CC **CONTROL®**
CONTRACTOR

2 0 0   S e r i e s

Control® 226C/T

Control® 227C

User's Guide

Control® 227CT

UBL

P R O F E S S I O N A L

TABLE OF CONTENTS

Control® 226C/T , 227C and 227CT are premium in-ceiling speakers designed for applications requiring premium quality sound in ceiling-mount applications. The Control 200 Series loudspeakers incorporate breakthrough performance features such as best-in-class pattern control to provide a consistent sound throughout the listening area. Especially wide coverage allows fewer speakers to cover the space, reducing both the material and labor cost for the installation.

Handy, clip-in connections further reduce installation time, and the premium backcan for Control 227C & 227CT gives the performance of a top-quality wood cabinet in a metal ceiling-can form factor. The high-power kevlar-reinforced 6.5 in (165 mm) low-frequency driver along with the titanium-diaphragm compression driver and the advanced-technology steep-slope crossover network provide superb, wide-bandwidth sound quality.

Control 226C/T - An integrated backcan and coaxial design that features a 6.5" Kevlar-reinforced cone on the woofer coupled with a 1" exit Compression Driver. The Control 226C/T also includes a multi-tap transformer for use on 70V or 100V line distribution systems. The system can be used in either 8 ohm (low impedance) or transformer mode by selecting the desired function via the baffle mounted impedance switch. C-ring, tile rails and grille are included.
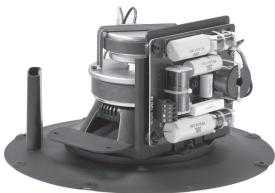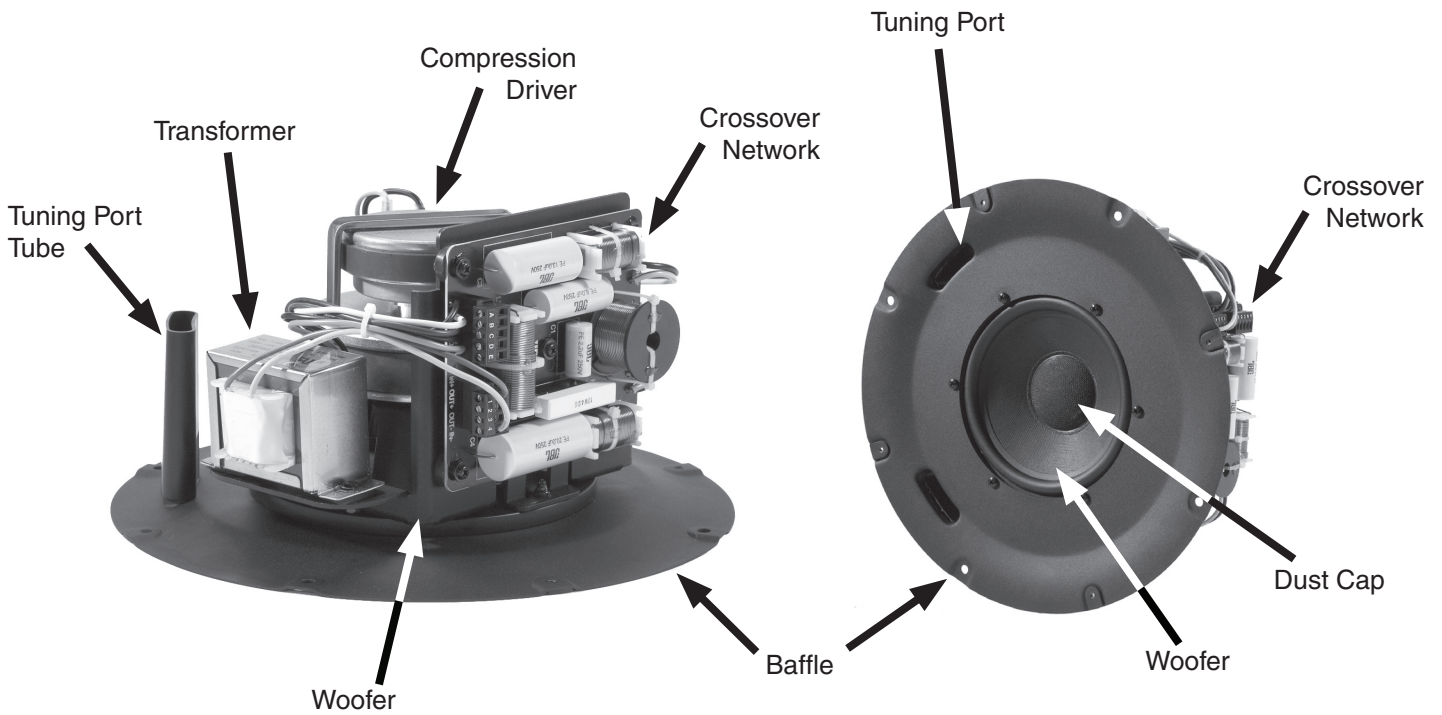
Control 227C - A coaxial design that features a 6.5" Kevlar-reinforced cone on the woofer coupled a 1" exit throat Compression Driver. The Control 227C is designed for pre-install applications using the optional MTC-200BB6 backcan and MTC-RG6/8 grille (sold separately).
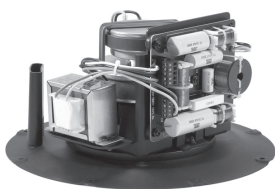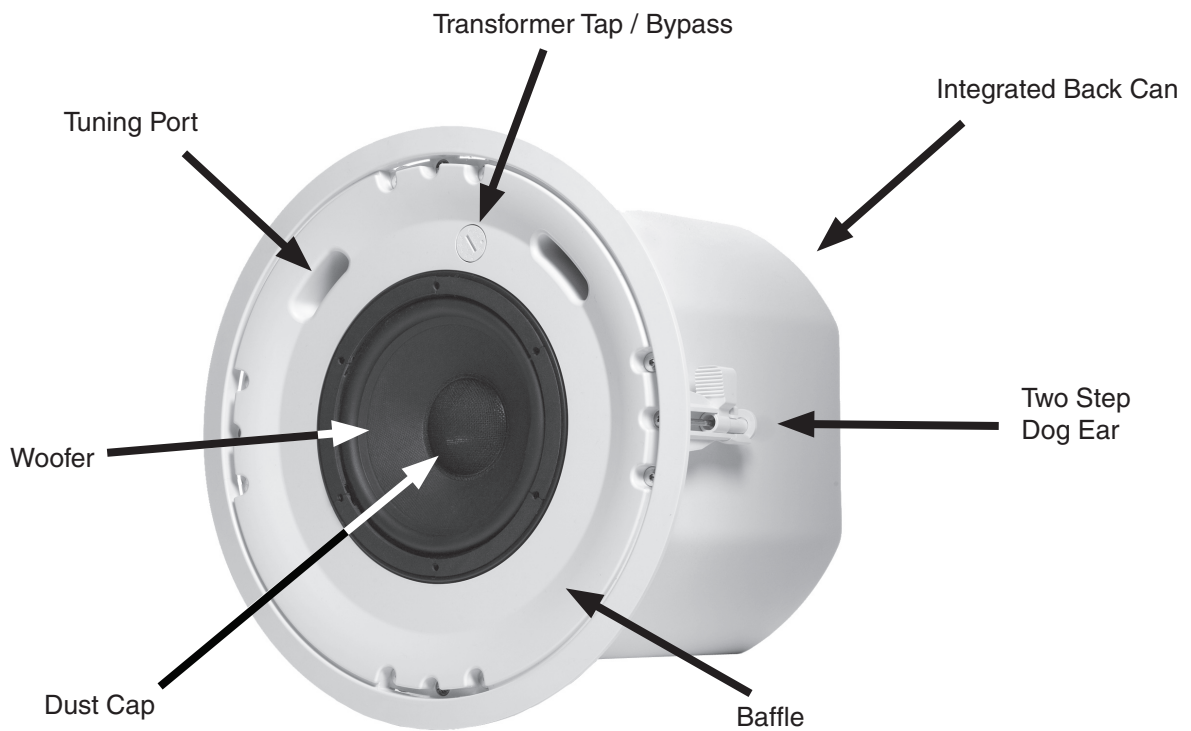
Control 227CT - the same design and driver compliment as found on the Control 227C and includes a 60 Watt multi-tap transformer for use on 70V or 100V line distribution systems.

(Control 227CT)

Compression Driver

Transformer

Crossover Network

Tuning Port Tube

Tuning Port

Crossover Network

Dust Cap

Baffle

Woofer

Woofer

(Control 226C/T)

Transformer Tap / Bypass

Integrated Back Can

Tuning Port

Woofer

Two Step Dog Ear

Dust Cap

Baffle

The installation of the Control 226C/T can be accomplished, if necessary, without requiring access above the ceiling. Bracketry for use with either suspended ceilings or sheetrock ceilings is included. The speaker is held securely in place via mounting ears which lock into place. Inputs are attached to a removable locking connector (included) which can be prewired before installing the speaker for ultra-fast snap-on installation.

## OPTIONAL PRE-INSTALLATION BRACKETS

IN MOST CASES, NO BRACKETS OTHER THAN THE ONES INCLUDED WITH YOUR SPEAKER ARE REQUIRED. Everything needed for most installations of these loudspeakers is provided with your Control 226C/T ceiling speaker.

However, a particular procedure that is sometimes used for installation into sheet rock (typically gypsum board) can be facilitated by the use of JBL's optional preinstallation brackets before the sheetrock is installed. The preinstallation bracket provides a bracket to which wiring can be tied behind the sheetrock and it can function as a cutout template when many cutouts are to be made in a production-line style installation. Two types of pre-installation brackets are available from JBL Professional as optional accessories:

1) The optional NEW-CONSTRUCTION BRACKET (MTC-19NC) is made of flat sheet metal, with wings to attach to the building structure. Holes are drilled for nails or screws at 16 inches (406 mm) and 24 inches (610 mm) on-center. Additional holes can be drilled by the installer at other spacings up to a maximum of 24-3/4 inches (630 mm) apart. Sheet rock installs over the bracket, and the bracket provides a template for blind cutout of the hole in the sheet rock. The sheet rock is typically cut with a router-type cutting tool, using the bracket ring as a cutout guide.

Optional New-Construction Bracket
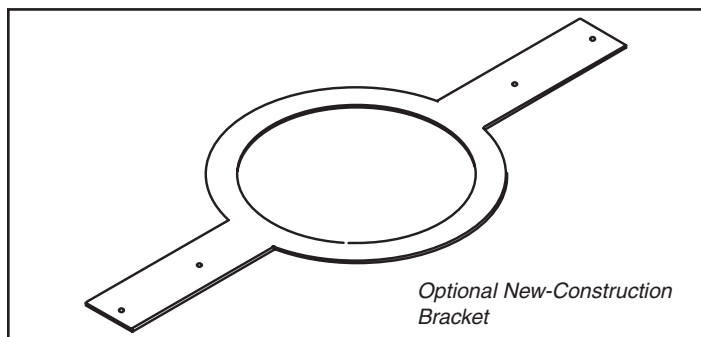
2) The optional PLASTER-RING BRACKET or "mud ring" (MTC-19MR) contains a circular offset, forming a edge guide for sheet rock plastering. The bracket has wings that attach to the building structure. Sheet rock is typically precut, then the sheet rock hole is then plastered (or "mudded") up to the ring to create a seamless cutout.

Optional Plaster Ring Bracket
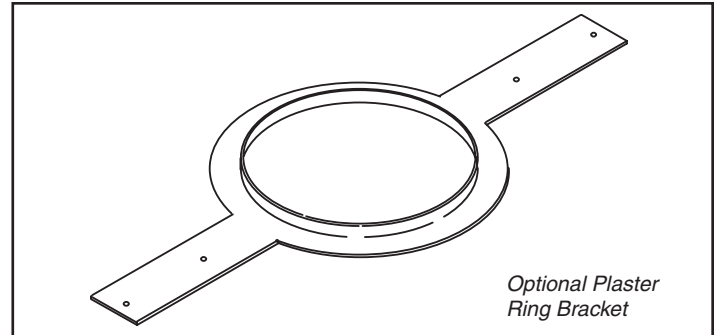
USING INCLUDED C-BRACKET WITH SHEETROCK
For most installations, the INCLUDED C-shaped backing plate provides adequate reinforcement to the ceiling material, spreading out the clamping force from the tab clamps.

CUTOUT SIZE
Packaged with the speakers are cardboard cutout templates for scribing the cutout hole onto your ceiling surface. The cutout size diameter for the Control 226C/T is 12.1 inches (307 mm).

The installation system has been designed so that the entire installation can be accomplished from beneath the ceiling, for instances when access above the tile is not possible or practical. However, in some cases it may be easier with removable ceiling tiles to access from both the top and bottom of the ceiling tile during various phases of the installation.

Step 1 – Cut the Hole. Cutout the hole size either by tracing the cardboard cutout template or with a circular cutter set to the cutout sizes listed above. Pull the wiring through the cutout hole.

Hole Cutout
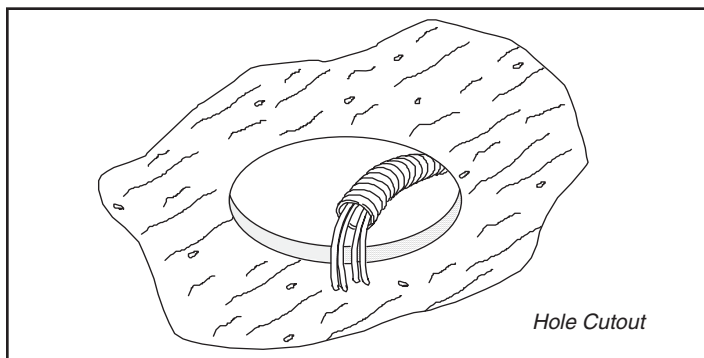
Step 2 – Insert Backing Hardware Through the Hole. Packaged with the speakers are two types of backing hardware – a C-shaped backing-plate bracket and two tile rails.

Suspended Ceilings – Insert the C-plate through the hole cut in the ceiling tile. Place the C-plate around the hole with the tabs located as shown on Figure 4. Insert the tile rails through the cut hole in the ceiling tile. Snap the two rails into the two tabs in the C-plate and align the rails so that the ends extend OVER the T-channel grid on the side of the tile. Secure the rails onto the C-bracket tabs by inserting a screw though each tab into the rail. This can all be accomplished from below the ceiling tile, if necessary.

FOR SAFETY: IMPORTANT TO USE BRACKETS.
ALL included support brackets – C-plate and tile rails -- MUST be used when installing into suspended ceiling tiles.

*C-Bracket and Tile Rail Positioned on Ceiling Tile*
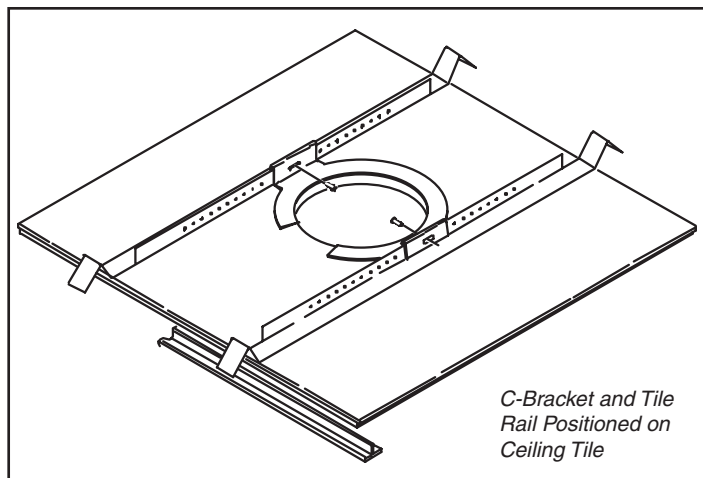
Tile Rails: The tile rails are designed to fit either standard 24-inch wide tiles or 600-mm wide tiles. The tile rail pieces do NOT physically attach to the T-grid struts. Instead, the inverted-V shape at the ends of the rails sit OVER the T-grid strut. During normal operation, the rails are supported by the edge of the tile. In the unlikely even that the tile comes out or falls apart, the ends of the support rails are designed to catch onto the T-grid, providing secure support to hold the loudspeaker assembly in place.

Vibration Reduction: These loudspeakers can generate substantial vibration, which can cause buzzing of the ceiling materials or structure. Depending on the character of the ceiling tile and structure, the installer might need to place neoprene or other dampening material under the tile rails or the edges of the tiles to eliminate rattles.

Cutout Placement: The tile rails are pre-punched with attachment holes along their length. Placement is not limited to the center of the tile as is the case with many other tile rail support systems.

Non-Suspended Ceiling Types – The C-bracket can be optionally used by itself to shore up the ceiling material and to spread out the clamping force from the tab clamps. Insert the C-plate through the cut hole in the ceiling and place it on the back side of the hole before inserting the speaker.

Thick-Ceiling Dog-Ears – The Control 226C/T is equipped with a two-landing dog ear suspension system enabling the Control 226C/T to be used with ceiling tiles that are up to 2.75" (70 mm) thick.


Second Landing
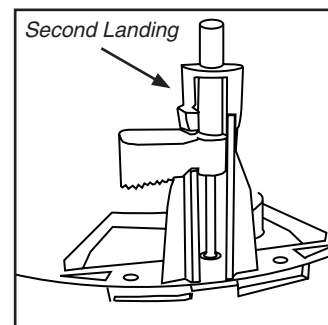
Control 200 Series Loudspeakers include Euroblock or Phoenix-type locking input connectors that allow the system to be "pre-wired" before the speakers are installed.

Connecting the Wiring to the Euroblock -- Connect the wiring to the removable locking connector that is INCLUDED with the speaker by stripping the insulation back about 5 mm (about 3/16 inch), inserting the bare end of wire into the connector and screwing down the hold-down screw until tight using a small flatblade screwdriver. Tighten any unused screws to avoid vibration. Using terminal block connectors allows the system to be pre-wired before final installation of the drivers.
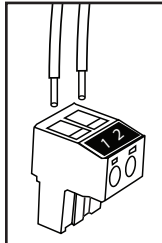
Control 226C/T Terminal Shown

When wiring Control 200 Series loudspeakers, always use proper electrical wiring practices in accordance with your area's building codes and regulations.

Control 226C/T

Connecting the Input Terminal Block on the Control 226C/T -- The input terminal cover on the Control 226C/T is fitted with a conduit connector for running and securing wiring or conduit to and from the unit. To wire the unit:

1. Loosen the screw on top of the input terminal cover and then remove (and save) the input terminal cover screw on the side of the can.

2. Swing open the input terminal cover and remove the euroblock connector.

3. Insert the bare end of wire into the euroblock connector and secure the wires with the hold-down screws. *(see Connecting the Wiring to the Euroblock)*

Euroblock Connector
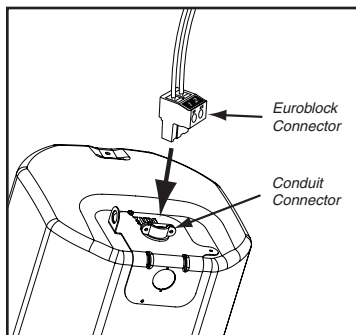
Conduit Connector

4. Loosen the conduit connector on the input terminal cover and insert the wired euroblock connector through the conduit connector opening. Connect the euroblock to the matching receptacle.

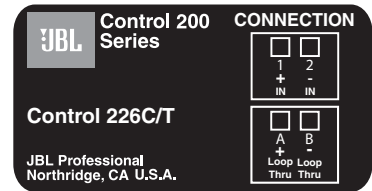5. Shut the input terminal cover and replace and tighten the terminal cover screws.

6. Allowing sufficient strain relief for the input wiring and re-tighten the conduit connector on the terminal cover.

NOTE: The input terminal cover on the Control 226C/T also includes a .75 in (19 mm) knockout for an additional conduit clamp. This knockout point can be used in addition to the conduit connector located on the top of the can and is useful for wiring loop-thru runs or when access is limited on the top of the Control 226C/T can.

Knockout
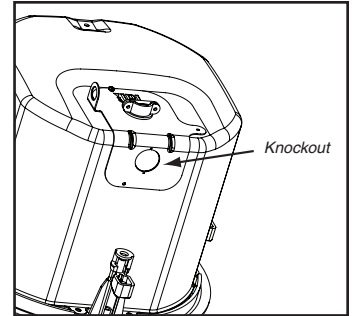
Guide to Connection Pins on Control 226C/T -- There are two (2) removable locking input connectors with two (2) terminals on each. The pin functions are listed on the label located on the cover on the rear of the can.

Control 226C/T:

	Control 200 Series	CONNECTION
JBL		1 +IN 2 -IN
	Control 226C/T	A +Loop Thru B -Loop Thru
	JBL Professional Northridge, CA U.S.A.	

On the Control 226C/T, connect the negative wire to the "-" or pin 2 and connect the positive wire to "+" or pin 1. Pins 1 & 2 are looped to pins A & B, respectively (Pin 1 connects to Pin A and Pin 2 connects to Pin B) inside the speaker. Pins A & B are intended as loop-through connections to subsequent loudspeakers. *(See next page Using Loop-Through Terminals).*
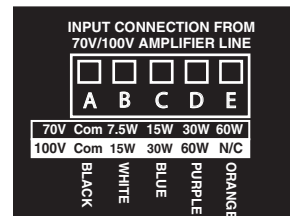
To select the operating mode or desired output tap of the loudspeaker, simply rotate the tap selector switch located on the front of the baffle to the desired setting.

Note: Both 70V/(100V) connections and low impedance connections are made at the same pins. When using the transformer tap selections, be sure that the power amplifier is set on 70V/(100V) Mode and the leads feeding the system are connected to 70V/(100V) outputs on the amplifier.

Control 227C & Control 227CT

Guide to Connection Pins on Control 227CT -- The removable locking input connector contains 5 terminals, as marked on the connector. The pin functions are listed on the label located on the crossover frame.

Control 227CT:

INPUT CONNECTION FROM 70V/100V AMPLIFIER LINE

	A	B	C	D	E
70V	Com	7.5W	15W	30W	60W
100V	Com	15W	30W	60W	N/C
	BLACK	WHITE	BLUE	PURPLE	ORANGE

On the Control 227CT, connect the negative input to the "Common" terminal and connect the positive input to the appropriate tap. *For example, if the system is being driven from a 70V Distributed Line and the 30W tap is desired, the positive input would be made to the input marked 30W and the negative connection would be made to the "Common" pin.* The input pins correspond to the taps of the transformer indicated on the label below each connector.

Guide to Connection Pins on Control 227C -- The removable locking input connector contains 4 terminals, as marked on the connector. The pin functions are listed on the label located on the crossover frame.

Control 227C:
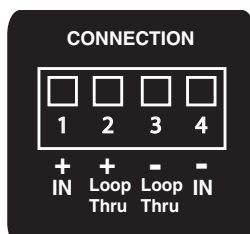
Pins 1 & 4 are the "+" and "-" inputs to the loudspeaker. Connect the negative wire to "-" or pin 4 and connect the positive wire to "+" or pin 1. Pins 1 & 4 are looped to pins 2 & 3, respectively (Pin 1 connects to Pin 2 and Pin 3 connects to Pin 4) inside the speaker. Pins 2 & 3 are intended as loop-through connections to subsequent loudspeakers. There are two possible hookup schemes for connecting subsequent speakers, determined by the desired result from the circuit whenever this speaker's connector gets disconnected during troubleshooting.

Hookup Schemes for Subsequent Speakers

Choose whichever of the following hookup patterns best accommodates your installation.

1.) Paralleling Input Terminals -- Connect the wire pair of the subsequent speaker to pins 1 & 4 (in parallel with the input wire pair). Whenever the connector is pulled out of the speaker for troubleshooting, subsequent speakers will stay connected. This can be useful during troubleshooting to be able to disconnect a single loudspeaker at a time. In this hookup scheme, no wires get connected to pins 2 & 3.
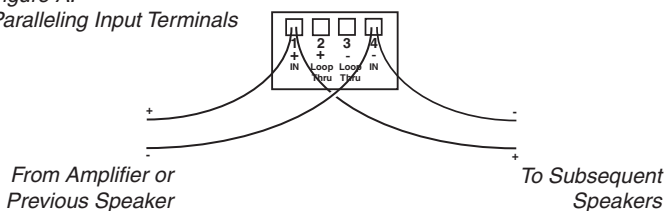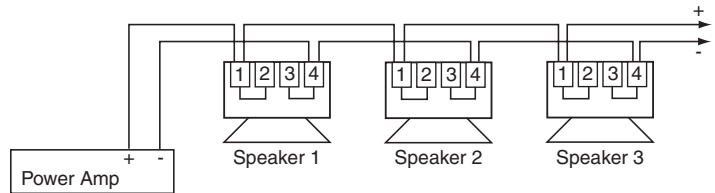
Figure A:
Paralleling Input Terminals

From Amplifier or
Previous Speaker

To Subsequent
Speakers

Figure B:
Parallel System
Hookup Diagram

Speaker 1   Speaker 2   Speaker 3
Power Amp

2.) Using Loop-Through Terminals (Pins 2 & 3 on Control 227C, Pins A & B on Control 226C/T) -- By connecting the wire pair of the subsequent speaker to pins 2 & 3 on the Control 227C and Pins A & B on Control 226C/T, then all subsequent speakers will be disconnected when this speaker's connector is disconnected during troubleshooting . This can be useful as a way to isolate problems to a section of the distributed line while leaving the wires attached to the connector.

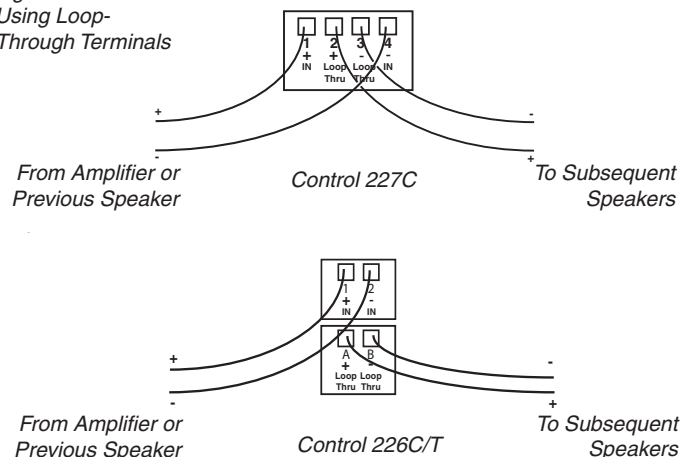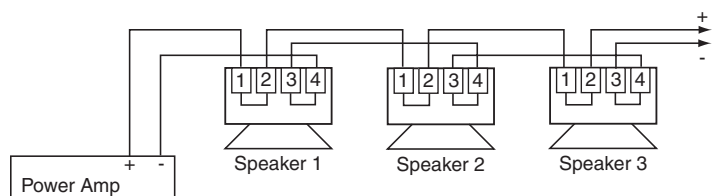Figure C:
Using Loop-
Through Terminals

From Amplifier or
Previous Speaker

Control 227C

To Subsequent
Speakers

From Amplifier or
Previous Speaker

Control 226C/T

To Subsequent
Speakers

Figure D:
Loop-Through System
Hookup Diagram

Speaker 1   Speaker 2   Speaker 3
Power Amp

Assembling the Control 227C/CT into the Back Can - After inserting the Control 227C/CT into the back can, align the mouting holes <u>without</u> weldnuts to the holes with clip nuts on the back can. These are the mounting points that will be used to secure the Control 227C/CT baffle and driver to the backcan.


Non-Weldnut mount point

Weldnut mount point
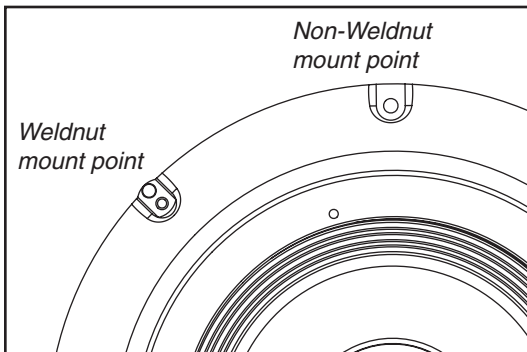
Next, using 4 pcs - #10 x 0.5 in (12mm) sheet metal screw, attach the baffle / driver to the back can. Be sure to match the mounting holes <u>without</u> weldnuts to clipnuts on back can.

Finally, using 4 pcs - M4 x 38mm powder coated machine screws, attach the metal grille to the baffle. Be sure to match the grille mounting holes to the weldnuts on the baffle assembly.
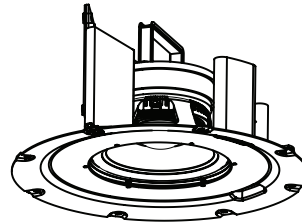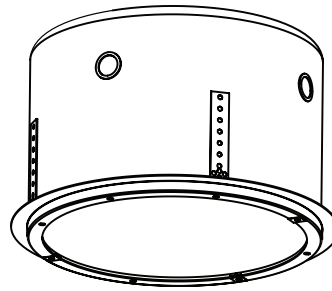
4 pcs - #10 x 0.5 in (12mm) sheet metal screw for attaching the baffle / driver to the back can. Match to clipnuts on back can. (Included with MTC-200BB6.)
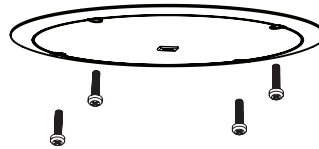
4 pcs - M4 x 38mm powder coated machine screws for attaching the metal grille to the baffle. (Included with JBL Professional grilles.)
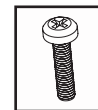
CAUTION:

WHEN INSTALLING CONTROL 200 SERIES BACK CANS INTO A CEILING OR BUILDING STRUCTURE, ALWAYS USE PROPER SUSPENSION AND RIGGING PRACTICES IN ACCORDANCE WITH YOUR AREA'S BUILDING CODES AND REGULATIONS.

Painting the Grille -- The optional MTC-RG6/8 grille for Control 227C/CT loudspeakers features a powder coated, satin finish paint (RAL 9016 - Pantone equivalent 11-0602TPX) and can be painted to match any decor. This should only be done when the grille has been removed from the loudspeaker and back can assembly.

For best results, a spray paint technique is recommended. If the grille is rolled or brush painted, the grille perforations may become clogged with paint and poor sound quality may result. When painting the Control 226C/T grille, remove the backing grille cloth to avoid paint clogs or diminished sound quality reproduction.

To avoid damage when removing the Control 226C/T grille, use a scratch awl, flatblade screw driver, or similar tool to GENTLY pry the grille from the baffle at one of the dog ear points.

Maintenance -- No maintenance is required when assembled in accordance with the instructions and wiring guidelines described in this manual.

Contacting JBL Professional -- These products are designed and backed by JBL Professional, the world leader in professional sound reinforcement. For complete warranty information, to order replacement parts or to ask for clarifications to this manual, contact JBL Professional.

Within the United States:

Applications Department, JBL Professional
8400 Balboa Blvd., PO Box 2200
Northridge, CA 91329 USA

In the USA you may call Monday through Friday 8:00am to 5:00pm Pacific Coast Time (800) 894-8850.

Outside the USA:

Contact the JBL Professional Distributor in your country.

A list of JBL Professional Distributors and US Service Centers can be obtained from the JBL Professional website at: **www.jblpro.com**

Control 226C/T

Frequency Range (-10 dB)[1]:	47 Hz – 19 kHz
Frequency Response (±3 dB)[1]:	74 Hz – 17 kHz
Coverage Pattern[2]:	120º conical, broadband
Long-Term System Power Rating, IEC[3]:	150 W (1600 W peak), 2 hrs
	100 W (1000 W peak), 100 hrs
Sensitivity (2.83V @ 1m):	90 dB measured half-space
Nominal Impedance :	8 ohms
Transformer Taps :	100V: 60W, 30W & 15W (plus 7.5W at 70V)
Transducers :	6.5" woofer with Kevlar reinforced cone, 1" exit compression driver
Input Connector :	Removable locking connector with screw-down terminals.
Cutout Dimension :	226C/T: Ø 307 mm (Ø 12.1 in)
Ceiling Thickness Range :	70 mm (2.75 in) Max, 12 mm (.5 in) Min
Dimensions (Diameter x D) :	226C/T: Ø 330 mm x 246 mm (Ø 13 in x 9.7 in)
Net Weight :	9.1 kg (20.0 lbs)

Control 227C/CT

Frequency Range (-10 dB)[1]:	43 Hz – 19 kHz
Frequency Response (±3 dB)[1]:	75 Hz – 17 kHz
Coverage Pattern[2]:	120º conical, broadband
Long-Term System Power Rating, IEC[3]:	150 W (1600 W peak), 2 hrs
	100 W (1000 W peak), 100 hrs
Sensitivity (2.83V @ 1m):	90 dB measured half-space
Nominal Impedance :	8 ohms (227C)
Transducers :	6.5" woofer with Kevlar reinforced cone, 1" exit compression driver
Input Connector :	Removable locking connector with screw-down terminals.
Net Weight :	227C: 4.1 kg (9 lbs) 227CT: 5.2 kg (11.5 lbs)
Dimensions (Diameter x D) :	227C/CT: Ø 305 mm x 147 mm (Ø 12 in x 5.8 in)

Optional Accessories :	MTC-19NC New Construction Bracket, for use with 226C/T.
	MTC-19MR Mud Ring Construction Bracket, for use with 226C/T.
	MTC-RG6/8 Grille, round contoured, for use with 227C/CT.
	MTC-200BB6 Back can, (.5 cubic foot - nominal), for use with 227C/CT.

[1] In half space (in ceiling)
[2] Average 1 kHz to 16 kHz
[3] IEC standard, full bandwidth pink noise with 6 dB crest factor.

JBL continually engages in research related to product improvement. Changes introduced into existing products without notice are an expression of that philosophy.

CC **CONTROL** ® **CONTRACTOR**

2 0 0   S e r i e s