Note: The terms "Unidirectional Path Switched Ring" and "UPSR" may appear in Cisco literature. These terms do not refer to using Cisco ONS 15xxx products in a unidirectional path switched ring configuration. Rather, these terms, as well as "Path Protected Mesh Network" and "PPMN," refer generally to Cisco's path protection feature, which may be used in any topological network configuration. Cisco does not recommend using its path protection feature in any particular topological network configuration.

This chapter explains how to create Cisco ONS 15454 SDH low-order circuits and tunnels, high-order circuits, Ethernet circuits, and virtual concatenated (VCAT) circuits. For additional information about ONS 15454 SDH circuits, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.

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Before You Begin

Before performing any of the following procedures, investigate all alarms and clear any trouble conditions. Refer to the *Cisco ONS 15454 SDH Troubleshooting Guide* as necessary.

This section lists the chapter procedures (NTPs). Turn to a procedure for applicable tasks (DLPs).

1. NTP-D127 Verify Network Turn-Up-Complete this procedure before you create any circuits.
2. NTP-D334 Create an Automatically Routed Low-Order VC11 Circuit-Complete as needed.
3. NTP-D335 Create a Manually Routed Low-Order VC11 Circuit-Complete as needed.
4. NTP-D336 Create a Unidirectional Low-Order VC11 Circuit with Multiple Drops-Complete as needed.
5. NTP-D81 Create an Automatically Routed Low-Order VC12 Circuit-Complete as needed.
6. NTP-D82 Create a Manually Routed Low-Order VC12 Circuit-Complete as needed.
7. NTP-D83 Create a Unidirectional Low-Order VC12 Circuit with Multiple Drops-Complete as needed.
8. NTP-D54 Create an Automatically Routed Low-Order VC3 Circuit-Complete as needed.
9. NTP-D55 Create a Manually Routed Low-Order VC3 Circuit-Complete as needed.
10. NTP-D56 Create a Unidirectional Low-Order VC3 Circuit with Multiple Drops-Complete as needed.
11. NTP-D133 Create an Automatically Routed Low-Order Tunnel-Complete as needed.
12. NTP-D134 Create a Manually Routed Low-Order Tunnel-Complete as needed.
13. NTP-D216 Create a Low-Order Path Tunnel for Port Grouping-Complete as needed.
14. NTP-D187 Create a Low-Order Aggregation Point-Complete as needed.
15. NTP-D135 Test Low-Order Circuits-Complete this procedure after you create an electrical circuit.
16. NTP-D323 Create an Automatically Routed High-Order Circuit-Complete as needed.
17. NTP-D324 Create a Manually Routed High-Order Circuit-Complete as needed.
18. NTP-D190 Create a Unidirectional High-Order Circuit with Multiple Drops-Complete as needed.
19. NTP-D62 Test High-Order Circuits-Complete this procedure after you create a high-order optical circuit.

20. NTP-D139 Create a Half Circuit on an MS-SPRing or 1+1 Node-Complete this procedure as needed to create a half circuit using an STM-N as a destination in a multiplex section-shared protection ring (MS-SPRing) or 1+1 protection.
21. NTP-D140 Create a Half Circuit on an SNCP Ring Node-Complete as needed to create a half circuit using an STM-N as a destination in an subnetwork connection protection (SNCP) ring.
22. NTP-D191 Create an E-Series EtherSwitch Circuit (Multicard or Single-Card Mode)-Complete as needed.
23. NTP-D192 Create a Circuit for an E-Series Card in Port-Mapped Mode-Complete as needed.
24. NTP-D142 Create an E-Series Shared Packet Ring Ethernet Circuit-Complete as needed.
25. NTP-D143 Create an E-Series Hub-and-Spoke Ethernet Configuration-Complete as needed.
26. NTP-D144 Create an E-Series Single-Card EtherSwitch Manual Cross-Connect-Complete as needed.
27. NTP-D145 Create an E-Series Multicard EtherSwitch Manual Cross-Connect-Complete as needed.
28. NTP-D146 Test E-Series Circuits-Complete this procedure after creating E-Series SDH circuits.
29. NTP-D148 Create a Manual Cross-Connect for a G-Series or E-Series Card in Port-Mapped Mode-Complete as needed.
30. NTP-D241 Provision G-Series Ports for Transponder Mode-Complete as needed.
31. NTP-D149 Test G-Series Circuits-Complete this procedure after creating G-Series SDH circuits.
32. NTP-D194 Create Overhead Circuits-Complete as needed to create data communications channel (DCC) tunnels, create IP-encapsulated tunnels, provision orderwire, or create user data channel (UDC) circuits.
33. NTP-D283 Create an Automatically Routed VCAT Circuit-Complete as needed.
34. NTP-D284 Create a Manually Routed VCAT Circuit-Complete as needed.
35. NTP-D325 Create an STM Test Circuit around the Ring-Complete as needed.
36. NTP-D350 Create a Server Trail-Complete as needed.
37. NTP-D358 Create an Automatically Routed Open-Ended SNCP High-Order Circuit-Complete as needed.

Table 6-1 defines ONS 15454 SDH circuit creation terms and options.

Table 6-1: ONS 15454 SDH Circuit Options

Circuit Option	Description
Source	The circuit source is where the circuit enters the ONS 15454 SDH network.
Destination	The circuit destination is where the circuit exits an ONS 15454 SDH network.
Automatic circuit routing	Cisco Transport Controller (CTC) routes the circuit automatically on the shortest available path based on routing parameters and bandwidth availability.
Manual circuit routing	Manual routing allows you to choose a specific path, not just the shortest path chosen by automatic routing. You can choose a specific VC4, VC3, VC11, or VC12 for each circuit segment and create circuits from work orders prepared by an Operations Support System (OSS).
Low-order tunnel	Low-order tunnels allow VC3, VC11, and VC12 circuits to pass through an ONS 15454 SDH without using low-order cross-connect resources on the cross-connect cards. Low-order circuits using tunnels use low-order cross-connect capacity only at the source and destination nodes. One low-order tunnel can carry three VC3s, and each VC3 can contain a VC3 circuit span or 21 VC11 or VC12 circuit spans.
Low-order aggregation point	Low-order aggregation points (LAPs) allow low-order VC11, VC12, and VC3 circuits to be aggregated into a VC4 for handoff to non-ONS 15454 SDH networks or equipment, such as interoffice facilities (IOFs), switches, or digital access cross-connect systems (DACS). The VC4 grooming end of the LAP requires an STM-N card. LAPs can be created on MS-SPRings, 1+1, or unprotected nodes, but cannot be created on SNCP nodes.

ONS 15454 SDH circuits are either low-order or high-order circuits. Table 6-2 shows the circuit source and destination options for low-order VC3 circuits.

Table 6-2: CTC Circuit Source and Destination Options for Low-Order VC3 Circuits

Card	Ports	VC4s	VC3s
E3-12	12	1 per port	3 per VC4
DS3i-N-12	12	1 per port	3 per VC4
STM1E-12	12	1 per port	3 per VC4
OC3 IR 4/STM1	4	1 per port	3 per VC4
OC3 IR 4/STM1-8	8	1 per port	3 per VC4
OC12 IR/STM4 SH 1310 OC12 LR/STM4 LH 1310 OC12 LR/STM4 LH 1550	1	4 per port	3 per VC4
OC12 IR/STM4 SH 1310-4	4	4 per port	3 per VC4
All OC-48/STM16 cards (includes ML-Series card)	1	16 per port	3 per VC4
OC-192/STM64	1	64 per port	3 per VC4
CE-MR-10	10	16 per port	3 per VC4
MRC-12	12	1, 4, or 16[1] per port	3 per VC4
MRC-2.5G-12	12	1, 4, or 16[1] per port	3 per VC4
FC_MR-4	4	-	-

1. The number of VC4s depends on the Small Form-factor Pluggable (SFP) used as well as available backplane width and existing provisioned lines. For additional details, refer to the ?Optical Cards? chapter in the Cisco ONS 15454 SDH Reference Manual.

Table 6-3 shows the circuit source and destination options for VC11 and VC12 circuits.

Table 6-3: CTC Circuit Source and Destination Options for Low-Order VC12 or VC11 Circuits

Card	Ports	VC4s	VC3/TUG3s	TUG2s	VC11s/VC12s
E1-42	42	-	-	-	1 per port
STM1E-12	12	1 per port	3 per VC4	7 per TUG3	3 per TUG2
OC3 IR 4/STM1	4	1 per port	3 per VC4	7 per TUG3	3 per TUG2
OC3 IR 4/STM1-8	8	1 per port	3 per VC4	7 per TUG3	3 per TUG2
OC12 IR/STM4 SH 1310 OC12 LR/STM4 LH 1310 OC12 LR/STM4 LH 1550	1	4 per port	3 per VC4	7 per TUG3	3 per TUG2
OC12 IR/STM4 SH 1310-4	4	4 per port	3 per VC4	7 per	3 per TUG2

				TUG3	
All OC-48/STM16 cards (includes ML-Series card)	1	16 per port	3 per VC4	7 per TUG3	3 per TUG2
OC-192/STM64	1	64 per port	3 per VC4	7 per TUG3	3 per TUG2
CE-MR-10	10	16 per port	3 per VC4	7 per TUG3	3 per TUG2
MRC-12	12	1, 4, or 16[1] per port	3 per VC4	7 per TUG3	3 per TUG2
MRC-2.5G-12	12	1, 4, or 16[1] per port	3 per VC4	7 per TUG3	3 per TUG2
FC_MR-4	4	-	-	-	-

1. The number of VC4s depends on the SFP used as well as available backplane width and existing provisioned lines. For additional details, refer to the ?Optical Cards? chapter in the Cisco ONS 15454 SDH Reference Manual.

Table 6-4 shows the options that appear for high-order circuits.

Table 6-4: CTC Circuit Source and Destination Options for High-Order VC4 Circuits

Card	Ports	VC4s
E1-42	-	1
STM1E-12	12	1 per port
OC3 IR 4/STM1	4	1 per port
OC3 IR 4/STM1-8	8	1 per port
OC12 IR/STM4, OC12 LR/STM4	1	4 per port
OC12 IR 4/STM4, OC12 LR 4/STM4	4	4 per port
All OC-48/STM16 cards (includes ML-Series card)	1	16 per port
OC-192/STM64 (includes ML-MR-10 card)	1	64 per port
CE-MR-10	10	16 per port
MRC-12 and MRC-2.5G-12	12	64 per port
FC_MR-4	4	1, 4, or 16[1] per port

1. The number of VC4s depends on the SFP used as well as available backplane width and existing provisioned lines. For additional details, refer to the ?Optical Cards? chapter in the Cisco ONS 15454 SDH Reference Manual.

NTP-D127 Verify Network Turn-Up

Purpose	This procedure verifies that the ONS 15454 SDH network is ready for circuit provisioning.
Tools/Equipment	None
Prerequisite Procedures	Turn Up a Network
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create circuits. If you are already logged in, continue with Step 2.
2. From the View menu, choose **Go to Network View**. Wait for all the nodes that are part of the network to appear on the network map. (Large networks might take several minutes to display all the

nodes.)

Note: If this is the first time your computer has connected to this ONS 15454 SDH network, the node icons are stacked on the left side of the graphic area, possibly out of view. Use the scroll bar under the network map to display the icons. To separate the icons, press **Ctrl** and drag and drop the icon to the new location. Repeat until all the nodes are visible on the graphic area.

3. Verify node accessibility. In the network view, all node icons must be either green, yellow, orange, or red.

   If all network nodes do not appear after a few minutes, or if a node icon is gray with "Unknown" under it, do not continue. Look at the Net box in the lower right corner of the window. If it is gray, log in again, making sure not to check the Disable Network check box in the CTC Login dialog box. If problems persist, see Turn Up a Network to review the network turn-up procedure appropriate for your network topology, or refer to the *Cisco ONS 15454 SDH Troubleshooting Guide* for troubleshooting procedures.
4. Verify DCC connectivity. All nodes must be connected by green lines. If lines are missing or gray in color, do not continue. See Turn Up a Network and follow the network turn-up procedure appropriate for your network topology. Verify that all nodes have DCC connectivity before continuing. If DCCs need to be created, complete the "DLP-D363 Provision Regenerator-Section DCC Terminations" task.
5. Click the **Alarms** tab to view alarm descriptions. Investigate and resolve, if necessary, all critical (red node icon) or major (orange node icon) alarms. Refer to the *Cisco ONS 15454 SDH Troubleshooting Guide* to resolve alarms before continuing.
6. From the View menu, choose **Go to Home View**. Verify that the node is provisioned according to your site or engineering plan:
   1. View the cards that appear in the shelf map. Verify that the ONS 15454 SDH cards appear in the specified slots.
   2. Click the **Provisioning > General** tabs. Verify that the node name, contacts, date, time, and Network Time Protocol/Simple Network Time Protocol (NTP/SNTP) server IP address (if used) are correctly provisioned. If needed, make corrections using the "DLP-D140 Change the Node Name, Date, Time, and Contact Information" task.
   3. Click the **Network** tab. Verify that the IP address, Subnet mask, Default Router, Prevent LCD IP Config, and Gateway Settings are correctly provisioned. If not, make corrections using the NTP-D201 Change CTC Network Access.
   4. Click the **Protection** tab. Verify that protection groups are created as specified in your site plan. If the protection groups are not created, complete the NTP-D203 Modify or Delete Card Protection Settings.
   5. If the node is in an MS-SPRing, click the **MS-SPRing** tab. (If the node is not in an MS-SPRing, continue with Substep 6.) Verify that the following items are provisioned as specified in your site plan:
      - ◊ MS-SPRing type (2-fiber or 4-fiber)
      - ◊ MS-SPRing ring ID and node IDs
      - ◊ Ring reversion time
      - ◊ East and west card assignments
      - ◊ (4-fiber MS-SPRings only) Span reversion and east/west protect card assignments

        If you need to make corrections, see the NTP-D40 Provision MS-SPRing Nodes for instructions.
   6. Click the **Security** tab. Verify that the users and access levels are provisioned as specified. If not, see the NTP-D30 Create Users and Assign Security to correct the information.
   7. If Simple Network Management Protocol (SNMP) is used, click the **SNMP** tab and verify the trap and destination information. If the information is not correct, see the NTP-D87 Change SNMP Settings to correct the information.
   8. Click the **Comm Channels** tab. Verify that DCCs were created to the applicable STM-N slots and ports. If DCCs were not created for the appropriate STM-N slots and ports, see

Turn Up a Network and complete the turn-up procedure appropriate for your network topology.

9. Click the **Timing** tab. Verify that timing is provisioned as specified. If not, use the NTP-D85 Change Node Timing to make the changes.
10. Click the **Alarm Profiles** tab. If you provisioned optional alarm profiles, verify that the alarms are provisioned as specified. If not, see the NTP-D71 Create, Download, and Assign Alarm Severity Profiles to change the information.
11. Verify that the network element (NE) defaults listed in the status area of the node view window are correct.

7. Repeat Step 6 for each node in the network.
8. Complete the appropriate circuit creation procedure from the NTP list in the Before You Begin.

Stop. You have completed this procedure.

NTP-D334 Create an Automatically Routed Low-Order VC11 Circuit

Purpose	This procedure creates an automatically routed low-order VC11 circuit, which means that CTC chooses the circuit route based on the parameters you specify and on the software version.
Tools/Equipment	The following cards must be installed at the circuit source and destination nodes: XC-VXC-10G and optical cards (STM-N, MRC-12).
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note: This procedure requires the use of automatic routing. Automatic routing is not available if both the Automatic Circuit Routing NE default and the Network Circuit Automatic Routing Overridable NE default are set to FALSE. For a full description of these defaults see the "Network Element Defaults" appendix in the *Cisco ONS 15454 SDH Reference Manual*.

Note: VC11 circuits can start and end only at optical cards.

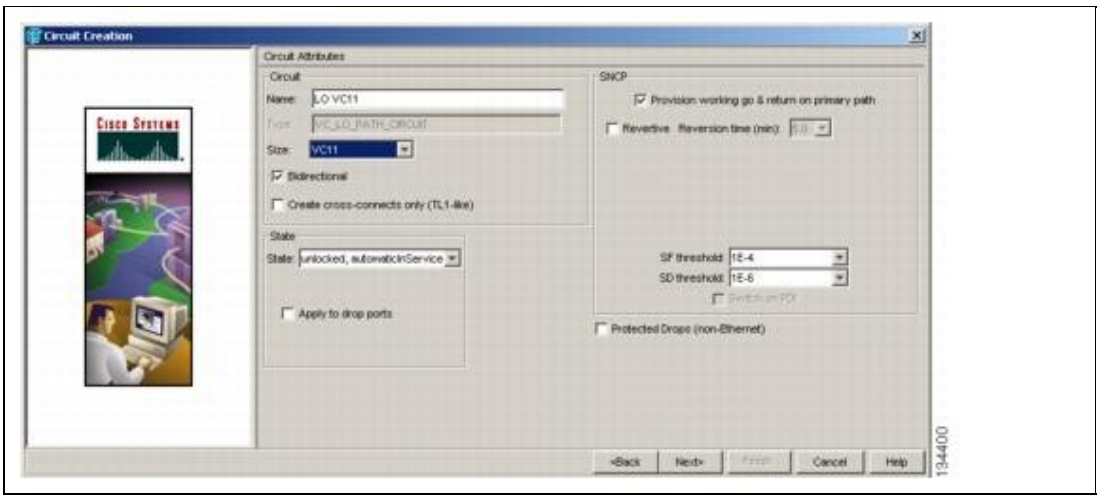
1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. Complete the following:
    1. On the shelf graphic, verify that XC-VXC-10G cross-connect cards are installed in Slots 8 and 10.
    2. Click the **Provisioning > Cross-Connect** tabs and set the Low Order Payload Type to **VC-11** or **VC-11 and VC-12 (Mixed Mode)**.
3. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 4.
4. From the View menu, choose **Go to Network View**.
5. Click the **Circuits** tab, then click **Create**.
6. In the Circuit Creation dialog box, complete the following fields:
    - Circuit Type-Choose **VC_LO_PATH_CIRCUIT**.
    - Number of Circuits-Enter the number of VC-11 circuits that you want to create. The default is 1. If you are creating multiple circuits with the same slot and consecutive port numbers, you can use Auto-ranged to create the circuits automatically.

- Auto-ranged-This check box is automatically selected if you enter more than 1 in the Number of Circuits field. Auto-ranging creates identical (same source and destination), sequential circuits automatically. Uncheck the box if you do not want CTC to create sequential circuits automatically.

7. Click **Next**.
8. Define the circuit attributes (Figure 6-1):
    - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters, (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
    - Size-Choose **VC11**.
    - Bidirectional-Leave checked for this circuit (default).
    - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
    - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
        - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
        - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
        - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
        - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
          For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
    - Apply to drop ports-Check this check box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

      Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.
    - Protected Drops-Check this check box if you want the circuit routed on protected drops only, that is, to ONS 15454 SDH cards that are in 1:1, 1:N, or 1+1 protection. If you check this check box, CTC shows only protected cards and ports as source and destination choices.

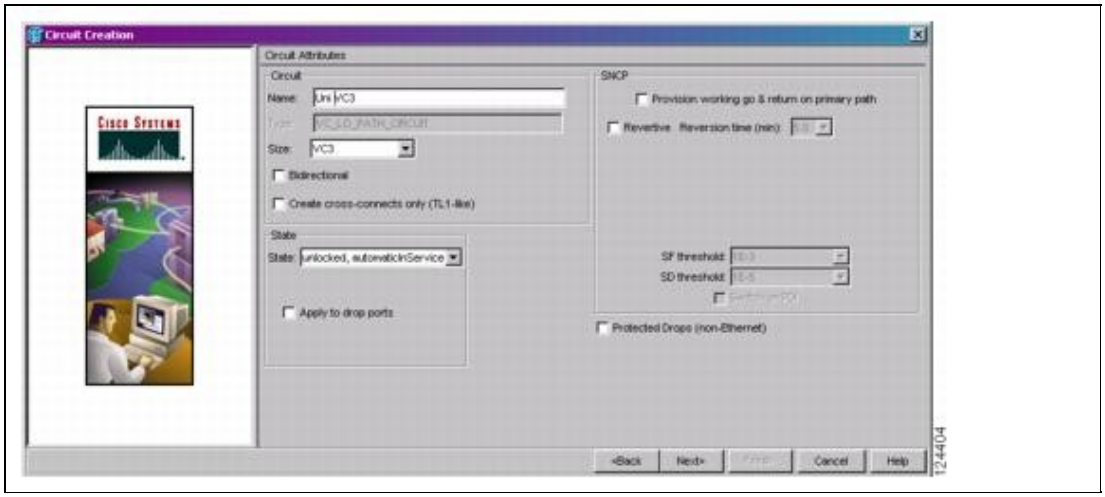
Figure 6-1: Setting Circuit Attributes for a Low-Order VC11 Circuit



9. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task. Otherwise, continue with Step 10.
10. Click **Next**.
11. Complete the "DLP-D186 Provision a Low-Order VC11 Circuit Source and Destination" task.
12. In the Circuit Routing Preferences area (Figure 6-2), choose **Route Automatically**. Two options are available; choose either, both, or none based on your preferences.

    - Using Required Nodes/Spans-Check this check box if you want to specify nodes and spans to include or exclude in the CTC-generated circuit route.
    - Including nodes and spans for a circuit ensures that those nodes and spans are in the working path of the circuit (but not the protect path). Excluding nodes and spans ensures that the nodes and spans are not in the working or protect path of the circuit.
    - Review Route Before Creation-Check this check box if you want to review and edit the circuit route before the circuit is created.

Figure 6-2: Setting Circuit Routing Preferences



13. Set the circuit path protection:

    - To route the circuit on a protected path, leave Fully Protected Path checked and continue with Step 14. CTC creates a fully protected circuit route based on the path diversity option you choose. Fully protected paths might or might not have SNCP path segments (with primary and alternate paths), and the path diversity options apply only to SNCP path segments, if any exist.

- To create an unprotected circuit, uncheck **Fully Protected Path** and continue with Step 16.
- To route the circuit on an MS-SPRing protection channel, if available, uncheck **Fully Protected Path**, check **Protection Channel Access**, click **Yes** in the Warning dialog box, and then continue with Step 16.

Caution! Circuits routed on MS-SPRing protection channels are not protected. They are preempted during MS-SPRing switches.

14. If you selected Fully Protected Path in Step 13 and the circuit will be routed on an SNCP, choose one of the following:

    - **Nodal Diversity Required**-Ensures that the primary and alternate paths within SNCP ring portions of the complete circuit path are nodally diverse.
    - **Nodal Diversity Desired**-Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.
    - **Link Diversity Only**-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node diverse, but CTC does not check for node diversity.
15. If you selected Fully Protected Path in Step 13 and the circuit will be routed on an SNCP DRI, check the **Dual Ring Interconnect** check box.
16. If you selected Using Required Nodes/Spans in Step 12, complete the following substeps. If not, continue with Step 18.
    1. Click **Next**.
    2. In the Circuit Route Constraints For Auto Routing area, click a node or span on the circuit map.
    3. Click **Include** to include the node or span in the circuit. Click **Exclude** to exclude the node or span from the circuit. The order in which you choose included nodes and spans is the order in which the circuit will be routed. Click spans twice to change the circuit direction.
    4. Repeat Substep 3 for each node or span that you wish to include or exclude.
    5. Review the circuit route. To change the circuit routing order, choose a node from the Required Nodes/Lines or Excluded Nodes Links lists and click the **Up** or **Down** buttons to change the circuit routing order. Click **Remove** to remove a node or span.
17. Click **Next**. In the VC LO Matrix Optimization page, choose one of the following:

    - Create VC LO tunnel on transit nodes-This option is available if the VC11 circuit passes through a node that does not have a low-order tunnel, or if an existing low-order tunnel is full. Low-order tunnels allow VC11 circuits to pass through ONS 15454 SDHs without consuming low-order cross-connect card resources. Creating low-order tunnels is a good idea if you are creating many low-order circuits from the same source and destination. Refer to the *Cisco ONS 15454 SDH Reference Manual* for more information.
    - Create VC LO aggregation point-This option is available if you are creating a VC11 circuit to an STM-N port for handoff to non-ONS 15454 SDH networks or equipment, such as an IOF, switch, or DACS. A LAP allows low-order circuits to be routed through a node using one VC4 connection on the cross-connect card high-order matrix rather than multiple connections on the low-order matrix. If you want to aggregate the low-order circuit you are creating with others onto an VC4 for transport outside the ONS 15454 network, choose one of the following:
        - VC4 grooming node is *source-node*, VC11 grooming node is *destination-node*-Creates the LAP on the VC11 circuit source node. This option is available only if the VC11 circuit originates on an STM-N card.

- VC4 grooming node is *destination-node*, VC11 grooming node is *source-node*-Creates the LAP on the VC11 circuit destination node. This option is available only if the VC11 circuit terminates on an STM-N card.
- None-Choose this option if you do not want to create a low-order tunnel or a LAP. This is the only available option if CTC cannot create a low-order tunnel or LAP.

18. If you selected Review Route Before Creation in Step 12, complete the following substeps. If not, continue with Step 19.
    1. Click **Next**.
    2. Review the circuit route. To add or delete a circuit span, choose a node on the circuit route. Blue arrows show the circuit route. Green arrows indicate spans that you can add. Click a span arrowhead, then click **Include** to include the span or **Remove** to remove the span.
    3. If the provisioned circuit does not reflect the routing and configuration you want, click **Back** to verify and change circuit information. If the circuit needs to be routed to a different path, see the NTP-D335 Create a Manually Routed Low-Order VC11 Circuit.
19. Click **Finish**. One of the following results occurs, depending on the circuit properties you chose in the Circuit Creation dialog box:
    - If you entered more than 1 in the Number of Circuits field and selected Auto-ranged, CTC automatically creates the number of circuits entered in the Number of Circuits field. If auto-ranging cannot complete all the circuits, for example, because sequential ports are unavailable at the source or destination, a dialog box appears. Set the new source or destination for the remaining circuits, then click **Finish** to continue auto-ranging. After completing the circuits, the Circuits window appears.
    - If you entered more than 1 in the Number of Circuits field and did not choose Auto-ranged, the Circuit Creation dialog box appears so you can create the remaining circuits. Repeat Steps 6 through 18 for each additional circuit. After completing the circuits, the Circuits window appears.
20. In the Circuits window, verify that the new circuits appear in the circuits list.
21. Complete the NTP-D135 Test Low-Order Circuits. Skip this step if you built a test circuit.

Stop. You have completed this procedure.

NTP-D335 Create a Manually Routed Low-Order VC11 Circuit

Purpose	This procedure creates a low-order VC11 circuit and allows you to provision the circuit route.
Tools/Equipment	The following cards must be installed at the circuit source and destination nodes: XC-VXC-10G and optical cards (STM-N or MRC-12).
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. Complete the following:
    1. On the shelf graphic, verify that XC-VXC-10G cross-connect cards are installed in Slots 8 and 10.
    2. Click the **Provisioning > Cross-Connect** tabs and set the Low Order Payload Type to **VC-11** or **VC-11 and VC-12 (Mixed Mode)**.

3. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 4.
4. From the View menu, choose **Go to Network View**.
5. Click the **Circuits** tab, then click **Create**.
6. In the Circuit Creation dialog box, complete the following fields:
   - Circuit Type-Choose **VC_LO_PATH_CIRCUIT**.
   - Number of Circuits-Enter the number of VC11 circuits that you want to create. The default is 1. If you are creating multiple circuits with the same slot and consecutive port numbers, you can use Auto-ranged to create the circuits automatically.
   - Auto-ranged-This check box is automatically checked if you enter more than 1 in the Number of Circuits field. Auto-ranging creates identical (same source and destination), sequential circuits automatically. Uncheck the box if you do not want CTC to create sequential circuits automatically.
7. Click **Next**.
8. Define the circuit attributes (Figure 6-1):
   - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters, (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
   - Size-Choose **VC11**.
   - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
   - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
     - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
     - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
     - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
     - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
       For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
   - Apply to drop ports-Select this check box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

     Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.
   - Protected Drops-Check this check box if you want the circuit routed on protected drops only, that is, to ONS 15454 SDH cards that are in 1:1, 1:N, or 1+1 protection. If you check this

check box, CTC shows only protected cards and ports as source and destination choices.

9. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task. Otherwise, continue with Step 10.
10. Click **Next**.
11. Complete the "DLP-D186 Provision a Low-Order VC11 Circuit Source and Destination" task.
12. In the Circuit Routing Preferences area (Figure 6-2), uncheck **Route Automatically**.
13. Set the circuit path protection:

    - To route the circuit on a protected path, leave Fully Protected Path checked and continue with Step 14. Fully protected paths might or might not have SNCP path segments (with primary and alternate paths), and the path diversity options apply only to SNCP path segments, if any exist.
    - To create an unprotected circuit, uncheck **Fully Protected Path** and continue with Step 17.
    - To route the circuit on an MS-SPRing protection channel, if available, uncheck **Fully Protected Path,** check **Protection Channel Access**, click **Yes** in the Warning dialog box, and then continue with Step 17.

    Caution! Circuits routed on MS-SPRing protection channels are not protected and are preempted during MS-SPRing switches.

14. If you selected Fully Protected Path in Step 13 and the circuit will be routed on an SNCP, choose a Node-Diverse Path option:

    - **Nodal Diversity Required**-Ensures that the primary and alternate paths within the SNCP ring portions of the complete circuit path are nodally diverse.
    - **Nodal Diversity Desired**- Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.
    - **Link Diversity Only**-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node diverse, but CTC does not check for node diversity.
15. If you selected Fully Protected Path in Step 13 and the circuit will be routed on an SNCP DRI, click the **Dual Ring Interconnect** check box.
16. Click **Next**. In the VC LO Matrix Optimization page, choose one of the following:

    - Create VC LO tunnel on transit nodes-This option is available if the VC11 circuit passes through a node that does not have a low-order tunnel, or if an existing low-order tunnel is full. Low-order tunnels allow VC11 circuits to pass through ONS 15454 SDHs without consuming low-order cross-connect card resources. Creating low-order tunnels is a good idea if you are creating many low-order circuits from the same source and destination. Refer to the *Cisco ONS 15454 SDH Reference Manual* for more information.
    - Create VC LO aggregation point-This option is available if you are creating a VC11 circuit to an STM-N port for handoff to non-ONS 15454 SDH networks or equipment, such as an IOF, switch, or DACS. A LAP allows low-order circuits to be routed through a node using one VC4 connection on the cross-connect card high-order matrix rather than multiple connections on the low-order matrix. If you want to aggregate the low-order circuit you are creating with others onto a VC4 for transport outside the ONS 15454 SDH network, choose one of the following:
        - VC4 grooming node is *source-node*, VC11 grooming node is *destination-node*-Creates the LAP on the VC11 circuit source node. This option is available only if the VC11 circuit originates on an STM-N card.

- VC4 grooming node is *destination-node*, VC11 grooming node is *source-node*-Creates the LAP on the VC11 circuit destination node. This option is available only if the VC11 circuit terminates on an STM-N card.

· None-Choose this option if you do not want to create a low-order tunnel or a LAP. This is the only available option if CTC cannot create a low-order tunnel or LAP.

17. Click **Next**. In the Route Review/Edit area, node icons appear for circuit routing. The circuit source node is selected. Green arrows pointing from the source node to other network nodes indicate spans that are available for routing the circuit.
18. Complete the "DLP-D187 Provision a Low-Order VC11 Circuit Route" task for the VC11 circuit you are creating.
19. Click **Finish**. CTC compares your manually provisioned circuit route with the specified path diversity option you chose in Step 14. If the path does not meet the specified path diversity requirement, CTC displays an error message and allows you to change the circuit path.
20. If you entered more than 1 in the Number of Circuits field, the Circuit Creation dialog box appears so you can create the remaining circuits. Repeat Steps 6 through 19 for each additional circuit.
21. When all the circuits are created, the main Circuits window appears. Verify that the circuits you created are correct.
22. Complete the NTP-D135 Test Low-Order Circuits. Skip this step if you built a test circuit.

Stop. You have completed this procedure.

NTP-D336 Create a Unidirectional Low-Order VC11 Circuit with Multiple Drops

Purpose	This procedure creates a unidirectional low-order VC11 circuit with multiple drops (destinations).
Tools/Equipment	The following cards must be installed at the circuit source and destination nodes: XC-VXC-10G and optical cards (STM-N or MRC-12).
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. Complete the following:
    1. On the shelf graphic, verify that XC-VXC-10G cross-connect cards are installed in Slots 8 and 10.
    2. Click the **Provisioning > Cross-Connect** tabs and set the Low Order Payload Type to **VC-11** or **VC-11 and VC-12 (Mixed Mode)**.
3. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 4.
4. From the View menu, choose **Go to Network View**.
5. Click the **Circuits** tab, then click **Create**.
6. In the Circuit Creation dialog box, complete the following fields:
    - Circuit Type-Choose **VC_LO_PATH_CIRCUIT**.
    - Number of Circuits-Leave the default (1) unchanged.
    - Auto-ranged-Unavailable when the Number of Circuits field is 1.
7. Click **Next**.
8. Define the circuit attributes:

- Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters, (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
- Size-Choose **VC11**.
- Bidirectional-Uncheck for this circuit.
- Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
- State-Choose the administrative state to apply to all of the cross-connects in a circuit:
  - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
  - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
  - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
  - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
    For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
- Apply to drop ports-Check this box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

  Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.
- Protected Drops-Check this box if you want the circuit routed to protect drops only, that is, to ONS 15454 SDH cards that are in 1:1, 1:N, or 1+1 protection. If you check this box, CTC displays only protected cards as source and destination choices.

9. Click **Next**.
10. Complete the "DLP-D186 Provision a Low-Order VC11 Circuit Source and Destination" task.
11. In the Circuit Routing Preferences area, uncheck **Route Automatically**. When Route Automatically is not selected, the Using Required Nodes/Spans and Review Route Before Circuit Creation check boxes are unavailable.
12. Set the circuit path protection:

    - To route the circuit on a protected path, leave Fully Protected Path checked and continue with Step 13. Fully protected paths might or might not have SNCP path segments (with primary and alternate paths), and the path diversity options apply only to SNCP path segments, if any exist.
    - To create an unprotected circuit, uncheck **Fully Protected Path** and continue with Step 16.

- To route the circuit on an MS-SPRing protection channel, if available, uncheck **Fully Protected Path**, check **Protection Channel Access**, click **Yes** in the Warning dialog box, and then continue with Step 16.

Caution! Circuits routed on MS-SPRing protection channels are not protected and are preempted during MS-SPRing switches.

13. If you selected Fully Protected Path in Step 12 and the circuit will be routed on an SNCP, choose one of the following:

    - **Nodal Diversity Required**-Ensures that the primary and alternate paths within the SNCP ring portions of the complete circuit path are nodally diverse.
    - **Nodal Diversity Desired**-Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.
    - **Link Diversity Only**-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node diverse, but CTC does not check for node diversity.
14. If you selected Fully Protected Path in Step 12 and the circuit will be routed on an SNCP DRI, click the **Dual Ring Interconnect** check box.
15. Click **Next**. In the VC LO Matrix Optimization page, choose one of the following:

    - Create VC LO tunnel on transit nodes-This option is available if the VC11 circuit passes through a node that does not have a low-order tunnel, or if an existing low-order tunnel is full. Low-order tunnels allow VC11 circuits to pass through ONS 15454 SDHs without consuming low-order cross-connect card resources. Creating low-order tunnels is a good idea if you are creating many low-order circuits from the same source and destination. Refer to the *Cisco ONS 15454 SDH Reference Manual* for more information.
    - Create VC LO aggregation point-This option is available if you are creating a VC11 circuit to an STM-N port for handoff to non-ONS 15454 SDH networks or equipment, such as an IOF, switch, or DACS. A LAP allows low-order circuits to be routed through a node using one VC4 connection on the cross-connect card high-order matrix rather than multiple connections on the low-order matrix. If you want to aggregate the low-order circuit you are creating with others onto an VC4 for transport outside the ONS 15454 SDH network, choose one of the following:
        - VC4 grooming node is *source-node*, VC11 grooming node is *destination-node*-Creates the LAP on the VC11 circuit source node. This option is available only if the VC11 circuit originates on an STM-N card.
        - VC4 grooming node is *destination-node*, VC11 grooming node is *source-node*-Creates the LAP on the VC11 circuit destination node. This option is available only if the VC11 circuit terminates on an STM-N card.
    - None-Choose this option if you do not want to create a low-order tunnel or a LAP. This is the only available option if CTC cannot create a low-order tunnel or LAP.
16. Click **Next**. In the Route Review and Edit area, node icons appear so you can route the circuit manually. The circuit source node is selected. Green arrows pointing from the source node to other network nodes indicate spans that are available for routing the circuit.
17. Complete the "DLP-D187 Provision a Low-Order VC11 Circuit Route" task for the VC11 circuit you are creating.
18. Click **Finish**. CTC completes the circuit and the Circuits window appears.
19. In the Circuits window, click the circuit that you want to route to multiple drops. The Delete, Edit, and Search buttons become active.
20. Click **Edit** (or double-click the circuit row). The Edit Circuit window appears with the General tab selected.

All nodes in the DCC network appear on the network. Circuit source and destination information appears under the source and destination nodes. To see a detailed view of the circuit, click **Show Detailed Map**. To rearrange a node icon, select the node, press **Ctrl**, then drag and drop the icon to the new location.

21. In the Edit Circuit dialog box, click the **Drops** tab. A list of existing drops appears.
22. Click **Create**.
23. In the Define New Drop dialog box, create the new drop:
    1. Node-Choose the target node for the circuit drop.
    2. Slot-Choose the target card and slot.
    3. Port, VC4, VC3/TUG3, TUG2, VC11-Choose the Port, VC4, VC3/TUG3, TUG2, or VC11 from the Port, VC4, VC3/TUG3, TUG2, or VC11 drop-down lists. The card selected in Step b determines the fields that appear. See Table 6-3 for a list of options.
    4. The routing preferences for the new drop match those of the original circuit. However, you can modify the following:
        - ◊ If the original circuit was routed on a protected SNCP path, you can change the nodal diversity options: Nodal Diversity Required, Nodal Diversity Desired, or Link Diversity Only. See Step 13 for descriptions.
        - ◊ If the original circuit was not routed on a protected path, the Protection Channel Access option is available. See Step 12 for a description of the Protection Channel Access option.
    5. Click **OK**. The new drop appears in the Drops list.
24. If you need to create additional drops for the circuit, repeat Steps 22 and 23 to create the additional drops.
25. Click **Close**. The Circuits window appears.
26. Verify that the new drops appear in the Destination column for the circuit that you edited. If they do not appear, repeat Steps 5 through 25, making sure that all options are provisioned correctly.
27. Complete the NTP-D135 Test Low-Order Circuits. Skip this step if you built a test circuit.

Stop. You have completed this procedure.

NTP-D81 Create an Automatically Routed Low-Order VC12 Circuit

Purpose	This procedure creates an automatically routed low-order VC12 circuit, meaning that CTC chooses the circuit route based on the parameters you specify and on the software version.
Tools/Equipment	XC-VXC-10G, XC-VXL-10G, or XC-VXL-2.5G cards must be installed at the circuit source and destination nodes.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note: This procedure requires the use of automatic routing. Automatic routing is not available if both the Automatic Circuit Routing NE default and the Network Circuit Automatic Routing Overridable NE default are set to FALSE. For a full description of these defaults see the "Network Element Defaults" appendix in the *Cisco ONS 15454 SDH Reference Manual*.

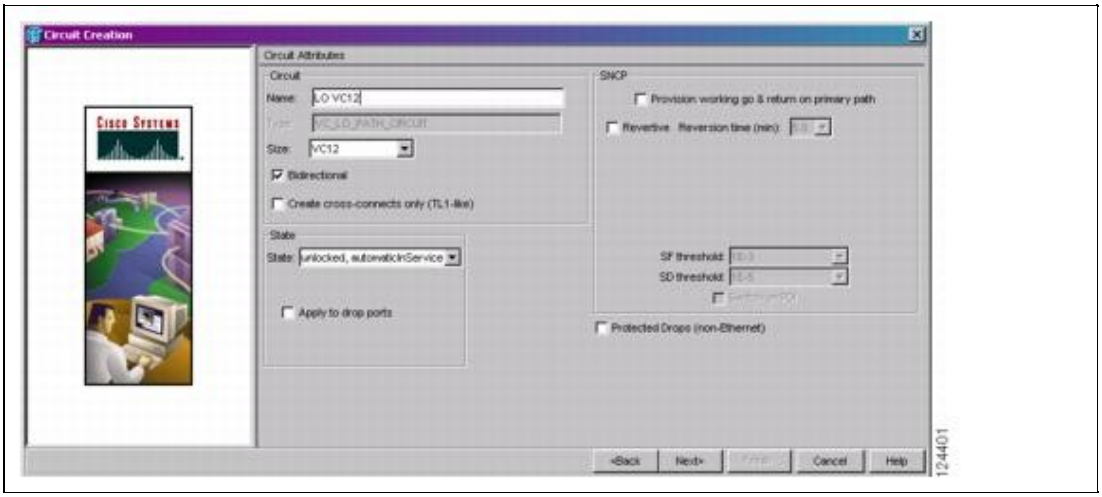
1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. Complete the following:
    1. On the shelf graphic, verify that XC-VXC-10G, XC-VXL-10G, or XC-VXL-2.5G cross-connect cards are installed in Slots 8 and 10.
    2. Click the **Provisioning > Cross-Connect** tabs and set the Low Order Payload Type to **VC-12** or **VC-11 and VC-12** (**Mixed Mode**).
3. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 4.
4. From the View menu, choose **Go to Network View**.
5. Click the **Circuits** tab, then click **Create**.
6. In the Circuit Creation dialog box, complete the following fields:
    - Circuit Type-Choose **VC_LO_PATH_CIRCUIT**.
    - Number of Circuits-Enter the number of VC-12 circuits that you want to create. The default is 1. If you are creating multiple circuits with the same slot and consecutive port numbers, you can use Auto-ranged to create the circuits automatically.
    - Auto-ranged-This check box is automatically selected if you enter more than 1 in the Number of Circuits field. Auto-ranging creates identical (same source and destination), sequential circuits automatically. Uncheck the box if you do not want CTC to create sequential circuits automatically.
7. Click **Next**.
8. Define the circuit attributes (Figure: Setting Circuit Attributes for a Low-Order VC12 Circuit):
    - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters, (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
    - Size-Choose **VC12**.
    - Bidirectional-Leave checked for this circuit (default).
    - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
    - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
        - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
        - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
        - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
        - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
          For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
    - Apply to drop ports-Check this check box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning

dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.

◊ Protected Drops-Check this check box if you want the circuit routed on protected drops only, that is, to ONS 15454 SDH cards that are in 1:1, 1:N, or 1+1 protection. If you check this check box, CTC shows only protected cards and ports as source and destination choices.

Figure 6-3: Setting Circuit Attributes for a Low-Order VC12 Circuit

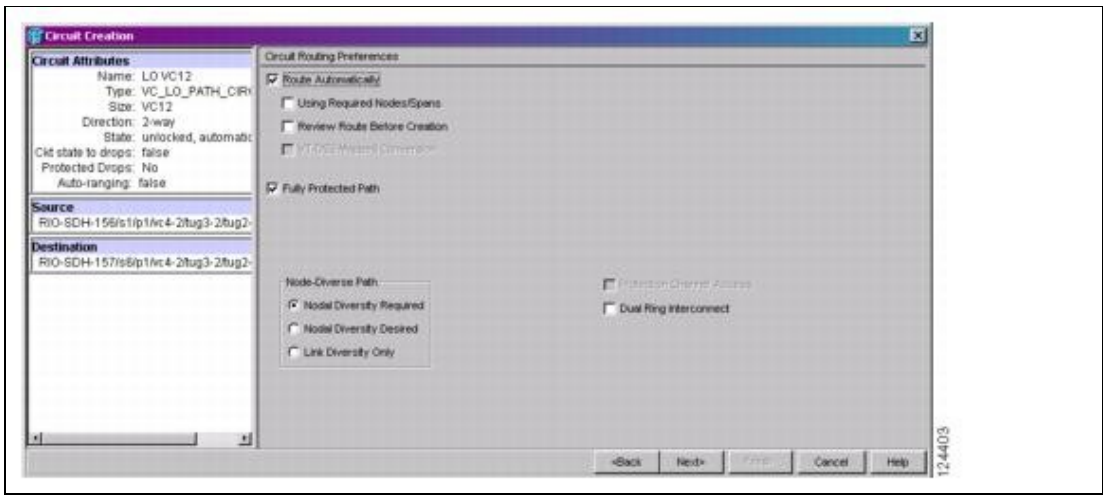


9. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task. Otherwise, continue with Step 10.
10. Click **Next**.
11. Complete the "DLP-D95 Provision a Low-Order VC12 Circuit Source and Destination" task.
12. In the Circuit Routing Preferences area (Figure 6-4), choose **Route Automatically**. Two options are available; choose either, both, or none based on your preferences.

· Using Required Nodes/Spans-Check this check box if you want to specify nodes and spans to include or exclude in the CTC-generated circuit route.
Including nodes and spans for a circuit ensures that those nodes and spans are in the working path of the circuit (but not the protect path). Excluding nodes and spans ensures that the nodes and spans are not in the working or protect path of the circuit.

· Review Route Before Creation-Check this check box if you want to review and edit the circuit route before the circuit is created.

Figure 6-4: Setting Circuit Routing Preferences



13. Set the circuit path protection:

    - To route the circuit on a protected path, leave Fully Protected Path checked and continue with Step 14. CTC creates a fully protected circuit route based on the path diversity option you choose. Fully protected paths might or might not have SNCP path segments (with primary and alternate paths), and the path diversity options apply only to SNCP path segments, if any exist.
    - To create an unprotected circuit, uncheck **Fully Protected Path** and continue with Step 16.
    - To route the circuit on an MS-SPRing protection channel, if available, uncheck **Fully Protected Path**, check **Protection Channel Access**, click **Yes** in the Warning dialog box, and then continue with Step 16.

    Caution! Circuits routed on MS-SPRing protection channels are not protected. They are preempted during MS-SPRing switches.

14. If you selected Fully Protected Path in Step 13 and the circuit will be routed on an SNCP, choose one of the following:

    - **Nodal Diversity Required**-Ensures that the primary and alternate paths within SNCP ring portions of the complete circuit path are nodally diverse.
    - **Nodal Diversity Desired**-Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.
    - **Link Diversity Only**-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node diverse, but CTC does not check for node diversity.

15. If you selected Fully Protected Path in Step 13 and the circuit will be routed on an SNCP DRI, check the **Dual Ring Interconnect** check box.
16. If you selected Using Required Nodes/Spans in Step 12, complete the following substeps. If not, continue with Step 18.
    1. Click **Next**.
    2. In the Circuit Route Constraints For Auto Routing area, click a node or span on the circuit map.
    3. Click **Include** to include the node or span in the circuit. Click **Exclude** to exclude the node or span from the circuit. The order in which you choose included nodes and spans is the order in which the circuit will be routed. Click spans twice to change the circuit direction.
    4. Repeat Substep 3 for each node or span that you wish to include or exclude.

Figure 6-4: Setting Circuit Routing Preferences

5. Review the circuit route. To change the circuit routing order, choose a node from the Required Nodes/Lines or Excluded Nodes Links lists and click the **Up** or **Down** buttons to change the circuit routing order. Click **Remove** to remove a node or span.

17. Click **Next**. In the VC LO Matrix Optimization page, choose one of the following:

- Create VC LO tunnel on transit nodes-This option is available if the VC12 circuit passes through a node that does not have a low-order tunnel, or if an existing low-order tunnel is full. Low-order tunnels allow VC12 circuits to pass through ONS 15454 SDHs without consuming low-order cross-connect card resources. Creating low-order tunnels is a good idea if you are creating many low-order circuits from the same source and destination. Refer to the *Cisco ONS 15454 SDH Reference Manual* for more information.
- Create VC LO aggregation point-This option is available if you are creating a VC12 circuit to an STM-N port for handoff to non-ONS 15454 SDH networks or equipment, such as an IOF, switch, or DACS. A LAP allows low-order circuits to be routed through a node using one VC4 connection on the cross-connect card high-order matrix rather than multiple connections on the low-order matrix. If you want to aggregate the low-order circuit you are creating with others onto an VC4 for transport outside the ONS 15454 network, choose one of the following:
  - VC4 grooming node is *source-node*, VC12 grooming node is *destination-node*-Creates the LAP on the VC12 circuit source node. This option is available only if the VC12 circuit originates on an STM-N card.
  - VC4 grooming node is *destination-node*, VC12 grooming node is *source-node*-Creates the LAP on the VC12 circuit destination node. This option is available only if the VC12 circuit terminates on an STM-N card.
- None-Choose this option if you do not want to create a low-order tunnel or a LAP. This is the only available option if CTC cannot create a low-order tunnel or LAP.

18. If you selected Review Route Before Creation in Step 12, complete the following substeps. If not, continue with Step 19.
    1. Click **Next**.
    2. Review the circuit route. To add or delete a circuit span, choose a node on the circuit route. Blue arrows show the circuit route. Green arrows indicate spans that you can add. Click a span arrowhead, then click **Include** to include the span or **Remove** to remove the span.
    3. If the provisioned circuit does not reflect the routing and configuration you want, click **Back** to verify and change circuit information. If the circuit needs to be routed to a different path, see the NTP-D82 Create a Manually Routed Low-Order VC12 Circuit.
19. Click **Finish**. One of the following results occurs, depending on the circuit properties you chose in the Circuit Creation dialog box:

- If you entered more than 1 in the Number of Circuits field and selected Auto-ranged, CTC automatically creates the number of circuits entered in the Number of Circuits field. If auto-ranging cannot complete all the circuits, for example, because sequential ports are unavailable at the source or destination, a dialog box appears. Set the new source or destination for the remaining circuits, then click **Finish** to continue auto-ranging. After completing the circuits, the Circuits window appears.
- If you entered more than 1 in the Number of Circuits field and did not choose Auto-ranged, the Circuit Creation dialog box appears so you can create the remaining circuits. Repeat Steps 6 through 18 for each additional circuit. After completing the circuits, the Circuits window appears.

20. In the Circuits window, verify that the new circuits appear in the circuits list.
21. Complete the NTP-D135 Test Low-Order Circuits. Skip this step if you built a test circuit.

Stop. You have completed this procedure.

Figure 6-4: Setting Circuit Routing Preferences

NTP-D82 Create a Manually Routed Low-Order VC12 Circuit

Purpose	This procedure creates low-order VC12 circuit and allows you to provision the circuit route.
Tools/Equipment	XC-VXC-10G, XC-VXL-10G, or XC-VXL-2.5G cards must be installed at the circuit source and destination nodes.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. Complete the following:
    1. On the shelf graphic, verify that XC-VXC-10G, XC-VXL-10G, or XC-VXL-2.5G cross-connect cards are installed in Slots 8 and 10.
    2. Click the **Provisioning > Cross-Connect** tabs and set the Low Order Payload Type to **VC-12** or **VC-11 and VC-12 (Mixed Mode)**.
3. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 4.
4. From the View menu, choose **Go to Network View**.
5. Click the **Circuits** tab, then click **Create**.
6. In the Circuit Creation dialog box, complete the following fields:
    - Circuit Type-Choose **VC_LO_PATH_CIRCUIT**.
    - Number of Circuits-Enter the number of VC12 circuits that you want to create. The default is 1. If you are creating multiple circuits with the same slot and consecutive port numbers, you can use Auto-ranged to create the circuits automatically.
    - Auto-ranged-This check box is automatically checked if you enter more than 1 in the Number of Circuits field. Auto-ranging creates identical (same source and destination), sequential circuits automatically. Uncheck the box if you do not want CTC to create sequential circuits automatically.
7. Click **Next**.
8. Define the circuit attributes (Figure 6-1):
    - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters, (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
    - Size-Choose **VC12**.
    - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
    - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
        - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
        - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
        - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.

◊ **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.

♦ Apply to drop ports-Select this check box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.

◊ Protected Drops-Check this check box if you want the circuit routed on protected drops only, that is, to ONS 15454 SDH cards that are in 1:1, 1:N, or 1+1 protection. If you check this check box, CTC shows only protected cards and ports as source and destination choices.

9. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task. Otherwise, continue with Step 10.
10. Click **Next**.
11. Complete the "DLP-D95 Provision a Low-Order VC12 Circuit Source and Destination" task.
12. In the Circuit Routing Preferences area (Figure 6-2), uncheck **Route Automatically**. When Route Automatically is not selected, the Using Required Nodes/Spans and Review Route Before Circuit Creation check boxes are unavailable.
13. Set the circuit path protection:

· To route the circuit on a protected path, leave Fully Protected Path checked and continue with Step 14. Fully protected paths might or might not have SNCP path segments (with primary and alternate paths), and the path diversity options apply only to SNCP path segments, if any exist.
· To create an unprotected circuit, uncheck **Fully Protected Path** and continue with Step 17.
· To route the circuit on an MS-SPRing protection channel, if available, uncheck **Fully Protected Path,** check **Protection Channel Access**, click **Yes** in the Warning dialog box, and then continue with Step 17.

Caution! Circuits routed on MS-SPRing protection channels are not protected and are preempted during MS-SPRing switches.

14. If you selected Fully Protected Path in Step 13 and the circuit will be routed on an SNCP, choose a Node-Diverse Path option:

· **Nodal Diversity Required**-Ensures that the primary and alternate paths within the SNCP ring portions of the complete circuit path are nodally diverse.
· **Nodal Diversity Desired**- Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.

- **Link Diversity Only**-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node diverse, but CTC does not check for node diversity.

15. If you selected Fully Protected Path in Step 13 and the circuit will be routed on an SNCP DRI, click the **Dual Ring Interconnect** check box.
16. Click **Next**. In the VC LO Matrix Optimization page, choose one of the following:

- Create VC LO tunnel on transit nodes-This option is available if the VC12 circuit passes through a node that does not have a low-order tunnel, or if an existing low-order tunnel is full. Low-order tunnels allow VC12 circuits to pass through ONS 15454 SDHs without consuming low-order cross-connect card resources. Creating low-order tunnels is a good idea if you are creating many low-order circuits from the same source and destination. Refer to the *Cisco ONS 15454 SDH Reference Manual* for more information.
- Create VC LO aggregation point-This option is available if you are creating a VC12 circuit to an STM-N port for handoff to non-ONS 15454 SDH networks or equipment, such as an IOF, switch, or DACS. A LAP allows low-order circuits to be routed through a node using one VC4 connection on the cross-connect card high-order matrix rather than multiple connections on the low-order matrix. If you want to aggregate the low-order circuit you are creating with others onto a VC4 for transport outside the ONS 15454 SDH network, choose one of the following:
  - VC4 grooming node is *source-node*, VC12 grooming node is *destination-node*-Creates the LAP on the VC12 circuit source node. This option is available only if the VC12 circuit originates on an STM-N card.
  - VC4 grooming node is *destination-node*, VC12 grooming node is *source-node*-Creates the LAP on the VC12 circuit destination node. This option is available only if the VC12 circuit terminates on an STM-N card.
- None-Choose this option if you do not want to create a low-order tunnel or a LAP. This is the only available option if CTC cannot create a low-order tunnel or LAP.

17. Click **Next**. In the Route Review/Edit area, node icons appear for circuit routing. The circuit source node is selected. Green arrows pointing from the source node to other network nodes indicate spans that are available for routing the circuit.
18. Complete the "DLP-D3 Provision a Low-Order VC12 Circuit Route" task on for the VC12 circuit you are creating.
19. Click **Finish**. CTC compares your manually provisioned circuit route with the specified path diversity option you chose in Step 14. If the path does not meet the specified path diversity requirement, CTC displays an error message and allows you to change the circuit path.
20. If you entered more than 1 in the Number of Circuits field, the Circuit Creation dialog box appears so you can create the remaining circuits. Repeat Steps 6 through 19 for each additional circuit.
21. When all the circuits are created, the main Circuits window appears. Verify that the circuits you created are correct.
22. Complete the NTP-D135 Test Low-Order Circuits. Skip this step if you built a test circuit.

Stop. You have completed this procedure.

NTP-D83 Create a Unidirectional Low-Order VC12 Circuit with Multiple Drops

Purpose	This procedure creates a unidirectional low-order VC12 circuit with multiple drops (destinations).
Tools/Equipment	XC-VXC-10G, XC-VXL-10G, or XC-VXL-2.5G cards must be installed at the circuit source and destination nodes.

Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. Complete the following:
    1. On the shelf graphic, verify that XC-VXC-10G, XC-VXL-10G, or XC-VXL-2.5G cross-connect cards are installed in Slots 8 and 10.
    2. Click the **Provisioning > Cross-Connect** tabs and set the Low Order Payload Type to **VC-12** or **VC-11 and VC-12** (**Mixed Mode**).
3. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 4.
4. From the View menu, choose **Go to Network View**.
5. Click the **Circuits** tab, then click **Create**.
6. In the Circuit Creation dialog box, complete the following fields:
    - Circuit Type-Choose **VC_LO_PATH_CIRCUIT**.
    - Number of Circuits-Leave the default unchanged (1).
    - Auto-ranged-Unavailable when the Number of Circuits field is 1.
7. Click **Next**.
8. Define the circuit attributes:
    - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters, (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
    - Size-Choose **VC12**.
    - Bidirectional-Uncheck for this circuit.
    - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
    - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
        - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
        - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
        - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
        - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
          For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
    - Apply to drop ports-Check this box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the

circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.

◊ Protected Drops-Check this box if you want the circuit routed to protect drops only, that is, to ONS 15454 SDH cards that are in 1:1, 1:N, or 1+1 protection. If you check this box, CTC displays only protected cards as source and destination choices.

9. Click **Next**.
10. Complete the "DLP-D95 Provision a Low-Order VC12 Circuit Source and Destination" task.
11. In the Circuit Routing Preferences area, uncheck **Route Automatically**. When Route Automatically is not selected, the Using Required Nodes/Spans and Review Route Before Circuit Creation check boxes are unavailable.
12. Set the circuit path protection:

    - To route the circuit on a protected path, leave Fully Protected Path checked and continue with Step 13. Fully protected paths might or might not have SNCP path segments (with primary and alternate paths), and the path diversity options apply only to SNCP path segments, if any exist.
    - To create an unprotected circuit, uncheck **Fully Protected Path** and continue with Step 16.
    - To route the circuit on an MS-SPRing protection channel, if available, uncheck **Fully Protected Path**, check **Protection Channel Access**, click **Yes** in the Warning dialog box, and then continue with Step 16.

    Caution! Circuits routed on MS-SPRing protection channels are not protected and are preempted during MS-SPRing switches.

13. If you selected Fully Protected Path in Step 12 and the circuit will be routed on an SNCP, choose one of the following:
    - **Nodal Diversity Required**-Ensures that the primary and alternate paths within the SNCP ring portions of the complete circuit path are nodally diverse.
    - **Nodal Diversity Desired**-Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.
    - **Link Diversity Only**-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node diverse, but CTC does not check for node diversity.
14. If you selected Fully Protected Path in Step 12 and the circuit will be routed on an SNCP DRI, click the **Dual Ring Interconnect** check box.
15. Click **Next**. In the VC LO Matrix Optimization page, choose one of the following:

    - Create VC LO tunnel on transit nodes-This option is available if the VC12 circuit passes through a node that does not have a low-order tunnel, or if an existing low-order tunnel is full. Low-order tunnels allow VC12 circuits to pass through ONS 15454 SDHs without consuming low-order cross-connect card resources. Creating low-order tunnels is a good idea if you are creating many low-order circuits from the same source and destination. Refer to the *Cisco ONS 15454 SDH Reference Manual* for more information.

- Create VC LO aggregation point-This option is available if you are creating a VC12 circuit to an STM-N port for handoff to non-ONS 15454 SDH networks or equipment, such as an IOF, switch, or DACS. A LAP allows low-order circuits to be routed through a node using one VC4 connection on the cross-connect card high-order matrix rather than multiple connections on the low-order matrix. If you want to aggregate the low-order circuit you are creating with others onto an VC4 for transport outside the ONS 15454 SDH network, choose one of the following:
  - VC4 grooming node is *source-node*, VC12 grooming node is *destination-node*-Creates the LAP on the VC12 circuit source node. This option is available only if the VC12 circuit originates on an STM-N card.
  - VC4 grooming node is *destination-node*, VC12 grooming node is *source-node*-Creates the LAP on the VC12 circuit destination node. This option is available only if the VC12 circuit terminates on an STM-N card.
- None-Choose this option if you do not want to create a low-order tunnel or a LAP. This is the only available option if CTC cannot create a low-order tunnel or LAP.

16. Click **Next**. In the Route Review and Edit area, node icons appear so you can route the circuit manually. The circuit source node is selected. Green arrows pointing from the source node to other network nodes indicate spans that are available for routing the circuit.
17. Complete the "DLP-D3 Provision a Low-Order VC12 Circuit Route" task for the VC12 circuit you are creating.
18. Click **Finish**. CTC completes the circuit and the Circuits window appears.
19. In the Circuits window, click the circuit that you want to route to multiple drops. The Delete, Edit, and Search buttons become active.
20. Click **Edit** (or double-click the circuit row). The Edit Circuit window appears with the General tab selected.

    All nodes in the DCC network appear on the network. Circuit source and destination information appears under the source and destination nodes. To see a detailed view of the circuit, click **Show Detailed Map**. To rearrange a node icon, select the node, press **Ctrl**, then drag and drop the icon to the new location.
21. In the Edit Circuit dialog box, click the **Drops** tab. A list of existing drops appears.
22. Click **Create**.
23. In the Define New Drop dialog box, create the new drop:
    1. Node-Choose the target node for the circuit drop.
    2. Slot-Choose the target card and slot.
    3. Port, VC4, VC3/TUG3, TUG2, VC12-Choose the Port, VC4, VC3/TUG3, TUG2, or VC12 from the Port, VC4, VC3/TUG3, TUG2, or VC12 drop-down lists. The card selected in Step b determines the fields that appear. See Table 6-3 for a list of options.
    4. The routing preferences for the new drop match those of the original circuit. However, you can modify the following:
       - If the original circuit was routed on a protected SNCP path, you can change the nodal diversity options: Nodal Diversity Required, Nodal Diversity Desired, or Link Diversity Only. See Step 13 for descriptions.
       - If the original circuit was not routed on a protected path, the Protection Channel Access option is available. See Step 12 for a description of the Protection Channel Access option.
    5. Click **OK**. The new drop appears in the Drops list.
24. If you need to create additional drops for the circuit, repeat Steps 22 and 23 to create the additional drops.
25. Click **Close**. The Circuits window appears.

26. Verify that the new drops appear in the Destination column for the circuit that you edited. If they do not appear, repeat Steps 5 through 25, making sure that all options are provisioned correctly.
27. Complete the NTP-D135 Test Low-Order Circuits. Skip this step if you built a test circuit.

Stop. You have completed this procedure.

NTP-D54 Create an Automatically Routed Low-Order VC3 Circuit

Purpose	This procedure creates an automatically routed low-order VC3 circuit, meaning that CTC chooses the circuit route based on the parameters you specify and on the software version.
Tools/Equipment	XC-VXL-10G or XC-VXL-2.5G cards must be installed at the circuit source and destination nodes.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up XC-VXL-10G or XC-VXL-2.5G cards must be installed at the circuit source and destination nodes.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

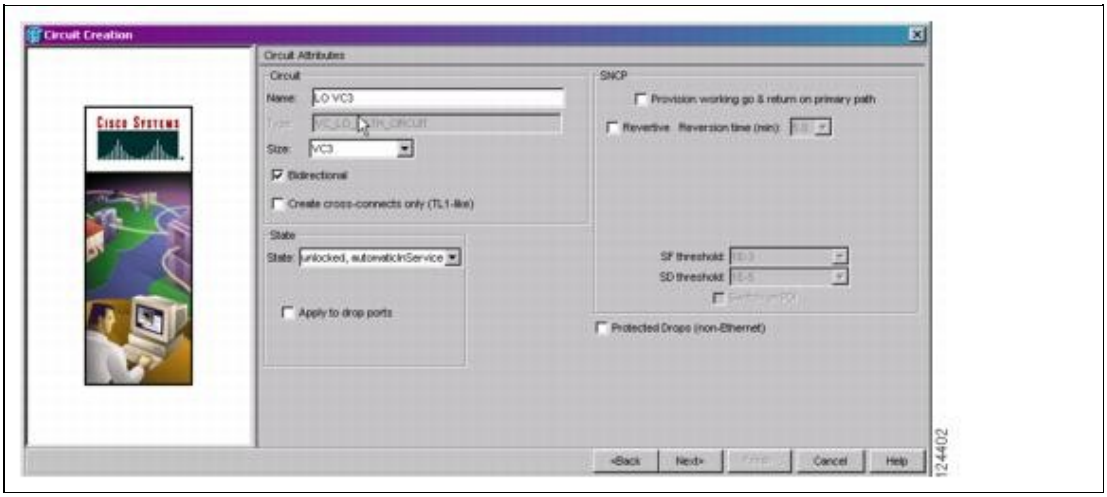
Note: This procedure requires the use of automatic routing. Automatic routing is not available if both the Automatic Circuit Routing NE default and the Network Circuit Automatic Routing Overridable NE default are set to FALSE. For a full description of these defaults see the "Network Element Defaults" appendix in the *Cisco ONS 15454 SDH Reference Manual*.

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. On the shelf graphic, verify that XC-VXL-10G or XC-VXL-2.5G cross-connect cards are installed in Slots 8 and 10.
3. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 4.
4. From the View menu, choose **Go to Network View**.
5. Click the **Circuits** tab, then click **Create**.
6. In the Circuit Creation dialog box, complete the following fields:
   - Circuit Type-Choose **VC_LO_PATH_CIRCUIT**.
   - Size-Choose **VC3**.
   - Number of Circuits-Enter the number of VC3 circuits that you want to create. The default is 1. If you are creating multiple circuits with the same slot and consecutive port numbers, you can use Auto-ranged to create the circuits automatically.
7. Click **Next**.
8. Define the circuit attributes (Figure 6-5):
   - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters, (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
   - Auto-ranged-This check box is automatically selected if you enter more than 1 in the Number of Circuits field. Auto-ranging creates identical (same source and destination), sequential circuits automatically. Uncheck the box if you do not want CTC to create sequential circuits automatically.

- Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
- State-Choose the administrative state to apply to all of the cross-connects in a circuit:
  - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
  - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
  - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
  - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
    For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
- Apply to drop ports-Check this check box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

  Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.
- Protected Drops-Select this check box if you want the circuit routed on protected drops only, that is, to ONS 15454 SDH cards that are in 1:1, 1:N, or 1+1 protection. If you select this check box, CTC displays only protected cards and ports as source and destination choices.

Figure 6-5: Setting Circuit Attributes For a Low-Order VC3 Circuit



9. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task. Otherwise, continue with Step 10.

10. Click **Next**.
11. Complete the "DLP-D318 Provision a Low-Order VC3 Circuit Source and Destination" task.
12. In the Circuit Routing Preferences area (Figure 6-2), choose **Route Automatically**. Two options are available; choose either, both, or none based on your preferences.

    - Using Required Nodes/Spans-Check this check box if you want to specify nodes and spans to include or exclude in the CTC-generated circuit route.
      Including nodes and spans for a circuit ensures that those nodes and spans are in the working path of the circuit (but not the protect path). Excluding nodes and spans ensures that the nodes and spans are not in the working or protect path of the circuit.
    - Review Route Before Creation-Check this check box if you want to review and edit the circuit route before the circuit is created.
13. Set the circuit path protection:

    - To route the circuit on a protected path, leave Fully Protected Path checked and continue with Step 14. CTC creates a fully protected circuit route based on the path diversity option you choose. Fully protected paths might or might not have SNCP path segments (with primary and alternate paths), and the path diversity options apply only to SNCP path segments, if any exist.
    - To create an unprotected circuit, uncheck **Fully Protected Path** and continue with Step 16.
    - To route the circuit on an MS-SPRing protection channel, if available, uncheck **Fully Protected Path**, check **Protection Channel Access**, click **Yes** in the Warning dialog box, and then continue with Step 16.

    Caution! Circuits routed on MS-SPRing protection channels are not protected. They are preempted during MS-SPRing switches.

14. If you selected Fully Protected Path in Step 13 and the circuit will be routed on an SNCP, choose one of the following:

    - **Nodal Diversity Required**-Ensures that the primary and alternate paths within SNCP ring portions of the complete circuit path are nodally diverse.
    - **Nodal Diversity Desired**-Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.
    - **Link Diversity Only**-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node diverse, but CTC does not check for node diversity.
15. If you selected Fully Protected Path in Step 13 and the circuit will be routed on an SNCP DRI, click the **Dual Ring Interconnect** check box.
16. If you selected Using Required Nodes/Spans in Step 12, complete the following substeps. If not, continue with Step 18.
    1. Click **Next**.
    2. In the Circuit Route Constraints For Auto Routing area, click a node or span on the circuit map.
    3. Click **Include** to include the node or span in the circuit. Click **Exclude** to exclude the node or span from the circuit. The order in which you choose included nodes and spans is the order in which the circuit is routed. Click spans twice to change the circuit direction.
    4. Repeat SubStep 3 for each node or span that you wish to include or exclude.
    5. Review the circuit route. To change the circuit routing order, choose a node from the Required Nodes/Lines or Excluded Nodes Links lists and click the **Up** or **Down** buttons to change the circuit routing order. Click **Remove** to remove a node or span.
17. Click **Next**. In the VC LO Matrix Optimization page, choose one of the following:

- Create VC LO tunnel on transit nodes-This option is available if the VC3 circuit passes through a node that does not have a low-order tunnel, or if an existing low-order tunnel is full. Low-order tunnels allow VC3 circuits to pass through ONS 15454 SDHs without consuming low-order cross-connect card resources. Creating low-order tunnels is a good idea if you are creating many low-order circuits from the same source and destination. Refer to the *Cisco ONS 15454 SDH Reference Manual* for more information.
- Create VC LO aggregation point-This option is available if you are creating a VC3 circuit to an STM-N port for handoff to non-ONS 15454 SDH networks or equipment, such as an IOF, switch, or DACS. A LAP allows low-order circuits to be routed through a node using one VC4 connection on the cross-connect card high-order matrix rather than multiple connections on the low-order matrix. If you want to aggregate the low-order circuit you are creating with others onto an VC4 for transport outside the ONS 15454 SDH network, choose one of the following:
  - VC4 grooming node is *source-node*, VC12 grooming node is *destination-node*-Creates the LAP on the VC3 circuit source node. This option is available only if the VC3 circuit originates on an STM-N card.
  - VC4 grooming node is *destination-node*, VC12 grooming node is *source-node*-Creates the LAP on the VC12 circuit destination node. This option is available only if the VC3 circuit terminates on an STM-N card.
- None-Choose this option if you do not want to create a low-order tunnel or a LAP. This is the only available option if CTC cannot create a low-order tunnel or LAP.

18. If you selected Review Route Before Creation in Step 12, complete the following substeps. If not, continue with Step 19.
    1. Click **Next**.
    2. Review the circuit route. To add or delete a circuit span, choose a node on the circuit route. Blue arrows show the circuit route. Green arrows indicate spans that you can add. Click a span arrowhead, then click **Include** to include the span or **Remove** to remove the span.
    3. If the provisioned circuit does not reflect the routing and configuration you want, click **Back** to verify and change circuit information. If the circuit needs to be routed to a different path, see the NTP-D55 Create a Manually Routed Low-Order VC3 Circuit.
19. Click **Finish**. One of the following results occurs, depending on the circuit properties you chose in the Circuit Creation dialog box:
    - If you entered more than 1 in the Number of Circuits field and selected Auto-ranged, CTC automatically creates the number of circuits entered in the Number of Circuits field. If auto-ranging cannot complete all the circuits, for example, because sequential ports are unavailable at the source or destination, a dialog box appears. Set the new source or destination for the remaining circuits, then click **Finish** to continue auto-ranging. After completing the circuits, the Circuits window appears.
    - If you entered more than 1 in the Number of Circuits field and did not choose Auto-ranged, the Circuit Creation dialog box appears so you can create the remaining circuits. Repeat Steps 6 through 18 for each additional circuit. After completing the circuits, the Circuits window appears.
20. In the Circuits window, verify that the new circuits appear in the circuits list.
21. Complete the NTP-D135 Test Low-Order Circuits. Skip this step if you built a test circuit.

    Stop. You have completed this procedure.

NTP-D55 Create a Manually Routed Low-Order VC3 Circuit

Purpose	This procedure creates low-order VC3 circuit and allows you to provision the circuit route.
Tools/Equipment	

	XC-VXL-10G or XC-VXL-2.5G cards must be installed at the circuit source and destination nodes.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. On the shelf graphic, verify that XC-VXL-10G or XC-VXL-2.5G cross-connect cards are installed in Slots 8 and 10.
3. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 4.
4. From the View menu, choose **Go to Network View**.
5. Click the **Circuits** tab, then click **Create**.
6. In the Circuit Creation dialog box, complete the following fields:
   - Circuit Type-Choose **VC_LO_PATH_CIRCUIT**.
   - Number of Circuits-Enter the number of VC3 circuits that you want to create. The default is 1. If you are creating multiple circuits with the same slot and consecutive port numbers, you can use Auto-ranged to create the circuits automatically.
   - Auto-ranged-This check box is automatically selected if you enter more than 1 in the Number of Circuits field. Auto-ranging creates identical (same source and destination), sequential circuits automatically. Uncheck the box if you do not want CTC to create sequential circuits automatically.
7. Click **Next**.
8. Define the circuit attributes (Figure 6-5):
   - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters, (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
   - Size-Choose **VC3**.
   - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
   - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
     - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
     - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
     - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
     - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.

For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.

- Apply to drop ports-Select this check box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

  Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.
- Protected Drops-Select this check box if you want the circuit routed on protected drops only, that is, to ONS 15454 SDH cards that are in 1:1, 1:N, or 1+1 protection. If you select this check box, CTC displays only protected cards and ports as source and destination choices.

9. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task. Otherwise, continue with Step 10.
10. Click **Next**.
11. Complete the "DLP-D318 Provision a Low-Order VC3 Circuit Source and Destination" task.
12. In the Circuit Routing Preferences area (Figure 6-2), uncheck **Route Automatically**.
13. Set the circuit path protection:

    - To route the circuit on a protected path, leave Fully Protected Path checked and continue with Step 14. Fully protected paths might or might not have SNCP path segments (with primary and alternate paths), and the path diversity options apply only to SNCP path segments, if any exist.
    - To create an unprotected circuit, uncheck **Fully Protected Path** and continue with Step 17.
    - To route the circuit on an MS-SPRing protection channel, if available, uncheck **Fully Protected Path,** check **Protection Channel Access**, click **Yes** in the Warning dialog box, then continue with Step 17.

    Caution! Circuits routed on MS-SPRing protection channels are not protected and are preempted during MS-SPRing switches.

14. If you selected Fully Protected Path in Step 13 and the circuit will be routed on an SNCP, choose a Node-Diverse Path option:

    - **Nodal Diversity Required**-Ensures that the primary and alternate paths within the SNCP ring portions of the complete circuit path are nodally diverse.
    - **Nodal Diversity Desired**- Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.
    - **Link Diversity Only**-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node diverse, but CTC does not check for node diversity.
15. If you selected Fully Protected Path in Step 13 and the circuit will be routed on an SNCP DRI, click the **Dual Ring Interconnect** check box.
16. Click **Next**. In the VC LO Matrix Optimization page, choose one of the following:

    - Create VC LO tunnel on transit nodes-This option is available if the VC3 circuit passes through a node that does not have a low-order tunnel, or if an existing low-order tunnel is full. Low-order tunnels allow VC3 circuits to pass through ONS

15454 SDHs without consuming low-order cross-connect card resources. Creating low-order tunnels is a good idea if you are creating many low-order circuits from the same source and destination. Refer to the *Cisco ONS 15454 SDH Reference Manual* for more information.

- Create VC LO aggregation point-This option is available if you are creating a VC3 circuit to an STM-N port for handoff to non-ONS 15454 SDH networks or equipment, such as an IOF, switch, or DACS. A LAP allows low-order circuits to be routed through a node using one VC4 connection on the cross-connect card high-order matrix rather than multiple connections on the low-order matrix. If you want to aggregate the low-order circuit you are creating with others onto an VC4 for transport outside the ONS 15454 SDH network, choose one of the following:
  - VC4 grooming node is *source-node*, VC12 grooming node is *destination-node*-Creates the LAP on the VC3 circuit source node. This option is available only if the VC3 circuit originates on an STM-N card.
  - VC4 grooming node is *destination-node*, VC3 grooming node is *source-node*-Creates the LAP on the VC3 circuit destination node. This option is available only if the VC3 circuit terminates on an STM-N card.
- None-Choose this option if you do not want to create a low-order tunnel or a LAP. This is the only available option if CTC cannot create a low-order tunnel or LAP.

17. Click **Next**. In the Route Review and Edit area, node icons appear for you to route the circuit. The circuit source node is selected. Green arrows pointing from the source node to other network nodes indicate spans that are available for routing the circuit.
18. Complete the "DLP-D96 Provision a Low-Order VC3 Circuit Route" task for the VC3 circuit you are creating.
19. Click **Finish**. CTC compares your manually provisioned circuit route with the specified path diversity option you chose in Step 14. If the path does not meet the specified path diversity requirement, CTC displays an error message and allows you to change the circuit path.
20. If you entered more than 1 in the Number of Circuits field, the Circuit Creation dialog box appears so you can create the remaining circuits. Repeat Steps 6 through 19 for each additional circuit.
21. When all the circuits are created, the main Circuits window appears. Verify that the circuits you created are correct.
22. Complete the NTP-D135 Test Low-Order Circuits. Skip this step if you built a test circuit.

Stop. You have completed this procedure.

NTP-D56 Create a Unidirectional Low-Order VC3 Circuit with Multiple Drops

Purpose	This procedure creates a unidirectional low-order VC3 circuit with multiple drops (destinations).
Tools/Equipment	XC-VXL-10G or XC-VXL-2.5G cards must be installed at the circuit source and destination nodes.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

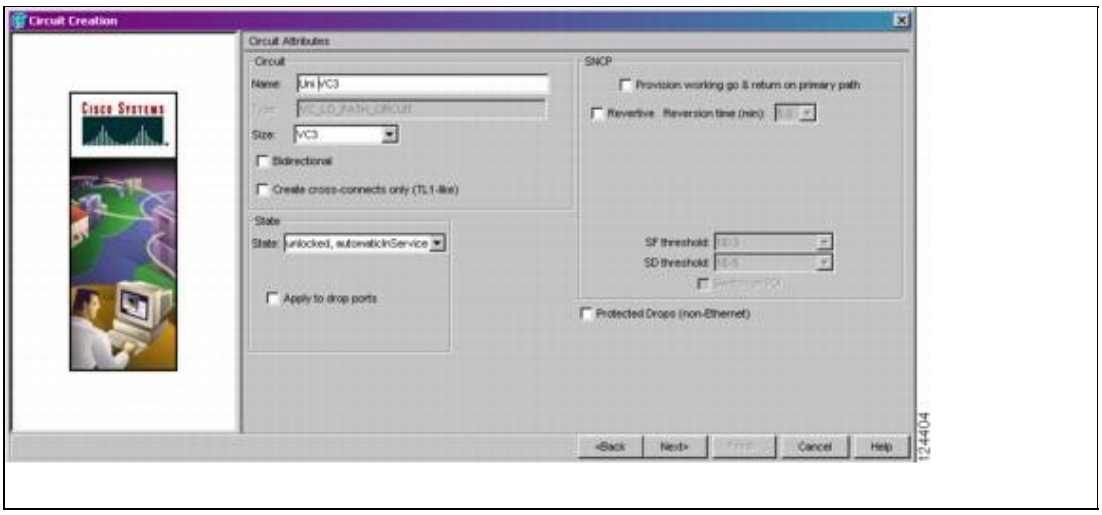
1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.

2. On the shelf graphic, verify that XC-VXL-10G or XC-VXL-2.5G cross-connect cards are installed in Slots 8 and 10.
3. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 4.
4. From the View menu, choose **Go to Network View**.
5. Click the **Circuits** tab, then click **Create**.
6. In the Circuit Creation dialog box, complete the following fields:
    - Circuit Type-Choose **VC_LO_PATH_CIRCUIT**.
    - Number of Circuits-Leave the default unchanged (1).
    - Auto-ranged-Unavailable when the Number of Circuits field is 1.
7. Click **Next**.
8. Define the circuit attributes (Figure 6-6):
    - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters, (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
    - Size-Choose **VC3**.
    - Bidirectional-Uncheck for this circuit.
    - Number of Circuits-Leave the default unchanged (1).
    - Auto-ranged-Unavailable when the Number of Circuits field is 1.
    - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
    - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
        - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
        - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
        - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
        - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
          For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
    - Apply to drop ports-Check this box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

      Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.
    - Protected Drops-Check this box if you want the circuit routed to protect drops only, that is, to ONS 15454 SDH cards that are in 1:1, 1:N, or 1+1 protection. If you check this box, CTC

displays only protected cards as source and destination choices.

Figure 6-6: Setting Circuit Attributes for a Unidirectional Low-Order VC3 Circuit



9. Click **Next**.
10. Complete the "DLP-D318 Provision a Low-Order VC3 Circuit Source and Destination" task.
11. In the Circuit Routing Preferences area, uncheck **Route Automatically**. When Route Automatically is not selected, the Using Required Nodes/Spans and Review Route Before Circuit Creation check boxes are unavailable.
12. Set the circuit path protection:

    - To route the circuit on a protected path, leave Fully Protected Path checked and continue with Step 13. Fully protected paths might or might not have SNCP path segments (with primary and alternate paths), and the path diversity options apply only to SNCP path segments, if any exist.
    - To create an unprotected circuit, uncheck **Fully Protected Path** and continue with Step 16.
    - To route the circuit on an MS-SPRing protection channel, if available, uncheck **Fully Protected Path**, check **Protection Channel Access**, click **Yes** in the Warning dialog box, then continue with Step 16.

    Caution! Circuits routed on MS-SPRing protection channels are not protected and are preempted during MS-SPRing switches.

13. If you selected Fully Protected Path in Step 12 and the circuit will be routed on an SNCP, choose one of the following:
    - **Nodal Diversity Required**-Ensures that the primary and alternate paths within the SNCP ring portions of the complete circuit path are nodally diverse.
    - **Nodal Diversity Desired**-Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.
    - **Link Diversity Only**-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node diverse, but CTC does not check for node diversity.
14. If you selected Fully Protected Path in Step 12 and the circuit will be routed on an SNCP DRI, click the **Dual Ring Interconnect** check box.
15. Click **Next**. In the VC LO Matrix Optimization page, choose one of the following:

- Create VC LO tunnel on transit nodes-This option is available if the VC3 circuit passes through a node that does not have a low-order tunnel, or if an existing low-order tunnel is full. Low-order tunnels allow VC3 circuits to pass through ONS 15454 SDHs without consuming low-order cross-connect card resources. Creating low-order tunnels is a good idea if you are creating many low-order circuits from the same source and destination. Refer to the *Cisco ONS 15454 SDH Reference Manual* for more information.
- Create VC LO aggregation point-This option is available if you are creating a VC3 circuit to an STM-N port for handoff to non-ONS 15454 SDH networks or equipment, such as an IOF, switch, or DACS. A LAP allows low-order circuits to be routed through a node using one VC4 connection on the cross-connect card high-order matrix rather than multiple connections on the low-order matrix. If you want to aggregate the low-order circuit you are creating with others onto an VC4 for transport outside the ONS 15454 SDH network, choose one of the following:
  - VC4 grooming node is *source-node*, VC12 grooming node is *destination-node*-Creates the LAP on the VC3 circuit source node. This option is available only if the VC3 circuit originates on an STM-N card.
  - VC4 grooming node is *destination-node*, VC12 grooming node is *source-node*-Creates the LAP on the VC3 circuit destination node. This option is available only if the VC3 circuit terminates on an STM-N card.
- None-Choose this option if you do not want to create a low-order tunnel or a LAP. This is the only available option if CTC cannot create a low-order tunnel or LAP.

16. Click **Next**. In the Route Review and Edit area, node icons appear so you can route the circuit manually. The circuit source node is selected. Green arrows pointing from the source node to other network nodes indicate spans that are available for routing the circuit.
17. Complete the "DLP-D96 Provision a Low-Order VC3 Circuit Route" task for the VC3 circuit you are creating.
18. Click **Finish**. The Circuits window appears.
19. In the Circuits window, click the circuit that you want to route to multiple drops. The Delete, Edit, and Search buttons become active.
20. Click **Edit** (or double-click the circuit row). The Edit Circuit window appears with the General tab selected.

    All nodes in the DCC network appear on the network. Circuit source and destination information appears under the source and destination nodes. To see a detailed view of the circuit, click **Show Detailed Map**. To rearrange a node icon, select the node, press **Ctrl**, then drag and drop the icon to the new location.
21. In the Edit Circuit dialog box, click the **Drops** tab. A list of existing drops appears.
22. Click **Create**.
23. In the Define New Drop dialog box, create the new drop:
    1. Node-Choose the target node for the circuit drop.
    2. Slot-Choose the target card and slot.
    3. Port, VC4, or VC3-Choose the Port, VC4, or VC3 from the Port, VC4, or VC3 drop-down lists. The card selected in Step b determines the fields that appear. See Table 6-3 for a list of options.
    4. The routing preferences for the new drop match those of the original circuit. However, you can modify the following:
       - If the original circuit was routed on a protected SNCP path, you can change the nodal diversity options: Nodal Diversity Required, Nodal Diversity Desired, or Link Diversity Only. See Step 13 for descriptions.
       - If the original circuit was not routed on a protected path, the Protection Channel Access option is available. See Step 12 for a

description of the Protection Channel Access option.

5. Click **OK**. The new drop appears in the Drops list.

24. If you need to create additional drops for the circuit, repeat Steps 22 and 23 to create the additional drops.
25. Choose **Close**. The Circuits window appears.
26. Verify that the new drops appear in the Destination column for the circuit that you edited. If they do not appear, repeat Steps 5 through 25, making sure that all options are provisioned correctly.
27. Complete the NTP-D135 Test Low-Order Circuits. Skip this step if you built a test circuit.

Stop. You have completed this procedure.

NTP-D133 Create an Automatically Routed Low-Order Tunnel

Purpose	This procedure creates an automatically routed low-order tunnel from source to destination nodes.
Tools/Equipment	None
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note: This procedure requires the use of automatic routing. Automatic routing is not available if both the Automatic Circuit Routing NE default and the Network Circuit Automatic Routing Overridable NE default are set to FALSE. For a full description of these defaults see the "Network Element Defaults" appendix in the *Cisco ONS 15454 SDH Reference Manual*.

Note: Low-order tunnels allow low-order VC12 and VC3 circuits to pass through intermediary ONS 15454 SDH nodes without consuming low-order matrix resources on the cross-connect card. In general, creating low-order tunnels is a good idea if you are creating many low-order circuits from the same source and destination. Refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual* for more information.

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the tunnel. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the tunnel source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. From the View menu, choose **Go to Network View**.
4. Click the **Circuits** tab, then click **Create**.
5. In the Circuit Creation dialog box, complete the following fields:
   - Circuit Type-Choose **VC_LO_PATH TUNNEL**.
   - For VC3 Port Grouping Only-Leave this box unchecked.
6. Click **Next**.
7. Define the circuit attributes (Figure 6-7):
   - Name-Assign a name to the low-order tunnel. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the tunnel.
   - Size-The default size is VC4. You cannot change this value.
   - Bidirectional-The default is Bidirectional. You cannot change this value.
   - State-Choose the administrative state to apply to all of the cross-connects in a circuit:

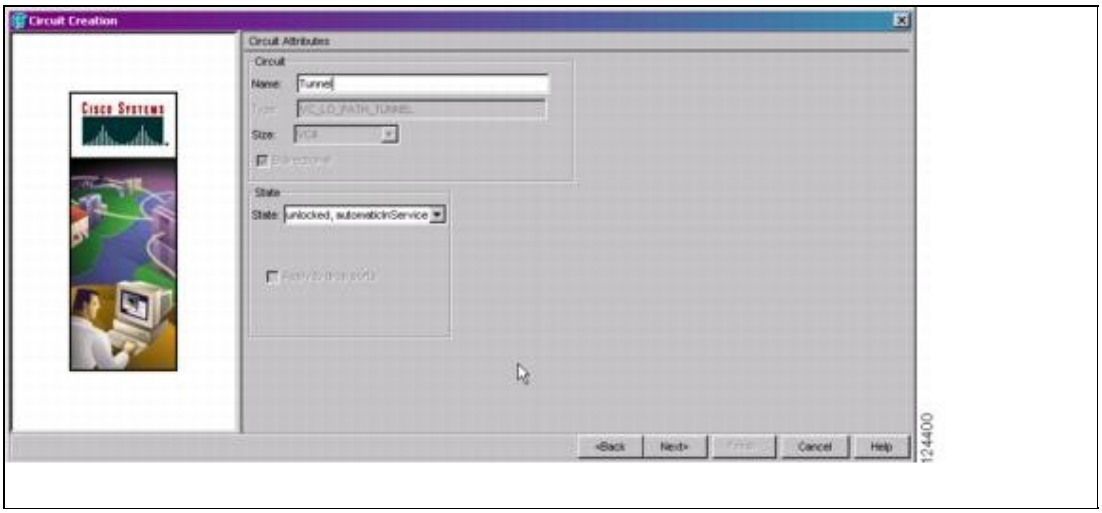
◊ **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
◊ **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
◊ **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
◊ **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.

Note: A low-order tunnel automatically transitions into the Unlocked service state after a VC12 or VC3 circuit is created.

- For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.

◊ Apply to drop ports-Unavailable for low-order tunnels.

Figure 6-7: Setting Attributes for a Low-Order Tunnel



8. Click **Next**.
9. In the Circuit Source area, choose the node where the low-order tunnel will originate from the Node drop-down list.
10. Click **Next**.
11. In the Circuit Destination area, choose the node where the low-order tunnel will terminate from the Node drop-down list.
12. Click **Next**.
13. In the Circuit Routing Preferences area, choose **Route Automatically**. Two options are available; choose either, both, or none based on your preferences.

· Using Required Nodes/Spans-Check this check box to specify nodes and spans to include or exclude in the CTC-generated tunnel route.
Including nodes and spans for a circuit ensures that those nodes and spans are in the working path of the circuit (but not the protect path). Excluding nodes and spans

ensures that the nodes and spans are not in the working or protect path of the circuit.
- Review Route Before Creation-Check this check box to review and edit the low-order tunnel route before the circuit is created.

14. If you selected Using Required Nodes/Spans in Step 13:
    1. Click **Next**.
    2. In the Circuit Route Constraints For Auto Routing area, click a span on the low-order tunnel map.
    3. Click **Include** to include the node or span in the low-order tunnel. Click **Exclude** to exclude the node or span from the low-order tunnel. The order in which you choose included nodes and spans sets the low-order tunnel sequence. Click spans twice to change the circuit direction.
    4. Repeat SubStep 3 for each node or span that you wish to include or exclude.
    5. Review the low-order tunnel route. To change the tunnel routing order, choose a node from the Required Nodes/Lines or Excluded Nodes Links lists, then click the **Up** or **Down** buttons to change the tunnel routing order. Click **Remove** to remove a node or span.
15. If you selected Review Route Before Creation in Step 13:
    1. Click **Next**.
    2. Review the tunnel route. To add or delete a tunnel span, choose a node on the tunnel route. Blue arrows show the tunnel route. Green arrows indicate spans that you can add. Click a span arrowhead, then click **Include** to include the span or **Remove** to remove the span.
    3. If the provisioned tunnel does not reflect the routing and configuration you want, click **Back** to verify and change the tunnel information.
16. Click **Finish**. The Circuits window appears.
17. Verify that the tunnel you just created appears in the circuits list. Low-order tunnels are identified by LOT in the Type column.

Stop. You have completed this procedure.

NTP-D134 Create a Manually Routed Low-Order Tunnel

Purpose	This procedure creates a manually routed, low-order tunnel from source to destination nodes.
Tools/Equipment	None
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note: Low-order tunnels allow low-order circuits to pass through intermediary ONS 15454 SDHs without consuming low-order matrix resources on the cross-connect card. In general, creating low-order tunnels is a good idea if you are creating many low-order circuits from the same source and destination. Refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual* for more information.

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the tunnel. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the tunnel source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 4.
3. From the View menu, choose **Go to Network View**.
4. Click the **Circuits** tab, then click **Create**.
5. In the Circuit Creation dialog box, complete the following fields:

- Circuit Type-Choose **VC_LO_PATH TUNNEL**.
- For VC3 Port Grouping Only-Leave this box unchecked.

6. Click **Next**.
7. Define the circuit attributes (Figure 6-8):
   - Name-Assign a name to the low-order tunnel. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the tunnel.
   - Size-The default size is VC4. You cannot change this value.
   - Bidirectional-Unavailable for low-order tunnels.
   - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
     - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
     - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
     - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
     - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.

     Note: A low-order tunnel automatically transitions into the Unlocked service state after a VC12 or VC3 circuit is created.
     For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
   - Apply to drop ports-Unavailable for low-order tunnels.

8. Click **Next**.
9. In the Circuit Source area, choose the node where the low-order tunnel will originate from the Node drop-down list.
10. Click **Next**.
11. In the Circuit Destination area, choose the node where the low-order tunnel will terminate from the Node drop-down list.
12. Click **Next**.
13. In the Circuit Routing Preferences area, uncheck **Route Automatically**. When Route Automatically is not selected, the Using Required Nodes/Spans and Review Route Before Circuit Creation check boxes are unavailable.
14. Click **Next**. In the Route Review and Edit area, node icons appear for tunnel routing. The circuit source node is selected. Green arrows pointing from the source node to other network nodes indicate spans that are available for routing the tunnel.
15. Complete the "DLP-D219 Provision a Low-Order Tunnel Route" task for the tunnel you are creating. The Circuits window appears.
16. Verify that the tunnel you just created appears in the circuits list. Low-order tunnels are identified by LOT in the Type column.

Stop. You have completed this procedure.

NTP-D216 Create a Low-Order Path Tunnel for Port Grouping

Purpose	This procedure creates a low-order path tunnel for the E3 and DS3i-N-12 cards. Port group tunnels can be used to transport VC3 signal rates.
Tools/Equipment	None
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note: This procedure requires the use of automatic routing. Automatic routing is not available if both the Automatic Circuit Routing NE default and the Network Circuit Automatic Routing Overridable NE default are set to FALSE. For a full description of these defaults see the "Network Element Defaults" appendix in the *Cisco ONS 15454 SDH Reference Manual*.

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the tunnel. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the tunnel source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. From the View menu, choose **Go to Network View**.
4. Click the **Circuits** tab, then click **Create**.
5. In the Circuit Creation dialog box, complete the following fields:
   - Circuit Type-Choose **VC_LO_PATH TUNNEL**.
   - For VC3 Port Grouping Only-Check this box.
6. Click **Next**.
7. Define the circuit attributes:
   - Name-Assign a name to the low-order tunnel. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the tunnel.
   - Size-The default size is VC4. You cannot change this value.
   - Bidirectional-This check box is automatically checked.

Three ports form one port group. For example, in one E3 or one DS3i-N-12 card, there are four port groups:

- Ports 1 to 3 = PG1
- Ports 4 to 6 = PG2
- Ports 7 to 9 = PG3
- Ports 10 to 12 = PG4

Low-order path tunneling is performed at the VC3 level.

◊ State-Choose the administrative state to apply to all of the cross-connects in a circuit:

- **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
- **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
- **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
- **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt

traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.

Note: A low-order tunnel automatically transitions into the Unlocked service state after a VC12 or VC3 circuit is created.

For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.

◊ Apply to drop ports-Uncheck this box.

8. If the tunnel will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task. Otherwise, continue with Step 9.
9. Click **Next**.
10. In the Circuit Source area, choose the node where the low-order tunnel will originate from the Node drop-down list. Complete the following:
    1. From the Slot drop-down list, choose the slot containing the card where the circuit will originate.
    2. For optical circuits, choose the VC4 from the VC4 drop-down list.
    3. For electrical circuits on E3 or DS3i-N-12 cards, choose the port group from the Port Group drop-down list.
    4. Click **Next**.
11. In the Circuit Destination area, choose the node where the low-order tunnel will terminate from the Node drop-down list. Complete the following:
    1. From the Slot drop-down list, choose the slot containing the card where the circuit will terminate.
    2. For optical circuits, choose the VC4 from the VC4 drop-down list.
    3. For electrical circuits on E3 or DS3i-N-12 cards, choose the port group from the Port Group drop-down list.
    4. Click **Next**.
12. In the Circuit Routing Preferences area, choose **Route Automatically**. Two options are available; choose either, both, or none based on your preferences.

    · Using Required Nodes/Spans-Check this check box to specify nodes and spans to include or exclude in the CTC-generated tunnel route.
    Including nodes and spans for a circuit ensures that those nodes and spans are in the working path of the circuit (but not the protect path). Excluding nodes and spans ensures that the nodes and spans are not in the working or protect path of the circuit.

    · Review Route Before Creation-Select this check box to review and edit the low-order tunnel route before the circuit is created.
13. If you selected Using Required Nodes/Spans in Step 12:
    1. Click **Next**.
    2. In the Circuit Route Constraints For Auto Routing area, click a span on the low-order tunnel map.
    3. Click **Include** to include the node or span in the low-order tunnel. Click **Exclude** to exclude the node or span from the low-order tunnel. The order in which you choose included nodes and spans sets the low-order tunnel sequence. Click spans twice to change the circuit direction.
    4. Repeat SubStep 3 for each node or span that you wish to include or exclude.
    5. Review the low-order tunnel route. To change the tunnel routing order, choose a node from the Required Nodes/Lines or Excluded Nodes Links lists, then click the **Up** or **Down** buttons to change the tunnel routing order. Click **Remove** to remove a node or span.
14. If you selected Review Route Before Creation in Step 12:

1. Click **Next**.
2. Review the tunnel route. To add or delete a tunnel span, choose a node on the tunnel route. Blue arrows show the tunnel route. Green arrows indicate spans that you can add. Click a span arrowhead, then click **Include** to include the span or **Remove** to remove the span.
3. If the provisioned tunnel does not reflect the routing and configuration you want, click **Back** to verify and change the tunnel information.

15. Click **Finish**. The Circuits window appears.
16. Verify that the tunnel you just created appears in the circuits list. Low-order tunnels are identified by LOT in the Type column.

Stop. You have completed this procedure.

NTP-D187 Create a Low-Order Aggregation Point

Purpose	This procedure creates a low-order aggregation point (LAP). LAPs allow multiple VC3 or VC12 low-order circuits to be aggregated on a single VC4 circuit. LAPs allow multiple low-order circuits to pass through cross-connect cards without utilizing resources on the cross-connect card low-order matrix.
Tools/Equipment	None
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note: This procedure requires the use of automatic routing. Automatic routing is not available if both the Automatic Circuit Routing NE default and the Network Circuit Automatic Routing Overridable NE default are set to FALSE. For a full description of these defaults see the "Network Element Defaults" appendix in the *Cisco ONS 15454 SDH Reference Manual*.

Note: You can create low-order aggregation points for circuits in MS-SPRing or 1+1 protection, or for unprotected circuits. You cannot create them for SNCP ring circuits.

Note: The maximum number of LAPs that you can create depends on the node protection topology and the number of low-order circuits that terminate on the node. Assuming that no other low-order circuits terminate at the node, the maximum number of LAPs that you can terminate at one node is 8 for 1+1 and 12 for MS-SPRing protection.

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the LAP. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the tunnel source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. From the View menu, choose **Go to Network View**.
4. Click the **Circuits** tab, then click **Create**.
5. In the Circuit Creation dialog box, choose **VC_LO_PATH_AGGREGATION**.
6. Click **Next**.
7. Define the circuit attributes (Figure 6-8):
   - Name-Assign a name to the low-order aggregation point. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default

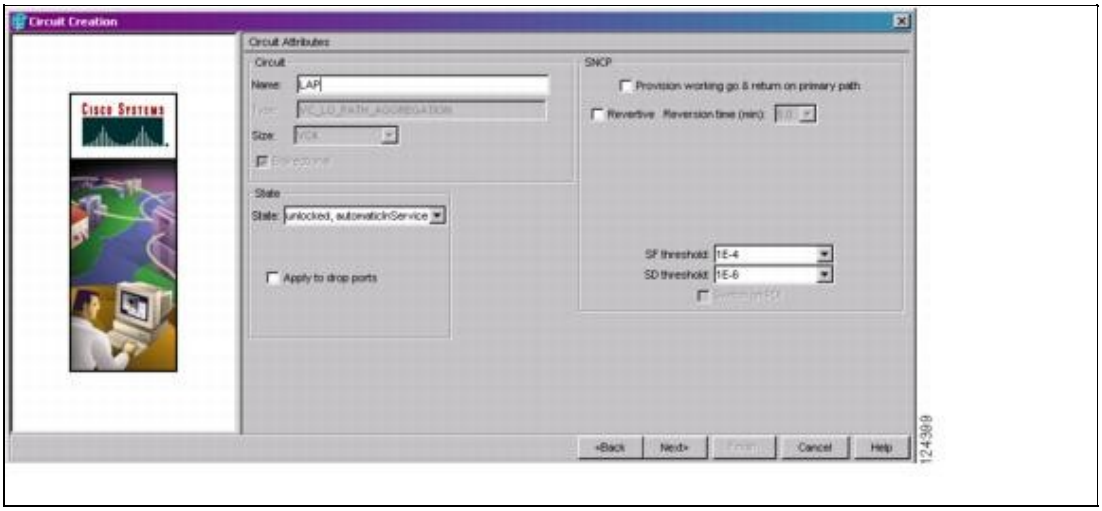
name to the LAP.

- Size-Defaults to VC4. You cannot change the value.
- Bidirectional-Defaults to Bidirectional. You cannot change the value.
- State-Choose the administrative state to apply to all of the cross-connects in a circuit:
  - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
  - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
  - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
  - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.

Note: A low-order aggregation point automatically transitions into the Unlocked service state after a VC12 or VC3 circuit is created.
For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.

- Apply to drop ports-Uncheck this box.

Figure 6-8: Setting Attributes for a Low-Order Aggregation Point



Note: LAPs cannot be routed on an SNCP ring, so the SNCP path selectors do not apply.

8. Click **Next**.
9. In the Circuit Source area, choose the source node, slot, port, and VC4 for the LAP. The LAP source is where the low-order circuits are aggregated into a single VC4. The LAP destination is where the low-order circuits originate.
   1. From the Node drop-down list, choose the node where the LAP will originate.
   2. From the Slot drop-down list, choose the slot containing the STM-N, E3-12, DS3i-N-12, or STM1E-12 card where the LAP will originate.
   3. Depending on the card chosen in SubStep 2, choose the port and/or VC4 from the Port and VC4 drop-down lists.

10. Click **Next**.
11. In the Circuit Destination area, choose the node where the low-order circuits aggregated by the LAP will terminate from the Node drop-down list.
12. Click **Next**.
13. In the Circuit Routing Preferences area, choose **Route Automatically**. Two options are available; choose either, both, or none based on your preferences.

    - Using Required Nodes/Spans-Check this check box to specify nodes and spans to include or exclude in the CTC-generated tunnel route.
      Including nodes and spans for a circuit ensures that those nodes and spans are in the working path of the circuit (but not the protect path). Excluding nodes and spans ensures that the nodes and spans are not in the working or protect path of the circuit.
    - Review Route Before Creation-Check this check box to review and edit the low-order tunnel route before the circuit is created.
14. If you selected Using Required Nodes/Spans in Step 13:
    1. Click **Next**.
    2. In the Circuit Route Constraints For Auto Routing area, click a span on the LAP map.
    3. Click **Include** to include the node or span in the LAP. Click **Exclude** to exclude the node or span from the LAP. The sequence in which you choose the nodes and spans sets the LAP sequence. Click spans twice to change the circuit direction.
    4. Repeat SubStep 3 for each node or span that you wish to include or exclude.
    5. Review the LAP route. To change the tunnel routing order, choose a node from the Required Nodes/Lines or Excluded Nodes Links lists, then click the **Up** or **Down** buttons to change the tunnel routing order. Click **Remove** to remove a node or span.
15. If you selected Review Route Before Creation in Step 13:
    1. Click **Next**.
    2. Review the tunnel route. To add or delete a tunnel span, choose a node on the tunnel route. Blue arrows show the tunnel route. Green arrows indicate spans that you can add. Click a span arrowhead, then click **Include** to include the span or **Remove** to remove the span.
    3. If the provisioned tunnel does not reflect the routing and configuration you want, click **Back** to verify and change the tunnel information.
16. Click **Finish**. The Circuits window appears.
17. Verify that the LAP you just created appears in the circuits list. LAPs are identified in the Type column.

Stop. You have completed this procedure.

NTP-D135 Test Low-Order Circuits

Purpose	This procedure tests low-order VC11, VC12, and VC3 circuits.
Tools/Equipment	A test set and all appropriate cables
Prerequisite Procedures	This procedure assumes that you completed facility loopback tests on the fibers and cables from the source and destination ONS 15454 SDHs to the digital signal cross-connect (DSX), and that you created a circuit using one of the following procedures: NTP-D334 Create an Automatically Routed Low-Order VC11 Circuit NTP-D335 Create a Manually Routed Low-Order VC11 Circuit NTP-D336 Create a Unidirectional Low-Order VC11 Circuit with Multiple Drops

	NTP-D81 Create an Automatically Routed Low-Order VC12 Circuit NTP-D82 Create a Manually Routed Low-Order VC12 Circuit NTP-D83 Create a Unidirectional Low-Order VC12 Circuit with Multiple Drops NTP-D54 Create an Automatically Routed Low-Order VC3 Circuit NTP-D55 Create a Manually Routed Low-Order VC3 Circuit NTP-D56 Create a Unidirectional Low-Order VC3 Circuit with Multiple Drops
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will test the circuit. If you are already logged in, continue with Step 2.
2. From the View menu, choose **Go to Network View**.
3. Click the **Circuit** tab.
4. Complete the "DLP-D230 Change a Circuit State" task and set the circuit ports to the Locked-enabled,maintenance service state. Take note of the original state because you will return the circuit to that state later.
5. Attach loopback cables to the circuit destination card.
    1. Verify the integrity of the loopback cable by looping the test set transmit (Tx) connector to the test set receive (Rx) connector. If the test set does not run error-free, check the cable for damage and check the test set to make sure it is set up correctly before going to SubStep 2.
    2. Attach the loopback cable to the port you are testing. Connect the Tx connector to the Rx connector of the port.
6. Attach loopback cables to the circuit source node.
    1. Verify the integrity of loopback cable by looping the test set Tx connector to the test set Rx connector. If the test set does not run error-free, check the cable for damage and check the test set to make sure it is set up correctly before going to SubStep 2.
    2. Attach the loopback cable to the port you are testing. Connect the test set to the circuit source port. Connect the Tx port of the test set to the circuit Rx port and the test set Rx port to the circuit Tx port.
7. Configure the test set for the ONS 15454 SDH card that is the source of the circuit you are testing:
    - VC4 or VC4-nc-If you are testing a VC4 circuit or a VC4-nc circuit on an STM-N card, you must have a direct optical interface into the ONS 15454 SDH. Set the test set for STM-N. For information about configuring your test set, consult your test set user guide.
    - VC3-If you are testing a clear channel E3/DS3i-N-12, you must have a patch panel or a direct E3/DS3i-N-12 interface into the ONS 15454 SDH. Set the test set for clear channel E3/DS3i-N-12. For information about configuring your test set, consult your test set user guide.
    - VC12-If you are testing an E1, you must have a patch panel or a direct E1 interface to the ONS 15454 SDH. Set the test set for E1. For information about configuring your test set, consult your test set user guide.
8. Verify that the test set has a clean signal. If a clean signal is not shown, repeat Steps 4 through 7 to make sure the test set and cabling are configured correctly.
9. Inject errors from the test set. Verify that the errors appear at the source and destination nodes.
10. Clear the performance monitoring (PM) counts for the ports that you tested. See the "DLP-D459 Clear Selected PM Counts" task for instructions.

11. Complete the "DLP-D230 Change a Circuit State" task and put the circuit and circuit ports back to the state they were in at the beginning of the test.
12. Perform the protection switch test appropriate to the SDH topology:
    - For SNCP rings, complete the "DLP-D94 SNCP Protection Switching Test" task
    - For MS-SPRings complete the "DLP-D91 MS-SPRing Switch Test" task.
13. Perform a bit error rate test (BERT) for 12 hours or follow your site requirements for length of time. For information about configuring your test set for BERT, see your test set user guide.
14. After the BERT is complete, print the results or save them to a disk for future reference. For information about printing or saving test results, see your test set user guide.

    Stop. You have completed this procedure.

NTP-D323 Create an Automatically Routed High-Order Circuit

Purpose	This procedure creates an automatically routed bidirectional or unidirectional high-order circuit, including VC4 and concatenated VC4-2c, VC4-3c, VC4-4c, VC4-8c, VC4-16c, and VC4-64c speeds.
Tools/Equipment	STM-N cards and all Ethernet cards, except E-Series cards. For a G-Series circuit, a G-Series card or ML-Series card must be installed at the other end of the circuit.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note: This procedure requires the use of automatic routing. Automatic routing is not available if both the Automatic Circuit Routing NE default and the Network Circuit Automatic Routing Overridable NE default are set to FALSE. For a full description of these defaults see the "Network Element Defaults" appendix in the *Cisco ONS 15454 SDH Reference Manual*.

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 6.
3. If you are creating a circuit on G-Series cards, complete the "DLP-D222 Provision G-Series Ethernet Ports" task before or after you create the G-Series circuit.
4. If you are creating a circuit on ML-Series, CE-100T-8, CE-1000-4, or CE-MR-10 cards, complete the following as necessary (you can provision Ethernet or packet-over-SDH (POS) ports before or after the VCAT circuit is created):
    - To provision Ethernet ports for CE-100T-8 or CE-MR-10 circuits, complete the "DLP-D136 Provision CE-100T-8 and CE-MR-10 Ethernet Ports" task.
    - To provision Ethernet ports for CE-1000-4 circuits, complete the "DLP-D211 Provision CE-1000-4 Ethernet Ports" task.
    - To provision POS ports for CE-Series circuits, complete the "DLP-D141 Provision CE-100T-8, CE-1000-4, and CE-MR-10 POS Ports" task.
    - To provision Ethernet ports for ML-Series circuits, complete the "DLP-D493 Provision the Ethernet Port of the ML-Series Card" task.
    - To provision POS ports for ML-Series circuits, complete the "DLP-D494 Provision the POS Port of the ML-Series Card" task.

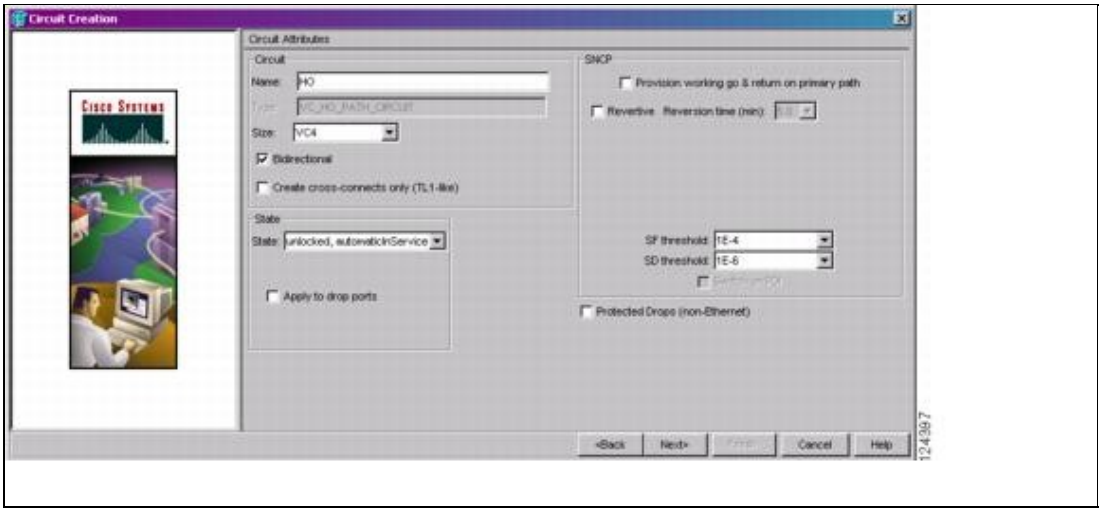
5. To provision the card mode for ML-Series cards, complete the "DLP-D213 Provision the Card Mode for ML-Series Ethernet Cards" task.
6. From the View menu, choose **Go to Network View**.
7. Click the **Circuits** tab, then click **Create**.
8. In the Circuit Creation dialog box, complete the following fields:
   - Circuit Type-Choose **VC_HO_PATH_CIRCUIT**.
   - Number of Circuits-Enter the number of high-order circuits that you want to create. The default is 1. If you are creating multiple circuits with the same source and destination, you can use auto-ranging to create the circuits automatically.
   - Auto-ranged-This check box is automatically selected when you enter more than 1 in the Number of Circuits field. Leave this check box selected if you are creating multiple high-order circuits with the same source and destination and you want CTC to create the circuits automatically. Uncheck the box if you do not want CTC to create the circuits automatically.
9. Click **Next**.
10. Define the circuit attributes (Figure 6-9):
    - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
    - Size-Choose the high-order circuit size: **VC4**, **VC4-2c**, **VC4-3c**, **VC4-4c**, **VC4-8c**, **VC4-9c**, **VC4-16c**, or **VC4-64c**. Valid circuit sizes for a G-Series or CE-MR-10 circuit are **VC4**, **VC4-2c**, **VC4-3c**, **VC4-4c**, **VC4-8c**, and **VC4-16c**.
    - Bidirectional-Leave checked for this circuit (default).
    - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
    - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
      - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
      - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
      - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
      - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
        For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
    - Apply to drop ports-Check this box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

      Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to

Unlocked-disabled,failed.

◊ Protected Drops-Select this check box if you want the circuit routed to protected drops only, that is, to ONS 15454 SDH cards that are in 1:1, 1:N, or 1+1 protection. If you select this check box, CTC shows only protected cards as source and destination choices.

Figure 6-9: Setting Circuit Attributes for an High-Order Circuit



11. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task.
12. Click **Next**.
13. Complete the "DLP-D97 Provision a High-Order Circuit Source and Destination" task for the high-order circuit you are creating.
14. In the Circuit Routing Preferences area, choose **Route Automatically**. Two options are available; choose either, both, or none based on your preferences.

    · Using Required Nodes/Spans-Check this check box to specify nodes and spans to include or exclude in the CTC-generated circuit route.
    Including nodes and spans for a circuit ensures that those nodes and spans are in the working path of the circuit (but not the protect path). Excluding nodes and spans ensures that the nodes and spans are not in the working or protect path of the circuit.
    · Review Route Before Creation-Check this check box to review and edit the circuit route before the circuit is created.
15. Set the circuit path protection:

    · To route the circuit on a protected path, leave Fully Protected Path checked and continue with Step 16. CTC creates a fully protected circuit route based on the path diversity option you choose. Fully protected paths might or might not have SNCP path segments (with primary and alternate paths), and the path diversity options apply only to SNCP path segments, if any exist.
    · To create an unprotected circuit, uncheck **Fully Protected Path** and continue with Step 18.
    · To route the circuit on an MS-SPRing protection channel, if available, uncheck **Fully Protected Path**, check **Protection Channel Access**, click **Yes** in the Warning dialog box, then continue with Step 18.
16. If you selected Fully Protected Path in Step 15 and the circuit will be routed on SNCP, choose one of the following:

- **Nodal Diversity Required**-Ensures that the primary and alternate paths within SNCP ring portions of the complete circuit path are nodally diverse.
- **Nodal Diversity Desired**-Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.
- **Link Diversity Only**-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node diverse, but CTC does not check for node diversity.

17. If you selected Fully Protected Path in Step 15 and the circuit will be routed on an MS-SPRing DRI or SNCP DRI, check the **Dual Ring Interconnect** check box. If not, continue with Step 20.
18. If you checked Dual Ring Interconnect for an SNCP in Step 17, complete the following substeps. If you checked Dual Ring Interconnect for a MS-SPRing, skip this step and continue with Step 19.
    1. Click **Next**.
    2. In the Circuit Route Constraints For Auto Routing area, click a node or span on the circuit map.
    3. Click **Include** to include the node or span in the circuit, or click **Exclude** to exclude the node or span from the circuit. The order in which you choose included nodes and spans is the order in which the circuit is routed. Click spans twice to change the circuit direction.
    4. Repeat SubStep 3 for each node or span that you wish to include or exclude.
    5. Review the circuit route. To change the circuit routing order, choose a node from the Required Nodes/Lines or Excluded Nodes Links lists, then click the **Up** or **Down** buttons to change the circuit routing order. Click **Remove** to remove a node or span.
19. If you checked Dual Ring Interconnect for a MS-SPRing in Step 17, complete the following substeps to assign primary and secondary nodes and ring type.
    1. In the Circuit Constraints for Automatic Routing area, click **Add MS-SPRing DRI**.
    2. In the confirmation window, click **OK**.
    3. In the Node Options area of the MS-SPRing DRI Options dialog box, complete the following:
        - Primary Node-For a traditional or integrated MS-SPRing DRI, choose the node where the circuit interconnects the rings.
        - Secondary Node-For a traditional or integrated MS-SPRing DRI, choose the secondary node for the circuit to interconnect the rings. This route is used if the route on the primary node fails.
        - Primary Node #2-For a traditional MS-SPRing DRI where two primary nodes are required to interconnect rings, choose the second primary node.
        - Secondary Node #2-For a traditional MS-SPRing DRI where two secondary nodes are required, choose the second secondary node.
    4. In the Ring and Path Options area, complete the following:
        - The first ring is-Choose SNCP or MS-SPRing from the drop-down list.
        - The second ring is-Choose SNCP or MS-SPRing from the drop-down list.
        - Use ring interworking protection (RIP) on secondary path-Check this box to carry the secondary spans on the protection channels. These spans will be preempted during a ring/span switch.
    5. Click **OK**. The node information appears in the Required Nodes/Lines list, and the map graphic indicates which nodes are primary and secondary.
    6. In the Circuit Constraints for Automatic Routing area, click a node or span on the circuit map.
    7. Click **Include** to include the node or span in the circuit, or click **Exclude** to exclude the node or span from the circuit. The order in which you choose included nodes and spans is the order in which the circuit will be routed. Click spans twice to change the circuit direction. If you are creating an SNCP to MS-SPRing traditional handoff, exclude the unprotected links

from the primary node towards the secondary node. If you are creating an SNCP to MS-SPRing integrated handoff, exclude unnecessary DRIs on the SNCP segments.

8. Review the circuit constraints. To change the circuit routing order, choose a node in the Required Nodes/Lines lists and click the **Up** or **Down** buttons to change the circuit routing order. Click **Remove** to remove a node or span.

20. If you selected Review Route Before Creation in Step 14, complete the following substeps; otherwise, continue with Step 22:
    1. Click **Next**.
    2. Review the circuit route. To add or delete a circuit span, choose a node on the circuit route. Blue arrows show the circuit route. Green arrows indicate spans that you can add. Click a span arrowhead, then click **Include** to include the span or **Remove** to remove the span.
    3. If the provisioned circuit does not reflect the routing and configuration you want, click **Back** to verify and change circuit information. If the circuit needs to be routed to a different path, see the NTP-D324 Create a Manually Routed High-Order Circuit to assign the circuit route yourself.
21. If you selected Review Route Before Creation in Step 14, click **Next**. If not, continue with Step 22. View the route in the Route Review/Edit window. As necessary, click **Add MS-SPRing DRI** to add another DRI. Click **Remove** to remove a DRI assignment. Click the **Included Spans** tab to view the spans. The map graphic updates as you apply changes.
22. Click **Finish**. One of the following occurs, based on the circuit properties that you provisioned in the Circuit Creation dialog box:
    - If you entered more than 1 in the Number of Circuits field and selected Auto-ranged, CTC automatically creates the number of circuits entered in Number of Circuits. If auto-ranging cannot complete all the circuits, for example, because sequential ports are unavailable on the source or destination, a dialog box appears. Set the new source or destination for the remaining circuits, then click **Finish** to continue auto-ranging. After completing the circuits, the Circuits window appears.
    - If you entered more than 1 in Number of Circuits and did not choose Auto-ranged, the Circuit Creation dialog box appears so you can create the remaining circuits. Repeat Steps 8 through 21 for each additional circuit. After completing the circuits, the Circuits window appears.
23. In the Circuits window, verify that the circuits you created appear in the circuits list.
24. Complete the following as necessary. Skip this step if you built a test circuit.
    1. Complete the NTP-D62 Test High-Order Circuits.
    2. Complete the NTP-D149 Test G-Series Circuits.

Stop. You have completed this procedure.

NTP-D324 Create a Manually Routed High-Order Circuit

Purpose	This procedure creates a manually routed, bidirectional or unidirectional high-order circuit, including VC4 and concatenated VC4-2c, VC4-3c, VC4-4c, VC4-8c, VC4-16c, and VC4-64c speeds.
Tools/Equipment	STM-N cards and all Ethernet cards, except E-Series cards. For a G-Series circuit, a G-Series card or ML-Series card must be installed at the other end of the circuit.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed

Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. If you are creating a circuit on G-Series cards, complete the "DLP-D222 Provision G-Series Ethernet Ports" task before or after you create the G-Series circuit.
4. If you are creating a circuit on CE-100T-8, CE-1000-4, or CE-MR-10 circuits, complete the following as necessary (you can provision Ethernet or POS ports before or after the VCAT circuit is created):
   - To provision Ethernet ports for CE-100T-8 or CE-MR-10 circuits, complete the "DLP-D136 Provision CE-100T-8 and CE-MR-10 Ethernet Ports" task.
   - To provision Ethernet ports for CE-1000-4 circuits, complete the "DLP-D211 Provision CE-1000-4 Ethernet Ports" task.
   - To provision POS ports for CE-Series circuits, complete the "DLP-D141 Provision CE-100T-8, CE-1000-4, and CE-MR-10 POS Ports" task.
   - To provision Ethernet ports for ML-Series circuits, complete the "DLP-D493 Provision the Ethernet Port of the ML-Series Card" task.
   - To provision POS ports for ML-Series circuits, complete the "DLP-D494 Provision the POS Port of the ML-Series Card" task.
5. To provision the card mode for ML-Series cards, complete the "DLP-D213 Provision the Card Mode for ML-Series Ethernet Cards" task.
6. From the View menu, choose **Go to Network View**.
7. In the Circuit Creation dialog box, complete the following fields:
   - Circuit Type-Choose **VC_HO_PATH_CIRCUIT**.
   - Number of Circuits-Enter the number of high-order circuits that you want to create. The default is 1.
   - Auto-ranged-(Applies to automatically routed circuits only) If you entered more than 1 in Number of Circuits, uncheck this check box. (The check box is unavailable if only one circuit is entered in Number of Circuits.)
8. Click **Next**.
9. Define the circuit attributes:
   - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
   - Size-Choose the high-order circuit size: **VC4**, **VC4-2c**, **VC4-3c**, **VC4-4c**, **VC4-8c**, **VC4-16c**, or **VC4-64c**. Valid circuit sizes for a G-Series or CE-MR-10 circuit are **VC4**, **VC4-2c**, **VC4-3c**, **VC4-4c**, **VC4-8c**, and **VC4-16c**.
   - Bidirectional-Leave checked for this circuit.
   - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
   - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
     - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
     - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
     - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state

automatically changes to Unlocked-enabled.

◊ **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.

For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.

♦ Apply to drop ports-Check this box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.

◊ Protected Drops-Select this check box if you want the circuit routed to protect drops only, that is, to ONS 15454 SDH cards that are in 1:1, 1:N, or 1+1 protection. If you select this check box, CTC shows only protected cards as source and destination choices.

10. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task.
11. Click **Next**.
12. Complete the "DLP-D97 Provision a High-Order Circuit Source and Destination" task for the high-order circuit you are creating.
13. In the Circuit Routing Preferences area, uncheck **Route Automatically**.
14. Set the circuit path protection:

    · To route the circuit on a protected path, leave Fully Protected Path checked and continue with Step 15.
    · To create an unprotected circuit, uncheck **Fully Protected Path** and continue with Step 17.
    · To route the circuit on an MS-SPRing protection channel, if available, uncheck **Fully Protected Path**, check **Protection Channel Access**, click **Yes** in the Warning dialog box, then continue with Step 17.

    Caution! Circuits routed on MS-SPRing protection channels are not protected and are preempted during MS-SPRing switches.

15. If you selected Fully Protected Path in Step 14 and the circuit will be routed on an SNCP, choose one of the following:

    · **Nodal Diversity Required**-Ensures that the primary and alternate paths within the SNCP ring portions of the complete circuit path are nodally diverse.
    · **Nodal Diversity Desired**-Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.
    · **Link Diversity Only**-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node diverse, but CTC does not check for node diversity.

16. If you selected Fully Protected Path in Step 14 and the circuit will be routed on an MS-SPRing DRI or SNCP DRI, click the **Dual Ring Interconnect** check box.
17. Click **Next**. In the Route Review/Edit area, node icons appear for you to route the circuit manually. If you checked Dual Ring Interconnect for MS-SPRing, continue with Step 18. If not, continue with Step 19.
18. If you checked Dual Ring Interconnect in Step 14 for a MS-SPRing DRI, complete the following substeps to assign primary and secondary nodes.
    1. In the Route/Review Edit area, click the **MS-SPRing DRI Nodes** tab.
    2. Click **Add MS-SPRing DRI**.
    3. In the Node Options area of the MS-SPRing DRI Options dialog box, complete the following:
        - Primary Node-For a traditional or integrated MS-SPRing DRI, choose the node where the circuit interconnects the rings.
        - Secondary Node-For a traditional or integrated MS-SPRing DRI, choose the secondary node for the circuit to interconnect the rings. This route is used if the route on the primary node fails.
        - Primary Node #2-For a traditional MS-SPRing DRI where two primary nodes are required to interconnect rings, choose the second primary node.
        - Secondary Node #2-For a traditional MS-SPRing DRI where two secondary nodes are required, choose the second secondary node.
    4. Click **OK**.
    5. Review the circuit constraints. To change the circuit routing order, choose a node in the Required Nodes/Lines lists and click the **Up** or **Down** buttons to change the circuit routing order. Click **Remove** to remove a node or span.
    6. Click the **Included Spans** tab, and continue with Step 19.
19. Complete the "DLP-D98 Provision a High-Order Circuit Route" task.
20. Click **Finish**. If the path does not meet the specified path diversity requirement, CTC shows an error message and allows you to change the circuit path. If you entered more than 1 in the Number of Circuits field, the Circuit Creation dialog box appears after the circuit is created so you can create the remaining circuits. Repeat Steps 7 through 19 for each additional circuit.
21. When all the circuits are created, the main Circuits window appears. Verify that the circuits you created appear in the window.
22. Complete the following as necessary. Skip this step if you built a test circuit.
    1. Complete the NTP-D62 Test High-Order Circuits.
    2. Complete the NTP-D149 Test G-Series Circuits.

Stop. You have completed this procedure.

NTP-D190 Create a Unidirectional High-Order Circuit with Multiple Drops

Purpose	This procedure creates a unidirectional STM-N circuit with multiple traffic drops (circuit destinations).
Tools/Equipment	None
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.

2. If you want to assign a name to the tunnel source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. From the View menu, choose **Go to Network View**.
4. Click the **Circuits** tab, then click **Create**.
5. In the Circuit Creation dialog box, complete the following fields:
    - Circuit Type-Choose **VC_HO_PATH_CIRCUIT**.
    - Number of Circuits-Leave the default unchanged (1).
    - Auto-ranged-Unavailable when the Number of Circuits field is 1.
6. Click **Next**.
7. Define the circuit attributes:
    - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
    - Size-Choose the high-order circuit size: **VC4**, **VC4-2c**, **VC4-3c**, **VC4-4**c, **VC4-8c**, **VC4-9c**, **VC4-16c**, or **VC4-64c**.
    - Bidirectional-Uncheck this check box for this circuit.
    - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
    - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
        - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
        - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
        - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
        - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
          For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
    - Apply to drop ports-Check this box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

      Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.
    - Protected Drops-Select this check box if you want the circuit routed to protect drops only, that is, to ONS 15454 SDH cards that are in 1:1, 1:N, or 1+1 protection. If you select this check box, CTC shows only protected cards as source and destination choices.

8. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task.
9. Click **Next**.
10. Complete the "DLP-D97 Provision a High-Order Circuit Source and Destination" task for the circuit you are creating.
11. Uncheck **Route Automatically**. When Route Automatically is not selected, the Using Required Nodes/Spans and Review Route Before Circuit Creation check boxes are unavailable.
12. Set the circuit path protection:

    - To route the circuit on a protected path, leave Fully Protected Path checked and continue with Step 13. Fully protected paths might or might not have SNCP path segments (with primary and alternate paths), and the path diversity options apply only to SNCP path segments, if any exist.
    - To create an unprotected circuit, uncheck **Fully Protected Path** and continue with Step 15.
    - To route the circuit on an MS-SPRing protection channel, if available, uncheck **Fully Protected Path**, check **Protection Channel Access**, click **Yes** in the Warning dialog box, then continue with Step 15.

    Caution! Circuits routed on MS-SPRing protection channels are not protected and are preempted during MS-SPRing switches.

13. If you selected Fully Protected Path in Step 12 and the circuit will be routed on an SNCP, choose one of the following:

    - **Nodal Diversity Required**-Ensures that the primary and alternate paths within the SNCP ring portions of the complete circuit path are nodally diverse.
    - **Nodal Diversity Desired**-Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.
    - **Link Diversity Only**-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node diverse, but CTC does not check for node diversity.
      Note: For manually routed circuits, CTC checks your manually provisioned path against the path diversity option you choose. If the path does not meet the path diversity requirement that is specified, an error message appears.
14. If you selected Fully Protected Path in Step 12 and the circuit will be routed on an SNCP DRI, click the **Dual Ring Interconnect** check box.
15. Click **Next**. In the Route Review and Edit area, node icons appear so you can route the circuit manually. The green arrows pointing from the selected node to other network nodes indicate spans that are available for routing the circuit.
16. Complete the "DLP-D98 Provision a High-Order Circuit Route" task.
17. Click **Finish**. After completing the circuit, the Circuits window appears.
18. In the Circuits window, click the circuit that you want to route to multiple drops. The Delete, Edit, and Search buttons become active.
19. Click **Edit**. The Edit Circuit window appears with the General tab selected. Nodes in the DCC network are shown graphically. Circuit source and destination information appears under the source and destination nodes. To see a detailed view of the circuit, click **Show Detailed Map**. You can rearrange the node icons by pressing **Ctrl** while you drag and drop the icon to the new location.
20. In the Edit Circuit dialog box, click the **Drops** tab. A list of existing drops appears.
21. Click **Create**.
22. In the Define New Drop dialog box, define the new drop:
    1. Node-Choose the target node for the circuit drop.
    2. Slot-Choose the target card and slot.

3. Port, VC4-Choose the port and/or VC4 from the Port and VC4 drop-down lists. The choice in these drop-down lists depends on the card selected in SubStep 2. See Table 6-2 for a list of options.
4. The routing preferences for the new drop match those of the original circuit. However, you can modify the following:
   - If the original circuit was routed on a protected SNCP path, you can change the nodal diversity options: Nodal Diversity Required, Nodal Diversity Desired, or Link Diversity Only. See Step 13 for descriptions.
   - If the original circuit was not routed on a protected path, the Protection Channel Access option is available. See Step 12 for a description of the Protection Channel Access option.
5. Click **OK**. The new drop appears in the Drops list.

23. If you need to create additional drops on the circuit, repeat Steps 21 and 22.
24. Click **Close**. The Circuits window appears.
25. Verify that the new drops appear in the Destination column for the circuit that you edited. If they do not appear, repeat Steps 21 through 24, making sure that all options are provisioned correctly.
26. Complete the NTP-D62 Test High-Order Circuits.

Stop. You have completed this procedure.

NTP-D62 Test High-Order Circuits

Purpose	This procedure tests a high-order circuit.
Tools/Equipment	Test set capable of optical speeds, appropriate fibers, and attenuators
Prerequisite Procedures	This procedure assumes that you completed facility loopback tests to test the fibers and cables from the source and destination ONS 15454 SDHs to the fiber distribution panel or the DSX and one of following circuit procedures: NTP-D323 Create an Automatically Routed High-Order Circuit NTP-D324 Create a Manually Routed High-Order Circuit NTP-D190 Create a Unidirectional High-Order Circuit with Multiple Drops NTP-D284 Create a Manually Routed VCAT Circuit NTP-D325 Create an STM Test Circuit around the Ring
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will test the high-order circuits. If you are already logged in, continue with Step 2.
2. From the View menu, choose **Go to Network View**.
3. Click the **Circuits** tab.
4. Complete the "DLP-D230 Change a Circuit State" task and set the circuit and circuit ports to the Locked-enabled,maintenance service state.
5. Set up the patch cable at the destination node:

   1. Test the patch cable by connecting one end to the test set Tx port and the other end to the test Rx port. If the test set does not run error-free, check the cable for damage and check the test set to make sure it is set up correctly.
   2. Install the loopback cable on the port you are testing between the Tx and Rx connections.
6. Set up the loopback cable at the source node:
   1. Test the loopback cable by connecting one end to the test set Tx port and the other end to the test Rx port. If the test set does not run error-free, check the cable for damage and check the test set to make sure it is set up correctly.
   2. At the source node, attach the loopback cable to the port you are testing. Connect the test set to the circuit source port: Tx port of the test set to the circuit Rx port, and the test set Rx port to the circuit Tx port.
7. Configure the test set for the source ONS 15454 SDH card:
   - STM-1 cards-You will test a VC4 circuit on one of the STM-1 ports. Configure the test set for an STM-1 port.
   - STM-4 cards-You will test either a VC4-4c or a multiplexed VC4-4. If you are testing a VC4-4c, configure the test set for a VC4-4c. If you are testing a multiplexed VC4-4, configure the test set for a multiplexed VC4-4 and choose the E3, DS3i-N-12, or E1 you will test. For information about configuring your test set, consult your test set user guide.
   - STM-16 cards-You will test either a VC4-16c or a multiplexed VC4-16. If you are testing a VC4-16c, configure the test set for a VC4-16c. If you are testing a multiplexed VC4-16, configure the test set for a multiplexed VC4-16 and choose the E3, DS3i-N-12, or E1 you will test. For information about configuring your test set, consult your test set user guide.
   - STM-64 cards-You will test a VC4-64c or a multiplexed VC4-64. If you are testing a VC4-64c, configure the test set for a VC4-64c. If you are testing a multiplexed VC4-64, configure the test set for a multiplexed VC4-64 and choose the E3, DS3i-N-12, or E1 you will test. For information about configuring your test set, consult your test set user guide.
8. Verify that the test set shows a clean signal. If a clean signal does not appear, repeat Steps 1 through 7 to make sure you have configured the test set and cabling correctly.
9. Inject errors from the test set. Verify that the errors appear at the source and destination nodes.
10. Clear the PM counts for the ports that you tested. See the "DLP-D459 Clear Selected PM Counts" task for instructions.
11. Perform protection switch testing appropriate to the SDH topology:
    - For SNCP rings, see the "DLP-D94 SNCP Protection Switching Test" task.
    - For MS-SPRings see the "DLP-D91 MS-SPRing Switch Test" task.
12. Perform a BERT for 12 hours or follow your site requirements for length of time. For information about configuring your test set for BERT, see your test set user guide.
13. After the BERT is complete, print the results or save them to a disk for future reference. For information about printing or saving test results, see your test set user guide.
14. Complete the "DLP-D230 Change a Circuit State" task and change the circuit and circuit ports from Unlocked,maintenance to their previous service states.

Stop. You have completed this procedure.

NTP-D139 Create a Half Circuit on an MS-SPRing or 1+1 Node

Purpose	This procedure creates a low-order or high-order circuit from a drop card to an STM-N trunk (span) card on the same node in an MS-SPRing or 1+1 topology.
Tools/Equipment	None
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up

Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at the ONS 15454 SDH where you will create the half circuit. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. From the View menu, choose **Go to Network View**.
4. Click the **Circuits** tab, then click **Create**.
5. In the Circuit Creation dialog box, complete the following fields:
   - Circuit Type-For low-order circuits, choose **VC_LO_PATH_CIRCUIT**. For high-order circuits, choose **VC_HO_PATH_CIRCUIT**. VC4 cross-connects carry the circuit across the ONS 15454 SDH network.
   - Number of Circuits-Enter the number of circuits that you want to create. The default is 1.
   - Auto-ranged-This check box is automatically selected if you enter more than 1 in the Number of Circuits field. Uncheck the box.
6. Click **Next**.
7. Define the circuit attributes:
   - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
   - Size-For high-order circuits, choose **VC4**. For low-order circuits, choose **VC11**, **VC12**, or **VC3**.
   - Bidirectional-Leave checked for this circuit (default).
   - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
   - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
     - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
     - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
     - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
     - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
       For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
   - Apply to drop ports-Select this check box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is

unchecked, CTC does not change the state of the source and destination ports.

Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.

◊ Protected Drops-Uncheck this check box if it is selected.

8. Click **Next**.
9. Complete the "DLP-D311 Provision a Half Circuit Source and Destination on an MS-SPRing or 1+1 Node" task.
10. Click **Finish**. One of the following results occurs, depending on the circuit properties you chose in the Circuit Creation dialog box:

    · If you entered more than 1 in Number of Circuits and selected Auto-ranged, CTC automatically creates the number of circuits entered in Number of Circuits. If auto-ranging cannot complete all the circuits, for example, because sequential ports are unavailable at the source or destination, a dialog box appears. Set the new source or destination for the remaining circuits, then click **Finish** to continue auto-ranging. After completing the circuits, the Circuits window appears.

    · If you entered more than 1 in the Number of Circuits field and did not choose Auto-ranged, the Circuit Creation dialog box appears so you can create the remaining circuits. Repeat Steps 4 through 9 for each additional circuit. After completing the circuits, the Circuits window appears.
11. In the Circuits window, verify that the new circuits appear in the circuits list.

    Stop. You have completed this procedure.

NTP-D140 Create a Half Circuit on an SNCP Ring Node

Purpose	This procedure creates a low-order or high-order circuit from a drop card to an STM-N trunk (span) card on the same SNCP ring node.
Tools/Equipment	None
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at the ONS 15454 SDH where you will create the half circuit. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. From the View menu, choose **Go to Network View**.
4. Click the **Circuits** tab, then click **Create**.
5. In the Circuit Creation dialog box, complete the following fields:
   - ♦ Circuit Type-For low-order circuits, choose **VC_LO_PATH_CIRCUIT**. For high-order circuits, choose **VC_HO_PATH_CIRCUIT**. VC4 cross-connects carry the circuit across the ONS 15454 SDH network.
   - ♦ Number of Circuits-Enter the number of circuits that you want to create. The default is 1.
   - ♦ Auto-ranged-This check box is automatically selected if you enter more than 1 in the Number of Circuits field. Uncheck the box.

6. Click **Next**.
7. Define the circuit attributes:
   - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
   - Size-For high-order circuits, choose **VC4**. For low-order circuits, choose **VC11**, **VC12**, or **VC3**.
   - Bidirectional-Leave checked for this circuit (default).
   - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
   - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
     - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
     - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
     - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
     - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
       For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
   - Apply to drop ports-Check this box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

     Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.
   - Protected Drops-Uncheck this check box if it is selected.

8. Complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task.
9. Click **Next**.
10. Complete the "DLP-D312 Provision a Half Circuit Source and Destination on an SNCP Ring" task.
11. Click **Finish**. One of the following results occurs, depending on the circuit properties you chose in the Circuit Creation dialog box. If you entered more than 1 in the Number of Circuits field, the Circuit Creation dialog box appears so you can create the remaining circuits. Repeat Steps 5 through 9 for each additional circuit. After completing the circuits, the Circuits window appears.
12. In the Circuits window, verify that the new circuits appear in the circuits list.
13. Complete the NTP-D135 Test Low-Order Circuits. Skip this step if you built a test circuit.

Stop. You have completed this procedure.

NTP-D191 Create an E-Series EtherSwitch Circuit (Multicard or Single-Card Mode)

Purpose	This procedure creates a multicard or single-card EtherSwitch circuit. It does not apply to E-Series cards in port-mapped mode. To create a port-mapped mode circuit, see the NTP-D192 Create a Circuit for an E-Series Card in Port-Mapped Mode.
Tools/Equipment	E-Series Ethernet cards (E100T-G or E1000-2-G) must be installed at each end of the Ethernet circuit.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. If a high number of VLANs is already used by the network, complete the "DLP-D99 Determine Available VLANs" task to verify that sufficient VLAN capacity is available. (You will create a VLAN during each circuit creation task.)
4. If enough VLANs are not available, complete the "DLP-D34 Delete VLANs" task to free space.
5. Verify that the circuit source and destination Ethernet cards are provisioned for the mode of the circuit you will create, either multicard or single-card. See the "DLP-D246 Provision E-Series Ethernet Card Mode" task.
6. From the View menu, choose **Go to Network View**.
7. Click the **Circuits** tab, then click **Create**.
8. In the Circuit Creation dialog box, complete the following fields:
   - Circuit Type-Choose **VC_HO_PATH_CIRCUIT**.
   - Number of Circuits-Leave the default unchanged (1).
   - Auto-ranged-Unavailable.
9. Click **Next**.
10. Define the circuit attributes:
    - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
    - Size-Choose the circuit size. Valid circuit sizes for an Ethernet multicard circuit are VC4 and **VC4-2c**. Valid circuit sizes for an Ethernet single-card circuit are **VC4**, **VC4-2c**, and **VC4-4c**.
    - Bidirectional-Leave the default unchanged (checked).
    - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
    - State-Choose **IS**. Ethergroup circuits are always in service.
    - Apply to drop ports-Uncheck this box.
    - Protected Drops-Leave the default unchanged (unchecked).
11. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task.

Caution! Layer 1 SDH protection does not extend to multicard EtherSwitch circuits on SNCP rings.

Caution! A TCC2/TCC2P card reset disrupts single-card and multicard Etherswitch circuits for 45 seconds to two minutes. During this time, a spanning tree topology is created by the newly activated TCC2/TCC2P card.

12. Click **Next**.
13. Provision the circuit source:
    1. From the Node drop-down list, choose one of the EtherSwitch circuit endpoint nodes. (Either end node can be the EtherSwitch circuit source.)
    2. From the Slot drop-down list, choose one of the following:
        - If you are building a multicard EtherSwitch circuit, choose **Ethergroup**.
        - If you are building a single-card EtherSwitch circuit, choose the Ethernet card where you enabled the single-card EtherSwitch.
14. Click **Next**.
15. Provision the circuit destination:
    1. From the Node drop-down list, choose the second EtherSwitch circuit endpoint node.
    2. From the Slot drop-down list, choose one of the following:
        - If you are building a multicard EtherSwitch circuit, choose **Ethergroup**.
        - If you are building a single-card EtherSwitch circuit, choose the Ethernet card where you enabled the single-card EtherSwitch.
16. Click **Next**.
17. In the Circuit VLAN Selection area, click **New VLAN**. If the VLAN already exists, continue with Step 20.

    Tip: You can also add VLANs in network view by choosing **Tools > Manage VLANs**. In the All VLANs dialog box, click the **Create** button to open the Define New VLAN dialog box.
18. In the New VLAN dialog box, complete the following:

    · VLAN Name-Assign an easily identifiable name to your VLAN.
    · VLAN ID-Assign a VLAN ID. The VLAN ID should be the next available number between 2 and 4093 that is not already assigned to an existing VLAN. Each ONS 15454 SDH network supports a maximum of 509 user-provisionable VLANs.
    · Topology Host-Choose the topology host ID from the drop-down list.
19. Click **OK**.
20. In the Circuit VLAN Selection area, highlight the VLAN name and click the arrow button to move the available VLANs to the Circuit VLANs column.
21. If you are building a single-card EtherSwitch circuit and want to disable spanning tree protection on this circuit, uncheck the Enable Spanning Tree check box and click OK on the Disabling Spanning Tree dialog box. The Enable Spanning Tree box remains checked or unchecked for the creation of the next single-card, point-to-point Ethernet circuit.

    Caution! Disabling spanning tree protection increases the likelihood of logic loops on an Ethernet network.

    Caution! Turning off spanning tree on a circuit-by-circuit basis means that the ONS 15454 SDH is no longer protecting the Ethernet circuit and that the circuit must be protected by another mechanism in the Ethernet network.

    Caution! Multiple circuits with spanning tree protection enabled incur blocking if the circuits traverse the same E-Series card and use the same VLAN.

Spanning tree rules prevent users from creating new circuits or modifying existing circuits if the circuits do not meet certain VLAN assignment constraints. If the VLAN set of the new circuit overlaps with existing circuits, the same spanning tree instance is used for all circuits. If the VLAN set of the new circuit overlaps with VLAN sets of existing circuits with different spanning tree instances, the VLAN assignment fails. Cisco recommends that you plan VLAN assignments so that circuits with larger VLAN sets and a higher chance of overlap are added first. This means that if a circuit with an overlapping VLAN set is added, it collapses into the same spanning tree. To view circuits mapped to a spanning tree and their VLAN assignments, see the "DLP-D23 View Spanning Tree Information" task.

You can disable or enable spanning tree protection on a circuit-by-circuit basis only for single-card, point-to-point Ethernet circuits. Other E-Series Ethernet configurations disable or enable spanning tree on a port-by-port basis.

22. Click **Next**.
23. Confirm that the following information about the circuit is correct:

    · Circuit name
    · Circuit type
    · Circuit size
    · ONS 15454 SDH circuit nodes
24. Click **Finish**.
25. Complete the "DLP-D220 Provision E-Series Ethernet Ports" task.
26. Complete the "DLP-D221 Provision E-Series Ethernet Ports for VLAN Membership" task.
27. Complete the NTP-D146 Test E-Series Circuits.

    Stop. You have completed this procedure.

NTP-D192 Create a Circuit for an E-Series Card in Port-Mapped Mode

Purpose	This procedure creates an E-Series point-to-point SDH circuit with an E-Series card in port-mapped mode.
Tools/Equipment	An E-Series Ethernet card must be installed at each end of the circuit and configured in port-mapped mode.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. Complete the "DLP-D246 Provision E-Series Ethernet Card Mode" task.
4. Provision and enable the Ethernet ports. See "DLP-D220 Provision E-Series Ethernet Ports" task.
5. From the View menu, choose **Go to Network View**.
6. Click the **Circuits** tab and click **Create**.
7. In the Circuit Creation dialog box, complete the following fields:
   - Circuit Type-Choose **VC_HO_PATH_CIRCUIT**.

- Number of Circuits-Leave the default (1) unchanged.

8. Click **Next**.
9. Define the circuit attributes:
   - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
   - Size-Choose the circuit size. Valid circuit sizes for an E-Series in port-mapped mode are **VC4**, **VC4-2c**, and **VC4-4c**.
   - Bidirectional-Leave the default (checked) unchanged.
   - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
   - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
     - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
     - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
     - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
     - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
       For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
   - Apply to drop ports-Select this check box if you want to apply the state chosen in the State field (Unlocked or Locked,maintenance only) to the Ethernet circuit source and destination ports. You cannot apply Unlocked,automaticInService to E-Series Ethernet card ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.

     Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.
   - Auto-ranged-Unavailable.
   - Protected Drops-Leave the default unchanged (unchecked).

10. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task.
11. Click **Next**.
12. Provision the circuit source:
    1. From the Node drop-down list, choose the circuit source node. Either end node can be the point-to-point circuit source.
    2. From the Slot drop-down list, choose the slot containing the E-Series card that you will use for one end of the point-to-point circuit.

   3. From the Port drop-down list, choose a port.
13. Click **Next**.
14. Provision the circuit destination:
    1. From the Node drop-down list, choose the circuit destination node.
    2. From the Slot drop-down list, choose the slot containing the E-Series card that you will use for other end of the point-to-point circuit.
    3. From the Port drop-down list, choose a port.
15. Click **Next**. The Circuits window appears.
16. Confirm that the following circuit information is correct:

    · Circuit name
    · Circuit type
    · Circuit size
    · ONS 15454 SDH circuit nodes
17. Click **Finish**.
18. Complete the NTP-D146 Test E-Series Circuits.

Stop. You have completed this procedure.

NTP-D142 Create an E-Series Shared Packet Ring Ethernet Circuit

Purpose	This procedure creates a shared packet ring Ethernet circuit. It does not apply to E-Series cards in port-mapped mode.
Tools/Equipment	E-Series Ethernet cards must be installed at both Ethernet circuit endpoint nodes.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. If a high number of VLANs is already used by the system, complete the "DLP-D99 Determine Available VLANs" task to verify that sufficient VLAN capacity is available. (You will create a VLAN during each circuit creation task.)
4. Verify that the Ethernet cards that will carry the circuit are provisioned for Multicard EtherSwitch Group. See the "DLP-D246 Provision E-Series Ethernet Card Mode" task.
5. Provision and enable the Ethernet ports. See "DLP-D220 Provision E-Series Ethernet Ports" task.
6. From the View menu, choose **Go to Network View**.
7. Click the **Circuits** tab and click **Create**.
8. In the Circuit Creation dialog box, complete the following fields:
   - Circuit Type-Choose **VC_HO_PATH_CIRCUIT**.
   - Number of Circuits-Leave the default (1) unchanged.
   - Auto-ranged-Unavailable.
9. Click **Next**.
10. Provision the circuit destination:
    - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to

create monitor circuits.
- Size-Choose the circuit size. Valid shared packet ring circuit sizes are **VC4** and **VC4-2c**.
- Bidirectional-Leave the default unchanged (checked).
- Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
- State-Choose **IS** (in service). Ethergroup circuits are always in service.
- Apply to drop ports-Uncheck this box; states cannot be applied to E-Series ports.
- Protected Drops-Leave the default unchanged (unchecked).

11. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task.

Caution! Layer 1 SDH protection does not extend to multicard EtherSwitch circuits on SNCP rings.

12. Click **Next**.
13. Provision the circuit source:
    1. From the Node drop-down list, choose one of the shared packet ring circuit endpoint nodes. (Either end node can be the shared packet ring circuit source.)
    2. From the Slot drop-down list, choose **Ethergroup**.
14. Click **Next**.
15. Provision the circuit destination:
    1. From the Node drop-down list, choose the second shared packet ring circuit endpoint node.
    2. From the Slot drop-down list, choose **Ethergroup**.
16. Click **Next**.
17. Review the VLANs in the Available VLANs list. If the VLAN you want to use appears, continue with Step 18. If you need to create a new VLAN, complete the following steps:
    1. Click the **New VLAN** button.
    2. In the New VLAN dialog box, complete the following:
        - VLAN Name-Assign an easily identifiable name to your VLAN.
        - VLAN ID-Assign a VLAN ID. The VLAN ID should be the next available number between 2 and 4093 that is not already assigned to an existing VLAN. Each ONS 15454 SDH network supports a maximum of 509 user-provisionable VLANs.
        - Topology Host-Choose the topology host ID from the drop-down list.
    3. Click **OK**.

       Tip: You can also add VLANs in network view by choosing **Tools > Manage VLANs**. In the All VLANs dialog box, click the **Create** button to open the Define New VLAN dialog box.
18. In the Available VLANs column, click the VLAN you want to use and click the arrow button (**>>**) to move the VLAN to the Circuit VLANs column.

    Note: Moving the VLAN from Available VLANs to Circuit VLANs forces all the VLAN traffic to use the shared packet ring you are creating.
19. Click **Next**.
20. In the Circuit Routing Preferences area, uncheck the **Route Automatically** check box and click **Next**.
21. In the Route Review and Edit area, click the source node, then click a span (green arrow) leading away from the source node.

    The span turns white.
22. Click **Add Span**.

    The span turns blue. CTC adds the span to the Included Spans list.

23. Click the node at the end of the blue span.
24. Click the green span attached to the node you clicked in Step 23.

    The span turns white.
25. Click **Add Span**.

    The span turns blue.
26. Repeat Steps 23 through 25 for every node in the ring.
27. Verify that the new circuit is correctly configured in the Route Review and Edit area. If the circuit information is not correct, click the **Back** button and repeat the procedure with the correct information.

    Note: If the circuit is incorrect, you can also click **Finish**, delete the completed circuit, and begin the procedure again.
28. Click **Finish**.
29. Complete the "DLP-D220 Provision E-Series Ethernet Ports" task for each node that carries the circuit.
30. Complete the "DLP-D221 Provision E-Series Ethernet Ports for VLAN Membership" task for each node that carries the circuit.
31. Complete the NTP-D146 Test E-Series Circuits.

    Stop. You have completed this procedure.

NTP-D143 Create an E-Series Hub-and-Spoke Ethernet Configuration

Purpose	This procedure creates a hub-and-spoke Ethernet configuration, which is made up of multiple circuits that share a common endpoint. It does not apply to E-Series cards in port-mapped mode.
Tools/Equipment	E-Series Ethernet cards (E100T-G or E1000-2-G) must be installed at all Ethernet circuit endpoint nodes.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note: This procedure requires the use of automatic routing. Automatic routing is not available if both the Automatic Circuit Routing NE default and the Network Circuit Automatic Routing Overridable NE default are set to FALSE. For a full description of these defaults see the "Network Element Defaults" appendix in the *Cisco ONS 15454 SDH Reference Manual*.

1. Complete the "DLP-D60 Log into CTC" task at the hub node (the common endpoint). If you are already logged in, continue with Step 2.
2. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. Complete the DLP-D99 Determine Available VLANs|"DLP-D99 Determine Available VLANs" task to verify that sufficient VLAN capacity is available. (You will create a VLAN during each circuit creation task.)
4. Verify that the Ethernet card that will carry the hub-and-spoke circuit is provisioned for Single-card EtherSwitch Group. See the "DLP-D246 Provision E-Series Ethernet Card Mode" task.

5. Provision and enable the Ethernet ports. See "DLP-D220 Provision E-Series Ethernet Ports" task.
6. Log into the spoke node and repeat Steps 4 and 5 for the Ethernet card in the other circuit endpoint. (You only need to verify that the hub node is provisioned for single-card EtherSwitch once.)
7. Click the **Circuits** tab and click **Create**.
8. In the Circuit Creation dialog box, complete the following fields:
    - Circuit Type-Choose **VC_HO_PATH_CIRCUIT**.
    - Number of Circuits-Leave the default (1) unchanged.
    - Auto-ranged-Unavailable.
9. Click **Next**.

1. Define the circuit attributes:
    - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
    - Size-Choose the circuit size. Valid circuit sizes for a single-card EtherSwitch circuit are **VC4**, **VC4-2c**, and **VC4-4c**.
    - Bidirectional-Leave the default unchanged (checked).
    - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
    - State-Leave the default (IS) unchanged. Ethergroup circuits are always in service.
    - Apply to drop ports-Uncheck this box; states cannot be applied to E-Series ports.
    - Protected Drops-Leave the default unchanged (unchecked).
2. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task.
3. Click **Next**.
4. Provision the circuit source:
    1. From the Node drop-down list, choose the hub node.
    2. From the Slot drop-down list, choose the Ethernet card where you enabled the single-card EtherSwitch.
5. Click **Next**.
6. Provision the circuit destination:
    1. From the Node drop-down list, choose an EtherSwitch circuit endpoint node.
    2. From the Slot drop-down list, choose the Ethernet card where you enabled the single-card EtherSwitch.
7. Click **Next**.
8. Review the VLANs in the Available VLANs list. If the VLAN you want to use appears, continue with Step 19. If you need to create a new VLAN, complete the following steps:
    1. Click the **New VLAN** button.
    2. In the New VLAN dialog box, complete the following:
        - VLAN Name-Assign an easily identifiable name to your VLAN.
        - VLAN ID-Assign a VLAN ID. The VLAN ID should be the next available number between 2 and 4093 that is not already assigned to an existing VLAN. Each ONS 15454 SDH network supports a maximum of 509 user-provisionable VLANs.
        - Topology Host-Choose the topology host ID from the drop-down list.
    3. Click **OK**.
    Tip: You can also add VLANs in network view by choosing **Tools > Manage VLANs**. In the All VLANs dialog box, click the **Create** button to open the Define New VLAN dialog box.
9. In the Available VLANs column, click the VLAN you want to use and click the arrow button (**>>**) to move the VLAN to the Circuit VLANs column.

Note: Moving the VLAN from Available VLANs to Circuit VLANs forces all the VLAN traffic to use the shared packet ring you are creating.

10. Click **Next**.
11. Confirm that the following information about the hub-and-spoke circuit is correct:
    - Circuit name
    - Circuit type
    - Circuit size
    - VLAN names
    - ONS 15454 SDH circuit nodes

    If the circuit information is not correct, click the **Back** button and repeat the procedure with the correct information. If the information is correct, check **Route Automatically**.

    Note: You can also click **Finish**, delete the completed circuit, and start the procedure from the beginning.
12. Click **Finish**.
13. Complete the "DLP-D220 Provision E-Series Ethernet Ports" task.
14. Complete the "DLP-D221 Provision E-Series Ethernet Ports for VLAN Membership" task.
15. Complete the NTP-D146 Test E-Series Circuits.
16. To create additional circuits (spokes), repeat Steps 3 through 24.

    Stop. You have completed this procedure.

NTP-D144 Create an E-Series Single-Card EtherSwitch Manual Cross-Connect

Purpose	This procedure manually creates a single-card EtherSwitch cross-connect between E-Series Ethernet cards and STM-N cards connected to non-ONS equipment.
Tools/Equipment	E-Series Ethernet cards (E100T-G or E1000-2-G) must be installed at the circuit source node.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note: In this procedure, cross-connect refers to a circuit connection created within the same node between the Ethernet card and an STM-N card that is connected to third-party equipment. You create cross-connects at the source and destination nodes so that an Ethernet circuit can be routed from source to destination across third-party equipment.

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. If a high number of VLANs is already used by the network, complete the "DLP-D99 Determine Available VLANs" task to verify that sufficient VLAN capacity is available. (You will create a VLAN during each circuit creation task.)
4. In the node view, double-click the Ethernet card that will carry the cross-connect.
5. Verify that the Ethernet card that will carry the circuit is provisioned for single-card EtherSwitch. See the "DLP-D246 Provision E-Series Ethernet Card Mode" task.
6. From the View menu, choose **Go to Network View**.
7. Click the **Circuits** tab and click **Create**.
8. In the Circuit Creation dialog box, complete the following fields:

- Circuit Type-Choose **VC_HO_PATH_CIRCUIT**.
- Number of Circuits-Leave the default unchanged (1).
- Auto-ranged-Unavailable.

9. Click **Next**.
10. Define the circuit attributes:
    - Name-Assign a name to the cross-connect. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the cross-connect.
    - Size-Choose the cross-connect size. For single-card EtherSwitch, the available sizes are **VC4**, **VC4-2c**, and **VC4-4c**.
    - Bidirectional-Leave the default (checked) unchanged.
    - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
    - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
        - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
        - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
        - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
        - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
          For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
    - Apply to drop ports-Uncheck this box.
    - Protected Drops-Leave the default unchanged (unchecked).
11. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task.
12. Click **Next**.
13. Provision the circuit source:
    1. From the Node drop-down list, choose the cross-connect source node.
    2. From the Slot drop-down list, choose the Ethernet card where you verified the single-card EtherSwitch in Step 5.
14. Click **Next**.
15. Provision the circuit destination:
    1. From the Node drop-down list, choose the cross-connect circuit source node selected in Step 13. (For Ethernet cross-connects, the source and destination nodes are the same.)
    2. From the Slot drop-down list, choose the STM-N card that is connected to the non-ONS equipment.
    3. Depending on the STM-N card, choose the port and/or circuit size from the Port and Size drop-down lists.
16. Click **Next**.
17. Review the VLANs in the Available VLANs list. If the VLAN you want to use appears, continue with Step 18. If you need to create a new VLAN, complete the following steps:
    1. Click the **New VLAN** button.

2. In the New VLAN dialog box, complete the following:
   - ◊ VLAN Name-Assign an easily identifiable name to your VLAN.
   - ◊ VLAN ID-Assign a VLAN ID. The VLAN ID should be the next available number between 2 and 4093 that is not already assigned to an existing VLAN. Each ONS 15454 SDH network supports a maximum of 509 user-provisionable VLANs.
   - ◊ Topology Host-Choose the topology host ID from the drop-down list.
3. Click **OK**.
   Tip: You can also add VLANs in network view by choosing **Tools > Manage VLANs**. In the All VLANs dialog box, click the **Create** button to open the Define New VLAN dialog box.

18. Click the VLAN you want to use on the Available VLANs column, then click the arrow (**>>**) button to move the VLAN to the Circuit VLANs column.
19. Click **Next**. The Circuit Creation (Circuit Routing Preferences) dialog box appears.
20. Confirm that the following information about the single-card EtherSwitch manual cross-connect is correct (in this task, "circuit" refers to the Ethernet cross-connect):
    - ♦ Circuit name
    - ♦ Circuit type
    - ♦ Circuit size
    - ♦ VLAN names
    - ♦ ONS 15454 SDH nodes
    If the information is not correct, click the **Back** button and repeat the procedure with the correct information.
21. Click **Finish**.
22. Complete the "DLP-D220 Provision E-Series Ethernet Ports" task.
23. Complete the "DLP-D221 Provision E-Series Ethernet Ports for VLAN Membership" task.
24. Complete the NTP-D146 Test E-Series Circuits.
    Stop. You have completed this procedure.

NTP-D145 Create an E-Series Multicard EtherSwitch Manual Cross-Connect

Purpose	This procedure manually creates multicard EtherSwitch cross-connects between E-Series Ethernet cards and STM-N cards connected to non-ONS equipment.
Tools/Equipment	E-Series Ethernet cards must be installed at the circuit source node.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note: This procedure requires the use of automatic routing. Automatic routing is not available if both the Automatic Circuit Routing NE default and the Network Circuit Automatic Routing Overridable NE default are set to FALSE. For a full description of these defaults see the "Network Element Defaults" appendix in the *Cisco ONS 15454 SDH Reference Manual*.

Note: In this procedure, cross-connect refers to a circuit connection created within the same node between the Ethernet card and an STM-N card connected to third-party equipment. You create cross-connects at the source and destination nodes so an Ethernet circuit can be routed from source to destination across third-party equipment.

1. Complete the "DLP-D60 Log into CTC" task at a circuit endpoint. If you are already logged in, continue with Step 2.

2. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. Complete the "DLP-D99 Determine Available VLANs" task to verify that sufficient VLAN capacity is available. (You will create a VLAN during each circuit creation task.)
4. Verify that the Ethernet card that will carry the circuit is provisioned for Multicard EtherSwitch Group. See the DLP-D246 Provision E-Series Ethernet Card Mode" task.
5. Provision and enable the Ethernet ports. See "DLP-D220 Provision E-Series Ethernet Ports" task.
6. From the View menu, choose **Go to Network View**.
7. Click the **Circuits** tab and click **Create**.
8. In the Circuit Creation dialog box, complete the following fields:
    - Circuit Type-Choose **VC_HO_PATH_CIRCUIT**.
    - Number of Circuits-Leave the default unchanged (1).
    - Auto-ranged-Unavailable.
9. Click **Next**.
10. Define the circuit attributes:
    - Name-Assign a name to the source cross-connect. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the source cross-connect.
    - Size-Choose the size of the circuit that will be carried by the cross-connect. For multicard EtherSwitch circuits, the available sizes are **VC4** and **VC4-2c**.
    - Bidirectional-Leave the default unchanged (checked).
    - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
    - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
        - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
        - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
        - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
        - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
          For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
    - Apply to drop ports-Uncheck this box.
    - Protected Drops-Leave the default (unchecked) unchanged.
11. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task.
12. Click **Next**.
13. Provision the cross-connect source:
    1. From the Node drop-down list, choose the cross-connect source node.
    2. From the Slot drop-down list, choose **Ethergroup**.
14. Click **Next**.

15. From the Node drop-down list under Destination, choose the circuit source node selected in Step 13. (For Ethernet cross-connects, the source and destination nodes are the same.)
    The Slot field is provisioned automatically for Ethergroup.
16. Click **Next**.
17. Review the VLANs in the Available VLANs list. If the VLAN you want to use appears, continue with Step 18. If you need to create a new VLAN, complete the following steps:
    1. Click the **New VLAN** button.
    2. In the New VLAN dialog box, complete the following:
        - ◊ VLAN Name-Assign an easily identifiable name to your VLAN.
        - ◊ VLAN ID-Assign a VLAN ID. The VLAN ID should be the next available number between 2 and 4093 that is not already assigned to an existing VLAN. Each ONS 15454 SDH network supports a maximum of 509 user-provisionable VLANs.
        - ◊ Topology Host-Choose the topology host ID from the drop-down list.
    3. Click **OK**.
       Tip: You can also add VLANs in network view by choosing **Tools > Manage VLANs**. In the All VLANs dialog box, click the **Create** button to open the Define New VLAN dialog box.
18. In the Available VLANs column, click the VLAN you want to use and click the arrow button to move the VLAN to the Circuit VLANs column.
19. Click **Next**.
    The Circuit Creation (Circuit Routing Preferences) dialog box appears.
20. Verify the cross-connect information (in this step, "circuit" refers to the Ethernet cross-connect):
    - ♦ Circuit name
    - ♦ Circuit type
    - ♦ Circuit size
    - ♦ VLANs
    - ♦ ONS 15454 SDH nodes
      If the information is not correct, click the **Back** button and repeat the procedure with the correct information. If the information is correct, check **Route Automatically**.
21. Click **Finish**.
22. Complete the "DLP-D220 Provision E-Series Ethernet Ports" task.
23. Complete the "DLP-D221 Provision E-Series Ethernet Ports for VLAN Membership" task.
24. From the View menu, choose **Go to Home View**.
25. Click the **Circuits** tab.
26. Highlight the circuit and click **Edit**.
    The Edit Circuit dialog box appears.
27. Click **Drops** and click **Create**.
    The Define New Drop dialog box appears.
28. From the Slot drop-down list, choose the STM-N card that links the ONS 15454 SDH to the non-ONS 15454 SDH equipment.
29. From the Port drop-down list, choose the appropriate port.
30. From theVC4 drop-down list, choose the VC4 that matches the VC4 of the connecting non-ONS 15454 SDH equipment.
31. Click **OK**.
32. Confirm the circuit information appears in the Edit Circuit dialog box and click **Close**.
33. Repeat Steps 3 through 32 at the second Ethernet manual cross-connect endpoint. The Ethernet circuits that are created first and second will be bridged by the appropriate circuit in the non-ONS equipment.
    Note: The appropriate circuit must exist in the non-ONS equipment to connect the two Ethernet manual cross-connect endpoints.

Caution! If a CARLOSS alarm repeatedly appears and clears on an Ethernet manual cross-connect, the two Ethernet circuits might have a circuit-size mismatch, for example, if a circuit size of VC4 was configured on

the first ONS 15454 SDH and a circuit size of VC4-2c was configured on the second ONS 15454 SDH. Refer to the *Cisco ONS 15454 SDH Troubleshooting Guide* if the alarm persists.

34. Complete the NTP-D146 Test E-Series Circuits.

Stop. You have completed this procedure.

NTP-D146 Test E-Series Circuits

Purpose	This procedure tests circuits created on E-Series Ethernet cards that are provisioned for multicard EtherSwitch, single-card EtherSwitch, or port-mapped mode.
Tools/Equipment	Ethernet test set and appropriate fibers
Prerequisite Procedures	This procedure assumes that you completed facility loopback tests to test the fibers and cables from the source and destination ONS 15454 SDHs to the fiber distribution panel or the DSX, and one of the following procedures: NTP-D191 Create an E-Series EtherSwitch Circuit (Multicard or Single-Card Mode) NTP-D192 Create a Circuit for an E-Series Card in Port-Mapped Mode NTP-D142 Create an E-Series Shared Packet Ring Ethernet Circuit NTP-D143 Create an E-Series Hub-and-Spoke Ethernet Configuration NTP-D144 Create an E-Series Single-Card EtherSwitch Manual Cross-Connect NTP-D145 Create an E-Series Multicard EtherSwitch Manual Cross-Connect
Required/As Needed	As needed
Onsite/Remote	Onsite
Security	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at the ONS 15454 SDH source Ethernet node. If you are already logged in, continue with Step 2.
2. On the shelf graphic, double-click the circuit source card.
3. Click the **Provisioning > Port** tabs.
4. Verify the following settings:
   - Mode-Set to **Auto**, **10 Half**, **10 Full**, **100 Half**, or **100 Full**.
   - Enabled-Checked.
   - Priority-Set to the priority level indicated by the circuit or site plan. Priority does not apply to E-Series cards in port-mapped mode.
   - Stp State-Checked if Spanning Tree Protocol (STP) is enabled for the circuit. STP does not apply to E-Series cards in port-mapped mode.
5. Click the **VLAN** tab. If the E-Series cards is not in port-mapped mode, verify that the source port is on the same VLAN as the destination port.
6. Repeat Steps 2 through 5 for the destination card.
7. At the destination node, connect an Ethernet test set to the destination port and configure the test set to send and receive the appropriate Ethernet traffic.

   Note: At this point, you are not able to send and receive Ethernet traffic.

8. At the source node, connect an Ethernet test set to the source port and configure the test set to send and receive the appropriate Ethernet traffic.
9. Transmit Ethernet frames between both test sets. If you cannot transmit and receive Ethernet traffic between the nodes, repeat Steps 2 through 8 to make sure that you configured the Ethernet ports and test set correctly.
10. Perform protection switch testing appropriate to the topology:
    - For SNCP rings, see the "DLP-D94 SNCP Protection Switching Test" task.
    - For MS-SPRings see the "DLP-D91 MS-SPRing Switch Test" task.
    Configure your test set according to local site practice. For information about configuring your test set, see your test set user guide.
11. After the Ethernet test is complete, print the results or save them to a disk for future reference. For information about printing or saving test results, see your test set user guide.
    Stop. You have completed this procedure.

NTP-D148 Create a Manual Cross-Connect for a G-Series or E-Series Card in Port-Mapped Mode

Purpose	This procedure manually creates a cross-connect between a G-Series Ethernet card or an E-Series Ethernet card in Port-mapped mode and an STM-N card connected to non-ONS equipment.
Tools/Equipment	A G-Series or E-Series card must be installed at the circuit source node.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note: This procedure requires the use of automatic routing. Automatic routing is not available if both the Automatic Circuit Routing NE default and the Network Circuit Automatic Routing Overridable NE default are set to FALSE. For a full description of these defaults see the "Network Element Defaults" appendix in the *Cisco ONS 15454 SDH Reference Manual*.

Note: In this procedure, cross-connect refers to a circuit connection created within the same node between the Ethernet card and an STM-N card connected to third-party equipment. You create cross-connects at the source and destination nodes so an Ethernet circuit can be routed from source to destination across third-party equipment.

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH where you will create the cross-connect. If you are already logged in, continue with Step 2.
2. If you are provisioning an E-Series card, verify that the Ethernet card that will carry the circuit is provisioned for port-mapped mode. See the "DLP-D246 Provision E-Series Ethernet Card Mode" task.
3. If you are provisioning a G-Series card, complete the "DLP-D222 Provision G-Series Ethernet Ports" task.
4. If you want to change the default flow control settings, complete the "DLP-D353 Provision G-Series Flow Control Watermarks" task.
5. Click the **Circuits** tab and click **Create**.
6. In the Circuit Creation dialog box, complete the following fields:
    - Circuit Type-Choose **VC_HO_PATH_CIRCUIT**.
    - Number of Circuits-Leave the default (1) unchanged.
    - Auto-ranged-Unavailable.

7. Click **Next**.
8. Define the circuit attributes:
    - Name-Assign a name to the source cross-connect. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the source cross-connect.
    - Size-Choose the size of the circuit that will be carried by the cross-connect. Valid sizes for a G-Series circuit are **VC4**, **VC4-2c**, **VC4-3c**, **VC4-4c**, **VC4-8c**, and **VC4-16c**. For an E-Series circuit in port-mapped mode, valid sizes are **VC4**, **VC4-2c**, and **VC4-4c**.
    - Bidirectional-Leave the default (checked) unchanged.
    - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
    - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
        - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
        - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
        - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
        - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
          For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
    - Apply to drop ports-Uncheck this box.
    - Protected Drops-Leave the default (unchecked) unchanged.
9. If the circuit will be routed on an SNCP ring, complete the "DLP-D218 Provision SNCP Ring Selectors During Circuit Creation" task.
10. Click **Next**.
11. Provision the circuit source:
    1. From the Node drop-down list, choose the circuit source node.
    2. From the Slot drop-down list, choose the Ethernet card that will be the cross-connect source.
    3. From the Port drop-down list, choose the cross-connect source port.
12. Click **Next**.
13. Provision the circuit destination:
    1. From the Node drop-down list, choose the cross-connect source node selected in Step 11. (For Ethernet cross-connects, the source and destination nodes are the same.)
    2. From the Slot drop-down list, choose the STM-N card that connects to the non-ONS equipment.
    3. Depending on the STM-N card, choose the port and VC4 from the Port and VC4 drop-down lists.
14. Click **Next**.
15. Verify the cross-connect information (in this step, "circuit" refers to the cross-connect):
    - Circuit name
    - Circuit type
    - Circuit size
    - ONS 15454 SDH circuit nodes

If the information is not correct, click the **Back** button and repeat the procedure with the correct information. If the information is correct, check **Route Automatically**.

16. Complete the NTP-D149 Test G-Series Circuits for a G-Series card, or complete the NTP-D146 Test E-Series Circuits for an E-Series card.
17. Click **Finish**.

    Stop. You have completed this procedure.

NTP-D241 Provision G-Series Ports for Transponder Mode

Purpose	This task provisions G-Series ports for transponder mode.
Tools/Equipment	None
Prerequisite Procedures	NTP-D222 Provision G-Series Ethernet Ports
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

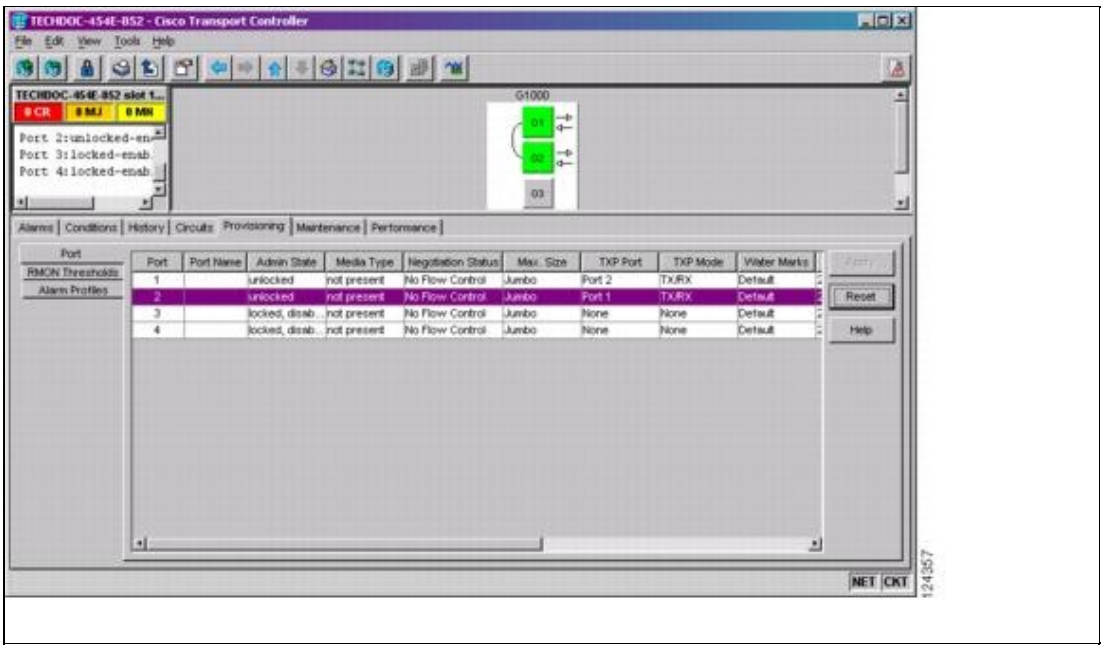
1. Complete the "DLP-D60 Log into CTC" task at the node where you will provision G-Series ports. If you are already logged in, continue with Step 2.
2. In the node view, double-click the G-Series card graphic to open the card.
3. Click the **Provisioning >Port** tabs.
4. To put a pair of G-Series card ports in two-port bidirectional transponder mode (Figure 6-10):

   Note: In this step, "Port A" represents the first port in a pair and "Port B" the second port in the pair. You can pair any two ports on a G-Series card in two-port bidirectional mode.

   1. Click the Port A row (for example, Port 1).
   2. In the TXP Port column, choose the port number that reflects Port A (for example, Port 1).
   3. In the TXP Mode column, choose **TX/RX** from the drop-down list.
   4. Click a Port B row (for example, Port 2).
   5. In the TXP Port column, choose Port A (for example, Port 1) from the drop-down list.
   6. In the TXP Mode column, choose **TX/RX** from the drop-down list.
   7. Click **Apply**.

      The ports in card view have arrows and a connecting line between the back of the ports.

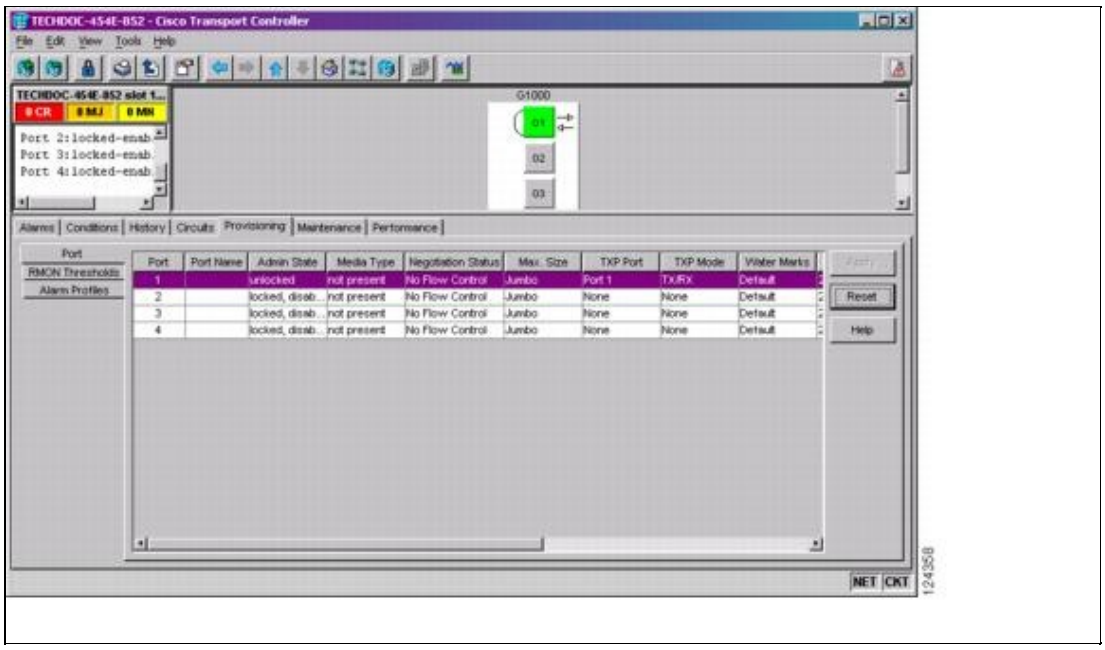
Figure 6-10: Two Port Bidirectional Transponder Mode



5. To put a G-Series card port in one-port bidirectional transponder mode (Figure 6-11):
    1. Click the desired port row (for example, Port 1).
    2. In the TXP Port column, choose the desired port from the drop-down list (for example, Port 1).
    3. In the TXP Mode column, choose **TX/RX** from the drop-down list.
    4. Click **Apply**.

In card view, the desired port has arrows and a curved line on the back of the port.

Figure 6-11: One Port Bidirectional Transponder Mode



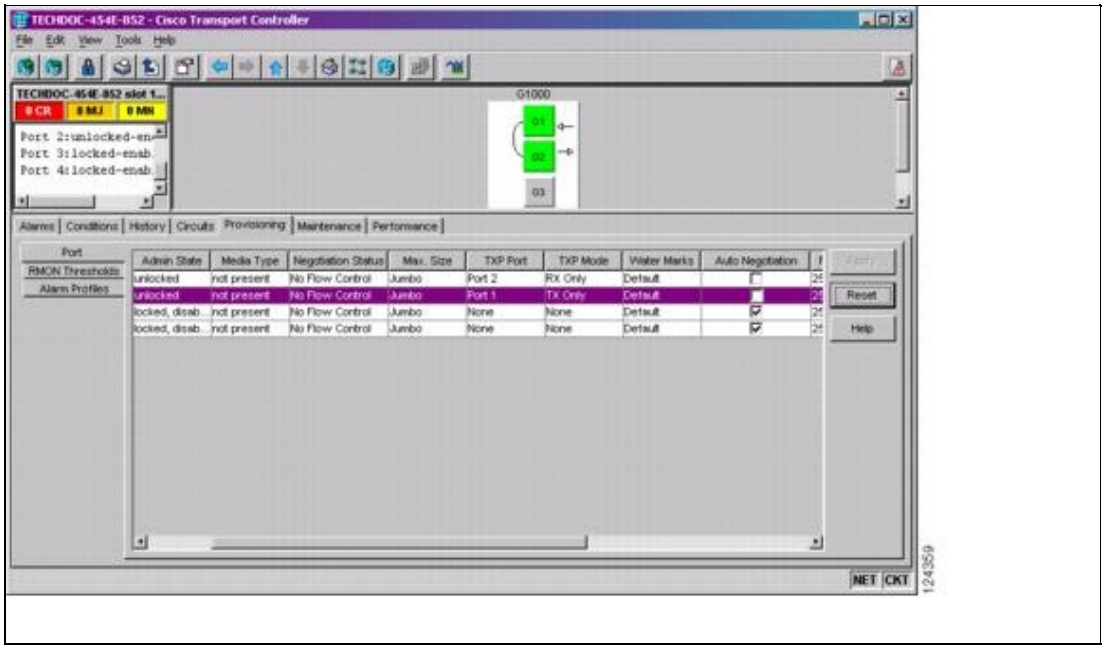
6. To provision two-port unidirectional transponder mode (Figure 6-12):

Note: In this step, "Port A" represents the first port in a pair and "Port B" the second port in the pair. You can pair any two ports on a G-Series card in two-port unidirectional mode.

1. Click the Port A row (for example, Port 1).
2. Uncheck Auto Negotiation. Ports cannot be provisioned in unidirectional transponder mode when autonegotiation is enabled.
3. In the TXP Port column, choose Port B (for example, Port 2) from the drop-down list.
4. In the TXP Mode column, choose **RX Only** from the drop-down list. CTC completes the Port B TXP Port with Port A and TXP Mode with TX Only.
5. Click the Port B row and uncheck Auto Negotiation.
6. Click **Apply**.

The ports in CTC card view display arrows and a line between the back of the ports.

Figure 6-12: Two-Port Unidirectional Transponder Mode



Stop. You have completed this procedure.

NTP-D149 Test G-Series Circuits

Purpose	This procedure tests circuits created on G-Series Ethernet cards.
Tools/Equipment	Ethernet test set and appropriate fibers
Prerequisite Procedures	This procedure assumes that you completed facility loopback tests to test the fibers and cables from the source and destination ONS 15454 SDHs to the fiber distribution panel or the DSX, and one of the following procedures: NTP-D323 Create an Automatically Routed High-Order Circuit NTP-D324 Create a Manually Routed High-Order Circuit NTP-D148 Create a Manual Cross-Connect for a G-Series or E-Series Card in Port-Mapped Mode
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at the ONS 15454 SDH source Ethernet node. If you are already logged in, continue with Step 2.
2. Complete the "DLP-D230 Change a Circuit State" task and change the circuit and circuit ports to the Locked-enabled,maintenance service state.
3. On the shelf graphic, double-click the circuit source card.
4. Click the **Provisioning > Port** tabs.
5. Verify the following settings:
   - Service State-Locked-enabled,maintenance
   - Flow Control-Checked or unchecked as indicated by the circuit or site plan
   - Max Size-Check or unchecked as indicated by the circuit or site plan
   - Media Type-SX, LX, ZX, CWDM, or DWDM for G-Series
6. Repeat Steps 1 through 5 for the destination node.
7. At the destination node, connect the Ethernet test set to the destination port and configure the test set to send and receive the appropriate Ethernet traffic.
   Note: At this point, you are not able to send and receive Ethernet traffic.
8. At the source node, connect the Ethernet test set to the source port and configure the test set to send and receive the appropriate Ethernet traffic.
9. Transmit Ethernet frames between both test sets. If you cannot transmit and receive Ethernet traffic between the nodes, repeat Steps 1 through 8 to make sure that you configured the Ethernet ports and test set correctly.
10. Perform protection switch testing appropriate to the SDH topology:
    - For SNCP rings, complete the "DLP-D94 SNCP Protection Switching Test" task.
    - For MS-SPRings, complete the "DLP-D91 MS-SPRing Switch Test" task.
      Configure your test set according to local site practice. For information about configuring your test set, see your test set user guide.
11. Complete the "DLP-D230 Change a Circuit State" task and change the circuit ports to the Unlocked-enabled service state.
12. After the circuit test is complete, print the results or save them to a disk for future reference. For information about printing or saving test results, see your test set user guide.
    Stop. You have completed this procedure.

NTP-D194 Create Overhead Circuits

Purpose	This procedure creates overhead circuits on an ONS 15454 SDH network. Overhead circuits include DCC tunnels, IP-encapsulated tunnels, the AIC-I card orderwire, and the AIC-I card user data channel (UDC).
Tools/Equipment	None
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the overhead circuit. If you are already logged in, continue with Step 2.
2. From the View menu, choose **Go to Network View**.
3. As needed, complete the "DLP-D361 Create a DCC Tunnel" task.
4. As needed, complete the "DLP-D4 Create an IP-Encapsulated Tunnel" task.
5. As needed, complete the "DLP-D83 Provision Orderwire" task.
6. As needed, complete the "DLP-D212 Create a User Data Channel Circuit" task.

Stop. You have completed this procedure.

NTP-D283 Create an Automatically Routed VCAT Circuit

Purpose	This procedure creates an automatically routed VCAT circuit. For more information about VCAT circuits, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
Tools/Equipment	ML-Series, CE-100T-8, CE-1000-4,CE-MR-10, or FC_MR-4 cards must be installed at the nodes used in the VCAT circuit.
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

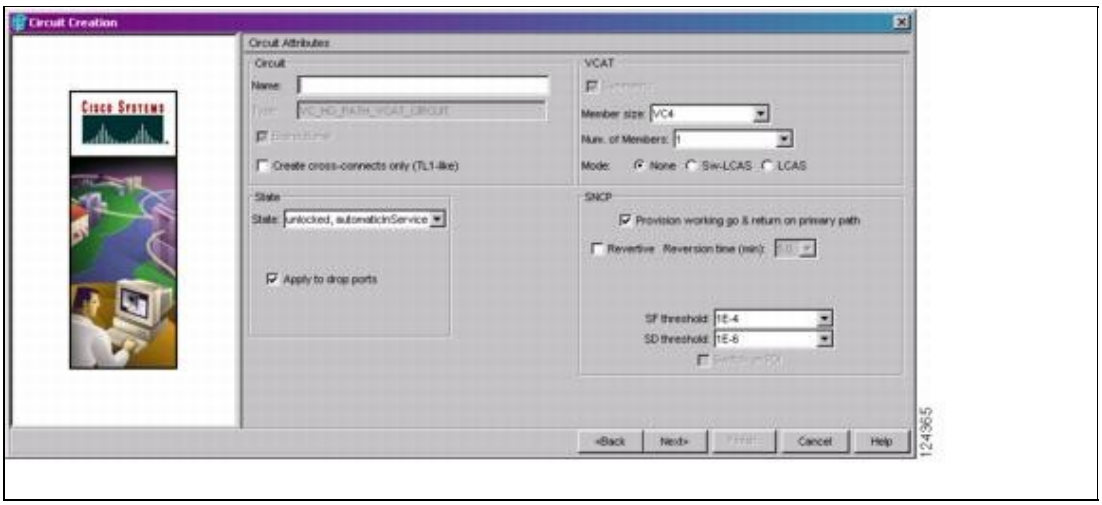
Note: This procedure requires the use of automatic routing. Automatic routing is not available if both the Automatic Circuit Routing NE default and the Network Circuit Automatic Routing Overridable NE default are set to FALSE. For a full description of these defaults see the "Network Element Defaults" appendix in the *Cisco ONS 15454 SDH Reference Manual*.

1. Complete the "DLP-D60 Log into CTC" task at the node where you will create the VCAT circuit. If you are already logged in, continue with Step 2.
2. Complete the following as necessary (you can provision Ethernet or POS ports before or after the VCAT circuit is created):
   - To provision Ethernet ports for CE-100T-8 or CE-MR-10 circuits, complete the "DLP-D136 Provision CE-100T-8 and CE-MR-10 Ethernet Ports" task.
   - To provision Ethernet ports for CE-1000-4 circuits, complete the "DLP-D211 Provision CE-1000-4 Ethernet Ports" task.
   - To provision POS ports for CE-Series circuits, complete the "DLP-D141 Provision CE-100T-8, CE-1000-4, and CE-MR-10 POS Ports" task.
   - To provision Ethernet ports for ML-Series circuits, complete the "DLP-D493 Provision the Ethernet Port of the ML-Series Card" task.
   - To provision POS ports for ML-Series circuits, complete the "DLP-D494 Provision the POS Port of the ML-Series Card" task.
3. From the View menu, choose **Go to Network View**.
4. Click the **Circuits** tab, then click **Create**.
5. In the Circuit Creation dialog box, choose **VC_HO_PATH_VCAT_CIRCUIT** from the Circuit Type drop-down list.
6. Click **Next**.
7. Define the circuit attributes (Figure 6-13):
   - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
   - Type-Displays the circuit type you chose in Step 5. You cannot change it.
   - Bidirectional-Checked is the default. You cannot change it.
   - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
   - State-Choose **Unlocked**.

- Apply to drop ports-Check this check box to apply the IS administrative state to the circuit source and destination ports. CTC applies the administrative state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the port. If not, a Warning dialog box shows the ports where the administrative state could not be applied. If the check box is unchecked, CTC does not change the service state of the source and destination ports.
- Symmetric-Checked is the default. You cannot change it.
- Member size-Choose the member size. For information about the member size supported for each card, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
- Num. of members-Choose the number of members. For information about the number of members supported for each card, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
  Note: When creating open-ended VCAT circuits the number of members must be the same on each side of the virtual concatenated group (VCG). The configuration with different number of members on each side of circuit is not supported. This is applicable to circuits created on CE-Series and ML-Series cards.
- Mode-Choose the protection mode for the VCAT circuit:
  - None-Provides no protection. A failure on one member causes the entire VCAT circuit to fail. You cannot delete members after creating a VCAT circuit with no protection.
  - SW-LCAS-(Software link capacity adjustment scheme) Allows the VCAT circuit to adapt to member failures and keep traffic flowing after failures at a reduced bandwidth. SW-LCAS provides interoperability with the ML-Series cards. SW-LCAS uses legacy SONET failure indicators like path alarm indication signal (AIS-P) and path remote defect indication (RDI-P) to detect member failure. You cannot add or delete members from a VCAT circuit with SW-LCAS protection.

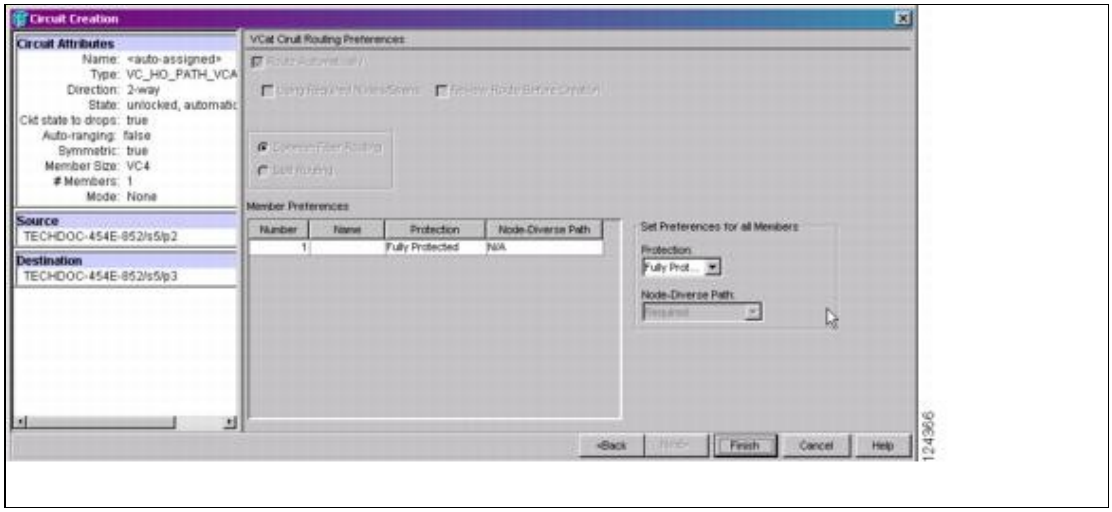
  Note: While deleting SW-LCAS circuit members place the members in the Locked,disabled, state. This is applicable to circuits created on CE-Series and ML-Series cards.
  - LCAS-Sets the VCAT circuit to use LCAS. With LCAS, you can add or delete members without interrupting the operation of uninvolved members. If a member fails, LCAS temporarily removes the failed member from the VCAT circuit. The remaining members carry the traffic until the failure clears.
    Note: For CE-MR-10 card, before you create a VCAT circuit in the LCAS protection mode, it is recommended that you move all members of the VCAT circuit being created to Locked,OutOfGroup service state and then move them to Unlocked state.
    Note: While deleting HW-LCAS circuit members change the administrative state of the members to Locked, OutOfGroup. This is applicable to circuits created on CE-Series and ML-Series cards.

Figure 6-13: Setting VCAT Circuit Attributes



8. Click **Next**.
9. Complete the "DLP-D36 Provision a VCAT Circuit Source and Destination" task for the VCAT circuit you are creating. If you are creating an open-ended VCAT circuit, complete the "DLP-D290 Provision an Open VCAT Circuit Source and Destination" task.
10. In the VCAT Circuit Routing Preferences area (Figure 6-14), check **Route Automatically**. Two options are available; choose either, both, or none based on your preferences.
    - Using Required Nodes/Spans-Check this check box to specify nodes and spans to include or exclude in the CTC-generated circuit route.
      Including nodes and spans for a circuit ensures that those nodes and spans are in the working path of the circuit (but not the protect path). Excluding nodes and spans ensures that the nodes and spans are not in the working or protect path of the circuit.
    - Review Route Before Creation-Check this check box to review and edit the circuit route before the circuit is created.

Figure 6-14: Automatically Routing a VCAT Circuit



11. If you want to set preferences for individual members, complete the following in the Member Preferences area. Repeat for each member and continue with Step 13. To set identical preferences for all members, skip this step and continue with Step 12.
    1. Number-Choose a number (between 1 and 256) from the drop-down list to identify the member.
    2. Name-Type a unique name to identify the member. The name can be alphanumeric and up to 48 characters (including spaces). If you leave the field blank, CTC assigns a default name to the circuit.
    3. Protection-Choose the member protection type:

- Fully Protected-Routes the circuit on a protected path.
- Unprotected-Creates an unprotected circuit.
- PCA-Routes the member on an MS-SPRing protection channel.

12. To set preferences for all members, choose the member protection type:

    · Fully Protected-Routes the circuit on a protected path.
    · Unprotected-Creates an unprotected circuit.
    · PCA-Routes the member on a MS-SPRing protection channel.
13. Click **Next**. If you chose Fully Protected or PCA, click **OK** to continue. If not, continue with the next step.
14. If you selected Using Required Nodes/Spans in Step 10, complete the following substeps. If not, continue with Step 15:
    1. In the Circuit Route Constraints For Auto Routing area, choose the member that you want to route from the Route member number drop-down list.
    2. Click a node or span on the circuit map.
    3. Click **Include** to include the node or span in the circuit, or click **Exclude** to exclude the node or span from the circuit. The order in which you choose included nodes and spans is the order in which the circuit is routed. Click spans twice to change the circuit direction.
    4. Repeat Substeps 2 and 3 for each node or span that you wish to include or exclude.
    5. Review the circuit route. To change the circuit routing order, choose a node in the Required Nodes/Lines or Excluded Nodes Links lists, then click the **Up** or **Down** buttons to change the circuit routing order. Click **Remove** to remove a node or span.
    6. Repeat SubSteps 1 through 5 for each member.
15. If you selected Review Route Before Creation in Step 10, complete the following substeps; otherwise, continue with Step 16:
    1. In the Route Review/Edit area, choose the member that you want to route from the Route member number drop-down list.
    2. Click a node or span on the circuit map.
    3. Review the circuit route. To add or delete a circuit span, choose a node on the circuit route. Blue arrows show the circuit route. Green arrows indicate spans that you can add. Click a span arrowhead, then click **Include** to include the span or **Remove** to remove the span.
    4. If the provisioned circuit does not reflect the routing and configuration you want, click **Back** to verify and change circuit information. If the circuit needs to be routed to a different path, see the NTP-D284 Create a Manually Routed VCAT Circuit to assign the circuit route yourself.
    5. Repeat SubSteps 1 through 4 for each member.
16. Click **Finish**. The Circuits window appears.

    Note: Depending on the complexity of the network and number of members, the VCAT circuit creation process might take several minutes.
17. In the Circuits window, verify that the circuit you created appear in the circuits list.

    Stop. You have completed this procedure.

NTP-D284 Create a Manually Routed VCAT Circuit

Purpose	This procedure creates a manually routed VCAT circuit. For more information about VCAT circuits, refer to the "Circuits and Tunnels" chapter of the *Cisco ONS 15454 SDH Reference Manual*.
Tools/Equipment	ML-Series, CE-100T-8, CE-MR-10, CE-1000-4, or FC_MR-4 cards must be installed at the nodes used in the VCAT circuit.
	NTP-D127 Verify Network Turn-Up

Prerequisite Procedures	
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at the node where you will create the circuit. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the tunnel source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 6.
3. Complete the following as necessary (you can provision Ethernet or POS ports before or after the VCAT circuit is created):
   - To provision Ethernet ports for CE-100T-8 or CE-MR-10 circuits, complete the "DLP-D136 Provision CE-100T-8 and CE-MR-10 Ethernet Ports" task.
   - To provision Ethernet ports for CE-1000-4 circuits, complete the "DLP-D211 Provision CE-1000-4 Ethernet Ports" task.
   - To provision POS ports for CE-Series circuits, complete the "DLP-D141 Provision CE-100T-8, CE-1000-4, and CE-MR-10 POS Ports" task.
   - To provision Ethernet ports for ML-Series circuits, complete the "DLP-D493 Provision the Ethernet Port of the ML-Series Card" task.
   - To provision POS ports for ML-Series circuits, complete the "DLP-D494 Provision the POS Port of the ML-Series Card" task.
4. From the View menu, choose **Go to Network View**.
5. In the Circuit Creation dialog box, choose **VC_HO_PATH_VCAT_CIRCUIT** from the Circuit Type drop-down list.
6. Click **Next**.
7. Define the circuit attributes (Figure 6-13):
   - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
   - Type-Displays the circuit type you chose in Step 5. You cannot change it.
   - Bidirectional-Checked is the default. You cannot change it.
   - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
   - State-Choose **Unlocked**.
   - Apply to drop ports-Check this check box to apply the IS administrative state to the circuit source and destination ports. CTC applies the administrative state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the port. If not, a Warning dialog box shows the ports where the administrative state could not be applied. If the check box is unchecked, CTC does not change the service state of the source and destination ports.
   - Symmetric-Checked is the default. You cannot change it.
   - Member size-Choose the member size. For information about the member size supported for each card, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
   - Num. of members-Choose the number of members. For information about the number of members supported for each card, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.

Note: When creating open-ended VCAT circuits the number of members must be the same on each side of the virtual concatenated group (VCG). The configuration with different number of members on each side of circuit is not supported. This is applicable to circuits created on CE-Series and ML-Series cards.

- Mode-Choose the protection mode for the VCAT circuit:
  - None-Provides no protection. A failure on one member causes the entire VCAT circuit to fail. You cannot delete members after creating a VCAT circuit with no protection.
  - SW-LCAS-Allows the VCAT circuit to adapt to member failures and keep traffic flowing after failures at a reduced bandwidth. SW-LCAS provides interoperability with the ML-Series cards. SW-LCAS uses legacy SONET failure indicators like AIS-P and RDI-P to detect member failure. You cannot add or delete members from a VCAT circuit with SW-LCAS protection.

  Note: While deleting SW-LCAS circuit members place the members in the Locked,disabled, state. This is applicable to circuits created on CE-Series and ML-Series cards.
- LCAS-Sets the VCAT circuit to use LCAS. With LCAS, you can add or delete members without interrupting the operation of uninvolved members. If a member fails, LCAS temporarily removes the failed member from the VCAT circuit. The remaining members carry the traffic until the failure clears.

  Note: For CE-MR-10 card, before you create a VCAT circuit in the LCAS protection mode, it is recommended that you move all members of the VCAT circuit being created to Locked,OutOfGroup service state and then move them to Unlocked state.

  Note: While deleting HW-LCAS circuit members change the administrative state of the members to Locked, OutOfGroup. This is applicable to circuits created on CE-Series and ML-Series cards.

8. Click **Next**.
9. Complete the "DLP-D36 Provision a VCAT Circuit Source and Destination" task for the VCAT circuit you are creating. If you are creating an open-ended VCAT circuit, complete the "DLP-D290 Provision an Open VCAT Circuit Source and Destination" task.
10. In the Circuit Routing Preferences area (Figure 6-14), uncheck **Route Automatically**.
11. If you want to set preferences for individual members, complete the following in the Member Preferences area. Repeat for each member and continue with Step 13. To set identical preferences for all members, skip this step and continue with Step 12.
    1. Number-Choose a number (between 1 and 256) from the drop-down list to identify the member.
    2. Name-Type a unique name to identify the member. The name can be alphanumeric and up to 48 characters (including spaces). If you leave the field blank, CTC assigns a default name to the circuit.
    3. Protection-Choose the member protection type:
       - Fully Protected-Routes the circuit on a protected path.
       - Unprotected-Creates an unprotected circuit.
       - PCA-Routes the member on a MS-SPRing protection channel.
12. To set preferences for all members, choose the member protection type:
    - Fully Protected-Routes the circuit on a protected path.
    - Unprotected-Creates an unprotected circuit.
    - PCA-Routes the member on a MS-SPRing protection channel.
13. Click **Next**. If you chose Fully Protected or PCA, click **OK** to continue. If not, continue with the next step.
14. In the Route Review and Edit area, node icons appear so you can route the circuit manually.
15. Complete the "DLP-D26 Provision a VCAT Circuit Route" task.
16. Click **Finish**.

    Note: Depending on the complexity of the network and number of members, the VCAT circuit creation process might take several minutes.

17. When all the circuits are created, the Circuits window appears. Verify that the circuit you created appears in the window.
18. Complete the NTP-D62 Test High-Order Circuits.

Stop. You have completed this procedure.

NTP-D325 Create an STM Test Circuit around the Ring

Purpose	This procedure creates an STM test circuit that routes traffic around a ring with the source and destination located on different ports of the same node.
Tools/Equipment	None
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at an ONS 15454 SDH on the network where you will create the circuit. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If you want CTC to assign a name automatically based on circuit type, node name, and sequence number, continue with Step 3.
3. From the View menu, choose **Go to Network View**.
4. In the Circuit Creation dialog box, complete the following fields:
   - Circuit Type-Choose **VC_HO_PATH_CIRCUIT**.
   - Number of Circuits-Enter the number of high-order circuits that you want to create. The default is 1.
   - Auto-ranged-(Applies to automatically routed circuits only) If you entered more than 1 in Number of Circuits, uncheck this check box. (The check box is unavailable if only one circuit is entered in Number of Circuits.)
5. Click **Next**.
6. Define the circuit attributes:
   - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
   - Size-Choose the high-order circuit size: **VC4**, V**C4-2c**, **VC4-3c**, **VC4-4c**, **VC4-8c**, **VC4-16c**, or **VC4-64c**.
   - Bidirectional-Leave checked for this circuit.
   - Create cross-connects only (TL1-like)-Check this check box if you want to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you check this box, low-order tunnels and Ethergroup sources and destinations are unavailable.
   - State-Choose the administrative state to apply to all of the cross-connects in a circuit:
     - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
     - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
     - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.

◊ **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task.
For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.

- Apply to drop ports-Check this box if you want to apply the state chosen in the State field to the circuit source and destination ports. CTC applies the circuit state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the drop port. If not, a Warning dialog box shows the ports where the circuit state could not be applied. If the box is unchecked, CTC does not change the state of the source and destination ports.
Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.
- Protected Drops-Select this check box if you want the circuit routed to protect drops only, that is, to ONS 15454 SDH cards that are in 1:1, 1:N, or 1+1 protection. If you select this check box, CTC shows only protected cards as source and destination choices.

7. Click **Next**.
8. Choose the circuit source:
   1. From the Node drop-down list, choose the node where the circuit will originate.
   2. From the Slot drop-down list, choose the slot containing the high-order card where the circuit originates. (If a card's capacity is fully utilized, it does not appear in the drop-down list.)
   3. Depending on the circuit origination card, choose the source port and/or VC-4 from the Port and VC-4 drop-down lists. The Port drop-down list is only available if the card has multiple ports. VC-4s are not shown if they are already in use by other circuits.
   Note: The VC4s that appear depend on the card, circuit size, and protection scheme.
9. Click **Next**.
10. Choose the circuit destination:
   Note: The destination port must be located on the same node as the circuit source port.
   1. From the Node drop-down list, choose the node selected in Substep 1 of Step 8.
   2. From the Slot drop-down list, choose the slot containing the optical card where the circuit will terminate (destination card). (If a card's capacity is fully utilized, the card does not appear in the drop-down list.)
   3. Depending on the card selected in SubStep 2, choose the destination port and/or VC-4 from the Port and VC-4 drop-down lists. The Port drop-down list is available only if the card has multiple ports. The VC-4s that appear depend on the card, circuit size, and protection scheme.
11. Click **Next**.
12. In the Circuit Routing Preferences area, uncheck **Route Automatically**.
13. When routing a test circuit with source and destination ports on the same node, the Fully Protected Path check box is automatically disabled. Choose one of the following options:
   - To leave the test circuit unprotected, continue with Step 14.
   - To route the test circuit on a MS-SPRing protection channel, check **Protection Channel Access**, click **Yes** in the Warning dialog box, then continue with Step 14.

Caution! Circuits routed on MS-SPRing protection channels are not protected and are preempted during MS-SPRing switches.

14. Click **Next**. In the Route Review/Edit area, node icons appear for you to route the circuit manually.
15. Complete the "DLP-D98 Provision a High-Order Circuit Route" task.
16. Click **Finish**. If you entered more than 1 in the Number of Circuits field, the Circuit Creation dialog box appears after the circuit is created so you can create the remaining circuits. Repeat Steps 6 through 15 for each additional circuit.
17. When all the circuits are created, the main Circuits window appears. Verify that the circuits you created appear in the window.
18. Complete the NTP-D62 Test High-Order Circuits.

Stop. You have completed this procedure.

NTP-D350 Create a Server Trail

Purpose	This procedure creates a server trail, which provides a connection between ONS nodes through a third-party network. You can create server trails between any two STM-N ports.
Tools/Equipment	None
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note: You cannot create server trails on ports with DCC links.

1. Complete the "DLP-D60 Log into CTC" task at the node where you will create the circuit. If you are already logged in, continue with Step 2.
2. From the View menu, choose **Go to Network View**.
3. Click the **Provisioning > Server Trails** tabs.
4. Click **Create**.
5. In the Server Trail Creation dialog box, complete the following fields:
   - ♦ Type-Choose **VC_HO_PATH_CIRCUIT** or **VC_LO_PATH_CIRCUIT**.
   - ♦ Size-Depending on the type selected, choose the server trail size. For VC_HO_PATH_CIRCUIT, choose **VC4-2c**, **VC4-3c**, **VC4-4c**, **VC4-6c**, **VC4-8c**, **VC4-12c**, **VC4-16c**, **VC4-64c**, or **VC4**. For VC_LO_PATH_CIRCUIT, choose **VC3**, **VC12**, or **VC11**.
   - ♦ Protection Type-Choose one of the following protection types: Preemptible, Unprotected, or Fully Protected. The server trail protection sets the protection type for any circuit that traverses it.
     - Preemptible- PCA circuits will use server trails with the Preemptible attribute.
     - Unprotected-In Unprotected Server Trail, CTC assumes that the circuits going out from that specific port will not be protected by provider network and will look for a secondary path from source to destination if you are creating a protected circuit.
     - Fully Protected-In Fully Protected Server Trail, CTC assumes that the circuits going out from that specific port will be protected by provider network and will not look for a secondary path from source to destination.
   - ◊ Number of Trails-Enter the number of server trails. Number of trails determine the number of circuits that can be created on server trail. You can create a maximum of 3744 server trails on a node. You can create multiple server trails from the same port. This is determined by how many circuits of a particular server trail size can be supported on the port (for example, you can create three VC4 server trails from one STM-3 port or two VC3 and six VC11

server trails from one STM-3 port).

6. Click **Next**.
7. In the Source area, complete the following:
    1. From the Node drop-down list, choose the node where the source will originate.
    2. From the Slot drop-down list, choose the slot containing the card where the server trail originates. (If a card's capacity is fully utilized, the card does not appear in the list.)
    3. Depending on the origination card, choose the source port and/or VC4 or VC11 from the Port and VC4 or VC11 lists. The Port list is only available if the card has multiple ports. VC4s and VC11s do not appear if they are already in use by other circuits.
8. Click **Next**.
9. In the Destination area, complete the following:
    1. From the Node drop-down list, choose the destination node.
    2. From the Slot drop-down list, choose the slot containing the card where the server trail will terminate (destination card). (If a card's capacity is fully utilized, the card does not appear in the list.)
    3. Depending on the card selected, choose the destination port and/or VC4 or VC11 from the Port and VC4 or VC11 lists. The Port list is only available if the card has multiple ports. VC4s and VC11s do not appear if they are already in use by other circuits.
10. Click **Finish**.

Stop. You have completed this procedure.

NTP-D358 Create an Automatically Routed Open-Ended SNCP High-Order Circuit

Purpose	This procedure creates an open-ended high-order SNCP.
Tools/Equipment	None
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at a node on the network where you want to create the circuit. If you are already logged in, continue with Step 2.
2. If you want to assign a name to the circuit source and destination ports before you create the circuit, complete the "DLP-D314 Assign a Name to a Port" task. If not, continue with Step 3.
3. From the View menu, choose **Go To Network View**.
4. Click the **Circuits** tab, then click **Create**.
5. In the Circuit Creation dialog box, complete the following fields:
    - Circuit Type-Choose **VC_HO_PATH_CIRCUIT**.
    - Number of Circuits-Leave set to 1.
    - Auto-ranged-Leave unchecked.
6. Click **Next**.
7. Define the circuit attributes (Figure 6-1: Setting Circuit Attributes for a Low-Order VC11 Circuit):
    - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
    - Size-Choose **VC-4**.
    - Bidirectional-As desired. When checked, CTC creates a two-way circuit.

- Create cross-connects only (TL1-like)-Check this check box to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you are creating an open-ended high-order SNCP circuit to bridge low-order traffic, you must check this check box.
- Diagnostic-Leave unchecked.
- State-Choose the administrative state to apply to all of the cross-connects in a circuit:
  - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
  - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
  - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
  - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the "DLP-D230 Change a Circuit State" task. For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
- Apply to drop ports-Check this check box if you want to apply the administrative state chosen in the State field to the circuit source and destination ports. CTC applies the administrative state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the port. If not, a Warning dialog box displays the ports where the administrative state could not be applied. If the check box is unchecked, CTC does not apply the administrative state of the source and destination ports.
  Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.
- Protected Drops-If selected, CTC displays only protected cards and ports (1+1 protection) as choices for the circuit source and destination.

8. If the circuit will be routed on an SNCP ring, complete the "DLP-D230 Change a Circuit State" task.
9. Click **Next**.
10. Complete the "DLP-D97 Provision a High-Order Circuit Source and Destination" task for the optical circuit that you are creating. Choose a single source and secondary destinations to create the open-ended SNCP circuit.
11. In the Circuit Routing Preferences area (Figure 6-2), check **Route Automatically**. Two options are available; choose either, both, or none based on your preferences.
    - Using Required Nodes/Spans-Check this box to specify nodes and spans to include or exclude in the CTC-generated circuit route.
      Including nodes and spans for a circuit ensures that those nodes and spans are in the working path of the circuit (but not the protect path). Excluding nodes and spans ensures that the nodes and spans are not in the working or protect path of the circuit.
    - Review Route Before Creation-Check this box to review and edit the circuit route before the circuit is created.
12. Leave **Fully Protected Path** checked.
13. Choose one of the following:
    - Nodal Diversity Required-Ensures that the primary and alternate paths within the SNCP ring portions of the complete circuit path are nodally diverse.

- Nodal Diversity Desired-Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.
- Link Diversity Only-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node-diverse, but CTC does not check for node diversity.

14. Click **Next**. If you selected Review Route Before Creation in Step 12, complete the following substeps; otherwise, continue with Step 15:
    1. Click **Next**.
    2. Review the circuit route. To add or delete a circuit span, select a node on the circuit route. Blue arrows show the circuit route. Green arrows indicate spans that you can add. Click a span arrowhead, then click **Include** to include the span or **Remove** to remove the span.
    3. If the provisioned circuit does not reflect the routing and configuration you want, click **Back** to verify and change circuit information. If the circuit needs to be routed to a different path, see the NTP-D324 Create a Manually Routed High-Order Circuit to assign the circuit route yourself.
15. Click **Finish**. If the path does not meet the specified path diversity requirement, an error message appears and allows you to change the circuit path. If you entered more than 1 in the Number of circuits field, the Circuit Creation dialog box appears after the circuit is created so you can create the remaining circuits. Repeat Steps 5 through 15 for each additional circuit.
16. When all the circuits are created, the main Circuits window appears. Verify that the circuit(s) you created appear in the window.
17. Complete the NTP-D62 Test High-Order Circuits.

Stop. You have completed this procedure.

NTP-D375 Manually Create a CCAT or VCAT Circuit on the CE-MR-10 Card

Purpose	This procedure manually creates a CCAT or VCAT circuit on the CE-MR-10 Card.
Tools/Equipment	None
Prerequisite Procedures	NTP-D127 Verify Network Turn-Up
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

1. Complete the "DLP-D60 Log into CTC" task at the node where you will create the circuit. If you are already logged in, continue with Step 2.
2. In the node view, double-click the CE-MR-10 card.
3. Click the **Circuits > Circuits** tabs and click **Create**.
4. In the Circuit Creation dialog box, complete the following fields:
    - Circuit Type-Choose **VC_HO_PATH_CIRCUIT**.
    - Number of Circuits-Leave set to 1.
    - Auto-ranged-Leave unchecked.
5. Click **Next**.
6. Define the circuit attributes:
    - Name-Assign a name to the circuit. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.

- Size-Choose **VC-4**.
- Bidirectional-As desired. When checked, CTC creates a two-way circuit.
- Create cross-connects only (TL1-like)-Check this check box to create one or more cross-connects to complete a signal path for TL1-generated circuits. If you are creating an open-ended high-order SNCP circuit to bridge low-order traffic, you must check this check box.
- Diagnostic-Leave unchecked.
- State-Choose the administrative state to apply to all of the cross-connects in a circuit:
  - **Unlocked**-Puts the circuit cross-connects in the Unlocked-enabled service state.
  - **Locked,disabled**-Puts the circuit cross-connects in the Locked-enabled,disabled service state. Traffic is not passed on the circuit.
  - **Unlocked,automaticInService**-Puts the circuit cross-connects in the Unlocked-disabled,automaticInService service state and suppresses alarms and conditions. When the connections receive a valid signal, the service state automatically changes to Unlocked-enabled.
  - **Locked,maintenance**-Puts the circuit cross-connects in the Locked-enabled,maintenance service state. The maintenance state does not interrupt traffic flow; it suppresses alarms and conditions and allows loopbacks to be performed on the circuit. Use Locked,maintenance for circuit testing or to suppress circuit alarms temporarily. Change the administrative state to Unlocked; Unlocked,automaticInService; or Locked,disabled when testing is complete. See the [[ONS 15454 SDH Procedure Guide R8.5.1 -- DLPs D200 to D299#"DLP-D230 Change a Circuit State" task on page 19-28. For additional information about circuit service states, refer to the "Circuits and Tunnels" chapter in the *Cisco ONS 15454 SDH Reference Manual*.
- Apply to drop ports-Check this check box if you want to apply the administrative state chosen in the State field to the circuit source and destination ports. CTC applies the administrative state to the ports only if the circuit bandwidth is the same as the port bandwidth or, if the port bandwidth is larger than the circuit, the circuit must be the first circuit to use the port. If not, a Warning dialog box displays the ports where the administrative state could not be applied. If the check box is unchecked, CTC does not apply the administrative state of the source and destination ports.
  Note: If ports managed into the Unlocked administrative state are not receiving signals, loss of signal alarms are generated and the port service state transitions to Unlocked-disabled,failed.
- Protected Drops-If selected, CTC displays only protected cards and ports (1+1 protection) as choices for the circuit source and destination.

7. If the circuit will be routed on an SNCP ring, complete the "DLP-D230 Change a Circuit State" task.
8. Click **Next**.
9. Complete the "DLP-D97 Provision a High-Order Circuit Source and Destination" task for the optical circuit that you are creating. Choose a single source and secondary destinations to create the open-ended SNCP circuit.
10. In the Circuit Routing Preferences area, check **Route Automatically**. Two options are available; choose either, both, or none based on your preferences.
    - Using Required Nodes/Spans-Check this box to specify nodes and spans to include or exclude in the CTC-generated circuit route.
      Including nodes and spans for a circuit ensures that those nodes and spans are in the working path of the circuit (but not the protect path). Excluding nodes and spans ensures that the nodes and spans are not in the working or protect path of the circuit.
    - Review Route Before Creation-Check this box to review and edit the circuit route before the circuit is created.
11. Leave **Fully Protected Path** checked.
12. Choose one of the following:

- **Nodal Diversity Required**-Ensures that the primary and alternate paths within the SNCP ring portions of the complete circuit path are nodally diverse.
- **Nodal Diversity Desired**-Specifies that node diversity is preferred, but if node diversity is not possible, CTC creates fiber-diverse paths for the SNCP ring portion of the complete circuit path.
- **Link Diversity Only**-Specifies that only fiber-diverse primary and alternate paths for SNCP ring portions of the complete circuit path are needed. The paths might be node-diverse, but CTC does not check for node diversity.

13. Click **Next**. If you selected Review Route Before Creation in Step 10, complete the following substeps; otherwise, continue with Step 14:
    1. Click **Next**.
    2. Review the circuit route. To add or delete a circuit span, select a node on the circuit route. Blue arrows show the circuit route. Green arrows indicate spans that you can add. Click a span arrowhead, then click **Include** to include the span or **Remove** to remove the span.
    3. If the provisioned circuit does not reflect the routing and configuration you want, click **Back** to verify and change circuit information. If the circuit needs to be routed to a different path, see the NTP-D324 Create a Manually Routed High-Order Circuit to assign the circuit route yourself.
14. Click **Finish**. If the path does not meet the specified path diversity requirement, an error message appears and allows you to change the circuit path. If you entered more than 1 in the Number of circuits field, the Circuit Creation dialog box appears after the circuit is created so you can create the remaining circuits. Repeat Steps 4 through 14 for each additional circuit.
15. When all the circuits are created, the main Circuits window appears. Verify that the circuit(s) you created appear in the window.
16. Complete the NTP-D62 Test High-Order Circuits.

    Stop. You have completed this procedure.