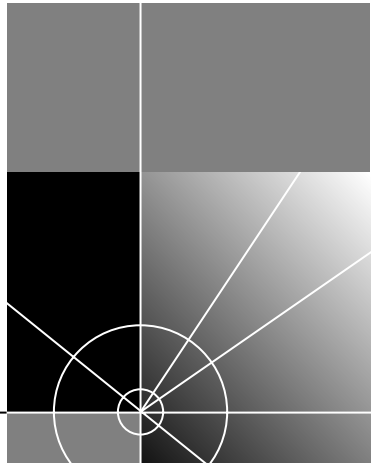
Total Control System Application Guide

PPP Dial-in / IP Network / PRI
HiPer ARC / HiPer DSP

Part No. 1.024.1845-00
Version Number 1.0

Total Control System Application Guide

Point-to-Point Protocol (PPP) Dial-in Access To an Internet Protocol (IP) Network Over PRI Lines: HiPer ARC and HiPer DSPs



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Part No. 1.024.1845-00

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YEAR 2000 INFORMATION:

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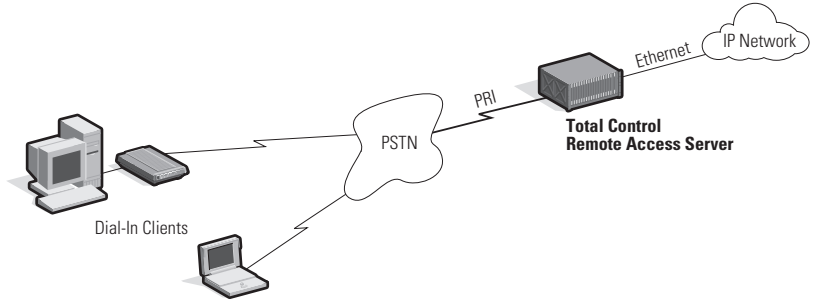
CONTENTS

CONFIGURATION INSTRUCTIONS

This document explains how to configure the Total Control remote access server to allow dial-in Point-to-Point Protocol (PPP) clients access to an Internet Protocol (IP) network. It assumes that the Total Control server is connected to the public switched telephone network (PSTN) by an ISDN primary rate interface (PRI) line.

The following diagram and tables show the components of this application.



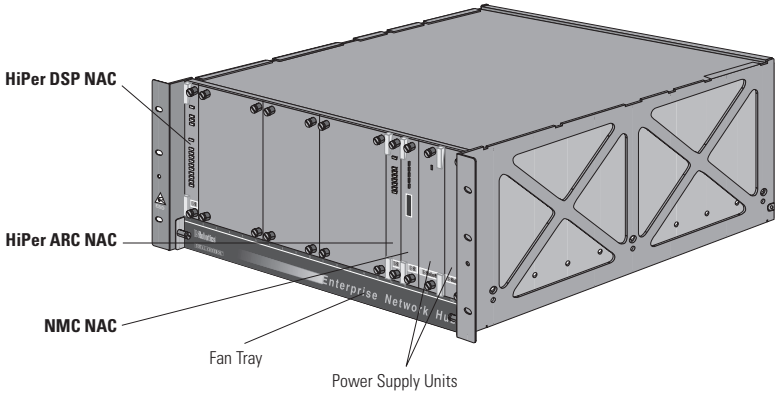
Clients	Analog modem
WAN protocols	IP over PPP
WAN connection	ISDN PRI
LAN protocols	IP over Ethernet

Cards / Software	**Software/Firmware Version**
HiPer DSP (T1/PRI + 24 modems)	1.0.8
HiPer ARC (router)	4.0.29
NMC & Ethernet NIC [MUST have 16 MB DRAM]	5.5.2 (486/16)
Total Control Manager/SNMP for Windows	5.5.1
HiPer ARM (management software)	1.0.8

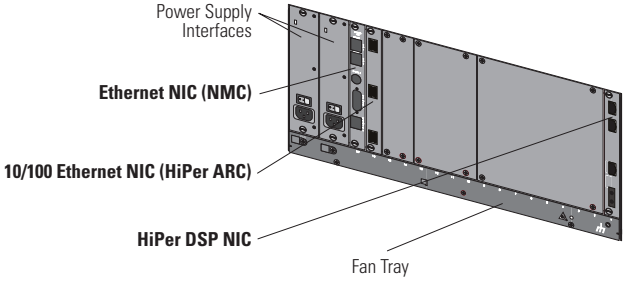
Chassis Configuration

In this application, the Total Control chassis contains the following network application cards (NACs), which are loaded from the front, and network interface cards (NICs), which are loaded from the back.

Cards	Functions
HiPer DSP NAC & NIC	Terminates the PRI and handles modem connections from dial-in clients, communicates with HiPer ARC
HiPer ARC & 10/100 Ethernet NIC	Routes data between dial-in clients and an Ethernet network
NMC & Ethernet NIC	Handles SNMP management and software updates on behalf of the other cards and components of the Total Control system



Front view of the Total Control chassis in this application



Back view of the Total Control chassis in this application

What You Need

Make sure you have the following before continuing:

- A live IP network to connect the chassis to
- The latest code for all the cards (see *Preparing the Management Workstation* and *Inventorying the Chassis*)
- 16 MB DRAM on your NMC (see *Inventorying the Chassis*)
- Computer with a terminal-emulation application
- Serial cable with RJ-45 connector at one end and DB-25 connector at the other, plus a null modem (included with NMC)
- Two Ethernet cables with RJ-45 connectors, one for connecting to the HiPer ARC, the other for the NMC
- T1/PRI cable with RJ-45 connectors
- Information to fill out the following tables:

IP information for the NMC

IP address
Subnet mask
Default gateway IP address
Public community string (SNMP read-only password)
Private community string (SNMP read-write password)

IP information for the HiPer ARC

IP address
Subnet mask
Default gateway IP address
Metric (number of hops to default gateway)
Public community string (SNMP read-only password)
Private community string (SNMP read-write password)
Username for administrator access
Password for administrator access
SYSLOG server IP address [optional]
RADIUS accounting server IP address [optional]

IP information for the HiPer ARC

RADIUS authentication server IP address [optional]
RADIUS shared secret [optional]
DNS server IP address [optional]
Default DNS domain name [optional]
First address of pool of contiguous IP addresses to assign to dial-in users
Number of addresses in pool

PRI configuration

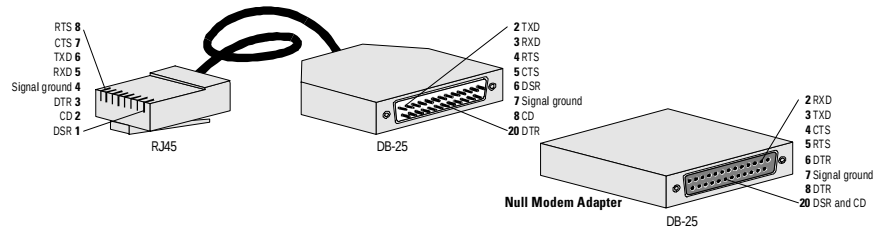
Central office switch type [such as 5ESS, DMS-100]

Preparing the System to Be Managed

This section explains how to make a local serial connection to the NMC and then the HiPer ARC and set IP parameters. This enables you to manage the chassis remotely using an SNMP-based management application, such as Total Control Manager.

Communicating with the Console Interface

1. Connect the DB-25 end of the cable shown in the following diagram to a serial port of your computer.
2. Connect the RJ-45 end of the cable shown in the following diagram to the console port of the NMC's Ethernet NIC. The console port is the topmost port of the NIC.



Pinouts for the serial cable [8-pin RJ-45 jack, DB-25 (male), DB-25 (female) with adapter]

3. On your computer, start any communications application that is capable of sending commands to your computer's serial port. An example is HyperTerminal for Windows.
4. Configure your communications application to use the COM port to which the serial cable is connected, plus the following settings:

Settings for serial communication with the NMC's console port

Port speed	9600 bps (default)
Terminal type	VT100
Data bits	8
Parity	None
Stop bits	1
Flow control	None

5 Press [Enter] several times, until the NMC's console interface appears. Then continue with *Configuring the NMC*.

If garbled messages appear on the screen, try changing the serial port speed from 9600 to 57600, 38400, or 19200 bps.

Configuring the NMC

Follow this procedure to configure the NMC.

1 Set IP parameters for the NMC.

```
Main Menu
 1 Configuration
    1 Local LAN IP Address
       1 LAN IP Address
          Enter New LAN IP Address:
             x.x.x.48 [Enter]
       2 LAN IP Subnet Mask
          Enter New LAN IP Subnet Mask:
             255.255.255.x [Enter]
          [Esc]

    3 Local Gateway IP Address
       Enter New Gateway IP Address:
          x.x.x.62 [Enter]

    5 Local SNMP Community Strings
       1 SNMP Read-Only (Public) Community String
          Enter New SNMP Read-Only (Public) Community Stri
             your_read-only_access_password [Enter]
       2 SNMP Read-Write (Private) Community String
          Enter New SNMP Read-Write (Private) Community St
             your_read-write_access_password [Enter]
    [Esc]
```

2 Save the configuration.

```
 Configuration
    9 Save Configuration To Non-Volatile Memory
    [Esc]
 [Esc]
```

3 Reset the NMC.

```
Main Menu
 2 Command
   1 Reset
      Enter (Y) to Reset NMC:
         y [Enter]
```

Configuring the HiPer ARC

This section explains how to configure IP, SNMP, and RADIUS settings for the HiPer ARC.

CAUTION: *Following the steps in this section deletes any existing HiPer ARC configuration data.*

1 Install the 10/100 Ethernet NIC.

2 Install the HiPer ARC NAC in the slot in front of the 10/100 Ethernet NIC.

3 Unplug the serial cable from the NMC's Ethernet NIC and connect it to the topmost port in the 10/100 Ethernet NIC.

4 Use the same communications program, but change the serial port speed to 115200 bps.

(If you are using Windows HyperTerminal,

a Change the speed to 115200 bps.

b Exit HyperTerminal.

c Start HyperTerminal.)

Make sure you see the following prompt before continuing:

```
HiPer>>
```

If garbled messages appear on the screen, try changing the serial port speed from 115200 to 57600, 19200, or 9600 bps.

5 Remove the HiPer ARC NAC from the chassis and then reinstall it. After a moment, the Boot Configuration menu appears.

Quickly, type **13** and then press [Enter]. This deletes the current HiPer ARC configuration, if there is any.

```
   HiPer Access Router Boot Configuration
   --------------------------------------

 1.  Boot mode                   :  FLASH
 2.  IP Configuration Source     :  STATIC
 3.  Boot IP Interface           :  eth:1
 4.  Boot IP Address             :  0.0.0.0
 5.  Boot IP Default Gateway     :  0.0.0.0
 6.  Boot IP Network Mask        :  0.0.0.0
 7.  TFTP Image on Startup       :  NEVER
 8.  TFTP Boot Server IP Address :  0.0.0.0
 9.  TFTP Boot Image File Name   :
 10. Crash upload                :  DISABLED
 11. Crash Dump Upload Filename  :
 12. Manufacturing Diagnostics   :  NONE
 13. Delete Router Configuration :
 14. Delete Boot Configuration   :
 15. Exit

              Enter Choice :   [15] 13 <Enter>
```

6 The Boot Configuration menu appears again. Press [Enter].

7 Quick Setup starts. Answer the questions as indicated.

```
HiPer>> _QuickSetup
HiPer>> Welcome to the HiPer Quick Setup
...
Do you want to configure only enough to use the GUI based
system[yes]?
n <Enter>
Network management [yes]?
<Enter>
IP [yes]?
<Enter>
```

8 Enter the identification information.

```
Quick Setup Identification information
-------------------------------------
>>> Enter the name of your system []:
jimsystem [Enter]
>>> Who is the system contact person []?
jim [Enter]
>>> Where is this system located []?
the lab [Enter]
```

9 Enter SNMP management information.

- *Login at console* determines whether a user is prompted for login when connecting to the console port of the HiPer ARC's Ethernet NIC.
- *Manage via SNMP* determines whether to allow an SNMP-based management application to manage the HiPer ARC.
- *SNMP community name* is a password for accessing the HiPer ARC using an SNMP-based management application.
- *Community address*, if specified, restricts access to the HiPer ARC to a management station that has a certain address (0.0.0.0 = any address).
- *Change permission* determines whether the password user can read configuration information only or read-and-write.

```
Quick Setup Management information
---------------------------------
>>> Do you want a log in required at the console [no]?
[Enter]
>>> Do you want to be able to manage the system via SNMP
[yes]?
[Enter]
>>> What SNMP community will manage this system [public]?
[Enter]
>>> What is the address of the station for this community
[0.0.0.0]?
[Enter]
>>> Can this community change management information
[yes]?
```

10 Enter Telnet and SYSLOG management information.

- *Telnet command line* allows access to the HiPer ARC command line using a Telnet application.
- *User name and password* apply only to Telnet access to the HiPer ARC command line.
- *Syslog dæmon* prepares the HiPer ARC to send SYSLOG event messages to a SYSLOG server, if you use one.
- *Syslog IP address* tells HiPer ARC where to send the SYSLOG messages.
- *Level of logging* refers to the severity level at which the HiPer ARC should send messages to the SYSLOG server

Logging levels

Logging level	Meaning
Critical	A serious system error that may affect the integrity of the system
Unusual	An event that normally doesn't happen, but from which the system should recover
Common	A normal event

```
  >>> Do you want to allow command line management via
TELNET [y]?
  [Enter]
  >>> What user name will be allowed to manage this system
  [administrator]?
  [Enter]
  >>> What password will be used for this user []?
  admin [Enter]
  >>> Do you want to set up the syslog daemon [yes]?
  [Enter]
  >>> What is the ip address of the syslog []?
  x.x.164.125 [Enter]
  >>> What level of logging do you want [critical]?
  <Enter>
```

11 Enter RADIUS accounting and authentication information.

- *RADIUS accounting* prepares the HiPer ARC to send accounting messages to a RADIUS server.
- *IP address* tells HiPer ARC where to send the RADIUS messages.
- *RADIUS authentication* prepares the HiPer ARC to rely on a RADIUS server for administering usernames and passwords.
- *IP address* tells HiPer ARC where to send the RADIUS messages.
- A *shared secret* between the HiPer ARC and the RADIUS server is required.

```
  >>> Would you like to set up radius accounting [yes]?
  [Enter]
  >>> Enter the IP address of the primary radius accounting
server
  x.x.164.125 [Enter]
  >>> Would you like to set up radius authentication [yes]?
  [Enter]
  >>> Enter the IP address of the primary radius authentication
server [x.x.164.125]?
  [Enter]
  >>> What is the shared secret with this server []?
  itsasecret [Enter]
```

12 Enable NMC chassis awareness.

```
  >>> Would you like to use NMC chassis awareness [yes]?
  [Enter]
```

13 Set IP parameters.

- *Network name* is a verbal identifier you assign to the IP network.
- *Mask* sets the HiPer ARC subnet mask.
- *Framing* (Ethernet II or SNAP) should reflect the Ethernet framing used in your network.
- *Default gateway* is the address of a router to which the HiPer ARC will forward packets to when it knows of no other route to their destination. It cannot be the same address as the HiPer ARC's.
- The *metric* or *hop count* indicates how many LANs are between the HiPer ARC and the router.

```
>>> Enter the network name of your IP network [ip]:
[Enter]
>>> Enter the IP address for the HiPer []:
x.x.150.49 [Enter]
>>> What should the mask be set to [B]?
255.255.255.224 [Enter]
>>> What is the framing for the IP network [ethernet_ii]?
[Enter]
>>>Do you want to set up a default gateway [yes]?
[Enter]
>>> Enter the IP address of the default gateway []?
x.x.150.62 [Enter]
>>> What metric should be applied to the default gateway
[1]?
[Enter]
```

14 Enter DNS information.

- *DNS* prepares the HiPer ARC to send domain name service requests to a DNS server (which maintains a list matching domain names with IP addresses)
- The *default domain name* refers to the name used on the Ethernet segment to which the HiPer ARC is connected

```
>>> Do you want to configure DNS for this HiPer [yes]?
[Enter]
>>> What is the address of the main DNS server for this
HiPer?
x.x.20.2 [Enter]
>>> What is the default DNS domain name for this HiPer
[]?
usr.com [Enter]
```

15 Set up the IP address pool (from which the HiPer ARC will assign addresses to dial-in users). The address pool must be a continuous range of addresses.

- The *address pool name* is a verbal identifier you assign to the address pool.
- Specify the *initial address* in the pool and *how many addresses* are in the pool.

```
>>>Do you want to set up an address pool [yes]?
[Enter]
>>>Enter the name of your IP address pool [ippool]:
[Enter]
>>>What is the initial address in the pool []?
x.x.150.50 [Enter]
>>>How many addresses should be the pool [1]?
2 [Enter]
```

16 Indicate whether you would like to limit access to the TFTP server that runs on the HiPer ARC. If so, type **y [Enter].** Then enter the addresses of the systems that are permitted to transfer files to and from the HiPer ARC.

```
>>>Do you want to allow all systems to access the TFTP
server [no]?
[Enter]
```

17 Review the settings and make any changes before submitting them to HiPer ARC. When configuration is complete, the following message appears:

```
HiPer>> Spawned Process CFP 272002   /./QuickSetup.cfg
Completed Successfully
```

18 Test the IP configuration by pinging the HiPer ARC and the NMC.

```
HiPer>> ping x.x.150.48
PING Destination: x.x.150.48 Status: ALIVE
HiPer>> ping x.x.150.49
PING Destination: x.x.150.49 Status: ALIVE
```

19 After testing the IP connectivity, you can add a test user. Enter the following command:

```
HiPer>> add user test password test type network
```

This adds a user named **test** with password **test**, who will dial in using PPP.

HiPer ARC does not provide feedback that the command was successful. To view the user list, enter the following command:

```
HiPer>> list users
```

Preparing the Management Workstation

At a workstation, install Total Control Manager and HiPer Access Router Manager (if they are not already installed). Connect to the same IP network as the chassis. Ping the chassis from the workstation to make sure you can reach it. If not, solve your IP-connectivity problem before continuing.

These are the code versions for the software and firmware used in this application. All are part of Total Control system release 3.1.1.

Software versions used in this example

Program	Code version
Total Control Manager/SNMP for Windows	5.5.1
HiPer ARM	1.0.8

Firmware versions used in this example

Card	Code version
HiPer ARC	4.0.29
HiPer DSP	1.0.8
NMC, 486 MHz / 16 MB DRAM	5.5.2

If Total Control Manager is already installed, start it, then from the **Help** menu, click **About Total Control Manager**. The software version should read 5.5.1.

Getting and Installing Total Control Manager and HARM

You can get both Total Control Manager and HiPer Access Router Manager from the TOTALservice web site, if you are a contract customer. Refer to **http://totalservice.3com.com/** for details.

To find the software, log in to TOTALservice. Go to **Latest Code**, then go to the **Total Control Hub** section.

Installing Total Control Manager

1. Unzip the file into a temporary directory. Four subdirectories are created:
   - \accounti (Accounting Server)
   - \alarms (Alarm Server)
   - \tcm (Total Control Manager)
   - \view (View)
2. Run **Setup** from the \tcm directory. Total Control Manager installs itself.

Installing HiPer Access Router Manager

1. Unzip the file into a temporary directory.
2. Run **Setup**. Be sure that HARM installs within the \usrsuite directory (where Total Control Manager is installed).

Inventorying the Chassis

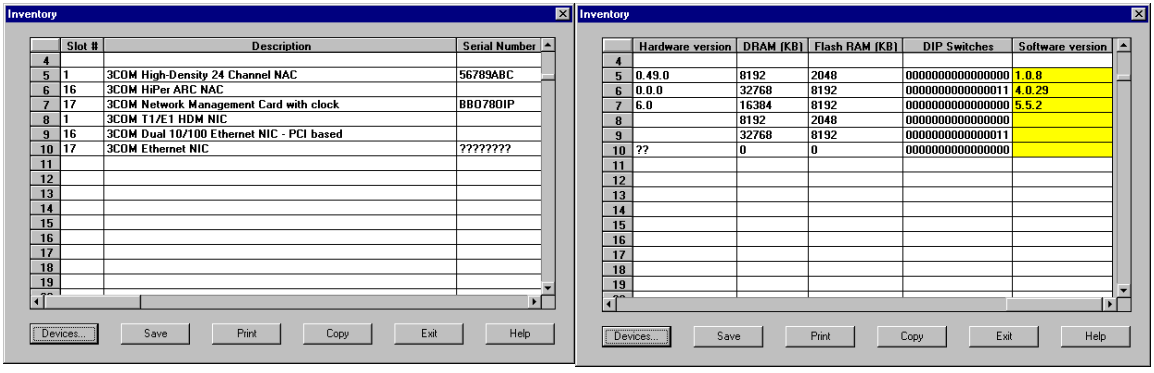
Inventory the chassis to determine the firmware versions of all the cards. If they are not current, get and install new firmware.

1. Start Total Control Manager.
2. From the **File** menu, click **New...**

3 Enter a name for the chassis (this name is used for identification purposes within Total Control Manager) the IP address you assigned to the NMC, and SNMP community strings (passwords), if you entered them. Click **OK**.

4 When the chassis appears, from the **Configure** menu, click **Inventory**.

5 Select the chassis from the list, then click **OK**. The inventory appears.



6 Scroll to the far right and find the Software Version column. Compare the versions against those in . Then click **Exit**.

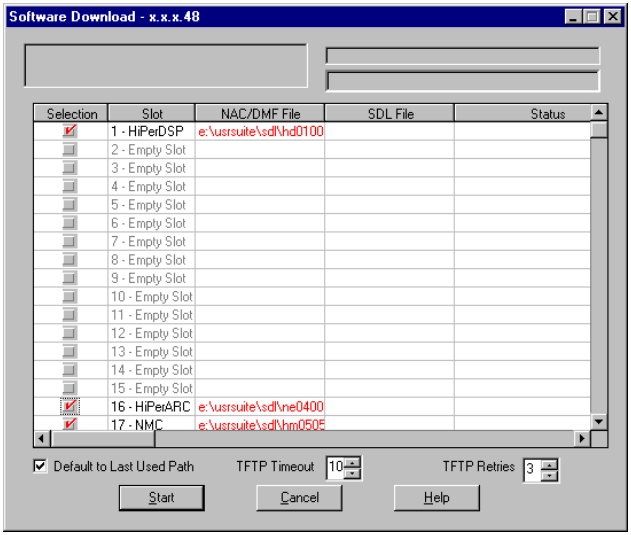
If you need new firmware, you can get it from the TOTALservice web site (if you are a contract customer). Refer to **http://totalservice.3com.com/** for details. To find the firmware, log in to TOTALservice. Go to **Latest Code** for the **Total Control Hub**.

Updating the Firmware

Firmware from the TOTALservice web site is in compressed ZIP files.

1 Unzip the SDL and NAC files to the \usrsuite\sdl directory.

2 From the **Configure** menu, click **Software Download**. Total Control Manager associates the files with the correct cards.



3 Select the cards you want to update, then click **Start**.

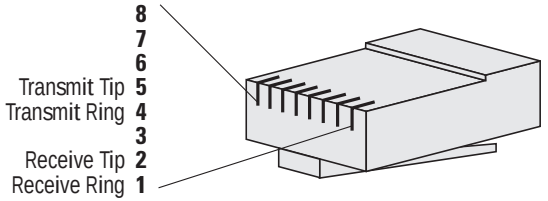
4 When the box in the upper left reads *Software download completed*, click **Done**.

Software download is complete. Continue with Configuring the HiPer DSP.

Configuring the HiPer DSP

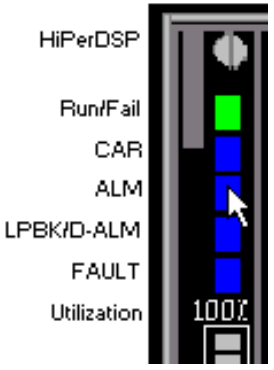
The HiPer DSP provides the interface to the PRI line and contains 24 modems, 23 of which are available to a PRI line.

1 Connect a PRI line to the SPAN 1 jack. Use a straight-through cable with an RJ-48C (RJ-45) 8-pin modular jack with the following pinout:



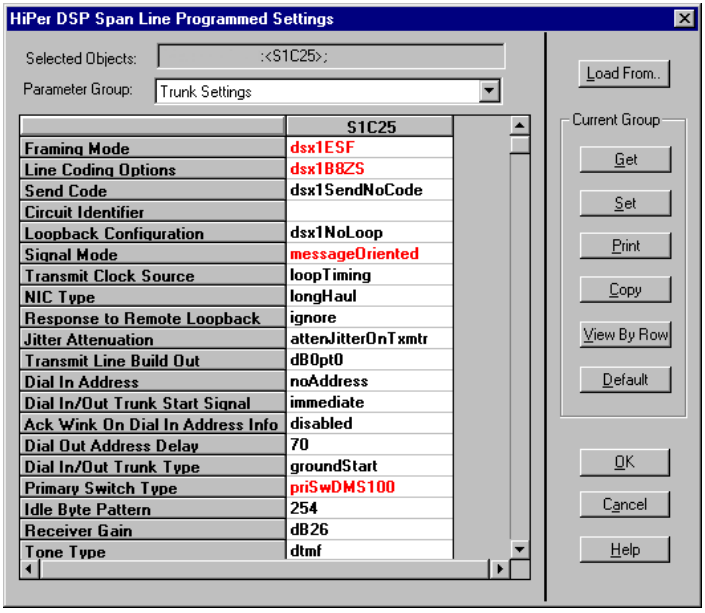
If the physical layer connection is good, the Alarm light [red] goes off and the CD light [green] goes on.

2 From Total Control Manager, click one of the span *LEDs* (when you click one, the others are also selected).



3 From the **Configure** menu, click **Programmed Settings**.

4 Select the **Trunk Settings** parameter group.

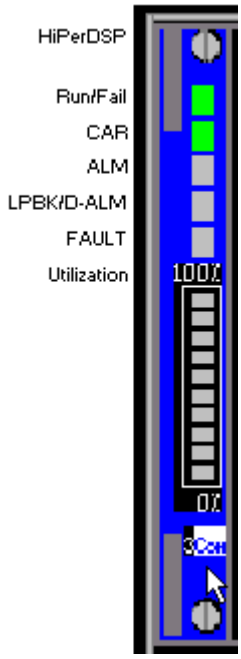


5 Double-click each parameter to change. The primary switch type must be set correctly, according to the information provided by your telephone company. Make sure these items are also set as follows:

- Framing mode [**ESF**]
- Line coding [**B8ZS**]
- Signal mode [**messageOriented**]

6 Click **Set**, then click **OK**.

7 Click the *face* of the HiPer DSP card, near the 3Com logo.



8 From the **Configure** menu, click **Actions/Commands**.

9 Under **Command to execute**, select **Software**, then **Save T1/E1 to NVRAM**.

10 Select **Execute** to save the configuration. Wait until Result reads *Success*.

11 Under **Command to execute**, select **Software Reset**.

12 Select **Execute** to reset the HiPer DSP card. Wait until Result reads *Success*, then select **Close**.

HiPer DSP configuration is complete. Continue with Verifying the Chassis Configuration.

Verifying the Chassis Configuration

Before the chassis can accept calls, the HiPer ARC must detect the HiPer DSP modems. This section helps you verify that the configuration works.

First, run a telnet application from a workstation that is on the same IP network as the chassis.

1. From the Windows 95 **Start** menu, click **Run...** A Run dialog appears.
2. Type **telnet x.x.x.x [Enter]**, where x.x.x.x is the IP address of your HiPer ARC. A login prompt appears.
3. Type **administrator [Enter]**. A password prompt appears.
4. Type the password and then press **[Enter]**. A HiPer>> prompt appears.
5. Type **list chassis [Enter]**.

```
HiPer>> list chassis
Slot    Owner   Description                      Ports   Type
1       YES     24 Channel High Density Modem    24      DYNAMIC
2       YES      --EMPTY--                        0       STATIC
3       YES      --EMPTY--                        0       STATIC
4       YES      --EMPTY--                        0       STATIC
5       YES      --EMPTY--                        0       STATIC
6       YES      --EMPTY--                        0       STATIC
7       YES      --EMPTY--                        0       STATIC
8       YES      --EMPTY--                        0       STATIC
9       YES      --EMPTY--                        0       STATIC
10      YES      --EMPTY--                        0       STATIC
11      YES      --EMPTY--                        0       STATIC
12      YES      --EMPTY--                        0       STATIC
13      YES      --EMPTY--                        0       STATIC
14      YES      --EMPTY--                        0       STATIC
15      YES      --EMPTY--                        0       STATIC
16      YES     HiPer Access Router NAC          0       DYNAMIC
```

For each HiPer DSP, an entry should appear that reads **24 Channel High Density Modem**.

6. Here's another test. From the HiPer>> prompt, type **list interfaces [Enter]**.

```
HiPer>> list interfaces
INTERFACES
Interface                       Oper    Admin
Name                            Status  Status
eth:1                           Up      Up
eth:2                           Down    Up
slot:1/mod:1                    Up      Up
slot:1/mod:2                    Up      Up
slot:1/mod:3                    Up      Up
slot:1/mod:4                    Up      Up
slot:1/mod:5                    Up      Up
[...]
internal                        Up      Up
loopback                        Up      Up
```

eth:1 and eth:2 are Ethernet interfaces on the HiPer ARC's Ethernet NIC. **slot:1/mod:1, slot:1/mod:2**, and so on, are modems, and 23 of them should show for each HiPer DSP.

- If these tests fail to show either the HiPer DSP itself or the HiPer DSP modems, save the HiPer ARC configuration and then restart the card. If the modems still do not appear, remove the HiPer ARC NAC and then reinstall it.
- If the tests pass, the system is ready.

The system is now configured to accept calls.

Making a Test Call

This section explains how to make a test call from a Windows 95 PC using Dial-Up Networking.

1. From the **Start** menu, click **Programs**, then click **Accessories**, then click **Dial-Up Networking**.
2. Double-click **Make New Connection**.
3. Type a name for the new connection and select a modem to use for the call.
4. For the **Telephone number**, type the number assigned to the PRI line. Click **Next**, then click **Finish**.
5. Right-click on the icon for your new connection. From the menu that appears, click **Properties**.
6. Click the **Server Types** tab. Deselect everything except **Enable software compression** and **TCP/IP**. Click **OK**.
7. Double-click your new connection icon. Type the username and password of the account you created on the HiPer ARC. Then click **Connect**.

The modem should answer.

8. From the Windows **Start menu, click Run**.
9. In the **Open** field, type **ping**, then press [Enter]. A PING dialog appears.
10. Type the IP address of the HiPer ARC, then press [Enter].

You should see *Reply from* messages.

The configuration is verified.

For More Information

The Total Control Hub Documentation Library is an excellent source of more detailed information about the chassis. The library is available on CD-ROM and on our web site.

- Total Control Enterprise Network Hub Documentation Library, System Release 3.1, part number 1.035.0008-02.
- Web site: **http://totalservice.3com.com**

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