Information on the instrument and the studio equipment used:

The fortepiano was built from a kit made by Zuckermann, USA, however supplied by the company Atelier Ducornet, Paris, in the winter term 1994/95. It was assembled by a piano maker employed at Bösendorfer, Vienna (Mr. Küker) and myself in our spare time. This took approximately 600 hours, the place of the happening was my Vienna apartment, whose living room was hardly usable for other purposes during this time.

The cost of the kit was approximately Schilling 74000,-- (corresponding to Euro 5400,-). The kit turned out to be perfect, any additional shaping of wooden parts becoming necessary only in minimal extent. The kit is based on an instrument built by Andreas Stein, Augsburg 1773. The photo to the right shows a similar original instrument built in 1777. My fortepiano partner of many years, Richard Fuller, owns a similar Stein copy which, however, is based on a somewhat more recent instrument, but he also still has his Walther copy; his Stein copy is very similar to mine in sound. In other acoustic characteristics, however, they are different; for example, removing the so-called “listing ribbon” dampening the tail portions of the strings proved catastrophic with my fortepiano (the tones blurred all into one another), whereas removing it from Fuller’s instrument caused a clear improvement of the sound.

To build a fortepiano results in the inestimable advantage that one knows the instument very well. A fortepiano player is frequently forced to intervene here and there, to adjust the action occasionally, work on the hammer heads covered with leather or substitute a broken string. Tuning is necessary much more frequently than with a modern piano because fortepianos are much more depending on the stability of the room climate.

The instrument is 2.16 m long and 0.98 m wide; the outside is veneered in mahogany. It weighs a total of some 80 kg.

I normally used to tune the instrument on 435 cycles per second according to the method published by Herbert Kellner. I use an electronic tuning device in order to find the desired pitch exactly, however, tune the instrument by ear, since the Kellner method is not yet included in my already somewhat out-of-date device.

Right after finishing the recording I found out that Bradley Lehman of the University of Michigan had, following a publication by Andreas Sparschuh of Heidelberg University (1999), done much research on the long-lost tuning method Bach himself had used, and had published his findings in 2005. This is the method I have been using since; fortunately the Kellner temperament is almost as good as Bach’s.

Deviating from the (very good!) construction manual, some changes were made.

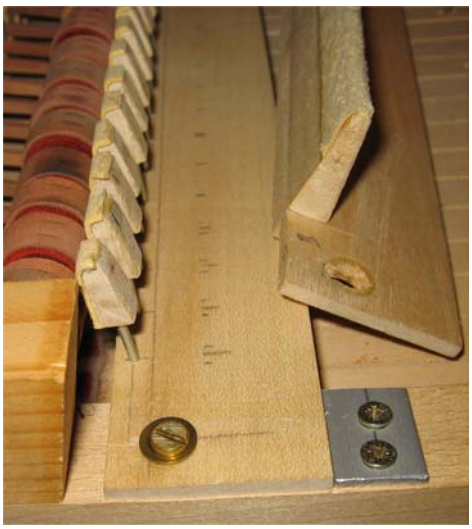
The moderator was actually (as with the underlying original instrument) intended to be operated with lever situated in the middle of the nameboard. We decided, however, to add a knee lever at the left side, similar to the damper knee lever on the right side (see photo!) for the moderator (the moderator is a felt ribbon slipping in between hammer heads and strings, similar to many modern upright pianos).

This naturally required also designing a suitable mutation (that is the lever system which transfers the movement of the knee lever to the moderator rail). Thus the moderator can be drawn back and forth at any time, even if one does not have a hand free.

One should not exaggerate this effect; we made use of it, on two fortepianos, particularly with the Decima canon and with the Choral; the same is true of my single fortepiano recording.

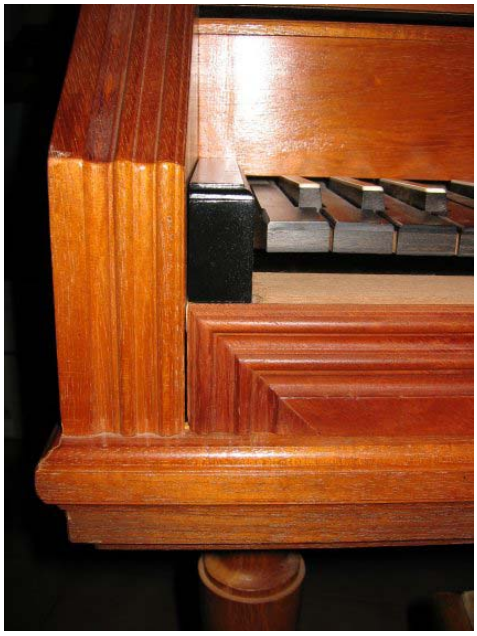
A very significant improvement was that of the backcheck device. Included in the kit there was a continuous backcheck, whose purpose is to catch and hold the falling hammer head in such a way that it cannot again hit the string unintentionally.

It is very difficult to ensure the effectiveness of catching every hammer with a continuous backcheck; we therefore built a backcheck in a similar manner to the construction used in “modern” grand pianos with Viennese action, where each catching piece sits on a wire and is thus individually adjustable.



One recognizes above how the catching piece holds the hammer head. The photo at the left shows the individually adjustable backcheck (left, in its normal position) and on the right of it for comparison the continuous backcheck.

The horizontal moulding under the keyboard attached to the cheek did not please me because of the pretty profiles not fitting correctly there according to the construction manual (left photo). I therefore found a different solution (right photo), which, however, required to have an additional piece of the moulder rail sent to me.



It might be interesting to view the rib construction as well as the wooden frames which give stability to the case.

The instrument has no metallic framing; the forces the strings exert are controlled just by the wooden construction. Nevertheless the tuning is amazingly stable, as long as the room climate is stable. After moving the instrument, of course, tuning preferably on the day before a concert is inevitable.

With Bach's original tuning method the stability seems even better; God only knows why.

Johann Andreas Stein (1728-1792) was an eminent piano builder, who contributed essentially to the fortepiano's development by inventing the now so-called "Viennese action".

He was born as a son of the organ builder Johann Georg Stein in Heidelsheim. His wandering years started when he became an apprentice with Joh. Andreas and Joh. Heinrich Silbermann in Strassburg in 1748. When in Augsburg in 1751 an organ builder was needed, Andreas Stein established his shop

there. In 1758 and in 1773 he made study trips to Paris. He started out restoring only organs, later he turned more and more to building pianos. In this field by inventing the now so-called “Viennese action” he earned much acknowledgement. With enthusiasm, Mozart in a letter to his father (Augsburg, October 17, 1777) describes the advantages and careful craftmanship of Stein instruments:

Nun muß ich gleich bey die steinischen Piano forte anfangen. Ehe ich noch vom stein seiner arbeit etwas gesehen habe, waren mir die spättischen Clavier die liebsten; Nun muß ich aber den steinischen den vorzug lassen; denn sie dämpfen noch viell besser, als die Regensburger, wenn ich starck anschlage, ich mag den finger liegen lassen, oder aufheben, so ist halt der ton in dem augenblick vorbey, da ich ihn hören ließ. ich mag an die Claves kommen wie ich will, so wird der ton immer gleich seyn. er wird nicht schebern, er wird nicht stärcker, nicht schwächer gehen, oder gar ausbleiben; mit einem wort, es ist alles gleich. es ist wahr, er giebt so ein Piano forte nicht unter 300 f: aber seine Mühe und fleiß die er anwendet, ist nicht zu bezahlen. seine instrumente haben besonders das vor andern eigen, daß sie mit auslösung gemacht sind. da giebt sich der hunderteste nicht damit ab. aber ohne auslösung ist es halt nicht möglich da ein Piano forte nicht schebere oder nachklinge; seine hämmerl, wen man die Claves anspielt, fallen, in den augenblick da sie an die saiten hinauf springen, wieder herab, man mag den Claves liegen lassen oder auslassen. wen er ein solch Clavier fertig hat, wie er mir selbst sagte, so setzt er sich erst hin, und Probirt allerley Pasagen, läüffe und springe, und schabt und arbeitet so lange bis das Clavier alles thut. denn er arbeitet nur zum Nuzen der Musique, und nicht seines nuzens wegen allein, sonst würde er gleich fertig seyn.

Er sagt oft, wenn ich nicht selbst ein so Paßionirter liebhaber der Musick wäre, und nicht selbst etwas weniges auf dem Clavier könnte, so hätte ich gewis schon längst die gedult bey meiner arbeit verloren; allein ich bin halt ein liebhaber vom instrumenten die den spieller nicht ansezen, und die dauerhaft sind. seine Clavier sind auch wircklich vom dauer. Er steht gut davor da der Raisonanceboden nicht bricht, und nicht springt. wenn er einen raisonanceboden zu einem Clavier fertig hat, so stellt er ihn in die luft, Regen, schnee, sonnenhitze, und allen Teüfel, damit er zerspringt, und dann legt er span ein, und leimt sie hinein, damit er recht starck und fest wird. er ist völlig froh wenn er springt; man ist halt hernach versichert daß ihm nichts mehr geschieht. er schneidet gar oft selbst hinein, und leimmt ihn wieder zu, und befestiget ihn recht. er hat drey solche Piano forte fertig. ich habe erst heüt wieder darauf gespiellet . . . die lezte [meiner 6 Sonaten] ex D kommt auf die Pianforte vom stein unvergleichlich heraus. die Machine wo man mit dem knie drückt, ist auch bey ihm besser gemacht, als bey den andern. ich darf es kaum anrühren, so geht es schon; und so bald man das knie nur ein wenig wegthut, so hört man nicht den mindesten nachklang“ (Letters, II, p. 68 f.).

We moved our two fortepianos originally in a Fiat Ulysse, one on top of the other (the photo shows only one).

My individual fortepiano goes in straight into a Fiat Marea, but not quite easily (see photo below)!

In both cases a suitable wooden rack was a necessity.

The recording of the "Art of the Fugue" was planned for early summer 2005. At the end of October 2004 the demo CD was recorded, with special attention on finding and adjusting optimal acoustic conditions. A 101 m² vaulted room at Niederfellabrunn Castle was considered. This room cannot be heated easily, therefore recording the whole work was possible only in the summer season. The room, however, owing to its vault construction, has pleasant natural, somewhat reverberant acoustics, characterized particularly by a very evenly mixed sound field. In addition it is situated on the backside of the building next to the park, where absolute calmness is guaranteed. The wall of acoustic cubes, set up at the left side by the piano, has above all the purpose to make the impression of the sound more agreeable for the player.

In the long run a stereo pair of microphones (AKG C391B Blue Line) in front of the opened fortepiano was sufficient. Additional microphones in the room did not result in any improvement. The signals went into a mixer Behringer MX 1602, were digitized by means of an ADDAC Lake People F29 (20 bits). As recording equipment both a DAT recorder Pioneer as well as a Tascam CD Writer CD-RW4U were used; the material was further processed by means of the computer program SEK'D Samplitude studio.

The remaining devices on the photo are a CD Player Pioneer, an amplifier SONY as well as an effect processor t.c.electronic M300 (which was passive in this recording). The actual recording in early summer 2005 was made with a „Field Recorder“ Fostex FR-2, the rest of the arrangement unchanged.