

Film Composer Studio Acoustic Design

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Music Acoustic

Mar/12/2018

Film Composer Studio

This document contains the acoustic concept design for a film composer's studio. The room provides a composer ideal acoustics for the purpose of orchestral score composition, mixing, solo instrument recording as well as comfortably housing a composer and a director/producer during extended periods of time.

Acoustics properties for the propose of:

Composing:

A film composer spends most of their time sitting behind a midi keyboard, triggering samples that come out of studio monitors. Alternatively they will use acoustic instruments such as guitars and pianos as part of their composition process. For accurate instrument selection during the composition process it is important for the room to have a flat frequency response as well as low reverberation times (0.2 to 0.4) while providing enough space to house a variety of instruments and a large desk for composing on score paper.

Mixing:

Most film composers will send their scores to a professional mixer before delivering their work diminishing the importance of their rough mix. However it is still important to have an adequate environment in order to create a good sounding mock-up. In order to mix for film media the room should closely resemble the acoustics of a movie theatre, without generating a theater's financial footprint. A mixing room should have flat frequency responses, low reverberation time, high diffusion and enough space for 5.1 monitoring.

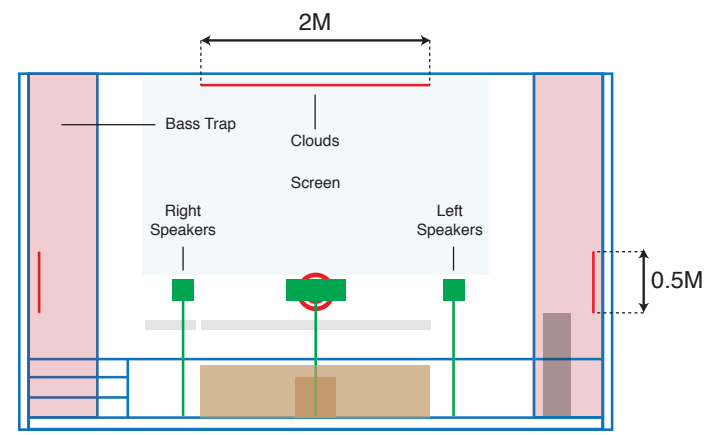
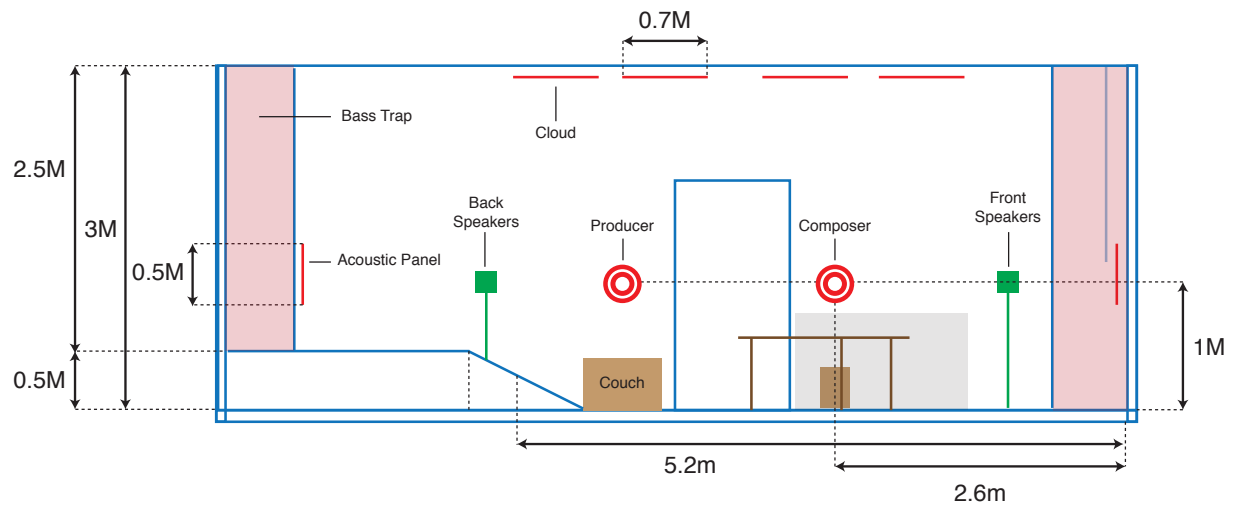
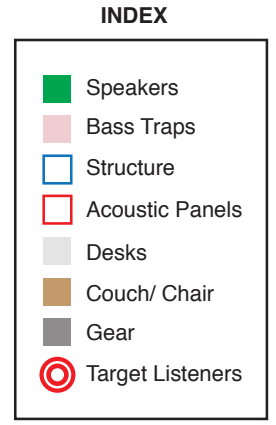
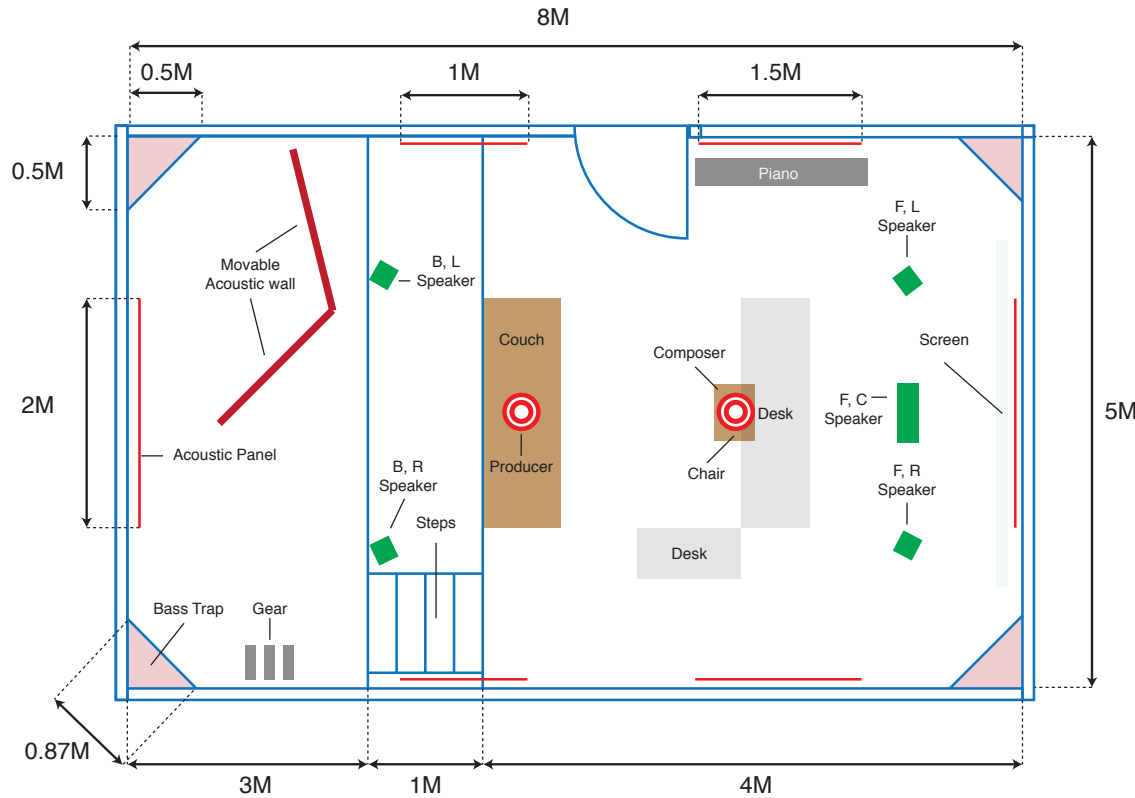
Recording:

Most of a film's recording will be done on a recording studio, however many composers choose to record solo instruments during the composition process, for this purpose the composer's studio should be able to provide professional recording capabilities. The room should have low little reverberation times enabling the composer to accurately digitally alter the reverberation of their recordings. The studio must be well isolated from preventing outside sounds from bleeding into the microphone. The room should be have as little room mode frequency build ups as possible in order to prevent the need for post production corrections on the recordings.

Comfort:

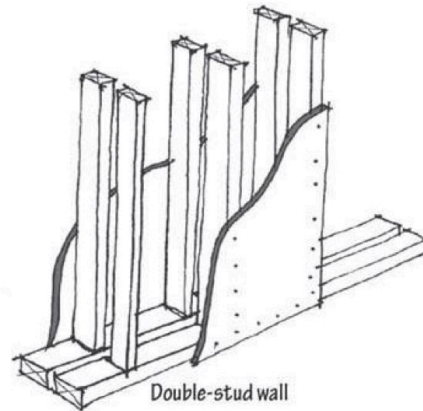
The studio should be spacious enough to house at least four people for more then 14 hours and the necessary furniture. The studio should not be completely dead in order to prevent fatigue and headaches.

SCHEMATICS



Room Properties

The room walls are made by insulated double layered studs spaced every 24in and covered by a layer of gypsum wood sheets on each side in order to increase transmission loss. The choice to use wood instead of concrete is in order to lower construction cost and to diminish reflection since recording is a small part of composing where room isolation isn't as important.



Frequency	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Transmission Loss: Walls	42	59	72	80	77	66

Materials:

Ceiling: Fiberglass: 2" 703 no airspace
 Floors: Carpet on foam
 Walls: Wood: 3/8" plywood panel
 Acoustic Pad: Foam: SDG 4"

Surface Area:

Ceiling: 31.9m²
 Floors: 37.5m²
 Walls: 66m²
 Acoustic Pads: 10.1m²
Total SA: 145.5m²
Volume: 85m³

Average Reverberation Time: 0.22s

Materials	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Fiberglass: 2" 703 no airspace	0.22	0.82	0.99	0.99	0.99	0.99
Carpet on foam	0.08	0.24	0.57	0.69	0.71	0.73
Wood: 3/8" plywood panel	0.28	0.22	0.17	0.09	0.10	0.11
Foam: SDG 4"	0.33	0.90	0.84	0.99	0.98	0.99

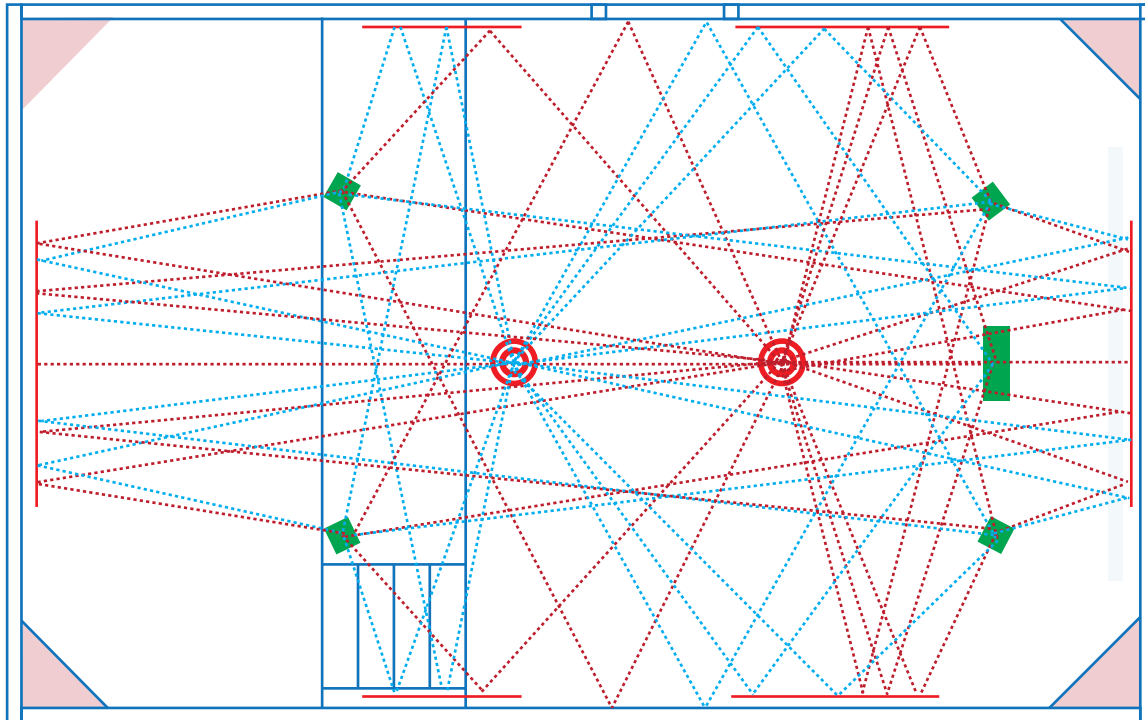
Frequency	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Sabins	31.831	58.768	72.66	73.395	74.704	76.215

Frequency	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	AVG
RT ₆₀	0.42	0.23	0.18	0.18	0.18	0.17	0.22

Early Reflections:

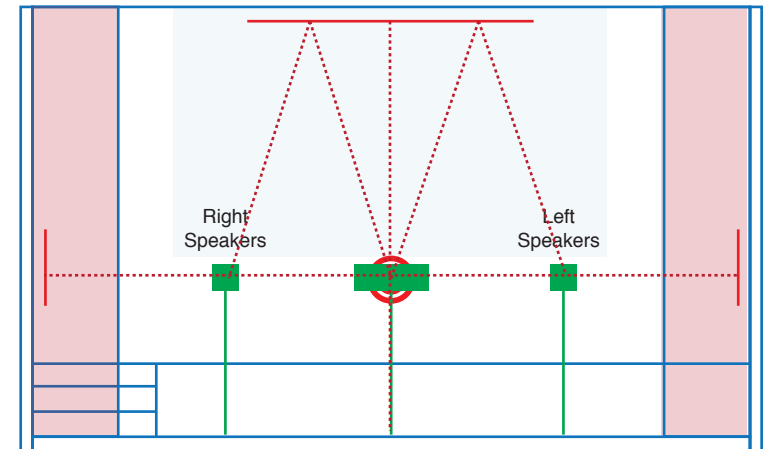
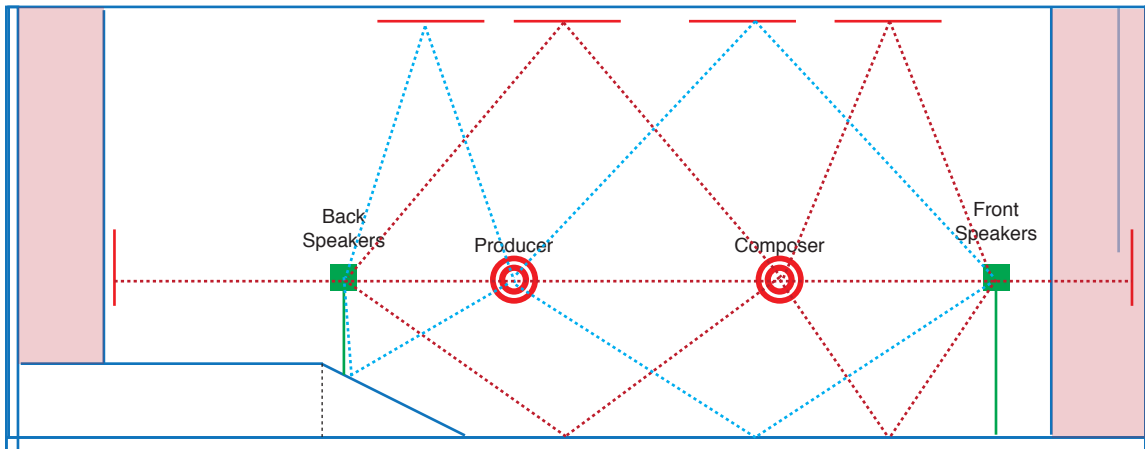
Acoustic padding on the walls and ceiling were placed at specific positions in order to reduce the intensity of early reflections that reach the composer sitting on the desk chair and the producer sitting on the couch. The placement priorities the front speakers leaving only two first reflections from the surround speakers directly reflecting on the walls.

EARLY REFLECTIONS



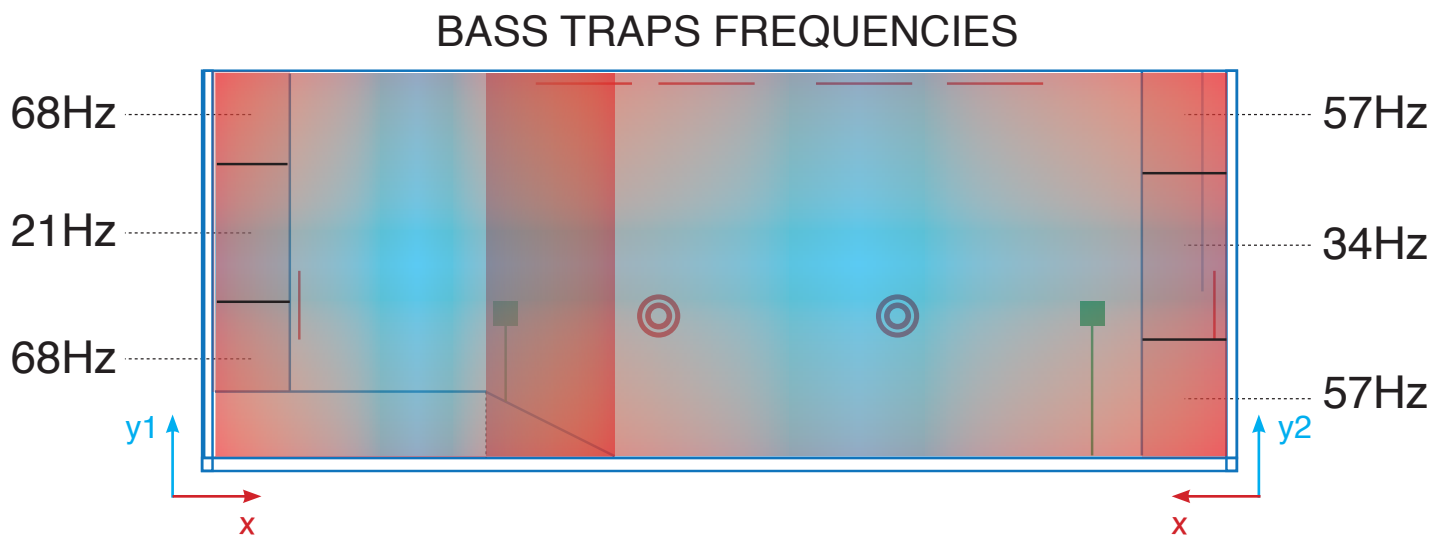
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Room Modes

In order to manage the room’s most problematic frequencies resonant bass traps were added to the corners of the room. The bass traps are segmented into three layers vertically in order to target the frequency absorption more precisely. The placement of the composer’s chair takes in consideration the room mode generated by the angled floor level change.



Problematic Frequencies:

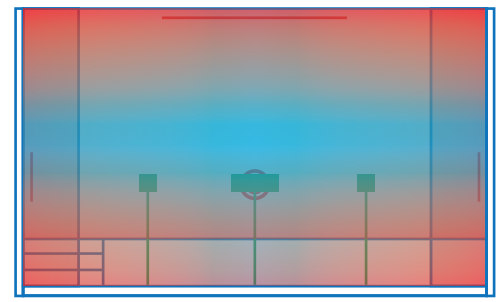
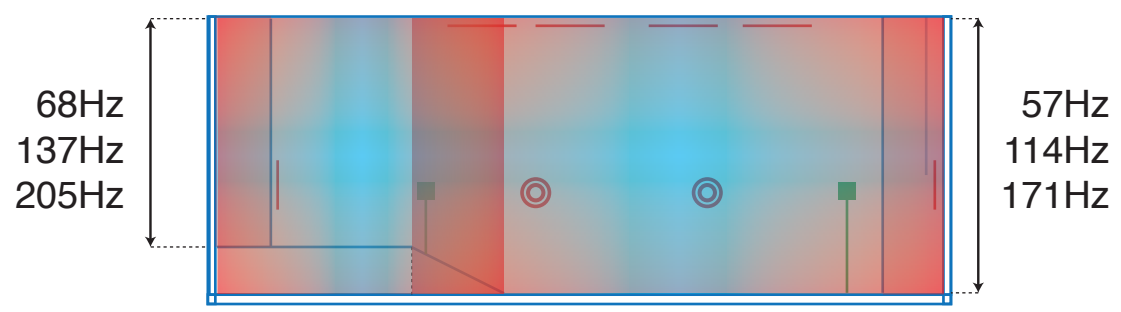
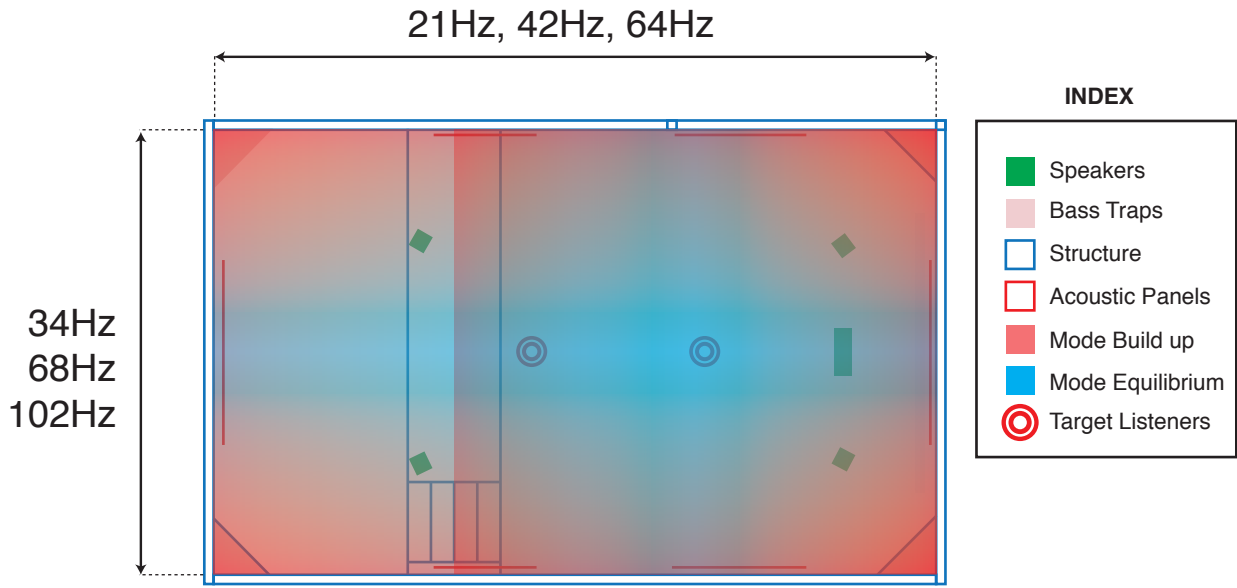
The image on the next page includes three axial modes for each room orientation as well as a visual representation of the zones where those frequencies build up.

X:	Y 1st level:	Y 2nd level:	Z:
a) 21Hz	a) 57Hz	a) 68Hz	a) 34Hz
b) 42Hz	b) 114Hz	b) 137Hz	b) 68Hz
c) 64Hz	c) 171Hz	c) 205Hz	c) 102Hz

The top bass trap on the image above makes use of the 68Hz mode generated on the Y axis of that floor on the extremities. The middle trap covers the problematic frequencies that build up across the room on the X axis.

On the right side of the image the extremities cancel the mode from the Y axis of the lower level and the middle helps to attenuate the Y axis build up.

ROOM MODES



BASS TRAPS FREQUENCIES

