

# About the PA eroll MIDI files

*Peter Phillips*

## Overview

Notes give background and information about the Phillips-Ampico MIDI eroll files available at [www.petersmidi.com](http://www.petersmidi.com)

## Background

The first “full fidelity” piano roll recordings were made in 1905, by the German company Welte and Sons. These rolls not only recorded the notes being played, but how loudly. This invention spawned a huge industry, as for the first time those that could afford it were able to have concert performances on their living room piano.

By 1915, many other companies were producing their brand of “reproducing piano” and the rolls to go with it. The major names were Welte, Hupfeld, Duo-Art (from the Aeolian Company, who coined the term ‘Pianola’), and the American Piano Company, known as Ampico. The recordings described here are from Ampico reproducing piano rolls.

The reproducing piano industry was huge, employing thousands, and of course making recordings of virtually every famous concert pianist, as well as a host of popular pianists. It all ended with the depression, and faded away to virtual obscurity by the end of the 1930s. The legacy however is a vast number of reproducing piano rolls, covering a huge range of pianists and musical styles.

Arguments rage as to how faithful these roll recordings are. Certainly the pianists who made the rolls felt the results were authentic, often signing to this effect. Today, musicologists are now researching piano roll performances to gain a better understanding of performance practice of the times. There are certainly some legendary pianists on these roll recordings, many of whom did not make gramophone recordings.

## History of the eroll files

This collection of eroll files represents the culmination of over 20 years of work. In principle, each piano roll was recorded as an electronic data file, using a purpose-built roll reader. An eroll file could then be played into an Ampico fitted with electric “valves” controlled by the data file. I finalised the development in the early 1980s, and over the next 10 years gathered rolls from around Australia, recording nearly 1500 rolls.

As far as I know, I was the first person to make a piano play from a computer, and to make it commercially viable. Today, there are some 20 collectors in Australia who currently own, or have owned my system.



*Peter Phillips in 1979 operating his roll recording machine.*

During the 1990s, MIDI technology saw instruments such as the Disklavier and the PianoDisc become almost consumer items. As the owner of such an instrument, I was keen to convert my eroll files to MIDI, so they could be played on a MIDI piano. A colleague (Ross Chapman) had the required technology, so he spent a year converting each file in real time to a range of formats.

## The formats

The conversion process from the original Phillips format has resulted in over 1430 eroll files in three formats:

- **Bar/Ann** – first released in 2001 for use with WindPlay and the PowerRoll.
- **e-MIDI** – so called, as all perforations are represented as a MIDI note. These files are similar to the Bar/Ann files, but can be played with any MIDI sequencer (eg Cakewalk) into an Ampico piano fitted with either a PowerRoll or the Gerety/Chase MIDI valve system.
- **MIDI** – released 2003, these files have been optimised for playing on a MIDI mechanical piano like the Disklavier, although many people enjoy them on an electronic piano or computer.

## Processing and cataloging

Although the conversion process was completed in early 2000, there was still a lot to be done. All files needed a file name and the MIDI and e-MIDI files had to be titled so the item name would be displayed during playing. The first CD-ROM (released 2001) contained Bar/Ann files only. It was to take a further two years to fully process the MIDI and e-MIDI files.

Next came the task of cataloging the files. As these are historical, the date each roll was issued had to be included (where known) along with the first name of each pianist and the real pianist behind the pseudonyms used.

## MIDI emulation

A reproducing piano roll has the note dynamics recorded as perforations that control the playback system in the piano. A MIDI file stores this information as digital codes (called the *velocity*). This required the piano roll expression coding to be converted to MIDI velocity values with a program called an *emulator*. The emulation program used was Windplay, written by Richard Brandle (USA).

Expression emulation of reproducing piano rolls is not always accurate, depending on the emulator and the type of reproducing piano roll. Fortunately, the Ampico expression system is predictable, allowing equally predictable MIDI emulations. This is not the case with say Duo-Art rolls, where the expression system relies on its inefficiencies to give certain effects.

Following the emulation process, each MIDI file was optimised for playing on a mechanical piano, such as the Disklavier or PianoDisc. This meant setting the dynamic range to suit these types of pianos, ensuring soft playing without note drop out, and loud playing that is not excessive. Initially we owned a PianoDisc (in a 6'6" Yamaha), replacing it in 2002 with a C7 Disklavier. Owning both types of instruments has allowed these files to be tested extensively.

## The results

A singular advantage with the roll recording system used was the ability to monitor the performance on an Ampico piano during recording. Some rolls were more demanding than others, sometimes taking considerable time to get the best possible recording. Because the roll reader played each roll at its correct tempo, the timing is accurately preserved in the recorded file. This is not always the case with roll “scans”, in which rolls are scanned optically and the MIDI file is generated from the scanned data.

In 2007, Bösendorfer (piano manufacturer in Vienna) purchased the rights to use the PA eroll MIDI files for demonstrating their CEUS player system. At this time a series of recordings was made of some 200 piano roll performances by playing the PA eroll MIDI file into a Bösendorfer Imperial piano fitted with Bösendorfer’s high-performance MIDI mechanical player system, called the CEUS.

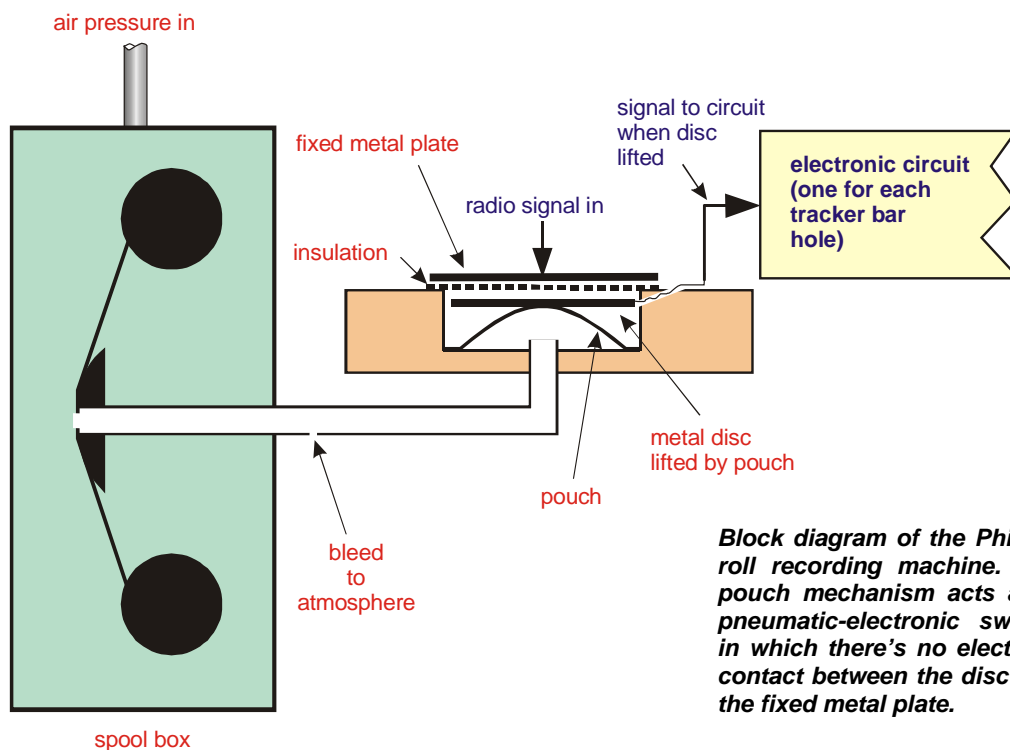
These recordings are pioneering a new way of hearing piano roll performances, bringing history back to life through audio CDs. (See our website: [www.petersmidi.com](http://www.petersmidi.com))

## The roll reader

As shown below, the Phillips roll reader uses a combination of air and electronics to read the roll perforations.

The roll being recorded is placed in a spool box that is pressurised with air (around 3" WG). Each hole in the tracker bar is connected with a tube to a small pouch, which inflates when a hole in the roll allows air through to the underside of the pouch. A metal disc sits on each pouch, which when inflated lifts the disc, allowing a radio signal to pass through, turning on an electronic device. The rest of the electronics processes the information and produces the output data signal for recording into a computer.

During the development of the reader, I experimented with optical reading, as it seemed so much simpler than using the above arrangement. However I found too many inconsistencies occurred when rolls were "read" with optical sensors, in particular sensing the starting point of a roll perforation. Other problems were also encountered, sufficient to result in the development of the reader described above, the principles of which are shown below.



**Block diagram of the Phillips roll recording machine. The pouch mechanism acts as a pneumatic-electronic switch, in which there's no electrical contact between the disc and the fixed metal plate.**

## The future

A new roll reader able to record all types of rolls is now in development. This new reader has a higher level of sophistication, making it easier to use. We anticipate having more erolls available in 2011, with the first batch being of Ampico erolls, then later Duo-Art erolls. It is hoped to also produce Welte and possibly Hupfeld erolls.

We believe the future of piano roll music lies in MIDI files. We also know it is essential to do the conversion from paper to electronic media in a way that preserves every detail of the original roll. After all, many of the artists who recorded on reproducing piano rolls were of an exceptionally high standard, with some now regarded as legendary.

## Contact address

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