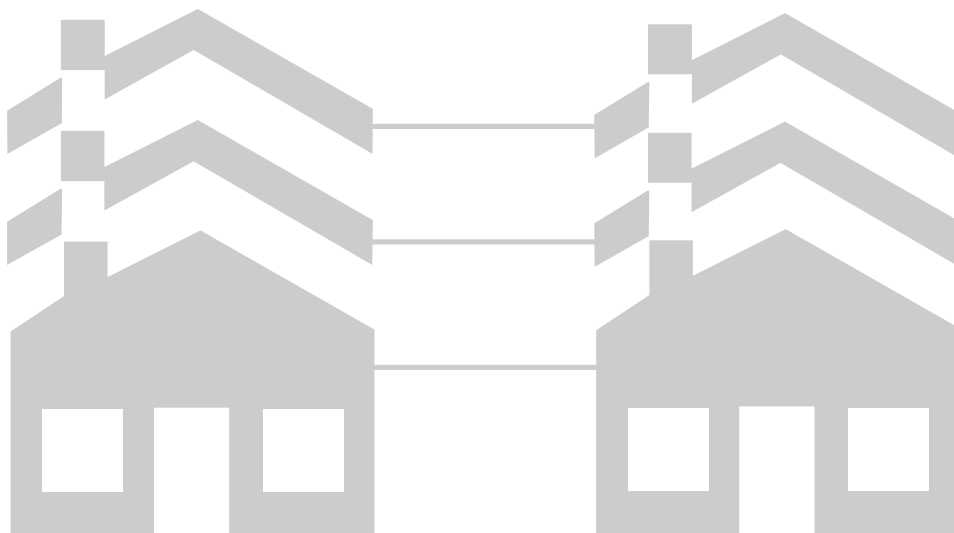




## *750 MHz System Amplifier III*

- *Low Gain Dual*
- *High Gain Dual*



**Please read this entire guide**

**Veillez lire entièrement ce guide**

**Bitte das gesamte Handbuch durchlesen**

**Sírvase leer completamente la presente guía**

**Si prega di leggere completamente questa guida**

---

**Important**

Please read this entire guide before you install or operate this product. Give particular attention to all safety statements.

---

**Important**

Veillez lire entièrement ce guide avant d'installer ou d'utiliser ce produit. Prêtez une attention particulière à toutes les règles de sécurité.

---

**Zu beachten**

Bitte lesen Sie vor Aufstellen oder Inbetriebnahme des Gerätes dieses Handbuch in seiner Gesamtheit durch. Achten Sie dabei besonders auf die Sicherheitshinweise.

---

**Importante**

Sírvase leer la presente guía antes de instalar o emplear este producto. Preste especial atención a todos los avisos de seguridad.

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**Importante**

Prima di installare o usare questo prodotto si prega di leggere completamente questa guida, facendo particolare attenzione a tutte le dichiarazioni di sicurezza.

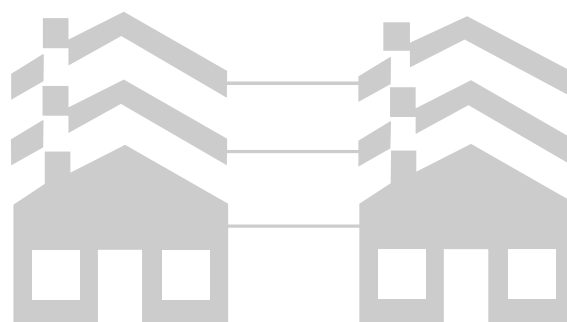
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Scientific  
Atlanta

## **750 MHz System Amplifier III Installation & Operation Guide**

- *Low Gain Dual*
- *High Gain Dual*



## Trademark Acknowledgments

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### Trademarks

*All brand and product names are trademarks or registered trademarks of their respective owners.*

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• Description of the 750 MHz System Amplifier III .....	1-2
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## Safety Precautions

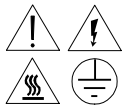
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### Protect yourself from electric shock and your system from damage!

This product complies with international safety and design standards.

- Observe all safety procedures that appear throughout this guide, and the safety symbols that are affixed to this product.
  - If circumstances impair the safe operation of this product, stop operation and secure this product against further operation.
- 

### Safety symbols



**Avoid personal injury and product damage! Do not proceed beyond any symbol until you fully understand the indicated conditions!**



**You will find this symbol in the literature that accompanies this product. This symbol indicates important operating or maintenance instructions.**



**You may find this symbol affixed to this product. This symbol indicates a live terminal; the flash points to the terminal device.**



**You may find this symbol affixed to this product. This symbol indicates a protective earth terminal.**



**You may find this symbol affixed to this product. This symbol indicates excessive or dangerous heat.**

---

### Power

**Important!** The power shunts must be removed before installing the unit into a powered housing. With the shunts removed, it reduces the power surge to the components and F-connectors.



**Caution:**

**RF connectors and housing seizure assemblies can be damaged if fuse shunts are not removed from the amplifier before installing or removing the amplifier module from the housing.**

---

*Continued on next page*

## **Safety Precautions, Continued**

---

### **Enclosure**

- Do not allow moisture to enter this product.
  - Do not open the enclosure of this product unless otherwise specified.
- 

### **Fuse**

Shunt fuses are provided with this product.

---

### **Service**

Refer service only to service personnel who are authorized by Scientific-Atlanta.

---



## Compliance

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### Electromagnetic compatibility



**Caution:**

**Any changes or modification to this equipment not expressly approved by Scientific-Atlanta can void the user's authority to operate this equipment.**

**FCC Part 76 Subpart K:** This equipment has been tested and found to comply with the limits for Part 76 of the FCC Rules. These limits provide reasonable protection against harmful interference when operating this equipment in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if the user does not install and use this equipment according to the instruction manual, it may cause harmful interference to radio communications.

---

## Warranty

---

### Statement

We warrant good title to any hardware furnished under this Contract. For software, we warrant that we have the right to grant any software license granted. We warrant that services will be performed in a good and workmanlike manner. We also warrant that during the Warranty Period as defined below, each Item we deliver (other than separately licensed software and services) will be free from material defects in workmanship and materials and under ordinary use, conform in all material respects to its published specifications current at the time the Item was shipped.

Items may include refurbished goods, subassemblies, or components which we warrant as provided in this Warranty section.

---

### Warranty period

The Warranty Period begins on the date the Item is delivered and extends for 12 months for hardware and 90 days for software, parts and services. We will repair or replace, at our option, any product returned to us by Customers at their expense during the Warranty Period, which fails to satisfy this Warranty, unless the failure was the result of shipping; improper installation, maintenance or use; abnormal conditions of operation; attempted modification or repair by the Customer; or an act of God. We will reperform any services which do not conform to this Warranty provided we have received notice of non-conformance within the Warranty Period.

---

### Limitation of liability

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NONINFRINGEMENT. CUSTOMER'S SOLE REMEDY FOR ANY BREACH OF WARRANTY IS THE REPAIR OR REPLACEMENT, AT OUR OPTION, OF THE FAILED ITEM. WE SPECIFICALLY DISCLAIM ANY AND ALL WARRANTIES, EXPRESS OR IMPLIED, TO CUSTOMERS OF THE CUSTOMER.

---

### Customer responsibility

Customer must pay packing, crating, and transportation costs to and from the factory.

At Customer's request, we will make reasonable efforts to provide warranty service at the Customer's premises, provided the Customer pays our then current rates for field services and the associated travel and living expenses.

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## Warranty, Continued

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### Claims under this warranty

In case of a claim under this warranty, Customer should do the following:

Step	Action
A	<ul style="list-style-type: none"><li>• Notify us by giving the Item model number, serial number and details of the difficulty.</li><li>• On receipt of this information, you will be given service data or shipping instructions.</li></ul>
B	<ul style="list-style-type: none"><li>• On receipt of shipping instructions, forward the Item prepaid.</li><li>• If the Item or fault is not covered by warranty, an estimate of charges will be furnished before work begins.</li></ul>

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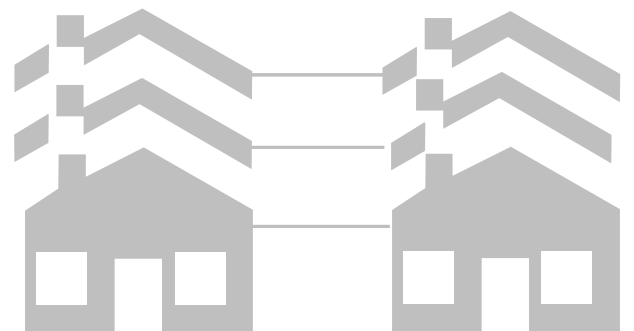
### Disclaimer

EXCEPT FOR CLAIMS FOR PERSONAL INJURY CAUSED BY ITEMS FURNISHED HEREUNDER, WE SHALL NOT BE LIABLE TO CUSTOMER OR ANY OTHER PERSON OR ENTITY FOR INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE, OR EXEMPLARY DAMAGES ARISING OUT OF OR IN CONNECTION WITH THIS TRANSACTION OR ANY ACTS OR OMISSIONS ASSOCIATED THEREWITH OR RELATING TO THE SALE OR USE OF ANY ITEMS OR SERVICES FURNISHED, WHETHER SUCH CLAIM IS BASED ON BREACH OF WARRANTY, CONTRACT, TORT OR OTHER LEGAL THEORY, AND REGARDLESS OF THE CAUSES OF SUCH LOSS OR DAMAGES OR WHETHER ANY OTHER REMEDY PROVIDED HEREIN FAILS. IN NO EVENT SHALL OUR TOTAL LIABILITY UNDER A CONTRACT EXCEED AN AMOUNT EQUAL TO THE TOTAL AMOUNT PAID FOR ITEMS PURCHASED UNDER SUCH CONTRACT.

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750 MHz System Amplifier III  
Installation and Operation Guide

# 1 Introducing the 750 MHz System Amplifier III



# Chapter 1

## Introducing the 750 MHz System Amplifier III

### Overview

---

#### In this guide

This guide is divided into three chapters and two appendices and contains the following information.

Topic	See Page
Chapter 1 - Introducing the 750 MHz System Amplifier III	1-1
Chapter 2 - Installing and Configuring the 750 MHz System Amplifier III	2-1
Chapter 3 - Balancing and Setup of the 750 MHz System Amplifier III	3-1
Appendix A - Technical Information	A-1
Appendix B - Customer Information	B-1

---

#### In this chapter

This chapter introduces you to the 750 MHz System Amplifier III (SAIII) and covers the following 750 MHz System Amplifier III modules.

- Low Gain Dual
- High Gain Dual

**Note:** Installation procedures for all models are very similar.

Topic	See Page
Description of the 750 MHz System Amplifier III	1-2
Types of System Amplifier IIIs	1-3
Low Gain Dual and High Gain Dual Accessories	1-4
Illustrations	1-6
Block Diagrams	1-8

---

## Description of the 750 MHz System Amplifier III

---

### Introduction

This section lists available System Amplifier III modules – Low Gain Dual and High Gain Dual – and provides open view illustrations of each amplifier type.

- The Low Gain Dual and High Gain Dual amplifiers have one output hybrid for the main output and one for the auxiliary outputs. The auxiliary hybrid can supply one or both auxiliary outputs – so the dual amplifiers can actually provide up to three outputs.
  - The standard power supply has a selectable AC undervoltage lockout feature.
    - The 30 volt lockout is for 60 volt systems (factory default).
    - The 40 volt lockout is for 90 volt systems (customer configurable via removable resistor).
- 

### Amplifier listing

The following amplifiers that are available are listed in the following table.

<b>Part Number</b>	<b>Amplification Split</b>	<b>Power Supply</b>	<b>Type</b>
562402	5 MHz to 40 MHz (Reverse) 51 MHz to 750 MHz (Forward)	60/90 volt	Low Gain Dual with standard gain reverse
562462	5 MHz to 40 MHz (Reverse) 51 MHz to 750 MHz (Forward)	60/90 volt	High Gain Dual with standard gain reverse
568071	5 MHz to 40 MHz (Reverse) 51 MHz to 750 MHz (Forward)	60/90 volt	High Gain Dual with high gain reverse
573360	5 MHz to 42 MHz (Reverse) 54 MHz to 750 MHz (Forward)	60/90 volt	Low Gain Dual with standard gain reverse

---

## Types of System Amplifier IIIs

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### Low Gain Dual and High Gain Dual

The 750 MHz Low Gain Dual and High Gain Dual System Amplifier IIIs have one input and two or three output ports. The number of output ports is determined by which one of the following is installed in the signal director position. In the jumper configuration, either the Aux 1 or Aux 2 output port can be selected as the second output port. The splitters or couplers activate both Aux 1 and Aux 2 ports.

- Jumper (part number 467778)
  - 3.5 dB splitter (part number 502110)
  - 8 dB directional coupler (part number 502115)
  - 12 dB directional coupler (part number 502120)
- 

### Configuration

The 40/51 MHz System Amplifier III modules are configured with a 5-40 MHz reverse amplifier. The 42/54 System Amplifier III module (Low Gain Dual) is configured with a 5-42 MHz reverse amplifier.

---

### Diplex filters

Both the High Gain Dual and Low Gain Dual have one common diplex filter for the Aux 1 and Aux 2 output ports, and one on the main port. The lowpass portions of all three diplex filters used in this amplifier are plug-in filters.

---

### Fuse shunts

Four fuse shunts, located near the center of the amplifier, are used to direct AC current to and from the desired ports.

---

## Low Gain Dual and High Gain Dual Accessories

---

### Overview

The Low Gain Dual and High Gain Dual System Amplifier III s are equipped to work with the following field installable, signal director, factory installed, and miscellaneous accessories.

---

### Field installable accessories

The following table contains the field installable accessories used with the Low Gain Dual and High Gain Dual System Amplifier IIIs, and the jumper wires that must be removed before installing each accessory.

Accessory	Part Number	Location/Jumper
Attenuator pads	Various	Various (see illustrations)/ no jumper(s)
Forward equalizer	501220 through 501234 and 540016 through 540018	EQ1/ no jumper
Cable simulator	562262 through 562269	EQ1/ no jumper
Variable reverse equalizer	511075, 511295, 511298	EQ2/W13
Fixed reverse equalizer	545107 through 545118	EQ2/W13
Thermal compensator/EQ	503100	A5/W1 Low Gain Dual A5/W6 High Gain Dual
Interstage EQ	511380	A5/W1 Low Gain Dual A5/W6 High Gain Dual
AGC module/EQ	Various	A5/W1, W6
System trim	Various	A7/W4 Low Gain Dual Trim/W4 High Gain Dual

---

*Continued on next page*



## Low Gain Dual and High Gain Dual Accessories, Continued

---

### Signal directors

The following table contains the signal directors used with the Low Gain Dual and High Gain Dual System Amplifier IIIs, and the jumper wires that must be removed before installing each accessory.

Accessory	Part Number	Location/Jumper
Jumper	467778	A4/ no jumper wire
Splitter	502110	A4/ no jumper wire
8 dB coupler	502115	A4/ no jumper wire
12 dB coupler	502120	A4/ no jumper wire

---

### Factory installed accessories

The following table contains the factory installed accessories used with the Low Gain Dual and High Gain Dual System Amplifier IIIs, and their locations in the amplifier.

Accessory	Part Number	Location
Reverse amplifier	544171 (low gain 5-40 MHz reverse) 539900 (high gain 5-40 MHz reverse) 573364 (low gain 5-42 MHz reverse)	A6 for all
Reverse filters	545499 (40 MHz) 573367 (42 MHz)	A1, A2, A3 for all

---

### Miscellaneous accessories

The following table contains the miscellaneous accessories used with the Low Gain Dual and High Gain Dual System Amplifier IIIs, and the jumper wires that must be removed before installing each accessory.

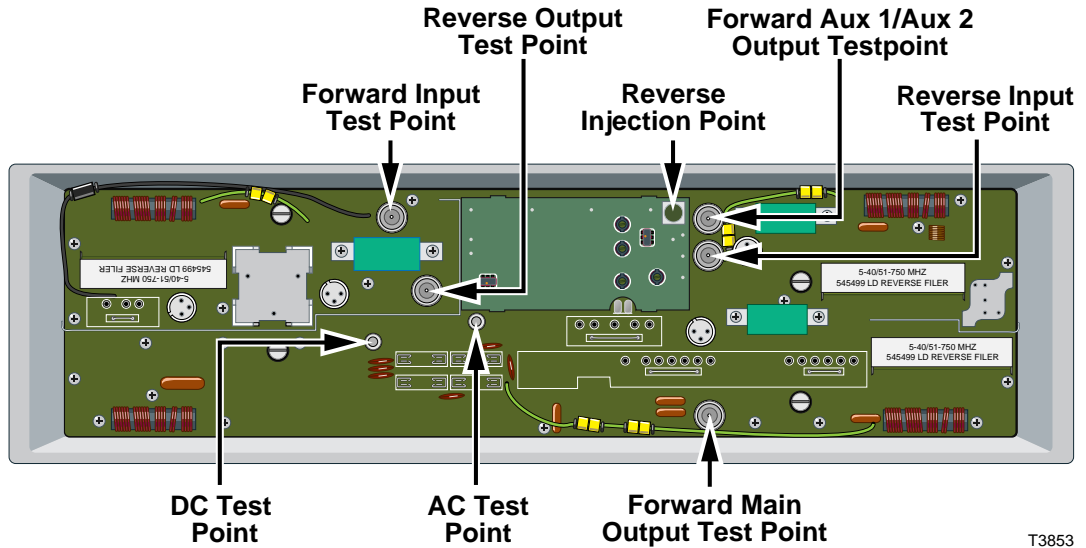
Accessory	Part Number	Location/Jumper
Surge protector	467351	A10/ no jumper wire
Status monitor	See Status Monitor manual	J5/ no jumper wire

---

## Illustrations

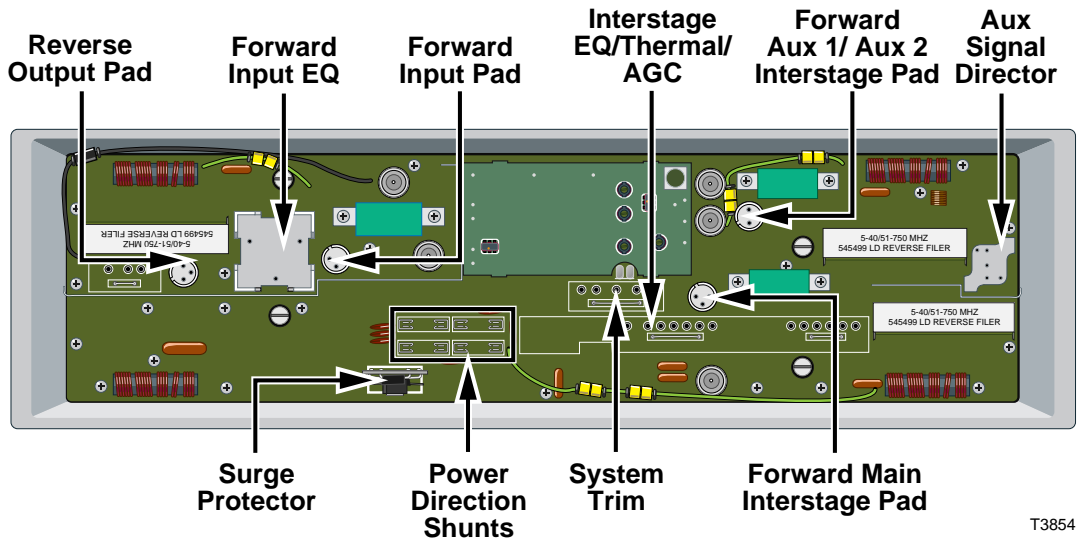
### Low Gain Dual test points

The following diagram shows the test points of the Low Gain Dual System Amplifier III with the reverse amplifier installed.



### Low Gain Dual accessories

The following diagram shows the accessories of the Low Gain Dual System Amplifier III with the reverse amplifier installed.

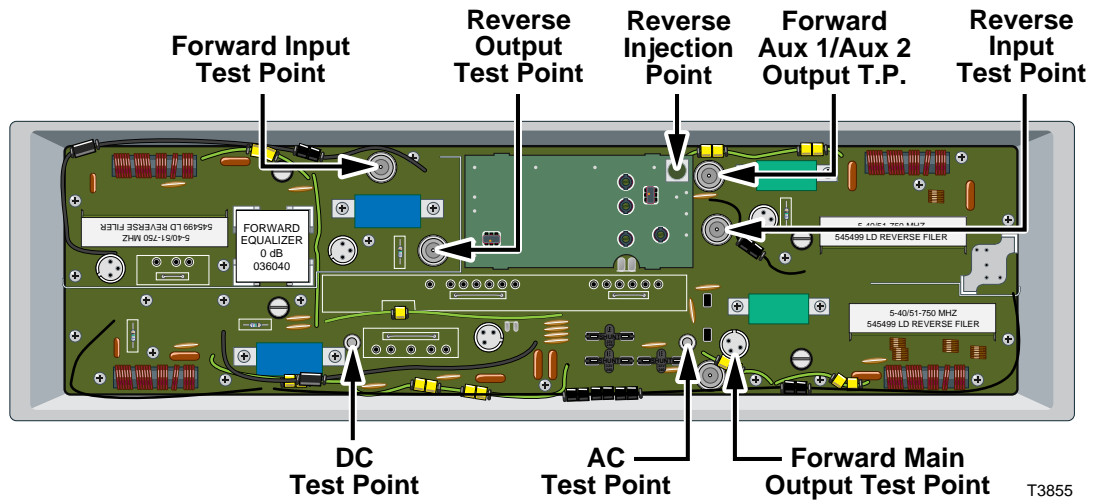


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## Illustrations, Continued

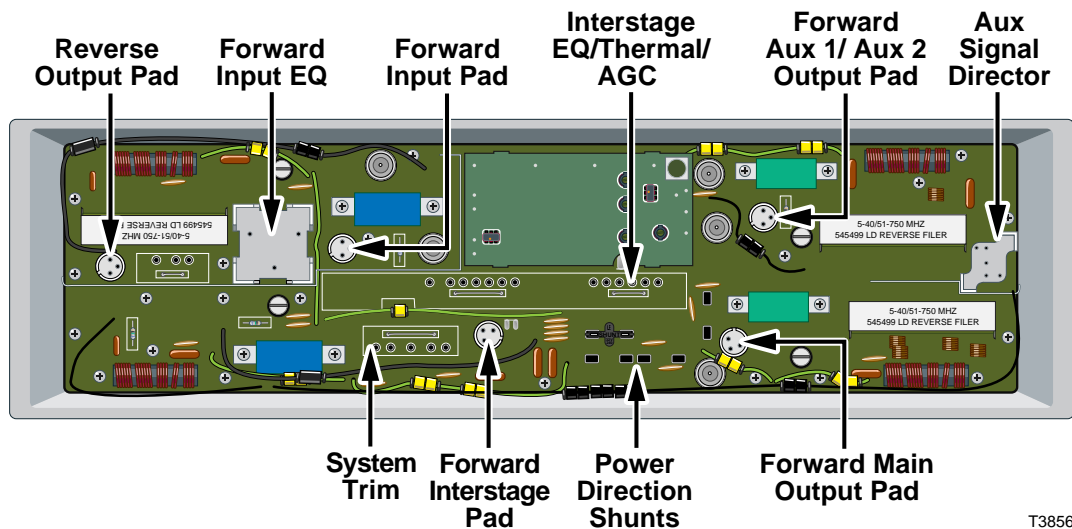
### High Gain Dual test points

The following diagram shows the test points of the High Gain Dual System Amplifier III with the reverse amplifier installed.



### High Gain Dual accessories

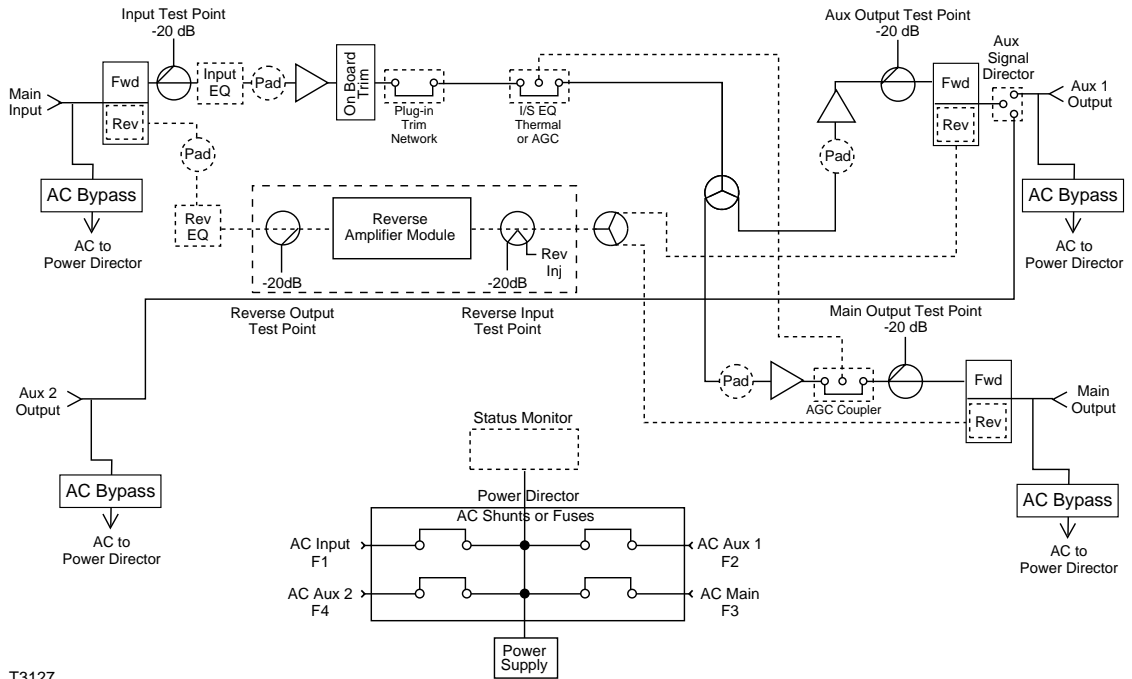
The following diagram shows the accessories of the High Gain Dual System Amplifier III with the reverse amplifier installed.



# Block Diagrams

## Low Gain Dual

The following diagram shows the block diagram of the 750 MHz Low Gain Dual Output System Amplifier III.



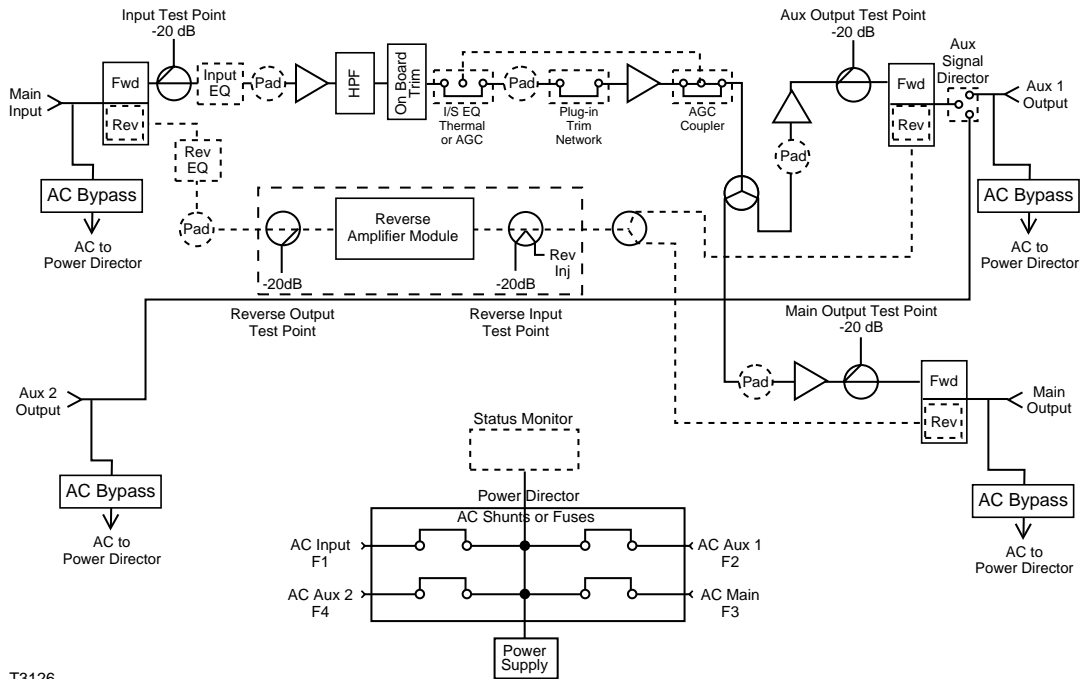
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## Block Diagrams, Continued

### High Gain Dual

The following diagram shows the block diagram of the 750 MHz High Gain Dual Output System Amplifier III.

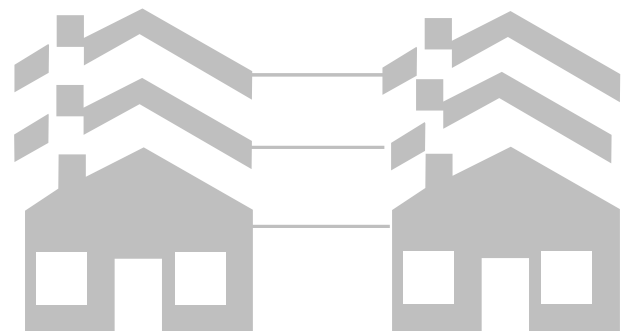


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750 MHz System Amplifier III  
Installation and Operation Guide

# 2

## Installing and Configuring the 750 MHz System Amplifier III



## Chapter 2

# Installing and Configuring the 750 MHz System Amplifier III

### Overview

---

#### Introduction

This chapter is divided into four sections and gives step-by-step instructions on installing and configuring the System Amplifier III (SAIII) in your cable system.

Section	Topic	See Page
A	Installing the Housing	2-2
B	Configuring the Amplifier Module	2-12
C	Installing the Amplifier Module	2-24
D	Illustrations	2-29

---

# Section A

## Installing the Housing

### Overview

---

#### Scope of this section

This section covers requirements and procedures needed to install the System Amplifier III housing in the distribution system and contains the following topics.

Topic	See Page
Before You Begin	2-3
Upgrading Existing Housing Seizures	2-6
Attaching Connectors	2-8
Attaching the Housing	2-10

---



## Before You Begin

---

### Overview

The procedures in this section assume you have completed the following:

- Prepared the installation site
  - Located the coaxial cable, with or without the pin-type coaxial connectors mounted on the cable
- 

### Required tools

Before you start, make sure you have the following tools.

- Torque wrench with a 1/2-in. socket
  - Heavy-duty wire cutters or snips
- 

### Blue label on housing

**Important!** The SAIII module is marked with a blue label to indicate 15 ampere capability. The RF connectors in this module are also blue. This module must be used in conjunction with the proper SAIII housing, which is also marked with a blue label.

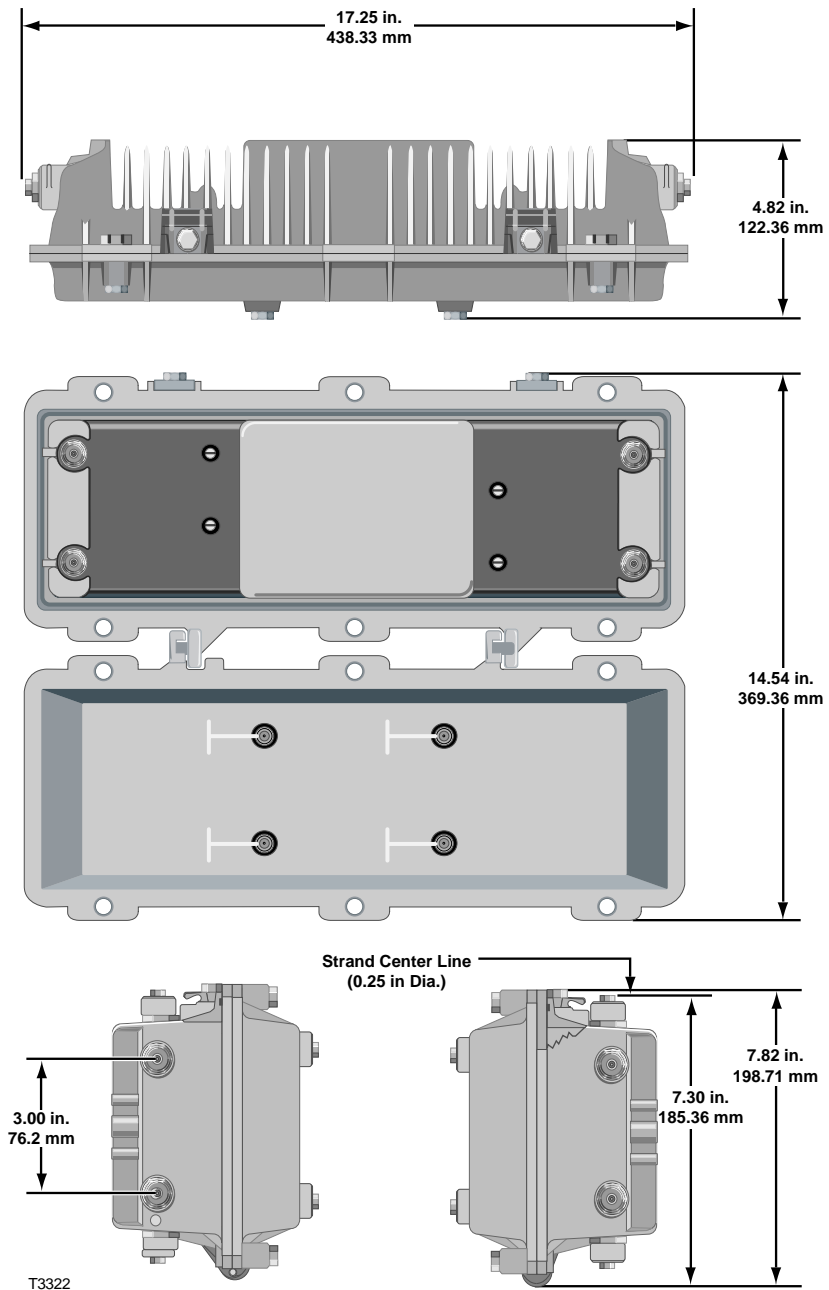
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## Before You Begin, Continued

### Measurements

The diagram below shows dimensions, in inches and millimeters, of the System Amplifier III housing. Use these measurements to calculate clearance requirements for your installation.

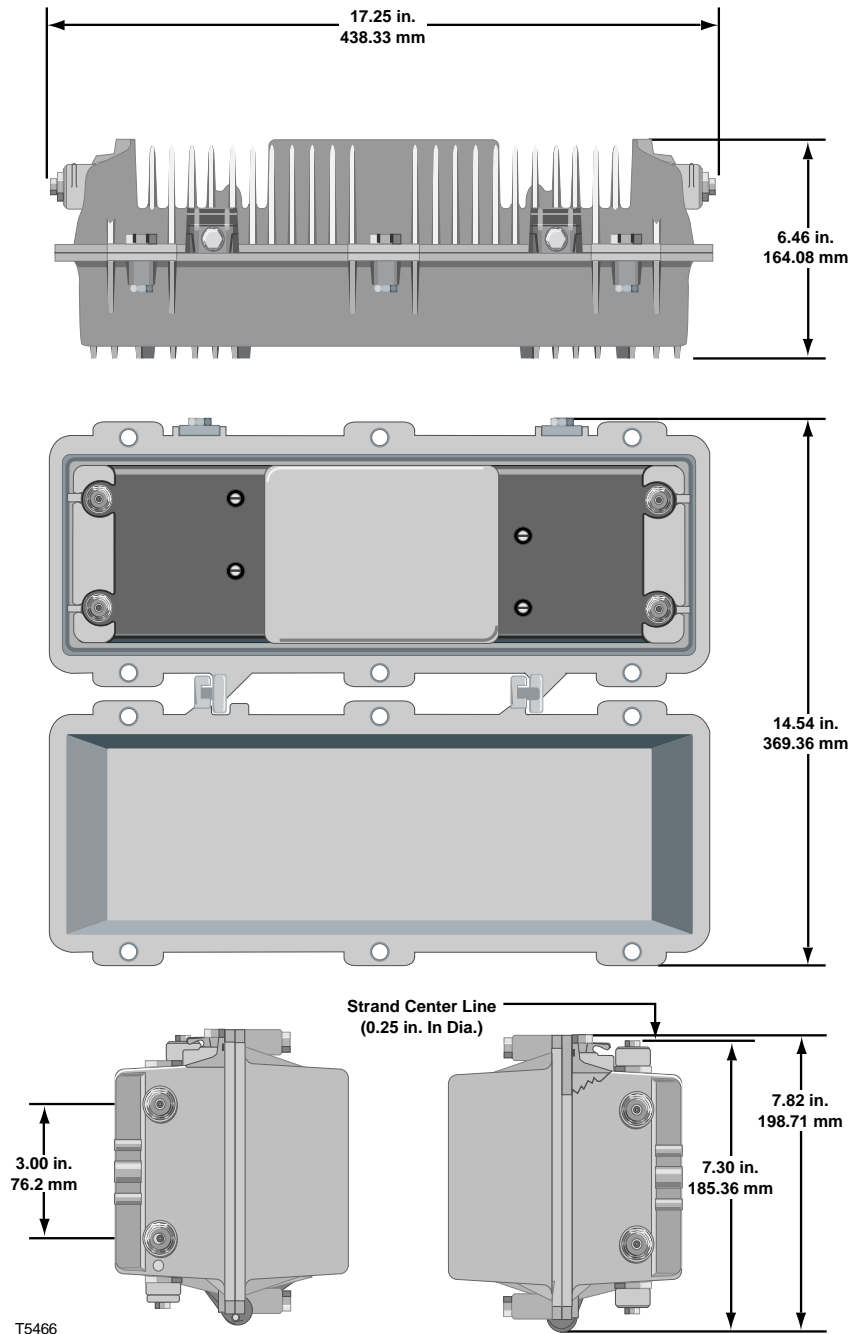


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## Before You Begin, Continued

### Measurements (continued)

The diagram below shows dimensions, in inches and millimeters, of the System Amplifier III mid-sized housing. Use these measurements to calculate clearance requirements for your installation.



## Upgrading Existing Housing Seizures

---

### Introduction

The SAIII has a higher current-carrying capacity than earlier amplifier products. If you are replacing an SAII or SAII+ with an SAIII, you must upgrade the housing to handle the higher current demands.

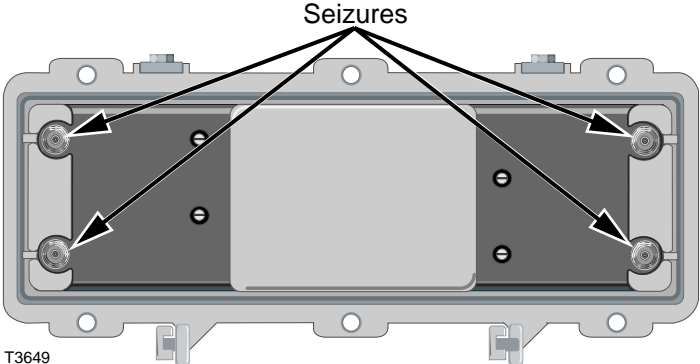
The 15 A housings have silver-plated 0.063 in. diameter pins in the seizures. The plastic material in the seizures and anvils are glass filled in order to handle higher AC currents, as well as higher temperatures.

The 15 A amplifier modules have a newly designed RF connector that accepts 0.063 in. diameter pins that are rated for higher current applications. The RF connectors, seizures, and anvils are blue for ease of identification.

---

### Installation instructions

Follow these steps to upgrade an amplifier housing to 15 A current capacity.

Step	Action
1	If an amplifier module is installed in the housing, you must remove it before continuing. See <b>Installing the Amplifier Module</b> for information about installing the module and retaining screw locations.
2	Remove the seizures on either side of the housing, using a 0.5-in. nut driver. See the diagram below. 
3	Insert the seizures from the upgrade kit (part number 548775).

---

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## Upgrading Existing Housing Seizures, Continued

---

### Installation instructions (continued)

Step	Action
4	Is coaxial cable already connected to the housing? <ul style="list-style-type: none"><li>• If <b>yes</b>, tighten each seizure from 2 ft-lb to 5 ft-lb (2.7 Nm to 6.8 Nm).</li><li>• If <b>no</b>, turn each seizure by hand, about halfway into the socket, and proceed to <b>Attaching Connectors</b>.</li></ul>
5	Place the blue stickers on the outside of the housing between the ports to indicate upgrading has been completed.

---

## Attaching Connectors

### Trimming the center conductor

The System Amplifier III requires pin-type connectors for all RF connections.

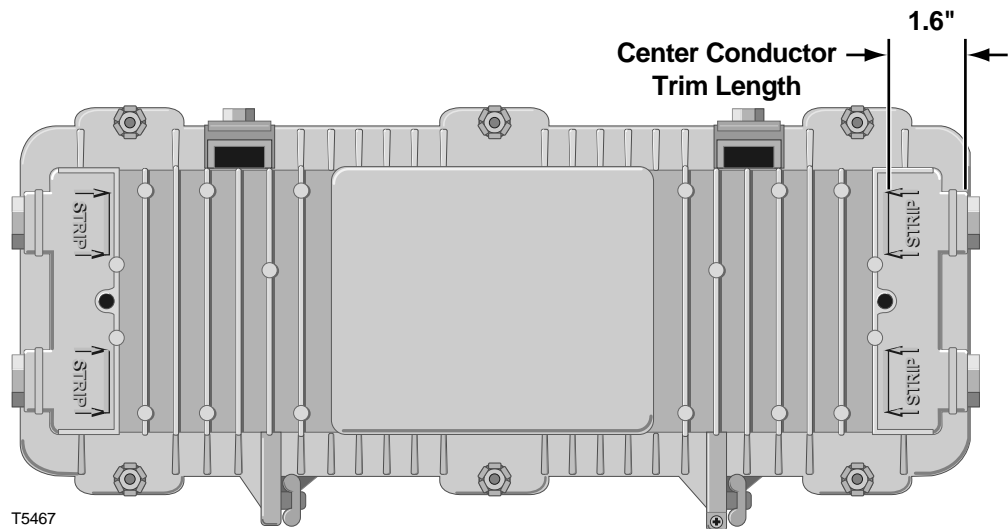
Standard pin connectors, with pins extending 1.5 inches to 1.6 inches (3.8 cm to 4.1 cm) from the connector shoulder, require no trimming. You must trim longer pins before inserting them into the housing. The pin length applies to both end entry and side entry ports.

To trim long pins, follow these steps.

Step	Action
1	Place the connector above the entry port so that it lines up with its installed position.
2	If the center conductor pin extends past the <b>STRIP</b> line on the housing, trim the pin flush to the <b>STRIP</b> line. See the section entitled "Center conductor trim length."

### Center conductor trim length

The following diagram shows a visual guide of the center conductor trim length.



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## Attaching Connectors, Continued

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### Connecting the coaxial cable pin connector to the SAIII

Follow these steps to connect the coaxial cable pin connector to the SAIII housing.

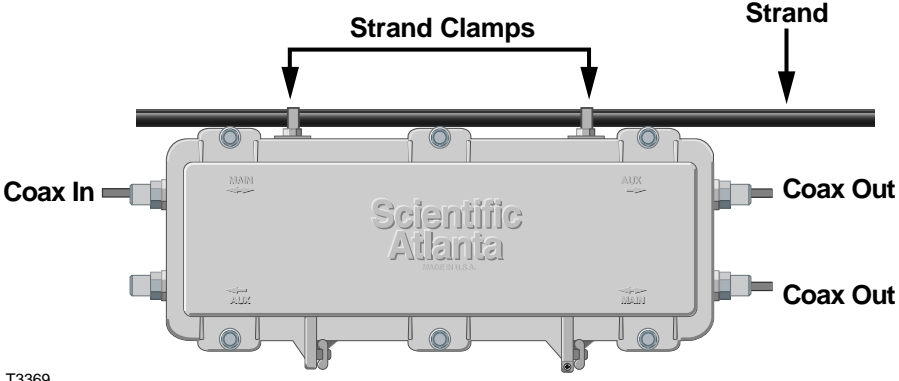
Step	Action
1	Begin this procedure with the SAIII housing open.
2	If the center conductor pin extends more than the length specified in "Trimming the center conductor," trim the pin with heavy-duty wire cutters.
3	Insert the appropriate coaxial connector into the housing at the desired housing port. Tighten the connector nut according to manufacturer's specifications.
4	Tighten the seizure screw from 2 ft-lb to 5 ft-lb (2.7 Nm to 6.8 Nm).
5	Repeat steps 2, 3, and 4 for each used RF port used.
6	If RF is present at an unused port, insert a 75 Ohm housing terminator into the port and tighten from 2 ft-lb to 4 ft-lb (2.7 Nm to 5.4 Nm). If RF is not present at an unused port, insert a housing plug into the port and tighten from 2 ft-lb to 4 ft-lb (2.7 Nm to 5.4 Nm).
7	Proceed to <b>Attaching the Housing</b> .

---

## Attaching the Housing

### Installing the housing on a strand procedure

Follow these steps to install the housing on an aerial strand.

Step	Action
1	Loosen the strand clamp bolts.
2	Check the direction of forward signal flow and orient the housing to match proper signal flow.
3	Lift the housing into proper position on the strand.
4	Slip the strand clamps over the strand and finger-tighten the clamp bolts. This allows additional movement of the housing as needed.
5	<p>Move the housing as needed to install the coaxial cable and connectors. See the diagram below for an example.</p>  <p>T3369</p>
6	<p>Tighten the strand clamp bolts (using a 1/2-inch torque wrench) from 5 ft-lb to 8 ft-lb (6.8 Nm to 10.8 Nm). Make sure there is good mechanical contact between the strand and the SAIII housing.</p> <p><b>Note:</b> A slight tilt of the face of the housing is normal. Cable tension will cause the housing to hang more closely to vertical.</p>
7	Connect the coaxial cable to the pin connector according to connector manufacturer's specifications.
8	Proceed to <b>Configuring the Amplifier Module.</b>

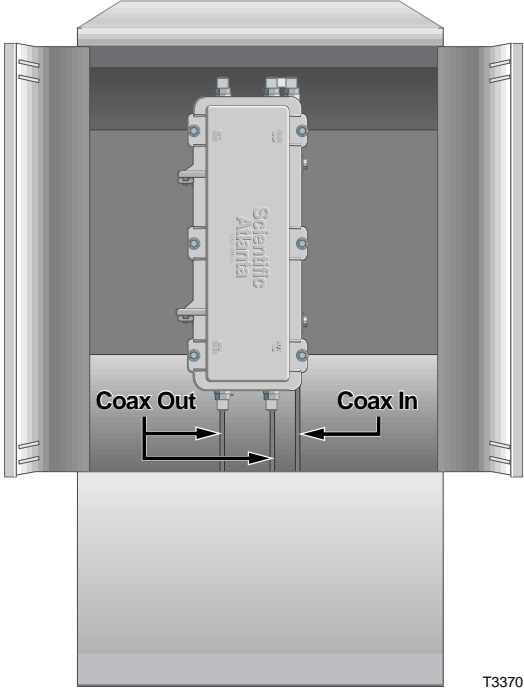
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## Attaching the Housing, Continued

### Installing the housing in a pedestal procedure

Follow these steps to install the housing in a pedestal.

Step	Action
1	Remove the cover of the pedestal.
2	Remove the self-tapping bolts from the strand clamps and set the bolts and strand clamps aside.
3	Position the housing in the pedestal frame as shown below. Line up the self-tapping bolt holes on the bottom of the housing with the mounting holes on the bracket.  <p style="text-align: right;">T3370</p>
4	Secure the housing to the bracket by using the bolts that you removed in step 2. Use the strand clamps as spacers if necessary. Torque the bolts from 8 ft-lb to 10 ft-lb (10.8 Nm to 13.6 Nm).
5	Connect the coaxial cable to the pin connector according to connector manufacturer's specifications.
6	Proceed to <b>Configuring the Amplifier Module</b> .

## Section B

### Configuring the Amplifier Module

#### Overview

---

#### Scope of this section

This section covers requirements and procedures needed to configure the System Amplifier III amplifier and contains the following topics.

**Note:** Install all desired accessories into the amplifier module before installing the amplifier module into the housing.

Topic	See Page
Installing Accessories	2-13
Installing Reverse Accessories	2-20
Restoring Jumpers	2-23

---

## Installing Accessories

---

### Installing attenuator pads

For best results, follow this installation procedure exactly.

**Note:** Pads are color-coded to denote their maximum application frequency as listed below.

- Blue - 5 MHz to 600 MHz (reverse path)
- Yellow - 5 MHz to 800 MHz (forward or reverse path in 750 MHz systems)

Step	Action
1	Begin this procedure with the housing open and the interior of the amplifier module exposed.
2	Install the pad(s) specified by the design print in the appropriate pad slot(s). For the exact location of each pad, refer to <b>Illustrations</b> . <b>Note:</b> Be sure all the pins on the pad bottom align with the pin holes in the pad slot, allowing the pad to install flat against the SAIII amplifier module.
3	Install other options or accessories as desired, or proceed to <b>Installing the Amplifier Module</b> .

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*Continued on next page*

## Installing Accessories, Continued

### Installing the forward equalizer or cable simulator

For best results, follow this installation procedure exactly.

Step	Action																																								
1	Begin this procedure with the housing open and the interior of the amplifier module exposed.																																								
2	<p data-bbox="467 621 1398 720">Install the forward equalizer specified by the design print in the forward input equalizer slot. For the exact location of the forward equalizer slot, refer to <b>Illustrations</b>.</p> <table border="1" data-bbox="524 730 1377 1745"> <thead> <tr> <th data-bbox="524 730 951 779">For:</th> <th data-bbox="951 730 1377 779">Install part number:</th> </tr> </thead> <tbody> <tr><td data-bbox="524 779 951 827">0 dB - 750 MHz</td><td data-bbox="951 779 1377 827">036040</td></tr> <tr><td data-bbox="524 827 951 875">1.5 dB - 750 MHz</td><td data-bbox="951 827 1377 875">501220</td></tr> <tr><td data-bbox="524 875 951 924">3.0 dB - 750 MHz</td><td data-bbox="951 875 1377 924">501221</td></tr> <tr><td data-bbox="524 924 951 972">4.5 dB - 750 MHz</td><td data-bbox="951 924 1377 972">501222</td></tr> <tr><td data-bbox="524 972 951 1020">6.0 dB - 750 MHz</td><td data-bbox="951 972 1377 1020">501223</td></tr> <tr><td data-bbox="524 1020 951 1068">7.5 dB - 750 MHz</td><td data-bbox="951 1020 1377 1068">501224</td></tr> <tr><td data-bbox="524 1068 951 1117">9.0 dB - 750 MHz</td><td data-bbox="951 1068 1377 1117">501225</td></tr> <tr><td data-bbox="524 1117 951 1165">10.5 dB - 750 MHz</td><td data-bbox="951 1117 1377 1165">501226</td></tr> <tr><td data-bbox="524 1165 951 1213">12.0 dB - 750 MHz</td><td data-bbox="951 1165 1377 1213">501227</td></tr> <tr><td data-bbox="524 1213 951 1262">13.5 dB - 750 MHz</td><td data-bbox="951 1213 1377 1262">501228</td></tr> <tr><td data-bbox="524 1262 951 1310">15.0 dB - 750 MHz</td><td data-bbox="951 1262 1377 1310">501229</td></tr> <tr><td data-bbox="524 1310 951 1358">16.5 dB - 750 MHz</td><td data-bbox="951 1310 1377 1358">501230</td></tr> <tr><td data-bbox="524 1358 951 1407">18.0 dB - 750 MHz</td><td data-bbox="951 1358 1377 1407">501231</td></tr> <tr><td data-bbox="524 1407 951 1455">19.5 dB - 750 MHz</td><td data-bbox="951 1407 1377 1455">501232</td></tr> <tr><td data-bbox="524 1455 951 1503">21.0 dB - 750 MHz</td><td data-bbox="951 1455 1377 1503">501233</td></tr> <tr><td data-bbox="524 1503 951 1551">22.5 dB - 750 MHz</td><td data-bbox="951 1503 1377 1551">501234</td></tr> <tr><td data-bbox="524 1551 951 1600">24.0 dB - 750 MHz</td><td data-bbox="951 1551 1377 1600">540016</td></tr> <tr><td data-bbox="524 1600 951 1648">25.5 dB - 750 MHz</td><td data-bbox="951 1600 1377 1648">540017</td></tr> <tr><td data-bbox="524 1648 951 1696">27.0 dB - 750 MHz</td><td data-bbox="951 1648 1377 1696">540018</td></tr> </tbody> </table>	For:	Install part number:	0 dB - 750 MHz	036040	1.5 dB - 750 MHz	501220	3.0 dB - 750 MHz	501221	4.5 dB - 750 MHz	501222	6.0 dB - 750 MHz	501223	7.5 dB - 750 MHz	501224	9.0 dB - 750 MHz	501225	10.5 dB - 750 MHz	501226	12.0 dB - 750 MHz	501227	13.5 dB - 750 MHz	501228	15.0 dB - 750 MHz	501229	16.5 dB - 750 MHz	501230	18.0 dB - 750 MHz	501231	19.5 dB - 750 MHz	501232	21.0 dB - 750 MHz	501233	22.5 dB - 750 MHz	501234	24.0 dB - 750 MHz	540016	25.5 dB - 750 MHz	540017	27.0 dB - 750 MHz	540018
For:	Install part number:																																								
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25.5 dB - 750 MHz	540017																																								
27.0 dB - 750 MHz	540018																																								

*Continued on next page*

## Installing Accessories, Continued

### Installing the forward equalizer or cable simulator (continued)

Step	Action																		
2 cont.	<p data-bbox="472 474 1360 543">Or install the correct cable simulator specified by the design print for your system in the forward input equalizer slot.</p> <table border="1" data-bbox="522 550 1380 1005"> <thead> <tr> <th data-bbox="529 556 951 604">For:</th> <th data-bbox="951 556 1373 604">Install part number:</th> </tr> </thead> <tbody> <tr> <td data-bbox="529 604 951 653">1.5 dB - 750 MHz</td> <td data-bbox="951 604 1373 653">562262</td> </tr> <tr> <td data-bbox="529 653 951 701">3.0 dB - 750 MHz</td> <td data-bbox="951 653 1373 701">562263</td> </tr> <tr> <td data-bbox="529 701 951 749">4.5 dB - 750 MHz</td> <td data-bbox="951 701 1373 749">562264</td> </tr> <tr> <td data-bbox="529 749 951 798">6.0 dB - 750 MHz</td> <td data-bbox="951 749 1373 798">562265</td> </tr> <tr> <td data-bbox="529 798 951 846">7.5 dB - 750 MHz</td> <td data-bbox="951 798 1373 846">562266</td> </tr> <tr> <td data-bbox="529 846 951 894">9.0 dB - 750 MHz</td> <td data-bbox="951 846 1373 894">562267</td> </tr> <tr> <td data-bbox="529 894 951 942">10.5 dB - 750 MHz</td> <td data-bbox="951 894 1373 942">562268</td> </tr> <tr> <td data-bbox="529 942 951 991">12.0 dB - 750 MHz</td> <td data-bbox="951 942 1373 991">562269</td> </tr> </tbody> </table> <p data-bbox="472 1020 1377 1157"><b>Note:</b> Be sure all the pins on the forward equalizer or cable simulator bottom align with the pin holes in the forward equalizer slot, allowing the forward equalizer or cable simulator to install flat against the SAIII amplifier module.</p>	For:	Install part number:	1.5 dB - 750 MHz	562262	3.0 dB - 750 MHz	562263	4.5 dB - 750 MHz	562264	6.0 dB - 750 MHz	562265	7.5 dB - 750 MHz	562266	9.0 dB - 750 MHz	562267	10.5 dB - 750 MHz	562268	12.0 dB - 750 MHz	562269
For:	Install part number:																		
1.5 dB - 750 MHz	562262																		
3.0 dB - 750 MHz	562263																		
4.5 dB - 750 MHz	562264																		
6.0 dB - 750 MHz	562265																		
7.5 dB - 750 MHz	562266																		
9.0 dB - 750 MHz	562267																		
10.5 dB - 750 MHz	562268																		
12.0 dB - 750 MHz	562269																		
3	Install other options or accessories as desired, or proceed to <b>Installing the Amplifier Module.</b>																		

*Continued on next page*

## Installing Accessories, Continued

### Installing signal directors

For best results, follow this installation procedure exactly.

Step	Action								
1	Begin this procedure with the housing open and the interior of the amplifier module exposed.								
2	<p>Be sure to install the correct signal director for your system as specified by the design print.</p> <table border="1" data-bbox="524 730 1386 1108"> <thead> <tr> <th data-bbox="524 730 1027 779">IF you are installing a ...</th> <th data-bbox="1027 730 1386 779">This will ...</th> </tr> </thead> <tbody> <tr> <td data-bbox="524 779 1027 863">Jumper, part number 467778</td> <td data-bbox="1027 779 1386 863">activate only one auxiliary port.</td> </tr> <tr> <td data-bbox="524 863 1027 989">Splitter, part number 502110</td> <td data-bbox="1027 863 1386 989">activate both auxiliary ports with equal signal levels.</td> </tr> <tr> <td data-bbox="524 989 1027 1108">8 dB Coupler, part number 502115 or 12 dB Coupler, part number 502120</td> <td data-bbox="1027 989 1386 1108">activate both auxiliary ports with differing signal levels.</td> </tr> </tbody> </table>	IF you are installing a ...	This will ...	Jumper, part number 467778	activate only one auxiliary port.	Splitter, part number 502110	activate both auxiliary ports with equal signal levels.	8 dB Coupler, part number 502115 or 12 dB Coupler, part number 502120	activate both auxiliary ports with differing signal levels.
IF you are installing a ...	This will ...								
Jumper, part number 467778	activate only one auxiliary port.								
Splitter, part number 502110	activate both auxiliary ports with equal signal levels.								
8 dB Coupler, part number 502115 or 12 dB Coupler, part number 502120	activate both auxiliary ports with differing signal levels.								
3	<p>Install the signal director in the signal director slot. For the exact location of the signal director, refer to <b>Illustrations</b>.</p> <p><b>Note:</b> Be sure the signal director is oriented in the proper direction for your system. Rotating the signal director in the slot will change which ports are activated with which signal. For example, rotating the jumper version of the signal director will change which auxiliary port is activated.</p> <p>Be sure all the pins on the signal director bottom align with the pin holes in the signal director slot, allowing the signal director to install flat against the SAIII amplifier module.</p>								
4	Install other options or accessories as desired, or proceed to <b>Installing the Amplifier Module</b> .								

*Continued on next page*

## Installing Accessories, Continued

### Interstage equalizer or thermal/equalizer

For best results, follow this installation procedure exactly.

Step	Action						
1	Begin this procedure with the housing open and the interior of the amplifier module exposed.						
2	Using heavy-duty wire cutters or snips, carefully cut and remove the jumper from the interstage or thermal/equalizer slot. <table border="1" data-bbox="522 730 1382 884" style="margin-left: 40px;"> <thead> <tr> <th data-bbox="522 730 951 779">For:</th> <th data-bbox="951 730 1382 779">Remove Jumper:</th> </tr> </thead> <tbody> <tr> <td data-bbox="522 779 951 827">Low Gain Dual</td> <td data-bbox="951 779 1382 827">W1</td> </tr> <tr> <td data-bbox="522 827 951 884">High Gain Dual</td> <td data-bbox="951 827 1382 884">W6</td> </tr> </tbody> </table>	For:	Remove Jumper:	Low Gain Dual	W1	High Gain Dual	W6
For:	Remove Jumper:						
Low Gain Dual	W1						
High Gain Dual	W6						
3	Install the interstage or thermal/equalizer specified by the design print in the interstage or thermal/equalizer equalizer slot. For the exact location of the interstage or thermal/equalizer slot, refer to <b>Illustrations</b> . <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• Either the interstage or thermal/equalizer may be installed at one time. It is not possible to install both of these accessories in the same SAIII unit.</li> <li>• Be sure all the pins on the interstage or thermal/equalizer bottom align with the pin holes in the interstage or thermal/equalizer slot, allowing the interstage or thermal/equalizer to install flat against the SAIII amplifier module.</li> </ul>						
4	Install other options or accessories as desired, or proceed to <b>Installing the Amplifier Module</b> .						

*Continued on next page*

## Installing Accessories, Continued

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### Automatic Gain Control (AGC) with interstage equalizer

For best results, follow this installation procedure exactly.

Step	Action				
1	Begin this procedure with the housing open and the interior of the amplifier module exposed.				
2	Using heavy-duty wire cutters or snips, carefully cut and remove the jumpers from the AGC slot. <table border="1" data-bbox="522 730 1382 867"><thead><tr><th>For:</th><th>Remove Jumper:</th></tr></thead><tbody><tr><td>Low Gain Dual or High Gain Dual</td><td>W1 and W6</td></tr></tbody></table>	For:	Remove Jumper:	Low Gain Dual or High Gain Dual	W1 and W6
For:	Remove Jumper:				
Low Gain Dual or High Gain Dual	W1 and W6				
3	Install the AGC specified by the design print in the AGC slot. For the exact location of the AGC slot, refer to <b>Illustrations</b> . <b>Note:</b> Be sure all the pins on the AGC bottom align with the pin holes in the AGC slot, allowing the AGC module to install flat against the SAIII amplifier module.				
4	Install other options or accessories as desired, or proceed to <b>Installing the Amplifier Module</b> .				

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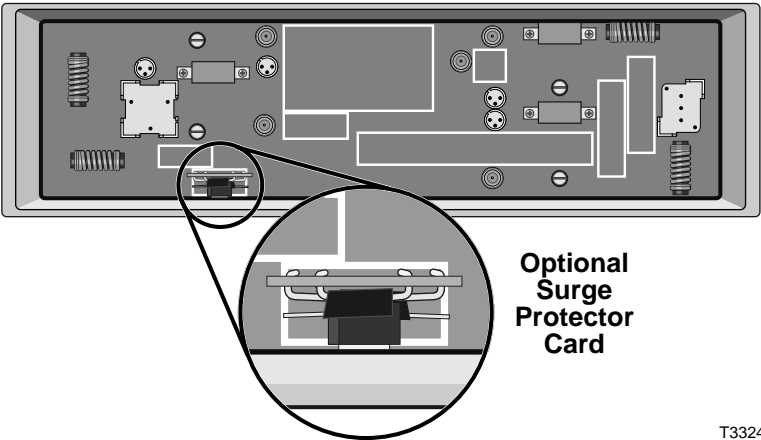
*Continued on next page*



## Installing Accessories, Continued

### Installing the surge protector

For best results, follow this installation procedure exactly.

Step	Action
1	Begin this procedure with the housing open and the interior of the amplifier module exposed.
2	<p data-bbox="472 619 1317 682">Install the surge protector in the surge protector slot. Refer to the illustration below.</p> <div data-bbox="565 747 1321 1184"><p data-bbox="1076 995 1195 1100"><b>Optional Surge Protector Card</b></p><p data-bbox="1279 1167 1321 1184">T3324</p></div> <p data-bbox="472 1205 561 1234"><b>Notes:</b></p> <ul data-bbox="472 1255 1377 1472" style="list-style-type: none"><li data-bbox="472 1255 1377 1354">• Be sure all the pins on the surge protector bottom align with the pin holes in the surge protector slot, allowing the surge protector to install flat against the SAIII amplifier module.</li><li data-bbox="472 1375 1377 1472">• Make sure the components face the outside of the station (see the diagram above for proper positioning). Heat shrink tubing has been added to prevent shorting.</li></ul>
3	Install other options or accessories as desired, or proceed to <b>Installing the Amplifier Module</b> .

# Installing Reverse Accessories

## Installing the reverse equalizer

For best results, follow this installation procedure exactly.

Step	Action				
1	Begin this procedure with the housing open and the interior of the amplifier module exposed.				
2	<p>Using heavy-duty wire cutters or snips, carefully cut and remove the jumper from the fixed reverse equalizer slot.</p> <div data-bbox="548 701 1344 1207" style="text-align: center;"> </div> <p style="text-align: right;">T3134</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td data-bbox="522 1213 951 1266"><b>For:</b></td> <td data-bbox="951 1213 1380 1266"><b>Remove Jumper:</b></td> </tr> <tr> <td data-bbox="522 1266 951 1352" style="text-align: center;">Low Gain Dual or High Gain Dual</td> <td data-bbox="951 1266 1380 1352" style="text-align: center;">W13</td> </tr> </table>	<b>For:</b>	<b>Remove Jumper:</b>	Low Gain Dual or High Gain Dual	W13
<b>For:</b>	<b>Remove Jumper:</b>				
Low Gain Dual or High Gain Dual	W13				

*Continued on next page*

## Installing Reverse Accessories, Continued

### Installing the reverse equalizer (continued)

Step	Action																																		
3	<p data-bbox="467 474 1382 543">Install the fixed reverse equalizer specified by the design print for your system in the reverse equalizer slot.</p> <table border="1" data-bbox="522 550 1382 1209"> <thead> <tr> <th data-bbox="529 558 966 600">For:</th> <th data-bbox="966 558 1375 600">Install part number:</th> </tr> </thead> <tbody> <tr><td data-bbox="529 600 966 653">1 dB - 40 MHz</td><td data-bbox="966 600 1375 653">545107</td></tr> <tr><td data-bbox="529 653 966 705">2 dB - 40 MHz</td><td data-bbox="966 653 1375 705">545108</td></tr> <tr><td data-bbox="529 705 966 758">3 dB - 40 MHz</td><td data-bbox="966 705 1375 758">545109</td></tr> <tr><td data-bbox="529 758 966 810">4 dB - 40 MHz</td><td data-bbox="966 758 1375 810">545110</td></tr> <tr><td data-bbox="529 810 966 863">5 dB - 40 MHz</td><td data-bbox="966 810 1375 863">545111</td></tr> <tr><td data-bbox="529 863 966 915">6 dB - 40 MHz</td><td data-bbox="966 863 1375 915">545112</td></tr> <tr><td data-bbox="529 915 966 968">7 dB - 40 MHz</td><td data-bbox="966 915 1375 968">545113</td></tr> <tr><td data-bbox="529 968 966 1020">8 dB - 40 MHz</td><td data-bbox="966 968 1375 1020">545114</td></tr> <tr><td data-bbox="529 1020 966 1073">9 dB - 40 MHz</td><td data-bbox="966 1020 1375 1073">545115</td></tr> <tr><td data-bbox="529 1073 966 1125">10 dB - 40 MHz</td><td data-bbox="966 1073 1375 1125">545116</td></tr> <tr><td data-bbox="529 1125 966 1178">11 dB - 40 MHz</td><td data-bbox="966 1125 1375 1178">545117</td></tr> <tr><td data-bbox="529 1178 966 1209">12 dB - 40 MHz</td><td data-bbox="966 1178 1375 1209">545118</td></tr> </tbody> </table> <p data-bbox="467 1224 1382 1293">Or install the correct variable reverse equalizer specified by the design print for your system in the reverse equalizer slot.</p> <table border="1" data-bbox="522 1299 1382 1501"> <thead> <tr> <th data-bbox="529 1308 966 1350">For:</th> <th data-bbox="966 1308 1375 1350">Install part number:</th> </tr> </thead> <tbody> <tr><td data-bbox="529 1350 966 1402">1.5 dB to 4.5 dB - 40 or 42 MHz</td><td data-bbox="966 1350 1375 1402">511075</td></tr> <tr><td data-bbox="529 1402 966 1455">4.5 dB to 7.5 dB - 40 or 42 MHz</td><td data-bbox="966 1402 1375 1455">511295</td></tr> <tr><td data-bbox="529 1455 966 1501">7.5 dB to 12.0 dB - 40 or 42 MHz</td><td data-bbox="966 1455 1375 1501">511298</td></tr> </tbody> </table> <p data-bbox="467 1516 1382 1619"><b>Note:</b> Be sure all the pins on the equalizer bottom align with the pin holes in the equalizer slot, allowing the equalizer module to install flat against the SAIII amplifier module.</p>	For:	Install part number:	1 dB - 40 MHz	545107	2 dB - 40 MHz	545108	3 dB - 40 MHz	545109	4 dB - 40 MHz	545110	5 dB - 40 MHz	545111	6 dB - 40 MHz	545112	7 dB - 40 MHz	545113	8 dB - 40 MHz	545114	9 dB - 40 MHz	545115	10 dB - 40 MHz	545116	11 dB - 40 MHz	545117	12 dB - 40 MHz	545118	For:	Install part number:	1.5 dB to 4.5 dB - 40 or 42 MHz	511075	4.5 dB to 7.5 dB - 40 or 42 MHz	511295	7.5 dB to 12.0 dB - 40 or 42 MHz	511298
For:	Install part number:																																		
1 dB - 40 MHz	545107																																		
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7.5 dB to 12.0 dB - 40 or 42 MHz	511298																																		
4	<p data-bbox="467 1633 1382 1705">Install other options or accessories as desired, or proceed to <b>Installing the Amplifier Module</b>.</p>																																		

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## Installing Reverse Accessories, Continued

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### Installing the reverse attenuator pad

For best results, follow this installation procedure exactly.

Step	Action
1	Begin this procedure with the housing open and the interior of the amplifier module exposed.
2	Install the reverse pad specified by the design print in the reverse pad slot(s). For the exact location of the reverse pad, refer to <b>Illustrations</b> . <b>Note:</b> Be sure all the pins on the pad bottom align with the pin holes in the pad slot, allowing the pad to install flat against the SAIII amplifier module.
3	Install other options or accessories as desired, or proceed to <b>Installing the Amplifier Module</b> .

---

## Restoring Jumpers

### Restoring jumper procedures

If you need to remove an installed interstage accessory, or replace one accessory with another, restore jumpers as follows:

IF you...	THEN install...
remove an interstage EQ or interstage EQ/thermal	an interstage jumper (part number 379986) between pins 1 and 6 at the <b>INT EQ/THERMAL</b> location, OR solder a 22-AWG buss wire in this location. Refer to <b>Field installable accessories</b> in chapter 1 for the location of these jumpers.
remove an AGC/interstage EQ	an interstage jumper (part number 379986) between pins 1 and 6 at the <b>INT EQ/THERMAL</b> location, and a mini-jumper (part number 081630) between pins 9 and 11 at the <b>BODE/AGC</b> location, OR solder a 22-AWG buss wire in these locations. Refer to <b>Field installable accessories</b> in chapter 1 for the location of these jumpers.
replace an AGC/interstage EQ with an interstage EQ or interstage EQ/thermal	a mini-jumper (part number 081630) at the <b>BODE/AGC</b> location, OR solder a 22-AWG buss wire in this location. Refer to <b>Field installable accessories</b> in chapter 1 for the location of these jumpers.
restore signal continuity after removing a reverse equalizer	plug in a 0 dB reverse equalizer, OR solder a 22-AWG buss wire in the <b>REVERSE EQ</b> jumper location. Refer to <b>Field installable accessories</b> in chapter 1 for the location of these jumpers.

## Section C

### Installing the Amplifier Module

#### Overview

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#### Scope of this section

This section covers requirements and procedures needed to install the amplifier module in the housing.

Topic	See Page
Installing the Amplifier Module in the Housing	2-25
Setting the Power Direction	2-27
Closing the Housing	2-28

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## Installing the Amplifier Module in the Housing

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### Introduction

The amplifier module plugs into the strand-mounted or pedestal-mounted (bottom) half of the housing through RF connectors on the bottom side of the module.

The System Amplifier III housing and amplifier module are designed so you can orient the amplifier module conveniently for maintenance. The amplifier module is reversible, since the input port and main output port are located diagonally from each other.

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### Cover and shields

Each of these amplifiers has a cast aluminum cover that attaches to the chassis with eight self-tapping screws. Care should be taken not to strip the threads of the cover screw holes when re-installing the cover. The cover has grooves with conductive gaskets which mate to the input and output shields.



**Caution:**

**It is important that the shields are not bent as the cover is installed. This will reduce the grounding of the PWB and can degrade the performance of the amplifier.**


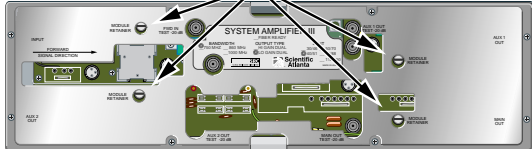
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## Installing the Amplifier Module in the Housing, Continued

### Installation procedure

Follow these steps to install the amplifier module.

Step	Action
1	<p>Perform the following if you are working with an amplifier station where AC is present.</p> <ul style="list-style-type: none"><li>• Install the fuse shunts in the amplifier <i>after</i> you install the amplifier module in the housing.</li><li>• Remove the fuse shunts from the amplifier <i>before</i> you remove the amplifier module from the housing.</li></ul> <div data-bbox="479 779 1393 919" style="border: 1px solid black; padding: 5px;"><p> <b>Caution:</b> <b>Failure to follow these instructions may cause damage to module RF connectors and housing seizure assemblies.</b></p></div>
2	Orient the amplifier module so the <b>Input</b> and <b>Main Out</b> ports (the locations of which are stamped on the module cover) are in the proper corners for your installation.
3	Line up the RF connectors on the amplifier module and the housing, then push the amplifier module into the housing.
4	<p>Secure the amplifier module to the housing by tightening the four module retainer screws with a flat-blade screwdriver from 6 in-lb to 9 in-lb (0.7 Nm to 1.0 Nm). See the following illustration for the location of the retainer screws.</p> <div data-bbox="673 1291 1201 1522" style="text-align: center;"><p><b>Module Retainer Screws</b></p><p>T3139</p></div>



## Setting the Power Direction

---

### Installing and removing fuse shunts

The amplifiers draw AC power (typically 60 V AC or 90 V AC) from the coaxial cable. This AC power comes from an external ferroresonant power supply.

Power can come from the input or output ports, and each amplifier can pass or block AC power flow on any port without affecting RF continuity. However, at least one port must pass AC power to bring power into the amplifier.

Set the power direction by installing fuse shunts for the ports through which you wish to pass AC.



**Caution:**

**RF connectors and housing seizure assemblies can be damaged if fuse shunts are not removed from the amplifier before installing or removing the amplifier module from the housing.**

To select the power direction, follow these steps.

Step	Action										
1	Begin this procedure with the interior of the amplifier module exposed.										
2	<p>Refer to the system design print to determine AC fusing capabilities and install the fuse shunts provided with the SAIII amplifier.</p> <p><b>Note:</b> One of the provided fuse shunts is red. It is recommended that this fuse shunt be installed in the fuse shunt slot the system design details as the incoming power source for the amplifier module.</p> <p>(ATC [automotive] fuses, with values prescribed by the system design print, may be substituted for the provided fuse shunts.)</p> <p>Install the fuse shunts in the required locations using the following table for reference.</p> <table border="1"><thead><tr><th>To pass AC through the ...</th><th>Install a fuse shunt in slot ...</th></tr></thead><tbody><tr><td>Input port</td><td>F1</td></tr><tr><td>Aux 1 output port</td><td>F2</td></tr><tr><td>Main output port</td><td>F3</td></tr><tr><td>Aux 2 output port</td><td>F4</td></tr></tbody></table>	To pass AC through the ...	Install a fuse shunt in slot ...	Input port	F1	Aux 1 output port	F2	Main output port	F3	Aux 2 output port	F4
To pass AC through the ...	Install a fuse shunt in slot ...										
Input port	F1										
Aux 1 output port	F2										
Main output port	F3										
Aux 2 output port	F4										
3	Proceed to <b>Closing the Housing</b> .										

---

## Closing the Housing

### Tightening the closure bolts

To tighten the closure bolts, follow the steps in the table below.

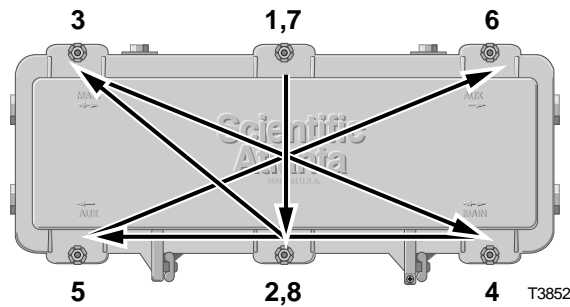
**⚠ Caution:**

**Avoid moisture damage and RF leakage! Follow the procedure *exactly* as shown below to ensure a proper seal.**

Step	Action
1	Inspect the housing gasket and all mating surfaces. Wipe off any dirt and debris.
2	Close the housing and finger-tighten all closure bolts.
3	Use a torque wrench with a 1/2-in. socket to tighten each closure bolt from 5 ft-lb to 12 ft-lb (6.8 Nm to 16.3 Nm) each. The tightening sequence is shown in "Torquing sequence." Follow the numbered sequence to tighten the housing's closure bolts.

### Torquing sequence

The following diagram shows the proper torquing sequence for the System Amplifier III housing's closure bolts.



# Section D

## Illustrations

### Overview

---

#### Scope of this section

This section contains all the illustrations referred to in earlier sections in this chapter.

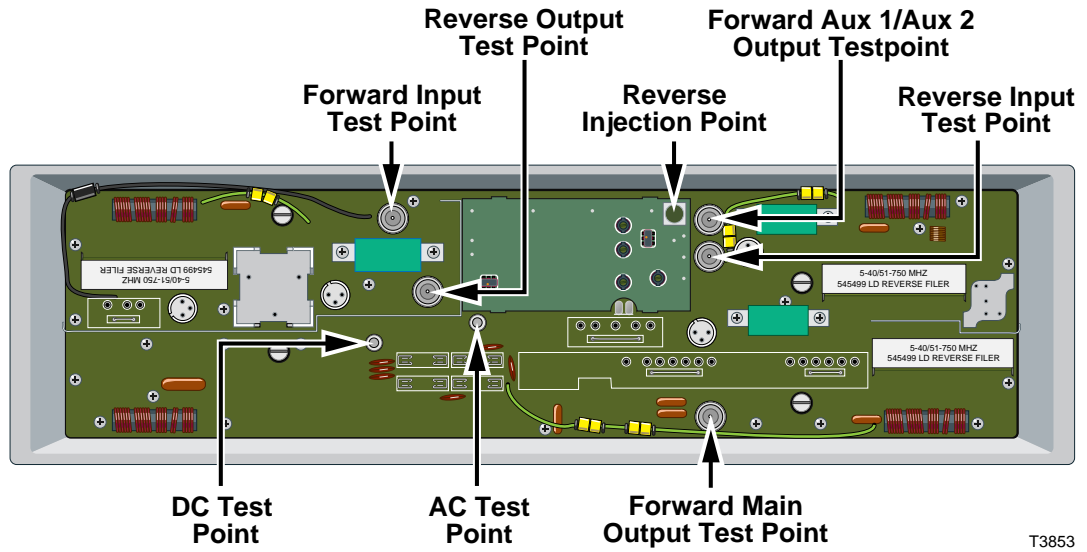
Topic	See Page
Low Gain Dual	2-30
High Gain Dual	2-31

---

# Low Gain Dual

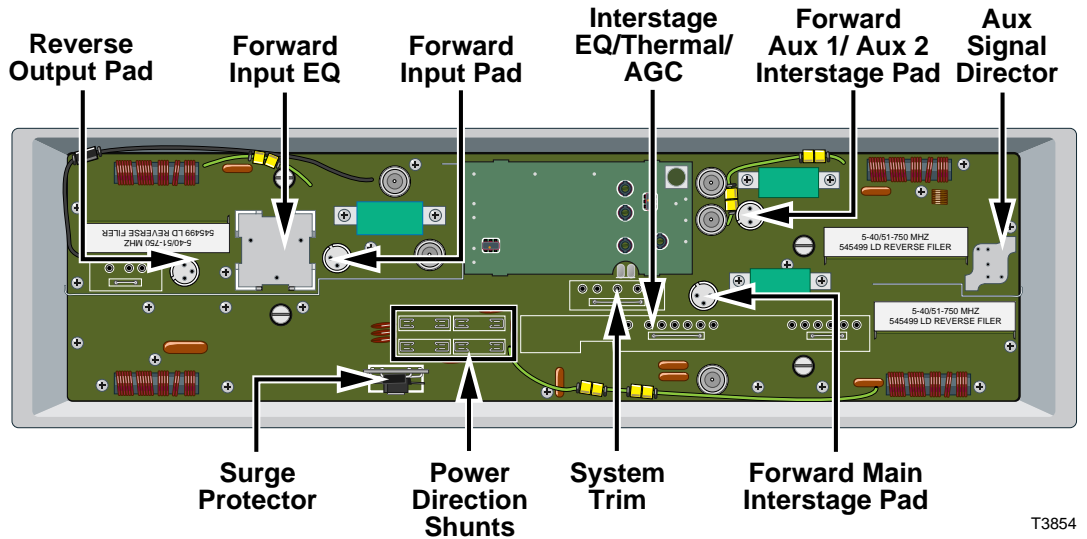
## Test points

The following diagram shows the location of the test points for Low Gain Dual amplifiers.



## Accessories

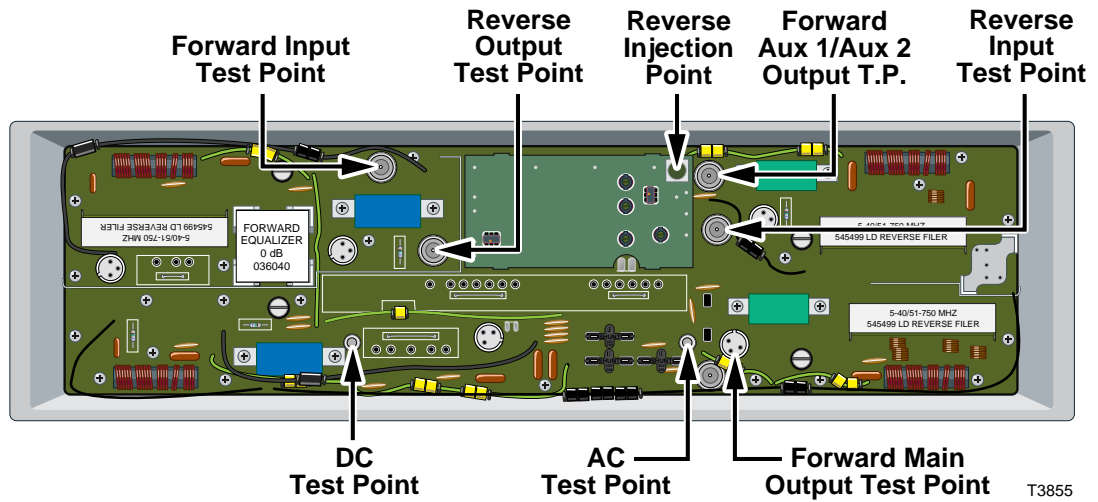
The following diagram shows the location of accessories for Low Gain Dual amplifiers.



# High Gain Dual

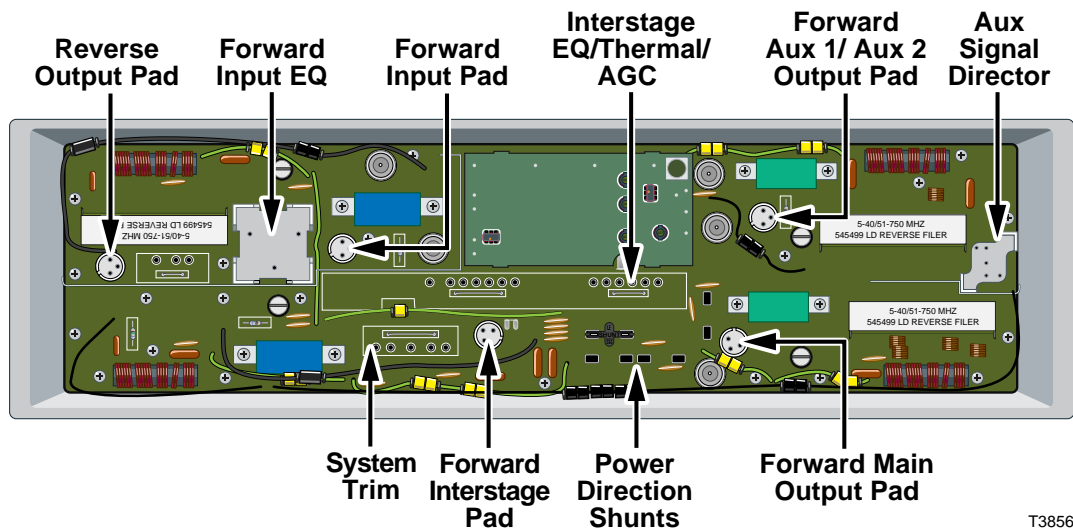
## Test points

The following diagram shows the location of test points for High Gain Dual amplifiers.



## Accessories

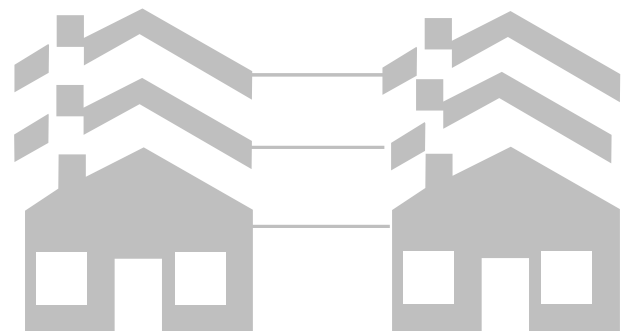
The following diagram shows the location of accessories for High Gain Dual amplifiers.



750 MHz System Amplifier III  
Installation and Operation Guide

# 3

## Balancing and Setup of the 750 MHz System Amplifier III



## Chapter 3

# Balancing and Setup of the 750 MHz System Amplifier III

### Overview

---

#### Introduction

This chapter covers setup and balancing procedures for the System Amplifier III and contains the following topics.

Topic	See Page
Test Points	3-2
Balancing the Forward Path	3-3
Automatic Gain Control Setup	3-9
Frequency Response Shaping	3-12

---

## Test Points

---

### Low Gain Dual and High Gain Dual

There are seven test points on the Low Gain Dual and High Gain Dual System Amplifier III as shown in the following table. The reverse input test point is measured relative to the input of the reverse amplifier module. The reverse output test point is measured relative to the reverse amplifier output.

Test Points	Levels
TP1	-20 dB RF test point corresponding to the forward input port
TP2	-20 dB RF test point corresponding to the Aux hybrid output
TP3	-20 dB RF test point corresponding to the main output port
TP4	-20 dB from the reverse amplifier input
TP5	-20 dB from the reverse amplifier output
TP6	Monitors 24 V DC line
TP7	Monitors 60 V AC line

**Note:** There is 4.25 dB of loss from the reverse input of the station to the reverse module input test point. There is 1.75 dB of loss from the reverse module output test point to the station output with a 1 dB reverse pad and a 0 dB reverse equalizer installed.

---



## Balancing the Forward Path

---

### Purpose

Balancing sets the operating levels of the station to ensure proper performance.

---

### Before you start

Before beginning balancing, make sure you have configured the SAIII amplifier module according to the specifications in the design print and that the amplifier has warmed up for approximately one hour.

You need the following for balancing.

You need a ...	To ...
copy of the design print	determine expected input and output signal levels.
torque wrench with a 1/2-in. socket	open and close the system amplifier housing.
spectrum analyzer or signal analysis meter, capable of working with frequencies up to the highest design frequency	determine absolute and relative signal levels.
test point adapter (part number 501111) or an F-81 female-to-female adapter	access the test ports.
a length of 75 Ohm cable, with F-connectors on each end	connect the test point adapter to the test equipment.
voltmeter	test the power supply AC and DC voltages.
screwdriver	open and close the amplifier module cover.

---

*Continued on next page*

## Balancing the Forward Path, Continued

---

### Testing input signal levels

Follow the steps in the table below to test the input signal level.

Step	Action
1	Connect the test equipment to the forward input test point shown in the diagram in <b>Illustrations</b> in chapter 2.
2	Measure the signal level at ... <ul style="list-style-type: none"><li>• the lowest frequency specified in the system design, and</li><li>• the highest frequency specified in the system design.</li></ul>
3	Compare the measured levels to the design input levels on the system design sheet. <b>Note:</b> Add 20 dB to the measured levels to find the true levels. The test point attenuates signals by 20 dB.
4	Are measured levels within the desired limits? If <b>yes</b> , proceed to step 5. If <b>no</b> , or if no signals are present, find the problem before proceeding. You cannot balance the amplifier without the proper input signals.
5	Remove the test point adapter from the forward input test point (leaving other equipment connectors intact) and proceed to "Setting the variable equalizer or thermal/equalizer."

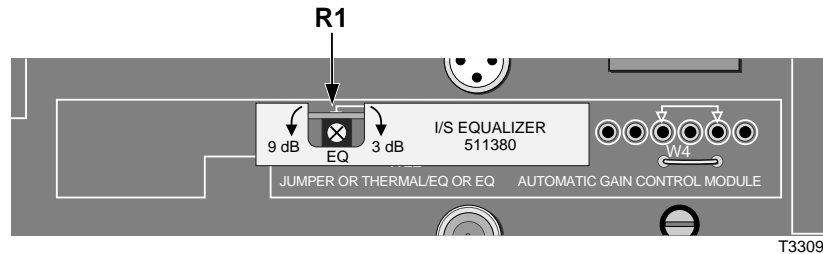
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*Continued on next page*

## Balancing the Forward Path, Continued

### Setting the variable equalizer or thermal/variable equalizer

For non-AGC interstage EQ modules (interstage equalizer or thermal/interstage equalizer) with variable EQs, adjust **R1** (see the diagram below for the location) fully counterclockwise for maximum interstage equalization. No EQ adjustment is required with non-variable (fixed) EQ interstage equalizers or thermal/interstage equalizers.



For AGC interstage EQ modules, follow these steps.

Step	Action
1	<p>Set the Auto/Thermal switch to Thermal (see the diagram below for the location).</p>
2	<p>For variable EQ AGCs, turn <b>R1</b> fully counterclockwise for maximum interstage equalization (see the diagram above for the location). No EQ adjustment is required with non-variable (fixed) EQ AGCs.</p>

**Note:** The standard single-pilot AGC uses channel 61 (445.25 MHz) as the pilot channel, and makes amplifier output adjustments based on the power level of this channel. You should activate the pilot channel with its final unscrambled video source before beginning balance and alignment.

*Continued on next page*

## Balancing the Forward Path, Continued

---

### Determining output tilt

To determine the output tilt of the SAIII amplifier module, follow the steps in the table below.

Step	Action
1	Connect the test point adapter to the forward output test point shown in the diagram in <b>Illustrations</b> in chapter 2.
2	Consult the design print to find the proper output tilt.
3	Measure the output signal levels at the frequencies you used in “Testing input signal levels.”
4	To determine the actual output tilt, calculate the difference (in dB) between the levels of the lowest and highest specified frequencies.
5	Proceed to “Setting the output tilt.”

---

*Continued on next page*

## Balancing the Forward Path, Continued

---

### Setting the output tilt

Equalizers (EQs) are available in 1.5 dB (cable equivalent) increments. A 1.5 dB change in value changes the difference between low and high frequencies by approximately 1 dB.

- Increasing the equalizer value *reduces* the level at lower frequencies, relative to the level at 750 MHz.
- Decreasing the equalizer value *increases* the level at lower frequencies, relative to the level at 750 MHz.

To select the proper forward input equalizer value, follow the steps in the table below.

Step	Action								
1	Compare the calculated output tilt in step 4 of "Determining output tilt" with the design tilt (on the design print).								
2	Is the output tilt within $\pm 0.5$ dB of the design tilt? <table border="1"><thead><tr><th>IF the output tilt is ...</th><th>THEN ...</th></tr></thead><tbody><tr><td>within <math>\pm 0.5</math> dB of the design tilt,</td><td>proceed to "Setting the output level."</td></tr><tr><td>more than the design tilt,</td><td>replace the forward input EQ with a lower value EQ.</td></tr><tr><td>less than the design tilt,</td><td>replace the forward input EQ with a higher value EQ.</td></tr></tbody></table>	IF the output tilt is ...	THEN ...	within $\pm 0.5$ dB of the design tilt,	proceed to "Setting the output level."	more than the design tilt,	replace the forward input EQ with a lower value EQ.	less than the design tilt,	replace the forward input EQ with a higher value EQ.
IF the output tilt is ...	THEN ...								
within $\pm 0.5$ dB of the design tilt,	proceed to "Setting the output level."								
more than the design tilt,	replace the forward input EQ with a lower value EQ.								
less than the design tilt,	replace the forward input EQ with a higher value EQ.								
3	Re-measure the output tilt, and return to step 1.								

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*Continued on next page*

## Balancing the Forward Path, Continued

---

### Setting the output level

After setting the tilt, follow the steps in the table below to select the proper pad values for the amplifier module. The output level of the amplifier module is set by selecting the proper pad value.

Step	Action								
1	Connect the test probe to the forward output test point.								
2	Measure the output level at the highest design frequency, and compare this level with the design level (on the design print).								
3	Is the measured output level within $\pm 0.5$ dB of the design level? <table border="1"><thead><tr><th>IF the output level is ...</th><th>THEN ...</th></tr></thead><tbody><tr><td>within <math>\pm 0.5</math> dB of the design level,</td><td>proceed to step 5.</td></tr><tr><td>more than the design level,</td><td>replace the forward input pad with a higher value pad.</td></tr><tr><td>less than the design level,</td><td>replace the forward input pad with a lower value pad.</td></tr></tbody></table>	IF the output level is ...	THEN ...	within $\pm 0.5$ dB of the design level,	proceed to step 5.	more than the design level,	replace the forward input pad with a higher value pad.	less than the design level,	replace the forward input pad with a lower value pad.
IF the output level is ...	THEN ...								
within $\pm 0.5$ dB of the design level,	proceed to step 5.								
more than the design level,	replace the forward input pad with a higher value pad.								
less than the design level,	replace the forward input pad with a lower value pad.								
4	Repeat steps 2 and 3 until the output level is correct.								
5	If the amplifier is equipped with an AGC proceed to <b>Automatic Gain Control Setup</b> . If the amplifier is not equipped with an AGC proceed to "Adjusting the frequency response."								

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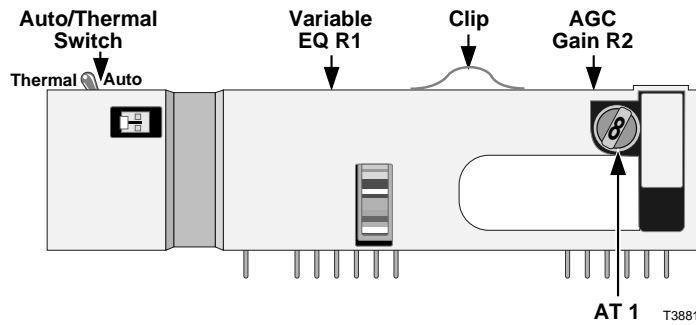
# Automatic Gain Control Setup

## Overview

This section provides procedures and tables for configuring and aligning the AGC in System Amplifier IIIs.

## Diagram

The following diagram shows the location of controls and attenuator sockets on the AGC module, 29 dBmV reference level.



## AGC setup procedure

Follow the steps in the table below to perform the AGC setup.

Step	Action
1	Prior to installing the AGC, remove the 0 dB jumper from the AGC pad socket.
2	Install the designated pad value (refer to the chart entitled "750 MHz AGC pad selection").
3	Clip out the interstage jumpers from the amplifier and discard the buss wire.
4	Install the AGC.
5	Once you have placed the module in the housing, switch the AGC to thermal, close the housing, and allow it to warm up for a minimum of one hour.
6	Set the amplifier for the desired output tilt and level with the AGC in thermal mode.

*Continued on next page*

## Automatic Gain Control Setup, Continued

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### AGC setup procedure (continued)

Step	Action
7	Insert the test probe into the -20 dB forward output test point shown in the diagram in <b>Illustrations</b> in chapter 2.
8	Measure and note the output level at the highest frequency, the pilot, and the lowest frequency. Remember to add 20 dB to compensate for the test point loss.
9	Switch the AGC to <b>Auto</b> and adjust the "Gain Adj." potentiometer to the same output level previously recorded in thermal. <b>Note:</b> If unable to achieve the level recorded in thermal, go to step 10.
10	For the SAIII Low Gain Dual, subtract the 29 dB AGC pilot reference from the measured pilot output level. Replace the pad value using the following formula: <b>(Measured Pilot Level - 29) = AGC Pad Value.</b> For the SAIII High Gain Dual, subtract the 40 dB AGC pilot reference from the measured pilot output level. Replace the pad value using the following formula: <b>(Measured Pilot Level - 40) = AGC Pad Value</b>

---

*Continued on next page*



## Automatic Gain Control Setup, Continued

---

### 750 MHz AGC pad selection

Follow the chart below for proper padding of the AGC in the Low Gain Dual. The chart also pertains to the High Gain Dual (HGD) when the output pad value is 0 dB. When the HGD output pad value is not 0 dB, refer to the chart in "HGD AGC selection when output pad is greater than 0 dB."

**Note:** The Low Gain Dual AGC reference level is 29 dB and must be measured at the pilot frequency. The HGD AGC reference level is 40 dB at the pilot frequency (different reference level due to the location of the pick off point).

AGC Pad Value (dB)	Pilot Level (dBmV) Main Port* for SAIH Low Gain Dual	Pilot Level (dBmV) Main Port* for HGD
0	29	40
1	30	41
2	31	42
3	32	43
4	33	44
5	34	45
6	35	46

\* All output levels are measured at the pilot frequency.

---

### HGD AGC pad selection when output pad is greater than 0 dB

The output pad value affects the HGD AGC pad selection. See the chart below for examples on how the output pad value affects the HGD setup. For every 1 dB increase in output pad value, increase the recommended AGC pad value in the above chart by 1 dB.

AGC Pad Value (dB)	Output Pad Value (dB)	Pilot Level (dBmV) Main Port*
1	1	40
4	2	42

\* All output levels are measured at the pilot frequency.

---

## Frequency Response Shaping

---

### Purpose

The purpose of this procedure is to verify (and if necessary, adjust for) the proper frequency response of the System Amplifier III.

---

### Preparation

To prepare the SAIII for frequency response shaping, follow these steps.

Step	Action
1	Open the SAIII housing to access the forward output test point.
2	Insert the test point adapter into the forward output test point.
3	If the SAIII has an AGC module installed, set the Auto/ Thermal switch on the AGC module to <b>THERMAL</b> .

---

### What to do first

Use a sweep receiver or spectrum analyzer to observe the overall peak-to-valley shape of the response.

IF the peak-to-valley shape is...	THEN...
within the standards set for the system	no further adjustments are necessary. Remove the test point adapter and close the station housing.
outside the standards set for the system	proceed to "Adjusting the frequency response."

---

*Continued on next page*

## Frequency Response Shaping, Continued

### Adjusting the frequency response

To adjust the frequency response of the System Amplifier III follow the steps below.

Step	Action				
1	Open the SAIII module cover.				
2	Select a system trim that has a frequency response opposite to that of the measured system response. This produces a net effect closer to a flat response.				
3	<p>Using heavy-duty wire cutters or snips, carefully cut and remove the jumper from the system trim location.</p> <table border="1" data-bbox="522 810 1382 947"> <thead> <tr> <th data-bbox="522 810 951 861">For:</th> <th data-bbox="951 810 1382 861">Remove Jumper:</th> </tr> </thead> <tbody> <tr> <td data-bbox="522 861 951 947">Low Gain Dual and High Gain Dual</td> <td data-bbox="951 861 1382 947">W4</td> </tr> </tbody> </table>	For:	Remove Jumper:	Low Gain Dual and High Gain Dual	W4
For:	Remove Jumper:				
Low Gain Dual and High Gain Dual	W4				
4	<p>Install the system trim in the appropriate system trim slot. For the exact location of the system trim, refer to the following illustration.</p> <p><b>Note:</b> The High Gain Dual system trim location is slightly lower than shown in the illustration below.</p> <div data-bbox="574 1178 1256 1633" data-label="Image"> <p>The illustration shows the top view of the SAIII amplifier module. A circular callout provides a magnified view of the system trim slot, which is a rectangular slot with four circular pin holes. A yellow system trim component is shown being inserted into this slot. The trim component has a central rectangular slot and four pins that align with the holes in the module's slot. The callout is labeled 'Forward System Trim Location'.</p> </div> <p style="text-align: right;">T3133</p> <p><b>Note:</b> Be sure all the pins on the system trim bottom align with the pin holes in the system trim slot, allowing the system trim to install flat against the SAIII amplifier module.</p>				

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## Frequency Response Shaping, Continued

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### Adjusting the frequency response (continued)

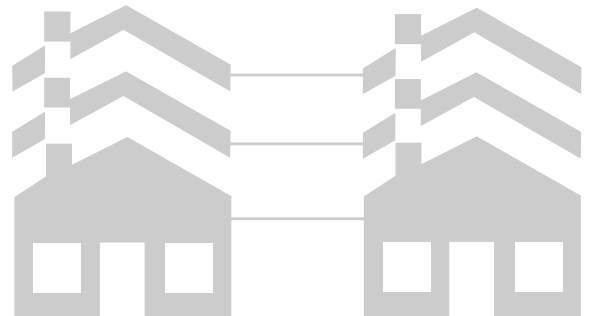
Step	Action
5	Adjust the system trim to produce the flattest frequency response.
6	Using the sweep receiver or spectrum analyzer, check the module output level and the tilt.
7	Is the module output level within design limits? <ul style="list-style-type: none"><li>• If <b>no</b>, reset the output tilt and/or level. Refer to “Setting the output tilt” and/or “Setting the output level” described earlier in this chapter.</li><li>• If <b>yes</b>, proceed to step 8.</li></ul>
8	If the SAIII has an AGC module installed... <ul style="list-style-type: none"><li>• set the Auto/Thermal switch on the AGC module to <b>AUTO</b>, and</li><li>• adjust R2 on the AGC module to match the output level measured in <b>THERMAL</b> mode.</li></ul>
9	Remove the test point adapter and close the amplifier module cover and housing.

---

# 750 MHz System Amplifier III Installation & Operation Guide

## **A**ppendices

- Appendix A - Technical Information
- Appendix B - Customer Information



# Appendix A

## Technical Information

### Overview

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#### In this appendix

This appendix contains tilt and equalizer charts.

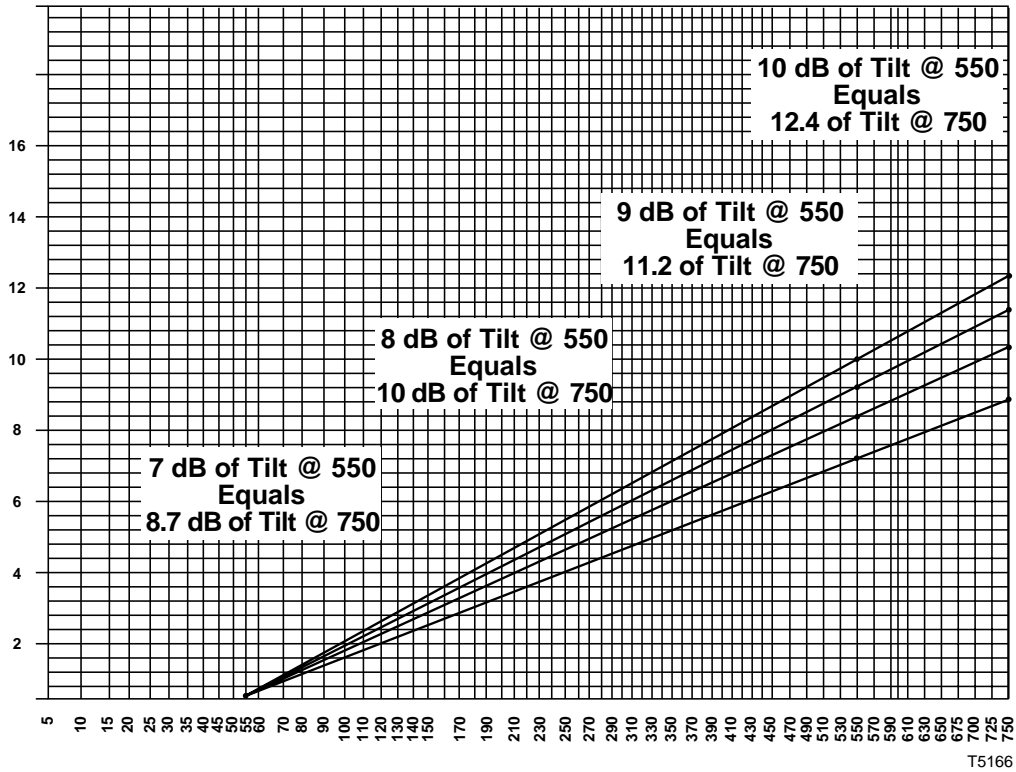
Topic	See Page
Tilt Chart	A-2
Equalizer Charts	A-3

---

# Tilt Chart

## Amplifier output tilt

The following chart can be used to determine the operating level at a particular frequency considering the operating tilt.

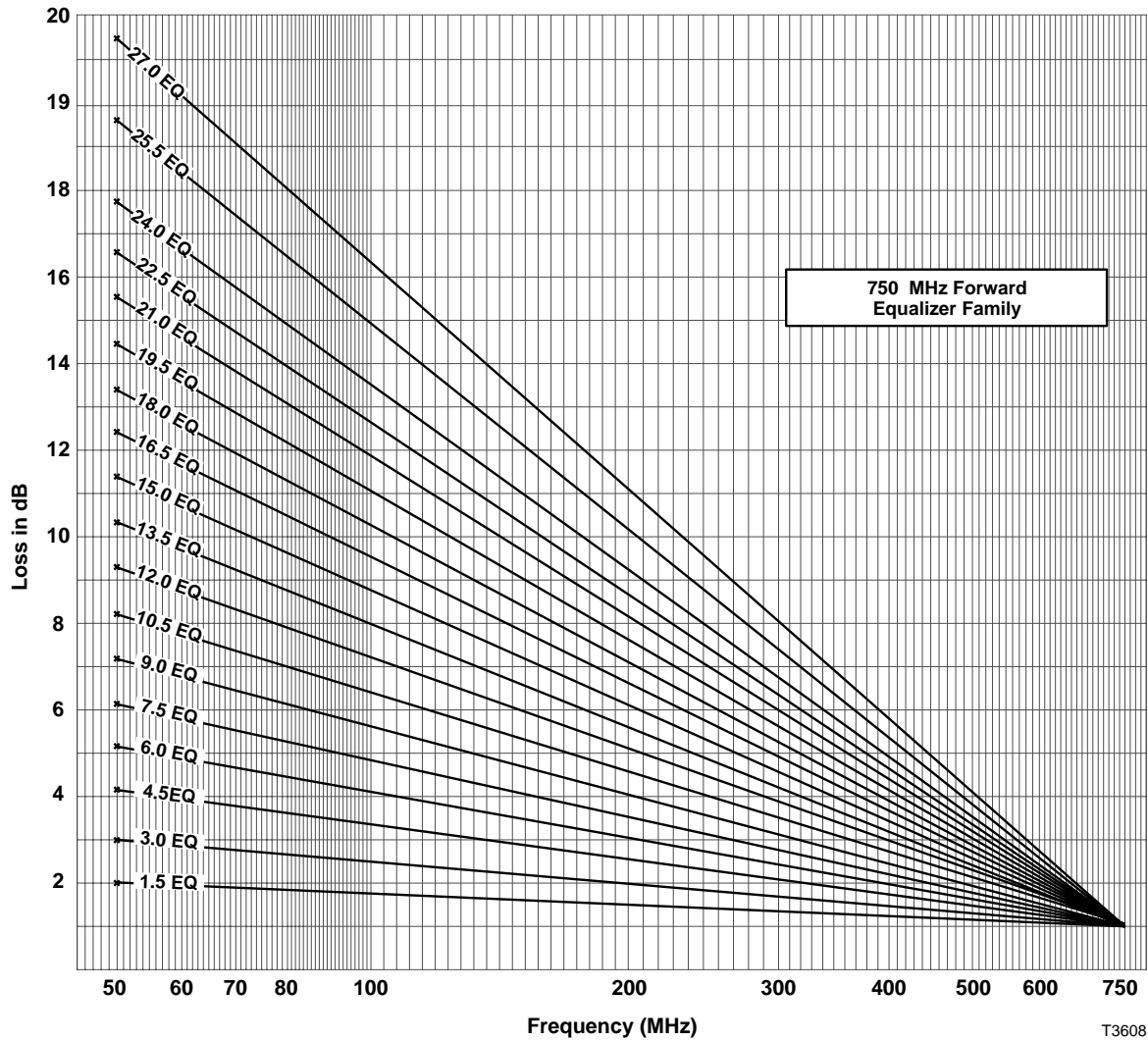


**For example:** If the amplifier operating levels are 42 dBmV with an operating tilt of 10 dB at 750 MHz, the operating level at the pilot frequency of 445.25 MHz would be 39 dBmV. This was found by taking the difference in tilt between 750 MHz and 445.25 MHz (10-7=3 dB). Then subtract the difference in tilt from the operating level (42-3=39 dBmV).

# Equalizer Charts

## 750 MHz forward equalizer

The following diagram shows the 750 MHz forward equalizer chart.



T3608

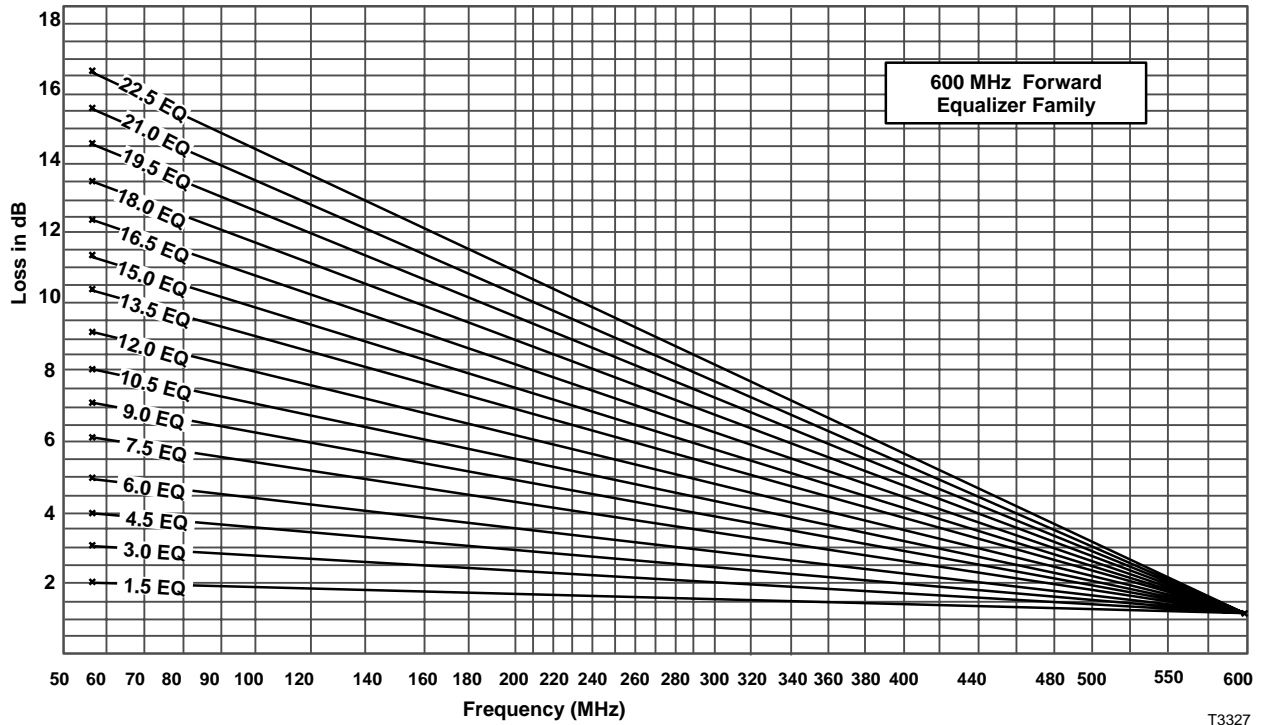
*Continued on next page*



## Equalizer Charts, Continued

### 600 MHz forward equalizer

The following diagram shows the 600 MHz forward equalizer chart.



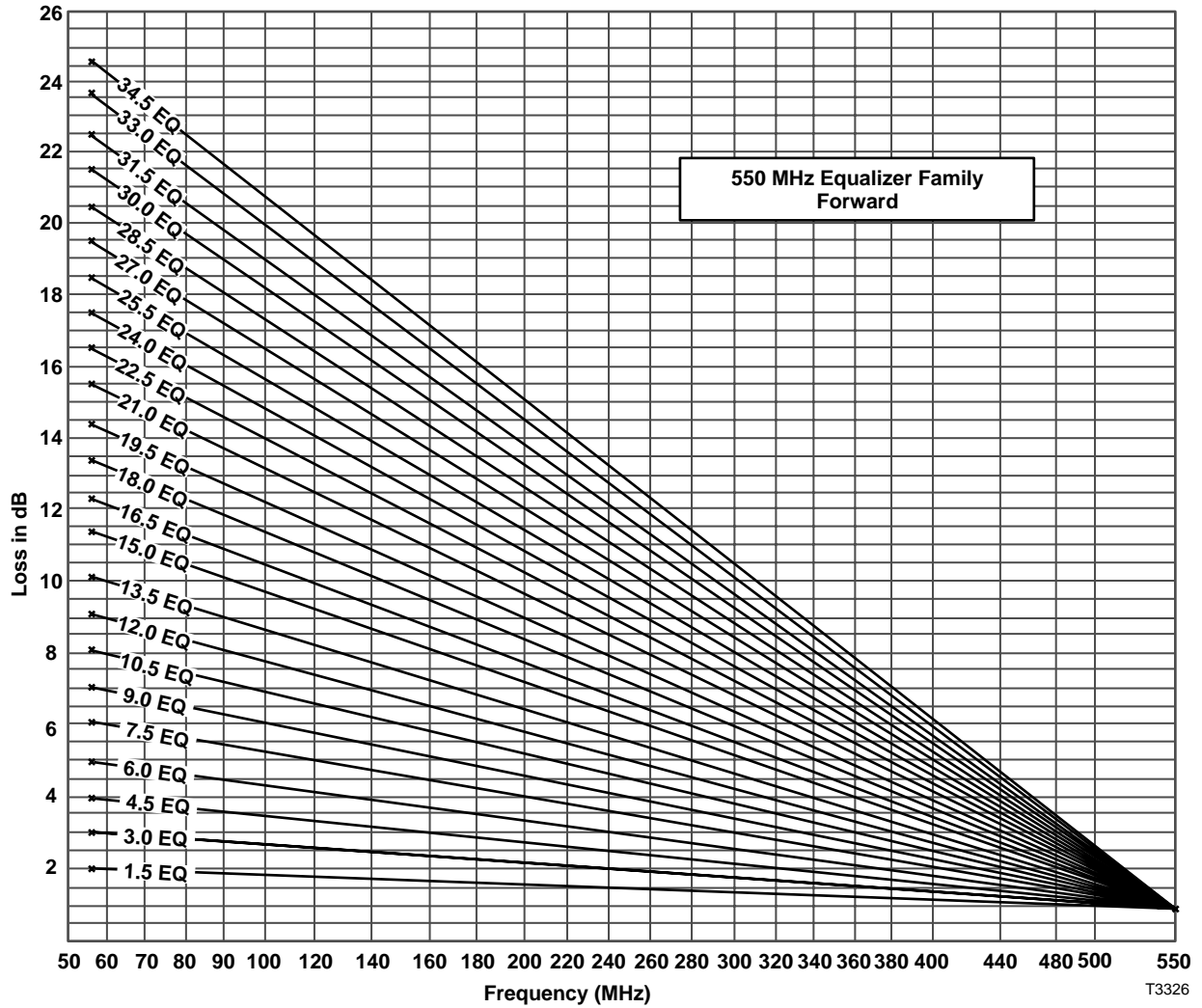
T3327

*Continued on next page*

# Equalizer Charts, Continued

## 550 MHz forward equalizer

The following diagram shows the 550 MHz forward equalizer chart.

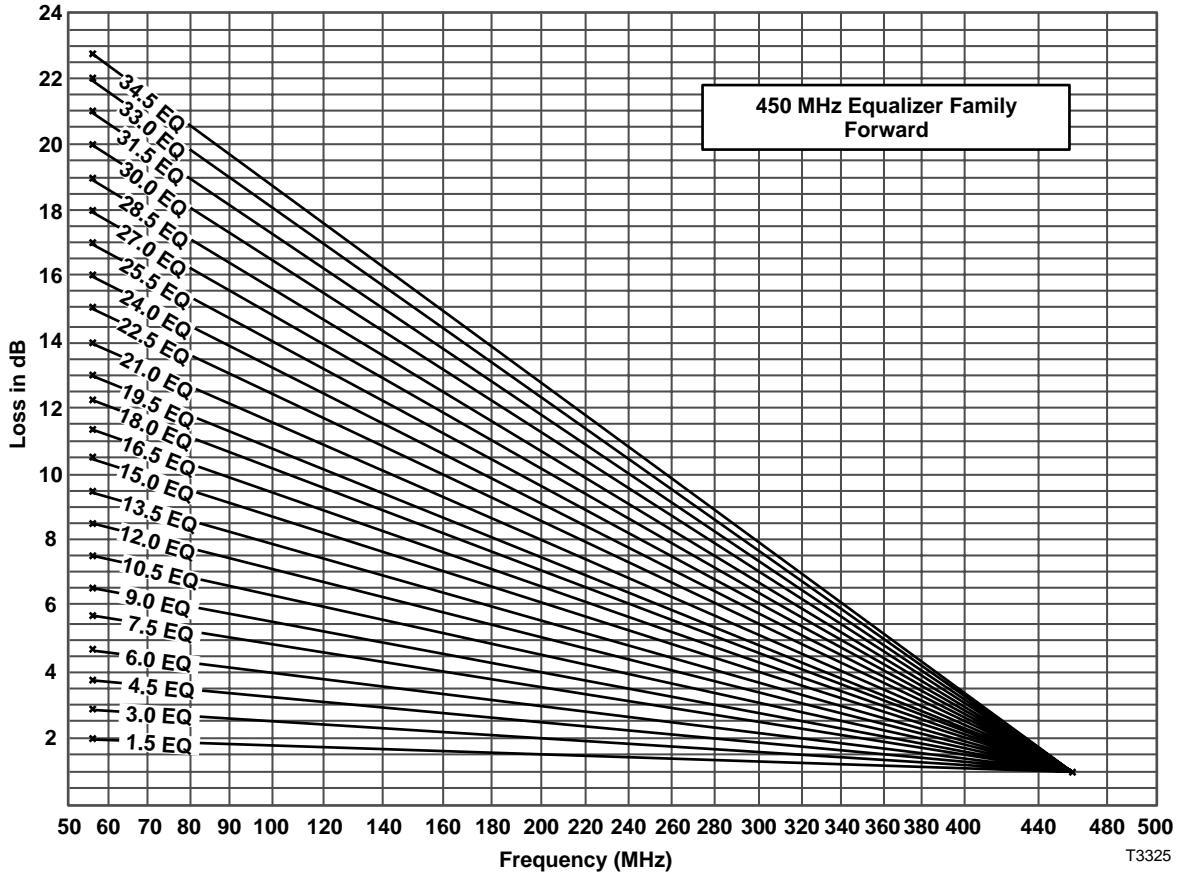


Continued on next page

# Equalizer Charts, Continued

## 450 MHz forward equalizer

The following diagram shows the 450 MHz forward equalizer chart.



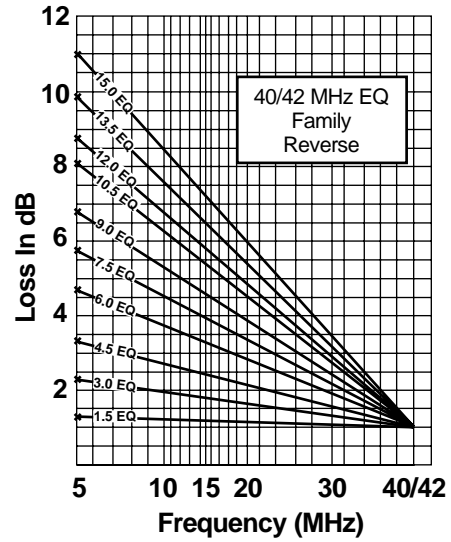
Continued on next page

## Equalizer Charts, Continued

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### 40 MHz reverse equalizer

The following diagram shows the 40 / 42 MHz reverse equalizer chart.



T3329

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# Appendix B

## Customer Information

### Overview

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#### Introduction

This appendix contains information on how to obtain product support, how to return damaged products, and how to send your comments about this guide to Scientific-Atlanta.

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#### In this appendix

This appendix contains the following topics.

Topic	See Page
Customer Support	B-2
Returning Products	B-3
Your Comments, Please	B-5

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## Customer Support

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### List of telephone numbers

If you have questions about this product, contact your distributor or sales agent for information. If further assistance is required, telephone your nearest Scientific-Atlanta office at one of the following telephone numbers.

<b>The Americas</b>		
United States	Scientific-Atlanta Technical Assistance Center, Atlanta, Georgia	<ul style="list-style-type: none"><li>• From within North America <b>1-800-722-2009</b> (toll-free)</li><li>• From outside North America <b>+1-770-903-5400</b> (direct)</li></ul>
<b>United Kingdom and Europe</b>		
United Kingdom	Kings Langley	<ul style="list-style-type: none"><li>• <b>+44-1-923-266133</b></li><li>• <b>+44-1-923-271420</b> (Technical Assistance Centre for Europe)</li></ul>

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## Returning Products

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### Procedure

To return any Scientific-Atlanta product for repair or replacement, follow the steps in the table below.

**Note:** Products **must** have an **return material authorization (RMA)** number to receive credit.

Step	Action						
1	<p>Telephone or fax Scientific-Atlanta and request a <b>return material authorization (RMA) number</b>.</p> <table border="1" data-bbox="467 787 1409 1039"> <thead> <tr> <th data-bbox="467 787 889 825">From within the US</th> <th data-bbox="889 787 1409 825">From outside the US</th> </tr> </thead> <tbody> <tr> <td data-bbox="467 825 889 955"> <ul style="list-style-type: none"> <li>• Tel: 1-800-722-2009</li> </ul> </td> <td data-bbox="889 825 1409 955"> <ul style="list-style-type: none"> <li>• <b>To the United States</b> Tel: +1-770-903-5300 Fax: +1-770-903-5888</li> </ul> </td> </tr> <tr> <td data-bbox="467 955 889 1039"> <ul style="list-style-type: none"> <li>• Fax: 1-770-903-5888</li> </ul> </td> <td data-bbox="889 955 1409 1039"> <ul style="list-style-type: none"> <li>• <b>To the United Kingdom</b> Tel: +44-1-923-271460</li> </ul> </td> </tr> </tbody> </table>	From within the US	From outside the US	<ul style="list-style-type: none"> <li>• Tel: 1-800-722-2009</li> </ul>	<ul style="list-style-type: none"> <li>• <b>To the United States</b> Tel: +1-770-903-5300 Fax: +1-770-903-5888</li> </ul>	<ul style="list-style-type: none"> <li>• Fax: 1-770-903-5888</li> </ul>	<ul style="list-style-type: none"> <li>• <b>To the United Kingdom</b> Tel: +44-1-923-271460</li> </ul>
From within the US	From outside the US						
<ul style="list-style-type: none"> <li>• Tel: 1-800-722-2009</li> </ul>	<ul style="list-style-type: none"> <li>• <b>To the United States</b> Tel: +1-770-903-5300 Fax: +1-770-903-5888</li> </ul>						
<ul style="list-style-type: none"> <li>• Fax: 1-770-903-5888</li> </ul>	<ul style="list-style-type: none"> <li>• <b>To the United Kingdom</b> Tel: +44-1-923-271460</li> </ul>						
2	<p>Tag or identify the defective product and write a detailed description of the circumstances.</p> <p>Include the following information on the tag.</p> <ul style="list-style-type: none"> <li>• RMA number</li> <li>• sales order number</li> <li>• purchase order number(if available)</li> <li>• date the product was received</li> </ul>						
3	<p>Pack the product in its original container and protective packing material.</p> <p><b>Note:</b> If the original container and packing material are no longer available, pack the product in a sturdy, corrugated box and cushion it with packing material.</p>						

*Continued on next page*

## Returning Products, Continued

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### Procedure (continued)

Step	Action
4	<p>Write the following information on the <i>outside</i> of the container.</p> <ul style="list-style-type: none"><li>• your name</li><li>• street address, city, state, and zip code</li><li>• telephone number</li><li>• RMA number</li><li>• problem description</li></ul> <p><b>Note:</b> Absence of the RMA number may delay processing your product for repair. Include the RMA number in all correspondence.</p>
5	<p>Ship the product, prepaid and insured, using United Parcel Service (UPS), your postal service, or other freight carrier to the following address:</p> <p>Scientific-Atlanta, Inc. RMA Number _____ Product Services 4311 Communications Drive Norcross, GA 30093 USA</p> <p><b>Note:</b> Scientific-Atlanta, Inc. does not accept freight collect. Be sure to prepay all shipments.</p>

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## Your Comments, Please

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### Introduction

Please take a few minutes to fill out and mail this questionnaire. Your comments will help us improve our publications.

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### Comments

Please complete the table below.

What do you think about this publication's...	Check the box that best describes your opinion	If you checked fair or poor, please explain
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Name, title, department, and company

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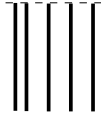
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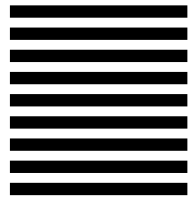
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