
Chapter 7. MAP 0051: SCSI-2 Fast/Wide Adapter/A Problem Isolation Procedure

Purpose of This MAP

This MAP is intended to be used for the single-ended version of the SCSI-2 Fast/Wide Adapter/A. Use it after diagnostics have been run on the adapter and further isolation is needed for appropriate FRU identification and replacement.

Note: This procedure can be applied to adapters configured with both internal and external devices.

Some implementation considerations are:

- The system will not allow concurrent diagnostics to be run on an adapter associated with a device in the root volume group (such as paging space). If the adapter being diagnosed is associated with the root volume group for the system, standalone diagnostics must be used in this procedure. Use the *SCSI Subsystem* diagnostic diskettes if supported on the system.
- The system must be powered OFF before performing any connecting and disconnecting of cables or devices to prevent any damage to hardware or erroneous diagnostic results.
- This procedure is also valid for embedded SCSI-2 Fast/Wide implementations. Replace the planar (or parent device) when the procedure calls for replacing the adapter.

The following steps should be followed for determining the defective FRUs in the SCSI system.

Step 0051-1

This step determines the error that led to this procedure.

Error Description	SRN	Action
Terminator power failure (PTC error)	890-106, 890-107, 890-160, 890-175, 890-180, 890-206, 890-207, 890-260, 890-275, 890-280, 890-306, 890-307, 890-360, 890-375, 890-380, 890-406, 890-407, 890-460, 890-475, 890-480	Go to "Step 0051-2."
SCSI bus error on external bus.	890-109, 890-190, 890-209, 890-290, 890-309, 890-390, 890-407, 890-490	Go to "Step 0051-3" on page 7-3.
SCSI bus error on internal bus.	890-108, 890-185, 890-208, 890-285, 890-308, 890-385, 890-408, 890-485	Go to "Step 0051-5" on page 7-4.
Any other SCSI error		Go to "Step 0051-8" on page 7-6.

Step 0051-2

This step determines the component causing the PTC failure.

If diagnostics indicated a terminator power failure (PTC error) then perform the following:

1. Turn the system off to allow PTC to cool (five minutes is recommended).
2. While waiting for the PTC to cool, check that SCSI cables and terminators on the failing buses are properly connected. Inspect for bent pins and obvious cable damage.
3. Rerun diagnostics for the adapter.
 - If this same error persists, refer to the SCSI-2 Fast/Wide PTC Problem Isolation Procedure beginning on 7-6
 - If no errors are indicated, the problem is intermittent, or was corrected by adjusting the cables.
If any damage was noted in cables or terminators, suspect that component as the source of intermittent problems.
4. If errors are still occurring and the PTC Isolation Procedure has been followed, continue isolating the problem and move onto "Step 0051-8" on page 7-6.

Step 0051-3

This step determines if an external device may be causing this failure.

Turn off the power to all external devices and rerun diagnostics for the adapter. (If there is an external cable attached, but no devices, go directly to “Step 0051-5” on page 7-4.)

- If diagnostics fails with the same error, go to “Step 0051-5” on page 7-4.
 - If no failures occurred, go to “Step 0051-4.”
 - If any other error occurred, follow the instructions for the SRN indicated.
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Step 0051-4

This step determines if a particular device can be identified as the source of the problem.

Notes:

- If you arrived at this step as a result of getting SRN 890-X90, you have a problem on the SCSI bus that is preventing one of your SCSI devices from being detected and configured. If no changes have been made to the SCSI bus configuration, make sure the SCSI cabling attached to the missing resource is secure and that the device has power. Refer to the appropriate service guide for your SCSI device if you discover a power related problem.
- If changes have been made to the SCSI bus configuration, check for address conflicts between devices and for cabling problems, such as configurations that exceed maximum cabling lengths, missing termination, or excessive termination. Refer to the Adapters, Devices, and Cable Information manual for more details on supported SCSI cabling information.
- If the diagnostics fail to identify a failing component and all cabling and power connections are correct, replace the components in the following order:
 - a. Device
 - b. Cable
 - c. Adapter

If however, there is only one device on the bus and it is not configuring, suspect the cable, then the adapter before the device.

Turn on the external SCSI devices one at a time. After turning on each device, follow this procedure:

- Rerun diagnostics for the adapter.
- If there is any failure, the problem should be with the last device turned back on. Follow the problem determination procedure for that device. Replace the device if no problem determination procedure exists.
- If no errors occurred, the problem could be intermittent. Make a record of the problem. Running diagnostics for each of the devices on the bus may provide more information.
- After replacing any hardware, go to Chapter 19, “MAP 0410: Repair Checkout” on page 19-1.

Step 0051-5

Steps from this point on isolate the problem to the adapter, cables, or devices by bringing the system down to a minimum configuration and methodically building it back to the original configuration.

Notes:

- If you arrived at this step as a result of getting SRN 890-X85, you have a problem on the SCSI bus that is preventing one of your SCSI devices from being detected and configured. If no changes have been made to the SCSI bus configuration, make sure the SCSI cabling attached to the missing resource is secure and that the device has power. Refer to the appropriate service guide for your SCSI device if you discover a power related problem.
- If changes have been made to the SCSI bus configuration, check for address conflicts between devices and for cabling problems, such as configurations that exceed maximum cabling lengths, missing termination, or excessive termination. Refer to the Adapters, Devices, and Cable Information manual for more details on supported SCSI cabling information.
- If the diagnostics fail to identify a failing component and all cabling and power connections are correct, replace the components in the following order:
 - a. Device
 - b. Cable
 - c. Adapter

If however, there is only one device on the bus and it is not configuring, suspect the cable, then the adapter before the device.

Disconnect the SCSI cable from the adapter on the bus that is indicating the error. Rerun diagnostics for the adapter.

Reminder: No terminator needs to be attached to the open connector on the adapter for this step because the adapter has built-in terminators.

- Replace the adapter if there is a failure, then go to Chapter 19, "MAP 0410: Repair Checkout" on page 19-1.
- If no errors occurred, go to "Step 0051-6" on page 7-5.

Step 0051-6

This step continues to build up from a minimum configuration to determine if a cable, terminator, or device is the cause of the error. This step concentrates on the cable and terminator.

Reconnect the SCSI cable without any devices attached.

For the external bus, only attach the first section of cable. If the appropriate terminator is not available for the end of the cable, reconnect the SCSI cable with one device attached so that the bus can be properly terminated through the device connector. The device should be turned off.

Rerun diagnostics for the adapter.

- If there is a failure, replace components in the following order:
 - Cable
 - Terminator
 - Device (if attached)
- If no errors occurred, go to “Step 0051-7.”
- If any component is replaced, go to Chapter 19, “MAP 0410: Repair Checkout” on page 19-1.

Step 0051-7

This step determines whether a particular section of cable or a device may be causing a problem. This step differs from “Step 0051-4” on page 7-3 because, the devices are detached from the bus, not just turned off. Make sure all cables, terminators, and devices are reconnected before leaving this step.

Reconnect the SCSI devices one at a time, making sure that the bus remains appropriately terminated. (A new section of cable will be added with each device on an external bus). After connecting each device and turning it on, follow the procedure below:

- Rerun diagnostics.
- If there is any failure, the problem should be that device or cable. Replace the components in following order:
 - Cable
 - Device
- If no errors occurred, the problem could be intermittent. The problem is most likely cabling or a device. Contact the next level of support if this problem continues to occur.
- If any component is replaced, go to Chapter 19, “MAP 0410: Repair Checkout” on page 19-1.

This is the end of this part of the procedure. Go to “Step 0051-9” on page 7-6.

Step 0051-8

This step determines if the error is caused by the adapter.

Disconnect all cables, and rerun diagnostics for the adapter.

- If there is any failure, replace adapter.
- If no errors were indicated, reconnect the cable with the devices and rerun diagnostics.

Note: If there are both external and internal devices, then reconnect one bus at a time, starting with the internal bus. If the internal bus had no errors, then reconnect the external bus.

- If there is any failure, go to "Step 0051-6" on page 7-5.
 - If no failure occurs, there may be intermittent or transient errors. The problem is most likely the cabling or a device. If the problem continues contact next level of support.
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Step 0051-9

This step finds out if there are operational errors that can be determined by actually transferring data on the SCSI bus.

Run the SCSI service aid to issue an inquiry command to a device on the bus. The command completion status returned by adapter will indicate if a failure occurred, and whether the failure was due to a device error. If a device error occurred, diagnostics for that device should be performed. If it fails with other errors, replace components in the following order:

- Cable
- Adapter
- Devices

Note: Run diagnostics after swapping each of the above components.

Proceed to Chapter 19, "MAP 0410: Repair Checkout" on page 19-1.

SCSI-2 Fast/Wide PTC Problem Isolation Procedure

Use the following procedures if diagnostics testing indicates a potential temperature coefficient (PTC) resistor fault and you are diagnosing a single-ended adapter. The SRNs do not distinguish between the SCSI-2 Differential Fast/Wide Adapter/A or the SCSI-2 Fast/Wide Adapter/A.

Before replacing a SCSI-2 Fast/Wide Adapter/A, use these procedures to determine if a short-circuit condition exists on the SCSI Bus. There is one PTC for the internal SCSI bus and another for the external bus. The PTC protects the SCSI bus from high currents due to shorts on the cable, terminator, or device. It is unlikely that the PTC can be tripped by a defective adapter. Unless instructed to do so by these procedures, *do not* replace the adapter because of a tripped PTC resistor.

A fault (short-circuit) causes an increase in PTC resistance and temperature. The increase in resistance causes the PTC to halt current flow. The PTC returns to a low resistive and low temperature state when the fault is removed from the SCSI bus or when the system is turned off. Wait 5 minutes for the PTC resistor to fully cool, then reset.

These procedures determine if the PTC resistor is still tripped and then determines if there is a short somewhere on the SCSI bus.

Picking the Proper Procedure

For SRNs 890-160, 890-260, 890-360 and 890-460, follow the procedure for isolating the internal PTC and then follow the procedure for isolating the external bus PTC resistor.

For SRNs 890-106, 890-175, 890-206, 890-275, 890-306, 890-375, 890-406 and 890-475, follow the procedure for isolating the internal bus PTC resistor.

For SRNs 890-107, 890-180, 890-207, 890-280, 890-307, 890-380, 890-407 and 890-480, follow the procedure for isolating the external bus PTC resistor.

Internal Bus PTC Isolation Procedure

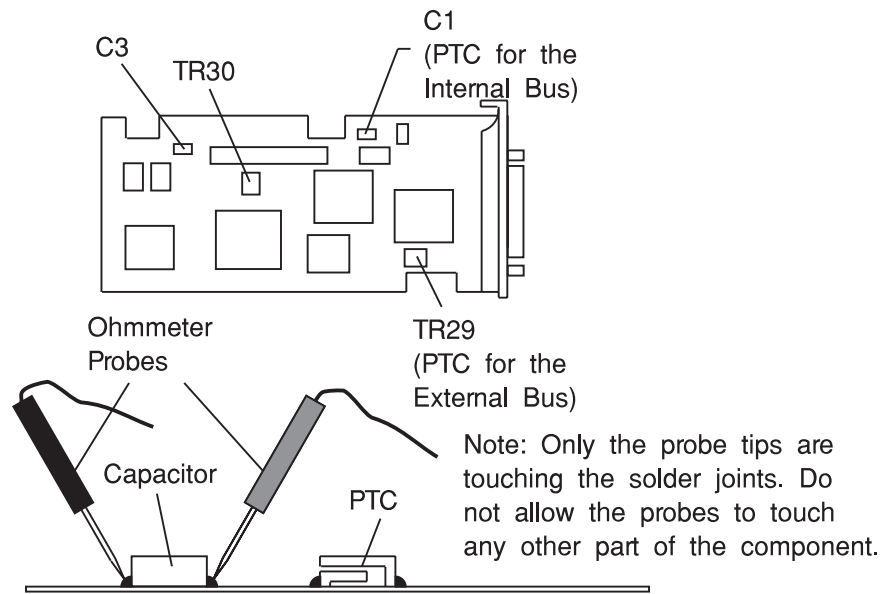
Isolate the internal SCSI bus PTC resistor fault with the following procedure.

Note: The internal bus is single-ended.

1. Ensure that system power and all externally attached device power is turned off.
2. Disconnect the internal and external cables from the adapter then remove the adapter from the system.
3. Verify with a digital Ohmmeter, that the internal PTC resistor, labeled TR30, is cool and in a low resistance state, typically less than 1/2 Ohm. Measuring across, be sure to probe both sides of the PTC where the solder joints a board come together. The polarity of the test leads is not important. If necessary, allow the PTC to cool and remeasure. Refer to 7-8

If there was no internal cable attached, diagnostics either sent you here in error or the adapter is shorted. The next step determines if there is a short on the adapter.

SCSI-2 Fast/Wide Adapter/A Test Locations



4. Locate capacitor C3 and measure the resistance across it using the following procedure:

- Connect the positive lead to the side of the capacitor where the + is indicated. Be sure to probe at the solder joint where the capacitor and board come together.
- Connect the negative lead to the opposite side of the capacitor. Be sure to probe at the solder joint where the capacitor and board come together.
- If there is no short present, the resistance reading will be high, typically hundreds of Ohms.

Note: This reading is a function of the Ohmmeter used and is not predictable.

- If there is a fault, the resistance reading is low, typically below 10 Ohms. Because there are no cables attached, the fault is on the adapter. The adapter should be replaced.
- If the resistance is high and there is no internal cable to reattach, there is no apparent cause for the PTC resistor diagnostic failure.
- If the resistance is high and there is an internal cable to reattach, proceed to the next step.

5. Reattach the internal cable to the adapter then:

- Remeasure across C3 as described above.
- If the resistance is still high, above 25 Ohms, there is no apparent cause for a PTC failure.
- If the resistance is less than 10 Ohms, there is a possibility of a fault the internal SCSI bus. Troubleshoot the internal SCSI bus by disconnecting devices and terminators. Measure across C3 to determine if the fault has been removed.

Note: Some internal cables have non-removable terminators.

Probable Tripped PTC Resistor Causes

- A shorted terminator or cable. Check for bent pins on each connector and removable terminator.

- Intermittent PTC failures can be caused by improperly seated cable connectors. Reseat the connector and flex the cable in an attempt to duplicate the fault condition across C3.
- A shorted device.
- On some systems, the terminator is fixed to the internal cable and cannot be removed. If all devices are removed from the cable and the resistance is still low, then the cable should be replaced.

Note: The SCSI-2 Fast/Wide Adapter/A uses an onboard electronic terminator on the internal SCSI bus. When power is removed from the adapter, as in the case of this procedure, the terminator goes to a high impedance state and the resistance measured can not be verified, other than it will be high. Some internal terminators use an electronic terminator which also goes to a high impedance state when power is removed. Therefore, this procedure is designed to find a short or low resistance fault as opposed to the presence of a terminator or a missing terminator.

External Bus PTC Isolation Procedure

Isolate the external SCSI bus PTC fault with the following procedure.

Note: The external bus is of single-ended design.

1. Ensure the system power and all externally attached device power is turned off. All testing is accomplished with the power off.
2. Disconnect the internal and external cables from the adapter and remove the adapter from the system.
3. Verify with a digital Ohmmeter that the internal PTC resistor, labeled TR29, (refer to 7-8) is cool and in a low resistance state, typically less than 1/2 Ohm. Measuring across, be sure to probe both sides of the PTC where the solder joints and board come together. The polarity of the test leads is not important. If necessary, allow the PTC resistor to cool and remeasure.

If there was no internal cable attached, diagnostics either sent you here in error or the adapter is shorted. The next step determines if there is a short on the adapter.

4. Locate Capacitor C1 and measure the resistance across it using the following procedure:
 - a. Connect the positive lead to the side of the capacitor where the + is indicated on the board near C1. Be sure to probe at the solder joint where the capacitor and board come together.
 - b. Connect the negative lead to the opposite side of the capacitor. Be sure to probe at the solder joint where the capacitor and board come together.
 - c. If there is no short present, then the resistance reading will be high, typically hundreds of Ohms.

Note: This reading is a function of the Ohmmeter used and is not predictable.

- If there is a fault, the resistance reading is low, typically below 10 Ohms. Because there are no cables attached, the fault is on the adapter. The adapter should be replaced.
- If the resistance is high and there is no external cable to reattach, there is no apparent cause for the PTC diagnostic failure.
- If the resistance measured was high and there is an external cable to reattach proceed to the next step.

5. Reattach the external cable to the adapter, then:
 - a. Remeasure across C1 as previously described.
 - b. If the resistance is still high, in this case above 10 Ohms, then there is no apparent cause for a PTC failure.
 - c. If the resistance is less than 10 Ohms, there is a possibility of a fault on the external SCSI bus. Troubleshoot the external SCSI bus by disconnecting devices and terminators. Measure across C1 to determine if the fault has been removed.

Probable Tripped PTC Causes

- A shorted terminator or cable. Check for bent pins on each connector and removable terminator.
- Intermittent PTC failures can be caused by improperly seated cable connectors. Reseat the connector and flex the cable in an attempt to duplicate the fault condition across C1.
- Plugging or unplugging a cable or terminator while the system is turned on (hot plugging).
- A shorted device.
- Differential devices or terminators are attached to the single-ended SCSI bus.

Note: The SCSI-2 Fast/Wide Adapter/A uses an onboard electronic terminator on the external SCSI bus. When power is removed from the adapter, as in the case of this procedure, the terminator goes to a high impedance state and the resistance measured cannot be verified, other than it will be high. Some external terminators use an electronic terminator which also goes to a high impedance state when power is removed. Therefore, this procedure is designed to find a short or low resistance fault as opposed to the presence of a terminator or a missing terminator.