Shown: A typical TCS 60º array consisting of five TCS215's, one TCS215W for bass and one TCS 115 mounted at a 45º angle for downfill.

CARVIN TCS
TOURING CONCERT SYSTEM

TCS210

TCS115

TCS115M

TCS215

TCS215W

TCS218

Congratulations! You've joined a fast growing group of people who have chosen the high quality TCS loudspeaker systems. We welcome you and will do our best to satisfy you with your new TCS loudspeaker.

In order for you to use this product most effectively, please take some time to read this manual. We have included a great deal of information that will help you achieve optimum performance, sound, and quality from your new loudspeaker system.

The TCS series loudspeakers give you greater response, more power, and more intelligibility than any other two-way speaker system on the market today. We achieved this by using the highest quality components, the best speaker design systems, and over 80 years of combined experience in professional audio engineering. TCS systems provide the ultimate in pro sound for any venue, large or small. TCS loudspeakers are designed to be suspended separately or several different models together to create perfect coverage for a given application. TCS loudspeakers are specifically engineered for optimum performance as front of house speakers, fills, subwoofers, and stage monitors. Set up an entire sound system using Carvin's TCS series loudspeakers.

All TCS loudspeakers are designed around 13 ply Baltic birch enclosures that are engineered to a rated 1000 lbs. tensile strength. Each enclosure incorporates 12 to 16 fly points to create any array cluster desired. TCS enclosures feature 26 ply Baltic birch baffles (except TCS115M and TCS210) to eliminate cabinet resonance and increase overall efficiency. All enclosures include internal bracing for structural stability and support.

For your records, you may wish to record the following information.

Serial No._____ Invoice Date_____

76-00021 1099

CARVIN

12340 World Trade Drive, San Diego, CA 92128
(800) 854-2235
www.carvin.com

RECEIVING INSPECTION—READ BEFORE GETTING STARTED

INSPECT YOUR UNIT FOR ANY DAMAGE which may have occurred during shipping. If any damage is found, please notify the shipping company and CARVIN immediately.

SAVE THE CARTON & ALL PACKING MATERIALS. In the event you have to re-ship your unit, always use the original carton and packing material. This will provide the best possible protection during shipment. CARVIN and the shipping company are not liable for any damage caused by improper packing.

SAVE YOUR INVOICE. It will be required for warranty service if needed in the future.

SHIPMENT SHORTAGE. If you find items missing, they may have been shipped separately. Please allow several days for the rest of your order to arrive before inquiring.

RECORD THE SERIAL NUMBER on the enclosed warranty card or below on this manual for your records. Keep your portion of the card and return the portion with your name and comments to us.

IMPORTANT SAFETY INFORMATION

CAUTION: describes an operating condition or user action that may expose the equipment, user, or other parties to potential damage or danger.

WARNING: describes an operating condition or user action that will cause damage to the equipment or injure the user or other parties.

DANGER: describes an operating condition or user action that will immediately damage the equipment or be extremely dangerous or possibly life threatening to the user or other parties.

WARRANTY

CARVIN TCS loudspeakers are covered by a ONE year limited warranty unless otherwise stated. WARRANTY DOES NOT COVER: 1) Opened or burned voice coils. 2) Torn cones due to improper packing or abuse. 3) Damage from rain, moisture, ETC. When returning defective driver(s), remove them from the enclosure to reduce shipping costs. DO NOT stuff paper into the driver(s). Return pre-paid by UPS. Include your address and description of the problem. Your driver(s) will be returned COD for the cost of shipping and reconditioning if not covered under warranty.

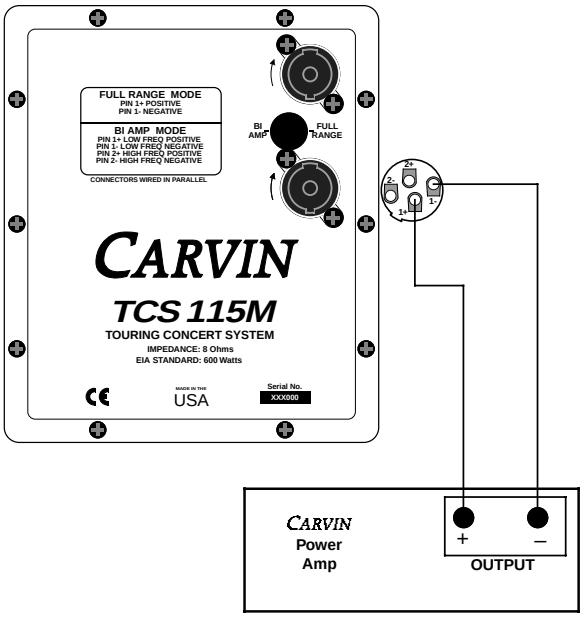
INTERNAL CROSSOVER

Each TCS series loudspeaker includes an internal crossover constructed of high quality components such as precision wound inductors, high current resistors, and 250 Volt film capacitors. These components along with high grade FR-4 circuit board material, ensure high quality for many years. The characteristics of the crossover along with the physical alignments of the drivers ensures seamless integration causing a virtually coherent acoustic wavefront as from a single source. All TCS series crossovers are Bi ampable with the exception of the TCS218 and TCS215W. Carvin suggests using the internal crossover at all times in either Full Range or Bi Amp mode as the components work together to form one system.

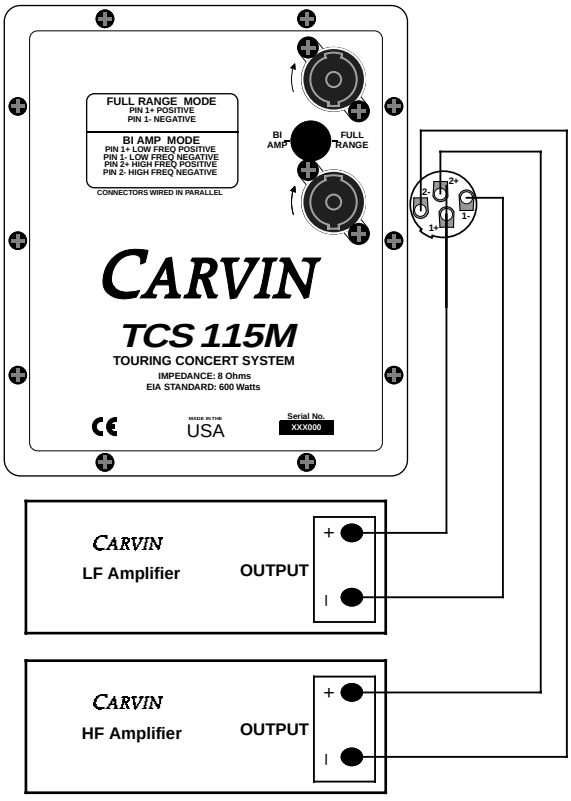
OPERATING MODES

The switch on the TCS series input panels allows you to select two operating modes: FULL RANGE mode (single amplifier) or BI AMP mode (separate low and high frequency amplifiers). In FULL RANGE mode, the internal crossover of the loudspeakers divide the audio signal into the seperate frequency ranges for each driver. In BI AMP mode, one amplifier is used to power the low frequency drivers and another amplifier is used to power the high frequency drivers. In both modes the internal crossover is active to ensure the best quality sound possible from the loudspeaker.

QUICK START: FULL RANGE MODE



QUICK START: BI AMP MODE

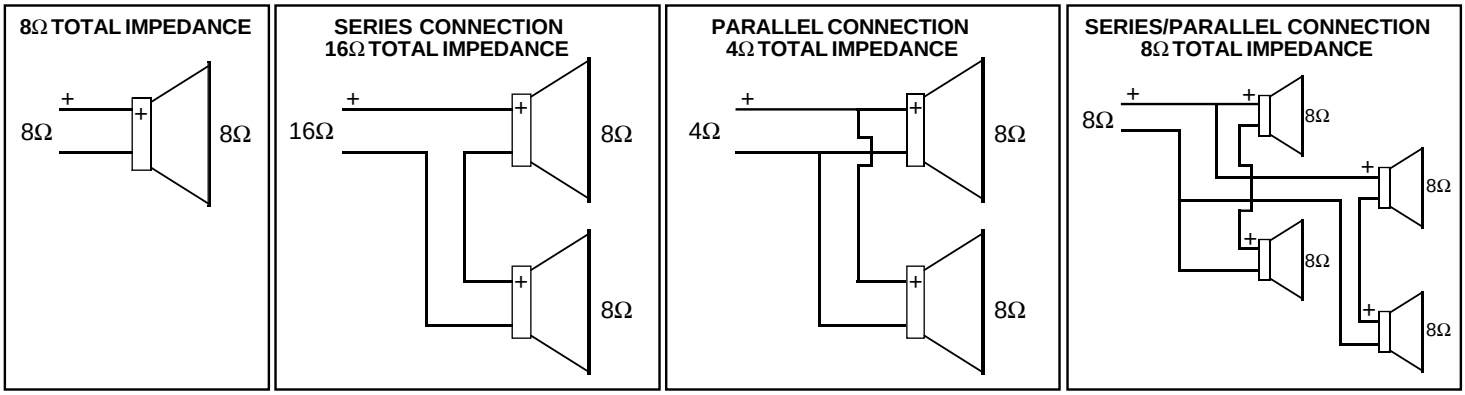


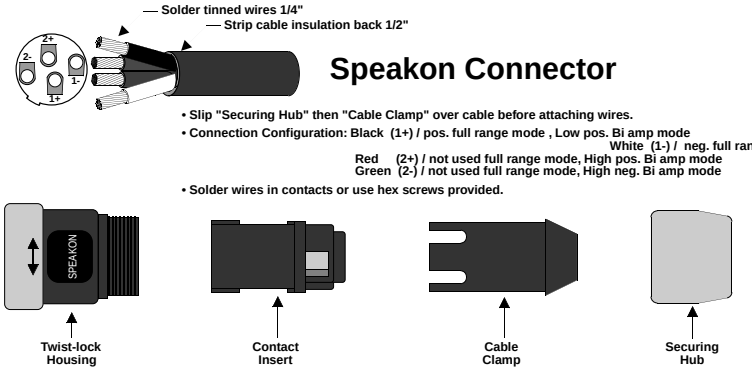
NOTE:

Speakon jacks are wired in parallel in Full Range mode and in Bi Amp mode.

TYPICAL LOUDSPEAKER IMPEDANCE CONFIGURATIONS

Individual speaker or speaker cabinet wiring examples for total impedance. **DO NOT EXCEED AMPLIFIERS LOWEST RATED IMPEDANCE.**





CHOOSING THE CORRECT POWER AMPLIFIER

CAUTION: It is important to select the proper wattage power amplifier. For optimum performance you need to have enough power from your amplifier . Great care should be taken to not exceed the published power ratings of the loudspeakers. Damage that occurs from overpowering voids the manufacturers warranty. External limiting can be used to avoid this.

The first thing to consider when selecting a power amplifier is how loud the system needs to be. This should be determined by the maximum output ratings of the loudspeaker or number of loudspeakers, not by amplifier power. A loudspeaker who's capability exceeds the needs of the system will always perform well, where as a loudspeaker who's capability does not meet the needs of the system will likely be pushed beyond it's capabilities resulting in distortion which may cause failure.

Based on these considerations, the choice of power amplifier size should be based on the power rating or just under the power rating of the loudspeaker. **CAUTION:** If you choose an amplifier under the power rating of the loudspeaker take care not to drive the power amplifier into clipping for extended periods of time as this will permanently damage the loudspeakers again voiding the manufacturers warranty.

HI FREQUENCY DRIVERS

The TCS115 & TCS215 use Carvin's TCS3000 high frequency driver. This driver features a 100 oz. magnet, 4" precision wound ferrofluid cooled voice coil, titanium diaphram and surround and a 2" throat exit. This massive driver delivers smooth mids and pristine highs at an incredible 350 W power rating.

The TCS115M & TCS210 use Carvin's HF1100 high frequency driver. This driver features an 88 oz. motor structure, 2" precision wound voice coil, titanium diaphram and a 1" throat exit. This driver delivers crystal clear vocals and sweet highs at a 100 W power rating.

LOW FREQUENCY DRIVERS

The TCS115, TCS215, TCS215W and the TCS218 all use a special type of heatsinked driver. These drivers incorporate the latest in speaker technology using a 4" precision wound voice coil cooled by a uniquely designed heatsink structure which allows these drivers to handle up to 1500 W each. The massive motor structure drives a very rigid kevlar impregnated paper cone to deliver thunderous lows.

The TCS115M & TCS210 use Carvin's PS15C and PS10 drivers. Both drivers feature kapton voice coil formers, firm surrounds, and impregnated paper cones.

Every one of the TCS series loudspeakers are tested to maximum power capacity before shipping to ensure they are free of defects and to guarantee 100% satisfaction.

TCS SPECIFICATIONS

SPECIFICATION	TCS115	TCS115M	TCS210	TCS215	TCS215W	TCS218
Freq. Resp.	58 - 19k Hz	65 - 15k Hz	70 0 - 15k Hz	48 - 19k Hz	40 - 1k Hz	30 - 800 Hz
Sensitivity 1W/1M	100 dB	101.7 dB	102 dB	101.5 dB	99.7 dB	101 dB
Power (EIA)	1500 Watts	600 Watts	600 Watts	3000 Watts	3000 Watts	3000 Watts
Nominal Impedance	8 Ω	8Ω	4Ω	4Ω	4Ω	4Ω
Crossover Biamp switch	Yes	Yes	Yes	Yes	No	No
Nominal Dispersion	90° x 40°	60° x 40°	60° x 40°	90° x 40°	N/A	N/A
Crossover Frequency	850 Hz	1k Hz	1k Hz	850 Hz	700 Hz	500 Hz
Mounting / Fly points	16	8	12	12	12	N/A
Dimensions						
Height	32"	17"	31.25"	48"	48"	30"
Width (front)	20.5"	29.25"	13.25"	20.5"	20.5"	45"
Width (back)	7.25"	29.25"	7.50"	10"	10"	45"
Depth	18.75"	17"	14"	25"	25"	29.75"
Trap. Angle	12.5°	N/A	12.5°	12.5°	12.5°	N/A
Grille Material	14 Ga. Perf. Steel	14 Ga. Perf. Steel	14 Ga. Perf. Steel	14 Ga. Perf. Steel	14 Ga. Perf. Steel	14 Ga. Perf. Steel
Net Weight	119 lbs.	68 lbs.	57 lbs.	169 lbs.	138 lbs.	217 lbs.

For speaker response and coverage, see polar plots on facing page.

POLAR PLOTS

Polar plots are loudspeaker SPL measurements taken at various rotational positions around the loudspeaker to complete a 360° circle. The purpose of this type of measurement is to analyze the coverage angles of the loudspeaker at different frequencies and to display the frequency respone attenuation from a given listening position. This will help the user to set up arrays to achieve the optimum coverage for a given situation. 0° = front of loudspeaker

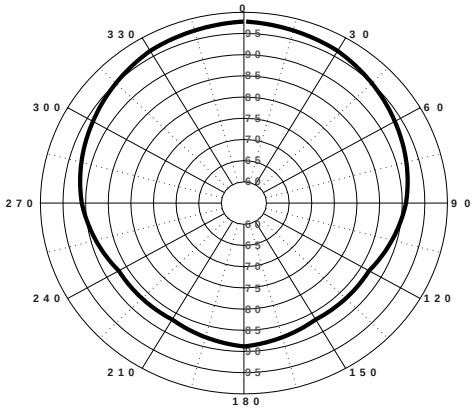
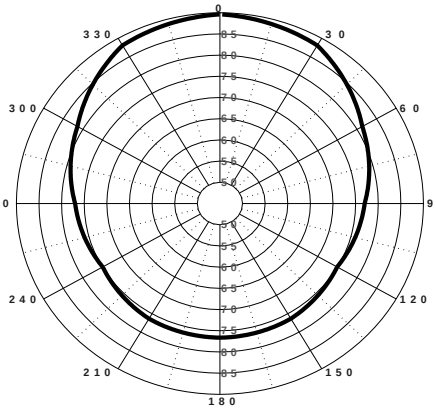
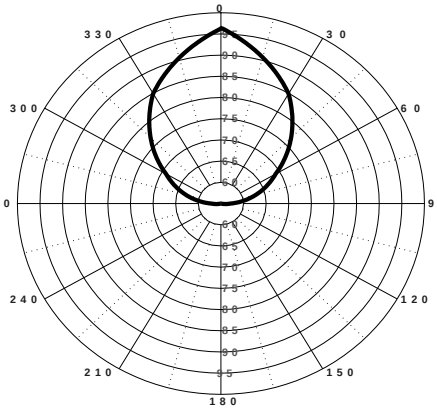
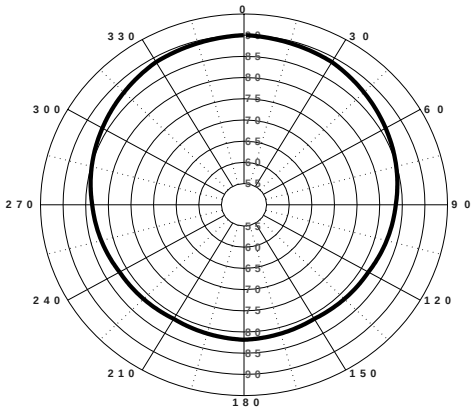
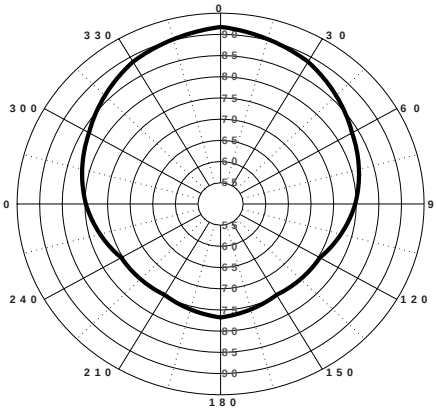
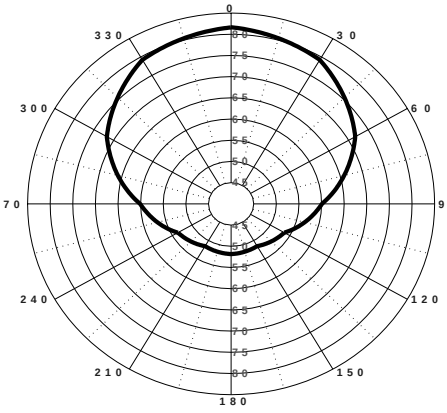
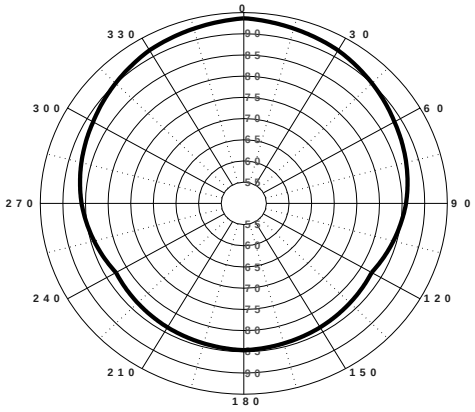
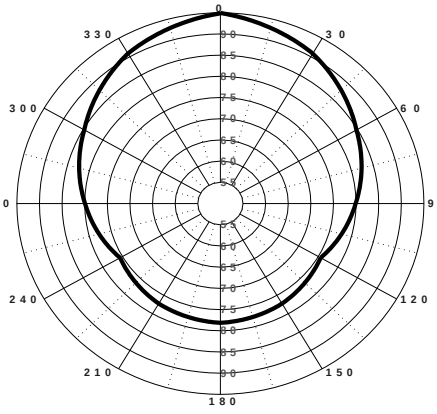
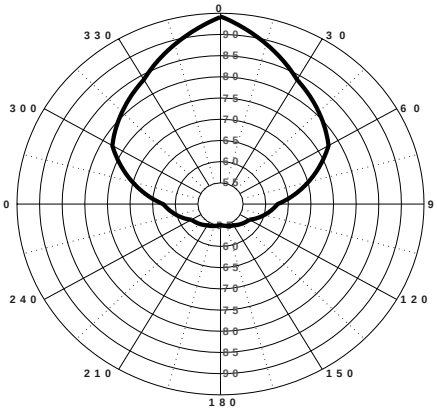
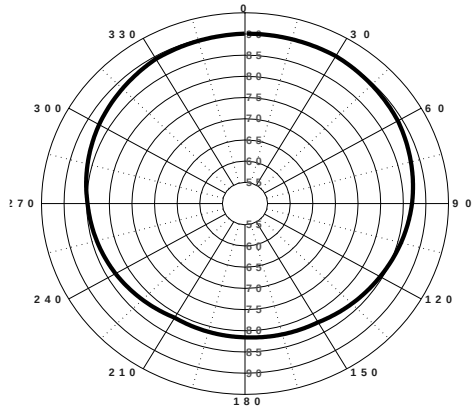
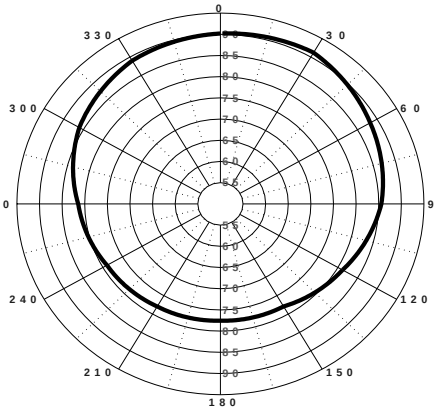
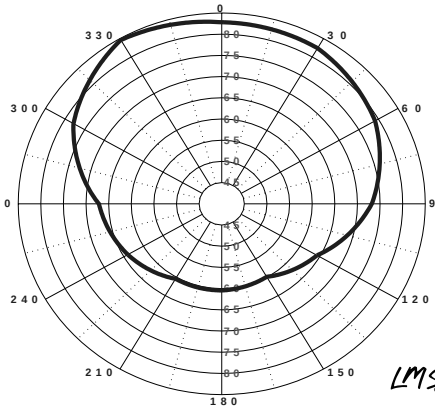
	250 Hz	1k Hz	10k Hz
TCS215			
TCS210			
TCS115			
TCS115M			

Fig 3

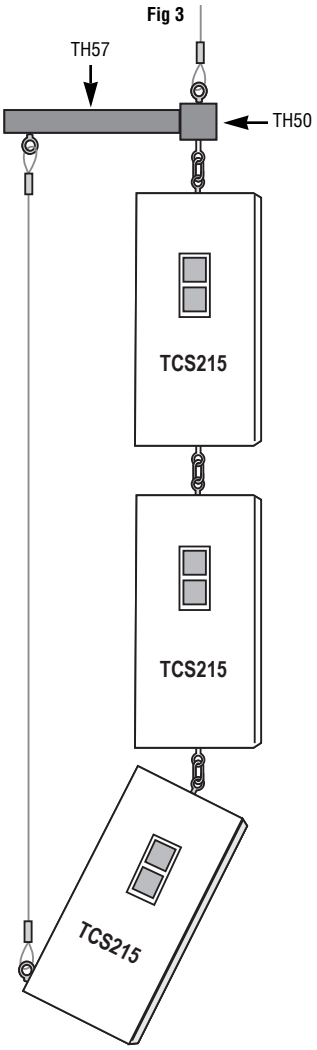


Fig 4

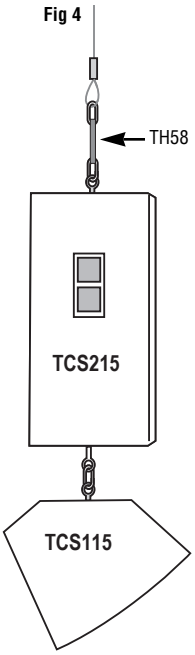
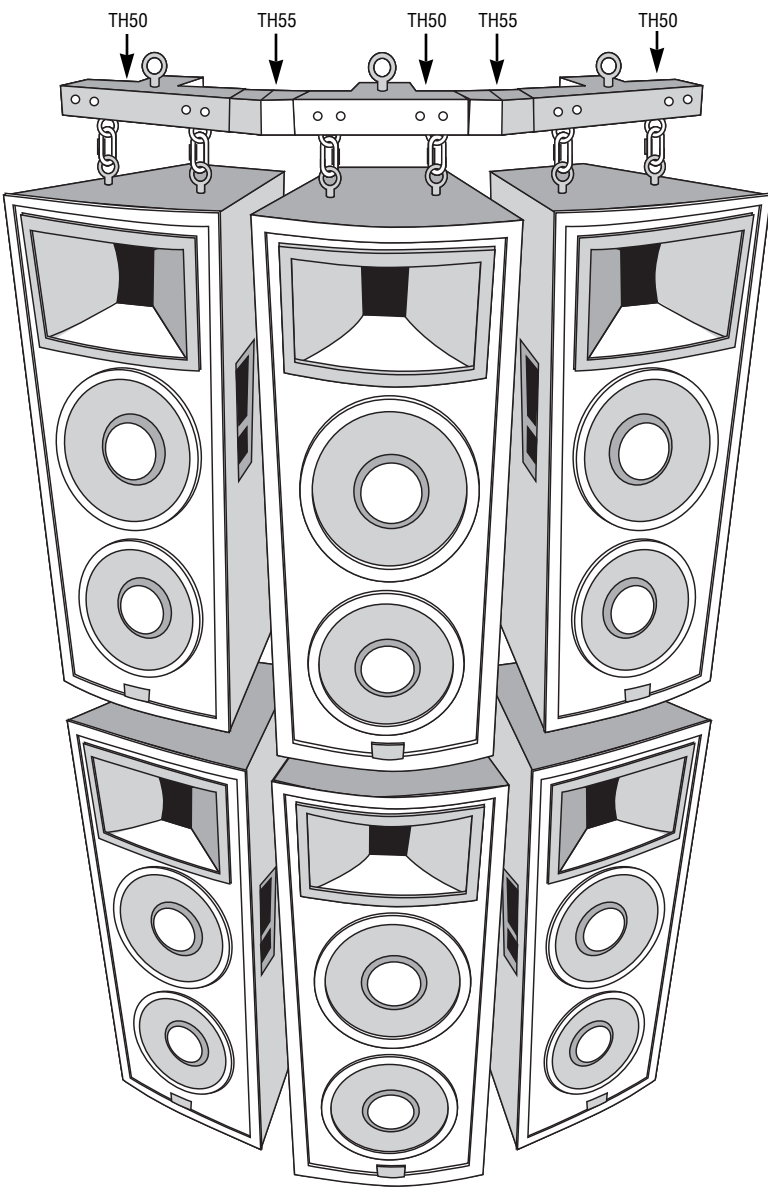


Fig 5



Figures 1-5 show a few different array/mounting configurations possible with the TCS series loudspeakers.

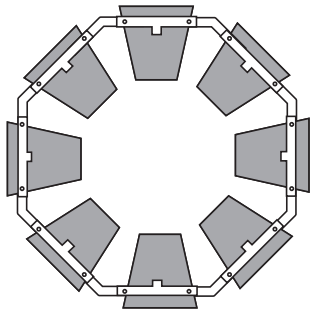
Fig. 1 is a bottom side view of a 360° array of sixteen TCS210 cabinets with an additional two TCS210's used for a downfill application. TCS hardware needed for this application is as follows:
(8) TH50 truss bar kit, (8) TH56 truss bar connector 45°, (56) TH10 3/8-16 forged steel eyebolts, (36) 3/8-16 forged steel quick links.

Fig. 2 is a top side view of a 360° array of sixteen TCS210 cabinets. TCS hardware needed for this application is as follows: (8) TH50 truss bar kit, (8) TH56 truss bar connector 45°, (48) TH10 3/8-16 forged steel eyebolts, (32) 3/8-16 forged steel quick links.

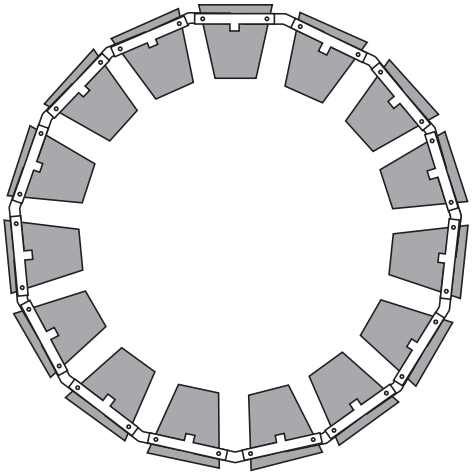
Fig. 3 is a side view of a small array of three TCS215's with one pulled back for downfill. TCS hardware needed for this application is as follows: (1) TH50 truss bar kit, (1) TH57 pull back bar kit, (11) TH10 3/8-16 forged steel eyebolts, (7) 3/8-16 forged steel quick links.

Fig. 4 is a side view of a small array consisting of one TCS215 and one TCS115 suspended at the 45° angle for downfill. TCS hardware deeded for this application is as follows: (1) TH58 mounting bar kit, (6) TH10 3/8-16 forged steel eyebolts, (2) TH5 3/8-16 forged steel quick links.

Fig. 5 is a 60° array of TCS215's constructed at a 24° angle. TCS hardware needed for this application is as follows: (3) TH50 truss bar kit, (2) TH56 truss bar connector 24°, (18) TH10 3/8-16 forged steel eyebolts, (12) 3/8-16 forged steel quick links.



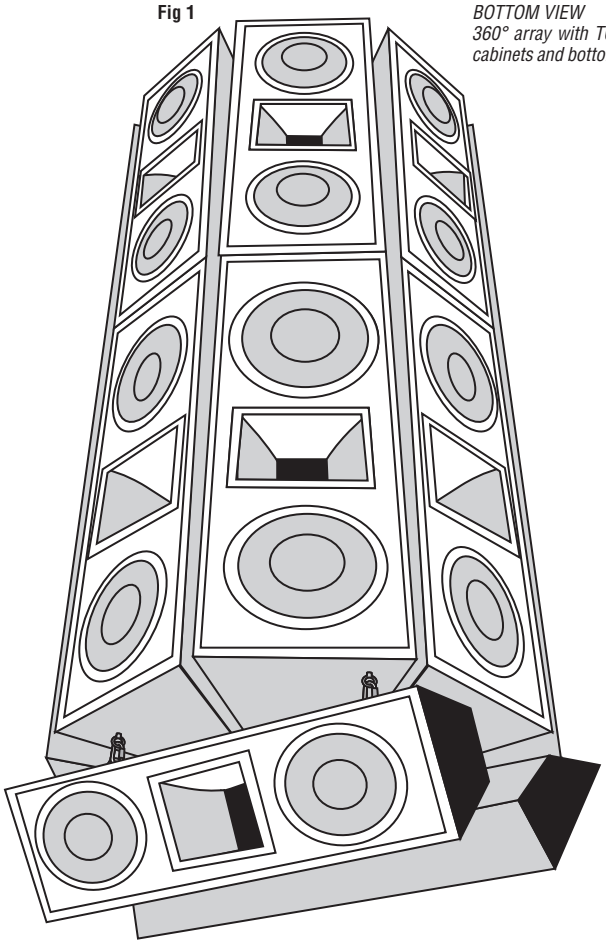
Top view of 360° array using (8) TH50 and (8) TH56 kits. Total of 8 loudspeakers needed.



Top view of 360° array using (15) TH50 and (15) TH55 kits. Total of 15 loudspeakers needed.

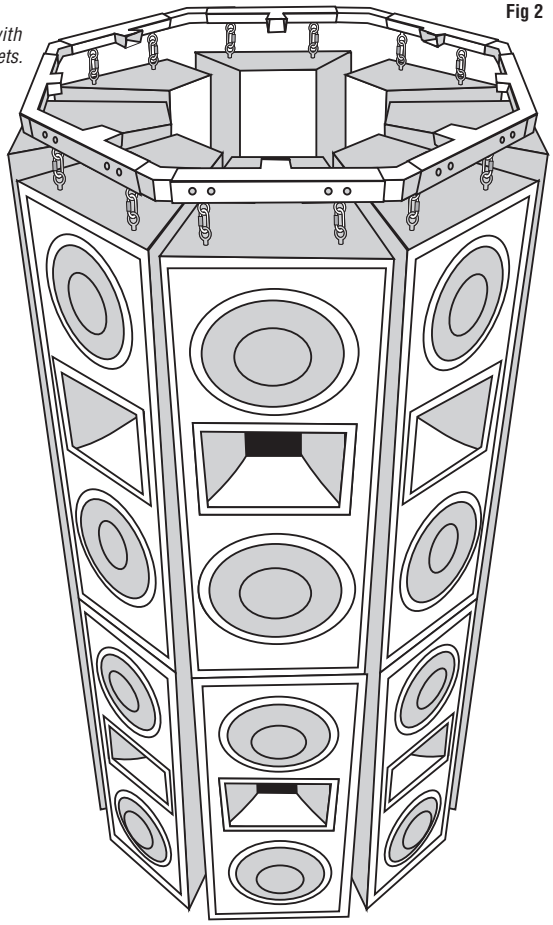
SUSPENSION / RIGGING

Fig 1



BOTTOM VIEW
360° array with TCS210 cabinets and bottom fills.

Fig 2



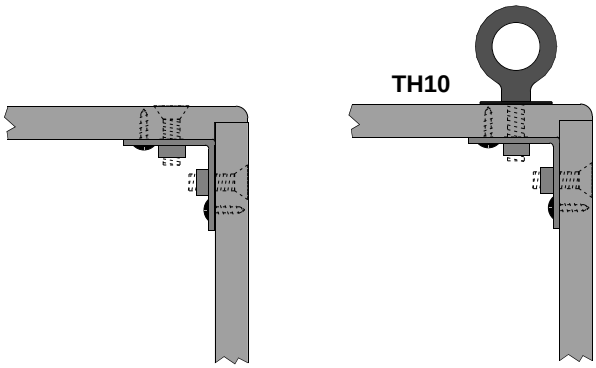
TOP VIEW
360° array with TCS210 cabinets.

SUSPENSION / RIGGING

The TCS series loudspeakers can be flown in many different arrays and configurations (above). The many possibilities are ideally suited for large venue main house systems, fill or delay systems, church installations, as well as small to large club installations. Hanging speaker arrays serve two main purposes (1) to clear up floor space and (2) to pinpoint sound locations. Speaker arrays ensure that everyone listening hears the sound at the same level.

IMPORTANT NOTE

The mounting/rigging points of the TCS loudspeakers must either be used for mounting hardware (eyebolts) or "plugged" with the hex-socket screws provided. There are two reasons for this. When suspending the loudspeaker from one end, the screws in the mounting/rigging points on the other end transfer the load through the internal steel bracing to the bottom surface of th enclosure for structural support. Also if they are not "plugged", the holes can create air leaks compromising the low frequency performance of the enclosure (below).



Cutaway view of TCS cabinet showing rigging points.

DE-RATING

Using the mounting points at an angle will de-rate the WLL (working load limit) for each point. Each point mounted at an angle should be de-rated according to the following formula. WLL=cosine(angle) x 500
angle = degrees form vertical pull
500 = WLL for each TCS mounting point @ vertical pull

DANGER

Mounting or rigging loudspeakers is a serious endeavor, always seek the advice of qualified experts. Improper installations may result in damage, injury or death.

WARNING

Never use the handles for suspending the loudspeaker, they are not designed or rated for this purpose.

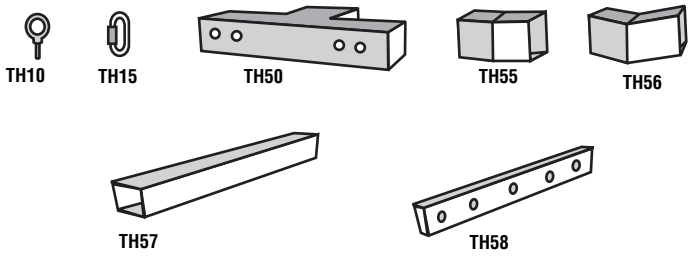
CAUTION

All hardware used for overhead suspension should be designed and used with a minimum 5:1 design factor. This is the ratio between the structural failure point and the loading to be applied to the component. Periodically inspect and maintain on all rigging points on the loudspeaker and on all suspension hardware. **DANGER: hardware found at your local hardware store should not be used as it may not be rated for this application. Carvin is not responsible for damage caused by use of improper hardware.**

SUSPENSION HARDWARE

Carvin offers suspension hardware to allow you to suspend one cabinet or as many as 255 cabinets (TCS210) in a 360° array ! Although most of us will never need this many speakers, it just demonstrates the awsome capability of the TCS series loudspeakers and rigging/suspension hardware.

The internal steel bracket used on all TCS loudspeakers is designed to accept 3/8" forged steel eyebolts (Carvin's TH10). A description of the hardware is listed below:



TH10-3/8-16 forged steel eyebolt with washer / WLL=1600 lbs.

TH15-3/8-16 forged steel quicklink connector / WLL=2000 lbs.

TH50-TCS truss bar kit / WLL=2500 lbs. includes: (1) truss bar, (1) 1/2" x 3 3/4" eyebolt, (1) 1/2" washer, (1) 1/2" hex nut, (2) 3/8" x 3 3/4" eyebolts, (2) 3/8" washers, (2) 3/8" hex nuts.

TH55-TCS truss bar connector kit 24° includes: (1) 24° truss bar connector, (2) 1/2" x 3 3/4" hex screws, (2) 1/2" washers, (2) 1/2" hex nuts.

TH56-TCS truss bar connector kit 45° includes: (1) 45° truss bar connector, (2) 1/2" x 3 3/4" hex screws, (2) 1/2" washers, (2) 1/2" hex nuts.

TH57-TCS pull back bar kit / WLL 1000 lbs. includes: (1) pull back bar, (1) 1/2" x 3 3/4" hex screw, (1) 1/2" washer, (1) 1/2" hex nut, (1) 3/8" x 3 3/4" eyebolt, (1) 3/8" washers, (1) 3/8" hex nut.

TH58-TCS mounting bar kit / WLL 400 lbs. includes: (1) mounting bar, (3) 3/8" quick links.