



Subject: MPR540 Music Production and Recording practice

**Recording portfolio
with detailed descriptions**

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1. Introduction

Herein lies a presentation of the recordings I have made during my studies of music production and recording, at the music conservatory of Stavanger in 2008 and 2009.

During my studies I have focused on recording acoustic music, mostly live performances of the classical repertoire. I have often recorded using multiple sets of microphones, in order to learn something of what different placement and different types of microphones will sound like. Then later I have listened to the recording and chosen one (or sometimes more) stereo pair which I deemed sounded right for the musical program played.

Overall, I have learned quite a lot, especially with regards to the balance between presence and ambience. Also I have learnt a lot about the different frequency responses and sound images produced by different microphone setup techniques.

Included is a CD with excerpts of the recordings I have made. And the written descriptions are in the same order as the tracks on the CD, namely chronological. Note that the CD is, by standard definition, limited to 16bit 44.1kHz PCM digital audio. Which means that many of my recordings needed to be degraded from higher bit resolution and/or higher sampling rates.

2. Main part: The Recordings

2.1. October 8th – Beethoven

Live concert recording.

Date: October 8th 2008

Venue: LKS

Performers: Unknown

Music: Piano Sonata #23 In F Minor, Op. 57, "Appassionata" - 1st movement Allegro Assai, by Ludwig van Beethoven

Microphone setup:

- Two Schoeps MK2 condenser microphones, omnidirectional, hung from the audience boom approximately 3 meters apart, AB style.
- Two DPA 4006 condenser microphones, omnidirectional, mounted on the audience boom far up and far to the sides: approximately 8 meters apart, AB style.
- Two Neumann KM140 condenser microphones, cardioid, mounted near-coincident on a stand at stage front, ORTF style.
- AKG C246 dual condenser microphone, cardioid and figure-of-eight, mounted on the same stand (see photo) at stage front, mid-side (MS) configuration.

Signal chain: All microphones into separate channels on Yamaha 02V96, and via T/DIF to Tascam DA-88 DTRS. Backup from Yamaha AES/EBU to HHB CD recorder.

Recording format: Digital, 16 bit, 48 kHz, to DTRS. Backup: Digital, 16 bit, 44.1 kHz, to CD.

Mixing: After a bit of critical listening, it became apparent that the different stereo pairs each had their advantages and drawbacks. The Schoeps AB pair had a nice lively sound with ample bottom end, but lacked a bit of definition and presence. The DPA AB pair had more room ambience (which was the intent) but had even less presence. The Neumann ORTF pair had quite a bit of definition and presence, as well as a nice stereo image, but they were lacking in the bottom end, and since the piano was placed slightly to the right side on the stage (to allow space for the cellist on the next pece) the stereo image wasn't quite even, and panning helped only so far. The AKG MS setup had very nice presence, a bit less detailed stereo image (owing to it being a coincident setup) and not quite enough bottom end.



So for my mix I used mainly the AKG C246 MS microphone, and some (-4dB) ambience from the DPA AB pair. I boosted the main mix up 5.3dB which made it peak at -0.2dB. The sound was to my liking, having a nice presence as well as a spacious bottom end and a fair stereo image.

I imagine that an ORTF pair placed closer to the piano (combined with some AB) would have served better, giving a more convincing stereo image.

Problems: No technical problems.

Some hum, which I would assume is from the ventilation system, because it comes and goes in long intervals. I was lucky though: it seems as if the combination of the DPA and the AKG microphones cancels out most of the hum rather nicely.

The cello player had a habit of stomping his foot at the most musically intense moments. Which was picked up nicely by all the microphones and became more than a bit annoying.

Lessons learnt: Musicians can be a bit unpredictable.



2.2. October 14th – Händel

Live concert recording.

Date: October 14th 2008

Venue: LKS

Performers: Linn Ellise Hovland, soprano; Ida Olea Kongshaug, trumpet; Kristin P. Fjelseth, harpsichord; Silje K. Gotaas, violincello

Music: Let the Bright Seraphim (from Samson), by Georg Friedrich Händel

Microphone setup:

- Two Schoeps MK2 condenser microphones, omnidirectional, hung from the audience boom approximately 2 meters apart, AB style.
- Two Groove Tubes GT-50 condenser microphones, cardioid, mounted on stands on the far sides of the audience, approximately 6 meters from stage center, AB style.
- Two AKG C450 condenser microphones, cardioid, mounted near-coincident on a stand at stage front, ORTF style.
- AKG C246 dual condenser microphone, figure-of-eight, mounted on the same stand (see photo) at stage front, stereophonic (Blumlein) configuration.

Signal chain: All microphones into separate channels on Yamaha 02V96, and via T/DIF to Tascam DA-88 DTRS. Backup from Yamaha AES/EBU to HHB CD recorder.

Recording format: Digital, 16 bit, 48 kHz, to DTRS. Backup: Digital, 16 bit, 44.1 kHz, to CD.

Mixing: For this piece of music I chose to use only the AKG Blumlein stereo microphone. It gave a very precise and accurate stereo image. The sound is rather on the dry side. It would have been nice with some more presence from the harpsichord, but it isn't exactly buried either.

Lessons learnt: A pair of cardioids far out by the audience is rather pointless.

2.3. October 14th – Messiaen

Live concert recording.

Date: October 14th 2008

Venue: LKS

Performer: Håkon Austbø, piano

Music: Regard de l'Esprit de joie (from Vingt regards sur l'Enfant Jesus), by Olivier Messiaen

Microphone setup:

- Two Schoeps MK2 condenser microphones, omnidirectional, hung from the audience boom approximately 2 meters apart, AB style.
- Two Groove Tubes GT-50 condenser microphones, cardioid, mounted on stands on the far sides of the audience, approximately 6 meters from stage center, AB style.
- Two AKG C450 condenser microphones, cardioid, mounted near-coincident on a stand at stage front, ORTF style.
- AKG C246 dual condenser microphone, figure-of-eight, mounted on the same stand (see photo) at stage front, stereophonic (Blumlein) configuration.

Signal chain: All microphones into separate channels on Yamaha 02V96, and via T/DIF to Tascam DA-88 DTRS. Backup from Yamaha AES/EBU to HHB CD recorder.

Recording format: Digital, 16 bit, 48 kHz, to DTRS. Backup: Digital, 16 bit, 44.1 kHz, to CD.

Mixing: Here, I used the AKG ORTF pair mainly, with some ambience and bottom end added from the Schoeps AB pair. The AKG ORTF pair gives a more natural and spacious stereo image, compared to that of the MS microphone in the Beethoven recording. It still was a bit weak on the bass side though, which the Schoeps AB pair amended for.

Lessons learnt: The ORTF setup is a nice compromise between coincident and AB.

2.4. November 4th – Liszt / Schubert

Live concert recording.

Date: November 4th 2008

Venue: LKS

Performer: Liwen Huang, piano

Music: Auf dem Wasser zu singen, by Franz Schubert, rewritten by Franz Liszt

Microphone setup:

- Two AKG C414 condenser microphones, cardioid, mounted under the audience boom approximately 40 centimeters apart and angled 90° apart (see photo), near-coincident.
- Two DPA 4006 condenser microphones, omnidirectional, mounted under the audience boom approximately 3 meters apart, AB style.

Signal chain: All microphones into separate channels on Mackie 1202VLZ. Schoeps pair recorded to Studer ¼" analog reel-to-reel at 15 ips, AKG pair recorded to HHB CD burner.

Recording format: Analog, ¼" tape @ 15 ips. Backup: Digital, 16 bit, 44.1 kHz, to CD.

Mixing: There was no mixing involved, the two stereo pairs were recorded each to their own medias. And since one failed catastrophically, I was left with the other one.

The sound of the two AKG C414 microphones was quite nice, though. They captured a slightly mellow piano sound which suited the music very well, in my humble opinion. Stereo imaging and ambience was quite pleasant and seems natural.



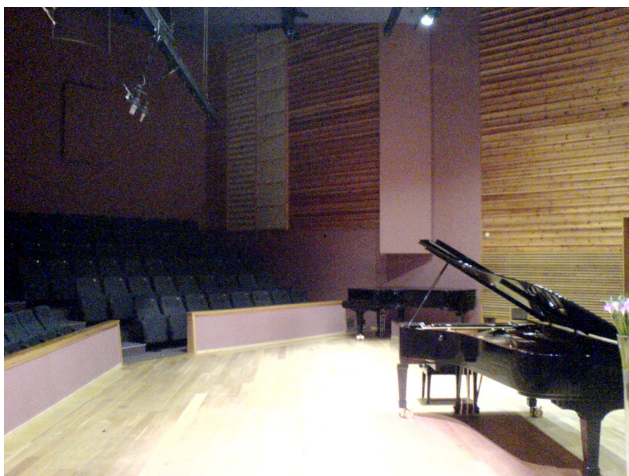
Problems: Some technical issues were encountered this evening.

I was originally intending to use the Soundcraft Sapphyre console for this session, but its power supplies went tits-up and so I had to settle for the slightly smaller Mackie 1202VLZ mixer. So I used the mic pre-amps in the Mackie and routed the outputs to two recorders: the Studer which was to be my main recorder, and to the HHB CD burner for backup.

But although I had tested everything before the concert, the Studer tape recorder failed catastrophically 12 minutes into the concert. It seemed as if one of the wheels (for which I do not know the proper name) had melted. So I

never got to evaluate the merits of analog reel-to-reel recording versus CD.

Lessons learnt: Never trust equipment that has been sitting unused for a while.



2.5. November 20th – Messiaen

Live concert recording.

Date: November 20th 2008

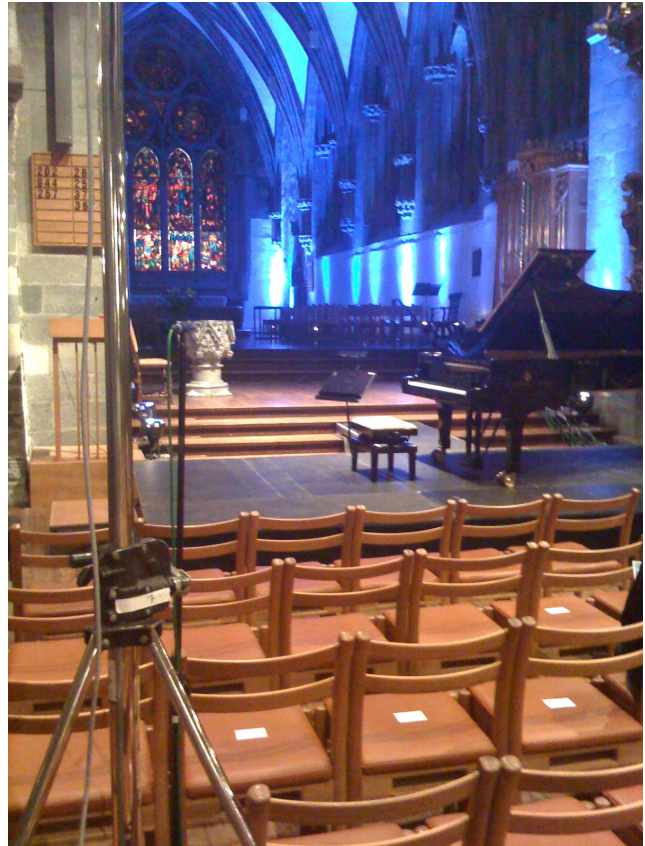
Venue: Stavanger Domkirke

Performer: Sanae Yoshida, piano

Music: Pièce pour le tombeau de Paul Dukas, by Olivier Messiaen

Microphone setup:

- Two Schoeps MK2 condenser microphones, omnidirectional, on 5 meter tall stands approximately 3 meters apart and 10 meters from stage, AB style.
- Two DPA 4006 condenser microphones, omnidirectional, mounted on 2 meter tall stands on each side of the stage, approximately 5 meters from stage center and 5 meters apart, AB style.
- AKG C246 dual condenser microphone, cardioid and figure-of-eight, mounted on a 1 meter tall stand at stage front, mid-side (MS) configuration.
- Two Neumann KM140 condenser microphones, cardioid, mounted on stand at piano end, semicoincident and angled 90° apart, NRK style.



Signal chain: All microphones into separate channels on Mackie ONYX 1604, analog signal from there to Tascam DA-88 DTRS. Backup from Mackie analog to HHB CD recorder.

Recording format: Digital, 16 bit, 48 kHz, to DTRS. Backup: Digital, 16 bit, 44.1 kHz, to CD.

Mixing: For this piano piece I used mainly the Neumann ORTF setup by the foot of the piano. It gave a very nice balance between fullness and presence, as well as a decent stereo image.

Some room ambience were added from the DPA AB pair – these seemed to give a more natural room feeling than the Schoeps pair, which was rather far away.

Problems: No particular problems here. The only thing was that the lighting crew had their power cable out through a door nearby where I was sitting, which made my working environment rather a cold one.

Lessons learnt: Closer microphone placement would have been better in such an acoustically live venue.

2.6. November 20th – Messiaen

Live concert recording.

Date: November 20th 2008

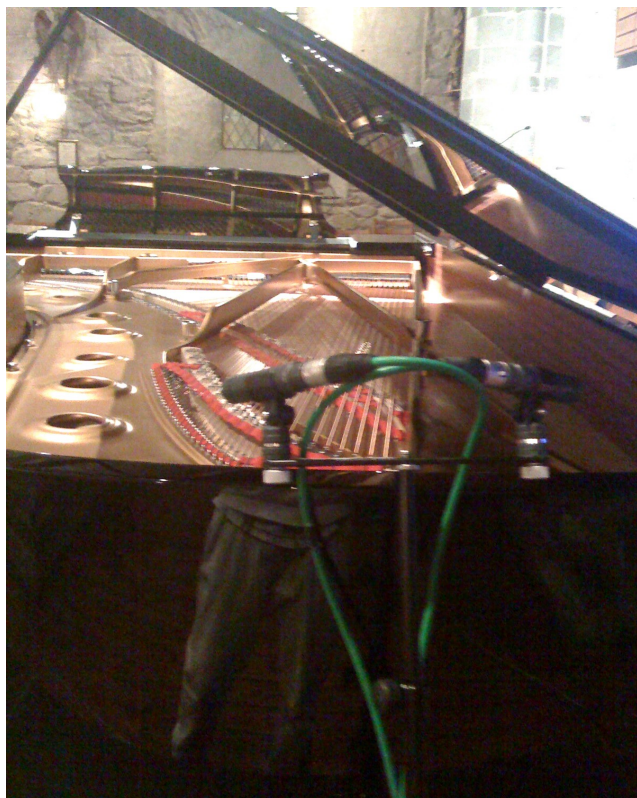
Venue: Stavanger Domkirke

Performers: Ingrid Kappelle, vocal; Håkon Austbø, piano

Music: Doundou tchil (from Harawi), by Olivier Messiaen

Microphone setup:

- Two Schoeps MK2 condenser microphones, omnidirectional, on 5 meter tall stands approximately 3 meters apart and 10 meters from stage, AB style.
- Two DPA 4006 condenser microphones, omnidirectional, mounted on 2 meter tall stands on each side of the stage, approximately 5 meters from stage center and 5 meters apart, AB style.
- AKG C246 dual condenser microphone, cardioid and figure-of-eight, mounted on a 1 meter tall stand (see photo) at stage front, mid-side (MS) configuration.
- Two Neumann KM140 condenser microphones, cardioid, mounted on stand at piano end, semicoincident and angled 90° apart, NRK style.



Signal chain: All microphones into separate channels on Mackie ONYX 1604, analog signal from there to Tascam DA-88 DTRS. Backup from Mackie analog to HHB CD recorder.

Recording format: Digital, 16 bit, 48 kHz, to DTRS. Backup: Digital, 16 bit, 44.1 kHz, to CD.

Mixing: The AKG C246 stereo microphone in MS mode gave a very nice sound by itself here. It captured the vocals nicely, as well as the piano, in a pleasant mix. The stereo image was a bit narrow though, and the piano sounded a bit far away. This was amended by adding some signal from the Neumann ORTF pair for the piano clarity and size, and some signal from the Schoeps ambience AB pair. This gave, to my ears, a sound image both spacious and defined.

In retrospect, there could have been a microphone placed closer to the singer, so that I could have given more vocal presence without too much dull piano background sound.

Lessons learnt: Closer microphone placement would have been better.

2.7. February 10th – Haydn

Live concert recording.

Date: February 10th 2009

Venue: St.Petri kirke, Stavanger

Performers: Karin Venaas, flute; Stacey Dixon, oboe; Gyrlid Erlandsen, clarinet; Dmitry Arsenyev, bassoon; Anett Åkerseth, horn

Music: Divertimento in B major no.1 1st movement, by Joseph Haydn

Microphone setup:

- Two Schoeps MK2 condenser microphones, omnidirectional, on 1 meter tall stands placed on each side of the harpsichord on stage, AB style.
- Two AKG C414 condenser microphones, cardioid, mounted on 1.2 meter tall stands approximately 2.5 meters apart by the first pew (see photos), AB configuration.

Signal chain: All microphones into separate channels on Mackie ONYX 1604, analog signal from there to Tascam MX2424 digital HDD multitrack. Backup from Mackie analog to portable Tascam DAT.

Recording format: Digital, 24 bit, 96 kHz, to hard disk. Backup: Digital, 16 bit, 48 kHz, to DAT.

Mixing: There was no mixing involved, as only one of the two stereo pairs were recorded directly to the DAT backup, and the main recorder failed catastrophically.

Problems: I had planned to record in high definition this time, so I brought along the Tascam MX2424 hard disk recorder. This unit is supposedly able to record 24 tracks in 24 bit 96 kHz. I had it connected to the 8 channel D-sub analog output of the Mackie ONYX console, intending to record four channels.



It went well for about thirty minutes, but after the intermission it wouldn't start again, giving some sort of disk related error message. Which is not very useful in a live situation.

Luckily I had my posterior covered. The portable Tascam DAT recorder was hooked up to the analog main outputs of the ONYX. This recorded only the AKG AB pair, so that is what I had for my troubles.

Lessons learnt: Don't trust equipment you haven't worked with before. And St.Petri is wonderful for chamber music recording.

2.8. February 10th – Haydn

Live concert recording.

Date: February 10th 2009

Venue: St.Petri kirke, Stavanger

Performers: Maja Vagner, violin; Carol Harris, violin; Krzystof Bilicki, violin; Sigrun Egeland-Eriksen, violin; Sayaka Takeutchi, violin; Wouter Raubenheimer, viola; Torill Lura, viola; Hjalmar Kvam, violincello; Petro Sokach, violincello; Igor Eliseev, doublebass; Petteri Pitko, harpsichord; Fabio Biondi, violin and orchestra leader

Music: Divertimento in D-major 1st movement, by Joseph Haydn

Microphone setup:

- Two Schoeps MK2 condenser microphones, omnidirectional, on 1 meter tall stands placed on each side of the harpsichord on stage, AB style.
- Two AKG C414 condenser microphones, cardioid, mounted on 1.2 meter tall stands approximately 2.5 meters apart by the first pew (see photos), AB configuration.



Signal chain: All microphones into separate channels on Mackie ONYX 1604, analog signal from there to Tascam MX2424 digital HDD multitrack. Backup from Mackie analog to portable Tascam DAT.

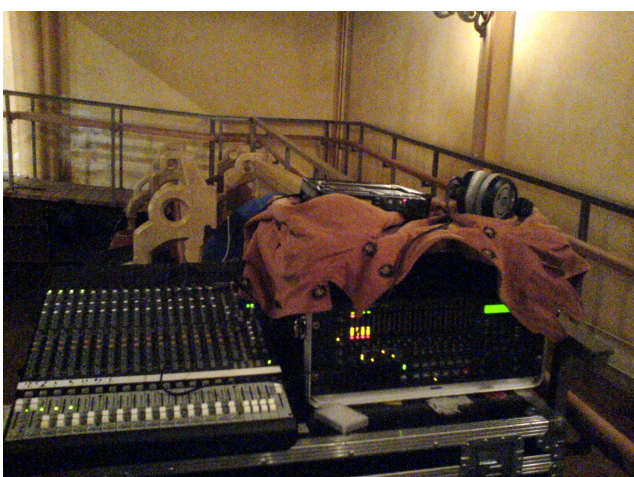
Recording format: Digital, 24 bit, 96 kHz, to hard disk. Backup: Digital, 16 bit, 48 kHz, to DAT.

Mixing: There was no mixing involved, as only one of the two stereo pairs were recorded directly to the DAT backup, and the main recorder failed catastrophically.

The sound from the two AKG C414 cardioid condenser microphones is quite amazing though. I must have had a stroke of good fortune this evening. Although I expected decent sound, I hadn't ever tried this particular sort of microphone placement before and didn't quite know what to expect.

The stereo imaging is very nice and detailed, the instruments have a nice presence, the ambience is natural and convincing, and there's a pleasantly round and deep bass response. Not quite what you'd expect from an AB pair of cardioid microphones placed at ear height by the first pews.

The only regret is that the harpsichord is not quite as present as I'd like.



2.9. June 11th – Coupenin

Studio recording.

Date: June 11th 2009

Venue: Bjergsted Terrasse, Blokk 7 – the Church Simulator

Performers: Kristin Fjelnseth

Music: L'Art de toucher le Clavecin: Cinquieme prelude, by Francois Coupenin

Microphone setup:

- Three DPA 4006 condenser microphones, omnidirectional, mounted on a 1 meter tall stand placed in front of the harpsichord approximately 2 meters away, in a mini Decca tree configuration (see photo).
- Two Schoeps MK2 condenser microphones, omnidirectional, mounted on a 4 meter tall stand near the harpsichord, semi coincident (20 centimeters apart).
- Two AKG C414 condenser microphones, figure-of-eight, mounted 40 centimeters apart on a 1 meter tall stand placed in front of the harpsichord approximately 3.5 meters away, angled 90° from center and facing from each other, to capture the room ambience.

Signal chain: All microphones into separate channels on Mackie ONYX 1604, digital FireWire from there to Apple iBook G4 laptop running Logic DAW.

Recording format: Digital, 24 bit, 96 kHz, to hard disk.

Mixing: The microphones were set up with the 2+2+2 surround sound format in mind, so that I may have some raw material for mixing in such a format when I some time in the future have the equipment to do so.

For stereo playback, I found, as expected, the DPA stereo pair to sound best. They give a very nice presence and a pleasant stereo image. I had originally placed them roughly 1 meter from the instrument, but we found that this setup exaggerated the mechanical noise, and so I moved this stand a bit farther away and also a bit sideways away from the keyboard mechanics.



This microphone pair no doubt captures much of what the audience may hear at a chamber music concert. The treble is nice and crisp, and there is fullness to the bass.

Problems: While mixing I noticed that the levels were rather low, although I had increased the gain on the ONYX pre-amps more than I thought necessary. So I had to increase the levels again, as much as 16dB. This raised the noise floor too, which was already too high for my taste. In the end, the noise floor lies at roughly -35dB. Not nice.

Some of the noise was obviously from the room though. Hum from what is most likely the ventilation system.

Lessons learnt: The ONYX pre-amps are perhaps not the best tool for this sort of job. And the room, while the acoustics are interesting, have some background noise issues.

2.10. June 11th – Froberger

Studio recording.

Date: June 11th 2009

Venue: Bjergsted Terrasse, Blokk 7 – the Church Simulator

Performers: Kristin Fjelnseth

Music: Plainte faite à Londres pour passer la melancholie, FbWV 630, by Johann Jakob Froberger

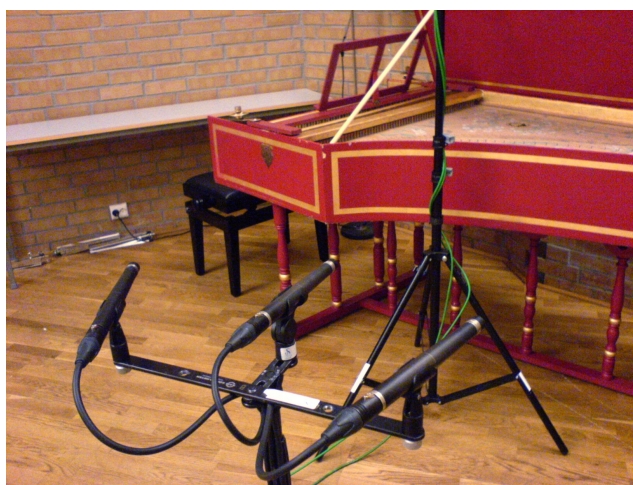
Microphone setup:

- Three DPA 4006 condenser microphones, omnidirectional, mounted on a 1 meter tall stand placed in front of the harpsichord approximately 2 meters away, in a mini Decca tree configuration (see photo).
- Two Schoeps MK2 condenser microphones, omnidirectional, mounted on a 4 meter tall stand near the harpsichord, semi coincident (20 centimeters apart).
- Two AKG C414 condenser microphones, figure-of-eight, mounted 40 centimeters apart on a 1 meter tall stand placed in front of the harpsichord approximately 3.5 meters away, angled 90° from center and facing from each other, to capture the room ambience.

Signal chain: All microphones into separate channels on Mackie ONYX 1604, digital FireWire from there to Apple iBook G4 laptop running Logic DAW.

Recording format: Digital, 24 bit, 96 kHz, to hard disk.

Mixing: On this particular piece I used the same DPA stereo microphone pair as above, but here I also added the AKG ambience pair, as the music had more space and more dynamics which benefitted from the more reverberant sound.



2.11. June 11th – Bach

Studio recording.

Date: June 11th 2009

Venue: Bjersted Terrasse, Blokk 7 – the Church Simulator

Performers: Kristin Fjelnseth

Music: Prelude, Fuge & Allegro in Eb major BWV 998: Allegro, by Johann Sebastian Bach

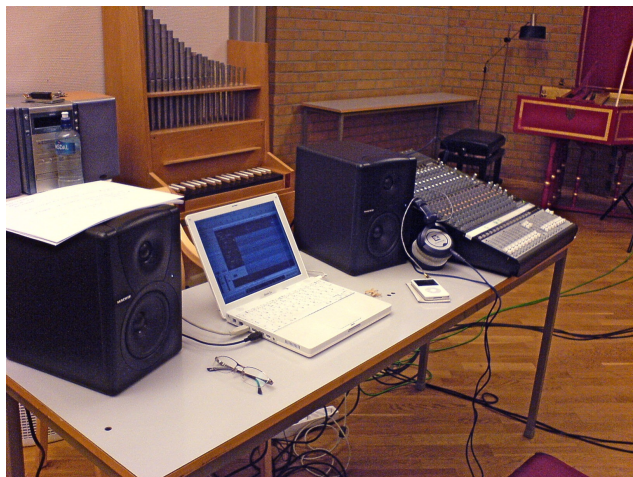
Microphone setup:

- Three DPA 4006 condenser microphones, omnidirectional, mounted on a 1 meter tall stand placed in front of the harpsichord approximately 2 meters away, in a mini Decca tree configuration (see photo).
- Two Schoeps MK2 condenser microphones, omnidirectional, mounted on a 4 meter tall stand near the harpsichord, semi coincident (20 centimeters apart).
- Two AKG C414 condenser microphones, figure-of-eight, mounted 40 centimeters apart on a 1 meter tall stand placed in front of the harpsichord approximately 3.5 meters away, angled 90° from center and facing from each other, to capture the room ambience.

Signal chain: All microphones into separate channels on Mackie ONYX 1604, digital FireWire from there to Apple iBook G4 laptop running Logic DAW.

Recording format: Digital, 24 bit, 96 kHz, to hard disk.

Mixing: This is harpsichord music from the heavier side of the repertoire. Very dense, continuous flow of sound. So I went back to using only the DPA pair, for a slightly dryer sound again. Also I reduced the gain by a few dB – this track is simply louder.



3: Conclusion

In the end I can say that what I've learnt the most from is trying out different microphones and different ways to place said microphones in relation to the sound source(s) and the environment which they appear in. Although no-one can rightfully claim to know all there is to know about such things, all practice is helpful. I could most certainly benefit from more practice, but what little I have has helped me quite a bit.

I do have experience with equipment and hardware and such elements from before, and so I have never had technical difficulties or equipment failures that has hindered me from recording an event. I've always had backup plans and tested things out beforehand, which provides a degree of safety.

It has been fun.