



### SYSTEM COMPONENTS

#### Enclosure:

18 mm 13-ply birch plywood  
Horizontally arrayable

#### Low Frequency Transducer:

12" Cone  
3" Voice coil  
95 oz. Magnet

#### High Frequency Transducer:

1.4" Exit compression driver  
3" Titanium diaphragm  
Elliptic conical horn

#### Input Connectors:

Cinch 142 screw terminal  
barrier strip

#### Grille:

14 Gauge black powder  
coated perforated steel in an  
extruded aluminum frame with  
weather seal

#### Standard Hardware:

Rigging points  
3 - Forged steel eyebolts  
4 - Machined aluminum  
speaker mounting clamps

#### Optional Hardware:

Steel yoke kit

### ACOUSTIC AND ELECTRICAL

#### System Type:

2-way vented 1.6 ft<sup>3</sup>

#### Impedance:

8 Ω

#### Crossover Network:

Passive Time-Align® equalizer  
type @ 1.9 kHz

#### Time Offset Between Drivers:

< ± 25 Microseconds

#### Frequency Response:

95 Hz to 18 kHz ±3 dB  
(4π Steradians)

#### Sensitivity:

100 dB SPL (1W @ 1m)

#### Dispersion:

55° Horizontal (-6 dB)  
40° Vertical (-6 dB)

#### Power Handling:

300 W continuous sine wave  
600 W continuous program  
1200 W instantaneous peak

### PHYSICAL

#### Finish:

Black textured lacquer

#### Dimensions:

24" h x 14" w x 16" d  
61 cm x 36 cm x 41 cm

#### Weight:

68 lbs.  
31 kg

#### Shipping Dimensions:

21" x 30" x 25"  
54 cm x 77 cm x 64 cm

#### Shipping Weight:

80 lbs.  
37 kg

## APPLICATIONS:

Stadium Sound Reinforcement

Auditorium Sound Reinforcement

Church Sound Reinforcement

Audio Visual Presentations

Nightclub Applications

**OPAL-I** The OPAL is a full range, compact, long throw loudspeaker system offering high fidelity, high efficiency and high power handling capacity. The OPAL is designed for applications where high sound pressure and highly directive long throw capability are required. The OPAL-I includes permanent rigging attachment points and three forged steel eyebolts. Units are designed to use the Bag End yoke (YOKE-1) or, for large arrays, ATM Flyware™. Constructed from 18 mm 13-ply birch plywood and finished in black textured lacquer, the OPAL-I enclosure is durable and attractive. In addition, weatherproofing options are available.

**About Time Align®** Time Align® assures that the fundamental and overtones of a complex, transient, acoustical signal are presented to the listener in the same relationship as the electrical signal at the input terminals of the loudspeaker.

The conventional loudspeaker spreads out the sound in time: when a rapid series of transients occur the results are blurring and lost detail. With Time Align®, a transient is presented as a tight package of energy, with the same time relationships as the natural sound. This means that a rapid series of transients will be heard clearly.

True Time Alignment™ requires much more than just physically lining up the loudspeaker components. It requires consideration of the driver placement, driver delay and adjustment of the crossover delay parameters. This achieves the precise simultaneous acoustical arrival time of each driver throughout the crossover region.

Along with state-of-the-art laboratory instruments, the proprietary Time Align® generator, built by Ron Wickersham, is used in designing our loudspeaker systems. The Time Align® generator is founded upon different underlying mathematical principles than are used in the more common Fourier based measurement equipment.

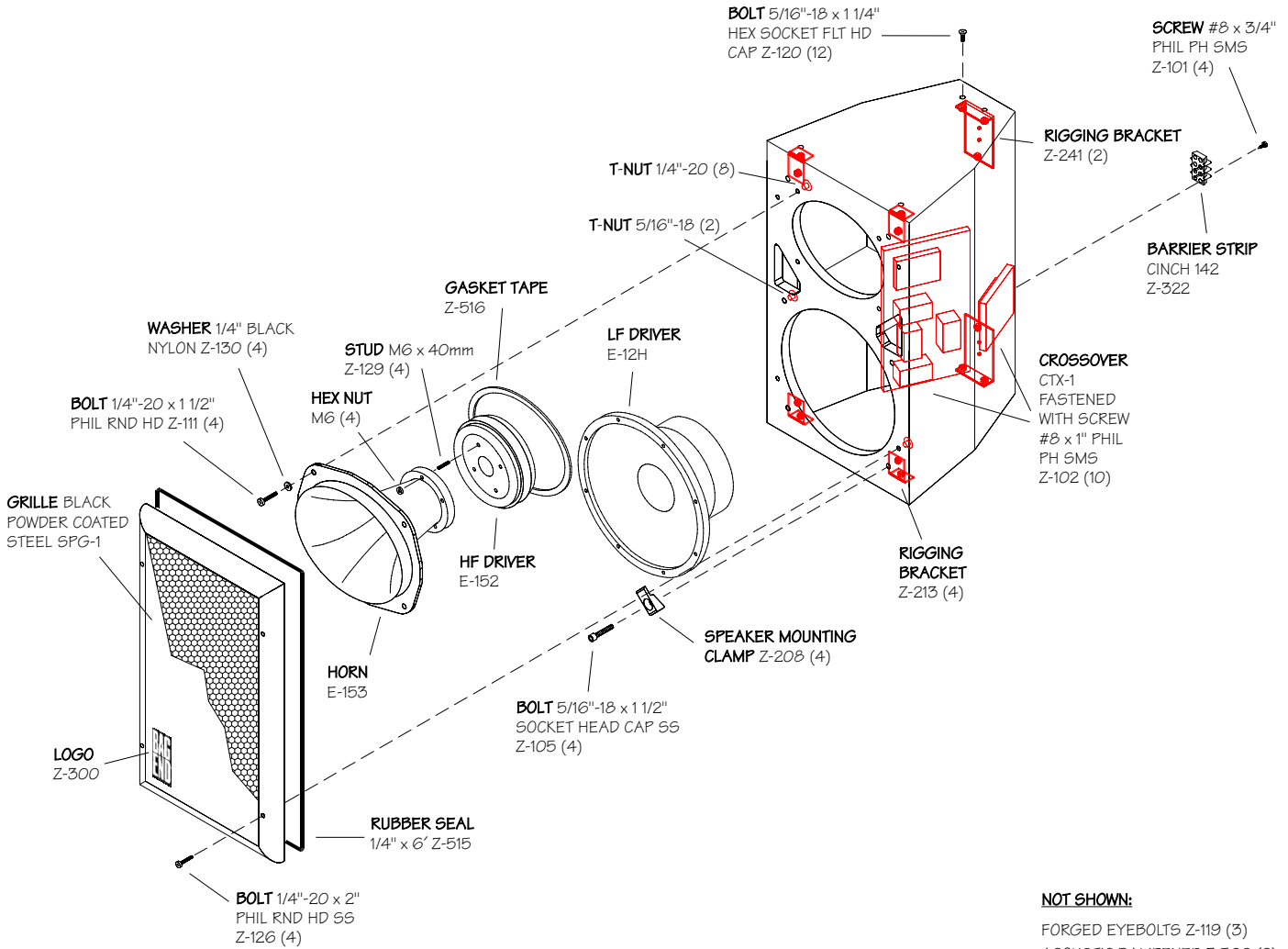
When comparing a genuine BAG END Time Aligned™ speaker system to any other, our additional design work is easy to hear and appreciate. The dramatic clarity, realism, and overall pleasant sound of our Time Aligned™ loudspeakers is noted throughout the world.

BAG END Loudspeakers  
22272 Pepper Road  
Barrington, Illinois  
60010 USA  
Voice 847 382 4550  
Fax 847 382 4551  
www.bagend.com



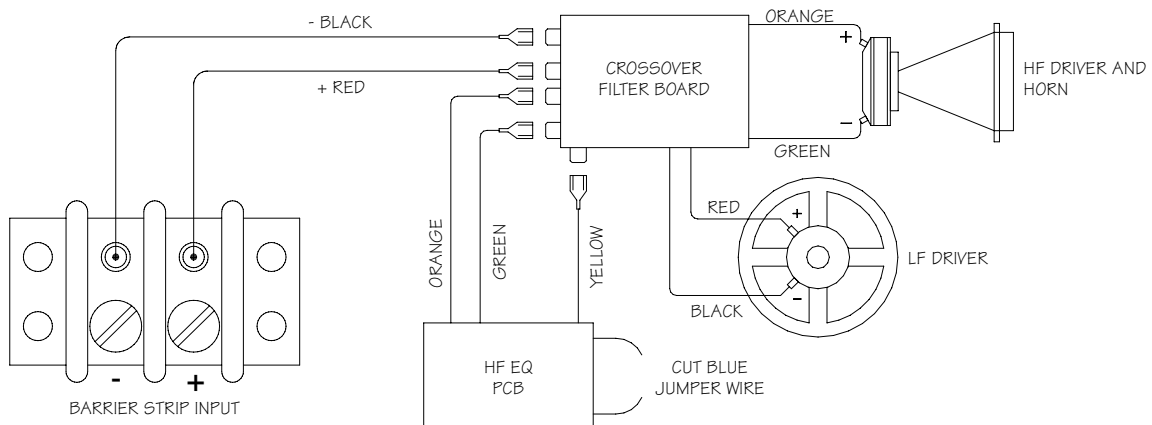


# OPAL-I



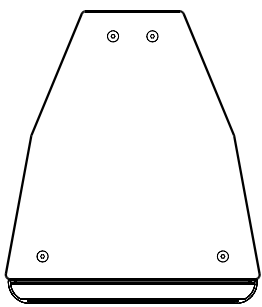
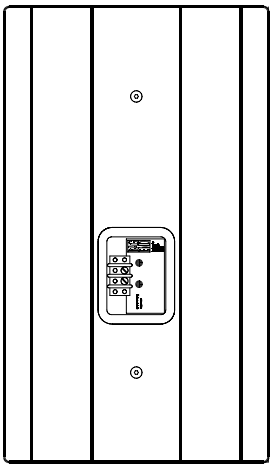
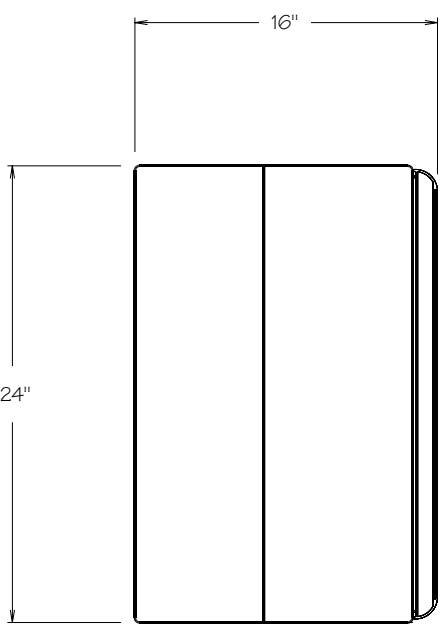
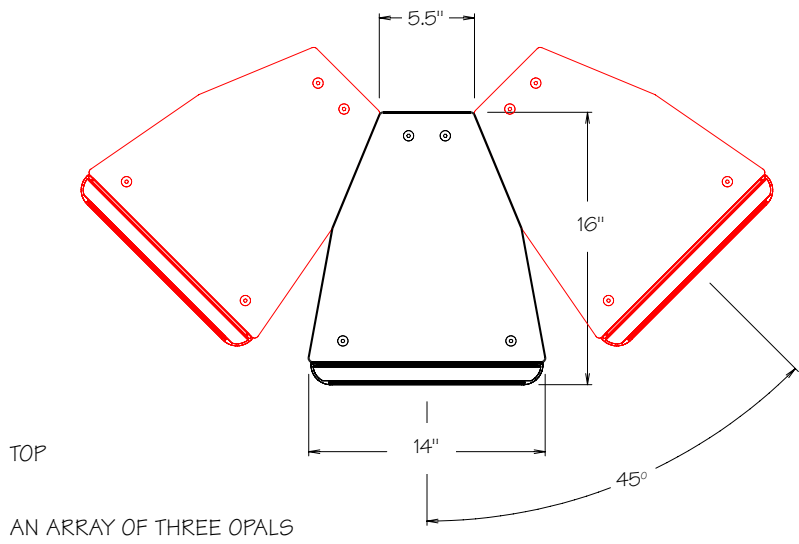
- NOT SHOWN:**
- FORGED EYEBOLTS Z-119 (3)
  - ACOUSTIC DAMPENERS Z-500 (2)
  - PACKING FOAM SET Z-576 (1)
  - SHIPPING CARTON Z-608 (1)
  - PLASTIC BAG Z-627 (1)

## SYSTEM SCHEMATIC



# ARCHITECTURAL SPECIFICATIONS

The loudspeaker shall be a 2-way vented type system with one low frequency driver and one high frequency compression driver with horn. The low frequency driver shall be 300 mm (12") with a 2.7 kg (95 oz.) magnet and a rear vented back plate assembly. A 76 mm (3") copper voice coil wound on Kapton former shall be coupled to a 70F cone. The high frequency driver shall have a titanium diaphragm coupled to a 76 mm (3") copper voice coil driving a fiberglass elliptic conical horn. System dispersion of a single unit shall be 55° horizontally by 40° vertically at the -6dB points. Units shall array for wider horizontal dispersion. The frequency response shall be 95 Hz to 18 kHz ±3 dB. The system shall be Time-Aligned™ by E. M. Long Associates with a time offset at crossover of <±25 microseconds. The system shall have an average sensitivity of 100 dB SPL with 1 Watt input at 1 meter. The system shall have a minimum power handling of 600 Watts continuous program long term. The enclosure shall be made of 18 mm (3/4") thick 13-ply birch plywood with glued rabbet joints and internal bracing. The enclosure shall be internally dampened with 125 gram/inch<sup>2</sup> cotton acoustic treatment. The enclosure shall have rigging attachment points. The protective grille shall be powder coated 14 gauge perforated steel with a welded aluminum frame. The input connector plate shall be recessed in the back of the enclosure and shall include one Cinch 142 screw terminal barrier strip. Overall dimensions shall not exceed 61 cm (24") h x 36 cm (14") w x 41 cm (16") d. The unit shall weigh no more than 31 kg (68 pounds). The unit shall be completely painted with durable black textured lacquer.



# OPAL POLAR RESPONSE

## Instrumentation:

DSP: Techron TEF 20

Microphone: Brüel & Kjær 4007

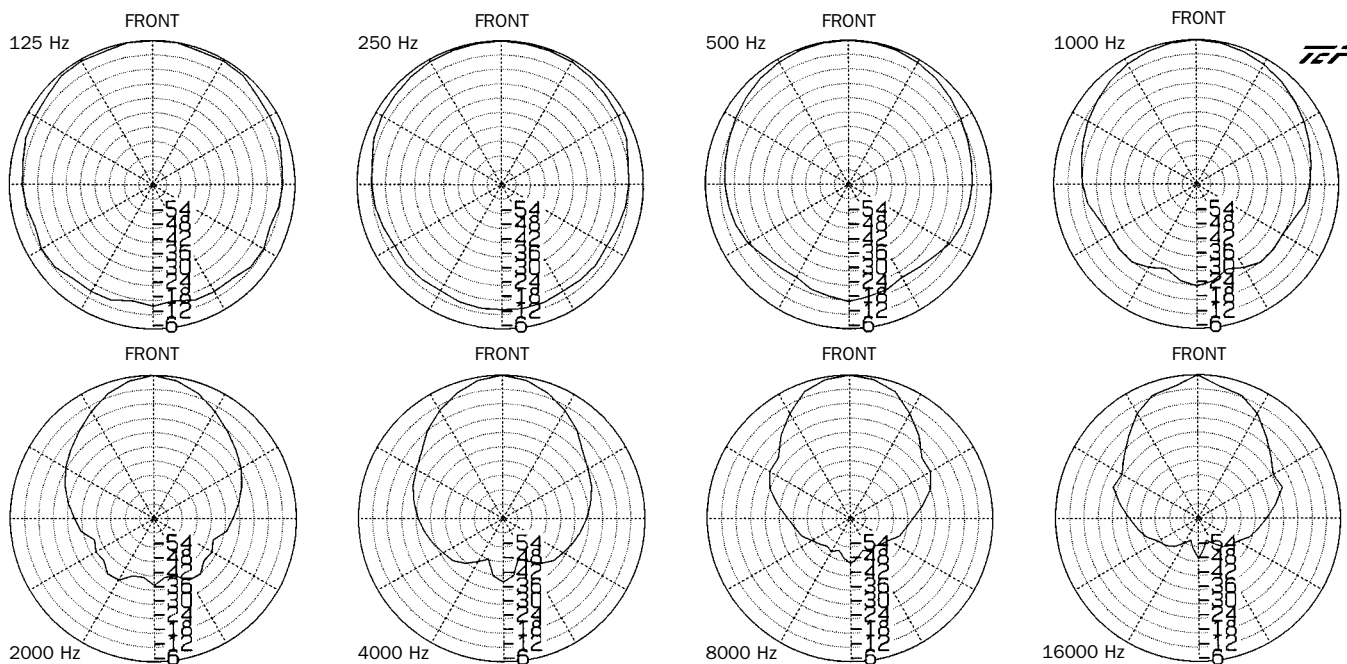
Power amplifier: Crown Macro Reference

AC voltmeter: Hewlett Packard 400E

Software: Sound Lab TDS ver. 2.1b, Sound Lab Polar ver. 2.1c, Sound Lab SLX ver. 2.1

Polar measurements taken at 3 meters from baffle, Top of scale normalized to zero degree axis, Scale step 6 dB

## Horizontal



## Vertical

