

SAN DIEGO: ACADEMIC SENATE  
COMMITTEE ON RESEARCH

March 16, 1971

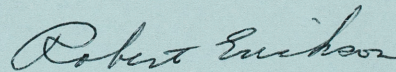
Department of Music

Dear Professor Oliveros:

SUBJECT: Research Grant No. 509-Oliveros  
Acct. #6/564212/19900/3

The Committee on Research was pleased to recommend the award of a research grant to you in July, 1970. May I remind you that you are expected to provide the Committee with a report on the progress and results of investigations conducted under your grant.

Please send your report to the Academic Senate Office by April 19, 1971. The report may be brief, but should be informative about the contribution made by these funds to your research program. The Committee anticipates that these reports will form part of the justification for allocation of research funds to this campus in future years.



Robert Erickson

Chairman

\*\*\*We would like to remind you that Research Grant funds not used prior to June 30 of each fiscal year lapse and thus are lost to the Committee. After reviewing your plans for use of the money granted, please return any that you will not be spending before that date, preferably no later than April 1. Your departmental Bookkeeper can do this by sending a Request for Transfer of Funds to the Committee, c/o Acad. Senate Office, crediting Acct. #6/500000/19900/8 and debiting your account number. We will then send it on to Accounting.

cc: Departmental Bookkeeper

Sept. 20, 1972

My initial research toward a proposed "Electronic Environment" to ~~be~~ result in an installation in the art gallery has taken a different direction. Originally I had intended a semi automatic environment of light and sound which would be influenced by the presence of a visitor or visitors in combination with environmental factors such as temperature, <sup>humidity</sup> and other elements of weather. The ~~first~~ grant received enabled me to work with heat sensitive transducers and brain waves. <sup>See attached diagram.</sup>

I became increasingly concerned with <sup>the</sup> psychophysiological state of performers and audience in relation to the environment. This concern led to the formation of a performance group devoted to Sonic Meditation. Besides the Sonic Meditations which have been composed by me I developed exercises which helped to enhance certain psychological and physiological states which have interesting potential in relation to performance with electronic instrumentation. My research group has met for nearly two years and led to the articulation of 12 Sonic Meditations and numerous exercises. At this point I am ready to expand the instrumentation in order to instrument the group for bio-potentials in relation to a new concept of the proposed "Electronic Environment". The psychophysical states which my group is trained to produce will interact with equipment which responds to these potentials. ~~precisely~~. I would expect an organic <sup>result</sup> human interfaced with electronic environment with human bio potentials manifested by appropriate electronic <sup>SONIC AND VISUAL</sup> transformations to audibility and visibility.

FOR ORCHESTRA, CHORUS, MIMES AND LIGHTS

DEDICATED TO TOM NEE

JULY 1968

CENTER HARBOR, NEW HAMPSHIRE

### CONDUCTOR:

CHOOSE A CHORD FROM THE ORCHESTRAL LITERATURE WHICH INCLUDES ALL PLAYERS AND THE CHORUS. WHEN YOUR LIGHT IS ON CONDUCT THE ORCHESTRA AND CHORUS INDICATING ARTICULATIONS, DYNAMICS AND DURATIONS. THE CHORD VOICING MUST NOT CHANGE BUT DIFFERENT GROUPS OR INDIVIDUALS MAY HAVE DIFFERENT DURATIONS, DYNAMICS OR ARTICULATIONS SIMULTANEOUSLY ACCORDING TO YOUR CONDUCTING. TRY TO INFLUENCE THE OVERALL TIMBRE.

SOLOISTS: FL., CL., OBOE, BSN., TPT., TRB., HRN., PERC., VIN., VLA., VCL., C.B.

CHOOSE AN ETUDE OR STUDYPIECE FROM \*PARIS CONSERVATORY LITERATURE FOR YOUR INSTRUMENT. (DO NOT PLAY ORCHESTRAL EXCERPTS) WHEN YOUR LIGHT IS ON PLAY THE ETUDE. WHEN LIGHT GOES OFF FADE OUT. ALWAYS PLAY ETUDE FROM BEGINNING WHEN YOUR LIGHT COMES ON.

### 5 MIMES:

DRESS IN REVOLUTIONARY COSTUME FROM ANY PERIOD. WHEN YOUR LIGHT IS ON FREEZE IN ANY GESTURE. GESTURES MAY CHANGE WHEN LIGHT IS OFF. MOTION MUST NOT BE SEEN BY THE AUDIENCE.

### 2 SLIDE PROJECTORS:

SLIDES MUST BE OF LOCAL LANDMARK STATUES. AT LEAST 50 SLIDES SHOULD BE AVAILABLE. DIFFERENT ANGLES AND VIEWS OF THE SAME STATUE ARE DESIREABLE.

### 1 FILM PROJECTOR:

A 20 MINUTE FILM OF THE CITY OR LOCALITY WHERE FESTIVAL HOUSE IS PLAYED MUST BE AVAILABLE. (WITHOUT SOUNDTRACK) IT SHOULD SHOW THE CONDUCTOR DIRECTING VARIOUS ENVIRONMENTAL PHENOMENA SUCH AS TRAFFIC, THE OCEAN, FLIGHTS OF BIRDS, ANIMALS, PLANTS, WHAT EVER MOVES OR DOES NOT MOVE IN THE LOCAL ENVIRONMENT. THE CONDUCTOR SHOULD APPEAR IN UNLIKELY PLACES.

\* SEE APPENDIX

THE ORCHESTRA AND CHORUS SHOULD BE DISTRIBUTED IN MIXED

IN SINGLE FILE

CHORAL AND INSTRUMENTAL GROUPS, THROUGHOUT THE AUDITORIUM OR SPACE, OR IN GROUPS WHICH BEST FILL THE SPACE WITH SOUND.

THE 12 SOLOISTS REMAIN ON STAGE IN A STRAIGHT LINE OR SEMI-CIRCLE DIVIDED EQUALLY ON EITHER SIDE OF THE CONDUCTOR. EACH SOLOIST MUST BE FRAMED BY A SEPARATELY CONTROLLED COHERENT LIGHT SOURCE WHICH DOES NOT SPILL ONTO ANOTHER SOLOIST. THE SOLOISTS NEED NOT SEE THE CONDUCTOR.

THE CONDUCTOR MUST FACE THE AUDIENCE ON A PLATFORM AT LEAST 8 FEET HIGH. HIS LIGHT SHOULD BE A FOOTLIGHT ATTACHED TO THE PLATFORM IN SUCH A WAY THAT HE CASTS A HUGE SHADOW TOWARD BACKSTAGE. ALL ORCHESTRAL-CHORAL GROUPS MUST BE ABLE TO SEE THE CONDUCTOR, EXCEPT THE SOLOISTS.

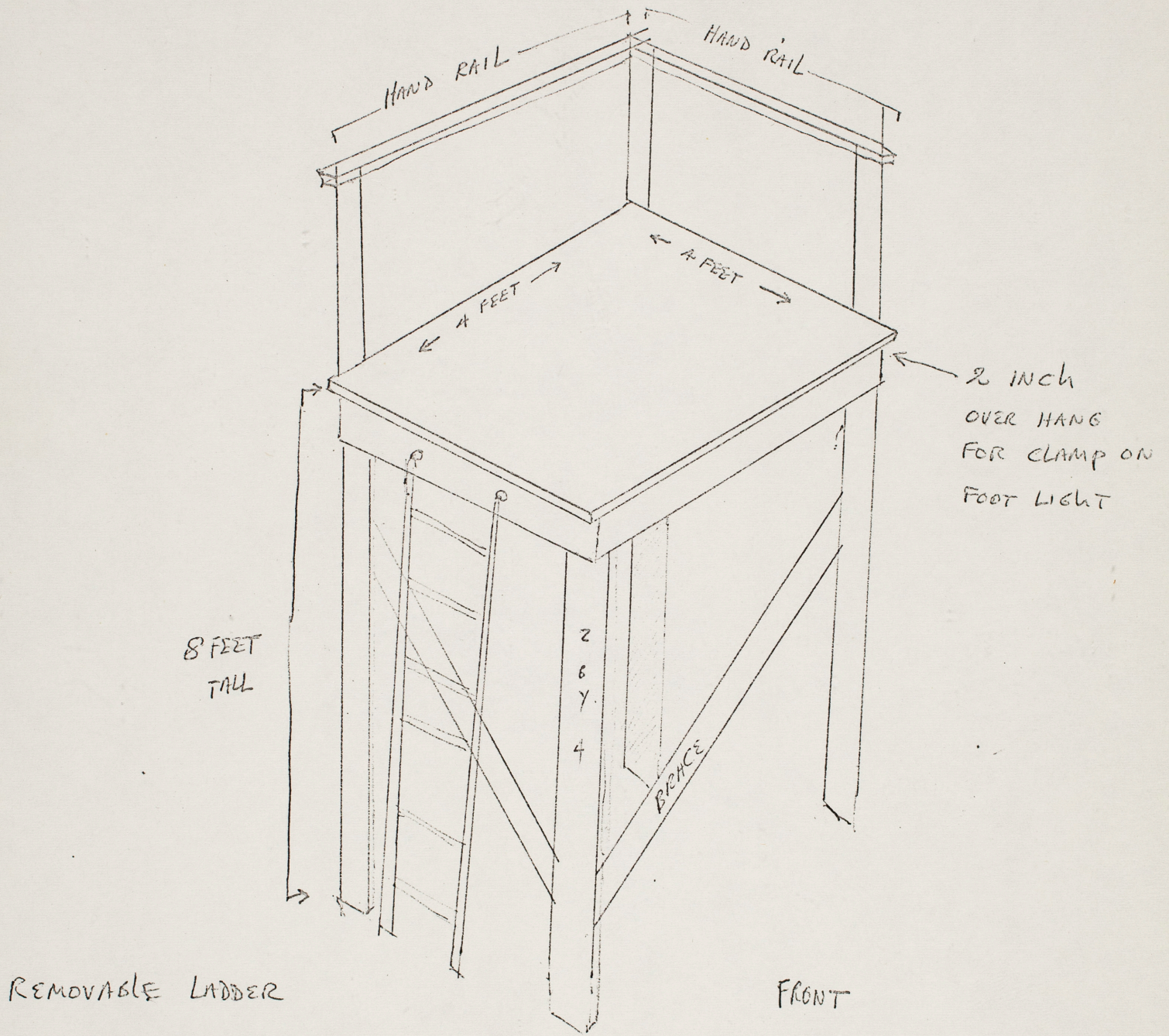
THE MIMES SHOULD APPEAR ON PEDESTALS, EACH ONE LIT BY A SEPARATELY CONTROLLED COHERENT LIGHT SOURCE.

THE SLIDE SCREENS SHOULD BE ABOVE THE PROSCENIUM ARCH IF POSSIBLE.

THE FILM SCREEN SHOULD BE HUNG FROM THE CONDUCTOR'S PLATFORM.

THE LIGHT ON EACH INDIVIDUAL MAY BE VERY LOW LEVEL; JUST INTENSE ENOUGH TO TRIGGER THE DESIRED EVENT. IN GENERAL THE LIVE FIGURES, SOLOISTS, MIMES, CONDUCTOR SHOULD HAVE MOSTLY BLURRED PRESENCE WHILE SLIDES AND FILM ARE INCISIVELY CLEAR.

CONDUCTOR'S PODIUM  
ELEVATED EIGHT FEET  
FROM STAGE



ADD BRACES AS NECESSARY FOR SUPPORT  
AND STEADINESS OR REVISE DESIGN.

FESTIVAL HOUSE

Festival House for Orchestra, Mimes and Light Projections was composed in July 1968. It is dedicated to Thomas Nee and was first performed by the New Hampshire Music Festival Orchestra under his direction in August 1968.

I was a member of Thomas Nee's festival orchestra and lived in the Festival House in Center Harbor, New Hampshire during the summers of 1962 and 1964. My impressions of the environment were deep and unforgettable.

The beginning of the Festival season was marked by the fourth of July and a town Independence Day parade featuring fire engines, Uncle Sam on stilts, a rag-tag band and smart American Revolutionaries. It passed by Festival House and we orchestra members reviewed it from the balcony. In the evening we were treated to spectacular fireworks over Lake Winnepesaukee.

Mornings were devoted to rehearsals, afternoons to individual practice and relaxation, evenings to concerts or visitations.

The area is rich in statuary of the 19th century - Community commemoration.

On the way to the rehearsal barn we always passed Kona; "Presented to Centre Harbor for Dumb Animals 1904". Legendary Indian figure of the area, a fountain flanked by the stereophony of lake reflected bird sounds and sun colored waters.

Sipping a deep purple grape soda from Minnie Nichols' general store, I listened and looked while musicians climbed for the high Cs.

In the summer of 1968 I was permitted to return to New Hampshire and paste up my memories. Festival House is a collage of the echoes of revolutionaries, statuary of the romantics, constant soundings of possible musical skills, illuminations and chordal glue.

The conductor is asked to select a chord from orchestral literature. The orchestra plays only this chord with durations, dynamics and articulations determined by the virtuosity of the conductor.

Each of twelve soloists from the orchestra is asked to play an etude or study piece for his instrument which he selects from 19th century French Conservatory literature.

The Mimes are asked to appear as revolutionaries from any period.

The slides show local statuary and the film is of local surroundings, in this case, La Jolla.

The orchestra is distributed throughout the performance area.

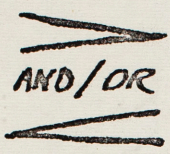
Festival House program notes Page 2

The conductor, each soloist and each mime is illuminated by a separately controlled, coherent light source which is a signal to perform.

The light score is prepared with timed sequences for the conductor, soloists, mimes, slides and film.

Pauline Oliveros .

# CIRCUITRY

	1	2	3	4
a	SLOW	PPP	SHORT (choke)	ROLL OFF
b	SPEED UP AND/OR SLOW DOWN		GLISSANDO	STREET BEAT
c	FAST	fff	INDUCTION OR SUSTAIN	SINGLE STROKE ROLL

EACH OF THE ABOVE TWELVE BOXES IS REPRESENTED BY ONE LIGHT BULB. IN ADDITION TO THE TWELVE LIGHT BULBS REPRESENTING THE SCORE, EACH PERCUSSIONIST HAS AN INDICATOR LIGHT. LIGHT ON MEANS PLAY, LIGHT OFF MEANS DON'T PLAY. IF LIGHT BULBS 1a, 2c AND 4a OF THE SCORE ARE ON, A SLOW, LOUD ROLL OFF IS INDICATED. MORE THAN ONE LIGHT ON IN A VERTICAL COLUMN INDICATES CHOICE. NO LIGHTS ON IN A VERTICAL COLUMN INDICATES FREE CHOICE. ALL SCORE LIGHTS OFF MEANS DO NOT PLAY.

CHOICE OF METAL, WOOD OR SKIN INSTRUMENTS AND MALLETS, STICKS, METAL BEATER, HANDS OR BOW IS FREE. DO NOT CHANGE INSTRUMENT OR COMBINATION OF INSTRUMENTS AND MAINTAIN TEMPO a OR c UNTIL INDICATOR LIGHT GOES OFF OR SCORE LIGHTS CHANGE.

THE FIFTH PERCUSSIONIST DOES NOT READ THE SCORE BUT PLAYS EITHER JAZZ, ROCK AND ROLL OR DIXIELAND WHEN HIS INDICATOR LIGHT IS ON. THE TEMPO RANGES FROM SLOW TO FAST, BUT ONCE SELECTED IS STEADY. THE OTHER FOUR PLAYERS SHOULD HAVE EQUAL RESOURCES.

PAULINE OLIVEROS

FEB. 1967



## Supplies and Equipment

- VOLTAGE CONTROLLED  
1. ELECTRONIC MUSIC MODULES
- |   |        |
|---|--------|
| 4 DUAL OSCILLATORS                        | \$1800 |
| 2 QUAD VOLTAGE CONTROLLED AMPLIFIERS      | 760    |
| MIXER (2 DUAL 3 IN + 10 IN VC)            | 700    |
| ENVELOPE GENERATOR (1 QUAD VIC. + 1 QUAD) | 960    |
| POWER SUPPLY                              | 100    |
| CABINET                                   | 100    |
| WHITE NOISE GENERATOR                     | 420    |
2. 6 EEG PREAMPLIFIERS 600
3. TEKTRONIX EQUIPMENT
- |   |       |
|---|-------|
| 5103 N/D13 STORAGE OSCILLOSCOPE (DUAL BEAM) | 1,370 |
| 5B 10N TIME BASE                            | 175   |
| 5A 14N FOUR TRACE AMPLIFIER                 | 575   |
4. MISC. SUPPLIES (ELECTRODES, ELECTRONIC PARTS, RECORDING TAPE ETC) \$1000
- 
- \$8,560

## Input Interface Box

4 ea

- Signal Processing Channels for EEG
- Lo Pass: 24db/Octave  $f_c = 5, 7, 10, 14, 20, 28, 40, 56$  Hz  
switch in/out          jacks for separate use
- Hi Pass: 24db/Octave  $f_c = 1, 2, 1.7, 2.5, 3.5, 5, 7, 14$  Hz  
switch in/out          jacks for separate use
- Amplifier: Switchable gain: 1, 2, 5, 10, 20, 100
- Integrating Threshold Gate: Controls for level & T
- Small V.U. meters in each channel for monitoring.

10 ea

- Preamps for  $\Delta R$  input
- Controls for Gain & D.C. offset
- Monitor meter for each preamp
- Integrating Threshold Gate for each Preamp

10 ea

- General Purpose Preamps
- Gain: 0  $\rightarrow$  60db          D.C.  $\rightarrow$  20 K Hz
- Each preamp has meter + integrating threshold gate

4 ea

- Envelope Followers (analog)
- $\pm 2V$  pk in for +10V out. Sensitivity & T controls

2 ea

- Digital Frequency  $\rightarrow$  Voltage Converters          7bit
- Resolution: 0.15% lowest octave  
1% next octave
- low freq limit switchable: 0.1, 0.5, 1, 5, 10, 50, 100, 500, Hz
- Can be switched to become staircase generator

all inputs phone jack thru panel at cabinet rear  
all outputs miniphone // banana at lower front

Umbilicle for control voltages to Control Processing Supermodule

Umbilicle for signals to Signal Routing Module

# Signal Routing Box

- 16 ea Electronically Controlled S.P.D.T. switches Half  $2 \Rightarrow 1$   
& half  $1 \Rightarrow 2$ .
- 10 ea V.C. A.C. Power circuits. Each channel controls  
1 K.W.  $0 \Rightarrow +10V$  control voltage. Manual  
Control. Triac circuits are located in a  
separate box connected by an umbilical  
cord.
- 1 ea 4-in, 4-out matrix mixer: Gain Controls for each  
input & each output. V.V. meters on the  
outputs. Each input has associated with  
it a 4 position ring counter. Which stages  
of this counter are "on", determine which  
output(s) that particular input is connected  
to. The ring counter has a clock <sup>input</sup> so that  
any preset combination of on/off stages may  
be propagated. Or each stage may be  
turned on or off directly by means of  
a control input. Each counter stage (16 total  
one for each input/output combination) has  
an envelope generator with TR, Ton, and  
T<sub>off</sub> controls. The ring counters are internally wired  
to shift in one direction, however they may  
be externally patched to different configurations.  
The Meters are switchable to read either in V.V.  
or read +10V<sub>PK</sub> max
- 2 ea 4-in, 4-out matrix mixer: As above only without  
ring counter & envelope circuits. i.e. only direct  
control (either by internal switch or external  
control voltage) of each in/out combination.  
Outputs may be paralleled to form an 8 in  
4 out configuration.
- 4 ea 4 in one out mixers: 20db max gain with  
inverted out. Not voltage controlled, 4 input &  
1 master gain control. With inverted output

All digital functions have pilot lamps. All inputs & outputs  
have paralleled miniplugs & banana. Umbilical chord connect  
to input interface box & audio gen/mod box & also to  
power amps.

# Control Voltage Processing Box

- 6 ea Integrating Threshold Gate: Doubles as monostable multivibrator. Threshold control is 0-2 V & may be external or internal. Time constant is adjustable 10ms  $\rightarrow$  10s
- 6 ea Trigger Delays: Give fast pulse a delayed time after leading edge of input pulse. Delay 100s  $\rightarrow$  0.1s
- 4 ea Voltage Controlled Clocks: 2 ranges 50Hz  $\rightarrow$  0.05 Hz & 500  $\rightarrow$  0.5 Hz. Exp control voltage: 1V/octave. Sawtooth & square out. Simultaneous internal & external control
- 8 ea Digital "And" Gates: 4 input, <sup>with inv out</sup> may be switched to 3 or 2 in
- 8 ea Digital "Or" Gates: 4 input, with inverted output
- 8 ea Inverters: Functions as linear or digital. Convert 0  $\rightarrow$  +13 V to +13V to Zero
- 8 ea Flip Flops: S, R, & Clock inputs; Q,  $\bar{Q}$  outputs. May be operated in S-R or toggle mode.
- 2 ea Logic Controlled Voltage Sources: 8 S-R flip flops, each with 2 pots at the Q output. The two sets of 8 voltages are summed thru a summing amp. Thus when any stage is "on" it produces a preset voltage at each of the two outputs. Each stage can be operated in either direct or toggle mode. Also each stage can be operated either independently or in an "exclusive" mode which sets all other stages to off. Each stage has an "or" gate preceding its control input. The output summing amplifier has a range control so that the 2 pots at each stage control 0  $\rightarrow$  1 to 0  $\rightarrow$  10 V.
- 4 ea 4 Stage Ripple Counters: Each stage has Set and Reset inputs + Q &  $\bar{Q}$  outputs. Each group has a clock input. The groups may be placed in series by a switch which allows the 1st stage of a group to accept its input from the last stage of the preceding group instead of the last stage of its own group.
- 2 ea Voltage Controlled  $\div$  N Counter.  $1 < N < 10$ . N is controlled by an analog control voltage between 1 & 10 V. Sing digit monitor to determine N.

## Control Voltage Processing Box (Cont.)

- 2 ea Staircase Generators : 7 bit with analog output
- 8 ea Sample & Hold Circuits : Voltage Range  $0 \rightarrow +10$  V
- 1 ea % Time / Time Indicator : Two digit readout. Sample time : 10 sec, 30 sec, 1 min. Analog output voltage  $0 \rightarrow +10$  V =  $0 \rightarrow 100\%$ . Also analog output voltage corresponding to difference in reading between present & previous periods.
- 2 ea Very Lo : Low Pass Filters =  $f_c = 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 91$  Hz
- 4 ea 4 input, D.C. coupled mixers. With inverted out &  $0 \rightarrow 10$  V D.C. offset control.  $G_v = 20$  db max

All Digital Functions have lights to monitor state. Control outputs from Interface box are brought out at the top of the Processing Box. All connections with Banana Plugs.

# Audio Signal Generating/Modifying Box

- 4 ea V.C.O.s Exponential control voltage. Fixed input control voltage + attenuator on 1 control in. All other inputs are 1 V/octave. 2 ranges 15 Hz  $\rightarrow$  15 KHz & 0.15 Hz - 150 Hz. Outputs: sine, square, saw, tri, V.W. pulse. Output levels are  $\pm 2.5V$  pk except square & pulse are 0  $\rightarrow$  +13 V. Attenuators on all outputs. V.C. pulse width modulation or internal control.
- 4 ea V.C.O.s Linear Control Voltage: sine, square outputs otherwise same as above.
- 2 ea V.C. transient generators: Voltage control of rise, initial decay, on, and fall times. Exponential control voltage. All times variable in 2 ranges 10 ms  $\rightarrow$  10 sec & 100 ms  $\rightarrow$  100 sec. 2 modes: external on time or internal on time with lockout = generator cannot be retriggered or reset until entire cycle is complete.
- 8 ea VCA / transient generator combinations
- 2 ea 4 quadrant multipliers. May be AC or DC coupled. Monitor VU meters with switch. Gain controls on input.
- 2 ea Zero crossing detector with variable hysteresis.
- 1 ea 4 stage frequency doubler. A.C. coupled, cuts off at 0.5 Hz. Stages may be used independently or in series. V.U. meters.
- 2 ea V.C. filters: Lo pass (12db/oct), Hi Pass (12db/oct) or Bandpass (6db/oct on each side). With voltage controlled resonance.
- 2 ea Knob Controlled Lo Pass filters 12db/octave Continuous variable 20 KHz  $\rightarrow$  200 Hz or 2 KHz  $\rightarrow$  20 Hz. With resonance control.

All inputs & outputs parallel miniphone & banana. Umbilical chord connects to input interface box & output switching box.

## Additional Devices

4 ea EEG Preamplifiers:  $G_v = 50, 100, 500$  D.C.  $\rightarrow$  100 Hz  
Differential input. Hi CMRR. Battery operated

1 ea Frequency/Period Meter 4 digit (full)  
Freq: 1 sec Gate (1 Hz resolution)  
10 sec Gate (0.1 Hz " )  
Period: 100s, 10 sec, 1 sec, 0.1 sec F.S.

3 ea Dual Regulated Power supplies  
 $\pm 15V$  @ 500 ma. 0.1% Reg

#2000

1. Analog equipment i.e. synthesizer modules  
Important to get hi quality, "state of the art" equipment. Desirable to have V.C. of timbre and V.C. envelope gens.

V.C.O.s (with V.C. timbre)

V.C.A.s or V.C. mixers

Attack generators : v.c. attack & decay times  
etc. ad. infin.

2. Technicians salary :

at \$3/hr half time = \$100/week, \$430 mo

quarter time : 50/week, \$215 mo

3. Misc budget account for

a) electronic supplies

b) phone calls, Xerox etc

c) research supplies tape, electrodes etc

4. Mini Computer with associated equipment i.e

a) tty with paper tape reader

b) D/A and A/D converters

c) C.R.T.

etc a.d.

#1000

#5000



10,000 →

5,000 mini computers  
2,000 technicians  
2,000 analog equip  
1,000 misc supplies

5,000 →

2,000 tech.  
2,000 analog equip  
1,000 misc supplies

2,000 →

9,000 ~~tech~~ ← (watch those zeros!)  
9,000 ~~analog equip~~  
200 misc.

Tape 48 rolls of 1200ft at 3.00 ea.

Tyfnist

Heath kit

200.00

Alpha preamps electrodes etc

600.00

Bruce Voltage controlled dimmer 20 Kwatts  
Forkner Lights and optics trigger inputs each channel with  
voltage controlled threshold and variable voltage  
2 to 6 Alpha trainers for attack sustain decay time  
also programmable.

White noise generator (Buchla)  
Filters Resonant 10 channels?

Morrisette's equipment for Sonic Roosters

Set Sonic meditation

Setting - Light environment

2,000 → 5,000

Minimum Components

cabnet	\$ 100	①
Power supply	\$ 100	②
Oscillators (4 dual)	\$ 1800	
Vcas. or VCMixer (2 quad)	\$ 760	
Mixer (2 dual 3in + 10in Vc)	(700)	③
Envelope Gen (1 quad V.C. + 1 quad)	960	
	<hr/>	
	\$ 4420.	

- ① Custom; not Buchla
- ② Prepackaged, ; , not Buchla
- ③ Sonic Res. Ass. can deliver two dual 3 in mixers plus a 10 input mixer within 1 month.
- ④ All other modules are Buchla 200 series delivery time 1 → 2 months

240  
400  
6

How will this grant be administered.

## SETTINGS FOR CONTROL VOLTAGES

### ATTACK GENERATOR I:

- 1) short attack
- 2) decay length setting determines ease of turning-on tape delay  
[ie: "0%" = easy (short alpha) ; "100%" = hard (long alpha)]
- 3) trigger length (note duration inoperable)

### LEVEL DETECTOR:

Best at 12:00 (delay easier to trigger to the right, harder to left)

### ATTACK GENERATOR II:

- 1) short attack
- 2) short decay
- 3) internal control: note duration determines how long decay stays on

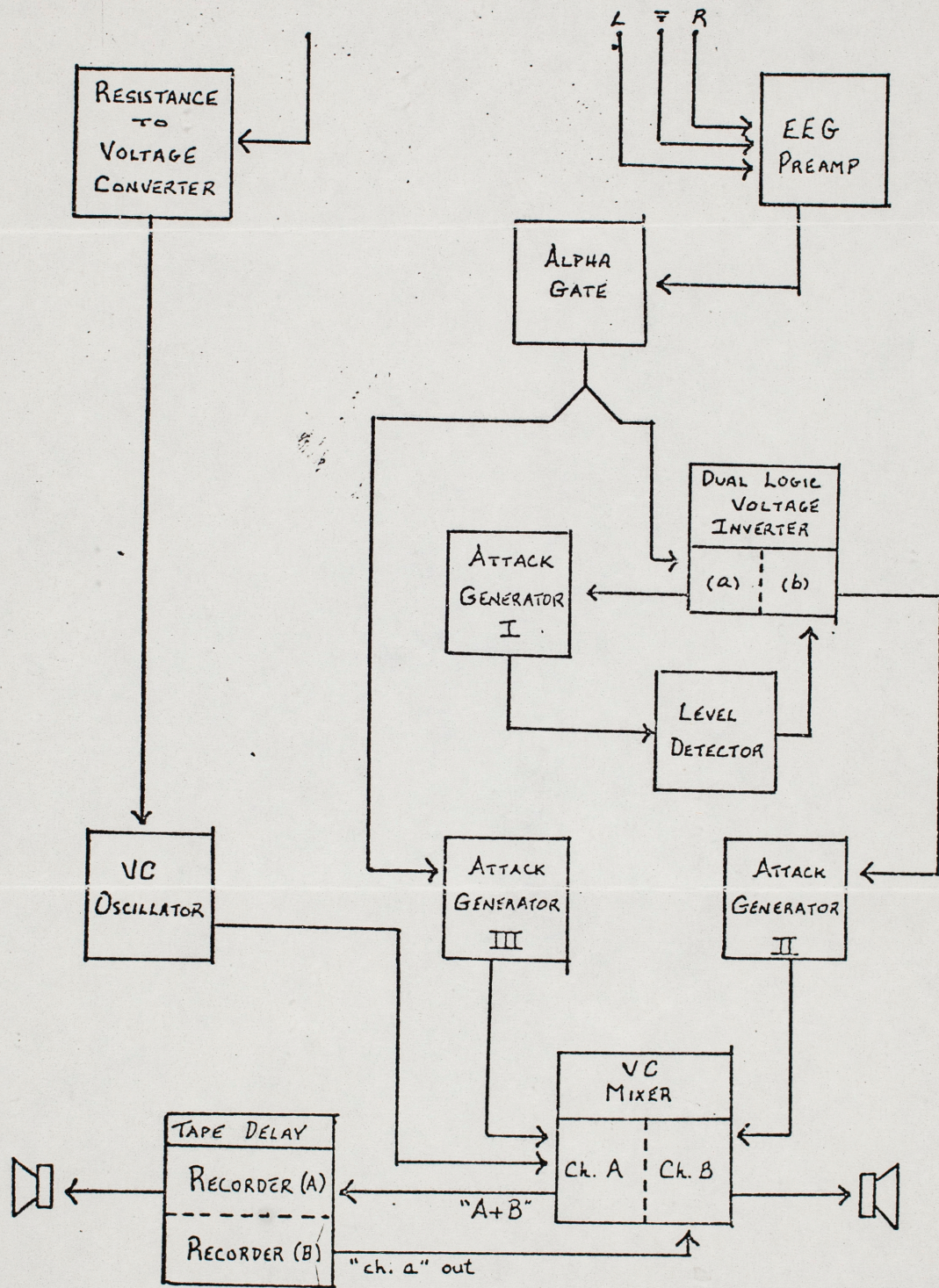
### ATTACK GENERATOR III:

- 1) short attack
- 2) 12:00 decay
- 3) trigger length (duration determined by threshold and time constant settings)

Bio-feedback/Buchla Patch

(in nostril) Thermister

Electrodes (pasted on scalp)



work these out with  
Ed Kobrin

Oct 22, 1972

## Circuitry For Percussion

Feed back

Triggers: Frequency, Amplitude of players sound signals. Temperature of player, Temperature of environment, Humidity of environment, Heart rate, body movements, Light, preset triggers

Pre-program - night sky (Current) for preset program  
Time lights go on and off and what order.

Biorhythms or  
Heart beat  
could directly  
control low  
intensity stage  
lights. or  
projector

What is triggered: 12 score lights in all possible combinations. Rate of on and off. and from 1 to 12 simultaneously.  
Also a number of stage lights and projectors. (Slides and Film) and preset program triggers. 5 stand lights on and off time, attack and decay time. Synchronous heart ~~rate~~ beat causes huge flash.

## Festival House

Feed back triggers: Conductor, heart rate, temperature, body movement. Soloists, Frequency, amplitude of sound signals. Mimes, body movement

What is triggered: Pre set triggers, 18 separate coherent light sources lighting individually: 12 soloists, 1 conductor, 5 mimes 2 slide projectors, 1 16mm film projector.  
On and off time decay and attack time

Pre-set triggers programmed from external information such as the weather conditions, phase of the moon, the current night sky, the stock market or any other such information.

Any part of each program open for manual, feedback or pre-set control.

## Biofeed back potentials

High amplitude alpha burst triggers brilliant flash. Must be unusually high in relation to "normal alpha". Environment fluctuates with other parameters such as temperature or GSR. Environment meaning light and sound. A group could be instrumented so that some produced fitch changes some influenced light changes and at some point a brilliant flash. Somehow visitors plugged into this ongoing experience.

head voltage controlled dimmer single pulse voltage controlled strobe. What kind of attack and decay time on lamps.

head oscilloscope monitor

Tune lights: blue corresponding to + temperature  
red .. .. .. - .. ..  
yellow .. .. .. ?

Phase relationships

\* unique opportunity because released and people to work with.



# Television Equipment Associates

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BILL PEGLER, Director

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## SALES

### A NEW ~~PRODUCTION~~ TOOL FOR STATION IDs — COMMERCIALS — TAGS

Introducing HERN — A Unique, Low-Cost, Automatic Music Synthesizer for Use "On Air" and in Commercial Production.

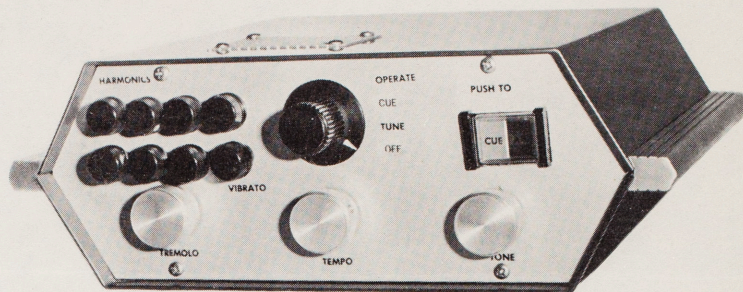
Instantly Adaptable to Any Tune or Jingle, Making it Infinitely Variable to Any Mood or Format.

If you have ever had a tune running through your head all day, you know that SOUND SELLS. It can cost hundreds of thousands of dollars to get a musical signature before the public, to get *YOUR TUNE* running through *THEIR HEADS*. Much of this cost goes to the jingle producers, the musicians, the hours of studio time required to make even a ten-second tag.

With HERN, you can do it yourself. No musicians, no studio time, no outrageous hourly charges. What's more, your jingle, tag, tune or whatever is **never obsolete**. The revolutionary semiconductor technology employed in HERN allows a tune to be produced electronically, repetitively, in any pitch, any timbre, any tempo. It can *blend* for subtlety. It can *clash* for attention. It can *weave* in and around melodies subliminally. It can sell!

### WHAT IS HERN?

Glad you asked. You have seen pictures of electronic music synthesizers. You have heard them. You have probably worked with one by now. And you know that they cost a fortune, are difficult to tune, and require a musician to operate. HERN is a different type of synthesizer. It doesn't cost a fortune. It is simple to tune. And, it can be operated by anyone who can push a button. Yet it employs circuitry similar to that of the expensive synthesizers and is capable of infinite variation around a single tune or variation of the tune itself.



### TECHNICAL CHARACTERISTICS

HERN produces a series of sixteen notes. Each note can be tuned over a three-octave range. After tuning each note and arriving at a satisfactory tune, the entire melody can be adjusted over an additional three-octave range. Tremolo and/or vibrato can be added in varying amounts. The harmonic content can be varied to produce a deep bass accompaniment or a thin, reedy sound. The length of each note and the tempo of the melody are independently adjustable over a wide range. Attack and decay are individually adjustable for realistic musical effects.

For catchy *electronic* effects, any of the above characteristics can be changed *during the playing time* of the tune, thus achieving changes in time and register *without detuning* the instrument in any way. It is indefinitely expandable, with additional sixteen-note modules available as options.

### COMPATIBLE AND PORTABLE

HERN goes anywhere and can be used anywhere. It is small and light-weight. It is thoroughly compatible with the studio environment. It makes no mechanical noise. It has a built-in cue speaker and a 'phone jack. A noiseless switch converts the unit from a tuning mode to "on line" operation, with a variable output level up to +8dbm, 600Ω.

Demonstration tapes illustrating HERN'S features and capabilities are available upon request.

*Features and specifications are subject to change without notice.*

Manufactured by:

AUDIO DATA RESEARCH LABORATORIES