The SmartLoop Test

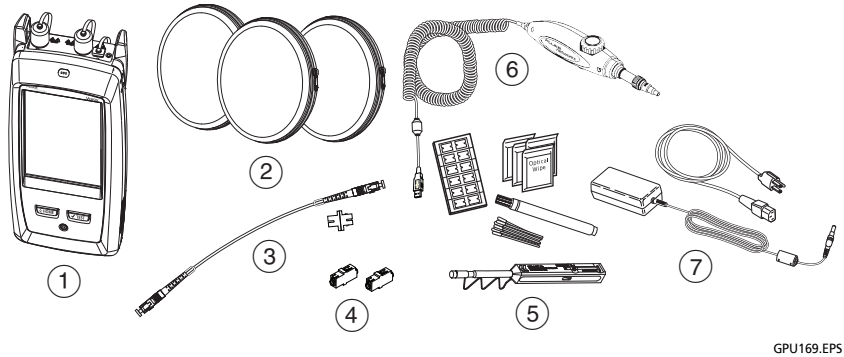
The SmartLoop test lets you connect the far ends of the two fibers in a link and do one OTDR test to get separate results for each fiber. This reduces your test time by approximately 50% and lets you keep the tester at one end of the links.

You use a launch cord to connect the fibers together at the far end of the link. When you do the SmartLoop test, the tester uses the launch compensation settings to remove the effects of the loopback cord and its connectors.

The tester saves the results in two records, one for each fiber in the link.

The Auto and Manual settings for the SmartLoop test operate the same as for the OTDR test. See Table 11 on page 287.

Figure 148 shows the equipment for the SmartLoop test.



1. Versiv unit with OTDR module installed
2. Three launch cords for launch, tail, and loopback connections (match the fiber and connectors to be tested)
3. Short patch cord (30 cm (12 in) maximum) and adapter for bi-directional tests
4. Two adapters
5. Fiber cleaning supplies
6. FI-1000 video probe with USB connector
7. AC adapter with line cord (optional)

Figure 148. Equipment for SmartLoop Tests

How To Do an Auto SmartLoop Test

Set Up SmartLoop Launch Compensation

1 On the home screen, tap the test setup panel.

2 On the **CHANGE TEST** screen, tap the button next to the Auto SmartLoop test, then tap **USE SELECTED**.

If an Auto SmartLoop test is not available, tap **NEW TEST** to add one to the project. Select settings as necessary on the **TEST SETUP** screen. See “Settings for OTDR Tests” on page 287.

(continued)

3 Select three launch cords that have the same type of fiber as the fiber you will test. The connectors must be the correct type for each connection you will make. If necessary, you can connect two launch cords together to make a loopback cord that has the same connectors on both ends.

4 On the home screen, tap the **TOOLS** icon, then tap **Set Launch Compensation**.

5 On the **SET LAUNCH METHOD** screen tap **SmartLoop**.

6 Clean and inspect the OTDR port and connectors on the three launch cords.

7 Make the connections shown in Figure 149.

8 Tap **SET**.

9 When the **SET LAUNCH COMP** screen shows, make sure the tester shows the correct distances for the end of the launch cord and the start of the tail cord.

Note

*If the fibers have APC connectors, the tester possibly will not find the correct launch and tail events. If this occurs, do the compensation again and select **Manual Entry** to enter the lengths of the cords manually.*

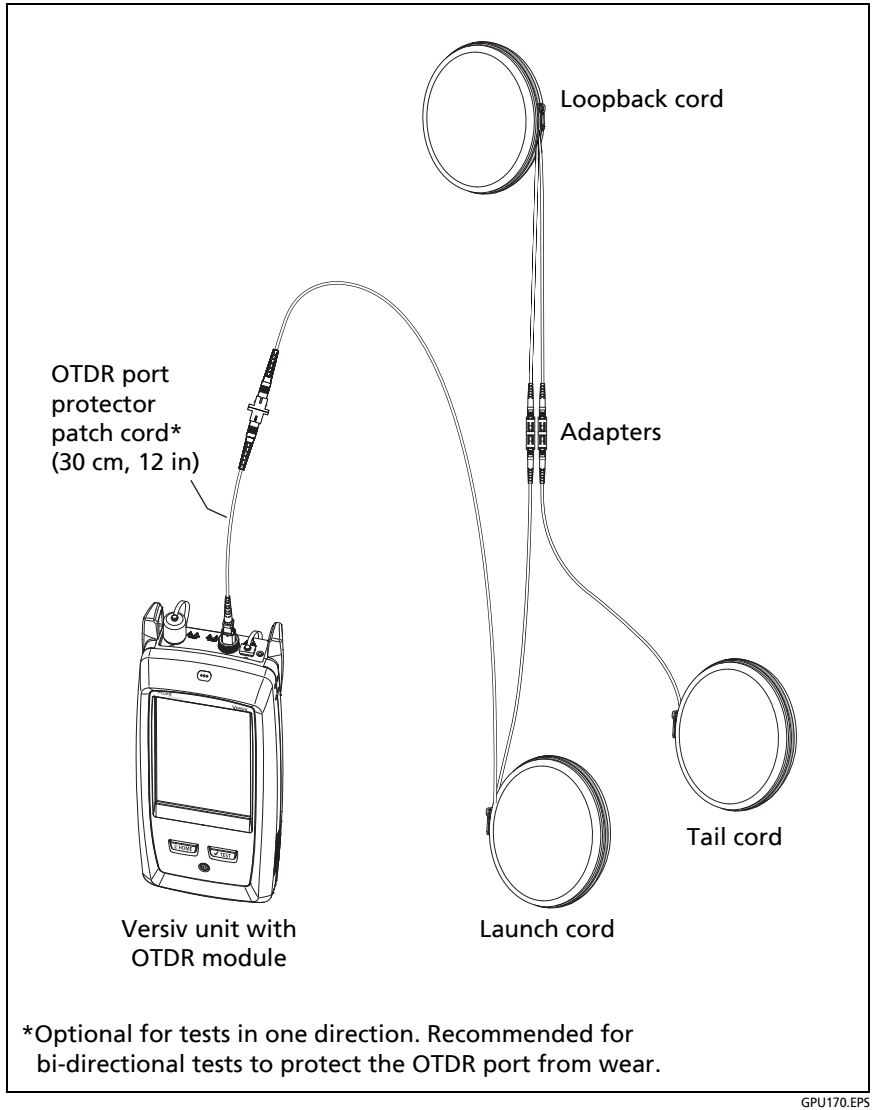
10 Tap **SAVE**.

Do the SmartLoop Test

1 Make the connections shown in Figure 150.

2 On the home screen, make sure the IDs for the fibers are correct. The tester uses the **Fiber A** ID for the fiber connected to the launch cord.

3 Tap **TEST** or press ✔TEST.



GPU170.EPS

Figure 149. SmartLoop Launch Compensation Connections

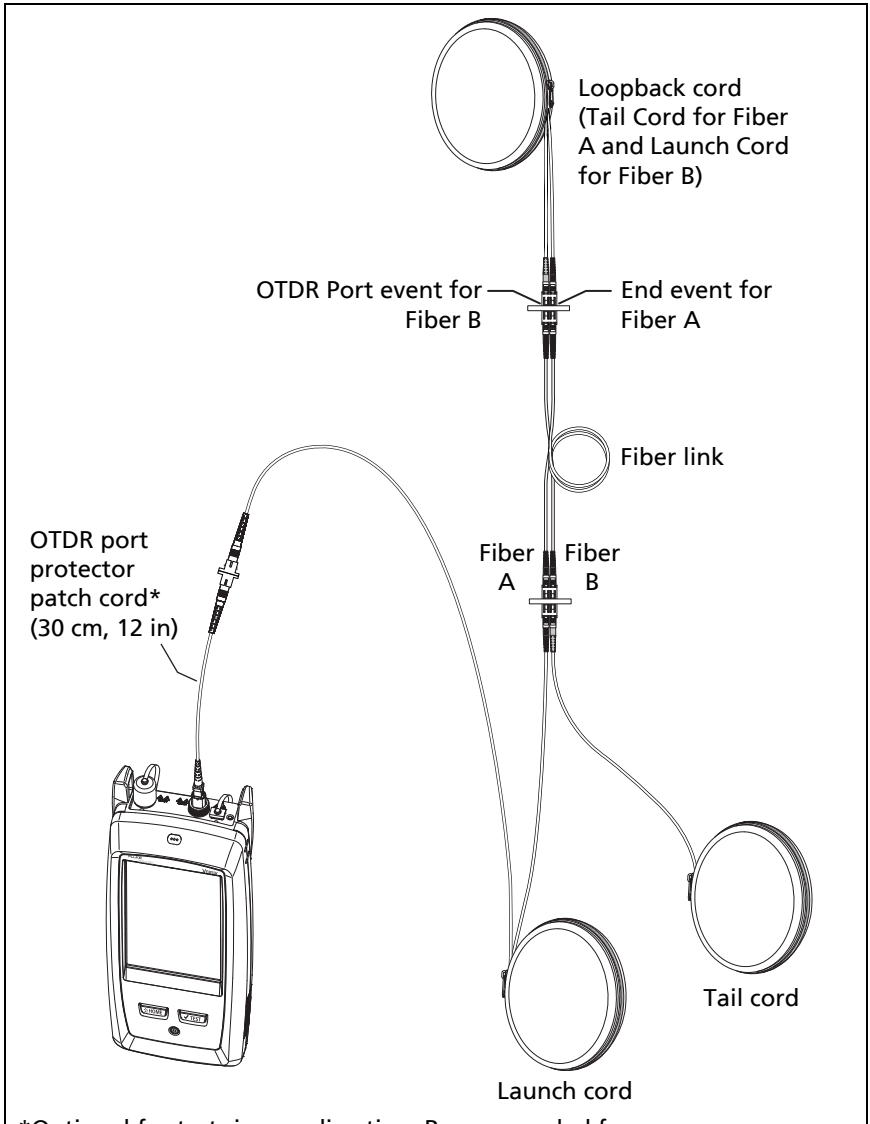
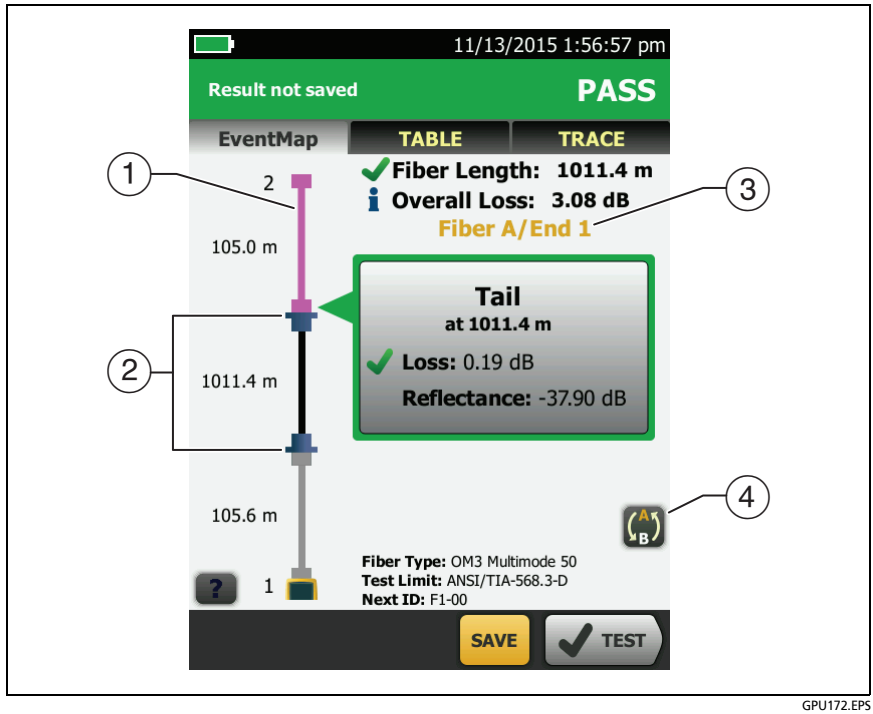


Figure 150. SmartLoop Test Connections

SmartLoop Results

The tester shows the SmartLoop results on two sets of **EventMap**, **TABLE**, and **TRACE** screens, one for each fiber in the link. See Figure 151.



GPU172.EPS

Figure 151. EventMap from a SmartLoop Test

① The purple fiber is the loopback cord.

Note

In saved SmartLoop results, the loopback cord is gray.

② The fiber between the launch cord and the loopback cord is the fiber on one side of the link.

③ **Fiber A** is the side of the link connected to the OTDR at **End 1**.

④ To switch between results for fibers A and B, tap  on the EventMap screen.

Note

When you save SmartLoop results, the tester saves the results in two records, one for each fiber in the link.

Bi-Directional SmartLoop Tests

The bi-directional SmartLoop test gives you bi-directional OTDR results for both fibers in a link. The tester also automatically calculates averages of the two results and includes the averaged values in the test record.

Why Do Bi-Directional Tests?

OTDR tests from both ends of a fiber can give different results because some properties of fiber and fiber components can cause differences in the loss measurements in each direction.

For example, the loss of an event is the difference between the backscatter levels before and after the event. If a segment after a connector or splice has a higher backscatter value than the segment before, the tester shows different values of loss for the connector or splice from the two directions.

For splices, which have very little loss, the difference in the backscatter of the two fibers can cause an apparent gain in power across the splice in one direction. On multimode fibers, the loss of a splice can be different for the two directions, even if the backscatter of the fibers before and after the splice are the same. This difference is caused by differences in the modal distribution of light in the launch cords and differences in how multimode light propagates down the fiber in each direction.

For these and other reasons, bi-directional averages of connector and splice loss in both directions are more accurate than measurements from one direction.

When To Do Bi-Directional Tests

You might need to do bi-directional OTDR tests to meet customer requirements. You should also do a bi-directional test if you get these results:

- The OTDR event table shows a gainer (see Table 13).
- The OTDR event table shows a hidden event (see Table 13).
- The loss of a connector or splice is unusually low.
- The loss of a connector or splice is unusually high, and you are sure that the connector or splice is good.
- There is a splice on the fiber, but it does not show in the OTDR test results.

Note

To do bi-directional tests on single fibers, see "How To Do Bi-Directional Tests on Single Fibers" on page 331.

How to Do a Bi-Directional SmartLoop Test

Set Up SmartLoop Launch Compensation

1 On the home screen, tap the test setup panel, make sure the correct SmartLoop test is selected on the **CHANGE TEST** screen, then tap **EDIT**.

If an Auto SmartLoop test is not available, tap **NEW TEST** to add one to the project. Select settings as necessary on the **TEST SETUP** screen. See "Settings for OTDR Tests" on page 287.

2 On the **TEST SETUP** screen, in the **Bi-Directional** panel, tap the control to make it show **On**, then tap **SAVE**.

3 On the **CHANGE TEST** screen tap **USE SELECTED**.

(continued)

4 Select three launch cords that have the same type of fiber as the fiber you will test. The connectors must be the correct type for each connection you will make. If necessary, you can connect two launch cords together to make a loopback cord that has the same connectors on both ends.

5 On the home screen, tap the **TOOLS** icon, then tap **Set Launch Compensation**.

6 On the **SET LAUNCH METHOD** screen tap **SmartLoop**.

7 Clean and inspect the OTDR port and connectors on the three launch cords.

8 Make the connections shown in Figure 149 on page 349.

9 Tap **SET**.

10 When the **SET LAUNCH COMP** screen shows, make sure the tester shows the correct distances for the end of the launch cord and the start of the tail cord.

Note

*If the fibers have APC connectors, the tester possibly will not find the correct launch and tail events. If this occurs, do the compensation again and select **Manual Entry** to enter the lengths of the cords manually.*

11 Tap **SAVE**.

Do the SmartLoop Test

1 On the home screen, make sure the IDs for the fibers are correct. The tester uses the **Fiber A** ID for the fiber connected to the launch cord at the start of the test.

2 Make the connections for **End 1** as shown in Figure 152.

Note

To decrease the wear on the OTDR connector and help keep it clean, use the OTDR port protector (30 cm, 12 in) patch cord provided to connect the

OTDR to the launch and tail cords for bi-directional SmartLoop tests.

To reduce the effect of the port protector patch cord on results, do not use a cord longer than 50 cm (20 in).

3 Tap **TEST** or press TEST.

4 Halfway through the test, the tester tells you to connect the tail cord to the OTDR port. Make the connections for **End 2** as shown in Figure 152, then tap **DONE**.

The tester automatically calculates bi-directional averages of loss measurements. See "Averaged Bi-Directional Results" on page 357.

⚠ Caution

Switch the launch and tail connections at the end of the short patch cord. If you switch the connectors at the patch panel, you will possibly get less accurate results for those connections during the second half of the test.

5 If **Auto Save** is on, the tester uses the next two IDs to save the results for the two fibers.

If **Auto Save** is off, and you tap **SAVE** or **FIX LATER**, the **SAVE RESULTS** screen shows the next two IDs available. You can change the IDs if necessary.

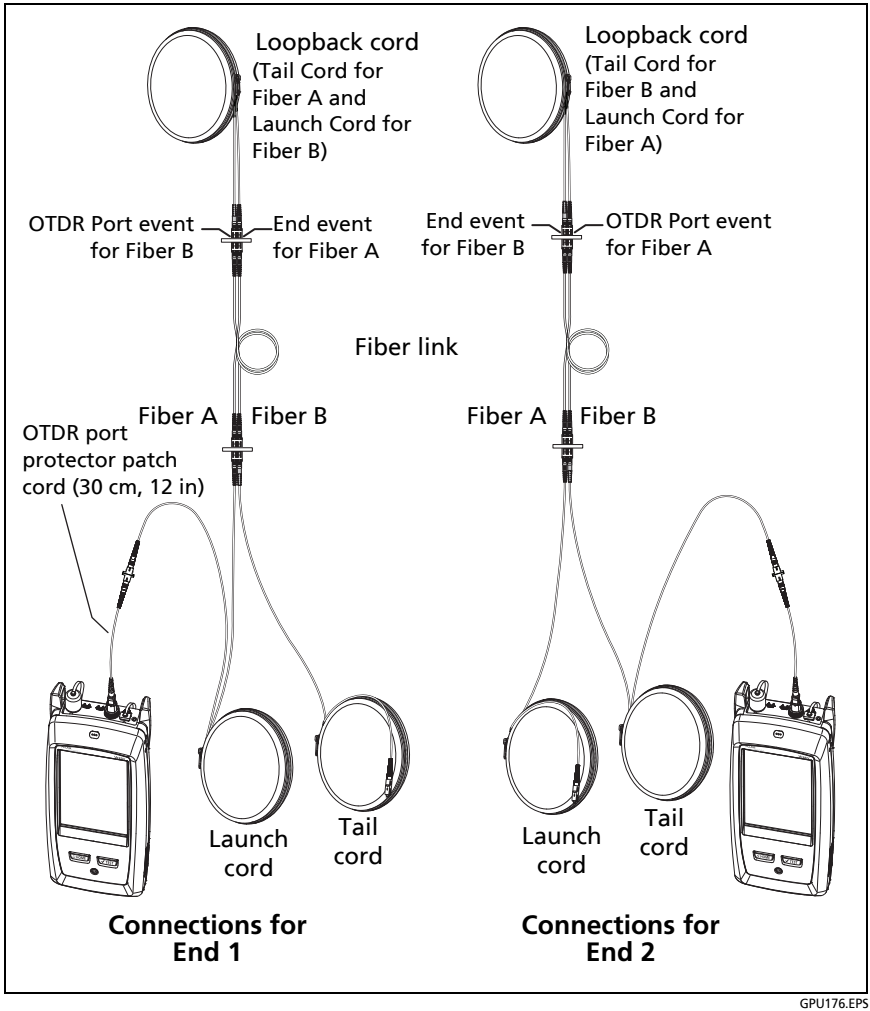


Figure 152. SmartLoop Test Connections for a Bi-Directional Test

Averaged Bi-Directional Results

Note

Unless otherwise noted, this section applies to bi-directional results from SmartLoop tests and bi-directional OTDR tests on single fibers.

Figure 153 shows an **EventMap** with averaged results from a bi-directional SmartLoop test.

- For averaged results, the tester shows the **EventMap** and the event **TABLE** tabs, but not the **OTDR** tab. The averaged results do not include **Ghost** events.
- For **Hidden** events, the tester calculates the average loss of the event that causes the hidden event, then divides that loss among the events inside the dotted lines. For example, if the average loss of an event is 0.24 dB, and the event causes one event to be hidden, then the average results show 0.12 dB for the event and 0.12 dB for the hidden event.
- For these measurements, the averaged results show the larger or the worst of the two results:
  - Distance between events: larger distance is shown
  - Reflectance: worst value is shown (for example, -30 dB is worse than -40 dB). The reflectance measurements from the unconnected ends are not used in the averaged results.
  - Segment length: larger value is shown
  - Segment attenuation: larger value is shown
  - Fiber length: larger value is shown
  - Overall loss: average value is shown
  - Optical return loss: worse value is shown (for example, 30 dB is worse than 40 dB)
- The **Port Connection Quality** in the averaged results is the rating from End 1.

- The tester does not calculate averaged results in some situations, for example if a launch, tail, or loopback cord was not detected or if the distance to the end was not the same in both directions.

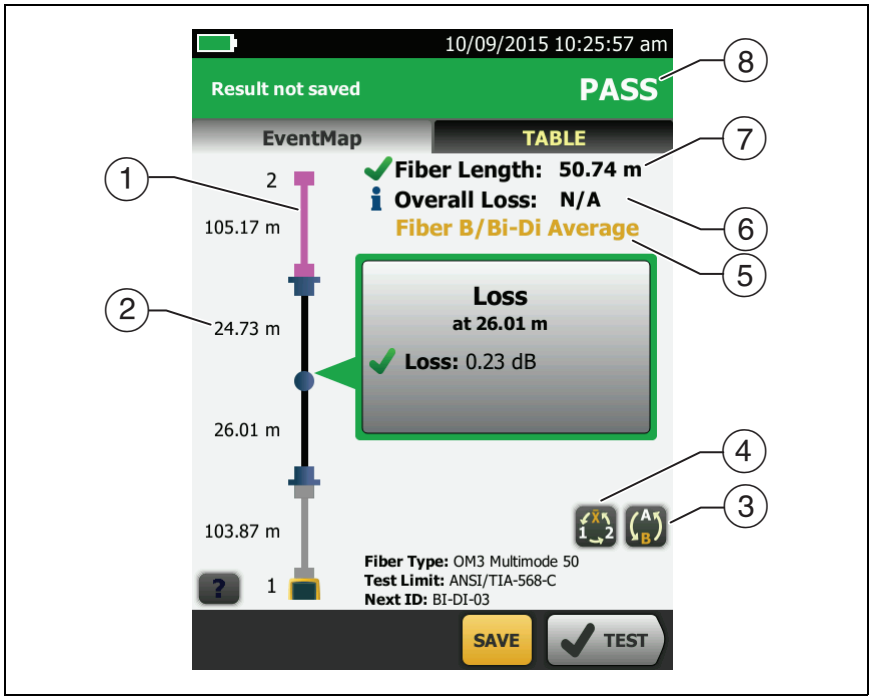


Figure 153. EventMap for Averaged, Bi-Directional SmartLoop Results

① The purple fiber is the loopback cord.

② The longest segment length of the two directions.

③ Tap this button to see the results for the other fiber (**A** or **B**).

Touch for 3 seconds to see a summary of the results from ends 1 and 2 on fibers A and B. To see the EventMap for a result in the list, tap the result.

④  This button shows with bi-directional SmartLoop results and bi-directional OTDR results from single fibers. Tap this button to see results from each direction (**End 1** or **End 2**) or the averaged results ($\overline{X}$).

⑤ This line shows which results are on the display. Use the selection buttons (④ and ⑤) to see other results.

⑥ **Overall Loss**: The average loss of the two directions.

⑦ **Fiber Length**: The longest length of the two directions.

⑧ **PASS/FAIL**: The overall result for the fibers.

- **PASS**: The averaged results passed. It is possible for one or both directions to have **FAIL** results, while the overall result is **PASS**.
- **FAIL**: The averaged results failed.

Note

*The tester does not use the bi-directional average results in the calculation for the % **Tested** that shows on the home screen.*

How to Do a Manual SmartLoop Test

The manual SmartLoop test uses settings for manual OTDR mode. Manual OTDR mode lets you select settings that give you the best view of specific events on the OTDR trace.

To do a manual SmartLoop test

1. On the **TEST SETUP** screen, set the **Test Type** to **SmartLoop OTDR (Manual)**.
2. On the **TEST SETUP** screen, tap **Manual OTDR Settings**, then select settings for the test. See “Manual OTDR Settings” on page 337. Tap **DONE** to save the settings.
3. On the **TEST SETUP** screen, tap **SAVE**.
4. Set up the launch compensation function if necessary, then do the SmartLoop test. For details, see “The SmartLoop Test” on page 346.