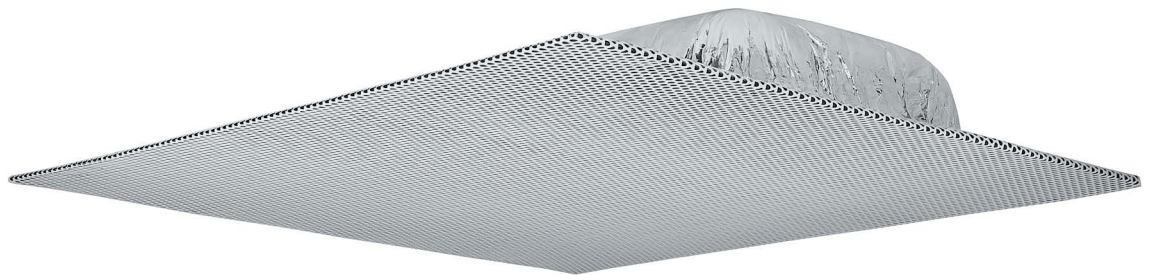


# FF 220T

Flat Field® Ceiling Speakers



**Extron Electronics**  
INTERFACING, SWITCHING AND CONTROL

68-1683-01  
Rev. B  
08 13

# Safety Instructions

## Safety Instructions • English

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**ATTENTION:** This symbol, ⚠, when used on the product, is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

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有關安全性指導方針、法規遵守、EMI/EMF 相容性、存取範圍和相關主題的詳細資訊, 請瀏覽 Extron 網站: [www.extron.cn](http://www.extron.cn), 然後參閱《Extron 安全性與法規遵守手冊》, 準則編號 68-290-01。

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In this user guide, the following are used:

**ATTENTION:** An attention is used to indicate potential damage to product or property.

**CAUTION:** A caution indicates a potential hazard to equipment or data.

**NOTE:** A note draws attention to important information.

## Specifications Availability

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# Introduction

This user guide contains information about the Extron FF 220T Flat Field speaker. This speaker is designed for use in plenum rated ceiling spaces and can be dropped into a square (2-foot by 2-foot or 600 mm by 600 mm) or rectangular (2-foot by 4-foot or 600 mm by 1200 mm with supplied cross bars) false ceiling tile space on a T-bar grid.

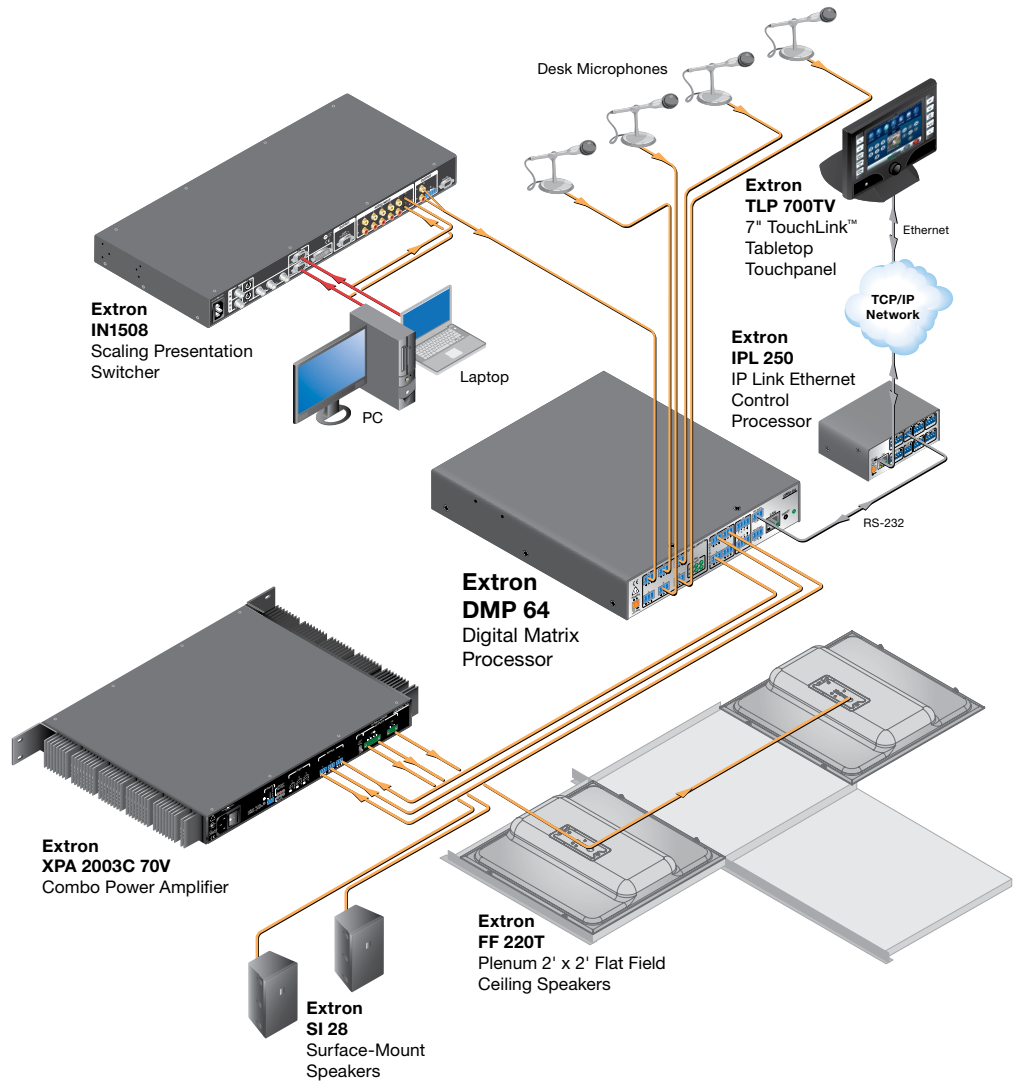
The FF 220T features a low profile design that houses a 3-inch driver and has the appearance of a standard ventilation grill. All the drivers and components above the ceiling are hidden behind the grill.

## Features

- Drop-in ceiling tile speakers for suspended ceilings
- UL 2043 plenum rated enclosure
- Extron patent pending Flat Field technology for consistent sound levels across the listening area, reducing the number of speakers required
- A 3-inch (7.6 cm) horn-loaded, full range driver provides extended low frequency response.
- The white perforated grille matches the appearance of air conditioning vents.
- 8 ohm direct or 70/100 volt operation with 16, 8, 4, 2, and 1 watt selectable power taps accessed with speaker wiring connections inside the rear panel
- Frequency response of 68 Hz to 18 kHz
- 16 watts continuous pink noise, 32 watts continuous program rated
- Wide 170° dispersion
- Low profile enclosure for plenum environments
- 5 year parts and labor warranty

## Application Example

The illustration below is one example of configuring a system using the FF 220T speakers.



**Figure 1.** FF 220T Application Diagram

# Installation

The Installation section describes:

- [Installation Considerations](#)
- [Installing the Speaker](#)

## Installation Considerations

**ATTENTION:** Installation and service must be performed by authorized personnel only.

**NOTE:** The FF 220T comes in two ceiling tile configurations depending on the tile unit of measurement:

- US version (part #42-141-03) – Drops into 2-foot x 2-foot (61 cm x 61 cm) or 2-foot x 4-foot (61 cm x 122 cm) suspended tile ceilings
- Metric version (part #42-141-23) – Drops into 60 cm x 60 cm (1.97-foot x 1.97-foot) or 60 cm x 120 cm (1.97-foot x 3.94-foot) suspended tile ceilings

**Be sure to order the correct part number as the two configurations are not interchangeable and will not fit correctly.**

Installation of conduit and conduit adapters must conform to all applicable building codes and local ordinances.

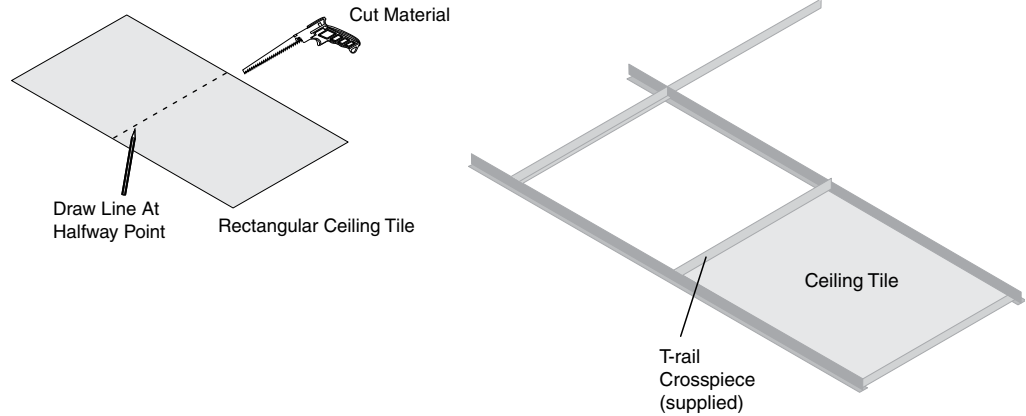
- Installation in a plenum-rated environment requires a wire gauge of 12 AWG to 18 AWG. Conduit may be required.

**NOTE:** If you are daisy chaining speakers in 70 V or 100 V configuration, the maximum wire gauge is 16 AWG. If you are daisy chaining speakers in direct (8 ohm) configuration, the maximum wire gauge is 14 AWG.

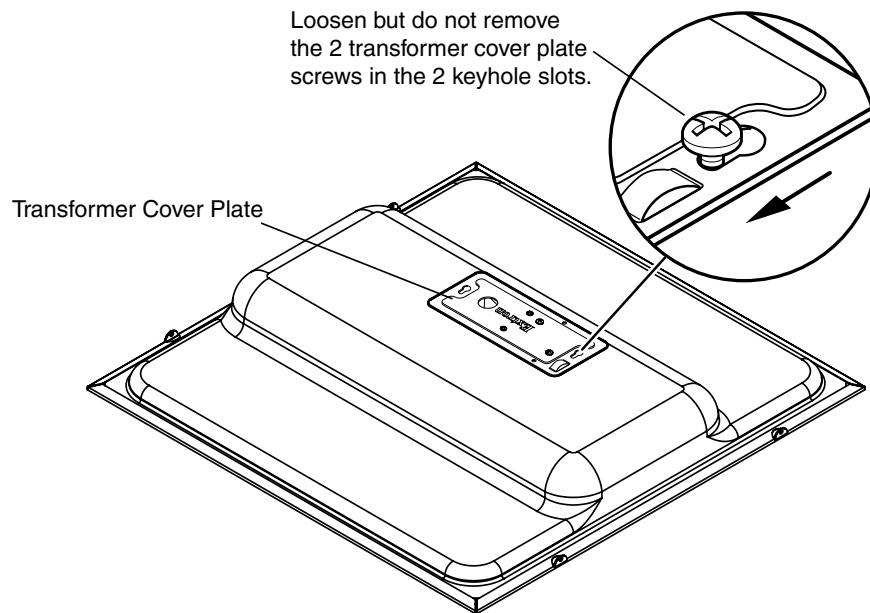
- If using secondary attachment points, the installer must provide the cables.
- Wiring connections depend on whether or not a distributed (70 or 100 volt) audio system is installed with these speakers.

## Installing the Speaker

1. **Power down** — Power down all attached devices before proceeding.
2. **Remove the suspended ceiling tile** — Remove the square ceiling tile where the FF 220T will be installed as shown below. If the ceiling has rectangular tiles, cut the tile in half.

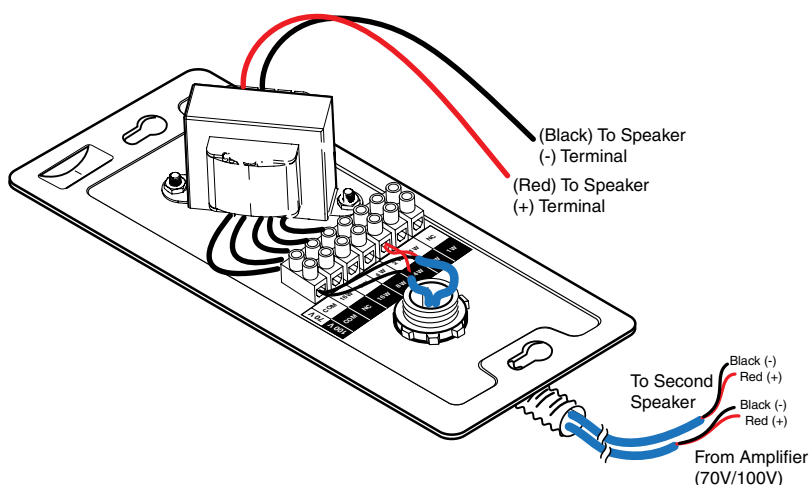


3. **Remove the terminal cover plate** — Loosen (do not remove) the two screws on the top terminal cover plate and remove the cover plate as shown below.



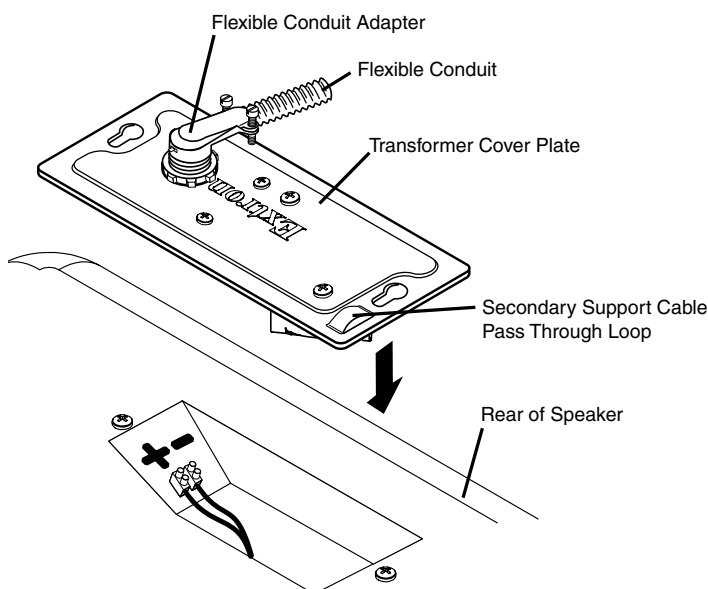
**Figure 2.** Removing the Terminal Cover Plate

4. **Routing cables through the transformer cover plate** — Slide and remove the terminal cover plate. The transformer cover plate is mounted to the speaker with the transformer side down. See the illustration below.



**Figure 3. Routing the Cables Through the Cover Plate**

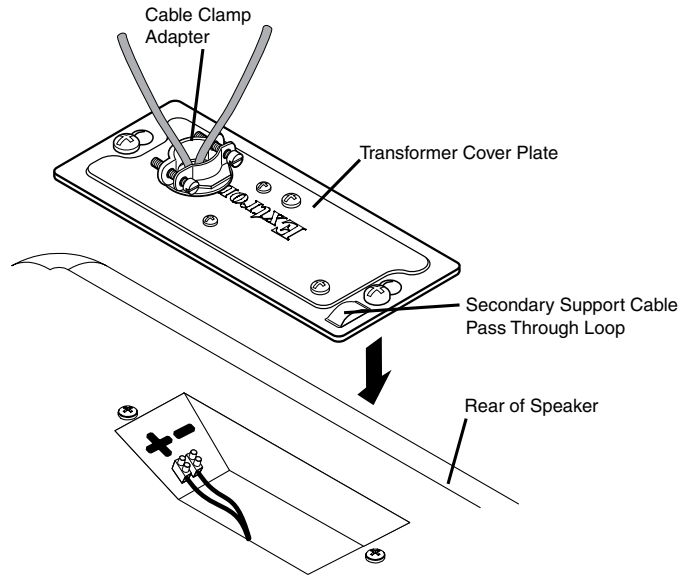
5. **When using flexible conduit** — Route the wires through the conduit. Insert the conduit into the cover plate opening using an appropriate conduit adapter, and secure the conduit to the plate. Pull the wires out of the conduit and through the cover plate. See the figure below.



**Figure 4. Flexible Conduit Wiring**

**NOTE:** Installation of conduit and conduit adapters should conform to all applicable building codes and local ordinances.

**When using speaker wires without a conduit** — Secure the cable clamp adapter (included) to the cover plate and insert the wires through the clamp. Tighten the clamp screws. See the following illustration.



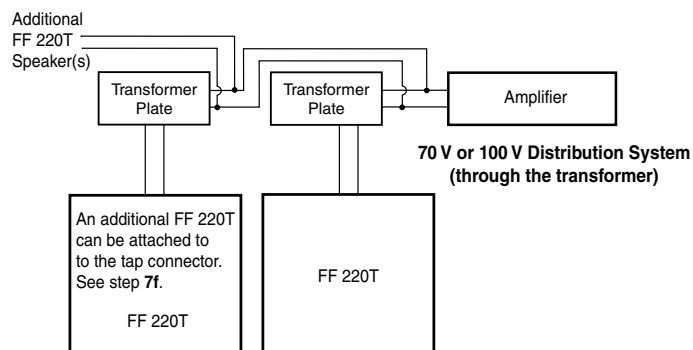
**Figure 5. Wiring Without Conduit**

6. Proceed to step 7 (going through the transformer) or 9 (bypassing the transformer) for the appropriate wiring procedure for either a distributed audio system (70 V or 100 V line distribution through the transformer) or for a direct connection from an amplifier (bypassing the transformer).

**NOTE:** In the 70 V or 100 V distribution system block diagram below, an optional speaker has been added as an example of daisy chaining FF 220T speakers to a single amplifier output.

### Wiring for Installation in a 70 V or 100 V Audio Distribution System (through the transformer)

7. Connect cables from the amplifier to the transformer on the FF 220T terminal cover plate.



**Figure 6. 70 V or 100 V Distribution System**

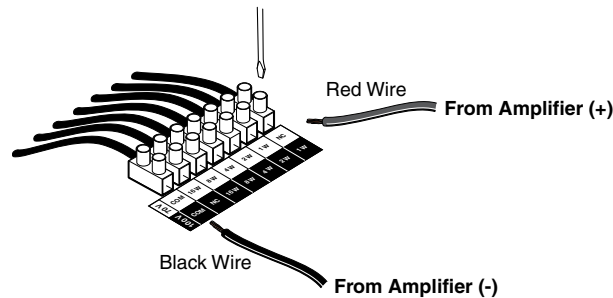
- a. If a conduit is used, pull the wires from the amplifier through and out of the conduit.

- b. Route the two wires from the amplifier through the cover plate hole to the transformer side.
- c. Strip 3/16 inch (5 mm) from the wire ends and keep the wire end strands together by twisting them. Do not tin the wires.
- d. Secure the wires to the appropriate taps on the captive screw connectors of the seven-connector terminal block (on the transformer side of the cover plate) as indicated on the tap label. See the note below.

**NOTE:** Observe the 70 V or 100 V system designation as indicated on the tap label.

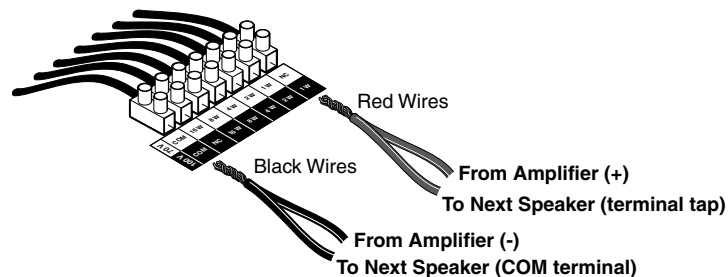
70 V	COM	16 W	8 W	4 W	2 W	1 W	NC
100 V	COM	NC	16 W	8 W	4 W	2 W	1 W

When wiring to a single speaker, the black negative (-) wire attaches to the “COM” terminal, and the red positive (+) wire attaches to the desired terminal tap. See below.



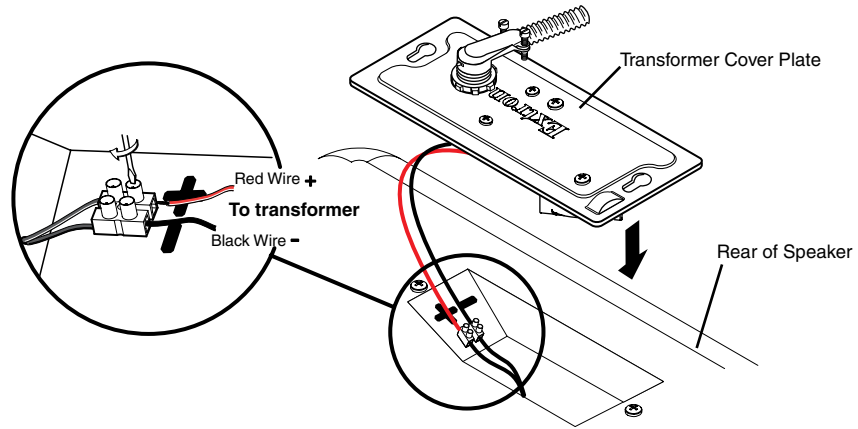
**Figure 7. Wiring to a Single Speaker**

- e. Use a small flat blade screwdriver to tighten the terminal block screws.
- f. To wire additional speakers, route the speaker wires from the second speaker through the cover plate hole to the transformer side. Twist the black negative (-) wires together and the red positive (+) wires together before inserting them into the terminal block. Additional speakers can be daisy-chained this way. See below.



**Figure 8. Wiring to Additional Speakers**

8. Connect wires from the transformer to the speaker.
  - a. Keep the wire strands together by twisting them (do not tin the wires).
  - b. Connect the red positive (+) wire to the + speaker terminal and connect the black negative (-) wire to the - speaker terminal as shown below.

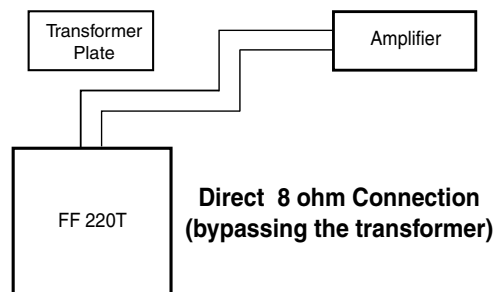


**Figure 9. Wiring the Speaker to the Transformer**

- c. Proceed to step 10.

### Wiring for Installation with Direct 8 ohm Connection to an Amplifier (bypassing the transformer)

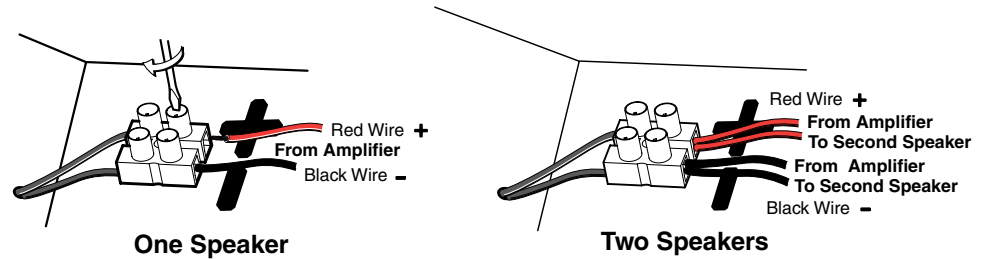
9. See the block diagram below.



**Figure 10. Direct 8 Ohm Connection**

- a. Route the wires from the amplifier to the speaker using the same procedure for routing speaker wire (and conduit if applicable) through the cover plate as described in step 5. Strip 3/16 inch (5 mm) from the ends of the two speaker wire leads (+ and -) coming from the amplifier. Keep the wire strands together by twisting them (do not tin the wires), and secure the wires to the input terminals of the speaker, observing the correct polarity.

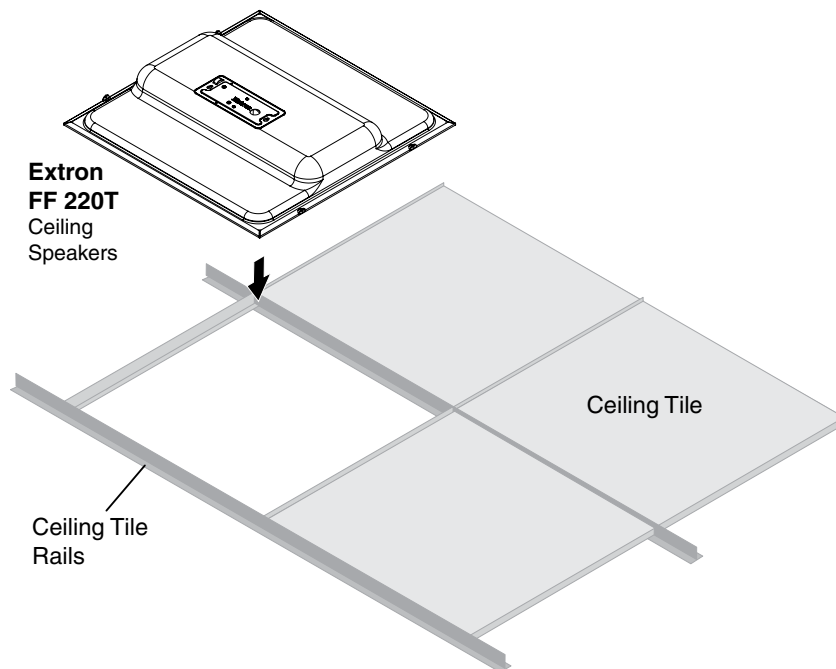
- b. Connect the red positive (+) wire to the + speaker terminal and the black negative (-) wire to the - speaker terminal depending on whether one or two speakers are being connected.



**Figure 11. Wiring the Speaker Terminals**

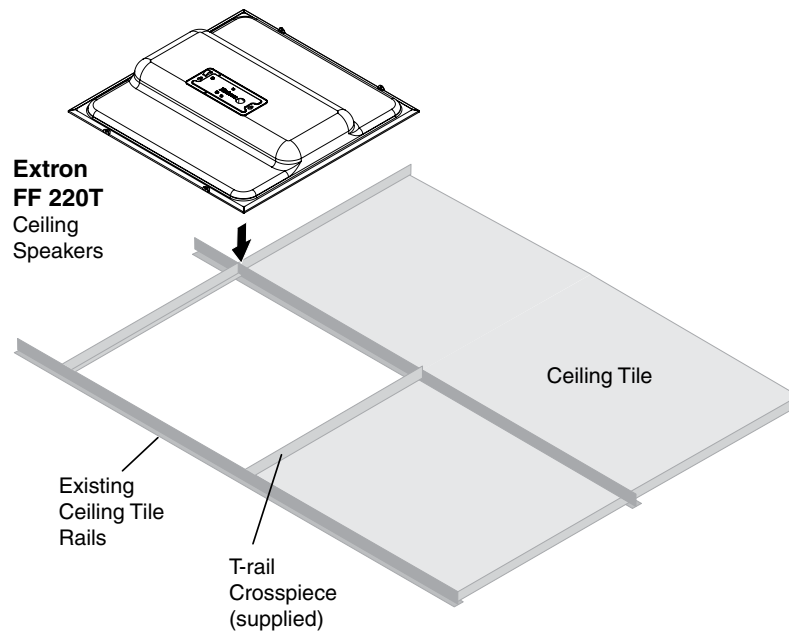
## Finishing Steps, All Installation Types

10. Replace the transformer cover plate and tighten the two cover plate screws that were loosened in step 3.
11. Temporarily test the system and speakers by powering on the amplifier and listening for the correct response from the speakers, then disconnect power from the amplifier.
12. For installation in a square ceiling grid, remove a tile and place the speaker on the existing support rails and position it so that the speaker edges are hidden by the support rails, as shown below.



**Figure 12. Installation in a Square Ceiling Grid**

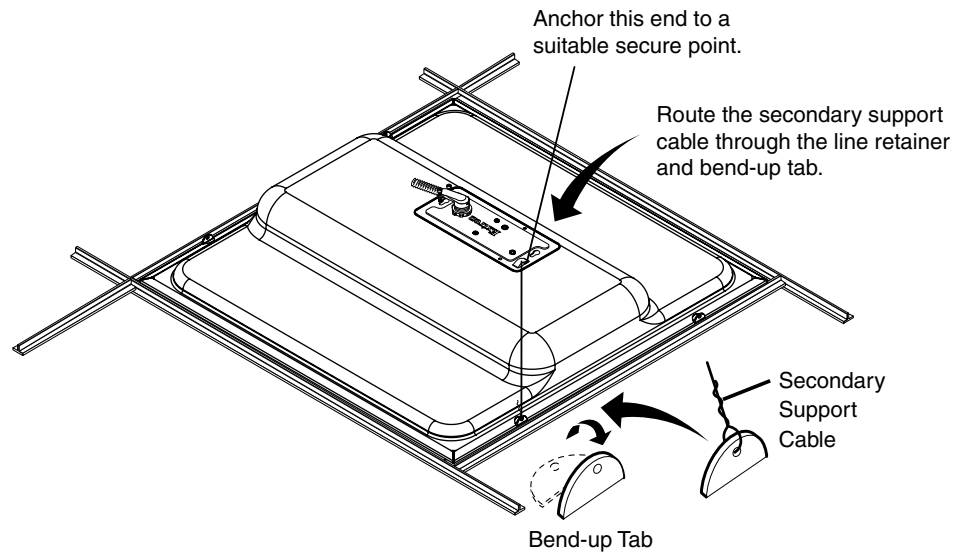
For installations in a rectangular ceiling grid, replace half of the rectangular tile which was cut in half in step 2. Install the supplied T-rail crosspiece, then place the speaker on the grid and position it so that the speaker edges are hidden by the support rails and T-rails, as shown below.



**Figure 13.** Installation in a Rectangular Ceiling Grid

13. If secondary support cables are being used, install them. See the illustration below.

**NOTE:** Observe all applicable building codes and local ordinances when installing the speaker.

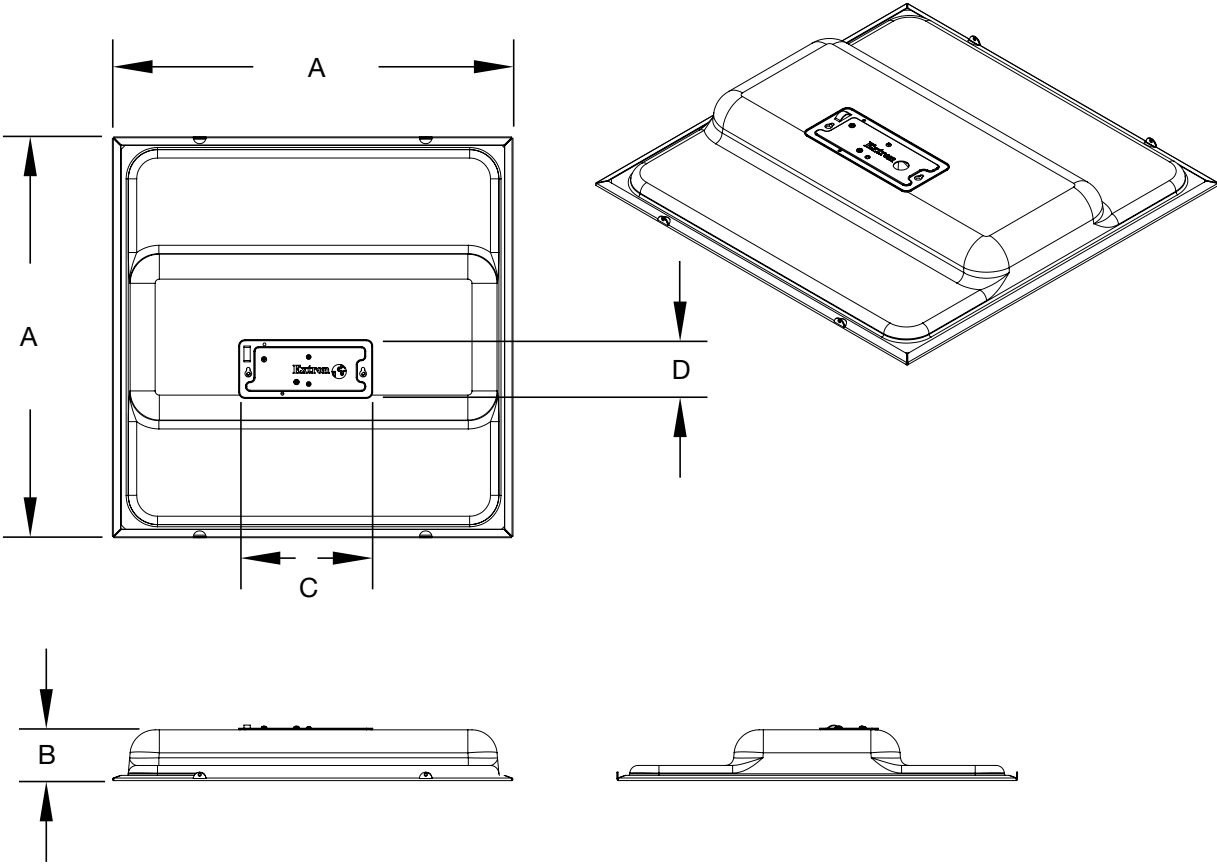


**Figure 14. Installing a Secondary Support Cable**

- a. Temporarily remove a ceiling tile adjacent to the speaker and set it aside.
  - b. Connect a secondary support cable through the cable pass through loop, and attach it to one of the bend-up tabs located on either side of the speaker.
  - c. Attach the other end of the cable to a sturdy part of the building (studs, roof struts, or the like).
  - d. For additional support lines repeat as needed.
  - e. Replace all ceiling tiles.
14. Check all wiring before powering up the amplifier.

# Reference Information

## Dimensions



	U.S. Version	Metric Version
A	23.75" (60.35 cm)	57.4 cm (23.4")
B	3.25" (8.3 cm)	8.3 cm (3.25")
C	8.0" (20.32 cm)	20.32 cm (8.0")
D	3.5" (8.89 cm)	8.89 cm (3.5")

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Extron Electronics warrants this product against defects in materials and workmanship for a period of five years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

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Extron Electronics  
1230 South Lewis Street  
Anaheim, CA 92805  
U.S.A.

**Japan:**

Extron Electronics, Japan  
Kyodo Building, 16 Ichibancho  
Chiyoda-ku, Tokyo 102-0082  
Japan

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3825 PH Amersfoort  
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**China:**

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686 Ronghua Road  
Songjiang District  
Shanghai 201611  
China

**Asia:**

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135 Joo Seng Road, #04-01  
PM Industrial Bldg.  
Singapore 368363  
Singapore

**Middle East:**

Extron Middle East  
Dubai Airport Free Zone  
F12, PO Box 293666  
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This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or modifications were made to the product that were not authorized by Extron.

**NOTE:** If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

**USA:** (714) 491-1500

**Asia:** 65.6383.4400

**Europe:** 31.33.453.4040

**Japan:** 81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

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