Performance 202

1. Spaces — Large + Small, — Physiological adjustment of the ear to size of space. Space listening exercise. Inside - Outside

2 Speakers - placement and efficient coupling to space moving air. Resonances Stage - walls.

3 Amplifiers

4 Transducers + input devices

Travelings
Care of equipment - like your instrument
What to ask for

Tape play back — different materials ie Bog Bog — Erase head etc. judging what will sound well in a given situation

Theater — handling of equipment
Disciplined wrap up.
Separations of audio — video or projection equipment.

[Speech system 500 to 10K]

Speakers to Space – Are speakers properly coupled to space?

1. Quietness – Signal to noise ratio
Measurable Factors = total sound pressure level and its distribution by frequency.

2. Proper reverberation – (often desirable to have low freqs. reverberate longer than high freq. in same space)
Measurable Factors decay time and how decay time varies with different frequencies – (measure in ⅓ octave interval from 50 to 10K
As system must be tailored to fit the room, not to change the room.

3. Useful and adequate loudness
Louder is not necessarily clearer. Echoes amplify but also interfere. Failure to achieve useful loudness =
1. Nonuniform frequency response
2. high distortion of signal
3. improper polar response characteristics
4. incorrect high + low cut off frequencies
5. or improper equalization
(Pulse test gives relative amplitudes in db and relative time differences in milliseconds) Reveals when direct sound has failed to reach seat or overide ambient noise.

4. Proper distribution
All audience must hear clearly – Graphic level recorder, random noise gen + tunable ⅓ octave filter measures change in acoustic level.

Measurements at listeners seat
1. Freq response
2 Total harmonic distortion per octave
3- Relative direct to reflected sound differences of amplitude (in db) and time (in milliseconds

Good musicians know their instruments and all kinds of tricks for repair etc. carry tools
Can't over emphasize knowing equipment. Only twice in career have started to play accordion with strap locked.

Show basic set up – question every cable and adapter all tools necessary. And what is playing condition of each device. No screaming speakers.

What has irritated you at an instrumental concert?
(hate Rubin and his squeaky chair)
(Casals and his stomping foot)
What has irritated you at an electronic concert?
(Bad sound distribution.)
(too loud too soft)

Assign groups of 2 or individuals to collect information on types of equipment

$P = E^2 R$
$P = I^2 R$

$P = I E$ 9 amps
$\frac{P}{E} = I$ 110v | 1000 w
990
10

Rules: Isolate all inputs
Do not plug in AC until all components are connected.
Connect speakers first
Do not turn on amplifier unless speakers are connected.
" " " " Jap mixer with no load – causes noisy transistors.
Plug in AC last during set up
Unplug AC first during take down or recovery
Don't plug into DC or 220 or 440 ask first
Concentrate on your work – you'll never know how the space sounds if you are continually chattering.

Go into space sit down in audience. Look at it and listen to it.

Map out performance areas - Speaker placement.
Where will cables go - tape them down - will audience interfere?
you should already have co-ordinating diagram for entire concert - how to accomodate each piece
what changes are necessary. both electronic & physical.
what necessary to accomodate equipment - tables? etc Theater.
Black noise generator test.

Wednesday

Mixers from Y plug to the "ideal mixer"

Condenser mikes for bass or low freq. needs power supply for built in pre amp.
Cardioid proximity effect = bass boost.

What to ask for when on tour
is equipment
rehearsal time in hall -
house lights and help
electrician.

Equipment checklist
for playing conditions

Chicago cabinet patch panels

202C REQUIREMENTS ! MARCH 28, 1968

1. PARTICIPATION IN CLASS EXPERIMENTS AND REHEARSALS.

2. READ MATERIAL ON READING LIST.

3. ATTEND AND PARTICIPATE IN THE THREE SEMINAR CONCERTS.

APRIL 18, 8:30 PM - 409 — GUEST ARTISTS DAVID TUDOR AND ANTHONY GNAZZO
WORKS BY ICHIYANAGI, BEHRMAN AND BARTLETT TO BE PREPARED IN CLASS.

MAY 10, 8:30 PM - 409 — ELECTRONIC SIGHTS AND SOUNDS
GUEST ARTISTS LOWELL CROSS, TUDOR AND GNAZZO.

MAY 23 (TENTATIVE) ALL DAY REVELLE — GUEST ARTIST ALVIN LUCIER
12 HOUR GATHERING OF WHISTLERS.

4. INDIVIDUAL OR COLLABORATIVE PROJECT.

a) COMPOSITION UTILIZING ELECTRONICS
b) EQUIPMENT BUILDING
c) RECORDING OF CONCERTS
d) RESEARCH LEADING TO ACTION.
e) ?

5. LEARN TO SET UP, OPERATE AND DIAGRAM BASIC SOUND SYSTEM IN ACCORDANCE WITH PERFORMANCE CHECKLIST.
RETURN ALL EQUIPMENT TO ITS PROPER LOCATION IMMEDIATELY AFTER USE. !!!!!! DO NOT DRAG POWER CORDS AND CABLES ON THE GROUND.
ALWAYS LOCK DOORS OF QUONSETS AND 409.
DO NOT LEAVE EQUIPMENT IN 409 UNATTENDED. THE BUILDING IS NEVER SECURE.

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ASSIGNMENT 202C MARCH 28, 1968

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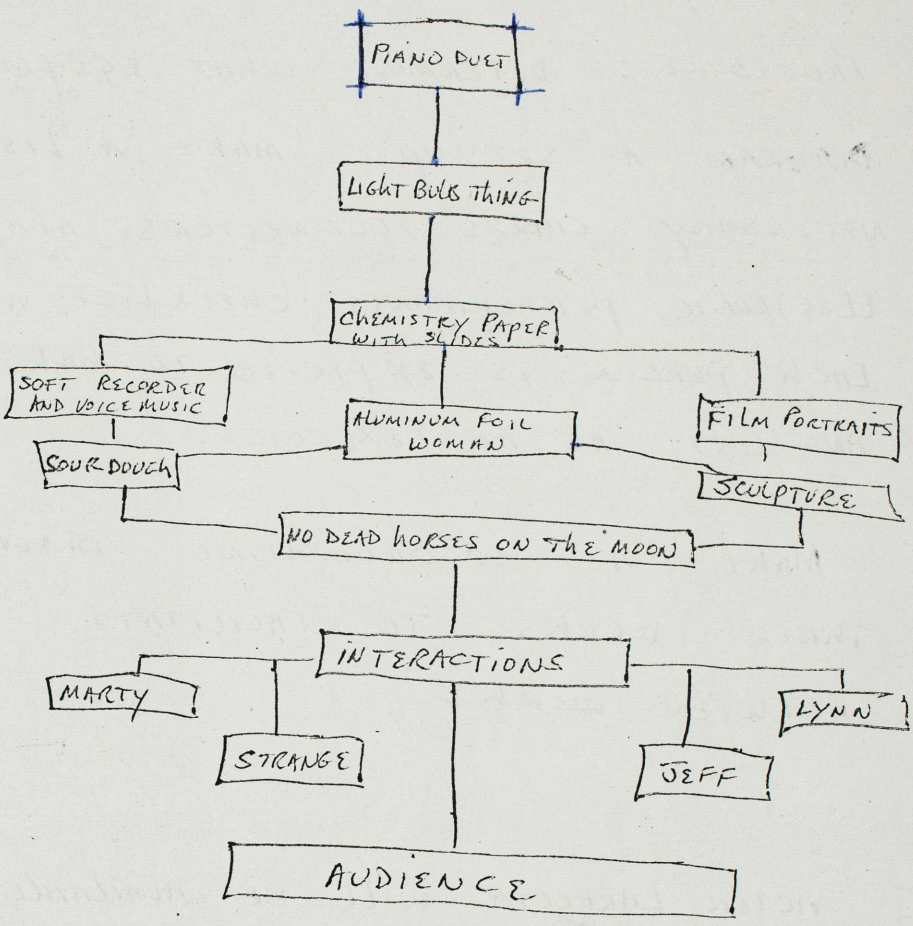
II PROCEDURE: DETERMINE WHAT EQUIPMENT IS NECESSARY. DIAGRAM A SET UP. MAKE A LIST OF ALL NECESSARY CABLES, CONNECTORS, ADAPTORS, ETC.. USE ELECTRONIC PERFORMANCE CHECKLIST AS A GUIDE. EACH PERSON IS EXPECTED TO MAKE HIS OWN DIAGRAM AND LIST AS AN EXERCISE.

III MAKE A CO-ORDINATING DIAGRAM FOR ALL THREE WORKS TO FACILITATE SET UP CHANGES BETWEEN WORKS.

IV VICTOR LARUCCIA WILL BE AVAILABLE ONE HOUR BEFORE AND AFTER CLASS FOR MOVING EQUIPMENT.

LOU PRINCE IS THE MUSIC DEPT. TECHNICIAN AND MAY BE CONSULTED ABOUT EQUIPMENT NEEDS.

EVIDENCE FOR COMPETING BIMOLECULAR AND TRIMOLECULAR MECHANISMS IN THE HYDROCHLORINATION OF CYCLOHEXENE



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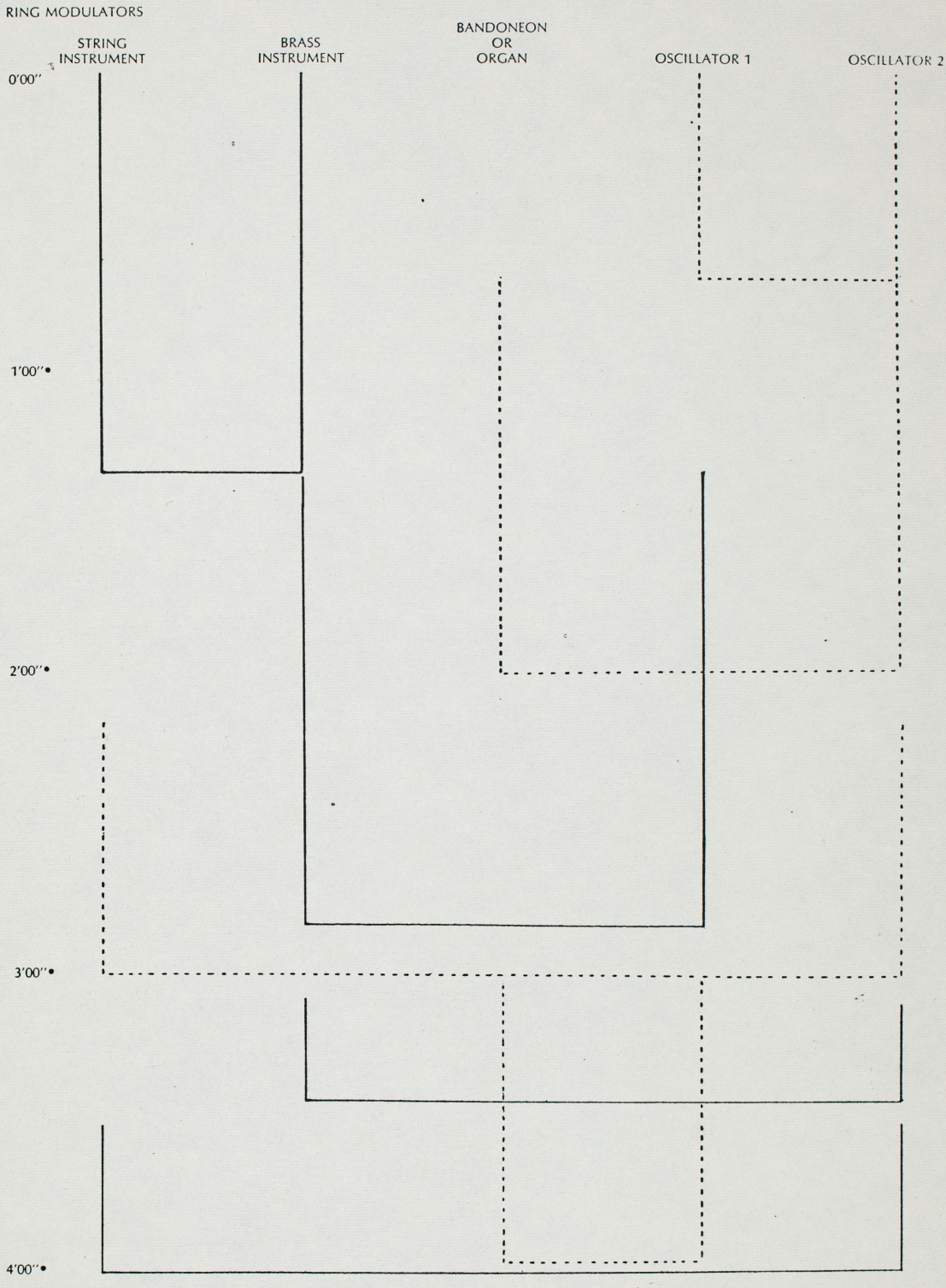
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STRING INSTRUMENT
BRASS INSTRUMENT
BANDONEON OR ORGAN
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OSCILLATOR 2
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1'00''•
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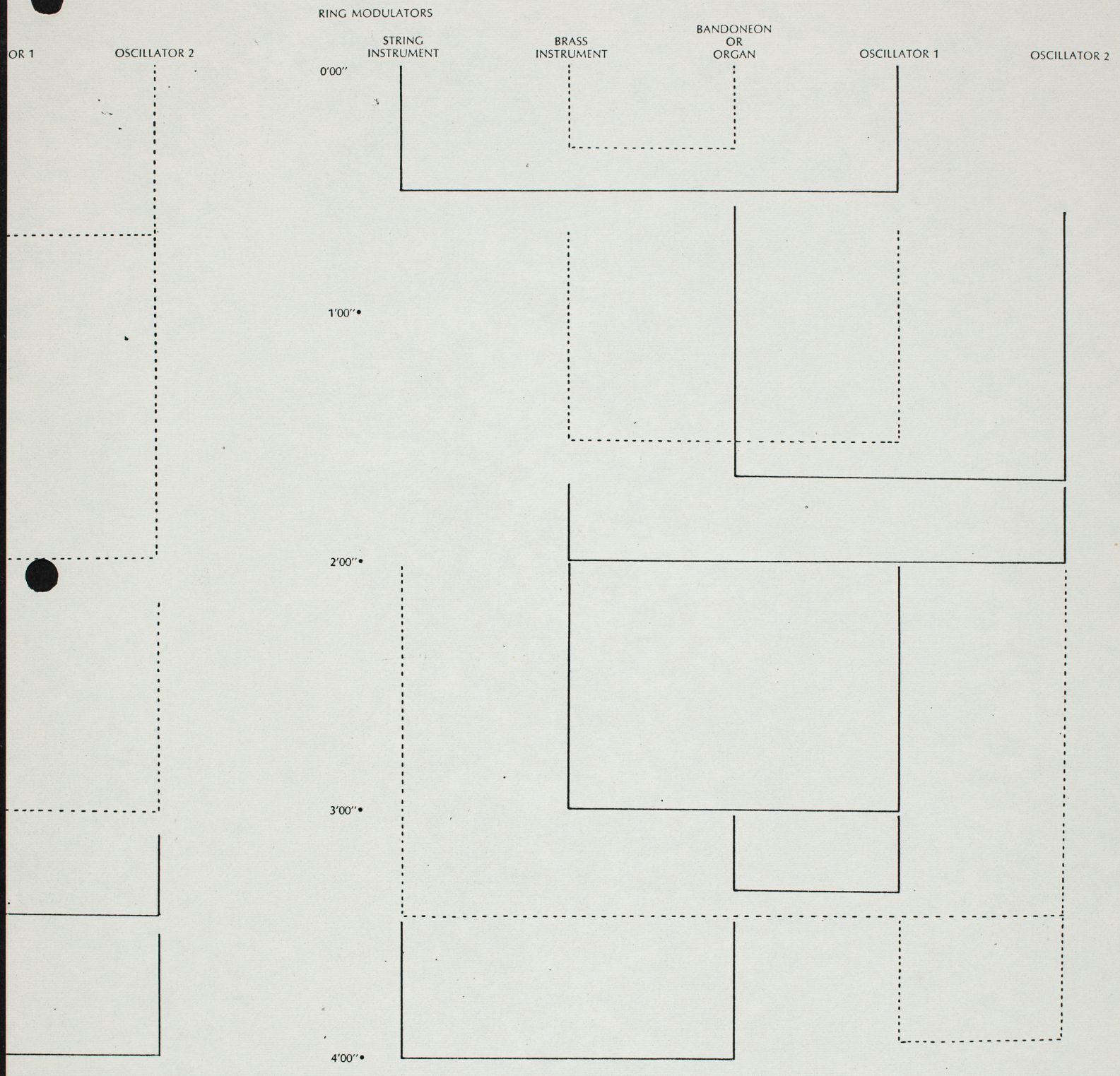
4'00''•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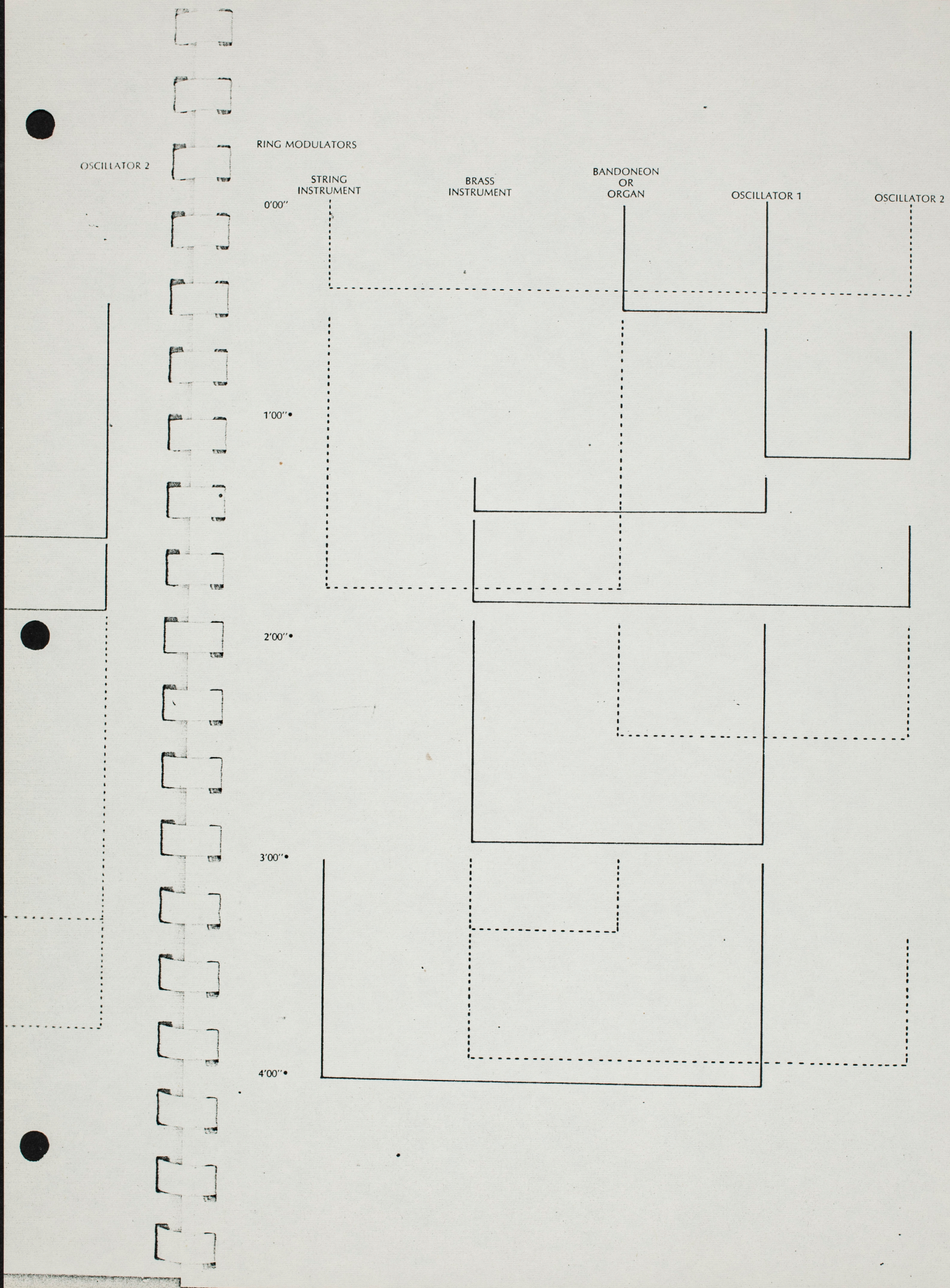
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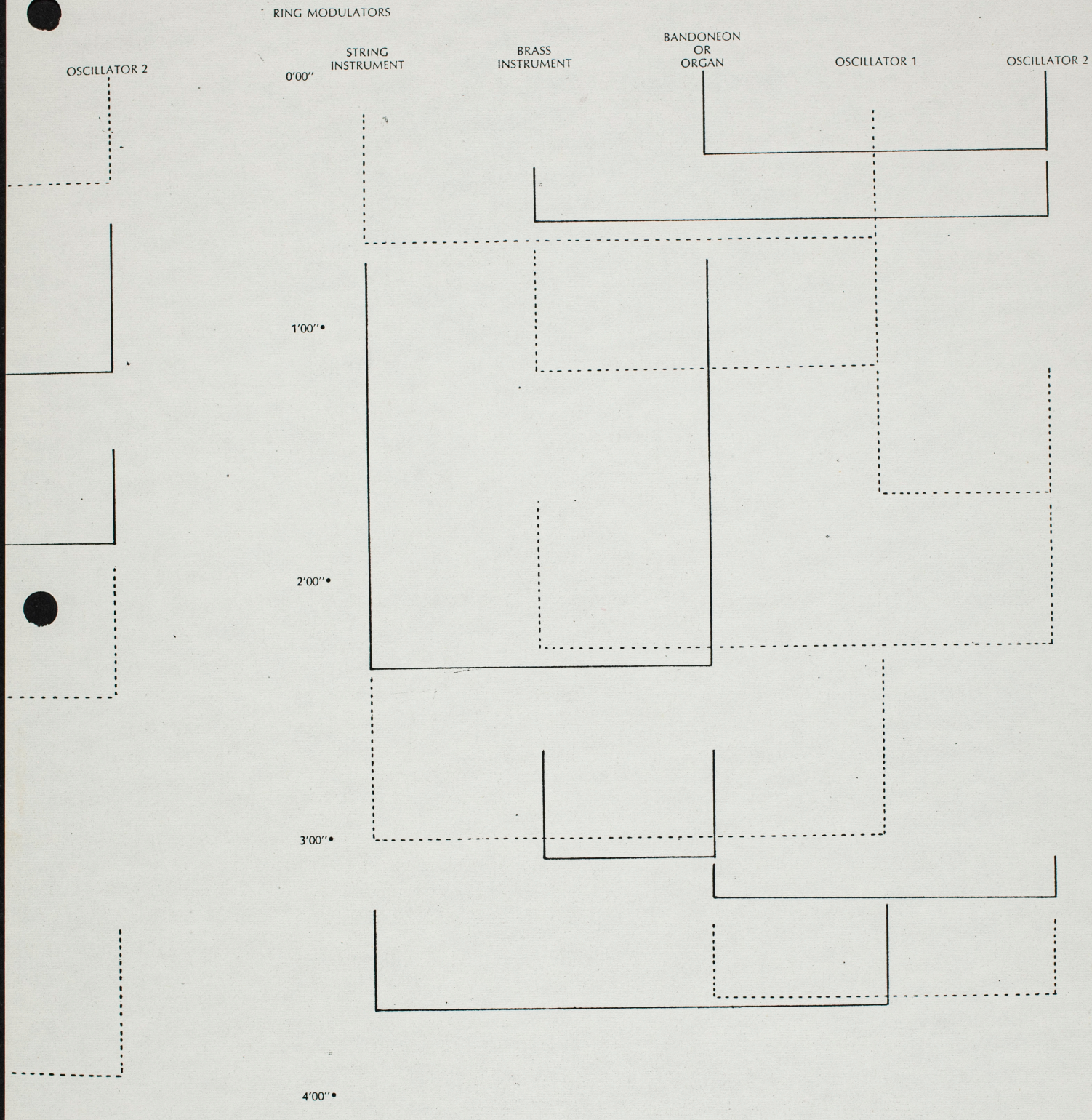
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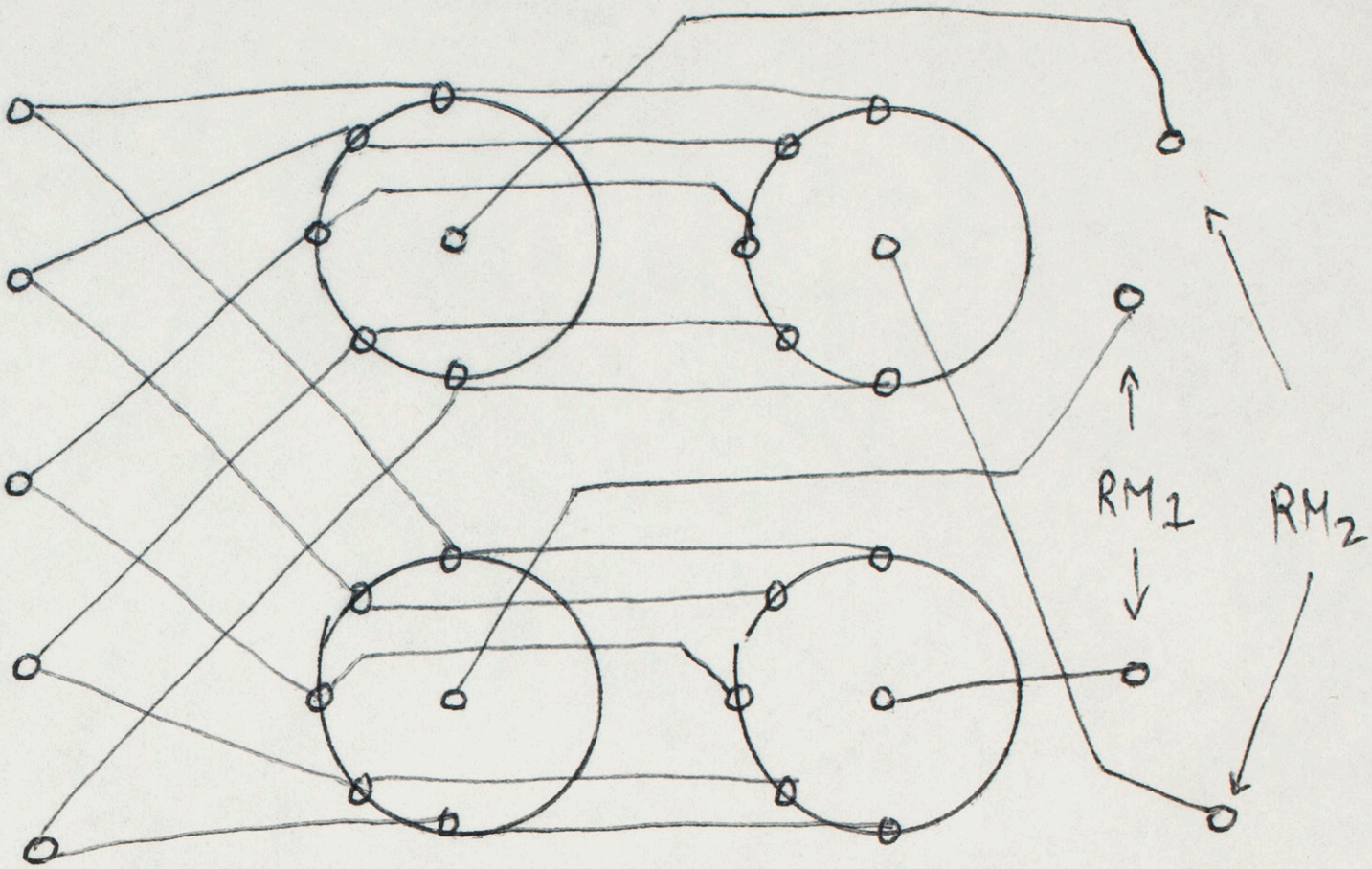
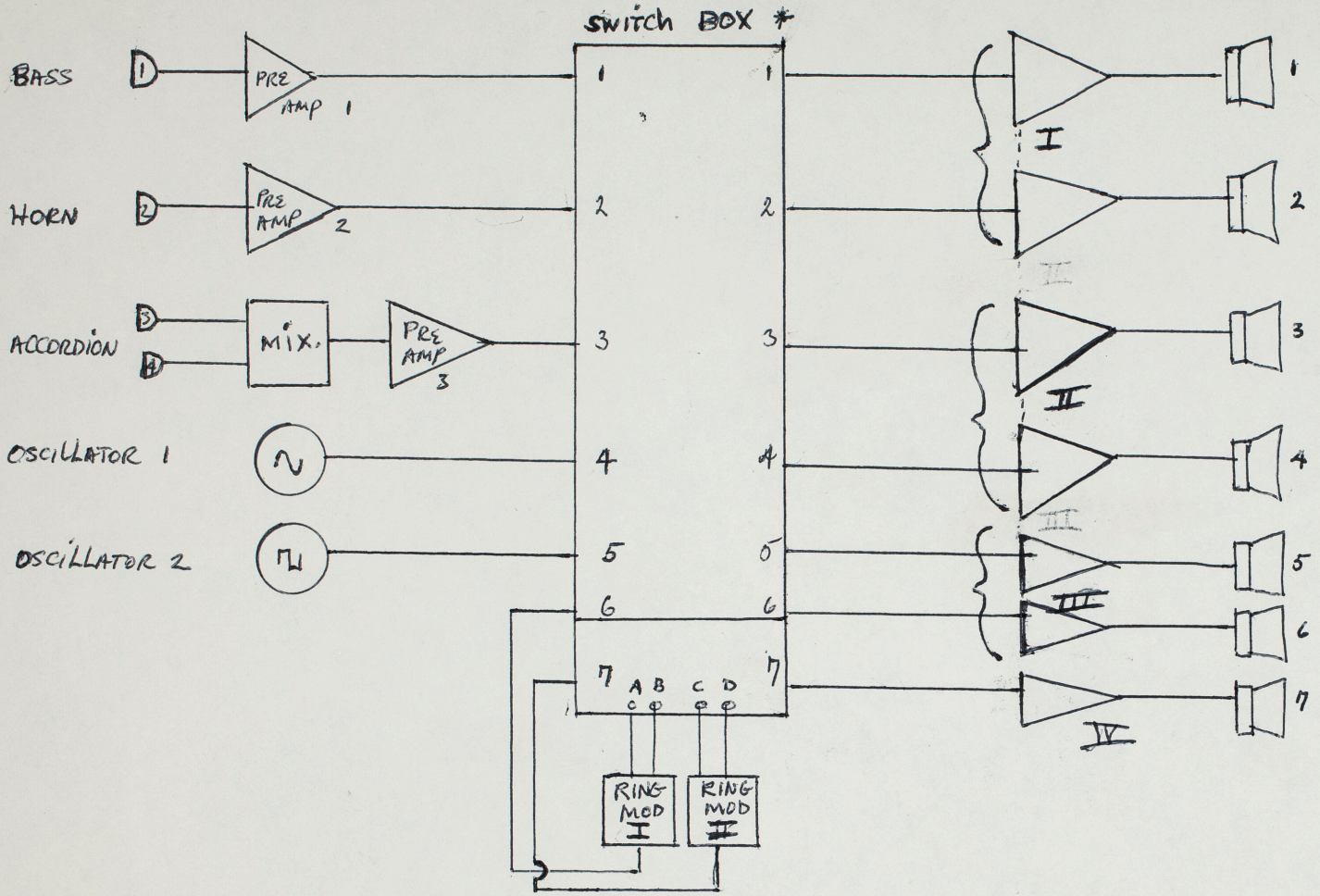
'appearance'

in



FLOW CHART FOR APPEARANCES BY Toshi IchiyANAGI



* ANY INPUT MAY BE SWITCHED TO ANY OUTPUT.
INPUTS 1–5 MAY BE SWITCHED IN ANY COMBINATION
TO OUTPUTS A,B,C OR D

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EQUIPMENT NECESSARY FOR APPEARANCES

BY TOSHI ICHIYANAGI

MICROPHONES :

1 BASS DE ARMOND CONTACT

3 ELECTROVOICE 666's

3 MIC STANDS WITH CROSS ARMS

3 CABLES W/ EXTENSIONS

(ADAPTORS)

1 PHONE TO PHONO

MIXER :

1 AMPEX MIC MIXER (AC)

1 CANNON TO PHONO CABLE

PRE-AMPS :

1 SHURE (HI IMPEDANCE) (AC)

1 30 FT SHEILDED CABLE PHONO TO PHONO

BUCHLA DUAL MIC PRE-AMP (AC)

2 CABLES MINIPLUG TO PHONO

4 " " " " MINIPLUG

2 " BANANA TO BANANA

OSCILLATORS :

2 AUDIO FREQUENCY FUNCTION GENERATORS WITH AMPLITUDE, WAVE SHAPE AND FREQ. CONTROLS. (POTENTIOMETERS) (AC) (AC)

RING MODULATORS :

2 CABLES BANANAS TO PHONO.

2 WITH BALANCE CONTROLS

6 PHONO TO PHONO CABLES

POWER AMPS :

3 STEREO (2 MACINTOSH 1 SONY) (AC) (AC) (AC)

1 MONO (1 ~~DU HAUT~~ MARANTZ) (AC)

7 PHONO TO PHONO CABLES

SWITCH BOX

7 INPUTS 7 OUTPUTS TO POWER AMPS

4 OUTPUTS FOR RING MOD. LOOPS

ANY INPUT MAY BE SWITCHED TO ANY OUTPUT.

AC RECEPTACLES 9

SPEAKERS

4 A7 500's

3 AR 3's

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CITE LIBRE

Music for three performers using any sound-producing means

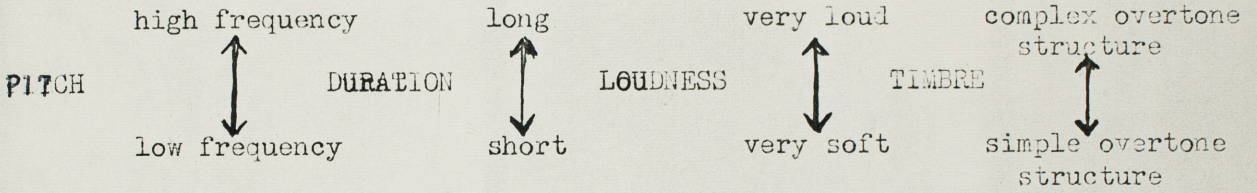
MARTIN BARTLETT

Vancouver, April 1966

The piece is a system of sound responses made by players to sounds the other performers make. Each performer has the following options:

1. He may choose either of the other players' sounds as response-requiring stimuli.
2. He may choose any aspect of that performer's sounds (pitch, duration, loudness or timbre) as the response-requiring parameter.
3. He may choose in which of these four parameters he will make his own response.

Each choice should be made without consulting the other performers. Every sound poseesses, of course, all four parameters, and each may be considered As possessing a continuum from "low" to "high". Thus:



A player concentrates on one aspect of another player's sounds, then inverts the characteristics of that aspect in another parameter. For example, he may hear a high pitch, and choose to respond in terms of loudness, so he plays a sound of "low" loudness. Or, he may respond to a very short sound (low duration) with a very noisy one (high overtone complexity).

There are three possibilities of determining event frequency:

1. Each sound-response may be made as rapidly as possible after the stimulus.
2. Each response may be made after a count of three, six or nine (either in clock time or in the player's choice of tempo) depending on whether the stimulus was low, medium or high in its perceived parameter.
3. The distance between stimulus and response may be articulated by the performer making three, six or nine (for low, medium or high stimuli) physical gestures of his own choice.

During the course of the piece, a player may freely

1. redirect his attention to another performer.
2. redirect his attention to another sound parameter.
3. change the parameter-mode of his response.

The piece begins by one or more of the players directing his attention to sounds occuring in the environment, and making his first response, in terms of his chosen parameters, to any sound he may hear.

The piece ends either when no further sounds occur (this can happen under certain circumstances) or, when all three players make a sound simultaneously.

CHECK LIST FOR PERFORMANCE ELECTRONICS MARCH 28, 1968 PAULINE OLIVEROS

IS IT PLUGGED IN? IS IT TURNED ON?
DON'T BE A NERVOUS POT TWIDDLER

1. POWER SOURCE

110 V AC orDC ?

a) Number of circuits needed? Separate Audio from Video.
b) Load? Allow 1 amp for 100 Watts.
c) Number of AC receptacles needed?
d) Number and length extension cords needed?
e) Number of 2 to 3 prong AC adaptors or vice versa needed?
f) Spare fuses.
g) Fresh batteries.

2. TOOLS AND SUPPLIES

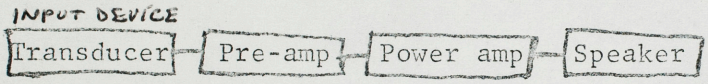
INSULATE HANDLES

a) Set of screwdrivers ordinary and phillips head, small to large.
b) Soldering iron and solder.
c) Long nose pliers
d) Regular pliers
e) awl
f) Scout knife
g) Wire strippers and cutters.
h) Flash light
i) Scissors
j) Electrical tape
k) Masking tape
l) Continuity tester or VOM.

CABLES, CONNECTORS AND ADAPTORS

a) Set of alligator clip leads.
b) Assorted length phono to phono cables.
c) Complete set of adaptors. (consult Switchcraft catalogue.)
d) Zip cord No. 16 or 18.

4. BASIC SOUND SYSTEM COMPONENTS



A. TRANSDUCER (ie. microphone, tapehead, phonograph cartridge, etc.)
1. High level or low level? Impedance? Is transformer necessary?
2. Output power? Does it match input of pre - amp?
3. What kind of connector does it have? Is an adaptor necessary?
4. Power supply?

B. PRE_ AMP
1. Impedance at input?
2. Output? Does it match input of power amp?
3. Input and output connectors? (Usually phono.)
4. Power supply?
5. Gain controls?
6. Tone controls?

C. POWER AMP
1. Impedance?
2. Output power? Will it drive speakers efficiently?
3. Tube or transistor? What cautions to be observed in loading the amp?
4. Cables and connectors needed?
5. Power supply?

D. SPEAKERS

1. Impedance?
2. Efficiency?
3. Frequency Response?
4. POWER RATING

E. SPACE

1. ARE SPEAKERS PROPERLY COUPLED TO THE ENVIRONMENT.
2. QUIETNESS
3. REVERBERATION
4. USEFUL AND ADEQUATE LOUDNESS
5. PROPER DISTRIBUTION (even freq. distribution) no dead spots for audience

Incidents of tech. failure:

Accordion strap locked.
missing mouthpiece

1. cartridge fed back xanaka
2. ½ hour search for extension cord - Tune machine
3. Not turned on - Telrepmen
4. Hose crackle - Song 777 on portable list
5. Associated inputs.
6. Pot turned down
7. Speaker wires shorted
8. Not enough power to do the job S. S. State.

READING LIST FOR 202C ELECTRONICS PERFORMANCE APRIL 2, 1968

An Introduction to the American Underground Film, Sheldon Renan, Dutton D207 Paperback Pgs. 227-257, Expanded Cinema

Happenings, Michael Kirby, Dutton D192, Paperback

ARTICLES Concerning Electronic Performance, Zeroxed collection in Music Office Conference room and on reserve in the library.

Source 1, 2 and 3, Composer- Performer Edition, (Scores utilizing electronics and related articles.

Fylkingen Bulletin International 1 and 2, 1967, (General articles)

ELECTRONIC Music Review, All issues, General and technical articles.

Reproduction of Sound, Edgar Vilchur, ARinc. Library, (Basic Hi-Fi very clearly written.)

How To Read Schematic Diagrams, Donald E. Herrington, Sams. (RequiredFor those who don't know how.) (Thoroughly explains small components.)

The Commercial Sound Installers Handbook, Leo G. Sands, Sams

DICTIONARY of Electronics, S. Handel, Penguin

The Electronic Revolution, S. Handel, Penguin (GEneral ideas about the kinds of equipment in use today.)

How to Build Electronic Equipment, Richard Johnson, Rider

Audio Amplifier Design, Farl J. Waters, Sams. (General and technical. Good for defining large components ie. transducer, amplifier, transformer, etc.)

Electronic Musical Instrument Handbook, N.H. Crowhurst, Sams

Electric Guitar Amplifier Handbook, Jack Darr, Sams

Troubleshooting Audio Equipment, Mannie Horowitz, Sams

Electronics, Harry MIleaf, Hayden (A course in basic electronics.)

Basic Pulses., I. Gottlieb, Rider(Wave shaping techniques.)

Magazines with occasional articles of interest are: Popular Electronics, Radio Electronics, Electronics World, Radio TV EXperimenter, Electronics Illustrated, Electronics, DB, Audio, Broadcast Engineering and Electronic Design.

IS IT THERE?
IS IT PLUGGED IN?
IS IT TURNED ON?

202 c CLASS SCHEDULE FOR THURSDAY APRIL 11

Ichiyanagi — 8:00 AM — 10:30 AM

GOLDMAN — MIC PLACEMENT AND CONNECTION TO PREAMPS

JOHNSON — ALL CONNECTIONS TO SWITCH BOX AND AMPLIFIERS, PLACEMENT OF EQUIPMENT ON TABLES.

WEIL — SPEAKER PLACEMENT AND TABLES FOR EQUIPMENT.

MULLEN — SPEAKER CONNECTION (TURN OFF AMPLIFIERS WHEN ALL AC CONNECTIONS SPEAKERS ARE DISCONNECTED)

OLIVEROS (LEEDY)

BARTLETT — 12:30 PM — 2:00 PM

BUELL — ALL CONNECTIONS FROM YOUR INDEPENDENT SYSTEM

DUTTON — " " " " " " " " "

RASKIN — " " " " " " " " "

BEHRMAN — 2:00 PM — 3:00 PM

STRANGE — SPEAKER CONNECTIONS (TURN OFF AMPLIFIERS WHEN SPEAKERS ARE DISCONNECTED)

DON — MIC CONNECTIONS TO PRE-AMPS TO MIXER TO RING MODULATOR.

LARUCCIA — OSCILLATOR CONNECTION TO RING MODULATOR.

CARTER — RING MOD. CONNECTION TO PRE-AMP TO AMP.

SET-UP CHANGE REHEARSAL — 3:00 — 4:00 PM

JOHNSON IN CHARGE AND RESPONSIBLE FOR CHECKING ALL CONNECTIONS DURING CONCERT.

ALL CLASS MEMBERS ARE EXPECTED TO BE PRESENT ATTENTIVE AND HELPFUL. WE HAVE VERY LITTLE TIME SO DON'T WAIT FOR (THE OTHER GUY) TO DO IT!

STAGE MANAGER — LES WEIL, ASSISTANTS — DUTTON, KEN & DAVE

RECORDISTS — JOHN GARVEY AND DAVE

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TO → 202C FROM OLIVEROS April 25, 1968

REMINDER: PLEASE! RETURN BORROWED EQUIPMENT TO ITS PROPER LOCATION IMMEDIATELY AFTER USE. LEAVE A NOTE STATING WHERE IT IS AND WHEN IT WILL BE RETURNED.

TEXT BOOK: SOURCE 3 IS NOW AVAILABLE AT $5.00 PER SINGLE ISSUE OR $9.00 FOR A SUBSCRIPTION TO TWO ISSUES. MAKE CHECKS PAYABLE TO SOURCE. I WILL ORDER FOR OUR CLASS. ISSUE 3 IS REQUIRED FOR 202C.

ASSIGNMENT: SELECT A SCORE FROM SOURCE 3. MAKE A LIST OF NECESSARY EQUIPMENT. MAKE A BLOCK DIAGRAM OF CONNECTIONS. ARRANGE FOR A REHEARSAL DURING CLASS TIME AND DO IT. ARRANGE FOR EQUIPMENT TO BE PRESENT AND RETURNED.

SCHEDULE: CLASS WILL NOT MEET THURSDAY MAY 2. ARRANGE WITH MUSIC DEPT. TO ATTEND THE AUDIO ENGINEERING SOCIETY MEETINGS AT HOLLYWOOD ROOSEVELT HOTEL IN HOLLYWOOD. ROBERT MOOG WILL BE PRESENT WITH A LECTURE DEMONSTRATION.

ALAN KAPROW WILL LECTURE WEDNESDAY MAY 8, AT 8:00 PM. USB LECTURE HALL. PLEASE ATTEND AND PLAN TO TAKE PART IN THE TWO SEMINARS AND HAPPENING WHICH WILL FOLLOW UP THE LECTURE. FRIDAY MAY 10, 4:00 USB 3070 MON. MAY 13, 4:00 USB 3070

LOWELL CROSS WILL LECTURE THURSDAY MAY 9, 11:00 AM – 12:00 ON THE PRINCIPLES OF VIDEO IN 409.

THE CONCERT ELECTRONIC SIGHTS AND SOUNDS WILL TAKE PLACE ON FRIDAY MAY 10 AT 8:30 PM WITH CROSS AND TUDOR.

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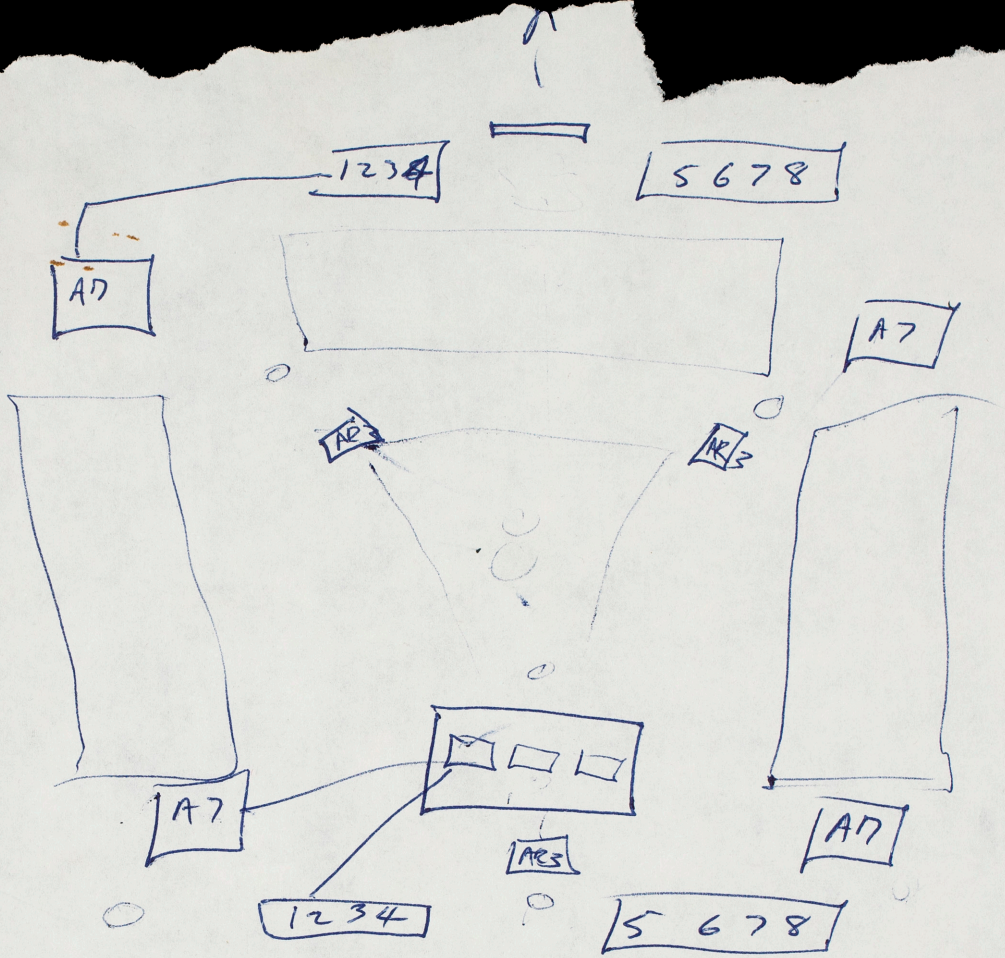
stereo Speaker
connection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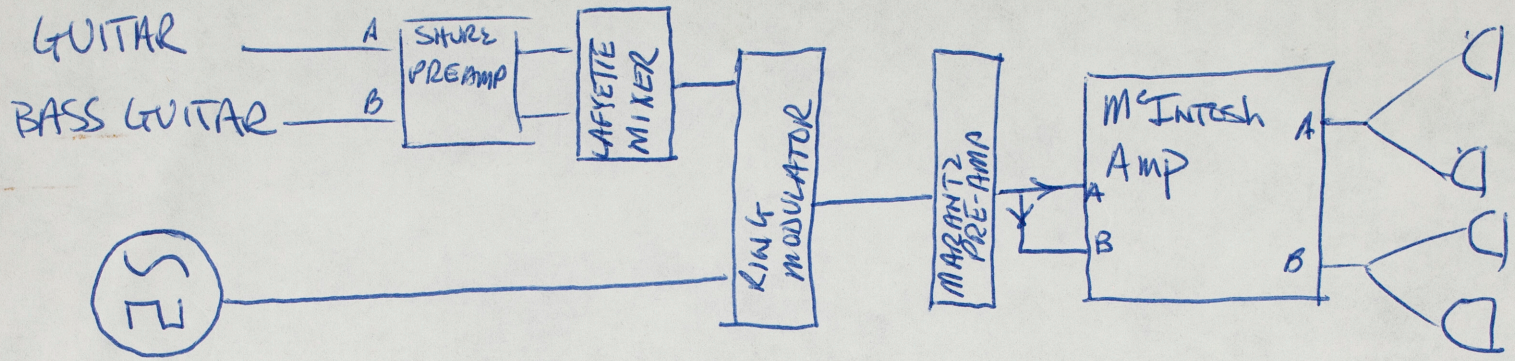
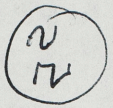


Show specifications for each component



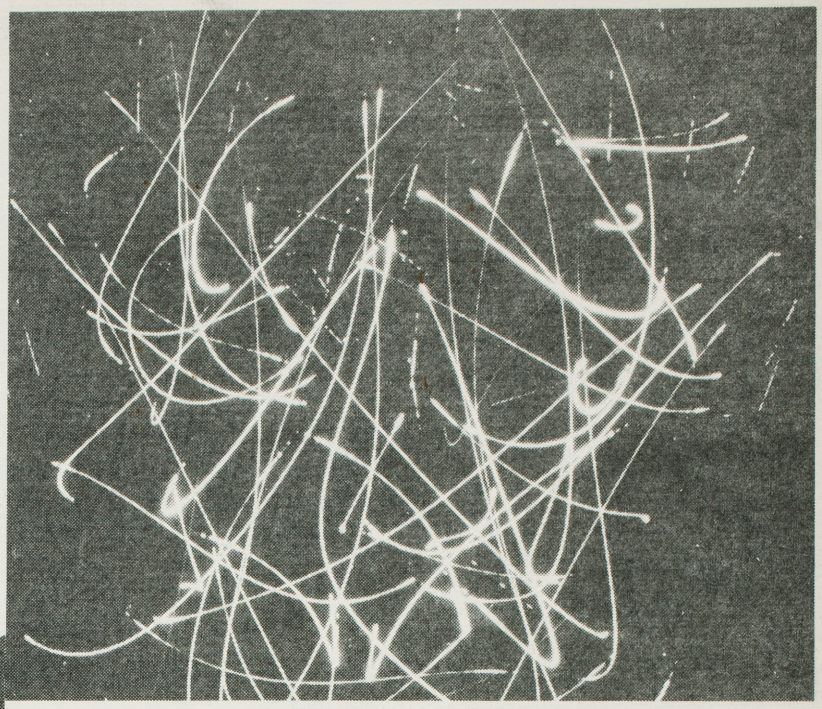
Show speaker connections phased properly

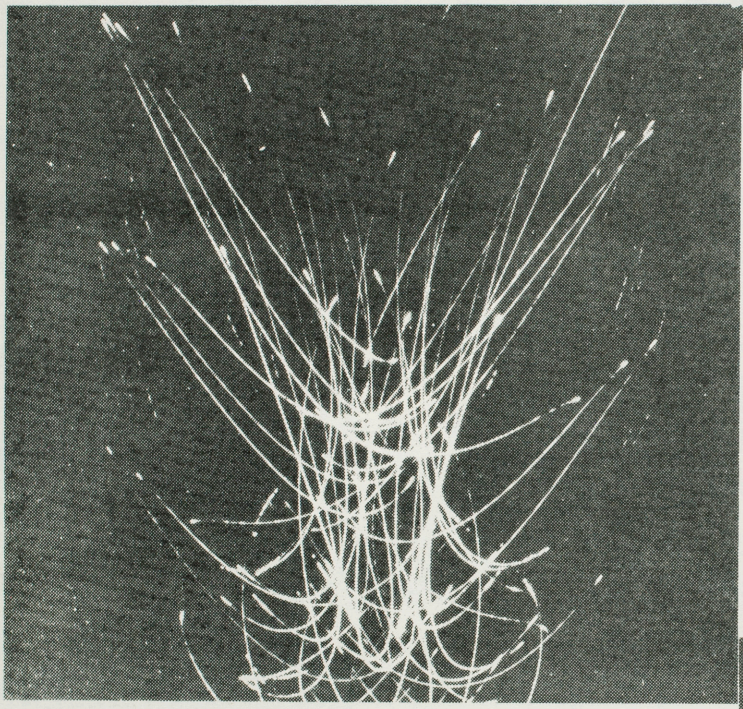
CQ Nov-Dec
issue

Soldering

Lecture: "The Principles of Video"

11:00 in the morning
Recital Hall (409 MC)
May 8, Thursday

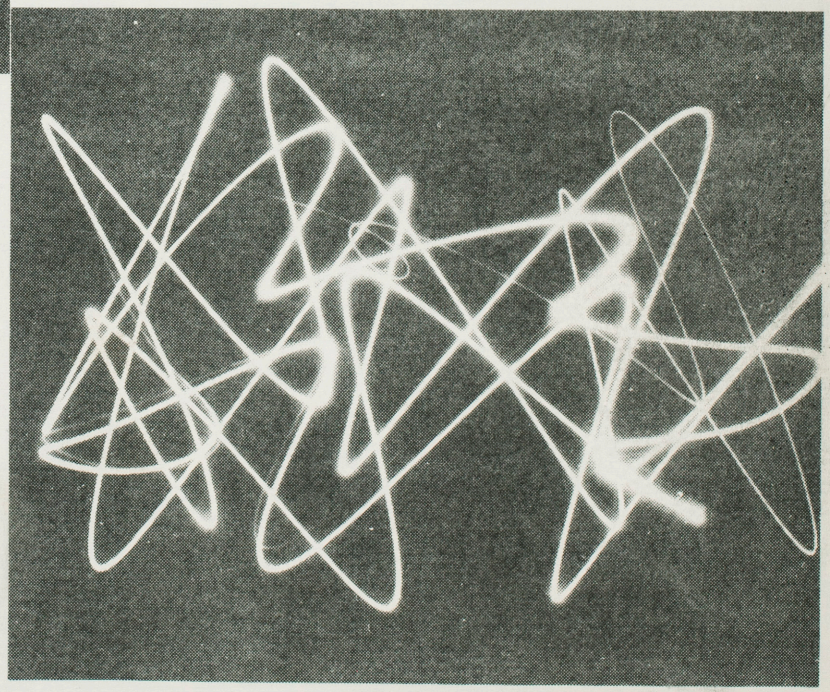




Lowell Cross is a doctoral candidate in Musicology at the University of Toronto. He is an expert electronics technician, as well as composer.

Mr. Cross's publications include A Bibliography of Electronic Music, University of Toronto Press; The Stirrer and Video; and Electronic Music 1948-1953 (in preparation).

His works include compositions for tape, instrumental ensembles, oscilloscopes and TV.



Department of Music
University of California, San Diego

Please Post

PROJECT PROPOSAL FOR MUSIC 202C:

FILMSOUNDS

Pauline Oliveros

Victor Laruccia

The purpose of this project is to create a more than casual relation between film and sound. A film will be made to be used as a score for musicians and to provide the sound system with the stimulus for change. It should be recognized that this paper is at this time only a general outline and will undoubtedly require some transformation before the project reaches its final stage.

The main principle involved here is that the changing intensity of the projected image and the differences in intensity at any single moment from one part of the screen to another will be reflected in a changing sound. This will be accomplished by utilising photoelectric sensors at the screen itself; these will be arrayed so that an average distribution of light can be obtained. The screen itself will be divided into six sections, each section to contain one photosensor. Each sensor will control one oscillator and will contribute to the control of the sounds produced by the other five sensors.

Each oscillator will be connected to four function amplifiers in series; these amplifiers will square, in turn, the signal which is introduced into them. This will give a fundamental tone provided by the oscillator and the first four overtones of the fundamental. The signal produced by each of these amplifiers will be sent to a pre-amp where the intensity of the signal will be modulated by one of the other photosensors. The signals from the four amplifiers will then be introduced into a mixer where the resultant signal will have its intensity determined by the sixth photosensor. The final product of these operations will be amplified in an audio-frequency amplifier, such as the MacIntosh 100, and distributed to a speaker system.

Although it may not be obvious, the intent here is to provide a system which will give frequency, timbre and intensity changes. These changes will depend on the intensity changes of the film and on the hookup of the components. The diagram which follows is not complete. I have given the schematic for one complete bank; the other five banks will be exact repetitions except that the arrangement of the wires will vary from bank to bank.

Once the electronics are built there is no reason why any film should not function adequately; it might be interesting to see Buster Keaton accompanied by modern sounds. However, my purpose is to produce a film which will in effect play the electronic system. The system, as will be noted, will be tuneable so that the final effect should be on the order of thirty-six sound makers (comb, kazoo, scrub boards, jugs, etc.). Finally the length of the film should be about fifteen minutes at the most, very probably less.

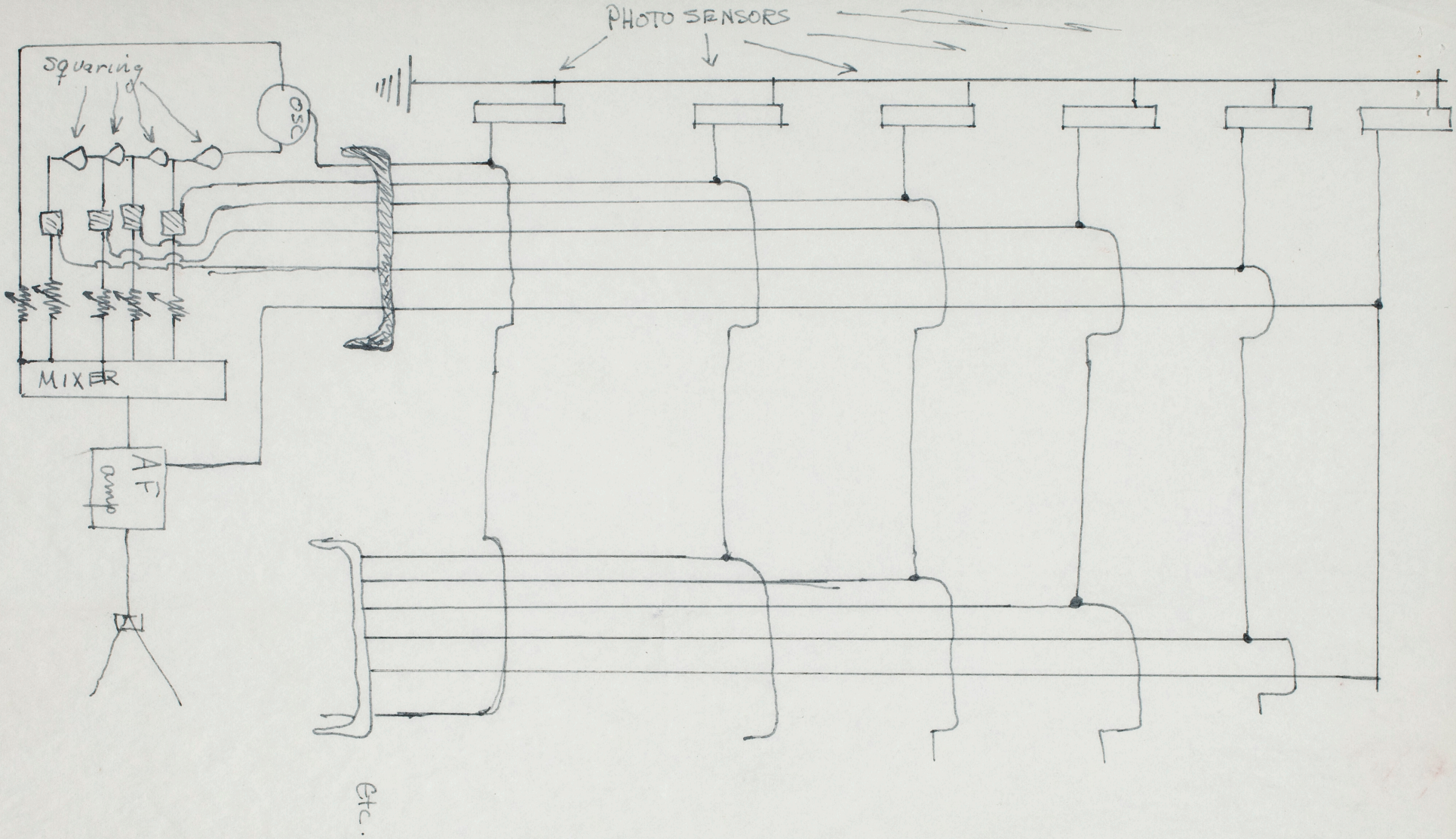


PHOTO SENSORS
Squaring
OSC
MIXER
AF amp
Etc.

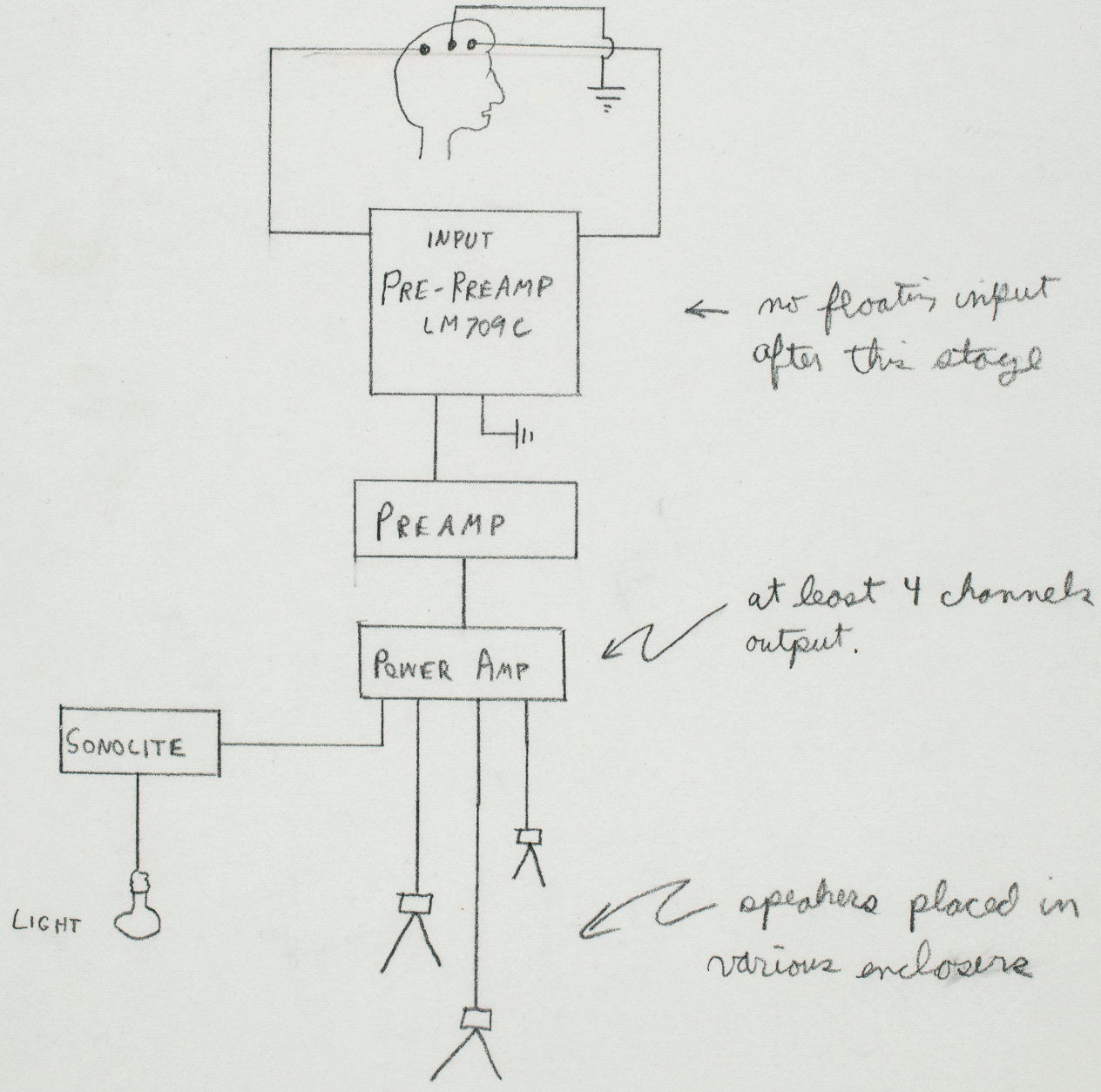
PROJECT FOR MUSIC 202C

Keith C arter

INSIDE

This piece is generated from the alpha brain waves of the preformer. These are waves which can be conciously controled (turned on and off) and are of about 13 Hz, depending upon the preformer. They have an amplitude of about 25 μv.

The block diagram of the setup is shown below;



The signal will be taken from electrodes placed on the scalp. The electrodes will be silver plated, and a special electroconductive paste will be used to enhance the electrical contact between the scalp and the electrodes. There will be 3 electrodes; one a ground electrode and the other 2 electrodes for the signal. The two signal electrodes are for a floating input in hopes of minimizing interference. The exact location of the electrodes will be determined experimentally to optimize the pickup of the alpha waves and minimize the noise and interference.

The signal will then be fed into a special preamplifier.

This preamplifier will be constructed around a LM 709 C operational amplifier. This is an integrated circuit which costs around $4.00.

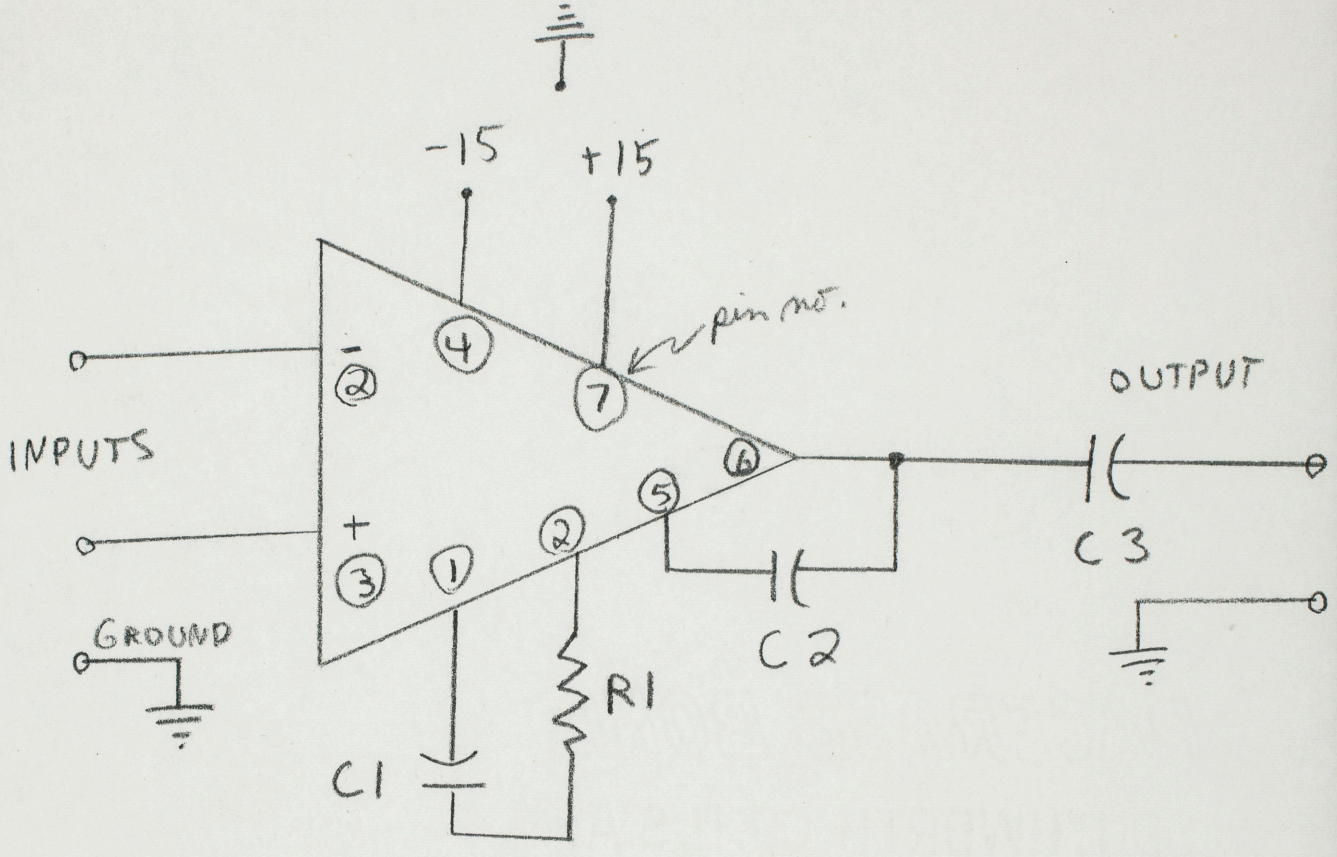
It comes in an 8 pin metal can the size of a transistor case, even though it incorporates 15 transistors in the circuit.

It requires both positive and negative power supplies of between 9 and 15 volts. I'll use ±15 volt batteries (it draws about 3 ma.) hopefully to eliminate the noise and hum from power supplies.

The circuit shown below has an gain of approximately 20,000, with a maximum input signal level of .6 mv. The frequency response is determined by frequency compensation networks, R1, C1, C2, C3. R1, C1, C2 determine the high end cutoff point. C3 determines the low end cutoff point.

PRE-PREAMP

fig. 2



LM 709 C

With R1=1.5K, C1=.0005 f,C2=200 pf, the high end frequency cutoff point is around 20 cps., which would be very good for this application. The value of C3, and further adjustment of R1, C1, C2 will have to be determined by experiment.

The total noise of the amplifier operating in the bandwidth of 8-20 cps. will be equivalent to 70 nano-volts rms at the input. This provides 25 db. of quiting at an input level of 25 micro-volts. This figure will vary depending upon the impedences of various heads. It will also vary depending upon the filter networks.

All these factors will be adjusted to optimize operation as the pre-preamp is constructed. If there is still to much noise, Feild effect transistors will be added to the circuit as shown below (fig. 3).

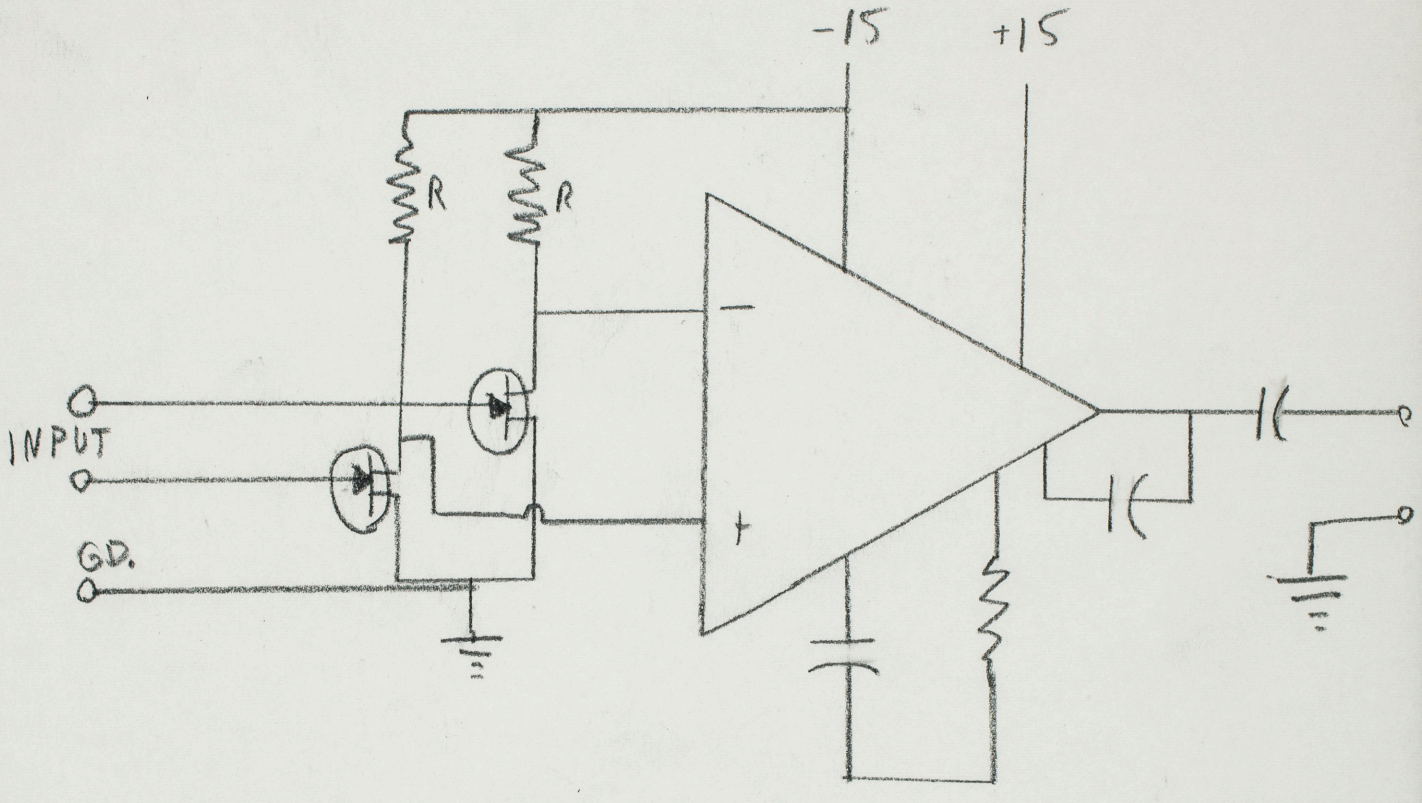
The filter is used to filter out all noise and other brainwaves outside the frequency of the alpha wave bandwidth. Since the alpha waves cover a very limited range, the filter will have to be quite sharp. And the sharper the filter, the better the signal to noise ratio.

The preamp will be a standard preamp with treble and bass controls. They will be set to maximum bass boost and minimum treble boost. The input mode used for best impedence match will depend upon the filter used.

The power amplifiers used will depend largely upon the speakers used. The low frequencies used will

PRE-PREAMP WITH FET's

fig 3



probably require a fairly high quality amplifier.

The speakers used sill have to be determined after the output is heard. Possibly cheap speakers would work the best, because high quality is not important in this application, and it may turn out that low quality speakers would sound better due to the distortion they produce.

Most, if not all, the speakers will be used as indirect sound producers. The low frequency isn't heard by humans, all that people would hear comming from the speakers would be the harmonics that the speaker cones have generated. Most ot the accoustical output of 13cps. will be used to rattle various sound producing mechanisms; Some of these would include garbage cans, snare drums, symbols, sheet metal or/and tin foil,gongs,paper, etc. The right combination of these sources will be determined through emperical studies (I'll play around with it when the system works). I will also try hooking a sonolite to the output of one of the channels to get visual output as well as a sound output.

During the preformance it might be good to have an assistant who would control the various sources being used by a simple switching network. Perhaps through pratice the preformer and the technician could become fairly well coordinated and enhance the effects.

The preformance would consist of having the assitant attach the electrodes to the preformer on stage, the piece would then last for about 40 minutes

during which the assistant would adjust the controls and the preformer would control his alpha waves.

The preformer controls the alpha waves by controling the "state " of his mind. Alpha waves are generated when nothing is being "concentrated" upon, the same state of mind is generated in Yogi. The waves are turned off when the preformer visualizes something; they stop immediately upon opening the eyes.

It is hoped that a state of suspense or "mystery" could be generated in the audience during the preformance.

THE SYSTEM

The Modular Electronic Music system that was developed at the Tape Music Center is composed of functional *modules*, each designed to generate a particular class of signals or perform a specific type of signal processing. Each module is 7 inches high and 4¼ inches (or an integral multiple thereof) wide. Up to 15 modules sharing a single power supply may be assembled in a single cabinet, and form a *super-module*.

The system employs three varieties of signals, each with a distinctly different function:

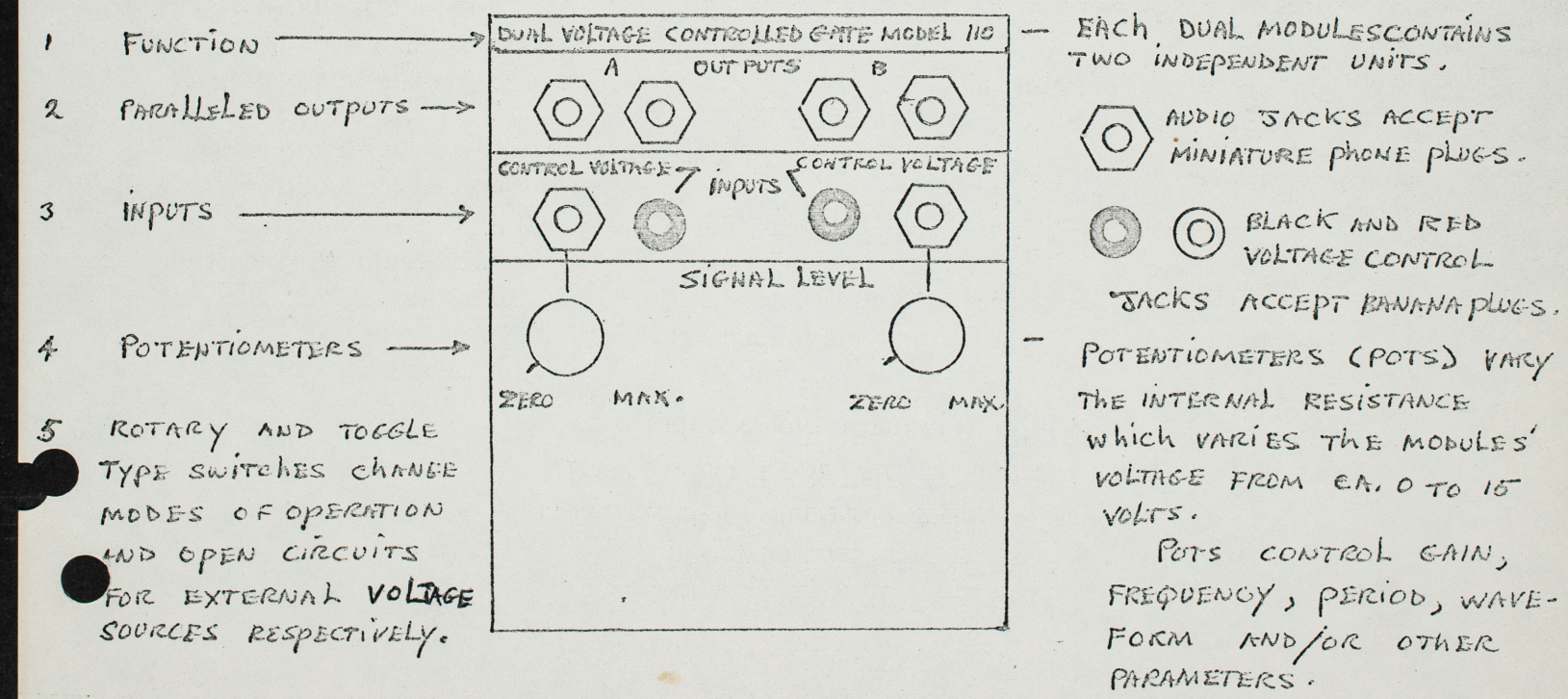
Audio signals, the raw material of electronic music, are formed by various sorts of generators (sine, square, sawtooth, harmonic) or are produced externally (tape loop, radio, microphone). In constructing a piece, they may be filtered, gated, mixed, modulated, or otherwise processed. The patch cords carrying audio signals within the system are grey, shielded cables terminated with miniature phone plugs. A standard level of Odb (ref. 600Ω) is employed for audio signals within the system.

Control voltages, used to determine frequencies, envelope characteristics, amplitudes and other parameters, are generated by keyboards, programmable voltage sources, and format generators. Black banana plug patch cords are used to interconnect control voltages. The standard control voltage range is from .5 to 15 volts.

Timing pulses are originated by keyboards, programmable sequencers, and pulse generators. They are used to trigger notes, open gates, or initiate chains of musical events. Timing pulses are about 10 volts in amplitude and are interconnected with red banana plug patch cords.

The rules for interconnection are straight-forward. Any number of inputs may be connected to a single output. Timing pulse outputs may be paralleled and connected to one input. The system output may be derived from any module; output is of sufficient magnitude to drive line inputs on tape recorders or sensitive inputs on power amplifiers.

PANEL FORMAT



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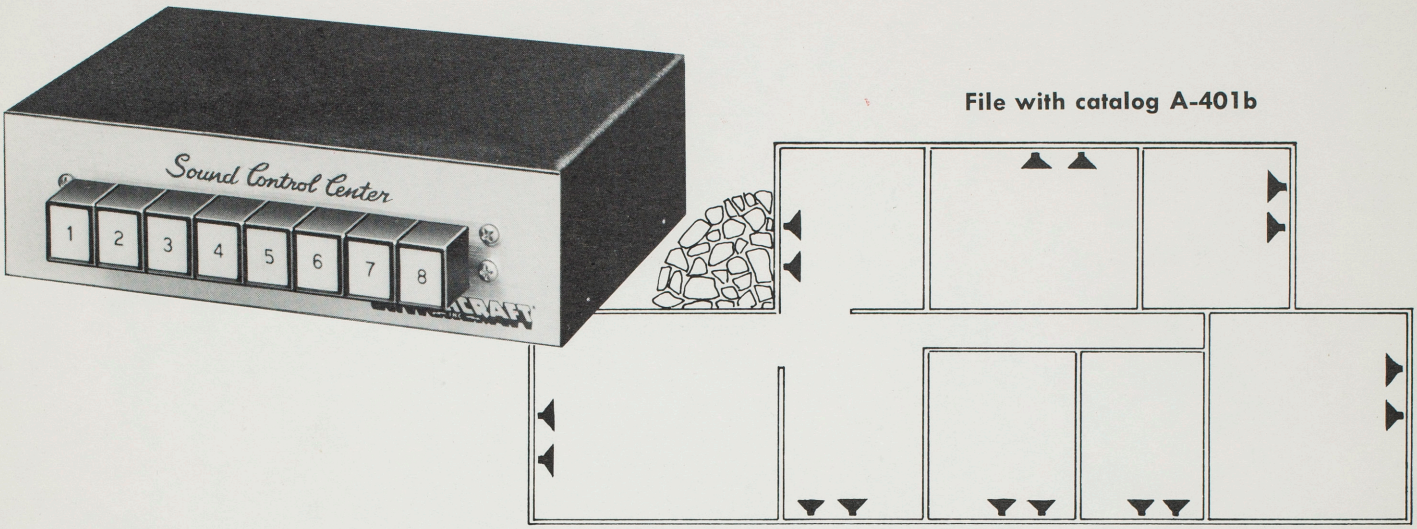
No. 168

NEW PRODUCT *bulletin*

File with catalog A-401b



File with catalog A-401b

hi-fi stereo speaker switching systems

MODELS 641 & 642

Controls up to 8 complete stereo speaker systems (or 8 pairs of monophonic speaker systems). The audiophile's answer to full stereo sound in every room throughout the house, or in classrooms, or offices . . . with positive multiple-selection control.

1. **If you already have multiple speakers** placed in family room, library, den, kitchen, patio, bedrooms, workshop, etc., but are using an "all-or-nothing-at-all" method of control as you switch from speaker to speaker and room to room, or if you find your present speaker selector switch too restrictive as to number of operator combinations available, then Switchcraft's new 8-station Sound Control Center is for you!

2. **If you have wanted stereo in rooms throughout the house** but had previously found there was no easy-to-operate, dependable, simply installed method of controlling these speakers, Switchcraft's Sound Control Center with its easy plug-in speaker connections and simple pushbutton operation is tailor made for you!

The Sound Control Center uses Switchcraft's famous "Multi-Switch," the same reliable switch specified by engineers for today's Space-Age computers, data processing and ground support equipment.

The metal housing of the Sound Control Center is attractively finished in black wrinkle, with a brushed aluminum escutcheon plate . . . designed by Switchcraft's Audio Engineers to blend in with present audio components. Freshly styled control buttons have recessed white face with black numbers for easy identification. Protective rubber "feet" on Sound Control Center housing eliminates scratches and mars on hi-fi cabinets, book shelves, etc. Compact unit measures only 2¼" x 6⅜" x 7".

SPECIFICATIONS

Frequency response through the internal switching network is from D.C. to 30,000 Hz with negligible switching loss. Trouble-free, hum-free connections provided by Switchcraft's unique "Hi-D Jax." "Hi-D" Jax's molded nylon bushing provides complete insulation from mounting panel, and isolates both speaker lines to eliminate cross-talk.

No other external power (other than audio power being distributed) is required for operation. Power handling capacity is 100 watts maximum into a 4-ohm load.

Model 641—with "interlock" function. Allows only one speaker system at a time to be on. (Actuating a pushbutton automatically releases previously actuated pushbutton). **$49.50** Suggested User Net.

Model 642—with "push-to-lock; push-to-release" functions. Pushbutton locks when depressed and is released when depressed again. Allows any number of speaker systems (up to eight) to play simultaneously. **$49.50** Suggested User Net.

ACCESSORY: Model 643—Escutcheon plate for flush mounting Models 641 and 642. Complete with instruction sheet, template and four mounting screws. **$3.50** Suggested User Net.

Form No. GL 258R3 1-64

LARRY CURRAN/ELECTRONICS/LOS ANGELES
WE'RE DOING A PROBING ON ELECTRONICS AND THE ARTS, WITH THE MAIN EMPHASIS ON MUSIC. PLS CHECK THE LOCAL UNIVERSITIES' COMPUTING CENTERS AND FIND OUT WHO IS INVOLVED WITH THIS ART FORM AND INTERVIEW THEM ON THEIR TECHNIQUES AND GENERAL VIEWS ON ELECTRONIC ART. WE'RE SURE MOST WILL SAY IT IS GREAT, THE COMING THING. BUT WHAT WE WANT ARE INDICATIONS OF CONTROVERSY, BACKBITING, THE TECHNOLOGY INVOLVED AND WHY THEY WENT THAT ROUTE.

Vere & Cowie - on Shatto Pl -

THE BULK OF THE WORK, OF COURSE, IS BEING DONE IN ELECTRONIC MUSIC. THIS IS ALSO THE AREA OF GREATEST CONTROVERSY. PEOPLE THAT WE'VE TALKED TO AROUND HERE SEEM POLES APART IN THEIR VIEWS ON THE SUBJECT. AT ONE END OF THE SPECTRUM ARE PEOPLE LIKE MILTON BABBIT,OTTO LEUNING, AND VLADIMIR USSACHEVSKY, ALL OF WHOM MIGHT BE CHARACTERIZED AS THE CONSERVATIVES IN THE MOVEMENT. APPARENTLY THEIR COMPOSING IS MOST CONCERNED WITH MATHEMATICAL RELATIONSHIPS, WITH CREATING P(ECISE PITCH AND EXACTING RHYTHMS THAT HUMAN PERFORMERS CANT ACHIEVE EITHER SINGING OR USING INSTRUMENTS. AT THE OTHER END OF THE SCALE ARE THE RADICALS LIKE MAX NEUHOUSE, JOHN CAGE, AND JIM TENNEY, ALL OF WHOM SEEM MORE CONCERNED WITH RANDOM SOUND. THEY DONT CARE ABOUT EXACT RHYTHMS OR PERFECT PITCH, BUT RATHER ARE CONCERNED WITH SIMPLY PRODUCING SOUND AND EXPANDING HUMAN PERCEPTION OF SAME.

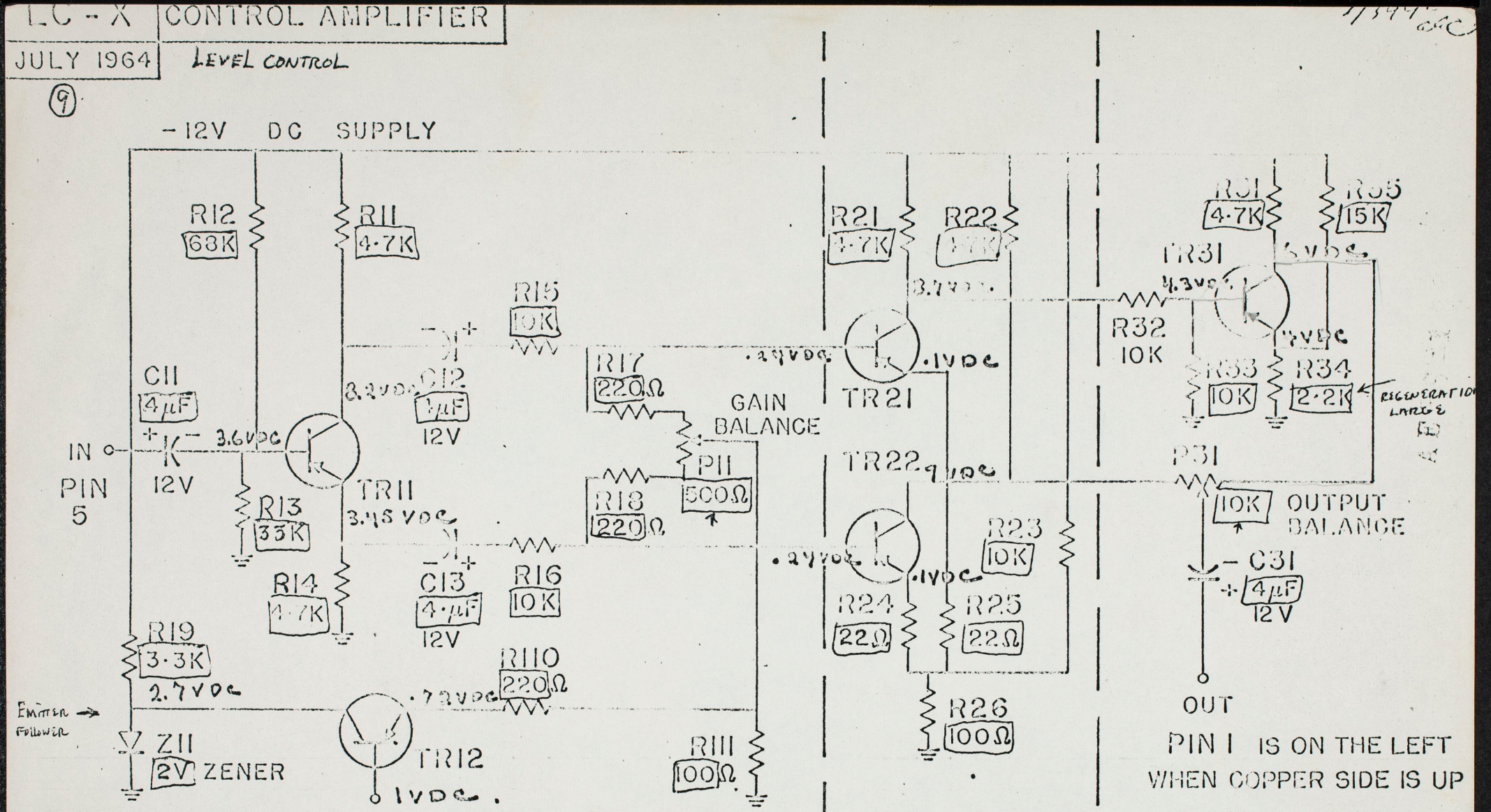
ALSO, BELL LABS, IN NEW JERSEY, IS WORKING IN THE FIELD ON THE THEORY THAT IT'S AN APPROACH TOWARDS SYNTEHSIZING SPEECH. SO FAR THEY HAVE COME OUT WITH TWO ELECTRONIC PROGRAMS, MUSIC IV AND MUSIC V, BOTH OF WHICH ARE WRITTEN IN FORTRAN. PLS CHECK THE LARGE SOFTWARE HOUSES LIKE COMPUTER SCIENCES CORP. AND COMPUTER USAGE CO. AND FIND OUT WHAT THEY THINK OF BELL LABS WORK. ALSO FIND OUT WHETHER THEY KNOW OF ANYONE DOING SIMILAR WORK ON THE COAST. DEADLINE FOR INPUT IS MARCH 25. BUT IF THIS THING'S A DUD IN YOUR AREA, WOULD APPRECIATE KNOWING SOONER.
AIKEN/SSHUYTEN/ELECTRONICS/PENNEY BLDG 3/5/68 1215P EST CB

262 7040

LC - X | CONTROL AMPLIFIER

JULY 1964 | LEVEL CONTROL

(9)



PIN 1 IS ON THE LEFT WHEN COPPER SIDE IS UP

ALL RESISTORS 1/10 WATT

ALL TRANSISTORS 2N1377

Laboratory - 9 The level control amplifier.

The level control amplifier goes back to the early days of vacuum tubes. The two essential parts are (1) a variable gain amplifier (2) a push-pull circuit which balances out the variable current in the output which results from the variation of the gain, that is, the application of a control signal.

Transistors give better results than vacuum tubes because because the gain change is more uniform.

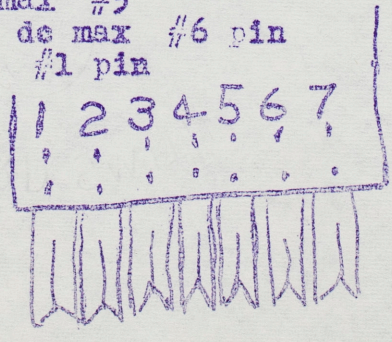
(1) Adjusting the current balance:
Put a small low frequency alternating voltage together with a suitable dc voltage (-1.0 volts or less) on the control terminal. Look at the output on an oscilloscope. The total excursion should not be greater than the normal range, 1 volt. Adjust the balance control for minimum fundamental as indicated by the pattern on the scope.

(2) Adjusting the gain balance:
Put about three times the normal signal of 0.25 volts rms on the input terminal and a variable DC voltage of 1 volt max. on the control terminal. Adjust the gain balance for maximum symmetry of the output. At th is input level there will be noticeable distortion.

(3) Put the normal voltage of 0.25 volts rms. on the input and a variable voltage (not over -1.0 dc) on the control terminal. Use one of your amplifiers to amplify the output so that the maximum output of the amplifier is about 2 volts rms. (obtained when the control voltage is 1.0 volts negative)
Plot output in decibels against control voltage using linear graph paper. Carry the readings down to as low a voltage as the voltmeter permits.

Note: IC-X specs as follows:

Supply -12 volts dc #8 pin(#2)
Input 0.25 v. rms. max #5
Control voltage -1 volt dc max #6 pin
Output 0.15 v. rms max #1 pin
Ground —— #7 pin



A START

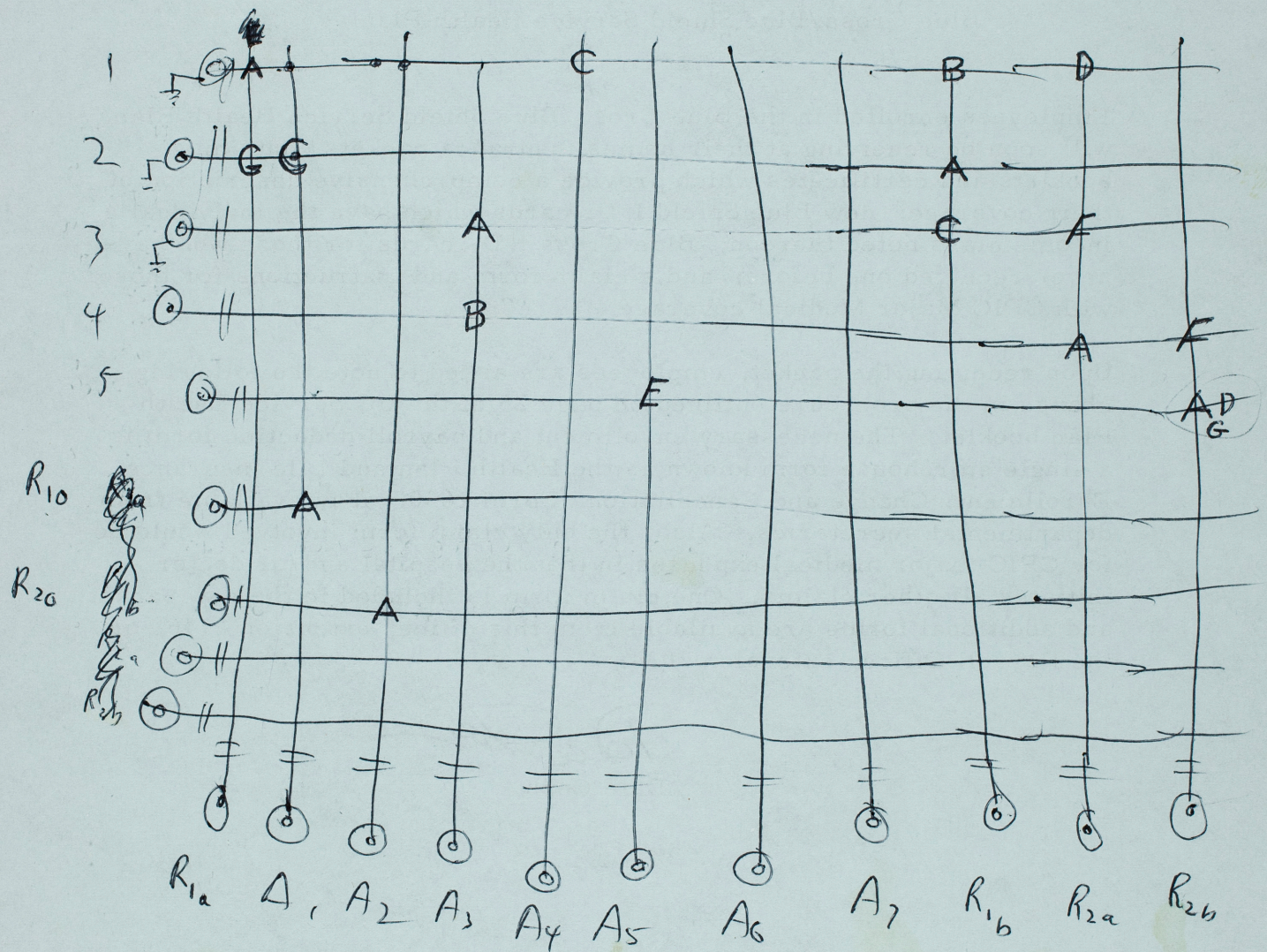
B ~~Maa~~ 0:40

C 1:20 — E 2:00

D 2:10

F 3:00

G 3:05



SAN DIEGO: PERSONNEL OFFICE

March 29, 1968

DEANS/DIRECTORS, DEPARTMENT/DIVISION CHAIRMEN,
ADMINISTRATIVE OFFICERS AND OTHERS CONCERNED

Subject: Employee Health Insurance Packets -
Blue Cross/Blue Shield Service Health Plan

Employees enrolled in the Blue Cross/Blue Shield Service Health Plan will soon be receiving at their homes insurance packets containing booklets and certificates which provide a comprehensive description of their coverage; new Blue Shield I. D. cards which have the individual's income class noted thereon; Blue Cross I. D. cards for those who have never received one before; and a claim form and instructions for those with CPIC Major Medical coverage.

Upon receiving the packet, employees are asked to note the following change in the procedure outlined on page 25 of the UC Service Health Plan booklet. The necessary enrollment and payroll deduction form is a single storehouse form known as the Health Plan and Life Insurance Enrollment, Change and Cancellation, Form 1630. It is available from departmental secretaries. Also, the only claim form involved would be for CPIC major medical expenses in that the hospital and/or doctor initiates all other claims. One claim form is included in the new packet, and additional forms are available from this office, extension 2146, or the Payroll Office, extension 2034.

Dale Cobb

1261 north vine st. hollywood, calif. 90038

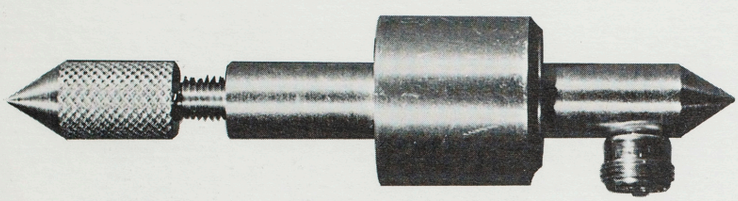
telephone (213) 461-4557

D / C7

POLYTONE

F# / C7

MADE FOR MUSICIANS BY MUSICIANS



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AT LAST A NATURAL BASS SOUND! THE ONLY PICK-UP OF ITS KIND THAT RETAINS A TRUE, NATURAL SOUND AND YET CAN BE INSTALLED BY ANYONE. THE V-100 SERIES FITS BETWEEN THE FEET OF THE BRIDGE. BASS DOES NOT HAVE TO BE ALTERED IN ANY WAY (NO DRILLING) PICK-UP IGNORES FINGER AND BOW NOISE. ANY TYPE OF STRINGS CAN BE USED. PICK-UP COMES IN NEAT, SMALL PACKAGE, COMPLETE WITH 12-FOOT CORD. V100-1 FITS 3/4 SIZE BRIDGE. V100-2 FITS FULL SIZE BRIDGE.

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SEPARATE CHANNELS (EACH WITH TWO INPUTS).

SEPARATE BASS, TREBLE AND VOLUME CONTROLS.

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300 WATTS MUSIC POWER (120 WATTS RMS) HEAVY DUTY 15-INCH SPEAKER TECHNICALLY ENGINEERED FOR BASS.

APPROXIMATE WEIGHT: 43 LBS.

3/4 INCH U. S. PLYWOOD FOR STRENGTH

24 INCHES X 21 X 12 WHD

COVERED WITH HEAVY GAUGE VINYL

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