Installation and Operation Guide

Scientific Atlanta

750 MHz System Amplifier III Types 1 and 2

Please read this entire guide

Veuillez 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

Veuillez 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.

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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750 MHz System Amplifier III Types 1 and 2 Installation and Operation Guide

Trademark Acknowledgments

Trademarks

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

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Contents, Continued

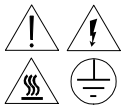
Safety Precautions

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.

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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

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: The 40/52 SAIII Type 1 and 2 amplifiers have 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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Claims under this warranty

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

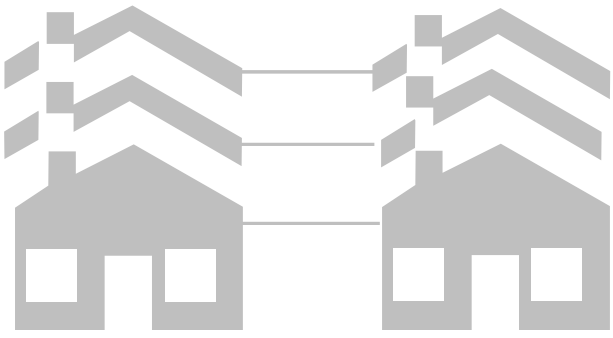
Step	Action
A	• Notify us by giving the Item model number, serial number and details of the difficulty. • On receipt of this information, you will be given service data or shipping instructions.
B	• On receipt of shipping instructions, forward the Item prepaid. • If the Item or fault is not covered by warranty, an estimate of charges will be furnished before work begins.

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.

750 MHz System Amplifier III Types 1 and 2
Installation & Operation Guide

1 Introducing the System Amplifier III Types 1 and 2



Chapter 1

Introducing the System Amplifier III Types 1 and 2

Overview

In this guide

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

Introduction

This chapter introduces you to the System Amplifiers Types 1 and 2 and contains the following topics.

Description of the System Amplifier III Types 1 and 2

Introduction

This section lists available System Amplifier III Types 1 and 2 modules for Unbalanced Triple and High Gain Dual applications, and provides open view diagrams of each amplifier module. These amplifier modules have the following characteristics.

- -20 dB test points provide testing of forward and reverse input and output signals without disrupting normal operation.
- Backward compatibility with previous System Amplifier II housings provides reduced upgrade costs.
- Direct module plug-in to the housing provides superior amplifier heat sinking.
- Symmetrical housing and modules provide convenient mounting.
- Improved AC circuitry provides 15 A of steady state current capability that is able to withstand 25 A of peak current (for a maximum of 2 hours).
- Surge protection provides improved resistance to high voltage transients.
- Coated housing protects outdoor equipment in coastal areas and other corrosive environments.
- Input and output reverse pad locations to increase flexibility in reverse path design and alignment.
- DC 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 by removing resistor)

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Amplifier listing

This table lists the available amplifiers.

Part Number	Amplification Split	Power Supply	Type
545185	5 MHz to 40 MHz (Reverse) 52 MHz to 750 MHz (Forward)	60/90 Volt	Type 1 Unbalanced Triple
545191	5 MHz to 40 MHz (Reverse) 52 MHz to 750 MHz (Forward)	60/90 Volt	Type 2-2 High Gain Dual
573965	5 MHz to 40 MHz (Reverse) 52 MHz to 750 MHz (Forward)	60/90 Volt	Type 2-3 High Gain Dual
565266	5 MHz to 55 MHz (Reverse) 70 MHz to 750 MHz (Forward)	60/90 Volt	Type 1 Unbalanced Triple
573863	5 MHz to 55 MHz (Reverse) 70 MHz to 750 MHz (Forward)	60/90 Volt	Type 2-2 High Gain Dual

Types of System Amplifiers

Input and output ports

The Type 1 Unbalanced Triple System Amplifier has one input port and three output ports. The main output port is a low gain outpu t trunk, while the Aux 1 and Aux 2 output ports are bridger or high gain outputs.

There are two configurations of 40/52 MHz Type 2 System Amplifiers available, standard and enhanced. The Type 2-2 High Gain Dual System Amplifier has one input and two output ports. Both output ports are bridger or high gain outputs. The Type 2-3 High Gain Dual System Amplifier has one input and either two or three output ports. The number of output ports is determined by which one of the following is installed in the plug-in signal director position.

- Jumper
- 3.5 dB splitter
- 8 dB directional coupler
- 12 dB directional coupler

Aux 1 or Aux 2 output port can be selected as the second output port in the jumper configuration. The splitter or couplers activate both Aux 1 and Aux 2 ports.

Configuration

All Type 1 Unbalanced Triple System Amplifier s and Type 2 High Gain Dual System Amplifiers are configured with reverse amplifiers, Automatic Gain Controls (AGCs), 16.5 dB interstage equalizer, and interstage and output attenuator pads. Pad values are chosen so that amplifier gain is set within 1 dB of its specified value.

Test points

There are eight RF and two voltage test points on the Type 1 Unbalanced Triple System Amplifier s.

There are six RF and two voltage test points on the Type 2 High Gain Dual System Amplifiers.

Continued on next page

Fuse shunts

The Unbalanced Triple System Amplifier has four fuse shunts located near the center of the amplifier which are used to direct AC current to and from the amplifier's input and output ports.

The Type 2-2 High Gain Dual System Amplifier has three fuse shunts located near the center of the amplifier which are used to direct AC current to and from the amplifier's input and output ports.

The Type 2-3 High Gain Dual System Amplifier has three fuse shunts located near the center of the amplifier and one fuse shunt located near the Aux 2 port. These fuse shunts are used to direct AC current to and from the amplifiers input and output ports.

Accessories

Type 1 and Type 2 accessories

Both the Type 1 Unbalanced Triple and Type 2 High Gain Dual System Amplifiers are equipped to work with the following field installable, factory installed, and miscellaneous accessories.

Field installable accessories

The following table lists the field installable accessories, their location in the amplifier module, and the jumper wires that must be removed before installing each accessory.

Accessory	Part Number	Location/Jumper
Forward Input Attenuator pad	Various	AT1/no jumper
Reverse Input Attenuator pad	Various	AT6, AT7, AT8 (Type 1) /no jumper AT6, AT7 (Type 2) /no jumper
Reverse Output Attenuator pad	Various	AT5/factory installed pad
Forward equalizer	501220 through 501234, 540016 through 540018	EQ1/no jumper
Cable simulator	562262 through 562269	EQ1/no jumper
Fixed reverse equalizer	545107 through 545118 (40 MHz) 573822 through 573833 (55 MHz)	EQ2/0 dB jumper

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Field installable accessories for the Type 2-3 High Gain Dual amplifiers only

The following table lists additional field installable accessories that are available for the Type 2-3 High Gain Dual System Amplifiers. These accessories plug into the signal director position.

Accessory	Part Number	Location/Jumper
Jumper	562406	Signal director/no jumper
Splitter	562414	Signal director/no jumper
DC-8 directional coupler	562419	Signal director/no jumper
DC-12 directional coupler	562420	Signal director/no jumper

Factory installed accessories

The following table contains the factory installed accessories used with the Type 1 Unbalanced Triple and Type 2 High Gain Dual System Amplifiers, and their locations in the amplifier.

Accessory	Part Number	Location
Forward Output Attenuator pads	Various	AT3, AT4 (Type 1) AT2, AT3 (Type 2)
Forward Interstage Attenuator pad	Various	AT2 (Type 1) AT4 (Type 2)
Reverse Output Attenuator pad	Various	AT5
Reverse EQ (0 dB) jumper	562658	EQ2
AGC Attenuator pad	Various	AT1 (on AGC module)
16.5 dB Interstage EQ	545095	A7
AGC (445.25 MHz pilot)	545130 for 40/52 split	A5
AGC (451.25 MHz pilot)	573875 for 55/70 split	A5

Continued on next page

Factory installed accessories (continued)

Accessory	Part Number	Location
Reverse amplifier	545470 for Type 1 40/52 split 545471 for Type 2 40/52 split 573814 for Type 1 55/70 split 573816 for Type 2 55/70 split	A6
Reverse filter (forward input)	561947 for 40/52 split 573851 for 55/70 split	A1
Reverse filters (forward output)	561948 for 40/52 split 573852 for 55/70 split	A2, A4 (Type 1) A2, A3 (Type 2)

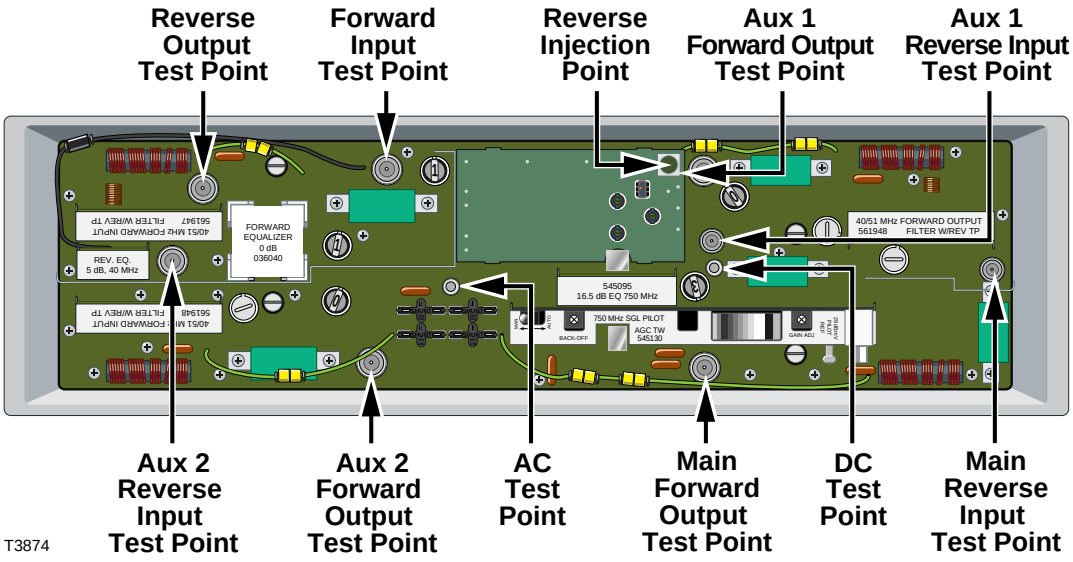
Miscellaneous accessories

The following table contains the miscellaneous accessories used with the Type 1 Unbalanced Triple and Type 2 High Gain Dual System Amplifiers, and the jumper wires that must be removed before installing each accessory.

Accessory	Part Number	Location/Jumper
Surge protector	467351	CB1/no jumper (Type 1) A10/no jumper (Type 2)
Status monitor	See Status Monitor Installation & Operation Guide	J5/no jumper

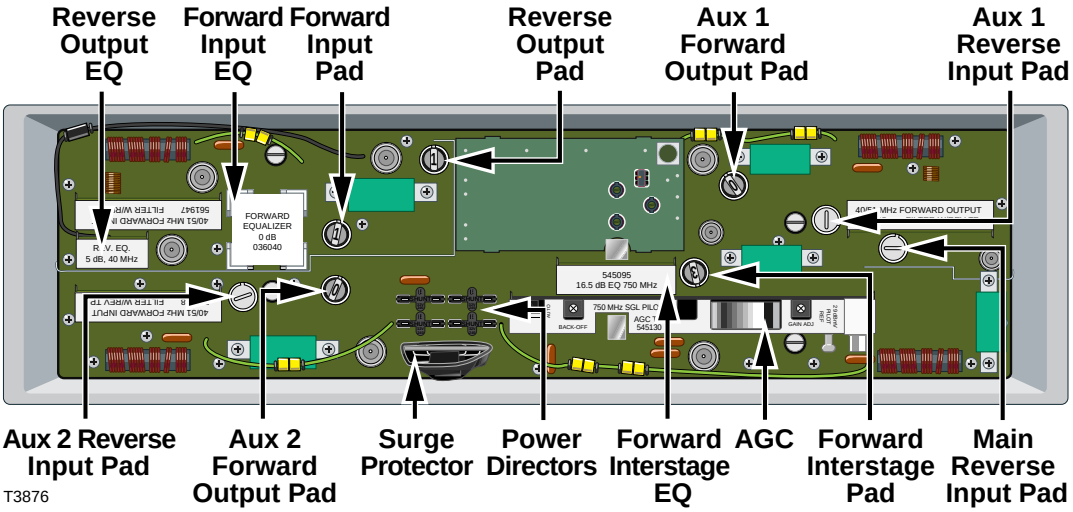
Type 1 Unbalanced Triple test points

The following diagram shows the test points of the Type 1 Unbalanced Triple System Amplifier.



Type 1 Unbalanced Triple accessories

The following diagram shows the accessory locations of the Type 1 Unbalanced Triple System Amplifier.



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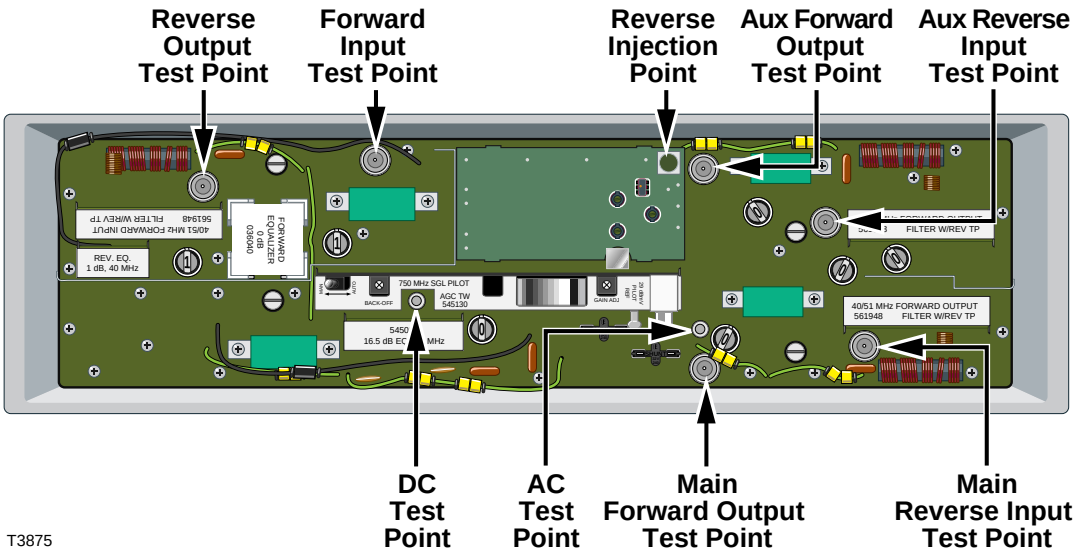
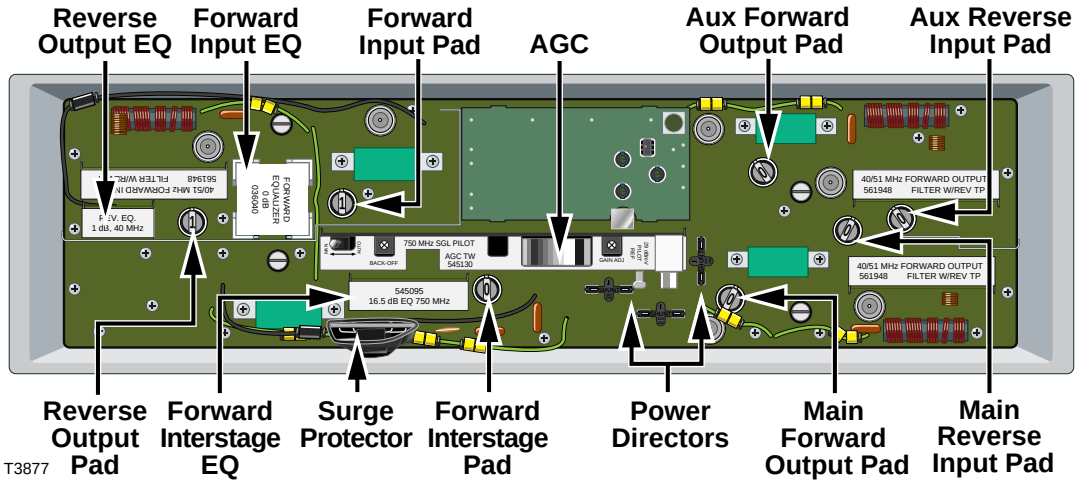
Type 2-2 High Gain Dual test points

The following diagram shows the test points of the Type 2 -2 High Gain Dual System Amplifier.



Type 2-2 High Gain Dual accessories

The following diagram shows the accessory locations of the Type 2 -2 High Gain Dual System Amplifier.



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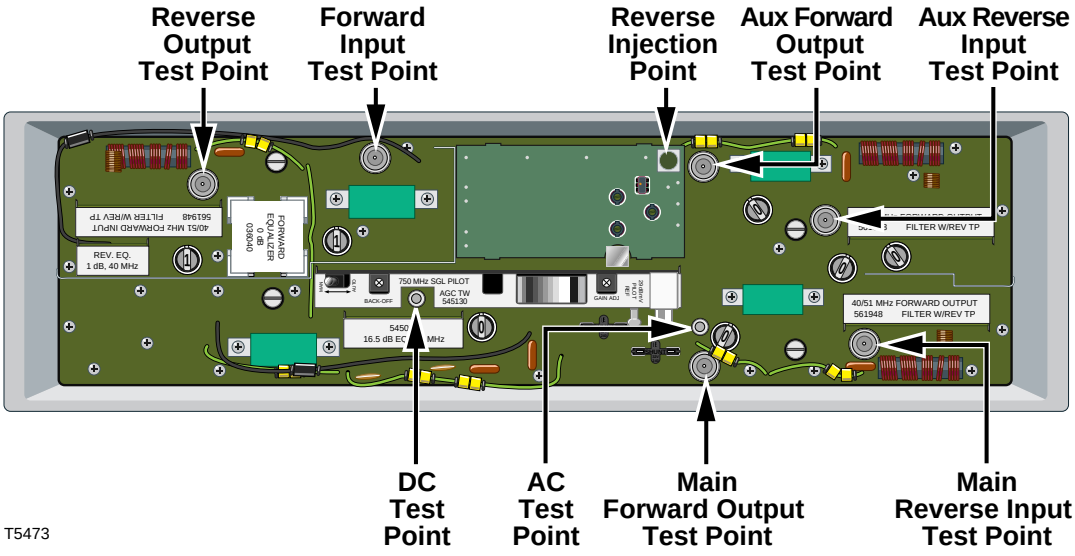
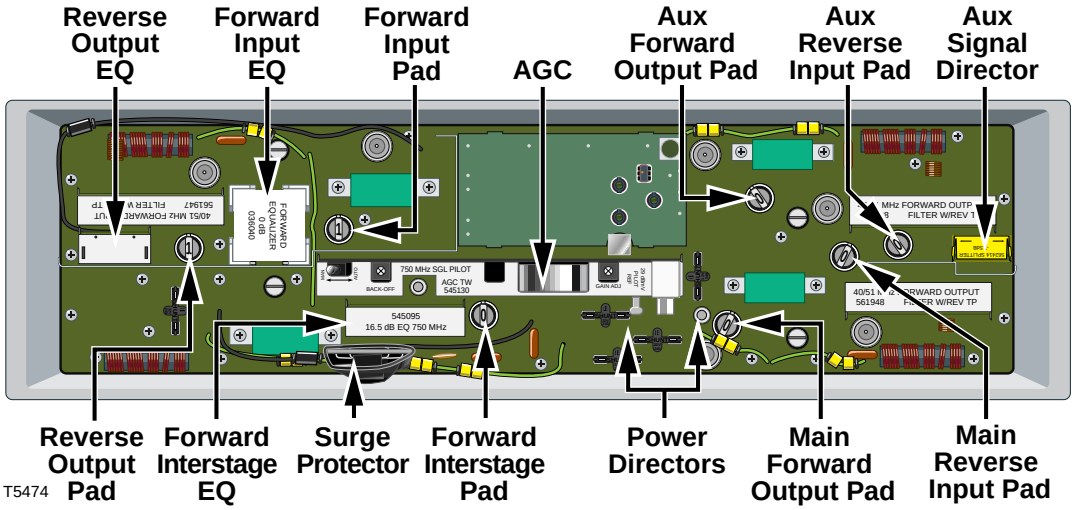
Type 2-3 High Gain Dual test points

The following diagram shows the test points of the Type 2 -3 High Gain Dual System Amplifier.



Type 2-3 High Gain Dual accessories

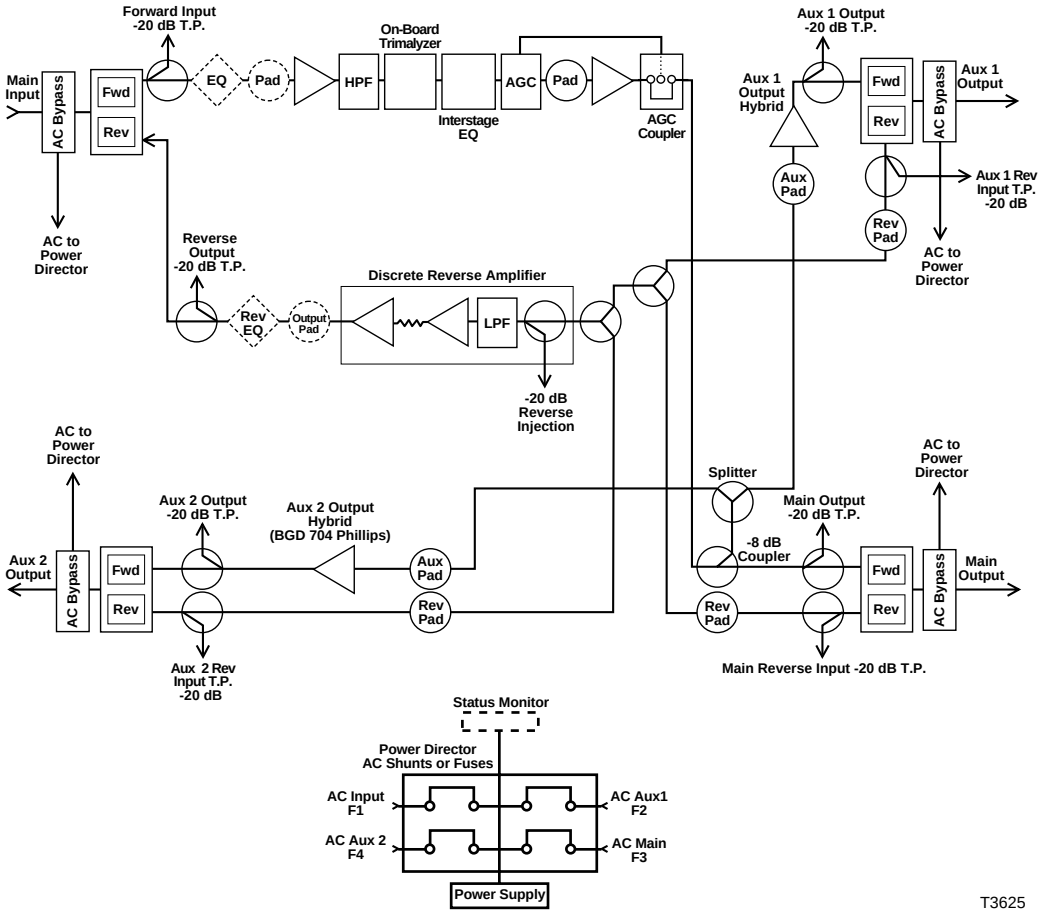
The following diagram shows the accessory locations of the Type 2 -3 High Gain Dual System Amplifier.



Block Diagrams

Type 1 Unbalanced Triple

The following illustration is a block diagram of the Type 1 Unbalanced Triple Output System Amplifier.



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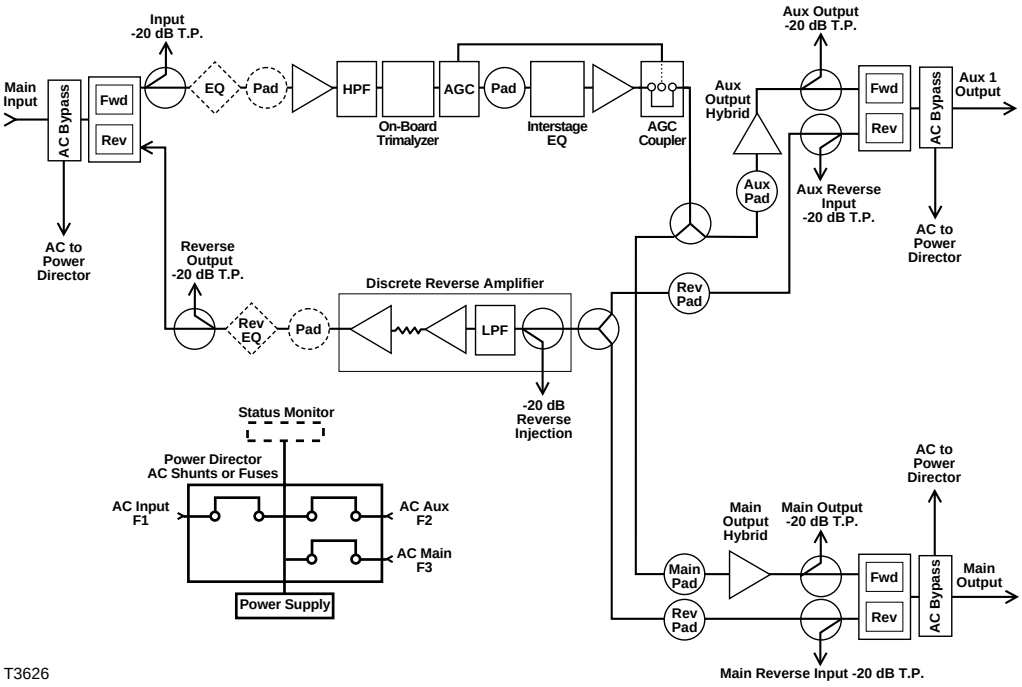
Type 2-2 High Gain Dual

The following illustration is a block diagram of the Type 2 -2 High Gain Dual Output System Amplifier.



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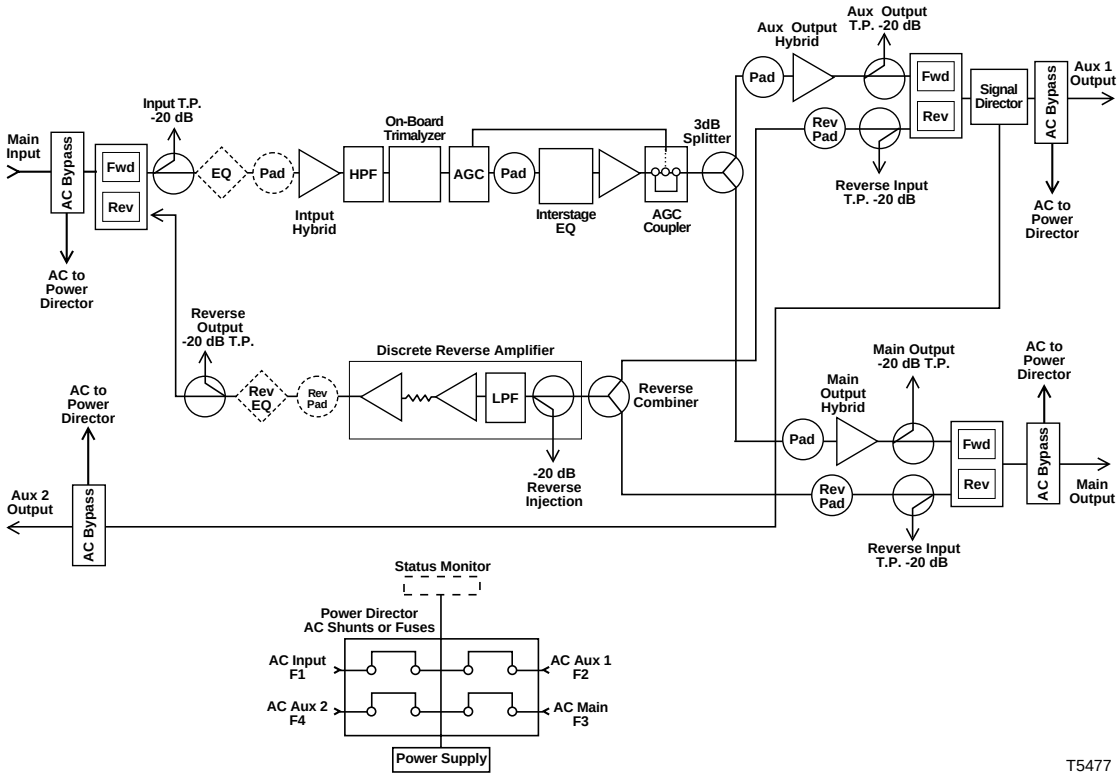
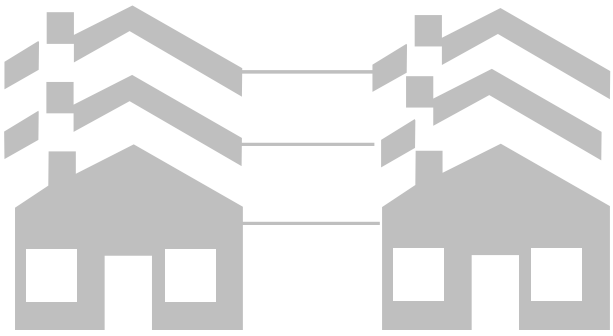
Type 2-3 High Gain Dual

The following illustration is a block diagram of the Type 2 -3 High Gain Dual Output System Amplifier.



2 Installing and Configuring the System Amplifier III Types 1 and 2



Chapter 2

Installing and Configuring the System Amplifier III Types 1 and 2

Overview

Introduction

This chapter is divided into four sections and gives step-by-step instructions on installing and configuring System Amplifiers Types 1 and 2 in your cable system.

Section A

Installing the Housing

Overview

Scope of this section

This section covers requirements and procedures needed to install the Type 1 and Type 2 System Amplifier housing in the distribution system and contains the following topics.

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

Cover and shields

Types 1 and 2 amplifiers have 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 that 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.**

Blue label on housing

Important! The Type 1 and Type 2 amplifier modules are marked with a blue label to indicate 15 ampere capability. The RF connectors in these modules are also blue. These modules must be used in conjunction with the proper Type 1 or Type 2 amplifier housings, which are also marked with a blue label.

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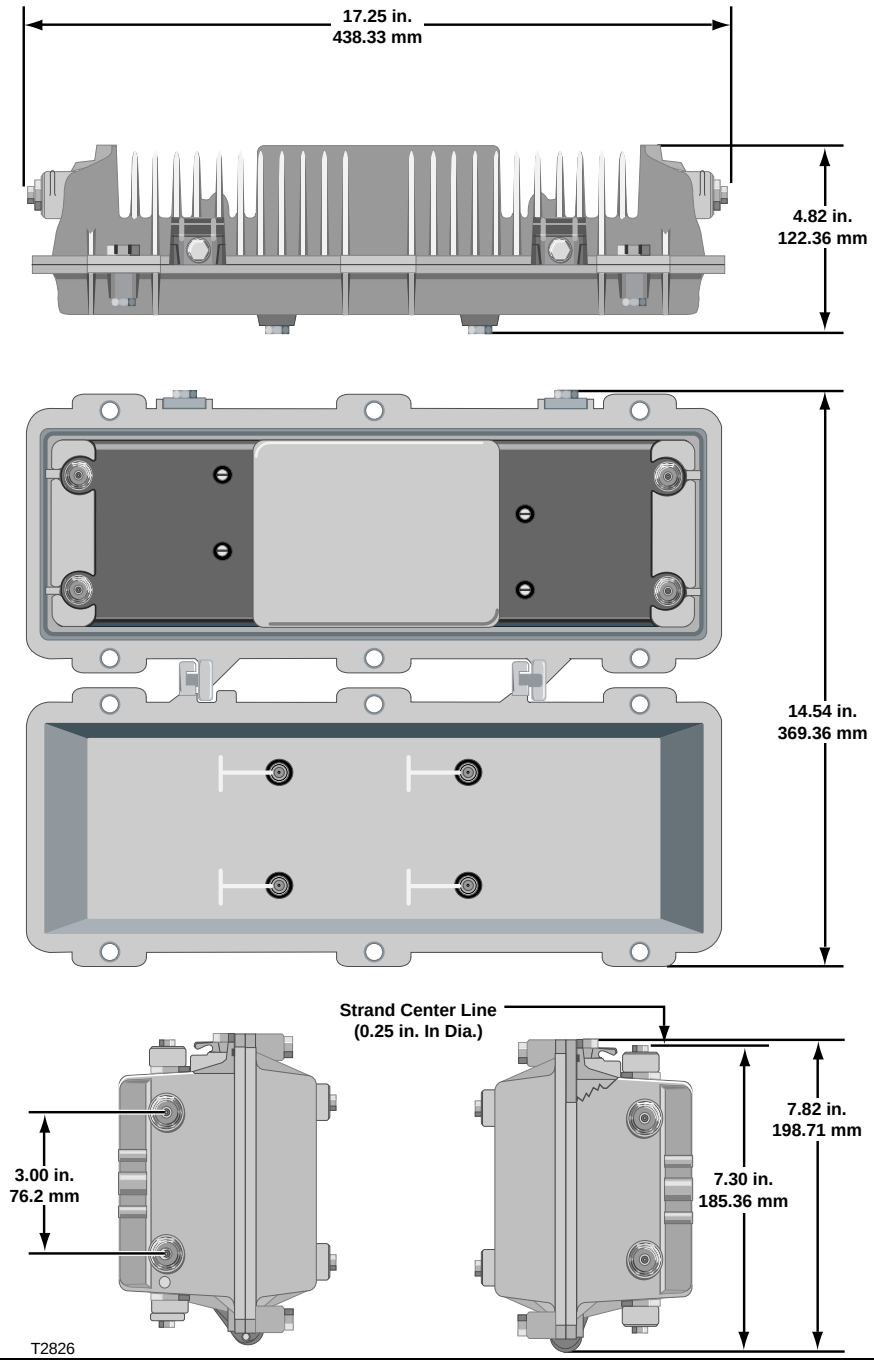
Measurements

The diagram below shows dimensions, in inches and millimeters, of the system amplifier housing with a standard lid. Use these measurements to calculate clearance requirements for your installation.



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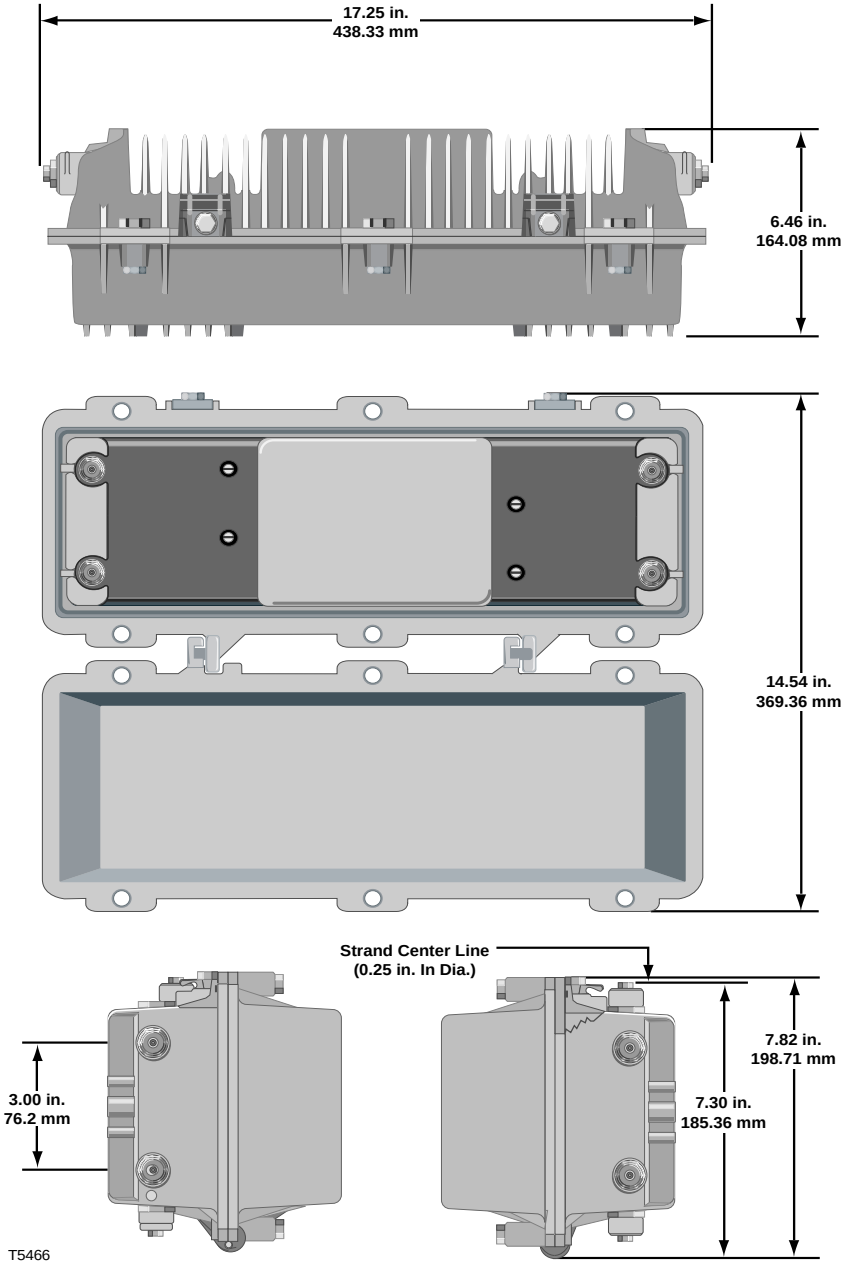
Measurements (continued)

The diagram below shows dimensions, in inches and millimeters, of the system amplifier housing with a mid-sized lid. Use these measurements to calculate clearance requirements for your installation.



Upgrading Existing Housing Seizures

Introduction

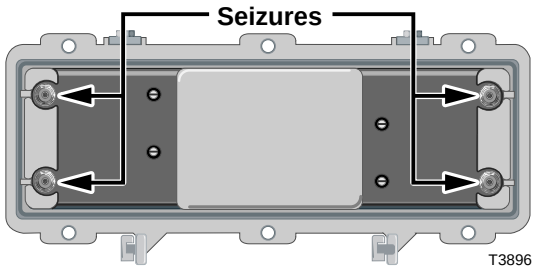
The Type 1 and Type 2 amplifiers have a higher current-carrying capacity than earlier amplifier products. If you are replacing an earlier amplifier with a new Type 1 or Type 2 amplifier, you must upgrade the housing to handle the higher current demands.

The 15 A housings have silver-plated 0.063 in. diameter pins in the sei zures. 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 **Installing the Amplifier Module** 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).
4	Is coaxial cable already connected to the housing? • If **yes**, tighten each seizure from 2 ft-lb to 5 ft-lb (2.7 Nm to 6.8 Nm). • If **no**, turn each seizure by hand, about halfway into the socket, and proceed to **Attaching Connectors.**
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 requires pin-type connectors for all RF connections.

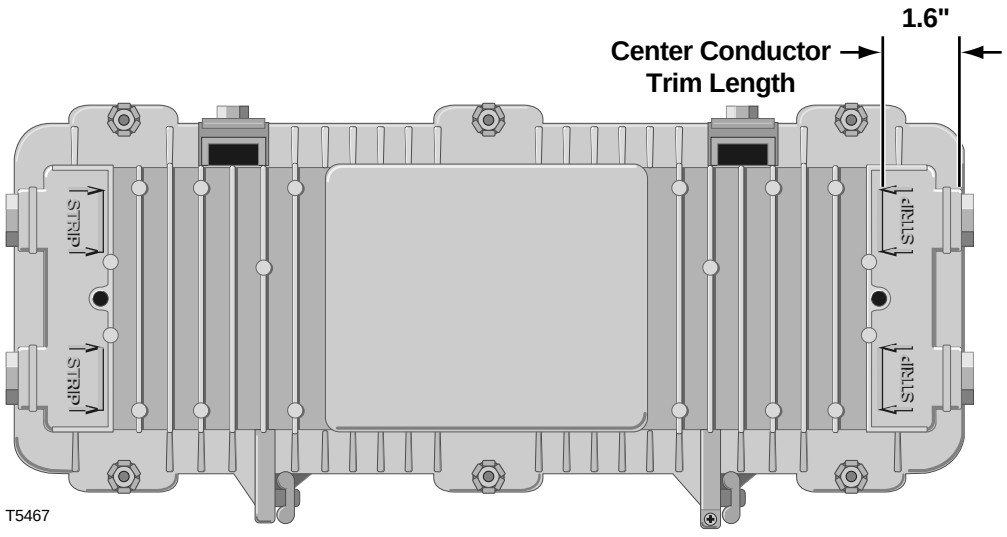
Standard pin connectors, with pins extending 1.5 in. to 1.6 in. (3.8 cm to 4.1 cm) from the connector shoulder, require no trimming. You must trim longer pins before inserting them into the housing. The pin length applies to both end entry and side entry ports.

To trim long pins, follow the steps in the table below.

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 **STRIP** line on the housing, trim the pin flush to the **STRIP** 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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Connecting the coaxial cable pin connector to the system amplifier housing

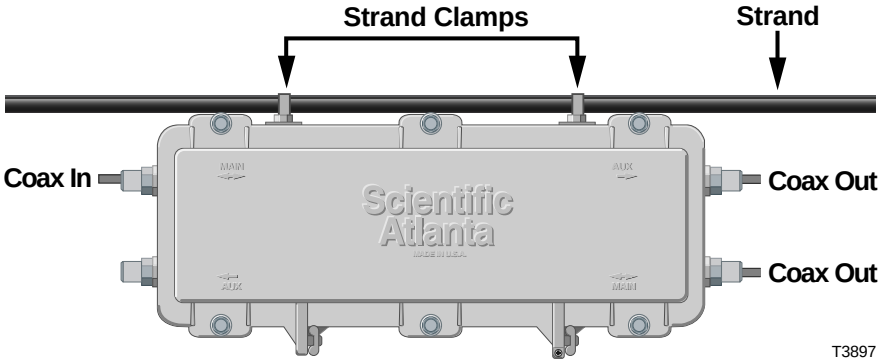
Follow these steps to connect the coaxial cable to the system amplifier housing.

Step	Action
1	Begin this procedure with the system amplifier 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 through 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 **Attaching the Housing.**

Attaching the Housing

Installing the housing on a strand procedure

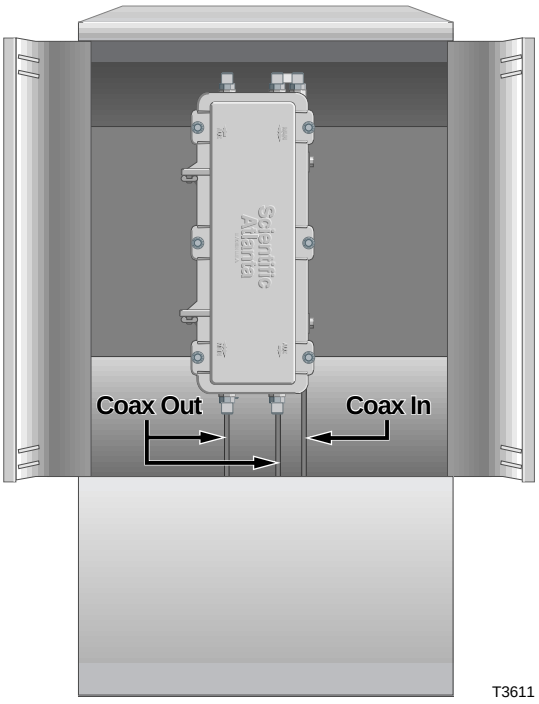
Follow these steps to install the housing on an aerial strand.

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	Move the housing as needed to install the coaxial cable and connectors. See the diagram below for an example. 
6	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 housing. **Note:** A slight tilt of the face of the housing is normal. Cable tension will cause the housing to hang more closely to vertical.
7	Connect the coaxial cable to the pin connector according to connector manufacturer's specifications.
8	Proceed to **Configuring the Amplifier Module.**

Continued on next page

Installing the housing in a pedestal procedure

Follow these steps to install the amplifier 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.  **Note:** The housing mounts to the bracket provided by the pedestal manufacturer.
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 **Configuring the Amplifier Module.**

Section B

Configuring the Amplifier Module

Overview

Scope of this section

This section covers requirements and procedures needed to configure the Type 1 and Type 2 System Amplifiers and contains the following topics.

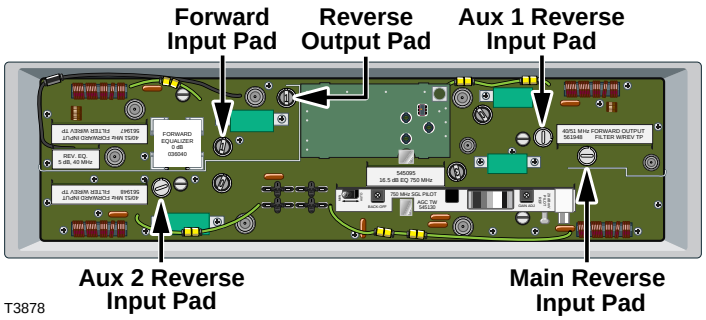
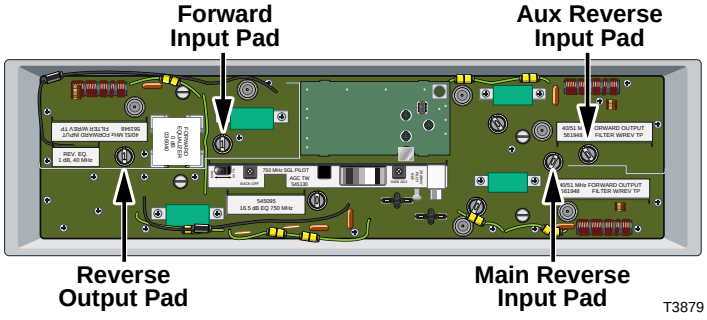
Note: Install all desired accessories into the amplifier module before installing the amplifier module into the housing.

Installing the 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 860 MHz (forward or reverse path)

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 the illustration below. **Type 1**  **Type 2**  **Note:** Be sure all the pins on the pad bottom align with the pin holes in the pad slot, allowing the pad to install fla t against the system amplifier module.
3	Install other options or accessories as desired, or proceed to **Installing the Amplifier Module**.

Continued on next page

Forward input equalizer or cable simulator

For best results, follow this installation procedure exactly.

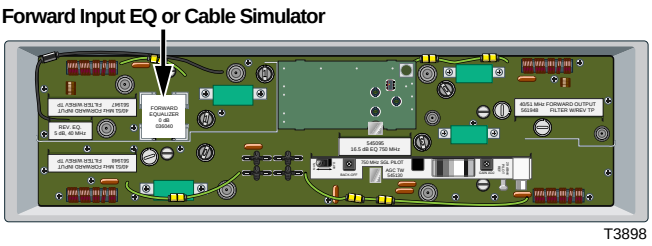
Step	Action
1	Begin this procedure with the housing open and the interior of the amplifier module exposed.
2	Install the forward input equalizer specified by the design print in the forward input equalizer slot. For the exact location of the equalizer refer to the illustrations on the next page.

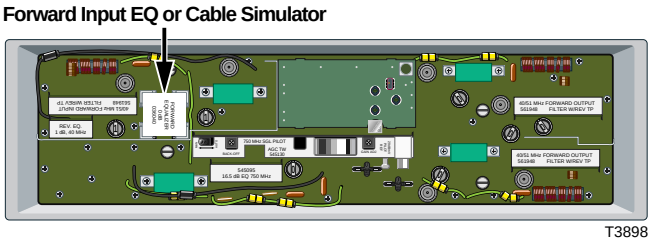
For:	Install part number:
0 dB - 750 MHz	036040
1.5 dB - 750 MHz	501220
3.0 dB - 750 MHz	501221
4.5 dB - 750 MHz	501222
6.0 dB - 750 MHz	501223
7.5 dB - 750 MHz	501224
9.0 dB - 750 MHz	501225
10.5 dB - 750 MHz	501226
12.0 dB - 750 MHz	501227
13.5 dB - 750 MHz	501228
15.0 dB - 750 MHz	501229
16.5 dB - 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

Continued on next page

Forward input equalizer or cable simulator (continued)

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>2
cont.</td><td>Or install the correct cable simulator specified by the design print for your system in the forward input equalizer slot.
<table>
<tr><th>For:</th><th>Install part number:</th></tr>
<tr><td>1.5 dB - 750 MHz</td><td>562262</td></tr>
<tr><td>3.0 dB - 750 MHz</td><td>562263</td></tr>
<tr><td>4.5 dB - 750 MHz</td><td>562264</td></tr>
<tr><td>6.0 dB - 750 MHz</td><td>562265</td></tr>
<tr><td>7.5 dB - 750 MHz</td><td>562266</td></tr>
<tr><td>9.0 dB - 750 MHz</td><td>562267</td></tr>
<tr><td>10.5 dB - 750 MHz</td><td>562268</td></tr>
<tr><td>12.0 dB - 750 MHz</td><td>562269</td></tr>
</table>
Note: Be sure all the pins on the forward input equalizer or cable simulator bottom align with the pin holes in the forward input equalizer slot, allowing the equalizer or simulator to install flat against the amplifier module.

Type 1


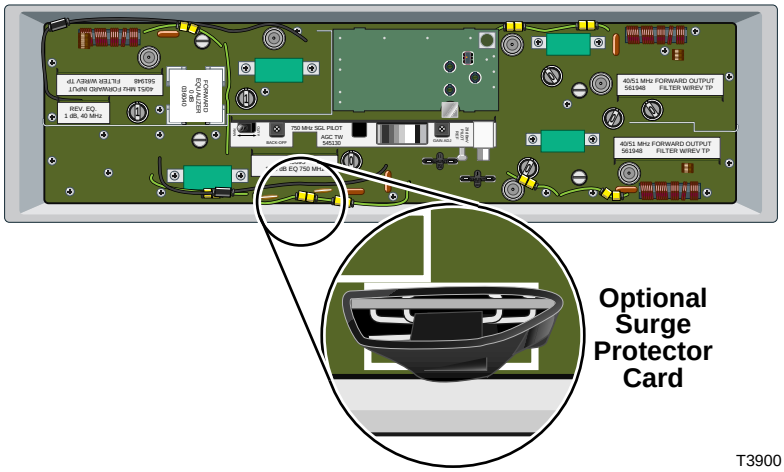
Type 2


</td></tr>
<tr><td>3</td><td>Install other options or accessories as desired, or proceed to Installing the Amplifier Module.</td></tr>
</table>

Continued on next page

Installing the surge protector

To install the surge protector in the amplifier, follow the steps in the table below.

Step	Action
1	Begin this procedure with the housing open and the interior of the amplifier module exposed.
2	Install the surge protector in the surge protector slot. Refer to the illustration below.  **Notes:** • 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 amplifier module. • 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.
3	Install other options or accessories as desired, or proceed to **Installing the Amplifier Module**.

Continued on next page

Installing the plug-in signal director (Type 2-3 High Gain Dual only)

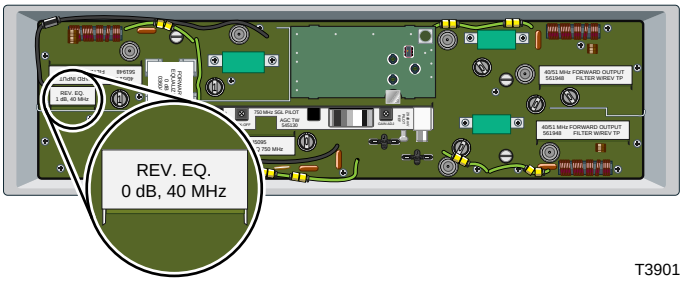
To install the signal director in the amplifier, follow the steps in the table below.

Step	Action
1	Begin this procedure with the housing open and the interior of the amplifier module exposed.
2	Be sure to install the correct signal director for your system as specified by the design print. **IF you are installing a ...** / **This will ...** Jumper, part number 562406 — activate only one auxiliary port. Splitter, part number 562414 — activate both auxiliary ports with equal signal levels. 8 dB Coupler, part number 562419 or 12 dB Coupler, part number 562420 — activate both auxiliary ports with differing signal levels.
3	Install the signal director in the signal director slot. For the exact location of the signal director, refer to **Illustrations**. **Note:** 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. 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.
4	Install other options or accessories as desired, or proceed to **Installing the Reverse Accessories**.

Installing Reverse Accessories

Installing the reverse equalizer

If the station requires a reverse equalizer, follow the steps in the table below.

Step	Action
1	Begin this procedure with the housing open and the interior of the amplifier module exposed.
2	Remove the jumper from the location shown below.  T3901
3	Install the correct fixed reverse equalizer for your system as specified by the design print in the reverse equalizer slot. **Note:** 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 line extender amplifier module.
4	Install other options or accessories as desired, or proceed to **Installing the Amplifier Module**.

EQ Value	For 40 MHz reverse amplifiers, install part number	For 55 MHz reverse amplifiers, install part number
1 dB	545107	573822
2 dB	545108	573823
3 dB	545109	573824
4 dB	545110	573825
5 dB	545111	573826
6 dB	545112	573827
7 dB	545113	573828
8 dB	545114	573829
9 dB	545115	573830
10 dB	545116	573831
11 dB	545117	573832
12 dB	545118	573833

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 are...	THEN install...
restoring signal continuity after removing a reverse equalizer	jumper board, part number 562658.

Section C

Installing the Amplifier Module

Overview

Scope of this section

This section covers requirements and procedures needed to install the Type 1 or Type 2 System Amplifier module in the housing.

Installing the Amplifier Module in the Housing

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.

Types 1 and 2 housings and amplifier modules are designed so you can orient the amplifier module conveniently for maintenance. The amplifier module is reversible since the input and main output ports are located diagonally across from each other. Therefore, you may orient all of the amplifier housings to open either to the road side or to the field side. The amplifier is then installed in the appropriate position, either right side up or upside down.

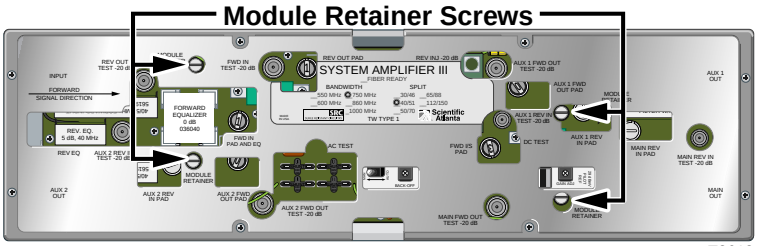
Installation procedure

Follow these steps to install the amplifier module.

Step	Action
1	Perform the following if you are working with an amplifier station where AC is present. • Install the fuse shunts in the amplifier *after* you install the amplifier module in the housing. • Remove the fuse shunts from the amplifier *before* you remove the amplifier module from the housing. **⚠ Caution:** **Failure to follow these instructions may cause damage to module RF connectors and housing seizure assemblies.**
2	Orient the amplifier module so the **Input** and **Main Out** ports (the locations of which are stamped on the module cover) are in the proper corners for your installation.

Continued on next page

Installation procedure (continued)

Step	Action
3	Line up the RF connectors on the amplifier module and the housing, then push the amplifier module into the housing.
4	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. 

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.

Note: A unique colored fuse shunt is included with the unit. This is intended to be used to activate the port that supplies power. The colored shunt identifies the shunt to be pulled to remove power for insertion and removal of the module.

⚠ 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	Refer to the systems design print to determine AC fusing capabilities and install ATC (automotive) fuses, with values prescribed by the system design print, in the required locations using the following table for reference.
3	Proceed to **Closing the Housing.**

To activate the ...	Install a fuse shunt in slot ...
Input port	F1
Aux 1 output port	F2
Main output port	F3
Aux 2 output port	F4 (for Type 1 and Type 2-3 only)

Closing the Housing

Tightening the closure bolts

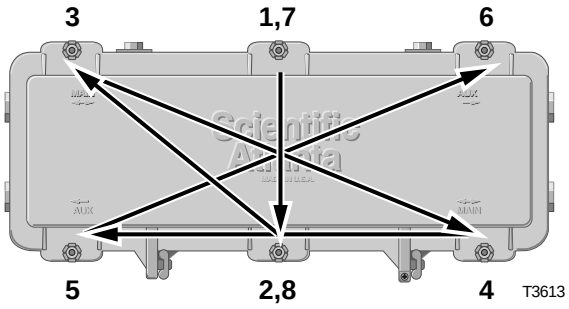
To tighten the closure bolts, follow the steps in the table below.

> ⚠ **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 closure bolts.

Torquing sequence

The following diagram shows the proper torquing sequence for the system amplifier housing's closure bolts.



Section D

Illustrations

Overview

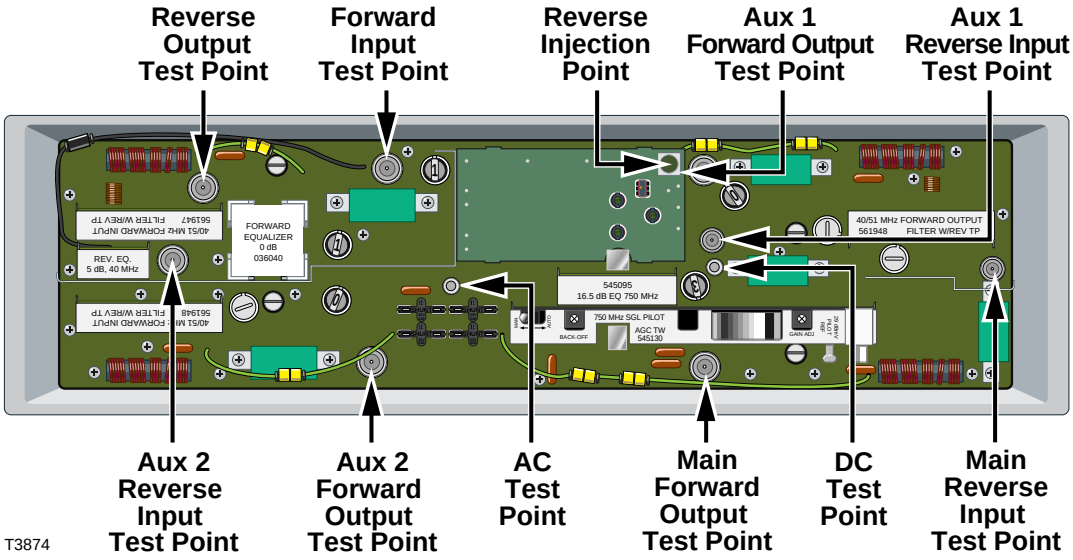
Scope of this section

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

Type 1 System Amplifier

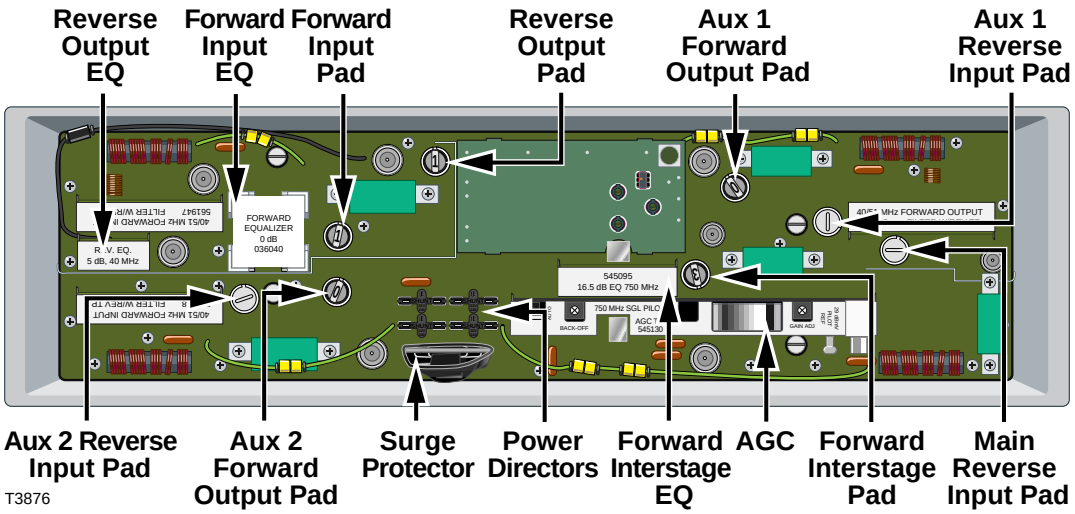
Test points

The following diagram shows the location of test points for the Type 1 System Amplifier.



Accessories

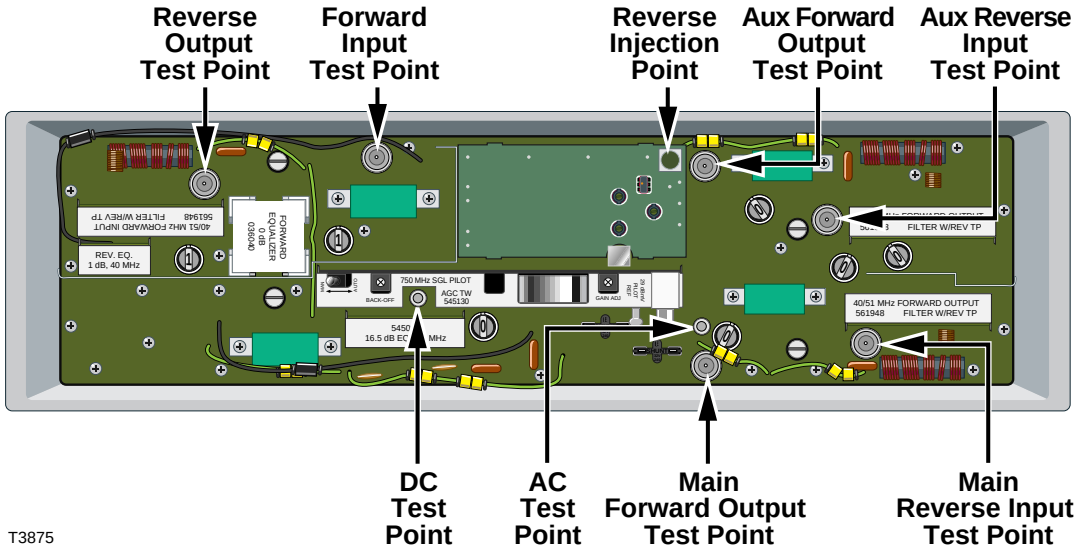
The following diagram shows the location of accessories for the Type 1 System Amplifier.



Type 2-2 System Amplifier

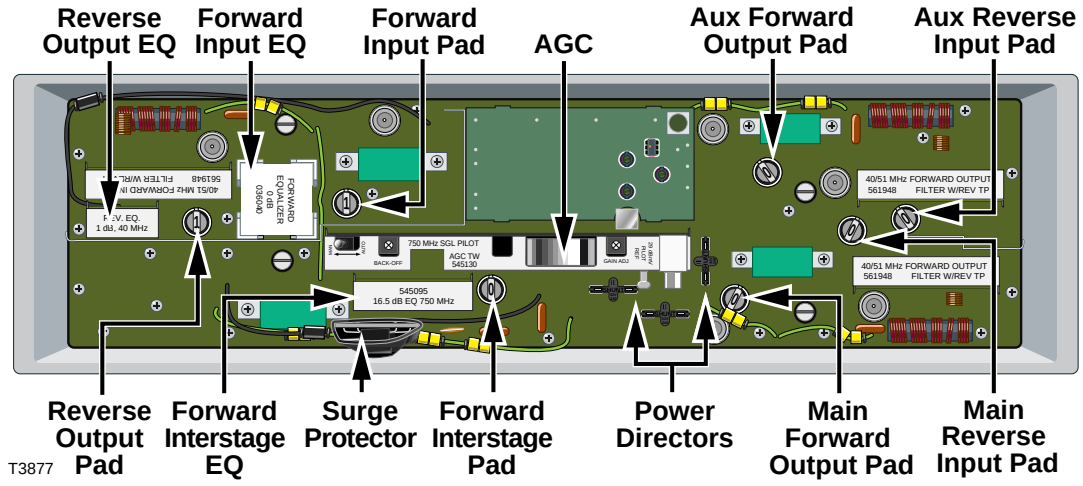
Test points

The following diagram shows the location of test points for the Type 2 -2 System Amplifier.



Accessories

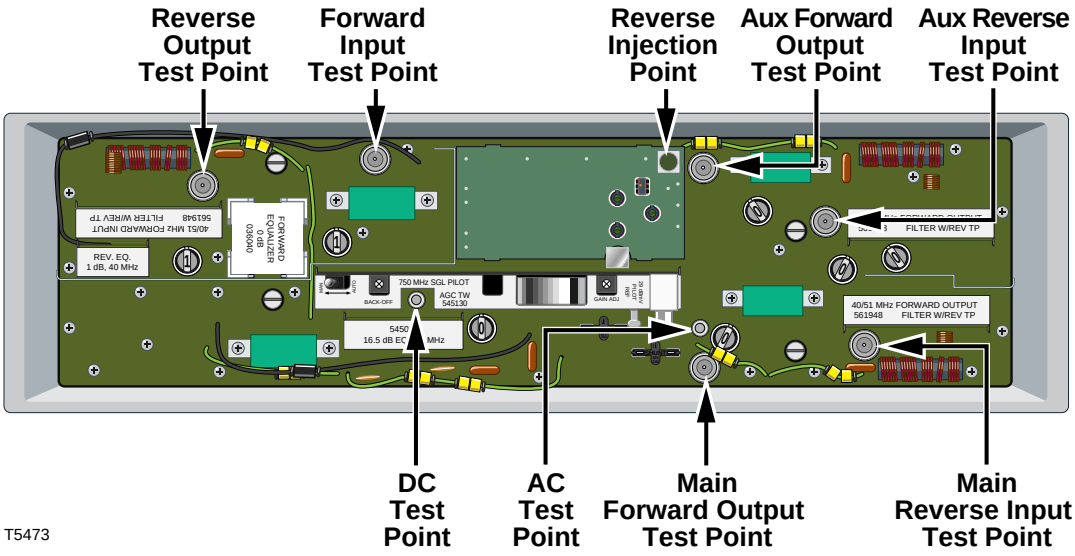
The following diagram shows the location of accessories for the Type 2 -2 System Amplifier.



Type 2-3 System Amplifier

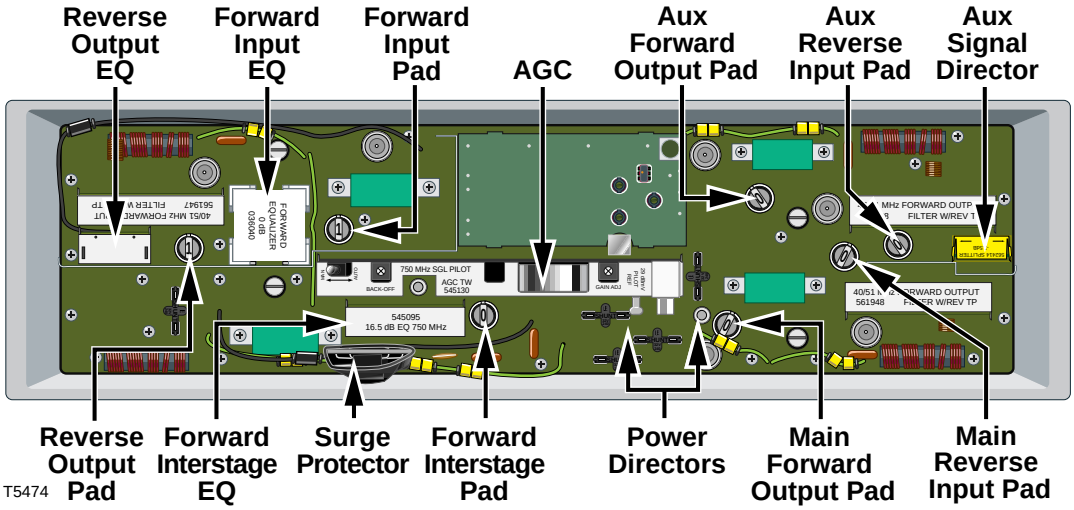
Test Points

The following diagram shows the location of test points for the Type 2 -3 System Amplifier.

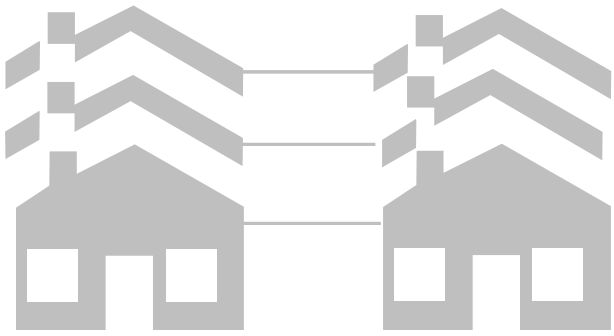


Accessories

The following diagram shows the location of accessories for the Type 2-3 System Amplifier.



3 Balancing and Setup of the System Amplifier III Types 1 and 2



Chapter 3

Balancing and Setup of the System Amplifier III Types 1 and 2

Overview

Introduction

This chapter covers setup and balancing procedures for Type 1 and Type 2 System Amplifiers and contains the following topics.

Test Points

Type 1 Unbalanced Triple System Amplifier test points

There are ten test points on the Type 1 Unbalanced Triple System Amplifier. The following table lists each test point and what it corresponds to. The reverse test points are measured relative to the reverse station input and output.

Test Points	Levels
TP1	-20 dB RF test point corresponding to the forward input port
TP2	-20 dB RF test points corresponding to the forward Aux 1 output port
TP3	-20 dB RF test points corresponding to the forward Main output port
TP4	-20 dB RF test points corresponding to the forward Aux 2 output port
TP5	-20 dB RF test point corresponding to the reverse Aux 1 input port
TP6	-20 dB RF test point corresponding to the reverse main input port
TP7	Monitors 60 V AC line
TP8	Monitors 24 V DC line
TP9	-20 dB RF test point corresponding to the reverse output port
TP10	-20 dB RF test point corresponding to the reverse Aux 2 input port

Type 2 High Gain Dual System Amplifier test points

There are eight test points on the Type 2 High Gain Dual System Amplifier. The following table lists each test point and what it corresponds to. The reverse test points are measured relative to the reverse station input and output ports.

Test Points	Levels
TP1	-20 dB RF test point corresponding to the forward input port
TP2	-20 dB RF test point corresponding to the forward Aux output port
TP3	-20 dB RF test point corresponding to the forward main output port
TP4	-20 dB RF test point corresponding to the reverse main input port
TP5	-20 dB RF test point corresponding to the reverse Aux input port
TP6	Monitors 24 V DC line
TP7	Monitors 60 V AC line
TP8	-20 dB RF test point corresponding to the reverse output port

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 amplifier module according to the specifications in the design print and that the amplifier has warmed up for approximately 1 hour.

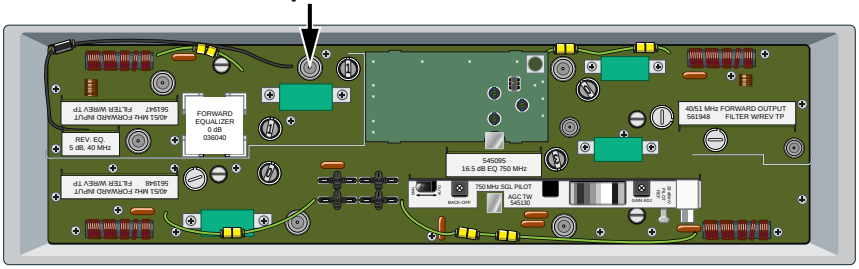
You need the following for balancing.

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.

Continued on next page

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 below. **Forward Input Test Point**  T5464
2	Measure the signal level at ... • the lowest frequency specified in the system design, and • the highest frequency specified in the system design.
3	Compare the measured levels to the design input levels on the system design sheet. **Note:** Add 20 dB to the measured levels to find the true levels. The test point attenuates input signals by 20 dB.
4	Are measured levels within the desired limits? If **yes**, proceed to step 5. If **no**, 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 AGC back-off level."

Continued on next page

Setting the AGC back-off level

You must adjust the AGC back-off level.

To set the AGC back-off level, follow the steps in the table below.

Step	Action
1	Connect an RF meter or spectrum analyzer to the forward output test point.
2	Set the switch on the AGC module to the **MANUAL** position.
3	Turn the BACK-OFF potentiometer on the top of the AGC module fully **clockwise**.
4	Measure the outside temperature at the amplifier location.
5	Refer to the "AGC back-off chart" on the following page to find the proper back-off level for the current temperature and reference frequency.
6	Turn the BACK-OFF potentiometer on the top of the AGC module **counterclockwise** to reduce the output level by the amount specified in the "AGC back-off chart." **Note:** After making this adjustment, do not adjust the BACK-OFF potentiometer again.
7	Proceed to "Determining output tilt."

Continued on next page

AGC back-off chart

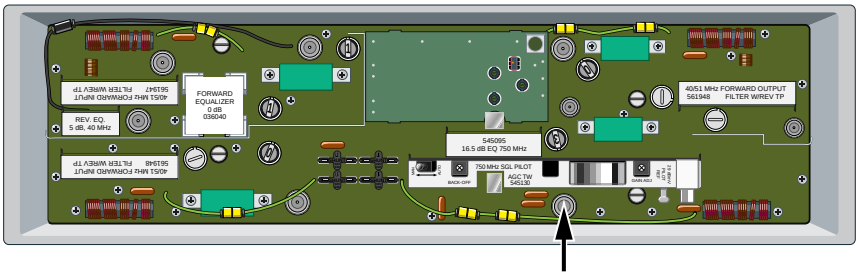
The following table displays the back-off level for selected frequencies and various temperatures.

Temperature		Back-off level at ...		
		AGC pilot frequency 445.25 MHz or 451.25 MHz	**547.25 MHz**	**750 MHz**
60°C	140°F	0.0 dB	0.0 dB	0.0 dB
55°C	131°F	0.3 dB	0.4 dB	0.4 dB
50°C	122°F	0.7 dB	0.7 dB	0.9 dB
45°C	113°F	1.0 dB	1.1 dB	1.3 dB
40°C	104°F	1.3 dB	1.5 dB	1.7 dB
35°C	95°F	1.6 dB	1.8 dB	2.2 dB
30°C	86°F	2.0 dB	2.2 dB	2.6 dB
25°C	77°F	2.3 dB	2.6 dB	3.0 dB
20°C	68°F	2.6 dB	2.9 dB	3.4 dB
15°C	59°F	2.9 dB	3.3 dB	3.9 dB
10°C	50°F	3.3 dB	3.7 dB	4.3 dB
5°C	41°F	3.6 dB	4.0 dB	4.7 dB
0°C	32°F	3.9 dB	4.4 dB	5.2 dB
-5°C	23°F	4.3 dB	4.8 dB	5.6 dB
-10°C	14°F	4.6 dB	5.1 dB	6.0 dB
-15°C	5°F	4.9 dB	5.5 dB	6.5 dB
-20°C	-4°F	5.2 dB	5.9 dB	6.9 dB
-25°C	-13°F	5.6 dB	6.2 dB	7.3 dB
-30°C	-22°F	5.9 dB	6.6 dB	7.7 dB
-35°C	-31°F	6.2 dB	7.0 dB	8.2 dB
-40°C	-40°F	6.6 dB	7.3 dB	8.6 dB

Continued on next page

Determining output tilt

To determine the output tilt of the amplifier, 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 below.  **Forward Output Test Point** T5465
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

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.

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

Continued on next page

Setting the output level

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

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>Connect the test probe to the forward output test point.</td></tr>
<tr><td>2</td><td>Measure the output level at the highest design frequency, and compare this level with the design level (on the design print).</td></tr>
<tr><td>3</td><td>Is the measured output level within ±0.5 dB of the design level?
<table>
<tr><th>IF the output level is ...</th><th>THEN ...</th></tr>
<tr><td>within ±0.5 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 pa d.</td></tr>
<tr><td>less than the design level,</td><td>replace the forward input pad with a lower value pad.</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>Repeat steps 2 and 3 until the output level is correct.</td></tr>
<tr><td>5</td><td>Proceed to Automatic Gain Control Setup.</td></tr>
</table>

Automatic Gain Control Setup

Overview

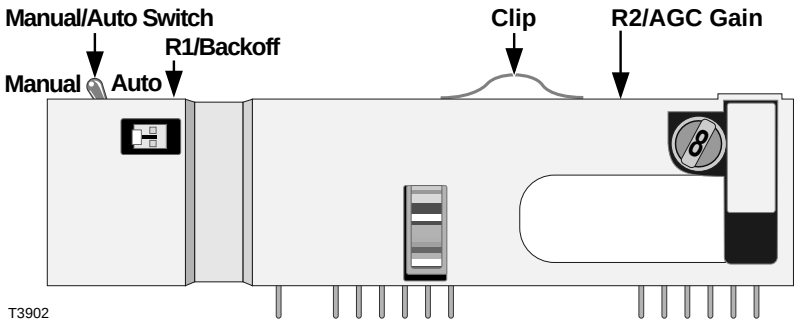
This section provides procedures and tables for configuring and aligning the AGC in the Type 1 and Type 2 amplifiers. The table containing AGC attenuator values are required to select the proper AGC attenuator value based upon actual output level.

Notes:

- Output levels are measured at the pilot frequency (445.25 MHz for 40/52 amplifiers or 451.25 for 55/70 amplifiers).
- The standard single-pilot AGC makes amplifier output adjustments based on the power level of the pilot frequency channel. You should activate the pilot channel with its final unscrambled video source before beginning balance and alignment.

Diagram

The following diagram shows the location of switches, controls, and attenuator sockets on the AGC module.



Default output levels

Scientific-Atlanta ships AGC modules with a default value attenuator pad already installed. The default attenuator pad is appropriate for amplifiers operating with the following output levels.

Amplifier	Output level at AGC pilot frequency 445.25 or 451.25 MHz
Type 1 Main port	33 dBmV
Type 2 Main port	42 dBmV

Note: If you need to operate the amplifier with a different output level at the pilot frequency, see the following sections to determine the proper AGC pad value.

Continued on next page

Attenuator values for Type 1 amplifiers

The following table shows the values of the AGC attenuator (AT1) required for Type 1 amplifiers for various output levels at the pilot frequency (445.25 or 451.25 MHz).

AGC Pad Value	Main Port Output Level	Aux Port Output Levels
7 dB	31 dBmV	41 dBmV
8 dB	32 dBmV	42 dBmV
9 dB (default)	33 dBmV	43 dBmV
10 dB	34 dBmV	44 dBmV
11 dB	35 dBmV	45 dBmV

Attenuator values for Type 2 amplifiers

The following table shows the values of the AGC attenuator (AT1) required for Type 2 amplifiers for various output levels at the pilot frequency (445.25 or 451.25 MHz).

AGC Pad Value	Main Port Output Level	Aux Port Output Levels
3 dB	40 dBmV	40 dBmV
4 dB	41 dBmV	41 dBmV
5 dB (default)	42 dBmV	42 dBmV
6 dB	43 dBmV	43 dBmV
7 dB	44 dBmV	44 dBmV

Note: The actual output level at Aux 1 and Aux 2 ports in the Type 2-3 SAIII amplifier will be lower than what is measured at the test point by the amount of loss introduced by the signal director.

Continued on next page

Aligning the AGC module

To align the AGC module follow these steps.

Step	Action
1	Make sure that the Auto/Manual switch on the AGC module is set to **MANUAL**.
2	Make sure the configured amplifier module has warmed up for about 1 hour and that the AGC backoff, output tilt, and output level have been set with the AGC in manual mode.
3	Insert the test probe into the -20 dB forward output test point on amplifier. See **Illustrations** in chapter 2 for the test point location.
4	Measure and note the RF output level at the AGC pilot frequency. Remember to add 20 dB to compensate for the test point loss.
5	Set the Auto/Manual switch on the AGC module to **AUTO**.
6	Adjust the gain control potentiometer **R2** on the AGC module to match the level you measured in step 4.
7	Move the Auto/Manual switch back and forth between the **AUTO** and **MANUAL** settings. Let the amplifier MODULE settle before reading signal levels. **Result**: The signal level should not vary when you switch between **AUTO** and **MANUAL**.
8	Set the Auto/Manual switch to **AUTO** for operation.
9	Close the amplifier module cover and housing. Refer to **Closing the Housing** in chapter 2 for more information.

Appendices

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

Appendix A

Technical Information

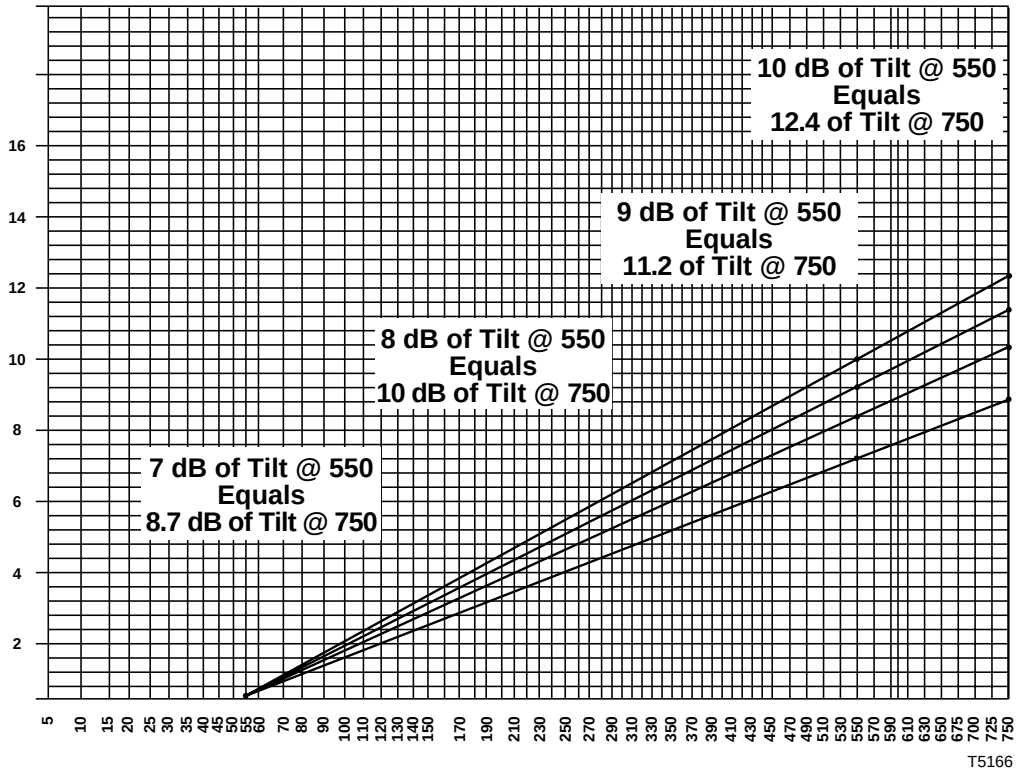
Overview

In this appendix

This appendix contains tilt and equalizer charts.

Amplifier output tilt when using “cable” tilt

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

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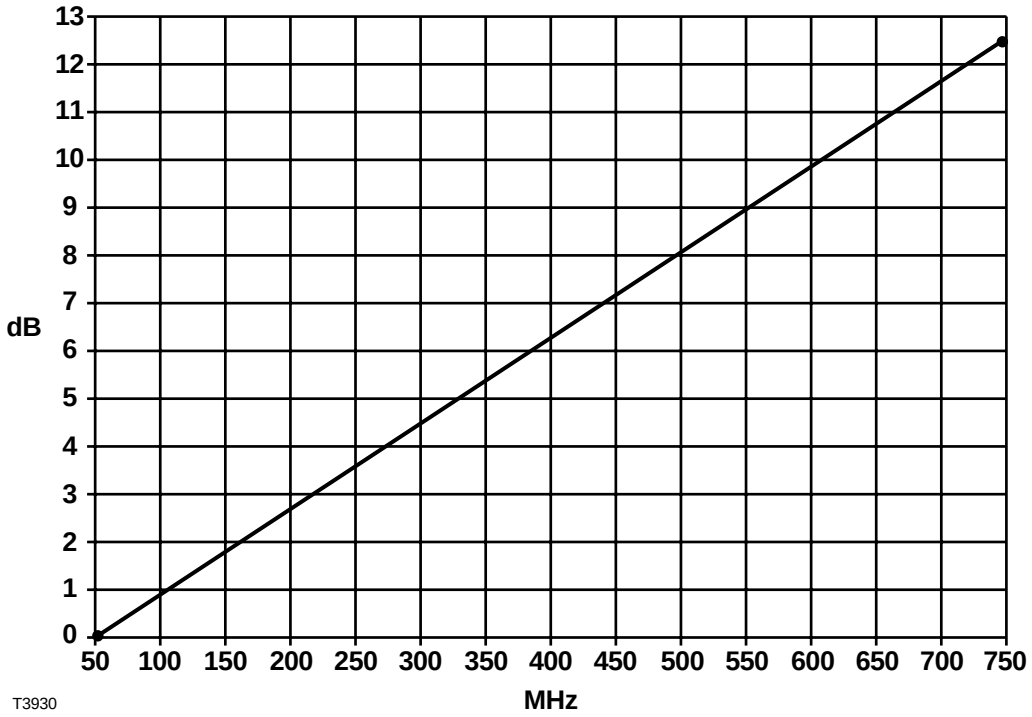
Amplifier output tilt when using “linear” tilt

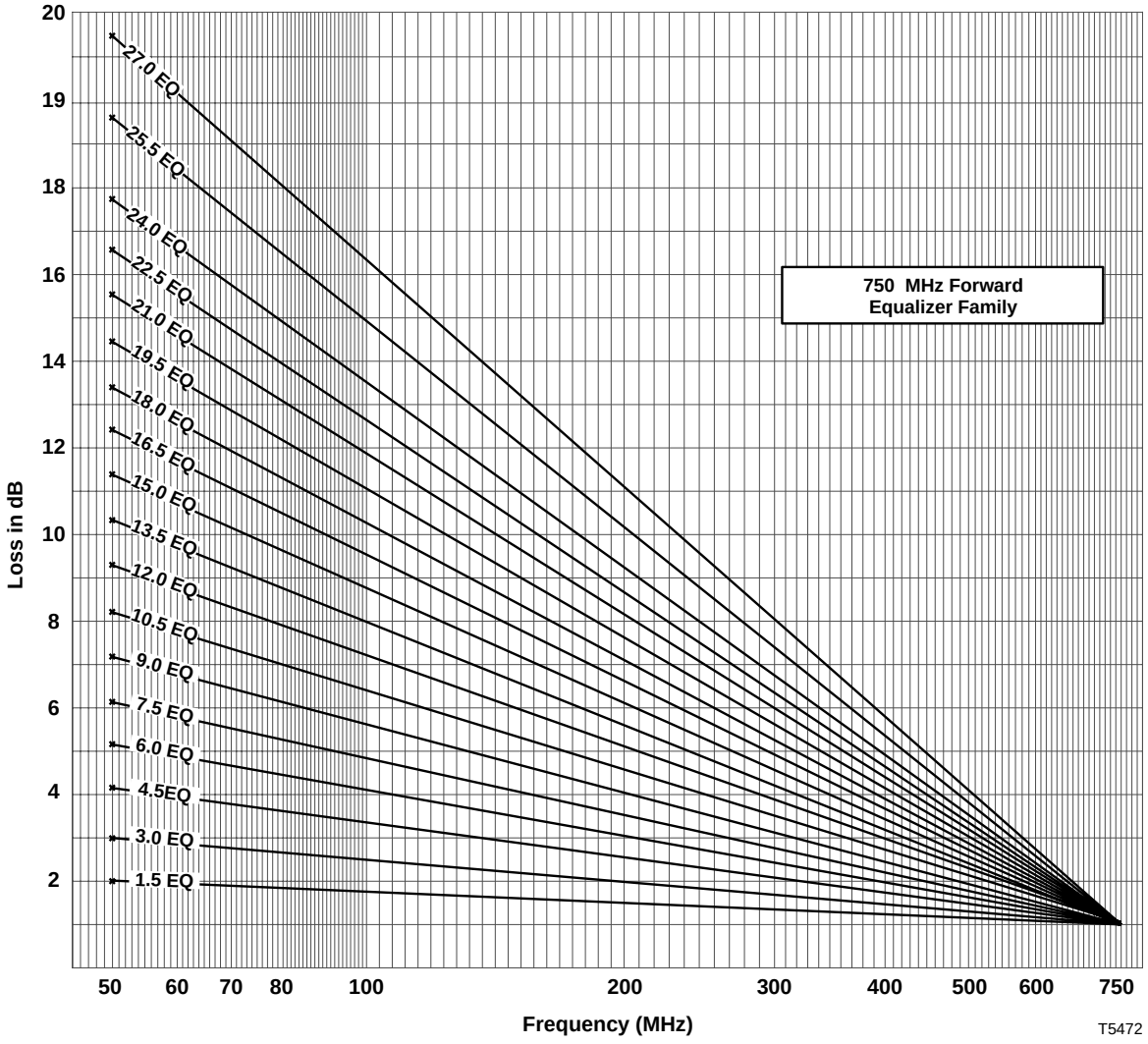
The following chart can be used to determine the operating level at a particular frequency considering the operating linear tilt.



For example: If the amplifier’s 750 MHz output level is 46 dBmV with a linear operating tilt of 12.5 dB (from 50 to 750 MHz), the corresponding output level at 550 MHz would be 42.5 dBmV. This was found by taking the difference in tilt between 750 and 550 MHz (12.5 - 9 = 3.5 dB). Then subtract the difference in tilt from the operating level (46 - 3.5 = 42.5 dB).

750 MHz forward equalizer

The following diagram shows the 750 MHz forward equalizer chart.



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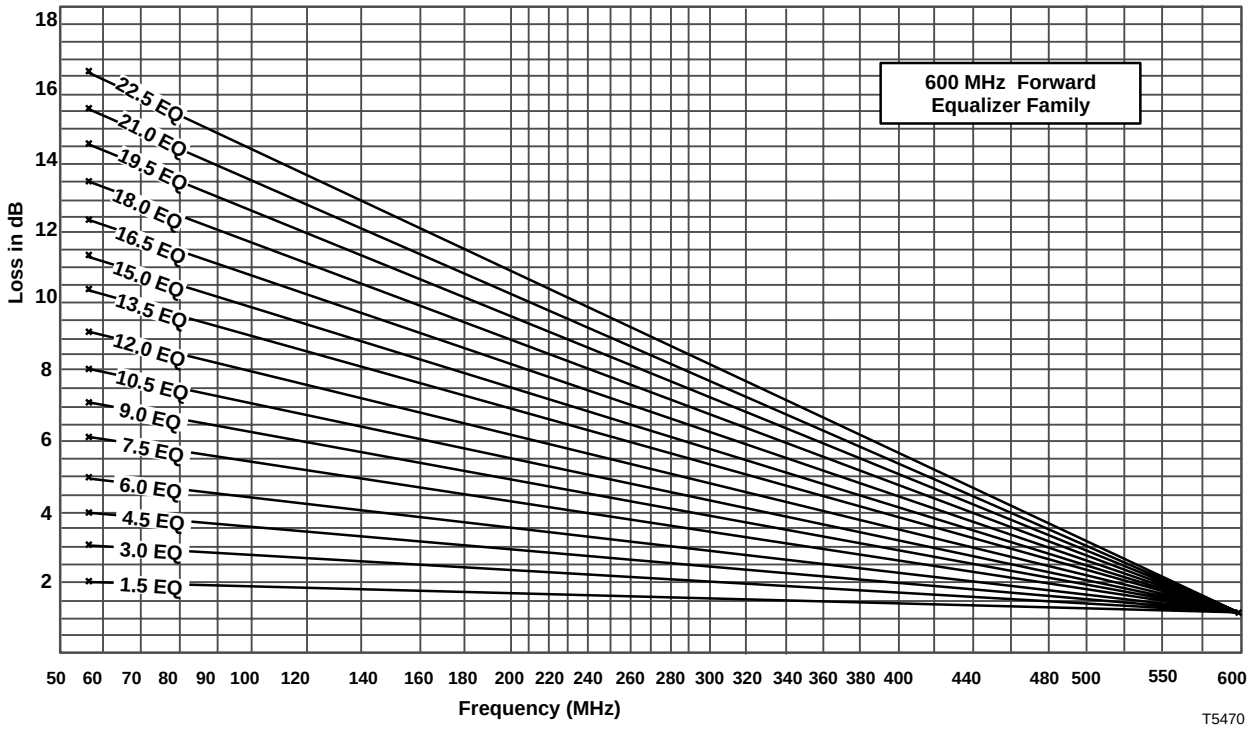
600 MHz forward equalizer

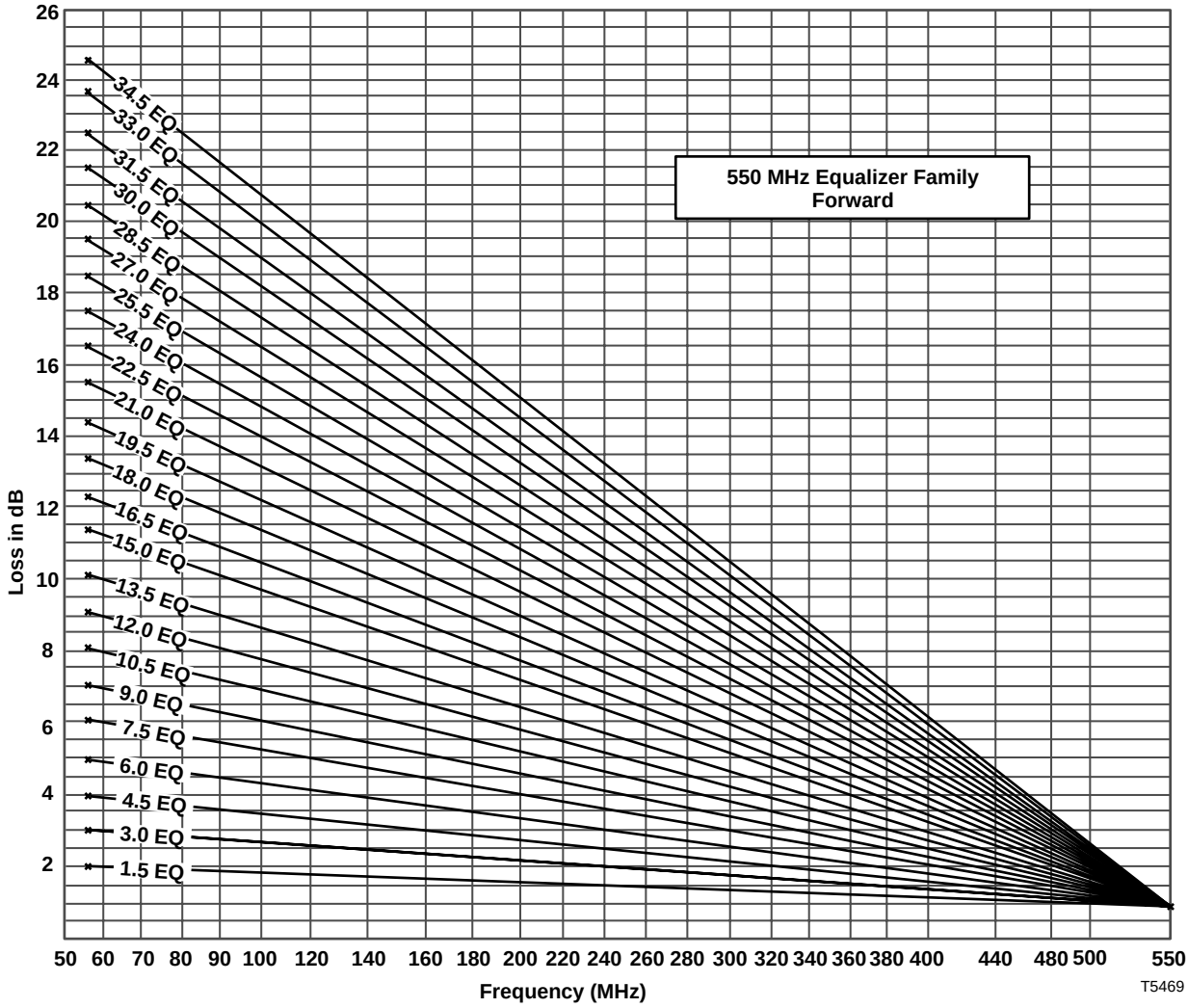
The following diagram shows the 600 MHz forward equalizer chart.



Continued on next page

550 MHz forward equalizer

The following diagram shows the 550 MHz forward equalizer chart.



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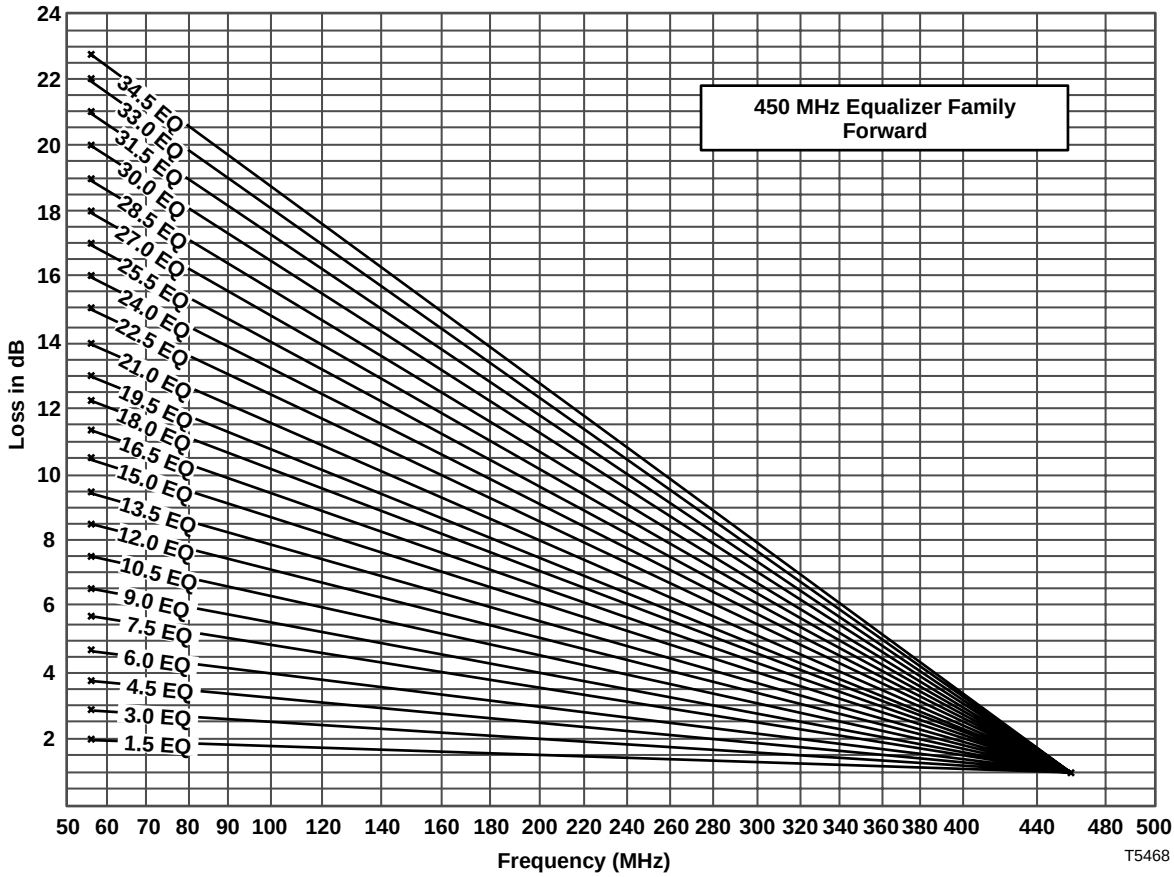
450 MHz forward equalizer

The following diagram shows the 450 MHz forward equalizer chart.



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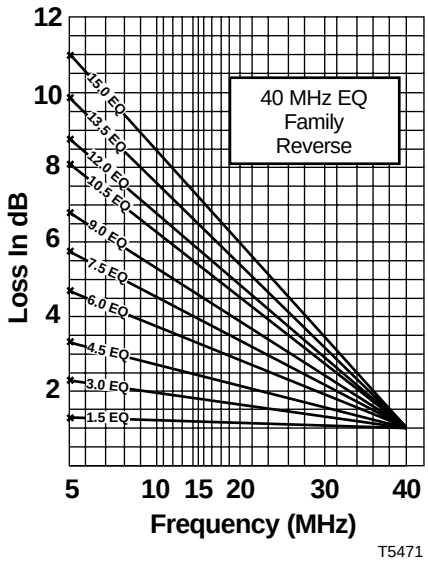
40 MHz reverse equalizer

The following diagram shows the 40 MHz reverse equalizer chart.



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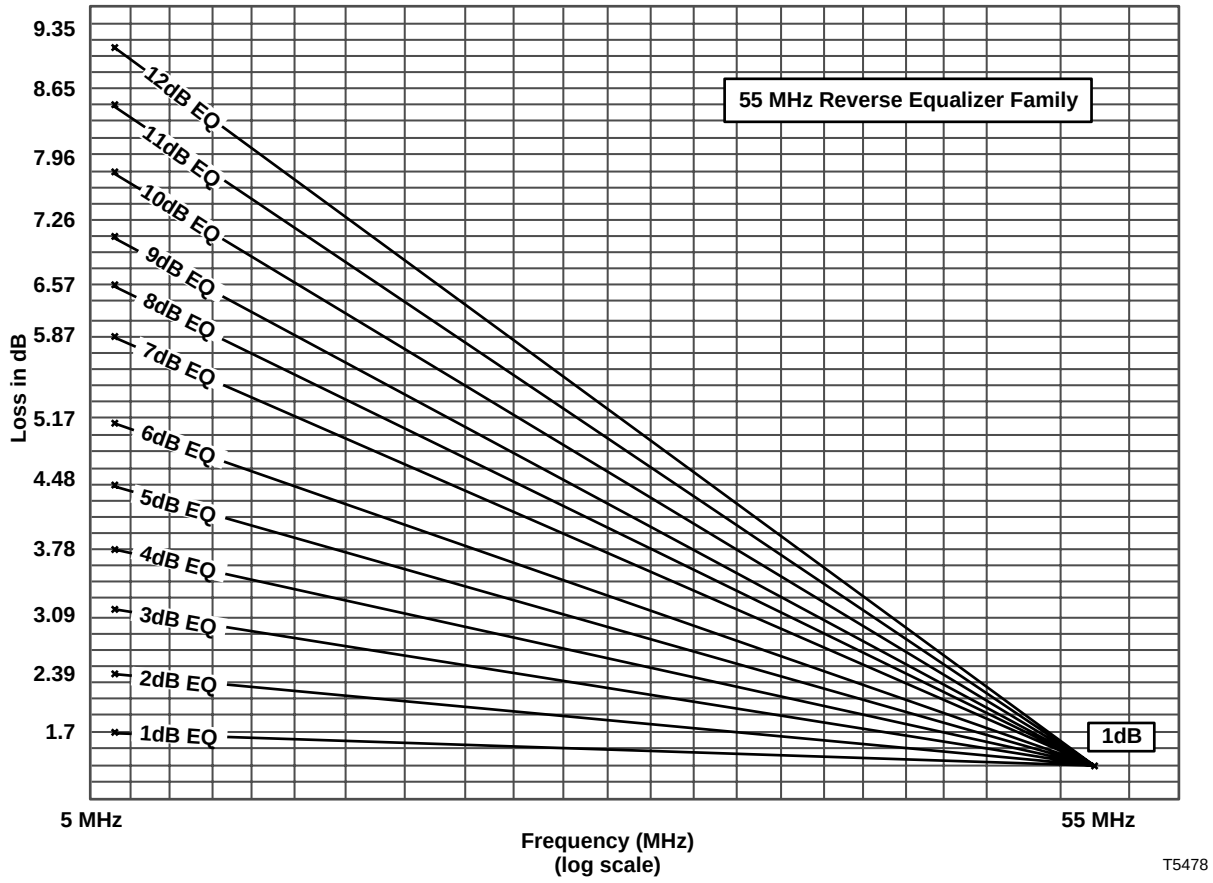
55 MHz reverse equalizer

The following diagram shows the 55 MHz reverse equalizer chart.



Appendix B

Customer Information

Overview

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.

In this appendix

This appendix contains the following topics.

Customer Support

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.

The Americas		
United States	Scientific-Atlanta Technical Assistance Center, Atlanta, Georgia	• From within North America **1-800-722-2009** (toll-free) • From outside North America **+1-770-903-5400** (direct**)**
United Kingdom and Europe		
United Kingdom	Kings Langley	• **+44-1-923-266133** • **+44-1-923-271420** (Technical Assistance Centre for Europe)

Returning Products

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.

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>Telephone or fax Scientific-Atlanta and request a return material authorization (RMA) number.
<table>
<tr><th>From within the US</th><th>From outside the US</th></tr>
<tr><td>• Tel: 1-800-722-2009

• Fax: 1-770-903-5888</td><td>• To the United States
Tel: +1-770-903-5300
Fax: +1-770-903-5888

• To the United Kingdom
Tel: +44-1-923-271460</td></tr>
</table></td></tr>
<tr><td>2</td><td>Tag or identify the defective product and write a detailed description of the circumstances.

Include the following information on the tag.
• RMA number
• sales order number
• purchase order number(if available)
• date the product was received</td></tr>
<tr><td>3</td><td>Pack the product in its original container and protective packing material.
Note: 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.</td></tr>
</table>

Continued on next page

Procedure (continued)

Step	Action
4	Write the following information on the *outside* of the container. • your name • street address, city, state, and zip code • telephone number • RMA number • problem description **Note:** Absence of the RMA number may delay processing your product for repair. Include the RMA number in all correspondence.
5	Ship the product, prepaid and insured, using United Parcel Service (UPS), your postal service, or other freight carrier to the following address: Scientific-Atlanta, Inc. RMA Number _____ Product Services 4311 Communications Drive Norcross, GA 30093 USA **Note:** Scientific-Atlanta, Inc. does not accept freight collect. Be sure to prepay all shipments.

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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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usefulness?	❑ Excellent ❑ Fair ❑ Very good ❑ Poor ❑ Good	

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Part Number 564825 Rev C January 1998