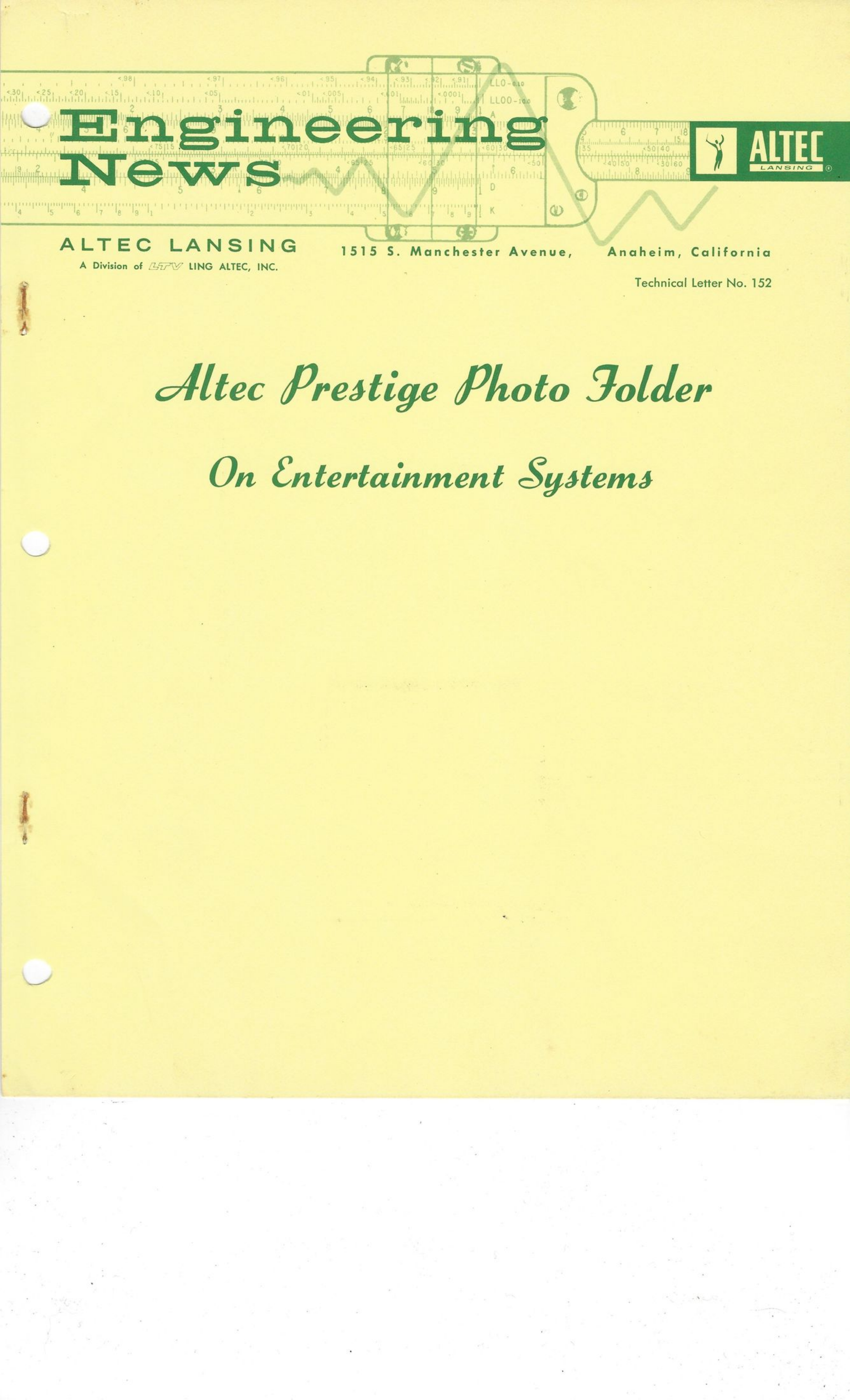




Engineering News



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1515 S. Manchester Avenue,

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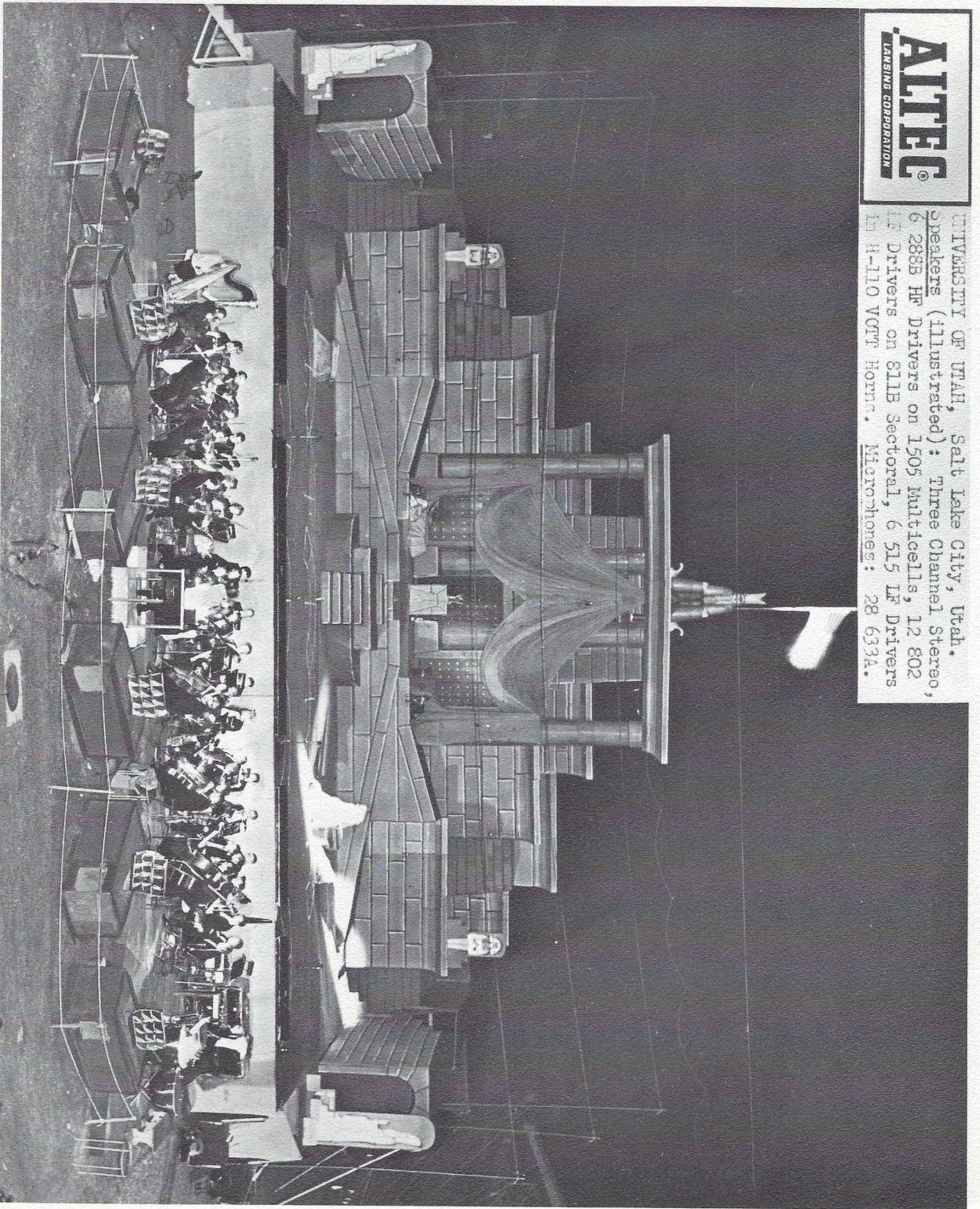
Technical Letter No. 152

Altec Prestige Photo Folder

On Entertainment Systems

ALTEC
LANSING CORPORATION

UNIVERSITY OF UTAH, Salt Lake City, Utah.
Speakers (Illustrated): Three Channel Stereo,
6 288B HF Drivers on 1505 Multicells, 12 802
LF Drivers on 811B Sectoral, 6 515 LF Drivers
in H-110 VOTF Horns. Microphones: 28 633A.





MERLE'S DISCOTHEQUE, PORTLAND, OREGON. System cost: \$4000.00. Speakers: 1 - A7 "Voice Of The Theatre" speaker system, 1 - 210 low frequency horn with 2 - 515B low frequency speakers, 1 - 805B multicellular horn with 1 - 288C high frequency driver. Amplifiers: 1 - 360B PLAYBACK stereo pre-power amplifier, 1 - 436C compressor amplifier, 1 - 438C compressor amplifier, 5 - 14799A mixer control assemblies with 1578A preamplifiers and 1579A phono amplifiers, 1 - 14800A booster/master control amplifier, 1 - 1581A line/tone amplifier, 1 - 1576A power supply. Microphones: 2 - 685A cardioid microphones.



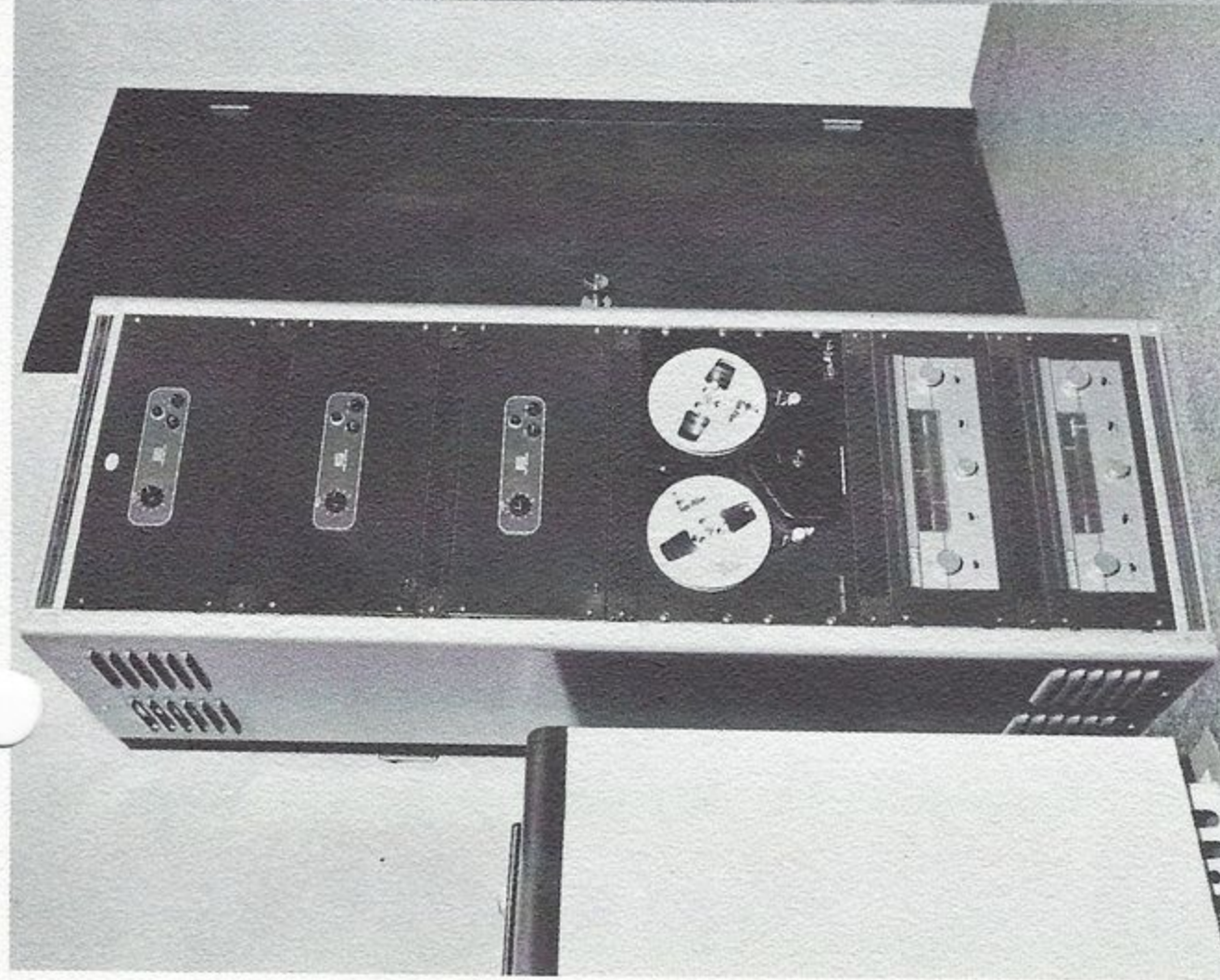
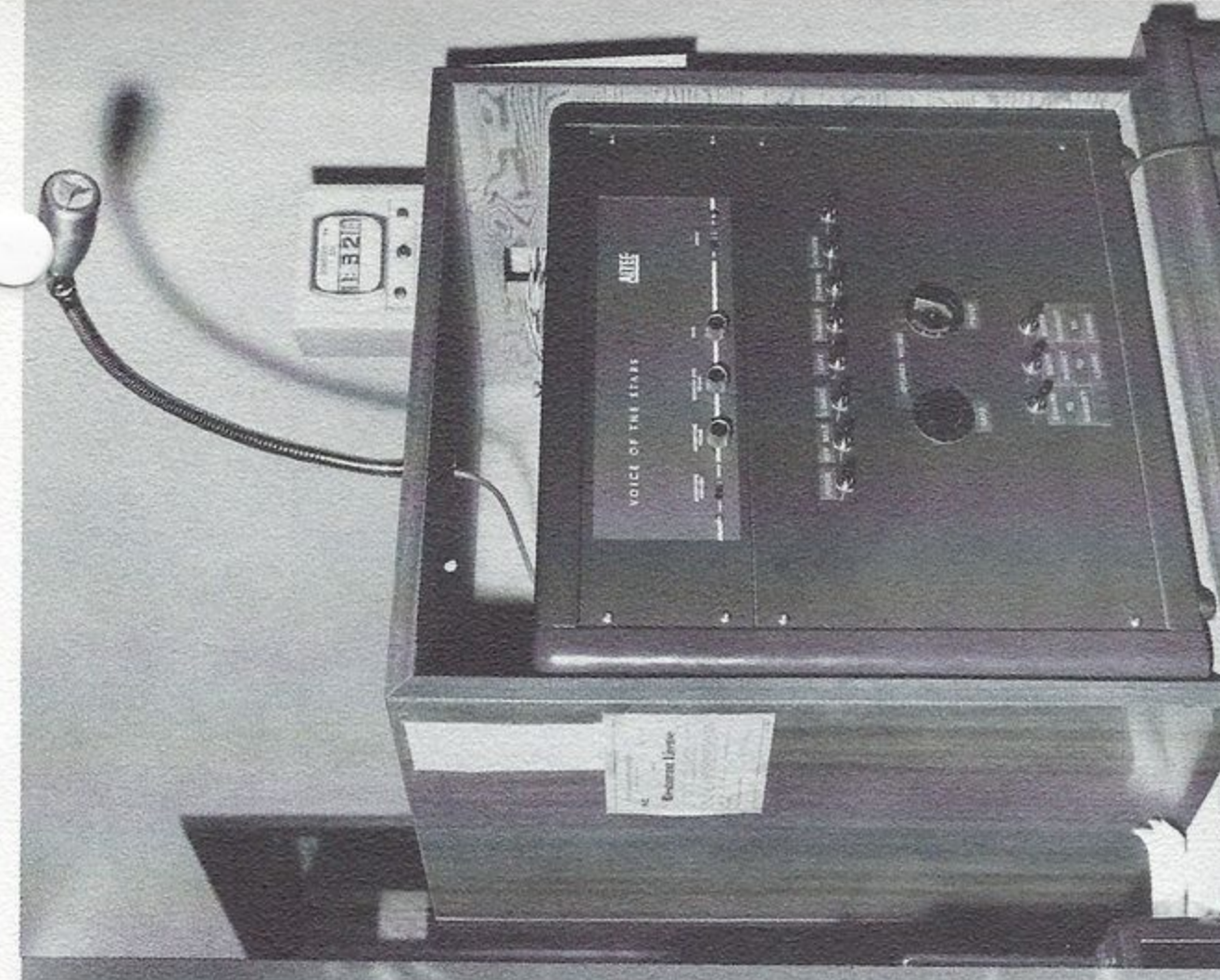
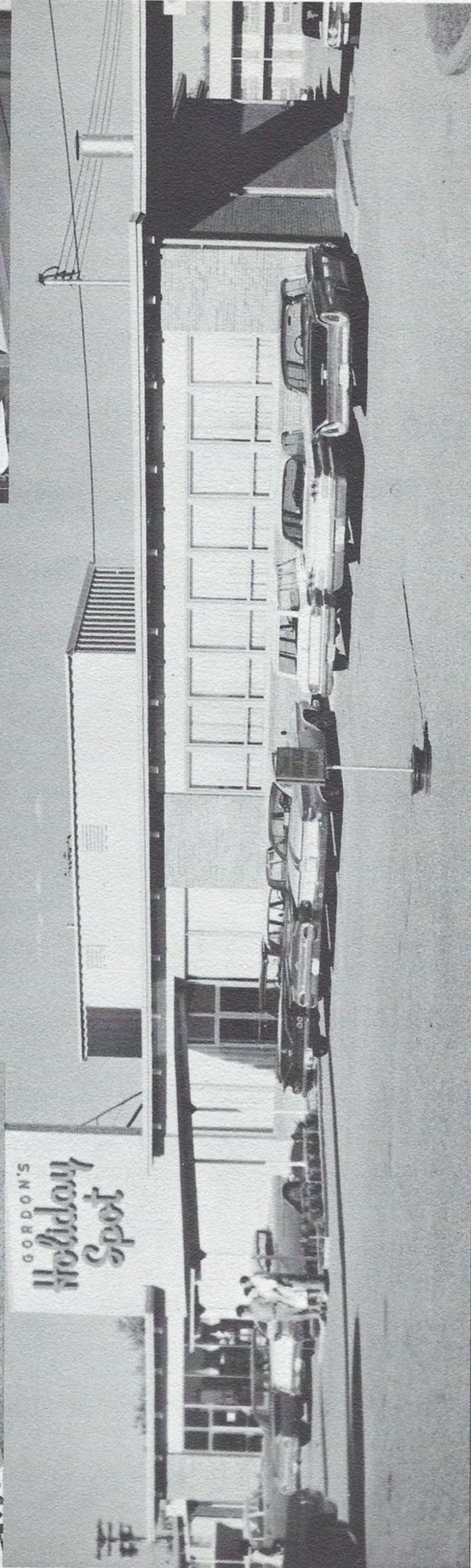
ALTEC
LANSING



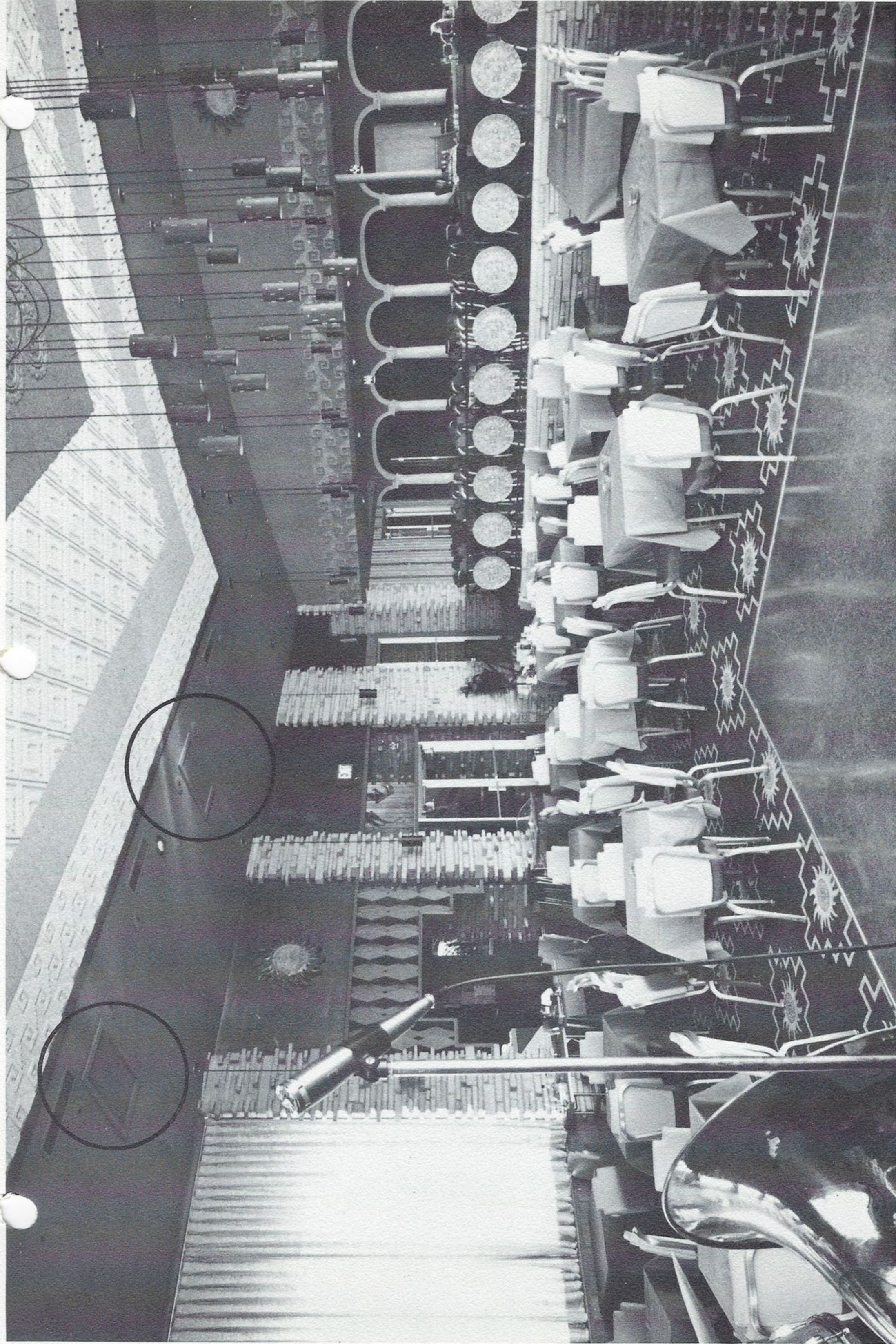
MERLE'S DISCOTHEQUE, PORTLAND, OREGON. System cost: \$4000.00. Speakers: 1 - A7 "Voice Of The Theatre" speaker system, 1 - 210 low frequency horn with 2 - 515B low frequency speakers, 1 - 805B multicellular horn with 1 - 288C high frequency driver. Amplifiers: 1 - 360B PLAYBACK stereo pre-power amplifier, 1 - 436C compressor amplifier, 1 - 438C compressor amplifier, 5 - 14799A mixer control assemblies with 1578A preamplifiers and 1579A phono amplifiers, 1 - 14800A booster/master control amplifier, 1 - 1581A line/line amplifier, 1 - 1576A power supply. Microphones: 2 - 685A cardioid microphones.



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GORDON'S 'HOLIDAY SPOT' MOTEL; Minot, North Dakota: Equipment Used: 1-1568, 2-1569A Amplifiers; 2-309A tuners (Mounted in rack, upper left, with background music reproducer); 1-356A, 1-661C (Paging system for coffee shop, upper right); 1-342B, 2-683A (Dining Room); 126 403A Loudspeakers (1 in each room to reproduce three program channels plus additional music and paging reproducers in public areas.)



DESERT INN - AZTEC ROOM; Columbus, Ohio:

Microphones: 3 683A (On band platform)

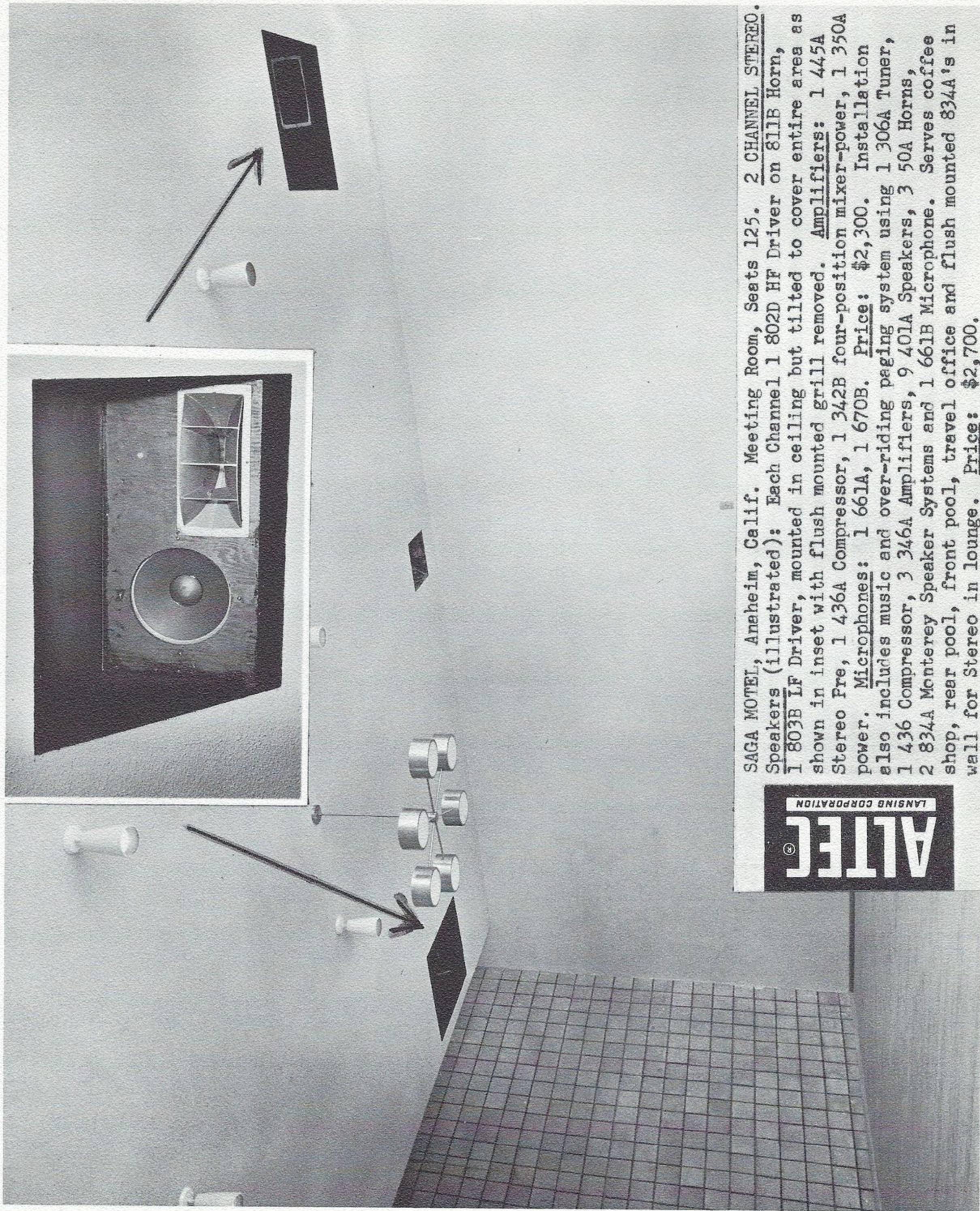
Amplifiers: 1 342B (In cabinet at side of platform; provides both background and live music feed)

Speakers: 6 412B (Mounted in custom bass reflex housings in ceiling -- encircled in photograph)

4 403A (Mounted in Lowell housings at rear of room to cover bar area and entranceways)

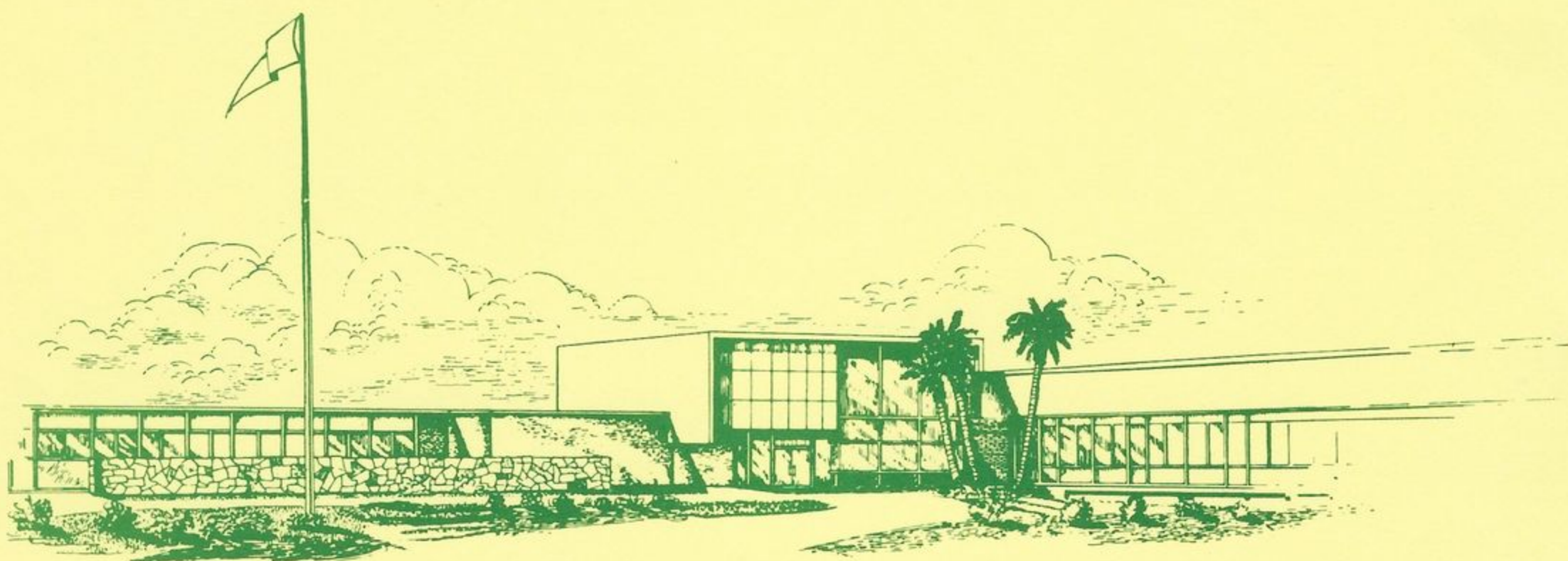


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SAGA MOTEL, Anaheim, Calif. Meeting Room, Seats 125. 2 CHANNEL STEREO. Speakers (illustrated): Each Channel 1 802D HF Driver on 811B Horn, 1 803B LF Driver, mounted in ceiling but tilted to cover entire area as shown in inset with flush mounted grill removed. Amplifiers: 1 445A Stereo Pre, 1 436A Compressor, 1 342B four-position mixer-power, 1 350A power. Microphones: 1 661A, 1 670B. Price: \$2,300. Installation also includes music and over-riding paging system using 1 306A Tuner, 1 436 Compressor, 3 346A Amplifiers, 9 401A Speakers, 3 50A Horns, 2 834A Monterey Speaker Systems and 1 661B Microphone. Serves coffee shop, rear pool, front pool, travel office and flush mounted 834A's in wall for Stereo in lounge. Price: \$2,700.

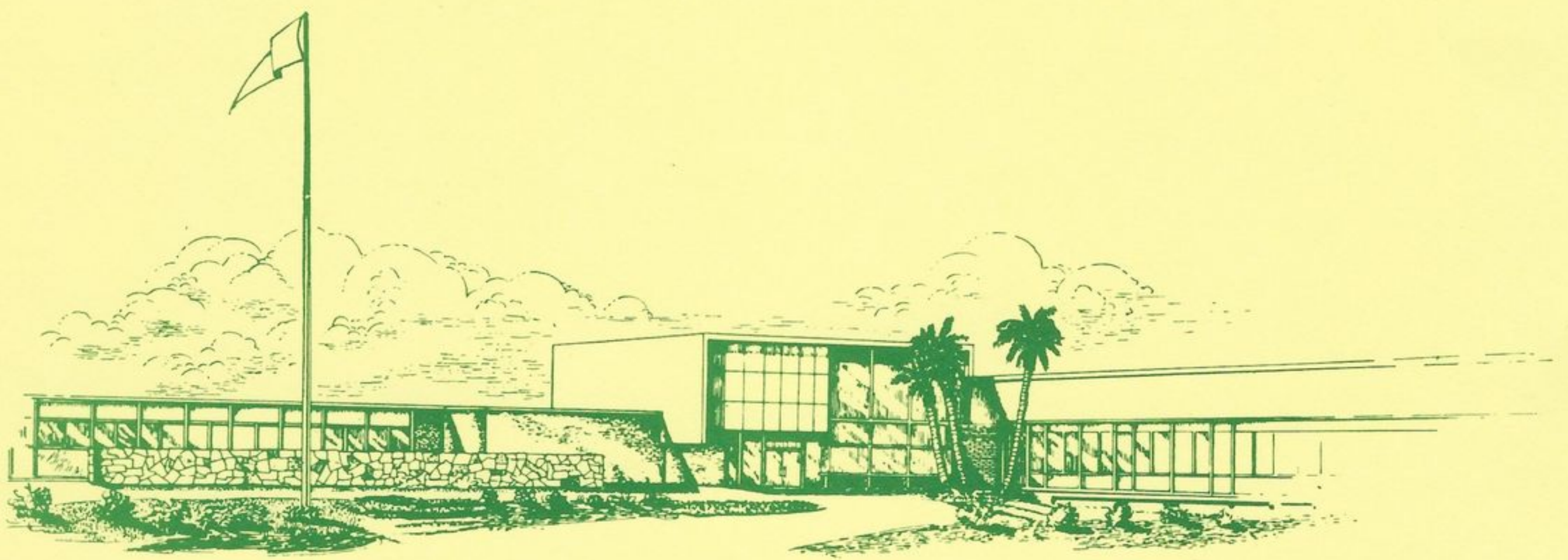




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Technical Letter No. 151

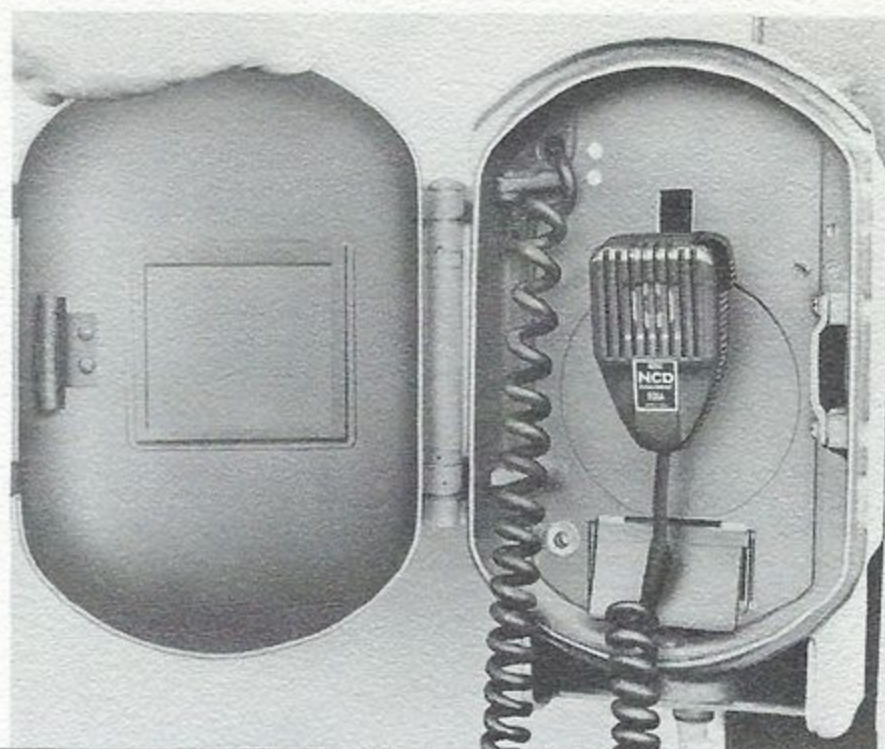
Altec Prestige Photo Folder

On Mass Communication Systems



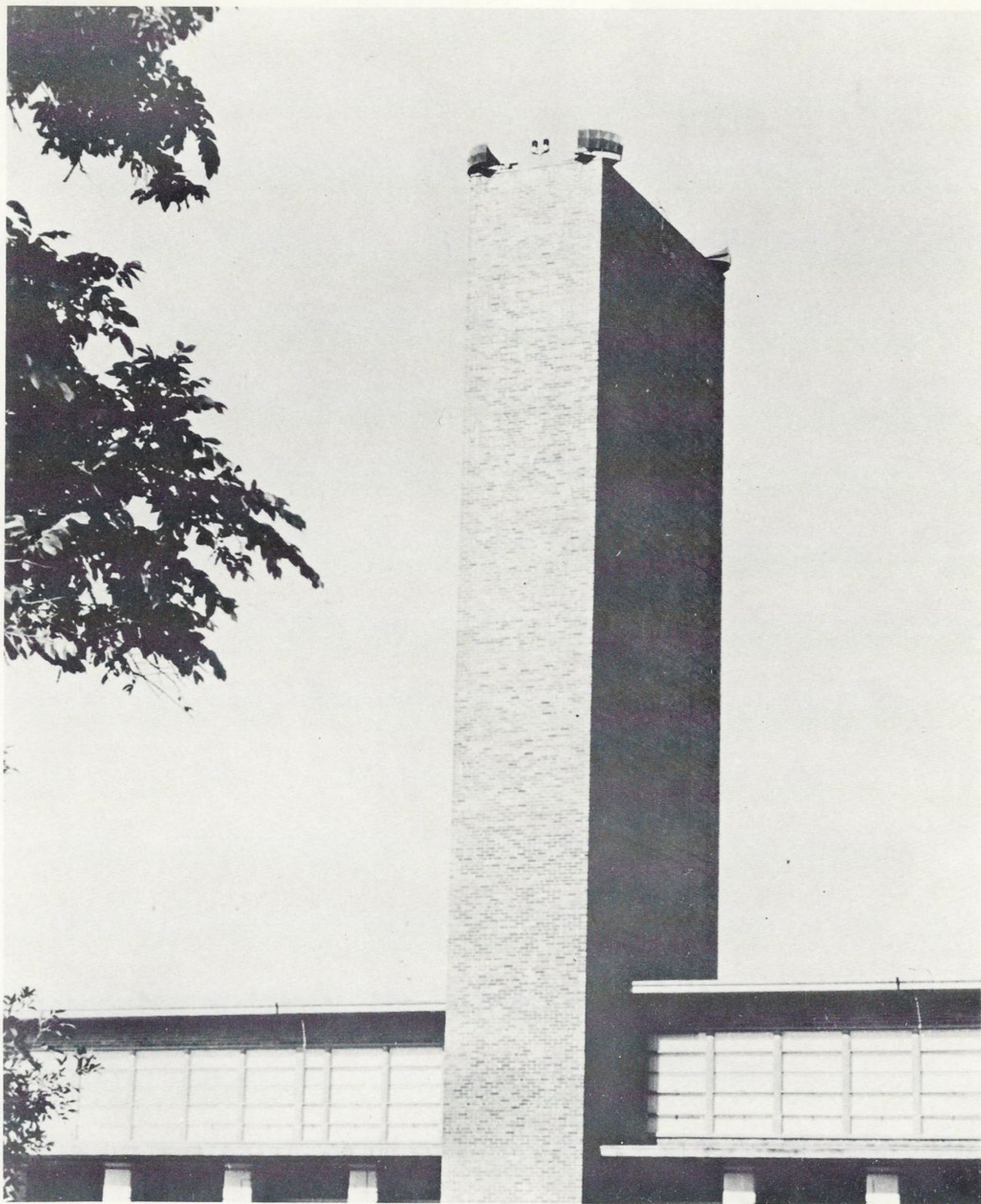
**ALTEC
696A
NCD
MICROPHONE**

IN USE AT
DELTA AIRLINES
AMERICAN AIRLINES



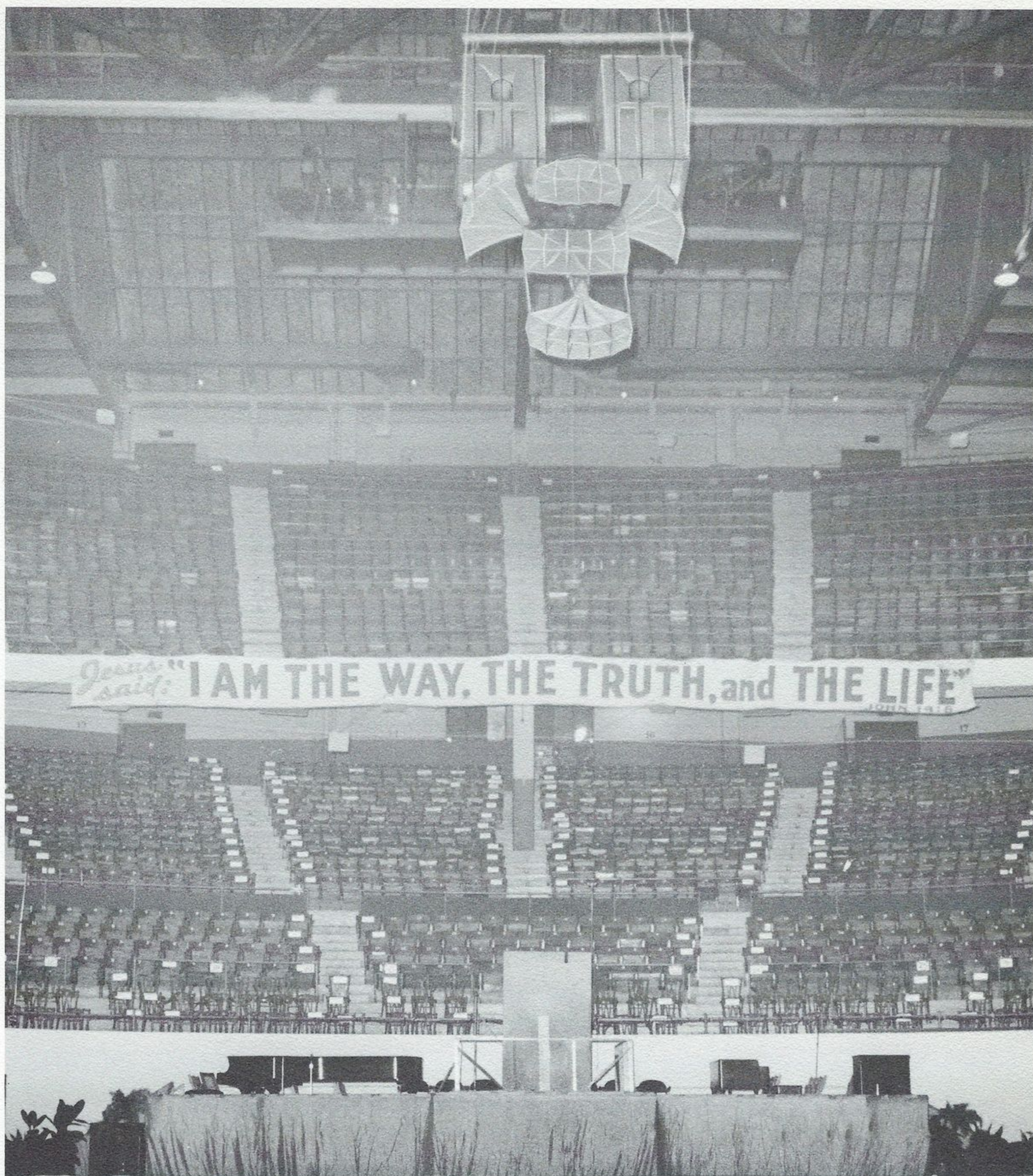
ALTEC[®]
LANSING CORPORATION

LITTLE ROCK AIRPORT, LITTLE ROCK, ARKANSAS. Speakers: 49 - 409B Loudspeakers. Amplifiers: 2 - 1570B Amplifiers, 2 - 438C Compressor Amplifiers, 1 - 7740B "SEQR" Panel. Microphones: 11 696A NCD (Noise Cancelling Dynamic) Microphones.



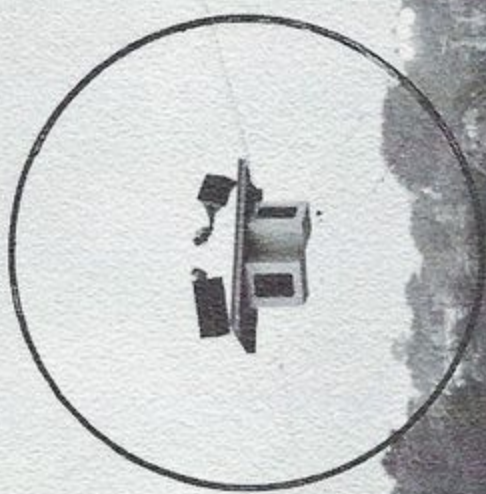
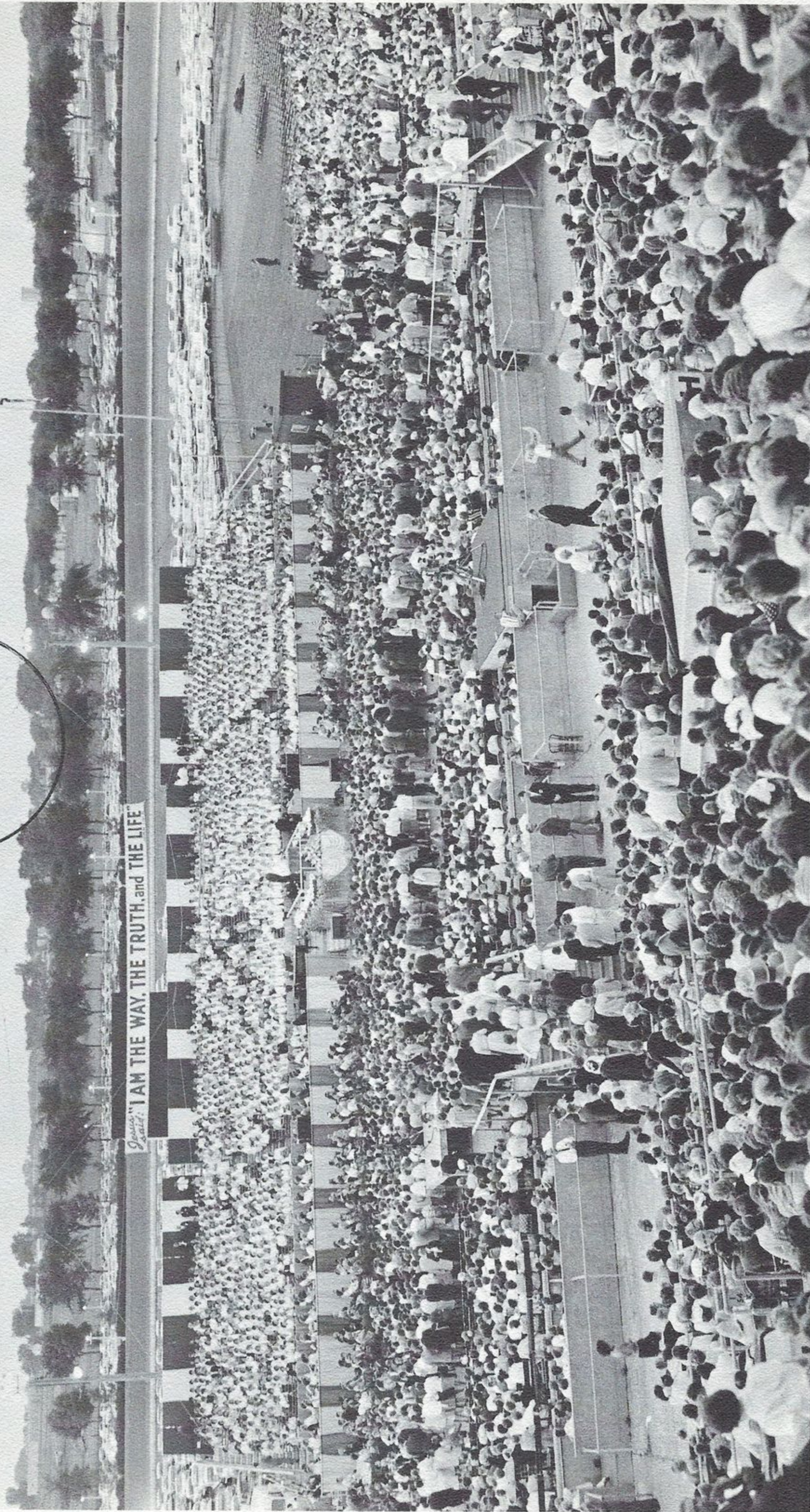
ALTEC
LANSING CORPORATION

CIVIL DEFENSE AIR RAID AND DISASTER WARNING SYSTEM, Salina, Kansas. Covers 10 sq. miles. Speakers: on City Hall Tower 16 290C H. F. Drivers on 4 1504B Multicells. At 11 auxiliary locations (Senior High School illustrated) total of 76 730A Drivers on 38 1003B Multicells. Amplifiers: 1 342B drives Power amplifiers at all locations through telephone lines, 4 260A and 16 1570B. Microphones: 661's in offices of Civil Defense Director, Police Chief and Fire Chief.



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BILLY GRAHAM CRUSADE, BOSTON GARDEN, Boston, Massachusetts. Speakers: 2 - 825 cabinets, each with 1 - 515B speaker, 15 - 803B multicellular horns, 4 - 1003B multicellular horns, 19 - 288C drivers, 55 - 409A loudspeakers in special housings. Amplifiers and Accessories: 3 - 1567A, 4 - 1570B, 1 - 1569A, 55 - 15065, 1 - 15067, 1 - N500C. Microphones: 3 - 689A Cardioid Microphones.



MINNESOTA STATE FAIRGROUNDS, Minneapolis, Minnesota: (Special Installation for Billy Graham Crusade):
Equipment Used: 2-1003B Multicellular Horns; 4-290C Drivers; 2-515B Low-Frequency Loudspeakers; 2-612A
Bass Reflex Cabinets. The Altec system effectively covered an audience of more than 40,000 people.



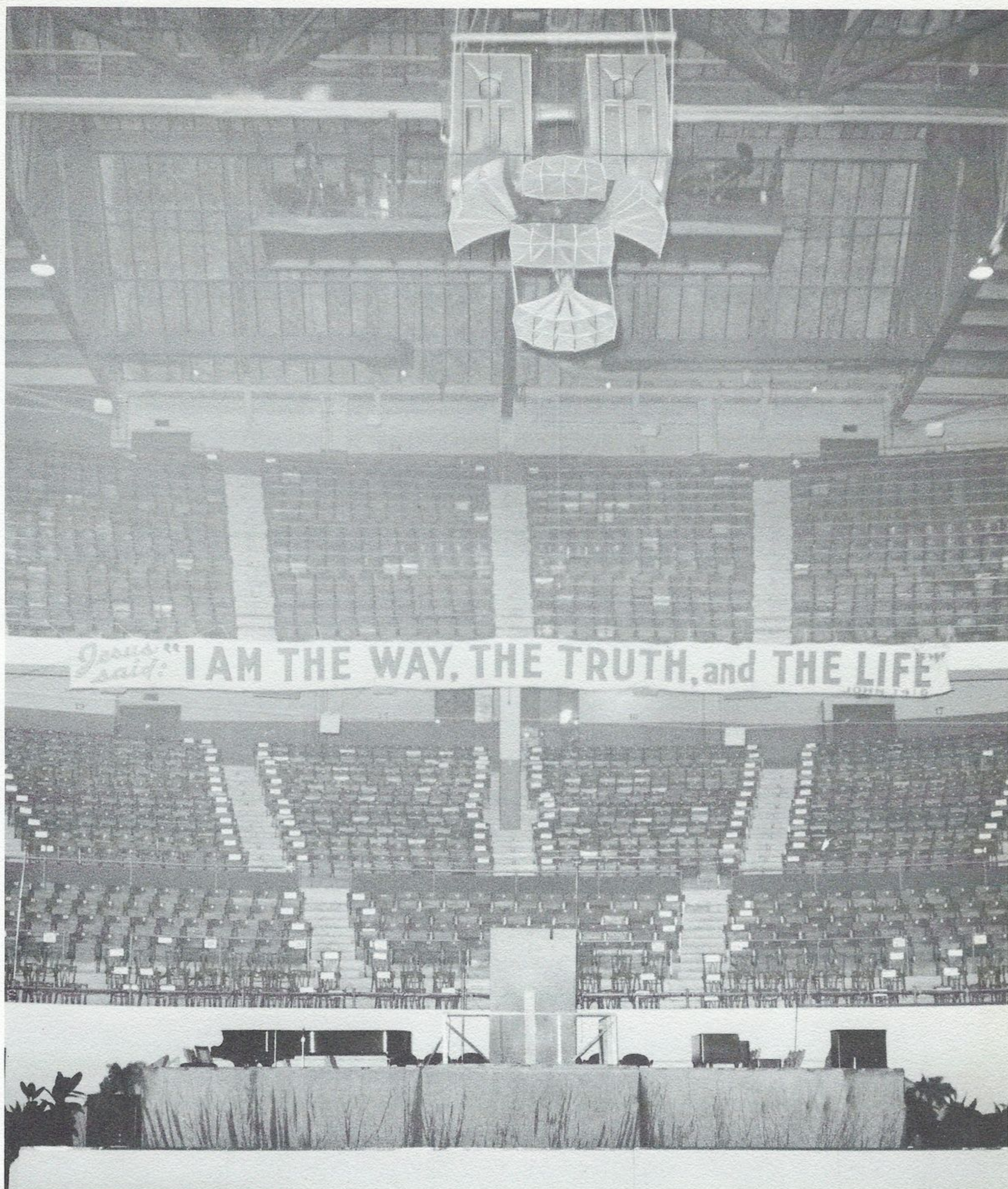
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AIRBORNE PRESS CONFERENCE ABOARD A LOCKHEED C-130 TURBO-PROP TRANSPORT 10,000 FEET OVER NEW YORK CITY. Speakers: 2 - 511A horns with 730B drivers. Amplifiers: 1 - 1567A, 2 - 1569A, 1 - 7740B "SEQR".
Microphones: 3 - 696A.



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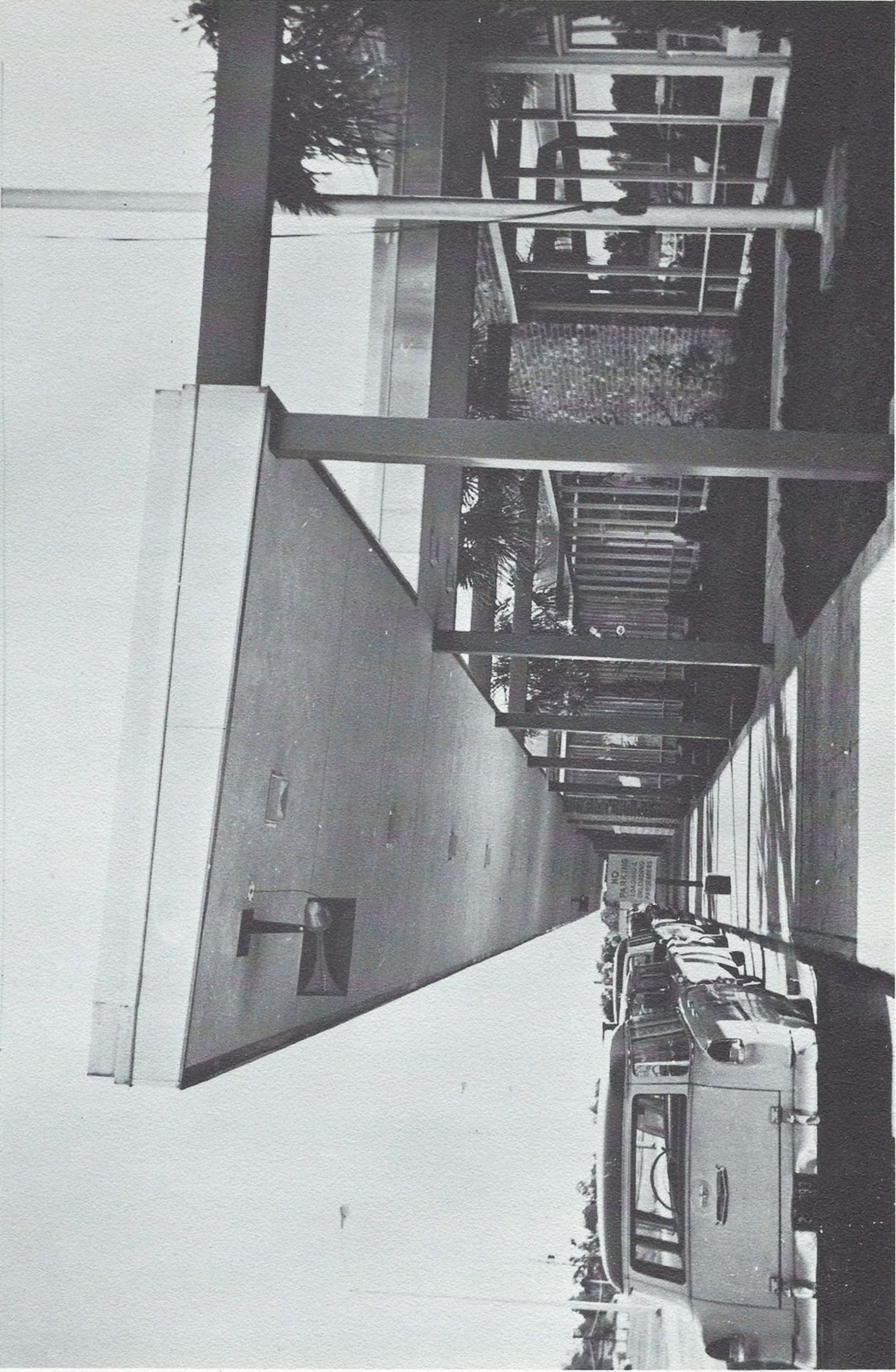
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BILLY GRAHAM CRUSADE, BOSTON GARDEN, Boston, Massachusetts. Speakers: 2 - 825 cabinets, each with 1 - 515B speaker, 15 - 803B multicellular horns, 4 - 1003B multicellular horns, 19 - 288C drivers, 55 - 409A loudspeakers in special housings. Amplifiers and Accessories: 3 - 1567A, 4 - 1570B, 1 - 1569A, 55 - 15065, 1 - 15067, 1 - N500C. Microphones: 3 - 689A Cardioid Microphones.



TRAVIS FIELD AIR PORT, Savannah, Ga.

Price \$6,000.
Loudspeakers (illustrated): Outside 9 730A Drivers on 511A Horns. Inside 27 401A, 1 1553A Monitor. Amplifiers: 2 1566A Pre, 1 436A Compressor, 2 1569A connected parallel with 15067 coil to provide maximum "Fail-Safe" security. Contractor reports "Delta personnel claim it to be finest system in any of their terminals".





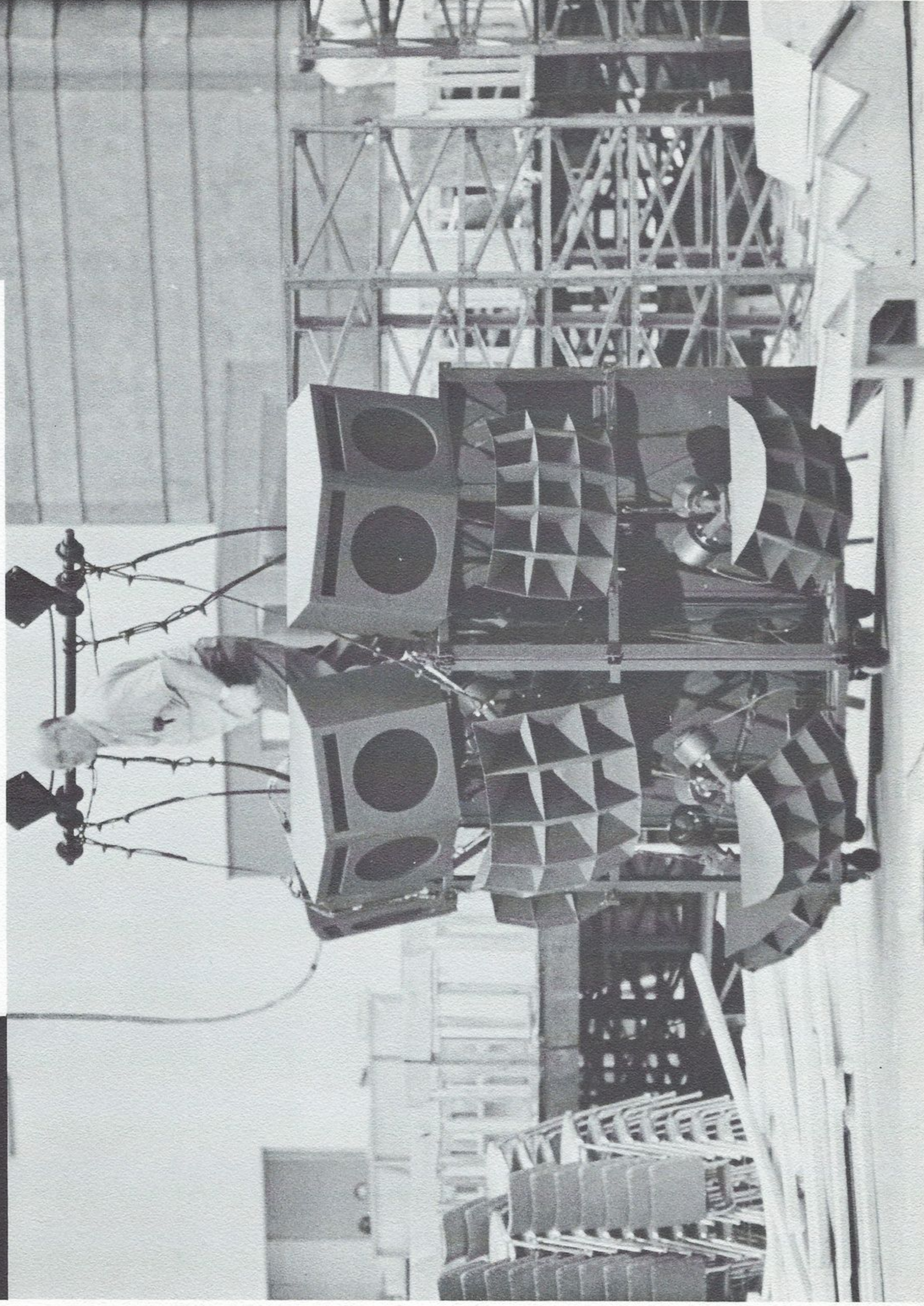
NEWARK (N.J.) AIRPORT
 Paging and Background Music.
 Speakers: 181 755A on 40' centers in ceiling
 of waiting room and on 20' centers through-
 out arcades (ramps). Microphones: 632A.

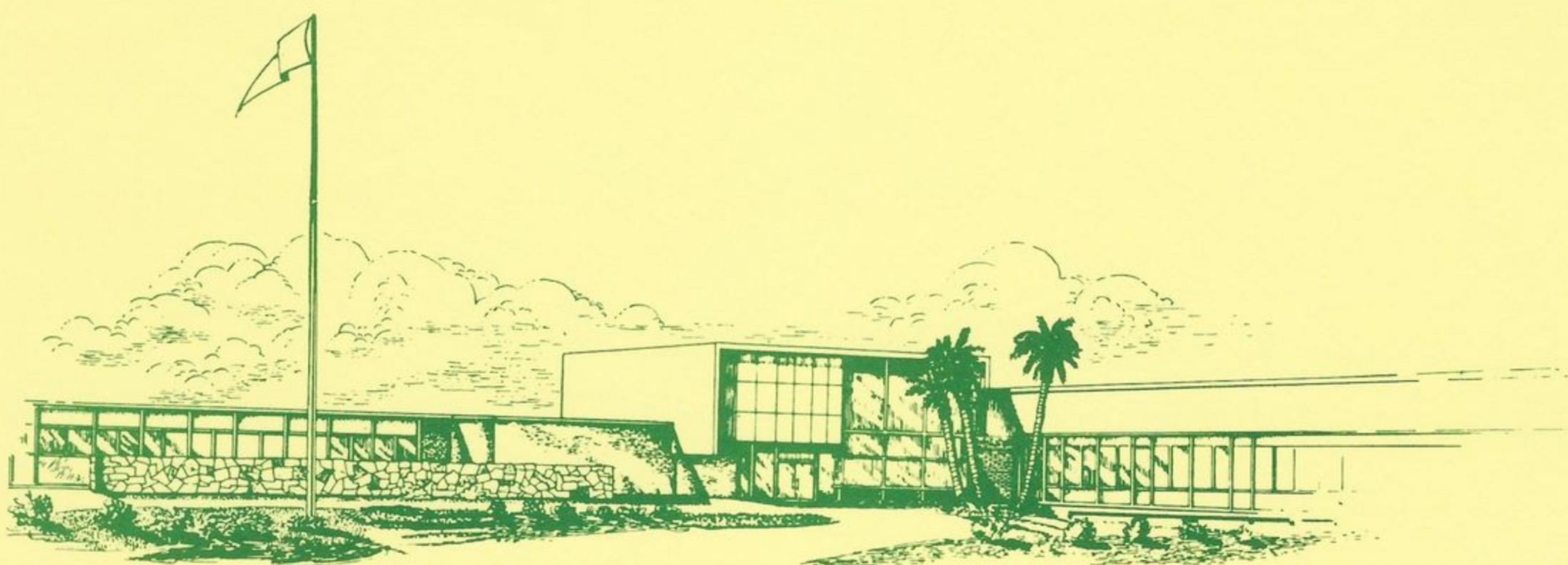
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Speaker gondola installed prior to the 1964 Democratic National Convention, Atlantic City, New Jersey, Convention Hall: Seating Capacity: 42,000. Speakers: 5 1504B and 1 1505B multicellular horns, 14 288C HF drivers, 6 515B LF speakers, 3 613 cabinets, and 6 A7-500 speaker systems. Amplifiers: 1 250-SU Console, 7 1569A Power Amplifiers, 2 1570B Power Amplifiers, and 1 436C Compressor Amplifier. Microphones: 4 M-30 Cardioid microphones. Ballroom Seating Capacity: 5,000. Speakers: 2 1504B and 1 1505B multicellular horns with 6 288C HF drivers, 2 515B LF speakers in 1 613 cabinet, and 2 A7-500 speaker systems. Amplifiers: 1 250-SU Console, 5 1569A Power Amplifiers, and 1 436C Compressor Amplifier.

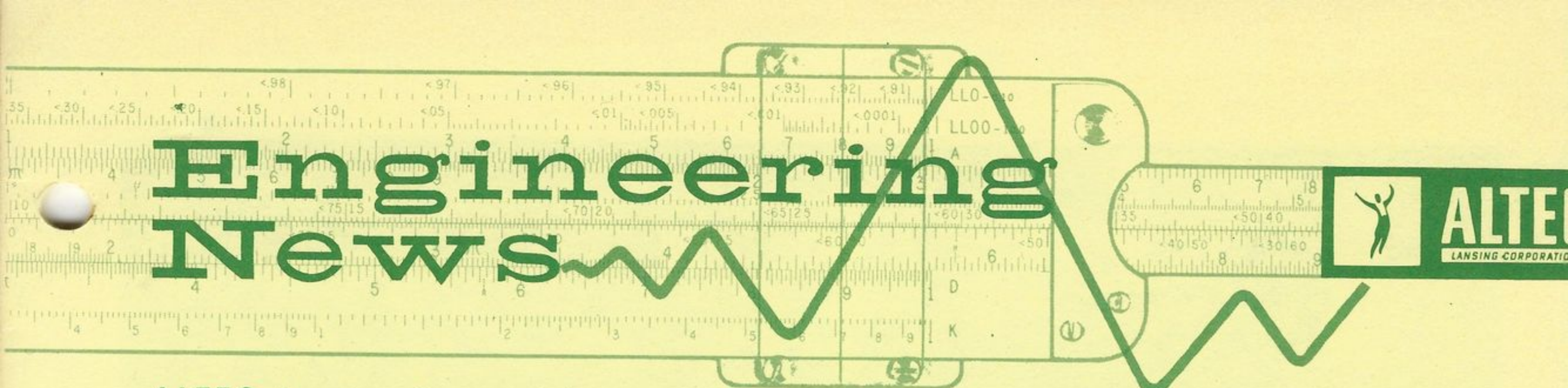




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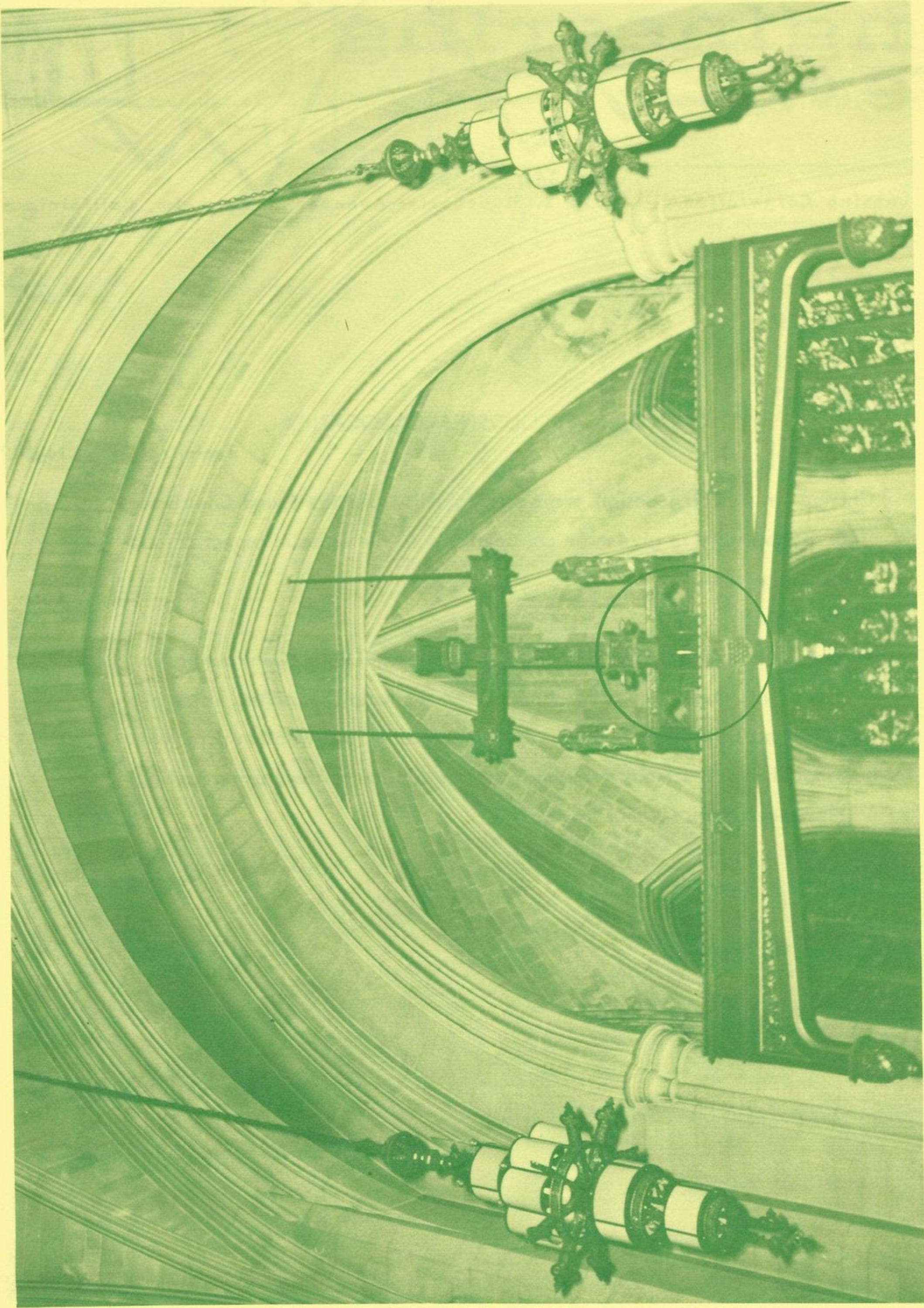
ALTEC
LANSING CORPORATION

CHOOSING A LOUDSPEAKER LOCATION

Technical Letter No. 129

Changes in building design are occurring daily and the Sound Contractor finds it necessary to give more consideration to the esthetic aspect of loudspeaker locations.

A few of the approaches to this problem which some Altec Contractors have pursued are reproduced photographically on the following pages. These pictures are not dimensioned or detailed to serve as construction parameters but should evoke serious thinking toward a solution to the many mounting problems which arise from time to time.

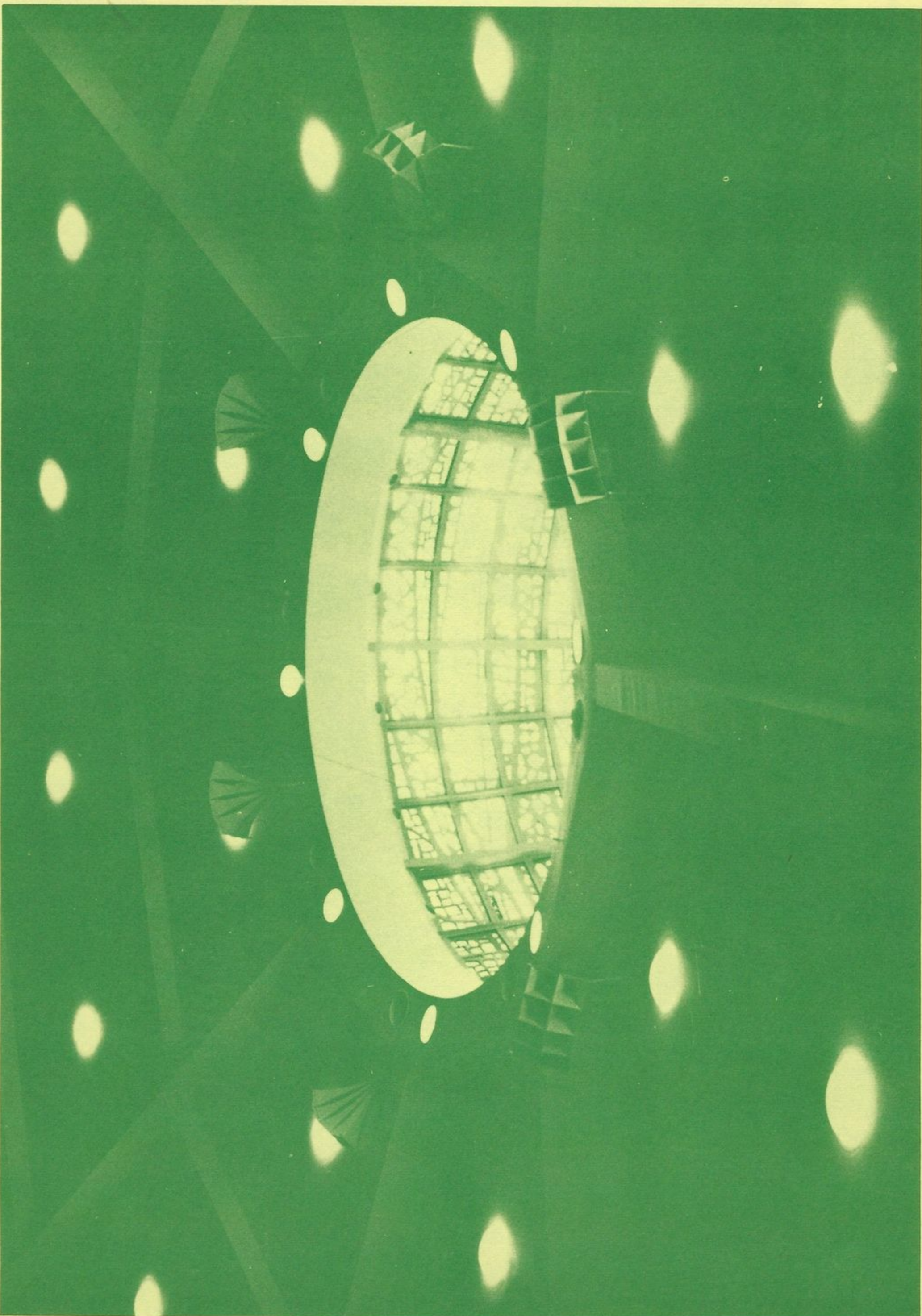


CATHEDRAL OF THE BLESSED SACRAMENT; Detroit, Michigan; Seats 1,000.

Equipment Used: 1 - 803B Multicellular Horn; 1 - 288C HF Driver (Encircled above as incorporated in main beam across grand arch to apse. Additional smaller speakers are located at organ, choir, and sacristy so that all participants in mass are fully informed.



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ST. MICHAEL'S CHURCH, Annendale, Va. Octagonal shape with altar in center. 1400 seats
Loudspeakers (illustrated): 6 288B HF Drivers on 6 803B Multicells, 1 1553A Monitor
Panel. Amplifiers: 1 1567A Mixer, 1 128A Power, 1 1555A Switch Panel, 1 1551A
Jack Panel. Microphones: 1 686A Lavalier, 5 683A Cardioid.



703-256-0446



CAMP RANDALL STADIUM; UNIVERSITY OF WISCONSIN; Madison, Wisconsin; Seats 51,000.
(Photograph shows one of 12 systems arranged in front of stands on periphery of playing field):
Equipment Used: 12 - 1003B Multicellular Horns; 12 - 290D HF Drivers.





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GYMNASIUM, NEENAH HIGH SCHOOL.
Equipment Used: 4 - 1003B Multicellular Horns; 5 - 288C HF Drivers.

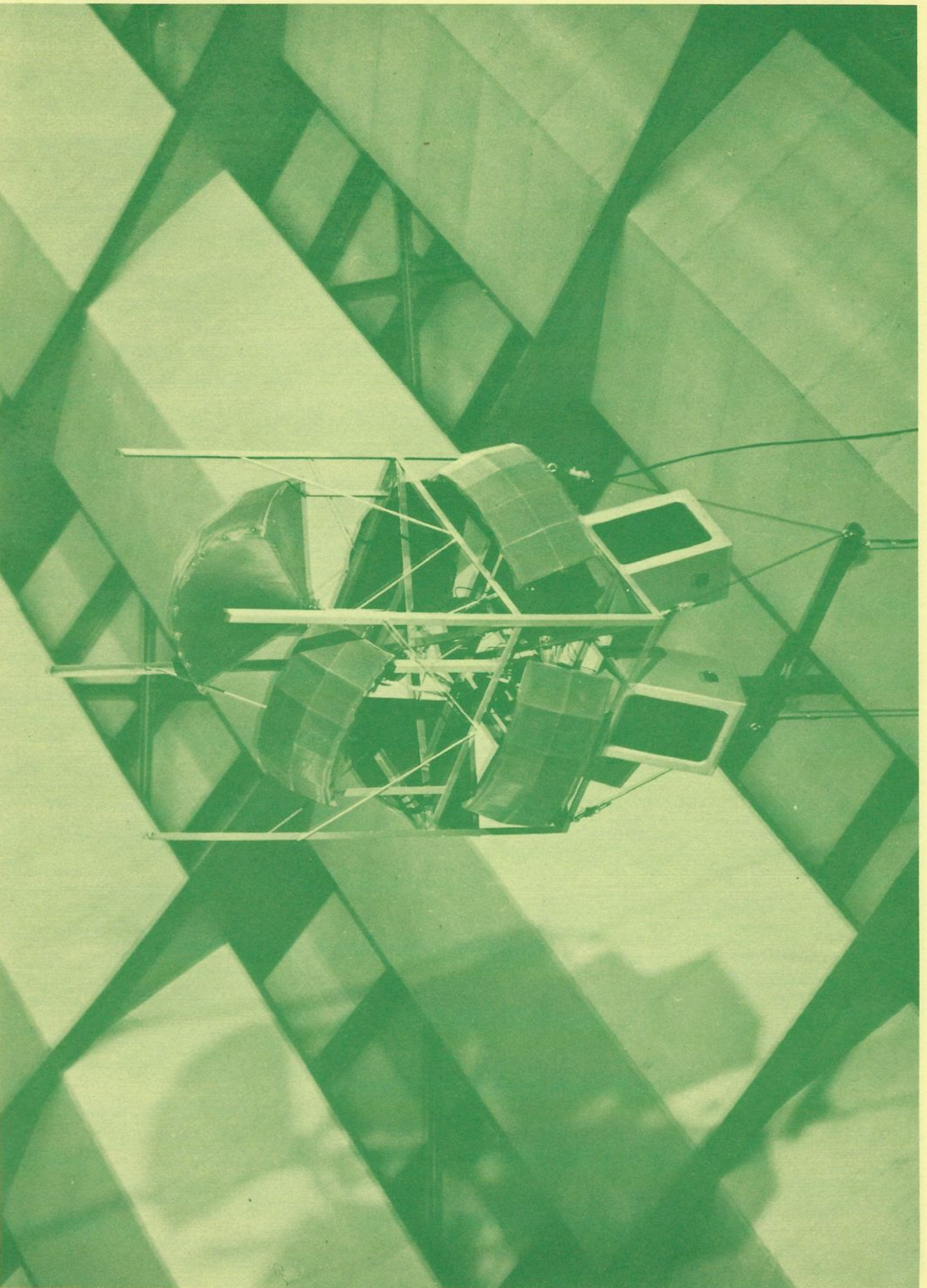




ST. JOHN'S CHURCH (EPISCOPAL); Washington, D.C. (Seats 704).

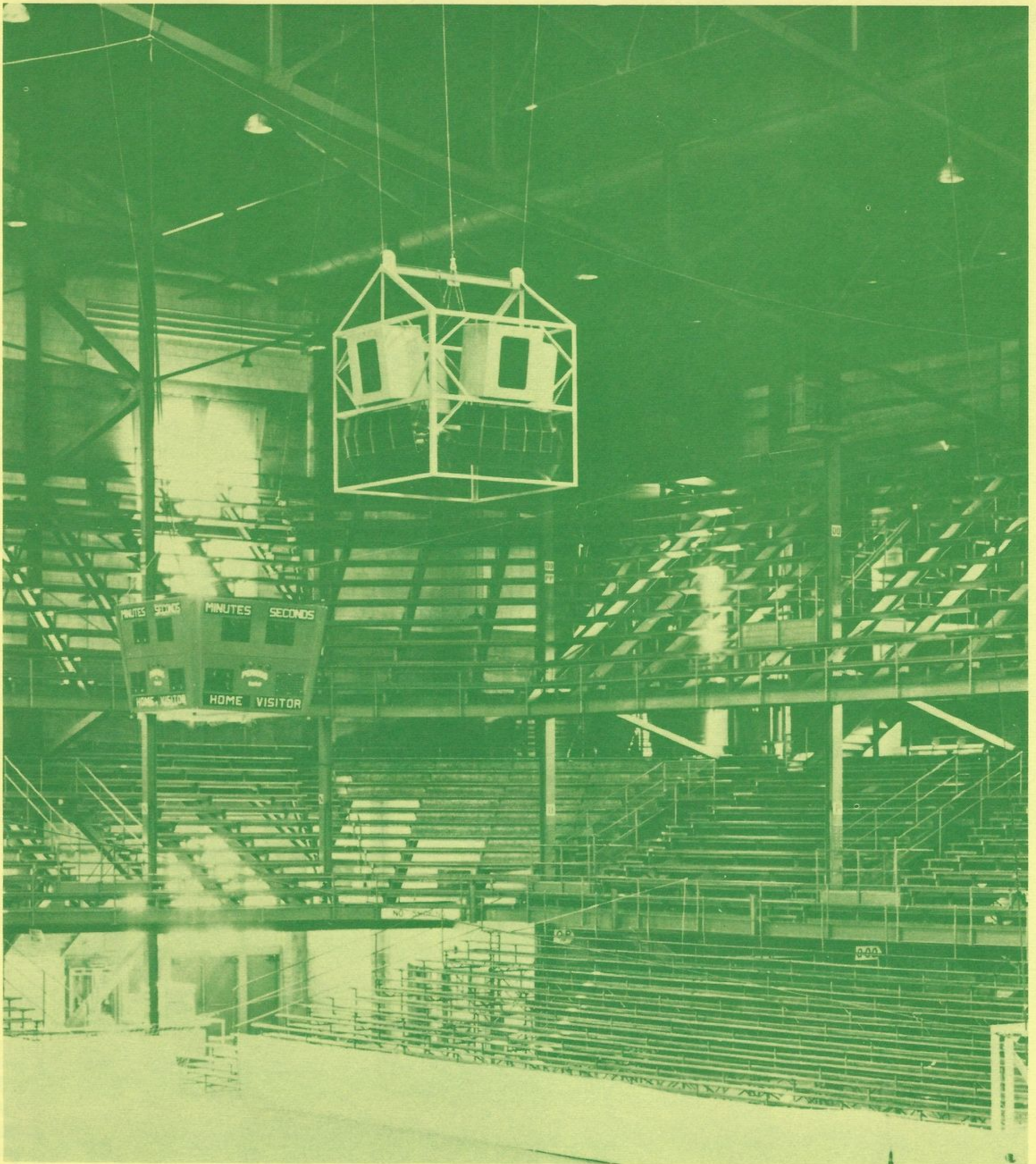
Equipment Used: 2 - KS-12025 Horns; 2 - 730B HF Drivers (Located on either side of church, crossfiring so that each speaker covers the opposite side of both the balcony and under the balcony. The HF drivers are connected directly across the output of the amplifier for full response, without networks or high pass filter.)





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COLISEUM, LOUISIANA STATE AGRICULTURAL COLLEGE, Baton Rouge, Louisiana: Seats 6,000
Equipment Used: 1 - 1803B; 5 - 1003B Multicellular Horns; 7 - 290D HF Drivers; 4 - 803B LF Speakers;
4 - 614A Cabinets.



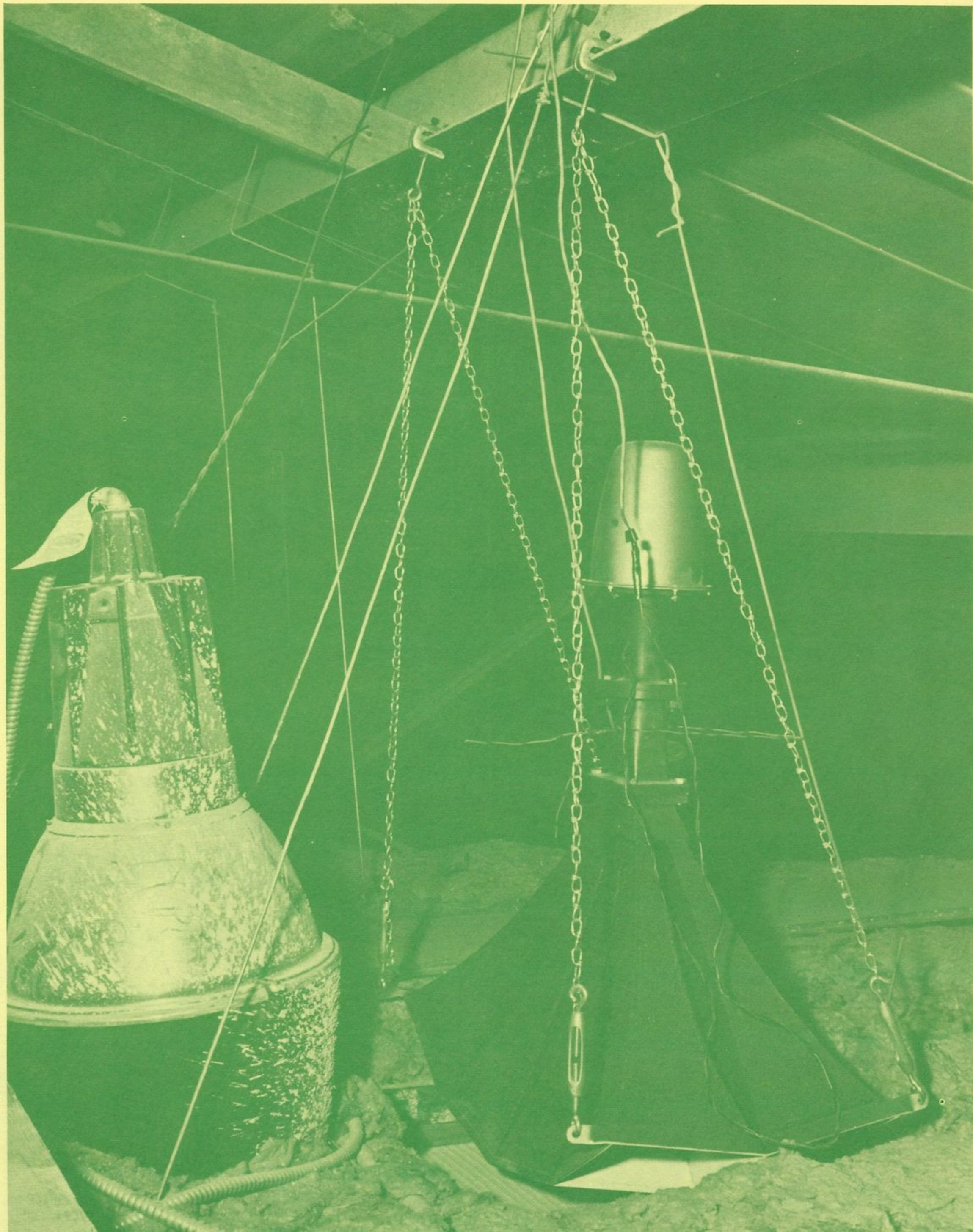
ALTEC
LANSING CORPORATION

FIELD HOUSE, UNIVERSITY OF WISCONSIN; Madison, Wisconsin: Seats 14,500.

Microphones: 6 - 660A.

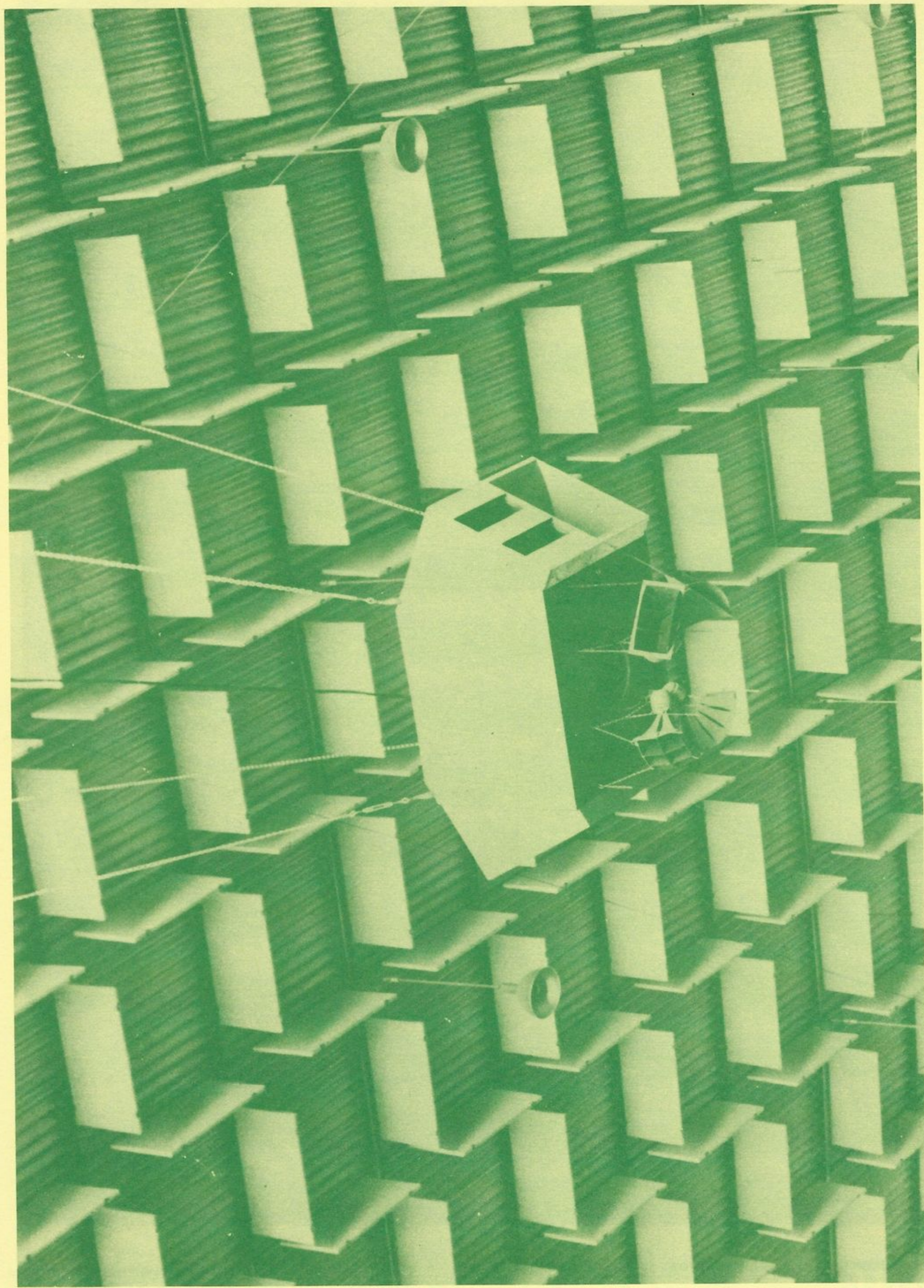
Amplifiers: 3 - 1510A Preamps in 1560A Console; 4 - 1530A Power Amplifiers.

Loudspeakers: 4 - 1803B Multicellular Horns; 4 - 290D HF Drivers; 4 - 803B LF Speakers; 4 - 612A Cabinets.



ST. NORBERT ABBEY; Green Bay, Wisconsin:

Equipment Used: 8 - 805A Horns w/8 - 730B Drivers suspended vertically in loft above 80-foot ceiling.

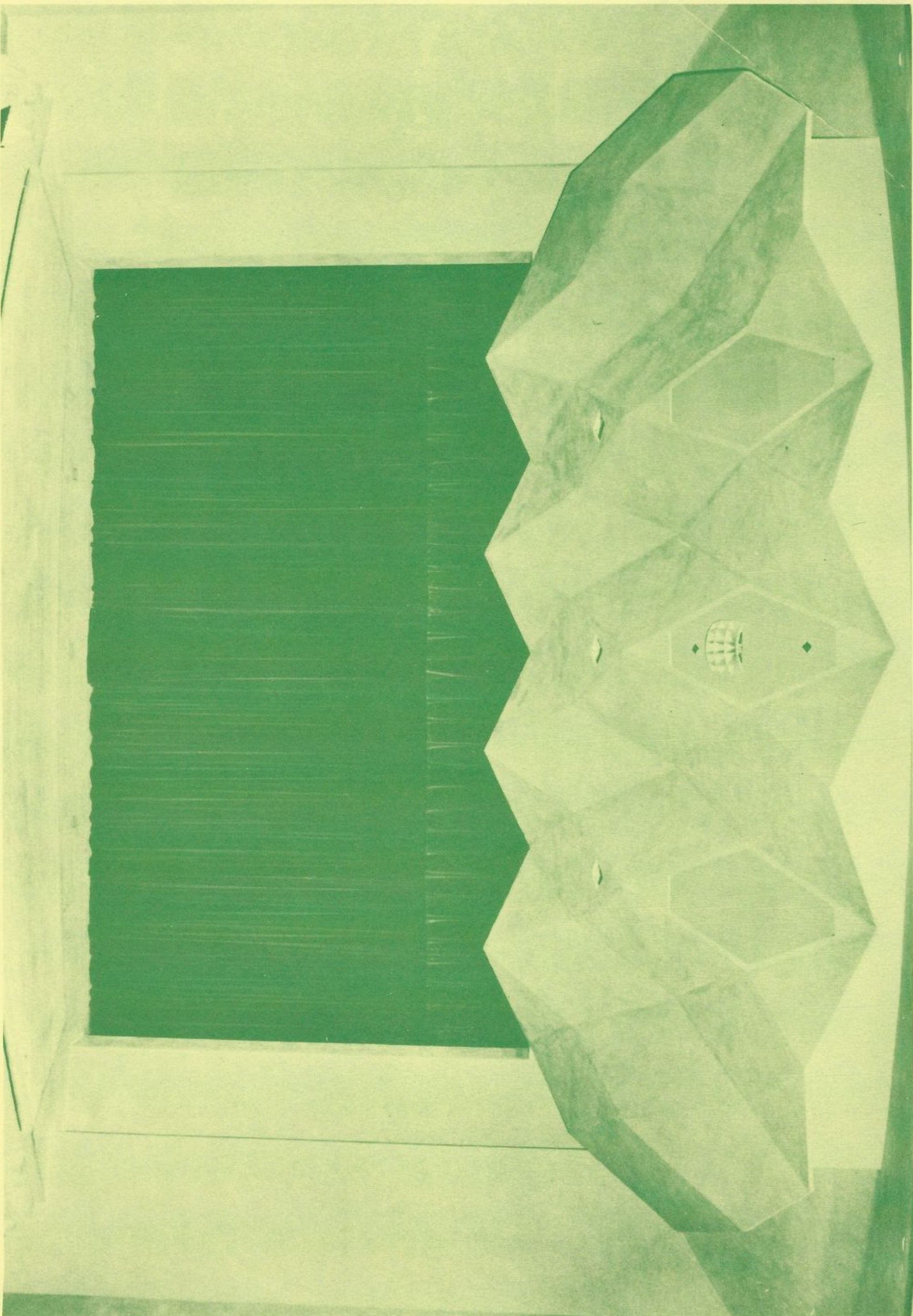


STATE FAIR COLISEUM; Raleigh, North Carolina; Seats 5,000:

Equipment Used: Amplifiers: 2 - 1410A Preamps; 2 - 1430A Power Amplifiers.

Loudspeakers: 2 - 808B Multicellular Horns; 2 - 802D HF Drivers; 1 - 604C; 2 - A7 Systems.





MUNICIPAL MUSIC HALL, Houston, Texas. Seats 3,000.

Equipment Used:

Microphones: 3 - M11 (hanging on stage); 1 - 670B, 2 - 671B (General Usage).

Amplifiers: 4 - 1510A; 2 - 1511A; 2 - 1530A.

Loudspeakers: 2 - 1505B Multicellular Horns; 2 - 288C HF Drivers; 2 - 515B LF Speakers; 2 - 825A cabinets (Mounted in valance over stage, as shown); 6 - 601C (in Lobby and Lounge Areas).

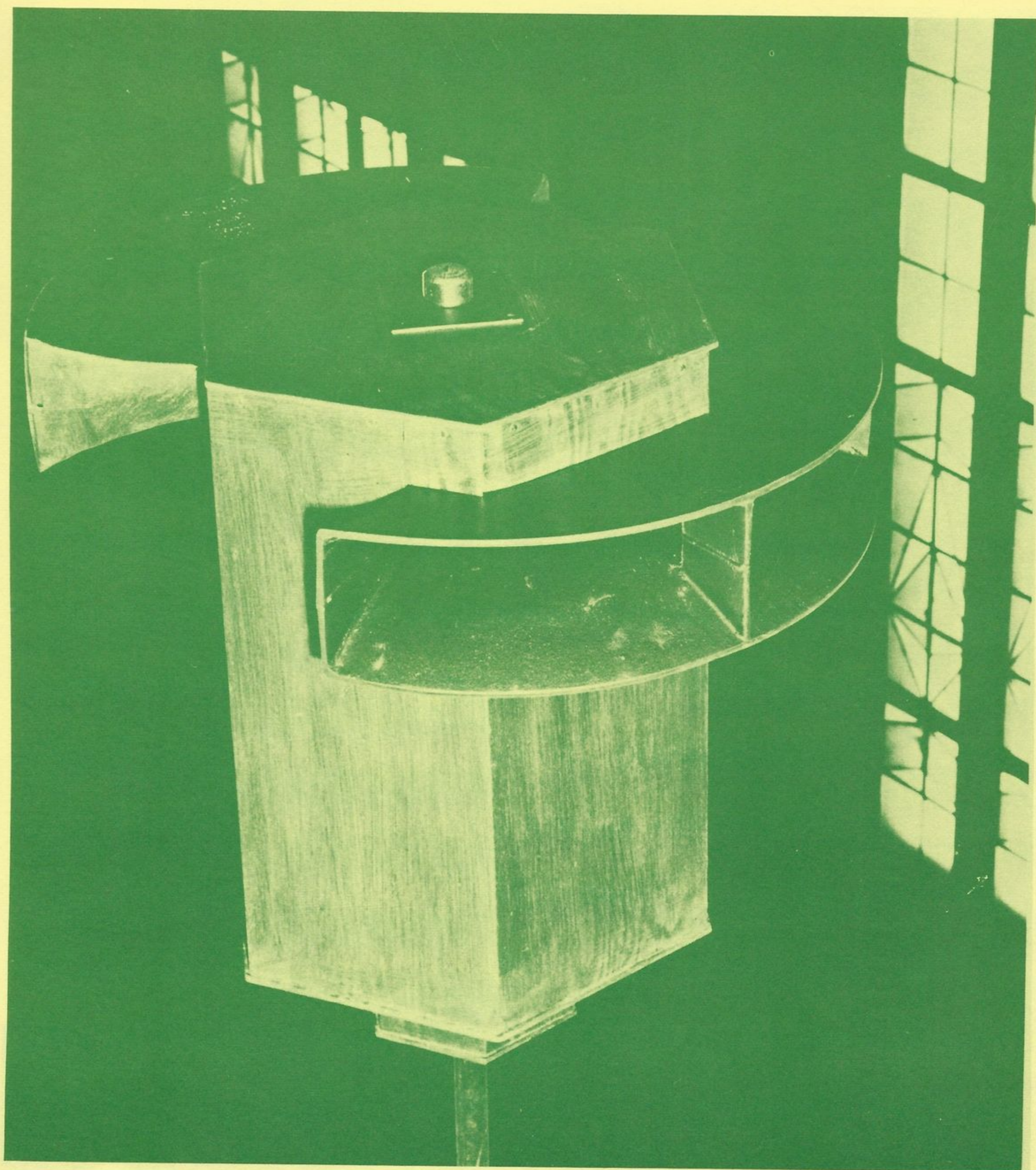


ALTEC
LANSING CORPORATION

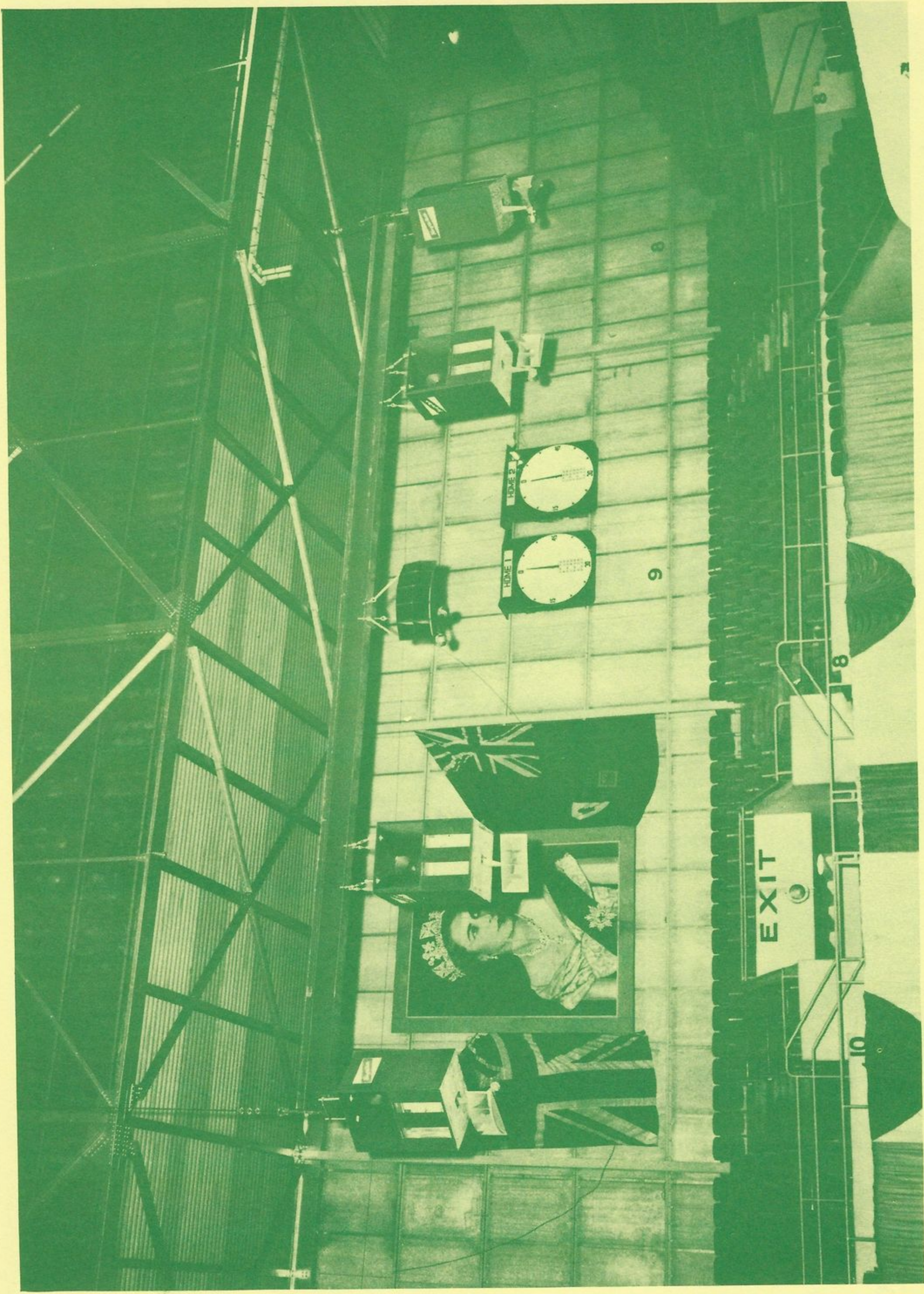


MINNESOTA STATE FAIR GROUNDS; Minneapolis, Minnesota: Special Installation for Billy Graham Crusade.
Equipment Used: 2 - 1003B Multicellular Horns; 4 - 290D Drivers; 2 - 515B LF Loudspeakers; 2 - 612A Bass
 Reflex cabinets. The Altec system effectively covered an audience of more than 40,000 people.





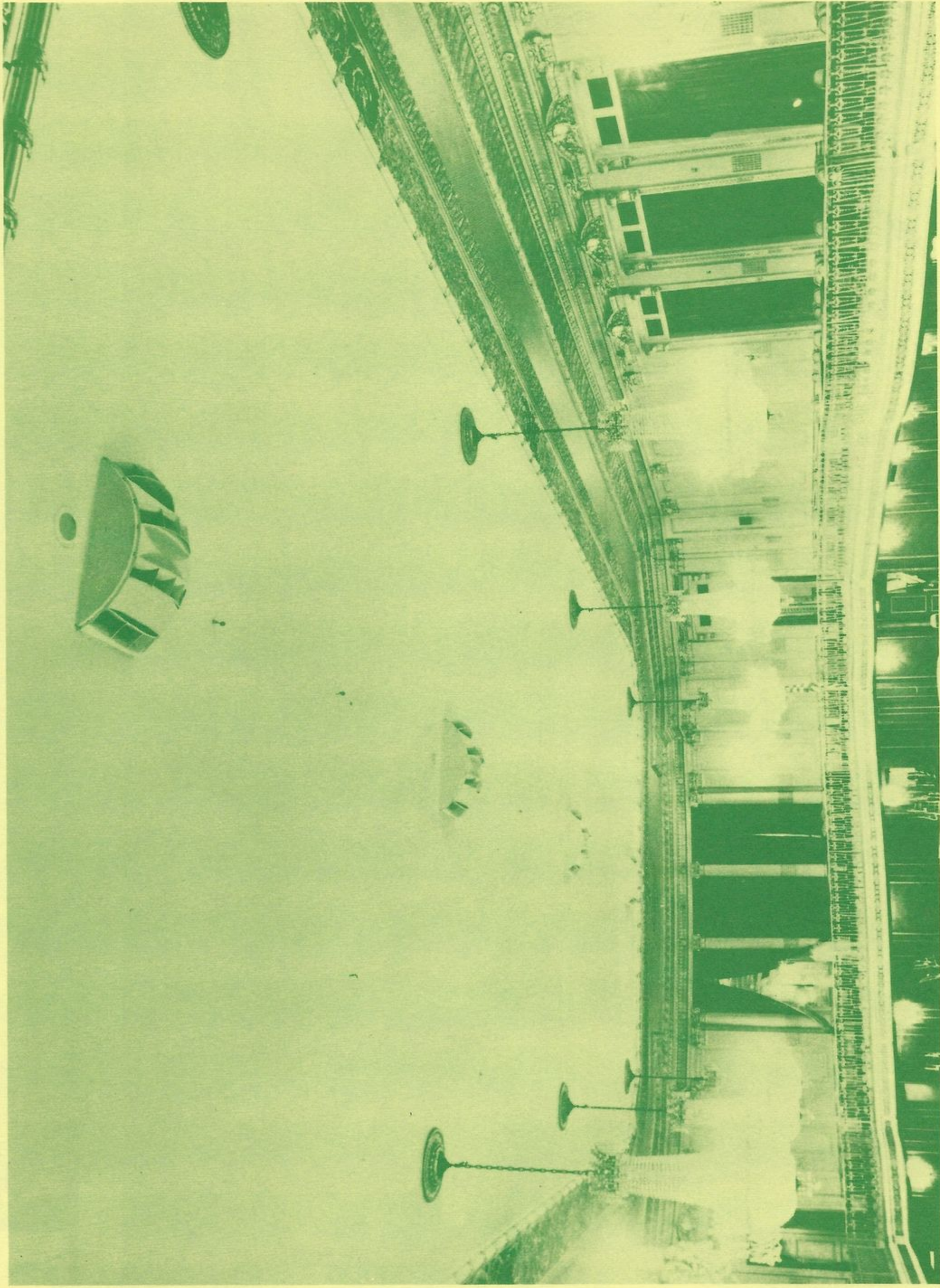
UNION PACIFIC STATION; Omaha, Nebraska: Unique mounting of components devised for train announcements.
Equipment Used: 2 - 31A Horns; 2 - 730B HF Drivers.



WINNIPEG ARENA; Winnipeg, Canada: Seats 8,800.

Equipment Used: Amplifiers: 1 - 1567A Mixer; 1 - 438A Compressor; 2 - 1569A.

Loudspeakers: 2 - 288C HF Drivers; 1 - 1005B Multicellular Horn; 4 - A7 Systems.



GRAND BALLROOM, PALMER HOUSE HOTEL; Chicago, Illinois:

Equipment Used: Microphones: 15 - 639B; 20 - 633A; 3 - M11; 1 - M20
Amplifiers: 4 - 1410 Preamps; 1 - T430A.

Loudspeakers: (4 ceiling clusters, each consisting of): 4 - KS-12025 Horns; 4 - 802D HF Drivers;
2 - 600C LF Loudspeakers.



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FIRST CHURCH OF CHRIST, SCIENTIST; Boston, Massachusetts: (Seats 4,000).

Equipment Used: 2 - 1505B Multicellular Horns w/2 - 288C HF Drivers (encircled); 2 - 515B LF Speakers;
2 - A2 'Voice of the Theatre' Systems.

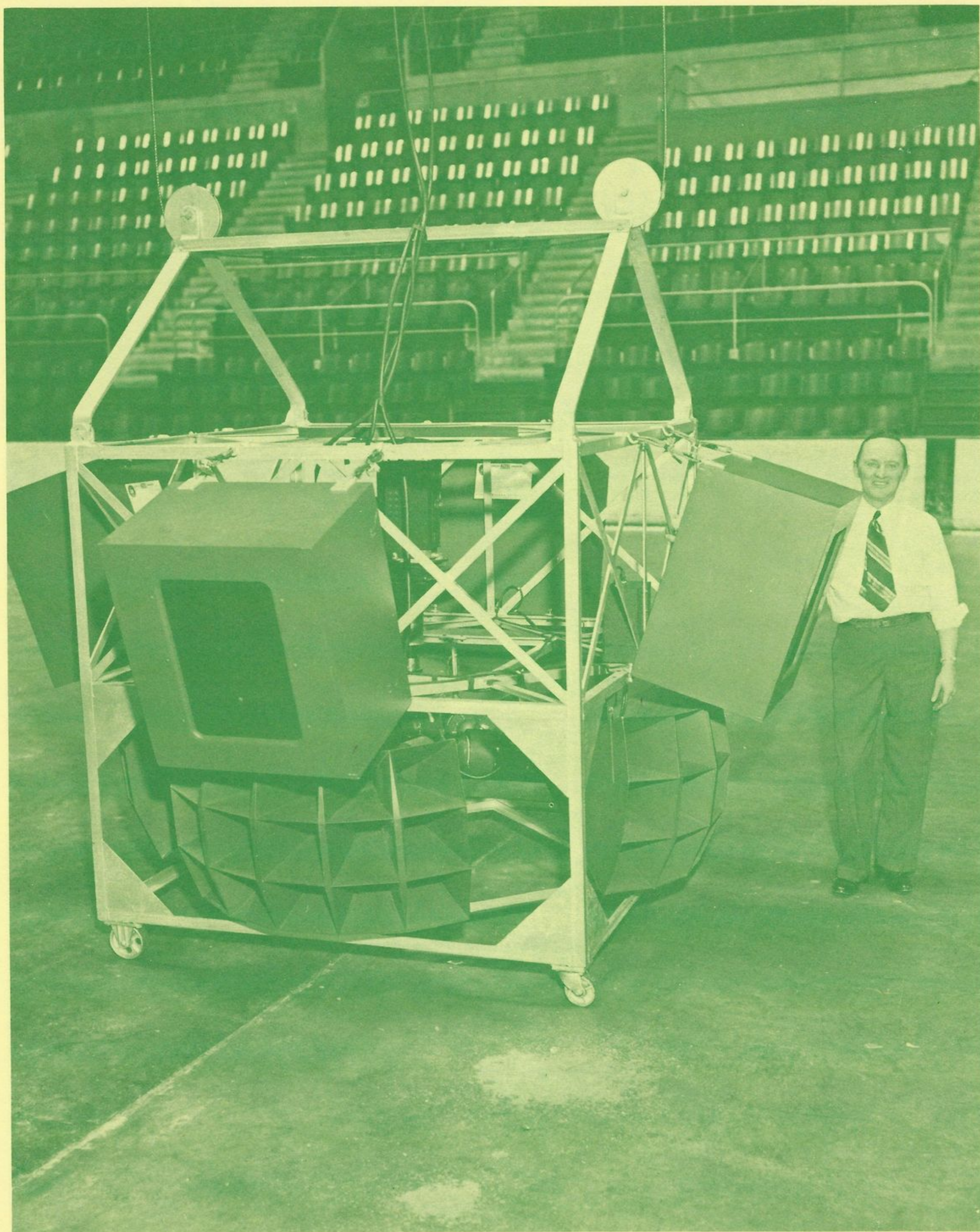


MEMORIAL COLISEUM, KENTUCKY UNIVERSITY: Seats 15,000

Microphones: 2 - 633A

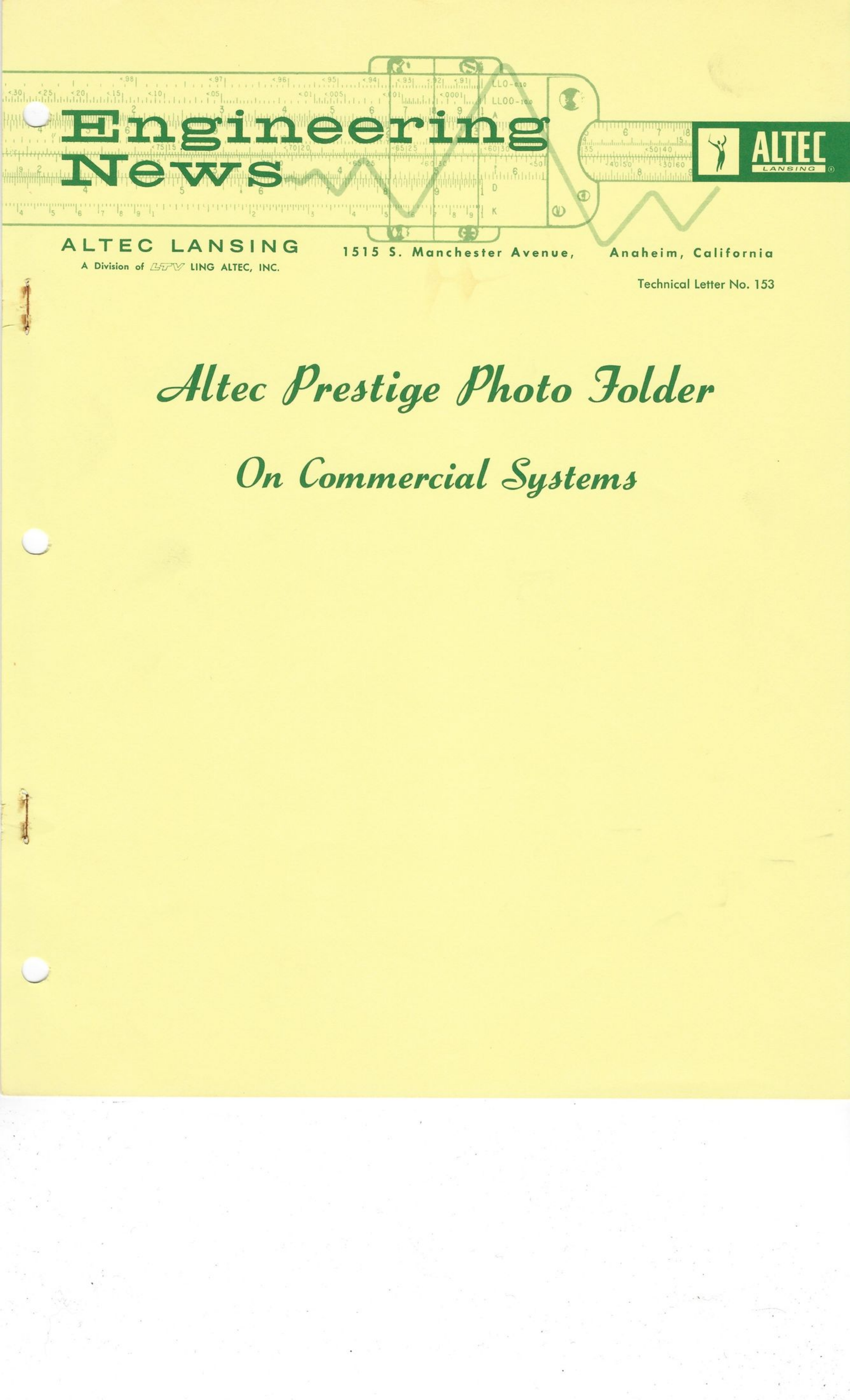
Amplifiers: 7 - 425B; 1 - 426B; 2 - A127; 2 - 287F

Loudspeakers: 4 - 1005B Multicellular Horns; 8 - 290D HF Drivers; 8 - 515B LF Speakers;
4 - 603B Loudspeakers; 12 - 612A Cabinets.



HERSHEY SPORTS ARENA; Hershey, Pennsylvania: Seats 7,200.

Equipment Used: 6 - 1504B Multicellular Horns; 12 - 288C HF Drivers; 2 - 605A Speakers;
7 - 515B LF Speakers; 9 - 612A Cabinets.



Engineering News



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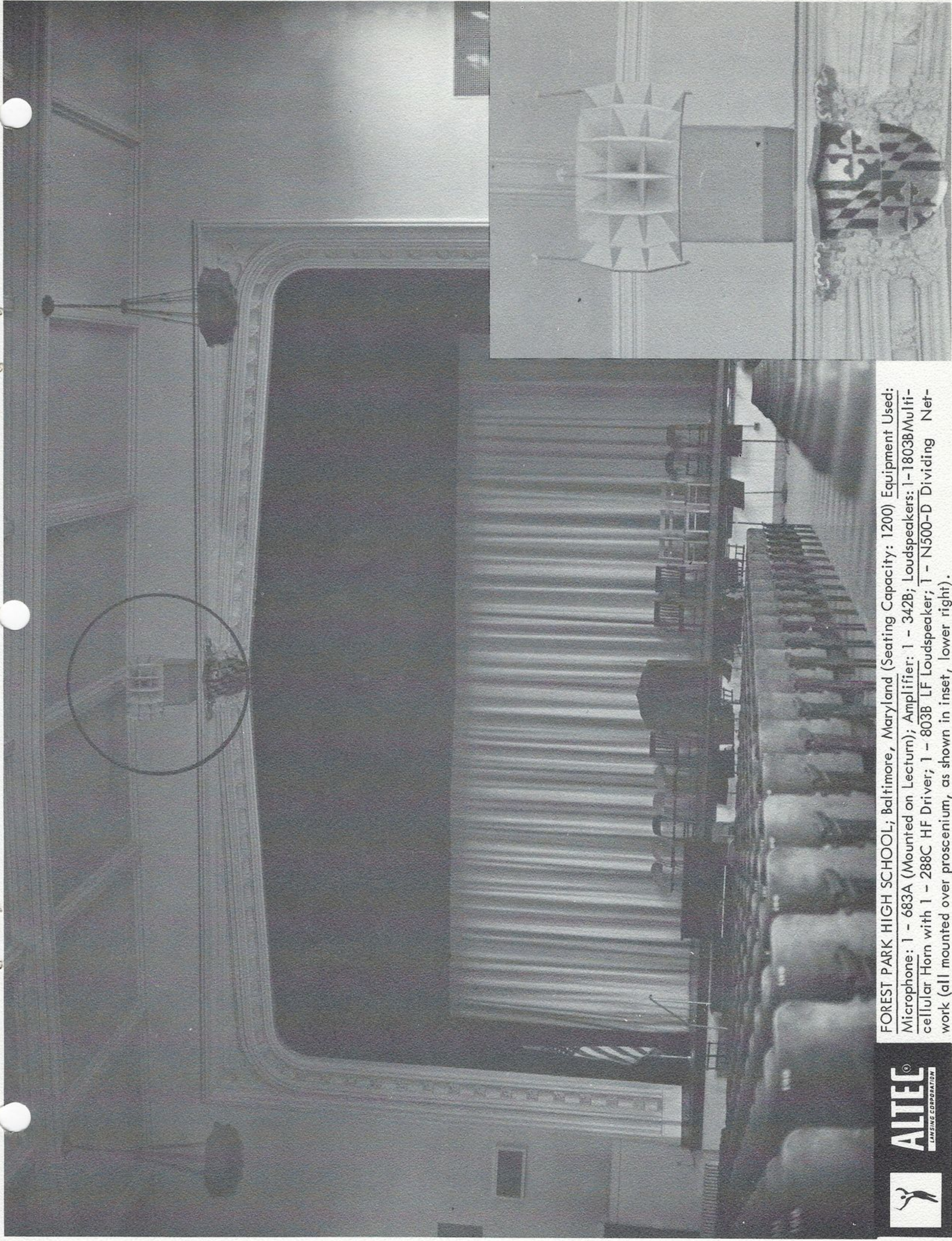
1515 S. Manchester Avenue,

Anaheim, California

Technical Letter No. 153

Altec Prestige Photo Folder

On Commercial Systems



FOREST PARK HIGH SCHOOL; Baltimore, Maryland (Seating Capacity: 1200) Equipment Used:
Microphone: 1 - 683A (Mounted on Lectern); Amplifier: 1 - 342B; Loudspeakers: 1 - 1803BMulti-cellular Horn with 1 - 288C HF Driver; 1 - 803B LF Loudspeaker; 1 - N500-D Dividing Net-work (all mounted over proscenium, as shown in inset, lower right).



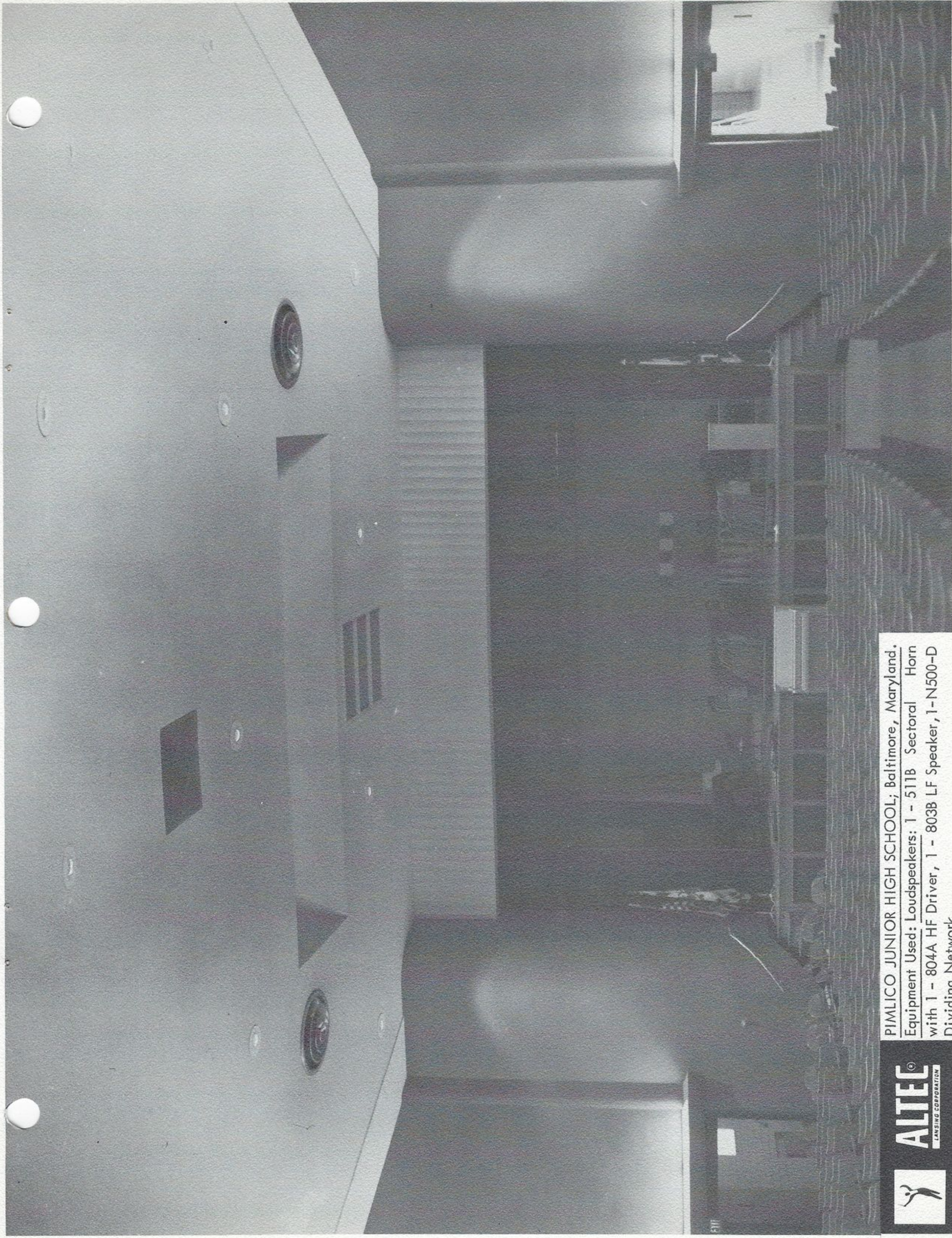
ALTEC
LANSING CORPORATION



BALTIMORE CIVIC CENTER, Arena, Exhibition Hall and 40 meeting rooms, Baltimore, Maryland. Seating: 13,200. System price: \$55,000. Arena Speakers: (illustrated) 4 - 803B low frequency speakers, each in a 825A horn cabinet, 2 - 804B, 2 - 1003B, and 2 - 1505B multicellular horns, each equipped with a 288C driver, in center gondola. 4 - 515B low frequency speakers in a 410 horn cabinet, 1 - 804B multicellular horn with 2 - 288C drivers, 4 - 804B, and 1 - 1203B (special) multicellular horns, each with a 288C driver, in proscenium gondola. Exhibition Hall and meeting rooms equipped with 357 - 755C speakers. Amplifiers: Arena - 1 - 309A Tuner, 1 - 250SU Console, 1 - 438A, 1 - 438B, 4 - 1507B, 2 - 7740 "Sequor", 3 - 1557A Speaker Selection Panels, and 5 - 1551A Jack Panels. Exhibition Hall and meeting rooms - 1 - 1567A Mixer, 2 - 1570B, 1 - 1555A Switch Panel, and 2 - 1551A Jack Panels. 3 - 342B portable amplifiers. Microphones: 15 - M30, 5 - 683A. System includes Manager's Emergency system (1 - 438A Amplifier and 1 - 682 Omnidirectional Microphone) to permit paging anywhere within the building.



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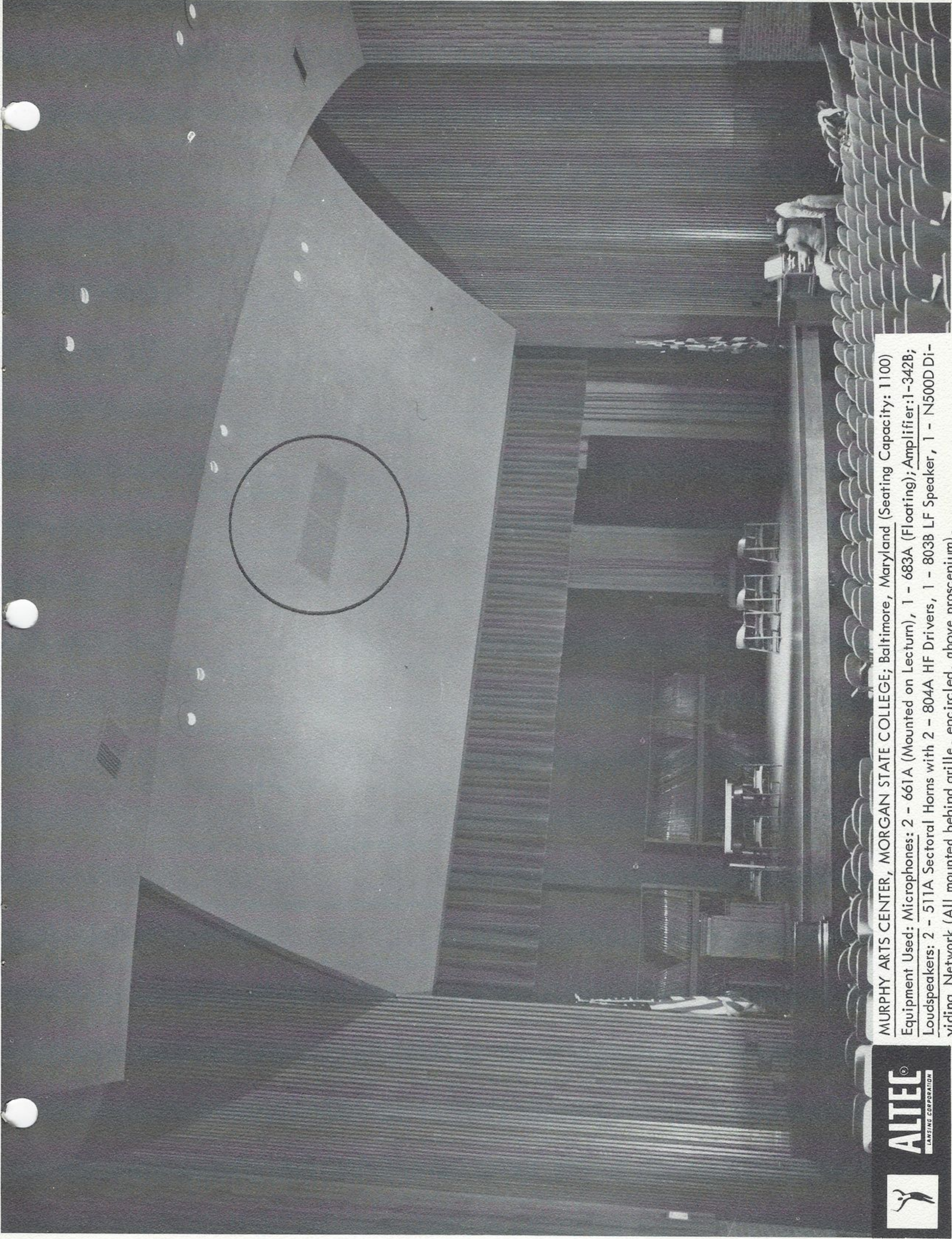


PIMLICO JUNIOR HIGH SCHOOL; Baltimore, Maryland.

Equipment Used: Loudspeakers: 1 - 511B Sectoral Horn
with 1 - 804A HF Driver, 1 - 803B LF Speaker, 1-N500-D
Dividing Network.



ALTEC
LANSING CORPORATION



MURPHY ARTS CENTER, MORGAN STATE COLLEGE, Baltimore, Maryland (Seating Capacity: 1100)

Equipment Used: Microphones: 2 - 661A (Mounted on Lectern), 1 - 683A (Floating); Amplifier: 1-342B;

Loudspeakers: 2 - 511A Sectoral Horns with 2 - 804A HF Drivers, 1 - 803B LF Speaker, 1 - N500D Di-

viding Network (All mounted behind grille, encircled, above proscenium).

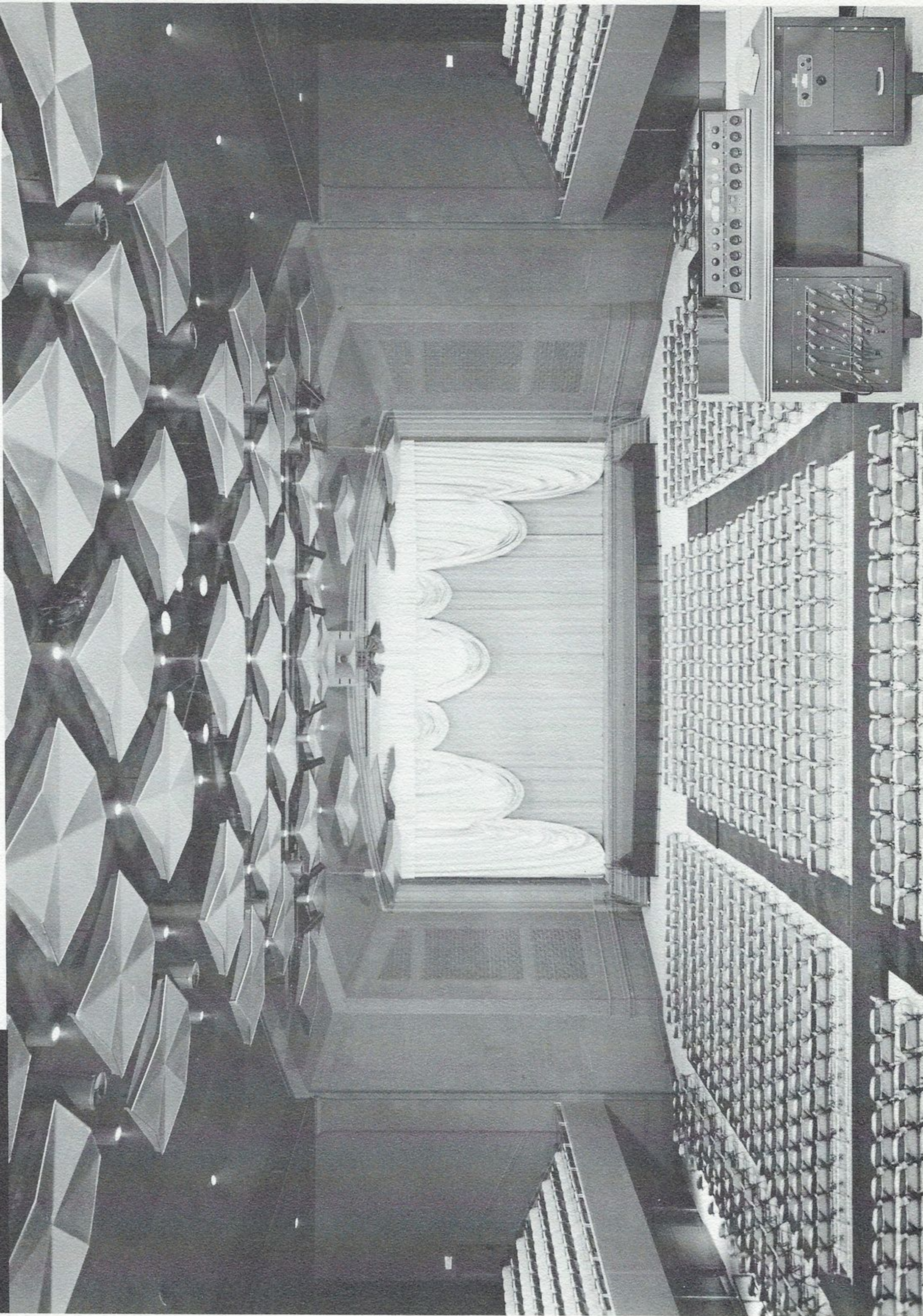


ALTEC
LANSING CORPORATION



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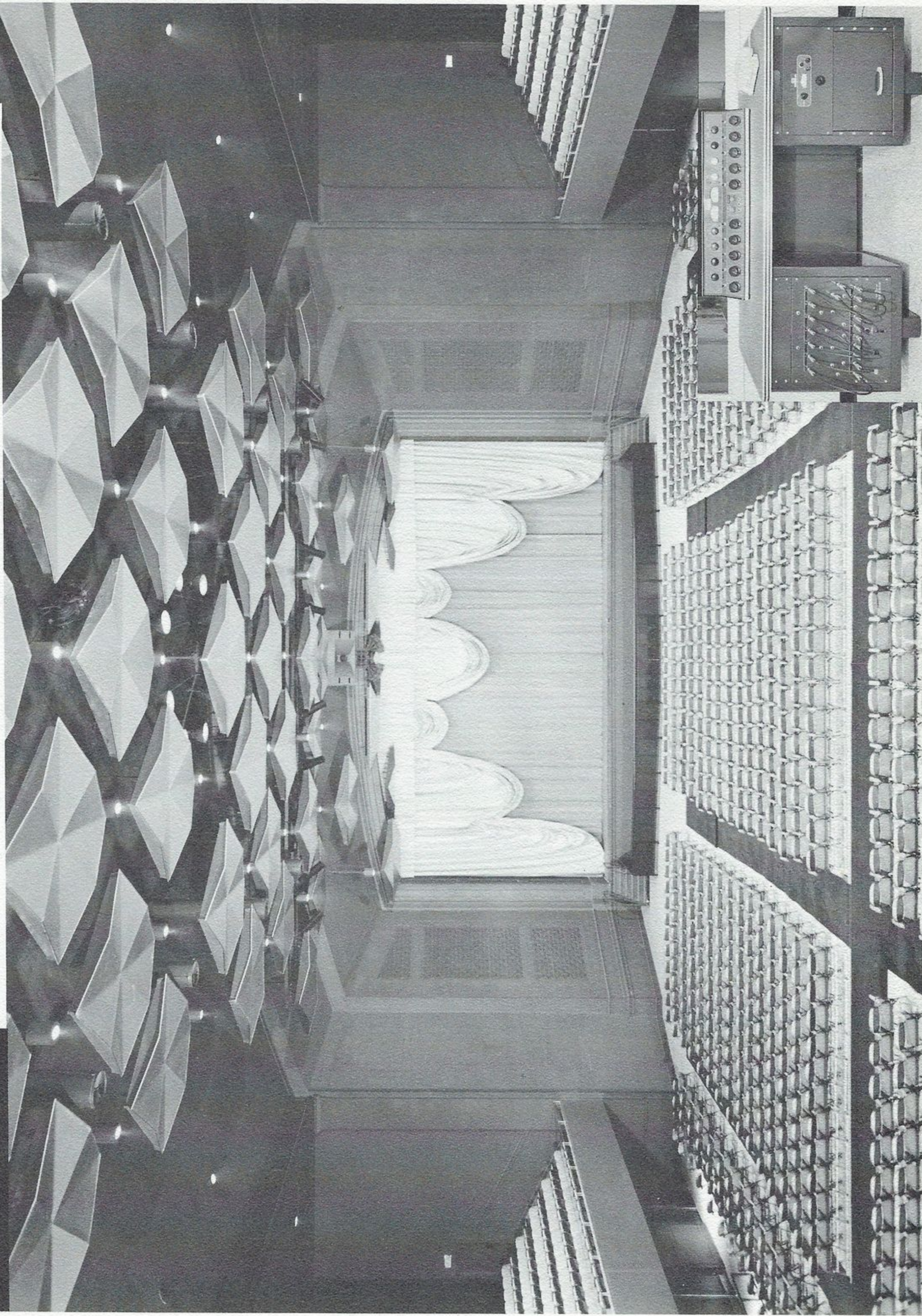
RALEIGH MEMORIAL AUDITORIUM, RALEIGH, NORTH CAROLINA. Speakers: 3 - 803B Multicellular horns, 3 - 288C HF drivers, 2 - 515B LF Speakers, 1 - 210 LF horn, 20 - 755C Loudspeakers. Amplifiers: 1 - 250SU Console, 12 - 458A Preamplifiers, 2 - 459A Line Amplifiers, 1 - 1569AT Amplifier, 3 - 342B Amplifiers, 2 - 15067 Transformers, 20 - 15074 Transformers, 1 - 5981 Tube Test Meter, 1 - 535A Power Supply. Microphones: 4 - 683A Cardioid Microphones, 7 - 689A Cardioid Microphones, 2 - 688A Omnidirectional Microphones, 2 - 686A "Lavalier" Microphones.





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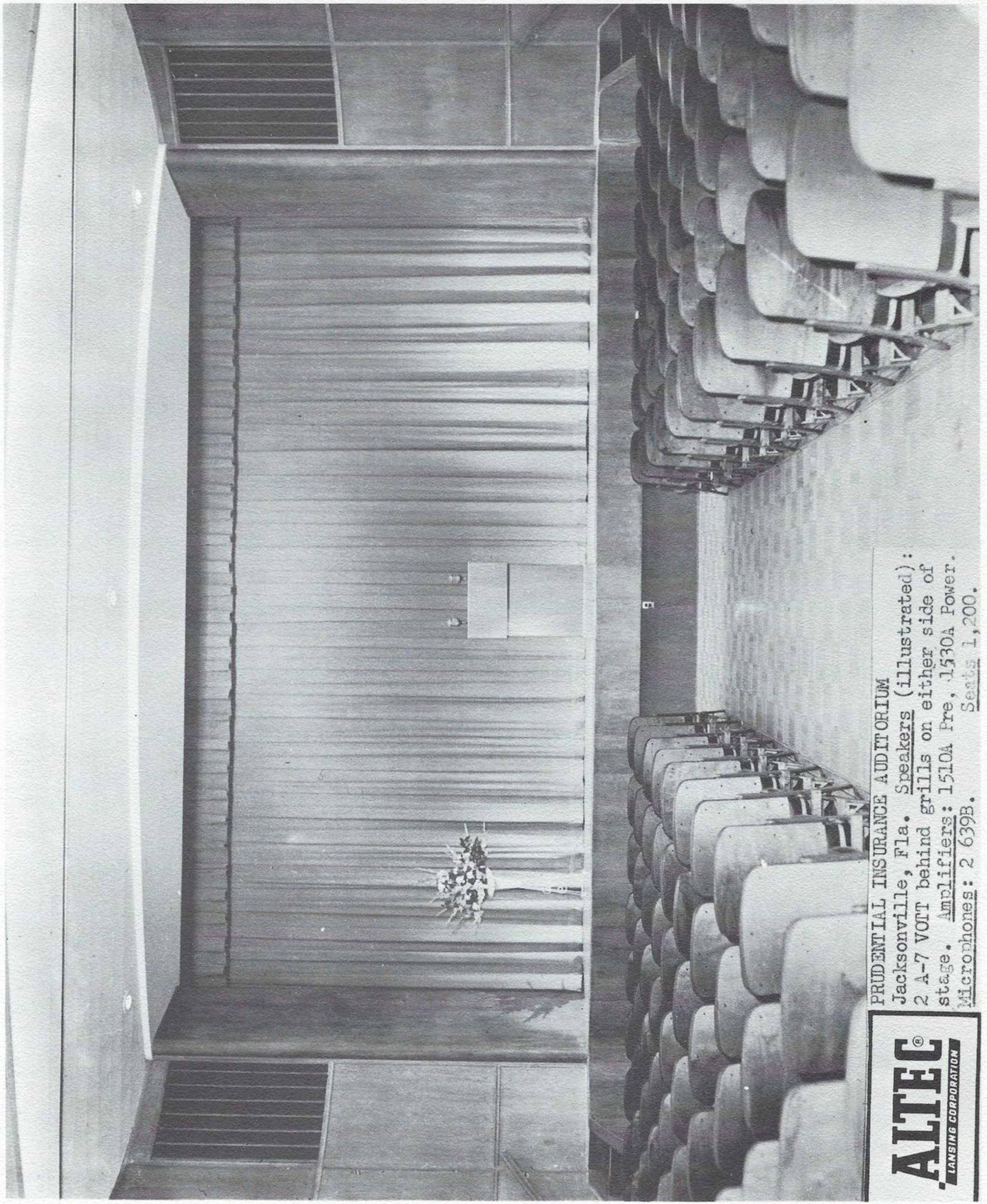
RALEIGH MEMORIAL AUDITORIUM, RALEIGH, NORTH CAROLINA. Speakers: 3 - 803B Multicellular horns, 3 - 288C HF drivers, 2 - 515B LF Speakers, 1 - 210 LF horn, 20 - 755C Loudspeakers. Amplifiers: 1 - 250SU Console, 12 - 458A Preamplifiers, 2 - 459A Line Amplifiers, 1 - 1569AT Amplifier, 3 - 342B Amplifiers, 2 - 15067 Transformers, 20 - 15074 Transformers, 1 - 5981 Tube Test Meter, 1 - 535A Power Supply. Microphones: 4 - 683A Cardioid Microphones, 7 - 689A Cardioid Microphones, 2 - 688A Omnidirectional Microphones, 2 - 686A "Lavalier" Microphones.





NORTHWEST AIRLINES OVERHAUL BASE (largest area under a single roof in the state of Minnesota), Minneapolis. Speakers (illustrated): 73 50A Horns, 19 401A. Amplifiers: 6 436B Compressors, 10 1569A Power. Microphones: Any or all of 5 hangars, Engine Building, Stores, Shops and Ramps can be dialed direct from any of 700 telephone locations. Price: \$20,000.





PRUDENTIAL INSURANCE AUDITORIUM
Jacksonville, Fla. Speakers (illustrated):
2 A-7 VOTT behind grills on either side of
stage. Amplifiers: 1510A Pre, 1530A Power.
Microphones: 2 639B. Seats 1,200.

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FISHER BODY DIVISION

GENERAL MOTORS, Detroit, Mich.

Amplifiers: 3 1510A and 1 1511A Pre, 1 1520A and 1 1530A Power. Speakers: 96 401A, 2 A-7. Microphones: 2 660B, 2 639B

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WICHITA COUNTY COURTHOUSE, Wichita Falls, Texas: 3 courtrooms, 32' x 36'; 1 large courtroom, 32' x 66'.
Smaller Courtrooms:
 Microphones: 4 - 683A; (Bench, witness stand, attorney's table, and exhibit areas)
 Amplifiers: 4 - 1561A; 1 - 4368; 1 - 128A
 Speakers: 6 - 403A (2 over Jury Box; 4 over spectator seating)
Larger Courtroom:
 Microphones: 4 - 683A; (Bench, witness stand, attorney's table and exhibit areas)
 Amplifiers: 4 - 1561A; 1 - 4368; 1 - 128A
 Speakers: 8 - 403A (2 over Jury Box; 6 over spectator seating)



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GENERAL MOTORS, Detroit Mich.
PHOTOGRAPHIC BLDG. TECH. CENTER.
Paging and Background Music.
Amplifiers: 1 1510A and 1 1511A Pre, 1 1540A Line, 1
1530 Power. Speakers: 49 401A. Microphones: 632C.



CHRYSLER CORP. EXECUTIVE GARAGE, Highland Park, Mich.
Display areas, Executive offices, Cafeteria,
Engineering Auditorium. Amplifiers: 6
1410A Pre, 3 1430A. Speakers: 98 400B
in ceiling. Microphones: 11 633A.

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TICKETING LOBBY

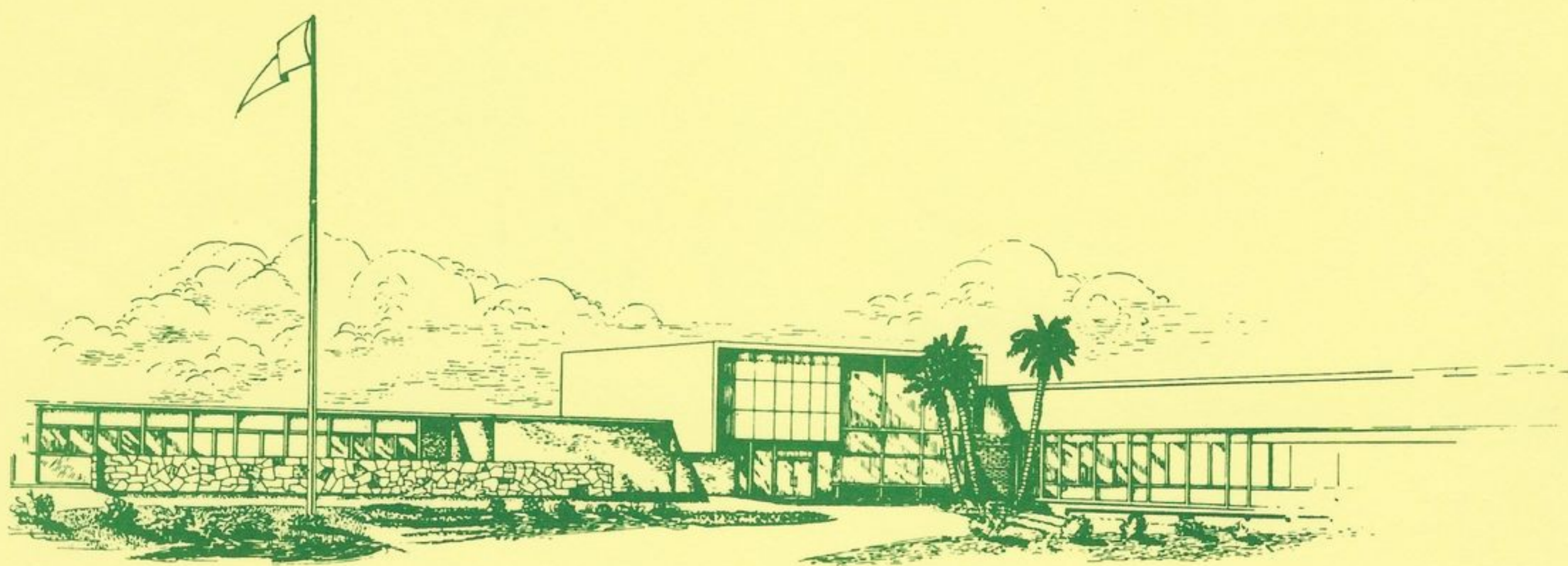


MONTGOMERY MUNICIPAL AIRPORT, Montgomery, Ala.
Loudspeakers: 48 401A flush in ceiling. Amplifiers:
2 1510A, 1 1570A. Microphones: 2 660A. Price: \$3000

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GENERAL MOTORS STYLING CENTER, Detroit, Mich.
Priority Paging, Background Music. Auditorium (Domed Building)
Amplifiers: 1 306A Tuner, 20 1510A and 1 1511A Pre, 12
1520A and 15 1530A Power. Speakers: 75 400B, 24 412A,
2 A-7, 6 754B. Microphones: 12, 632C. Total Price: \$60,000.





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Technical Letter No. 154

Altec Prestige Photo Folder

On Church Systems



ST. FRANCIS XAVIER CATHEDRAL, Green Bay, Wisc. Loudspeakers (illustrated): 8 730 Drivers on 8 Gold Painted 803B Multicells suspended vertically from arches along each side of the church. Amplifiers: 1 1510A Pre, 1 1530A Power. Microphones: 2 680A.

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NEVEH SHALOM SYNAGOGUE, PORTLAND, OREGON. Seating capacity: 12,000. Speakers: 1 - 210 low frequency horn with 2 - 515B low frequency speakers, 1 - 8038 multicellular horn with 1 - 288C high frequency driver, 1 - 511B multicellular horn with 1 - 802D high frequency driver. Amplifiers: 1 - 1567A mixer preamplifier, 1 - 436C compressor amplifier, 1 - 1568A amplifier, 1 - 1553A monitor panel, 1 - 1554A power distribution panel. Microphones: 1 - 689A cardioid microphone in 1 - 181B boom mount, 4 - 685A cardioid microphones (see insert).



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HILLSDALE COMMUNITY CHURCH, PORTLAND, OREGON. Seating capacity: 400. System cost: \$1600.00. Speakers: 1 - 803B multi-cellular horn with 1 - 288C high frequency driver, 2 - 515B low frequency loudspeakers. Amplifiers: 1 - 342B mixer amplifier. Microphones: 3 - 683A cardioid microphones.



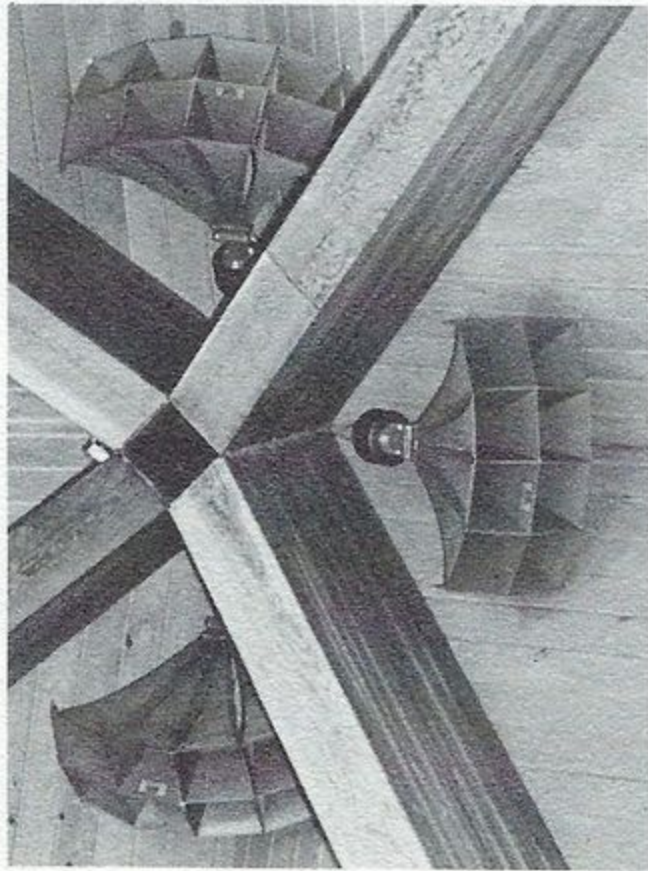
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FIRST CHRISTIAN CHURCH, OKLAHOMA CITY, OKLAHOMA.
Speakers: 14 - 605A Duplex Loudspeakers (six mounted in chandeliers). Amplifiers: 1 - 1567A Mixer Preamplifier, 1 - 436C Compressor Amplifier, 1 - 260A Power Amplifier. Microphones: 4 - 689A Cardioid Microphones, 1 - 685A "Lavalier" Microphone.



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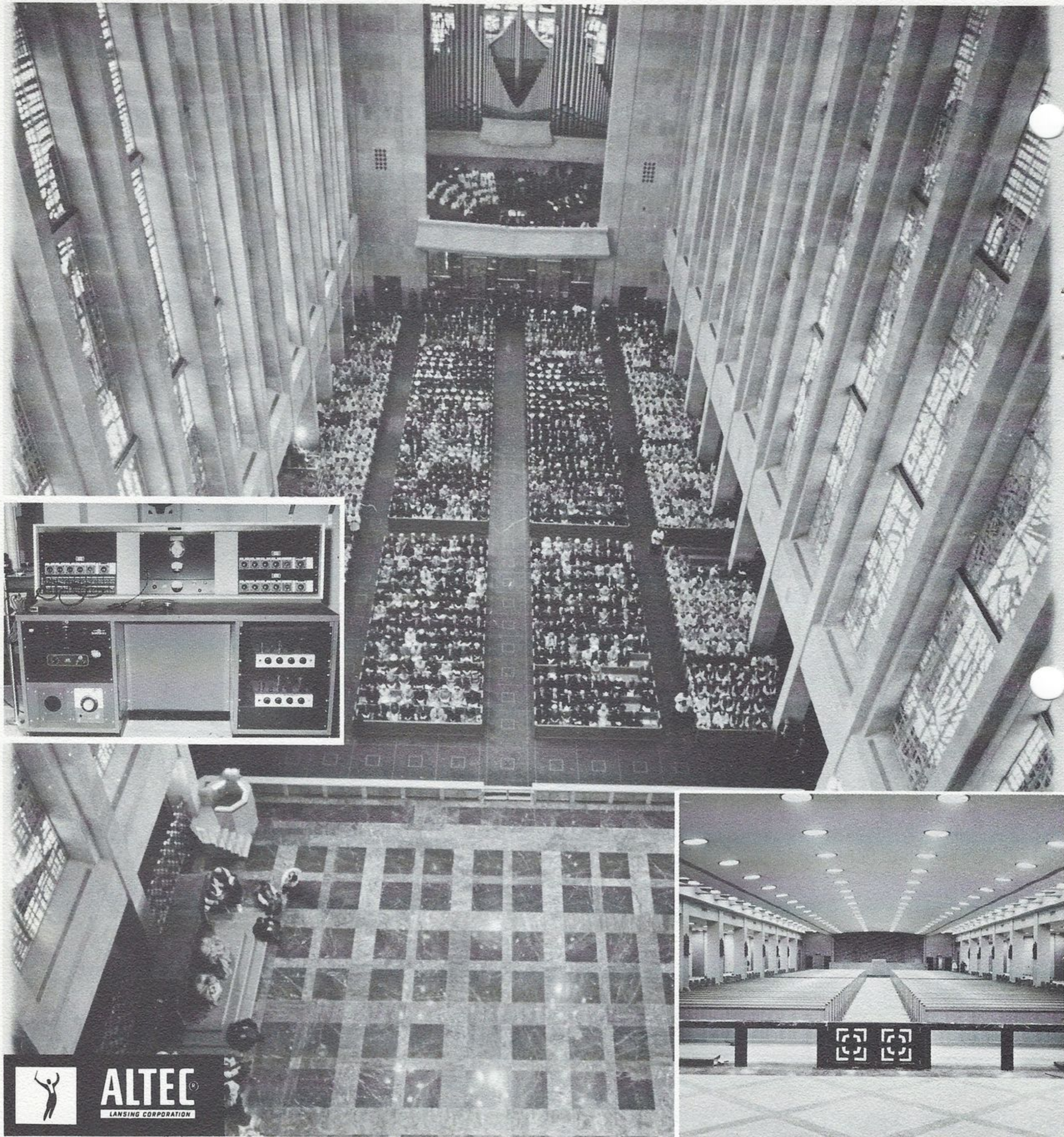
Ceiling mounted multicellular horns



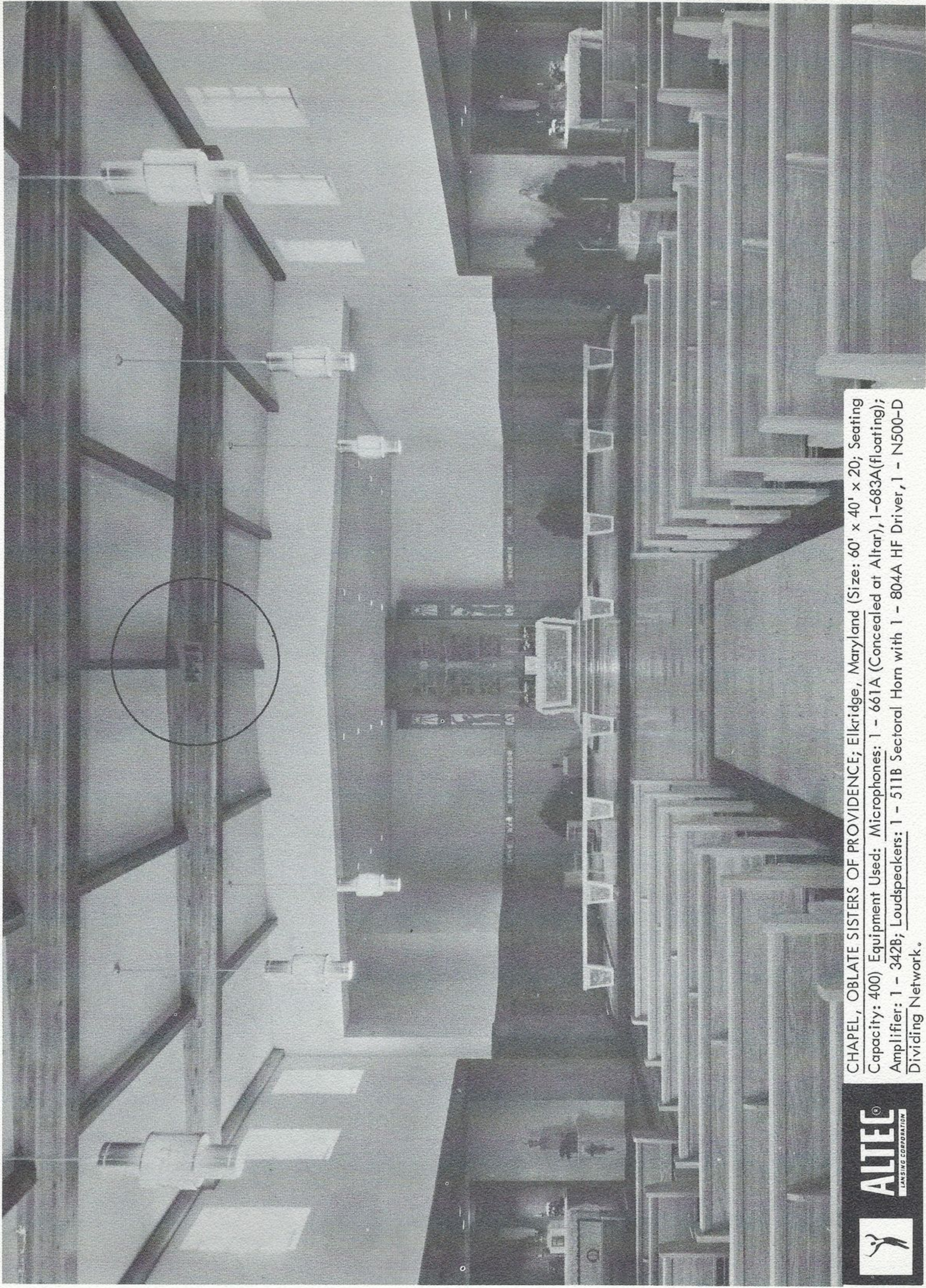
INFANT OF PRAGUE CATHOLIC CHURCH, JACKSONVILLE, NORTH CAROLINA. Speakers: 3 - 803B Multicellular Horns, 3 - 288C High Frequency Drivers. Amplifiers: 1 - 342B Amplifier, 3 - 15065 Transformers. Microphones: 1 - 683A Cardioid Microphone, 1 - 682A Omnidirectional Microphone.



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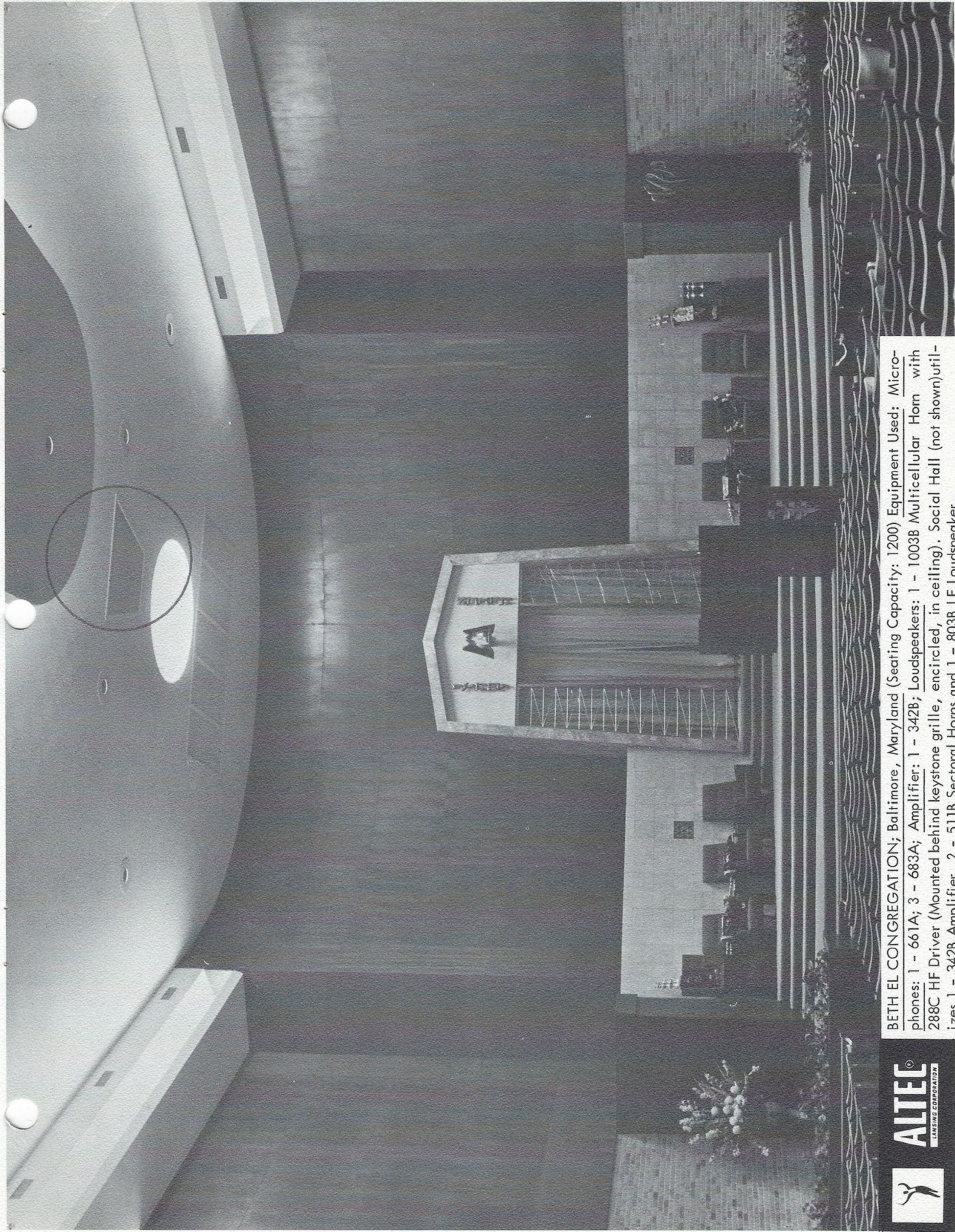
ST. JOSEPH'S CATHEDRAL; Hartford, Connecticut: Equipment Used: 1-1554A Power Distribution Panel; 2-346A Amplifiers; 12-1561A Pre-amplifiers; 3-1562A Tone Control amplifiers; 4-1563A Line Amplifiers; 4-1564A Power Supplies; 1-438A Limiter; 2-1551A Jack Panels; (Preceding installed in Control Console, upper left inset). 1-1554A Power distribution panel; 1-1552A Meter Test Panels; 1-1553A Monitor Speaker Panel; 1-1551A Jack Panel; 2-1569A Amplifiers (Preceding installed in equipment racks, upper church). 1-602 monitor speaker (Control monitor); 25-408A Loudspeakers; 2-A7 Speaker Systems (Ch. Reinforcement); 10-680A Microphones; 5-M20 Condenser Microphone Systems (Preceding used for sound reinforcement in upper church -- Main Photo). 5-1561A Microphone Pre-amplifiers; 1-1562A Tone Control Amplifier; 1-1563A Program Amplifier; 1-1564A Line Amplifier; 1-1554A Power Distribution Panel; 6-1568A Amplifiers; 1-1569A Amplifier; 40-408A Loudspeakers; 5-680A Microphones (Preceding installed and used in lower church -- right photo inset -- for sound reinforcement.)



CHAPEL, OBLATE SISTERS OF PROVIDENCE; Elkridge, Maryland (Size: 60' x 40' x 20; Seating Capacity: 400) Equipment Used: Microphones: 1 - 661A (Concealed at Altar), 1-683A(floating); Amplifier: 1 - 342B; Loudspeakers: 1 - 511B Sectoral Horn with 1 - 804A HF Driver, 1 - N500-D Dividing Network.



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BETH EL CONGREGATION; Baltimore, Maryland (Seating Capacity: 1200) Equipment Used: Microphones: 1 - 661A; 3 - 683A; Amplifier: 1 - 342B; Loudspeakers: 1 - 1003B Multicellular Horn with 288C HF Driver (Mounted behind keystone grille, encircled, in ceiling). Social Hall (not shown) utilizes 1 - 342B Amplifier, 2 - 511B Sectoral Horns and 1 - 803B LF Loudspeaker.

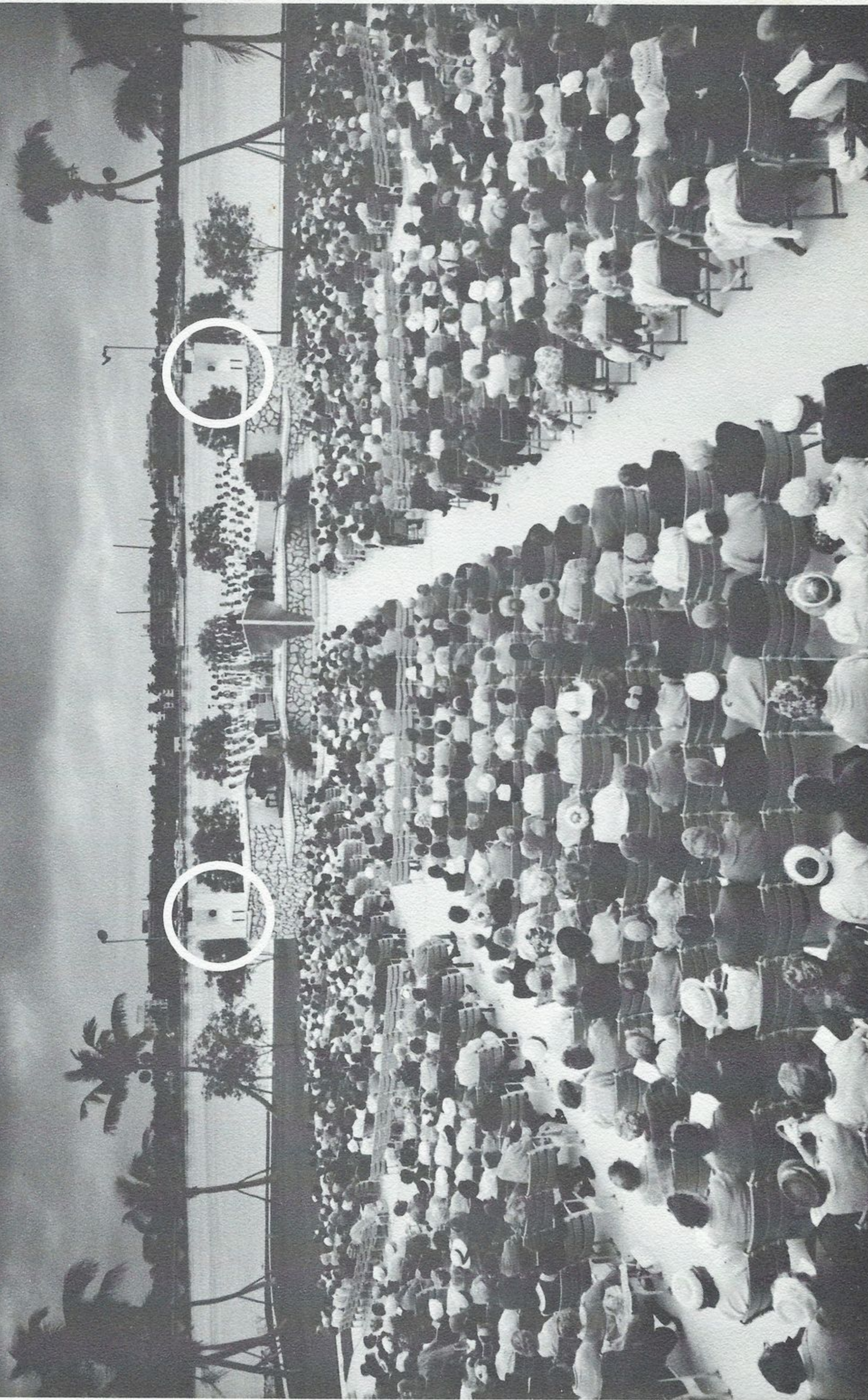


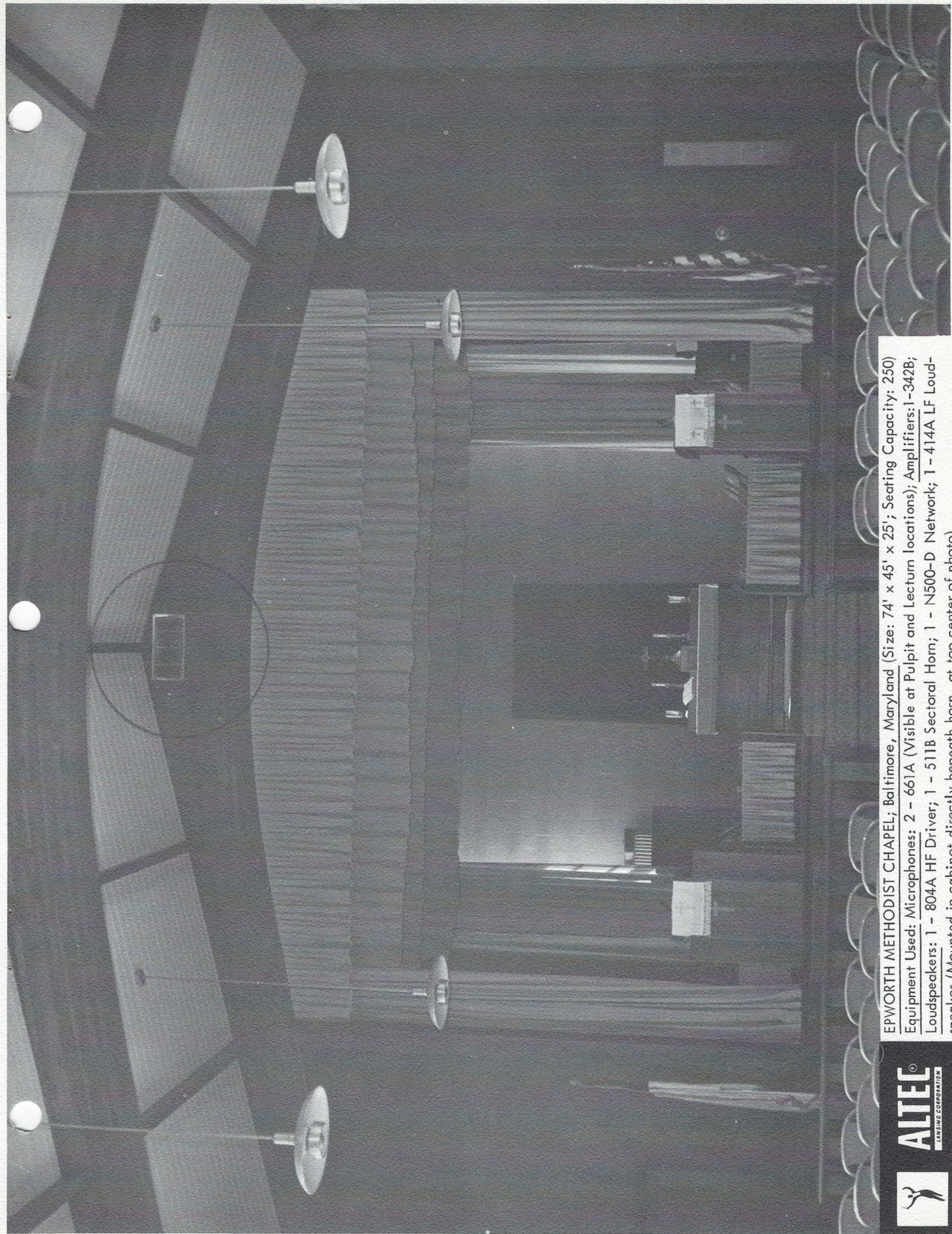
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CHAPEL-BY-THE-LAKE, First Baptist Church, West Palm Beach, Florida. Capacity: 1666. System Cost: \$8,000. Speakers: 2 - 210 horn cabinets, each with 1 - 515B speaker, 1 - 1005B multicellular horn and 1 - 288C driver (circled); 2 - 755C (Choir Monitors), 1 - 401B (Control Room Monitor). Amplifiers: 1 - 1561A, 1 - 1563A, 2 - 1567A, 1 - 436B, 2 - 1570B (all in remotely located control room). Microphones: 1 - M30 (Pulpit), 1 - 684A, 5 - 685A (Choir and Instruments), 1 - 684A (Baptistry).

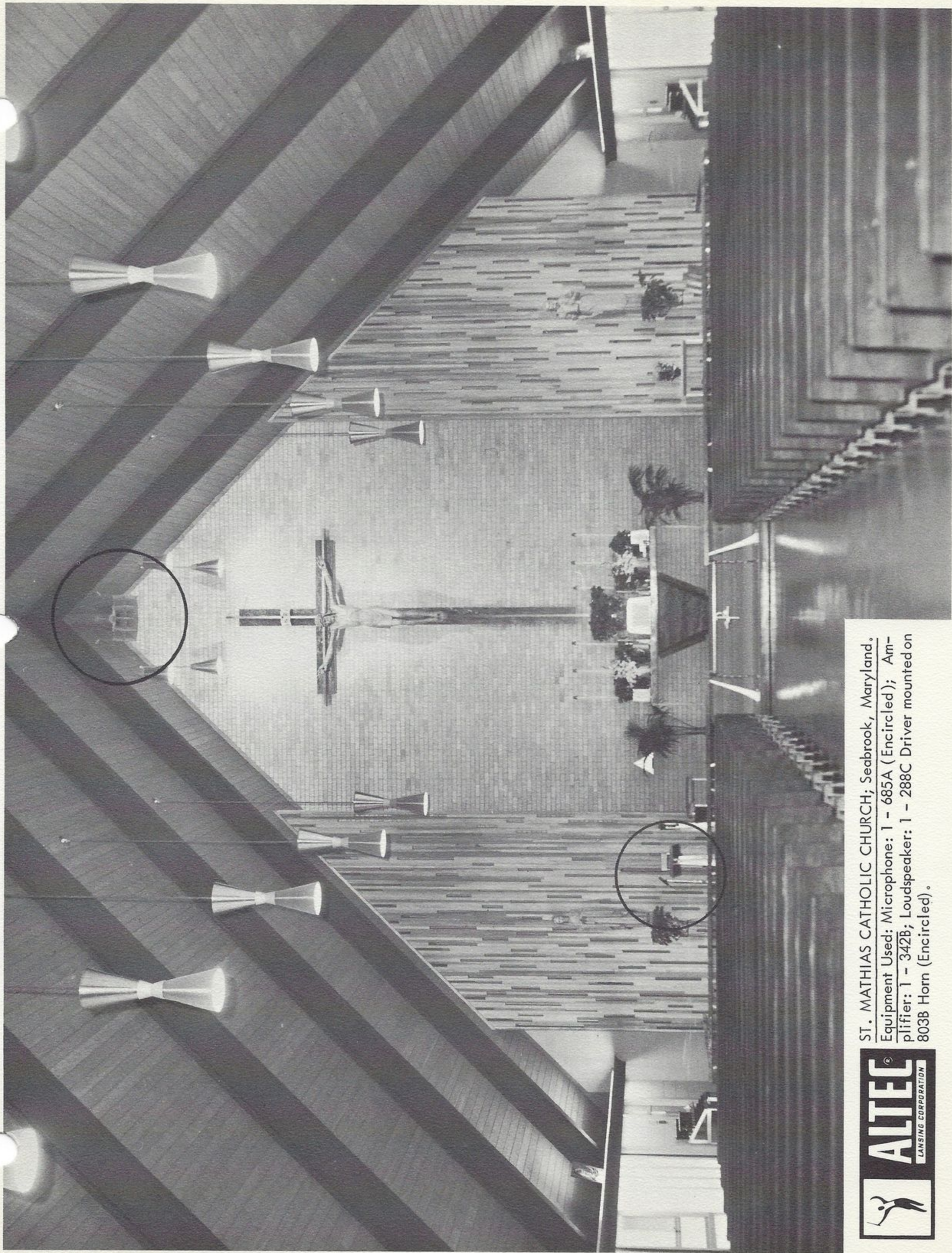




EPWORTH METHODIST CHAPEL; Baltimore, Maryland (Size: 74' x 45' x 25'; Seating Capacity: 250)
Equipment Used: Microphones: 2 - 661A (Visible at Pulpit and Lectern locations); Amplifiers: 1-342B;
Loudspeakers: 1 - 804A HF Driver; 1 - 511B Sectoral Horn; 1 - N500-D Network; 1 - 414A LF Loud-
speaker (Mounted in cabinet directly beneath horn, at top center of photo)



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ST. MATHIAS CATHOLIC CHURCH; Seabrook, Maryland.
Equipment Used: Microphone: 1 - 685A (Encircled); Amplifier: 1 - 342B; Loudspeaker: 1 - 288C Driver mounted on 803B Horn (Encircled).





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First Christian Church, Wichita Falls, Texas. Equipment Used - Microphones: 2 - M30 (Pulpit and Lectern), 1 - 682A, 1 - 683A (Choir), 2 - 685A (Receiving Microphones and Communion Table), 1 - 686A (Baptistry). Amplifiers: (Inset) 2 - 1567A, 1 - 438C, 2 - 1569A, 1 - 1553A. Speakers: 2 - 511 horns with 802D drivers and 412C speakers (Main Auditorium), 2 - 403B (Choir), 2 - 403B (Narthex).



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ST. NORBERT ABBEY, Green Bay, Wisc.

Loudspeakers (illustrated): 8 730A Drivers on 8 805A Horns suspended vertically in loft above 80 ft. high ceiling. Amplifiers: 1 1567A Mixer 1 436B and 1 438A Compressors, 2 1569A Power. Microphones: 2 680A.

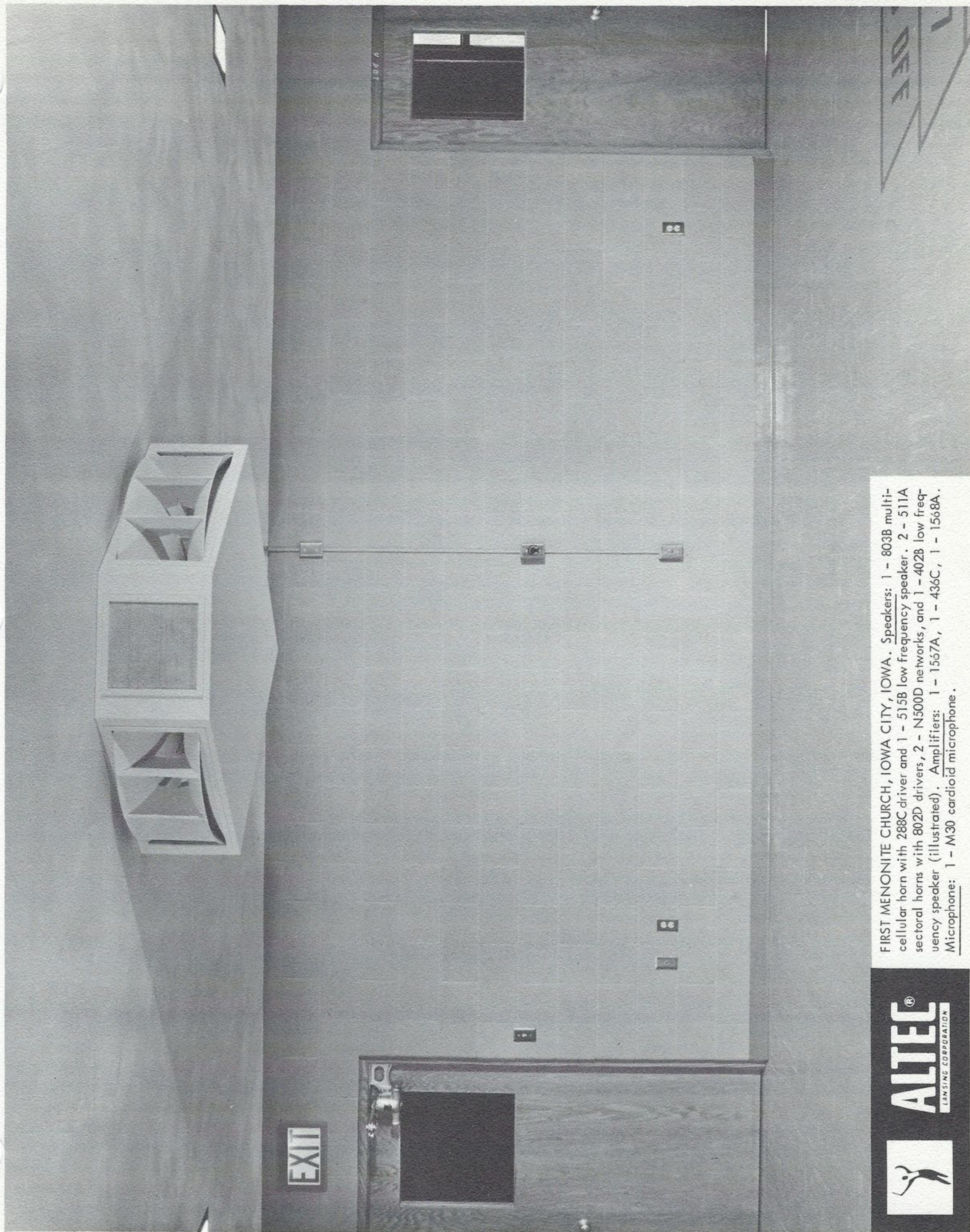


HOGE MEMORIAL PRESBYTERIAN CHURCH; Columbus, Ohio.
 (Seating Capacity, 500; Dimensions: 300' x 100' x 40'); Equipment Used:
 Microphones: 2 - 686A (Mounted inside pulpit and lectern)
 Amplifiers: 1 - 342B
 Speakers: 1 - 803B Horn and 288C Driver (encircled in above photo);
 6 - 755C (For coverage of front side pews, choir, narthex,
 and adjoining lounge room).



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FIRST MENONITE CHURCH, IOWA CITY, IOWA. Speakers: 1 - 803B multi-cellular horn with 288C driver and 1 - 515B low frequency speaker (illustrated). 2 - 511A sectoral horns with 802D drivers, 2 - N500D networks, and 1 - 402B low frequency speaker. Amplifiers: 1 - 1567A, 1 - 436C, 1 - 1568A. Microphone: 1 - M30 cardioid microphone.



FIRST MENONITE CHURCH, IOWA CITY, IOWA. Speakers: 1 - 803B multi-cellular horn with 288C driver and 1 - 515B low frequency speaker. 2 - 511A sectoral horns with 802D drivers, 2 - N500D networks, and 1 - 402B low frequency speaker (illustrated). Amplifiers: 1 - 1557A, 1 - 436C, 1 - 1568A. Microphone: 1 - M30 cardioid microphone.



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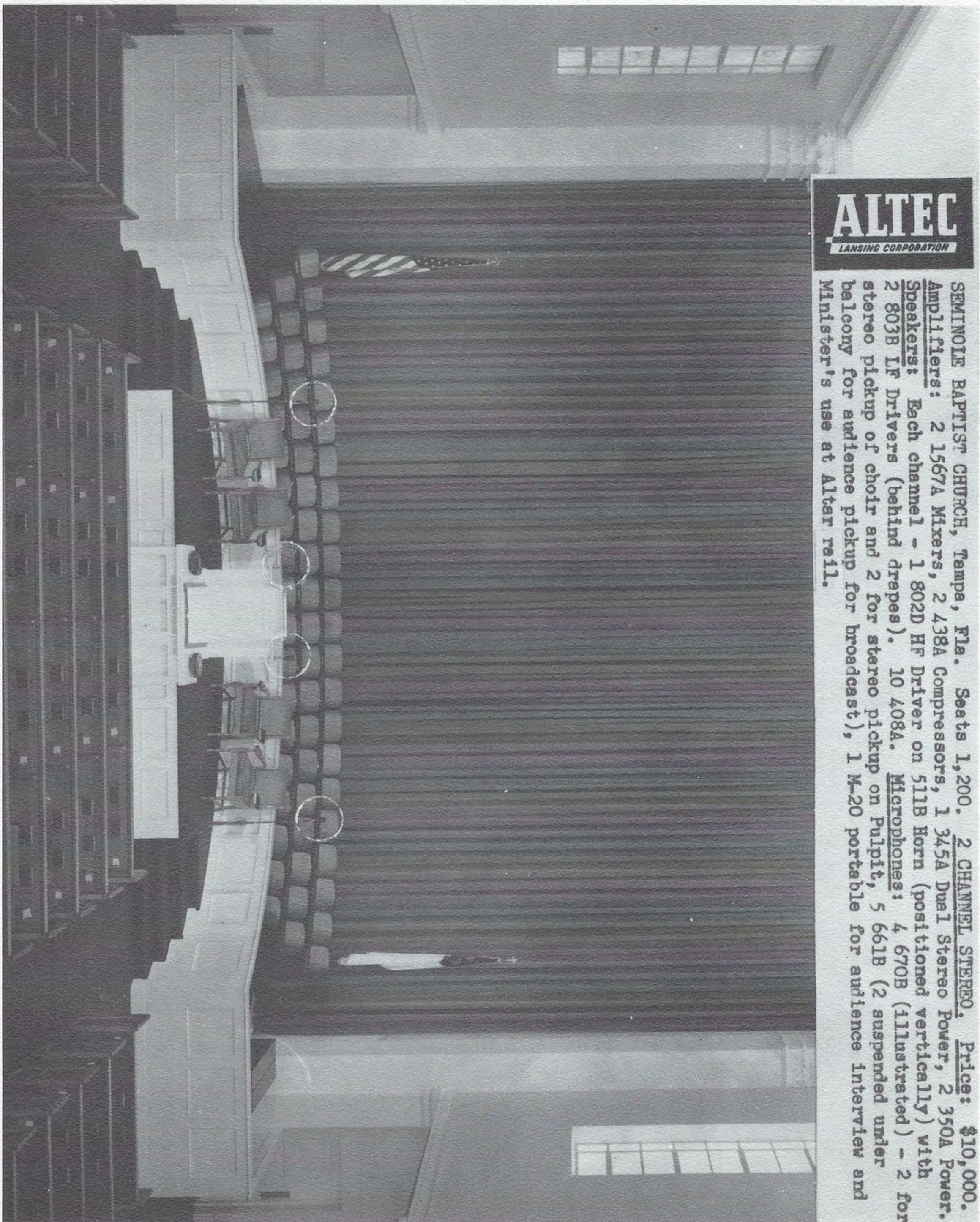
HOLY COMFORTER EPISCOPAL CHURCH; Charlotte, North Carolina: Equipment Used:

Microphones: 2 - M20 Systems; 1 - 684A; 2 - 686A; Amplifiers: 1 - 351B; 1 - 436C Compressor; 1 - 1567A Mixer; Loudspeakers: 1 - 288C Driver mounted on 1 - 803B Horn.



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SEMINOLE BAPTIST CHURCH, Tampa, Fla. Seats 1,200. 2 CHANNEL STEREO. Price: \$10,000.
Amplifiers: 2 1567A Mixers, 2 438A Compressors, 1 345A Dual Stereo Power, 2 350A Power.
Speakers: Each channel - 1 802D HF Driver on 511B Horn (positioned vertically) with
2 803B LF Drivers (behind drapes). 10 408A. Microphones: 4 670B (illustrated) - 2 for
stereo pickup of choir and 2 for stereo pickup on Pulpit, 5 661B (2 suspended under
balcony for audience pickup for broadcast), 1 M-20 portable for audience interview and
Minister's use at Altar rail.





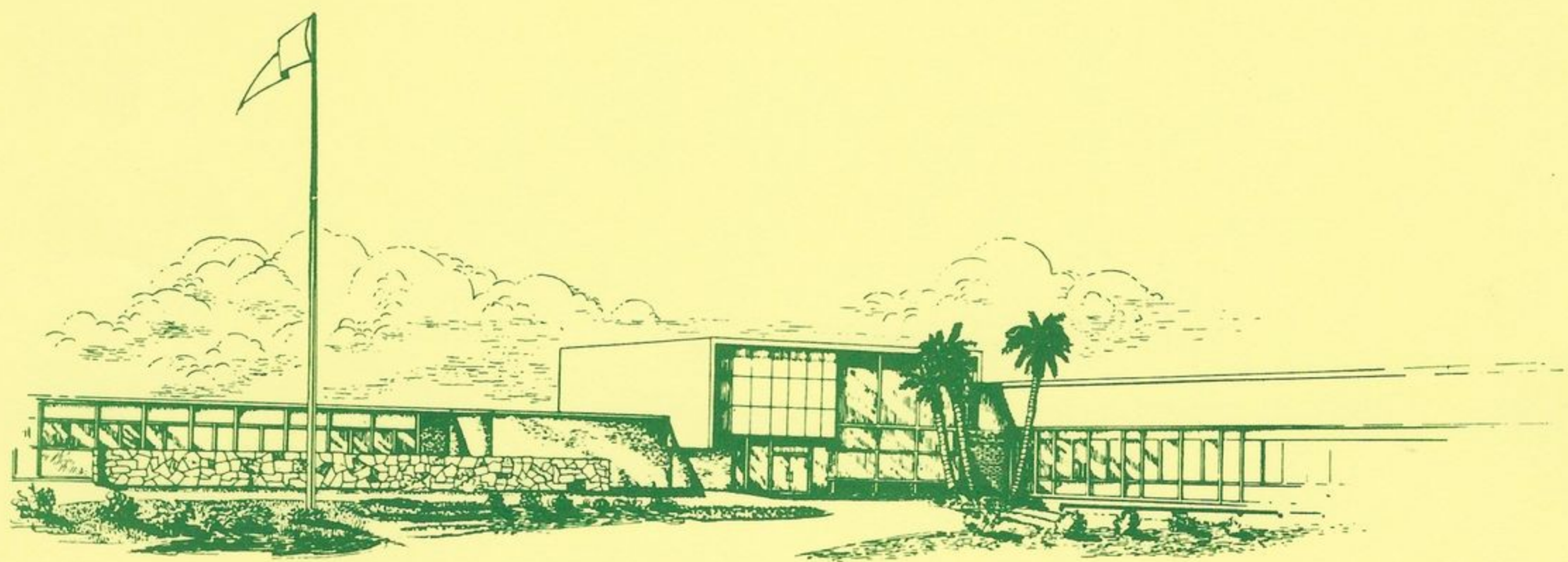
ST. MARK'S LUTHERAN CHURCH; Charlotte, North Carolina: (Seating Capacity, 800; Dimensions, 95' x 70' x 20')
Equipment Used: Microphones: 3 - M20 Systems (at Pulpit, Lectern, and Altar locations); 3 - 681A.
Amplifiers: 4 - 1561A; 1 - 1563A; 1 - 1564A; 1 - 1565A; 1 - 436A; 1 - 1568A (all in Sanctuary);
1 - 342B (in Fellowship Hall).
Speakers: 1 - 803B Horn; 1 - 288C Driver (in Sanctuary); 2 - 412B (in Fellowship Hall)



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SEMINOLE BAPTIST CHURCH, Tampa, Fla. 2 CHANNEL STEREO. Seats 1,200.
Amplifiers (illustrated): 2 1567A Pre, 2 438A Compressors, 1 345A Dual Stereo
Power, 2 350A Power. Speakers: 2 802D HF Drivers on 2 511B Horns with 4 803B
LF Drivers, 10 408A. Microphones: 4 670B, 5 661B, 1 M-20. Price: \$10,000.





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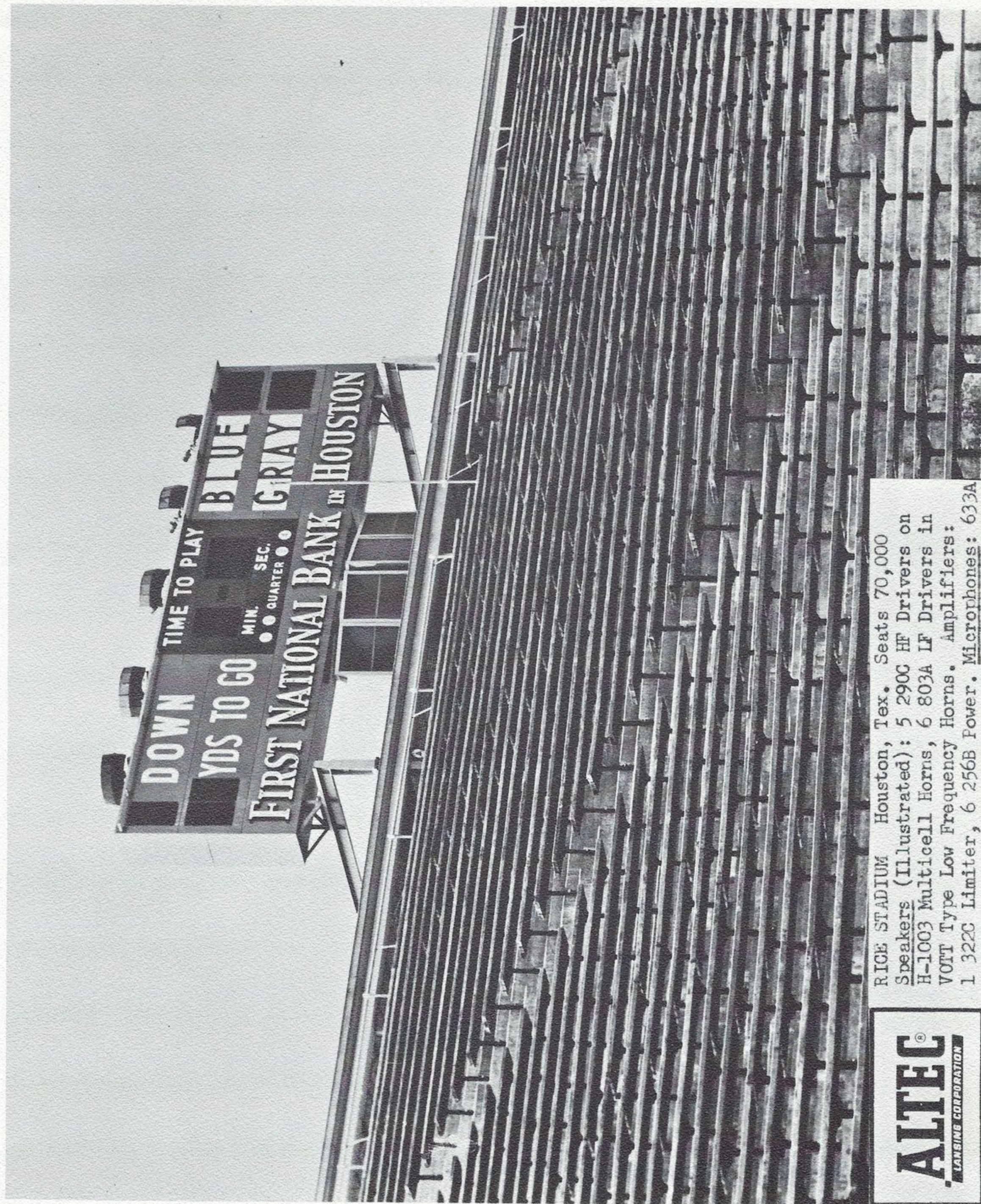
1515 S. Manchester Avenue,

Anaheim, California

Technical Letter No. 150

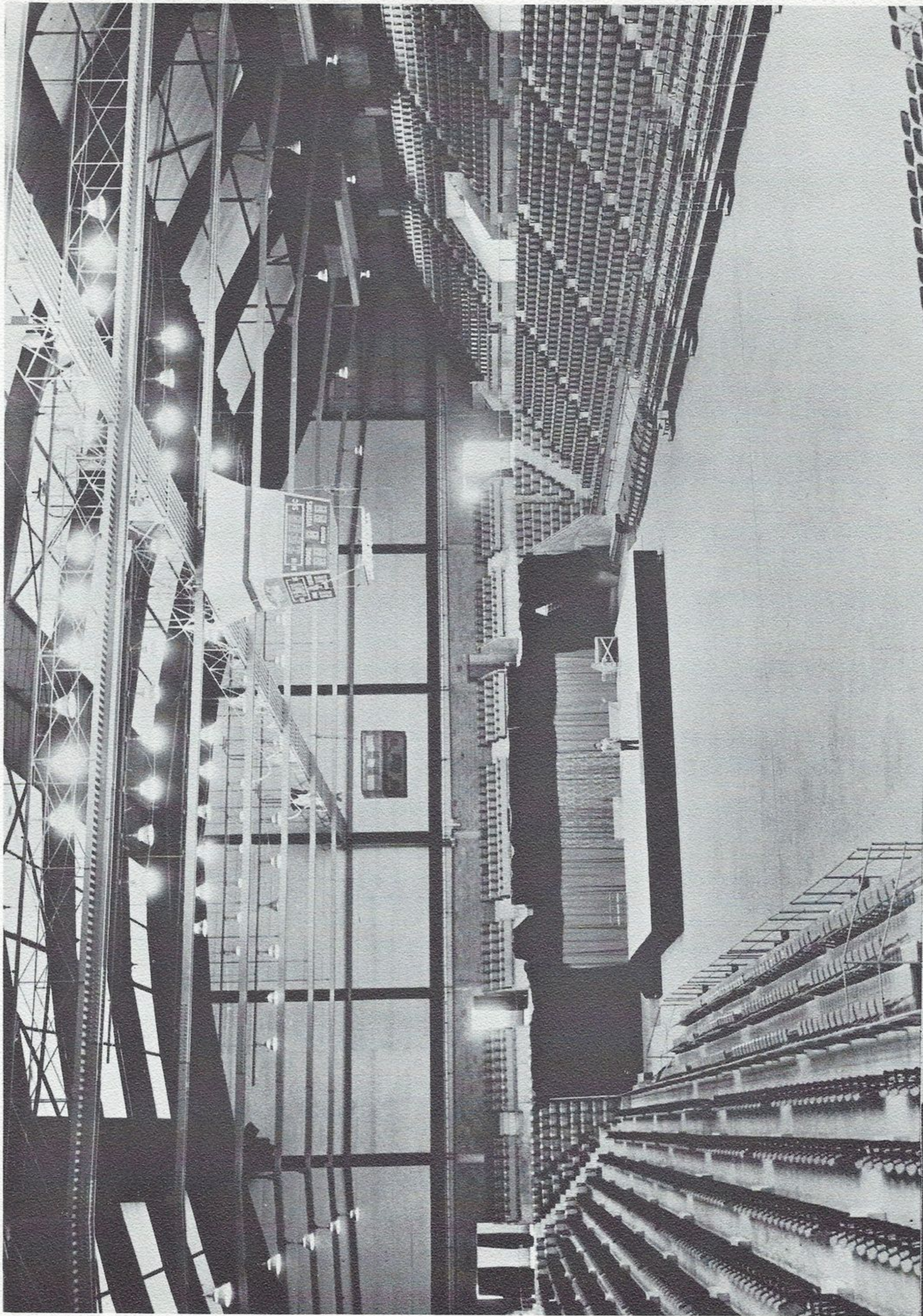
Altec Prestige Photo Folder

On Sport Systems



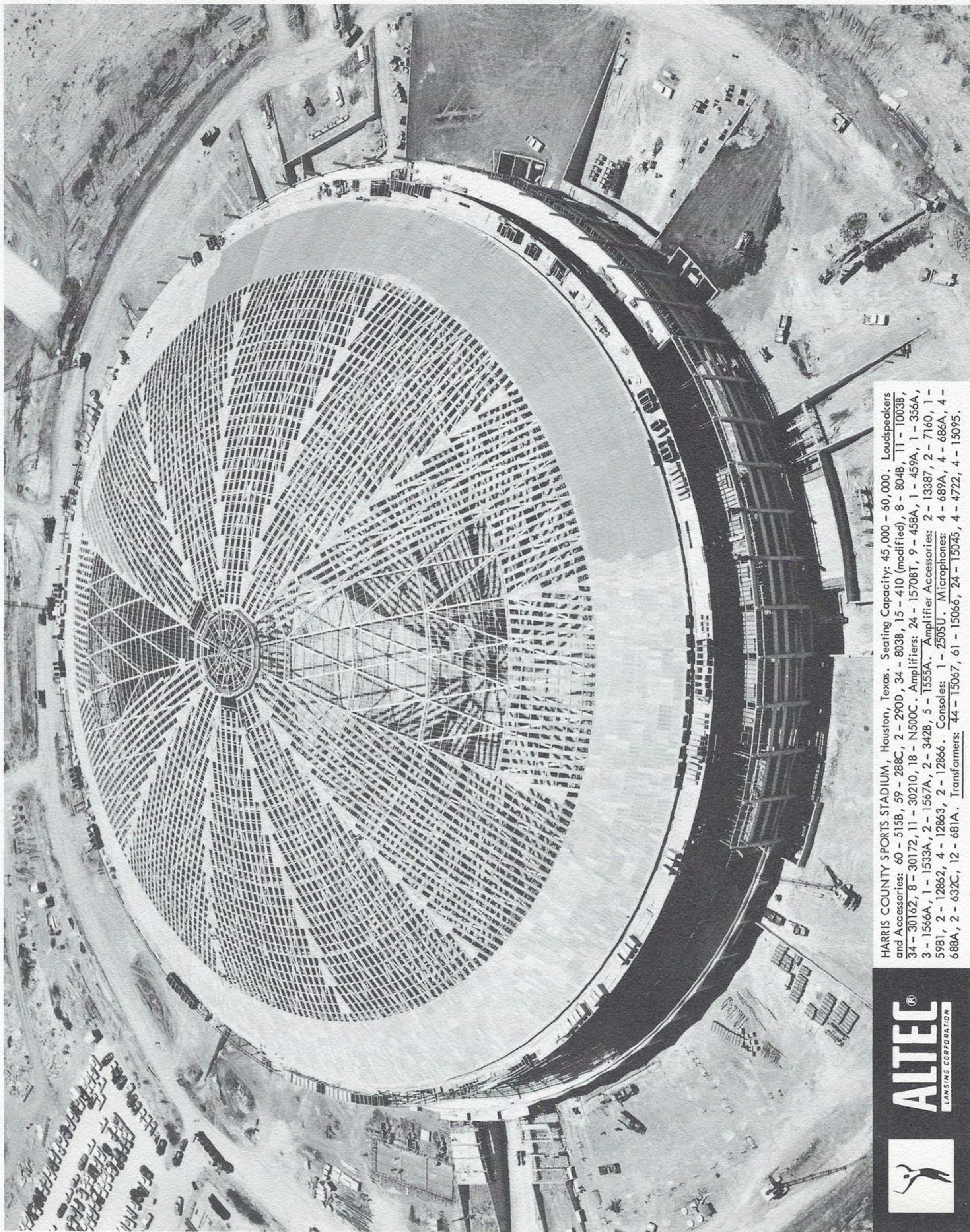
RICE STADIUM Houston, Tex. Seats 70,000
Speakers (Illustrated): 5 290C HF Drivers on
H-1003 Multicell Horns, 6 803A LF Drivers in
VOTT Type Low Frequency Horns. Amplifiers:
1 322C Limiter, 6 256B Power. Microphones: 633A

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WINSTON-SALEM COLISEUM, WINSTON-SALEM, N.C. Seats 9,000
Speakers (Illustrated): Center projectolier 4 288B HF Drivers on 4 H-1003
Multicells; Stage projectolier 4 288B HF Drivers on 1 H-805 and 2 H-804
Multicells, plus 4 515 LF Drivers in 4 612 Cabinets. Amplifiers: 2 1510A
Pre, 2 1530A Power. Microphones: 2 M-20, 2 633A, 1 632C. Price \$9,000

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HARRIS COUNTY SPORTS STADIUM, Houston, Texas. Seating Capacity: 45,000 - 60,000. Loudspeakers and Accessories: 60 - 515B, 59 - 288C, 2 - 290D, 34 - 803B, 15 - 410 (modified), 8 - 804B, 11 - 1003B, 34 - 30162, 8 - 30172, 11 - 30210, 18 - N500C. Amplifiers: 24 - 1570BT, 9 - 458A, 1 - 459A, 1 - 336A, 3 - 1566A, 1 - 1533A, 2 - 1567A, 2 - 342B, 5 - 1555A. Amplifier Accessories: 2 - 13387, 2 - 7160, 1 - 5981, 2 - 12862, 4 - 12863, 2 - 12866. Consoles: 1 - 2505U. Microphones: 4 - 689A, 4 - 686A, 4 - 688A, 2 - 632C, 12 - 681A. Transformers: 44 - 15067, 61 - 15066, 24 - 15045, 4 - 4722, 4 - 15095.



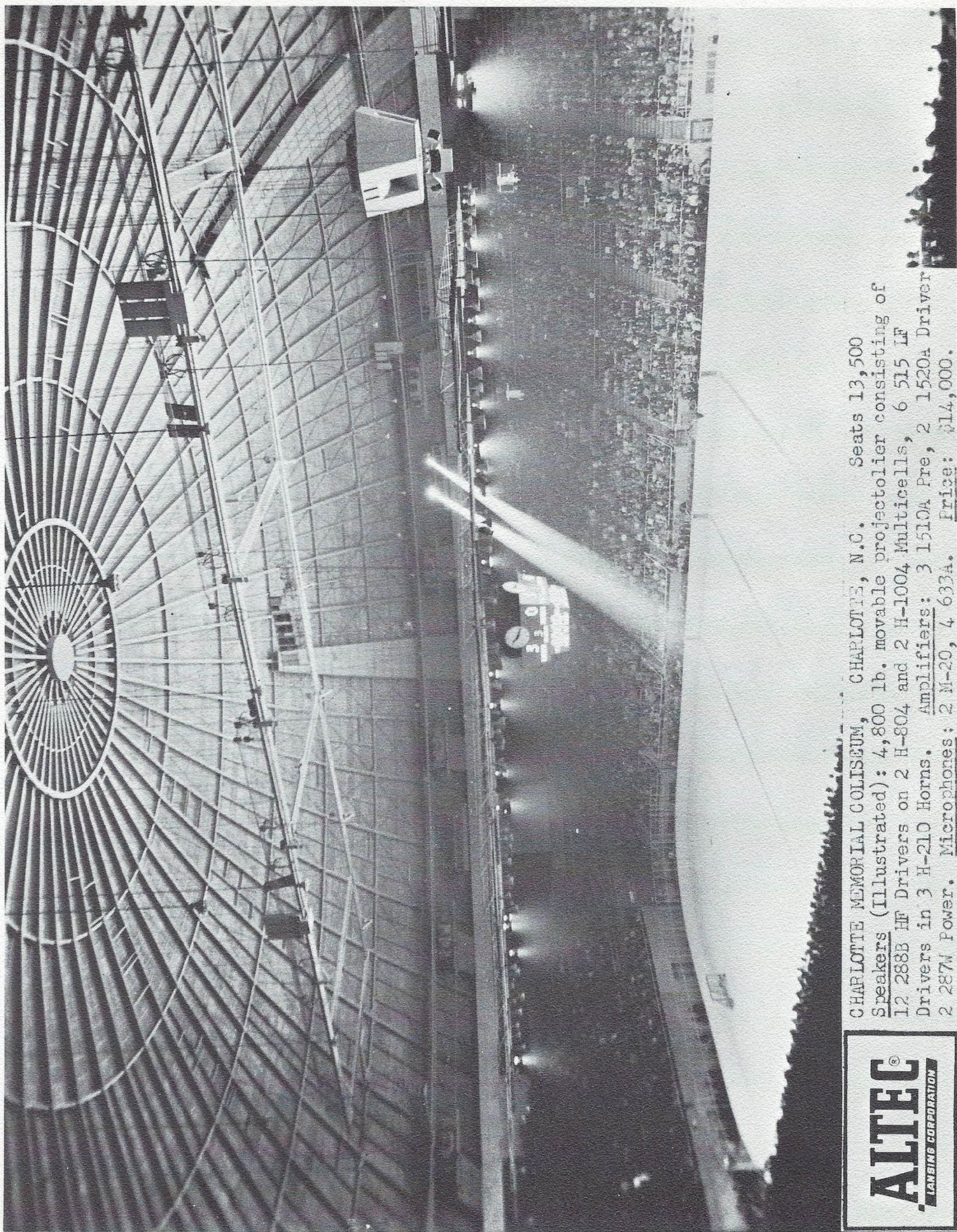
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WAR MEMORIAL STADIUM; Little Rock, Arkansas: (Seating Capacity: 45,000; Dimensions: 500' X 280'). Equipment Used: Microphone: 1 - 632C (Located in Press Box); Amplifiers: 1 - 1567A Mixer; 1 - 436C Compressor; 6 - 1570B Power Amplifiers; 3 - 7740 'SEQR' Panels (Also located in Press Box); Loudspeakers: 11 - 290D Drivers mounted on 11 - 203B Multi-cellular Horns (Shown in inset, upper right). System Price: \$12,000



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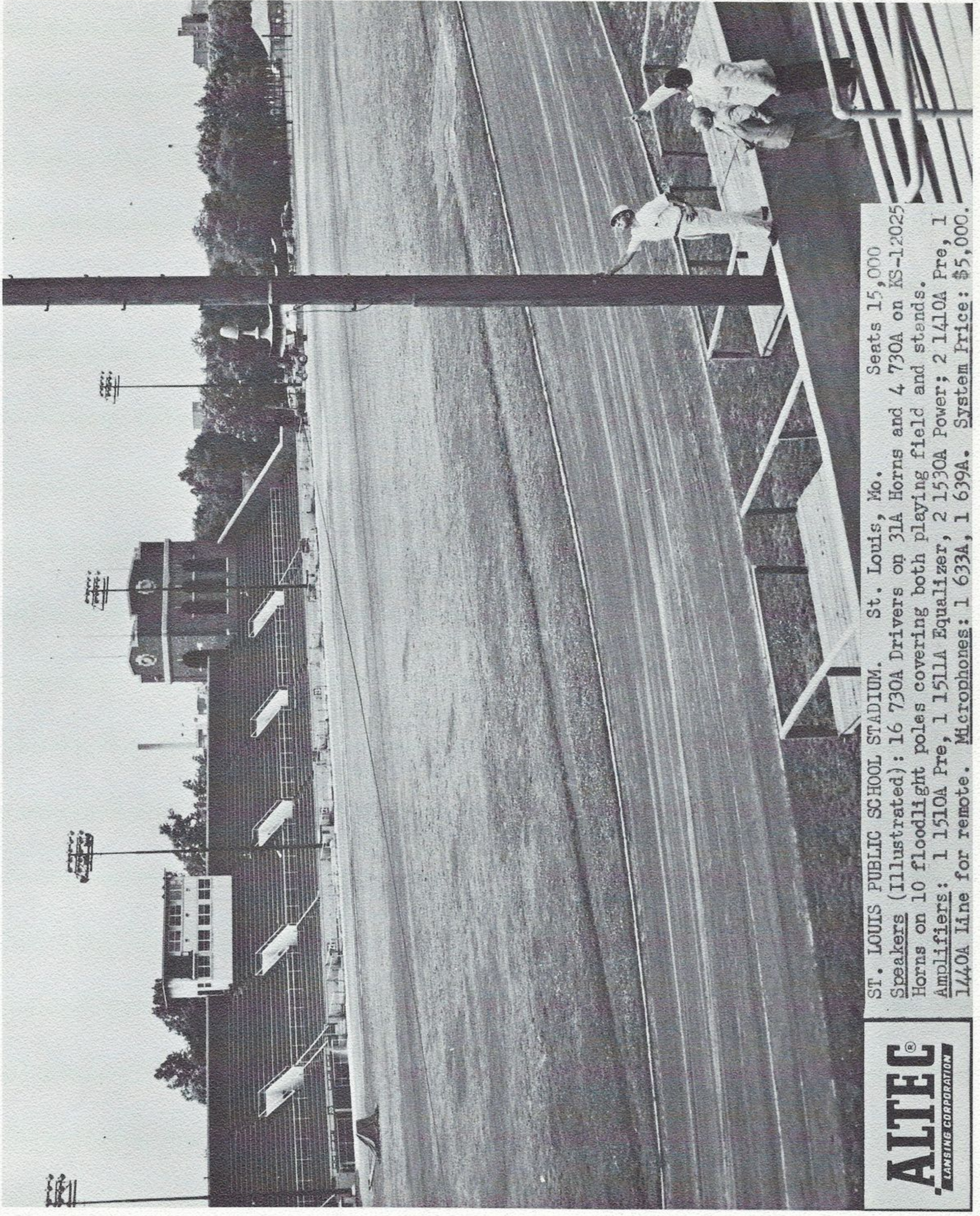
CHARLOTTE MEMORIAL COLISEUM, CHARLOTTE, N.C. Seats 13,500
Speakers (Illustrated): 4,800 lb. movable projectolier consisting of
12 288B HF Drivers on 2 H-804 and 2 H-1004 Multicells, 6 515 LF
Drivers in 3 H-210 Horns. Amplifiers: 3 1510A Pre, 2 1520A Driver
2 287W Power. Microphones: 2 M-20, 4 633A. Price: \$14,000.

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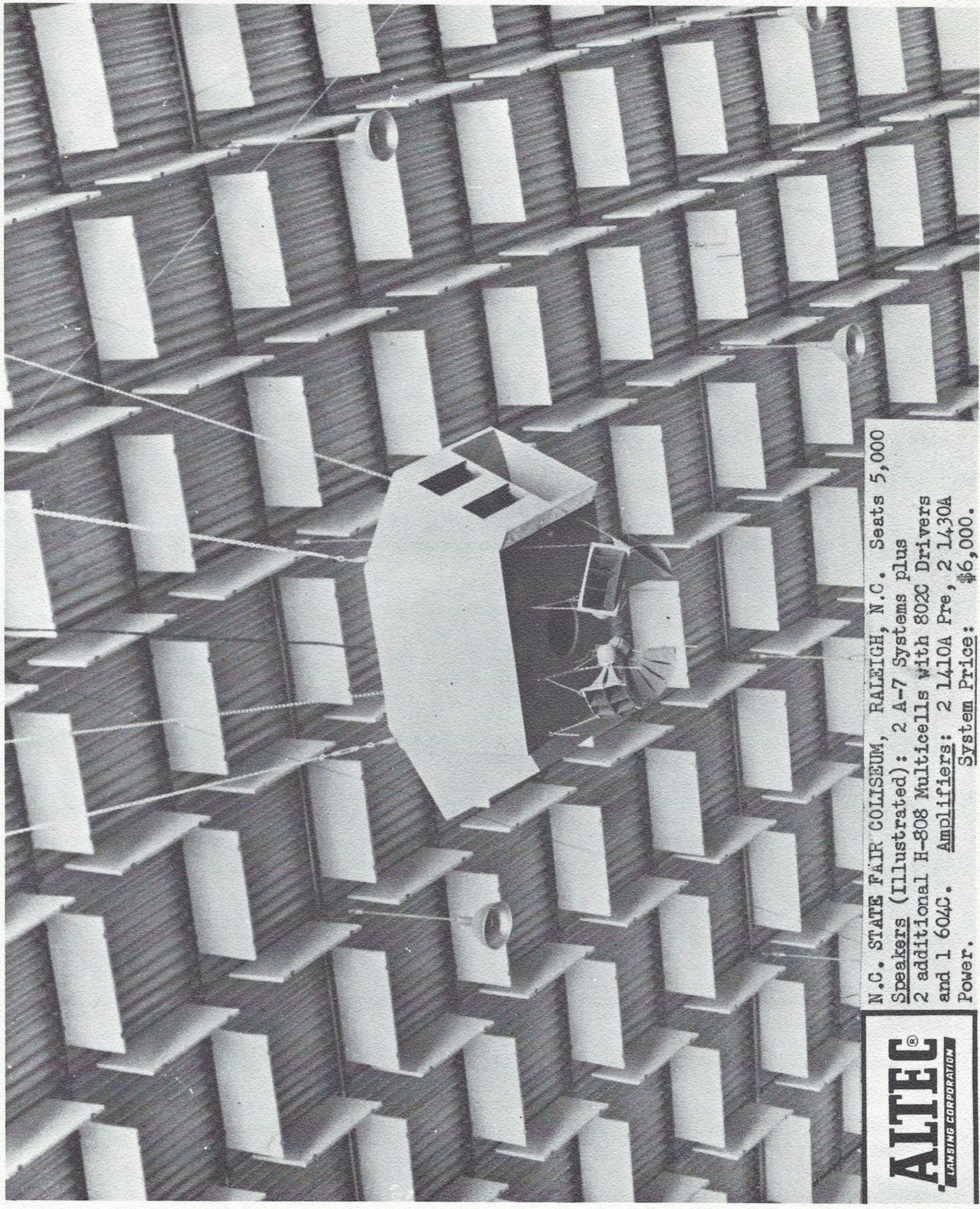
TEXAS CHRISTIAN UNIVERSITY STADIUM Fort Worth, Tex. Seats 45,000
Speakers (Illustrated): 10 290C HF drivers on 5 H-1003 multicells,
4 515 LF Drivers in 4 825A baffles, on top of score board. Amplifiers:
2 1510 Pre, 1 1540 Line, 1 322C Limiter, 2 260A Power. Microphones:
2 660B. System Price: \$14,500.





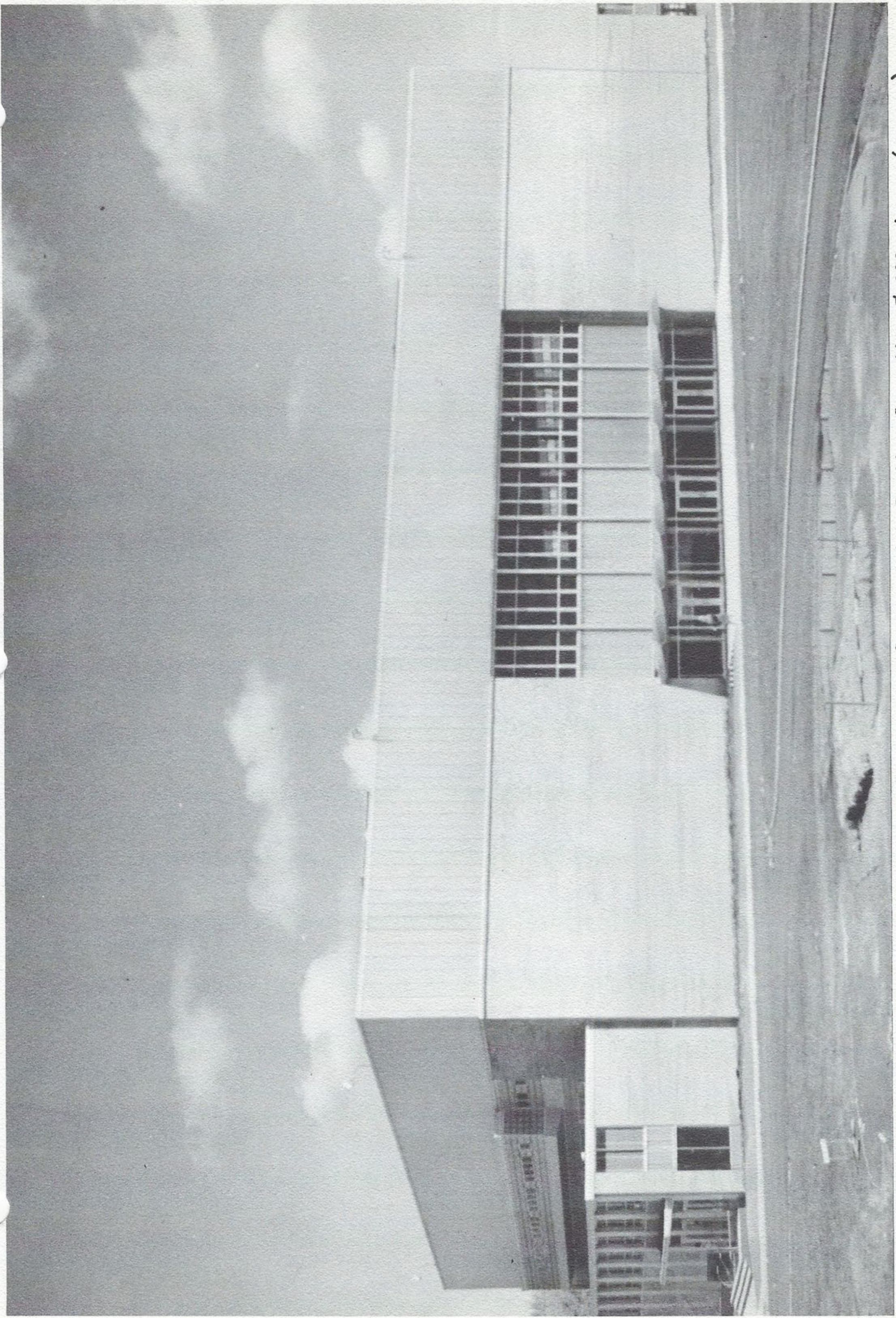
ST. LOUIS PUBLIC SCHOOL STADIUM. St. Louis, Mo. Seats 15,000
Speakers (Illustrated): 16 730A Drivers on 31A Horns and 4 730A on KS-12025
Horns on 10 floodlight poles covering both playing field and stands.
Amplifiers: 1 1510A Pre, 1 1511A Equalizer, 2 1530A Power; 2 1410A Pre, 1
1440A Line for remote. Microphones: 1 633A, 1 639A. System Price: \$5,000.

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N.C. STATE FAIR COLISEUM, RALEIGH, N.C. Seats 5,000
Speakers (Illustrated): 2 A-7 Systems plus
2 additional H-808 Multicells with 802C Drivers
and 1 604C. Amplifiers: 2 1410A Pre, 2 1430A
Power. System Price: \$6,000.

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MEMORIAL HALL, BOWLING GREEN STATE UNIVERSITY, Bowling Green, Ohio: Seating Capacity: 5,000; Area, (approx) over 30,000 square feet; Equipment Used: Microphones: 2-639A, 2-M30 Systems, 2-633A; Power Supplies: 1-1564A; Pre-Amplifiers: 7-1561A, 1-1563A, 1-440C; Amplifiers: 3-1569A; Tuner: 1-306A; Speakers: 19-1803B horns, 19-730B Drivers, 4-612A cabinets, 4-515B Drivers.

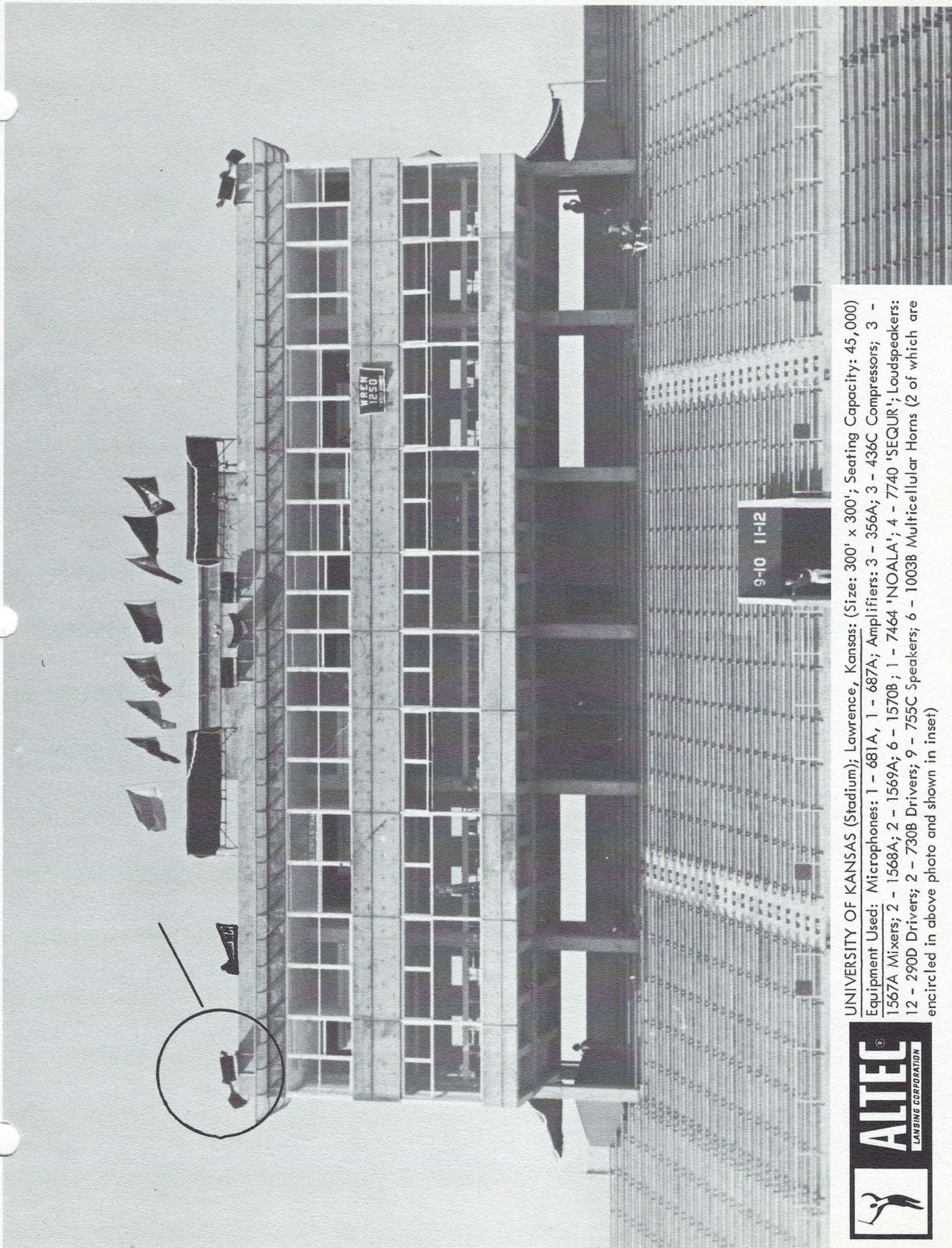


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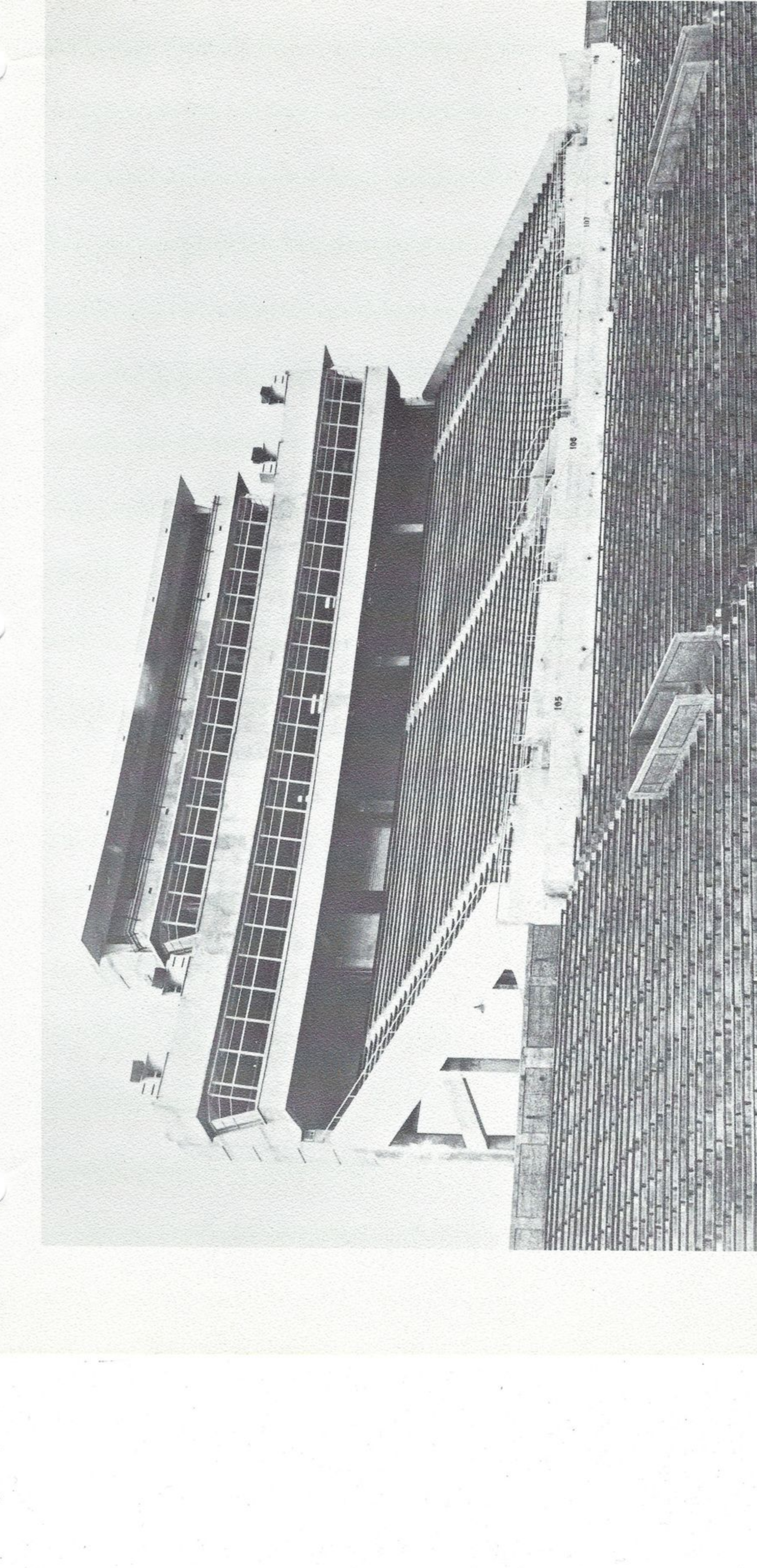


MISSOURI STATE FAIR, 1964 AUTO RACES; Harold Douglas, IMCA track announcer using an ALTEC 696A NOISE CANCELLING DYNAMIC microphone. Track Conditions: Noisy! Sound Conditions: Excellent!! Mixers: Two Altec 1567A's Compression Amplifier: Altec 438C Power Amplifier: Altec 1570B



UNIVERSITY OF KANSAS (Stadium); Lawrence, Kansas; (Size: 300' x 300'; Seating Capacity: 45,000)
Equipment Used: Microphones: 1 - 681A, 1 - 687A; Amplifiers: 3 - 356A; 3 - 436C Compressors; 3 - 1567A Mixers; 2 - 1568A; 2 - 1569A; 6 - 1570B; 1 - 7464 'NOALA'; 4 - 7740 'SEQR'; Loudspeakers: 12 - 290D Drivers; 2 - 730B Drivers; 9 - 755C Speakers; 6 - 1003B Multicellular Horns (2 of which are encircled in above photo and shown in inset)





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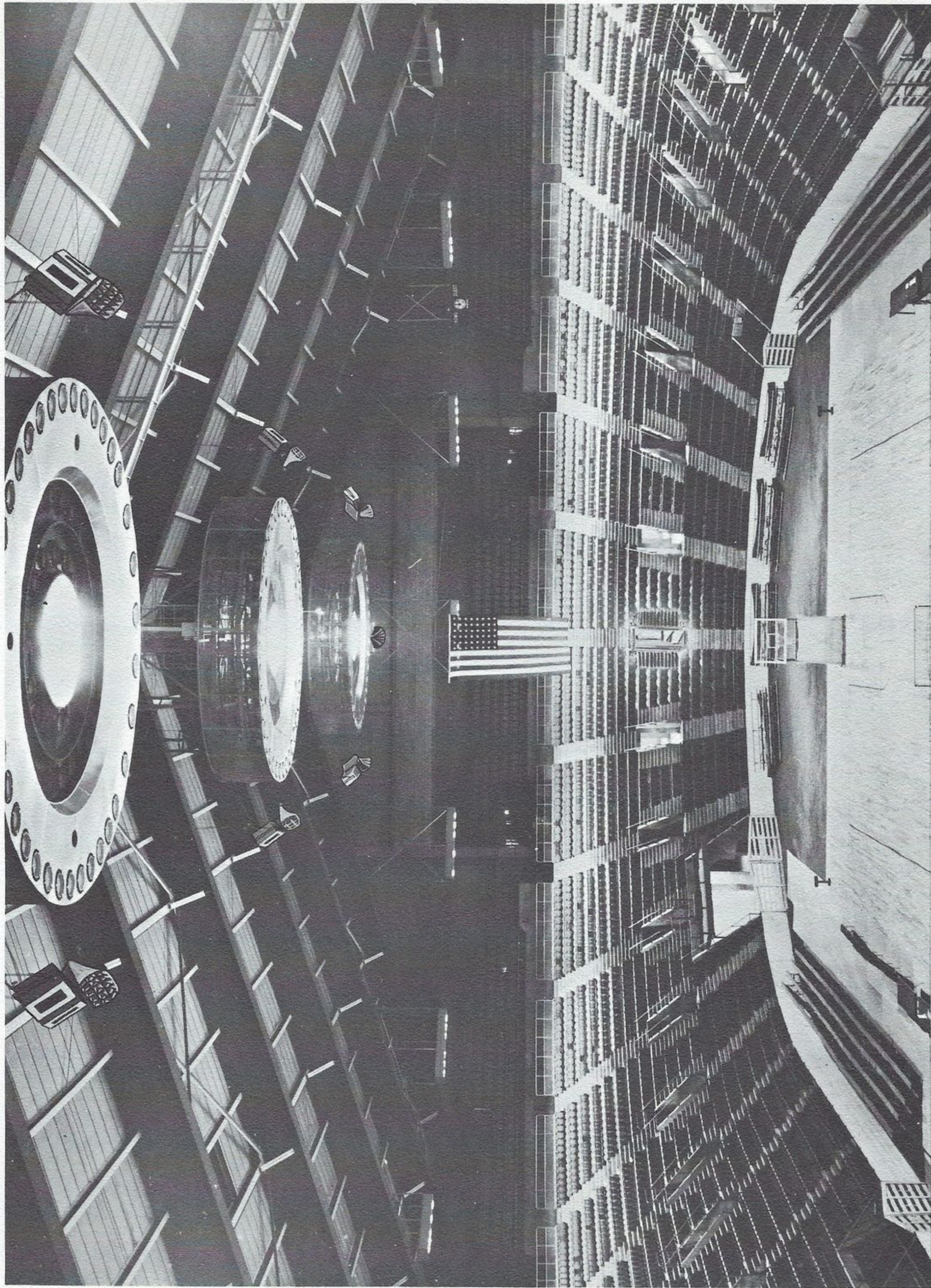
KYLE FIELD, TEXAS A & M COLLEGE College Station, Tex. Seats 35,000
Speakers (Illustrated): 4 290C HF Drivers on 4 H-1003 multicells, 8
515 LF Drivers in 4 H-210 horns. Auxiliary Speakers - 19 400B, 2 730A
on 31A horns. Amplifiers: 220A Portable Mixer, 1 322C Limiter, 2
A-127B Drivers, 2 287W Power. Microphones: 2 660B. Price: \$8,000.



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IOWA CITY HIGH SCHOOL, Iowa City, Iowa. Speakers: 5 - 31A horns with 730B drivers and 15045A 70-volt transformers. Amplifiers: 2 - 1561A Preamp-lifiers, 1 - 1564A Power Supply, 1 - 436C Compressor Amplifier, 1 - 1570B Amplifier. Microphones: 1 - 633A Dynamic Microphone, and 1 - 618A Omnidirectional Microphone.





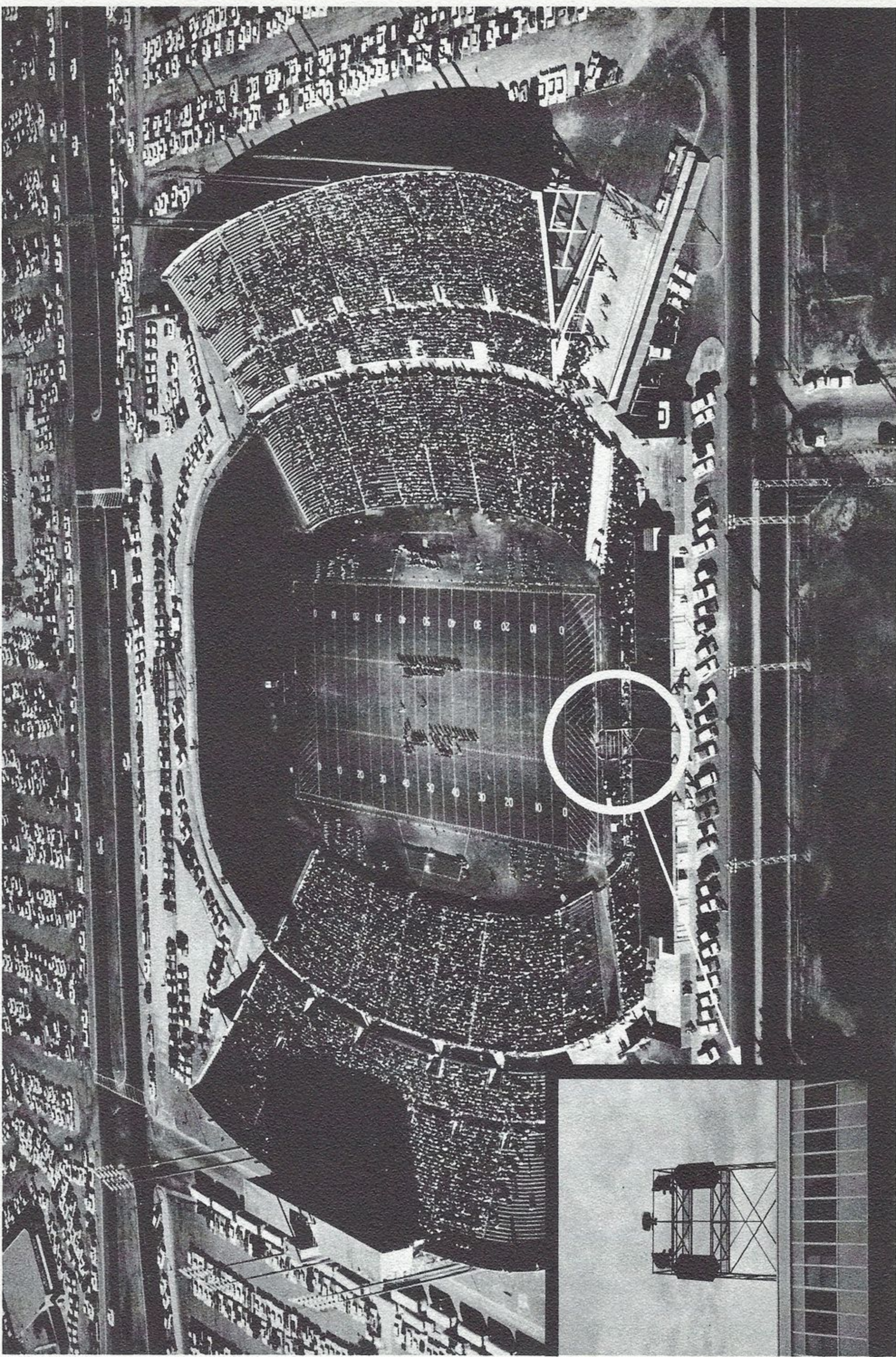
HARRISBURG (PENNSYLVANIA) FARM SHOW BLDG. System Price: \$19,000. Speakers: 16 288B HF Drivers on 16 H-1803 Multicells mounted in special cluster racks with 16 515 LF Drivers in 612A cabinets (illustrated), 11 755A in 11 618C cabinets. Amplifiers: 1 250A console, 4 438A compressors, 4 1570A Power. Tuner: 1 306A AM-FM. Microphones: 3 639B, 1 661A.



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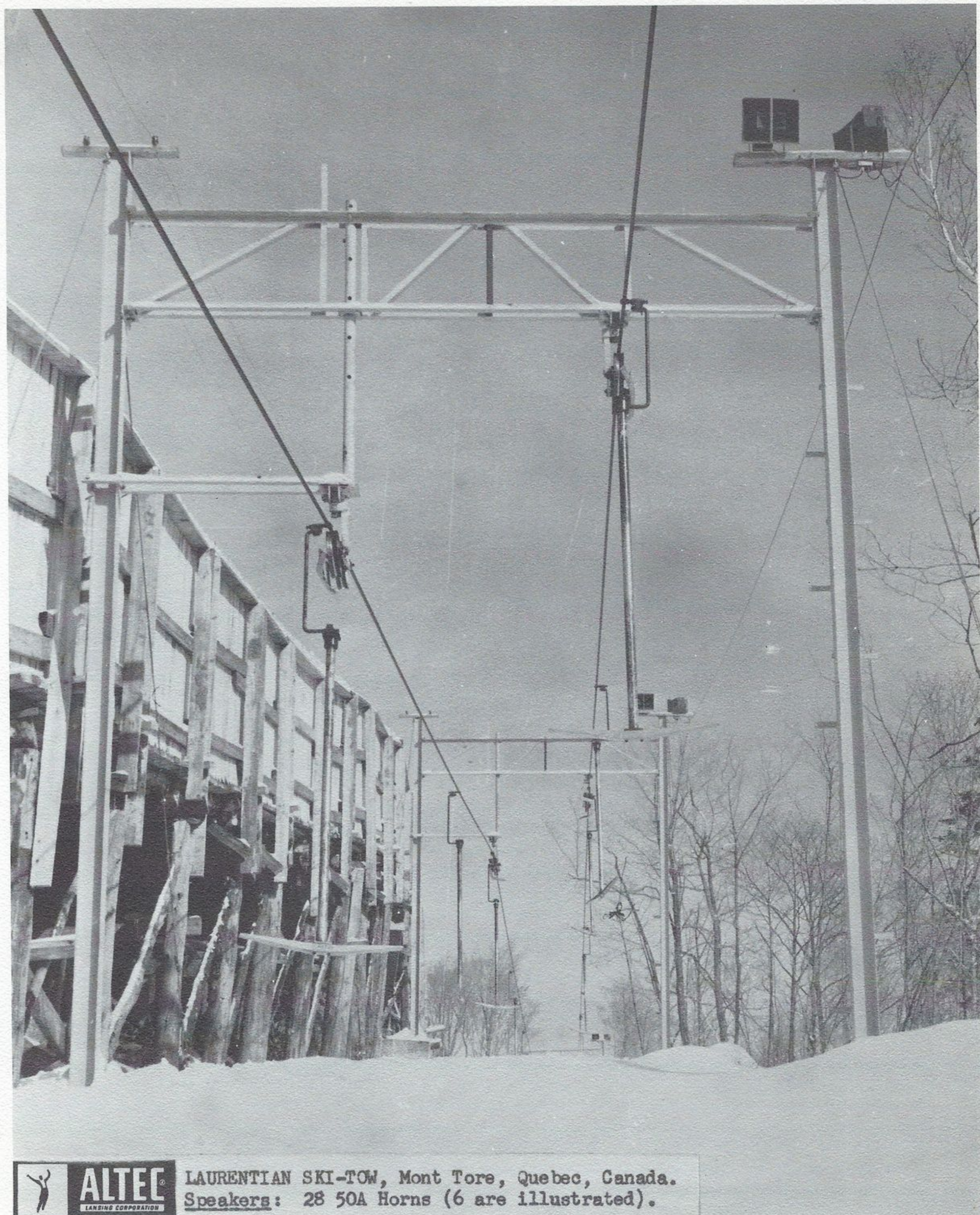
LANSING CORPORATION

TEXAS TECH STADIUM (Lubbock, Texas) System price - \$21,500 Seats 45,000
Microphones: 2 - 632C, 2 - 661C. Amplifiers: 2 - 1567A Amplifiers (one rack mounted and other for spare to be removed from rack for field use), 1 - 436B Compressor, 3 - 260A Amplifiers (two for use for each speaker system and the 3rd can be switched to either location for emergency). Tuner: 1 - 306A AM FM (pre-game activities). Speakers: 5 - 1003B HF Horns, 10 - 290C Drivers, 3 - N500C Crossover Networks, 2 - 210 LF Baffles, 4 - 515 LF Speakers.



S/O-103-05

Altec Prestige Photo

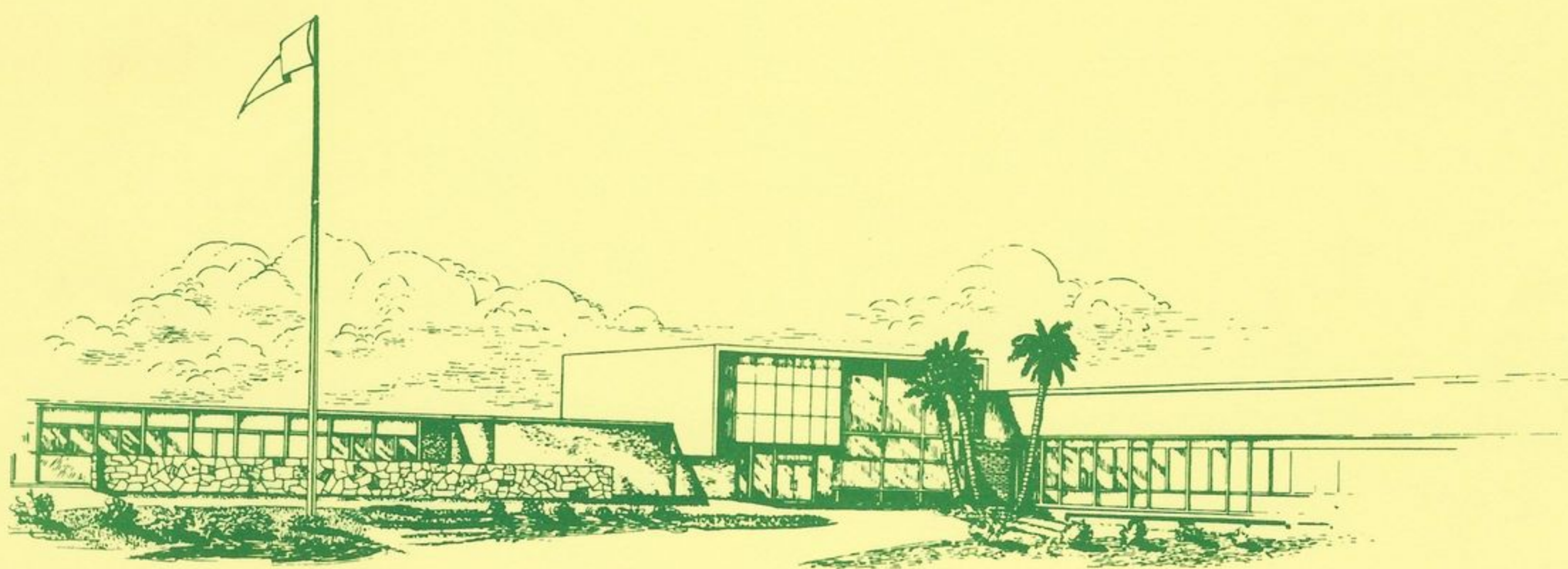


ALTEC
LANSING CORPORATION

LAURENTIAN SKI-TOW, Mont Tore, Quebec, Canada.
Speakers: 28 50A Horns (6 are illustrated).

S/O-104-03

Altec Prestige Photo



ALTEC LANSING

A Division of **LTV** Ling Altec, Inc.
ANAHEIM, CALIFORNIA

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Engineering News



ALTEC LANSING

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1515 S. Manchester Avenue,

Anaheim, California

TECHNICAL LETTER NO. 203

MEASUREMENT OF NOMINAL SENSITIVITY RATINGS FOR HORN-DRIVER COMBINATIONS COMMONLY USED IN ACOUSTA-VOICING®

by
Bob Beavers, Chief Engineer, Acoustics

In design work for Acousta-Voicing sound systems, measurements of sensitivity ratings that can be duplicated in the field are essential.

The following procedure for measuring nominal horn-driver sensitivity ratings has been adapted at the ALTEC Engineering Laboratory.

1. Inputs

The input signal is a band of 'pink' noise generated by filtering the output of a GR 1382A Random Noise Generator through an ALTEC 9067B Band Pass Filter, properly terminated with 600 ohms and set to pass frequencies ranging from 500 Hz to 3000 Hz.

The input power is defined to be one watt delivered to the nominal driver impedance; i.e., 4.00 volts RMS for 16-ohm drivers, 2.83 volts RMS for 8-ohm drivers and 2.00 volts RMS for 4-ohm drivers.

Since the 500-3000 Hz 'pink' noise level will fluctuate, a long-time-constant ac VTVM will be more convenient to obtain these input measurements.

2. Test Setup (see Figure 1)

The sound pressure level (SPL) is measured four feet from the mouth of the specified horn, and on its principal axis. If the SPL is measured with a sound level meter (SLM), it will be convenient to use the 'RMSslow' position to average the fluctuations. If an anechoic environment is not available, measurements should be made outdoors.

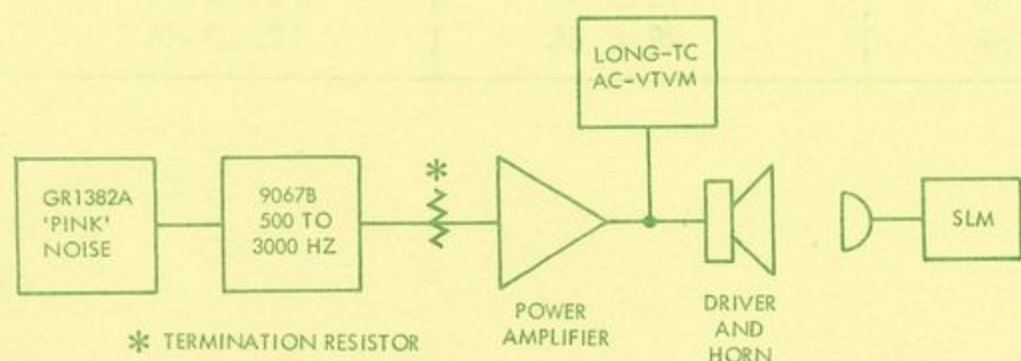


Figure 1. Block Diagram of Test Setup

3. Calculating the Sensitivities

If a SLM is used, the '1 watt nominal sensitivity' will be read directly. This reading can be extrapolated to any power level or distance by the following equation:

$$SPL_{x,p} = S_o + 10 \log P - 20 \log \left(\frac{D_x}{4} \right)$$

where

$SPL_{x,p}$ is the SPL at distance 'x' in feet and with 'p' watts power input
 S_o is the one watt at four feet value
 P is the power level in the field application
 D_x is the distance to the driver in the field

The SPLs shown in Table I have been extrapolated for the common horn-driver combinations and are given for 10' and 30' at the full power ratings for the various drivers.

The 730C driver unit has been included in Table I for convenience. The sensitivity of this unit compares favorably with the 290 throughout the 500-3000 Hz range but since its high sensitivity is achieved at the expense of bandwidth, it is recommended only for speech reinforcement applications.

The 288-series drivers are assumed to have a power handling capacity of 20 watts, resulting in a SPL rating 3 dB lower than obtained for each of the full-power SPL ratings in the 291-16-series drivers. The 1-watt sensitivity measurements for the 288-series drivers are the same as those obtained for the 291-16-series drivers.

This data should be considered as tentative and subject to an error of ± 1 dB due to variances in driver elements and extrapolations from anechoic measurements.

Litho in USA CP-870-2.5K

Table 1. Field Sensitivity Measurements

Driver	Horn	Electrical Input Power	SPL at 30 Ft	SPL at 10 Ft	SPL at 4 Ft
291-16 291-16	203B 203B	40 watts 1 watt	110.0 dB 94.0 dB	119.5 dB 103.5 dB	127.5 dB 111.5 dB
290E 290E	203B 203B	100 watts 1 watt	110.5 dB 90.5 dB	120.0 dB 100.0 dB	128.0 dB 108.0 dB
730C 730C	203B 203B	75 watts 1 watt	110.5 dB 92.0 dB	120.0 dB 101.5 dB	128.0 dB 109.5 dB
291-16 291-16	803B 803B	40 watts 1 watt	109.0 dB 92.5 dB	118.5 dB 102.0 dB	126.5 dB 110.0 dB
290E 290E	803B 803B	100 watts 1 watt	109.0 dB 89.0 dB	118.5 dB 98.5 dB	126.5 dB 106.5 dB
730C 730C	803B 803B	75 watts 1 watt	109.0 dB 90.5 dB	118.5 dB 100.0 dB	126.5 dB 108.0 dB
291-16 291-16	1003B 1003B	40 watts 1 watt	106.5 dB 90.5 dB	116.0 dB 100.0 dB	124.0 dB 108.0 dB
290E 290E	1003B 1003B	100 watts 1 watt	107.0 dB 87.0 dB	116.5 dB 96.5 dB	124.5 dB 104.5 dB
730C 730C	1003B 1003B	75 watts 1 watt	107.0 dB 88.5 dB	116.5 dB 98.0 dB	124.5 dB 106.0 dB
291-16 291-16	1203B 1203B	40 watts 1 watt	103.5 dB 88.0 dB	113.0 dB 97.5 dB	121.5 dB 105.5 dB
290E 290E	1203B 1203B	100 watts 1 watt	104.5 dB 84.5 dB	114.0 dB 94.0 dB	122.0 dB 102.0 dB
730C 730C	1203B 1203B	75 watts 1 watt	104.5 dB 86.0 dB	114.0 dB 95.5 dB	122.0 dB 103.5 dB
291-16 291-16	311-60 311-60	40 watts 1 watt	110.0 dB 94.0 dB	119.5 dB 103.5 dB	127.0 dB 111.5 dB
290E 290E	311-60 311-60	100 watts 1 watt	110.5 dB 90.5 dB	120.0 dB 100.0 dB	128.0 dB 108.0 dB
730C 730C	311-60 311-60	75 watts 1 watt	110.5 dB 92.0 dB	120.0 dB 101.5 dB	128.0 dB 109.5 dB
291-16 291-16	311-90 311-90	40 watts 1 watt	106.5 dB 90.5 dB	116.0 dB 100.0 dB	124.0 dB 108.0 dB
290E 290E	311-90 311-90	100 watts 1 watt	107.0 dB 87.0 dB	116.5 dB 96.5 dB	124.5 dB 104.5 dB
730C 730C	311-90 311-90	75 watts 1 watt	107.0 dB 88.5 dB	116.5 dB 98.0 dB	124.5 dB 106.0 dB

ALTEC LANSING
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Quantity	Brochures, Flyers and Reprints	Latest Issue	Unit Price	Total Price
_____	Reprint from Theatre Crafts Magazine - "Tuning the Legitimate Theatre"	AL-1007	N/C	_____
_____	Locating Loudspeakers Work Sheet.	AL-1009	N/C	_____
_____	Reprint Audio Magazine '69 "Facts and Fallacies" by Don Davis . . .	AL-1013	N/C	_____
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_____	9017-9013-729A and Real-Time Audio and Hi Q Array Acousta-Voice Sample A & E Specifications	AL-1043	N/C	_____
_____	Acousta-Voicette Folder	AL-1047	N/C	_____
_____	Acousta-Voice Graph	AL-1385	N/C	_____
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_____	Calibrated Monitoring Systems by Don Davis, Reprinted from DB Magazine	AL-1392	N/C	_____
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_____	Loudspeaker Location Survey Form	AL-1394-2	N/C	_____
Preview Sheets				
_____	9018A Altec Acousta-Voice Broad Band Equalizer	EI32868-1	N/C	_____
_____	9014A Acousta-Voice Narrow Band Equalizer	EI113067-1	N/C	_____
_____	Altec's 729A Acousta-Voicette Stereo Equalizer	EI3470	N/C	_____

TECHNICAL LETTER NO. 201

USEFUL DIRECTIVITY DATA FOR REVERBERANT SOUND FIELDS

By
Bob Beavers, Chief Engineer, Acoustics

CALCULATION OF DIRECTIVITY FACTOR

The directivity factor (Q) of a loudspeaker is the ratio of the total power radiated by a hypothetical loudspeaker, having a uniform radiation pattern, to the given loudspeaker when each have identical symmetry on the principle axis of symmetry. Although the analytical calculation can be made for many simple models (1), most real loudspeakers deviate from mathematical models so that data must be taken for accurate results.

When the sound radiation pattern under examination can be considered to have radial symmetry about its principal axis; i.e., a figure of revolution; the Q can be calculated from the following integral in Equation 1.

(Eq. 1)

$$Q = \frac{2}{\int_0^{\pi/2} [P(\theta)]^2 \sin \theta d\theta}$$

Where Q is the directivity factor

P_0 is 1

θ is the polar angle

The graphical evaluation of this integral suggested by Bauer (2), has been used in reducing several hundred polar response curves to Qs, which are presented in the data sheets.

TEST SETUP

Polar response patterns were run on the various horns and low-frequency loudspeakers with the test setup shown in Figure 1. One third-octave band filtered pink noise was used as a test signal, except in the broadband measurements where a 500 Hz

to 3000 Hz passband was obtained by using an ALTEC 9067B adjustable bandpass filter.

DATA PRESENTATION

Polar patterns were obtained in both horizontal and vertical orientations wherever possible. The integral (1) was obtained by graphical means from each polar plot and the resulting Q was plotted, as a function of frequency, for each loudspeaker. This was done for both horizontal and vertical polar data. This technique offers the important advantage of providing both integrated horizontal and vertical directivity information, as well as allowing a mean Q* figure to be calculated for the effective Q in a highly reverberant space. The mean Q figure used is a geometric mean based on the area of the rectangle formed by the horizontal and vertical coverage angles as expressed in Equation 2.

(Eq. 2)

$$\text{Mean } Q^* = \frac{\pi}{4} \sqrt{Q_H \cdot Q_V}$$

Where Mean Q is the mean directivity factor

Q_H is the apparent horizontal directivity factor

Q_V is the apparent vertical directivity factor

It is interesting to reverse this process and assign coverage angles to the loudspeakers, based on the concept that the total sound power radiated is through a rectangular window. These angles are indicated on the right margin of the "Q versus Frequency" curves and should be used to read a rough horizontal and vertical coverage from the Q_H and Q_V curves, respectively.

In addition to the "Q versus Frequency" curves, typical polar response patterns have been included for preferred horn-driver combinations at a 1/3-octave frequency band centered at 1000 Hz. These curves have been split in half to display both the horizontal and vertical polar response on one sheet. These curves are typical of several hundred that were recorded and that are on file for reference.

- (1) Hopkins and Stryker, Procedures of I.E.E., March, 1948, P4.
- (2) B.B. Baumzeiger (Bauer), J.A.S.A. No. 11, 1940, P477

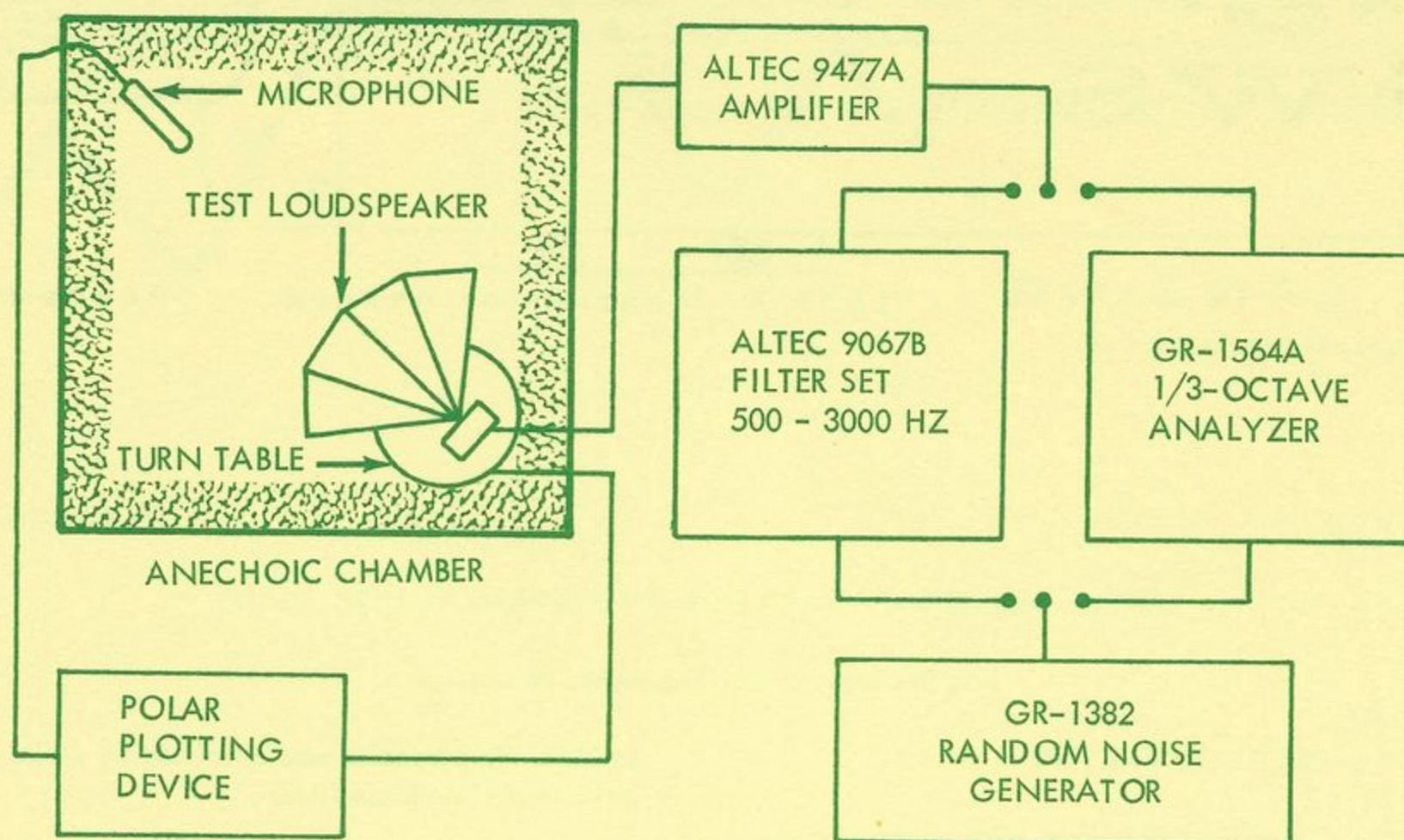


Figure 1. Test Setup for Measuring Polar Response Patterns