

ZONES 1971-72

stuart marshall

A THESIS SUBMITTED TO THE FACULTY OF WESLEYAN UNIVERSITY
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE
MASTER OF ARTS IN MUSIC

MIDDLETOWN CONNECTICUT JUNE 1972

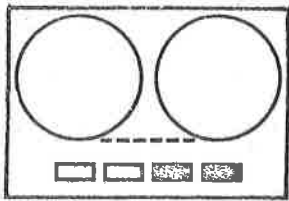
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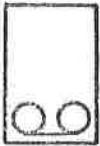
SOUND SOURCE



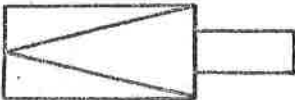
THRESHOLD OF HEARING



AUDIO OR VIDEO TAPE RECORDER



CASSETTE TAPE RECORDER



VIDEO CAMERA



MONITOR TV



FM RADIO



FM RADIO MICROPHONE



VIBRATION PICKUP



TELEPHONE MICROPHONE



HEADPHONES



TELEPHONE



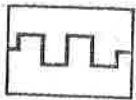
MICROPHONE



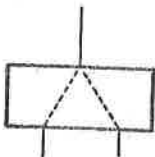
AMPLIFIER



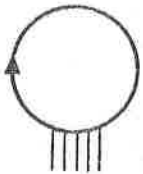
LOUDSPEAKER



SIGNAL GENERATOR



MIXER



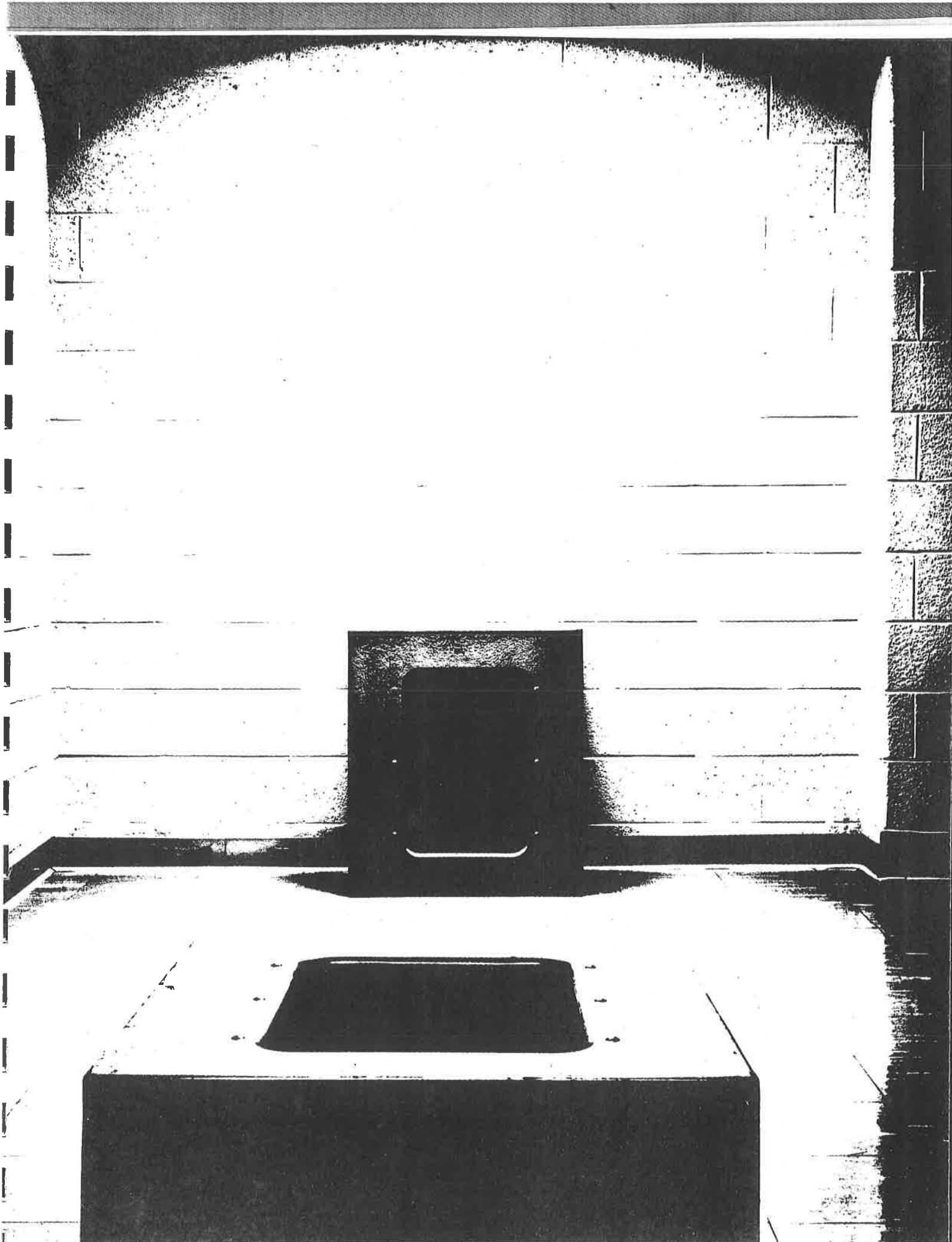
MOTORISED SPEAKER CONTROL

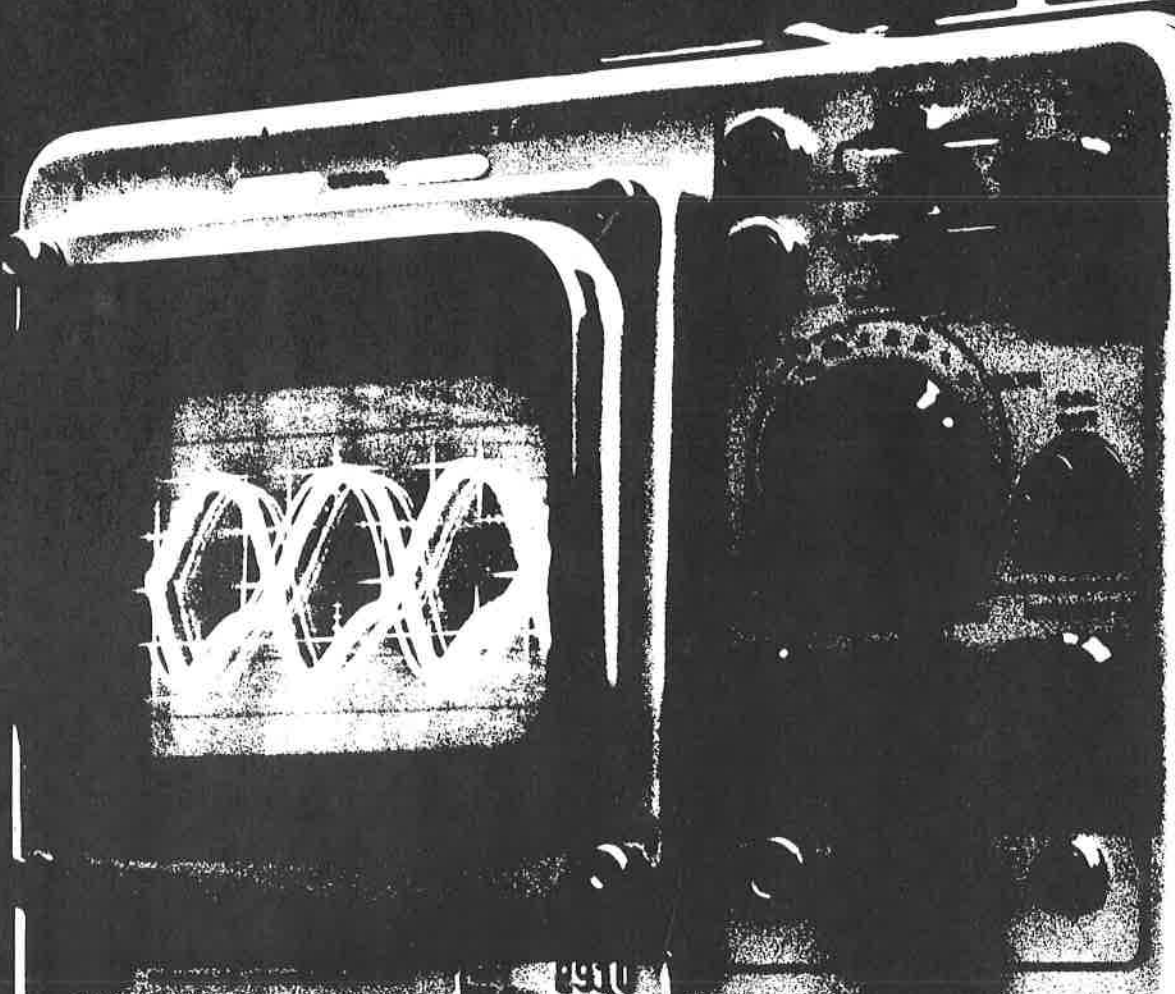
ROOM TONE 1

EXCITATION BY SQUARE WAVES OF THE THREE RESONANCE FREQUENCIES OF A ROOM WHICH ARE DETERMINED BY HEIGHT WIDTH AND LENGTH.

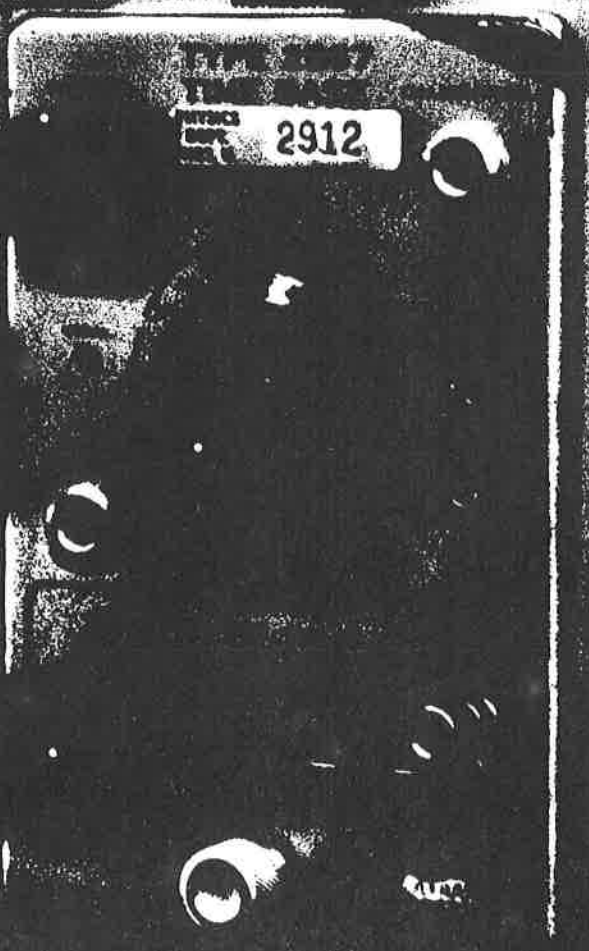
OBSERVATION OF THE STANDING WAVES AT THE NODES AND ANTINODES BY MEANS OF MICROPHONES AND OSCILLOSCOPES.

DYNAMICS SET AT THE MINIMUM LEVEL OBSERVABLE BY THE OSCILLOSCOPES.

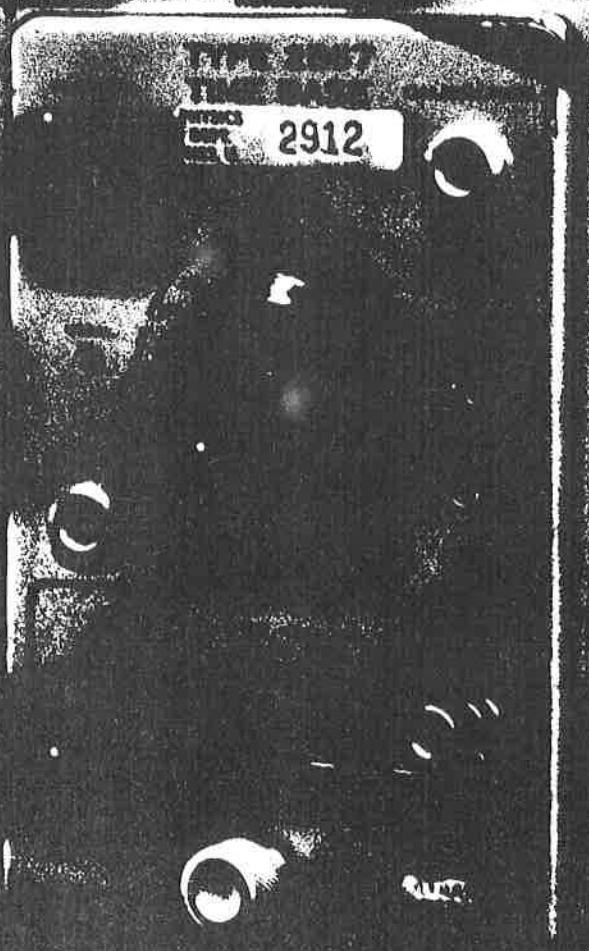
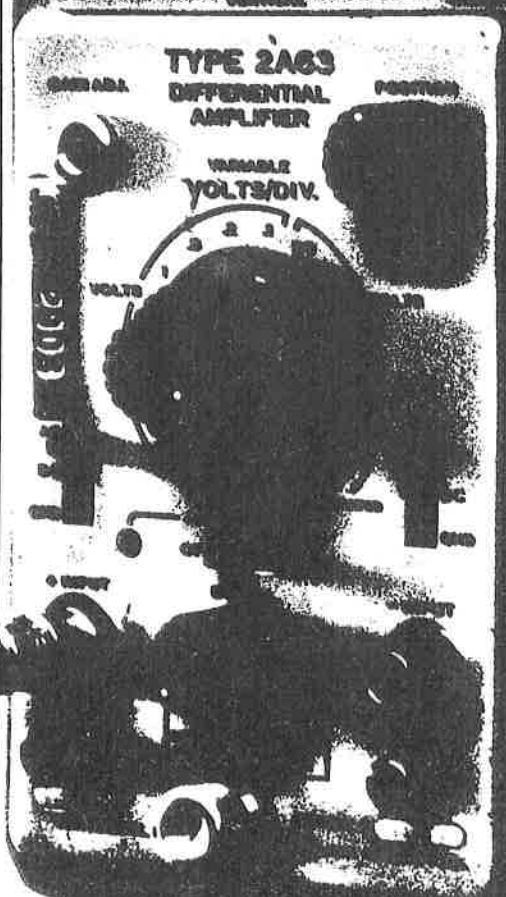
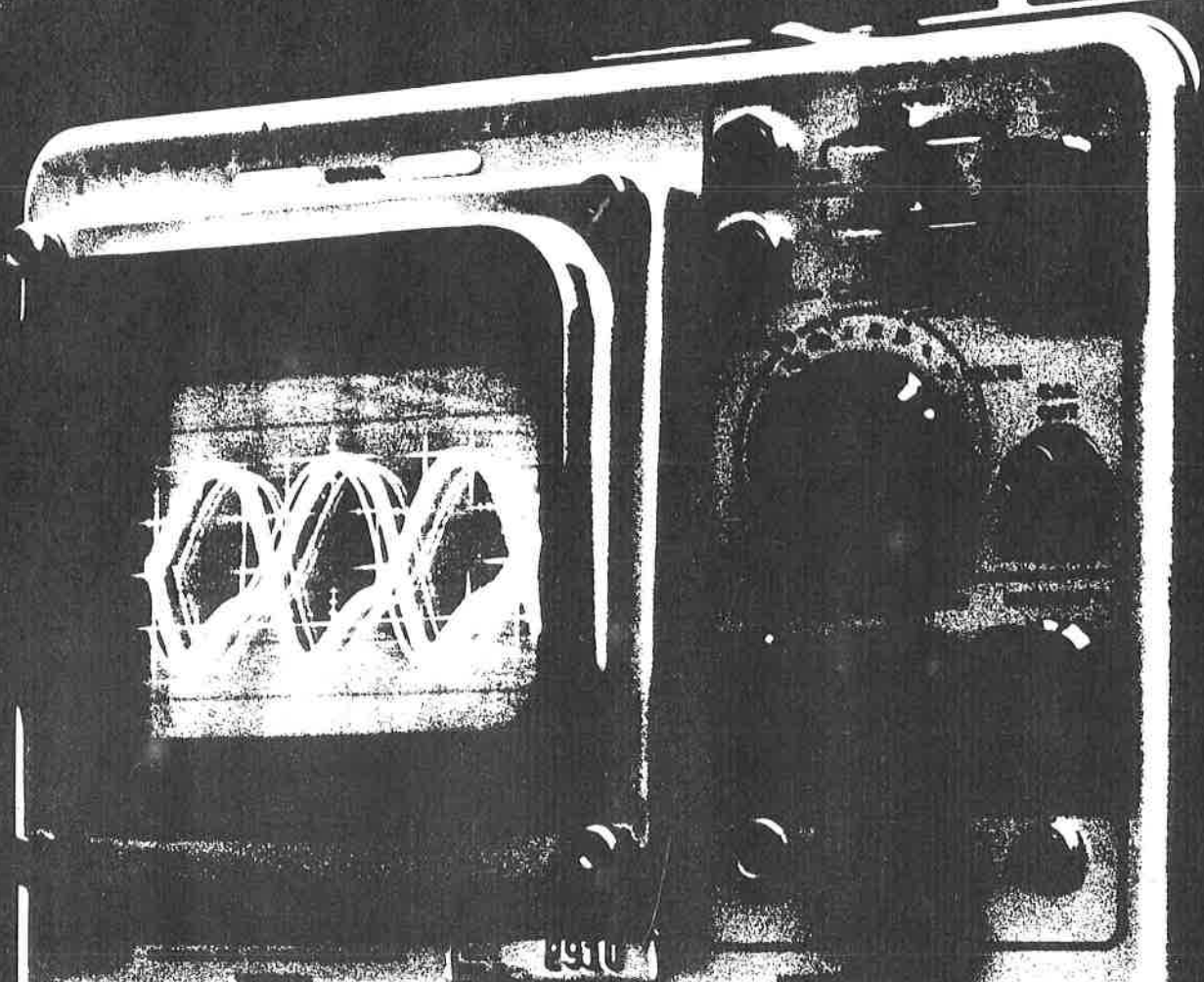


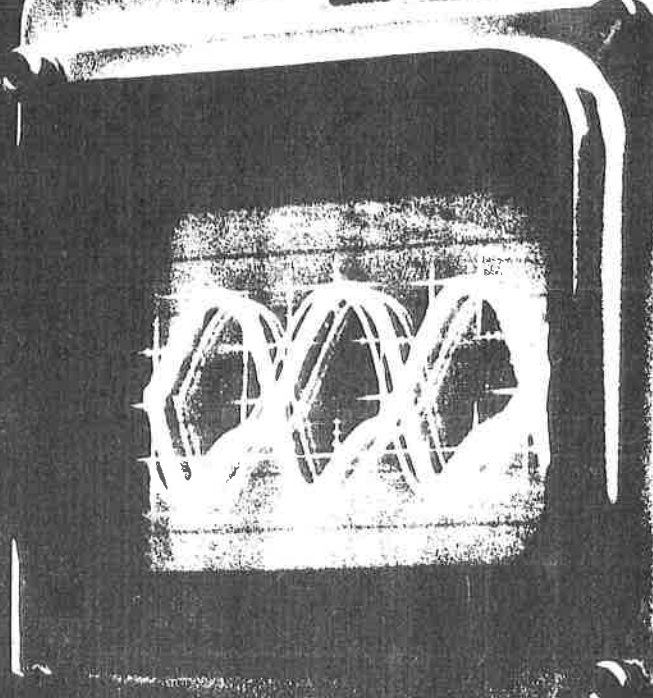


2910



2912





2910

Panel of electronic components, possibly a control panel or a specialized amplifier, featuring several knobs, switches, and a central display area. The panel is dark with some lighter-colored labels and markings.

TYPE 2A63
DIFFERENTIAL
AMPLIFIER

CONTROL POSITION

VARIABLE
VOLTS/DIV.

1 2 3 4 5

VOLTS

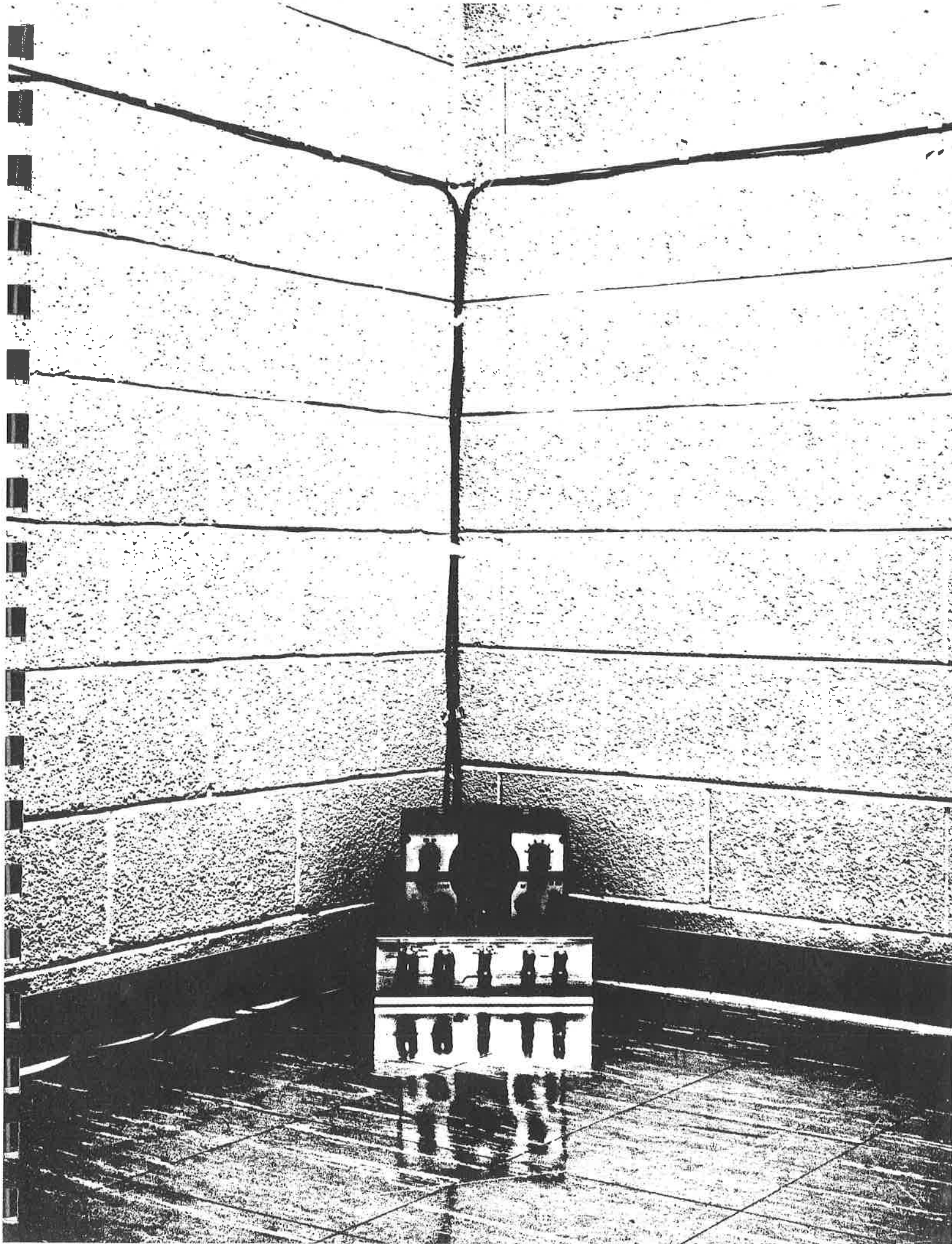
OUTPUT

Panel of a Type 2A63 Differential Amplifier. It features a vertical scale on the left labeled "VOLTS" and a horizontal scale at the top labeled "VARIABLE VOLTS/DIV." with markings from 1 to 5. There are several knobs and switches on the panel, and a label "CONTROL POSITION" is visible on the right side.

TYPE 2A63
TIME BASE

2912

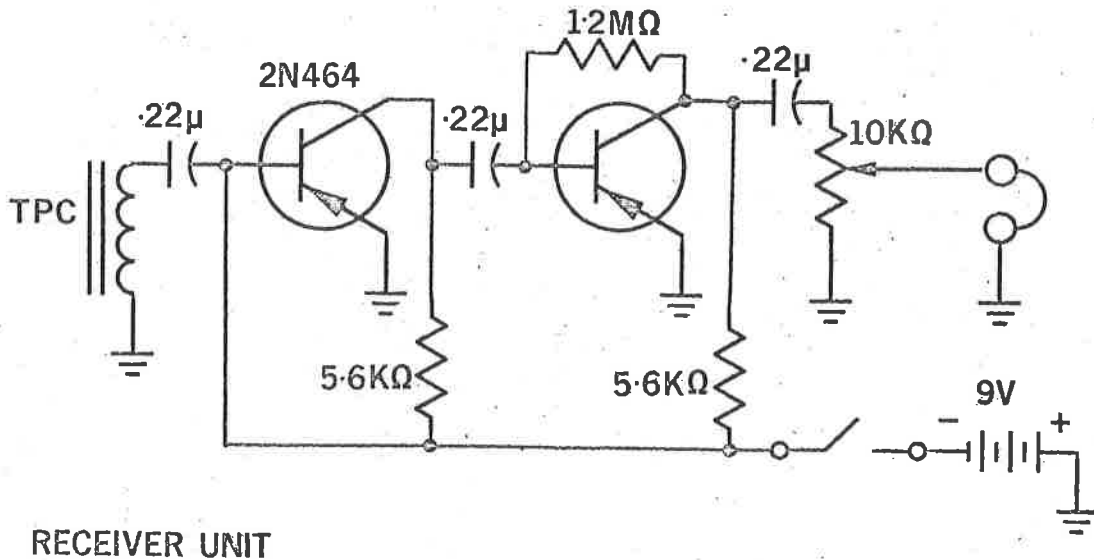
Panel of a Type 2A63 Time Base. It features a label "2912" in the upper right corner. The panel is dark with several knobs and switches, and a vertical scale on the left side.

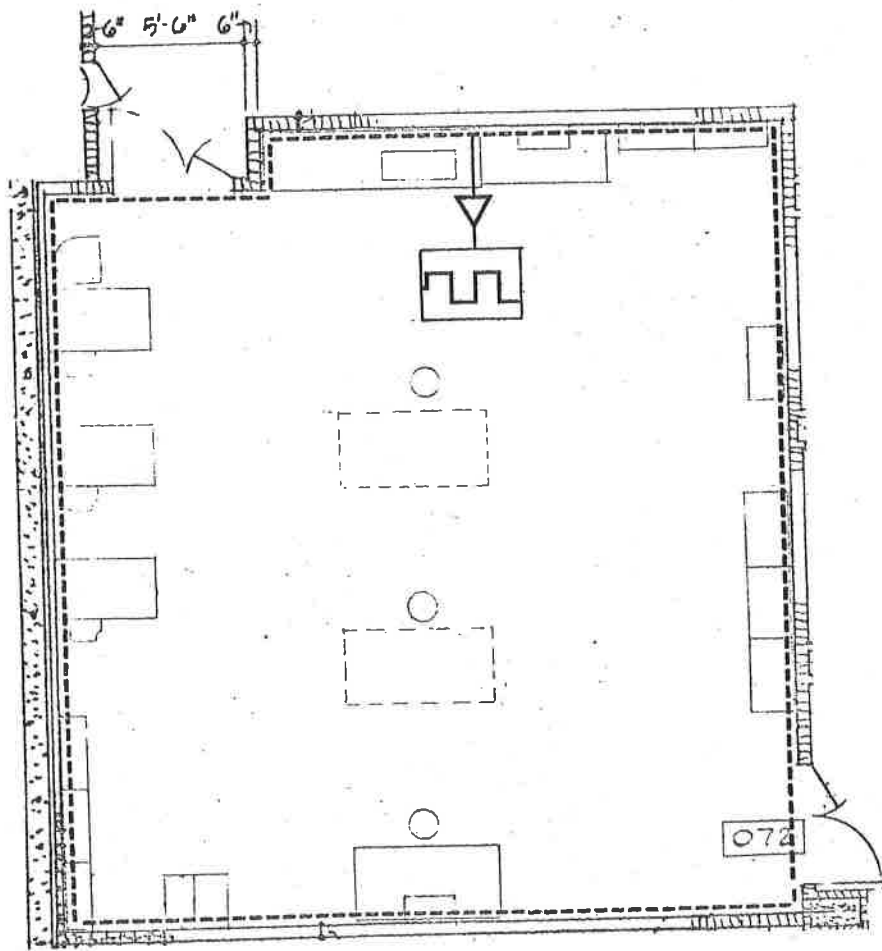


ROOM TONE 2

TWO SQUARE WAVE GENERATORS TUNED TO THE RESONANCE FREQUENCIES DETERMINED BY THE LENGTH AND WIDTH OF A ROOM. THE FREQUENCIES BROADCAST AS ELECTROMAGNETIC WAVES USING AN AMPLIFIER AND CLOSED LOOP ANTENNA WHICH RUNS AROUND THE ROOM AT SHOULDER HEIGHT. ELECTROMAGNETIC WAVES MADE AVAILABLE AS AN AUDIO SIGNAL BY MEANS OF PERSONAL MONITORS.

THE TRANSMITTER IS MADE BY MATCHING THE CLOSED LOOP TO THE RESISTANCE OF THE AMPLIFIER SPEAKER OUTPUT WITH A RESISTOR OF THE APPROPRIATE WATTAGE.





ROOM TONE 3

A VOLTAGE CONTROLLABLE OSCILLATOR PRODUCES A SQUARE WAVE WHICH IS FREQUENCY MODULATED TO THE UPPER AND LOWER LIMITS OF PERCEPTION BY A SUB AUDIO SINE WAVE OF .033 TO .016 HZ. THE SQUARE WAVE IS FADED BY A MOTORISED SPEAKER PAN POT SYSTEM BETWEEN SPEAKERS THAT ARE POSITIONED IN ROOMS OF DIFFERING ACOUSTICS.

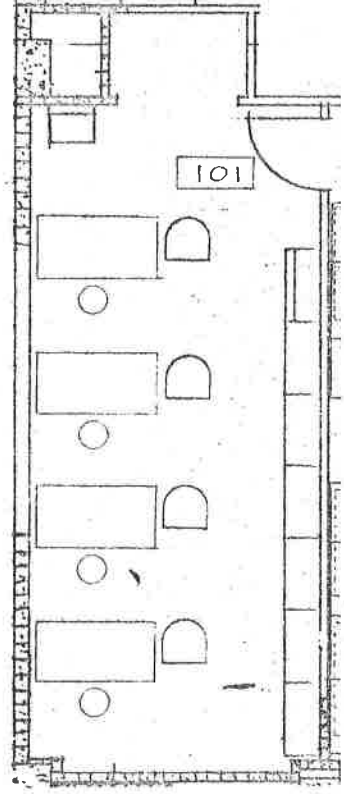
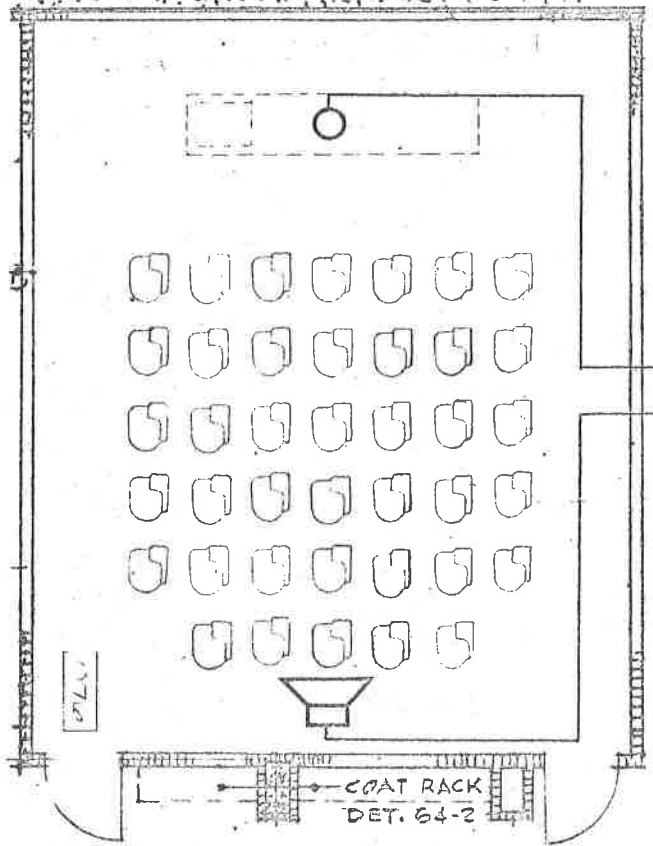
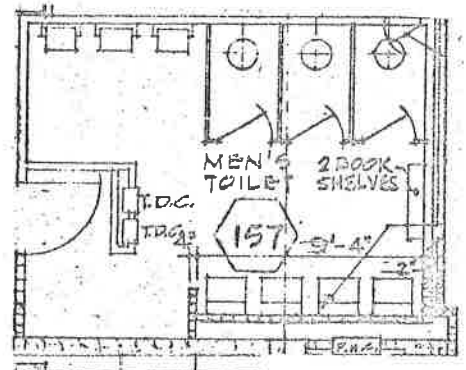
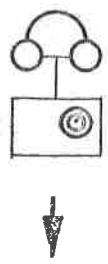
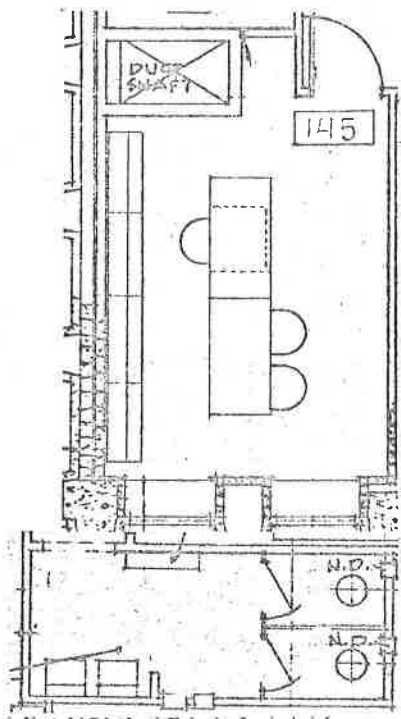
MICROPHONES IN THESE ROOMS CONVEY THE ACOUSTICALLY PROCESSED SQUARE WAVE BACK TO THE AUDIENCE AREA WHERE IT IS AMPLIFIED AND HEARD THROUGH LOUDSPEAKERS.

ROOM TONE 4

FLOOR SOUNDS FROM A CORRIDOR ARE DETECTED BY VIBRATION PICKUPS AND AMPLIFIED IN ROOMS OF DIFFERING ACOUSTICS WHICH LIE ADJACENT TO THE CORRIDOR.

THE ACOUSTICALLY PROCESSED FLOOR SOUNDS ARE DETECTED BY MICROPHONES IN THESE ROOMS AND CONVEYED TO FM RADIO TRANSMITTERS ALONG THE CORRIDOR WHERE THEY ARE THEN MADE AVAILABLE BY PORTABLE FM RADIOS WITH HEADPHONES.

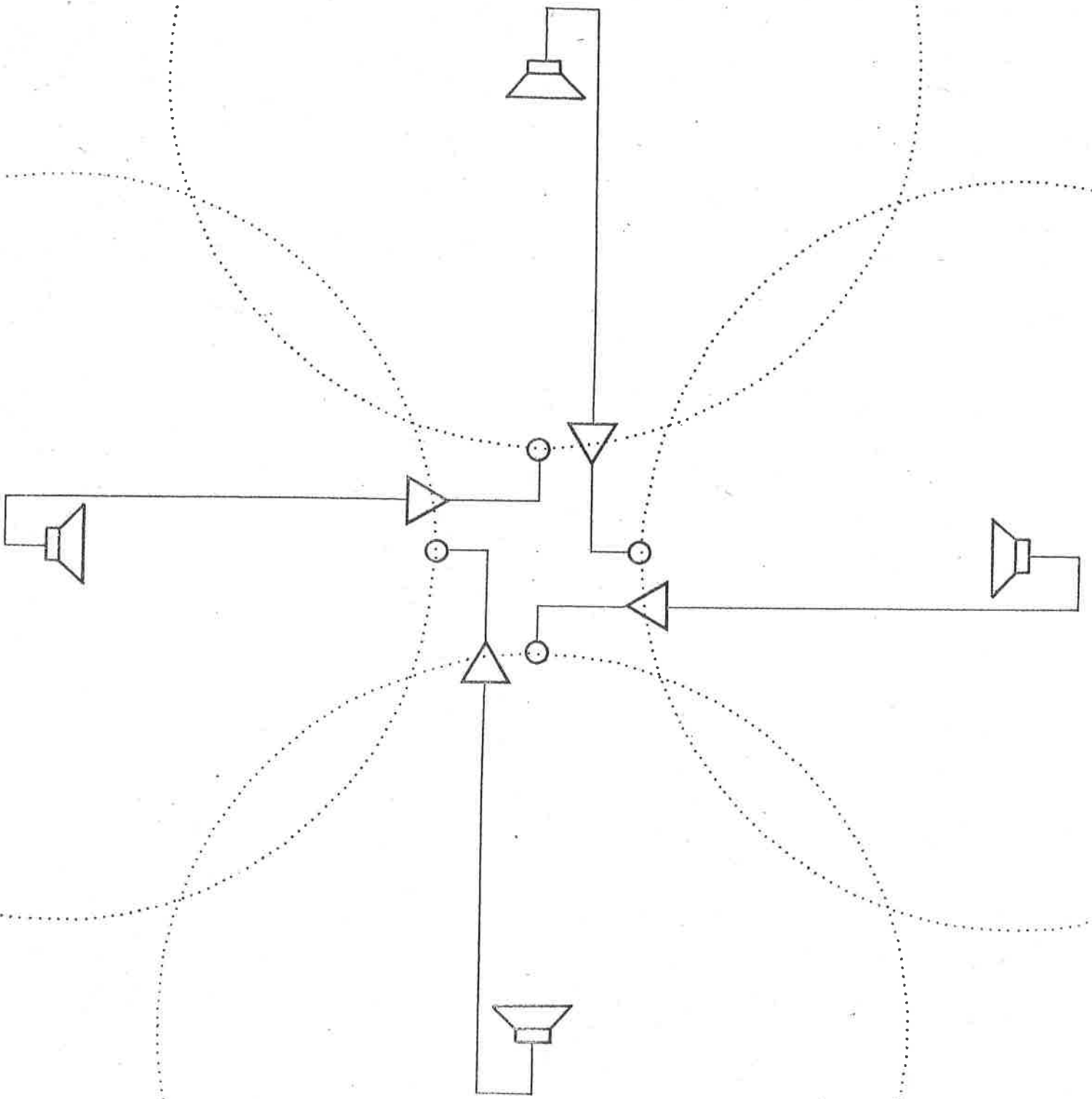
THE FM TRANSMITTERS ARE ADJUSTED SO THAT THE THRESHOLDS OF HEARING OF THE BROADCAST SOUNDS OF A ROOM COINCIDE WITH THE PLACES WHERE THE WALLS OF THOSE ROOMS MEET THE WALLS OF THE CORRIDOR.





OPEN SEQUENCE (AN ATMOSPHERICALLY MODULATED FEEDBACK SYSTEM)

A SCHEMATIC FOR AN UNSTABLE SOUND SYSTEM USING FOUR INTERLOCKING EQUIPMENT MODULES EACH CONSISTING OF A MICROPHONE POSITIONED AT THE THRESHOLD OF HEARING OF A FEEDBACK TONE PRODUCED BY A LOUDSPEAKER. ATMOSPHERIC TURBULENCES CHANGE AMPLITUDE AND PHASE RELATIONSHIPS. THESE CHANGES MAY BE EXHIBITED ON OSCILLOSCOPES.



4D PROJECTION THROUGH A 3D STRUCTURE (VERSION FOR TAP DANCER)

AN EVENT TAKES PLACE IN A ROOM CONTAINING TWO OR MORE MICROPHONES ALONG ONE WALL EACH LEADING TO A SEPARATE AMPLIFICATION SYSTEM.

STEREO FIELDS DERIVED FROM PAIRS OF MICROPHONES ARE GRADUALLY EXPANDED OR CONTRACTED BY PROJECTING LINES FROM A POINT WITHIN THE TOTAL SOUND FIELD THROUGH THE MICROPHONES AND THROUGH THE STRUCTURE IN WHICH THE PERFORMANCE TAKES PLACE. STEREO FIELDS MAY ADJOIN OR INTERSECT EACH OTHER IN MORE COMPLEX SYSTEMS.

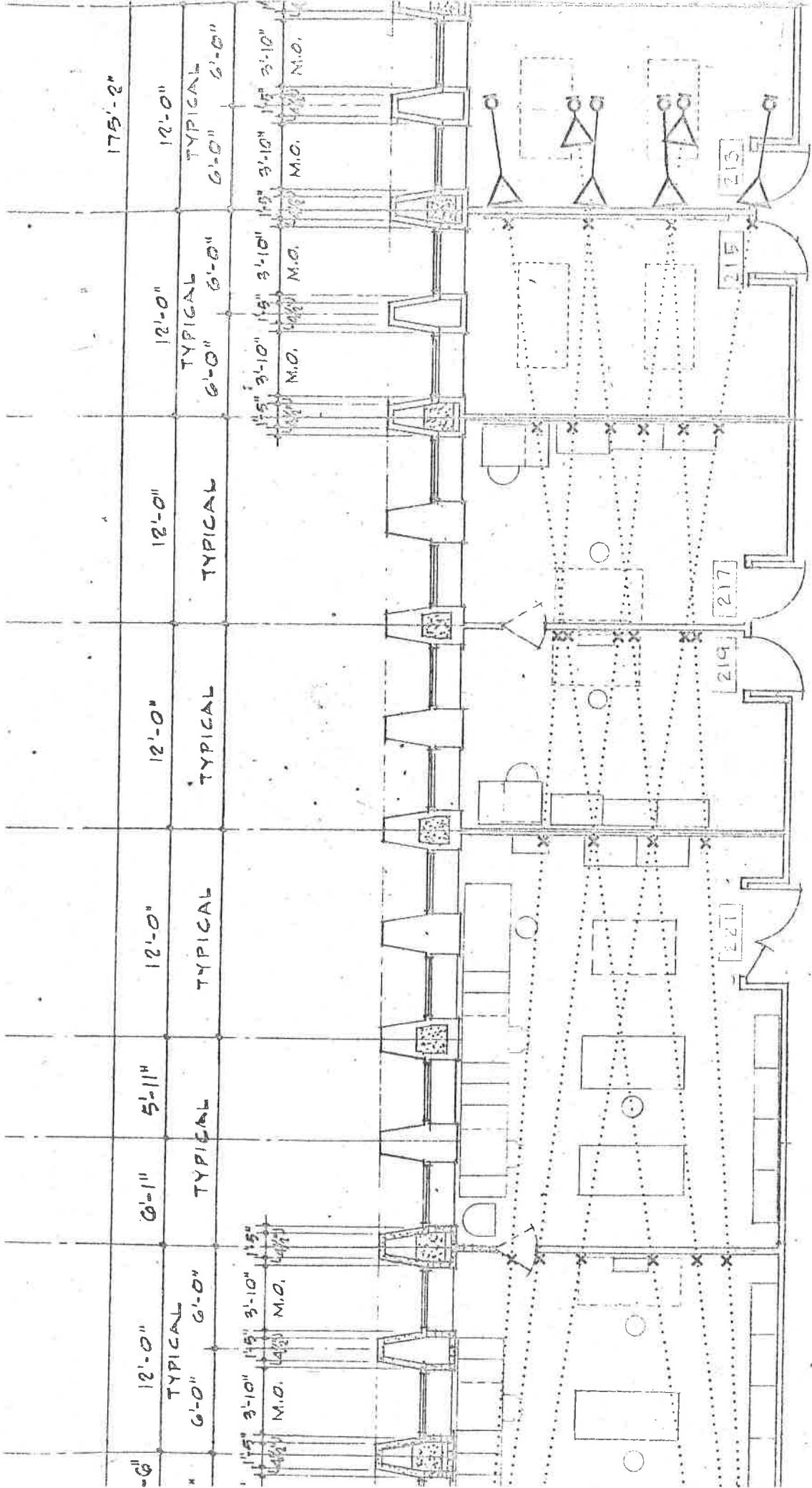
THE TOTAL SOUND FIELD MAY ALSO BE TILTED AT AN ACUTE ANGLE FROM THE FLOOR LEVEL OF THE ROOM IN WHICH THE EVENT TAKES PLACE IN ORDER THAT IT MAY ASCEND OR DESCEND THROUGH THE PERFORMANCE STRUCTURE, PASSING THROUGH FLOORS AS WELL AS WALLS. A LOUDSPEAKER LOCATES THE POINT AT WHICH A PROJECTION LINE PASSES THROUGH A WALL AND IS MOUNTED ON THE SIDE OF THE WALL THAT ALLOWS IT TO POINT AWAY FROM THE WALL ALONG WHICH THE MICROPHONES ARE PLACED.

A PROJECTION LINE IS THEREFORE ONLY LOCATED ON THE WALL BY WHICH IT ENTERS A ROOM IN THE PERFORMANCE STRUCTURE. THE TOTAL SOUND FIELD SHOULD ONLY PROJECT THROUGH THE WALL ALONG WHICH THE MICROPHONES STAND AND SHOULD NOT EXPAND AT AN ANGLE WHICH WILL ALLOW PROJECTION LINES TO PASS THROUGH WALLS OTHER THAN THOSE PARALLEL TO THE WALL ALONG WHICH THE MICROPHONES STAND.

A CONCERT VERSION MAY BE REALISED BY USE OF A SIMILARLY CONSTRUCTED PROJECTION SYSTEM.

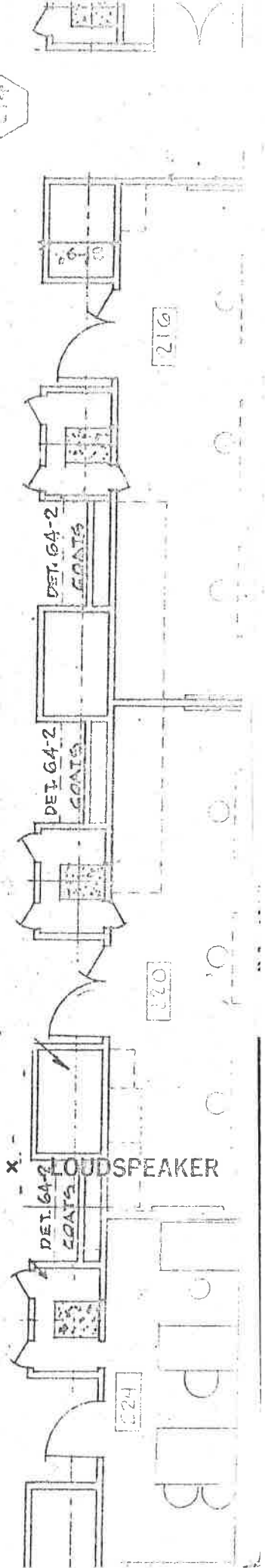
A MULTI MICROPHONE CONFIGURATION IN A PERFORMANCE ROOM FEEDS THROUGH INDEPENDENT AMPLIFICATION CHANNELS TO A LOUDSPEAKER CONFIGURATION IN THE PERFORMANCE AREA.

THE MICROPHONE CHANNELS ARE SIMULTANEOUSLY AND INDEPENDENTLY PANNED ACROSS THE LOUDSPEAKERS TO SIMULATE THE PASSING OF THE PROJECTION SYSTEM THROUGH THE LOUDSPEAKER CONFIGURATION.



WEST CORRIDOR

214



175'-2"

12'-0"

TYPICAL
6'-0" 6'-0"

12'-0"

TYPICAL
6'-0" 6'-0"

12'-0"

TYPICAL

12'-0"

TYPICAL

12'-0"

TYPICAL

5'-11"

TYPICAL

12'-0"

TYPICAL

6'-0" 6'-0"

115" 3'-10" 145" 3'-10" 115" 3'-10" 145" 3'-10"
M.O. M.O. M.O. M.O.

115" 3'-10" 145" 3'-10" 115" 3'-10" 145" 3'-10"
M.O. M.O. M.O. M.O.

215

215

217

219

221

224

220

216

DET. GA-2
COATS

DET. GA-2
COATS

DET. GA-2
COATS

DET. GA-2
COATS

DET. GA-2
COATS

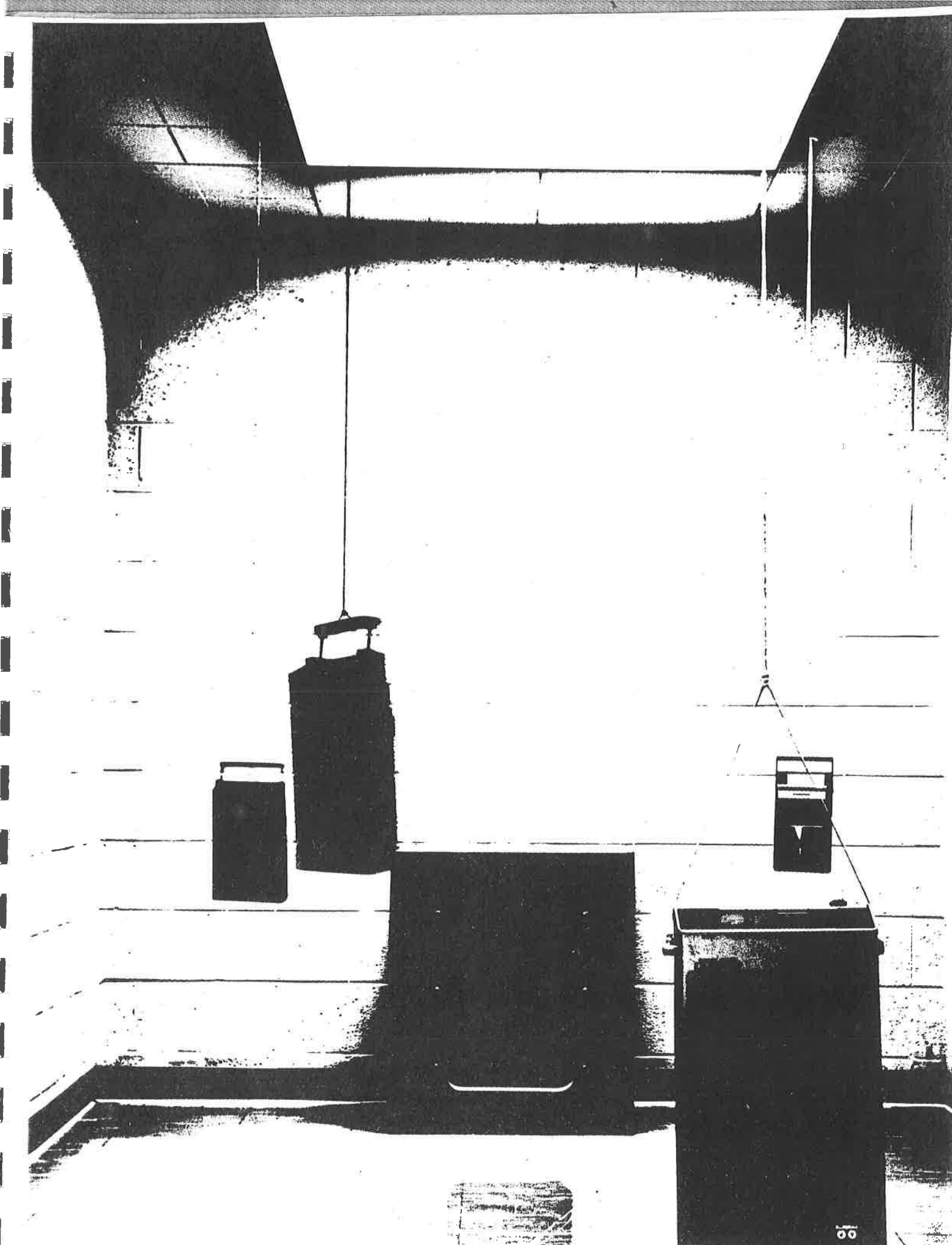
DET. GA-2
COATS

DET. GA-2
COATS

X - LOUDSPEAKER

DOPPLER PIECE FOR TAPE RECORDERS

CASSETTE TAPE RECORDERS ARE SUSPENDED ON PENDULUMS IN AN ENVIRONMENT RESONATED BY ONE OR MORE SQUARE WAVES. THE TAPE RECORDERS ARE SWITCHED ON TO RECORD AND ARE SWUNG ON THEIR PENDULUMS. THE CASSETTES ARE REWOUND AND REPLAYED ON THE STATIONARY PENDULUMS.



SPATTER

A SCHEMATIC FOR A PERFORMANCE USING TRANSMITTERS, RECEIVERS AND RECORDING AND STORAGE DEVICES.

DOTTED LINES REPRESENT RADIO TRANSMISSION.

DASHED LINES REPRESENT A SPATIAL RELOCATION OF RECORDING TAPE.

UNBROKEN LINES REPRESENT ELECTRICAL TRANSMISSION BY WIRES.

AN EVENT RECORDED BY A MONO TAPE RECORDER IN AN AUDIENCE AREA.

REMOVAL OF THE TAPE RECORDING FROM THE AUDIENCE AREA.

RECORDING REPLAYED ON A MONO TAPE RECORDER.

RECORDING TRANSMITTED BY A LOCAL RADIO STATION AND MONITORED BY A RADIO RECEIVER IN THE AUDIENCE AREA.

TRANSMISSION RECEIVED BY TWO RADIO RECEIVERS.

TRANSMISSION RECORDED ON TWO CASSETTE TAPE RECORDERS.

CASSETTE TAPES SPATIALLY RELOCATED.

RECORDINGS REPLAYED ON TWO CASSETTE TAPE RECORDERS.

RECORDINGS TRANSMITTED BY TWO TELEPHONES VIA TELEPHONE COILS AND MONITORED BY TWO TELEPHONES IN THE AUDIENCE AREA.

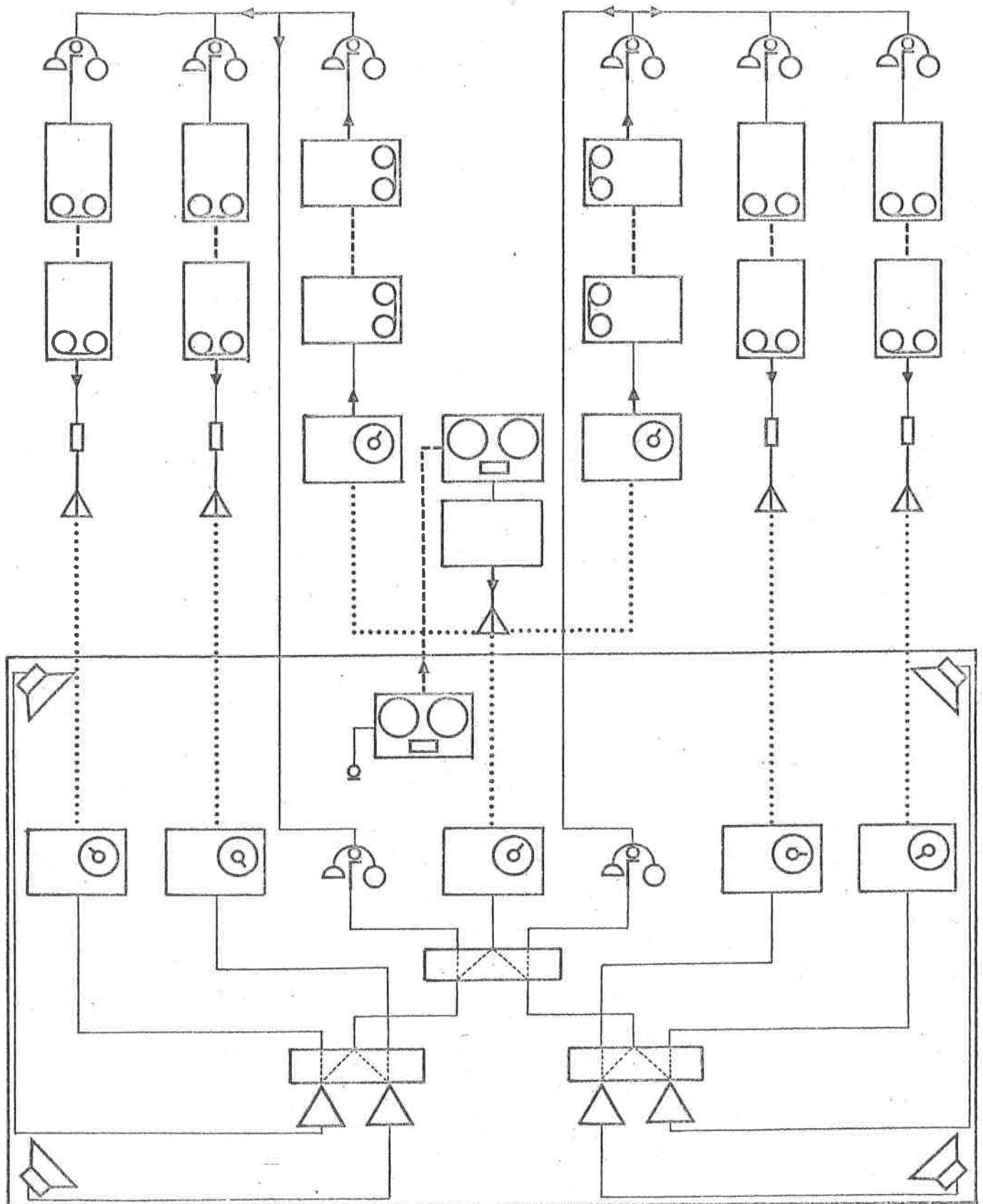
TRANSMISSION RECEIVED BY FOUR TELEPHONES.

TRANSMISSION RECORDED ON FOUR CASSETTE TAPE RECORDERS.

CASSETTE TAPES SPATIALLY RELOCATED.

RECORDINGS REPLAYED ON FOUR CASSETTE TAPE RECORDERS.

RECORDINGS TRANSMITTED BY FOUR FM RADIO MICROPHONES AND MONITORED BY FOUR FM RADIO RECEIVERS IN THE AUDIENCE AREA.



A SCHEMATIC FOR A PERFORMANCE WEDNESDAY DECEMBER 1, 1972

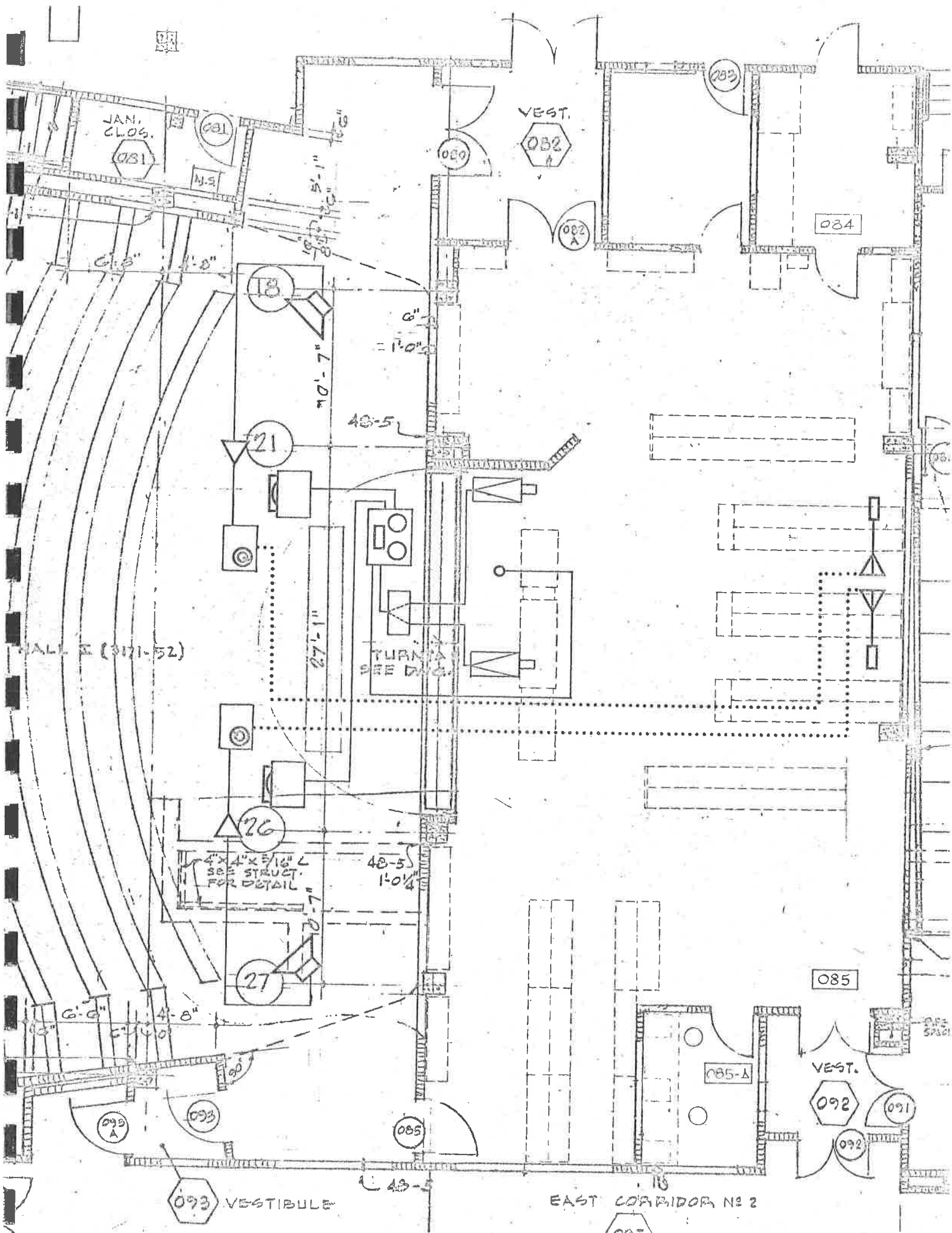
FOUR PERFORMERS RELAY INFORMATION BY FM RADIO AND LIVE VIDEO FROM A ROOM ADJACENT TO THE AUDIENCE AREA.

TWO PERFORMERS, OBSERVING EACH OTHER THROUGH SHELVING AND MISCELLANEOUS EQUIPMENT, USE FM RADIO MICROPHONES TO TRANSMIT TO THE AUDIENCE DESCRIPTIONS OF THEIR FIELDS OF PRESENTATION WITHIN AN ANGLE OF 45 TO EITHER SIDE OF A LINE THAT CONNECTS THEM.

AMPLIFIED FM RADIOS IN THE AUDIENCE AREA MAKE THIS INFORMATION AVAILABLE TO THE AUDIENCE.

TWO PERFORMERS USE CLOSED CIRCUIT VIDEO CAMERAS TO TRANSMIT TO THE AUDIENCE IMAGES FROM THEIR FIELDS OF PRESENTATION WITHIN AN ANGLE OF 90 TO EITHER SIDE OF A LINE THAT CONNECTS EACH OF THEM TO AN FM RADIO MICROPHONE PERFORMER.

MONITOR TV'S IN THE AUDIENCE AREA MAKE THIS INFORMATION AVAILABLE TO THE AUDIENCE.



JAN. CLOS.

VEST.

081

082

N.S.

082 A

084

18

5'-1"

6"

= 1'-0"

21

48-5

27'-1"

TURNING FIRE DR.

WALL 5 (3171-52)

26

4" X 4" X 1/2" L
SEE STRUCT.
FOR DETAIL

48-5

1'-0 1/4"

27

7'-0"

085

6'-0"

4'-8"

085-A

VEST.

092

091

095 A

093

085

092

093

VESTIBULE

EAST CORRIDOR NO 2

095

2 SPEEDS

FOR REALISATION AS A PERFORMANCE IN A LANDSCAPE OR AS A RECORDING ON TAPE OR DISK.

AN AUDIENCE AREA IS LOCATED BY AN FM RADIO WHICH IS CONNECTED TO AN AMPLIFIER AND SPEAKER.

A SINGLE PERFORMER CARRIES A POWERHORN WHICH IS ATTACHED TO AN FM RADIO MICROPHONE.

THE SOUNDS OF THE PERFORMANCE REACH THE AUDIENCE PREDOMINANTLY IN TWO SIMPLE WAVE TYPES, AUDIO AND RADIO, WHICH HAVE DIFFERENT TRANSMISSION SPEEDS IN AIR.

THE HORN IS SOUNDED AND A SOUND LEVEL READING IS MADE WITH A DB METER PLACED TEN FEET IN FRONT OF THE HORN.

THE AMPLIFIER GAINS ARE SET TO GIVE THE SAME LEVEL READING WHEN THE DB METER IS PLACED TEN FEET IN FRONT OF THE SPEAKER.

THE PERFORMANCE COMMENCES WITH THE PERFORMER AND SPEAKER PLACED TO THE LEFT AND RIGHT OF THE AUDIENCE.

THE PERFORMER PRODUCES PERIODIC PULSES WHILE WALKING AWAY FROM THE AUDIENCE AT RIGHT ANGLES TO A LINE BETWEEN THE SPEAKER AND HIS PRIMARY POSITION.

THE PERFORMANCE FINISHES WHEN EITHER THE LIVE OR BROADCAST PULSES OF THE HORN ARE NO LONGER AUDIBLE.

TO REALISE A VERSION FOR TAPE REQUIRES A STEREO TAPE RECORDER WITH A MICROPHONE CONNECTED TO THE LEFT INPUT AND AN FM RADIO CONNECTED TO THE RIGHT INPUT.

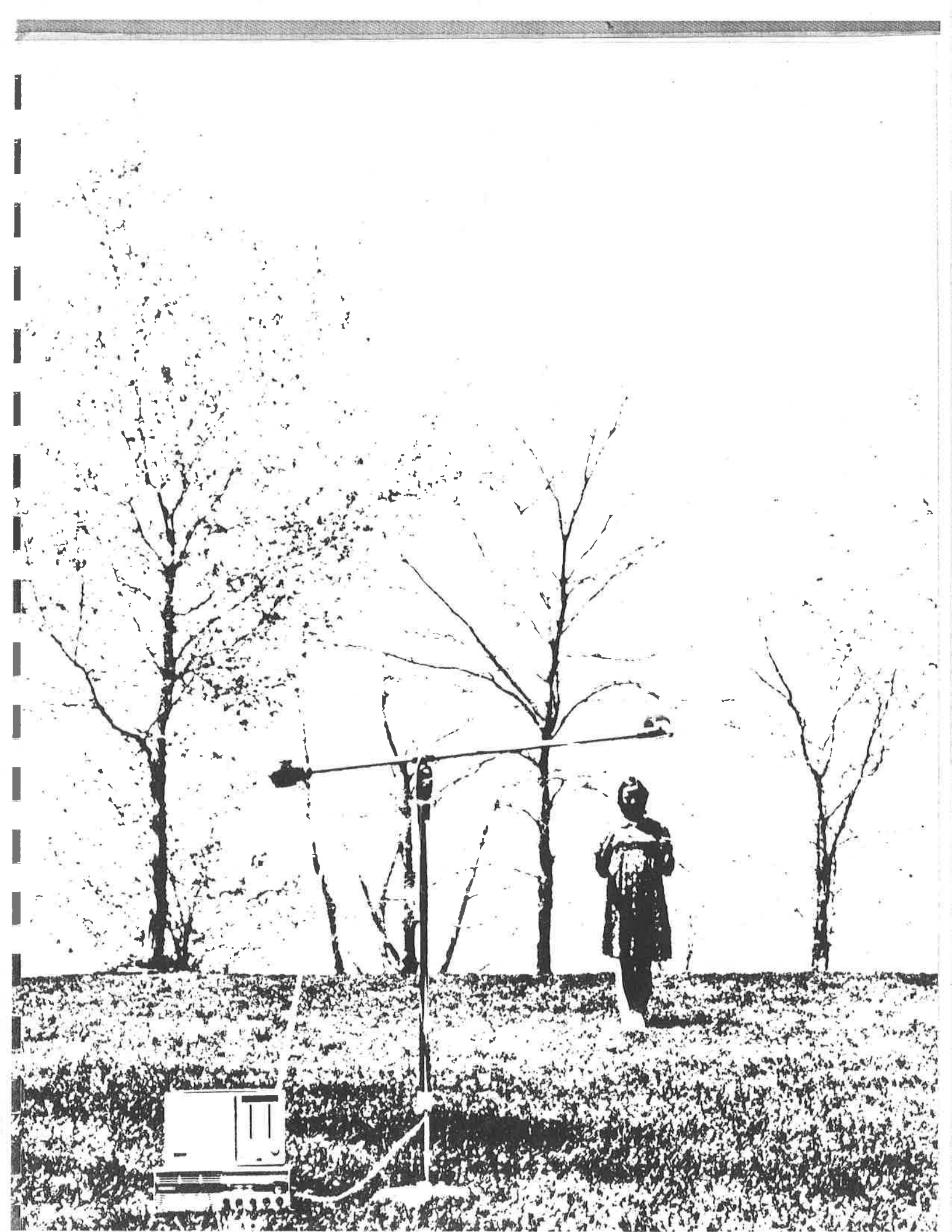
IN THIS CASE THE PRIMARY POSITION FOR PERFORMANCE AND THE SOUND LEVEL TESTING POSITION FOR THE HORN IS THIRTY FEET FROM THE TAPE RECORDER.

THE LEFT HAND CHANNEL LEVEL IS SET TO GIVE FULL MODULATION THROUGH THE MICROPHONE WHEN THE HORN IS SOUNDED IN THE TESTING POSITION.

THE RIGHT HAND CHANNEL LEVEL IS THEN SET AT THE SAME POSITION AND THE MONITOR GAIN ON THE FM RADIO IS SET TO GIVE FULL MODULATION WHEN THE HORN IS SOUNDED.

DIFFERENT VERSIONS MAY BE CONSTRUCTED FOR A PERFORMER PRODUCING ANY AUDIO PULSES WHICH MAY BE TRANSFORMED INTO ANY AUDIO DECODABLE WAVE TYPES WHICH WILL PASS OVER OR THROUGH MEDIA AT DIFFERENT SPEEDS.

FOR EXAMPLE A PERFORMER IN A BOAT MAY SEND AUDIO SIGNALS THROUGH WATER USING AN UNDERWATER TRANSDUCER AND THROUGH AIR USING A LOUDSPEAKER, OR THROUGH WATER USING A RADIO TRANSMITTER AND THROUGH AIR BY A MODULATED LIGHT BEAM.



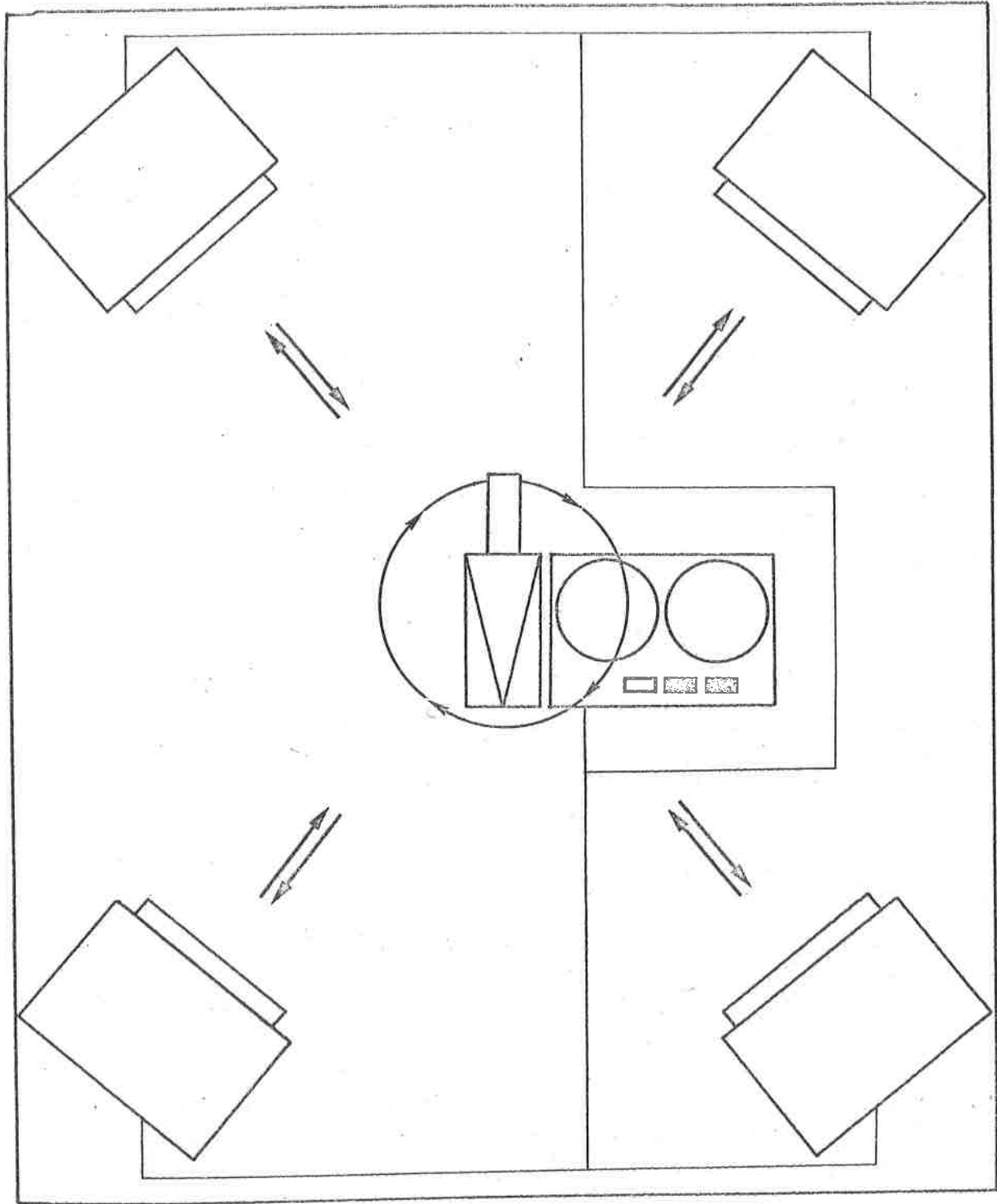
3 MOVEMENTS

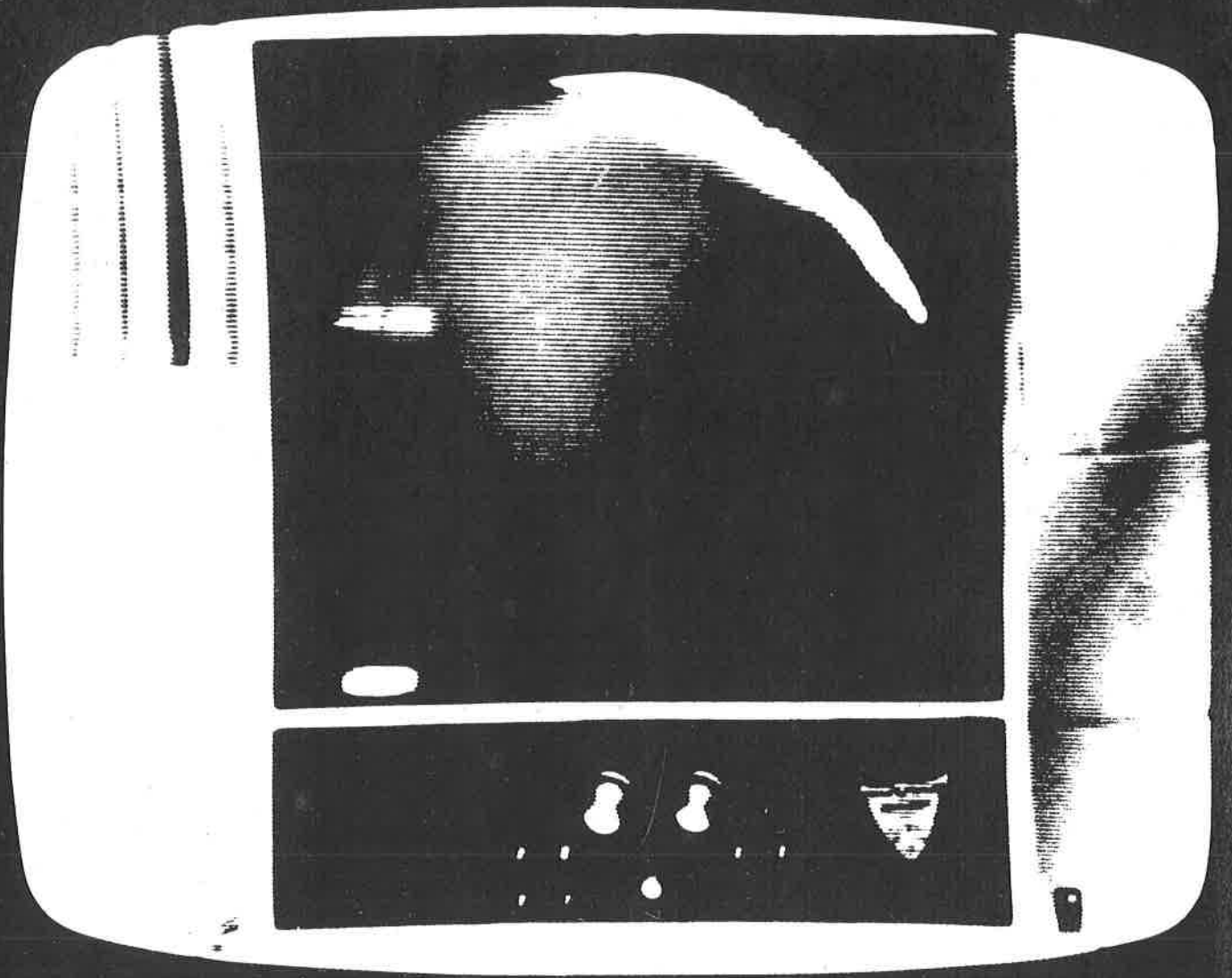
A VIDEO CAMERA AND A VIDEO TAPE RECORDER ARE POSITIONED AT THE CROSSING OF THE TWO DIAGONAL LINES WHICH CONNECT THE CORNERS OF A ROOM.

FOUR TV PLAYBACK MONITORS ARE POSITIONED IN THE CORNERS OF THE ROOM.

A VIDEO TAPE IS MADE BY ZOOMING IN TO A DISCONNECTED TV MONITOR UNTIL THE SCREEN REGISTERS EXACTLY WITH THE VIDEO CAMERA MONITOR SCREEN, ZOOMING OUT AGAIN, PANNING TO THE NEXT DISCONNECTED MONITOR AND REPEATING THE PREVIOUS CAMERA MOVEMENTS UNTIL A FULL CIRCLE IS TAPED.

THE LENGTH OF TAPE IS SPLICED INTO A LOOP AND REPLAYED CONTINUALLY ON THE CONNECTED TV PLAYBACK MONITORS.





4 MOVEMENTS 1970

ONE OR MORE OF FOUR POSSIBLE SLOW MOVEMENTS FROM THE LEVEL OF MOST AMBIENT NOISE, THE THRESHOLD OF HEARING OF THE SOUND SOURCE, TO THE HIGHEST SIGNAL LEVEL OF THE SOUND SOURCE. FOR REALISATION AS A RECORDING ON TAPE OR DISK FOR PLAYBACK IN THE ORIGINAL RECORDING SPACE OR ELSEWHERE, OR AS A LIVE PERFORMANCE WITHOUT TAPE TO BE HEARD IN A SPACE OTHER THAN THAT OF THE SOUND SOURCE.

MICROPHONE POSITIONED AT THE THRESHOLD OF HEARING OF THE SOUND SOURCE.

MICROPHONE MOVED TO THE SOUND SOURCE.

MICROPHONE POSITIONED AT THE THRESHOLD OF HEARING OF THE SOUND SOURCE.

SOUND SOURCE MOVED TO THE MICROPHONE.

MICROPHONE POSITIONED AT THE THRESHOLD OF HEARING OF THE SOUND SOURCE.

SOUND SOURCE INCREASES IN DYNAMICS UNTIL ALL AMBIENT NOISE IS MASKED.

MICROPHONE 1 POSITIONED AT THE THRESHOLD OF HEARING OF THE SOUND SOURCE, MICROPHONE 2 POSITIONED AT THE SOUND SOURCE. FADE THROUGH MIXER FROM MICROPHONE 1 TO MICROPHONE 2.

4 MOVEMENTS 1972

4 MOVEMENTS 1972 IS A REVISED FILM OR VIDEO TAPE WITH SOUND RECORDING VERSION OF THE 1970 VERSION FOR SOUND RECORDING ALONE.

THE REVISION TAKES THE FORM OF A SUBSTITUTE FOR MOVEMENT NO.3 WHICH WAS APPARENTLY UNREALISABLE ON FILM.

A REDEFINITION OF THE LEVEL OF MOST AMBIENT NOISE, THE THRESHOLD OF HEARING OF THE SOUND SOURCE, AND OF THE HIGHEST SIGNAL LEVEL OF THE SOUND SOURCE WAS NECESSARY. THE VISUAL DEFINITION BECAME THE DISTANCE AT WHICH THE SUBJECT WAS AT ITS POSITION OF LEAST DOMINANCE IN RELATIONSHIP TO THE ENVIRONMENT (THIS MAY NECESSITATE THE THRESHOLD OF VISION FOR THE SUBJECT) AND THE POSITION AT WHICH THE SUBJECT TOTALLY OBSCURED ANY VIEW OF THE ENVIRONMENT.

FILM RECORDINGS ARE MADE WITH SYNCHRONISED SOUND.

ALL MOVEMENTS ARE OF EXACTLY THE SAME DURATION AND ARE ALL FILMED IN THE SAME LOCATION.

THE FOUR PARTS ARE PROJECTED SIMULTANEOUSLY IN A ROW AND ARE SEPERATED FAR ENOUGH APART TO ALLOW THE AUDIENCE TO SPATIALLY DIFFERENTIATE THE SOUND TRACKS.

