

sexy?

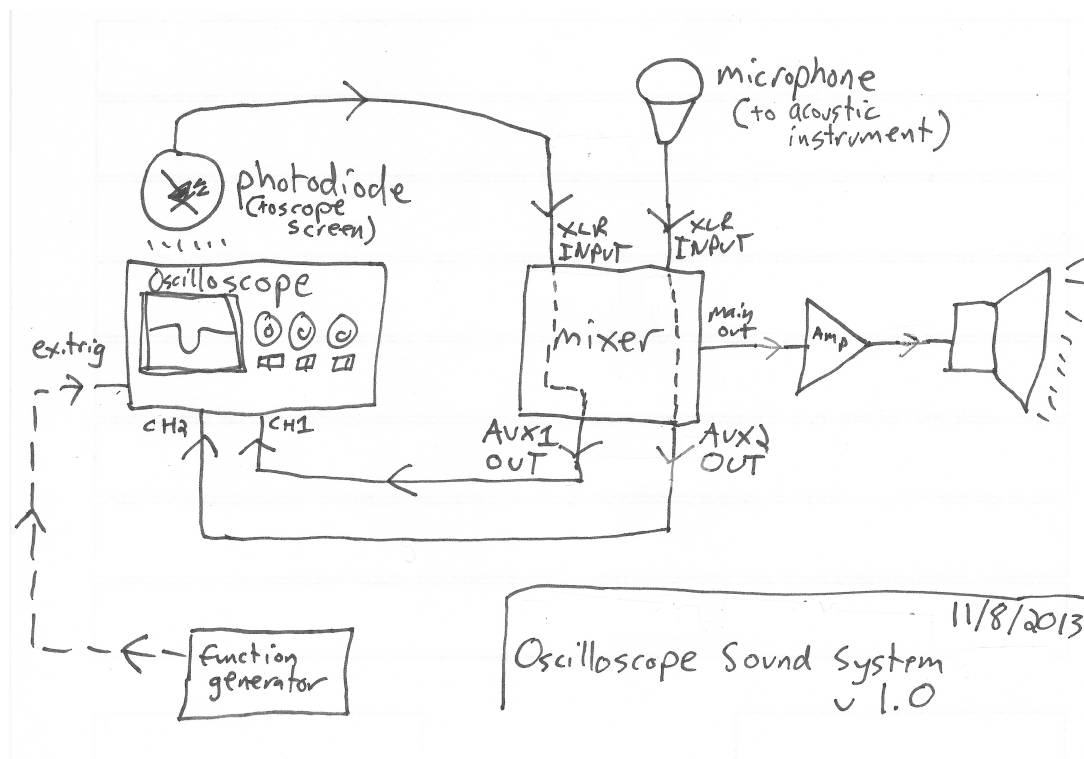
for acoustic instrument quartet and oscilloscope quartet

Daniel Fishkin
2013

General

sexy? is a double quartet, linking together two small ensembles. The acoustic quartet may be any group of tunable acoustic or electro-acoustic instruments. The oscilloscope quartet utilizes analog oscilloscopes with photodiode pickups and mixers to sonify the internal sweep circuit of the scope. Make sure that each quartet is comfortable and familiar as an independent ensemble. The scope players may need to rehearse independently to familiarize themselves with setup and playing technique before beginning rehearsals with both quartets. Acoustic instruments should tune to the dominant tonic of electrical grid. For example: a performance in North America should tune B^b to 60 Hz; a performance in UK should tune G to 50 Hz. Take care to perform and rehearse in a moderately dark environment—all light sources will affect the oscilloscope's performance! The concept of notation for this piece is deeply influenced by Nic Collins' *Broken Light*.

Electronics Setup



The patch above describes the signal path and setup routine for the each oscilloscope and its corresponding sound system. Each oscilloscope player requires a scope, photodiode pickup, mixer, and powered loudspeaker. Photodiodes should be miniature type PIN solar cells—Vishay BPW34 type works well. Balanced pickups can be made by soldering 3 conductor cable onto an XLR connector. No modifications need be performed to the oscilloscopes. Oscilloscopes must be analog CRT types, with at least 2 input channels and external trigger circuitry features. Scope bandwidth must be at least 60Mhz. Recommended Oscilloscope models are Tektronix 4xx series, 22xx series, and Hitachi v-xxx.

Dynamics are controlled by proximity of the photodiode to the beam—calibrate each scope by setting the “intensity” control to equal levels of brightness. Pitch is changed by varying the

sweep circuit, or time base, labeled in seconds/division. This is often a stepped switch, which will set the range, starting from rhythmic clicks, moving through choral ranges, and ending in ultrasonics. For fine tuning, glissandi, and coarse pitch control, use the calibration knob. Pitch and volume can thus be controlled with each hand, in a classical electronic instrument configuration ala Theremin.

By routing an aux send into the scope vertical channel, a very complex timbre can be generated and manipulated by using the EQ on the mixer. This creates a feedback loop that takes place between the light of the scope and the photodiode's sensitive surface. Take care to listen and experiment to familiarize yourself with the ranges and sounds and sights that come from this feedback system. The flat line of the trace will become a gorgeous curvy line. If you edge the waveform very slightly away from the photodiode, the trace will jitter unpredictably, which will create feedback tones locking onto lower pitches than the original tone. Allow the shapes to guide you. Complex timbres can be generated through this process.

Acoustic instruments are also amplified and routed through their respective oscilloscope partner's sound system, including another aux send line going into the oscilloscope's second channel. This balances the volume of the acoustic instruments with the scopes, and also allows the scope players in Section III to process the sound of their acoustic partner in their photo-feedback loop (XY mode).

A function generator tuned to a multiple of the electrical grid (e.g. 60 Hz to 3840 Hz) should be chained to all four scope external trigger inputs.

Acoustic Quartet

The "normal" instruments push towards and against imitation. No symbols or directions need be too strict. Rules can be broken. Transitions from measure to measure can happen indeterminately, between 10-40 seconds each measure. Pick your scope partner according to matching numbers in the score, e.g. 1st acoustic matches with 1st scope. Do not switch partners.

SECTION 1

Pulsing is a gesture of rhythmic patterns with soft attacks. Oscilloscope players create this by waving the photodiode in front of the beam. Acoustic instruments duplicate this pattern. Curved lines (glissandi) rise above the texture. Measure ends are signaled by big cues and the player making the cue is always changing.

SECTION 2

Acoustic instruments play only overtones on Bb. Scopes switch to external trigger mode in order to explore undertones. Eventually scopes should fade in aux feedback signal and increase the LOW eq knob for deep bass tones.

SECTION 3

Scopes switch to XY mode, enable channel 2, and embellish acoustic instruments. Photodiode proximity and mixer EQ controls processing. Play with bass and midrange frequency. Acoustic instruments should enjoy their freedom.

SECTION 4

Repeat Section 1. Allow your new feelings in time to press upon this repetition.

LEGEND/KEY

Acoustic Operators

©: circled letter
refers to pitch (concert)
in any octave

△: overtones
(select freely, as melody,
not timbre, to electrical
grid)

✕: destructive sounds

□: open

H: tacet

< >: dynamics

Oscilloscope Operators

○: internal trigger
(trigger on opposite
channel)

▽: external trigger
(use external
oscillator to achieve
undertones)

✕: self trigger
(trigger on same channel)

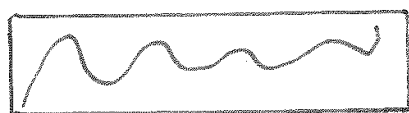
⊕: XY mode (Lissajou)

□: open

FB: scope feedback
(use mixer eq)

H: tacet

Global Gestures



curved line: indicates
pitch change (not strict)



straight line: indicates
stationary pitch (can change glacially)



pulsing: rhythmic patterns
(can drift!)



hard barline
is hard transition
"cup" means player
cross ensemble

dashed barline
is loose
transition



one direction

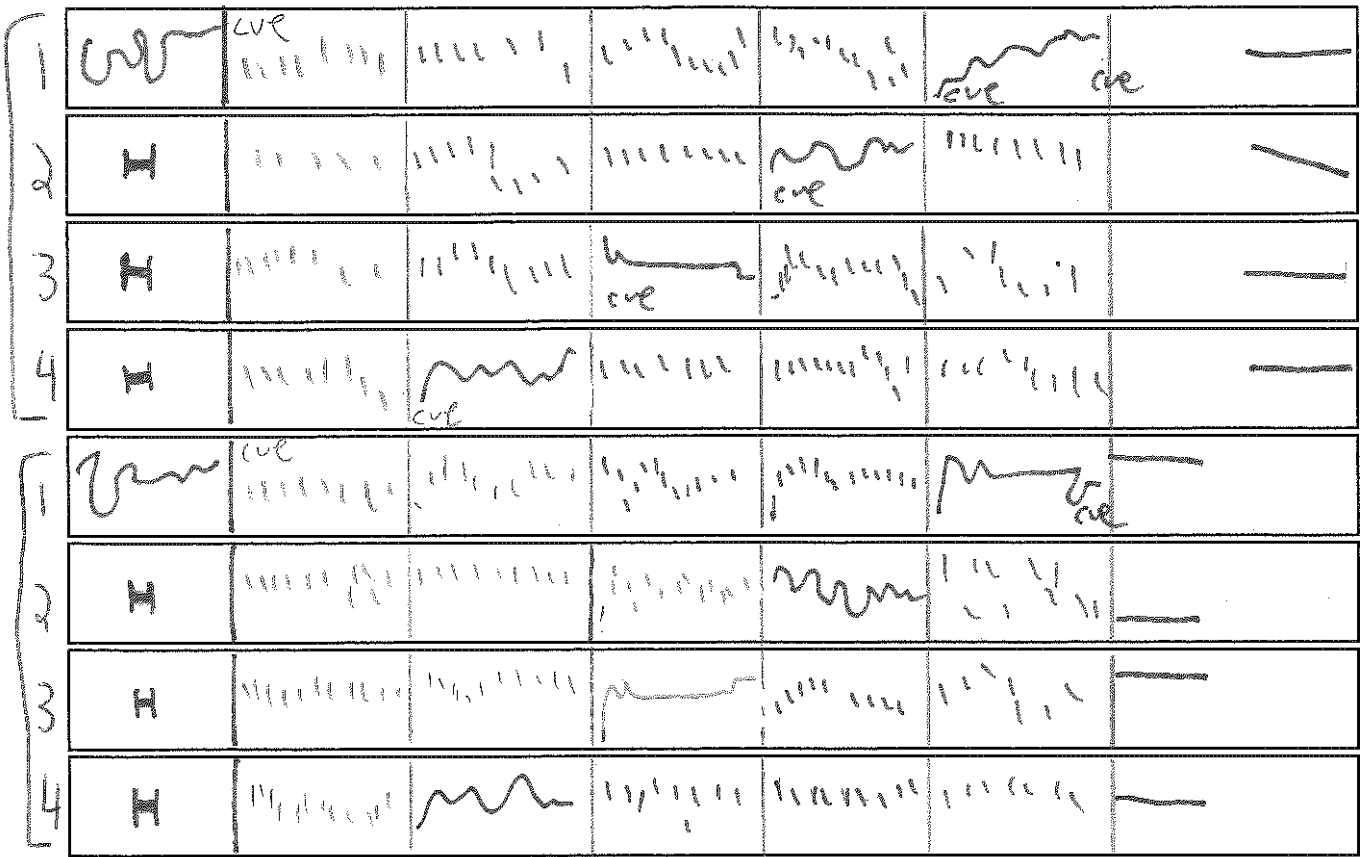


can wander
back and forth

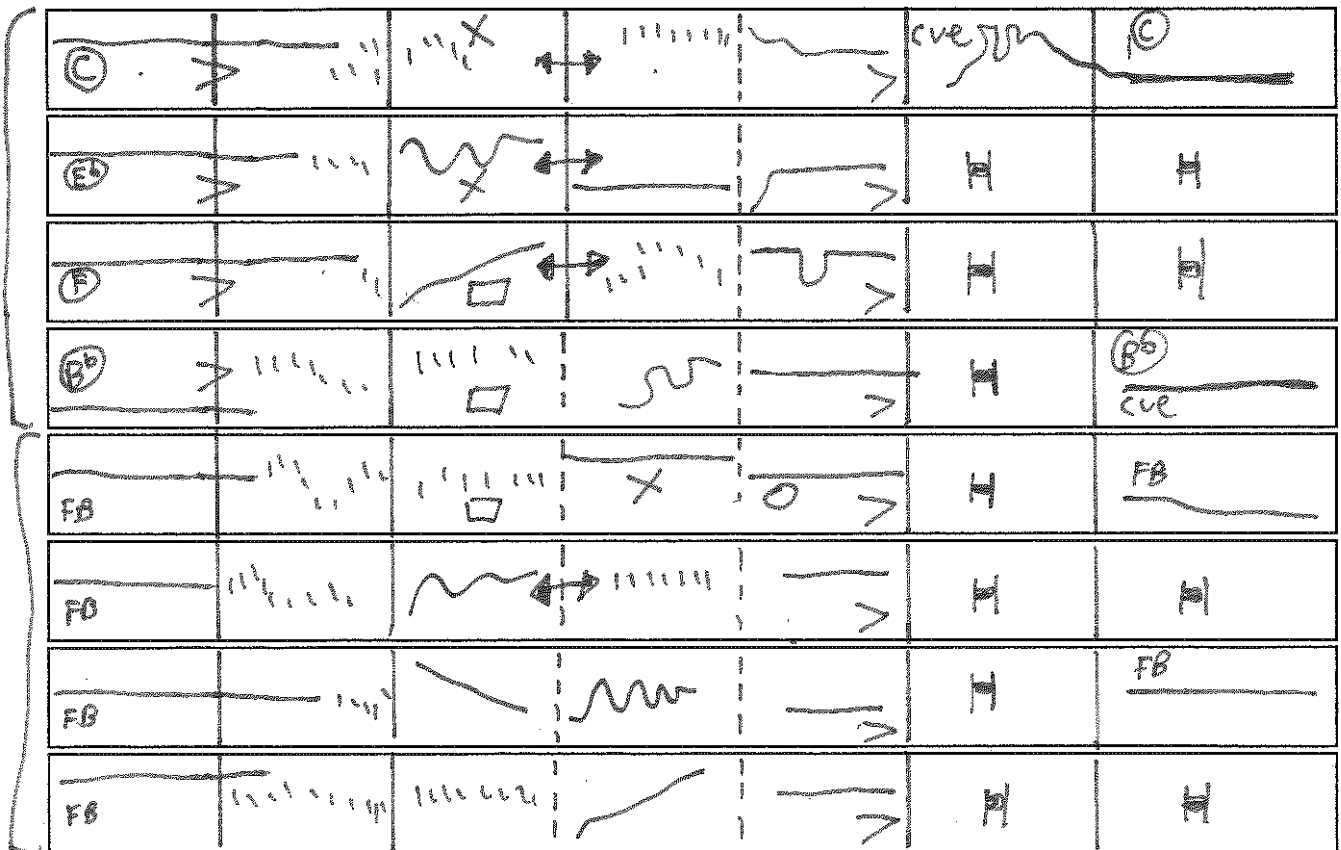
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ACOUSTIC
SCOPE

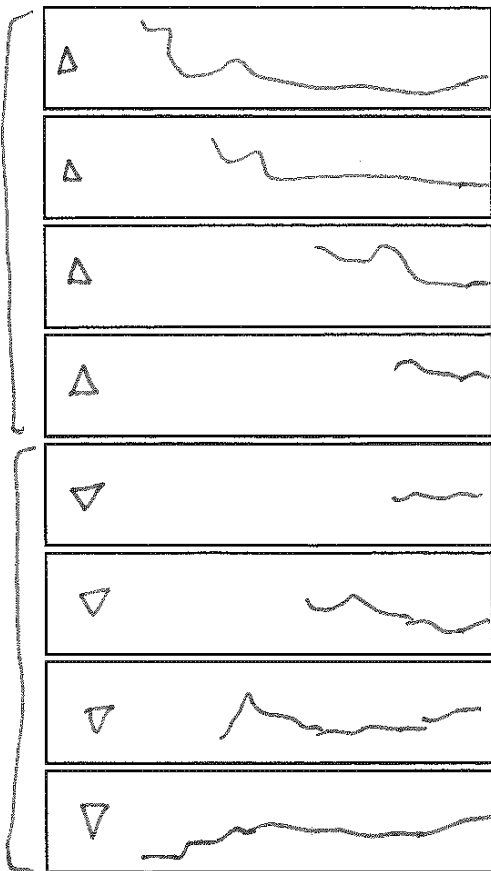


cue



cue

II



ensemble:

improvise on harmonics
overtones & undertones

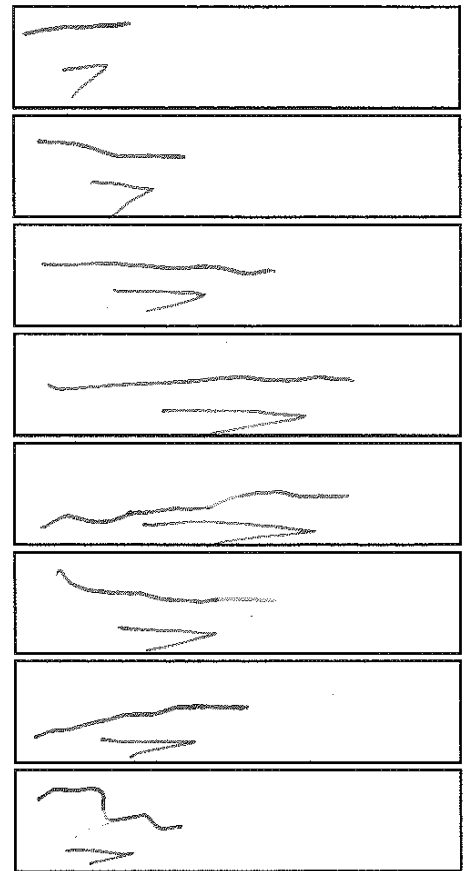
listen

long tones
allow silences

acoustic instruments:
tonic is electrical grid
overtones

scopes
stay on external trigger
under tones
eventually feedback.

indeterminate length



III

