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| APPLICATION NUMBER | FILING or 371(c) DATE | GRP ART UNIT | FIL FEE REC'D | ATTY.DOCKET.NO | TOT CLAIMS | IND CLAIMS |
|---|---|---|---|---|---|---|
| 61/794,891 | 03/15/2013 | | 250 | WYAT-0002.A | | |

**CONFIRMATION NO. 5395**

**FILING RECEIPT**

41066
MURABITO, HAO & BARNES LLP
TWO NORTH MARKET STREET
THIRD FLOOR
SAN JOSE, CA 95113

*OC000000060589297*

Date Mailed: 04/26/2013

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**Inventor(s)**

David Wyatt, San Jose, CA;

**Applicant(s)**

David Wyatt, San Jose, CA;

**Power of Attorney:**
Furqan Nanji--64405

**If Required, Foreign Filing License Granted:** 04/19/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/794,891**

**Projected Publication Date:** None, application is not eligible for pre-grant publication

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

MULTI-FUNCTIONAL CREDIT CARD DEVICE

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:**

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Doc Code: **TR.PROV**
Document Description: Provisional Cover Sheet (SB16)

PTO/SB/16 (11-08)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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## 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)

Inventor 1 Remove

| Given Name | Middle Name | Family Name | City | State | Country |
|---|---|---|---|---|---|
| David | | Wyatt | San Jose | CA | US |

All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

| | |
|---|---|
| **Title of Invention** | MULTI-FUNCTIONAL CREDIT CARD DEVICE |
| Attorney Docket Number (if applicable) | WYAT-0002.A |

### Correspondence Address

Direct all correspondence to (select one):

| | |
|---|---|
| ◉ The address corresponding to Customer Number | ◯ Firm or Individual Name |
| Customer Number | 41066 |

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

◉ No.

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## Entity Status

Applicant claims small entity status under 37 CFR 1.27

- ○ Yes, applicant qualifies for small entity status under 37 CFR 1.27
- ◉ No

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## Signature

Please see 37 CFR 1.4(d) for the form of the signature.

| | | | | | |
|---|---|---|---|---|---|
| Signature | /Furqan A. Nanji/ | | | Date (YYYY-MM-DD) | 2013-03-15 |
| First Name | Furqan | Last Name | Nanji | Registration Number (If appropriate) | 64405 |

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UNITED STATES PROVISIONAL PATENT APPLICATION

FOR

# MULTI-FUNCTIONAL CREDIT CARD DEVICE

Inventor:

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Prepared by:
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San Jose, California 95113

WYAT.P0002.A

MULTI-FUNCTIONAL CREDIT CARD DEVICE

## FIELD OF THE INVENTION

**[0001]** Embodiments according to the present invention generally relate to credit cards and, more specifically, to more secure, smarter credit cards.

## BACKGROUND OF THE INVENTION

**[0002]** There are a few different types of credit card available in the marketplace presently. The first type of credit card is a conventional standard piece of plastic with a magnetic strip, which is widely available and used commercially at present. The advantage of this first type of credit card is that the entire credit card infrastructure is built around this type of card and it works in various vendors' credit card machines, ATMs and anywhere else that supports the present credit card infrastructure.

**[0003]** Another type of credit card employs a smart chip. These types of credit cards have a built in micro-processor with cryptographic capabilities. These micro-processors operate similar to chips in a cell phone comprising a cryptographic processor. They require contact with a reader in order to be read. The reader provides the way for a facility to interact with the built-in processor on the card, e.g., for purposes of performing verification on the authenticity of the card or making a direct deposit on the card. These credit cards also comprise a magnetic strip so that they can be compatible with standard plastic credit cards that are widely used.

**[0004]** One type of credit card in circulation employs radio frequency ("RF") identification where there is a near field radio frequency. These cards essentially have a low power RF antenna built into the card and when the cardholder passes the antenna in front of a reader comprising an RF field, there is enough power generated and reduced for the processor to interact wirelessly with the receiving device.

**[0005]** The problem with all these types of credit cards presently available in the marketplace is that they can all be susceptible to theft in some way and, therefore, are not very secure. Further, cards employing smart chips and RF technology are not in wide use because the credit card infrastructure still predominantly supports the traditional plastic credit cards.

**[0006]** **BRIEF DESCRIPTION OF THE DRAWINGS**

**[0007]** Embodiments of the present invention are illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings and in which like reference numerals refer to similar elements.

**[0008]** Figure 1 is a block diagram illustrating the data flow between the magnetic coils on the credit card and the microprocessor on the credit card according to one embodiment of the present invention.

**DETAILED DESCRIPTION OF THE INVENTION**

**[0009]** Reference will now be made in detail to the various embodiments of the present disclosure, examples of which are illustrated in the accompanying drawings.

While described in conjunction with these embodiments, it will be understood that they are not intended to limit the disclosure to these embodiments. On the contrary, the disclosure is intended to cover alternatives, modifications and equivalents, which may be included within the spirit and scope of the disclosure as defined by the appended claims. Furthermore, in the following detailed description of the present disclosure, numerous specific details are set forth in order to provide a thorough understanding of the present disclosure. However, it will be understood that the present disclosure may be practiced without these specific details. In other instances, well-known methods, procedures, components, and circuits have not been described in detail so as not to unnecessarily obscure aspects of the present disclosure.

**[0010]** In one embodiment of the present invention, a credit card comprises a dynamic magnetic strip incorporating a main inductor assembly from which magnetic field data symbols are dynamically generated. In one embodiment the inductor assembly may be a planar coil formed within the plastic that the credit card is composed with. The advantage of using a planar coil is that it can produce the same magnetic field interaction that a traditional magnetic strip on a conventional credit card can produce when it is passed through a reader. Similar to a traditional plastic credit card, the planar coil can also produce a magnetic field that can be read by a pickup (or "transducer"). The pickup produces electric current in the coil that, in turn, produces a magnetic field that is read by the pickup. Accordingly, the planar coil can be read in the same way as the magnetic strip on a traditional plastic credit card. The magnetic field produced by the planar coil would behave identically to a traditional magnetic strip.

**[0011]** In one embodiment, alongside the main planar coil, auxiliary rate detection assembly independent of the main inductor assembly would be provided to assist with the alignment of the production of data from the loop as it is being passed over the head of the credit card reader. The reader module of a traditional credit card reader comprises a metal head with a small gap on the tip of the head. This gap is where the pickup armature resides, so that when the metal head passes over the credit card strip, an electric field is induced in the head reader pickup circuit. In one embodiment the auxiliary rate detection assembly is constructed of an array of auxiliary inductor coils and magnetic pickup coils, alongside the main coil. As the metal head of the card reader assembly passes over the arrangement of auxiliary coils and pickup circuits, a disturbance in the magnetic field flowing between the two generates a electrical current change that is detected by a rate detection circuit so as to detect the rate of motion of the card reader head passing across the surface of the card and therefore along the main induction assembly. The purpose of this is to allow the determination of the rate or production of magnetic data symbols in the main inductor assembly to align with the rate at which data is being read by the reader, according to the data density of standard card magnetic strips. Accordingly, it is irrelevant if the credit card of the present invention is being swiped fast or slow, the main inductor assembly produces data at just the right rate depending on the rate at which the card is detected it is being passed over the reader's head.

**[0012]** In one embodiment, a microprocessor is connected to the main coil and the alignment pickups. The microprocessor is responsible for producing the data from the coil at the appropriate rate in accordance with the speed with which the card is swiped through the reader. As shown in Figure 1, the auxiliary coil detects the rate at

which the credit card is being swiped. The microprocessor then uses this information to produce the data from the main planar coil at the appropriate rate for the credit card reader.

**[0013]** In addition, the credit card of the present invention comprises a real time clock that can produce a cryptographically worthy timestamp for each interaction and a battery back-up that can be used to power up the microprocessor. Further, the card can comprise additional human inputs, e.g., touch sensors which can be formed by contacts that a user can press. For example, there can be contacts that a user can press to wake up the card, to cause the battery to supply power, or to put the card to sleep when it is not being used. There can also be additional inputs to key in customer specific information. For example, there can be inputs to key in a password or any other kind of unique identifier. If any other number besides the password is entered multiple times, or if there is attempted usage of the card without entering in a password, an automatic phone call may be triggered to the appropriate fraud protection authorities.

**[0014]** In one embodiment, the number on the front of the card can be a full or partial number. The number may not have to necessarily be a static number. For example, the first four and last four digits of the card number can be fixed while the remaining eight can be dynamically generated. As the credit card is read by the machine, part or all of the number may be dynamically produced at the time the card is read. The dynamic part of the number generated may be based on the user's private information, the user's bank information, the time of day or the facility that is reading the card. Further, the expiration date of the card can also be dynamically

generated. Effectively, a credit card can be created that has no fixed number and therefore cannot be stolen. Only the number generated at the instant the card is being used matters. Accordingly, unauthorized use of the card is nearly impossible because no transaction can be conducted with only the partial static part of the credit card number. In one embodiment of the present invention, enough dynamically generated numbers are provided for on the credit card such that a unique credit card number can be generated for each transaction. In this embodiment, the credit card of the present invention effectively acts as a unique per transaction credit card.

**[0015]** In embodiments of the present invention comprising dynamically created credit card numbers, a single credit card can be used for multiple banks. For example, instead of carrying a separate credit card for all the different credit card companies, a customer would only need to carry a single card and one of the inputs on the front of the card can be used to select the appropriate bank or credit provider.

**[0016]** In one embodiment of the present invention, a thin film liquid crystal display ("LCD") can be fitted on the card so the credit card can have a display screen. The display can have multiple uses. In one embodiment, the display can be used to ask the user a security question if an improper password is entered. Or if the fraud protection services need to contact a customer, they can verify the customer's identity by transmitting a security question to the user's credit card screen to which the user would then need to respond correctly using the input buttons on the card.

**[0017]** In one embodiment, the credit card of the present invention could also be used to make online purchases. In this embodiment, the card could use RFID or near

field technology so that it can connect to a personal computer and be used to uniquely generate a credit card number for online purchases. The number could also, in one embodiment, be displayed on the front LCD of the card. In one embodiment, the card may also be equipped with a means for communicating with the USB port on the computer in connection with making the online purchases.

**[0018]** The foregoing description, for purpose of explanation, has been described with reference to specific embodiments. However, the illustrative discussions above are not intended to be exhaustive or to limit the invention to the precise forms disclosed. Many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as may be suited to the particular use contemplated.

**[0019]** Embodiments according to the invention are thus described. While the present disclosure has been described in particular embodiments, it should be appreciated that the invention should not be construed as limited by such embodiments, but rather construed according to the below claims.

CLAIMS

What is claimed is:

1. An apparatus for conducting credit transactions comprising:

a device with the similar dimensions and thickness to a standard credit card

an inductor assembly integrated into said device capable of generating a programmed magnetic field at a location on the device where it will come into proximity to a standard credit card magnetic-strip reader

the inductor assembly being operable to be read by a magnetic pickup of an electronic credit card reader;

at least one auxiliary rate detection units adjacent to said inductor assembly, wherein said at least one auxiliary detection unit is operable to detect a rate at which said device, including said inductor assembly, is passed through said electronic credit card reader; and

a microprocessor operatively coupled to said inductor assembly and said at least one detection unit, wherein said microprocessor is operable to simulate magnetic-strip data fields using the inductor assembly, at a rate determined from said auxiliary detection units.

2. A method of Claim 1, wherein the inductor assembly is a planar coil which is a looped inductor with dimension roughly equal to, and along the axis of, the standard credit-card magnetic strip

3. A method of Claim 1, wherein said detection assembly consists of a plurality of motion rate detection units, which may comprise inductor coils and companion magnetic-field pickup coils, each of which is able to detect the proximity of metallic objects, such as magnetic-strip reader heads, passing

through the magnetic field created by said inductor and detected by said pickup coil.

4. A method of Claim 1, wherein said device may incorporate a plurality of touch sensors arranged along the surface of said device which may;

allow user input of information,

allow introducing a transaction specific identifier,

to confirm/deny transaction information,

to operate in sequence, or with a gesture across said sensor for the purpose lock/unlock or control access for transactions

5. A method of Claim 4, wherein said device contains a real-time clock or counter unit which generates a sequential parameter when the card is read by said credit card reader, and which along with certain user information, transaction identifiers, user secrets, credit card authority secrets is combined to generate a limited-use credit card number, which has a limited recurrence, is limited in scope of use to a predetermined number of authorized transactions

6. A method of Claim 5, wherein the time, sequence, user, credit card authority and other information is similarly combined by credit card processing facility to generate a credit card number for comparison to the number transmitted by the credit card reader, for the purposes of authenticating said number is from a recognized card used in a user-authorized transaction

7. A method of Claim 1, wherein said device incorporates a display allowing credit card number, time, passcodes, sequence codes, amounts and other credit card transaction information to be displayed for user, merchant, bank or credit card authority

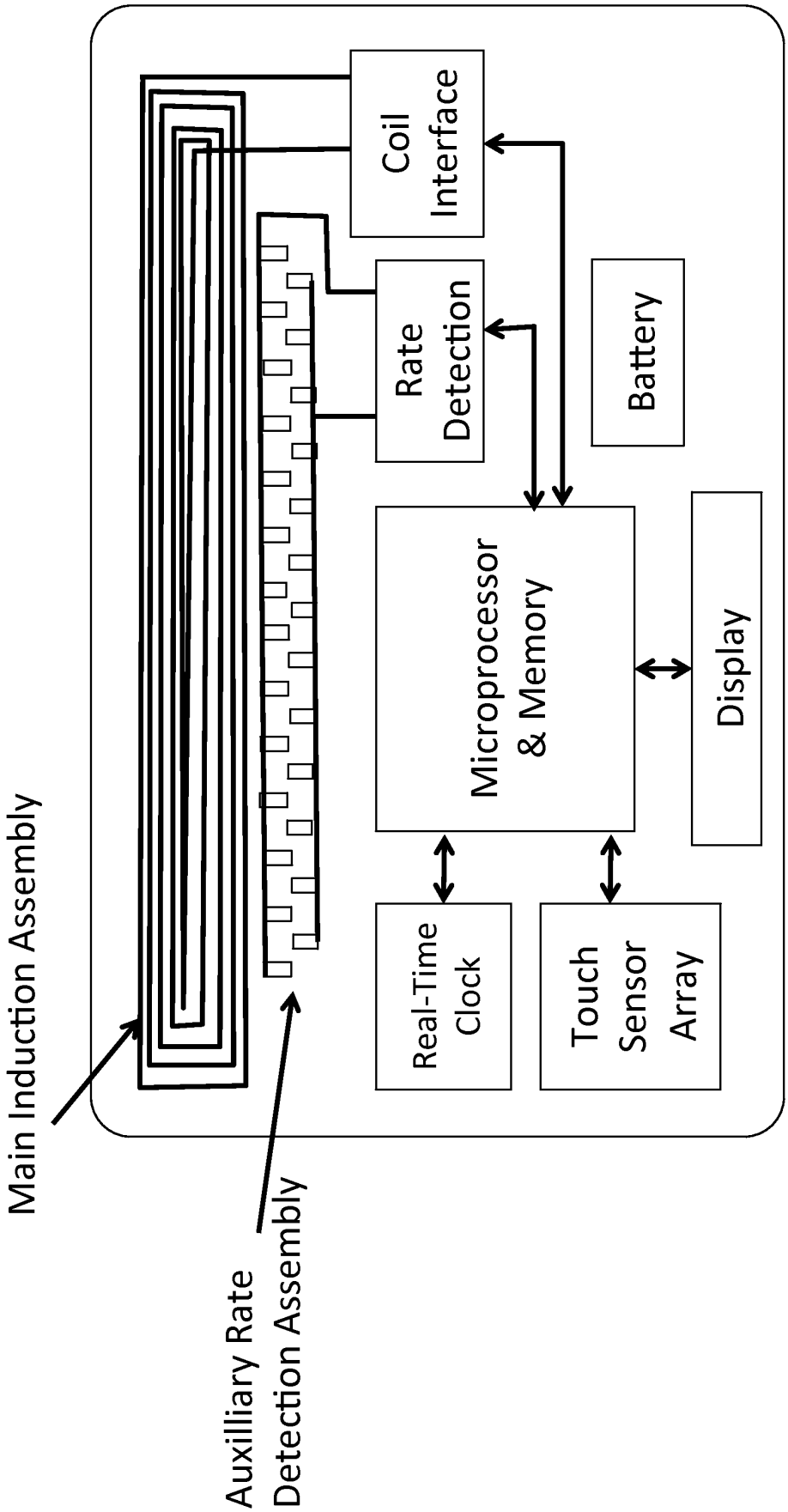
8. An Apparatus for conducting credit transactions comprising,

wherein the edge of said device contains a connector for connection to standard computing devices such as a USB interface.

MULTI-FUNCTIONAL CREDIT CARD DEVICE

**ABSTRACT OF THE DISCLOSURE**

Described within is a credit-card replacement apparatus, and methods for constructing a device for the purpose of emulating a standard credit card. A system is described to allow said device to emulate behavior of a credit card when used in electronic credit card readers. Additionally methods are described to allow user control of said device for the purpose of authorizing or controlling use of said device in the application of credit, debit and cash transactions. Methods are also described for the application of processing capability within said device, and said user control of said device, to generate a one-time credit card number when read by said card readers for the purposes creating a limited-use credit card number, limited in scope of use to a predetermined number of authorized transactions. Furthermore said device may interact with other similar devices in proximity for the purpose of funds or credit/debit transfers.


Main Induction Assembly
Auxilliary Rate Detection Assembly
Coil Interface
Rate Detection
Battery
Microprocessor & Memory
Display
Real-Time Clock
Touch Sensor Array

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | |
| **Filing Date:** | |
| **Title of Invention:** | MULTI-FUNCTIONAL CREDIT CARD DEVICE |
| **First Named Inventor/Applicant Name:** | David Wyatt |
| **Filer:** | Furqan Ahmed Nanji/Tina Mai |
| **Attorney Docket Number:** | WYAT-0002.A |

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## Provisional Filing Fees

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| Provisional Application Filing | 1005 | 1 | 250 | 250 |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| **Post-Allowance-and-Post-Issuance:** | | | | |
| **Extension-of-Time:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Miscellaneous:** | | | | |
| | | | **Total in USD ($)** | **250** |

# Electronic Acknowledgement Receipt

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| **EFS ID:** | 15266288 |
| **Application Number:** | 61794891 |
| **International Application Number:** | |
| **Confirmation Number:** | 5395 |
| **Title of Invention:** | MULTI-FUNCTIONAL CREDIT CARD DEVICE |
| **First Named Inventor/Applicant Name:** | David Wyatt |
| **Customer Number:** | 41066 |
| **Filer:** | Furqan Ahmed Nanji/Tina Mai |
| **Filer Authorized By:** | Furqan Ahmed Nanji |
| **Attorney Docket Number:** | WYAT-0002.A |
| **Receipt Date:** | 15-MAR-2013 |
| **Filing Date:** | |
| **Time Stamp:** | 18:29:21 |
| **Application Type:** | Provisional |

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| Submitted with Payment | yes |
| Payment Type | Electronic Funds Transfer |
| Payment was successfully received in RAM | $250 |
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| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
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| 1 | Provisional Cover Sheet (SB16) | WYAT-0002A_PRO_COVER_SHEET_03-15-2013.pdf | 2071593<br>3456d034ac1b8582c8ced0c74a5dad349a08c986 | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | | WYAT-0002A_NEW_PRO_APP_FILED_03-15-2013.pdf | 107917<br>40e74c139d4cdb0ff8096a0c15044e7c31e9ed1d | yes | 12 |
| | **Multipart Description/PDF files in .zip description** | | | | |
| | **Document Description** | | **Start** | **End** | |
| | Specification | | 1 | 8 | |
| | Claims | | 9 | 11 | |
| | Abstract | | 12 | 12 | |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Drawings-only black and white line drawings | WYAT-0002A_NEW_PRO_Figs_FILED_03-15-2013.pdf | 23328<br>c537d3c7f13ae486a0c32e4fbb0c58b55c9b9c29 | no | 1 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 4 | Fee Worksheet (SB06) | fee-info.pdf | 29389<br>22dbca9d57d5780a1a0618de43eb3966b3392353 | no | 2 |
| **Warnings:** | | | | | |
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| | | **Total Files Size (in bytes):** | 2232227 | | |

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