

# An example of the use of Performance History Database (PHD) software

## Loudspeaker analysis of New Orleans Civic Cultural Association (NOCCA) Dance Theatre

|  |                     |
|--|---------------------|
| Reference Distance:                    | 1 meter             |
| Frequency Band Centered at:            | 2000Hz              |
| Narrowest Major Dimension:             | 11 meters           |
| Interior Volume:                       | 2,231 cubic meters  |
| Interior Surface Area:                 | 1,129 square meters |
| Sabine Average Absorption Coefficient: | 0.172               |
| Reverberation Time:                    | 1.7 seconds         |
| English Sabins:                        | 2,100               |
| Metric Sabins:                         | 194                 |

### Seating Area (Only One)

|  |             |
|--|-------------|
| Number of Points per side = "PTS":               | 5           |
| Contour Interval = "CI":                         | 3 dB        |
| Contour Point Interval = "CPI":                  | 10 degrees  |
| Azimuth = "AZ":                                  | 0 degrees   |
| Right Front = "RF":                              | 1.52 meters |
| Left Front = "LF":                               | 1.52 meters |
| Depth, right front to rear corners = "RD":       | 13.4 meters |
| Depth, left front to rear corners = "LD":        | 13.4 meters |
| Azimuth Line to Right Front corner = "RFC":      | 8.2 meters  |
| Azimuth Line to Right Rear Corner = "RRC":       | 9.4 meters  |
| Azimuth Line to Left Front Corner = "LFC":       | -8.2 meters |
| Azimuth Line to Left Rear Corner = "LRC":        | 9.4 meters  |
| Ear Height = "EH":                               | 1.22 meters |
| Cluster Elevation to Right-Front Corner = "RFE": | -8.8 meters |
| Cluster Elevation to Right-Rear Corner = "RRE":  | -7.3 meters |

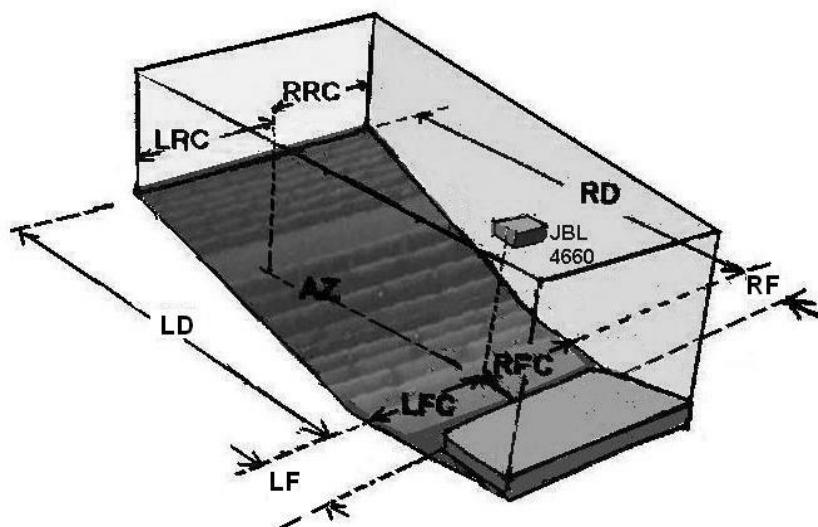
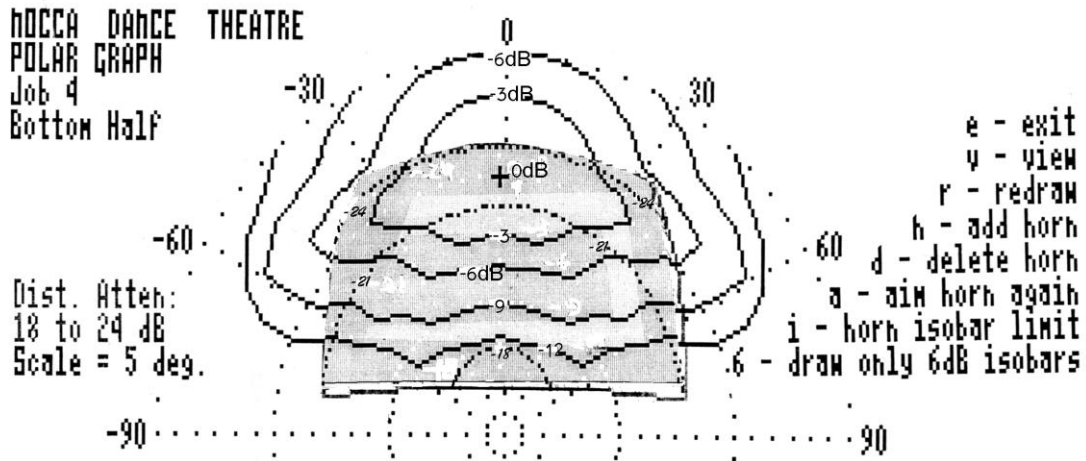
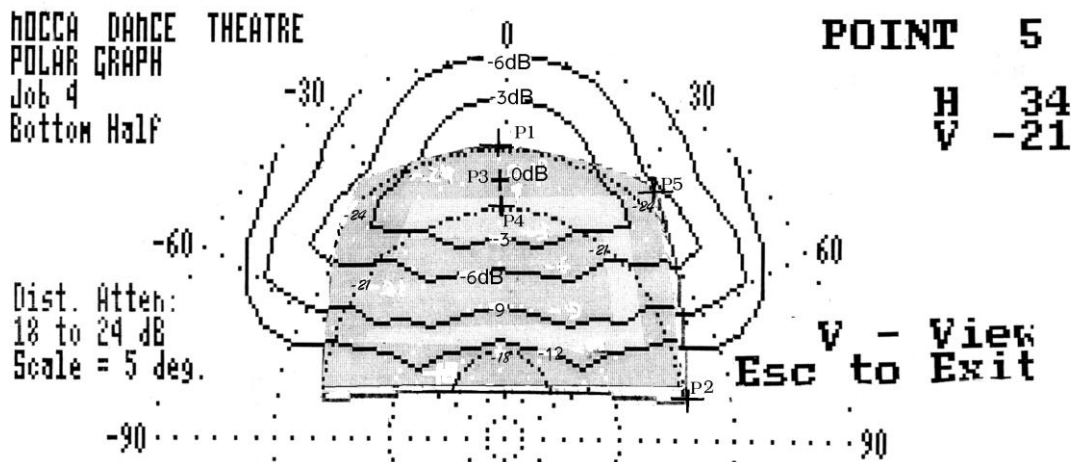


Figure 1 NOCCA Model in the PHD System



**Figure 2 NOCCA PHD system “G” printout.** 0 dB is loudspeaker axis projected on seating area, and strength contours to -12 dB are also shown, along with distance contours. Loudspeaker system, here JBL 4660 skewed coverage at 2000 Hz octave band, may be aimed using up, down, left, and right computer keys.



**Figure 3 NOCCA PHD system point 5 printout.** Any number of locations can be analyzed for direct and reverberant sound. The “H” horizontal angle and the “V” vertical angle are the angles from the azimuth line, 0° in this system, to the analyzed seat for point 5 analysis

### POWER ANALYSIS

JBL 4660 loudspeaker, horizontal aim 0 deg., vertical -30 deg.

For speech levels of 75 dB re  $10^{-5}$  Pa, 39.8 watts required, direct sound energy only, or 18.7 watts using the Eugene T. Patronis, Jr. method for direct and reverberant energy.

Loudspeaker capable of 111 dB level at maximum rated input power,

## PERFORMANCE (INTELLIGIBILITY & COVERAGE) ANALYSIS

|                      | point    | point     | point      | point       | point      |
|----------------------|----------|-----------|------------|-------------|------------|
| distance contour, dB |          | -         | -          | -           | -          |
| V and H angles. Deg. | /        | /         | /          | /           | /          |
| Distance fr talker   | 2.4m     | 10m       | 15m        | 11.5m       | 16.5m      |
| Horn Atten. Contour  | -8.0dB   | -8.0dB    | -2.0dB     | 0.0dB       | -2.0dB     |
| Max direct/Patronis  | 99/103dB | 95.7/99dB | 98.7/102dB | 103.7/107dB | 97.7/101dB |
| Deviation from goal  | /        | /         | /          | /           | 7.3/4.0    |
| "ALCONS"             |          | /         |            |             |            |
| "RASTI"              |          |           |            |             |            |
| "PAG"                |          |           |            |             | dB         |
| "NAG"                |          |           |            |             | dB         |

If you power the system considering **only** direct sound, then:

The lowest direct sound is 99 dB  
 The highest direct sound is 107 dB  
 ALCONS -  
 RASTI -

If you power the system using the Patronis method, then:

The lowest direct sound is 95.7 dB  
 The highest direct sound is 103.7 dB  
 ALCONS -  
 RASTI -

In conclusion, we may regard the intelligibility performance of this system as good enough, not perfect, but satisfactory for a multi-use space, a dance theatre, without adjustable acoustics. The JBL 4660 loudspeaker system is an attempt to provide uniform coverage and intelligibility in rectangular rooms with good acoustics in an unobtrusive and economical package, with a vertically-skewed coverage high frequency horn and driver and a 300mm. low-frequency cone loudspeaker. Figure 10.24 shows an application at the Spring Hill United Methodist Church, Mobile, AL. The unit is still available on special order from JBL.