (Confirm the removal with Show Pattern).

```
Enter:
  all, pattern ID number
>2
```


7 - Help

The Help option provides Help screens describing the creation of Filter Masks.

To move between the Help screens, type: [s]tart, [n]ext, or [p]rev. (You must use lower-case letters)

IP Router Pattern Filter Menu

```
                    IP ROUTER PATTERN FILTER MENU

    Option                   Description
 1. Show alias            - View pattern filter aliases
 2. Add alias             - Create an alias for a pattern filter
 3. Remove alias          - Delete a pattern filter alias
 4. Show pattern          - View current pattern filters
 5. Add pattern           - Create a pattern filter
 6. Remove pattern        - Delete a pattern filter
 7. Help                  - Read pattern filter and alias description




 Enter option number, "=" - main menu, <TAB> - previous menu



 >
```

The **IP ROUTER PATTERN FILTER MENU** allows for the inclusion of custom programmable filters in the filter table to provide increased security and maximum local LAN usage.

The router supports up to 64 patterns and 32 aliases (including the defaults). Each pattern may be up to 80 characters in length. The total number of characters in all defined patterns must not exceed 500.

EXAMPLES:	Refer to the Programmable Filtering section of the Reference Manual file, for detailed filter construction information with examples.

1 - Show Alias

The Show Alias option displays existing default Aliases and those created with the Add Alias option.

```
                    IP Router Pattern Filter Aliases

 1. TCP        - 09-06                    2. UDP        - 09-11


 Type: [s] to redraw, [=] main menu, any other key to end.
```

2 - Add Alias

The Add Alias option allows the creation of an easily identifiable string of characters to identify a complex Filter Mask:

```
Enter:
  alias name (up to 8 characters)

> bmCast

Enter:
  filter pattern for alias (up to 80 characters)
> 0-ffffffffffff

Enter:
  alias ID number (from 1 to 32)

> 3
```

3 - Remove Alias

The Remove Alias option deletes an Alias from the Alias Table. (Confirm with Show Alias.)

```
Enter:
  alias ID number, alias name

> bmCast
```

"bmCast" is used on LAN 1	**(Prevents blanket removal when an alias is in use:** carefully **check usage** of the alias with **Show Pattern** and then, **if removal of the alias is still desired**, use the **Remove Pattern** option first to remove all occurrences of the alias in the Filter Pattern table, **then use** the **Remove Alias** option).

4 - Show Pattern

The Show Pattern option displays the filter masks that have been defined with the Add Pattern option:

```
Enter:
  all, global, lan, remote site id or alias
>
```

global

```
                        Global IP Pattern Filters
Id    Pattern
--    ----------------------------
1     12-600x
3     LAT
```

Vancouver (Remote Site alias)

```
                    IP Pattern Filters to Vancouver
Id     Pattern
--     ---------------------------
2      0-010203040506&12-809B
```

all

```
                   Summary of all IP Pattern Filters
Type       Id    Pattern
--------   --    ---------------------------
Global      1     12-600x
            3     LAT
Vancouver   2     0-010203040506&12-809B
```

5 - Add Pattern

The Add Pattern option allows the definition of a filter mask and adds it to the filter table. *Filter masks are checked against the frame in the order of their index numbers, so those that are most likely to be encountered should have the lowest index numbers.*

```
Enter:
  global, lan, Remote site id or alias
> Vancouver

Enter:
  filter pattern (up to 80 characters)
> 12-600x

Enter:
  pattern ID number (from 1 to 64)
> 2
```

A **global** filter pattern will be applied to all IP routed data.

A **lan** filter pattern will be applied to all IP routed data being sent to the local LAN.

A **Remote Site Id or Alias** filter pattern will be applied to all IP routed data being sent to the specified remote site only. The Remote Site Alias specified must be defined on this device.

6 - Remove Pattern

The Remove Pattern option deletes a previously created filter mask (in this case, a filter mask with the pattern ID of "2"). (Confirm the removal with Show Pattern.)

```
Enter:
  all, pattern ID number
> 2
```

7 - Help

The Help option provides Help screens describing the creation of Filter Masks.

To move between the Help screens, type: [s]tart, [n]ext, or [p]rev. (You must use lower-case letters)

IPX Router Pattern Filter Menu

```
                   IPX ROUTER PATTERN FILTER MENU

    Option                    Description
 1. Show alias             - View pattern filter aliases
 2. Add alias              - Create an alias for a pattern filter
 3. Remove alias           - Delete a pattern filter alias
 4. Show pattern           - View current pattern filters
 5. Add pattern            - Create a pattern filter
 6. Remove pattern         - Delete a pattern filter
 7. Help                   - Read pattern filter and alias description




 Enter option number, "=" - main menu, <TAB> - previous menu



 >
```

The **IPX ROUTER PATTERN FILTER MENU** allows for the inclusion of custom programmable filters in the filter table to provide increased security and maximum local LAN usage.

The bridge/router supports up to 64 patterns and 32 aliases (including the defaults). Each pattern may be up to 80 characters in length. The total number of characters in all defined patterns must not exceed 500.

> **EXAMPLES:** Refer to the Programmable Filtering section of the Reference Manual file, for detailed filter construction information with examples.

1 - Show Alias

The Show Alias option displays existing default Aliases and those created with the Add Alias option.

```
                     IPX Router Filter Pattern Aliases

 1. NETBIOS    - 5-14
```

2 - Add Alias

The Add Alias option allows the creation of an easily identifiable string of characters to identify a complex Filter Mask:

```
Enter:
  alias name (up to 8 characters)

> bmCast


Enter:
  filter pattern for alias (up to 80 characters)
> 0-ffffffffffff


Enter:
  alias ID number (from 1 to 32)
> 3
```

3 - Remove Alias

The Remove Alias option deletes an Alias from the Alias Table. (Confirm with Show Alias.)

```
Enter:
  alias ID number, alias name

> bmCast
```

`"bmCast" is used on LAN 1`	**(Prevents blanket removal when an alias is in use:** carefully **check usage** of the alias with **Show Pattern** and then, **if removal of the alias is still desired**, use the **Remove Pattern** option first to remove all occurrences of the alias in the Filter Pattern table, **then use** the **Remove Alias** option).

4 - Show Pattern

The Show Pattern option displays the filter masks that have been defined with the Add Pattern option:

```
Enter:
  all, global, lan, remote site id or alias
>
```

    global

```
                        Global IPX Pattern Filters
Id    Pattern
--    --------------------------
1     12-600x
3     LAT
```

    Vancouver (Remote Site alias)

```
                     IPX Pattern Filters to Vancouver
Id    Pattern
--    --------------------------
2     0-010203040506&12-809B
```

all

```
                    Summary of all IPX Pattern Filters
Type       Id     Pattern
--------   --     ----------------------------
Global     1      12-600x
           3      LAT
Vancouver  2      0-010203040506&12-809B
```

5 - Add Pattern

The Add Pattern option allows the definition of a filter mask and adds it to the filter table. *Filter masks are checked against the frame in the order of their index numbers, so those that are most likely to be encountered should have the lowest index numbers.*

```
Enter:
  global, lan, Remote site id or alias
> Vancouver

Enter:
  filter pattern (up to 80 characters)
> 9-600x

Enter:
  pattern ID number (from 1 to 64)
> 2
```

A **global** filter pattern will be applied to all IPX routed data.

A **lan** filter pattern will be applied to all IPX routed data being sent to the local LAN.

A **Remote Site Id or Alias** filter pattern will be applied to all IPX routed data being sent to the specified remote site only. The Remote Site Alias specified must be defined on this device.

6 - Remove Pattern

The Remove Pattern option deletes a previously created filter mask (in this case, a filter mask with the pattern ID of "2"). (Confirm the removal with Show Pattern.)

```
Enter:
  all, pattern ID number
>2
```

7 - Help

The Help option provides Help screens describing the creation of Filter Masks.

To move between the Help screens, type: [s]tart, [n]ext, or [p]rev. (You must use lower-case letters)

Statistics Menu

```
                    STATISTICS MENU

   Option              Value           Description
 1. Statistics set-up  menu          - Define statistics operation
 2. LAN statistics     menu          - Access LAN statistics
 3. WAN statistics     menu          - Access WAN statistics







Enter option number, "=" - main menu, <TAB> - previous menu


>
```

The **STATISTICS MENU** provides paths to Menus for access to complete router statistics.

1 - Statistics Set-Up

The Statistics Set-up option takes you to the Statistics Set-Up Menu, where the interval and the range of reported statistics may be set. All statistics counts may also be reset from this menu.

2 - LAN Statistics

The LAN Statistics option takes you to the LAN Statistics Menu, where statistics can be examined to evaluate LAN performance.

3 - WAN Statistics

The WAN Statistics option takes you to the WAN Statistics Menu, where statistics can be examined to evaluate WAN performance.

Statistics Set-Up Menu

```
                      STATISTICS SET-UP MENU

   Option                  Value           Description
1. Extended statistics    [disabled]    - Enable/disable extended statistics
2. Interval               [60 sec]      - Set display interval
3. Clear all statistics                 - Reset all statistics




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

1 - Extended Statistics

Choosing the Extended Statistics option enables extended statistics causing additional statistics to be calculated and reported.

When extended stats are [disabled], the following statistics displays are unavailable:
   - **Frame Size**, LAN Statistics Menu

When extended stats are [disabled], limited information is available from:
   - **Link Status**, WAN Statistics Menu (throughput section is not available).
   - **Bridged Traffic**, LAN Statistics Menu (only the total column is available).
   - **IP Traffic**, LAN Statistics Menu (only the total column is available).
   - **IPX Traffic**, LAN Statistics Menu (only the total column is available).
   - **Total LAN Traffic**, LAN Statistics Menu (only the total column is available).

Default: [disabled]

Considerations:

Enabling this option will decrease router performance, as additional processing is required. You must confirm a change by entering "yes" at the prompt.

2 - Interval

The Interval option sets the timer that updates the statistics.

Default: [60 sec]

Range: 10 to 3,600 seconds.

Considerations:

Lowering the time interval will require more router processing power while increasing the time interval will require less.

3 - Clear All Statistics

The Clear All Statistics option clears ALL of the statistics and resets all fields to zero.

LAN Statistics Menu

```
                    LAN STATISTICS MENU

    Option                      Description
1. Bridged traffic      - Summary of Bridge traffic
2. IP traffic           - Summary of IP Router traffic
3. IPX traffic          - Summary of IPX Router traffic
4. Total LAN traffic    - Summary of LAN traffic
5. LAN error            - View LAN errors history
6. Frame size           - View frame size history
7. Clear LAN statistics - Reset LAN statistics
8. Clear LAN errors     - Reset LAN errors




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

1 - Bridged Traffic

The Bridged Traffic option displays a summary of Bridged LAN traffic since the statistics were last reset.

2 - IP Traffic

The IP Traffic option displays a summary of IP Router LAN traffic since the statistics were last reset.

3 - IPX Traffic

The IPX Traffic option displays a summary of IPX Router LAN traffic since the statistics were last reset.

4 - Total LAN Traffic

The Total LAN Traffic option displays a summary of Total LAN traffic since the statistics were last reset.

5 - LAN Error

The LAN Error option displays a summary of LAN and router errors since the statistics were last reset.

6 - Frame Size

The Frame Size option displays a summary of the distribution of LAN Frame Sizes since the statistics were last reset.

<u>Considerations</u>**:**

This option is available only if Extended Stats in the Statistics Set-Up Menu is Enabled.

7 - Clear LAN Statistics

The Clear LAN Statistics option clears all statistic fields in the LAN statistics to zero.

8 - Clear LAN Errors

The Clear LAN Errors option clears all error fields in the LAN statistics to zero.

Bridged Traffic Summary Display (Option 1)

This screen displays Bridged LAN traffic statistics gathered since the statistics were last reset and reports statistics generated within the current statistics interval.

```
                        Bridged Traffic Summary


                                 Average      Recent      Highest
Statistic                Total      Rate        Rate         Rate
--------------------------------------------------------------------
Frames from LAN         4348699      228         416          840
Bytes from LAN        278317248    14616       26667        53785
Frames filtered from LAN 132982        6           0          840

Frames to LAN           4215689      221         416          441
Bytes to LAN          269806208    14171       26667        28236

Frames from WAN         4169752      219         416          441
Bytes from WAN        268464916    14024       26667        28250
Frames  filtered from WAN      0        0           0            0

Frames to WAN            215689      121         416          441
Bytes to WAN            2696208    14171       26667        28236




Type: [s] to redraw, [=] main menu, any other key to end.
```

Column Analysis

Total	Indicates the total number of occurrences since the statistics were last reset. (Available with extended statistics disabled.)
Average Rate	Indicates the average rate of occurrences per second since the statistics were last reset.
Recent Rate	Indicates the averaged rate of occurrences per second of the last statistics interval.
Highest Rate	Indicates the highest recent rate encountered since the statistics were last reset or a re-powering of the router occurred.

__Bridged Traffic Summary Statistics Definitions__

Frames from LAN	All bridge data frames successfully received from the local LAN.
Bytes from LAN	All bridge data bytes successfully received from the local LAN.
Frames filtered from LAN	All bridge data frames received from the local LAN and filtered by the router. This includes frames filtered because the frame meets pattern filtering criteria or the frame was unsuccessfully received because of an error.
Frames to LAN	All bridge data frames successfully placed upon the local LAN.
Bytes to LAN	All bridge data bytes successfully placed upon the local LAN.
Frames from WAN	All bridge data frames successfully received from partner routers.
Bytes from WAN	All bridge data bytes successfully received from partner routers.
Frames filtered from WAN	All bridge data frames received from the partner routers and filtered by the router. This includes frames filtered because the frame meets pattern filtering criteria or the frame was unsuccessfully received because of an error.
Frames to WAN	All bridge data frames successfully sent to partner routers.
Bytes to WAN	All bridge data bytes successfully sent to partner routers.

IP Traffic Summary Display (Option 2)

This screen displays IP Routed LAN traffic statistics gathered since the statistics were last reset and reports statistics generated within the current statistics interval.

```
                    LAN Tokyo Routed Traffic Summary


                                Average      Recent       Highest
Statistic                  Total     Rate        Rate         Rate
---------------------------------------------------------------------
Frames from LAN           4348699      228         416          840
Bytes from LAN         278317248    14616       26667        53785
Frames Filtered from LAN   132982        6           0          840
Frames to LAN             4169752      219         416          441
Bytes to LAN           268464916    14024       26667        28250

Frames from WAN           9802916    14024       26667        28250
Bytes from WAN            4169752      219         416          441
Frames filtered from WAN     1982        6           0          840
Frames to WAN                 269       14          27           28
Bytes to WAN                  270       15          28           29

ARP Discards                    0        0           0            0
Redirect Sent                 269       14          27           28
Unreachable Sent                0        0           0            0


Type: [s] to redraw, [=] main menu, any other key to end.
```

Column Analysis

Total   Indicates the total number of occurrences since the statistics were last reset. (Available with extended statistics disabled.)

Average Rate   Indicates the average rate of occurrences per second since the statistics were last reset.

Recent Rate   Indicates the averaged rate of occurrences per second of the last statistics interval.

Highest Rate   Indicates the highest recent rate encountered since the statistics were last reset or a re-powering of the router occurred.

IP Traffic Summary Statistics Definitions

Frames from LAN	All IP frames successfully received from the local LAN.
Bytes from LAN	All IP bytes successfully received from the local LAN.
Frames filtered from LAN	All IP frames received from the local LAN and filtered by the router. This includes IP frames filtered because the frame meets pattern filtering criteria or the frame was unsuccessfully received because of an error.
Frames to LAN	All IP frames successfully received from partner routers and placed upon the local LAN.
Bytes to LAN	All IP bytes successfully received from partner routers and placed upon the local LAN.
Frames from WAN	All IP frames successfully received from the local LAN and forwarded to partner routers.
Bytes from WAN	All IP bytes successfully received from the local LAN and forwarded to partner routers.
Frames filtered from WAN	All IP frames received from partner routers and filtered by the router. This includes IP frames filtered because the frame meets pattern filtering criteria or the frame was unsuccessfully received because of an error.
Frames to WAN	All IP frames successfully forwarded to partner routers.
Bytes to WAN	All IP bytes successfully forwarded to partner routers.
ARP Discards	Data frames discarded because local LAN stations not responding to an ARP request. This occurs when an IP frame destined for this LAN is received from a partner router, but there is no entry in the ARP table for that IP address, and the station does not respond to an ARP request.
Redirect Sent	The number of ICMP Redirect messages generated.
Unreachable Sent	The number of ICMP Destination Unreachable messages generated.

NOTE: The IP frames and bytes in the above table refer to frames properly routed to this router. A properly routed frame will be MAC addressed to the router and IP addressed for a station on another network or sub-network.

IPX Traffic Summary Display (Option 3)

This screen displays IPX Routed LAN traffic statistics gathered since the statistics were last reset and reports statistics generated within the current statistics interval.

```
                       LAN Tokyo IPX Traffic Summary


                                    Average      Recent      Highest
Statistic                    Total     Rate        Rate         Rate
--------------------------------------------------------------------
Frames from LAN            4348699      228         416          840
Bytes from LAN           278317248    14616       26667        53785
Frames filtered from LAN    132982        6           0          840
Congestion discards from LAN      0        0           0            0

Frames to LAN            269806208    14171       26667        28236
Bytes to LAN               4169752      219         416          441

Frames from WAN          268464916    14024       26667        28250
Bytes from WAN             4169752      219         416          441
Frames filtered from WAN      1982        6           0          840

Frames to WAN                  269       14          27           28
Bytes to WAN                   270       15          28           29

Type: [s] to redraw, [=] main menu, any other key to end.
```

Column Analysis

Total   Indicates the total number of occurrences since the statistics were last reset. (Available with extended statistics disabled.)

Average Rate   Indicates the average rate of occurrences per second since the statistics were last reset.

Recent Rate   Indicates the averaged rate of occurrences per second of the last statistics interval.

Highest Rate   Indicates the highest recent rate encountered since the statistics were last reset or a re-powering of the bridge/router occurred.

IPX Traffic Summary Statistics Definitions

Frames from LAN	All IPX frames successfully received from the local LAN.
Bytes from LAN	All IPX bytes successfully received from the local LAN.
Frames filtered from LAN	All IPX frames received from the local LAN and filtered by the router. This includes IPX frames filtered because the frame meets pattern filtering criteria or the frame was unsuccessfully received because of an error.
Congestion Discards from LAN	IPX Data frames discarded because of internal congestion between the LAN and the IPX module
Frames to LAN	All IPX frames successfully placed upon the local LAN.
Bytes to LAN	All IPX bytes successfully placed upon the local LAN.
Frames from WAN	All IPX frames successfully received from partner routers.
Bytes from WAN	All IPX bytes successfully received from partner routers.
Frames filtered from WAN	All IPX frames received from partner routers and filtered by the router. This includes IPX frames filtered because the frame meets pattern filtering criteria or the frame was unsuccessfully received because of an error.
Frames to WAN	All IPX frames successfully forwarded to partner routers.
Bytes to WAN	All IPX bytes successfully forwarded to partner routers.

Total LAN Traffic Summary Display (Option 4)

This screen displays statistics gathered since the statistics were last reset and reports statistics generated within the current statistics interval.

```
                    LAN Tokyo Total Traffic Summary


                                 Average      Recent      Highest
Statistic                   Total   Rate        Rate         Rate
-------------------------------------------------------------------
Frames from LAN            4348699    228         416          840
Bytes from LAN          278317248  14616       26667        53785
Frames filtered from LAN   132982      6           0          840
Adapter Discards                0      0           0            0
Congestion Discards from LAN    0      0           0            0

Frames Forwarded          4215689    221         416          441
Bytes Forwarded         269806208  14171       26667        28236
Congestion Discards to WAN      0      0           0            0
Frames to LAN             4169752    219         416          441
Bytes to LAN            268464916  14024       26667        28250
Congestion Discards to LAN      0      0           0            0




Type: [s] to redraw, [=] main menu, any other key to end.
```

Column Analysis

Total   Indicates the total number of occurrences since the statistics were last reset. (Available with extended statistics disabled.)

Average Rate   Indicates the average rate of occurrences per second since the statistics were last reset.

Recent Rate   Indicates the averaged rate of occurrences per second of the last statistics interval.

Highest Rate   Indicates the highest recent rate encountered since the statistics were last reset or a re-powering of the router occurred.

Total LAN Traffic Summary Statistics Definitions

Frames from LAN	All frames successfully received from the local LAN.
Bytes from LAN	All bytes successfully received from the local LAN.
Frames filtered from LAN	All frames received from the local LAN and filtered by the router. This includes frames filtered because the router is in Learn mode, the destination address resides on the same LAN, the source address is specified for filtering, or the frame meets pattern filtering criteria.
Adapter Discards	All incoming frames lost because of an overflow error, receive buffer congest, missed frame detection, CRC errors, or framing errors. This is a case where LAN traffic exceeds the processing capability of the router, primarily because the router is engaged in other functions such as filtering.
Congestion Discards from LAN	This occurs when the router has to discard frames from the LAN because too many frames are waiting for processing inside the router and buffer space is unavailable.
Frames Forwarded	All frames successfully forwarded to partner routers.
Bytes Forwarded	All bytes successfully forwarded to partner routers.
Congestion Discards to WAN	This occurs when the router has to discard frames destined for the WAN because too many frames are waiting for processing inside the router and buffer space is unavailable.
Frames To LAN	All frames successfully placed upon the local LAN.
Bytes To LAN	All bytes successfully placed upon the local LAN.
Congestion Discards to LAN	This occurs when the router has to discard frames destined for the local LAN because too many frames are waiting for processing inside the router and buffer space is unavailable.

LAN Error Display (Option 5)

```
                          LAN Calgary Error Summary

Bridge Errors                               LAN Errors
-------------------------------------------------------------------
Loss of Carrier            : 0      CRC Errors                : 0
Underflow Errors           : 0      Framing Errors            : 0
Overflow Errors            : 0      Single Collision          : 0
Receive Buffer Congest     : 0      Multiple Collisions       : 0
Receiver Misses            : 0      Transmit Retry Failures   : 0
Transmit Buffer Errors     : 0      Late Collisions           : 0
Memory Errors              : 0      Heartbeat Failure         : 0


Type: [s] to redraw, [=] main menu, any other key to end.
```

Bridge Errors

Loss of Carrier	This usually indicates a problem with the LAN hardware either on the Router or in the transceiver.
Underflow Errors	This is a hardware error. The LAN hardware could not read the contents of a frame to be transmitted from memory.
Overflow Errors	The software could not supply a receive buffer in time to receive frames because of congestion.
Receive Buffer Congest	The router missed a frame; because of congestion, the software did not supply sufficient receive buffers to the LAN hardware fast enough to receive all segments of a frame.
Receiver Misses	The router missed the frame because there were no receive buffers available for storing the frame. Note that this statistic counts only this specific case—whereas the Traffic Summary Receiver Misses statistic counts two additional receive buffer errors and combines them into one statistic.
Transmit Buffer Errors	This is a hardware or software error. The transmit buffers are corrupted or the memory could not be read by the LANCE chip.
Memory Errors	This reports errors occurring with the router's memory.

LAN Errors	
CRC Errors	A frame was received with a bad CRC and was discarded.
Framing Errors	A frame was received that did not contain an integral number of bytes (some bits were missing).
Single Collision	The number of times exactly one retry was needed to transmit a packet.
Multiple Collisions	The number of times more than one retry was needed to transmit a packet.
Transmit Retry Failures	The LAN transceiver has made 16 attempts to transmit a packet and has been blocked each time because of collisions. The transmission is aborted.
Late Collisions	A collision should only be seen when the transceiver transmits the first 64 bytes of a packet. Some faulty transceiver has started transmitting after this point.
Heartbeat Failure	This is also called an "SQE" error. As a check for LAN presence, the transceiver is supposed to test the collision presence circuit whenever a transmission is made. The LANCE is complaining that this did not happen. Ethernet Version 1 does not support Heartbeat, so Heartbeat should be disabled when the router is connected to Version 1.

Frame Size Display (Option 6)

```
                    LAN Calgary Frame Size Distribution

    Range              From LAN         Forwarded              To LAN
   -----------------------------------------------------------------
   64 - 127             111331           111331                99980
   128 - 255                 0                0                    0
   256 - 383                 0                0                    0
   384 - 511                 0                0                    0
   512 - 639                 0                0                    0
   640 - 767                 0                0                    0
   768 - 895                 0                0                    0
   896 - 1023                0                0                    0
   1024 - 1151               0                0                    0
   1152 - 1279               0                0                    0
   1280 - 1407               0                0                    0
   1408 - 1518               0                0                    0
   1519 and up               0                0                    0


   Type: [s] to redraw, [=] main menu, any other key to end.
```

This screen displays a breakdown of the sizes of the frames processed by the router for the indicated LAN since the statistics were last reset.

The first column is the range of frame sizes in bytes;
The second, frames received from the local LAN;
The third, frames forwarded across the router to the other LAN;
The fourth, frames received from the other LAN.

WAN Statistics Menu

```
                       WAN STATISTICS MENU

    Option                      Value          Description
 1. Remote site status          menu         - Display remote site statistics
 2. Clear remote site stats                  - Reset remote site statistics
 3. Link status                              - View status of link
 4. Clear link statistics                    - Reset link statistics






Enter option number, "=" - main menu, <TAB> - previous menu


>
```

1 - Remote Site Status

The Remote Site Status option takes you to the Remote Site Status Menu, where statistics for a particular remote site can be examined.

2 - Clear Remote Site Statistics

The Clear Remote Site Statistics option clears all fields in all of the remote site statistics displays to zero.

3 - Link Status

The Link Status option displays the status of the links, either individually (more statistics), or together (provides overview).

Please refer to the following pages for more detailed information.

4 - Clear Link Statistics

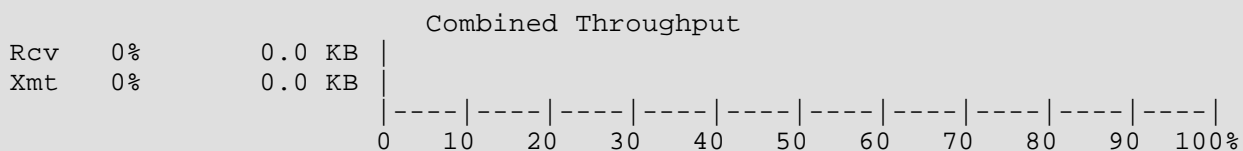The Clear Link Statistics option clears all fields in the Link statistics to zero.

Link Status Display (Option 3)

```
Enter:
   Link to display (1 or 2), all
```

all (Multilink)

```
                            Link  1 Status
State: Enabled, Up, Network, Opened
Remote Site: two
Speed: 64000 bps, BRI

                            Link  2 Status
State: Enabled, Up, Network, Opened
Remote Site: two
Speed: 64000 bps, BRI


                        Combined Throughput
Rcv   0%        0.0 KB |
Xmt   0%        0.0 KB |
                       |----|----|----|----|----|----|----|----|----|----|
                       0    10   20   30   40   50   60   70   80   90   100%



Type: [s] to redraw, [=] main menu, any other key to end.
```

The Link Status may be displayed individually for more detailed information:

```
                          Link  1 Status
State: Enabled, Up, Network, Opened
Remote Site: two

Interface State        Frame Counts  (Rcv/Xmt)      Frame Errors
Speed   : 64000 bps    Bytes :        47648/47639   Cgt disc  : 0
Type    : BRI          Frames:         3536/3536    CRC       : 0
Circuit : Outgoing                                  Rcv abort : 0
State   : Active                                    Overrun   : 0
                                                    Rcv miss  : 0
Partner Number:                                     Too large : 0
5551212                                             Misaligned : 0
                                                    Underrun  : 0
                           Throughput
Rcv   0%        0.0 KB |
Xmt   0%        0.0 KB |
                       |----|----|----|----|----|----|----|----|----|----|
                       0   10   20   30   40   50   60   70   80   90  100%

Type: [s] to redraw, [=] main menu, any other key to end.
```

State :

This displays the current state of the ISDN circuit: Enabled/Disabled, Idle / Opening / Up, Dead / Establish / Authenticate / Network / Terminate,   Initial / Starting / Closed / Stopped / Closing / Stopping / Req Sent / Ack Rcvd / Ack Sent / Opened.

Remote Site :

This displays the name of the current remote site that this link is connected to.

Speed :

This displays the speed of the ISDN call. The speed will be as set by the ISDN connection. Either the speed displayed may be 56000 or 64000 depending on the ISDN service the router is connected to. If the ISDN call is disconnected, no speed (0) will be shown.

The DI-1132 will perform V.110 rate adaption when required to complete an ISDN call.

Type :

The interface type is identified in this display (BRI DTE).

Circuit :

This identifies the type of ISDN call. The call may be "Incoming, Outgoing, or Cleared".

State :

This identifies the current state of the ISDN call. The state may be one of "Null, Proceeding, Disconnecting, or Active".

Partner Number :

This identifies the ISDN number of the remotely connected PPP ISDN router.

Frame Counts

    Bytes :

This indicates the total number of bytes received/transmitted across the link.

    Frames :

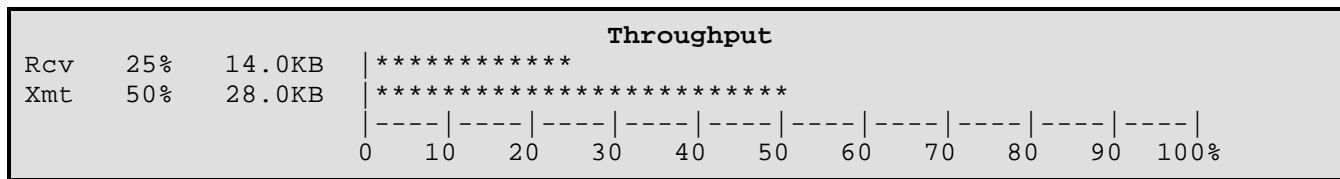This indicates the total number of frames received/transmitted across the link.

Frame Errors

These frames are considered invalid because they do not conform to valid frame checking parameters. These frames usually result from a hardware error on either the LAN or the router.

Cgt Disc	Congestion Discards — This is generated when a frame is discarded due to congestion.
CRC	Cyclic Redundancy Check — This often indicates a problem with the transmitting hardware and/or communications line (a modem, noisy line, router link problem) that has been detected by the receiver.
Rcv abort	Receiver Abort — This reports that an incoming frame has been aborted. This results when the transmitter doesn't receive all of a frame to be sent, and it sets an abort flag at the point this is discovered in the transmission. The receiver notes this as a statistic and discards the frame.
Overrun	The link controller could not empty the link FIFO into common memory before the next frame from the link is written to the FIFO. This indicates a problem with the memory inside the router.
Rcv miss	Receiver Miss — This reports that an incoming frame has been aborted. This results when the frame is missed because of a lack of receive buffers. The remote router will retransmit the frame.
Too large	This reports that an incoming frame has been discarded because the frame exceeded the maximum length. This may be caused by a frame being overrun by another frame on the link, so that the router thinks both frames are one frame.
Misaligned	This reports that frames detected on this link have a number of bits not exactly divisible by eight.
Underrun	The link controller could not read the rest of the frame from common memory before the link FIFO emptied. This indicates a problem with the memory inside the router.

Throughput

Both receive and transmit call utilization are displayed by the two bar graphs. Utilization describes the total bytes received or sent (including protocol overhead) divided by the total bytes possible based on the call speed. For each statistic, the numerical percentage is printed along with its equivalent baud rate and the bar graph.

```
                              Throughput
Rcv    25%    14.0KB   |************
Xmt    50%    28.0KB   |************************
                       |----|----|----|----|----|----|----|----|----|----|
                       0    10   20   30   40   50   60   70   80   90  100%
```

Remote Site Statistics Menu

```
                        REMOTE SITE STATUS MENU

    Option                     Value           Description
 1. Protocol status           menu         - Display protocol statistics
 2. Primary call status                    - Display primary call statistics
 3. Secondary call status                  - Display secondary call statistics
 4. Primary call quality                   - Display primary link quality data
 5. Secondary call quality                 - Display secondary link quality data
 6. Usage information                      - Display usage information




Enter :
    Remote site id or alias  (up to 16 characters)


> two
```

The above display is the first level of the **REMOTE SITE STATUS MENU**. Once the remote site id is entered, the id specified is added to the menu title bar and the Options are as shown below:

```
                       REMOTE SITE STATUS two MENU

    Option                     Value           Description
 1. Protocol status           menu         - Display protocol statistics
 2. Primary call status                    - Display primary call statistics
 3. Secondary call status                  - Display secondary call statistics
 4. Primary call quality                   - Display primary link quality data
 5. Secondary call quality                 - Display secondary link quality data
 6. Usage information                      - Display usage information




Enter option number, "=" - main menu, <TAB> - previous menu


>
```

1 - Protocol Status

The Protocol Status option takes you to the Remote Site - Protocol Status Menu, where the protocol statistics for this remote site can be examined.

2 - Primary Call Status

The Primary Call Status option displays a summary of the LCP parameters and the frame counts and errors for the primary ISDN call for the chosen remote site since the statistics were last reset.

3 - Secondary Call Status

The Secondary Call Status option displays a summary of the LCP parameters and the frame counts and errors for the secondary ISDN call in a Multilink configuration for the chosen remote site since the statistics were last reset.

4 - Primary Call Quality

The Primary Call Quality option displays a summary of the Call Quality parameters for the primary ISDN call for the chosen remote site since the statistics were last reset.

5 - Secondary Call Quality

The Secondary Call Quality option displays a summary of the Call Quality parameters for the secondary ISDN call in a Multilink configuration for the chosen remote site since the statistics were last reset.

6 - Usage Information

The Usage Information option displays a summary of the ISDN link usage and number of outgoing ISDN calls for the chosen remote site since the statistics were last reset.

Primary Call Status (Option 2)

```
                         Primary   Call                    Remote Site  2-two
Multilink: Enabled,  Auto-call: Disabled,  Link: 1
Operational Status: Network, Opened
                    Local LCP              Remote LCP
MRU             :     1500                   1500
ACCM            :     0x00000000             0x00000000
Quality         :     none                   none
Quality Period :      0                      0
Magic Number    :     0                      0
PFC             :     disabled               disabled
ACFC            :     enabled                enabled
FCS size        :     16-bit FCS             16-bit FCS
SDP             :     0                      0

     Frame Counts   (Rcv/Xmt)          Frame Errors
     Bytes  :        61917/61961        Header       : 0
     Frames :         4229/4229         Rcv Discards : 0
     LCP    :         4016/4016         Pad          : 0
     LQR    :            0/0            Unknown Prot : 0
     PAP    :            0/0
     CHAP   :            0/0
     MP     :          210/210
Type: [s] to redraw, [=] main menu, any other key to end.
```

Multilink :

This displays the current state of Multilink operation for this remote site connection: Enabled / Disabled.

Auto-Call :

This displays the current state of Auto-Call status for this remote site connection: Enabled / Disabled.

Link :

This displays the link number being used by the primary call to this remote site.

Operational Status :

This displays the current state of the PPP LCP module for this link of the remote site connection: Dead / Establish / Authenticate / Network / Terminate,   Initial / Starting / Closed / Stopped / Closing / Stopping / Req Sent / Ack Rcvd / Ack Sent / Opened.

MRU :

This displays the negotiated MRU (Maximum Receive Unit) value for this end of the link connection as well as the MRU value for the remote end.

ACCM :

This displays the negotiated ACCM (Asynchronous-Control Character-Map) Configuration value for this end of the link connection as well as the ACCM value for the remote end.

Quality :

This displays the negotiated quality protocol type for this end of the link connection as well as the quality protocol type for the remote end.

Quality Period :

This displays the negotiated quality period for this end of the link connection as well as the quality period for the remote end.

Magic Number :

This displays the negotiated magic number value for this end of the link connection as well as the magic number value for the remote end.

PFC :

This displays the negotiated PFC (Protocol Field Compression) state for this end of the link connection as well as the PFC state for the remote end.

ACFC :

This displays the negotiated ACFC (Access and Control Field Compression) state for this end of the link connection as well as the ACFC state for the remote end.

FCS Size :

This displays the negotiated FCS size (Frame Check Sequence) for this end of the link connection as well as the FCS size for the remote end.

SDP :

This displays the negotiated SDP value (Self-Describing-Padding) for this end of the link connection as well as the SDP value for the remote end. A value of 0 indicates no padding is being added.

Frame Counts

　Bytes :

This indicates the total number of bytes received/transmitted across this link.

　Frames :

This indicates the total number of frames received/transmitted across this link.

　LCP :

This indicates the total number of LCP (Link Control Protocol) negotiation frames received/transmitted across this link.

　LQR :

This indicates the total number of LQR (Link Quality Report) frames received/transmitted across this link.

PAP :

This indicates the total number of PAP (Password Authentication Protocol) frames received/transmitted across this link.

CHAP :

This indicates the total number of CHAP (Challenge-Handshake Authentication Protocol) frames received/transmitted across this link.

MP :

This indicates the total number of MP (Multilink Protocol) frames received/transmitted across this link.

Frame Errors

Header :

This is generated when an incoming frame is discarded due to a bad header.

Rcv Discards :

This is generated when an incoming frame is discarded due to the frame being destined for a bundle before this link has been bound to a bundle.

Pad :

This is generated when an incoming frame is discarded due to a problem trimming off the SDP padding.

Unknown Prot :

Unknown Protocol — This is generated when an incoming frame is discarded due to the frame being an unknown or unacceptable protocol type, i.e. BDP or IPXCP.

Secondary Call Status (Option 3)

```
                        Secondary  Call                Remote Site  2-two
Multilink: Enabled,  Auto-call: Disabled,  Link: 2
Operational Status: Network, Opened
                     Local LCP            Remote LCP
MRU            :       1500                 1500
ACCM           :       0x00000000           0x00000000
Quality        :       none                 none
Quality Period :       0                    0
Magic Number   :       0                    0
PFC            :       disabled             disabled
ACFC           :       enabled              enabled
FCS size       :       1                    1
SDP            :       0                    0


    Frame Counts   (Rcv/Xmt)          Frame Errors
    Bytes  :       61917/61961        Header      : 0
    Frames :        4229/4229         Discard     : 0
    LCP    :        4016/4016         Pad         : 0
    LQR    :           0/0            Unknown Prot : 0
    PAP    :           0/0
    CHAP   :           0/0
    MP     :         210/210
Type: [s] to redraw, [=] main menu, any other key to end.
```

The displayed values and statistics shown here are described under the Primary Call Status option on the preceding pages. All of the values in this display are for the secondary ISDN call to the chosen remote site when in Multilink mode.

Primary Call Quality (Option 4)

```
                          Primary   Call Quality              Remote Site  2-two
Multilink: Enabled


                      Local LQM           Remote LQM
 LQM             :       none                none
 Quality Period :       0                   0

  Recent             (Rcv/Xmt)       LQR
  Lost Packets:         0/0          Lost Outbound LQRs        : 0
  Lost Octets :         0/0          Outbound LQRs in Pipeline : 0
  Total                              Change in Peer InDiscards : 0
  Lost Packets:         0/0          Change in Peer InErrors   : 0
  Lost Octets :         0/0
  LQRs        :         0/0








Type: [s] to redraw, [=] main menu, any other key to end.
```

Multilink :

This displays the current state of Multilink operation for this remote site connection: Enabled / Disabled.

LQM :

This displays the negotiated LQM (Link Quality Mode) for this end of the link connection as well as the LQM for the remote end: LQR / none.

Quality Period :

This displays the negotiated quality period value for this end of the link connection as well as the quality period value for the remote end.

Recent Counts

Lost Packets :

This indicates the number of packets lost while receiving / transmitting across this link during the previous quality period.

Lost Octets :

This indicates the number of octets lost while receiving / transmitting across this link during the previous quality period.

Total Counts

Lost Packets :

This indicates the total number of packets lost while receiving / transmitting across this link.

Lost Octets :

This indicates the total number of octets lost while receiving / transmitting across this link.

LQRs :

This indicates the total number of LQR packets received / transmitted across this link.

LQR

Lost Outbound LQRs :

This indicates the total number of LQR packets sent to the remote site that have been lost.

Outbound LQRs in Pipeline :

This indicates the total number of LQR packets sent to the remote site that have not been received by the remote site.

Change in Peer InDiscards:

This indicates the number of times the remote site has discarded packets due to congestion.

Change in Peer InErrors :

This indicates the number of times the remote site has discarded packets due to invalid packets.

Secondary Call Quality (Option 5)

```
                        Secondary Call Quality              Remote Site  2-two
 Multilink: Enabled


                      Local LQM            Remote LQM
 LQM            :       none                  none
 Quality Period :       0                     0

  Recent              (Rcv/Xmt)       LQR
  Lost Packets:          0/0          Lost Outbound LQRs        : 0
  Lost Octets :          0/0          Outbound LQRs in Pipeline : 0
  Total                               Change in Peer InDiscards : 0
  Lost Packets:          0/0          Change in Peer InErrors   : 0
  Lost Octets :          0/0
  LQRs        :          0/0




 Type: [s] to redraw, [=] main menu, any other key to end.
```

The displayed values and statistics shown here are described under the Primary Call Quality option on the preceding pages. All of the values in this display are for the secondary ISDN call to the chosen remote site when in Multilink mode.

Multilink Statistics (Option 6)

```
                          Multilink                   Remote Site  2-two
Multilink: Enabled,  Auto-call: Disabled, Bundle state: Up, Links: 2


        Local MP                         Remote MP
 MRRU  : 1600                            1600
 SSNHF : normal                          normal
 EPD   : class MAC 02-03-04-05-06-07     class MAC 02-03-04-05-06-08


        Frame Counts                     Fragment Counts
        Rcv                 : 220         Rcv                 : 437
        Xmt                 : 220         Xmt                 : 436

        Header Error    : 0               Header Error    : 0
        Discard         : 0               Discard         : 0
        Unknown Protocol : 0




Type: [s] to redraw, [=] main menu, any other key to end.
```

Multilink :

This displays the current state of Multilink operation for this remote site connection: Enabled / Disabled.

Auto-Call :

This displays the current state of Auto-Call status for this remote site connection: Enabled / Disabled.

Bundle State :

This displays the current state of the PPP link bundle: Idle / Opening / Up / Stopping / Closing.

Links :

This displays the number of links currently in use by this connection to the chosen remote site.

MRRU :

This displays the negotiated MRRU (Maximum Receive Reconstructed Unit) value for this end of the link connection as well as the MRRU value for the remote end.

SSNHF :

This displays the negotiated SSNHF (Short Sequence Number Header Format) value for this end of the link connection as well as the SSNHF value for the remote end: normal / short.

EPD :

This displays the negotiated EPD (End Point Discriminator) value for this end of the link connection as well as the EPD value for the remote end.

Frame Counts

Rcv :

Receive — This indicates the number of MP frames that have been received. This is counted after reconstruction of the Multilink frame.

Xmt :

Transmit — This indicates the number of MP frames that have been transmitted. This is counted after reconstruction of the Multilink frame.

Header Error :

This indicates the number of MP frames that have been discarded due to an error in the header. This is counted after reconstruction of the Multilink frame.

Discard :

This indicates the number of MP frames that have been silently discarded due to the frame not belonging within a MP frame, i.e. LCP frames. This is counted after reconstruction of the Multilink frame.

Unknown Protocol :

This indicates the number of MP frames that have been discarded due to the frame being an unknown or unsupported protocol type, i.e. IPXCP or BDP. This is counted after reconstruction of the Multilink frame.

Fragment Counts

Rcv :

Receive — This indicates the number of MP frame fragments that have been received. This is counted before reconstruction of the Multilink frame.

Xmt :

Transmit — This indicates the number of MP frame fragments that have been transmitted. This is counted before reconstruction of the Multilink frame.

Header Error :

This indicates the number of MP frame fragments that have been discarded due to an error in the header. This is counted before reconstruction of the Multilink frame.

Discard :

This indicates the number of MP frame fragments that have been discarded due to the remaining portion of the MP frame not being received.

Usage Information (Option 7)

```
                               Usage                    Remote Site  2-two
Multilink: Enabled,  Auto-call: Disabled, Bundle state: Up

   Day of Week      Usage          Outgoing Calls
   Sunday      :   0 min         0 calls
   Monday      :   0 min         0 calls
   Tuesday     :   0 min         0 calls
   Wednesday   :   0 min         0 calls
   Thursday    :   0 min         0 calls
   Friday      :   0 min         0 calls
   Saturday    :   0 min         0 calls

   Current     :   0 min         0 calls




Type: [s] to redraw, [=] main menu, any other key to end.
```

Multilink :

This displays the current state of Multilink operation for this remote site connection: Enabled / Disabled.

Auto-Call :

This displays the current state of Auto-Call status for this remote site connection: Enabled / Disabled.

Bundle State :

This displays the current state of the PPP link bundle: Idle / Opening / Up / Stopping / Closing.

Usage :

This displays the total number of minutes of ISDN line usage to this remote site for the indicated day of the week. If the Restart Time is set to be before 12:00 noon, any connection usage before 12:00 noon will be counted in the previous days totals.

Outgoing Calls :

This displays the total number of outgoing ISDN calls to this remote site for the indicated day of the week. If the Restart Time is set to be before 12:00 noon, any outgoing ISDN calls established before 12:00 noon will be counted in the previous days totals.

Remote Site Statistics - Protocol Status Menu

```
                 REMOTE SITE STATUS two PROTOCOL STATUS MENU

     Option                  Description
 1. BCP status          - Display BCP status values
 2. IPCP status         - Display IPCP status values
 3. IPXCP status        - Display IPXCP status values
 4. CCP status          - Display CCP status values
 5. CMCP status         - Display CMCP status values
 6. BACP Status         - Display CMCP status values



Enter option number, "=" - main menu, <TAB> - previous menu

 >
```

The **REMOTE SITE - PROTOCOL STATUS MENU** allows the display of the status of each LCP module.

1 - BCP Status

Displays a summary of BCP (Bridge Control Protocol) parameters for the chosen remote site since the statistics were last reset.

2 - IPCP Status

Displays a summary of IPCP (Internet Protocol Control Protocol) parameters for the chosen remote site since the statistics were last reset.

3 - IPXCP Status

Displays a summary of IPXCP (Internet Packet Exchange Control Protocol) parameters for the chosen remote site since the statistics were last reset.

4 - CCP Status

Displays a summary of CCP (Compression Control Protocol) parameters for the chosen remote site since the statistics were last reset.

5 - CMCP Status

Displays a summary of CMCP (Connection Management Control Protocol) parameters for the chosen remote site since the statistics were last reset.

6 - BACP Status

Displays a summary of BACP (Bandwidth Allocation Control Protocol) parameters for the chosen remote site since the statistics were last reset.

BCP Status Display (Option 1)

```
                              BCP                   Remote Site  2-two
Multilink: disabled, Auto-call: disabled, Bundle state: Idle
Operational status: Initial


                        Local BCP                Remote BCP
802.3/Ethernet        : disabled                disabled
Tinygram Compression  : disabled                disabled
MAC Address           : 00-00-00-00-00-00        00-00-00-00-00-00

   Frame Counts          (Rcv/Xmt)              Frame Errors
   BCP        :            0/0                   Rcv BPDU Discards : 0
   BPDU       :            0/0                   Xmt BPDU Discards : 0
   Bridge     :            0/0                   Rcv Brg Discards  : 0
                                                 Xmt Brg Discards  : 0




Type: [s] to redraw, [=] main menu, any other key to end.
```

Multilink :

This displays the current state of Multilink operation for this remote site connection: Enabled / Disabled.

Auto-Call :

This displays the current state of Auto-Call status for this remote site connection: Enabled / Disabled.

Bundle State :

This displays the current state of the PPP link bundle: Idle / Opening / Up / Stopping / Closing.

Operational Status :

This displays the current state of the PPP IPCP protocol module for this remote site connection: Initial / Starting / Closed / Stopped / Closing / Stopping / Req Sent / Ack Rcvd / Ack Sent / Opened.

802.3/Ethernet:

This displays the resulting bridging state for this protocol after the advisory notices are sent by the local and remote bridges. The advisory notices indicate what frame types are supported by the device.

This may display disabled if the partner bridge sends a configure reject for the advisory notice for this frame type. When this happens, the device that originally sent the advisory notice will continue to send bridge frames in the frame formats originally reported in the advisory notice.

Tinygram Compression:

This displays the negotiated state of Tinygram Compression for the local and remote devices.

MAC Address:

This displays the MAC addresses of the local and remote devices which are used for bridging data between the devices.

Frame Counts

BCP :

This indicates the total number of BCP frames received/transmitted across the link.

BPDU :

This indicates the total number of BPDU (Bridge Protocol Data Unit) frames received/transmitted across the link. If this device is not running STP and receives STP frames from the peer device, the BPDU frames will be counted as received and then silently discarded.

Bridge:

This indicates the total number of non-compressed bridge frames received/transmitted across the link.

Frame Errors

Rcv BPDU Discards :

This is generated when an incoming BPDU frame is discarded due to congestion or BCP not being open.

Xmt BPDU Discards :

This is generated when an outgoing BPDU frame is discarded due to congestion.

Rcv Brg Discards :

This is generated when an incoming bridge frame is discarded due to congestion.

Xmt Brg Discards :

This is generated when an outgoing bridge frame is discarded due to congestion.

IPCP Status Display (Option 2)

```
                              IPCP                    Remote Site  2-two
 Multilink: Enabled,  Auto-call: Enabled, Bundle state: Up
 Operational status : Opened


                      Local IPCP                 Remote IPCP
 IP Address       :   198.169.3.1                198.169.3.2
 Subnet Mask size :   24                         24
 Link IP type     :   unNumbered
 VJ Compression   :   VJ TCP                     VJ TCP
 Max slot id      :   15                         15
 Slot id Comp     :   enabled                    enabled


   Frame Counts        (Rcv/Xmt)                Frame Errors
   IPCP       :            3/2                   VJ      : 0
   IP         :           15/16                  Rcv Discards : 0
   VJ Comp    :            0/0                    Xmt Discards : 0
   VJ Uncomp  :            0/0



 Type: [s] to redraw, [=] main menu, any other key to end.
```

Multilink :

This displays the current state of Multilink operation for this remote site connection: Enabled / Disabled.

Auto-Call :

This displays the current state of Auto-Call status for this remote site connection: Enabled / Disabled.

Bundle State :

This displays the current state of the PPP link bundle: Idle / Opening / Up / Stopping / Closing.

Operational Status :

This displays the current state of the PPP IPCP protocol module for this remote site connection: Initial / Starting / Closed / Stopped / Closing / Stopping / Req Sent / Ack Rcvd / Ack Sent / Opened.

IP Address :

This displays the current IP addresses for this end of the IPCP link connection as well as the IP address for the remote end.

Subnet Mask Size :

This displays the current subnet mask size for this end of the IPCP link connection as well as the subnet mask size for the remote end.

Link IP Type :

This displays the type of IP link connection between this DI-1132 and the remote site router, either numbered or unnumbered.

VJ Compression :

This displays the negotiated type of compression protocol for this end of the IPCP link connection as well as the compression protocol for the remote end: none, VJ TCP.

Max Slot Id :

This displays the negotiated value for the Van Jacobson max slot identifier for this end of the IPCP link connection as well as the value for the Van Jacobson max slot identifier for the remote end.

Slot Id Comp :

This displays the negotiated state of the Van Jacobson slot identifier compression for this end of the IPCP link connection as well as the state of the Van Jacobson slot identifier compression for the remote end.

Frame Counts

IPCP :

This indicates the total number of IPCP frames received/transmitted across the link.

IP :

This indicates the total number of non-compressed IP frames received/transmitted across the link.

VJ Comp :

This indicates the total number of compressed TCP frames received/transmitted across the link.

VJ Uncomp :

This indicates the total number of uncompressed TCP frames received/transmitted across the link.

Frame Errors

VJ :

VJ — This is generated when an incoming compressed TCP frame is discarded, possibly due to error detection.

Rcv Discards :

This is generated when an incoming IP frame is discarded due to congestion.

Xmt Discards :

This is generated when an outgoing IP frame is discarded due to congestion.

IPXCP Status Display (Option 3)

```
                              IPXCP                    Remote Site  2-two
Multilink: Disabled, Auto-call: Disabled, Bundle state: Up
Operational status: Opened


IPX Routing Protocol: RIP/SAP
Force RIP Updates   : disabled
IPX Network Number  : 0
IPX Node Number
    Local           : 00-00-00-00-00-00
    Remote          : 00-00-00-00-00-00


  Frame Counts         (Rcv/Xmt)              Frame Errors
  IPXCP      :            10/33               Rcv Discards : 0
  IPX        :           423/553              Xmt Discards : 0




Type: [s] to redraw, [=] main menu, any other key to end.
```

Multilink :

This displays the current state of Multilink operation for this remote site connection: Enabled / Disabled.

Auto-Call :

This displays the current state of Auto-Call status for this remote site connection: Enabled / Disabled.

Bundle State :

This displays the current state of the PPP link bundle: Idle / Opening / Up / Stopping / Closing.

Operational Status :

This displays the current state of the PPP IPCP protocol module for this remote site connection: Initial / Starting / Closed / Stopped / Closing / Stopping / Req Sent / Ack Rcvd / Ack Sent / Opened.

IPX Routing Protocol:

This displays the IPX routing protocol negotiated over the link.   The possible routing protocols are RIP/SAP, Static, Demand RIP/SAP.

Force RIP Updates:

This displays the state of the force RIP updates option on the link connection. This display is only applicable when the IPX Routing Protocol is RIP/SAP.

IPX Network Number:

This displays the IPX network number negotiated for the link. The network number will be 0 if the interface is unnumbered.

IPX Node Number:

Local :

This indicates the IPX node number negotiated for this end of the link. The node number will be 0 if the interface is unnumbered.

Remote :

This indicates the IPX node number negotiated for the remote site end of the link. The node number will be 0 if the interface is unnumbered.

Frame Counts

IPXCP :

This indicates the total number of IPXCP frames received/transmitted across the link.

IPX :

This indicates the total number of IPX frames received/transmitted across the link.

Frame Errors

Rcv Discards :

This is generated when an incoming IPX frame is discarded due to congestion.

Xmt Discards :

This is generated when an outgoing IPX frame is discarded due to congestion.

CCP Status Display (Option 4)

```
                             CCP                      Remote Site  2-two
Multilink: Disabled, Auto-call: Disabled, Compression: Enabled
Bundle state: Up, Operational status: Opened


                    Local CCP                  Remote CCP
Protocol       :    Stac LZS (17)              Stac LZS (17)
Histories      :    1                          1
Check mode     :    Sequence Number            Sequence Number
Restarts       :    0
Resyncs        :    0


   Frame Counts          (Rcv/Xmt)             Frame Errors
   CCP         :            2/1                Compress      : 0
   Reset Req   :            0/0                Decompress    : 0
   Reset Ack   :            0/0                Rcv Discards  : 0
   Comp Frames :        73647/172408           Zero pad      : 0
   Raw Bytes   :      3536850/8277384
   Comp Bytes  :      1397743/3274734
   Comp Ratio  :          2.5:1 / 2.5:1
   Recent Ratio:          4.1:1 / 6.7:1


Type: [s] to redraw, [=] main menu, any other key to end.
```

Multilink :

This displays the current state of Multilink operation for this remote site connection: Enabled / Disabled.

Auto-Call :

This displays the current state of Auto-Call status for this remote site connection: Enabled / Disabled.

Compression :

This displays the current state of compression status for this remote site connection: Enabled / Disabled.

Bundle State :

This displays the current state of the PPP link bundle: Idle / Opening / Up / Stopping / Closing.

Operational Status :

This displays the current state of the PPP CCP protocol module for this remote site connection: Initial / Starting / Closed / Stopped / Closing / Stopping / Req Sent / Ack Rcvd / Ack Sent / Opened.

Protocol :

This displays the current compression protocol for this end of the CCP link connection as well as the compression protocol for the remote end.

Histories :

This displays the current number of histories which have been negotiated for both the local end and the remote end of the connection.

Check Mode :

This displays the compression check modes which have been negotiated for both the local end and the remote end of the connection.

Restarts :

This displays the number of times that compression has been restarted by renegotiating CCP on the connection.

Resyncs :

This displays the number of times that CCP has been successfully resynchronized on the connection.

Frame Counts

CCP :

This indicates the total number of CCP frames received/transmitted across the link.

Reset Req :

This indicates the total number of Reset Requests received/transmitted across this link.

Reset Ack :

This indicates the total number of Reset Acknowledgments received/transmitted across this link.

Comp Frames :

This indicates the total number of compressed frames received/transmitted across this link.

Raw Bytes :

This indicates the total number of bytes before compression received/transmitted across this link.

Comp Bytes :

This indicates the total number of compressed bytes received/transmitted across this link.

Comp Ratio :

This indicates the received/transmitted average compression ratio since the last time statistics were cleared.

Recent Ratio :

This indicates the received/transmitted compression ratio in the last display period.

Frame Errors

Compress :

This is generated when an error occurred during compression.

Decompress :

This is generated when an error occurred during decompression or a compression sequence number was not received.

Rcv Discards :

The number of discards due to an incorrect compression sequence number or discards when a compressed frame is received before the Ack is received.

Zero Pad :

This number indicates the number of frames with zero pad compression received. This acts as a flag for frames received which have been compressed with an unsupported compression technique.

CMCP Status Display (Option 5)

```
                              CMCP                        Remote Site  2-two
Multilink: enabled, Auto-call: disabled, Bundle state: Up
Operational status: Closed


                       Local CMCP                 Remote CMCP
Callback number 1   :  none                       none
Callback number 2   :  none                       none


   Frame Counts          (Rcv/Xmt)            Connection Counts
   CMCP        :            0/0                Connections  : 0
                                              Terminations : 0
                                              Suspensions  : 0
                                              Resumptions  : 0






Type: [s] to redraw, [=] main menu, any other key to end.
```

Multilink :

This displays the current state of Multilink operation for this remote site connection: Enabled / Disabled.

Auto-Call :

This displays the current state of Auto-Call status for this remote site connection: Enabled / Disabled.

Bundle State :

This displays the current state of the PPP link bundle: Idle / Opening / Up / Stopping / Closing.

Operational Status :

This displays the current state of the PPP CMCP protocol module for this remote site connection: Initial / Starting / Closed / Stopped / Closing / Stopping / Req Sent / Ack Rcvd / Ack Sent / Opened / Suspend Sent/ Suspending / Suspended / Removing.

Callback Number 1:

This displays the primary ISDN number used to callback the partner router if a suspended link needs to be re-connected. The callback numbers are displayed for both devices here.

Callback Number 2:

This displays the alternate ISDN number used to callback the partner router if a suspended link needs to be re-connected. The callback numbers are displayed for both devices here.

Frame Counts

CMCP :

This indicates the total number of CMCP frames received/transmitted across the link.

Connection Counts

Connections :

This indicates the total number of CMCP link connections to this remote site.

Terminations :

This indicates the total number of CMCP link terminations to this remote site.

Suspensions :

This indicates the total number of CMCP link suspensions to this remote site.

Resumptions :

This indicates the total number of CMCP link resumptions to this remote site.

BACP Status Display (Option 6)

```
                               BACP                    Remote Site  2-two
Multilink: disabled, Auto-call: disabled, Bundle state: Idle
Operational status: Initial, BACP: enabled

Call Mode               :  Local
Request Number Option   :  Disabled

   Frame  Counts          (Rcv/Xmt)            Frame  Errors
   BACP        :             0/0               Rcv BAP Discards : 0
   BAP         :             0/0               Xmt BAP Discards : 0




Type: [s] to redraw, [=] main menu, any other key to end.
```

Multilink :

This displays the current state of Multilink operation for this remote site connection: Enabled / Disabled.

Auto-Call :

This displays the current state of Auto-Call status for this remote site connection: Enabled / Disabled.

Bundle State :

This displays the current state of the PPP link bundle: Idle / Opening / Up / Stopping / Closing.

Operational Status :

This displays the current state of the PPP BACP protocol module for this remote site connection: Initial / Starting / Closed / Stopped / Closing / Stopping / Req Sent / Ack Rcvd / Ack Sent / Opened.

BACP:

This displays the current state of the BACP for this remote site connection: Enabled / Disabled.

Call Mode:

This displays the call mode for this remote site: Local / Partner.

Request Number Option:

This displays the status of the request number option for this remote site: Enabled / Disabled.

Frame Counts

BACP :

This indicates the total number of BACP frames received/transmitted across the link.

BAP :

This indicates the total number of BAP frames received/transmitted across the link.

Frame Errors

Rcv BAP Discards :

This is generated when an incoming BAP frame is discarded due to congestion.

Xmt BAP Discards :

This is generated when an outgoing BAP frame is discarded due to congestion.

Diagnostics Menu

```
                        DIAGNOSTICS MENU

     Option              Value           Description
  1. Trace               menu          - View link frames
  2. Heartbeat         [enabled]       - Report transceiver heartbeat failures
  3. Soft reset                        - Reset device (retain configuration)
  4. Full reset                        - Reset device (use factory defaults)




Enter option number, "=" - main menu, <TAB> - previous menu

>
```

1 - Trace

The Trace option takes you to the Trace Menu, where options can be [enabled] or [disabled] for each link in order to evaluate link performance.

2 - Heartbeat

The Heartbeat option enables or disables reporting of transceiver heartbeat failures. This failure is not a router fault but a transceiver fault. As a check for LAN presence, the transceiver should ensure that the collision-presence circuit is working whenever a transmission is made. When Heartbeat is enabled, the router will report these failures. Ethernet Version 1 does not support Heartbeat, so all transceivers should have Heartbeat Disabled on these Version 1 Ethernet networks.

Considerations:

Enabling this option can help in determining transmission line performance, although it will decrease router performance, since additional processing must be done by the router to report these errors. (Disable for Version 1 Ethernet.)

3 - Soft Reset

Selecting the Soft Reset option resets the router software and restarts the router. The current configuration is retained.

Note that a hardware (and software) reset may be performed by toggling the switch behind the small access hole at the bottom of the faceplate on the right side.

4 - Full Reset

Selecting the Full Reset option resets the router configuration to factory default settings and restarts the router. The factory default settings include the terminal type and password.

CAUTION: Use this option with caution. All configuration settings will be lost.

Trace Menu

```
                         TRACE MENU

    Option              Value                   Description
 1. Trace 1             [disabled]           - View link 1 frames
 2. Trace 2             [disabled]           - View link 2 frames
 3. Real time           [disabled]           - Display frames in real-time
 4. Capture             [disabled]           - Capture frames in buffer
 5. Allocate            [0 kbytes]           - Set capture buffer size
 6. End                 [disabled]           - End capture at link down
 7. Data display        [hex] [single_line]  - Set frame display format
 8. Time                [disabled]           - Add time to display
 9. Show                                     - View capture buffer


Enter option number, "=" - main menu, <TAB> - previous menu

>
```

The **TRACE MENU** can be used to monitor the link with features such as statistics capture, frame and packet level tracing, and link-utilization and efficiency histograms. Note that these features will hamper the performance of the router; therefore, the tracing functions should only be [enabled] when needed.

1 - Trace Link 1
2 - Trace Link 2

[Enable] the trace for either or both links after the other options below are set. These options also determine which link is displayed with the Show option.

3 - Real Time

Enable the Real Time option when the display of frames in real-time is desired. When [enabled], the trace starts immediately and scrolls off the bottom of the screen. Return to the menu by entering "3" to disable real-time (You will have to wait 7-8 seconds or more for this to take effect).

4 - Capture

Enabling the Capture option allows for frame capture and display after the buffer is allocated. Use Option 9, Show, to display the capture.

5 - Allocate

Use the Allocate option to set the size of the buffer used to store captured frames. The buffer size is 3 to 20 KB. Once the buffer size is set, it can be adjusted only within the range given.

6 - End

With the End option [enabled], if the link goes down while a trace is underway, the Capture function will end and the data from the trace can be examined up until the point of failure. If this option is [disabled], the Capture function will end when the allocated capture buffer is full.

If the link goes down and then comes back up, the recovery can be examined with End [disabled].

7 - Data display

Three possibilities are offered for the display of data. Data may be displayed in **hex** or **ASCII,** or, since in most cases the data being sent doesn't itself need to be examined, **off** may be chosen, which will display only the protocol frame information. Note that command completion may be used (i.e. only the first letter(or letters) need to be entered for recognition). After a data from a trace is captured, you may move from off to ASCII or hex, as this information resides in the background.

```
Enter:
  ascii, hex, off
>

Enter:
  all_lines, single_line
>
```

8 - Time

[Enable] the Time option to add time to the trace display in thousands of a second (h.mm.ss.xxx). Time is always available and does not need to be enabled to capture data during a trace (i.e. may be enabled after the data from the trace is captured). Time is relative to the time of power-up.

9 - Show

The Show option appears once the buffers are allocated and displays the frames captured by the Trace and stored in the capture buffer. (BOB = Beginning of Buffer; EOB = End of Buffer.) The trace shown below is with the data display in the "off" mode.

```
BOB                          This Router              Partner Router
      rRR 0                                           expects 0
xI  4,0  122                 expects 4, sends 0       gets 0
      rRR 1                                           expects 1
      rI 1,4  68             gets 4                   still expecting 1, sends 4
xRR 5                        expects 5
      rI 1,5  68             gets 5                   still expecting 1, sends 5
xI 5,1  122                  still expecting 5, sends 1   gets 1
xRR 6                        expects 6
      rRR 2                                           expects 2
xI 6,2  236                  still expecting 6, sends 2   gets 2
      rRR 3                                           expects 3
      rI 3,6  68             gets 6                   still expecting 3, sends 6
xRR 7                        expects 7
      rI 3,7  68             gets 7                   still expecting 3, sends 7
xI 7,3  144                  still expecting 7, sends 3   gets 3
xRR 0                        expects 0
      rRR 4                                           expects 4
xI 0,4  122                  still expecting 0, sends 4   gets 4
      rRR 5                                           expects 5
      rI 5,0  68             gets 0                   still expecting 5, sends 0
xRR 1                        expects 1
      rI 5,1  68             gets 1                   still expecting 5, sends 1
xI 1,5  122                  still expecting 1, sends 5   gets 5
xRR 2                        expects 2
      rRR 6                                           expects 6
xI 2,6  258                  still expecting 2, sends 6   gets 6
      rRR 7                                           expects 7
      rI 7,2  68             gets 2                   still expecting 7, sends 2
xRR 3                        expects 3
      rI 7,3  68             gets 3                   still expecting 7, sends 3
xI 3,7  68                   still expecting 3, sends 7   gets 7
xRR 4                        expects 4
      rRR 0                                           expects 0
EOB
```

Format:

Receive frames (r) are indented.
Transmit frames (x) are not.

Valid frames are as follows:

I	-	Information
RR	-	Receiver Ready
RNR	-	Receiver Not Ready
REJ	-	Reject
SABM	-	Set Asynchronous Balance Mode
DM	-	Disconnect Mode
DISC	-	Disconnect
UA	-	Unnumbered Acknowledgment
FRMR	-	Frame Reject

Information (I) Frame traces will be displayed with the following:

Link (L1/L2)(x/r)I   N(r), N(s)   Data Field Length   Data Field (hex)

As much of the Data Field as will fit on one line will be displayed if hex or ASCII format is specified. If **off** is specified, only the Data Field Length is given.

Supervisory (S) frame traces will be displayed with the following:

Link (L1/L2)(x/r)(RR / RNR / REJ)   N(r)

Unnumbered (U) frame traces will be displayed with the following:

Link (0/1)   (x/r)   (SABM / DM / DISC / UA / FRMR)

Any illegal or unknown frame will be completely dumped in hex. Note that any frame with a CRC error will not be displayed and a Level 2 error will be output.

LAPB *control field* formats:

Three types of Link Access Procedures (Balanced) **LAPB** control field formats are used to perform:

1) numbered information transfer (**I** format),
2) numbered supervisory functions (**S** format) and
3) unnumbered control functions (**U** format).

The numbered **I** format is used to perform information transfer.

The numbered **S** format is used to perform data link supervisory control functions such as:
   - acknowledge **I** frames,
   - request transmission of **I** frames, and
   - to request a temporary suspension of **I** frames.

The unnumbered **U** format is used to provide additional data link control functions.

INFORMATION FRAMES:

I   **I**nformation

The (**I**) statistic indicates a transfer of a sequentially numbered frame containing an (**I**) information field.

To allow the sending of an **I**nformation frame a Receive Ready (**RR**) supervisory frame is sent by the remote router requesting the connection.

SUPERVISORY FRAMES:

RR   **R**eceiver **R**eady

A Receive Ready (**RR**) supervisory frame is sent by the router in order to:

1)   indicate that it is ready to receive an **I** frame;
2)   acknowledge previously received **I** frames numbered up to and including N(R) - 1.

An **RR** frame may be used to indicate the clearance of a busy condition reported by the earlier transmission of an **RNR** frame by that same router.

RNR   **R**eceiver **N**ot **R**eady

The **RNR** statistic is generated by either remote router to indicate a busy condition. A busy condition essentially indicates a temporary inability to accept incoming **I** frames. **I** frames numbered up to and including N(R) - 1 are acknowledged.

I frame N(R) and any subsequent **I** frames received, are not acknowledged; the acceptance state of these unacknowledged frames will be indicated in subsequent exchanges.

REJ   **REJ**ect

The **REJ** supervisory frame is generated when a remote router requests transmission of **I** frames starting with the frame numbered N(R). **I** frames numbered N(R) - 1 and below are acknowledged. Additional **I** frames (pending initial transmission) may be transmitted following the retransmitted **I** frame(s).

Only one **REJ** exception condition for a given transfer direction may be established at any time. This **REJ** exception condition is reset (cleared) upon the receipt of an **I** frame with an N(S) equal to the N(R) of the **REJ** frame. An **REJ** frame may be used to indicate the clearance of a busy condition that was reported by the earlier transmission of an **RNR** frame by that same router.

UNNUMBERED FRAMES:

SABM   **S**et **A**synchronous **B**alanced **M**ode

The **SABM** unnumbered command is generated to place the addressed router into an asynchronous balanced mode information-transfer phase, where all command/response control fields will be one octet in length.

The transmission of a **SABM** statistic indicates the clearance of a busy condition that was reported by the earlier transmission of an **RNR** frame and statistic by that same router.

The receiving router confirms acceptance of the **SABM** by the transmission, at the first opportunity, of a **UA** response.

Previously transmitted **I** frames that are unacknowledged when a **SABM** command is generated remain unacknowledged. It is the responsibility of a higher level (e.g. TCP, XNS, LAT) to recover from the loss of the contents (packets) of such **I** frames.

DISC   **DISC**onnect

The **DISC** statistic is generated when the router sending the **DISC** informs the other router that it (the sending router) is suspending its own operation.

Before the **DISC** is acted upon, the router receiving the **DISC** confirms its acceptance of the **DISC** command by the transmission of a **UA** response. The router sending the **DISC** enters the disconnected phase when it receives the acknowledged **UA** response.

Previously transmitted **I** frames that are unacknowledged when **DISC** is generated remain unacknowledged. It is the responsibility of a higher-level protocol (e.g. TCP, XNS, LAT) to recover from the possible loss of the contents (packets) of such **I** frames.

UA   **U**nnumbered **A**cknowledgment

A **UA** response and statistic is generated to acknowledge the receipt and acceptance of the mode-setting commands. Received mode-setting commands are not acted upon until the **UA** response is transmitted. The transmission of a **UA** response indicates the clearance of a busy condition that was reported by the earlier transmission of an **RNR** frame by that same router.

DM   **D**isconnected **M**ode

The **DM** unnumbered response and statistic is generated to report a status where the router is logically disconnected from the link, and is in the disconnected phase.

1)   The **DM** may be sent to indicate that the router has entered the disconnected phase without having received a **DISC** command.

2)   If sent in response to the reception of a mode-setting command, the **DM** is sent to inform the other router(s) that this router is still in the disconnected phase and cannot execute the Set Mode command.

A router in the **DM** phase will monitor received commands and will react to a **SABM** command. It will send a **DM** response with the F bit set to 1 in response to another command received with the P bit set to 1.

FRMR   **FR**a**M**e **R**eject

The **FRMR** statistic is generated by the router to report an error condition not recoverable by the re-transmission of an identical frame. This may result from at least one of the following conditions:

1)   the receipt of a command or response control field that is undefined or not implemented;

2)   the receipt of an I frame with an information field that exceeds the maximum established length;

3)   the receipt of an invalid N(R); or

4)   the receipt of a frame with an information field that is not permitted or the receipt of a supervisory or unnumbered frame with incorrect length.

An undefined or not implemented control field is any control field encoding not identified in Table 5, LAPB commands and responses.

A valid N(R) must be within the range from the lowest send sequence number N(S) of the still unacknowledged frame(s) to the current logical DCE send state variable, inclusive.

An information field that immediately follows the control field, and consists of 3 to 5 octets, is returned with the FRMR and provides the reason for the FRMR response.

Network Events Menu

```
                      NETWORK EVENTS MENU

    Option                     Description
 1. Acknowledge alarm       - Clear alarm status display
 2. Show events             - View event history
 3. Clear events            - Clear event history
 4. Show security log       - View security failure log
 5. Clear security log      - Clear security failure log
 6. Show resumption log     - View resume event log
 7. Clear resumption log    - Clear resume event log




Enter option number, "=" - main menu, <TAB> - previous menu


>
```

The **NETWORK EVENTS MENU** allows the display and management of alarm histograms.

Event and Security Logs are listed and explained in the Reference Manual file on the accompanying disks.

1 - Acknowledge Alarm

The Acknowledge Alarm option clears the screen ALARM display for the current alarm.

2 - Show Events

The Show Events option displays the 42 most recent ALARMs since the router was last powered up or Cleared with Option 3.

```
#1   94/12/22 13: 39: 05   SNMP is running
#2   94/12/22 13: 39: 06 * IP Routing is enabled
#3   94/12/22 13: 39: 07   Configuration restored
#4   94/12/22 13: 39: 08   Running in OPERATIONAL mode
#5   94/12/22 13: 39: 09 * LAN connection established
#6   94/12/22 13: 39: 35 * LAN started forwarding
time is 94/12/22 14: 24: 32, 8 items since last clear.



Type: [s]tart, [n]ext, [p]rev, [=] main menu, any other key to end.
```

The format of the time stamp for each alarm is as follows: year/month/day   hour: minute: second

These will be according to the date and time set in the Device Set-Up menu.

3 - Clear Events

The Clear Events option removes all ALARMs from the table.

4 - Show Security Log

The Show Security Log option displays the 36 most recent ISDN security logs since the router was last powered up or Cleared with Option 5.

```
#1   96/05/16 16:26:53   Link 1 PAP failed for one (5551313)
#2   96/05/16 16:28:19   Link 1 CHAP failed for one (5551313)
time is 96/05/16 16:28:19, 2 items since last clear.

Type: [s]-to redraw, [=] main menu, any other key to end.
```

The format of the time stamp for each alarm is as follows: year/month/day   hour: minute: second

These will be according to the date and time set in the Device Set-Up menu.

5 - Clear Security Log

The Clear Security Log option removes all ISDN security logs from the table.

6 - Show Resumption Log

The Show Resumption Log option displays the 36 most recent connection management link resumption logs since the router was last powered up or Cleared with Option 7. The entries in the log indicate the device that the call was resumed to, the protocol that caused the resumption, the source and destination addresses within the frame that caused the resumption, and a hex dump of the frame that caused the resumption. The hex dump of the frame may be used for debugging purposes when the link is being resumed incorrectly.

```
#1   97/06/18 14:53:27   Resume event to DEV000d05 (IPX)
#2   97/06/18 14:53:27   Dst 0000411b:000000000001:0451 Src
                       + 00001515:00001b02446b:4003
#3   97/06/18 14:53:27   Length = 46 – ff ff 00 29 01 11 00 00 41 1b 00 00 00
                       + 00 00 01 04 51 00 00 15 15 00 00 1b 02 44 6b 40 03 22
                       + 22 17 03 01 00 16 00 02 15 01 01 00 01 bf bf
#4   97/06/18 15:06:10   Resume event to DEV000d05 (IP)
#5   97/06/18 15:06:10   Dst 192.168.95.196 Src 198.169.1.149
#6   97/06/18 15:06:10   Length = 335 – 45 00 01 4f 00 00 00 00 1f 29 b1 db c6
                       + a9 01 95 c0 a8 5f c4 02 54 48 45 20 51 55 49 43 4b 20
                       + 42 52 4f 57 4e 20 46 4f 58 20 4a 55 4d 50 53 20 4f 56
                       + 45 52 20 54 48 45 20 4c 41 5a 59 20 44 4f 47 20 31 32
time is 97/06/18 15:06:16, 9 items since last clear.

Type: [s]-to redraw, [=] main menu, any other key to end.
```

The format of the time stamp for each alarm is as follows: year/month/day   hour: minute: second

These will be according to the date and time set in the Device Set-Up menu.

7 - Clear Resumption Log

The Clear Resumption Log option removes all connection management link resumption logs from the table.