



Cisco 1.2 GHz GainMaker Line Extender RF Split Upgrade Application Note

Overview

Introduction

As cable operators experience an exponential rise in the requirements for more reverse path bandwidth due to the popularity of advanced, on-demand services from an increasing number of subscribers, operators need an upgrade path for deployed equipment to overcome this operational challenge.

Purpose

This application note describes the RF split upgrade procedure for 1.2 GHz GainMaker® Line Extenders.

You will note that the final instruction in the split change process calls for the verification of forward and reverse signal for each port. This verification is included to ensure that all component replacements with respect to the split upgrade were performed correctly and to ensure that all replacement components perform as specified. Making this type of significant product change in the field rather than in a test environment would likely cause additional network downtime as troubleshooting any sort of issue associated with the upgrade could be quite time consuming.

While our line extender products would generally perform acceptably without this verification, we recommend this extra step to ensure that our products meet customer expectations immediately upon placement into service.

Should you need assistance with your upgrade, contact Cisco for support.



WARNING:

Avoid electric shock. Opening or removing this equipment cover may expose you to dangerous voltages. RF split upgrades should only be conducted on line extenders that have been removed from the cable system, not on line extenders actively in service.

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.

Related Publications

You may find the following publications useful as you implement the procedures in this document.

- *Cisco 1.2 GHz GainMaker Line Extender Installation and Operation Guide*

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Before You Begin

Before you start the upgrade procedure, make sure you have all the components, tools, and equipment ready.

Components Required to Make the Split Change

Note: Part numbers differ depending on desired final split.

- High Pass Filter Trim
- Low Pass Filter Trim
- Forward Trim
- Reverse Trim
- Mirrored Diplex Filters
- Non-mirrored Diplex Filters
- Part number label

Tools and Equipment Required to Make the Split Change

- 1/2-inch socket driver
- Torx T-15 screwdriver
- Cross screwdriver
- Flat-head screwdriver
- Torque wrench with 1/2-inch socket

Upgrading the RF Split in the GainMaker Line Extender

Using spare or in-stock units, perform these steps to upgrade out-of-service units. Use the upgraded units to replace in-service units, which then become the next units for upgrade and swap procedures.



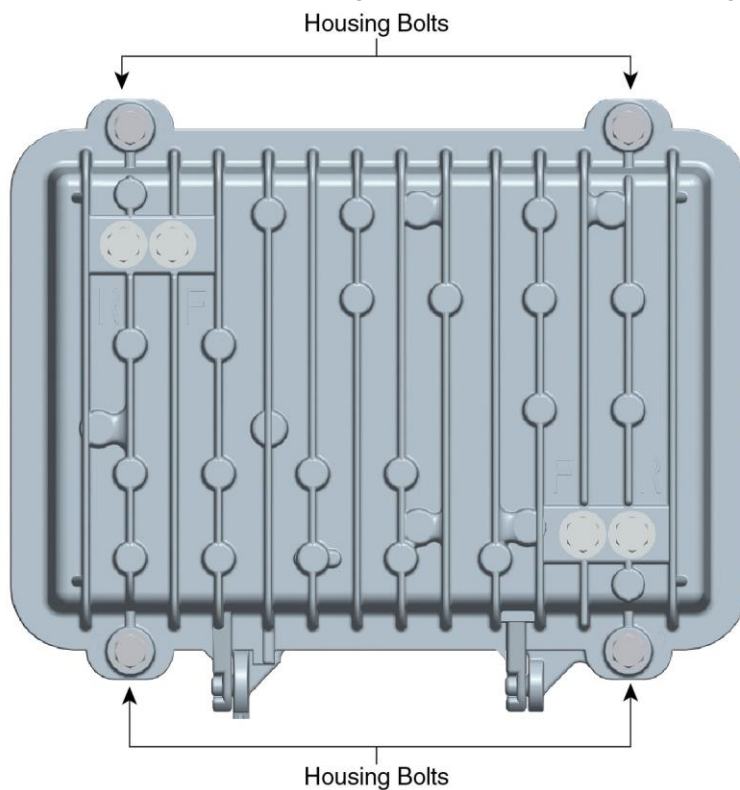
CAUTION:

To prevent electrostatic discharge (ESD) to electronic equipment, take ESD precautions, including the use of an ESD wrist or ankle strap or an anti-static mat.

Important: Before unscrewing the housing bolts, make sure the removable locking screw in the hinge is in place and secure. The locking screw prevents separation of the lid from the base.

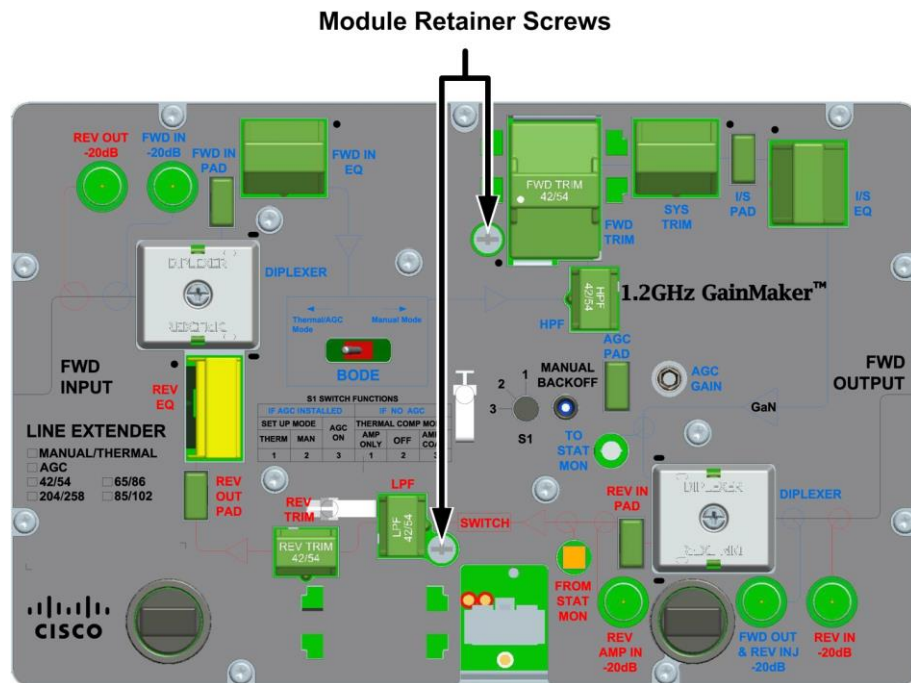
Removing the Line Extender Module from the Housing

- 1 Unscrew the 1/2-inch housing closure bolts on the housing lid until they are loose.



- 2 Open the housing.
Note: The closure bolts will remain attached to the housing.

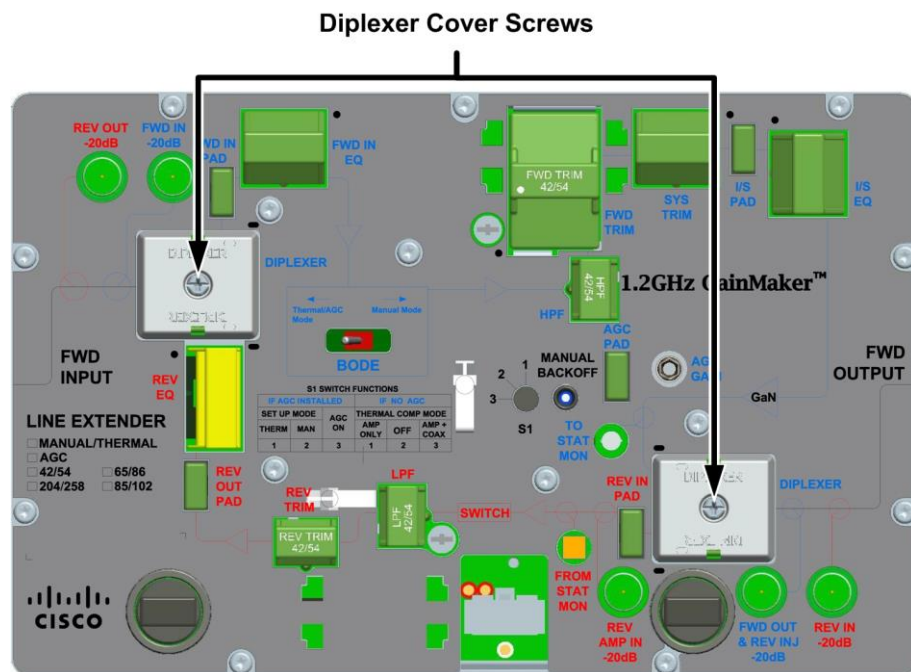
- 3 Unscrew the two line extender module retainer screws.



- 4 Remove the line extender module from the housing.

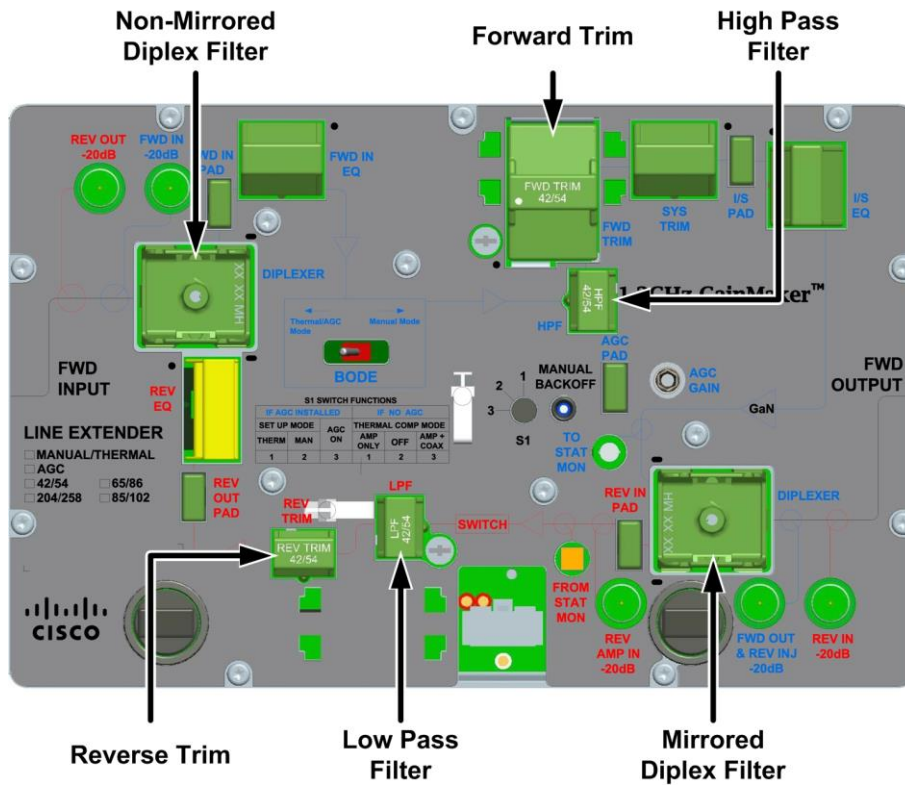
Upgrading the Line Extender Module

- 1 Remove the diplexer covers by removing the diplexer cover screws using a flat-head screwdriver or cross screwdriver.



Upgrading the RF Split in the GainMaker Line Extender

- Remove the two (2) diplexer using the plastic handle on the component. There is one (1) “mirrored” (blue PCB material) and one (1) “non-mirrored” (green PCB material) diplexer.



- Install two (2) new diplexer, being careful to match the location of “mirrored” and “non-mirrored” diplexer.



- Remove the Forward Trim using the plastic handle on the component.
- Install the new Forward Trim. Take caution to avoid bending any of the pins on this component during installation.

- 6 Remove the High Pass Filter Trim using the plastic handle on the component.
- 7 Install the new High Pass Filter Trim.
- 8 Remove the Low Pass Filter Trim using the plastic handle on the component.
- 9 Install the new Low Pass Filter Trim.
- 10 Remove the Reverse Trim using the plastic handle on the component.
- 11 Install the new Reverse Trim. Take caution to avoid bending any of the pins on this component during installation.
- 12 Using a flat-head screwdriver or cross screwdriver, replace the diplexer covers and tighten the diplexer cover screws from 5.3 in-lb to 7.1 in-lb (0.6 Nm to 0.8 Nm).
Important: Install the diplexer cover properly, or RF signal degradation may result.
- 13 Change the split indicator information on the cover to reflect the new split configuration by either moving the adhesive dot to the proper designation OR remove the dot and use a permanent marker to designate the new configuration. You should update the part number label on the module to reflect the new split.
- 14 Configure the line extender in the same configuration as the one it is intended to replace in the field (i.e., same attenuator pads, forward/reverse EQ values, and same AGC / Thermal / Manual setting).
- 15 All S parameters on each port in the forward and reverse band should be verified using a network analyzer.



CAUTION:

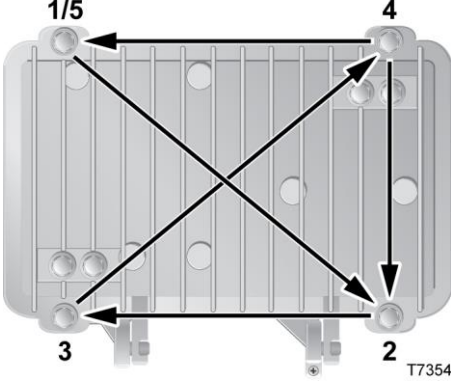
Modifying a line extender's split characteristics will impact the available channel lineup downstream from the upgraded line extender.

Note: Properly dispose of all parts you remove to protect the environment and to avoid their re-use, which could impact network performance.

Installing the Line Extender Module in the Housing

- 1 Insert the upgraded line extender module into the housing.
- 2 Secure the line extender module to the housing by tightening the module retainer screws with a screwdriver from 6 in-lb to 9 in-lb (0.7 Nm to 1.0 Nm).
- 3 Inspect the housing gasket and all mating surfaces. Wipe off any excess dirt and debris.
- 4 Close the housing and finger-tighten all closure bolts.
- 5 Use a torque wrench with a 1/2-inch socket to tighten each closure bolt from 5 ft-lb to 12 ft-lb (6.8 Nm to 16.3 Nm).
- 6 Follow the numbered tightening sequence to tighten the closure bolts.

Upgrading the RF Split in the GainMaker Line Extender



If You Have Questions

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

Access your company's extranet site to view or order additional technical publications. For accessing instructions, contact the representative who handles your account. Check your extranet site often as the information is updated frequently.



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