

# Theory of Operation [C]

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This appendix describes the theory of operation for the following OLNET test modes:

- Synchronous active-and-passive mode
- Loopback mode
- Asynchronous active-and-passive mode

## C.1 Synchronous active-and-passive mode

Synchronous active-and-passive mode tests the network path from system to system. It requires that the OLNET data pattern and message length selections be the same on both systems. Figure 116 illustrates synchronous active-and-passive mode. In this figure, node A is assigned as the synchronous active system, and node B is assigned as the synchronous passive system. Synchronous active mode is the mode of the computer that initiates and sends messages. Synchronous passive mode is the mode of the computer that receives the messages and returns them.

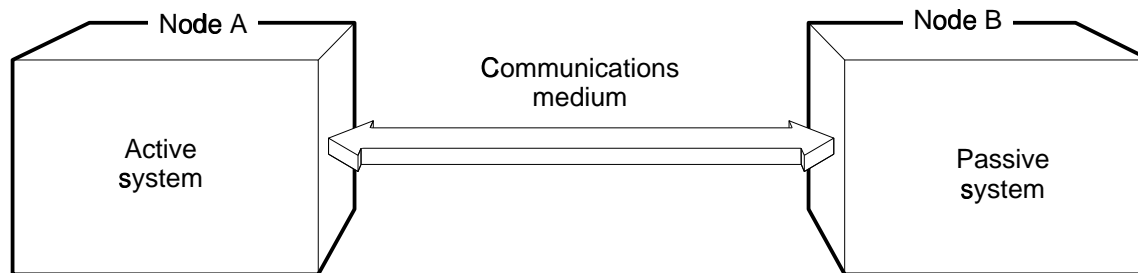


Figure 116. Synchronous active-and-passive mode

The following is an example of how synchronous active-and-passive mode works:

1. You initiate OLNET on the front-end and Cray Research systems and select the appropriate network type from the Main menu.

2. You set the OLNET test commands as follows:
  - a. Set passive mode on node B.
  - b. Set active mode on node A.
  - c. Set the OLNET PC, MP, AL, PT, and MD (for NSC and VME) commands identically for both active and passive systems.
  - d. Define the network connection. After OLNET determines that the network connection is valid, the adapter information menu field is filled in with local device information. You then enter this information as the remote address (RA) value for the target system.
  - e. Enter the appropriate remote address (RA) command on each system.
3. You enter the EX command on node B to start executing OLNET passive mode.
4. The passive system does the following:
  - a. Builds an output buffer for comparison with the data received.
  - b. Builds the message proper data field (bytes 10-63) if message proper data (MD) is enabled (NSC only).
  - c. Displays the following message:

```
Passive mode.  
Waiting for the first message to transfer
```
  - d. Opens input (read) and waits for the first message from the active system. The passive system times out and displays an error message if the first message is not received from the active system within 5 minutes.
5. You enter the EX command on node A to start executing OLNET active mode.
6. The active system does the following:
  - a. Builds an output data buffer.
  - b. Issues an output request to output the data contained in the output buffer and waits for the output to complete. After the output has

successfully completed, the active system opens input (read) and waits for a message of the same length to be returned from the passive system.

If a message is not received within 30 seconds, the active system terminates with a read time-out error.

The following data patterns build a new output buffer for each new message sent: random bits.

7. The passive system inputs the data and compares the data expected and received. If a data miscompare occurs, a data compare error message is displayed along with the data expected and received. The testing is terminated.
8. If no errors are detected by the passive system, a data buffer built by the passive system is sent to the active system.
9. The active system inputs the data, compares the message proper data buffer, and then compares the data buffers. If a data miscompare occurs, an error message is displayed along with data expected and received, and testing is terminated.
10. The data transfer and compare process continues until the pass count (PC) and message/pass count (MP) values have been satisfied. After the first message transfer is complete, waiting for input times out on the passive system if a message is not received within 30 seconds.

## C.2 Loopback mode

In loopback mode, a message sent by OLNET is returned by a mechanical device such as a loopback connector, or the target device is enabled through software for loopback. If the mechanical device is installed in the network, normal network traffic must be interrupted. Figure 117 illustrates mechanical loopback. Figure 118 illustrates software loopback.

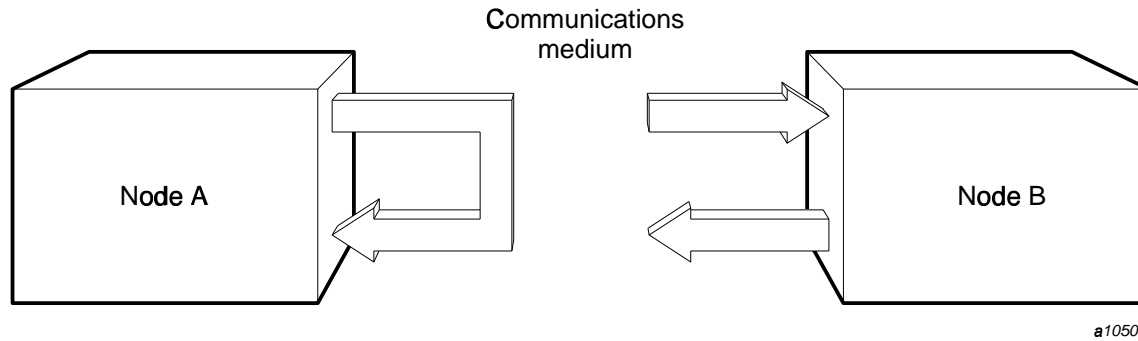


Figure 117. Mechanical loopback

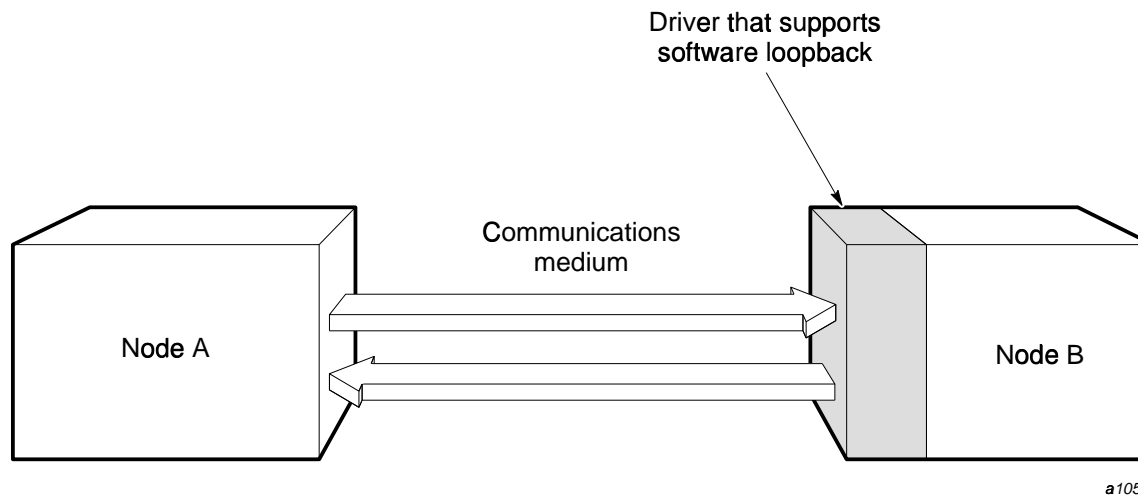
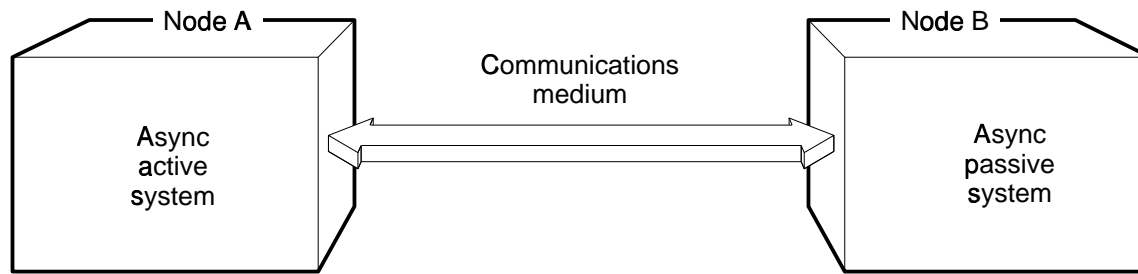


Figure 118. Software loopback

### C.3 Asynchronous mode

Asynchronous (async) mode provides additional flexibility for testing networks. In this mode, a variable number of messages is sent to a node on the network, followed by an acknowledgment by the target node. You control the message(s) sent acknowledgment ratio with the OLNET messages/acknowledgment ratio (AR) command.

In Figure 119, node A is assigned as the asynchronous active system, and node B is assigned as the asynchronous passive system. Asynchronous active mode is the mode of the computer that initiates and sends messages. Asynchronous passive mode is the mode of the computer that receives the messages and returns an acknowledgment message.



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Figure 119. Asynchronous active-and-passive mode

The following is an example of how asynchronous active-and-passive mode works:

1. You initiate OLNETH on the front-end and Cray Research systems and select the appropriate network type from the Main Menu.
2. You set the OLNETH test commands as follows:
  - a. Set asynchronous passive mode on node B.
  - b. Set asynchronous active mode on node A.
  - c. Set the OLNETH PC, AR, AL, PT, and MD (for NSC and VME) commands identically on both systems.
  - d. Define the network connection. After OLNETH determines that the network connection is valid, the adapter information menu field is filled in with the local adapter number and/or routing path. You then enter this information as the remote address (RA) value for the target system.
  - e. Enter the appropriate remote address (RA) command on each system.
3. You enter the EX command on node B to start executing OLNETH asynchronous passive mode.

4. The asynchronous passive system does the following:
  - a. Builds an output buffer for comparison with the data received.
  - b. Displays the following message:

```
Async passive mode.  
Waiting for the first message to transfer
```

- c. Opens input (read) and waits for the first message from the active system. The passive system times out and displays an error message if the first message is not received from the active system within 5 minutes.
5. You enter the EX command on node A to start executing OLNET asynchronous active mode.

6. The asynchronous active system does the following:

- a. Builds an output data buffer.
- b. Outputs the data contained in the output buffer, and waits for the transfer to complete. If another message is to be sent, the process is repeated until the messages/acknowledgment ratio is satisfied. At that time, the active system waits for the acknowledgment message.

If an acknowledgment message is not received within 30 seconds, the active system terminates with an input time-out error.

The random bits data pattern requires that a new output buffer be built for each new message sent.

7. The passive system inputs the data and compares the data expected and received. If a data miscompare occurs, an error message is displayed along with the data expected and received, and testing is terminated. If another message is to be received, the process is repeated until the messages/acknowledgment ratio is satisfied.
8. If no errors occur, an acknowledgment message is sent by the passive system to the active system. The cumulative byte count and the acknowledgment number are returned to the passive system.
9. The data transfer and compare process continues until the pass count number is satisfied. After the first message transfer completes, waiting for

input times out on the passive system if a message is not received within 30 seconds.

