PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

INVENTOR(S)

Given NameFamily Name or Surname Residence

Benjamin Errol Pritchard Kent, Ohio

TITLE OF THE INVENTION (500 characters max):

A novel method for real-time remapping of Musical Instrument Digital Interface (MIDI) messages to facilitate symmetrically-inverted playing on a digital piano keyboard

CORRESPONDENCE ADDRESS

Direct all correspondence to:

___ The address corresponding to Customer Number: _____

OR

X Firm or Individual Name: Kundalini Software and Systems Integration, LLC

Address: 1671 Franklin Ave

City: Kent

State: Ohio
Zip: 44240

Country: United States (US)

Telephone: 330-603-7387

Email: benjamin.pritchard@kundalinisoftware.com

ENCLOSED APPLICATION PARTS (check all that apply)

___ Application Data Sheet. See 37 CFR 1.76___ CD(s), Number of CDs _____

_X__Drawing(s) Number of Sheets _7_____ ___ Other (specify): _____

_X__ Specification (e.g. description of the invention) Number of Pages _4_____

METHOD OF PAYMENT OF THE FILING FEE AND APPLICATION SIZE FEE FOR THIS PROVISIONAL APPLICATION FOR PATENT

__X__ Applicant claims small entity status. See 37 CFR 1.27. **TOTAL FEE AMOUNT ($)**

_____ A check or money order made payable to the *Director of the United States Patent and Trademark Office* is enclosed to cover the filing fee and application size fee (if applicable) **$130**

_____ Payment by credit card. Form PTO-2038 is attached.

_____ The Director is hereby authorized to charge the filing fee and application size fee (if applicable) or credit any overpayment to Deposit Account Number: _____.

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PROVISIONAL APPLICATION COVER SHEET

PTO/SB/16 (12-08) Approved for use through 06/30/2010. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

X No.

___ Yes, the name of the U.S. Government agency and the Government contract number are: _____

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

SIGNATURE _____ Date March 24, 2019

TYPED or PRINTED NAME Benjamin Errol Pritchard REGISTRATION NO. _____
(if applicable)

TELEPHONE 330-603-7387 Docket Number: _____

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PROVISIONAL PATENT APPLICATION

Invention Type

This invention is an invention of the following type(s):
* Software
* Method or Process

Invention Title

The title of the invention is: **A novel method for real-time remapping of Musical Instrument Digital Interface (MIDI) messages to facilitate symmetrically-inverted playing on a digital piano keyboard**

Background

https://www.kundalinisoftware.com/kundalini-piano-mirror/

Invention Summary

This method remaps MIDI messages such that symmetrically inverted keyboard playing creates aesthetically pleasing musical outcomes.

Specifically, three remapping modes are described, referred to as "**Left Hand Ascending Mode**", "**Right Hand Descending Mode**", and "**Mirror Image Mode**", all three of which are implemented in the software program described in this document.

These modes are described in more detail below.

Invention Description

The method for remapping MIDI messages described in this provisional patent application facilitates producing aesthetically-pleasing musical outcomes while playing a digital piano using symmetrically inverted playing in either one or both hands.

Figure 1 provides an illustration of the symmetry of a piano keyboard about middle D.

Historically, concert pianists have practiced passages originally intended for one hand in the opposite hand in symmetrical inversion: each original note becomes its mirror image in the other hand, as illustrated in **Figure 2**.

However, on a piano with standard tuning, this inversion -- while very beneficial to development of equal dexterity in both hands -- produces pitches which are non-harmonic.

With the advent of digital pianos, it is possible to more readily manipulate which pitches are produced from which physical piano keys, and thus produce more aesthetically-pleasing musical outcomes when symmetrical inversion is used.

Normally, the pitch produced by the synthesizer inside a digital piano corresponds in pitch to that which would be produced by an acoustic piano using standard (equal temperament) tuning.

However, this type of arrangement is not the only thing that is possible.

An interesting feature of digital pianos is that they often feature a "local off" mode. In this mode of operation, no sound at all is produced via the keyboard's internal synthesizer when a key is pressed. However, digital (MIDI) messages are still sent via the standard MIDI-out port to a connected device, per normal.

Additionally, even while in local off mode, the digital piano will still produce sounds using its internal synthesizer for any incoming MIDI messages.

The methods for remapping MIDI messages described herein are implemented in the form of computer programs for the Android and Microsoft Windows platform.

The software is designed to listen to incoming MIDI messages produced by a connected digital piano, remap them, and to finally send the resultant remapped MIDI messages back to the digital piano for production of sound.

Specifically, three remapping modes exist, which are referred to as "**Left Hand Ascending Mode**", "**Right Hand Descending Mode**", and "**Mirror Image Mode.**" All three modes are implemented in the software program described in this document; these modes will be described in more detail below.

Figure 3 shows a musical example using a form of notation called symmetrically-inverted notation. In this notational form, one clef (the left-hand part in this particular example) is written in standard notation; this clef specifies which pitches will be produced by playing this passage. Additionally, the other clef (the right-hand part in this particular example) shows the symmetrically inverted form, which is to be played by the other hand.

By utilizing the methods described, passages inverted in one or both hands will result in pitches being produced per the (non-symmetrically-inverted) original passage.

Specifically, these methods makes it possible to either mirror left-handed passages into the right hand, mirror right-handed passages into the left hand, or to completely reverse the keyboard such that the left hand plays the original right-hand part in mirror image, while the left hand simultaneously plays the original right-hand part in mirror image.

As mentioned, these three remapping types are referred to as "**Left Hand Ascending Mode**", "**Right Hand Descending Mode**", and "**Mirror Image Mode**".

Left Hand Descending Mode is designed to practice right hand passages using the left hand, while simultaneously playing the original right hand part with the right hand, such that the right hand guides the left hand naturally.

Normally, when we play a standard piano, as our left hand moves further down (to the left) on the piano, we hear lower notes. Left Hand Descending Mode, on the other hand, changes this behavior. This mode splits the piano into two halves, separated at what is called the keyboard split point.

Any note above (to the right of) the split point is not changed. Any note below (to the left of) the split point is remapped to correspond to the note an equal interval distance above (to the right of) middle d.

Figure 4 shows an example of using Left Hand Ascending Mode to practice an original right handed passage using the left hand.

Right Hand Descending Mode is similar to Left Hand Ascending Mode, but is the inverse.

Right Hand Descending Mode is designed to practice left hand passages using the right hand, while simultaneously playing the original left hand part *with* the left hand, such that the left hand guides the right hand naturally.

Normally, when we play a standard piano, as our right hand moves further up (to the right) on the piano, we hear higher notes. **Right Hand Descending Mode**, on the other hand, changes this behavior. This mode also splits the piano into two halves, again separated at what is called the **keyboard split point,** and which again always defaults to middle D.

Any note **below** (to the left of) the split point is not changed. Any note above (to the right of) the split point is remapped to correspond to the note an equal interval distance below (to the left of) the split point.

Figure 5 shows an example of using Right Hand Descending Mode to practice an original left handed passage using the right hand.

Finally, **Mirror Image Mode** is designed create what could be called a left-handed piano. In this mode, the entire keyboard is inverted, such that low notes start on the extreme right, and become higher all the way to the extreme left.

In this configuration, it is possible to play the mirror image of the original right-hand part with the left hand, while simultaneously playing the mirror image of the original left-hand part with the right hand.

Figure 6 shows an excerpt from a passage from Mozart's Rondo for Piano and Orchestra in D major, K. 382, while **Figure 7** shows it notated with both clefs in symmetrical notation – the complete mirror image of what Mozart originally wrote.

This passage illustrates the utility of Mirror Image Mode to practice the passage completely symmetrically inverted – playing the original left hand part with the right hand in mirror image, while simultaneously playing the original right hand part with the left hand in mirror image.

Using the method of remapping outlined in this document, all three modes produce aesthetically pleasing outcomes – identical to the way a standard piano would sound when playing the piece as originally written.

Other Uses or Applications for This Invention

In addition to being of use to only pianists, the remapping approach described can be useful to anyone interested in utilizing a digital keyboard to work towards ambidexterity, development of the non-dominant hemisphere of their brain, and increased inter-hemispheric coordination.

Figure: 1

A piano keyboard is symmetrical about Middle D

Original Note:	Becomes when symmetrically inverted:
D	D
C#	D#
C	E
B	F
A#	F#
A	G
G#	G#
G	A
F#	B ♭
F	B
E	C
D#	C#

Figure: 2

The table showing the correspondences for each semitone

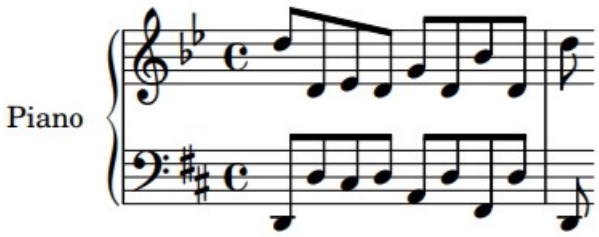

Figure: 3

Example of Symmetrically-Inverted Notation

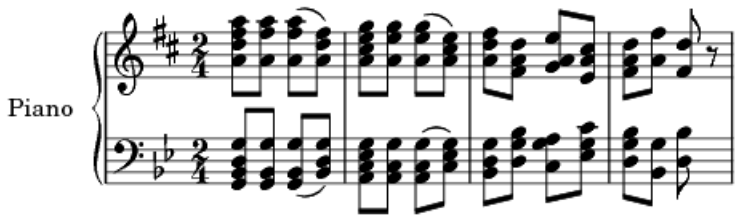

Figure: 4
Example of Left Hand Ascending Mode

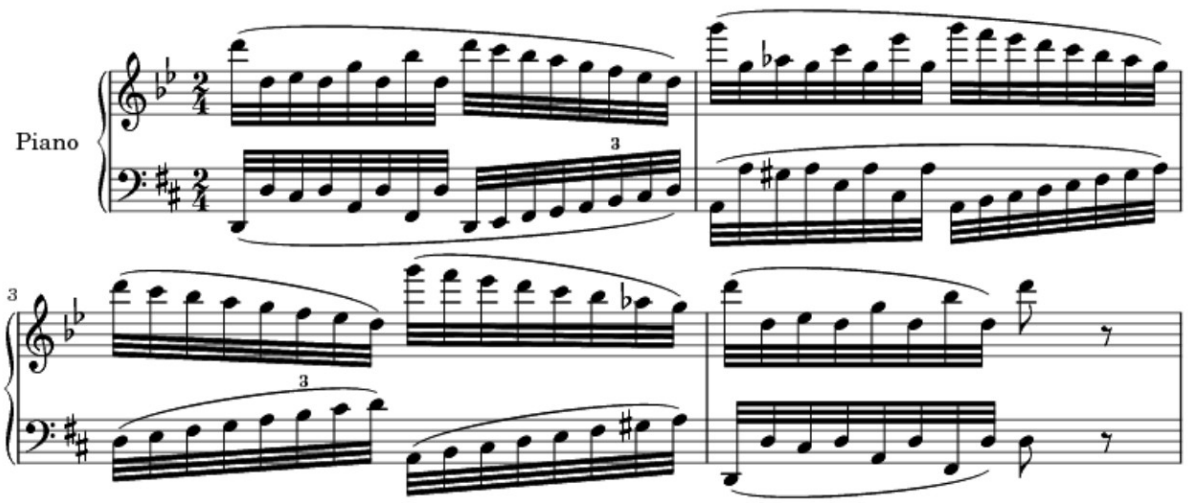

Figure: 5
Example of Right Hand Descending Mode

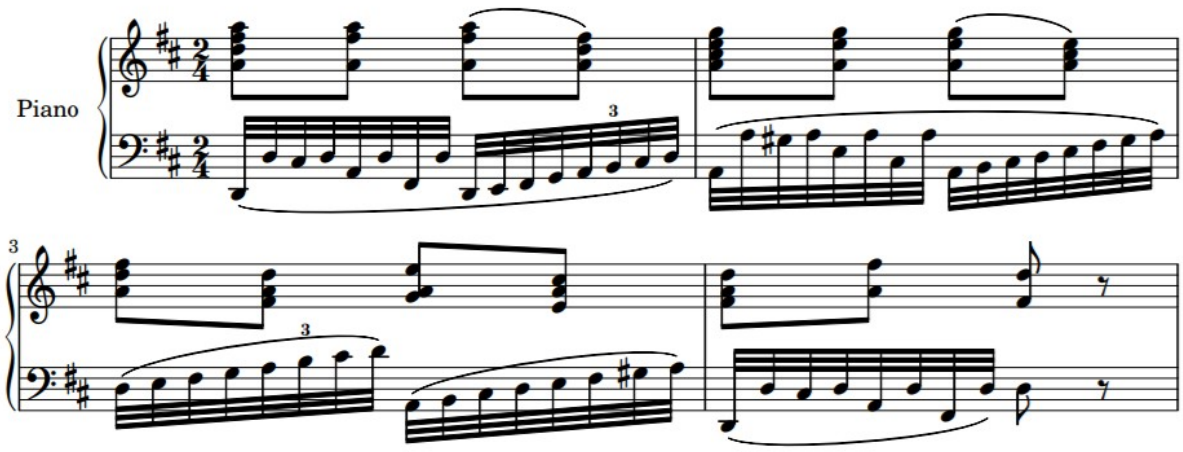

Figure: 6
Mozart Rondo for Piano and Orchestra in D major, K. 382

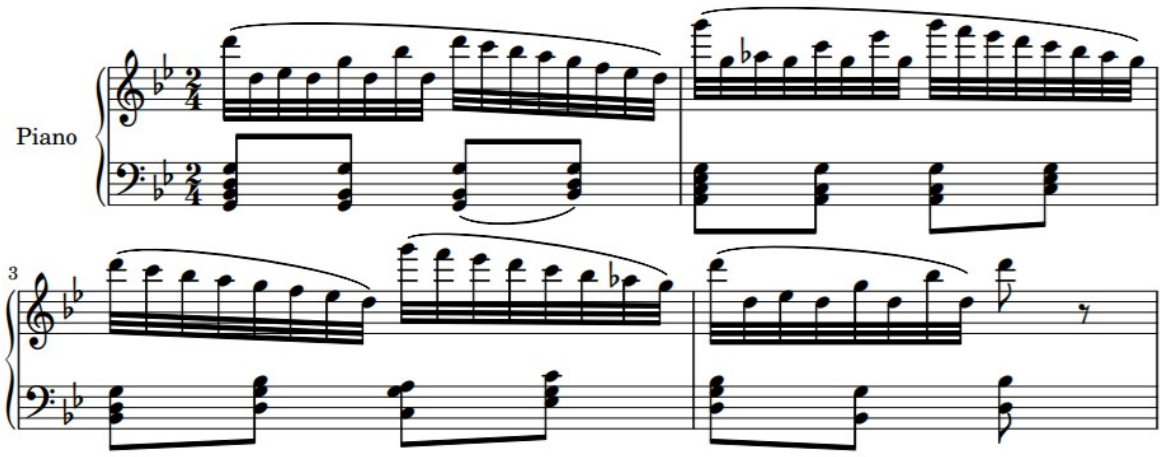

Figure: 7
Mozart Rondo for Piano and Orchestra in D major, K. 382 (symmetrical inversion)