Chapter 3 - Quick Start Guide

This guide provides a step by step checklist for the most common types of Dialnet connections. Dialnet is a term used by Livingston to describe any network connection which is made over a telephone line. Select the type of connection which best represents your planned use of Dialnet then follow the checklist. With the checklists Dialnet can be brought up to an operational state in the fewest number of steps.

Before continuing with this section you should be familiar with TCP/IP or IPX, wide area networking, and basic routing strategies. If you are not familiar with these concepts consult a networking primer on your type of network before proceeding.

Common Network Connection Models

Connecting Networks - The most common uses of Dialnet are to establish wide area network connections between local area networks at geographically dispersed sites, and to allow remote hosts to access the corporate LAN. The following diagrams show three examples:

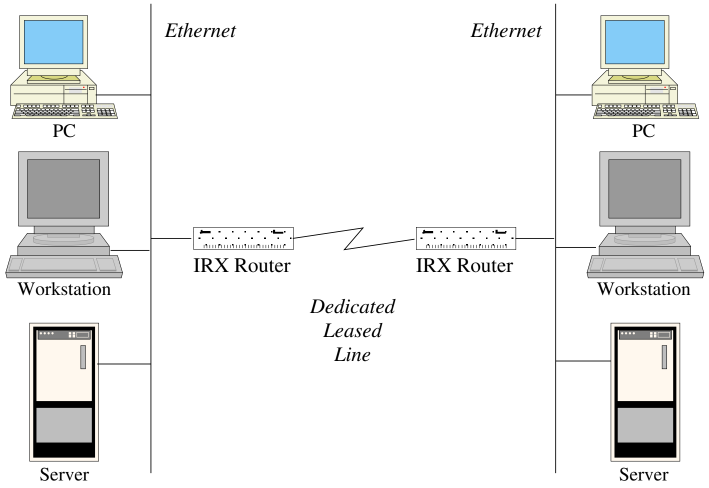

Figure 3-1. Synchronous WAN connection

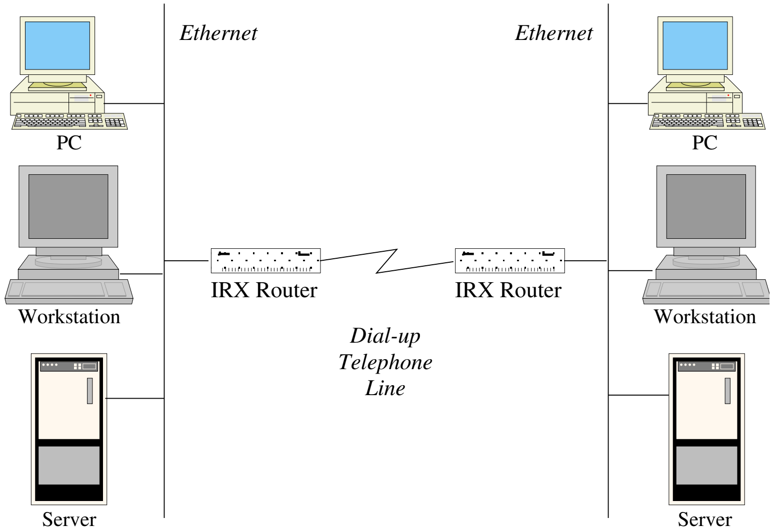

Figure 3-2. Dial up WAN connection

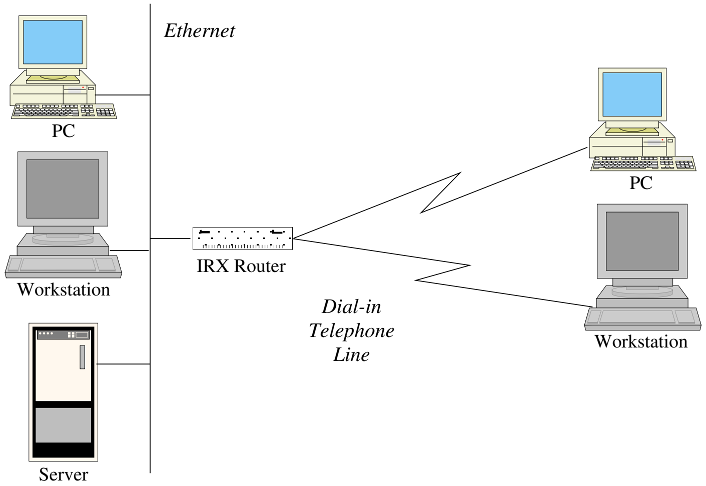

Figure 3-3. Dial up host connection

Each of the previous connection types is described in the following three sections. Proceed to the section which best matches your implementation requirements and follow the recommended installation steps. If none of these configurations matches your requirements, use them as a reference and proceed to Chapters 4, 5, or 6, depending on the interface you choose, for a detailed description of each configuration option.

Synchronous WAN Connections

This section describes the steps for connecting two networks together over dial-up or dedicated telephone lines. In a dial-up environment the remote site(s) can be set up in one of three ways:

- Manual - used for initial testing or when it is desirable to have an administrator manually intervene to cause the connection to come up.
- On Demand - the IRX automatically dials or attempts to establish the network link when packets are queued for the remote site.
- Continuous or Automatic - the IRX will dial or attempt to establish the link after a 60 second delay if the connection fails for any reason.

This section assumes that an IRX will be used at each site, and modems or DSU/CSUs which are compatible with each other will be used. These examples can be used for connecting more than two sites together by simply following the same steps for each additional site

Network Addresses

When connecting two sites which have never directly communicated with each other using TCP/IP or IPX it is important to perform some general address administration. The steps for this are:

❏ For TCP/IP networks verify that every computer on both networks has a unique IP address.

❏ Verify that the IP and/or IPX network (or subnet) numbers at each site are unique. If the two locations are using the same network numbers, routing will not work correctly. In this case, one of the networks must be changed.

❏ For TCP/IP create a common "hosts" file for both sites so users can access the computers at the remote location by name. In a hosts file, no two computers should have the same name. Alternatively, Domain Name Service can be implemented. Check your workstation or TCP/IP vendor manual for information on this service.

Quick Start Guide

Hardware Configuration

The IRX should be connected to the local Ethernet network and the installation steps in Chapter 2 of this manual should be followed. A DSU/CSU (Digital Service Unit/Channel Service Unit) should be attached to S1, S2, S3, or S4. Ports S1 and S3 may be used for connections up to T1/E1, ports S2 and S4 have a maximum speed of 64Kbps. When configured at the same speed any of these ports will support multi-line load balancing for improved performance to the remote site(s).

Each DSU/CSU manufacturer supports a wide variety of configuration settings. Consult the manufacturer’s manual for proper set up of their product with the following options:

❏ Set the DSU/CSU to receive clock from TelCo.

❏ Verify the DSU/CSU has any loopback testing disabled.

Ethernet Configuration

The IRX Ethernet Configuration should be checked. This may be done using the **pmconsole** program, by connecting a terminal to the S0 port, or by using the telnet application over the network.

The figure below is an example of a properly configured Ethernet port:

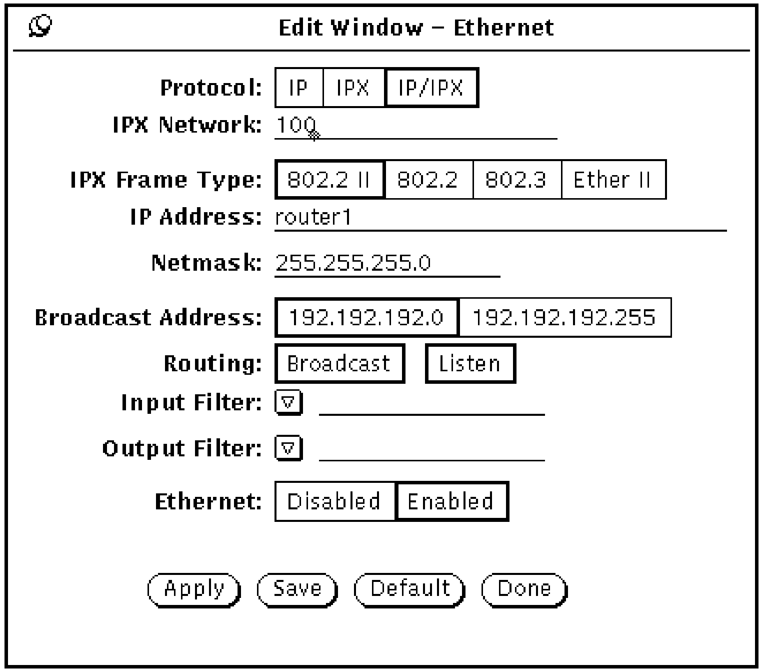

Figure 3-4. Edit Window - Ether0

In the figure above the protocol types of both IP and IPX have been selected, The IP address and IPX network number have been assigned, Broadcast and Listen have been enabled for routing, and the Broadcast Address has been set to all zeros (0).

From the Command Prompt Interface the following entries would produce the same result:

❏ Configure the IP and IPX addresses

```
Command> set address 192.192.192.1
Local address changed from 0.0.0.0 192.192.192.1

Command> set ipxnet 100
IPX network set to 00000100
```

❏ Routing should be set to "Broadcast" and "Listen".

```
Command> set routing on
Routing changed from off (no_broadcast,no_listen) to on (broadcast,listen)
```

❏ The broadcast address should be checked against the one being used by other gateways on the local Ethernet. If broadcast 0's are in use:

```
Command> set broadcast low
Broadcast address changed from high to low
```

Port Configuration

Each port with a DSU/CSU attached for use with a standard dedicated circuit from TelCo should be configured as detailed below. Frame Relay connections are discussed in the next section, followed by a discussion on ISDN connections which required V.25bis dialing scripts.

Below is an example configuration:

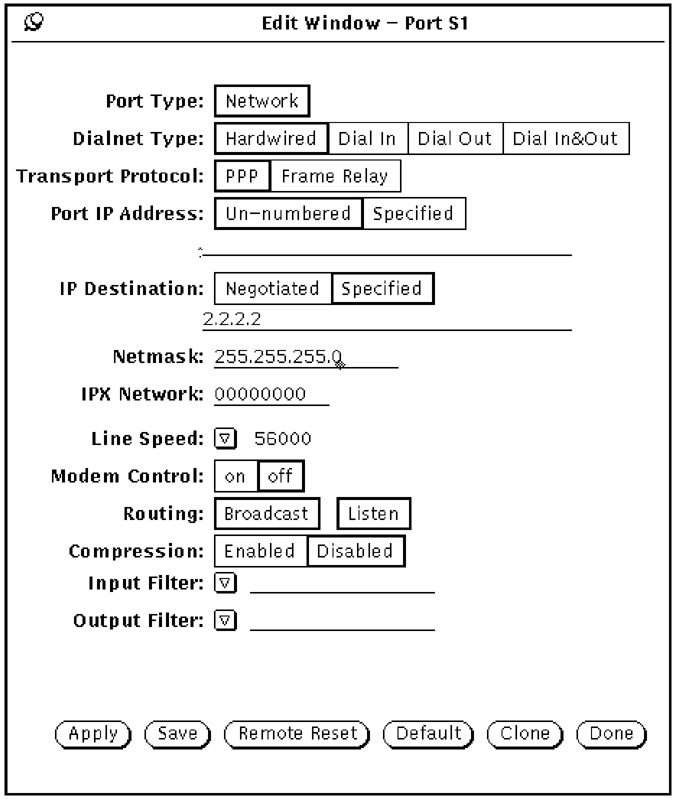

Figure 3-5. Edit Window - S1

In the example above the Destination Address and Netmask have been defined. All other values displayed are the factory defaults.

The IRX does not require each port to have its own IP address. The destination address should be the IP address associated with the Ethernet interface of the remote IRX. If router1 has the IP address 1.1.1.1 assigned to its Ethernet interface and router2 has 2.2.2.2 assigned to its Ethernet interface then the following command on router1 will properly set the destination address for the sync port:

From the Command Prompt Interface the following commands would be required to achieve this result:

❑ Set a destination address for the port.

```
Command> set s4 dest 2.2.2.2 255.255.255.0
Port S4 destination changed from 0.0.0.0 to 2.2.2.2
```

The opposite is true for router2:

```
Command> set s4 dest 1.1.1.1 255.255.255.0
Port S4 destination changed from 0.0.0.0 to 1.1.1.1
```

❑ Reset the port

```
Command> reset s4
Resetting port S4
```

In a typical installation, once the previous commands are issued the connection is established and the installation of the network illustrated in Figure 3-1 is complete.

❑ Save configuration to FLASH:

```
Command> save all
Saving global configuration
Saving ports
User table successfully saved
Hosts table successfully saved
Static route table successfully saved
Location table successfully saved
SNMP table successfully saved
Filter table successfully saved
New configurations successfully saved.
```

Frame Relay Configuration

The following figure displays the information required to connect the IRX to a Frame Relay network:

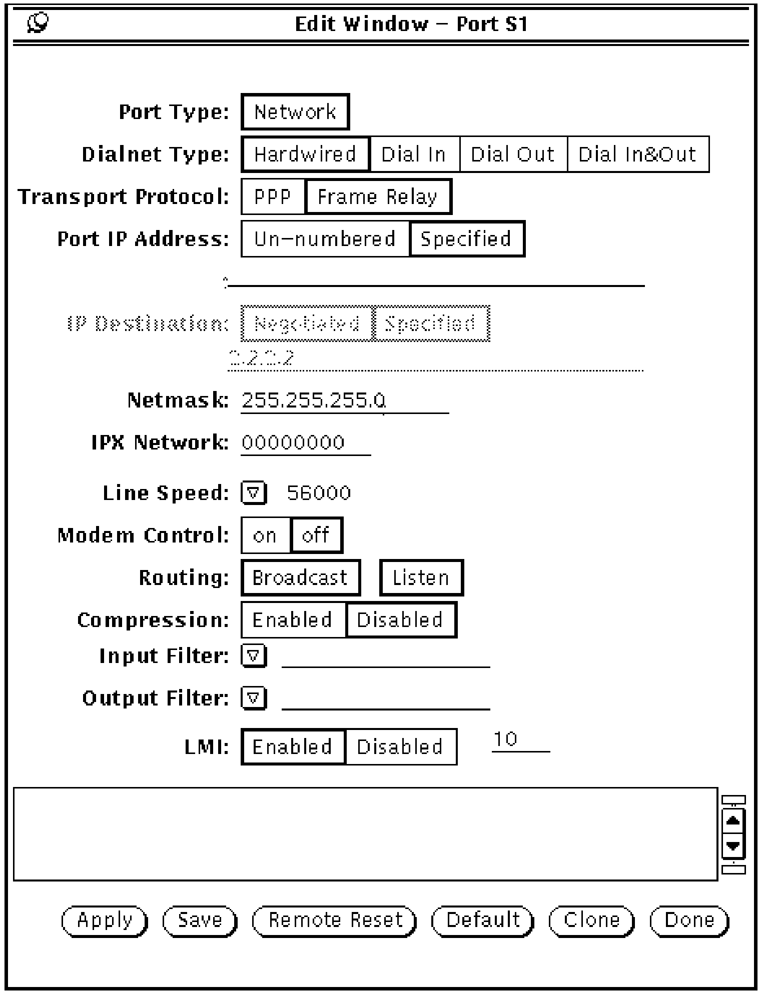

Figure 3-6. Edit Window - S1, Frame Relay

In the **pmconsole** window the only non-default information displayed is the Transport Protocol and LMI Enabled. When enabling LMI the number 10 automatically appears in the keepalive entry field.

When connecting to a Frame relay network, or "Cloud" there are only two steps required which are different than the Port Configuration discussed in the previous section.

❑ Set the port protocol to Frame Relay:

```
Command> set s1 protocol frame_relay
Protocol for port S1 changed from ppp to frame_relay
```

❑ Enter the DLCI list as provided by your carrier:

```
Command> set s1 dlci 22:2.2.2.2 23:3.3.3.3
New DLCI List: 22:2.2.2.2 23:3.3.3.3
```

In the above example, the host 2.2.2.2 is on the 22 PVC and the host 3.3.3.3 is on PVC 23.

The second step is not required if LMI is available on the Frame Relay Switch. If so, simply enabling LMI will cause the DLCI list to be completed automatically. LMI is enabled by specifying the keepalive timer:

```
Command> set s1 lmi 10
LMI keepalive timer for S1 changed from 0 to 10
```

LMI is disabled by setting the keepalive to 0:

```
Command> set s4 lmi 0
LMI disabled for port S1
```

The keepalive timer is expressed in seconds. Ten seconds is the standard described in the LMI Specification.

ISDN Configuration

An external Terminal Adapter (TA) is required to connect an IRX to an ISDN link. Some TAs have "Auto-Dial". For those which do not, or for administrators who do not prefer to manually interface with the TA, the IRX supports V.25bis dialing. The dial script is a part of the Location Table which is displayed below:

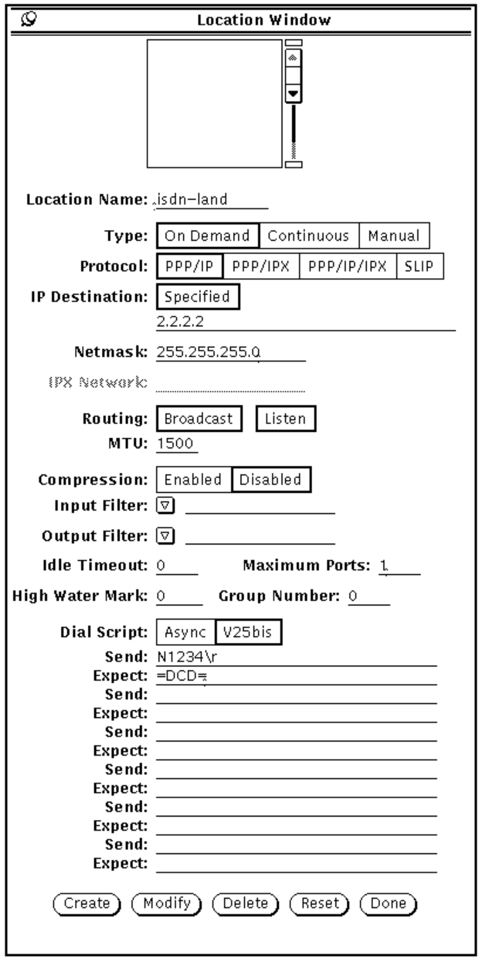

Figure 3-7. Location Table, V.25bis Dialing

In pmconsole, the only non-default information displayed is the Location Name, the Destination Address, Netmask, Max Ports, and the Dialer Script. To set these values from the Command Prompt Interface:

❑ Enter a Location Name

```
Command> add location isdn-land
Location isdn-land successfully added
```

❑ Set the protocol for the link

```
Command> set isdn-land protocol ppp
isdn-land protocol changed to ppp
```

❑ Set the maximum transmission unit for the link

```
Command> set isdn-land mtu 1500
isdn-land mtu changed from 1006 to 1500
```

❑ Enter the IP address of the destination router

```
Command> set isdn-land destination 2.2.2.2
isdn-land destination changed from 0.0.0.0 to 2.2.2.2
```

❑ Enter the Netmask of the destination network

```
Command> set isdn-land netmask 255.255.255.0
isdn-land netmask changed from 0.0.0.0 to 255.255.255.0
```

❑ Enter the Dial Script

```
Command> set isdn-land script 1 "N1234\r" "=DCD="
New script entry successfully added
```

❑ Show the location

```
 Command> show isdn-land
   Location: isdn-land              Type: Manual
 Destination: 2.2.2.2             Netmask: 255.255.255.0
    Protocol: PPP                 Options: Routing
       Group: 0                 Max Ports: 1
Idle Timeout: 0 minutes         High Mark: 0 bytes
         Mtu: 1500              Async Map: 00000000

 Dial Script:   Send Command                    Wait for Reply
                ------------------------------  ------------------------------
                N1234                         =DCD=
```

❑ Save the Location

```
Command> save location
Location table successfully saved
```

Dial Up WAN Connections

This section describes the steps for connecting two networks together over dial-up telephone lines for on-demand usage. On-demand means that the IRX automatically dials and establishes the network link when packets are queued for the remote site. This section assumes that a IRX will be used at each site, and modems which are compatible with each other will be used. This example can be used for connecting more than two sites together by following the same steps for each additional site.

Network Addresses

When connecting two sites which have never directly communicated with each other using TCP/IP or IPX it is important to perform some general address administration. The steps for this are:

❑ For TCP/IP networks verify that every computer on both networks has a unique Internet Address.

❑ Verify that the network (or subnet) numbers at each site are unique. If the two locations are using the same network numbers, datagram routing will not work correctly. In this case, one of the networks must be changed.

❑ For TCP/IP create a common "hosts" file for both sites so users can access the computers at the remote location by name. In a hosts file, no two computers should have the same name. Alternatively, Domain Name Service can be implemented. Check your workstation, or TCP/IP vendor’s manuals for information on this service.

Hardware Configuration

The IRX should be connected to the local Ethernet network and the installation steps in Chapter 2 of this manual should be followed. The modem should be attached to the S0 port on the IRX with a standard modem cable. A 25 pin straight-through cable can be used, although the IRX only uses 8 of these lines. Refer to Chapter 2 of this manual for the pin-out diagram. The modem should also be connected to a direct dial telephone line.

Every modem manufacturer supports a wide variety of configuration settings. Experience has shown that the following configuration parameters are the most important, however the modem manufacturer’s manual should be carefully reviewed if the following parameters are not sufficient. The modem should be configured as follows:

❑ Fixed DTE speed. (&B1)

❑ RTS/CTS flow control. (&H1&R2)

❑ 8 databits, 1 stop bit, no parity. (this is usually the default)

❑ Normal carrier detect. (&C1)

❑ Hang-up and reset when DTR drops. (&D2 or &D3)

❑ Error Correction enable in negotiate mode. (&M4)

❑ Compression enabled in negotiate mode. (&K1)

Refer to your modem vendor’s manual for exact register settings.

The following example represents how to set up the S0 port for the purpose of configuring modems:

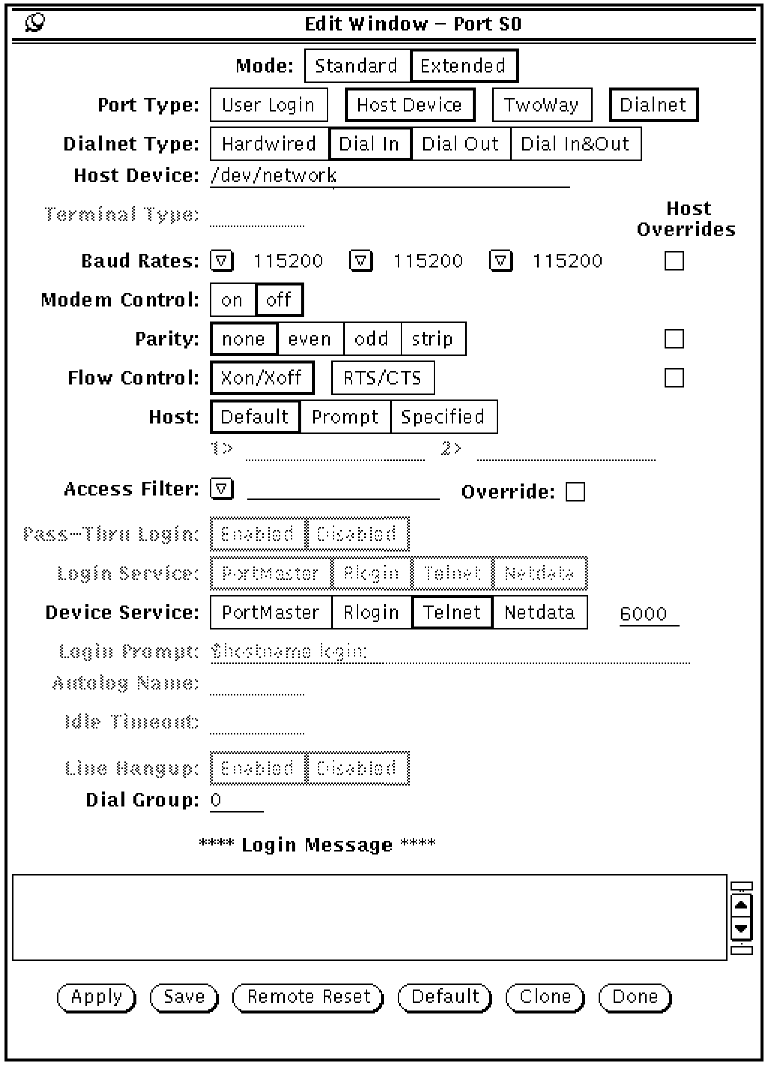

Figure 3-8. Edit Window - S0, Configuring Modems

In the previous example, by selecting Extended Mode, Host Device with the Device Service set to Telnet, the IRX S0 port can be used to configure modems. Setting the Host Device to /dev/network is an internal pointer on the IRX and must be filled in. Setting the Telnet Access port to 6000 is arbitrary, any number can be used

To connect to the port to configure the modem using the Command Prompt Interface, perform the following steps:

❏ Set the port to Extended Mode

```
Command> set s0 extended on
Extended mode for port S0 changed from off to on
```

❏ Set the port type to Device

```
Command> set s0 device /dev/network
Port type for port S0 changed from Login to Host Device(/dev/network)
```

❏ Set the Device Service to Telnet at an available socket number

```
Command> set s0 service_device telnet 6000
Device Service for port S0 changed from portmaster to telnet
```

❏ Turn Modem Control off

```
Command> set s0 modem off
CD required for port S0 changed from on to off
```

❏ Set the speed to the highest achievable DTE speed of the modem

```
Command> set s0 speed 115200
Speed for port S0 (1) changed from 9600 to 115200
```

❏ Reset the port

```
Command> reset s0
Resetting port S0
```

❏ Attach to the modem

```
writer @server /home/server/docs 20> telnet router1 6000
Trying 1.1.1.1 ...
Connected to router1.
Escape character is '^]'.
AT
OK
```

At this point the modem can be configured.

Port Configuration

If the async port has a modem attached and will be used for Dialnet connections it should be configured as follows.

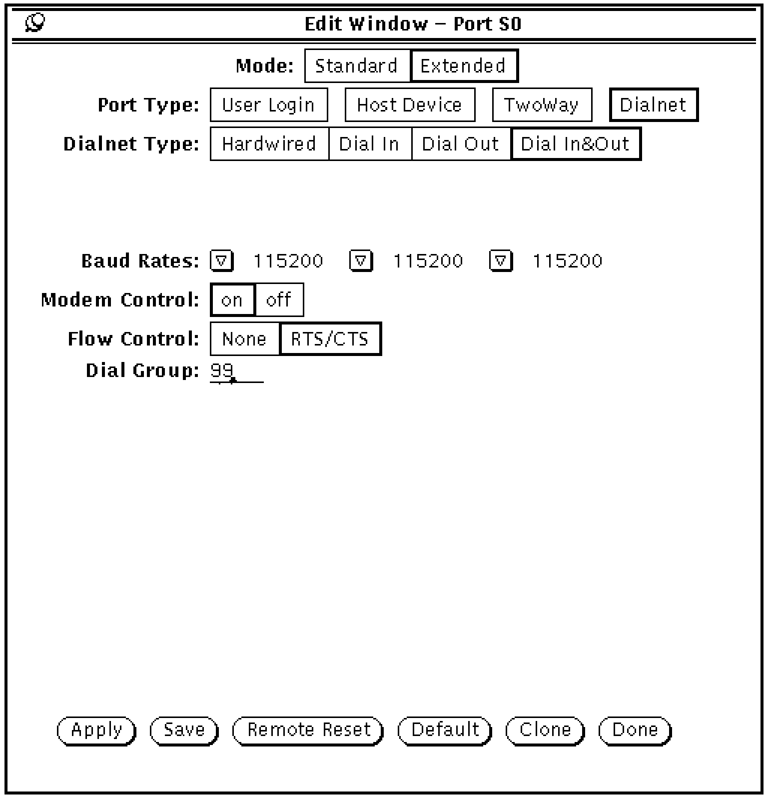

Figure 3-9. Edit Window - S0, Asynchronous WAN Connections

In **pmconsole**, the following fields need to be set. Dialnet, Dial In&Out, Baud Rates, Modem Control, Flow Control, and the Dial Group. This will allow all the flexibility required for using the S0 port as a WAN port. Refer to "Configuring Modems" earlier in this chapter.

The same results may be achieved with the Command Prompt Interface:

❏ Set the port to Extended Mode

```
Command> set s0 extended on
Extended mode for port S0 changed from off to on
```

❏ The Port Type should be set to Dialnet

```
Command> set s0 network dialin
Port type for port S0 changed from Device to Network(dialin)
```

❏ The Baud Rates and Flow Control should be set to match the modem

```
Command> set s0 speed 115200
Speed for port S0 (1) changed from 9600 to 115200
Command> set s0 speed 2 115200
Speed for port S0 (2) changed from 9600 to 115200
Command> set s0 speed 3 115200
Speed for port S0 (3) changed from 9600 to 115200
```

❏ Flow Control should be set to hardware handshaking

```
Command> set s0 rts/cts on
RTS/CTS flow control for port S0 changed from off to on
Command> set s0 xon/xoff off
XON/XOFF flow control for port S0 changed from on to off
```

❏ If TwoWay is selected Modem Control must be on

```
Command> set s0 modem on
CD required for port S0 changed from off to on
```

❏ The Dial Group must be a unique number from 0 to 99

```
Command> set s0 group 99
Group number for port S0 changed from 0 to 99
```

❏ Save the port

```
Command> save s0
Saving port S0
New configurations successfully saved.
```

❏ Reset the port

```
Command> reset s0
Resetting port S0
```

The port is now ready for use as a WAN port. If there is a need to apply a diagnostic terminal to the port, simply raising DIP switch #1 on the rear of the IRX will restore the port to 9600/8/1/N and User Login.

Users Table Entry

The Users Table is used for all dial-in connections. User entries may be created on the IRX at each site for login security or may be administered from a central location using RADIUS (See Chapter 7). Below is an example of a User Table entry for a Network User.

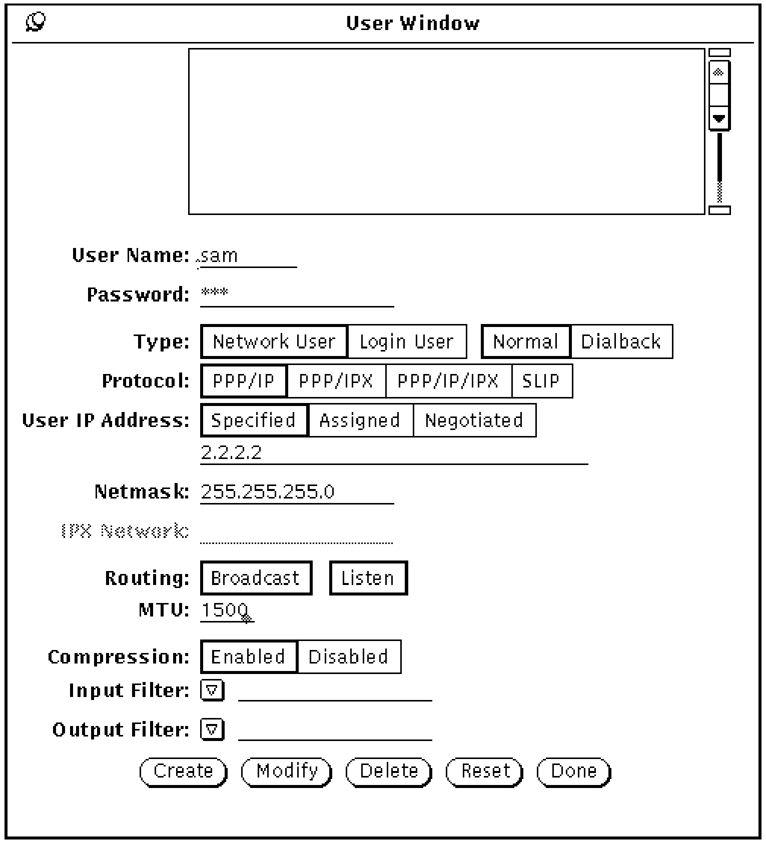

Figure 3-10. User Table - Asynchronous WAN

In the following it is shown that the keyword **netuser** need only be used once in order to manage Network users.

❏ Add a network user:

```
Command> add netuser sam
New User successfully added
```

❏ Set the protocol for the user to either SLIP or PPP:

```
Command> set user sam protocol ppp
   Username: sam                    Type: Dial-in Network User
    Address: Negotiated          Netmask: 0.0.0.0
   Protocol: PPP                 Options: Quiet, Listen
        MTU: 1006              Async Map: 00000000
```

Notice in this invocation that the keyword user was used. This is the designed behavior and it works much like the "least-unique" feature. That means the above example could have been typed in as:

```
se us sam pr ppp
```

Which is a bit cryptic but can be handy when dealing with many of users and sites. It is also possible with the Users Table to set many parameters at once. This is extremely useful when setting up many sites. In the following example the final User Table parameters are set.

❏ Set the destination address. This is the IP address associated to the ethernet interface of the remote IRX.

❏ Set the netmask. This must agree with the netmask on the remote end.

❏ Turn on routing. This command enables RIP and SAP in Broadcast and Listen mode.

❏ Turn on VJ header compression

❏ Set the Maximum Transmission Unit (expressed in bytes)

```
Command> set user sam des 2.2.2.2 netm 255.255.255.0 rout on com on mtu 1500
   Username: sam                    Type: Dial-in Network User
    Address: 2.2.2.2       Netmask: 255.255.255.0
   Protocol: PPP                 Options: Broadcast, Listen, Compression
        MTU: 1500              Async Map: 00000000
```

Location Table Entry

The Location Table is used for dialing from a local IRX to a remote site. Following is an example of a Location Table:

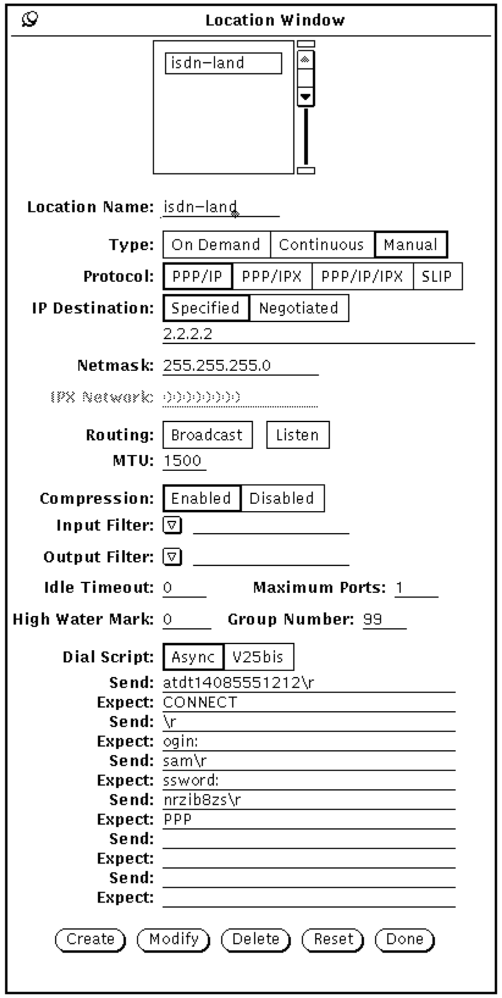

Figure 3-11. Location Table, Asynchronous WAN

To set up a new location:

❑ Assign a Location Name

```
Command> add location rem-site
Location rem-site successfully added
```

❑ Set the destination address for the location. This is the IP address associated with the Ethernet interface on the local IRX

```
Command> set location rem-site dest 2.2.2.2
rem-site destination changed from 0.0.0.0 to 2.2.2.2
```

❑ Set the netmask for the location. This is the netmask associated with the Ethernet interface on the local IRX

```
Command> set location rem-site netmask 255.255.255.0
rem-site netmask changed from 0.0.0.0 to 255.255.255.0
```

❑ Turn on compression

```
Command> set location rem-site compression on
rem-site header compression changed from off to on
```

❑ Set the protocol for the remote site to either SLIP or PPP

```
Command> set location rem-site protocol ppp
rem-site protocol changed to ppp
```

❑ Set the Maximum Transmission Unit (expressed in bytes)

```
Command> set location rem-site mtu 1500
rem-site mtu changed from 1006 to 1500
```

❑ Set the Max Ports value. Setting this to 0 disables the location

```
Command> set location rem-site max 1
rem-site maximum port count changed from 0 to 1
```

❑ Set up the Dial Script

```
Command> set location rem-site script 1 "atdt14085551515\r" "CONNECT"
New script entry successfully added.
Command> set location rem-site script 2 "\r" "ogin:"
New script entry successfully added.
Command> set location rem-site script 3 "sam\r" "ssword:"
New script entry successfully added.
Command> set location rem-site script 4 "nrzib8zs\r" "PPP"
New script entry successfully added.
```

❑ Show the Location

```
Command> sh location rem-site
    Location: rem-site                Type: Manual
 Destination: 1.1.1.1              Netmask: 255.255.255.0
    Protocol: PPP                  Options: Routing, Compression
       Group: 0                  Max Ports: 1
Idle Timeout: 0 minutes          High Mark: 0 bytes
         Mtu: 1500               Async Map: 00000000

 Dial Script:   Send Command                    Wait for Reply
             ------------------------------ ------------------------------
                atdt14085551515\r               CONNECT
                \r                              ogin:
                sam\r                           ssword:
                nrzib8zs\r                      PPP
```

❑ Save the Location

```
Command> save location
Location Table successfully saved
New configurations successfully saved.
```

In the example above the assumption is made that there is an IRX or PM2 on the remote side and that modems using the AT command set are installed. The script is Expect/Send oriented, like that of UUCP. The first line sends the AT string to the modem and "expects" to see CONNECT back from the remote end. The second line sends a carriage return to the distant modem and "expects" to see a login prompt. The third line send the login id for sam and "expects" to see a password prompt. The last line sends the users password and "expects" to see the word PPP. On slow links, or when connecting to products outside the Livingston family, it is often useful to "expect" the ~ (tilde) character because that is the first character in a PPP frame. In this way, it is assured that PPP will not time out waiting for an expect that may take too long to arrive back to the local IRX.

❑ Once the connection is successful verify that the remote IRX is accessible through the network (i.e., "ping" the remote IRX).

❑ Verify that a computer at the remote location is accessible (i.e., use rlogin, ping, or telnet).

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Dial Up Host Connections

This section describes the steps for enabling dial-in network connections for remote computers. Users who want to use this type of connection must have software on their workstation or PC which allows them to issue dial commands to their modem, respond to login and password prompts from the IRX for security, and switch over to the SLIP or PPP protocol for sending and receiving TCP/IP or IPX datagrams.

Network Addresses

When connecting a remote computer into the network through an IRX, that computer must be assigned valid network addresses. If using TCP/IP a valid IP address must be assigned. If using IPX, a unique network number must be assigned to the user. For example if the user is a TCP/IP user and the IRX is on network 192.200.1 and has the internet address 192.200.1.20, the remote computer should be assigned a free address on the 192.200.1 network (i.e., 192.200.1.21). If the user is an IPX user and the IRX is on network 00001000, the remote computer should be assigned a free IPX network number like 00001002.

❑ Verify that the remote computer has a unique Internet Address.

❑ Verify that the remote computer has a unique IPX network number.

❑ Update the global "hosts" file so users can access the computer at the remote location by name and install the global "hosts" file on the remote computer. Alternatively, Domain Name Service or Network Information Service can be implemented. Check your workstation or TCP/IP vendor's manuals for information on these services.

Hardware Configuration

The IRX should be connected to the local Ethernet network and the installation steps in Chapter 2 of the this manual should be followed. The modem should be attached to the So port on the IRX with a standard modem cable. The modem should also be connected to a direct dial telephone line.

Every modem manufacturer supports a wide variety of configuration settings. Experience has shown that the following configuration parameters are the most important, however the modem manufacturer's manual should be carefully reviewed if the following parameters are not sufficient. The modem should be configured as follows:

❑ Fixed baud rate. (&B1)

❑ RTS/CTS flow control. (&H1&R2)

❑ 8 databits, 1 stop bit, no parity. (this is usually the default)

❑ Normal carrier detect. (&C1)

❑ Hang-up and reset when DTR drops. (&D2 or &D3)

❑ Error Correction enable in negotiate mode. (&M4)

❑ Compression enabled in negotiate mode. (&K1)

Refer to your modem vendor's manual for exact commands.

The following example represents how to set up the S0 port for the purpose of configuring modems:

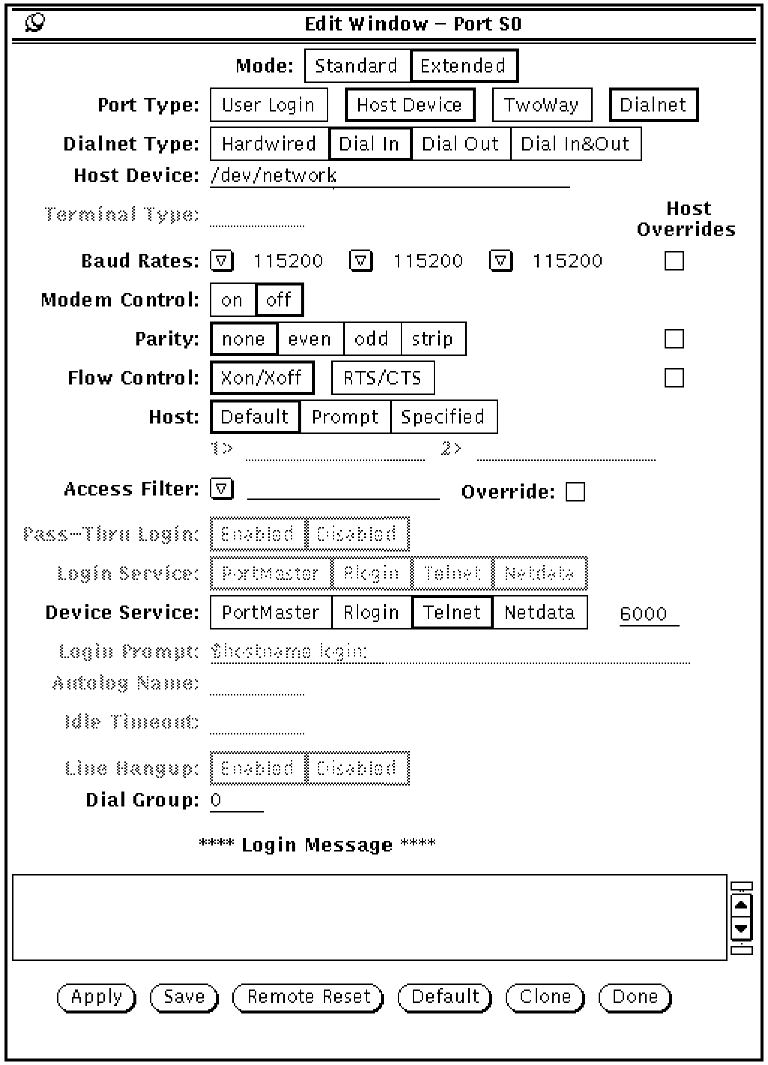

Figure 3-12. Edit Window - S0, Configuring Modems

In the previous example, by selecting Extended Mode, Host Device with the Device Service set to Telnet, the IRX S0 port can be used to configure modems. Setting the Host Device to /dev/network is an internal pointer on the IRX and must be filled in. Setting the Telnet Access port to 6000 is arbitrary.

To connect to the port to configure the modem using the Command Prompt Interface, perform the following steps:

❑ Set the port to Extended Mode

```
Command> set s0 extended on
Extended mode for port S0 changed from off to on
```

❑ Set the port type to Device

```
Command> set s0 device /dev/network
Port type for port S0 changed from Login to Host Device(/dev/network)
```

❑ Set the Device Service to Telnet at an available socket number

```
Command> set s0 service_device telnet 6000
Device Service for port S0 changed from portmaster to telnet
```

❑ Turn Modem Control off

```
Command> set s0 modem off
CD required for port S0 changed from on to off
```

❑ Set the speed to the highest achievable DTE speed of the modem

```
Command> set s0 speed 115200
Speed for port S0 (1) changed from 9600 to 115200
```

❑ Reset the port

```
Command> reset s0
Resetting port S0
```

❑ Attach to the modem

```
writer @server /home/server/docs 20> telnet router1 6000
Trying 1.1.1.1 ...
Connected to router1.
Escape character is '^]'.
AT
OK
```

At this point the modem can be configured.

Port Configuration

If the async port has a modem attached and will be used for Dialnet connections it should be configured as follows.

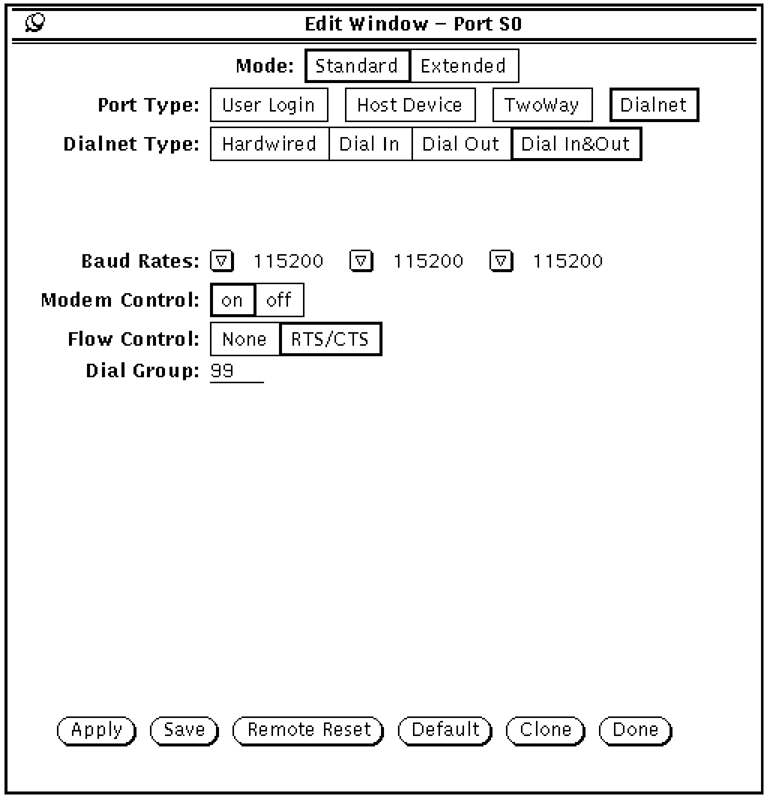

Figure 3-13. Edit Window - S0, Host Dial Up Connections

In **pmconsole**, the following fields need to be set. Dialnet, Dial In&Out, Baud Rates, Modem Control, Flow Control, and the Dial Group. This will allow all the flexibility required for using the S0 port as a Host Dial-Up port. Refer to "Configuring Modems" earlier in this chapter.

The same results may be achieved with the Command Prompt Interface:

❑ Set the port to Extended Mode

```
Command> set s0 extended on
Extended mode for port S0 changed from off to on
```

❑ The Port Type should be set to Dialnet

```
Command> set s0 network dialin
Port type for port S0 changed from Device to Network(dialin)
```

❑ If the port will be used for other services (i.e., TwoWay) this port type should be selected in addition to Dialnet

```
Command> set s0 TwoWay network dialin
Port type for port S0 changed from Network to TwoWay(Network)
```

❑ The Baud Rates and Flow Control should be set to match the modem

```
Command> set s0 speed 115200
Speed for port S0 (1) changed from 9600 to 115200
Command> set s0 speed 2 115200
Speed for port S0 (2) changed from 9600 to 115200
Command> set s0 speed 3 115200
Speed for port S0 (3) changed from 9600 to 115200
```

❑ Flow Control should be set to hardware handshaking

```
Command> set s0 rts/cts on
RTS/CTS flow control for port S0 changed from off to on
```

❑ If TwoWay is selected Modem Control must be on

```
Command> set s0 modem on
CD required for port S0 changed from off to on
```

❑ The Dial Group must be a unique number from 0 to 99

```
Command> set s0 group 99
Group number for port S0 changed from 0 to 99
```

❑ Save the port

```
Command> save s0
Saving port S0
New configurations successfully saved.
```

❑ Reset the port

```
Command> reset s0
Resetting port S0
```

The port is now ready for use as a Host Dial Up port. If the need to apply a diagnostic terminal to the port, simply raising DIP switch #1 on the rear of the IRX will restore the port to 9600/8/1/N and User Login.

Users Table Entry

The Users Table is used for all dial-in connections. User entries may be created on the IRX at each site for login security. Below is an example of a User Table entry for a Network User.

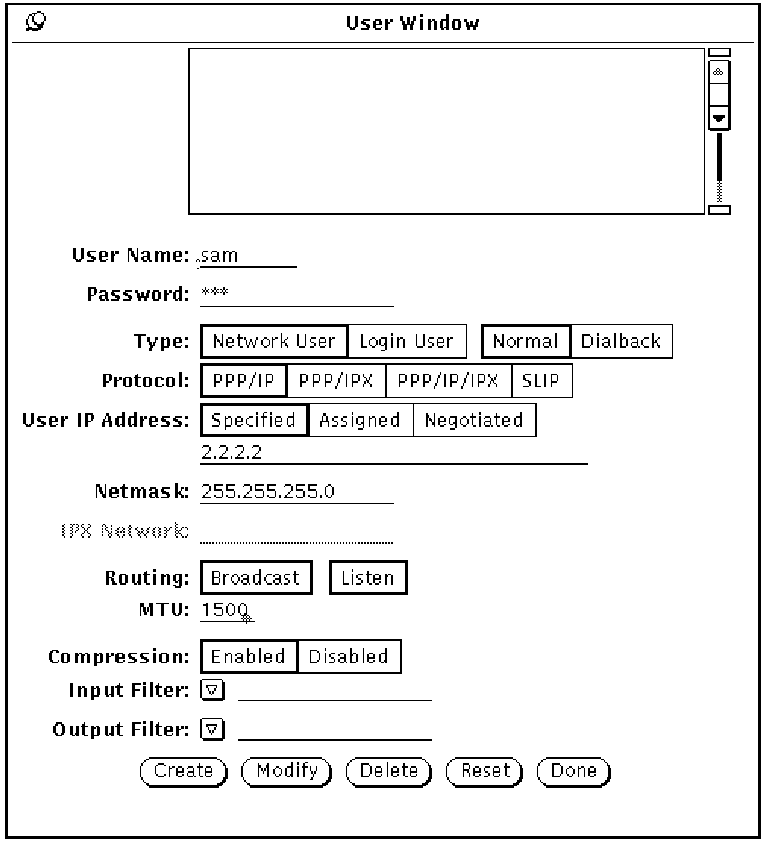

Figure 3-14. User Table - Host Dial Up

In the following it is shown that the keyword **netuser** need only be used once in order to manage Network users.

❑ Add a network user:

```
Command> add netuser sam
New User successfully added
```

❑ Set the protocol for the user to either SLIP or PPP:

```
Command> set user sam protocol ppp
   Username: sam                    Type: Dial-in Network User
    Address: Negotiated          Netmask: 0.0.0.0
   Protocol: PPP                 Options: Quiet, Listen
        MTU: 1006              Async Map: 00000000
```

Notice in this invocation that the keyword user was used. This is the designed behavior and it works much like the "least-unique" feature. That means the above example could have been typed in as:

```
se us sam pr ppp
```

Which is a bit cryptic but can be handy when dealing with thousands of users and sites. It is also possible with the Users Table to set many parameters at once. This is extremely useful when setting up many sites. In the following example the final User Table parameters are set.

❑ Set the destination address. This is the IP address associated to the Ethernet interface of the remote IRX.

❑ Set the netmask. This must agree with the netmask on the remote end.

❑ Turn on routing. This command enables both RIP and SAP.

❑ Turn on VJ header compression

❑ Set the Maximum Transmission Unit (expressed in bytes)

```
Command> set user sam des 2.2.2.2 netm 255.255.255.0 rout on com on mtu 1500
   Username: sam                    Type: Dial-in Network User
    Address: 2.2.2.2             Netmask: 255.255.255.0
   Protocol: PPP                 Options: Broadcast, Listen, Compression
        MTU: 1500              Async Map: 00000000
```