

Seminar: Multimedia Coding and Transmission

Coding
Transmission

Historic Music Coding

Ifi, UiO

Norsk Regnesentral

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This part of the course ...

- ... is the history of a lost technology



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1 This was supposed to be on the Titanic



Welte Philharmonic Organ

- Built in 1912
- by Welte, Freiburg
- 260 pipes, 7 registers
- programmable
- pneumatic
- MIGNON system

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History: The Rise

- ~1650: Clock with music facility
- ~1720: Wooden clock (Kuckucksuhr)
- ~1800: Organ (and other instruments) with
 - Cylinders
 - Disks
- ~1880: Orchestrion / organ / piano
 - Paper rolls
- ~1904: Welte Mignon / Hupfeld DEA
- Technology Top: 1905-1929

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History: The Decline

- 1877: Edison Phonograph
- 1887: E. Berliner: Record
- 1929: Sound film
- 1929: Radio
- 1931: Magnetic Tape Recorder
- ~1931: Welte stops production

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The History of the Pianola

The First Pianola

The first Pianola was completed by Edwin S. Votey in a workshop at his home at 312, Forest Avenue, Detroit, in the spring and summer of 1895. Votey later joined the Aeolian company, which put the instrument on sale in the USA in 1897, and in Europe in 1899. But the Pianola and its competitors were not only the invention of any one person. E. S. Votey's particular contribution was to draw together a number of existing mechanisms which rendered his creation the first truly musical piano-playing device in the world.

The Pianola Mechanism

The mechanism of the pianola is brought into operation by means of suction power generated by the pianolist's feet, and controlled in pitch by a perforated music roll. The greater the suction at any one instant, the louder a particular note or chord will sound, and the conscientious pianolist must learn to control dynamics as rapidly and subtly as a normal pianist.

Music Rolls

The vast majority of music rolls for the normal pianola were not recorded at a keyboard, but simply perforated by a technician after being marked up in pencil with reference to the original sheet music. Thus there are no changes of tempi, rubato or phrasing on normal pianola rolls, and instead the operator is provided with a tempo control, which must be used to create musical performances.

Reproducing Pianos

By late 1904 the firm of Welte in Freiburg had developed a new type of player piano, known at first as the Welte-Mignon, and this was followed within the year by the Dea piano manufactured by Ludwig Hupfeld in Leipzig. Both these instruments and their competitors have over the years come to be known as reproducing pianos, the other main systems being the Duo-Art and the Ampico.

Reproducing Piano Rolls

Nearly all of the major pianists of the early twentieth century made rolls for the reproducing piano, and these recordings are an important legacy of romantic piano music and interpretation, as well as jazz and ragtime. The first era of the player piano came to an effective end in the early 1930s, with sales of instruments all but ceasing during and after the depression.

Composers for the Pianola

Besides playing works from the standard piano repertoire, pianolas may be used for music unlimited by the restrictions of the human hand. Well over seventy composers have written or arranged music especially for the pianola over the years, including Stravinsky, Hindemith, Milhaud, Percy Grainger and Herbert Howells.

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Companies

- Welte - Vöhrenbach / Freiburg
- Imhof & Mukle - Vöhrenbach
- Hupfeld - Leipzig
- Gebr. Weber - Waldkirch
- Aeolian Company - Detroit
- American Piano Company
- ...

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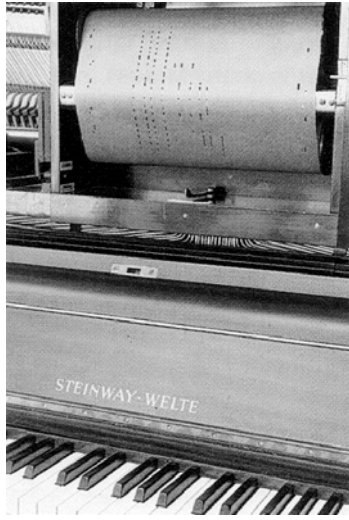
Music Coding



- Cylinders
- Metal / Paper Disk
- Planchette
- Paper folds
- Paper Rolls
- mechanic
- pneumatic

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Paper Rolls



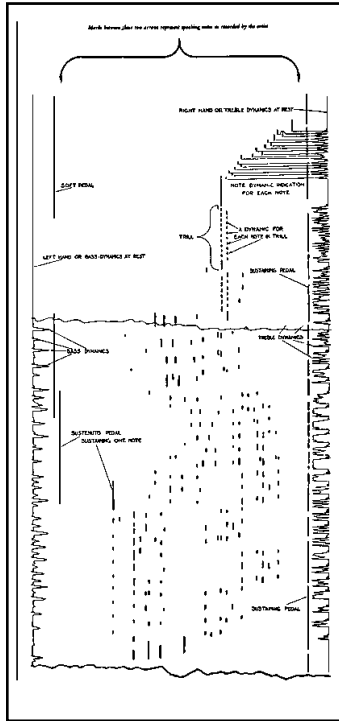
- Pneumatic
- Mechanic
- Paper Rolls vs. Cylinders
 - longer play time
 - cheaper
 - less space
 - easier to handle
 - less error prone

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Paper Roll Systems

- Pianola (Edwin S. Votey, 1897, Detroit) (Aeolian)
- Welte Mignon (1904, Freiburg)
- Hupfeld DEA (1905, Leipzig)
- Duo Art (Aeolian)
- Ampico (Stoddard, 1913, American Piano Company)
- ...

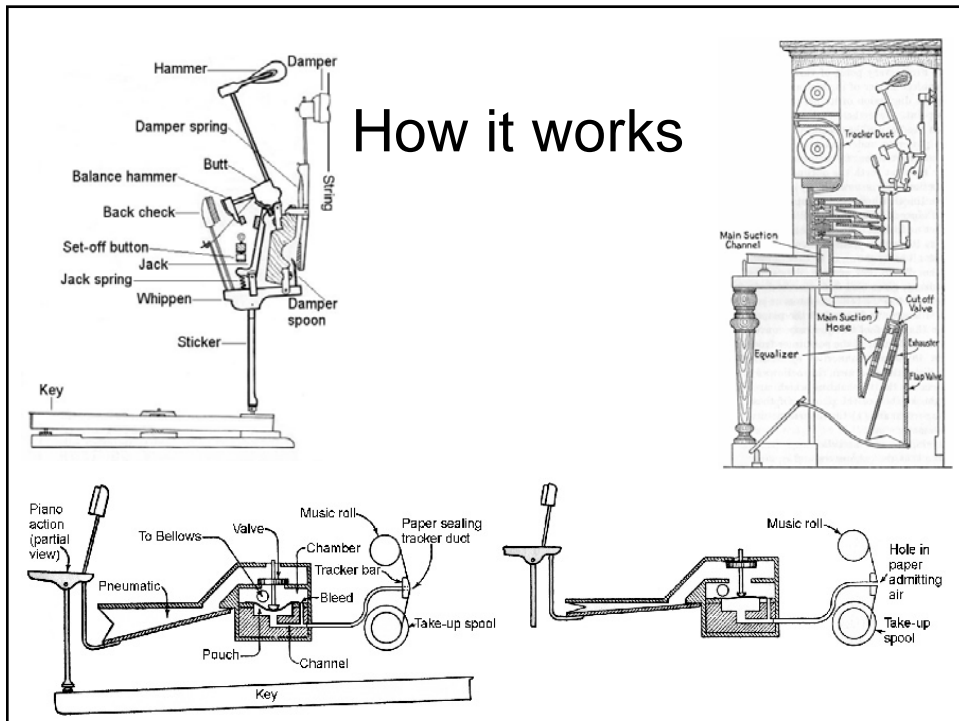
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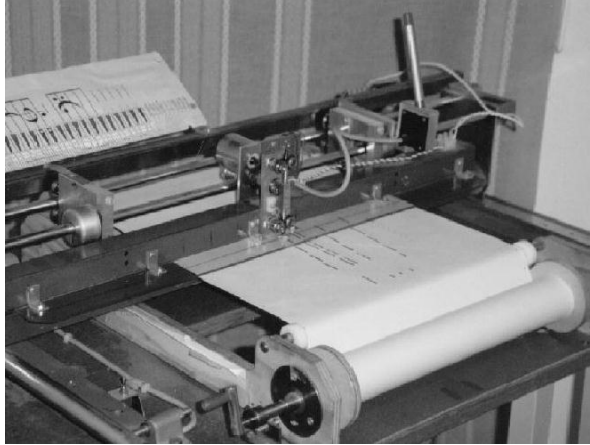
This photograph of a section from an original recording of Chopin's Etude in F Major shows how every detail of the artist's playing is graphically recorded while he plays. With this absolutely authentic "tone picture" as a guide, the making of records for Welte Mignon (Licensee) Reproducing Pianos is free from every vestige of guesswork. Nothing is added or subtracted that the artist does not himself put into his music, so that the record is not a mere approximation, but an exact reproduction of his playing. What may be called the "film of the music camera" receives impressions of every detail of both his fingering and pedaling. The exact position of every note played is fixed by faint vertical lines corresponding in number to the keys on the piano. The staggered lines on the extreme right and left are the means by which the mechanism, like the delicate needle of the sismograph that records the slightest tremor of the earth, graphically indicates exactly the degree of pressure with which the artist struck the keys, thus faithfully recording the finest shading of his interpretation.

Welte Mignon

- Patented in 1904 by Welte
- Nuancierungs-Apparat
- 1904: Phonolizst by Hupfeld with DEA system



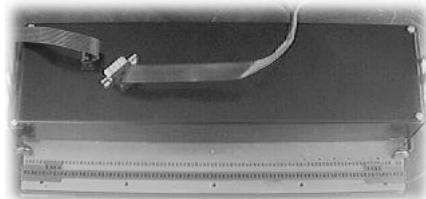
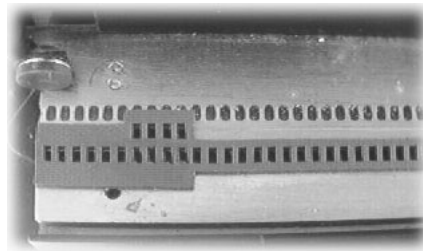
Coding of Paper Rolls



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Reading Piano Rolls

- Pneumatic
- FiberOptic
- Scanning/OCR
- (Mechanic)



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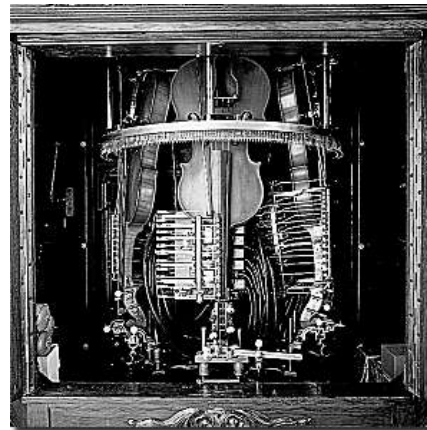
Welte-Mignon
LICENSEE
reproducing action.
THE AUTO PNEUMATIC ACTION CO.



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Hupfeld Phonoliszt-Violina



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Phonoliszt Violina - 1910



- Built by Hupfeld, Leipzig
- 3 violins (1 string each)
- piano
- programmable
- pneumatic
- DEA system
- 6 music roles

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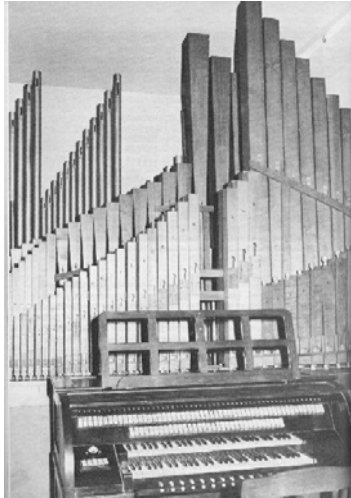
With animation ...



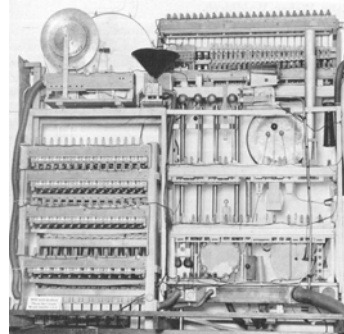
- Built by Weber, Waldkirch
- Model Styria (1920)
- Includes piano, violin, cello, flutes, drums
- Includes an animated image
- programmable
- pneumatic

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The Cinema Organ



- Built: 1924
- Welte Mignon
- St. Gallen, Switzerland



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STODART / WELTE MIGNON REPRODUCING GRAND PIANO



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Composers and Technology

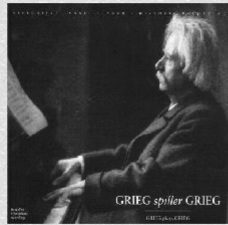


Trolld 07
Grieg plays
Grieg
an historical
recording

NOK 150.-

- Edvard Grieg

- Karl Bockisch
- Edwin Welte
- Composer d'Albert



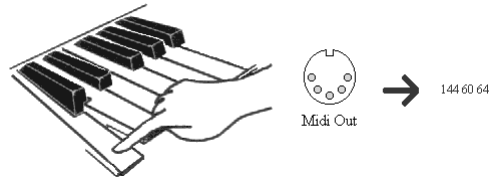
In the beginning of the 20th century, Edvard Grieg recorded a few of his own compositions, - both on gramophone and with the Welte Mignon technique. This CD contains nine gramophone recordings made in Paris in April 1904, and four Welte Mignon recordings made in Leipzig in 1906. The recordings give a very good impression of a pianist with his own style, filled with charm, - impulsive and distinctively romantic in expression as it was. The sound on the gramophone recordings has the surface noise of the original recordings. The sound of the Welte Mignon recordings is perfectly clear.

Music was (and is) business

KOMPONISTEN	
No.	Werk
GRANICHTAUFDES, BRUNO	
1112	Der Orlow, Polpotent Composit von Hans Hübner
GRIEG DE GRÉTRY	
1174	Ballett music: „Richard Coeur de Lion“ Composit von Arthur de Greef
1175	Fantasie: Act 1: „La Reine de Saba“ Composit von Arthur de Greef
1177	Gavotte: Act 1: „Collette à la Cour“ Composit von Arthur de Greef
GRIEG, F. D.	
1171	Norvegischer Bogen in Violoncellen, Op. 90, No. 2 Composit von Arthur de Greef
1172	Albeniz, A. L., Op. 25, No. 3 Composit von Arthur de Greef
HANSELMANN, F.	
1801	Großes Polpotent Kollischer Schläger (Die Kollischeren Händelchen von W.H. Hansmann) Composit von Hans Hübner

MIDI - The Revival

- 1983 MIDI Version 1.0
- Music Instrument Digital Interface
- File Format
- Electrical Specifications
- General MIDI
- Sequencer



What can we learn?

- Technology and market ...
- Patents and media formats ...
- Technology and fine arts ...

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The End



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