Model GS7000 Node Expanded Fiber Tray Installation Instructions

Overview

Introduction

The expanded fiber tray is an optional replacement for the standard fiber tray in the Model GS7000 GainMaker® Scaleable 4-Port Node. The expanded fiber tray provides additional space for fiber management/storage and the installation of additional bulkhead adaptors. The expanded fiber tray also provides the space for the installation of various passive devices such as CWDM and OADM cassettes and raw WDM cartridges.

Audience

These installation instructions are intended for all cable system operators or installers who operate and configure a Model GS7000 Node. For complete instructions on using the node refer to *Model GS7000 GainMaker Scaleable 4-Port Node Installation and Operation Guide*, part number 4013584.

Qualified Personnel

Only appropriately qualified and skilled service personnel should attempt to install, operate, maintain, and service this product.

WARNING:

Allow only qualified and skilled personnel to install, operate, maintain, and service this product. Otherwise, personal injury or equipment damage may occur.

Features

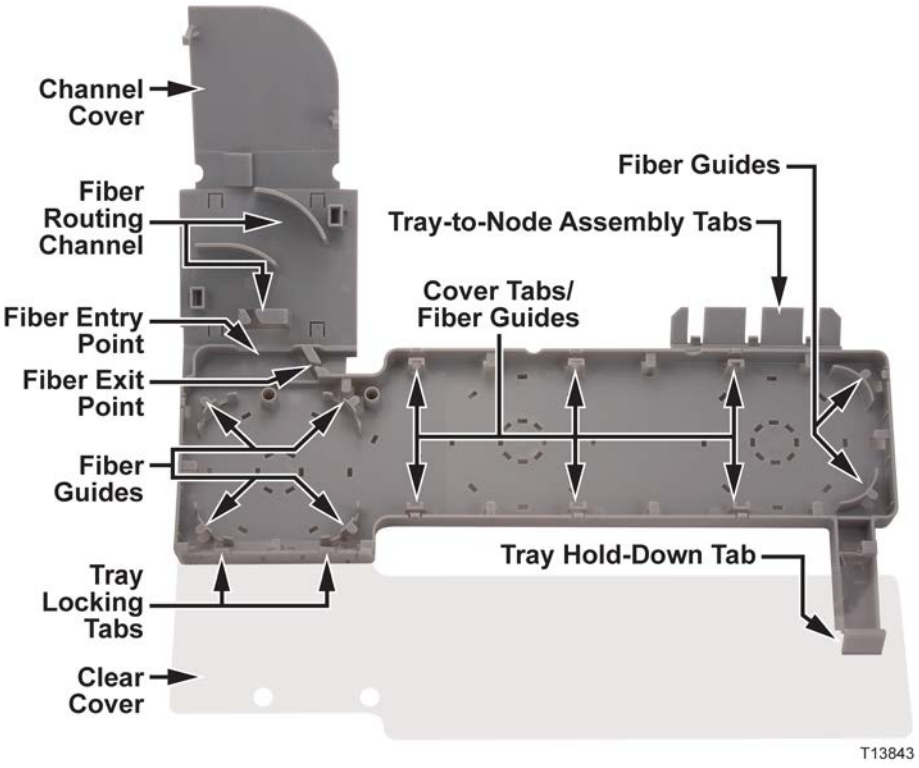
The expanded fiber tray provides the following features:

- Design allows for configuration flexibility.
- Built-in fiber guides and tabs aid management of slack fiber and maintenance of minimum bend radiuses.
- Accommodates most commercially available optical passive devices.

- Circular indexed slot pattern in tray base allows flexibility in mounting components.
- Custom mounting clips provided to secure various components in tray.
- Tray design facilitates additional securing of fibers and components with Velcro straps.

Tray Components

The following illustration shows the unassembled expanded fiber tray components.



Expanded Fiber Tray Installation

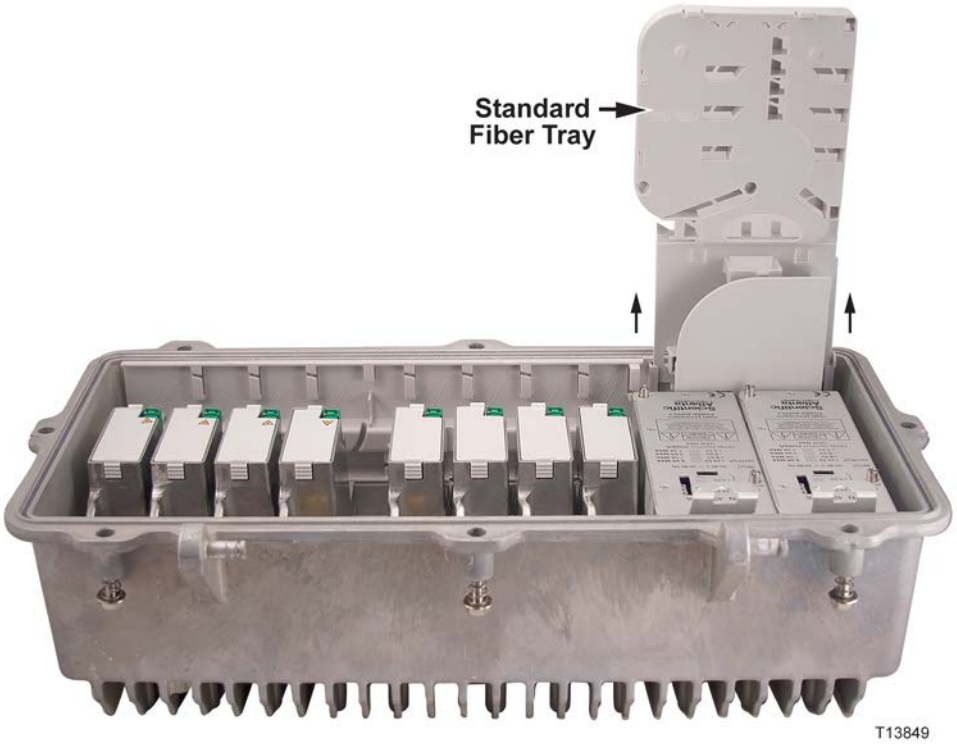
Installation Procedure

Perform the following steps to install the expanded fiber tray in the node.

1 If you are replacing a standard fiber tray in an existing node, go to step 2.

If you are not replacing a standard fiber tray, go to step 3.

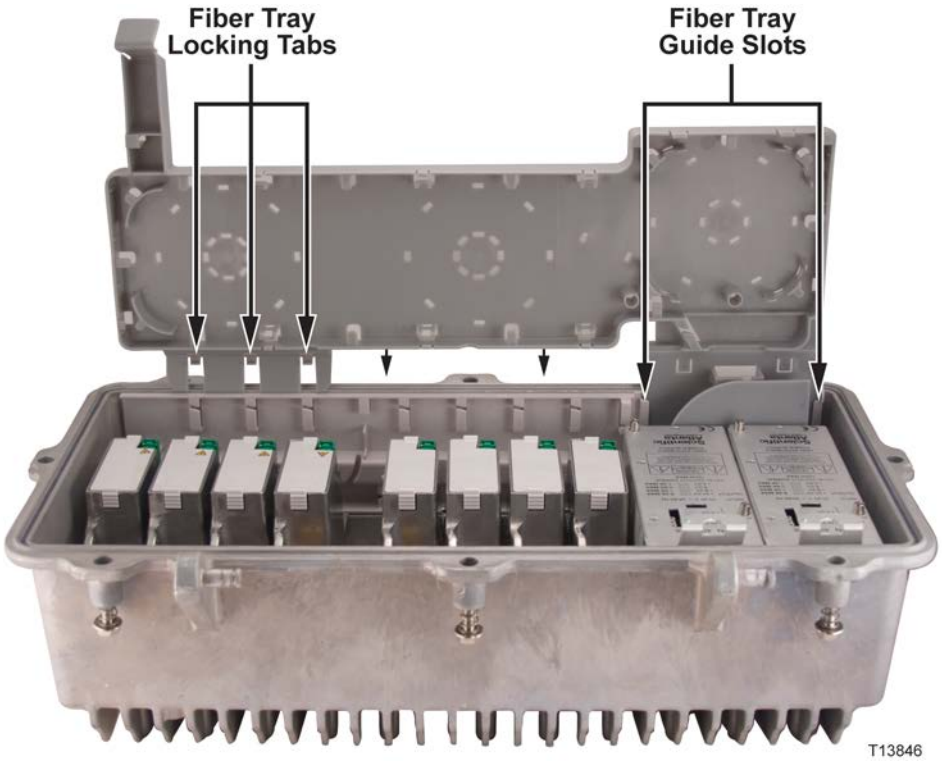
2 Remove any installed fibers from the existing standard fiber tray and then remove the fiber tray from the node by pulling up on the fiber tray assembly as shown in the following illustration.



3 Make sure that the expanded fiber tray clear cover is secured in place on the fiber tray.

Note: Push down on the cover at the cover locking tabs around the periphery of the fiber tray to secure the cover.

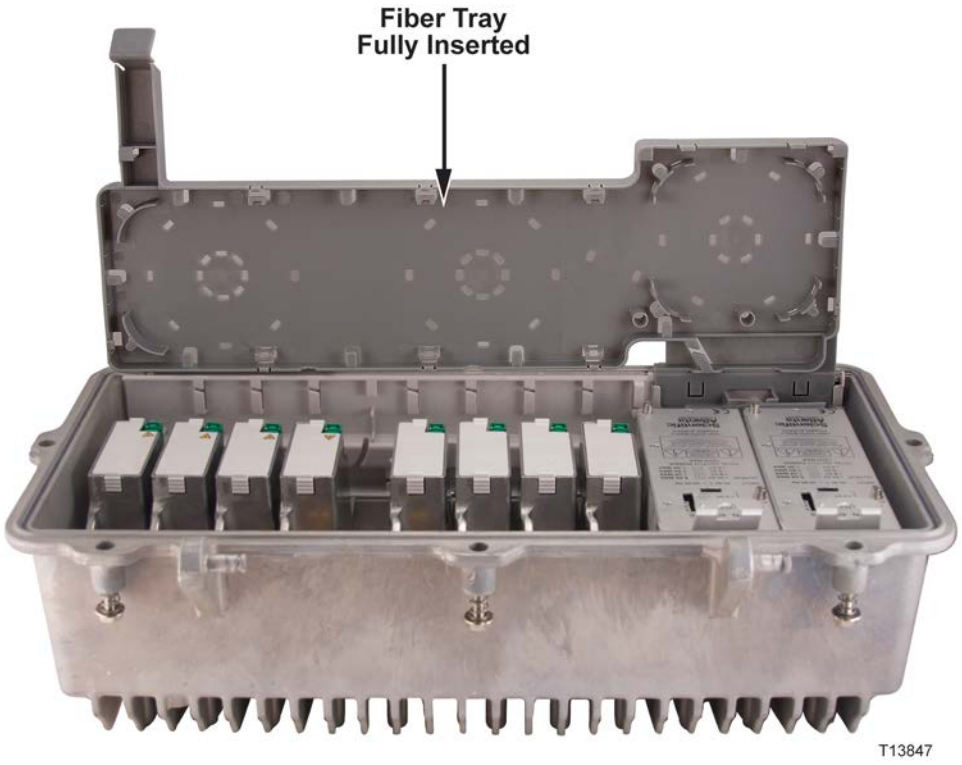
4 Insert the expanded fiber tray part way into the node lid as shown in the following illustration.



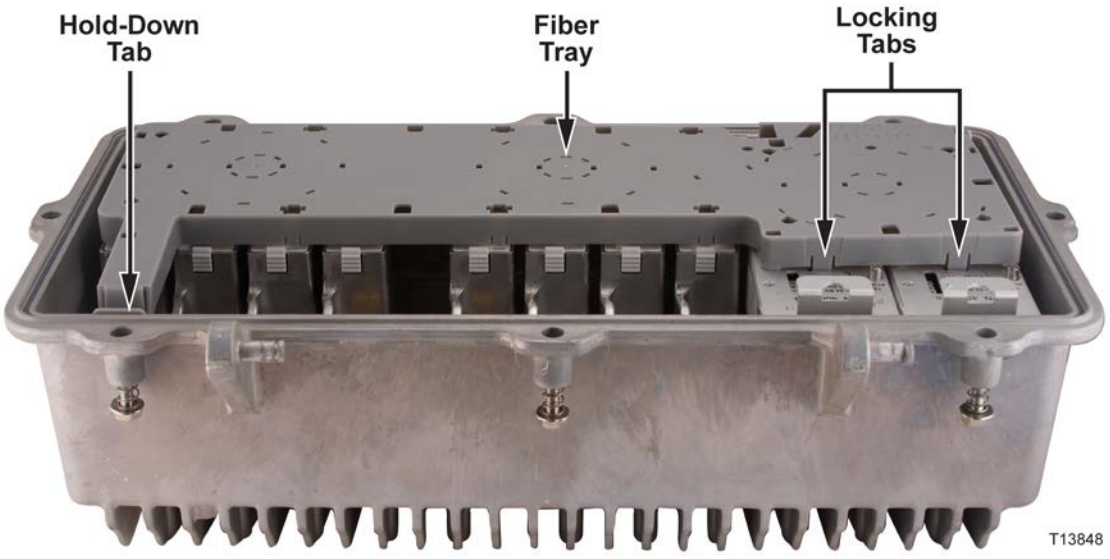
Important:

- Make sure that the fiber tray fits into the two guide slots in the fiber track near the power supplies.
- Make sure that the fingers and locking tabs on the other end of the fiber tray are inserted between the fiber track and the aluminum node housing.

5 Push down on the fiber tray housing until the fiber tray snaps into place and is fully inserted into the node as shown in the following illustration.



6 Pivot the fiber tray down and snap it into place on top of the power supplies with its locking tabs and in the node lid with its hold-down tab as shown in the following illustration.



Fiber Management System

Overview

The fiber management system is made up of a fiber tray and a fiber routing track. The fiber tray provides a convenient location to mount passive devices and store excess fiber. The tray is hinged to allow it to move out of the way during the insertion of the fibers and for installation or replacement of the various node modules. The fiber routing track provides a channel for routing fiber pigtails to their appropriate optical modules as well as a location to snap in unused fiber connectors for storage.

The expanded fiber tray provides various clips to hold passive devices and bulkhead adaptors neatly in the tray while providing easy access. An indexed pattern of mounting slots in the tray allows you to install a variety of components in the tray in various configurations. Several features are incorporated into the tray to provide fiber protection and aid in maintaining the proper bend radius of the fiber. A sheet of blank, stick-on, labels is also included for use in identifying the installed components and configuration.

Quality fiber management focuses on four key areas, as follows:

- Maintaining fiber bend radius
- Proper fiber routing
- Connectors and bulkhead access
- Fiber protection

These topics are discussed in detail in the next sections.

Maintaining Fiber Bend Radius

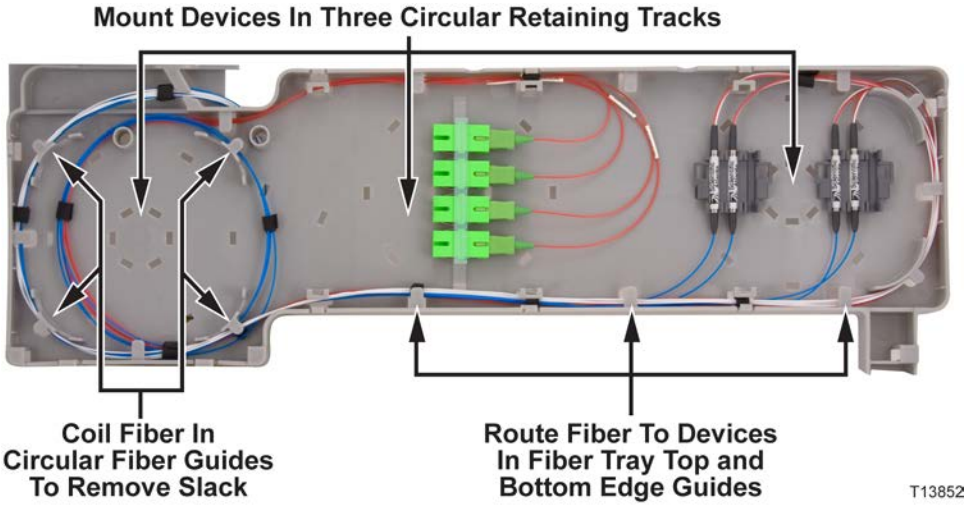
Observe the following considerations regarding fiber bend radius:

- Bent fibers can induce higher losses that can lead to signal degradation and service disruption.
- Current industry standards call for a minimum bend radius of 1.5 inches (38 mm).
- Using bend insensitive fiber, as defined in ITU-T G.657.A, can allow for a smaller bend radius. However, this does not diminish the need to control fiber bends.
- The expanded fiber tray provides several guide walls for spooling and routing fiber. Use these guides to maintain the bend radius of the fiber.

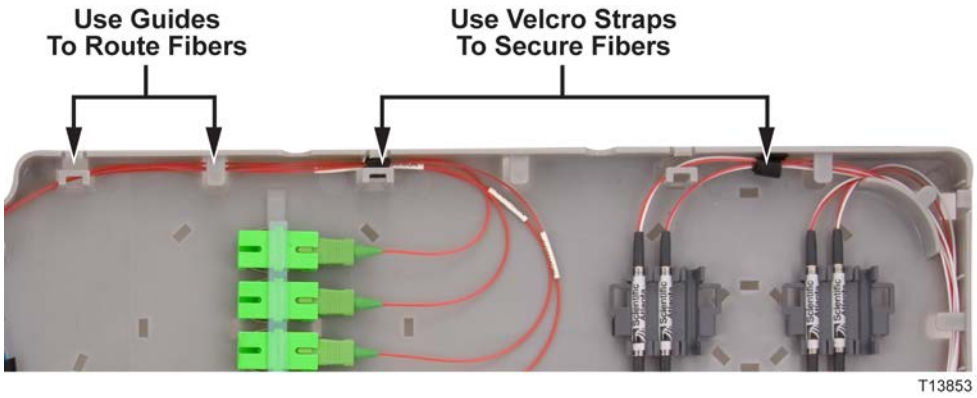
Proper Fiber Routing

Observe the following considerations regarding fiber routing:

- Poor fiber routing is a major cause of bend radius violations.
- Proper fiber routing provides well-defined paths, making it easier to access individual fibers.
- Easy to follow paths aid technicians in performing fiber tracing, testing, and reconfiguration.
- When fiber is not managed, slack fiber tends to become entangled, making tracing and rearrangement difficult.
- The expanded fiber tray provides fiber guides to contain slack fiber. Slack fiber can be coiled in a circular fashion using the guides on the left side of the tray, or by routing through the guides on the outer edge of the tray.



- The FIBER guides are designed to allow Velcro tie-down straps to be looped through the posts to further maintain neat fiber placement.



Connector and Bulkhead Access

Observe the following considerations regarding connector and bulkhead access:

- Connector access is critical for reconfiguration, testing, maintenance, and troubleshooting.
- The expanded fiber tray provides a clip which can accommodate up to four SC-type bulkhead adapters, and a smaller clip which can hold up to two SC-type bulkhead adapters.
- The clips can be placed in any one of the three circular retaining tracks in various orientations.

Fiber Protection

Observe the following considerations regarding fiber protection:

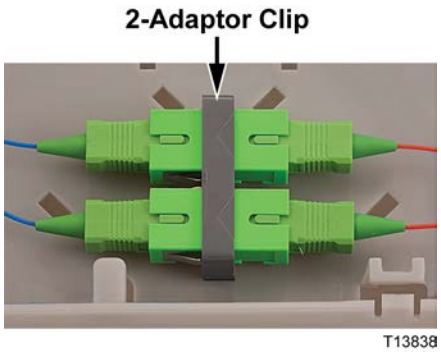
- Fibers are subject to serious damage from mishandling that can cause pinching and bending of the fiber beyond its capabilities.
- The expanded fiber tray comes with a clear protective cover. After fibers have been properly routed in the tray, the cover should be closed and locked in position with the locking tabs before stowing the tray in the node.
- Always route fibers in the tray using the fiber guides located about the tray periphery. This will retain the fiber within the tray and prevent inadvertent displacement or pinching of the cable when opening or closing the node.
- The mounting surface of the tray faces downward in the stowed position and upwards when the tray is in the access position, thereby discouraging inadvertent contact with the fibers and passive devices.

Passive Device and Bulkhead Mounting

Mounting clips are provided for installing available passive devices and bulkhead adaptors. These clips can be used to mount devices in various orientations in any of the three circular retaining tracks in the expanded fiber tray. The following illustrations show the available mounting clips.

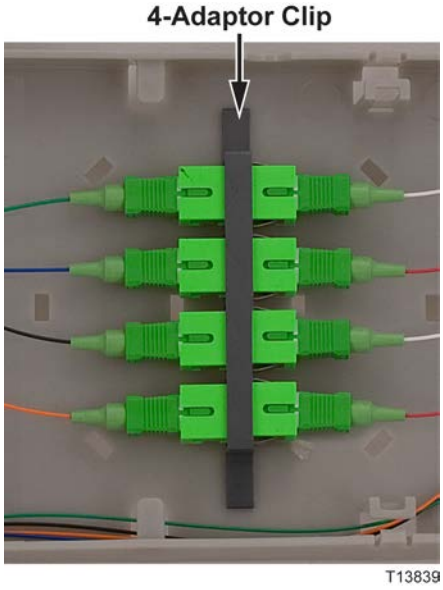
2-Adaptor Clip

The following illustration shows a 2-adaptor clip for bulkhead adaptors.



4-Adaptor Clip

The following illustration shows a 4-adaptor clip for bulkhead adaptors.

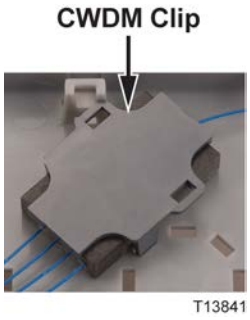


3-Cartridge Clip

The following illustration shows a 3-cartridge clip holding raw WDM cartridges.

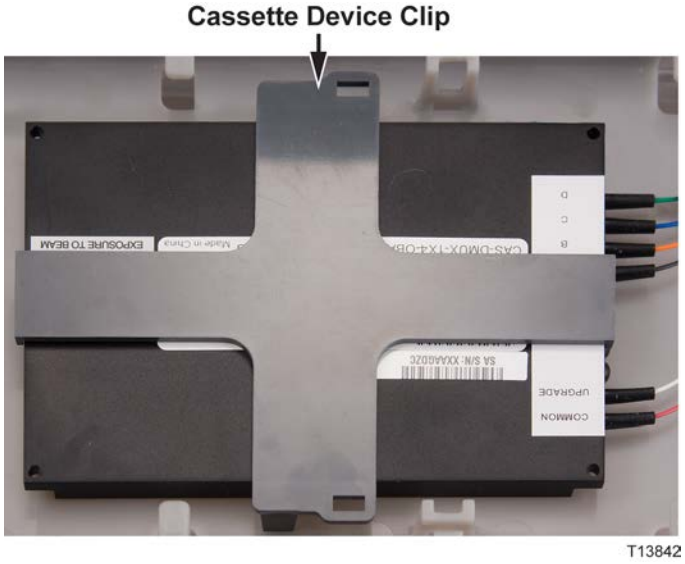
CWDM Clip

The following illustration shows a CWDM clip.



Cassette Device Clip

The following illustration shows a cassette device clip holding a demultiplexer.



Fiber Installation

Installation Procedure

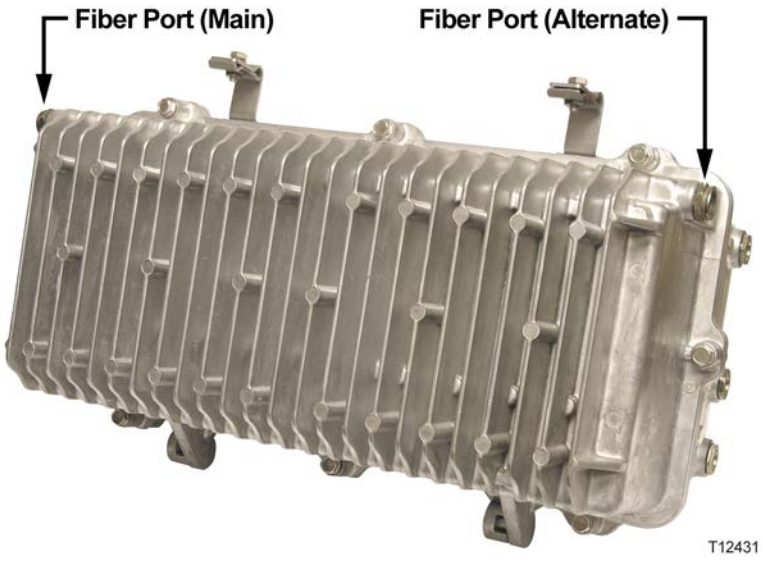
Install fiber optic cable in the node as described below.

WARNING:

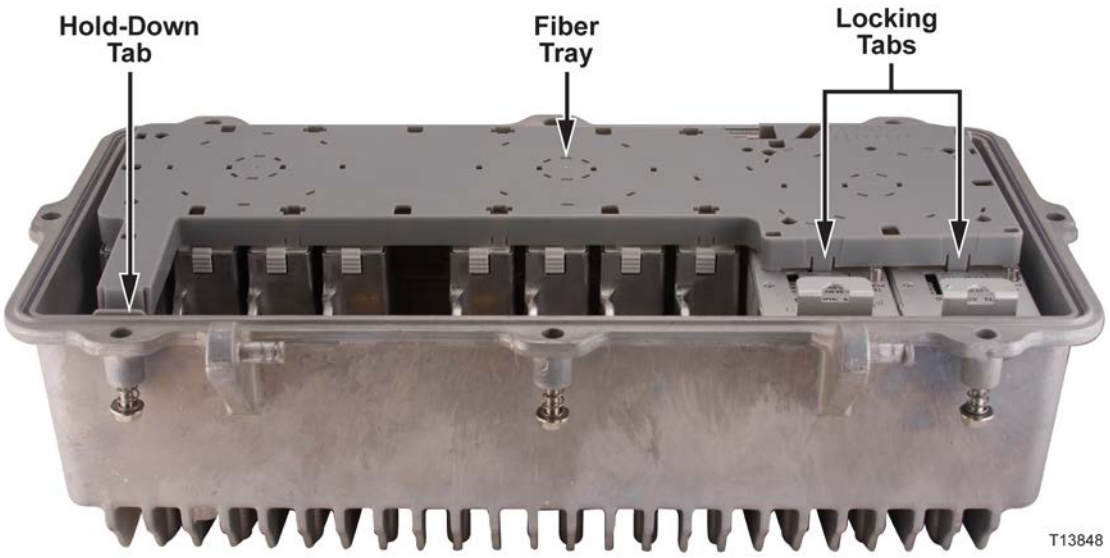
Laser light hazard. The laser light source on this product emits invisible laser radiation. Avoid direct exposure. Never look into the end of an optical fiber or connector. Failure to observe this warning can result in eye damage or blindness.

- Do not apply power to this product if the fiber is unmated or unterminated.
- Do not stare into an unmated fiber or at any mirror-like surface that could reflect light that is emitted from an unterminated fiber.
- Do not view an activated fiber with optical instruments.

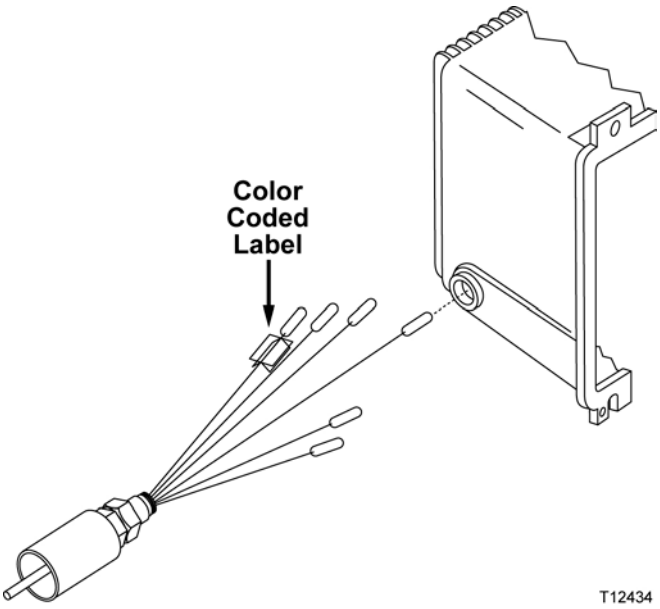
1 Select the main or alternate fiber connection port for use and remove its sealing plug.



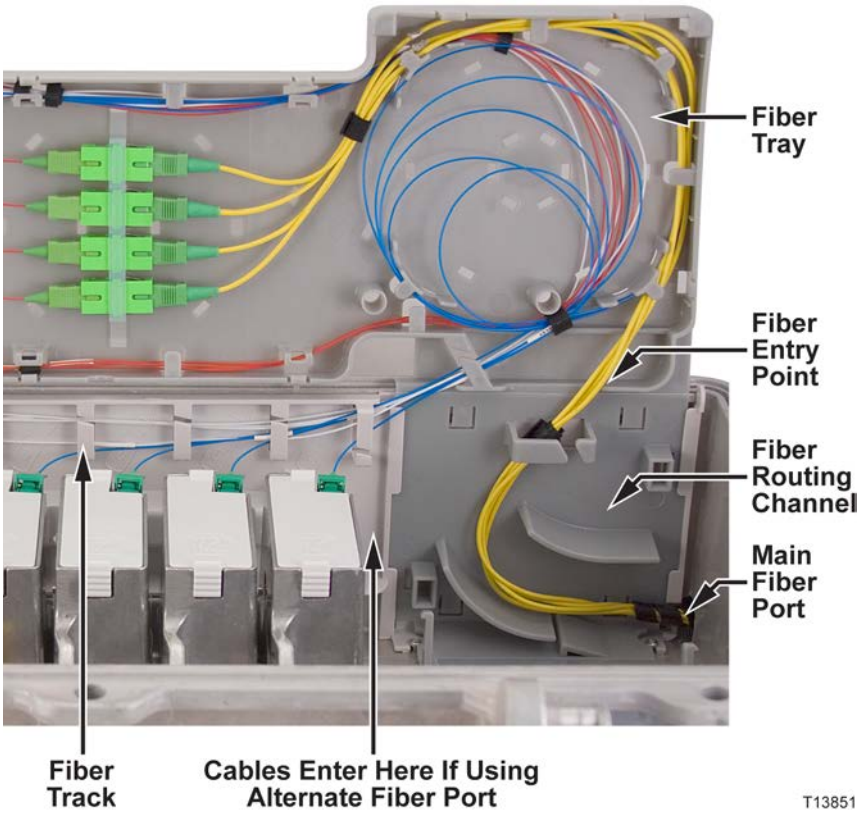
2 Push in the two locking tabs at the top of the fiber tray (over the power supplies) and lift up at the hold-down tab to swing the fiber tray up and back to allow a clear view of the fiber routing channel below.



3 One at a time, carefully insert fibers with attached connectors through the fiber connection port, the fiber channel, and then up and through the fiber entry point in the bottom of the fiber tray. Do not bend or kink fibers.

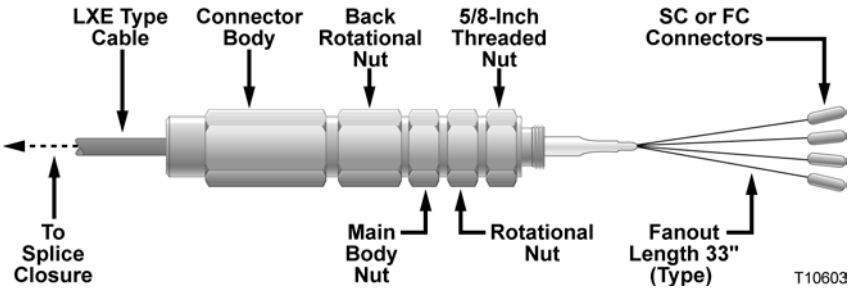


Note: Though not necessary, you can also remove the power supplies and open the fiber routing channel cover for additional access, as shown in the following illustration.



Note: If using the alternate (right-side) fiber connection port, you have to route the fibers through the fiber channel in the fiber track located underneath the unused fiber holders.

4 Hold the connector body to prevent rotation of the connector or fibers.



5 Carefully thread the 5/8-inch threaded nut into the threaded hole of the fiber port. Tighten to 20 to 25 ft-lbs (27.1 to 33.9 Nm).

6 Firmly tighten the rotational nut against the 5/8-inch threaded nut.

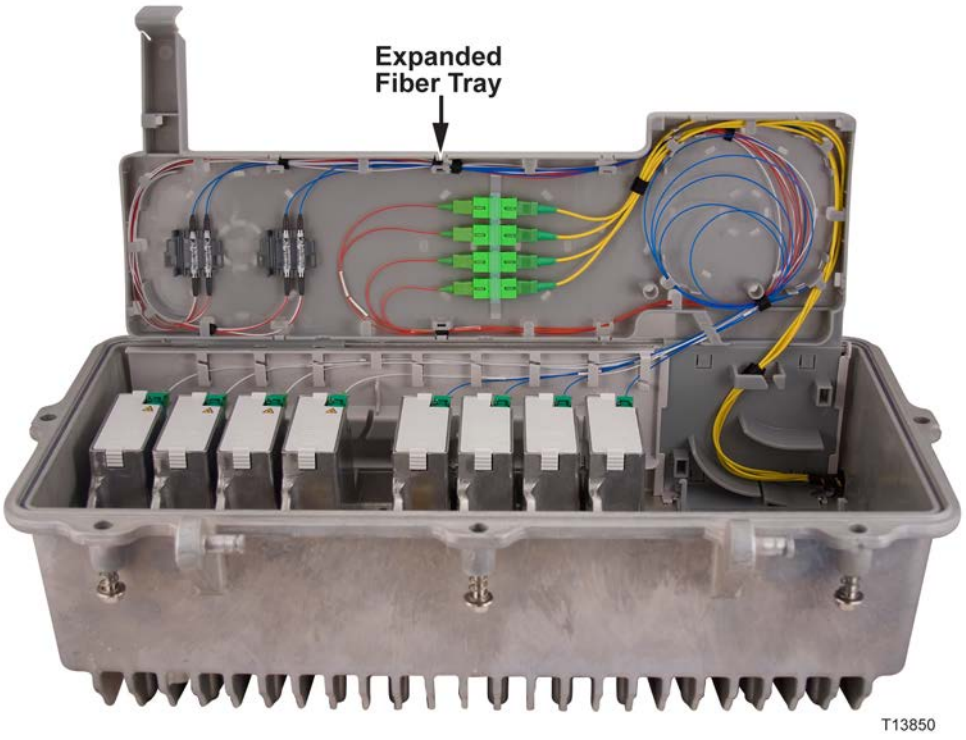
7 Push heat shrink tubing over the connector and fiber port and shrink in place.

8 Identify individual fibers according to their color code and determine to which receiver or transmitter module each fiber will connect.

9 Re-install the power supplies in the node.

10 Open the fiber tray clear cover and carefully wind the fibers around the circular fiber guides at the fiber entry side of the tray.

11 Arrange the fibers so that each one can reach its intended bulkhead adapter in the fiber tray or its intended module (transmitter, receiver, etc.) in the node. Use the various fiber guides in the tray to properly adjust the fiber length and maintain the proper bend radius. Refer to ***Fiber Management System*** (on page 6) for more information. See the following sample fiber routing illustration for an example.



12 Before connection, carefully clean the optical connectors on the fiber, module, or bulkhead adaptor according to the optical connector manufacturer's recommended procedures.

13 Carefully slide the fiber connector into the module connector or bulkhead adapter until it clicks.

14 Repeat steps 11 through 13 for each fiber.

15 Close the fiber tray clear cover and press down at the cover locking tabs on the periphery of the tray to secure the cover in place.

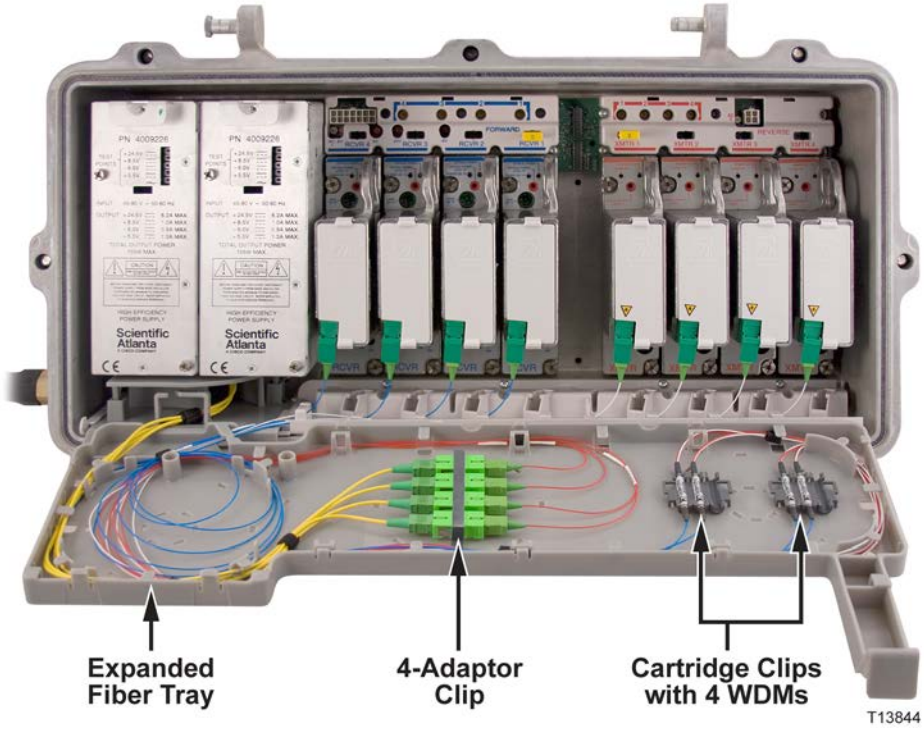
16 Pivot the fiber tray back down and snap it into place on top of the power supplies with its locking tabs and in the node lid with its hold-down tab.

17 Splice fiber pigtail of optical fiber input cable to your splice enclosure.

Configuration Examples

WDM Configuration Example

The following illustration shows a cartridge style WDM configuration of the expanded fiber tray.

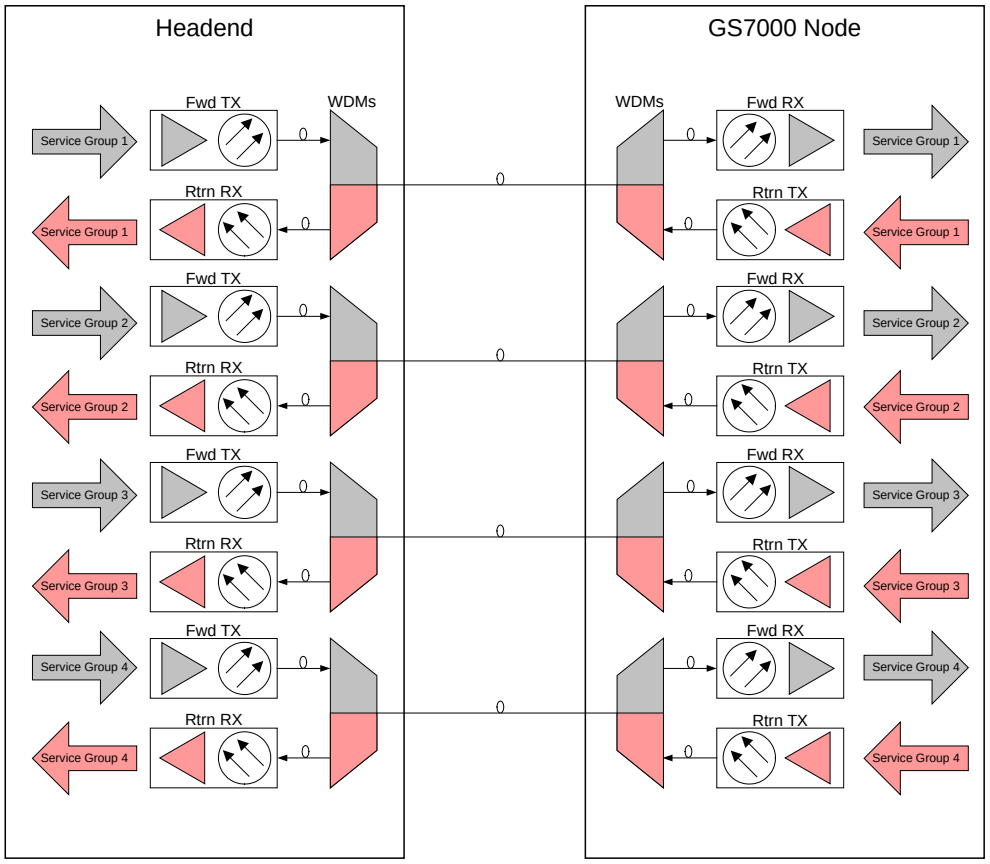


This application is used to fully segment the Model GS7000 4-Port Node when limited fiber counts are available, or as means to conserve fibers for future use.

The Model GS7000 Node comes with several optical module options to help you combine 2x2, 3x3, and 4x4 forward and return segments utilizing coarse wave division multiplexing (CWDM), dense wave division multiplexing (DWDM), and available analog or digital laser options.

With the use of four 1310 nm/1550 nm WDMs or four 1310 nm CWDMs installed in the node's expanded fiber tray, the 1310 nm forward path signals can be combined with the DWDM or CWDM return signals to achieve full 4x4 segmentation with half the quantity of fibers.

Note: This solution requires WDM modules at headend as shown in the following illustration.



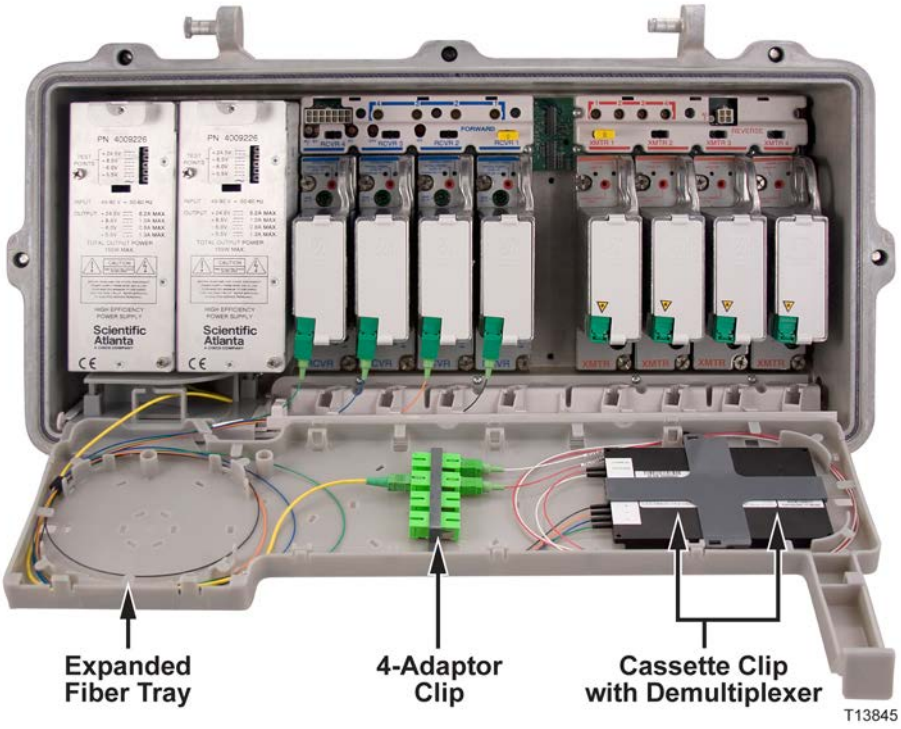
Multi-Wave O-Band Demultiplexer Configuration Example

As the demand for bandwidth continues to grow and clusters of homes decrease into smaller serving areas, networks can become capacity constrained or "fiber starved." A cost-effective approach to solving this problem uses multiple wavelengths on a single fiber.

The Prisma II™ Multi-Wavelength (O-Band) system solution enables dramatic bandwidth increase over a single optical fiber. This system uses forward transmitters capable of co-propagating multiple wavelengths in the 1320 nm to 1335 nm window down a single fiber using wavelength division multiplexing (WDM), with each transmitter carrying a full RF load.

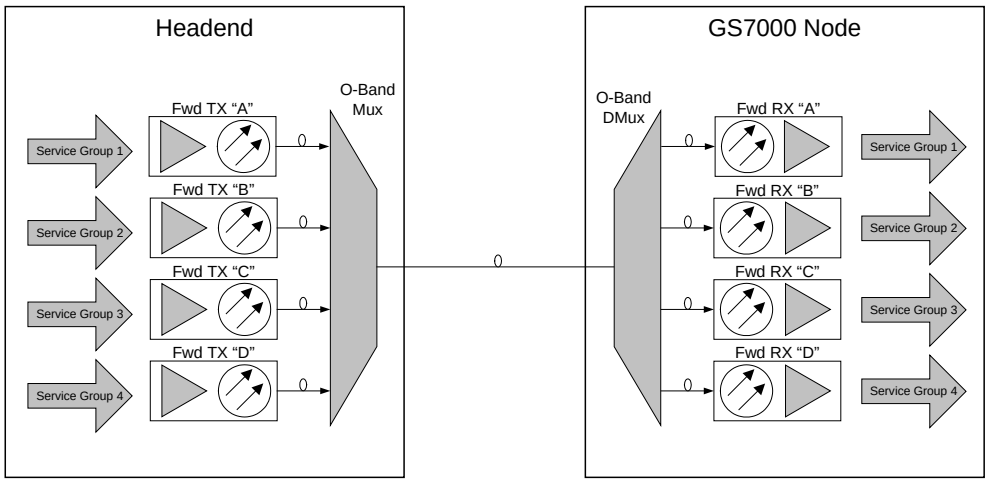
The multi-wavelength solution is ideal for segmentation of node service areas because they enable the reuse of existing fiber up to six times, over distances of up to 30 kilometers.

The following illustration shows a cassette style O-Band demultiplexer configuration of the expanded fiber tray.



Using the O-Band demultiplexer in the expanded fiber tray, the four multiplexed 13xx multi-wave forward path signals are demultiplexed and feed into the four individual receiver modules to achieve 4x forward segmentation with a single fiber.

Note: This solution requires an O-Band multiplexer at the headend as shown in the following illustration.



For Information

If You Have Questions

If you have technical questions, call Cisco Services for assistance. Follow the menu options to speak with a service engineer.

Cisco Systems, Inc.
5030 Sugarloaf Parkway, Box 465447
Lawrenceville, GA 30042

678 277-1120
800 722-2009
www.cisco.com

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