Freeway®
Loopback Test Procedures

DC 900-1533D

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Freeway Loopback Test Procedures

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Preface

Purpose of Document

This document describes how run the loopback tests for the various Simpact protocols. You must have installed the Freeway hardware as described in the appropriate Freeway hardware installation guide. You must also have installed the Freeway server/client, protocol, and toolkit software as described in the *Freeway User Guide*.

Intended Audience

This manual should be read by the person who will be running the loopback test.

Organization of Document

Protocol	Reference Chapter
AUTODIN	Chapter 1
AWS	Chapter 2
Bisynchronous Protocols	Chapter 3
DDCMP	Chapter 4
FMP	Chapter 5
ADCCP NRM	Chapter 6
Military/Government Protocols	Refer to the *Military/Government Protocols Programmer Guide*
Protocol Toolkit	Chapter 7
STD1200A	Chapter 8
X.25/HDLC	Chapter 9
Bit-Stream Protocol	Chapter 10

Simpact References

The following general product documentation list is to familiarize you with the available Simpact Freeway and embedded ICP products. The applicable product-specific reference documents are mentioned throughout each document (also refer to the "readme" file shipped with each product). Most documents are available on-line at Simpact's web site, www.simpact.com.

General Product Overviews

- *Freeway 1100 Technical Overview* 25-000-0419
- *Freeway 2000/4000/8800 Technical Overview* 25-000-0374
- *ICP2432 Technical Overview* 25-000-0420
- *ICP6000X Technical Overview* 25-000-0522

Hardware Support

- *Freeway 1100/1150 Hardware Installation Guide* DC-900-1370
- *Freeway 1200/1300 Hardware Installation Guide* DC-900-1537
- *Freeway 2000/4000 Hardware Installation Guide* DC-900-1331
- *Freeway 8800 Hardware Installation Guide* DC-900-1553
- *Freeway ICP6000R/ICP6000X Hardware Description* DC-900-1020
- *ICP6000(X)/ICP9000(X) Hardware Description and Theory of Operation* DC-900-0408
- *ICP2424 Hardware Description and Theory of Operation* DC-900-1328
- *ICP2432 Hardware Description and Theory of Operation* DC-900-1501
- *ICP2432 Electrical Interfaces (Addendum to DC-900-1501)* DC-900-1566
- *ICP2432 Hardware Installation Guide* DC-900-1502

Freeway Software Installation and Configuration Support

- *Freeway Message Switch User Guide* DC-900-1588
- *Freeway Release Addendum: Client Platforms* DC-900-1555
- *Freeway User Guide* DC-900-1333
- *Freeway Loopback Test Procedures* DC-900-1533

Embedded ICP Software Installation and Programming Support

- *ICP2432 User Guide for Digital UNIX* DC-900-1513
- *ICP2432 User Guide for OpenVMS Alpha* DC-900-1511
- *ICP2432 User Guide for OpenVMS Alpha (DLITE Interface)* DC-900-1516
- *ICP2432 User Guide for Solaris STREAMS* DC-900-1512
- *ICP2432 User Guide for Windows NT* DC-900-1510
- *ICP2432 User Guide for Windows NT (DLITE Interface)* DC-900-1514

Application Program Interface (API) Programming Support

- *Freeway Data Link Interface Reference Guide* DC-900-1385
- *Freeway Transport Subsystem Interface Reference Guide* DC-900-1386
- *QIO/SQIO API Reference Guide* DC-900-1355

Socket Interface Programming Support

- *Freeway Client-Server Interface Control Document* DC-900-1303

Toolkit Programming Support

- *Freeway Server-Resident Application and Server Toolkit Programmer Guide* DC-900-1325
- *OS/Impact Programmer Guide* DC-900-1030
- *Protocol Software Toolkit Programmer Guide* DC-900-1338

Protocol Support

- *ADCCP NRM Programmer Guide* DC-900-1317
- *Asynchronous Wire Service (AWS) Programmer Guide* DC-900-1324
- *AUTODIN Programmer Guide* DC-908-1558
- *Bit-Stream Protocol Programmer Guide* DC-900-1574
- *BSC Programmer Guide* DC-900-1340
- *BSCDEMO User Guide* DC-900-1349
- *BSCTRAN Programmer Guide* DC-900-1406
- *DDCMP Programmer Guide* DC-900-1343
- *FMP Programmer Guide* DC-900-1339

- *Military/Government Protocols Programmer Guide* DC-900-1602
- *N/SP-STD-1200B Programmer Guide* DC-908-1359
- *SIO STD-1300 Programmer Guide* DC-908-1559
- *X.25 Call Service API Guide* DC-900-1392
- *X.25/HDLC Configuration Guide* DC-900-1345
- *X.25 Low-Level Interface* DC-900-1307

Document Conventions

The term "Freeway" refers to any of the Freeway models (for example, 1100, 1150, 1200, 1300, 2000, 4000, or 8800).

Program code samples are written in the "C" programming language.

Earlier Freeway terminology used the term "synchronous" for blocking I/O and "asynchronous" for non-blocking I/O. Some parameter names reflect the previous terminology.

Revision History

The revision history of the *Freeway Loopback Test Procedures*, Simpact document DC 900-1533D, is recorded below:

Revision	Release Date	Description
DC 900-1533A	June 1998	Original release
DC 900-1533B	December 1998	Modify Protocol Toolkit test (Chapter 7)
DC 900-1533C	May 1999	Move the Military/Government test information to the *Military/Government Protocols Programmer Guide* Update DDCMP, STD1200B, and X.25 chapters.
DC 900-1533D	October 1999	Add Bit-Stream protocol test (Chapter 10)

Customer Support

If you are having trouble with any Simpact product, call us at 1-800-275-3889 Monday through Friday between 8 a.m. and 5 p.m. Pacific time.

You can also fax your questions to us at (858)560-2838 or (858)560-2837 any time. Please include a cover sheet addressed to "Customer Service."

We are always interested in suggestions for improving our products. You can use the report form in the back of this manual to send us your recommendations.

Chapter

1 AUTODIN Loopback Test Procedure

This chapter describes the AUTODIN loopback test procedure, including the following:

- an overview of the test
- a description of how to install the hardware needed for the test
- instructions on how to run the test
- a sample screen display from the test

Note

Before running the loopback test, you must install the Freeway software and boot Freeway to download the software as described in the *Freeway User Guide*.

Note

When the loopback test is run under VMS, Simpact recommends a minimum Buffered I/O Byte Count process quota of 30,000 bytes. The AST Limit and Open File Limit process quotas must provide a unit for each session that will be opened. The number of sessions is equal to the number of selected ports, plus one.

1.1 Overview of the Test Program

The loopback test uses the data link interface (DLI) available with Freeway. The DLI library is in the `freeway/client/`*op-sys*`/lib` (where *op-sys* is the identifier for the operating system you are using) directory and can be used with any data link protocol on Freeway servers.

The AUTODIN loopback test program is placed in the `freeway/client/`*op-sys*`/bin` directory during the installation procedures.

Note

Earlier Freeway terminology used the term "synchronous" for blocking I/O and "asynchronous" for non-blocking I/O. Some parameter names reflect the previous terminology.

One high-level test program written in C is supplied with the AUTODIN protocol, `autodinalp`, which uses non-blocking I/O. This test is interactive; it prompts you for all the information needed to run the test. The test communicates with Freeway through the client data link interface (DLI) commands.

The loopback test performs the following functions:

- Configures the link-level control parameters such as baud rates, clocking, and protocol
- Enables and disables links
- Initiates the transmission and reception of data on the serial lines
- Obtains link statistics from Freeway

You can use the loopback test as a template for designing client applications that interface with the DLI layer. You can also use it to verify that the installed Freeway devices and cables are functioning correctly.

1.2 Hardware Setup for the Test Program

The test program runs in loopback mode. Before running the test, perform the following procedure to install the loopback cabling:

Step 1:
Provide a synchronous modem. Configure the modem to supply continuous clocking at a data rate of 9600 bits per second. The Freeway ICPs are default configured for external clocking, and the modem supplies the clock signal for loopback testing.

Step 2:
Select a pair of adjacent ports to loopback. Ports are looped back in the following pairs: (0,1), (2,3), (4,5), and so on. Install the special three-headed loopback cable between the ports you selected and the synchronous modem. For information on port numbering, refer to the hardware installation guide for your Freeway.

Note

The loopback cable is only used during testing, not during normal Freeway operation.

1.3 Running the Test Program

Caution

To run the test program successfully, you must have write privileges in the `bin` directory on the boot server.

Step 1:

To start the test in a UNIX or Windows NT system, change to the directory that contains the test program. For example, if you performed the default installation on a UNIX system, this directory is called `/usr/local/freeway/client/`*op-sys*`/bin` (where *op-sys* is the identifier for the operating system you are using). On a Windows NT system the default directory is `c:\freeway\client\`*op-sys*`\bin`. Enter the following command at the prompt:

```
autodinalp
```

To start the test in a VMS system, change to the directory that contains the test program. If you performed the default installation, this directory is called `SYS$SYSDEVICE:[FREEWAY.CLIENT.`*OP-SYS*`.BIN]`, where *OP-SYS* is the identifier for the hardware platform model and TCP/IP software you are using, for example `AXP_TCPWARE`. Enter the following command at the prompt:

```
RUN AUTODINALP
```

Step 2:

The following prompts are displayed. Defaults are shown in brackets:

`Need help (H) [N] ?`

Enter **N** to proceed without help. Enter **H** to view a brief description of the test procedure.

`Minutes to run (1-1440) [1] ?`

Enter the number of minutes you want the test to run.

`External (X) or Internal clocking (I) [I] ?`

Enter the X for external clocking or I for internal clocking.

`BISYNC (B) or ASYNC (A) [B] ?`

Enter B for Bisynchronous or A for Asynchronous.

`BLOCK_BY_BLOCK (B) or CONTINUOUS (C) [B] ?`

Enter B for block-by-block testing or C for continuous testing.

`ICP board on which to run test (0-5) [0] ?`

Enter the number of the ICP to be tested. This is the ICP that you cabled for testing in Step 2 on page 19.

`Baud index (0-12) [9]?`

Enter the value for the desired baud rate from the list given.

`Even port number (0, 2, ..., 14) [0]`

Enter the even-numbered port you cabled for testing in Step 2 on page 19. For example, if you enter 0, the loopback test will be performed on ports 0 and 1.

Step 3:

After you answer the last prompt, the test starts. It displays a series of alternating greater than (>) and less than (<) to indicate that it is running. When it completes, it displays the test results in the form of a brief Statistics Report that shows activity on the two ports being tested. If no errors are shown, your installation is verified.

Step 4:

Remove the loopback cable and configure the cables for normal operation. Your Freeway server is now ready to communicate with its clients.

1.4 Sample Output from the Test Program

Figure 1–1 shows the screen display from a sample AUTODIN non-blocking loopback test program (`autodinalp`). Output displayed by the program is shown in `typewriter type` and your responses are shown in **bold type**. Each entry is followed by a carriage return.

```
% autodinalp

Need help (H) [N] ? H

This program transfers data between a pair of adjacent ports on an ICP
board.  The first ICP is zero; the first port on an ICP is zero.  The
program defaults to ICP zero, ports zero and one.

The ICPs and distribution panels are configured at the factory for
external clocking.  An adjacent port pair is normally connected with a
Simpact-supplied THREE-headed loopback cable, with the third head of
the cable connected to your powered up modem.  Your modem supplies
clocking to move the data, but the data does not reach the modem.  The
program does not work with an internal clock source unless "I" is
entered in response to the above prompt.

When prompted for values, the range of legal values appears within
parentheses immediately following the prompt.  The default value then
appears within square brackets.  To select the default value, simply
press the RETURN key.  To select a value other than the default, enter
the desired value followed by the RETURN key.

Minutes to run (1-1440) [1]? 5

External (X) or Internal clocking (I) [I] ? X

BISYNC (B) or ASYNC (A) [B] ? B

BLOCK_BY_BLOCK (B) or CONTINUOUS (C) [B] ? C

ICP board on which to run test (0-5) [0]? 0
 Index           Baud            Index           Baud
   0               75              1              110
   2              135              3              150
   4              300              5              600
   6             1200              7             2400
   8             4800              9             9600
  10            19200             11            38400
  12            56000             13                0
(Protocol assumes electrical interface of 232 if baud <= 9600,
otherwise 530 is assumed.)
Baud index (0-12) [9]? 9
```

Figure 1–1: Sample Output from AUTODIN Non-Blocking Loopback Program

```
Even port number (0, 2, ..., 14) [0]? 0

AUTODIN Asynchronous Port-To-Port Loopback Program.
   Test duration in minutes: 5 minute
   ICP board number: 0
   Baud rate = 9600
   Ports: 0 & 1
Buffer size confirmed.

AUTODIN Software Version:
<@@> VI-100-0169: ADN 1.2-0  AUTODIN 17-Mar-98
     for the Freeway 2000/4000 server  (ICP6000)
(OS/Impact Version  V331 )

ENABLING LINKS for link 0 and link 1.

TRANSFERRING DATA
>

AUTODIN Completed. Start cleanup.

AUTODIN Statistics Report:
                              BOL0                BOL1
                         ----------------    ----------------
   BCC errors                       0                   0
   parity errors                    0                   0
   overrun errors                   0                   0
   xmit NAKs                        0                   0
   recv NAKs                        0                   0
   xmit CANs                        2                   1
   recv CANs                        1                   1
   xmit RMs                         0                   0
   recv RMs                         0                   0
   xmit INVs                        0                   0
   recv INVs                        0                   0
   xmit REPs                        0                   0
   recv REPs                        0                   0
   xmit records                   790                 814
   receive records                814                 790

 From the Client Test Program
   sequence errors                  0                   0
   data writes                    395                 408
   data writes acked              393                 406
   data reads                     405                 394
```

Figure 1–1: Sample Output from AUTODIN Non-Blocking Loopback Program *(Cont'd)*

Chapter

2 AWS Loopback Test Procedure

This chapter describes the AWS loopback test procedure, including the following:

- an overview of the test
- a description of how to install the hardware needed for the test
- instructions on how to run the test
- sample screen displays from the test

Note

Before running the loopback test, you must install the Freeway software and boot Freeway to download the software as described in the *Freeway User Guide*.

Note

When the loopback test is run under VMS, Simpact recommends a minimum Buffered I/O Byte Count process quota of 30,000 bytes. The AST Limit and Open File Limit process quotas must provide a unit for each session that will be opened. The number of sessions is equal to the number of selected ports, plus one.

2.1 Overview of the Test Program

The loopback test uses the data link interface (DLI) available with Freeway. The DLI library is in the `freeway/client/`*op-sys*`/lib` directory (where *op-sys* is the identifier for the operating system you are using) and can be used with any data link protocol on Freeway servers.

The AWS loopback test program is placed in the `freeway/client/`*op-sys*`/bin` directory during the installation procedures.

Note

Earlier Freeway terminology used the term "synchronous" for blocking I/O and "asynchronous" for non-blocking I/O. Some parameter names reflect the previous terminology.

One high-level test program written in C is supplied with the AWS protocol, `awsalp`, which uses non-blocking I/O. The test is interactive; it prompts you for all the information needed to run the test. The test communicates with Freeway through the client data link interface (DLI) commands.

The loopback test performs the following functions:

- Configures the link-level control parameters such as baud rates, clocking, and protocol
- Enables and disables links
- Initiates the transmission and reception of data on the serial lines
- Obtains link statistics from Freeway

You can use the loopback test as a template for designing client applications that interface with the DLI layer. You can also use it to verify that the installed Freeway devices and cables are functioning correctly.

2.2 Hardware Setup for the Test Program

The test program runs in loopback mode. Before running the test, perform the following procedure to install the loopback cabling:

Step 1:
Provide a synchronous modem. Configure the modem to supply continuous clocking at a data rate of 9600 bits per second. The Freeway ICPs are default configured for external clocking, and the modem supplies the clock signal for loopback testing.

Step 2:
Select a pair of adjacent ports to loopback. Ports are looped back in the following pairs: (0,1), (2,3), (4,5), and so on. Install the special three-headed loopback cable between the ports you selected and the synchronous modem. For information on port numbering, refer to the hardware installation guide for your Freeway.

Note

The loopback cable is only used during testing, not during normal Freeway operation.

2.3 Running the Test Program

Caution

To run the test program successfully, you must have write privileges in the `bin` directory on the boot server.

Step 1:

To start the test in a UNIX or Windows NT system, change to the directory that contains the test program. For example, if you performed the default installation on a UNIX system, this directory is called `/usr/local/freeway/client/`*op-sys*`/bin` where *op-sys* is the identifier for the operating system you are using. On a Windows NT system the default directory is `c:\freeway\client\`*op-sys*`\bin`. Enter the following command at the prompt:

```
awsalp
```

To start the test in a VMS system, change to the directory that contains the test program. If you performed the default installation, this directory is called `SYS$SYSDEVICE:[FREEWAY.CLIENT.`*OP-SYS*`.BIN]`, where *OP-SYS* is the identifier for the hardware platform model and TCP/IP software you are using, for example `AXP_TCPWARE`. Enter the following command at the prompt:

```
RUN AWSALP
```

Step 2:

The following prompts are displayed. Defaults are shown in brackets:

`Need help [n]?`

Enter **n** to proceed without help. Enter **y** to view a brief description of the test procedure.

`Minutes to run (1-1440) [1]`

Enter the number of minutes you want the test to run.

`ICP board on which to run test (0-3) [0]`

Enter the number of the ICP to be tested. This is the ICP that you cabled for testing in Step 2 on page 27.

`Even port number (0, 2, ..., 14) [0]`

Enter the even-numbered port you cabled for testing in Step 2 on page 27. For example, if you enter 0, the loopback test will be performed on ports 0 and 1.

Step 3:

After you answer the last prompt, the test starts. It displays a series of periods, greater than (>) symbols, or less than (<) symbols to indicate that it is running. If no errors are shown, your installation is verified.

Step 4:

Remove the loopback cable and configure the cables for normal operation. Your Freeway server is now ready to communicate with its clients.

2.4 Sample Output from the Test Program

Figure 2–1 shows the screen display from a sample AWS non-blocking loopback test program (`awsalp`). Output displayed by the program is shown in `typewriter type` and your responses are shown in **bold type**. Each entry is followed by a carriage return

```
% awsalp
Need help [n]? y

      This program transfers data between a pair of adjacent ports on an ICP
      board. These ports must be connected with the supplied Simpact THREE-
      headed loopback cable. The third head of the cable must be connected
      to your powered up modem. Your modem supplies clocking to move the
      data. The data does not reach the modem, but the program does not
      work without an external clock source. The configuration file,
      awsaldcfg, specifies an external clock source, i.e., modem-supplied
      clocking. The ICP and the distribution panel jumpers are configured
      at the factory for external clocks. The first ICP is zero; the first
      port is zero. The program defaults to ICP board zero, ports zero and
      one.

      When prompted for values, the range of legal values appears within
      parentheses immediately following the prompt. The default value then
      appears within square brackets. To select the default value, simply
      press the RETURN key. To select a value other than the default, enter
      the desired value followed by the RETURN key.

Minutes to run (1-1440) [1]? 1
ICP board on which to run test (0-3) [0]? 0
Even port number (0, 2, ..., 14) [0]? 0

AWS Asynchronous Port-to-Port LOOP BACK program.
   Test duration of 1 minute
   ICP board number 0
   Ports 0 & 1
INIT COMPLETED
OPEN SESSION server0icp0port0
OPEN SESSION server0icp0port1
COMPLETED dl0pen
.>>.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<
<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.
>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<.>>.<<
CLOSING SESSIONS
Closing Session 0
Closing Session 1
Waiting for all sessions closed
Run time: 66 seconds.
awsalp completed OK.
```

Figure 2–1: Sample Output from AWS Non-Blocking Loopback Program

Chapter

3

BSC Loopback Test Procedure

This chapter describes the BSC loopback test procedure, including the following:

- an overview of the test
- a description of how to install the hardware needed for the test
- instructions on how to run the test
- a sample screen display from the test

Note

Before running the loopback test, you must install the Freeway software and boot Freeway to download the software as described in the *Freeway User Guide*.

Note

When the loopback test is run under VMS, Simpact recommends a minimum Buffered I/O Byte Count process quota of 30,000 bytes. The AST Limit and Open File Limit process quotas must provide a unit for each session that will be opened. The number of sessions is equal to the number of selected ports, plus one.

3.1 Overview of the Test Program

The loopback test uses the data link interface (DLI) available with Freeway. The DLI library is in the `freeway/client/`*op-sys*`/lib` directory (where *op-sys* is the identifier for the operating system you are using) and can be used with any data link protocol on Freeway servers.

The BSC loopback test program is placed in the `freeway/client/`*op-sys*`/bin` directory during the installation procedures. Each BSC protocol has its own loopback test program as shown in Table 3–1.

Note

Earlier Freeway terminology used the term "synchronous" for blocking I/O and "asynchronous" for non-blocking I/O. Some parameter names reflect the previous terminology.

Table 3–1: BSC Protocol Loopback Test Programs

Protocol	Type of I/O[a]	Test Program	TSI Configuration File
BSC3270	Non-blocking	`bsc3270alp`	`bsc3270altcfg`
BSC3780	Non-blocking	`bsc3780alp`	`bsc3780altcfg`

[a] The type of I/O is set in the `AsyncIO` parameter of the TSI configuration file in the `freeway/client/test/`*filename* directory.

One high-level test program written in C is supplied with each BSC protocol, `bsc3270alp` or `bsc3780alp`, which use non-blocking I/O. The test is interactive; it prompts you for all the information needed to run the test. The test communicates with Freeway through the client data link interface (DLI) commands.

The loopback test performs the following functions:

- Configures the link-level control parameters such as baud rates, clocking, and protocol
- Enables and disables links
- Initiates the transmission and reception of data on the serial lines
- Obtains link statistics from Freeway

You can use the loopback test as a template for designing client applications that interface with the DLI layer. You can also use it to verify that the installed Freeway devices and cables are functioning correctly.

3.2 Hardware Setup for the Test Program

The test program runs in loopback mode. Before running the test, perform the following procedure to install the loopback cabling:

Step 1:
Provide a synchronous modem. Configure the modem to supply continuous clocking at a data rate between 300 and 19,200 bits per second. The Freeway ICPs are default configured for external clocking, and the modem supplies the clock signal for loopback testing.

Step 2:
Select a pair of adjacent ports to loopback. Ports are looped back in the following pairs: (0,1), (2,3), (4,5), and so on. Install the special three-headed loopback cable between the ports you selected and the synchronous modem. For information on port numbering, refer to the hardware installation guide for your Freeway.

Note

The loopback cable is only used during testing, not during normal Freeway operation.

3.3 Running the Test Program

Caution

To run the test program successfully, you must have write privileges in the `bin` directory on the boot server.

Step 1:

To start the test in a UNIX or Windows NT system, change to the directory that contains the test program. For example, if you performed the default installation on a UNIX system, this directory is called `/usr/local/freeway/client/`*`op-sys`*`/bin` where *op-sys* is the identifier for the operating system you are using. On a Windows NT system the default directory is `c:\freeway\client\`*`op-sys`*`\bin`. Enter one of the following commands at the prompt:

```
bsc3270alp
```

or

```
bsc3780alp
```

To start the test in a VMS system, change to the directory that contains the test program. If you performed the default installation, this directory is called `SYS$SYSDEVICE:[FREEWAY.CLIENT.`*`OP-SYS`*`.BIN]`, where *OP-SYS* is the identifier for the hardware platform model and TCP/IP software you are using, for example `AXP_TCPWARE`. Enter one of the following commands at the prompt:

```
RUN BSC3270ALP
```

or

```
RUN BSC3780ALP
```

Step 2:

The following prompts are displayed. Defaults are shown in brackets:

`Need help (Y/N) [N]?`

Enter **n** to proceed without help. Enter **y** to view a brief description of the test procedure.

`Minutes to run (1-1440) [1]?`

Enter the number of minutes you want the test to run.

`ICP board on which to run test (0-5) [0]?`

Enter the number of the ICP to be tested. This is the ICP that you cabled for testing in Step 2 on page 33.

`Even port number (0, 2, ..., 14) [0]?`

Enter the even-numbered port you cabled for testing in Step 2 on page 33. For example, if you enter 0, the loopback test will be performed on ports 0 and 1.

Step 3:

After you answer the last prompt, the test starts. It displays a series of periods, greater than (>) symbols, or less than (<) symbols to indicate that it is running. When it completes, it displays the test results in the form of a brief Statistics Report that shows activity on the two ports being tested. If no errors are shown, your installation is verified.

Step 4:

Remove the loopback cable and configure the cables for normal operation. Your Freeway server is now ready to communicate with its clients.

3.4 Sample Output from Test Program

Figure 3–1 shows the screen display from a sample BSC3780 non-blocking loopback test program (`bsc3780alp`). Output displayed by the program is shown in `typewriter type` and your responses are shown in **bold type**. Each entry is followed by a carriage return.

```
% bsc3780alp
Need help (Y/N) [N]? Y

This program transfers data between a pair of adjacent ports on an ICP
board.  These ports must be connected with the supplied Simpact THREE-
headed loopback cable.  The third head of the cable must be connected
to your powered up modem.  Your modem supplies clocking to move the
data.  The data does not reach the modem, but the program does not
work without an external clock source.  The configuration file,
bsc3780aldcfg, specifies an external clock source, i.e. modem-
supplied clocking.  The ICP and the distribution panel jumpers are
configured at the factory for external clocks.  The first ICP is zero;
the first port is zero.  The program defaults to ICP board zero, ports
zero and one.

When prompted for values, the range of legal values appears within
parentheses immediately following the prompt.  The default value then
appears within square brackets.  To select the default value, simply
press the RETURN key.  To select a value other than the default, enter
the desired value followed by the RETURN key.

Minutes to run (1-1440) [1]? 1
ICP board on which to run test (0-5) [0]? 0
Even port number (0, 2, ..., 14) [0]? 0

BSC 2780/3780 Asynchronous Port-To-Port Loopback Program.
   Test duration in minutes: 1 minute
   ICP board number: 0
   Ports: 0 & 1

BSC 2780/3780 Software Version:
   <@@> VI-100-0186: BSC 2.0-0  BSC 2780/3780 16-June-98
 OS/Impact Version  V331

BSC 2780/3780 ICP Buffer Report:
      1024 ICP message buffer size
       278 Number of free ICP message buffers
       297 Total number of ICP message buffers
       512 Transmission buffer size
         1 Number of free transmission buffers
         1 Total number of transmission buffers
        16 Total number of links
><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><>< - 1
><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><>< - 2
><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><>> - 3
```

Figure 3–1: Sample Output from BSC3780 Non-Blocking Loopback Program

```
BSC 2780/3780 Statistics Report:
                              server0icp0port0      server0icp0port1
                              ----------------      ----------------
   Block check errors                    0                     0
   Parity errors                         0                     0
   Receive overrun errors                0                     0
   Buffer errors                         0                     0
   Messages sent                       338                   338
   Messages received                   338                   338
   NAKs sent                             0                     0
   NAKs received                         0                     0
   Buffer errors on send                 0                     0
   Transmission blocks sent            338                   338
   Transmission blocks received        338                   338

Loopback test complete
```

Figure 3–1: Sample Output from BSC3780 Non-Blocking Loopback Program *(Cont'd)*

Chapter

4 DDCMP Loopback Test Procedure

This chapter describes the DDCMP loopback test procedure, including the following:

- an overview of the test
- a description of how to install the hardware needed for the test
- instructions on how to run the test
- a sample screen display from the test

Note

Before running the loopback test, you must install the Freeway software and boot Freeway to download the software as described in the *Freeway User Guide*.

Note

When the loopback test is run under VMS, Simpact recommends a minimum Buffered I/O Byte Count process quota of 30,000 bytes. The AST Limit and Open File Limit process quotas must provide a unit for each session that will be opened. The number of sessions is equal to the number of selected ports, plus one.

4.1 Overview of the Test Program

The loopback test uses the data link interface (DLI) available with Freeway. The DLI library is in the `freeway/client/`*op-sys*`/lib` directory (where *op-sys* is the identifier for the operating system you are using) and can be used with any data link protocol on Freeway servers.

The DDCMP loopback test program is placed in the `freeway/client/`*op-sys*`/bin` directory during the installation procedures.

Note

Earlier Freeway terminology used the term "synchronous" for blocking I/O and "asynchronous" for non-blocking I/O. Some parameter names reflect the previous terminology.

One high-level test program written in C is supplied with the DDCMP protocol: `ddcmpalp`, which uses non-blocking I/O. The test is interactive; it prompts you for all the information needed to run the test. The test communicates with Freeway through the client data link interface (DLI) commands.

The loopback test performs the following functions:

- Configures the link-level control parameters such as baud rates, clocking, and protocol
- Enables and disables links
- Initiates the transmission and reception of data on the serial lines
- Obtains link statistics from Freeway

You can use the loopback test as a template for designing client applications that interface with the DLI layer. You can also use it to verify that the installed Freeway devices and cables are functioning correctly.

4.2 Hardware Setup for the Test Program

The test program runs in loopback mode. Before running the test, perform the following procedure to install the loopback cabling:

Step 1:
Provide a synchronous modem. Configure the modem to supply continuous clocking at a data rate between 300 and 19,200 bits per second. The Freeway ICPs are default configured for external clocking, and the modem supplies the clock signal for loopback testing.

Step 2:
Select a pair of adjacent ports to loopback. Ports are looped back in the following pairs: (0,1), (2,3), (4,5), and so on. Install the special three-headed loopback cable between the ports you selected and the synchronous modem. For information on port numbering, refer to the hardware installation guide for your Freeway.

Note

The loopback cable is only used during testing, not during normal Freeway operation.

4.3 Running the Test Program

Caution

To run the test program successfully, you must have write privileges in the `bin` directory on the boot server.

Step 1:

To start the test in a UNIX or Windows NT system, change to the directory that contains the test program. For example, if you performed the default installation on a UNIX system, this directory is called `/usr/local/freeway/client/`*op-sys*`/bin` where *op-sys* is the identifier for the operating system you are using. On a Windows NT system the default directory is `c:\freeway\client\`*op-sys*`\bin`. Enter the following command at the prompt:

```
ddcmpalp
```

To start the test in a VMS system, change to the directory that contains the test program. If you performed the default installation, this directory is called `SYS$SYSDEVICE:[FREEWAY.CLIENT.`*OP-SYS*`.BIN]`, where *OP-SYS* is the identifier for the hardware platform model and TCP/IP software you are using, for example `AXP_TCPWARE`. Enter the following command at the prompt:

```
RUN DDCMPALP
```

Step 2:

The following prompts are displayed. Defaults are shown in brackets:

`Need help (Y/N) [N]?`

Enter **n** to proceed without help. Enter **y** to view a brief description of the test procedure.

```
Clock source (0 = External; 1 = Internal) [0]
```

Enter **0** for external clock or **1** for internal clock.

```
Index Baud rates:
0         200
1         600
2        1200
3        2400
4        4800
5        9600
6       19200
7       38400
8       56000
9       64000
10    263100
Baud rate index (0 to 10) [5]?
```

Enter the appropriate baud rate index.

```
Electrical interface (ignored for VME Freeways)
EIA232      - 0
EIA449      - 5
EIA530      - 6
V35         - 7
Select an interface (0 - 7) [0]?
```

Enter the value for the electrical interface. This is only required for Freeway 1100/1150/1200/1300; the entry will be ignored if you have a Freeway 2000/4000/8800.

```
Minutes to run (1-1440) [1]
```

Enter the number of minutes you want the test to run.

`ICP board on which to run test (0-5) [0]`

Enter the number of the ICP to be tested. This is the ICP that you cabled for testing in Step 2 on page 41.

`Even port number (0, 2, ..., 14) [0]`

Enter the even-numbered port you cabled for testing in Step 2 on page 41. For example, if you enter 0, the loopback test will be performed on ports 0 and 1.

Step 3:

After you answer the last prompt, the test starts. It displays a series of spinning slashes to indicate that it is running. When it completes, it displays the test results in the form of a brief Statistics Report that shows activity on the two ports being tested. If no errors are shown, your installation is verified.

Step 4:

Remove the loopback cable and configure the cables for normal operation. Your Freeway server is now ready to communicate with its clients.

4.4 Sample Output from Test Program

Figure 4–1 shows the screen display from a sample DDCMP non-blocking loopback test program (`ddcmpalp`). Output displayed by the program is shown in `typewriter type` and your responses are shown in **bold type**. Each entry is followed by a carriage return.

```
% ddcmpalp
Need help (Y/N) [N]? y

   This program transfers data between a pair of adjacent ports on an ICP
   board.  These ports must be connected with the supplied Simpact THREE-
   headed loopback cable.  The third head of the cable must be connected
   to your powered up modem.  Your modem supplies clocking to move the
   data.  The data does not reach the modem, but the program does not
   work without an external clock source.  The configuration file,
   ddcmpaldcfg, specifies an external clock source, i.e. modem-
   supplied clocking.  The ICP and the distribution panel jumpers are
   configured at the factory for external clocks.  The first ICP is zero;
   the first port is zero.  The program defaults to ICP board zero, ports
   zero and one.

   When prompted for values, the range of legal values appears within
   parentheses immediately following the prompt.  The default value then
   appears within square brackets.  To select the default value, simply
   press the RETURN key.  To select a value other than the default, enter
   the desired value followed by the RETURN key.

Clock source (0 = External;  1 = Internal) [0]? 0
Index Baud rates:
     0       200
     1       600
     2      1200
     3      2400
     4      4800
     5      9600
     6     19200
     7     38400
     8     56000
     9     64000
     10   263100
Baud rate index (0 to 10) [5]? 5
Electrical interface (ignored for VME Freeways)
   EIA232      - 0
   EIA449      - 5
   EIA530      - 6
   V35         - 7
Select an interface (0 - 7) [0]? 0
Minutes to run (1-1440) [1]? 1
ICP board on which to run test (0-5) [0]? 0
Even port number (0, 2, ..., 14) [0]? 4
```

Figure 4–1: Sample Output from DDCMP Non-Blocking Loopback Program

```
DDCMP Asynchronous Port-To-Port Loopback Program.
   Test duration of 1 minute
   ICP board number 0
   Ports 4 & 5

Link 4 attached
Link 5 attached
Link 4 configured
Link 5 configured
Waiting for link 4 start to complete...
Waiting for link 5 start to complete...
Link 4 start complete
Link 5 start complete
Transferring data...
|
DDCMP Statistics Report:
                              server0icp0port4      server0icp0port5
                             -----------------     -----------------
   Header BCC error NAKs rcvd            0                     0
   Buffer BCC error NAKs rcvd            0                     0
   Header BCC error NAKs sent            0                     0
   Buffer BCC error NAKs sent            0                     0
   No buffer NAKS sent                   0                     0
   No buffer NAKs received               0                     0
   Local reply timeouts sent             0                     0
   Remote reply timeouts rcvd            0                     0
   Rcv overrun NAKs sent                 0                     0
   Rcv overrun NAKs rcvd                 0                     0
   Message too long NAKs sent            0                     0
   Message too long NAKs rcvd            0                     0
   Header format NAKs sent               0                     0
   Header format NAKs rcvd               0                     0
   Messages sent (ICP)                 504                   517
   Messages received (ICP)             517                   504
   Messages sent (Loop back)           504                   517
   Messages received (Loop back)       517                   504

Loopback test complete
```

Figure 4–1: Sample Output from DDCMP Non-Blocking Loopback Program *(Cont'd)*

Chapter

5 FMP Loopback Test Procedure

This chapter describes the FMP loopback test procedure, including the following:

- an overview of the test
- a description of how to install the hardware needed for the test
- instructions on how to run the test
- a sample screen display from the test

Note

Before running the loopback test, you must install the Freeway software and boot Freeway to download the software as described in the *Freeway User Guide*.

Note

When the loopback test is run under VMS, Simpact recommends a minimum Buffered I/O Byte Count process quota of 30,000 bytes. The AST Limit and Open File Limit process quotas must provide a unit for each session that will be opened. The number of sessions is equal to the number of selected ports, plus one.

5.1 Overview of the Test Program

The loopback test uses the data link interface (DLI) available with Freeway. The DLI library is in the `freeway/client/`*op-sys*`/lib` directory (where *op-sys* is the identifier for the operating system you are using) and can be used with any data link protocol on Freeway servers.

The FMP loopback test program is placed in the `freeway/client/`*op-sys*`/bin` directory during the installation procedures.

Note

Earlier Freeway terminology used the term "synchronous" for blocking I/O and "asynchronous" for non-blocking I/O. Some parameter names reflect the previous terminology.

One high-level test program written in C is supplied with each FMP protocol, `fmpalp`, which use non-blocking I/O. The test is interactive; it prompts you for all the information needed to run the test. The test communicates with Freeway through the client data link interface (DLI) commands.

The loopback test performs the following functions:

- Configures the link-level control parameters such as baud rates, clocking, and protocol
- Enables and disables links
- Initiates the transmission and reception of data on the serial lines
- Obtains link statistics from Freeway

You can use the loopback test as a template for designing client applications that interface with the DLI layer. You can also use it to verify that the installed Freeway devices and cables are functioning correctly.

5.2 Hardware Setup for the Test Program

The test program runs in loopback mode. Before running the test, perform the following procedure to install the loopback cabling:

Step 1:
Provide a synchronous modem. Configure the modem to supply continuous clocking at a data rate between 300 and 19,200 bits per second. The Freeway ICPs are default configured for external clocking, and the modem supplies the clock signal for loopback testing.

Step 2:
Select a pair of adjacent ports to loopback. Ports are looped back in the following pairs: (0,1), (2,3), (4,5), and so on. Install the special three-headed loopback cable between the ports you selected and the synchronous modem. For information on port numbering, refer to the hardware installation guide for your Freeway.

Note

The loopback cable is only used during testing, not during normal Freeway operation.

5.3 Running the Test Program

Caution

To run the test program successfully, you must have write privileges in the `bin` directory on the boot server.

Step 1:

To start the test in a UNIX or Windows NT system, change to the directory that contains the test program. For example, if you performed the default installation on a UNIX system, this directory is called `/usr/local/freeway/client/`*op-sys*`/bin` where *op-sys* is the identifier for the operating system you are using. On a Windows NT system the default directory is `c:\freeway\client\`*op-sys*`\bin`. Enter the following command at the prompt:

```
fmpalp
```

To start the test in a VMS system, change to the directory that contains the test program. If you performed the default installation, this directory is called `SYS$SYSDEVICE:[FREEWAY.CLIENT.`*OP-SYS*`.BIN]`, where *OP-SYS* is the identifier for the hardware platform model and TCP/IP software you are using, for example `AXP_TCPWARE`. Enter the following command at the prompt:

```
RUN FMPALP
```

Step 2:

The following prompts are displayed. Defaults are shown in brackets:

`Need help (Y/N) [N]?`

Enter **n** to proceed without help. Enter **y** to view a brief description of the test procedure.

`Minutes to run (1-1440) [1]?`

Enter the number of minutes you want the test to run.

`Number of initial writes (1-4) [1]?`

Enter the number of writes to be allowed before a response.

`ICP board on which to run test (0-5) [0]?`

Enter the number of the ICP to be tested. This is the ICP that you cabled for testing in Step 2 on page 49.

`Even port number (0, 2, ..., 14) [0]?`

Enter the even-numbered port you cabled for testing in Step 2 on page 49. For example, if you enter 0, the loopback test will be performed on ports 0 and 1.

Step 3:

After you answer the last prompt, the test starts. It displays a series of periods, greater than (>) symbols, or less than (<) symbols to indicate that it is running. When it completes, it displays the test results in the form of a brief Statistics Report that shows activity on the two ports being tested. If no errors are shown, your installation is verified.

Step 4:

Remove the loopback cable and configure the cables for normal operation. Your Freeway server is now ready to communicate with its clients.

5.4 Sample Output from Test Program

Figure 5–1 shows the screen display from a sample FMP non-blocking loopback test program (`fmpalp`). Output displayed by the program is shown in `typewriter type` and your responses are shown in **bold type**. Each entry is followed by a carriage return. .

```
% fmpalp
 Need help (Y/N) [N]? y

     This program transfers data between a pair of adjacent ports on an ICP
     board.  These ports must be connected with the supplied Simpact THREE-
     headed loopback cable.  The third head of the cable must be connected
     to your powered up modem.  Your modem supplies clocking to move the
     data.  The data does not reach the modem, but the program does not
     work without an external clock source.  The configuration file,
     fmpaldcfg, specifies an external clock source, i.e. modem-
     supplied clocking.  The ICP and the distribution panel jumpers are
     configured at the factory for external clocks.  The first ICP is zero;
     the first port is zero.  The program defaults to ICP board zero, ports
     zero and one.

     When prompted for values, the range of legal values appears within
     parentheses immediately following the prompt.  The default value then
     appears within square brackets.  To select the default value, simply
     press the RETURN key.  To select a value other than the default, enter
     the desired value followed by the RETURN key.

 Minutes to run (1-1440) [1]? 1
 Number of initial writes (1-4) [1]? 2
 ICP board on which to run test (0-3) [0]? 0
 Even port number (0, 2, ..., 14) [0]? 0

 FMP Asynchronous Port-To-Port Loopback Program.
    Test duration in minutes: 1 minute
    ICP board number: 0
    Ports: 0 & 1

FMP Software Version:
 @(#) Simpact FMP (Financial Market Protocols) - V1.5  22-Jan-96
      for the Freeway 2000/4000/8800 server  (ICP6000)
 (OS/Impact Version  V1.6 )
```

Figure 5–1: Sample Output from FMP Non-Blocking Loopback Program

```
FMP ICP Buffer Report:
      1024 ICP message buffer size
       523 Number of free ICP message buffers
       592 Total number of ICP message buffers
      1019 Transmission buffer size
        30 Number of free transmission buffers
        30 Total number of transmission buffers
         8 Total number of links
><><><<><><><><><><<><><><<><><><<><><><><<><><><<><><><><<><><><<><><<><><><<><><>
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<<><<><<><<><><<><><<><<><><<
FMP Statistics Report:
                                 server0icp0port0     server0icp0port1
                                 ----------------     ----------------
   Block check errors                   0                    0
   Parity errors                        0                    0
   Receive overrun errors               0                    0
   Q limit errors                       0                    0
   Messages sent                      703                  580
   Messages received                  580                  703
   Buffers not available                0                    0
   Buffer overruns                      0                    0
 Loopback test complete
```

Figure 5–1: Sample Output from FMP Non-Blocking Loopback Program *(Cont'd)*

Chapter

6 ADCCP NRM Loopback Test Procedure

This chapter describes the ADCCP NRM loopback test procedure, including the following:

- an overview of the test
- a description of how to install the hardware needed for the test
- instructions on how to run the test
- sample screen displays from the test

Note

Before running the loopback test, you must install the Freeway software and boot Freeway to download the software as described in the *Freeway User Guide*.

Note

When the loopback test is run under VMS, Simpact recommends a minimum Buffered I/O Byte Count process quota of 30,000 bytes. The AST Limit and Open File Limit process quotas must provide a unit for each session that will be opened. The number of sessions is equal to the number of selected ports, plus one.

6.1 Overview of the Test Program

The loopback test uses the data link interface (DLI) available with Freeway. The DLI library is in the `freeway/client/`*op-sys*`/lib` directory (where *op-sys* is the identifier for the operating system you are using) and can be used with any data link protocol on Freeway servers.

The ADCCP NRM loopback test program is placed in the `freeway/client/`*op-sys*`/ bin` directory during the installation procedures.

Note

Earlier Freeway terminology used the term "synchronous" for blocking I/O and "asynchronous" for non-blocking I/O. Some parameter names reflect the previous terminology.

One high-level test program written in C is supplied with the ADCCP NRM protocol, `nrmalp`, which uses non-blocking I/O. The test is interactive; it prompts you for all the information needed to run the test. The test communicates with Freeway through the client data link interface (DLI) commands.

The loopback test performs the following functions:

- Configures the link-level control parameters such as baud rates, clocking, and protocol
- Enables and disables links
- Initiates the transmission and reception of data on the serial lines
- Obtains link statistics from Freeway

You can use the loopback test as a template for designing client applications that interface with the DLI layer. You can also use it to verify that the installed Freeway devices and cables are functioning correctly.

6.2 Hardware Setup for the Test Program

The test program runs in loopback mode. Before running the test, perform the following procedure to install the loopback cabling:

Step 1:
Provide a synchronous modem. Configure the modem to supply continuous clocking at a data rate of 2400 bits per second. The Freeway ICPs are default configured for external clocking, and the modem supplies the clock signal for loopback testing.

Step 2:
Select a pair of adjacent ports to loopback. Ports are looped back in the following pairs: (0,1), (2,3), (4,5), and so on. Install the special three-headed loopback cable between the ports you selected and the synchronous modem. For information on port numbering, refer to the hardware installation guide for your Freeway.

Note

The loopback cable is only used during testing, not during normal Freeway operation.

6.3 Running the Test Program

Caution

To run the test program successfully, you must have write privileges in the `bin` directory on the boot server.

Step 1:

To start the test in a UNIX or Windows NT system, change to the directory that contains the test program. For example, if you performed the default installation on a UNIX system, this directory is called `/usr/local/freeway/client/`*op-sys*`/bin` where *op-sys* is the identifier for the operating system you are using. On a Windows NT system the default directory is `c:\freeway\client\`*op-sys*`\bin`. Enter the following command:

```
nrmalp
```

To start the test in a VMS system, change to the directory that contains the test program. If you performed the default installation, this directory is called `SYS$SYSDEVICE:[FREEWAY.CLIENT.`*OP-SYS*`.BIN]`, where *OP-SYS* is the identifier for the hardware platform model and TCP/IP software you are using, for example `AXP_TCPWARE`. Enter the following command at the prompt:

```
RUN NRMALP
```

Step 2:

The following prompts are displayed. Defaults are shown in brackets:

`Need help (Y/N) [N]?`

Enter **n** to proceed without help. Enter **y** to view a brief description of the test procedure.

`Minutes to run (1-1440) [1]`

Enter the number of minutes you want the test to run.

`ICP board on which to run test (0-5) [0]`

Enter the number of the ICP to be tested. This is the ICP that you cabled for testing in Step 2 on page 57.

`Even port number (0, 2, ..., 14) [0]`

Enter the even-numbered port you cabled for testing in Step 2 on page 57. For example, if you enter 0, the loopback test will be performed on ports 0 and 1.

Step 3:

After you answer the last prompt, the test starts. It displays a series of periods, greater than (>) symbols, or less than (<) symbols to indicate that it is running. When it completes, it displays the test results in the form of a brief Statistics Report that shows activity on the two ports being tested. If no errors are shown, your installation is verified.

Step 4:

Remove the loopback cable and configure the cables for normal operation. Your Freeway server is now ready to communicate with its clients.

6.4 Sample Output from Test Program

Figure 6–1 shows the screen display from a sample ADCCP NRM non-blocking loopback test program (`nrmalp`). Output displayed by the program is shown in `typewriter type` and your responses are shown in **bold type**. Each entry is followed by a carriage return.

```
% nrmalp
Need help (Y/N) [N]? Y

      This program transfers data between a pair of adjacent ports on an ICP
      board.  These ports must be connected with the supplied Simpact THREE-
      headed loopback cable.  The third head of the cable must be connected
      to your powered up modem.  Your modem supplies clocking to move the
      data.  The data does not reach the modem, but the program does not
      work without an external clock source.  The configuration file,
      nrmaldcfg, specifies an external clock source, i.e. modem-supplied
      clocking.  The ICP and the distribution panel jumpers are configured
      at the factory for external clocks.  The first ICP is zero; the first
      port is zero.  The program defaults to ICP board zero, ports zero and
      one.

      When prompted for values, the range of legal values appears within
      parentheses immediately following the prompt.  The default value then
      appears within square brackets.  To select the default value, simply
      press the RETURN key.  To select a value other than the default, enter
      the desired value followed by the RETURN key.

Minutes to run (1-1440) [1]? 1
ICP board on which to run test (0-5) [0]? 1
Even port number (0, 2, ..., 14) [0]? 0

ADCCP NRM Asynchronous Port-to-Port LOOP BACK program.
   Test duration of 1 minute
   ICP board number 1
   Ports 0 & 1
INIT COMPLETED
OPEN SESSION server0icp1port0
OPEN SESSION server0icp1port1
WAIT FOR SESSION server0icp1port0 TO BECOME ACTIVE
WAIT FOR SESSION server0icp1port1 TO BECOME ACTIVE
COMPLETED dlOpen
ADCCP NRM version:
@(#) Simpact ADCCP NRM for FREEWAY 2000 - V03.3 13-Dec-95, OS/Impact - V1.6
ADCCP NRM (ANSI X3.66-1979)         13-DEC-1995  - 3.1.4

..<.>><.>.><<<<>>..>.>>>><<<..>.>.<<<<>><<<<.>>>><<<<>>>><<<<.>>>><<<<>>>>..>>.<
<<<.>>>>>.<<<<>..>>.>><<<<..>.<<<<>>>..>.>>><<<<..>.<<<<>>>..>.>>><<<<..>.<<<<>>
>.<<>>.>.>>><<<<.>>>.<<<<><<<.>>
DONE READS / WRITES
```

Figure 6–1: Sample Output from NRM Non-blocking Loopback Program

```
ADCCP NRM Statistics Report ICP1
Links               0      1
               --------------
inv addresses       0      0
inv ctlfields       0      0
rcv FCS errs        0      0
Ifrm too long       0      0
rcv overruns        0      0
txmt underruns      0      0
txmt wtchdg         0      0
stn resets          0      0
               --------------
data writes       533    534
data reads        535    533

CLOSING SESSIONS
Closing Session 0
Closing Session 1
Waiting for all sessions closed
Run time: 60 seconds.
nrmalp completed OK.
```

Figure 6–1: Sample Output from NRM Non-blocking Loopback Program *(Cont'd)*

Chapter

7

Protocol Toolkit Loopback Test Procedure

This chapter describes the protocol toolkit test program, including the following:

- an overview of the test
- a description of how to install the hardware needed for the test
- instructions on how to run the test
- sample screen displays from the test

Note

Before running the loopback test program, you must install the Freeway software and boot Freeway to download the software as described in the *Freeway User Guide*.

Note

When the loopback test is run under VMS, Simpact recommends a minimum Buffered I/O Byte Count process quota of 30,000 bytes. The AST Limit and Open File Limit process quotas must provide a unit for each session that will be opened. The number of sessions is equal to the number of selected ports, plus one.

7.1 Overview of the Test Program

The loopback test uses the data link interface (DLI) available with Freeway. The DLI library is in the `freeway/client/`*op-sys*`/lib` directory (where *op-sys* is the identifier for the operating system you are using) and can be used with any data link protocol on Freeway servers.

The protocol toolkit loopback test program is placed in the `freeway/client/`*op-sys*`/bin` directory during the installation procedures.

Note

Earlier Freeway terminology used the term "synchronous" for blocking I/O and "asynchronous" for non-blocking I/O. Some parameter names reflect the previous terminology.

One high-level test program written in C is supplied with the protocol toolkit, `spsalp`, which uses non-blocking I/O. The program is interactive; it prompts you for all of the information needed to run the test. The program communicates with Freeway through the client data link interface (DLI) commands.

The loopback test performs the following functions:

- Configures the link-level control parameters such as baud rates, clocking, and protocol
- Enables and disables links
- Communicates with Freeway and initiates the transmission and reception of data on the serial lines
- Obtains link statistics from Freeway

You can use the loopback test program as a template for designing client applications that interface with the DLI layer. You can also use it to verify that the installed Freeway devices and cables are functioning correctly.

The test program can configure any of the Freeway links to perform one of three methods of communication: bit synchronous (HDLC/SDLC), byte synchronous (BSC), and asynchronous (ASYNC). The synchronous methods use an external modem as the clocking device. No external modem is required for the asynchronous method.

7.2 Hardware Setup for the Test Program

The test program runs in loopback mode. Before running the test, perform the following procedure to install the loopback cabling:

Step 1:
If you are using a synchronous protocol (HDLC/SDLC or BSC), locate a synchronous modem that you can use during the test.

Step 2:
Select a pair of adjacent ports to loopback. Ports are looped back in the following pairs: (0,1), (2,3), (4,5), and so on. For information on port numbering, refer to the hardware installation guide for your Freeway.

If you are using a synchronous protocol, install the special three-headed loopback cable between the ports you selected and the synchronous modem. It supplies the needed clock signal. Configure the modem to supply continuous clocking at a data rate between 300 and 19,200 bits per second.

If you are using an asynchronous protocol, the male connector of the loopback cable does not have to be attached to anything; however, if you have just run the synchronous test, you do not have to detach the modem before running the asynchronous test.

Note

The loopback cable is only used during testing, not during normal Freeway operation.

7.3 Running the Test Program

Caution

To run the test program successfully, you must have write privileges in the `bin` directory on the boot server.

Step 1:

To start the test program in a UNIX or Windows NT system, change to the directory that contains the test program. For example, if you performed the default installation on a UNIX system, this directory is called `/usr/local/freeway/client/`*op-sys*`/bin` where *op-sys* is the identifier for the operating system you are using. On a Windows NT system the default directory is `c:\freeway\client\`*op-sys*`\bin`. Enter the following command at the prompt:

```
spsalp
```

To start the test program in a VMS system, change to the directory that contains the test program. If you performed the default installation, this directory is called `SYS$SYSDEVICE:[FREEWAY.CLIENT.`*OP-SYS*`.BIN]`, where *OP-SYS* is the identifier for the hardware platform model and TCP/IP software you are using, for example `AXP_TCPWARE`. Enter the following command at the prompt:

```
RUN SPSALP
```

Step 2:

The following prompts are displayed. Defaults are shown in brackets:

`Need help (H) or no [N]?`

Enter **n** to proceed without help. Enter **h** to view a brief description of the test procedure.

`Enter protocol to run ( 0-BSC, 1-ASYNC, 2-SDLC) [1]?`

Enter **0**, **1**, or **2** to select the desired protocol.

`Minutes to run (1-1440) [1]?`

Enter the number of minutes you want the test to run.

`ICP board for even link (0-7) [0]?`

Enter the number of the ICP to be tested. This is the ICP that you cabled for testing in Step 2 on page 65.

`ICP board for odd link (0-7) [0]?`

Enter the number of the ICP to be tested. This is the ICP that you cabled for testing in Step 2 on page 65.

`Baud index (1-13) [8->9600]?`

Enter the index value for the desired baud rate. For a list of valid values, refer to the link configuration command description in the *Protocol Software Toolkit Programmer Guide*.

`Enter clock source (0-external, 1-internal) [1]?`

Enter **0** to use external clocking or **1** to use internal clocking.

`Even port number (0, 2, ..., 14) [0]?`

Enter the even-numbered port you cabled for testing in Step 2 on page 65. For example, if you enter 0, the loopback test will be performed on ports 0 and 1.

Step 3:

After you answer the last prompt, the test starts. It displays a series of periods, greater than (>) symbols, or less than (<) symbols to indicate that it is running. When it completes, it displays the test results in the form of a brief Statistics Report that shows activity on the two ports being tested. If no errors are shown, your installation is verified.

Step 4:

Remove the loopback cable and configure the cables for normal operation. Your Freeway server is now ready to communicate with its clients.

7.4 Sample Output from Test Program

Figure 7–1 shows the screen display from a sample Protocol Toolkit non-blocking loopback test program (`spsalp`). Output displayed by the program is shown in `typewriter type` and your responses are shown in **bold type**. Each entry is followed by a carriage return.

```
% spsalp
 Need help (H) or no [N] ? n
 Enter protocol to run ( 0-BSC, 1-ASYNC, 2-SDLC) [1]? 1
 Minutes to run (1-1440) [1]? 1
 Ports used will be an even/odd pair. They can be split across
 two different ICPs.  The DLI configuration file can even specify
 that the links be split across two different Freeways.
 ICP board for even link (0-7) [0]? 3
 ICP board for odd link (0-7) [0]? 3
 Baud index (1-13) [8->9600]? 8
 Enter clock source (0-external, 1-internal) [1]? 1
 Even port number (0, 2, ..., 14) [0]? 0

 SPS Asynchronous Port-To-Port Loopback Program.
    For protocol type (0-BSC, 1-ASYNC, 2-SDLC) : 1
    Test duration (in minutes) : 1
    ICP board number 3, link number 0
    ICP board number 3, link number 1
    Baud rate : 9600
 >>>>><><><<>><<<<>>>>><><<<>>><<<<>>>><>><<><<>>><<<<><><>>><<>>><<<<<<>>>>>><<><<>><<<>
 ><<>>><<>><<<<<>>>>>><<>><<><<>><<<<<>>>>><><><<<<>>>>><>><<>><<<<<<>>>>><<>><<<<<>>>>><
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 Toolkit Statistics Report:
                                  server0icp3port0      server0icp3port1
                                  ----------------      ----------------
    Received messages too long            0                     0
    Times DCD lost                        0                     0
    Received messages aborted             0                     0
    Receive overruns                      0                     0
    Receive CRC errors                    0                     0
    Receive parity errors                 0                     0
    Receive framing errors                0                     0
    Transmit underruns                    0                     0
    Data blocks sent                    287                   267
    Data blocks received                267                   287
    data writes                         287                   267
    data writes acked                   287                   267
    data reads                          267                   287
 Loopback test complete
```

Figure 7–1: Sample Output from Protocol Toolkit Non-Blocking Loopback Program

Chapter

8 STD1200B Loopback Test Procedure

This chapter describes the STD1200B loopback test procedure, including the following:

- an overview of the test
- a description of how to install the hardware needed for the test
- instructions on how to run the test
- a sample screen display from the test

Note

Before running the loopback test, you must install the Freeway software and boot Freeway to download the software as described in the *Freeway User Guide*.

Note

When the loopback test is run under VMS, Simpact recommends a minimum Buffered I/O Byte Count process quota of 30,000 bytes. The AST Limit and Open File Limit process quotas must provide a unit for each session that will be opened. The number of sessions is equal to the number of selected ports, plus one.

8.1 Overview of the Test Program

The loopback test uses the data link interface (DLI) available with Freeway. The DLI library is in the `freeway/client/`*op-sys*`/lib` directory (where *op-sys* is the identifier for the operating system you are using) and can be used with any data link protocol on Freeway servers.

The STD1200B loopback test program is placed in the `freeway/client/`*op-sys*`/bin` directory during the installation procedures.

Note

Earlier Freeway terminology used the term "synchronous" for blocking I/O and "asynchronous" for non-blocking I/O. Some parameter names reflect the previous terminology.

One high-level test program written in C is supplied with the STD1200B protocol, `s12alp`, which uses non-blocking I/O. This test is interactive; it prompts you for all the information needed to run the test. The test communicates with Freeway through the client data link interface (DLI) commands.

The loopback test performs the following functions:

- Configures the link-level control parameters such as baud rates, clocking, and protocol
- Enables and disables links
- Initiates the transmission and reception of data on the serial lines
- Obtains link statistics from Freeway

You can use the loopback test as a template for designing client applications that interface with the DLI layer. You can also use it to verify that the installed Freeway devices and cables are functioning correctly.

8.2 Hardware Setup for the Test Program

The test program runs in loopback mode. Before running the test, perform the following procedure to install the loopback cabling:

Step 1:
Provide a synchronous modem. Configure the modem to supply continuous clocking at a data rate of 9600 bits per second. The Freeway ICPs are default configured for external clocking, and the modem supplies the clock signal for loopback testing.

Step 2:
Select a pair of adjacent ports to loopback. Ports are looped back in the following pairs: (0,1), (2,3), (4,5), and so on. Install the special three-headed loopback cable between the ports you selected and the synchronous modem. For information on port numbering, refer to the hardware installation guide for your Freeway.

Note

The loopback cable is only used during testing, not during normal Freeway operation.

8.3 Running the Test Program

Caution

To run the test program successfully, you must have write privileges in the `bin` directory on the boot server.

Step 1:

To start the test program in a UNIX or Windows NT system, change to the directory that contains the test program. For example, if you performed the default installation on a UNIX system, this directory is called `/usr/local/freeway/client/`*op-sys*`/bin` where *op-sys* is the identifier for the operating system you are using. On a Windows NT system the default directory is `c:\freeway\client\`*op-sys*`\bin`. Enter the following command:

```
s12alp
```

To start the test program in a VMS system, change to the directory that contains the test program. If you performed the default installation, this directory is called `SYS$SYSDEVICE:[FREEWAY.CLIENT.`*OP-SYS*`.BIN]`, where *OP-SYS* is the identifier for the hardware platform model and TCP/IP software you are using, for example `AXP_TCPWARE`. Enter the following command:

```
RUN S12ALP
```

Step 2:

The following prompts are displayed. Defaults are shown in brackets:

`Need help (H) [N] ?`

Enter **N** to proceed without help. Enter **H** to view a brief description of the test procedure.

`Minutes to run (1-1440) [1] ?`

Enter the number of minutes you want the test to run.

`ICP board on which to run test (0-5) [0] ?`

Enter the number of the ICP to be tested. This is the ICP that you cabled for testing in Step 2 on page 73.

`Even port number (0, 2, ..., 14) [0]`

Enter the even-numbered port you cabled for testing in Step 2 on page 73. For example, if you enter 0, the loopback test will be performed on ports 0 and 1.

`Internal (0) or External (1) clock [1] ?`

Enter 0 for internal clocking or 1 for external clocking.

Step 3:

After you answer the last prompt, the test starts. It displays a series of greater than (>) and less than (<) symbols to indicate that it is running. When it completes, it displays the test results in the form of a brief Statistics Report that shows activity on the two ports being tested. If no errors are shown, your installation is verified.

Step 4:

Remove the loopback cable and configure the cables for normal operation. Your Freeway server is now ready to communicate with its clients.

8.4 Sample Output from the Test Program

Figure 8–1 shows the screen display from a sample STD1200B non-blocking loopback test program (`s12alp`). Output displayed by the program is shown in `typewriter type` and your responses are shown in **bold type**. Each entry is followed by a carriage return.

```
% s12alp

Need help (H) [N] ? H

    This program transfers data between a pair of adjacent ports on an ICP
    board.  The first ICP is zero; the first port on an ICP is zero.  The
    program defaults to ICP zero, ports zero and one.

    The ICPs and distribution panels are configured at the factory for
    external clocking.  An adjacent port pair is normally connected with a
    Simpact-supplied THREE-headed loopback cable, with the third head of
    the cable connected to your powered up modem.  Your modem supplies
    clocking to move the data, but the data does not reach the modem.  The
    program does not work with an internal clock source unless "I" is
    entered in response to the above prompt.

    When prompted for values, the range of legal values appears within
    parentheses immediately following the prompt.  The default value then
    appears within square brackets.  To select the default value, simply
    press the RETURN key.  To select a value other than the default, enter
    the desired value followed by the RETURN key.


    Once the program is running, entering one Control C causes the program
    to turn the timer off and go through its normal exit process as if the
    time had expired.  Entering two consecutive Control C's causes the
    program to exit immediately.

Minutes to run (1-1440) [1]? 1
ICP board on which to run test (0-5) [0]? 0
Even port number (0, 2, ..., 14) [0]? 0
Internal (0) or External (1) clock [1]? 1

STD1200B Asynchronous Port-To-Port Loopback Program.
   Test duration in minutes: 1 minute
   ICP board number: 0
   Ports: 0 & 1

STD1200B Software Version:
FREEWAY 2000/4000 ICP6000 COMMUNICATIONS FRONT END PROCESSOR
SIO-STD-1200B (V5.3-0, VI-100-0545) May 1999

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```

Figure 8–1: Sample Output from STD1200B Non-Blocking Loopback Program

```
STD1200B Statistics Report:
                              server0icp0port0      server0icp0port1
                              ----------------      ----------------
   inv addresses                         0                     0
   inv ctlfields                         0                     0
   rcv CRC errs                          0                     0
   lfrm too long                         0                     0
   rcv overruns                          0                     0
   txmt underruns                        0                     0
   txmt wtchdg                           0                     0
   ITS achieved                          1                     1
   data writes                         591                   584
   data reads                          584                   591
Loopback test complete
```

Figure 8–1: Sample Output from STD1200B Non-Blocking Loopback Program *(Cont'd)*

Chapter

9 X.25/HDLC Loopback Test Procedure

This chapter describes the X.25/HDLC loopback test procedure, including the following:

- an overview of the tests
- a description of how to install the hardware needed for the tests
- instructions on how to run the tests
- sample screen displays from the tests

Note

Before running the loopback tests, you must install the Freeway software and boot Freeway to download the software as described in the *Freeway User Guide*.

Note

When the loopback test is run under VMS, Simpact recommends a minimum Buffered I/O Byte Count process quota of 30,000 bytes. The AST Limit and Open File Limit process quotas must provide a unit for each session that will be opened. The number of sessions is equal to the number of selected ports, plus one.

9.1 Overview of the Test Programs

The loopback tests use the X.25 Call Service API (CS API). The CS API library is in the `freeway/client/`*`op-sys`*`/lib` directory (where *op-sys* is the identifier for the operating system you are using).

The X.25/HDLC loopback test programs are placed in the `freeway/client/`*`op-sys`*`/bin` directory during the installation procedures. These test programs are written in C and communicate with Freeway through the CS API function calls to perform the following functions:

- Establish virtual circuit or data link connections.
- Initiate the transmission and reception of data on the serial lines.
- Terminate virtual circuit or data link connections.

The test programs can be used to verify that the installed Freeway devices and cables are functioning correctly and as a template for designing applications that interface with the CS API layer.

9.2 Hardware Setup for the Test Programs

The test programs run in loopback mode. Before running any test program, perform the following procedure to install the loopback cabling:

Step 1:
Provide a synchronous modem. Configure the modem to supply continuous clocking at a data rate between 300 and 64,000 bits per second. The Freeway ICPs are default configured for external clocking, and the modem supplies the clock signal for loopback testing.

Step 2:

Install the special three-headed loopback cable between ports 0 and 1 on ICP 0 and the synchronous modem. For information on port numbering, refer to the hardware installation guide for your Freeway. To test ports other than 0 and 1, you must first edit the `.setup` file in the `freeway/client/test/x25mgr` directory, then run the make file.

Note

The loopback cable is only used during testing, not during normal Freeway operation.

9.3 Running the Test Programs

Caution

To run the test programs successfully, you must have write privileges in the `bin` directory on the boot server.

Note

Due to keyboard I/O restrictions on VMS machines, the user must not be connected to the host by means of the VMS `sethost` command.

Step 1:

Change to the directory that contains the test programs. For example, if you performed the default installation on a UNIX system, this directory is called `/usr/local/freeway/client/`*`op-sys`*`/bin` where *op-sys* is the identifier for the operating system you are using. On a VMS system the default directory is `SYS$SYSDEVICE:[FREEWAY.CLIENT.`*`OP-SYS`*`.BIN]`. On a Windows NT system the default directory is `c:\freeway\client\`*`op-sys`*`\bin`.

Before running the X.25 test program, `x25_svc`, or HDLC test program, `hdlc_user`, you must run the `x25_manager` utility to configure the X.25/HDLC software. This utility runs interactively or uses an input setup file to configure the links to test either X.25 or HDLC. Table 9–1 shows the appropriate setup file for each test program.

Table 9–1: X.25/HDLC Test Files[a]

Program	Description	Setup File for Input to x25_manager
`x25_manager`	This is the configuration utility program described fully in the *X.25/HDLC Configuration Guide*. It runs interactively or accepts a setup file as input to the `x25_manager file` command.	—
`x25_svc`	This is the sample test program used to verify the installation and configuration of the X.25 protocol service on Freeway.	`svc.setup`
`hdlc_user`	This is the sample test program used to verify the installation and configuration of the HDLC protocol service on Freeway.	`hdlc.setup`

[a] These files are located in the `freeway/client/test/x25mgr` directory. The executable files are located in the `freeway/client/`*op-sys*`/bin` directory, where *op-sys* is the identifier for the operating system you are using.

Step 2:

Enter the following command at the system prompt. If you omit the optional CS API configuration file name, `x25_manager` uses the default `cs_config` file.

For UNIX or Windows NT:

```
x25_manager [CS API configuration file name]
```

For VMS:

```
X25_MANAGER [CS API configuration file name]
```

or

```
RUN X25_MANAGER
```[1]

1. In VMS, you cannot have calling parameters if you use the keyword “RUN”.

Step 3:

At the x25_manager prompt, enter the file command with the appropriate setup file:

```
: file(hdlc.setup)
```

or

```
: file(svc.setup)
```

The hdlc.setup input file instructs the x25_manager program to configure the ICP links on Freeway for running HDLC. The svc.setup input file instructs the x25_manager program to configure the ICP links on Freeway for running X.25.

Step 4:

To start the test program, enter the following command at the system prompt. If you omit the optional CS API configuration file name, x25_manager uses the default cs_config file.

For UNIX or Windows NT:

```
hdlc_user [CS API configuration file name]
x25_svc [CS API configuration file name]
```

For VMS:

```
HDLC_USER [CS API configuration file name]
X25_SVC [CS API configuration file name]
```

or

```
RUN HDLC_USER[2]
RUN X25_SVC[2]
```

2. In VMS, you cannot have calling parameters if you use the keyword "RUN".

Step 5:

The program prompts you for the following parameters to run the test:

- Test length in minutes
- Packet data field size; this must not exceed the larger of the two buffer sizes configured in the setup file
- Packet transmit window size. The setup file configures Freeway to support a window size of 1–7. To use a window size greater than 7, you must change the setup file to support packet level modulo 128 operation. See the *X.25/HDLC Configuration Guide*.
- Link numbers of the links that were looped back in Step 2 on page 81
- User data field value (X.25 only). This may be any value in the given range. However, if you run multiple copies of the `x25_svc` test program, you must specify a different user data field value for each.

The installation is verified if the test completes successfully without errors.

Step 6:

Remove the loopback cable and configure the cables for normal operation. Your Freeway server is now ready to communicate with its clients.

9.4 Sample Output from Test Programs

Figure 9–1 shows the screen display from a sample `hdlc_user` test program. Figure 9–2 shows the screen display from a sample `x25_svc` test program. Output displayed by the program is shown in `typewriter type` and your responses are shown in **bold type**. Each entry is followed by a carriage return.

```
% x25_manager

SIMPACT X.25 MANAGER
----------------------------
:  file(hdlc.setup)
SAPX25{:  @(#) ICP 6000 COMMUNICATIONS FRONT END PROCESSOR/VME   - V1.6
SAPX25{:  @(#) CCITT/ISO 1984/1988 X.25 SERVICE/XIO  04-JAN-1995 - 3.1.2
SAPX25{BUFFERS[:  Configuring buffers.
SAPX25{BUFFERS[:  Configured 354 SMALL buffers 1024 bytes each.
SAPSLP{SLP[:  Configuring SLP 0.
SAPSLP{SLP[:  Configuring SLP 1.


% hdlc_user

SIMPACT HDLC OPTIONS
--------------------

Test Length in Minutes (1 to 1440): 1

HDLC data field size (32 to 1024): 512

HDLC transmit window (1 to 127): 7

Lowest link ID in test (0 to 7): 0

Highest link ID in test (0 to 7): 1

Connecting clients
Transferring data
No further screen interruptions for 1 minute(s)

2 links in test
Packet data size 512 bytes.
Packets/second: XMIT        4   RECV        4   TOTAL        8
Bits/second:    XMIT    16384   RECV    16384   TOTAL    32768
Link ID number         0       1
LCN reset errors       0       0
Transport errors       0       0
RCV data packets     136     136
XMT data packets     143     142

Allowing ICP to settle
Disconnecting
HDLC TEST test terminated
```

Figure 9–1: Sample hdlc_user Test Program Output

```
% x25_manager

SIMPACT X.25 MANAGER
----------------------------
:  file(svc.setup)
SAPX25{:  @(#) ICP 6000 COMMUNICATIONS FRONT END PROCESSOR/VME   - V1.6
SAPX25{:  @(#) CCITT/ISO 1984/1988 X.25 SERVICE/XIO  04-JAN-1995 - 3.1.2
SAPX25{BUFFERS[:  Configuring buffers.
SAPX25{SLP[:  Configuring SLP 0.
SAPX25{CALLSERVICE[:  Configuring CALLSERVICE on SLP 0.
SAPX25{SLP[:  Configuring SLP 1.
SAPX25{CALLSERVICE[:  Configuring CALLSERVICE on SLP 1.
SAPX25{REQUEST[:  Enabling link 0.
SAPX25{REQUEST[:  Enabling link 1.


% x25_svc

SIMPACT X.25 SVC OPTIONS
------------------------

Test Length in Minutes (1 to 1440): 1

Packet data field size (32 to 1024): 512

Packet transmit window (1 to 127): 7

Lowest link ID in test (0 to 15): 0

Highest link ID in test (0 to 15): 1

User data field value (0 to 32767): 2

Connecting clients
Transferring data
No further screen interruptions for 1 minute(s)

2 links in test
Packet data size 512 bytes.
Packets/second: XMIT        4   RECV        4   TOTAL        8
Bits/second:    XMIT    16384   RECV    16384   TOTAL    32768
Link ID number         0       1
LCN reset errors       0       0
Transport errors       0       0
RCV data packets     134     134
XMT data packets     139     138

Allowing ICP to settle
Disconnecting clients
X25 SVC TEST test terminated
```

Figure 9–2: Sample x25_svc Test Program Output

Chapter

10 Bit-Stream Loopback Test Procedure

This chapter describes the Bit-Stream loopback test procedure, including the following:

- an overview of the test
- a description of how to install the hardware needed for the test
- instructions on how to run the test
- sample screen displays from the test

Note

Before running the loopback test, you must install the Freeway software and boot Freeway to download the software as described in the *Freeway User Guide*.

Note

When the loopback test is run under VMS, Simpact recommends a minimum Buffered I/O Byte Count process quota of 30,000 bytes. The AST Limit and Open File Limit process quotas must provide a unit for each session that will be opened. The number of sessions is equal to the number of selected ports, plus one.

10.1 Overview of the Test Program

The loopback test uses the data link interface (DLI) available with Freeway. The DLI library is in the `freeway/client/`*op-sys*`/lib` directory (where *op-sys* is the identifier for the operating system you are using) and can be used with any data link protocol on Freeway servers.

The Bit-Stream loopback test program is placed in the `freeway/client/`*op-sys*`/bin` directory during the installation procedures.

Note

Earlier Freeway terminology used the term "synchronous" for blocking I/O and "asynchronous" for non-blocking I/O. Some parameter names reflect the previous terminology.

One high-level test program written in C is supplied with the Bit-Stream protocol, `bspalp`, which uses non-blocking I/O. The test is interactive; it prompts you for all the information needed to run the test. The test communicates with Freeway through the client data link interface (DLI) commands.

The loopback test performs the following functions:

- Configures the link-level control parameters such as baud rates, clocking, and protocol
- Enables and disables links
- Initiates the transmission and reception of data on the serial lines
- Obtains link statistics from Freeway

You can use the loopback test as a template for designing client applications that interface with the DLI layer. You can also use it to verify that the installed Freeway devices and cables are functioning correctly.

10.2 Hardware Setup for the Test Program

The test program runs in loopback mode. Before running the test, perform the following procedure to install the loopback cabling:

Step 1:
Provide a synchronous modem. Configure the modem to supply continuous clocking at a data rate of 9600 bits per second. The Freeway ICPs are default configured for external clocking, and the modem supplies the clock signal for loopback testing.

Step 2:
Select a pair of adjacent ports to loopback. Ports are looped back in the following pairs: (0,1), (2,3), (4,5), and so on. Install the special three-headed loopback cable between the ports you selected and the synchronous modem. For information on port numbering, refer to the hardware installation guide for your Freeway.

Note

The loopback cable is only used during testing, not during normal Freeway operation.

10.3 Running the Test Program

Caution

To run the test program successfully, you must have write privileges in the `bin` directory on the boot server.

Step 1:

To start the test in a UNIX or Windows NT system, change to the directory that contains the test program. For example, if you performed the default installation on a UNIX system, this directory is called `/usr/local/freeway/client/`*op-sys*`/bin` where *op-sys* is the identifier for the operating system you are using. On a Windows NT system the default directory is `c:\freeway\client\`*op-sys*`\bin`. Enter the following command at the prompt:

```
bspalp
```

To start the test in a VMS system, change to the directory that contains the test program. If you performed the default installation, this directory is called `SYS$SYSDEVICE:[FREEWAY.CLIENT.`*OP-SYS*`.BIN]`, where *OP-SYS* is the identifier for the hardware platform model and TCP/IP software you are using, for example `AXP_TCPWARE`. Enter the following command at the prompt:

```
RUN BSPALP
```

Step 2:

The following prompts are displayed. Defaults are shown in brackets:

`Need help (H) [No] ?`

Enter **n** to proceed without help. Enter **h** to view a brief description of the test procedure.

`Minutes to run (1-1440) [1]?`

Enter the number of minutes you want the test to run.

`ICP board on which to run test (0,1,...) [0]?`

Enter the number of the ICP to be tested. This is the ICP that you cabled for testing in Step 2 on page 89.

`Even link number (0,2,...) [0]?`

Enter the even-numbered port you cabled for testing in Step 2 on page 89. For example, if you enter 0, the loopback test will be performed on ports 0 and 1.

Step 3:

After you answer the last prompt, the test starts. It displays a series of greater than (>) symbols and less than (<) symbols to indicate that it is running. If no errors are shown, your installation is verified.

Step 4:

Remove the loopback cable and configure the cables for normal operation. Your Freeway server is now ready to communicate with its clients.

10.4 Sample Output from the Test Program

Figure 10–1 shows the screen display from a sample Bit-Stream non-blocking loopback test program (`bspalp`). Output displayed by the program is shown in `typewriter type` and your responses are shown in **bold type**. Each entry is followed by a carriage return.

```
% bspalp

Need help (H) [No] ? h

    This program transfers data between a pair of adjacent ports on an ICP
    board.  The first ICP is zero; the first port on an ICP is zero.  The
    program defaults to ICP zero, ports zero and one.

    The ICPs and distribution panels are configured at the factory for
    external clocking.  An adjacent port pair is normally connected with a
    Simpact-supplied THREE-headed loopback cable, with the third head of
    the cable connected to your powered up modem.  Your modem supplies
    clocking to move the data, but the data does not reach the modem.  The
    program does not work with an internal clock source unless "I" is
    entered in response to the clocking source prompt.

    When prompted for values, the range of legal values appears within
    parentheses immediately following the prompt.  The default value then
    appears within square brackets.  To select the default value, simply
    press the RETURN key.  To select a value other than the default, enter
    the desired value followed by the RETURN key.

    Once the program is running, entering one Control-C causes the program
    to turn the timer off and go through its normal exit process as if the
    time had expired.  Entering two consecutive Control-Cs causes the
    program to exit immediately.

Minutes to run (1-1440) [1]? 1
ICP board on which to run test (0,1,...) [0]? 0
Even link number (0,2,...) [0]? 0

@(#) VI-100-0507: BSPCFW 1.0-1 20-OCT-99 Bit-Stream Protocol client test program

   Test duration in minutes: 1
   ICP board number:         0
   Ports:                    0 & 1
```

Figure 10–1: Sample Output from Bit-Stream Non-Blocking Loopback Program

```
Bit-Stream Protocol Software Version:

<@@>VI-100-0506: BSP 1.0-1 Oct 19 1999
Simpact Bit-Stream Protocol for ICP2432
Number of Ports on ICP 0:  4
Buffer Size on ICP 0:      128
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Bit-Stream Protocol Statistics Report:
                                 server0icp0port0     server0icp0port1
                                 ----------------     ----------------
   msgs read from link                 553                  553
   msgs written to link                549                  551
   receive overruns                      0                    0
   transmit underruns                    0                    0
   client writes completed             549                  551
   client reads completed              553                  553
Loopback test complete
```

Figure 10–1: Sample Output from Bit-Stream Non-Blocking Loopback Program *(Cont'd)*

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Customer Report Form

We are constantly improving our products. If you have suggestions or problems you would like to report regarding the hardware, software or documentation, please complete this form and mail it to Simpact at 9210 Sky Park Court, San Diego, CA 92123, or fax it to (858) 560-2838.

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Your Name: _____

Company: _____

Address: _____

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Phone Number: _____

Product: _____

Problem or
Suggestion: _____

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